

Alabama Minimum Specifications for School Buses 2009



Alabama Department of Education
Division of Administrative and Financial Services
Pupil Transportation Section
Montgomery, Alabama
334-242-9730

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State Superintendent of Education
Effective as of April 1, 2008

**Alabama Minimum Specifications for School Buses 2009
Changes Document**

Changes to the Alabama Minimum Specifications for School Buses 2008 occur on the following pages and headings. All changes appear in italics with the exception of deletions. For noted deletions refer to the 2008 specifications for comparison.

NOTE: Page numbers in 2008 specs and 2009 specs may not coincide.

Page	Section	General Description of Change
<i>1</i>	<i>Bid Requirements</i>	<i>New statement # 4 evaporator placement.</i>
<i>14</i>	<i>School Bus Body- A/C Standards</i>	<i>New language refers to evaporator placement in all buses.</i>
<i>14</i>	<i>A/C Standards</i>	<i>New language # 3 light transmission for windows.</i>
<i>16</i>	<i>Color</i>	<i>New language # 3 white roof now standard.</i>
<i>20</i>	<i>First Aid Kit</i>	<i>#2A requires metal box, eliminates strap type fasteners.</i>
<i>21</i>	<i>Body Fluid Kit</i>	<i>#3 requires metal box, eliminates strap type fasteners.</i>
<i>25</i>	<i>Lamps and Signals</i>	<i>New language Item # 3 requires LED lighting on all lamps except front chassis lamps- eight way flashers to be strobing type.</i>
<i>30</i>	<i>Seat Belt - Driver</i>	<i>New language # 2 requires two seat belt cutters.</i>
<i>30</i>	<i>Seat Belt - Driver</i>	<i>New language # 3 requires audible alert and flashing light if drivers seatbelt is not fastened.</i>
<i>30</i>	<i>Seats and Crash Barriers</i>	<i>New language requires lap/shoulder belts on all buses 14,500 lbs GVWR and under.</i>
<i>32</i>	<i>Step Tread</i>	<i>New language # 2 allows polymer or metal backing on step tread.</i>
<i>35</i>	<i>Video Surveillance Equipment</i>	<i>New language requires digital video equipment if used and clarifies lens placement</i>
<i>36</i>	<i>Windshield and Windows</i>	<i>New language # 6 requires tinted windows and outlines light transmission requirements.</i>
<i>45</i>	<i>Restraining Devices</i>	<i>New language requires lap/shoulder belts if used on special needs buses.</i>
<i>50</i>	<i>Support Equipment</i>	<i>New language requires two belt cutters.</i>
<i>55</i>	<i>Disposal of Buses</i>	<i>Procedures for disposal of used school buses.</i>



INTRODUCTION

Alabama law (32-5-8) requires the Alabama State Board of Education to adopt minimum standards to govern the specifications for all new school buses and the overall operation of all school buses in the state of Alabama. This responsibility also extends to the inspection of school buses being sold and operated in the state of Alabama. The primary reason for the development of specifications and the inspection of school buses is to enhance the safety of our school buses. We must ensure that Alabama school buses continue to provide the safest ride available for our most precious cargo—our children.

A heartfelt thanks is extended to each member of the Alabama State Department of Education School Bus Specifications Committee for their service, hard work, and dedication to the task. School bus specifications always begin as a product of many individual thoughts and ideas. However, they culminate in standards, which help assure the safest school buses possible for Alabama's students as well as vehicles, which provide a true value for Alabama's taxpayers.

Additionally, special thanks must also be voiced for Alabama's school bus dealers and the many manufacturers and vendors in the school bus industry who assist in the Committee in the development of this document. Without their participation, the specifications process would be significantly weakened.

The 2009 Minimum Specifications for Alabama School Buses become effective on April 1, 2008. If you have questions or recommendations regarding any of the specifications in this document, please contact Mr. Greg Ray, Specifications Committee Chairperson or any member of the members of the committee members listed on the following page.

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The Alabama Minimum Specifications for School Buses can also be found on the Alabama State Department of Education website at www.alsde.edu. Look under “Sections” for Pupil Transportation, then “Publications”.

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ALABAMA
SCHOOL BUS INSPECTION
HANDBOOK



PREPARED BY
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TRANSPORTATION SECTION
MONTGOMERY, ALABAMA

The *Alabama School Bus Inspection Handbook* was developed by the Alabama State Department of Education (SDE) Pupil Transportation Section as a standard for school bus *safety* inspections at the local school system level. This handbook is provided as a guideline for local school system school bus inspectors, shop foremen, technicians, maintenance supervisors, and transportation directors in conducting the monthly inspections required by Alabama law and the Rules of the Alabama State Board of Education.

The goal of this handbook is to provide uniform standards for state and local school bus inspections. The manual also identifies the critical items to be inspected on Alabama school buses, how they are to be inspected, and which items should remove a school bus from service until the item is repaired (“out of service” items).

Copies of the handbook have been distributed to all local school systems.

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ALABAMA MINIMUM SPECIFICATIONS FOR SCHOOL BUSES
EFFECTIVE April 1, 2008

SECTION I - GENERAL PROVISIONS

Standards

1. All school buses ordered by local education agencies beginning **April 1, 2008**, shall (1) meet the applicable Federal Motor Vehicle Safety Standards (FMVSS), and (2) meet Alabama minimum specifications for school buses. In the event of a conflict between the requirements of an applicable Federal Motor Vehicle Safety Standard, as referred to in this section, and the Alabama minimum specifications, the requirements of the FMVSS shall control. **School buses not meeting minimum specifications will not be certified by the Alabama State Department of Education (SDE). Under unusual circumstances and with adequate justification, exceptions to these specifications may be granted by the SDE director of pupil transportation.**

Certification

2. All school bus manufacturers shall certify to the SDE, in the form of a **durable, legible** certification label mounted in the driver's compartment in the vehicle, that all school buses meet or exceed all standards as specified herein and are in compliance with the applicable FMVSS. All manufacturers shall certify to the State of Alabama and local education agencies that all components on school buses are new from bumper to bumper at time of delivery. All chassis and body information shall appear on this certification label.

Used School Buses

3. Used school buses purchased for use by a school system in Alabama shall meet all of the legal Federal and Alabama requirements for school buses that were in effect on the date the vehicle was manufactured.

Bid Requirements

4. In order to be in compliance with the State Bid Law, school bus purchases shall be by competitive bidding. Bid forms to the body manufacturer shall contain certain options required by the chassis manufacturer, which may result in changes in normal Gross Vehicle Weight Rating (GVWR) or alterations to the body. For special needs buses, the school bus body manufacturer shall submit floor plans which include dimensions at the time bid quotations are submitted showing:
 1. Location of the emergency door, emergency windows and roof hatches.
 2. Aisle and staging areas and seat spacing.

3. Track locations and/or wheelchair securement positions.
4. *Location of air conditioning evaporator(s) **for all buses** ordered with air conditioning.*
5. **Service Manual/Diagnostic Equipment**
Body and/or chassis suppliers, including integral (forward control) suppliers, shall provide each school district purchasing school buses with one complete set of the most current service manuals, as specified by the school system, available to include both body and chassis at no additional cost upon delivery of bus. Provisions for manuals and diagnostic equipment, including, but not limited to code books, software, and training, etc, shall be agreed upon during the pre-bid process. Diagnostic equipment cannot be used to determine low bidder.

6. **New Technology**

New technology not in the present specifications shall have prior written approval from the SDE School Bus Specifications Committee.

7. **School Bus Definitions**

School bus capacity is determined based on body size before modifications are made.

TYPE A: A Type A school bus is a conversion or body constructed upon a van-type or cutaway front-section vehicle with a left side driver's door designed for carrying more than 10 persons. This definition shall include two classifications: Type A-I with a GVWR of 10,000 or under; and Type A-II, with a GVWR over 10,000 pounds. All Type A buses shall have dual rear wheels. **Type A buses under 14,500 pounds GVWR shall have four-wheel disc brakes.**
Type A buses exceeding a GVWR of 14,500 pounds shall have air brakes.

TYPE B: A Type B school bus is a conversion or body constructed and installed upon a van or front-section vehicle chassis, or stripped chassis, with a GVWR of more than 10,000 pounds and designed for carrying more than 10 persons. Part of the engine is beneath and/or behind the windshield and beside the driver's seat. The entrance door is behind the front wheels. All Type B buses 14,500 pounds or under shall have four-wheel disc brakes.

TYPE C: A Type C school bus is a body installed upon a flat back cowl chassis with a GVWR of more than 10,000 pounds and designed for carrying more than 10 persons. The entire engine is in front of the windshield and the entrance door is behind the front wheels.
Type C buses may not exceed 72-passenger capacity without prior, written SDE approval.

TYPE C1 A Type C1 school bus is a body installed upon a flat back cowl chassis with a GVWR of more than 10,000 pounds and a maximum of 19,000 pounds and designed for carrying a maximum of 36 persons. This is a special category of a Type C school bus designed to be an alternate to a Type A1, Type A2. **This bus shall not exceed a maximum capacity of 36 persons.**

TYPE D: A Type D school bus is a body installed upon a chassis, with the engine mounted in the front, midship, or rear, with a gross vehicle weight rating of more than 10,000 pounds and designed for carrying more than 10 persons. The engine may be behind the windshield and beside the driver's seat, at the rear of the bus, behind the rear wheels, or midship between the front and rear axles. The entrance door is ahead of the front wheels.

Type D buses may not exceed 84-passenger capacity without prior, written SDE approval.

SECTION II - SCHOOL BUS CHASSIS STANDARDS

Air Cleaner

1. The engine intake air cleaner shall be furnished and properly installed by the chassis manufacturer to meet engine specifications.

The intake air system for diesel engines shall have an air cleaner restriction indicator properly installed by the chassis manufacturer to meet engine specifications.

Axles

1. The front and rear axles and suspension systems shall have a gross axle weight rating (GAWR) at ground commensurate with the respective front and rear weight loads of the bus loaded to the rated passenger capacity.
2. Vehicle minimum axle capacities at ground when loaded shall meet the body manufacturer's GVWR specified by the FMVSS. Axle assemblies shall have minimum capacities at ground as shown on the chart on the last page of this booklet.
3. Front wheel bearings must be oil filled on all Type C and D buses.

Brakes

1. A braking system, including service brake and parking brake, shall be provided and shall comply with all CDL pretrip inspection requirements. All Type A-1 and A-II school buses below 14,500 pounds GVWR shall be built to manufacturer's specifications. Type C-1 school buses between 10,000 pounds GVWR and 19,000 pounds GVWR are exempt from air brake requirements, but shall have four-wheel disc brakes.
2. Buses using air in the operation of the brake system shall be equipped with warning signals located within the interior of the driver compartment and clearly audible and

visible to the driver, that will give a continuous warning when the air pressure available in the system for braking is 60 psi (pounds per square inch) or less. An air pressure gauge shall be provided in the instrument panel capable of complying with CDL pretrip inspection requirements.

3. Antilock brake systems for either air or hydraulic brakes shall include control of all axles in compliance with FMVSS 105 or 121.
 - A. Air brakes shall be installed on **all** chassis exceeding 14,500 pounds GVWR. **Exception:** Type C-1 school buses between 10,000 pounds GVWR and 19,000 pounds GVWR are exempt from air brake requirements, but shall have four-wheel disc brakes.

All air-operated brake systems shall:

- (1) Meet all Federal Motor Vehicle Safety Standards (FMVSS) for air brakes.
 - (2) Be S-cam type brakes on all wheels. The camshaft, when applying brakes, shall rotate in the same direction as the wheels. Automatic slack adjusters shall be the same design on all wheels. Dust covers shall be installed on all wheels unless deleted through local option at the time of the bid.
 - (3) Have at least a 12 CFM air compressor.
 - (4) Be equipped with a parking and emergency brake. A manual control, clearly identified, shall be within easy reach of the driver. The parking brake valve shall comply with CDL pretrip inspection requirements.
 - (5) Have brake lining sizes as shown on the chart on the last page of this booklet.
 - (6) Have a reservoir capacity, which is equal to or greater than two (2) times total volume of all brake activators at full travel.
 - (7) Have air dryers installed. (Bendix AD-9, Midland DA33100 or prior written approved equal). Air dryers shall be serviceable at the local level.
- B. Buses using a hydraulic assist-booster in the operation of the brake system shall be equipped with warning signals, readily audible and visible to the driver, that will provide continuous warning in the event of a loss of fluid flow from the primary source, or loss of electric source powering the back-up system.
 - (1) The system shall be equipped with a source of hydraulic pressure, automatically initiated upon loss of power from primary source, and operating independently of the primary power source.

- (2) All brake systems shall be designed to permit visual inspection of brake lining wear without the removal of any chassis components.

Bumper, Front

1. The front bumper shall be furnished by the chassis manufacturer for all school bus types, unless there is specific agreement between the chassis manufacturer and the body manufacturer. When Type D chassis are supplied to a body company by a chassis manufacturer, the body company shall supply the front bumper as part of the body installation.
2. The front bumper shall be of pressed steel channel or equivalent material at least 3/16 inch thick, not less than 8 inches wide (high) and shall extend beyond forward-most part of the body, grille, hood, and fenders and shall extend to the outer edges of the fenders at the bumper's top line. Bumpers on Type A buses may be built to manufacturers' specifications.
3. Tow eyes or hooks shall be furnished and attached so as not to project beyond the front bumper. Tow eyes or hooks, attached to the frame chassis, shall be furnished by the chassis manufacturer. This installation shall be in accordance with the chassis manufacturer's standards. Type A buses are exempt from tow hook requirements.
4. The bumper shall be designed or reinforced so that it will not deform, when the bus is lifted by a chain that is passed under the bumper (or through the bumper if holes are provided for this purpose) and attached to both tow eyes. For the purpose of meeting this standard, the bus shall be empty and positioned on a level, hard surface, and both tow eyes shall share the load equally. Front bumper shall not be deformed when lifted by a bumper jack positioned on the bumper attachment points.

Certification

The chassis manufacturer shall certify to the SDE and local education agency having pupil transportation jurisdiction that their product meets minimum standards on items not covered by certification issued under requirements of the National Traffic and Motor Vehicle Safety Act.

Color

1. The chassis, including the front bumper, shall be black. The hood, cowl and fenders shall be in national school bus yellow. The hood may be painted with non-reflective paint.
2. Wheel rims shall be painted black, gray, or yellow on all buses.
3. Multifunctional School Activity Buses shall be exempt from these requirements. (See MFSAB specifications on page 51.)

Directional Lights

1. Each Type C chassis may be equipped with Type A front directional lights of the two-faced type mounted on the top of the fender and the hood side panel, or have an amber turn signal and marker light that is an integral part of the headlight assembly. This turn signal/marker light shall be seen from the front and the side of the vehicle.

Drive Shaft

1. Torque capacity of the drive shaft assembly shall at least equal maximum engine torque as developed through lowest transmission gear reduction.
2. Each drive shaft shall be equipped with protective metal guard or guards to reduce the possibility of it whipping through the floor or dropping to ground if broken. (Body manufacturer is responsible for Mini Bus.)

Electrical System

1. Battery
 - A. The storage batteries shall have a minimum total of 1,500 cold cranking amps at 0 degrees Fahrenheit. Type A buses shall be built to manufacturer's specifications.
 - B. Since all batteries in Type, C, and D buses are to be located in a sliding tray, the battery shall be temporarily mounted on the chassis frame by the chassis manufacturer.

In these cases, the final location of the battery and the appropriate cable lengths shall be according to the current SBMTC Design Objectives.

2. Alternator
 - A. All Type A and B buses up to 15,000 lbs. GVWR shall have a minimum 130 amperes alternator.
 - B. All C and D buses over 15,000 lbs. GVWR shall be equipped with a heavy-duty truck or bus-type alternator capable of producing a minimum output rating of 185 amperes; The alternator shall be capable of producing a minimum of 50 percent of its maximum rated output at the engine manufacturer's recommended idle speed.
 - C. All C and D, buses equipped with an air conditioner or electrical power lift shall have a minimum 200 amperes alternator.
 - D. A direct-drive alternator is permissible in lieu of a belt drive. A belt drive shall be capable of handling the rated capacity of the alternator with no detrimental effect on other driven components.

- E. Refer to SBMTC Design Objectives, most current edition, for estimating required alternator capacity.
3. Wiring
- A. All wiring shall conform to current applicable recommended practices of the Society of Automotive Engineers.
 - (1) All wiring shall use standard colors and number coding and each chassis shall be delivered with a wiring diagram that coincides with the wiring of the chassis. All wires passing through metal openings shall be protected by a grommet or loom.
 - B. The chassis manufacturer shall install a readily accessible terminal strip or plug on the body side of the cowl, or at an accessible location in the engine compartment of vehicles designed without a cowl, that shall contain the following terminals for the body connections:
 - (1) Main 100-amp body circuits
 - (2) Tail lamps
 - (3) Right turn signal
 - (4) Left turn signal
 - (5) Stop lamps
 - (6) Back-up lamps
 - (7) Instrument panel lights (rheostat controlled)
 - C. Daytime running lamps shall be provided.
4. Circuits
- A. An appropriate identifying diagram (color and number coded) for electrical circuits shall be provided to the body manufacturer for distribution to the end user.

Engine Fire Extinguisher (Optional)

See Fire Suppression System page 21.

Engine

- 1. All buses shall be equipped with diesel engines with a minimum horsepower as follows:
 - 29 to 60 passengers – 170 hp motor minimum
 - 65 passengers and above – 210 hp motor minimum
 - Type D buses 78 passengers and above – 230 hp minimum
 - Types A buses under 29 passenger – manufacturer's specifications
- 2. The engine heater may be installed as per the manufacturer's specifications.

Exhaust System

1. The exhaust pipe, muffler/ after treatment device, and tail pipe shall be outside the bus body and securely attached to the bus frame. The chassis manufacturer shall furnish an exhaust system with a tail pipe of sufficient length to exit the rear of the bus or at the left side of the bus body no more than 18 inches forward of the front edge of the rear wheelhouse opening. If designed to exit on the side of the bus, the tailpipe shall extend to the skirtline with a turndown angle of approximately 45 degrees. With the exception of special needs buses, Type A vehicles may have the manufacturers standard exhaust system. The bus shall not automatically begin to regenerate the diesel particulate filter while the bus is not moving. The switch to regenerate the diesel particulate filter shall not be visible or accessible to the driver.
2. The muffler and the tail pipe shall be constructed of aluminized, or equivalent corrosion resistant material. The tailpipe shall be made of at least 16 gauge material and shall be mounted in such a way that it will not cause damage to brake lines
3. The muffler/ after treatment device, and exhaust pipe shall be properly insulated from the fuel tank, lines, and connections by a protective shield at any point where it is 4 inches or less from fuel tank, lines or connections.
4. The tailpipe on all special needs vehicles shall be routed to the left of the left frame rail to allow for the installation of a lift on the right side of the vehicle.
5. No exhaust pipe shall exit beneath an emergency exit or the fuel fill.
6. On all Type C and D buses, the tailpipe shall exit at the bottom edge of the rear bumper or through the rear bumper. If tailpipe exits through the rear bumper sufficient clamps or brackets must be provided to eliminate rattles. If the tailpipe exits beneath the rear bumper, it shall be turned down approximately 45 degrees and positioned in such a way that it cannot be crushed beneath the rear bumper.

The opening in the tailpipe shall direct all exhaust gases clear of the perimeter of the bus body. Manufacturers must make reasonable efforts to ensure that exhaust gases will not produce burns on students or other individuals present.

Fenders, Hoods

1. The total spread of outer edges of front fenders, measured at the fender line, shall exceed the total spread of the front tires when the front wheels are in a straight-ahead position.
2. Front fenders shall be properly braced and free from any body attachments.
3. A fiberglass or other reinforced resin composite tilt hood shall be provided. The hood opening and closing effort shall be minimized to aid the driver with pre-trip

inspections and service. If the hood is not designed to remain secure in the open position, a safety prop will be required. The wiring harness shall be a “quick disconnect” type to aid with servicing.

Frame

1. The frame or equivalent shall be of such design and strength characteristics as to correspond at least to standard practice for trucks of the same general load characteristics, which are used for highway service.
2. Any secondary manufacturer that modifies the original chassis frame shall guarantee the performance of workmanship and materials resulting from such modification.
3. Any frame modification shall not be for the purpose of extending the wheelbase.
4. Holes in top or bottom flanges or side units of the frame, and welding to the frame, shall not be permitted except as provided or accepted by the chassis manufacturer.
5. Frame lengths shall be provided in accordance with current SBMTC Design Objectives.

Fuel Tank

1. All Types C, and D chassis above 170-inch wheelbase shall have a minimum 60-gallon fuel tank with a 55-gallon actual draw. The tank shall be filled and vented to the outside of the body, the location of which shall be so that accidental fuel spillage will not drip or drain on any part of the exhaust system. **Type C-1 school buses are exempt from this requirement.**
2. No portion of the fuel system, which is located to the rear of the engine compartment, except the filler tube, shall extend above the top of the chassis frame rail. Fuel lines shall be mounted to obtain maximum possible protection from the chassis frame.
3. Fuel filters shall be installed as per manufacturer's specifications. Fuel filtration shall include water detection and separation. At least one fuel filter shall have a replaceable spin-on or cartridge-type element.
4. Fuel tank installation shall be in accordance with current SBMTC Design Objectives for location on the chassis right frame rail or between frame rails; the filler tube shall be located on the right side of the bus.
5. Type A buses may meet manufacturer's specifications.
6. The fuel tank on vehicles constructed with a power lift unit may be mounted on left chassis rail or behind rear wheels.
7. Installation of alternative fuel tanks shall comply with all applicable fire codes.

8. On Types C, and D vehicles, fuel tanks shall have interior baffles to help prevent buses from fuel starvation on inclines.

Governor

1. An engine governor is permissible. When it is desired to limit road speed, a road speed governor should be installed.
2. An electronic engine speed limiter shall be provided and set to limit engine speed not to exceed the maximum revolutions per minute as recommended by the engine manufacturer. For Type C and D buses, and where feasible on Type A buses, bus road speed shall not exceed a maximum of 70 miles per hour.

Heating System, Provision for

1. The chassis engine shall have plugged openings for the purpose of supplying hot water for the bus heating system. The opening shall be suitable for attaching a pipe thread/hose connector. The engine shall be capable of supplying water having a temperature of at least 170 degrees Fahrenheit at a flow rate of 50 pounds/per minute at the return end of 30 feet of one inch inside diameter automotive hot water heater hose (SBMI Standard No. 001--Standard Code for Testing and Rating Automotive Bus Hot Water Heating and Ventilating Equipment).

Horn

Buses shall be equipped with a horn or horns of standard make with each horn capable of producing a complex sound in bands of audio frequencies between 250 and 2,000 cycles per second and tested per the Society of Automotive Engineers Standard J--377. There shall be no air horns.

Instruments and Instrument Panel

1. Chassis shall be equipped with the following instruments and gauges (lights in lieu of gauges are not acceptable except as noted):
 - A. Speedometer
 - B. Odometer shall show accrued mileage to six digits not including tenths.
 - C. Tachometer
 - D. Voltmeter
 - (1) An ammeter with graduated charge and discharge with the ammeter and its wiring compatible with generating capacities is permitted in lieu of a voltmeter
 - E. Oil-pressure gauge

- F. Water temperature gauge
 - G. Fuel gauge
 - H. Upper beam headlight indicator
 - I. Air brake indicator gauge
 - (1) A light indicator in lieu of a gauge is permitted on vehicles equipped with hydraulic-over-hydraulic brake system.
 - J. Turn signal indicator
 - K. Glow-plug indicator light where appropriate
 - L. A twelve-volt accessory outlet with cover
2. All instruments shall be easily accessible for maintenance and repair.
 3. Instruments and gauges shall be mounted on the instrument panel in such a manner that each is clearly visible to the driver while in a normal seated position in accordance with current SBMTC Design Objectives.
 4. The instrument panel shall have lamps of sufficient candlepower to illuminate all instruments and gauges and the shift selector indicator for an automatic transmission.

Oil Filter

An Oil filter with replaceable element shall be provided and connected by flexible oil lines if it is not of built-in or engine-mounted design. The oil filters shall have a capacity of at least one (1) quart.

Openings

All openings in the floorboard or firewall between the chassis and the passenger-carrying compartment, such as for gearshift selector and parking brake lever, shall be sealed.

Passenger Load

1. Actual GVW is the sum of the chassis weight, plus the body weight, plus the driver's weight, plus total seated pupil weight. For purposes of calculation, the driver's weight is 150 pounds. For purposes of calculation, the pupil weight is 120 pounds per pupil.
2. Actual GVW shall not exceed the chassis manufacturer's GVWR for the chassis, nor shall the actual weight carried on any axle exceed the chassis manufacturer's Gross Axle Weight Rating. (GAWR)

Retarder System (Optional)

A retarder system, if used, shall limit the speed of the fully loaded school bus at 19.0 mph or 30 km/hr on a 7% grade for 3.6 miles or 6 km.

Road Speed Control

When it is necessary to control vehicle maximum speed, a vehicle speed limiter shall be utilized. For Type C and D buses, and where feasible on Type A buses, bus road speed shall not exceed a maximum of 70 miles per hour.

Shock Absorbers

Buses shall be equipped with front and rear double-action shock absorbers compatible with the manufacturer's rated axle capacity at each wheel location.

Springs/Suspension Systems

1. The capacity of the springs or suspension assemblies shall be commensurate with the chassis manufacturer's GVWR.
2. Front springs shall be of the leaf type, shall have a stationary eye at one end, and shall be protected by a wrapper leaf in addition to the main leaf. Rear leaf springs shall be of the progressive type.
3. Air ride suspension may be used on the front and rear of Type C and D buses in lieu of leaf-type springs. Body and chassis parts must clear tires with air bags in fully deflated condition or steering wheel turned fully to the left or right. If brake dust covers are used, inspection holes of adequate size and location for easily viewing brake linings shall be provided.

Steering Gear

1. The steering gear shall be approved by the chassis manufacturer and designed to assure safe and accurate performance when the vehicle is operated with maximum load and at maximum speed.
2. If external adjustments are required, the steering mechanism must be accessible to accomplish the same.
3. No changes shall be made in the steering apparatus, which are not approved by the chassis manufacturer.
4. There shall be a clearance of at least two inches between the steering wheel and the cowl, instrument panel, windshield, or any other surface.
5. Power steering is required and shall be of the integral type with integral valves.
6. The steering system shall be designed to provide a means for lubrication of all wear-points, if wear-points are not permanently lubricated.

7. The steering wheel shall meet manufacturer's specifications.

Tires and Rims

1. Radial tubeless tires and rims of proper size and tires with a load rating commensurate with chassis manufacturer's GVWR shall be provided. Hubcaps are not permitted.
2. Dual rear tires shall be provided on all school buses.
3. All tires on any given vehicle shall be of the same size and the load range of said tires shall meet or exceed the gross axle weight rating as required by FMVSS 120. Low profile tires are acceptable. However, they must meet the load range and ply requirements as shown on the chart on the last page of this booklet. It is recommended that dish-type rims be used with low profile tires.
4. If the vehicle is equipped with a spare tire and rim assembly, it shall be of the same size as those mounted on the vehicle.
5. If a tire carrier is required, it shall be suitably mounted in an accessible location outside the passenger compartment.

Transmission

An automatic transmission shall be required on all buses. Type A buses may be built to manufacturer's specifications. Types C, and D buses must have a PTS 2500 series or prior approved equal. The automatic transmission shall have at least four forward-gear ratios, plus integral torque converter. The transmission shift quadrant shall provide at least four forward drive ranges plus neutral and reverse ranges. Within the range selected, ratio changes shall be effected automatically and at full engine power if desirable, and without use of an engine disconnect clutch. A PTS3000 or prior approved equal is required for chassis over 33,000 pounds GVWR.

Type C-1 school buses may use Allison PTS 1000 or PTS 2200 automatic transmission or prior approved equal.

Turning Radius

1. Chassis with a wheelbase of 264 inches or less shall have a right and left turning radius of not more than 42 1/2 feet, curb-to-curb measurement.
2. Chassis with a wheelbase of 265 inches or more shall have a right and left turning radius of not more than 44 and 1/2 feet, curb-to-curb measurement.

Undercoating

The chassis manufacturer, or agent thereof, shall coat the undersides of steel or metallic-constructed front fenders with rust-proofing compound for which compound manufacturers have issued notarized certification of compliance to the chassis builder that the compound meets or exceeds all performance and qualitative requirements of paragraph 3.4 of Federal Specification TT-C520B using modified test.

Weight Distribution

The weight distribution of a fully loaded bus on a level surface shall be such as not to exceed the manufacturer's front gross axle rating and rear gross axle weight rating.

SECTION III - SCHOOL BUS BODY STANDARDS

Air Conditioning

All special needs buses shall be equipped with air conditioning. Other buses **may** be equipped with an air conditioning unit at the discretion of the local school system. *For all buses equipped with air conditioning, evaporator placement shall be agreed upon by school system and dealer prior to bid award. Refer to Page 2 Bid Requirements item # 4.*

All buses ordered with air conditioning shall meet the following minimum specifications:

1. Floor--All flooring shall be 5/8-inch exterior-grade plywood over steel flooring.
2. All buses shall have a white roof.
3. Windows--All *passenger* windows shall be tinted with 28% light transmission.
4. All buses shall meet insulation standards as per Alabama bus specifications.
5. **Optional** mud flaps to protect the condenser may be installed.

Minimum Btu air conditioning system per passenger size:

- | | |
|--------------------|-------------|
| 1. 10-30-passenger | 40,000 Btu |
| 2. 31-48-passenger | 53,000 Btu |
| 3. 49-60-passenger | 78,000 Btu |
| 4. 61-84-passenger | 100,000 Btu |

Aisle

1. All emergency doors shall be accessible by a 12-inch minimum aisle. The aisle shall be unobstructed at all times.
2. Seat backs shall be slanted sufficiently to give aisle clearance of 15 inches at the tops of seat backs.

Back-Up Warning Alarm

An automatic, audible alarm with a minimum of 87dbA and maximum of 112dbA shall be installed behind the rear axle and shall comply with the Society of Automotive Engineers published Back-up Alarm Standards (SAE 994). The alarm shall have a protective deflector shield.

Battery/Batteries

1. Batteries are to be furnished by the chassis manufacturer.
2. When the battery/batteries is mounted as described in the Chassis Standard, the body manufacturer shall securely attach the battery on a slide-out or swing-out tray in a

closed, vented compartment in the body skirt, so that the battery is accessible for convenient servicing from the outside. The battery compartment door or cover shall be hinged at the front and secured by an adequate and conveniently-operated latch or other type fastener.

Bumper (Front)

On a Type D school bus, if the chassis manufacturer does not provide a bumper, it shall be provided by the body manufacturer. The bumper will conform to the standards in the chassis section.

Bumper (Rear)

1. Bumpers shall be of pressed steel channel or equivalent material, at least 3/16-inch thick, and shall be a minimum of 9-1/2 inches wide (high) on all Types C, and D buses. Type A buses shall have a minimum of an 8-inch rear bumper.
2. Bumpers shall be wrapped around the back corners of the bus. It shall extend forward at least 12 inches, measured from the rear-most point of the body at the floor line.
3. Bumpers shall be attached to the chassis frame in such a manner that it may be easily removed. It shall be so braced as to withstand impact from a rear or side impact. It shall be so attached as to discourage hitching of rides.
4. Bumpers shall extend at least one inch beyond rear-most part of body surface measured at the floor line.
5. Tow eyes or hooks may be furnished on the rear and attached so they do not project beyond the rear bumper. The installation shall be in accordance with the chassis manufacturer's specifications.
6. The bottom of the rear bumper shall not be more than 30 inches above ground level.

Ceiling

See Insulation and Interior, Body Standard.

Certification

The body manufacturer shall certify to the SDE and local education agency having pupil transportation jurisdiction that their product meets minimum standards on items not covered by certification issued under requirements of the National Traffic and Motor Vehicle Safety Act.

Chains (Tire)

See Wheel Housing Body Standard.

Color

1. The school bus body shall be painted National School Bus Yellow.
2. The body exterior paint trim, bumper, lamp hoods and lettering shall be black.
3. The roof of the bus *must* be painted white not to extend below the drip rails on the sides of the body.
4. Multifunctional School Activity Buses (MFSAB) shall be exempt from this requirement. (See MFSAB specifications on page 51.)

Communication Systems

Each bus shall be equipped with a two-way, voice communication system capable of providing communication with the operational base. Where technologically feasible, the communication system shall also communicate with 911 operators. CB radio systems will not meet this requirement. **It is the responsibility of the local school system to comply with this specification.**

Construction

1. Construction shall be of prime commercial quality steel or other material with strength at least equivalent to all-steel as certified by the bus body manufacturer. All such construction materials shall be fire resistant.
2. Construction shall be dust proof and watertight, so the bus does not leak under normal operating conditions.
3. Body joints present in that portion of a Type A school bus body furnished exclusively by the body manufacturer shall conform to the performance requirements of FMVSS 221, "School Bus Body Joint Strength." This does not include the body joints created when body components are attached to components furnished by the chassis manufacturer.
4. Type A school bus bodies shall be equipped with restraining barriers conforming to FMVSS 222, "School Bus Passenger Seating--Crash Protection," Sections 5.2 and 5.3.

Crossing Control Arm

1. Buses shall be equipped with a crossing control arm mounted on the right side of the front bumper, which shall not open more than 90 degrees.
2. All components of the crossing control arm and all connections shall be weatherproofed.
3. The crossing control arm shall incorporate system connectors (electrical or air) at the gate and shall be easily removable to allow for towing of the bus.

4. The crossing control arm shall meet or exceed SAE Standard J1133.
5. The crossing control arm shall be constructed of non-corrosive or nonferrous material or treated in accordance with the body sheet metal standard (see Metal Treatment).
6. There shall be no sharp edges or projections that could cause hazard or injury to students.
7. The crossing control arm shall extend at least 70" from the front bumper when in the extended position.
8. The crossing control arms shall extend simultaneously with the stop arm(s) by means of the stop arm controls. An automatic recycling interrupt switch shall be installed to allow the driver to deactivate the control arm when necessary.
9. An electromagnetic device or a stowed bracket shall be installed to stabilize the arm when in the stored position.
10. Crossing control arm shall be Specialty Manufacturing Company, Part #58600, Transpec 4000 series, or prior approved equal.

Defrosters

1. The windshield defroster and defogging system shall provide defogging of the entire windshield, driver's side window, and entrance door glasses by utilizing hot air taken from the heater core with vents across the entire windshield.
2. The defrosting system shall conform to Society of Automotive Engineers' Standards J381 and J382.
3. The defroster and defogging system shall be capable of furnishing heated outside ambient air.
4. Auxiliary fans are not considered defrosting or defogging systems.
5. Portable heaters shall not be used.

Doors

1. Service Door:
 - A. The service door shall be in the driver's control, and designed to afford easy release and provide a positive latching device on manual operating doors to prevent accidental opening. When a hand lever is used, no part shall come together that will shear or crush fingers. Manual door controls shall not require more than 25 pounds of force to operate at any point throughout the range of operation.

- B. The service door shall be located on the right side of the bus, opposite and within direct view of the driver.
- C. The service door shall have a minimum horizontal opening of 24 inches and a minimum vertical opening of 68 inches.
- D. The service door shall be a split type, both sections opening outward.
- E. Lower, as well as upper door panels, shall be of approved safety glass. The bottom of each lower glass panel shall not be more than 10 inches from the top surface of the bottom step. The top of each upper glass panel shall not be more than 6 inches from the top of the door.
- F. Vertical closing edges on split type entrance doors shall be equipped with flexible material to protect the children's fingers.
- G. There shall be no door to the left in driver compartment on Types C or D vehicles.
- H. All doors shall be equipped with padding at the top edge of each door opening. Pad shall be at least three inches wide and one inch thick and extend the full width of the door opening.
- I. If air or electric doors are used, the amber warning lights shall be activated from a momentary switch. A three-position switch shall activate the sequence as follows:
 - Position One – door closed; lights off.
 - Position Two – activate red lights, stop arm, and crossing control arm.
 - Position Three – red lights activated, door open, stop arm activated, and crossing control arm activated.

Emergency Exits

1. Emergency Door:

- A. The emergency door shall be hinged on the right side if in the rear end of bus and on the front side if on left or right side of the bus. It shall open outward and be labeled inside to indicate how it is to be opened. If double emergency doors are used on Type A vehicles, they shall be hinged on the outside edge and shall have a three-point fastening device. A device shall be used that holds the door open to prevent the emergency door from closing during emergencies and school bus evacuation drills. If emergency door locks are used, the vehicle ignition must be disabled until the emergency door lock is deactivated.

- B. The upper portion of the emergency door shall be equipped with approved safety glazing, the exposed area of which shall be at least 400 square inches. The lower portion of the rear emergency door on Types C, and D vehicles shall be equipped with a minimum of 350 square inches of approved safety glazing.
- C. There shall be no steps leading to an emergency door.
- D. The words **EMERGENCY DOOR**, in letters at least two inches high, shall be placed at the top of or directly above the emergency door or on the door in the metal panel above the top glass, both inside and outside of the bus. The words **EMERGENCY EXIT** in letters at least 2 inches high shall be placed on the exterior body directly above each emergency window.
- E. The emergency door shall be equipped with padding at the top edge of each door opening. Padding shall be at least three inches wide and one inch thick, and extend the full width of the door opening.
- F. The side emergency door, if installed, must meet the requirements as set forth in FMVSS 217 (a), regardless of its use with any other combination of emergency exits.
 - (1) A left side emergency door shall have a 20 inch unobstructed passageway and no flip seat is to be used. A barrier shall be used just before the door opening.
- G. There shall be no obstruction higher than 1/4 inch across the bottom of any emergency door opening.

2. Additional Emergency Exits:

- A. All school buses shall be equipped with emergency exits in the following capacity vehicles:
 - 0 to 54 passenger: one emergency window exit per side and one roof hatch located midpoint.
 - 55 and above passenger: two emergency window exits per side, and two roof hatches.
- B. Each emergency exit shall comply with FMVSS 217. These emergency exits are in addition to the rear emergency door or exit. Roof hatches must be Transpec Standard Vent, Model 1970, Specialty Manufacturing 8600, 8900, or 9000 series or prior approved equal.
 - (1) Emergency exit windows shall be as evenly spaced as possible under FMVSS 217 guidelines and shall not be obstructed by any devices.

- C. In addition to the audible warning required on emergency doors by FMVSS 217, additional emergency exits shall also be like protected. Warnings for these exits shall be clearly audible to the bus driver.
- D. School bus emergency exits shall be marked with a minimum one inch wide strip of retroreflective tape, either red, white or yellow in color, to be placed around the outside perimeter of the emergency exit opening, not the emergency exit itself. The words **EMERGENCY EXIT**, in letters at least two inches high, shall be placed on the body directly above each emergency window.

Emergency Equipment

All emergency equipment shall be stored in the driver compartment with the exception of the warning devices.

1. Fire Extinguishers:

- A. The bus shall be equipped with at least one pressurized, dry chemical fire extinguisher complete with hose to meet Underwriters Laboratories, Inc., approval. A pressure gauge shall be mounted on the extinguisher and easily read without moving the extinguisher from its mounted position.

The bracket shall be a heavy-duty, snap-in, spring type. Band type holders are not acceptable. Fire extinguisher brackets shall be Brooks Equipment Company # 4SC or Ridgeway Bus Products # 51-05 or prior approved equal.

- B. The fire extinguisher shall have a capacity of **five pounds** with an Underwriters Laboratories total rating of 2A10BC or greater. The operating mechanism shall be sealed with a type of seal that will not interfere with the use of the fire extinguisher.

- C. Fire extinguishers must comply with State Fire Codes.

2. First-Aid Kit:

- A. Bus shall have a removable, moisture-proof and dust-proof first-aid kit *stored in a metal container* and mounted with a separate bracket in an accessible place in driver's compartment. This place shall be marked to indicate its location. *Strap-type mounting brackets are not acceptable.*

- B. Contents shall include:

- 2 1" x 2 1/2 yards adhesive tape rolls
- 24 sterile gauze pads 3" x 3"
- 100 3/4" x 3" adhesive bandages
- 8 2" bandage compress
- 10 3" bandage compress
- 2 2" x 6" sterile gauze roller bandages
- 2 non-sterile triangular bandages approximately 40" x 36" x 54" with 2 safety pins

- 3 sterile gauze pads 36" x 36"
- 3 sterile eye pads
- 1 pair rounded-end scissors
- 1 pair latex gloves
- 1 mouth-to-mouth airway

3. Body Fluid Clean-up Kit:

- A. Each bus shall have a removable and moisture-proof body fluid clean-up kit *stored in a metal container. Strap-type mounting brackets are not acceptable.* It shall be properly mounted and identified as a body fluid clean-up kit. Must meet OSHA regulations.

4. Warning Devices:

- A. Each school bus shall contain at least three (3) reflectorized triangle road warning devices mounted in an accessible place in the driver's compartment or outside storage compartment. The mounting location in Type A vehicles is optional. These devices must meet requirements in FMVSS 125.

Fire Suppression (Optional)

When a fire suppression system is used, nozzles for suppression systems shall be located in the engine compartment, under the bus, in the electrical panel, or under the dash, but shall not be located in the passenger compartment. The system must include a light or buzzer to alert the driver that the system has been activated.

Floor and Floor Coverings

1. The floor in the underseat area, including the tops of the wheel housing, driver's compartment and toe board, shall be covered with a rubber floor covering or equivalent, having a minimum overall thickness of 1/8 inch.
2. The floor covering in the aisle shall be of aisle-type rubber or equivalent, wear resistant, and ribbed. The minimum overall thickness shall be 3/16 inch measured from tops of ribs.
3. The floor covering must be permanently bonded to the floor and must not crack when subjected to sudden changes in temperature. Bonding or adhesive material shall be waterproof and shall be of a type recommended by the manufacturer of the floor-covering material. All seams must be sealed with waterproof sealer.
4. For Type C and D school buses, the manufacturer shall provide a screw-down plate to access fuel tank sending unit that is secured and insulated. The plate shall be mounted so that access is readily available to repair personnel and so that the floor covering is not disturbed during the repair process.
5. The floor shall be of metal or alloy at least equal in strength to 14-gauge prime commercial quality steel and so constructed that exhaust gases cannot enter the passenger compartment.

6. All closures between the bus body and the engine compartment shall be fitted with gas-tight gaskets and pedal openings shall be closed bellows type, gas-tight boots.
7. There shall be a plate, of adequate size, provided to allow for transmission access or service.

Handrail(s)

At least one handrail shall be installed. The handrail(s) shall assist passengers during entry or exit, and shall be designed to prevent entanglement as evidenced by the passage of the NHTSA string and nut test.

Heaters

1. The heating system shall be capable of maintaining the temperature throughout the bus of not less than 55 degrees Fahrenheit during average minimum January temperatures as established by the U. S. Department of Commerce, Weather Bureau, for the area in which the vehicle is to be operated. Shall be capable of defrosting the total windshield area and the service door glass within thirty minutes after initial start with engine at idle speed. The system shall exceed SAE standards J-381 and J-382 performance requirements. **Fuel-fired auxiliary heaters will not be allowed.**

Heater performance shall be measured by the following:

A temperature measurement shall be taken at three locations within the body. These locations to be over the center aisle, thirty-six inches above the floor. The first location is to be thirty-nine inches from the windshield; the second location midpoint of the passenger compartment and the third will be thirty-nine inches from the rear emergency door.

After soaking the bus at twenty degrees F. for fifteen (15) hours, the bus will be started and after thirty (30) minutes, the temperature at each measuring point shall be fifty-five (55) degrees F.

2. If only one heater is used, it shall be a fresh-air or combination fresh-air and recirculation type.
3. If more than one heater is used, additional heaters shall be a recirculating-air type.
4. All heaters installed by body manufacturers shall bear a name plate that shall indicate the heater rating in accordance with SBMI Standard No. 001, with said plate to be affixed by the heater manufacturer which shall constitute certification that the heater performance is as shown on the plate.
5. Heater hoses shall be adequately supported to guard against excessive wear due to vibration. The hoses shall not dangle or rub against the chassis or sharp edges and

shall not interfere with or restrict the operation of any engine function. Heater hoses shall conform to the Society of Automotive Engineers' Standard J20c. Heater lines on the interior of the bus shall be shielded to prevent scalding of the driver or passengers.

6. Each hot water system installed by a body manufacturer shall include one shut-off valve in the pressure line and one shut-off valve in the return line with both valves at or near the engine in an accessible location.
7. There shall be a water flow-regulating valve, or an electronic valve actuator, installed in the pressure line for convenient operation by the driver while seated.
8. Accessible bleeder valves shall be installed in an appropriate place in the return lines of body company-installed heaters to remove air from the heater lines.
9. Access panels shall be provided to make heater motors, cores, and fans readily accessible for service. An outside access panel may be provided for the driver's heater.

Hinges

All exterior metal door hinges which do not have stainless steel, brass, or nonmetallic hinge pins or other designs that prevent corrosion shall be designed to allow lubrication to be channeled to the center 75% of each hinge loop without disassembly.

Identification

1. School bus bodies shall bear the words, **SCHOOL BUS**, in eight-inch black letters on National School Bus Yellow, on the front and back of the bus (lettering between flasher lights). (See page 51 for Multifunctional School Activity Bus identification requirements.) The name of the school system shall be on each side of the bus in at least 5-inch, black standard, unshaded letters. Lettering shall conform to "Series B" of Standard Alphabets for Highway Signs. Each bus shall be numbered on both sides, front left side and the rear, before being put into service. Bumper numbers may be white or yellow. An agreement between manufacturer and purchaser shall be reached at time order is placed as to who will put the numbers on the buses. Any other numbering shall be optional.
2. Only signs and lettering approved by state law or regulation, limited to the name of the owner or operator and any marking necessary for identification, shall appear on the bus.
3. School bus bodies shall display a high quality 6" x 9" warning sticker on permanent, adhesive, vinyl, bumper-sticker material. To increase visibility, this sticker shall be mounted just under the first or second rub rail at left side of the passenger entrance door. This sticker shall be worded as follows:

UNAUTHORIZED ENTRY ILLEGAL

Any person who attempts to enter a school bus without prior authorization of the driver or other appropriate school official and refuses to leave will be subject to prosecution that may result in fines of up to \$2,000 and up to one year in jail.

Alabama Code Sections 13A-10-2, 13A-7-4

4. Driver Alert Transpec Model 7500 or prior approved equal electronic signage warning traffic when the school bus stops to load or unload students and at railway grade crossings is required.
5. A high quality, 4" x 6", permanent, adhesive, vinyl, warning sticker prompting drivers that driver seat belt use is mandatory on all school buses shall be affixed in the driver compartment in a highly visible location. This sticker shall be worded as follows:

DRIVER SEAT BELT USE REQUIRED

Driver seat belt use is required at all times when driving this vehicle. Failure to do so could result in disciplinary action up to and including suspension or revocation of your Alabama School Bus Driver Certificate or termination.

Alabama Code Section 16-27-6

Unauthorized Entry Decals and Driver Seat Belt Use Decals are provided by the Alabama State Department of Education.

Inside Height

The inside body height shall be 72 inches or more, measured metal to metal, at any point on the longitudinal center line from the front vertical bow to the rear vertical bow. The inside body height of Type A buses shall be 62 inches or more.

Insulation

1. Ceilings and walls shall be insulated with proper material to deaden sound and reduce vibration to a minimum. If thermal insulation is specified, it shall be fire-resistant and approved by Underwriters Laboratories, Inc. If buses are equipped with air conditioning, walls and ceilings must be insulated to improve air conditioner efficiency.
2. If floor insulation is required, it shall be either 5-ply nominal 19/32 inches thick plywood, or a material of equal or greater strength and insulation R value, and it will equal or exceed properties of exterior-type softwood plywood, C-D Grade as specified in standard issued by U. S. Department of Commerce. When plywood is used, all exposed edges shall be sealed.

Interior

1. The interior of the bus shall be free of all unnecessary projections, which include luggage racks and attendant handrails, likely to cause injury. This standard requires inner lining on ceilings and walls. If the ceiling is constructed to contain lapped

joints, the forward panel shall be lapped by the rear panel and exposed edges shall be beaded, hemmed, flanged, or otherwise treated to minimize sharp edges.

2. The driver's area forward of the foremost padded barriers will permit the mounting of required safety equipment and vehicle operation equipment.
3. Every school bus shall be constructed so that the noise level taken at the ear of the occupant nearest to the primary vehicle noise source shall not exceed 85 dbA when tested.
4. Any added equipment shall be flush mounted with the exception of the video system.

Lamps and Signals

1. Interior lamps shall be provided which adequately illuminate aisle and step well. Step well lights shall be illuminated by a service door operated switch, to illuminate only when headlights and clearance lights are on and the service door is opened.
2. Clearance lamps shall automatically illuminate when the headlights are in the "on" position.
3. L.E.D. lighting *shall be used in all exterior body lamps and signals. Eight-way flashing lights and stop arm shall be strobe-type L.E.D. Manufacturers' front chassis lamps are exempt from this requirement.*
4. Definition--School bus alternately flashing red and amber signal lamps are lamps mounted at the same horizontal level, intended to identify the vehicle as a school bus and to inform other users of the highway that such vehicle is preparing to stop, or is stopped, on the roadway to take on or to discharge schoolchildren.

A. Master switches will not be allowed on the eight-way, alternately flashing signal lamps.

B. Buses shall be equipped with two red lamps and two amber lamps at the rear of the vehicle and two red lamps and two amber lamps at the front of the vehicle. One amber lamp shall be located near each red signal lamp at the same level, but closer to the vertical centerline of the bus.

C. The signaling system, including red and amber signal lamps and a stop arm with alternating flashing lamps, shall be so designed and wired as to have the following characteristics:

- (1) When the entrance door is closed, a manual push button may be depressed and the amber pilot light and amber warning lights will flash.

(2) When the entrance door is opened, the amber pilot and amber warning lights will go off, and the red pilot and red warning lights will flash; also, the stop arm will be extended and lights on the stop arm will flash.

(3) On closing the entrance door, all lights will go out and the stop arm retract automatically.

(4) If the entrance door is opened without depressing the manual push button, no lights will flash, nor will the stop arm be extended.

D. The area around the lenses of alternately flashing signal lamps shall have a readily visible black border for contrast purposes. Hoods/guards may be provided over front and rear amber warning lights and red warning lights.

5. Bus body shall be equipped with amber rear turn signal lamps at least seven inches in diameter, or if in a shape other than round, a minimum of 38 square inches of illuminated area. These signal lamps must be connected to the chassis hazard-warning switch to cause simultaneous flashing of signal lamps when needed as a vehicular traffic hazard warning.
6. Rear directional lights shall be mounted not more than 15 inches from the plane of the side of the body, and not more than 14 inches below the glass in the rear of the body. All buses shall have side turn indicators on both sides located within six inches of the floor line.
7. Buses shall be equipped with two red, brake/tail combination lights at least seven inches in diameter, or if in a shape other than round a minimum of 38 square inches of illuminated area and shall be mounted on the rear of the bus just inside the turn signal lamps.

A. Type A conversion vehicle lamps must be 21 square inches in the lens area. Two combination lamps with a minimum diameter of four inches, or if a shape other than round, a minimum 12 square inches of illuminated area shall be placed on the rear of the body between the beltline and the floor line. The rear license plate lamp may be combined with one lower tail lamp. Stop lamps shall be activated by the service brakes and shall emit a steady light when illuminated.

B. In addition to these requirements, all lamps and signals shall comply with applicable SAE specifications.

8. On all buses equipped with a monitor for the front and rear lamps of the school bus, the monitor shall be mounted in full view of the driver. If the full circuit current passes through the monitor, each circuit shall be protected by a fuse or circuit breakers or other equivalent technology against any short circuit or intermittent shorts.

9. A white flashing strobe light shall be installed on the roof of a school bus not to exceed 1/3 the body length forward from the rear of the roof edge. This light shall have a single white lens emitting light 360 degrees around its vertical axis and may not extend above the roof more than the maximum legal height. A manual switch and a pilot light of low intensity must be included to indicate when the light is in operation. The pilot light shall be incorporated into the switch.
10. If alternating headlights are used (i.e., wig-wag), they must operate in conjunction with the red overhead flashers and stop arm.

Metal Treatment

1. All metal used in construction of a bus body shall be zinc-coated or aluminum-coated or treated by an equivalent process before the bus is constructed. Included are such items as structural members, inside and outside panels, door panels and floor sills. Excluded are such items as door handles, grab handles, interior decorative parts and other interior plated parts.
2. In addition to the above requirements, all metal parts that will be painted shall be chemically cleaned, etched, zinc-phosphate-coat and zinc-chrome or epoxy primed or conditioned by equivalent process.
3. 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, unvented or undrained areas and surfaces subjected to abrasion during vehicle operation.
4. As evidence that the above requirements have been met, samples of materials and sections used in construction of the bus body, when subjected to 1,000-hour salt spray test as provided for in latest revision of ASTM Standard B-117 "Standard Method of Salt Spray (Fog) Testing" shall not lose more than 10 percent of its material by weight.

Mirrors

1. Interior mirrors shall be either clear laminated glass or clear view glass bonded to a backing, which retains the glass in the event of breakage. Mirrors shall have rounded corners and protected edges. Type A buses shall have a minimum of a 6" x 16" mirror and Type C, and D buses shall have a minimum of a 6" x 30" mirror. It shall be securely attached on the windshield header and so located as to give the driver a clear view of the entire interior of the bus and the road behind.
2. Each school bus shall be equipped with a system of exterior mirrors as defined in FMVSS 111.
 - A. Rear vision mirrors shall be capable of providing a view along the left and right sides of the vehicle which will provide the driver with a view of the rear tires at ground level, a minimum distance of 200 feet to the rear of the bus and at least

12 feet perpendicular to the side of the bus at a distance of 32 feet back from the front bumper.

- B. The cross view mirror system shall provide the driver with indirect vision of an area at ground level from the front bumper forward and the entire width of the bus to a point where the driver can see by direct vision. The cross view system shall also provide the driver with direct vision of the area at ground level around the left and right front corners of the bus to include the tires and service entrance on all types of buses to a point where it overlaps with the rear vision mirror system. A metal reinforcement plate shall be installed under the hood area of fiberglass or other reinforced resin composite hoods in order to reinforce cross view mirror mounting base area.
- C. This system of mirrors shall be easily adjustable but be rigidly braced so as to reduce vibration.

3. Heated and/or remote controlled external, rearview mirrors may be used.

Mounting

- 1. The chassis frames shall support the rear body cross member. The bus body shall be attached to the chassis frame at each main floor sill, except where chassis components interfere, in such a manner as to prevent shifting or separation of the body from the chassis under severe operating conditions.
- 2. Insulation material shall be placed at all contact points between the body and chassis frame on Types A, C and D buses, and shall be so attached to the chassis frame or body that it will not move under severe operating conditions.

Noise Suppression Switch

There shall be a manual noise suppression switch installed in the control panel. This switch or switch background shall be red or yellow and labeled. This switch shall be an on/off-type (not momentary) that deactivates all body equipment that produces noise including at least the am/fm radio, heaters, air conditioners, fans and defrosters. This switch shall not deactivate safety systems such as windshield wipers, lighting or warning systems. For Type A buses, all radios or communication devices shall be ordered as a body accessory and must be wired thru the noise suppression switch.

Overall Length

The overall length of the bus shall not exceed 45 feet excluding accessories.

Overall Width

The overall width of the bus shall not exceed 102 inches excluding accessories.

Public Address System

Buses may be equipped with a public address system having interior and exterior speakers. Interior speakers shall be flush mounted with bulkhead. No internal speakers

other than the driver's communication systems may be installed within four feet of the driver's seat back in its rearmost, upright position.

Retroreflective Material

1. The front and/or rear bumper may be marked diagonally 45 degrees down to the centerline of the pavement with 2" x 1/4" wide strips of non-contrasting retroreflective material.
2. The rear of the bus body shall be marked with strips of retroreflective National School Bus Yellow (NSBY) material to outline the perimeter of the back of the bus using material which conforms with the requirements of FMVSS 571.131 (Table I). The perimeter marking of rear emergency exits per FMVSS 217 and/or the use of retroreflective SCHOOL BUS signs partially accomplish the objective of this requirement. To complete the perimeter marking of the back of the bus, strips of at least one-inch retroreflective NSBY material shall be applied horizontally above the rear windows and above the rear bumper, extending from the rear emergency exit perimeter marking outward to the left and rear corners of the bus. Vertical strips shall be applied at the corners connecting these horizontal strips.
3. **SCHOOL BUS** signs, if not of a lighted design, shall be marked with retroreflective NSBY material comprising a background for lettering of the front and/or rear **SCHOOL BUS** signs.
4. The sides of the bus body shall be marked with retroreflective NSBY material at least one inch in width, extending the length of the bus body and located (vertically) between the floor line and the belt line.

NOTE: Reflectivity of the stop signal arm is to be addressed under the Stop Signal Arm Section. Signs, if used, placed on the rear of the bus relating to school bus flashing signal lamps or railroad stop procedure may be of a retroreflective material [as specified by each state].

Rub Rails

1. There shall be one rub rail located on each side of the bus approximately at seat level which shall extend from the rear side of the entrance door completely around the bus body (except emergency door or any maintenance access door) to a point of curvature near the outside cowl on the left side.
2. There shall be one additional rub rail located approximately at the floor line which shall cover the same longitudinal area as the upper rub rail, except at the wheel housing, and shall extend only to radii of the right and left rear corners.
3. Rub rails above the floor line shall be attached at each body post and all other upright structural members.

4. Each rub rail shall be 4 inches or more in width in their finished form, shall be of 16-gauge metal or other suitable material of equivalent strength, suitable to protect body side panels from damage. Rub rails shall be constructed in a corrugated or ribbed fashion.
5. Rub rails shall be applied to the outside of the body or outside body posts. Pressed-in or snap-on rub rails do not satisfy this requirement. For Type A1 vehicles using a chassis manufacturer's body, or for Types A2, C, and D buses using rear luggage or rear engine compartments, rub rails need not extend around rear corners.
6. The bottom edge of the body side skirts shall be stiffened by application of a rub rail, or the edge may be stiffened by providing a flange or other stiffeners.

Seat Belt for Driver

1. The driver's seat shall be equipped with the seat belt anchored to the floor, housed in scabbard and equipped with an emergency locking retractor (one side only). The driver's seat shall be equipped with a Type II occupant protection (lap and shoulder belt). Adjustability of the mounting point for the driver's seat belt pillar loop shall be provided to accommodate all heights and weights of bus drivers without interference with the driver's face or neck. The requirements of FMVSS 209 and 210 shall be met. Integrated seat belts in the driver's seat may be used at the discretion of the local school system.
2. Buses equipped with lap/shoulder seat belts for student seating shall contain at least *two belt cutters*. *One belt cutter must be properly secured in a location within reach of the driver while belted into the driver's seat. The belt cutter shall be durable, designed to eliminate the possibility of the operator or others being cut during use, and must have a full handgrip.*
3. **The driver's seat belt shall be high visibility orange or lime green in color on all buses except Type A. All Type C and D buses must be equipped with a continuous audible and visual warning signal activated when the driver's seat belt is not fastened and the ignition is in the on position. The warning signal shall be different from low air or emergency exit buzzer. Type A buses must be equipped with warning buzzers as per manufacturer's standard.**

Seats and Crash Barriers

All Type A1 buses, 14,500 pounds GVWR and under shall be equipped with lap/shoulder belts and must meet FMVSS 209 requirements.

1. Seats shall be spaced to obtain a minimum of 24-inch hip-to-knee room measured horizontally at the seat cushion level at the transverse centerline of the seat. In making this measurement from the back of the seat cushion to the back of the seat or barrier in front, upholstery may be placed against padding both forward and rear but padding may not be compressed. Greater seat spacing may be specified on local bids not to exceed the maximum allowable per FMVSS 222.

2. In determining seating capacity of standard school buses, the allowable average rump width shall be 13 inches where a 3-3 seating plan is used, and thirteen (13) or 15 inches where 3-2 seating plan is used on specially-equipped buses.
3. All seats shall be bench style, forward facing and have a minimum depth of 15 inches. No transit or activity seat will be used. There shall be no armrest on student seats. No bus shall be equipped with jump seats or portable seats.
4. All seat frames attached to the seat rail shall be fastened with two (2) bolts, washers and nuts or flange-headed nuts. Each seat leg shall be secured to the floor by a minimum of two (2) bolts, washers and nuts. Flange-head nuts may be used in lieu of nuts and washers, or seats may be track-mounted in conformance with FMVSS 222. If track seating is installed, the manufacturer shall supply minimum and maximum seat spacing dimensions applicable to the bus, which comply with FMVSS 222. This information shall be on a label permanently affixed to the bus.
5. The forward most pupil seat on the right side of the bus shall be located so as not to interfere with the driver's vision, not farther forward than the barrier behind the driver or the rear of the driver's seat when adjusted to its rear-most position.
6. All seats and backs shall be a standard color unless changed by purchaser. Seat and back cushions of all seats shall be designed to safely support the designated number of passengers under normal road conditions encountered in school-bus service. Coverings of seat cushions shall be of a material having 42-ounce finished weight, 54-inch width, and finished vinyl coating of 1.06 broken twill or approved equal by presenting independent laboratory reports for approval.
7. The driver seat shall be of the high back, air or mechanical suspension, box pedestal-type with a minimum seat back adjustment of 15 degrees and with a head restraint to accommodate a 95 percentile adult male (95 percentile adult male as defined in FMVSS 208). The driver's seat shall be secured with nuts, bolts, and washers or flanged-headed nuts. The driver's seat shall have a minimum distance between the steering wheel and seatback of not less than eleven inches, with a minimum aft adjustment of six inches. The seat shall be contoured with adequate padding and support on the sides and shall have a cloth cover. It shall be designed to provide lumbar support and shall be positioned on the centerline of the steering wheel.
8. All restraining barriers and passenger seats shall be constructed with materials that, at a minimum, meet the criteria contained in the School Bus Seat Upholstery Fire Resistant Test.
9. A driver storage pouch shall be provided on the front of the barrier behind driver's seat. This pouch shall be fire resistant and the same color as the bus seats.

10. Crash barriers shall be placed behind the driver's seat and step well. An aluminized courtesy panel on the right side of the bus shall extend to the floor and to the wall. Stanchions are not acceptable.

Passenger seats designed to accommodate a child or infant carrier seat shall comply with FMVSS 225. These seats shall be in compliance with NHTSA's "Guidelines for the Safe Transportation of Pre-School-age Children in School Buses.

Steering Wheel

See Chassis Standard.

Steps

1. The first step at the service door shall be no less than 10 inches and no more than 14 inches from the ground measured from the top of the first step. Ground clearance shall be no less than 10 inches.
 - A. Type D vehicles shall have the first step at the service door 12 to 16 inches from the ground measured from the top of the first step.
2. The service door entrance shall use a three-step step well. Risers shall be of equal height and depth. When a plywood floor is used on steel, the differential may be increased by the thickness of plywood.
3. Steps shall be enclosed to prevent accumulation of ice and snow.
4. Steps shall not protrude beyond the side bodyline.

Step Treads

1. All steps, excluding the floor line platform area, shall be covered with a 3/16-inch pebble-tread-type, rubber floor covering or other materials equal in wear and abrasion resistance to top grade rubber.
2. The *backing* of the step tread may be a minimum 24-gauge cold roll steel *or polymer and* shall be permanently bonded to ribbed rubber; the grooved design shall be such that said grooves run at 90-degree angles to the long dimension of the step treads.
3. A three-sixteenth-inch ribbed step tread shall have a 1 and 1/2 inch white nosing as an integral piece without any joint.
4. The rubber portion of step treads shall have the following characteristics:
 - A. Special compounding for good abrasion resistance and high coefficient of friction.
 - B. Flexibility so that it can be bent around a 1/2 inch mandrel both at 130 degrees Fahrenheit and 20 degrees Fahrenheit without breaking, cracking, or crazing.
 - C. Show a durometer hardness of 85 to 95.

Stirrup Step

There shall be one stirrup step on all Types C, and D buses on each side of the front of the body for use in cleaning the windshield and lamps. There shall be one handle on each side, at least eight inches in length suitably located for the driver to use while cleaning the windshield and lamps. The stirrup steps and the handles shall be of rust-resistant material. Transit buses shall have provisions for cleaning the windshield. Toe eyes in the bumper with a handle(s), above the windshield, are acceptable.

Stop Arm Signal

All stop arm signals shall be of the strobe-type and have high-intensity, retroreflective coating. The stop signal - arm(s) shall comply with the requirements of FMVSS 131.

Stop Arm Signal - Rear (Optional)

A rear stop arm is permissible when used in conjunction with the original stop arm. The rear stop arm location on dual stop arm-equipped buses shall be on the left side of the bus, as close as is practical to the left rear corner of the body. Airlines, if used, must not be readily accessible to students inside or outside of the bus.

Storage Compartment

A lockable, waterproof, exterior storage compartment shall be located on the bus body on the right side of the bus. The minimum size of the storage compartment shall be 12 inches high, 15 inches deep, and 25 inches wide and shall be marked "storage". Alternate storage compartment locations should be specified in local school system bid specifications. For Type A buses unable to meet this requirement, an appropriate waiver must be secured from the Alabama Department of Education, Pupil Transportation Section. If the storage compartment location cannot be on the right side, the alternate location must be approved by the school system during the bid process.

All lockable interior storage compartments containing emergency equipment shall be equipped with a warning buzzer installed so as to activate when the ignition switch is on and the compartment is locked. All such compartments shall be clearly labeled as to containing emergency equipment.

Sun Shield

Each Type C and D school bus shall have an interior adjustable sun visor with minimum measurements of 6 inches by 30 inches. It shall be installed in a position convenient for use by the driver, anchored on both ends, and shall be tinted transparent plastic or phlex-o-glass. On all Type A buses, the sun shield shall be the manufacturer's standard. An additional sun shield may be added over the left side driver window at option of the local school system.

Tailpipe

See Chassis Standard.

Traction-Assisting Devices

1. Where required or used, sanders shall:

- A. Be of the hopper cartridge-valve type.
 - B. Have a metal hopper with all interior surfaces treated to prevent condensation of moisture.
 - C. Be of at least 100-pound (grit) capacity.
 - D. Have a cover on the filler opening of the hopper, which screws into place, sealing the unit airtight.
 - E. Have discharge tubes extending to the front of each rear wheel under the fender.
 - F. Have no-clogging discharge tubes with slush-proof, non-freezing rubber nozzles.
 - G. Be operated by an electric switch with a telltale pilot light mounted on the instrument panel.
 - H. Be exclusively driver controlled.
 - I. Have a gauge to indicate the hopper needs refilling when it is down to one quarter full.
2. Automatic traction chains may be installed.

Trash Container and Holding Device

1. Where required or used, the trash container shall:
- A. Be of fire resistant polyethylene or equivalent material.
 - B. Be no greater than 14-quart capacity.
 - C. Be secured by a holding device that is designed to prevent movement and allow easy removal and replacement.
 - D. Be installed in an accessible location in the driver's compartment, not obstructing passenger use of the service door or access to emergency equipment.

Undercoating

1. The entire underside of the bus body, including floor sections, the cross member and below floor line side panels, shall be coated with rust-proofing the compound for which compound manufacturer has issued notarized certification of compliance to the bus body builder that the compound meets or exceeds all performance and qualitative requirements of paragraph 3.4 of Federal Specification TT-C-250b using modified test procedures for the following requirements*:
- A. Salt spray resistance-pass modified to 5% salt and 1000 hours.
 - B. Abrasion resistance-pass.

C. Fire resistance-pass.

*Test panels are to be prepared in accordance with paragraph 4.6.12 of TT-C-520b with the modified procedure requiring that the test be made on a 48-hour air-cured film at a thickness recommended by the compound manufacturer.

2. The undercoating compound shall be applied with suitable airless or conventional spray equipment to recommend film thickness and shall show no evidence of voids in cured film.

Ventilation

1. Auxiliary fans if installed shall meet the following requirements:
 - A. Fans for left and right sides shall be placed in a location where they can be adjusted for maximum effectiveness and do not obstruct vision to any mirror.
NOTE: All Type A buses may be equipped with one fan.
 - B. Fans shall be a nominal 6” diameter.
 - C. Fan blades shall be covered with a protective cage. Each fan shall be controlled by a separate switch.
2. The body shall be equipped with a suitably controlled ventilating system of sufficient capacity to maintain the proper quantity of air under operating conditions, without having to open windows except in extremely warm weather.
3. A static-type, non-closeable exhaust ventilator shall be installed in the roof.

Video Surveillance Equipment

1. Video equipment may be installed at the discretion of the local school system. *If installed, video equipment shall be digital with a minimum of two camera positions. One camera position must show driver compartment.*
2. While video equipment does not have to be flush mounted, positioning of video surveillance equipment shall not interfere with the safe operation of the bus or student safety. It is recommended that the SDE be contacted prior to the installation of new video equipment.

Wheel Housing

1. The wheel-housing opening shall allow for easy tire removal and service.
2. The wheel housing shall be attached to the floor sheets in such a manner as to prevent any dust, water or fumes from entering the body. The wheel housing shall be constructed of at least 16-gauge steel or other material of equal tensile strength.
3. The inside height of the wheel housing above the floor line shall not exceed 12 inches.

4. The wheel housing shall provide clearance for installation and use of tire chains on single and dual (if so equipped) power-driving wheels.
5. No part of a raised wheel housing shall extend into the emergency door opening.

Windshield and Windows

1. All glass in the windshield, the windows, and doors shall be of approved safety glass so mounted that a permanent mark is visible and of sufficient quality as to prevent distortion of view in any direction.
2. Glass in the windshield shall be heat absorbent, laminated plate. The windshield shall be large enough to permit the driver to see the roadway clearly, shall be slanted to reduce glare, and shall be installed between the front corner posts that are so designed and placed as to afford minimum obstruction to the driver's view of the roadway.
3. All full side windows shall open vertically so as to provide an unobstructed opening of not less than 9 inches high and 22 inches wide, obtained by lowering the window. Windows shall be a split-sash type and so installed as to provide an emergency exit. There shall be no horizontal, transit or activity-style windows in the student compartment.
4. All exposed edges of glass shall meet FMVSS requirements.
5. A tinted and shaded windshield with 73% light transmitted and a six-inch shaded band across the top shall be installed at the factory. Type A-I and A-II buses utilizing the chassis manufacturers one-piece windshield may be equipped with an O.E.M. shade band windshield with a band of approximately 4 inches in height.
6. *All windows in the passenger compartment shall be tinted with 28% light transmitted. The driver's compartment side window and entrance door windows shall be tinted with 70- 75% light transmitted.*

Windshield Washers

A windshield washer system shall be provided that will service the entire wiped surface area.

Windshield Wipers

1. A windshield wiping system, two speed or variable speed, with an intermittent feature shall be provided. The wipers shall meet the requirements of FMVSS 104.
2. The wipers shall be operated by one or more air or electric motors of sufficient power to operate the wipers. Type A-I and A-II buses utilizing the chassis manufacturer's one-piece windshield may be equipped with two wipers driven by either one or two electric motors.

Wiring

1. All wiring shall conform to current standards of the Society of Automotive Engineers.
2. Circuits
 - A. Wiring shall be arranged in circuits as required with each circuit protected by a circuit breaker or electronic protection device. A system of color and number coding shall be used and an appropriate identifying diagram shall be provided to the end user along with the wiring diagram provided by the chassis manufacturer. **A system of color and number coding shall be used on buses. The following body interconnecting circuits shall be color-coded as noted:**

<u>Function</u>	<u>Color</u>
Left Rear Directional Light	Yellow
Right Rear Directional Light	Dark Green
Stoplights	Red
Back-up Lights	Blue
Taillights	Brown
Ground	White
Ignition Feed, Primary Feed	Black

The color of cables shall correspond to SAE J1128.

- B. Wiring shall be arranged in at least six regular circuits as follows:
 - (1) Head, tail, stop (brake) and instrument panel lamps.
 - (2) Clearance and step well lamps. The step well lamp shall be actuated when the service door is opened.
 - (3) Dome lamp.
 - (4) Ignition and emergency exits signal.
 - (5) Turn signal lamps.
 - (6) Alternately flashing signal lamps.
- C. Any of the above combination circuits may be subdivided into additional independent circuits.
- D. Each heater and defroster shall have its own circuit breakers or other equivalent technology.

- E. Whenever possible, all other electrical functions (such as sanders and electric-type windshield wipers) shall be provided with independent and properly protected circuits.
 - F. Each body circuit shall be coded by number or letter on a diagram of circuits and shall be attached to the body in readily accessible location.
 - G. There shall be a manual noise suppression switch installed in the control panel. The switch shall be labeled and alternately colored. This switch shall be an on/off-type that deactivates all body equipment that produces noise including at least the am/fm radio, heaters, air conditioners, fans and defrosters. This switch shall not deactivate safety systems such as windshield wipers, lighting or warning systems. Noise suppression switch on Type AI buses shall be limited to bus body accessories.
3. The entire electrical system of the body shall be designed for the same voltage as the chassis on which the body is mounted.
 4. All wiring shall have an amperage capacity equal to or exceeding the designed load. All wiring splices are to be done at an accessible location and noted as splices on the wiring diagram.
 5. A body-wiring diagram of easily readable size shall be furnished with each bus body or affixed in an area convenient to the electrical accessory control panel.
 6. The body power wire shall be attached to a special terminal on the chassis.
 7. All wires passing through metal openings shall be protected by a grommet.
 8. Wires and tubing shall be enclosed within body panels.

SECTION IV – (SPECIAL NEEDS) SCHOOL BUS STANDARDS

Introduction

Equipping buses to accommodate students with special needs is discretionary depending upon the needs of the passengers. While one bus may be fitted with a lift, another may have seat belts installed to secure child seats. Buses so equipped are not to be considered a separate class of school bus, but simply a regular school bus, which is equipped for special accommodations.

The specifications in this section are intended to be supplementary to specifications in the chassis and body sections. In general, specially equipped buses shall meet all the requirements of the preceding sections plus those listed in this section. It is recognized by the entire industry that the field of special transportation is characterized by varied needs for individual cases and by a rapidly emerging technology for meeting those needs. A flexible, “common sense”, approach to the adoption and enforcement of specifications for these vehicle, therefore, is prudent.

By federal regulation, buses, including school buses, are defined as vehicles designed to carry eleven or more (passengers including the driver). Vehicles designed with 10 or fewer passenger positions (including the driver) cannot be certified as buses. For this reason, the federal vehicle classification Multipurpose Passenger Vehicle, or MPV, must be used by manufacturers for these vehicles in lieu of the School Bus. In determining passenger capacity, wheelchair positions are counted as passenger positions. This classification system, while requiring compliance with a less stringent set of Federal Standards for MPV’s does not preclude state or local agencies or these specifications from requiring compliance of school bus-type MPV’s with the more stringent Federal Standards for school buses.

The following standards address modifications as they pertain to school buses that, with a standard seating arrangement prior to modification, would accommodate more than 10 persons. If by addition of a power lift, mobile seating device positions or other modifications, the capacity is reduced such that vehicles become MPV’s, the intent of these standards is to have these vehicles be required to meet the same standards they would have had to meet prior to such modifications, and such MPV’s are included in all references to school buses and requirements for school buses which follow:

Definition – Specially Equipped School Bus

A specially equipped school bus is any school bus that is primarily designed, equipped, or modified to accommodate students with special needs.

General Requirements

1. School buses designed for transporting students with special transportation needs shall comply with these specifications and with FMVSS applicable to their GVWR category.

2. Any school bus to be used for the transportation of children who are confined to a wheelchair or other mobile positioning device, or who require life support equipment which prohibits use of the regular service entrance, shall be equipped with a power lift, unless a ramp is needed for unusual circumstances related to passenger needs.

Air Conditioning

Special needs buses shall be equipped with air conditioning. **Refer to page 14, School Bus Body Standards, for minimum air conditioning standards.**

Aisles

All school buses equipped with a power lift shall provide a minimum 30-inch aisle from any wheelchair position to front entrance and rear emergency exit door.

Communication System

Each special needs bus shall be equipped with a two-way, voice communication system capable of providing communication with the operational base. Where technologically feasible, the communication system shall also communicate with 911 operators. CB radio systems will not meet this requirement. **It is the responsibility of the local school system to comply with this specification.**

Crash Barriers

1. Crash barrier shall be placed between the lift and any seat position (bench seat or wheelchair position). Stanchions are not acceptable.
2. There shall be a padded crash barrier approximately 8 inches in front of the forward edge of the seat cushion of all passenger seats that do not have another seat approximately 27 inches in front of them. There shall be a padded crash barrier or seat in front of any wheelchair position unless it is contiguous with and behind another wheelchair position. The forward-most barrier on both sides of the bus shall have a full-width, aluminized courtesy panel extending to the floor.

Evacuation Blanket

A minimum of two fire-retardant, evacuation blankets, Tie Tech Evac-Aide Part # 1003, or prior approved equal, and storage pouch shall be provided. **The location to secure the evacuation blanket shall be easily accessible and determined by the purchaser at the time of the bid.**

Glazing

Tinted glazing may be installed in all doors, windows and windshield consistent with federal, state, and local regulations.

Identification

Buses with power lifts used for transporting physically handicapped students shall display three universal handicapped symbols located below the windowpane. Such emblems shall be white on blue background, shall not exceed 12 inches in size, and shall be of a high-intensity retroreflectorized material meeting U. S. Department of

Transportation FHWA FP-85 Standards. Symbols shall be located on the lift door, the rear of the bus, and the front left side of the bus.

Passenger Capacity Rating

In determining the passenger capacity of a school bus for purposes other than actual passenger load (i.e., vehicle classification, or various billing/reimbursement models), any location in a school bus intended for securing an occupied wheelchair/mobility aid during vehicle operations may be regarded as four designated seating positions. Similarly, each lift area may be regarded as four designated seating positions.

Power Lift

1. The option shall be provided to the local purchaser to have the lift located either in front of or behind the rear wheels, on the right side of the bus, but confined within the bus body when not extended.
2. All lifts shall be fully automatic with sufficient clearances to permit a wheelchair or other mobility user to reach a securement location.
3. The design load of the lift shall be at least 600 pounds. Working parts, such as cables, pulleys, and shafts, which can be expected to wear, and upon which the lift depends for support of the load, shall have a safety factor of at least 6 (six), based on the ultimate strength of the material. Non-working parts, such as the platform, frame, and attachment hardware, which would not be expected to wear, shall have a safety factor of at least 3 (three), based on the ultimate strength of the material.
4. The lifting mechanism and platform shall be able to lift a minimum of 800 pounds.
5. Controls shall be provided that enable the operator to activate the lift mechanism from either inside or outside the bus. The controls shall be interlocked with the vehicle brakes, transmission, or door, as required by FMVSS 403 and 404. The lift shall deploy to all levels (i.e., ground, curb, and intermediate positions) normally encountered in the operating environment. Where provided, each control for deploying, lowering, raising, and stowing the lift and lowering the roll-off barrier shall be of a momentary contact type requiring continuous manual pressure by the operator and shall not allow improper lift sequencing when the lift platform is occupied. The controls shall allow reversal of the lift operation sequence, such as raising or lowering a platform that is part way down, without allowing an occupied platform to fold or retract into the stowed position.
6. The lift shall incorporate an emergency method of deploying, lowering to ground level with a lift occupant, and raising and stowing the empty lift if the power to the lift fails. No emergency method, manual or otherwise, shall be capable of being operated in a manner that could be hazardous to the lift occupant or to the operator when operated according to manufacturer's instructions and shall not permit the platform to be stowed or folded when occupied. No manual emergency operation

shall require more than 2 (two) minutes to lower an occupied wheelchair to ground level.

7. Platforms stowed in a vertical position, and deployed platforms when occupied, shall have provisions to prevent their deploying, falling, or folding any faster than 12 inches per second or their dropping of an occupant in the event of a single failure of any load carrying component.
8. The lift platform shall be equipped with barriers to prevent any of the wheels of a wheelchair or mobility aid from rolling off the platform during its operation. A movable barrier or inherent design feature shall prevent a wheelchair or mobility aid from rolling off the edge closest to the vehicle until the platform is in its fully raised position. Each side of the lift platform, which extends beyond the vehicle in its raised position, shall have a barrier a minimum 1 and 1/2 inches high. Such barriers shall not interfere with maneuvering into or out of the aisle. The loading-edge barrier (outer barrier), which functions as a loading ramp when the lift is at ground level, shall be sufficient when raised or closed, or a supplementary system shall be provided, to prevent a power wheelchair or mobility aid from riding over or defeating it. The outer barrier of the lift shall automatically raise or close, or a supplementary system shall automatically engage, and remain raised, closed, or engaged at all times that the platform is more than 3 inches above the roadway or sidewalk and the platform is occupied. Alternatively, a barrier or system may be raised, lowered, opened, closed, engaged, or disengaged by the lift operator, provided an interlock or inherent design feature prevents the lift from rising unless the barrier is raised or closed or the supplementary system is engaged.
9. The platform surface shall be free of any protrusions over 1/4 inch high and shall be slip resistant. The platform shall have a minimum clear width of 28 and 1/2 inches at the platform, a minimum clear width of 30 inches measured from 2 inches above the platform surface to 30 inches above the surface of the platform, and a minimum clear length of 48 inches measured from 2 inches above the surface of the platform to 30 inches above the surface of the platform.
10. Any openings between the platform surface and the raised barriers shall not exceed 5/8 inches in width. When the platform is at vehicle floor height with the inner barrier (if applicable) down or retracted, gaps between the forward lift platform edge and the vehicle floor shall not exceed 1/2 inches horizontally and 5/8 inches vertically.
11. The outboard entrance ramp or loading-edge barrier used as a ramp and the transition plate from the inboard edge of the platform to the vehicle floor shall not exceed a slope of 1:8, measured on level ground, for a maximum rise of three inches, and the transition from roadway or sidewalk to ramp may be vertical without edge treatment up to 1/4 inches.

Thresholds between 1/4 inch and 1/2 inch high shall be beveled with a slope no greater than 1:2.

12. The lift platform (not including the entrance ramp) shall not deflect more than three degrees (exclusive of vehicle roll or pitch) in any direction between its unloaded position and its position when loaded with 60 pounds applied through a 26" by 26" test pallet at the centroid of the platform.
13. No part of the platform shall move at a rate exceeding 6 inches per second during lowering and lifting an occupant, and shall not exceed 12 inches per second during deploying or stowing. This requirement does not apply to the deployment or stowage cycles of lifts that are manually deployed or stowed. The maximum platform horizontal and vertical acceleration when occupied shall be 0.3 g.
14. The lift shall permit both inboard and outboard facing of wheelchair and mobility aid users.
15. Lifts shall accommodate persons using walkers, crutches, canes or braces, or who otherwise have difficulty using steps. The platform may be marked to indicate a preferred standing position.
16. Platforms on lifts shall be equipped with handrails on two sides, which move in tandem with the lift, and which shall be graspable and provide support to standees throughout the entire lift operation. Handrails shall have a usable component at least 8 inches long with the lowest portion a minimum 30 inches above the platform and the highest portion a maximum 38 inches above the platform. The handrails shall be capable of withstanding a force of 100 pounds concentrated at any point on the handrail without permanent deformation of the rail or its supporting structure. The handrails shall have a cross-sectional diameter between 1 and 1/4 inches and 1 and 1/2 inches or shall provide an equivalent grasping surface, and have eased edges with corner radii of not less than 1/8 inch. Handrails shall be placed to provide a minimum 1 and 1/2" knuckle clearance from the nearest adjacent surface. Handrails shall not interfere with wheelchair or mobility aid maneuverability when entering or leaving the vehicle. Any wheelchair frame utilizing a horizontal overhead support shall have padding at least 1" in thickness extending the full width of support.
17. A re-settable circuit breakers or other equivalent technology shall be installed between the power source and the lift motor if electrical power is used. It shall be located as close to the power source as possible, but not within the passenger/driver compartment.
18. Lift design shall prevent excessive pressure that could damage the lift system when the platform is fully lowered or raised, or that could jack the vehicle.
19. The following information shall be provided with each vehicle equipped with a lift:

- A. A phone number where information can be obtained about installation, repair, and parts. (Detailed written instructions and a parts list shall be available upon request.)
 - B. Detailed instructions regarding use of the lift and readily visible when the lift door is open, including a diagram showing the proper placement and positioning of wheelchair/mobility aids on lift.
20. The lift manufacturer shall make available training materials to ensure the proper use and maintenance of the lift. These may include instructional videos, classroom curriculum, system test results, or other related materials.
21. Each lift shall be permanently and legibly marked or incorporate a non-removable label or tag which states that it conforms to all applicable requirements of the current National Standards for School Buses. In addition, the lift manufacturer, or an authorized representative, upon request of the original titled purchaser, shall provide a Notarized Certificate of Conformance, either original or photocopied, which states that the lift system meets all the applicable requirements of the current National Standards for School Buses.

Ramp

Emergency ramps may be used with prior approval from the SDE.

Regular Service Entrance

1. Steps
 - A. The first step at the service door shall be not less than 10 inches and not more than 14 inches from the ground when measured from the top of the step based on standard chassis specifications.
 - B. Type D vehicles shall have the first step at the service door 12 to 16 inches from the ground.
2. The service door entrance shall use a three-step step well. Risers shall be of equal height and depth. When a plywood floor is used on steel, the differential may be increased by thickness of plywood.
3. Steps shall be enclosed to prevent accumulation of ice and snow.
4. Steps shall not protrude beyond the side bodyline.
 - A. A grab handle not less than 20 inches in length shall be provided in an unobstructed location inside the doorway.

Restraining Devices

1. On power-lift equipped vehicles, seat frames may be equipped with attachments or devices to which belts, restraining harnesses or other devices may be attached. Attachment framework or anchorage devices, if installed, shall conform to FMVSS 210.
2. Seat belt assemblies installed on special needs buses shall conform to FMVSS 209. *If seat belt assemblies are installed on special needs buses, they shall be of the lap/shoulder belt configuration.* Seat belt assemblies shall be color-coded, installed by the manufacturer, and must conform to FMVSS 209.
3. Child restraint systems, which are used to facilitate the transportation of children who in other modes of transportation would be required to use a child, infant, or booster seat, shall conform to FMVSS 213 and 222.
4. Passenger seats designed to accommodate a child or infant carrier seat shall comply with FMVSS 225. These seats shall be in compliance with NHTSA's "**Guidelines for the Safe Transportation of Pre-School-Age Children in School Buses.**"

Seating Arrangements

Flexibility in seat spacing to accommodate special circumstances shall be permitted to meet passenger requirements. All seating shall be forward facing. **Floor plans for special needs buses shall be designed with emphasis on placing wheelchair positions forward of the rear axle.**

Securement and Restraint System for Wheelchair/Mobility Aid and Occupant

For purposes of better understanding the various aspects and components of this section, the term securement or phrase securement system is used exclusively in reference to the device(s), which secure the wheelchair/mobility aid. The term restraint or phrase restraint system is used exclusively in reference to the device(s) used to restrain the occupant of the wheelchair/mobility aid. The phrase securement and restraint system is used to refer to the total system, which secures and restrains both the wheelchair/mobility aid and the occupant.

1. Securement and restraint system--general
 - A. The Wheelchair/Mobility Aid Securement and Occupant Restraint System shall be designed, installed, and operated to accommodate passengers in a forward-facing orientation within the bus and shall comply with all applicable requirements of FMVSS 222. Gurney-type devices shall be secured parallel to the side of each bus.
 - B. The securement and restraint system, including the system track, floor plates, pockets, or other anchorages shall be provided by the same manufacturer, or be certified to be compatible by manufacturers of all equipment/systems used.

- C. When a wheelchair/mobility aid securement device and an occupant restraint share a common anchorage, including occupant restraint designs that attach the occupant restraint to the securement device or the wheelchair/mobility aid, the anchorage shall be capable of withstanding the loads of both the securement device and occupant restraint applied simultaneously, in accordance with FMVSS 222 (see Sections 2 and 3 of this section).
- D. When a wheelchair/mobility aid securement device (webbing or strap assembly) is shared with an occupant restraint, the wheelchair/mobility aid securement device (webbing or strap assembly) shall be capable of withstanding a force twice the amount as specified in Section 4.4(a) of FMVSS 209 (see Sections 2 and 3 of this section).
- E. The bus body floor and sidewall structures where the securement and restraint system anchorages are attached shall have equal or greater strength than the load requirements of the system(s) being installed.
- F. The occupant restraint system shall be designed to be attached to the bus body either directly or in combination with the wheelchair/mobility aid securement system, by a method, which prohibits the transfer of weight or force from the wheelchair/mobility aid to the occupant in the event of an impact.
- G. When an occupied wheelchair/mobility aid is secured in accordance with the manufacturer's instructions, the securement and restraint system shall limit the movement of the occupied wheelchair/mobility aid to no more than 2 inches in any direction under normal driving conditions.
- H. The securement and restraint system shall incorporate an identification scheme, which will allow for the easy identification of the various components and their functions. It shall consist of one of the following, or combination thereof:
 - (1) The wheelchair/mobility aid securement (webbing or strap assemblies) and the occupant restraint belt assemblies shall be of contrasting color or color shade.
 - (2) The wheelchair/mobility aid securement device (webbing or strap assemblies) and occupant restraint belt assemblies shall be clearly marked to indicate the proper wheelchair orientation in the vehicle, and the name and location for each device or belt assembly; i.e., front, rear, lap belt, shoulder belt.
- I. All attachment or coupling devices designed to be connected or disconnected frequently shall be accessible and operable without the use of tools or other mechanical assistance.

- J. The securement and restraint system hardware and components shall be free of sharp or jagged areas and shall be of a non-corrosive material or treated to resist corrosion in accordance with Section 4.3(a) of FMVSS 209.
 - K. The securement and restraint system shall be located and installed such that when an occupied wheelchair/mobility aid is secured, it does not block access to the lift door or emergency door.
 - L. A device for storage of the securement and restraint system may be provided. When the system is not in use, the storage device shall allow for clean storage of the system, shall keep the system securely contained within the passenger compartment, shall provide reasonable protection from vandalism, and shall enable the system to be readily accessed for use.
 - M. The entire securement and restraint system, including the storage device, shall meet the flammability standards established in FMVSS 302.
 - N. Each securement device (webbing or strap assembly) and restraint belt assembly shall be permanently and legibly marked or incorporate a non-removable label or tag which states that it conforms to all applicable FMVSS requirements. In addition, the system manufacturer, or an authorized representative, upon request by the original titled purchaser, shall provide a notarized Certificate of Conformance, either original or photocopied, which states that the wheelchair/mobility aid securement and occupant restraint system meets all of the requirements as specified in FMVSS 222.
 - O. The following information shall be provided with each vehicle equipped with a securement and restraint system:
 - (1) A phone number where information can be obtained about installation, repair, and parts. (Detailed written instructions and a parts list shall be available upon request.)
 - (2) Detailed instructions regarding use, including a diagram showing the proper placement of the wheelchair/mobility aids and positioning of securement devices and occupant restraints, including correct belt angles.
 - P. The system manufacturer shall make available training materials to ensure the proper use and maintenance of the wheelchair/mobility aid securement and occupant restraint system. These may include instructional videos, classroom curriculum, system test results, or other related materials.
2. Wheelchair/mobility aid securement system
- A. Each securement system location shall consist of a minimum of four anchorage points. A minimum of two anchorage points shall be located in front of the

wheelchair/mobility aid and a minimum of two anchorage points shall be located in the rear. The securement anchorages shall be attached to the floor of the vehicle and shall not interfere with passenger movement or present any hazardous condition.

- B. Each securement system location shall have a minimum clear floor area of 30" x 48". Additional floor area may be required for some applications. Consultation between the user and the manufacturer is recommended to ensure adequate area is provided.
 - C. The securement system shall secure common wheelchair/mobility aids and shall be able to be attached easily by a person having average dexterity and who is familiar with the system and wheelchair/mobility aid.
 - D. As installed, each securement anchorage shall be capable of withstanding a minimum force of 3,000 pounds (13,344 Newtons) when applied as specified in FMVSS 222. When more than one securement device share a common anchorage, the anchorage shall be capable of withstanding the force indicated above, multiplied by the number of securement devices sharing that anchorage.
 - E. Each securement device, if incorporating webbing or a strap assembly, shall comply with the requirements for Type 1 safety belt systems, in accordance with Sections 4.2, 4.3, and 4.4(a) of FMVSS 209.
 - F. The securement system shall secure the wheelchair/mobility aid in such a manner that the attachments or coupling hardware will not become detached when any wheelchair/mobility aid component deforms, when one or more tires deflate, and without intentional operation of a release mechanism (e.g., a spring clip on a securement hook).
 - G. Each securement device (webbing or strap assembly) shall be capable of withstanding a minimum force of 2,500 pounds when tested in accordance with FMVSS 209.
 - H. Each securement device (webbing or strap assembly) shall provide a means of adjustment of manufacturer's design, to remove slack from the device or assembly.
 - I. Each securement device, webbing, or strap assembly shall be of the automatic, retractable type.
3. Occupant restraint system
- A. A Type II-A occupant restraint system, which meets all applicable requirements of FMVSS 209 and 210, shall provide for restraint of the occupant.

- B. The occupant restraint system shall be made of materials, which do not stain, soil, or tear an occupant's clothing, and which are resistant to water damage and fraying.
- C. Each restraint system location shall have not less than one anchorage, of manufacturer's design, for the upper end of the upper torso restraint.
 - (1) The anchorage for each occupant's upper torso restraint shall be capable of withstanding a minimum force of 1,500 pounds (6,672 Newtons) when applied as specified in FMVSS 222.
- D. Each wheelchair/mobility aid location shall have not less than two floor anchorages for the occupant pelvic and the connected upper torso restraint.
 - (1) Each floor anchorage shall be capable of withstanding a minimum force of 3,000 pounds (13,344 Newtons) when applied as specified in FMVSS 222.
 - (2) When more than one occupant restraint share a common anchorage, the anchorage shall be capable of withstanding a minimum force of 3,000 pounds (13,344 Newtons) multiplied by the number of occupant restraints sharing the common anchorage in accordance with FMVSS 222.
- E. Each floor and wall anchorage which secures the occupant restraint to the vehicle and which is not permanently attached, shall be of a "positive latch" design, and shall not allow for any accidental disconnection.

Special Light

Doorways, in which lifts are installed, shall have, lighting as required by FMVSS 403 and 404.

Special Service Entrance

1. Power lift equipped bodies shall have a special service entrance to accommodate the power lift. Door materials, panels and structural strength shall be equivalent to the conventional service and emergency doors. Color, rub rail extensions, lettering and other exterior features shall match adjacent sections of the body.
2. The special service entrance and door shall be located on the right side of the bus and shall be designed so as not to obstruct the regular service entrance. All doors shall have positive fastening devices to hold doors in the open position.
3. Each door shall have windows, set in a waterproof manner, which are visually similar in size and location to adjacent non-door windows. Glazing shall be of same type and tinting (if applicable) as standard fixed glass in other body location.
4. A drip molding shall be installed above the opening to effectively divert water from entrance.

5. Door posts and headers from entrance shall be reinforced sufficiently to provide support and strength equivalent to the areas of the side of the bus not used for special service entrance.
6. Special service entrance door shall be equipped with a device that will actuate a visible signal located in the driver's compartment when the door is open and ignition is in "on" position.
7. A switch shall be installed so that the lifting mechanism will not operate when the lift platform door is closed.
8. Special service entrance door shall be equipped with padding at the top edge of the door opening. Pad shall be at least three inches wide and one inch thick and extend the full width of the door opening.

Support Equipment and Accessories

1. Each bus shall contain at least *two belt cutters* properly secured in a location within reach of the driver while belted into his/her driver's seat. The belt cutter shall be durable, designed to eliminate the possibility of the operator or others being cut during use, and must have a full handgrip.
2. Special equipment or supplies which are used on the bus for mobility assistance, health support, or safety purposes shall meet any local, federal, or engineering standards which may apply, including proper identification.

Equipment which may be used for these purposes includes, but is not limited to:

- A. Wheelchairs and other mobile seating devices (see section on Securement System for Mobile Seating Devices/Occupant).
 - B. Crutches, walkers, canes, and other ambulating devices.
 - C. Medical support equipment. This may include respiratory devices such as oxygen bottles (which should be no larger than 22 cubic feet for liquid oxygen and 38 cubic feet for compressed gas), or ventilators. Tanks and valves should be located and positioned to protect them from direct sunlight, bus heater vents, or other heat sources. Other equipment may include intravenous, and fluid drainage apparatus. Appropriate medical placarding, if needed, shall be added by the LEA.
2. All portable equipment and special accessory items, including the equipment listed above, shall be secured at the mounting location to withstand a pulling force of five times the weight of the item, or shall be retained in an enclosed, latched compartment. The compartment shall be capable of withstanding forces applied to its interior equal to five times the weight of its contents without failure to the box's

integrity and securement to the bus. Exception: If these standards provide specific requirements for securement of a particular type of equipment, the specific standard shall prevail (i.e., wheelchairs).

Technology and Equipment, New

It is the intent of these specifications to accommodate new technologies and equipment that will better facilitate the transportation of students with special needs. When a new technology, piece of equipment or component is desired to be applied to the school bus it must meet the following criteria:

- A. The technology, equipment, or component shall not compromise the effectiveness or integrity of any major safety system. (Examples of safety systems include, but are not limited to, compartmentalization, the eight-lamp warning system, emergency exits and the approved color scheme.
- B. The technology, piece of equipment or component shall not diminish the safety of the interior of the bus.
- C. The technology, piece of equipment or component shall not create additional risk to students who are boarding or exiting the bus or are in or near the school bus loading zone.
- D. The technology, piece of equipment or component shall not require undue additional activity and/or responsibility for the driver.
- E. The technology, piece of equipment or component shall generally increase efficiency and/or safety of the bus, generally provide for a safer or more pleasant experience for the occupants and pedestrians in the vicinity of the bus or shall generally assist the driver and make his/her many tasks easier to perform.
- F. The technology, piece of equipment or component shall have prior written approval from the SDE School Bus Specifications Committee.

SECTION V - ALTERNATE FUEL SOURCE STANDARDS

1. The guidelines contained herein shall pertain only to the school buses approved by the Alabama State Board of Education to operate on alternative fuel sources and which meet the safe operation requirements of paragraph B-1.
 - A. Any company or individual servicing conversion equipment to school districts shall provide an approved certification program covering installation, personnel training, maintenance, repair, trouble-shooting and safety procedures for each responsible mechanic to assure that conversion and maintenance is performed only by personnel certified by the Alabama LP-Gas Board or other approved agency.

School systems considering the use of bio-diesel fuels shall secure written approval from the Alabama State Department of Education, Pupil Transportation Section, Montgomery, Alabama, 36130. The written request should, at a minimum, provide the SDE with specific information regarding the fuel designation (B-5 or B-20), the supplier, and the fuel blend.

Fuel blends containing used cooking oil will not be allowed.

- B. These companies or individuals shall submit to the Alabama State Department of Education, Pupil Transportation Section, Montgomery, Alabama, 36130, documentation certifying that the requirements of 1-A have been met.

SECTION VI - OPTIONS

Locking Fuel Compartment Door

Provide at the option of the purchaser a lock and key to secure the fuel compartment door.

Storage Compartment for Required Emergency Equipment

Provide at the option of the purchaser a storage compartment located in the driver's compartment to house the emergency equipment. It shall be a locked compartment with a warning buzzer attached so as to activate when the ignition switch is on and the compartment is locked.

SECTION VII – MULTIFUNCTIONAL SCHOOL ACTIVITY BUS (MFSAB)

DEFINITION:

A Multifunctional School Activity Bus (MFSAB) is a school bus constructed to Federal Motor Vehicle Safety Standards (FMVSS) and Alabama Minimum School Bus Specifications. It must be purchased or leased as a new bus and may only be used for extracurricular activities. **These buses may not be used to transport students to and from schools or between schools for the purpose of attendance.**

The following exceptions to the Alabama Minimum Specifications for School Buses for regular route buses shall be allowed for these vehicles.

Identification:

1. The bus body shall bear the words “**ACTIVITY BUS**” in a contrasting color at least 8 inches high in the area where “school bus” is normally positioned. Lettering and numbering shall conform to FMVSS and Alabama Minimum Specifications and shall meet reflectivity standards.
Bus numbering on this bus may be of a contrasting color.
2. The name of the school system shall be displayed in at least five-inch letters on both sides of the bus in the beltline area. **NO SIGNS OR LOGOS** shall be applied to any area of the bus including the bumpers. The name of the school may be displayed in the beltline area. No signs, logos, or other items shall be displayed on the windows of the bus.

Color:

The local school with school system approval may determine the color of the activity bus. The color scheme may utilize any combination of up to **THREE** colors. This combination may be in addition to an optional white roof. The color National School Bus Yellow (SBMTC-008 Publication) shall not be used as a part of the color scheme.

School systems and/or vendors shall submit preliminary color schemes to the Alabama Department of Education, Pupil Transportation Section for approval **prior to the purchase or manufacture** of a Multifunctional School Activity Bus (MFSAB).

Seating:

Transit style seats, which meet all aspects of FMVSS 222 and 302, may be used in lieu of regular school bus seats.

Lighting and Warning Devices:

All activity buses shall meet state and federal standards for normal school bus lighting and warning device requirements with the following exceptions:

Multifunctional School Activity Buses (MFSAB) may not be equipped with alternately flashing amber or red signal lamps used for loading and unloading students.

Multifunctional School Activity Buses (MFSAB) may not be equipped with stop arm signals or crossing control arms.

INSPECTIONS:

Annual inspection by Alabama Department of Education (SDE) state school bus inspectors and monthly inspections by local school bus inspectors shall be performed on all Multifunctional School Activity Buses (MFSAB) as required by Alabama law and the Rules of the Alabama State Board of Education.

REGULATIONS:

These buses shall be owned by the local school system or leased from private school bus transportation contractors. All Alabama laws, Rules of the State Board of Education, and other applicable regulations pertaining to the operation of school buses and certification of school bus drivers shall apply to Multifunctional School Activity Buses.



Disposal of Used School Buses



The procedures outlined in this document should be used in order to assure the proper disposal of school buses that are sold or otherwise removed from your school system's school bus fleet.

Alabama law requires that school buses be equipped with signal lamps and other visual signals and markings that clearly identify the vehicle as a school bus. School buses are also equipped with specialized equipment in order to help protect students, school bus drivers, and motorists. These visual markings, signals, and other specialized equipment, which include amber and red flashing lights, stop signs, warning signs on the rear of the bus, school bus lettering, and crossing control arms, are peculiar to school buses and may not be used on other vehicles, except as provided under Alabama law. Accordingly, the disposal of school buses requires measures above and beyond those necessary for the disposal of other school system vehicles.

To avoid possible liability, improve security, and also ensure compliance with the law, the following procedures should be followed when disposing of buses **that will no longer be used as school buses**:

1. Disable the overhead amber and red flashing lamps and stop arm used when loading and unloading students.
2. Disable the crossing control arm.
3. Paint out all references to the entire name of the system on the sides of the bus, not just the name of the county or city.
4. Paint out the words "SCHOOL BUS" on the **front and rear** of the bus.
5. Remove the Alabama State Inspection Sticker from the windshield.
6. Remove the county or municipal tag from the vehicle before the sale.

If the bus is sold to another school system, private school, or other agency that will continue to use the vehicle as a school bus, only the name of your system, the state inspection sticker, and the tag should be removed.

Questions regarding the proper disposal of used school buses should be addressed to the Alabama State Department of Education, Pupil Transportation Section, Montgomery, Alabama at 334-242-9730.

ALABAMA MINIMUM SPECIFICATIONS 2009
QUICK REFERENCE CHART

****TYPE A-I SCHOOL BUS****

<p>Type A-I and A-II buses under 14,500 pounds GVWR shall be built to manufacturer's specifications. All type A buses under 14,500 pounds GVWR shall have four-wheel disc brakes.</p>
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****TYPE A-II SCHOOL BUS****

(Over 14,500 pounds)

CAPACITY	BRAKE LINING SIZE	GAWR FRONT	GAWR REAR	GVWR TOTAL	TIRE SIZE
10-47	4" Front 6" Rear	9,000	14,200	23,200	10R x 22.5 10 ply

Type A-II school buses exceeding 14,500 pounds GVWR shall have air brakes.

****TYPE C SCHOOL BUS****

10-47	4" Front 6" Rear	9,000	14,200	23,200	10R x 22.5 10 ply
48-54	4" Front 6" Rear	9,000	16,000	25,000	10R x 22.5 10 ply
55-72	4" Front 7" Rear	9,000	17,500	26,500	10R x 22.5 12 ply

Type C school buses exceeding 72 capacity shall have prior, written SDE approval.

****TYPE C-1 SCHOOL BUS****

10-36	Four-wheel disc	6,000	13,500	19,000 maximum	225 x 70R 19.5 - 12 Ply
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****TYPE D FRONT ENGINE****

10-53	4" Front 6" Rear	10,800	17,000	27,800	10R x 22.5 10 ply
54-66	5" Front 7" Rear	11,000	17,000	28,000	10R x 22.5 10 ply
68-78	5" Front 7" Rear	11,000	19,000	30,000	11R x 22.5 14 ply
79-84	6" Front 8" Rear	13,000	20,000	33,000	11R x 22.5 16 ply

****TYPE D REAR ENGINE****

42-66	5" Front 7" Rear	12,000	19,000	30,000	11R x 22.5 16 ply
68-78	6" Front 7" Rear	12,000	19,000	30,000	11R x 22.5 16 ply
79-84	6" Front 8" Rear	12,000	21,000	33,000	11R x 22.5 16 ply

Type D school buses exceeding 84-capacity shall have prior, written SDE approval.

Alabama Minimum Specifications for School Buses 2008



Alabama Department of Education
Division of Administrative and Financial Services
Pupil Transportation Section
Montgomery, Alabama
334-242-9730

Joseph B. Morton
State Superintendent of Education
Effective as of April 1, 2007

The Alabama Minimum Specifications for School Buses can also be found on the Alabama State Department of Education website at www.alsde.edu. Look under “Sections” for Pupil Transportation, then “Publications”.

Alabama Minimum Specifications for School Buses 2008
Changes Document

Changes to the Alabama Minimum Specifications for School Buses 2007 occur on the following pages and headings. All changes appear in italics with the exception of deletions. For noted deletions refer to the 2007 specifications for comparison.

NOTE: Page numbers in 2007 specs and 2008 specs may not coincide.

Page	Section	General Description of Change
3	<i>Axles</i>	<i>New # 3 Requires oil filled front wheel bearings on all Type C and D school buses</i>
3	<i>Brakes</i>	<i>Item # 2 new wording concerning location of audible brake buzzers or signals</i>
6	<i>Batteries</i>	<i>Item #1A New battery cold cranking amp total</i>
6	<i>Alternator</i>	<i>Item #2B New alternator minimum amperage and wording change</i>
7	<i>Engine</i>	<i>New minimum horsepower rating for Type C and D school buses</i>
8	<i>Exhaust System</i>	<i>New wording for entire exhaust system Items 1 thru 6</i>
9	<i>Fenders & Hoods</i>	<i># 3 Clarification on wording concerning fiberglass or other resin composite materials</i>
20	<i>Emergency exits</i>	<i>Item # 2C additional emergency exits wording clarification on audible level for exit windows and roof hatch warnings</i>
20	<i>Fire Extinguisher</i>	<i># 1 New requirement for fire extinguisher bracket</i>
24	<i>Identification</i>	<i># 5 New language and label concerning driver seat belt use. Label will be supplied by ALSDE</i>
25	<i>Lamps and signals</i>	<i># 4-A New wording removes master switch for 8 way overhead flashers</i>
26	<i>Lamps and signals</i>	<i># 6 Adds Type A buses to side turn signal requirement</i>
28	<i>Mirrors</i>	<i>Item # 2B Clarification on wording concerning fiberglass or other resin composite materials</i>
28	<i>Noise Suppression Switch</i>	<i>Wording clarification on noise suppression switch color</i>
30	<i>Seat Belt -Driver</i>	<i>Item # 3 New specification requires high visibility orange or lime green drivers seat belt</i>
40	<i>Special Needs Bus-Aisle</i>	<i>Aisle- Specification change requires 30" aisle from front to rear of school bus</i>
40	<i>Evacuation Blanket</i>	<i>New specification requires 2 evacuation blankets per bus. Also wording clarification on placement of blankets in bus</i>
45	<i>Seating Arrangements</i>	<i>New wording on placement of wheelchair positions in forward of the rear axle in special needs buses.</i>
53	<i>Alternative Fuel Standards</i>	<i>New requirement for SDE approval for the use of bio-diesel fuels in school buses</i>



INTRODUCTION

Alabama law (32-5-8) requires the Alabama State Board of Education to adopt minimum standards to govern the specifications for all new school buses and the overall operation of all school buses in the state of Alabama. This responsibility also extends to the inspection of school buses being sold and operated in the state of Alabama. The primary reason for the development of specifications and the inspection of school buses is to enhance the safety of our school buses. We must ensure that Alabama school buses continue to provide the safest ride available for our most precious cargo—our children.

A heartfelt thanks is extended to each member of the Alabama State Department of Education School Bus Specifications Committee for their service, hard work, and dedication to the task. School bus specifications always begin as a product of many individual thoughts and ideas. However, they culminate in standards, which help assure the safest school buses possible for Alabama's students as well as vehicles, which provide a true value for Alabama's taxpayers.

Additionally, special thanks must also be voiced for Alabama's school bus dealers and the many manufacturers and vendors in the school bus industry who assist in the Committee in the development of this document. Without their participation, the specifications process would be significantly weakened.

The 2008 Minimum Specifications for Alabama School Buses become effective on April 1, 2007. If you have questions or recommendations regarding any of the specifications in this document, please contact Mr. Greg Ray, Specifications Committee Chairperson or any member of the members of the committee members listed on the following page.

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The Alabama Minimum Specifications for School Buses can also be found on the Alabama State Department of Education website at www.alsde.edu. Look under “Sections” for Pupil Transportation, then “Publications”.

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ALABAMA
SCHOOL BUS INSPECTION
HANDBOOK



PREPARED BY
ALABAMA DEPARTMENT OF EDUCATION
DIVISION OF ADMINISTRATIVE AND FINANCIAL SERVICES
TRANSPORTATION SECTION
MONTGOMERY, ALABAMA

The *Alabama School Bus Inspection Handbook* was developed by the Alabama State Department of Education (SDE) Pupil Transportation Section as a standard for school bus *safety* inspections at the local school system level. This handbook is provided as a guideline for local school system school bus inspectors, shop foremen, technicians, maintenance supervisors, and transportation directors in conducting the monthly inspections required by Alabama law and the Rules of the Alabama State Board of Education.

The goal of this handbook is to provide uniform standards for state and local school bus inspections. The manual also identifies the critical items to be inspected on Alabama school buses, how they are to be inspected, and which items should remove a school bus from service until the item is repaired (“out of service” items).

Copies of the handbook have been distributed to all local school systems.

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REFERENCE CHART

ALABAMA MINIMUM SPECIFICATIONS FOR SCHOOL BUSES
EFFECTIVE April 1, 2007

SECTION I - GENERAL PROVISIONS

Standards

1. All school buses ordered by local education agencies beginning **April 1, 2007**, shall (1) meet the applicable Federal Motor Vehicle Safety Standards (FMVSS), and (2) meet Alabama minimum specifications for school buses. In the event of a conflict between the requirements of an applicable Federal Motor Vehicle Safety Standard, as referred to in this section, and the Alabama minimum specifications, the requirements of the FMVSS shall control. **School buses not meeting minimum specifications will not be certified by the Alabama State Department of Education (SDE). Under unusual circumstances and with adequate justification, exceptions to these specifications may be granted by the SDE administrator of pupil transportation.**

Certification

2. All school bus manufacturers shall certify to the SDE, in the form of a **durable, legible** certification label mounted in the driver's compartment in the vehicle, that all school buses meet or exceed all standards as specified herein and are in compliance with the applicable FMVSS. All manufacturers shall certify to the State of Alabama and local education agencies that all components on school buses are new from bumper to bumper at time of delivery. All chassis and body information shall appear on this certification label.

Used School Buses

3. Used school buses purchased for use by a school system in Alabama shall meet all of the legal Federal and Alabama requirements for school buses that were in effect on the date the vehicle was manufactured.

Bid Requirements

4. In order to be in compliance with the State Bid Law, school bus purchases shall be by competitive bidding. Bid forms to the body manufacturer shall contain certain options required by the chassis manufacturer, which may result in changes in normal Gross Vehicle Weight Rating (GVWR) or alterations to the body. For special needs buses, the school bus body manufacturer shall submit floor plans which include dimensions at the time bid quotations are submitted showing:
 1. Location of the emergency door, emergency windows and roof hatches.
 2. Aisle and staging areas and seat spacing.
 3. Track locations and/or wheelchair securement positions.

5. **Service Manual/Diagnostic Equipment**

Body and/or chassis suppliers, including integral (forward control) suppliers, shall provide each school district purchasing school buses with one complete set of the most current service manuals, as specified by the school system, available to include both body and chassis at no additional cost upon delivery of bus. Provisions for manuals and diagnostic equipment, including, but not limited to code books, software, and training, etc, shall be agreed upon during the pre-bid process. Diagnostic equipment cannot be used to determine low bidder.

6. **New Technology**

New technology not in the present specifications shall have prior written approval from the SDE School Bus Specifications Committee.

7. **School Bus Definitions**

School bus capacity is determined based on body size before modifications are made.

TYPE A: A Type A school bus is a conversion or body constructed upon a van-type or cutaway front-section vehicle with a left side driver's door designed for carrying more than 10 persons. This definition shall include two classifications: Type A-I with a GVWR of 10,000 or under; and Type A-II, with a GVWR over 10,000 pounds. All Type A buses shall have dual rear wheels. **Type A buses under 14,500 pounds GVWR shall have four-wheel disc brakes. Type A buses exceeding a GVWR of 14,500 pounds shall have air brakes.**

TYPE B: A Type B school bus is a conversion or body constructed and installed upon a van or front-section vehicle chassis, or stripped chassis, with a GVWR of more than 10,000 pounds and designed for carrying more than 10 persons. Part of the engine is beneath and/or behind the windshield and beside the driver's seat. The entrance door is behind the front wheels. All Type B buses 14,500 pounds or under shall have four-wheel disc brakes.

TYPE C: A Type C school bus is a body installed upon a flat back cowl chassis with a GVWR of more than 10,000 pounds and designed for carrying more than 10 persons. The entire engine is in front of the windshield and the entrance door is behind the front wheels. **Type C buses may not exceed 72-passenger capacity without prior, written SDE approval.**

TYPE C1 A Type C1 school bus is a body installed upon a flat back cowl chassis with a GVWR of more than 10,000 pounds and a maximum of 19,000 pounds and designed for carrying a maximum of 36 persons. This is a special category of a Type C school bus designed to be an alternate to a

Type A1, Type A2. **This bus shall not exceed a maximum capacity of 36 persons.**

TYPE D: A Type D school bus is a body installed upon a chassis, with the engine mounted in the front, midship, or rear, with a gross vehicle weight rating of more than 10,000 pounds and designed for carrying more than 10 persons. The engine may be behind the windshield and beside the driver's seat, at the rear of the bus, behind the rear wheels, or midship between the front and rear axles. The entrance door is ahead of the front wheels.

Type D buses may not exceed 84-passenger capacity without prior, written SDE approval.

SECTION II - SCHOOL BUS CHASSIS STANDARDS

Air Cleaner

1. The engine intake air cleaner shall be furnished and properly installed by the chassis manufacturer to meet engine specifications.

The intake air system for diesel engines shall have an air cleaner restriction indicator properly installed by the chassis manufacturer to meet engine specifications.

Axles

1. The front and rear axles and suspension systems shall have a gross axle weight rating (GAWR) at ground commensurate with the respective front and rear weight loads of the bus loaded to the rated passenger capacity.
2. Vehicle minimum axle capacities at ground when loaded shall meet the body manufacturer's GVWR specified by the FMVSS. Axle assemblies shall have minimum capacities at ground as shown on the chart on the last page of this booklet.
3. *Front wheel bearings must be oil filled on all Type C and D buses.*

Brakes

1. A braking system, including service brake and parking brake, shall be provided and shall comply with all CDL pretrip inspection requirements. All Type A-1 and A-II school buses below 14,500 pounds GVWR shall be built to manufacturer's specifications. Type C-1 school buses between 10,000 pounds GVWR and 19,000 pounds GVWR are exempt from air brake requirements, but shall have four-wheel disc brakes.
2. Buses using air in the operation of the brake system shall be equipped with warning signals *located within the interior of the driver compartment and clearly audible and visible to the driver*, that will give a continuous warning when the air pressure available in the system for braking is 60 psi (pounds per square inch) or

less. An air pressure gauge shall be provided in the instrument panel capable of complying with CDL pretrip inspection requirements.

3. Antilock brake systems for either air or hydraulic brakes shall include control of all axles in compliance with FMVSS 105 or 121.

A. Air brakes shall be installed on **all** chassis exceeding 14,500 pounds GVWR. **Exception:** Type C-1 school buses between 10,000 pounds GVWR and 19,000 pounds GVWR are exempt from air brake requirements, but shall have four-wheel disc brakes.

All air-operated brake systems shall:

(1) Meet all Federal Motor Vehicle Safety Standards (FMVSS) for air brakes.

(2) Be S-cam type brakes on all wheels. The camshaft, when applying brakes, shall rotate in the same direction as the wheels. Automatic slack adjusters shall be the same design on all wheels. Dust covers shall be installed on all wheels unless deleted through local option at the time of the bid.

(3) Have at least a 12 CFM air compressor.

(4) Be equipped with a parking and emergency brake. A manual control, clearly identified, shall be within easy reach of the driver. The parking brake valve shall comply with CDL pretrip inspection requirements.

(5) Have brake lining sizes as shown on the chart on the last page of this booklet.

(6) Have a reservoir capacity, which is equal to or greater than two (2) times total volume of all brake activators at full travel.

(7) Have air dryers installed. (Bendix AD-9, Midland DA33100 or prior written approved equal). Air dryers shall be serviceable at the local level.

B. Buses using a hydraulic assist-booster in the operation of the brake system shall be equipped with warning signals, readily audible and visible to the driver, that will provide continuous warning in the event of a loss of fluid flow from the primary source, or loss of electric source powering the back-up system.

(1) The system shall be equipped with a source of hydraulic pressure, automatically initiated upon loss of power from primary source, and operating independently of the primary power source.

- (2) All brake systems shall be designed to permit visual inspection of brake lining wear without the removal of any chassis components.

Bumper, Front

1. The front bumper shall be furnished by the chassis manufacturer for all school bus types, unless there is specific agreement between the chassis manufacturer and the body manufacturer. When Type D chassis are supplied to a body company by a chassis manufacturer, the body company shall supply the front bumper as part of the body installation.
2. The front bumper shall be of pressed steel channel or equivalent material at least 3/16 inch thick, not less than 8 inches wide (high) and shall extend beyond forward-most part of the body, grille, hood, and fenders and shall extend to the outer edges of the fenders at the bumper's top line. Bumpers on Type A buses may be built to manufacturers' specifications.
3. Tow eyes or hooks shall be furnished and attached so as not to project beyond the front bumper. Tow eyes or hooks, attached to the frame chassis, shall be furnished by the chassis manufacturer. This installation shall be in accordance with the chassis manufacturer's standards. Type A buses are exempt from tow hook requirements.
4. The bumper shall be designed or reinforced so that it will not deform, when the bus is lifted by a chain that is passed under the bumper (or through the bumper if holes are provided for this purpose) and attached to both tow eyes. For the purpose of meeting this standard, the bus shall be empty and positioned on a level, hard surface, and both tow eyes shall share the load equally. Front bumper shall not be deformed when lifted by a bumper jack positioned on the bumper attachment points.

Certification

The chassis manufacturer shall certify to the SDE and local education agency having pupil transportation jurisdiction that their product meets minimum standards on items not covered by certification issued under requirements of the National Traffic and Motor Vehicle Safety Act.

Color

1. The chassis, including the front bumper, shall be black. The hood, cowl and fenders shall be in national school bus yellow. The hood may be painted with non-reflective paint.
2. Wheel rims shall be painted black, gray, or yellow on all buses.
3. Multifunctional School Activity Buses shall be exempt from these requirements. (See MFSAB specifications on page 51.)

Directional Lights

1. Each Type C chassis may be equipped with Type A front directional lights of the two-faced type mounted on the top of the fender and the hood side panel, or have an amber turn signal and marker light that is an integral part of the headlight assembly. This turn signal/marker light shall be seen from the front and the side of the vehicle.

Drive Shaft

1. Torque capacity of the drive shaft assembly shall at least equal maximum engine torque as developed through lowest transmission gear reduction.
2. Each drive shaft shall be equipped with protective metal guard or guards to reduce the possibility of it whipping through the floor or dropping to ground if broken. (Body manufacturer is responsible for Mini Bus.)

Electrical System

1. Battery
 - A. The storage batteries shall have a minimum total of *1,500* cold cranking amps at 0 degrees Fahrenheit. Type A buses shall be built to manufacturer's specifications.
 - B. Since all batteries in Type, C, and D buses are to be located in a sliding tray, the battery shall be temporarily mounted on the chassis frame by the chassis manufacturer.

In these cases, the final location of the battery and the appropriate cable lengths shall be according to the current SBMTC Design Objectives.

2. Alternator
 - A. All Type A and B buses up to 15,000 lbs. GVWR shall have a minimum 130 amperes alternator.
 - B. All C and D buses over 15,000 lbs. GVWR shall be equipped with a heavy-duty truck or bus-type alternator *capable of producing* a minimum output rating of *185* amperes; The alternator shall be capable of producing a minimum of 50 percent of its maximum rated output at the engine manufacturer's recommended idle speed.
 - C. All C and D, buses equipped with an air conditioner or electrical power lift shall have a minimum 200 amperes alternator.
 - D. A direct-drive alternator is permissible in lieu of a belt drive. A belt drive shall be capable of handling the rated capacity of the alternator with no detrimental effect on other driven components.

E. Refer to SBMTC Design Objectives, most current edition, for estimating required alternator capacity.

3. Wiring

A. All wiring shall conform to current applicable recommended practices of the Society of Automotive Engineers.

(1) All wiring shall use standard colors and number coding and each chassis shall be delivered with a wiring diagram that coincides with the wiring of the chassis. All wires passing through metal openings shall be protected by a grommet or loom.

B. The chassis manufacturer shall install a readily accessible terminal strip or plug on the body side of the cowl, or at an accessible location in the engine compartment of vehicles designed without a cowl, that shall contain the following terminals for the body connections:

- (1) Main 100-amp body circuits
- (2) Tail lamps
- (3) Right turn signal
- (4) Left turn signal
- (5) Stop lamps
- (6) Back-up lamps
- (7) Instrument panel lights (rheostat controlled)

C. Daytime running lamps shall be provided.

4. Circuits

A. An appropriate identifying diagram (color and number coded) for electrical circuits shall be provided to the body manufacturer for distribution to the end user.

Engine Fire Extinguisher (Optional)

See Fire Suppression System page 21.

Engine

1. All buses shall be equipped with diesel engines with a minimum horsepower as follows:

29 to 60 passengers – 170 hp motor minimum

65 passengers and above – 210 hp motor minimum

Type D buses 78 passengers and above – 230 hp minimum

Types A buses under 29 passenger – manufacturer's specifications

2. The engine heater may be installed as per the manufacturer's specifications.

Exhaust System

1. *The exhaust pipe, muffler/ after treatment device, and tail pipe shall be outside the bus body and securely attached to the bus frame. The chassis manufacturer shall furnish an exhaust system with a tail pipe of sufficient length to exit the rear of the bus or at the left side of the bus body no more than 18 inches forward of the front edge of the rear wheelhouse opening. If designed to exit on the side of the bus, the tailpipe shall extend to the skirtline with a turndown angle of approximately 45 degrees. With the exception of special needs buses, Type A vehicles may have the manufacturers standard exhaust system. The bus shall not automatically begin to regenerate the diesel particulate filter while the bus is not moving. The switch to regenerate the diesel particulate filter shall not be visible or accessible to the driver.*
2. *The muffler and the tail pipe shall be constructed of aluminized, or equivalent corrosion resistant material. The tailpipe shall be made of at least 16 gauge material and shall be mounted in such a way that it will not cause damage to brake lines*
3. *The muffler/ after treatment device, and exhaust pipe shall be properly insulated from the fuel tank, lines, and connections by a protective shield at any point where it is 4 inches or less from fuel tank, lines or connections.*
4. *The tailpipe on all special needs vehicles shall be routed to the left of the left frame rail to allow for the installation of a lift on the right side of the vehicle.*
5. *No exhaust pipe shall exit beneath an emergency exit or the fuel fill.*
6. *On all Type C and D buses, the tailpipe shall exit at the bottom edge of the rear bumper or through the rear bumper. If tailpipe exits through the rear bumper sufficient clamps or brackets must be provided to eliminate rattles. If the tailpipe exits beneath the rear bumper, it shall be turned down approximately 45 degrees and positioned in such a way that it cannot be crushed beneath the rear bumper.*

The opening in the tailpipe shall direct all exhaust gases clear of the perimeter of the bus body. Manufacturers must make reasonable efforts to ensure that exhaust gases will not produce burns on students or other individuals present.

Fenders, Hoods

1. The total spread of outer edges of front fenders, measured at the fender line, shall exceed the total spread of the front tires when the front wheels are in a straight-ahead position.
2. Front fenders shall be properly braced and free from any body attachments.

3. A fiberglass *or other reinforced resin composite* tilt hood shall be provided. The hood opening and closing effort shall be minimized to aid the driver with pre-trip inspections and service. If the hood is not designed to remain secure in the open position, a safety prop will be required. The wiring harness shall be a “quick disconnect” type to aid with servicing.

Frame

1. The frame or equivalent shall be of such design and strength characteristics as to correspond at least to standard practice for trucks of the same general load characteristics, which are used for highway service.
2. Any secondary manufacturer that modifies the original chassis frame shall guarantee the performance of workmanship and materials resulting from such modification.
3. Any frame modification shall not be for the purpose of extending the wheelbase.
4. Holes in top or bottom flanges or side units of the frame, and welding to the frame, shall not be permitted except as provided or accepted by the chassis manufacturer.
5. Frame lengths shall be provided in accordance with current SBMTC Design Objectives.

Fuel Tank

1. All Types C, and D chassis above 170-inch wheelbase shall have a minimum 60-gallon fuel tank with a 55-gallon actual draw. The tank shall be filled and vented to the outside of the body, the location of which shall be so that accidental fuel spillage will not drip or drain on any part of the exhaust system.
Type C-1 school buses are exempt from this requirement.
2. No portion of the fuel system, which is located to the rear of the engine compartment, except the filler tube, shall extend above the top of the chassis frame rail. Fuel lines shall be mounted to obtain maximum possible protection from the chassis frame.
3. Fuel filters shall be installed as per manufacturer's specifications. Fuel filtration shall include water detection and separation. At least one fuel filter shall have a replaceable spin-on or cartridge-type element.
4. Fuel tank installation shall be in accordance with current SBMTC Design Objectives for location on the chassis right frame rail or between frame rails; the filler tube shall be located on the right side of the bus.
5. Type A buses may meet manufacturer's specifications.

6. The fuel tank on vehicles constructed with a power lift unit may be mounted on left chassis rail or behind rear wheels.
7. Installation of alternative fuel tanks shall comply with all applicable fire codes.
8. On Types C, and D vehicles, fuel tanks shall have interior baffles to help prevent buses from fuel starvation on inclines.

Governor

1. An engine governor is permissible. When it is desired to limit road speed, a road speed governor should be installed.
2. An electronic engine speed limiter shall be provided and set to limit engine speed not to exceed the maximum revolutions per minute as recommended by the engine manufacturer. For Type C and D buses, and where feasible on Type A buses, bus road speed shall not exceed a maximum of 70 miles per hour.

Heating System, Provision for

1. The chassis engine shall have plugged openings for the purpose of supplying hot water for the bus heating system. The opening shall be suitable for attaching a pipe thread/hose connector. The engine shall be capable of supplying water having a temperature of at least 170 degrees Fahrenheit at a flow rate of 50 pounds/per minute at the return end of 30 feet of one inch inside diameter automotive hot water heater hose (SBMI Standard No. 001--Standard Code for Testing and Rating Automotive Bus Hot Water Heating and Ventilating Equipment).

Horn

Buses shall be equipped with a horn or horns of standard make with each horn capable of producing a complex sound in bands of audio frequencies between 250 and 2,000 cycles per second and tested per the Society of Automotive Engineers Standard J--377. There shall be no air horns.

Instruments and Instrument Panel

1. Chassis shall be equipped with the following instruments and gauges (lights in lieu of gauges are not acceptable except as noted):
 - A. Speedometer
 - B. Odometer shall show accrued mileage to six digits not including tenths.
 - C. Tachometer
 - D. Voltmeter

(1) An ammeter with graduated charge and discharge with the ammeter and its wiring compatible with generating capacities is permitted in lieu of a voltmeter

E. Oil-pressure gauge

F. Water temperature gauge

G. Fuel gauge

H. Upper beam headlight indicator

I. Air brake indicator gauge

(1) A light indicator in lieu of a gauge is permitted on vehicles equipped with hydraulic-over-hydraulic brake system.

J. Turn signal indicator

K. Glow-plug indicator light where appropriate

L. A twelve-volt accessory outlet with cover

2. All instruments shall be easily accessible for maintenance and repair.

3. Instruments and gauges shall be mounted on the instrument panel in such a manner that each is clearly visible to the driver while in a normal seated position in accordance with current SBMTC Design Objectives.

4. The instrument panel shall have lamps of sufficient candlepower to illuminate all instruments and gauges and the shift selector indicator for an automatic transmission.

Oil Filter

An Oil filter with replaceable element shall be provided and connected by flexible oil lines if it is not of built-in or engine-mounted design. The oil filters shall have a capacity of at least one (1) quart.

Openings

All openings in the floorboard or firewall between the chassis and the passenger-carrying compartment, such as for gearshift selector and parking brake lever, shall be sealed.

Passenger Load

1. Actual GVW is the sum of the chassis weight, plus the body weight, plus the driver's weight, plus total seated pupil weight. For purposes of calculation, the

driver's weight is 150 pounds. For purposes of calculation, the pupil weight is 120 pounds per pupil.

2. Actual GVW shall not exceed the chassis manufacturer's GVWR for the chassis, nor shall the actual weight carried on any axle exceed the chassis manufacturer's Gross Axle Weight Rating. (GAWR)

Retarder System (Optional)

A retarder system, if used, shall limit the speed of the fully loaded school bus at 19.0 mph or 30 km/hr on a 7% grade for 3.6 miles or 6 km.

Road Speed Control

When it is necessary to control vehicle maximum speed, a vehicle speed limiter shall be utilized. For Type C and D buses, and where feasible on Type A buses, bus road speed shall not exceed a maximum of 70 miles per hour.

Shock Absorbers

Buses shall be equipped with front and rear double-action shock absorbers compatible with the manufacturer's rated axle capacity at each wheel location.

Springs/Suspension Systems

1. The capacity of the springs or suspension assemblies shall be commensurate with the chassis manufacturer's GVWR.
2. Front springs shall be of the leaf type, shall have a stationary eye at one end, and shall be protected by a wrapper leaf in addition to the main leaf. Rear leaf springs shall be of the progressive type.
3. Air ride suspension may be used on the front and rear of Type C and D buses in lieu of leaf-type springs. Body and chassis parts must clear tires with air bags in fully deflated condition or steering wheel turned fully to the left or right. If brake dust covers are used, inspection holes of adequate size and location for easily viewing brake linings shall be provided.

Steering Gear

1. The steering gear shall be approved by the chassis manufacturer and designed to assure safe and accurate performance when the vehicle is operated with maximum load and at maximum speed.
2. If external adjustments are required, the steering mechanism must be accessible to accomplish the same.
3. No changes shall be made in the steering apparatus, which are not approved by the chassis manufacturer.

4. There shall be a clearance of at least two inches between the steering wheel and the cowl, instrument panel, windshield, or any other surface.
5. Power steering is required and shall be of the integral type with integral valves.
6. The steering system shall be designed to provide a means for lubrication of all wear-points, if wear-points are not permanently lubricated.
7. The steering wheel shall meet manufacturer's specifications.

Tires and Rims

1. Radial tubeless tires and rims of proper size and tires with a load rating commensurate with chassis manufacturer's GVWR shall be provided. Hubcaps are not permitted.
2. Dual rear tires shall be provided on all school buses.
3. All tires on any given vehicle shall be of the same size and the load range of said tires shall meet or exceed the gross axle weight rating as required by FMVSS 120. Low profile tires are acceptable. However, they must meet the load range and ply requirements as shown on the chart on the last page of this booklet. It is recommended that dish-type rims be used with low profile tires.
4. If the vehicle is equipped with a spare tire and rim assembly, it shall be of the same size as those mounted on the vehicle.
5. If a tire carrier is required, it shall be suitably mounted in an accessible location outside the passenger compartment.

Transmission

An automatic transmission shall be required on all buses. Type A buses may be built to manufacturer's specifications. Types C, and D buses must have a PTS 2500 series or prior approved equal. The automatic transmission shall have at least four forward-gear ratios, plus integral torque converter. The transmission shift quadrant shall provide at least four forward drive ranges plus neutral and reverse ranges. Within the range selected, ratio changes shall be effected automatically and at full engine power if desirable, and without use of an engine disconnect clutch. A PTS3000 or prior approved equal is required for chassis over 33,000 pounds GVWR. Type C-1 school buses may use Allison PTS 1000 or PTS 2200 automatic transmission or prior approved equal.

Turning Radius

1. Chassis with a wheelbase of 264 inches or less shall have a right and left turning radius of not more than 42 1/2 feet, curb-to-curb measurement.
2. Chassis with a wheelbase of 265 inches or more shall have a right and left turning radius of not more than 44 and 1/2 feet, curb-to-curb measurement.

Undercoating

The chassis manufacturer, or agent thereof, shall coat the undersides of steel or metallic-constructed front fenders with rust-proofing compound for which compound manufacturers have issued notarized certification of compliance to the chassis builder that the compound meets or exceeds all performance and qualitative requirements of paragraph 3.4 of Federal Specification TT-C520B using modified test.

Weight Distribution

The weight distribution of a fully loaded bus on a level surface shall be such as not to exceed the manufacturer's front gross axle rating and rear gross axle weight rating.

SECTION III - SCHOOL BUS BODY STANDARDS

Air Conditioning

All special needs buses shall be equipped with air conditioning. Other buses **may** be equipped with an air conditioning unit at the discretion of the local school system.

All buses ordered with air conditioning shall meet the following minimum specifications:

1. Floor--All flooring shall be 5/8-inch exterior-grade plywood over steel flooring.
2. All buses shall have a white roof.
3. Windows--All windows shall be tinted with a minimum of 50% light transmission.
4. All buses shall meet insulation standards as per Alabama bus specifications.
5. **Optional** mud flaps to protect the condenser may be installed.

Minimum Btu air conditioning system per passenger size:

- | | |
|--------------------|-------------|
| 1. 10-30-passenger | 40,000 Btu |
| 2. 31-48-passenger | 53,000 Btu |
| 3. 49-60-passenger | 78,000 Btu |
| 4. 61-84-passenger | 100,000 Btu |

Aisle

1. All emergency doors shall be accessible by a 12-inch minimum aisle. The aisle shall be unobstructed at all times.
2. Seat backs shall be slanted sufficiently to give aisle clearance of 15 inches at the tops of seat backs.

Back-Up Warning Alarm

An automatic, audible alarm with a minimum of 87dbA and maximum of 112dbA shall be installed behind the rear axle and shall comply with the Society of Automotive Engineers published Back-up Alarm Standards (SAE 994). The alarm shall have a protective deflector shield.

Battery/Batteries

1. Batteries are to be furnished by the chassis manufacturer.
2. When the battery/batteries is mounted as described in the Chassis Standard, the body manufacturer shall securely attach the battery on a slide-out or swing-out tray in a closed, vented compartment in the body skirt, so that the battery is accessible for convenient servicing from the outside. The battery compartment door or cover shall be hinged at the front and secured by an adequate and conveniently-operated latch or other type fastener.

Bumper (Front)

On a Type D school bus, if the chassis manufacturer does not provide a bumper, it shall be provided by the body manufacturer. The bumper will conform to the standards in the chassis section.

Bumper (Rear)

1. Bumpers shall be of pressed steel channel or equivalent material, at least 3/16-inch thick, and shall be a minimum of 9-1/2 inches wide (high) on all Types C, and D buses. Type A buses shall have a minimum of an 8-inch rear bumper.
2. Bumpers shall be wrapped around the back corners of the bus. It shall extend forward at least 12 inches, measured from the rear-most point of the body at the floor line.
3. Bumpers shall be attached to the chassis frame in such a manner that it may be easily removed. It shall be so braced as to withstand impact from a rear or side impact. It shall be so attached as to discourage hitching of rides.
4. Bumpers shall extend at least one inch beyond rear-most part of body surface measured at the floor line.
5. Tow eyes or hooks may be furnished on the rear and attached so they do not project beyond the rear bumper. The installation shall be in accordance with the chassis manufacturer's specifications.
6. The bottom of the rear bumper shall not be more than 30 inches above ground level.

Ceiling

See Insulation and Interior, Body Standard.

Certification

The body manufacturer shall certify to the SDE and local education agency having pupil transportation jurisdiction that their product meets minimum standards on items

not covered by certification issued under requirements of the National Traffic and Motor Vehicle Safety Act.

Chains (Tire)

See Wheel Housing Body Standard.

Color

1. The school bus body shall be painted National School Bus Yellow.
2. The body exterior paint trim, bumper, lamp hoods and lettering shall be black.
3. The roof of the bus may be painted white not to extend below the drip rails on the sides of the body.
4. Multifunctional School Activity Buses (MFSAB) shall be exempt from this requirement. (See MFSAB specifications on page 51.)

Communication Systems

Each bus shall be equipped with a two-way, voice communication system capable of providing communication with the operational base. Where technologically feasible, the communication system shall also communicate with 911 operators. CB radio systems will not meet this requirement. **It is the responsibility of the local school system to comply with this specification.**

Construction

1. Construction shall be of prime commercial quality steel or other material with strength at least equivalent to all-steel as certified by the bus body manufacturer. All such construction materials shall be fire resistant.
2. Construction shall be dust proof and watertight, so the bus does not leak under normal operating conditions.
3. Body joints present in that portion of a Type A school bus body furnished exclusively by the body manufacturer shall conform to the performance requirements of FMVSS 221, "School Bus Body Joint Strength." This does not include the body joints created when body components are attached to components furnished by the chassis manufacturer.
4. Type A school bus bodies shall be equipped with restraining barriers conforming to FMVSS 222, "School Bus Passenger Seating--Crash Protection," Sections 5.2 and 5.3.

Crossing Control Arm

1. Buses shall be equipped with a crossing control arm mounted on the right side of the front bumper, which shall not open more than 90 degrees.

2. All components of the crossing control arm and all connections shall be weatherproofed.
3. The crossing control arm shall incorporate system connectors (electrical or air) at the gate and shall be easily removable to allow for towing of the bus.
4. The crossing control arm shall meet or exceed SAE Standard J1133.
5. The crossing control arm shall be constructed of non-corrosive or nonferrous material or treated in accordance with the body sheet metal standard (see Metal Treatment).
6. There shall be no sharp edges or projections that could cause hazard or injury to students.
7. The crossing control arm shall extend at least 70” from the front bumper when in the extended position.
8. The crossing control arms shall extend simultaneously with the stop arm(s) by means of the stop arm controls. An automatic recycling interrupt switch shall be installed to allow the driver to deactivate the control arm when necessary.
9. An electromagnetic device or a stowed bracket shall be installed to stabilize the arm when in the stored position.
10. Crossing control arm shall be Specialty Manufacturing Company, Part #58600, Transpec 4000 series, or prior approved equal.

Defrosters

1. The windshield defroster and defogging system shall provide defogging of the entire windshield, driver’s side window, and entrance door glasses by utilizing hot air taken from the heater core with vents across the entire windshield.
2. The defrosting system shall conform to Society of Automotive Engineers’ Standards J381 and J382.
3. The defroster and defogging system shall be capable of furnishing heated outside ambient air.
4. Auxiliary fans are not considered defrosting or defogging systems.
5. Portable heaters shall not be used.

Doors

1. Service Door:

- A. The service door shall be in the driver's control, and designed to afford easy release and provide a positive latching device on manual operating doors to prevent accidental opening. When a hand lever is used, no part shall come together that will shear or crush fingers. Manual door controls shall not require more than 25 pounds of force to operate at any point throughout the range of operation.
- B. The service door shall be located on the right side of the bus, opposite and within direct view of the driver.
- C. The service door shall have a minimum horizontal opening of 24 inches and a minimum vertical opening of 68 inches.
- D. The service door shall be a split type, both sections opening outward.
- E. Lower, as well as upper door panels, shall be of approved safety glass. The bottom of each lower glass panel shall not be more than 10 inches from the top surface of the bottom step. The top of each upper glass panel shall not be more than 6 inches from the top of the door.
- F. Vertical closing edges on split type entrance doors shall be equipped with flexible material to protect the children's fingers.
- G. There shall be no door to the left in driver compartment on Types C or D vehicles.
- H. All doors shall be equipped with padding at the top edge of each door opening. Pad shall be at least three inches wide and one inch thick and extend the full width of the door opening.
- I. If air or electric doors are used, the amber warning lights shall be activated from a momentary switch. A three-position switch shall activate the sequence as follows:
 - Position One – door closed; lights off.
 - Position Two – activate red lights, stop arm, and crossing control arm.
 - Position Three – red lights activated, door open, stop arm activated, and crossing control arm activated.

Emergency Exits

1. Emergency Door:

- A. The emergency door shall be hinged on the right side if in the rear end of bus and on the front side if on left or right side of the bus. It shall open outward

and be labeled inside to indicate how it is to be opened. If double emergency doors are used on Type A vehicles, they shall be hinged on the outside edge and shall have a three-point fastening device. A device shall be used that holds the door open to prevent the emergency door from closing during emergencies and school bus evacuation drills. If emergency door locks are used, the vehicle ignition must be disabled until the emergency door lock is deactivated.

- B. The upper portion of the emergency door shall be equipped with approved safety glazing, the exposed area of which shall be at least 400 square inches. The lower portion of the rear emergency door on Types C, and D vehicles shall be equipped with a minimum of 350 square inches of approved safety glazing.
- C. There shall be no steps leading to an emergency door.
- D. The words **EMERGENCY DOOR**, in letters at least two inches high, shall be placed at the top of or directly above the emergency door or on the door in the metal panel above the top glass, both inside and outside of the bus. The words **EMERGENCY EXIT** in letters at least 2 inches high shall be placed on the exterior body directly above each emergency window.
- E. The emergency door shall be equipped with padding at the top edge of each door opening. Padding shall be at least three inches wide and one inch thick, and extend the full width of the door opening.
- F. The side emergency door, if installed, must meet the requirements as set forth in FMVSS 217 (a), regardless of its use with any other combination of emergency exits.
 - (1) A left side emergency door shall have a 20 inch unobstructed passageway and no flip seat is to be used. A barrier shall be used just before the door opening.
- G. There shall be no obstruction higher than 1/4 inch across the bottom of any emergency door opening.

2. Additional Emergency Exits:

- A. All school buses shall be equipped with emergency exits in the following capacity vehicles:
 - 0 to 54 passenger: one emergency window exit per side and one roof hatch located midpoint.
 - 55 and above passenger: two emergency window exits per side, and two roof hatches.

- B. Each emergency exit shall comply with FMVSS 217. These emergency exits are in addition to the rear emergency door or exit. Roof hatches must be Transpec Standard Vent, Model 1970, Specialty Manufacturing 8600, 8900, or 9000 series or prior approved equal.
 - (1) Emergency exit windows shall be as evenly spaced as possible under FMVSS 217 guidelines and shall not be obstructed by any devices.
- C. In addition to the audible warning required on emergency doors by FMVSS 217, additional emergency exits shall also be like protected. *Warnings for these exits shall be clearly audible to the bus driver.*
- D. School bus emergency exits shall be marked with a minimum one inch wide strip of retroreflective tape, either red, white or yellow in color, to be placed around the outside perimeter of the emergency exit opening, not the emergency exit itself.

The words **EMERGENCY EXIT**, in letters at least two inches high, shall be placed on the body directly above each emergency window.

Emergency Equipment

All emergency equipment shall be stored in the driver compartment with the exception of the warning devices.

1. Fire Extinguishers:

- A. The bus shall be equipped with at least one pressurized, dry chemical fire extinguisher complete with hose to meet Underwriters Laboratories, Inc., approval. A pressure gauge shall be mounted on the extinguisher and easily read without moving the extinguisher from its mounted position.

The bracket shall be a heavy-duty, snap-in, spring type. Band type holders are not acceptable. *Fire extinguisher brackets shall be Brooks Equipment Company # 4SC or Ridgeway Bus Products # 51-05 or prior approved equal.*

- B. The fire extinguisher shall have a capacity of **five pounds** with an Underwriters Laboratories total rating of 2A10BC or greater. The operating mechanism shall be sealed with a type of seal that will not interfere with the use of the fire extinguisher.
- C. Fire extinguishers must comply with State Fire Codes.

2. First-Aid Kit:

- A. Bus shall have a removable, moisture proof and dust-proof first-aid kit mounted with a separate bracket in an accessible place in driver's compartment. This place shall be marked to indicate its location.
- B. Contents shall include:

- 2 1" x 2 1/2 yards adhesive tape rolls
- 24 sterile gauze pads 3" x 3"
- 100 3/4" x 3" adhesive bandages
- 8 2" bandage compress
- 10 3" bandage compress
- 2 2" x 6" sterile gauze roller bandages
- 2 non-sterile triangular bandages approximately 40" x 36" x 54" with
2 safety pins
- 3 sterile gauze pads 36" x 36"
- 3 sterile eye pads
- 1 pair rounded-end scissors
- 1 pair latex gloves
- 1 mouth-to-mouth airway

3. Body Fluid Clean-up Kit:

- A. Each bus shall have a removable and moisture proof body fluid clean-up kit. It shall be properly mounted and identified as a body fluid clean-up kit. Must meet OSHA regulations.

4. Warning Devices:

- A. Each school bus shall contain at least three (3) reflectorized triangle road warning devices mounted in an accessible place in the driver's compartment or outside storage compartment. The mounting location in Type A vehicles is optional. These devices must meet requirements in FMVSS 125.

Fire Suppression (Optional)

When a fire suppression system is used, nozzles for suppression systems shall be located in the engine compartment, under the bus, in the electrical panel, or under the dash, but shall not be located in the passenger compartment. The system must include a light or buzzer to alert the driver that the system has been activated.

Floor and Floor Coverings

1. The floor in the underseat area, including the tops of the wheel housing, driver's compartment and toe board, shall be covered with a rubber floor covering or equivalent, having a minimum overall thickness of 1/8 inch.
2. The floor covering in the aisle shall be of aisle-type rubber or equivalent, wear resistant, and ribbed. The minimum overall thickness shall be 3/16 inch measured from tops of ribs.
3. The floor covering must be permanently bonded to the floor and must not crack when subjected to sudden changes in temperature. Bonding or adhesive material shall be waterproof and shall be of a type recommended by the manufacturer of the floor-covering material. All seams must be sealed with waterproof sealer.

4. For Type C and D school buses, the manufacturer shall provide a screw-down plate to access fuel tank sending unit that is secured and insulated. The plate shall be mounted so that access is readily available to repair personnel and so that the floor covering is not disturbed during the repair process.
5. The floor shall be of metal or alloy at least equal in strength to 14-gauge prime commercial quality steel and so constructed that exhaust gases cannot enter the passenger compartment.
6. All closures between the bus body and the engine compartment shall be fitted with gas-tight gaskets and pedal openings shall be closed bellows type, gas-tight boots.
7. There shall be a plate, of adequate size, provided to allow for transmission access or service.

Handrail(s)

At least one handrail shall be installed. The handrail(s) shall assist passengers during entry or exit, and shall be designed to prevent entanglement as evidenced by the passage of the NHTSA string and nut test.

Heaters

1. The heating system shall be capable of maintaining the temperature throughout the bus of not less than 55 degrees Fahrenheit during average minimum January temperatures as established by the U. S. Department of Commerce, Weather Bureau, for the area in which the vehicle is to be operated. Shall be capable of defrosting the total windshield area and the service door glass within thirty minutes after initial start with engine at idle speed. The system shall exceed SAE standards J-381 and J-382 performance requirements. **Fuel-fired auxiliary heaters will not be allowed.**

Heater performance shall be measured by the following:

A temperature measurement shall be taken at three locations within the body. These locations to be over the center aisle, thirty-six inches above the floor. The first location is to be thirty-nine inches from the windshield; the second location midpoint of the passenger compartment and the third will be thirty-nine inches from the rear emergency door.

After soaking the bus at twenty degrees F. for fifteen (15) hours, the bus will be started and after thirty (30) minutes, the temperature at each measuring point shall be fifty-five (55) degrees F.

2. If only one heater is used, it shall be a fresh-air or combination fresh-air and recirculation type.
3. If more than one heater is used, additional heaters shall be a recirculating-air type.

4. All heaters installed by body manufacturers shall bear a name plate that shall indicate the heater rating in accordance with SBMI Standard No. 001, with said plate to be affixed by the heater manufacturer which shall constitute certification that the heater performance is as shown on the plate.
5. Heater hoses shall be adequately supported to guard against excessive wear due to vibration. The hoses shall not dangle or rub against the chassis or sharp edges and shall not interfere with or restrict the operation of any engine function. Heater hoses shall conform to the Society of Automotive Engineers' Standard J20c. Heater lines on the interior of the bus shall be shielded to prevent scalding of the driver or passengers.
6. Each hot water system installed by a body manufacturer shall include one shut-off valve in the pressure line and one shut-off valve in the return line with both valves at or near the engine in an accessible location.
7. There shall be a water flow-regulating valve, or an electronic valve actuator, installed in the pressure line for convenient operation by the driver while seated.
8. Accessible bleeder valves shall be installed in an appropriate place in the return lines of body company-installed heaters to remove air from the heater lines.
9. Access panels shall be provided to make heater motors, cores, and fans readily accessible for service. An outside access panel may be provided for the driver's heater.

Hinges

All exterior metal door hinges which do not have stainless steel, brass, or nonmetallic hinge pins or other designs that prevent corrosion shall be designed to allow lubrication to be channeled to the center 75% of each hinge loop without disassembly.

Identification

1. School bus bodies shall bear the words, **SCHOOL BUS**, in eight-inch black letters on National School Bus Yellow, on the front and back of the bus (lettering between flasher lights). (See page 51 for Multifunctional School Activity Bus identification requirements.) The name of the school system shall be on each side of the bus in at least 5-inch, black standard, unshaded letters. Lettering shall conform to "Series B" of Standard Alphabets for Highway Signs. Each bus shall be numbered on both sides, front left side and the rear, before being put into service. Bumper numbers may be white or yellow. An agreement between manufacturer and purchaser shall be reached at time order is placed as to who will put the numbers on the buses. Any other numbering shall be optional.

2. Only signs and lettering approved by state law or regulation, limited to the name of the owner or operator and any marking necessary for identification, shall appear on the bus.
3. School bus bodies shall display a high quality 6" x 9" warning sticker on permanent, adhesive, vinyl, bumper-sticker material. To increase visibility, this sticker shall be mounted just under the first or second rub rail at left side of the passenger entrance door. This sticker shall be worded as follows:

UNAUTHORIZED ENTRY ILLEGAL

Any person who attempts to enter a school bus without prior authorization of the driver or other appropriate school official and refuses to leave will be subject to prosecution that may result in fines of up to \$2,000 and up to one year in jail.

Alabama Code Sections 13A-10-2, 13A-7-4

4. Driver Alert Transpec Model 7500 or prior approved equal electronic signage warning traffic when the school bus stops to load or unload students and at railway grade crossings is required.
5. *A high quality, 4" x 6", permanent, adhesive, vinyl, warning sticker prompting drivers that driver seat belt use is mandatory on all school buses shall be affixed in the driver compartment in a highly visible location. This sticker shall be worded as follows:*

DRIVER SEAT BELT USE REQUIRED

Driver seat belt use is required at all times when driving this vehicle. Failure to do so could result in disciplinary action up to and including suspension or revocation of your Alabama School Bus Driver Certificate or termination.

Alabama Code Section 16-27-6

Inside Height

The inside body height shall be 72 inches or more, measured metal to metal, at any point on the longitudinal center line from the front vertical bow to the rear vertical bow.

The inside body height of Type A buses shall be 62 inches or more.

Insulation

1. Ceilings and walls shall be insulated with proper material to deaden sound and reduce vibration to a minimum. If thermal insulation is specified, it shall be fire-resistant and approved by Underwriters Laboratories, Inc. If buses are equipped with air conditioning, walls and ceilings must be insulated to improve air conditioner efficiency.
2. If floor insulation is required, it shall be either 5-ply nominal 19/32 inches thick plywood, or a material of equal or greater strength and insulation R value, and it will equal or exceed properties of exterior-type softwood plywood, C-D Grade as

specified in standard issued by U. S. Department of Commerce. When plywood is used, all exposed edges shall be sealed.

Interior

1. The interior of the bus shall be free of all unnecessary projections, which include luggage racks and attendant handrails, likely to cause injury. This standard requires inner lining on ceilings and walls. If the ceiling is constructed to contain lapped joints, the forward panel shall be lapped by the rear panel and exposed edges shall be beaded, hemmed, flanged, or otherwise treated to minimize sharp edges.
2. The driver's area forward of the foremost padded barriers will permit the mounting of required safety equipment and vehicle operation equipment.
3. Every school bus shall be constructed so that the noise level taken at the ear of the occupant nearest to the primary vehicle noise source shall not exceed 85 dbA when tested.
4. Any added equipment shall be flush mounted with the exception of the video system.

Lamps and Signals

1. Interior lamps shall be provided which an adequately illuminated aisle and step well. Step well lights shall be illuminated by a service door operated switch, to illuminate only when headlights and clearance lights are on and the service door is opened.
2. Clearance lamps shall automatically illuminate when the headlights are in the "on" position.
3. L.E.D. lighting may be used as an alternative to conventional lighting in all lamps and signals except headlamps.
4. Definition--School bus alternately flashing red and amber signal lamps are lamps mounted at the same horizontal level, intended to identify the vehicle as a school bus and to inform other users of the highway that such vehicle is preparing to stop, or is stopped, on the roadway to take on or to discharge schoolchildren.

A. Master switches will not be allowed on the eight-way, alternately flashing signal lamps.

B. Buses shall be equipped with two red lamps and two amber lamps at the rear of the vehicle and two red lamps and two amber lamps at the front of the vehicle. One amber lamp shall be located near each red signal lamp at the same level, but closer to the vertical centerline of the bus.

C. The signaling system, including red and amber signal lamps and a stop arm with alternating flashing lamps, shall be so designed and wired as to have the following characteristics:

(1) When the entrance door is closed, a manual push button may be depressed and the amber pilot light and amber warning lights will flash.

(2) When the entrance door is opened, the amber pilot and amber warning lights will go off, and the red pilot and red warning lights will flash; also, the stop arm will be extended and lights on the stop arm will flash.

(3) On closing the entrance door, all lights will go out and the stop arm retract automatically.

(4) If the entrance door is opened without depressing the manual push button, no lights will flash, nor will the stop arm be extended.

D. The area around the lenses of alternately flashing signal lamps shall have a readily visible black border for contrast purposes. Hoods/guards may be provided over front and rear amber warning lights and red warning lights.

5. Bus body shall be equipped with amber rear turn signal lamps at least seven inches in diameter, or if in a shape other than round, a minimum of 38 square inches of illuminated area. These signal lamps must be connected to the chassis hazard-warning switch to cause simultaneous flashing of signal lamps when needed as a vehicular traffic hazard warning.
6. Rear directional lights shall be mounted not more than 15 inches from the plane of the side of the body, and not more than 14 inches below the glass in the rear of the body. *All buses shall have side turn indicators on both sides located within six inches of the floor line.*
7. Buses shall be equipped with two red, brake/tail combination lights at least seven inches in diameter, or if in a shape other than round a minimum of 38 square inches of illuminated area and shall be mounted on the rear of the bus just inside the turn signal lamps.

A. Type A conversion vehicle lamps must be 21 square inches in the lens area. Two combination lamps with a minimum diameter of four inches, or if a shape other than round, a minimum 12 square inches of illuminated area shall be placed on the rear of the body between the beltline and the floor line. The rear license plate lamp may be combined with one lower tail lamp. Stop lamps shall be activated by the service brakes and shall emit a steady light when illuminated.

B. In addition to these requirements, all lamps and signals shall comply with applicable SAE specifications.

8. On all buses equipped with a monitor for the front and rear lamps of the school bus, the monitor shall be mounted in full view of the driver. If the full circuit current passes through the monitor, each circuit shall be protected by a fuse or circuit breakers or other equivalent technology against any short circuit or intermittent shorts.
9. A white flashing strobe light shall be installed on the roof of a school bus not to exceed 1/3 the body length forward from the rear of the roof edge. This light shall have a single white lens emitting light 360 degrees around its vertical axis and may not extend above the roof more than the maximum legal height. A manual switch and a pilot light of low intensity must be included to indicate when the light is in operation. The pilot light shall be incorporated into the switch.
10. If alternating headlights are used (i.e., wig-wag), they must operate in conjunction with the red overhead flashers and stop arm.

Metal Treatment

1. All metal used in construction of a bus body shall be zinc-coated or aluminum-coated or treated by an equivalent process before the bus is constructed. Included are such items as structural members, inside and outside panels, door panels and floor sills. Excluded are such items as door handles, grab handles, interior decorative parts and other interior plated parts.
2. In addition to the above requirements, all metal parts that will be painted shall be chemically cleaned, etched, zinc-phosphate-coat and zinc-chrome or epoxy primed or conditioned by equivalent process.
3. 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, unvented or undrained areas and surfaces subjected to abrasion during vehicle operation.
4. As evidence that the above requirements have been met, samples of materials and sections used in construction of the bus body, when subjected to 1,000-hour salt spray test as provided for in latest revision of ASTM Standard B-117 "Standard Method of Salt Spray (Fog) Testing" shall not lose more than 10 percent of its material by weight.

Mirrors

1. Interior mirrors shall be either clear laminated glass or clear view glass bonded to a backing, which retains the glass in the event of breakage. Mirrors shall have rounded corners and protected edges. Type A buses shall have a minimum of a 6" x 16" mirror and Type C, and D buses shall have a minimum of a 6" x 30" mirror. It shall be securely attached on the windshield header and so located as to give the driver a clear view of the entire interior of the bus and the road behind.

2. Each school bus shall be equipped with a system of exterior mirrors as defined in FMVSS 111.
 - A. Rear vision mirrors shall be capable of providing a view along the left and right sides of the vehicle which will provide the driver with a view of the rear tires at ground level, a minimum distance of 200 feet to the rear of the bus and at least 12 feet perpendicular to the side of the bus at a distance of 32 feet back from the front bumper.
 - B. The cross view mirror system shall provide the driver with indirect vision of an area at ground level from the front bumper forward and the entire width of the bus to a point where the driver can see by direct vision. The cross view system shall also provide the driver with direct vision of the area at ground level around the left and right front corners of the bus to include the tires and service entrance on all types of buses to a point where it overlaps with the rear vision mirror system. A metal reinforcement plate shall be installed under the hood area of fiberglass *or other reinforced resin composite hoods* in order to reinforce cross view mirror mounting base area.
 - C. This system of mirrors shall be easily adjustable but be rigidly braced so as to reduce vibration.
3. Heated and/or remote controlled external, rearview mirrors may be used.

Mounting

1. The chassis frames shall support the rear body cross member. The bus body shall be attached to the chassis frame at each main floor sill, except where chassis components interfere, in such a manner as to prevent shifting or separation of the body from the chassis under severe operating conditions.
2. Insulation material shall be placed at all contact points between the body and chassis frame on Types A, C and D buses, and shall be so attached to the chassis frame or body that it will not move under severe operating conditions.

Noise Suppression Switch

There shall be a manual noise suppression switch installed in the control panel. *This switch or switch background shall be red or yellow and labeled.* This switch shall be an on/off-type (not momentary) that deactivates all body equipment that produces noise including at least the am/fm radio, heaters, air conditioners, fans and defrosters. This switch shall not deactivate safety systems such as windshield wipers, lighting or warning systems. For Type A buses, all radios or communication devices shall be ordered as a body accessory and must be wired thru the noise suppression switch.

Overall Length

The overall length of the bus shall not exceed 45 feet excluding accessories.

Overall Width

The overall width of the bus shall not exceed 102 inches excluding accessories.

Public Address System

Buses may be equipped with a public address system having interior and exterior speakers. Interior speakers shall be flush mounted with bulkhead. No internal speakers other than the driver's communication systems may be installed within four feet of the driver's seat back in its rearmost, upright position.

Retroreflective Material

1. The front and/or rear bumper may be marked diagonally 45 degrees down to the centerline of the pavement with 2" x 1/4" wide strips of non-contrasting retroreflective material.
2. The rear of the bus body shall be marked with strips of retroreflective National School Bus Yellow (NSBY) material to outline the perimeter of the back of the bus using material which conforms with the requirements of FMVSS 571.131 (Table I). The perimeter marking of rear emergency exits per FMVSS 217 and/or the use of retroreflective SCHOOL BUS signs partially accomplish the objective of this requirement. To complete the perimeter marking of the back of the bus, strips of at least one-inch retroreflective NSBY material shall be applied horizontally above the rear windows and above the rear bumper, extending from the rear emergency exit perimeter marking outward to the left and rear corners of the bus. Vertical strips shall be applied at the corners connecting these horizontal strips.
3. **SCHOOL BUS** signs, if not of a lighted design, shall be marked with retroreflective NSBY material comprising a background for lettering of the front and/or rear **SCHOOL BUS** signs.
4. The sides of the bus body shall be marked with retroreflective NSBY material at least one inch in width, extending the length of the bus body and located (vertically) between the floor line and the belt line.

NOTE: Reflectivity of the stop signal arm is to be addressed under the Stop Signal Arm Section. Signs, if used, placed on the rear of the bus relating to school bus flashing signal lamps or railroad stop procedure may be of a retroreflective material [as specified by each state].

Rub Rails

1. There shall be one rub rail located on each side of the bus approximately at seat level which shall extend from the rear side of the entrance door completely around the bus body (except emergency door or any maintenance access door) to a point of curvature near the outside cowl on the left side.

2. There shall be one additional rub rail located approximately at the floor line which shall cover the same longitudinal area as the upper rub rail, except at the wheel housing, and shall extend only to radii of the right and left rear corners.
3. Rub rails above the floor line shall be attached at each body post and all other upright structural members.
4. Each rub rail shall be 4 inches or more in width in their finished form, shall be of 16-gauge metal or other suitable material of equivalent strength, suitable to protect body side panels from damage. Rub rails shall be constructed in a corrugated or ribbed fashion.
5. Rub rails shall be applied to the outside of the body or outside body posts. Pressed-in or snap-on rub rails do not satisfy this requirement. For Type A1 vehicles using a chassis manufacturer's body, or for Types A2, C, and D buses using rear luggage or rear engine compartments, rub rails need not extend around rear corners.
6. The bottom edge of the body side skirts shall be stiffened by application of a rub rail, or the edge may be stiffened by providing a flange or other stiffeners.

Seat Belt for Driver

1. The driver's seat shall be equipped with the seat belt anchored to the floor, housed in scabbard and equipped with an emergency locking retractor (one side only). The driver's seat shall be equipped with a Type II occupant protection (lap and shoulder belt). Adjustability of the mounting point for the driver's seat belt pillar loop shall be provided to accommodate all heights and weights of bus drivers without interference with the driver's face or neck. The requirements of FMVSS 209 and 210 shall be met. Integrated seat belts in the driver's seat may be used at the discretion of the local school system.
2. Each bus shall contain at least one belt cutter properly secured in a location within reach of the driver while belted into the driver's seat. The belt cutter shall be durable, designed to eliminate the possibility of the operator or others being cut during use, and must have a full handgrip.
3. ***The driver's seat belt shall be high visibility orange or lime green in color in all buses not equipped with warning buzzers.***

Seats and Crash Barriers

1. Seats shall be spaced to obtain a minimum of 24-inch hip-to-knee room measured horizontally at the seat cushion level at the transverse centerline of the seat. In making this measurement from the back of the seat cushion to the back of the seat or barrier in front, upholstery may be placed against padding both forward and rear but padding may not be compressed. Greater seat spacing may be specified on local bids not to exceed the maximum allowable per FMVSS 222.

2. In determining seating capacity of standard school buses, the allowable average rump width shall be 13 inches where a 3-3 seating plan is used, and thirteen (13) or 15 inches where 3-2 seating plan is used on specially-equipped buses.
3. All seats shall be bench style, forward facing and have a minimum depth of 15 inches. No transit or activity seat will be used. There shall be no armrest on student seats. No bus shall be equipped with jump seats or portable seats.
4. All seat frames attached to the seat rail shall be fastened with two (2) bolts, washers and nuts or flange-headed nuts. Each seat leg shall be secured to the floor by a minimum of two (2) bolts, washers and nuts. Flange-head nuts may be used in lieu of nuts and washers, or seats may be track-mounted in conformance with FMVSS 222. If track seating is installed, the manufacturer shall supply minimum and maximum seat spacing dimensions applicable to the bus, which comply with FMVSS 222. This information shall be on a label permanently affixed to the bus.
5. The forward most pupil seat on the right side of the bus shall be located so as not to interfere with the driver's vision, not farther forward than the barrier behind the driver or the rear of the driver's seat when adjusted to its rear-most position.
6. All seats and backs shall be a standard color unless changed by purchaser. Seat and back cushions of all seats shall be designed to safely support the designated number of passengers under normal road conditions encountered in school-bus service. Coverings of seat cushions shall be of a material having 42-ounce finished weight, 54-inch width, and finished vinyl coating of 1.06 broken twill or approved equal by presenting independent laboratory reports for approval.
7. The driver seat shall be of the high back, air **or** mechanical suspension, box pedestal-type with a minimum seat back adjustment of 15 degrees and with a head restraint to accommodate a 95 percentile adult male (95 percentile adult male as defined in FMVSS 208). The driver's seat shall be secured with nuts, bolts, and washers or flanged-headed nuts. The driver's seat shall have a minimum distance between the steering wheel and seatback of not less than eleven inches, with a minimum aft adjustment of six inches. The seat shall be contoured with adequate padding and support on the sides and shall have a cloth cover. It shall be designed to provide lumbar support and shall be positioned on the centerline of the steering wheel.
8. All restraining barriers and passenger seats shall be constructed with materials that, at a minimum, meet the criteria contained in the School Bus Seat Upholstery Fire Resistant Test.
9. A driver storage pouch shall be provided on the front of the barrier behind driver's seat. This pouch shall be fire resistant and the same color as the bus seats.

10. Crash barriers shall be placed behind the driver's seat and step well. An aluminized courtesy panel on the right side of the bus shall extend to the floor and to the wall. Stanchions are not acceptable.
11. Passenger seats designed to accommodate a child or infant carrier seat shall comply with FMVSS 225. These seats shall be in compliance with NHTSA's "Guideline for the Safe Transportation of Pre-School-age Children in School Buses.

Steering Wheel

See Chassis Standard.

Steps

1. The first step at the service door shall be no less than 10 inches and no more than 14 inches from the ground measured from the top of the first step. Ground clearance shall be no less than 10 inches.
 - A. Type D vehicles shall have the first step at the service door 12 to 16 inches from the ground measured from the top of the first step.
2. The service door entrance shall use a three-step step well. Risers shall be of equal height and depth. When a plywood floor is used on steel, the differential may be increased by the thickness of plywood.
3. Steps shall be enclosed to prevent accumulation of ice and snow.
4. Steps shall not protrude beyond the side bodyline.

Step Treads

1. All steps, excluding the floor line platform area, shall be covered with a 3/16-inch pebble-tread-type, rubber floor covering or other materials equal in wear and abrasion resistance to top grade rubber.
2. The metal back of the tread, a minimum 24-gauge cold roll steel, shall be permanently bonded to ribbed rubber; the grooved design shall be such that said grooves run at 90-degree angles to the long dimension of the step treads.
3. A three-sixteenth-inch ribbed step tread shall have a 1 and 1/2 inch white nosing as an integral piece without any joint.
4. The rubber portion of step treads shall have the following characteristics:
 - A. Special compounding for good abrasion resistance and high coefficient of friction.
 - B. Flexibility so that it can be bent around a 1/2 inch mandrel both at 130 degrees Fahrenheit and 20 degrees Fahrenheit without breaking, cracking, or crazing.

C. Show a durometer hardness of 85 to 95.

Stirrup Step

There shall be one stirrup step on all Types C, and D buses on each side of the front of the body for use in cleaning the windshield and lamps. There shall be one handle on each side, at least eight inches in length suitably located for the driver to use while cleaning the windshield and lamps. The stirrup steps and the handles shall be of rust-resistant material. Transit buses shall have provisions for cleaning the windshield. Toe eyes in the bumper with a handle(s), above the windshield, are acceptable.

Stop Arm Signal

All stop arm signals shall be of the strobe-type and have high-intensity, retroreflective coating. The stop signal - arm(s) shall comply with the requirements of FMVSS 131.

Stop Arm Signal - Rear (Optional)

A rear stop arm is permissible when used in conjunction with the original stop arm. The rear stop arm location on dual stop arm-equipped buses shall be on the left side of the bus, as close as is practical to the left rear corner of the body. Airlines, if used, must not be readily accessible to students inside or outside of the bus.

Storage Compartment

A lockable, waterproof, exterior storage compartment shall be located on the bus body on the right side of the bus. The minimum size of the storage compartment shall be 12 inches high, 15 inches deep, and 25 inches wide and shall be marked "storage". Alternate storage compartment locations should be specified in local school system bid specifications. For Type A buses unable to meet this requirement, an appropriate waiver must be secured from the Alabama Department of Education, Pupil Transportation Section. If the storage compartment location cannot be on the right side, the alternate location must be approved by the school system during the bid process.

All lockable interior storage compartments containing emergency equipment shall be equipped with a warning buzzer installed so as to activate when the ignition switch is on and the compartment is locked. All such compartments shall be clearly labeled as to containing emergency equipment.

Sun Shield

Each Type C and D school bus shall have an interior adjustable sun visor with minimum measurements of 6 inches by 30 inches. It shall be installed in a position convenient for use by the driver, anchored on both ends, and shall be tinted transparent plastic or phlex-o-glass. On all Type A buses, the sun shield shall be the manufacturer's standard. An additional sun shield may be added over the left side driver window at option of the local school system.

Tailpipe

See Chassis Standard.

Traction-Assisting Devices

1. Where required or used, sanders shall:
 - A. Be of the hopper cartridge-valve type.
 - B. Have a metal hopper with all interior surfaces treated to prevent condensation of moisture.
 - C. Be of at least 100-pound (grit) capacity.
 - D. Have a cover on the filler opening of the hopper, which screws into place, sealing the unit airtight.
 - E. Have discharge tubes extending to the front of each rear wheel under the fender.
 - F. Have no-clogging discharge tubes with slush-proof, non-freezing rubber nozzles.
 - G. Be operated by an electric switch with a telltale pilot light mounted on the instrument panel.
 - H. Be exclusively driver controlled.
 - I. Have a gauge to indicate the hopper needs refilling when it is down to one quarter full.
2. Automatic traction chains may be installed.

Trash Container and Holding Device

1. Where required or used, the trash container shall:
 - A. Be of fire resistant polyethylene or equivalent material.
 - B. Be no greater than 14-quart capacity.
 - C. Be secured by a holding device that is designed to prevent movement and allow easy removal and replacement.
 - D. Be installed in an accessible location in the driver's compartment, not obstructing passenger use of the service door or access to emergency equipment.

Undercoating

1. The entire underside of the bus body, including floor sections, the cross member and below floor line side panels, shall be coated with rust-proofing the compound for which compound manufacturer has issued notarized certification of compliance to the bus body builder that the compound meets or exceeds all performance and

qualitative requirements of paragraph 3.4 of Federal Specification TT-C-250b using modified test procedures for the following requirements*:

- A. Salt spray resistance-pass modified to 5% salt and 1000 hours.
- B. Abrasion resistance-pass.
- C. Fire resistance-pass.

*Test panels are to be prepared in accordance with paragraph 4.6.12 of TT-C-520b with the modified procedure requiring that the test be made on a 48-hour air-cured film at a thickness recommended by the compound manufacturer.

- 2. The undercoating compound shall be applied with suitable airless or conventional spray equipment to recommend film thickness and shall show no evidence of voids in cured film.

Ventilation

- 1. Auxiliary fans if installed shall meet the following requirements:
 - A. Fans for left and right sides shall be placed in a location where they can be adjusted for maximum effectiveness and do not obstruct vision to any mirror.
NOTE: All Type A buses may be equipped with one fan.
 - B. Fans shall be a nominal 6” diameter.
 - C. Fan blades shall be covered with a protective cage. Each fan shall be controlled by a separate switch.
- 2. The body shall be equipped with a suitably controlled ventilating system of sufficient capacity to maintain the proper quantity of air under operating conditions, without having to open windows except in extremely warm weather.
- 3. A static-type, non-closeable exhaust ventilator shall be installed in the roof.

Video Surveillance Equipment

- 1. Video equipment may be installed at the discretion of the local school system.
- 2. While video equipment does not have to be flush mounted, positioning of video surveillance equipment shall not interfere with the safe operation of the bus or student safety. It is recommended that the SDE be contacted prior to the installation of new video equipment.

Wheel Housing

- 1. The wheel-housing opening shall allow for easy tire removal and service.

2. The wheel housing shall be attached to the floor sheets in such a manner as to prevent any dust, water or fumes from entering the body. The wheel housing shall be constructed of at least 16-gauge steel or other material of equal tensile strength.
3. The inside height of the wheel housing above the floor line shall not exceed 12 inches.
4. The wheel housing shall provide clearance for installation and use of tire chains on single and dual (if so equipped) power-driving wheels.
5. No part of a raised wheel housing shall extend into the emergency door opening.

Windshield and Windows

1. All glass in the windshield, the windows, and doors shall be of approved safety glass so mounted that a permanent mark is visible and of sufficient quality as to prevent distortion of view in any direction.
2. Glass in the windshield shall be heat absorbent, laminated plate. The windshield shall be large enough to permit the driver to see the roadway clearly, shall be slanted to reduce glare, and shall be installed between the front corner posts that are so designed and placed as to afford minimum obstruction to the driver's view of the roadway.
3. All full side windows shall open vertically so as to provide an unobstructed opening of not less than 9 inches high and 22 inches wide, obtained by lowering the window. Windows shall be a split-sash type and so installed as to provide an emergency exit. There shall be no horizontal, transit or activity-style windows in the student compartment.
4. All exposed edges of glass shall meet FMVSS requirements.
5. A tinted and shaded windshield with 73% light transmitted and a six-inch shaded band across the top shall be installed at the factory. Type A-I and A-II buses utilizing the chassis manufacturers one-piece windshield may be equipped with an O.E.M. shade band windshield with a band of approximately 4 inches in height.

Windshield Washers

A windshield washer system shall be provided that will service the entire wiped surface area.

Windshield Wipers

1. A windshield wiping system, two speed or variable speed, with an intermittent feature shall be provided. The wipers shall meet the requirements of FMVSS 104.
2. The wipers shall be operated by one or more air or electric motors of sufficient power to operate the wipers. Type A-I and A-II buses utilizing the chassis

manufacturer's one-piece windshield may be equipped with two wipers driven by either one or two electric motors.

Wiring

1. All wiring shall conform to current standards of the Society of Automotive Engineers.
2. Circuits
 - A. Wiring shall be arranged in circuits as required with each circuit protected by a circuit breaker or electronic protection device. A system of color and number coding shall be used and an appropriate identifying diagram shall be provided to the end user along with the wiring diagram provided by the chassis manufacturer. **A system of color and number coding shall be used on buses. The following body interconnecting circuits shall be color-coded as noted:**

<u>Function</u>	<u>Color</u>
Left Rear Directional Light	Yellow
Right Rear Directional Light	Dark Green
Stoptlights	Red
Back-up Lights	Blue
Taillights	Brown
Ground	White
Ignition Feed, Primary Feed	Black

The color of cables shall correspond to SAE J1128.

- B. Wiring shall be arranged in at least six regular circuits as follows:
 - (1) Head, tail, stop (brake) and instrument panel lamps.
 - (2) Clearance and step well lamps. The step well lamp shall be actuated when the service door is opened.
 - (3) Dome lamp.
 - (4) Ignition and emergency exits signal.
 - (5) Turn signal lamps.
 - (6) Alternately flashing signal lamps.
- C. Any of the above combination circuits may be subdivided into additional independent circuits.

- D. Each heater and defroster shall have its own circuit breakers or other equivalent technology.
 - E. Whenever possible, all other electrical functions (such as sanders and electric-type windshield wipers) shall be provided with independent and properly protected circuits.
 - F. Each body circuit shall be coded by number or letter on a diagram of circuits and shall be attached to the body in readily accessible location.
 - G. There shall be a manual noise suppression switch installed in the control panel. The switch shall be labeled and alternately colored. This switch shall be an on/off-type that deactivates all body equipment that produces noise including at least the am/fm radio, heaters, air conditioners, fans and defrosters. This switch shall not deactivate safety systems such as windshield wipers, lighting or warning systems. Noise suppression switch on Type AI buses shall be limited to bus body accessories.
3. The entire electrical system of the body shall be designed for the same voltage as the chassis on which the body is mounted.
 4. All wiring shall have an amperage capacity equal to or exceeding the designed load. All wiring splices are to be done at an accessible location and noted as splices on the wiring diagram.
 5. A body-wiring diagram of easily readable size shall be furnished with each bus body or affixed in an area convenient to the electrical accessory control panel.
 6. The body power wire shall be attached to a special terminal on the chassis.
 7. All wires passing through metal openings shall be protected by a grommet.
 8. Wires and tubing shall be enclosed within body panels.

SECTION IV – (SPECIAL NEEDS) SCHOOL BUS STANDARDS

Introduction

Equipping buses to accommodate students with special needs is discretionary depending upon the needs of the passengers. While one bus may be fitted with a lift, another may have seat belts installed to secure child seats. Buses so equipped are not to be considered a separate class of school bus, but simply a regular school bus, which is equipped for special accommodations.

The specifications in this section are intended to be supplementary to specifications in the chassis and body sections. In general, specially equipped buses shall meet all the requirements of the preceding sections plus those listed in this section. It is recognized by the entire industry that the field of special transportation is characterized by varied needs for individual cases and by a rapidly emerging technology for meeting those needs. A flexible, “common sense”, approach to the adoption and enforcement of specifications for these vehicle, therefore, is prudent.

By federal regulation, buses, including school buses, are defined as vehicles designed to carry eleven or more (passengers including the driver). Vehicles designed with 10 or fewer passenger positions (including the driver) cannot be certified as buses. For this reason, the federal vehicle classification Multipurpose Passenger Vehicle, or MPV, must be used by manufacturers for these vehicles in lieu of the School Bus. In determining passenger capacity, wheelchair positions are counted as passenger positions. This classification system, while requiring compliance with a less stringent set of Federal Standards for MPV’s does not preclude state or local agencies or these specifications from requiring compliance of school bus-type MPV’s with the more stringent Federal Standards for school buses.

The following standards address modifications as they pertain to school buses that, with a standard seating arrangement prior to modification, would accommodate more than 10 persons. If by addition of a power lift, mobile seating device positions or other modifications, the capacity is reduced such that vehicles become MPV’s, the intent of these standards is to have these vehicles be required to meet the same standards they would have had to meet prior to such modifications, and such MPV’s are included in all references to school buses and requirements for school buses which follow:

Definition – Specially Equipped School Bus

A specially equipped school bus is any school bus that is primarily designed, equipped, or modified to accommodate students with special needs.

General Requirements

1. School buses designed for transporting students with special transportation needs shall comply with these specifications and with FMVSS applicable to their GVWR category.

2. Any school bus to be used for the transportation of children who are confined to a wheelchair or other mobile positioning device, or who require life support equipment which prohibits use of the regular service entrance, shall be equipped with a power lift, unless a ramp is needed for unusual circumstances related to passenger needs.

Air Conditioning

Special needs buses shall be equipped with air conditioning. **Refer to page 14, School Bus Body Standards, for minimum air conditioning standards.**

Aisles

All school buses equipped with a power lift shall provide a minimum 30-inch aisle from any wheelchair position to front entrance and rear emergency exit door.

Communication System

Each special needs bus shall be equipped with a two-way, voice communication system capable of providing communication with the operational base. Where technologically feasible, the communication system shall also communicate with 911 operators. CB radio systems will not meet this requirement. **It is the responsibility of the local school system to comply with this specification.**

Crash Barriers

1. Crash barrier shall be placed between the lift and any seat position (bench seat or wheelchair position). Stanchions are not acceptable.
2. There shall be a padded crash barrier approximately 8 inches in front of the forward edge of the seat cushion of all passenger seats that do not have another seat approximately 27 inches in front of them. There shall be a padded crash barrier or seat in front of any wheelchair position unless it is contiguous with and behind another wheelchair position. The forward-most barrier on both sides of the bus shall have a full-width, aluminized courtesy panel extending to the floor.

Evacuation Blanket

A minimum of two fire-retardant, evacuation blankets, Tie Tech Evac-Aide Part # 1003, or prior approved equal, and storage pouch shall be provided. **The location to secure the evacuation blanket shall be easily accessible and determined by the purchaser at the time of the bid.**

Glazing

Tinted glazing may be installed in all doors, windows and windshield consistent with federal, state, and local regulations.

Identification

Buses with power lifts used for transporting physically handicapped students shall display three universal handicapped symbols located below the windowpane. Such emblems shall be white on blue background, shall not exceed 12 inches in size, and

shall be of a high-intensity retroreflectorized material meeting U. S. Department of Transportation FHWA FP-85 Standards. Symbols shall be located on the lift door, the rear of the bus, and the front left side of the bus.

Passenger Capacity Rating

In determining the passenger capacity of a school bus for purposes other than actual passenger load (i.e., vehicle classification, or various billing/reimbursement models), any location in a school bus intended for securing an occupied wheelchair/mobility aid during vehicle operations may be regarded as four designated seating positions. Similarly, each lift area may be regarded as four designated seating positions.

Power Lift

1. The option shall be provided to the local purchaser to have the lift located either in front of or behind the rear wheels, on the right side of the bus, but confined within the bus body when not extended.
2. All lifts shall be fully automatic with sufficient clearances to permit a wheelchair or other mobility user to reach a securement location.
3. The design load of the lift shall be at least 600 pounds. Working parts, such as cables, pulleys, and shafts, which can be expected to wear, and upon which the lift depends for support of the load, shall have a safety factor of at least 6 (six), based on the ultimate strength of the material. Non-working parts, such as the platform, frame, and attachment hardware, which would not be expected to wear, shall have a safety factor of at least 3 (three), based on the ultimate strength of the material.
4. The lifting mechanism and platform shall be able to lift a minimum of 800 pounds.
5. Controls shall be provided that enable the operator to activate the lift mechanism from either inside or outside the bus. The controls shall be interlocked with the vehicle brakes, transmission, or door, as required by FMVSS 403 and 404. The lift shall deploy to all levels (i.e., ground, curb, and intermediate positions) normally encountered in the operating environment. Where provided, each control for deploying, lowering, raising, and stowing the lift and lowering the roll-off barrier shall be of a momentary contact type requiring continuous manual pressure by the operator and shall not allow improper lift sequencing when the lift platform is occupied. The controls shall allow reversal of the lift operation sequence, such as raising or lowering a platform that is part way down, without allowing an occupied platform to fold or retract into the stowed position.
6. The lift shall incorporate an emergency method of deploying, lowering to ground level with a lift occupant, and raising and stowing the empty lift if the power to the lift fails. No emergency method, manual or otherwise, shall be capable of being operated in a manner that could be hazardous to the lift occupant or to the operator when operated according to manufacturer's instructions and shall not permit the platform to be stowed or folded when occupied. No manual emergency operation

shall require more than 2 (two) minutes to lower an occupied wheelchair to ground level.

7. Platforms stowed in a vertical position, and deployed platforms when occupied, shall have provisions to prevent their deploying, falling, or folding any faster than 12 inches per second or their dropping of an occupant in the event of a single failure of any load carrying component.
8. The lift platform shall be equipped with barriers to prevent any of the wheels of a wheelchair or mobility aid from rolling off the platform during its operation. A movable barrier or inherent design feature shall prevent a wheelchair or mobility aid from rolling off the edge closest to the vehicle until the platform is in its fully raised position. Each side of the lift platform, which extends beyond the vehicle in its raised position, shall have a barrier a minimum 1 and 1/2 inches high. Such barriers shall not interfere with maneuvering into or out of the aisle. The loading-edge barrier (outer barrier), which functions as a loading ramp when the lift is at ground level, shall be sufficient when raised or closed, or a supplementary system shall be provided, to prevent a power wheelchair or mobility aid from riding over or defeating it. The outer barrier of the lift shall automatically raise or close, or a supplementary system shall automatically engage, and remain raised, closed, or engaged at all times that the platform is more than 3 inches above the roadway or sidewalk and the platform is occupied. Alternatively, a barrier or system may be raised, lowered, opened, closed, engaged, or disengaged by the lift operator, provided an interlock or inherent design feature prevents the lift from rising unless the barrier is raised or closed or the supplementary system is engaged.
9. The platform surface shall be free of any protrusions over 1/4 inch high and shall be slip resistant. The platform shall have a minimum clear width of 28 and 1/2 inches at the platform, a minimum clear width of 30 inches measured from 2 inches above the platform surface to 30 inches above the surface of the platform, and a minimum clear length of 48 inches measured from 2 inches above the surface of the platform to 30 inches above the surface of the platform.
10. Any openings between the platform surface and the raised barriers shall not exceed 5/8 inches in width. When the platform is at vehicle floor height with the inner barrier (if applicable) down or retracted, gaps between the forward lift platform edge and the vehicle floor shall not exceed 1/2 inches horizontally and 5/8 inches vertically.
11. The outboard entrance ramp or loading-edge barrier used as a ramp and the transition plate from the inboard edge of the platform to the vehicle floor shall not exceed a slope of 1:8, measured on level ground, for a maximum rise of three inches, and the transition from roadway or sidewalk to ramp may be vertical without edge treatment up to 1/4 inches.

Thresholds between 1/4 inch and 1/2 inch high shall be beveled with a slope no greater than 1:2.

12. The lift platform (not including the entrance ramp) shall not deflect more than three degrees (exclusive of vehicle roll or pitch) in any direction between its unloaded position and its position when loaded with 60 pounds applied through a 26" by 26" test pallet at the centroid of the platform.
13. No part of the platform shall move at a rate exceeding 6 inches per second during lowering and lifting an occupant, and shall not exceed 12 inches per second during deploying or stowing. This requirement does not apply to the deployment or stowage cycles of lifts that are manually deployed or stowed. The maximum platform horizontal and vertical acceleration when occupied shall be 0.3 g.
14. The lift shall permit both inboard and outboard facing of wheelchair and mobility aid users.
15. Lifts shall accommodate persons using walkers, crutches, canes or braces, or who otherwise have difficulty using steps. The platform may be marked to indicate a preferred standing position.
16. Platforms on lifts shall be equipped with handrails on two sides, which move in tandem with the lift, and which shall be graspable and provide support to standees throughout the entire lift operation. Handrails shall have a usable component at least 8 inches long with the lowest portion a minimum 30 inches above the platform and the highest portion a maximum 38 inches above the platform. The handrails shall be capable of withstanding a force of 100 pounds concentrated at any point on the handrail without permanent deformation of the rail or its supporting structure. The handrails shall have a cross-sectional diameter between 1 and 1/4 inches and 1 and 1/2 inches or shall provide an equivalent grasping surface, and have eased edges with corner radii of not less than 1/8 inch. Handrails shall be placed to provide a minimum 1 and 1/2" knuckle clearance from the nearest adjacent surface. Handrails shall not interfere with wheelchair or mobility aid maneuverability when entering or leaving the vehicle. Any wheelchair frame utilizing a horizontal overhead support shall have padding at least 1" in thickness extending the full width of support.
17. A re-settable circuit breakers or other equivalent technology shall be installed between the power source and the lift motor if electrical power is used. It shall be located as close to the power source as possible, but not within the passenger/driver compartment.
18. Lift design shall prevent excessive pressure that could damage the lift system when the platform is fully lowered or raised, or that could jack the vehicle.

19. The following information shall be provided with each vehicle equipped with a lift:
 - A. A phone number where information can be obtained about installation, repair, and parts. (Detailed written instructions and a parts list shall be available upon request.)
 - B. Detailed instructions regarding use of the lift and readily visible when the lift door is open, including a diagram showing the proper placement and positioning of wheelchair/mobility aids on lift.
20. The lift manufacturer shall make available training materials to ensure the proper use and maintenance of the lift. These may include instructional videos, classroom curriculum, system test results, or other related materials.
21. Each lift shall be permanently and legibly marked or incorporate a non-removable label or tag which states that it conforms to all applicable requirements of the current National Standards for School Buses. In addition, the lift manufacturer, or an authorized representative, upon request of the original titled purchaser, shall provide a Notarized Certificate of Conformance, either original or photocopied, which states that the lift system meets all the applicable requirements of the current National Standards for School Buses.

Ramp

Emergency ramps may be used with prior approval from the SDE.

Regular Service Entrance

1. Steps
 - A. The first step at the service door shall be not less than 10 inches and not more than 14 inches from the ground when measured from the top of the step based on standard chassis specifications.
 - B. Type D vehicles shall have the first step at the service door 12 to 16 inches from the ground.
2. The service door entrance shall use a three-step step well. Risers shall be of equal height and depth. When a plywood floor is used on steel, the differential may be increased by thickness of plywood.
3. Steps shall be enclosed to prevent accumulation of ice and snow.
4. Steps shall not protrude beyond the side bodyline.
 - A. A grab handle not less than 20 inches in length shall be provided in an unobstructed location inside the doorway.

Restraining Devices

1. On power-lift equipped vehicles, seat frames may be equipped with attachments or devices to which belts, restraining harnesses or other devices may be attached. Attachment framework or anchorage devices, if installed, shall conform to FMVSS 210.
2. Seat belt assemblies may be installed on special needs buses, shall conform to FMVSS 209. Seat belt assemblies shall be color-coded, installed by the manufacturer, and must conform to FMVSS 209.
3. Child restraint systems, which are used to facilitate the transportation of children who in other modes of transportation would be required to use a child, infant, or booster seat, shall conform to FMVSS 213 and 222.
4. Passenger seats designed to accommodate a child or infant carrier seat shall comply with FMVSS 225. These seats shall be in compliance with NHTSA's **"Guideline for the Safe Transportation of Pre-School-Age Children in School Buses."**

Seating Arrangements

Flexibility in seat spacing to accommodate special circumstances shall be permitted to meet passenger requirements. All seating shall be forward facing. *Floor plans for special needs buses shall be designed with emphasis on placing wheelchair positions forward of the rear axle.*

Securement and Restraint System for Wheelchair/Mobility Aid and Occupant

For purposes of better understanding the various aspects and components of this section, the term securement or phrase securement system is used exclusively in reference to the device(s), which secure the wheelchair/mobility aid. The term restraint or phrase restraint system is used exclusively in reference to the device(s) used to restrain the occupant of the wheelchair/mobility aid. The phrase securement and restraint system is used to refer to the total system, which secures and restrains both the wheelchair/mobility aid and the occupant.

1. Securement and restraint system--general
 - A. The Wheelchair/Mobility Aid Securement and Occupant Restraint System shall be designed, installed, and operated to accommodate passengers in a forward-facing orientation within the bus and shall comply with all applicable requirements of FMVSS 222. Gurney-type devices shall be secured parallel to the side of each bus.
 - B. The securement and restraint system, including the system track, floor plates, pockets, or other anchorages shall be provided by the same manufacturer, or be certified to be compatible by manufacturers of all equipment/systems used.

- C. When a wheelchair/mobility aid securement device and an occupant restraint share a common anchorage, including occupant restraint designs that attach the occupant restraint to the securement device or the wheelchair/mobility aid, the anchorage shall be capable of withstanding the loads of both the securement device and occupant restraint applied simultaneously, in accordance with FMVSS 222 (see Sections 2 and 3 of this section).
- D. When a wheelchair/mobility aid securement device (webbing or strap assembly) is shared with an occupant restraint, the wheelchair/mobility aid securement device (webbing or strap assembly) shall be capable of withstanding a force twice the amount as specified in Section 4.4(a) of FMVSS 209 (see Sections 2 and 3 of this section).
- E. The bus body floor and sidewall structures where the securement and restraint system anchorages are attached shall have equal or greater strength than the load requirements of the system(s) being installed.
- F. The occupant restraint system shall be designed to be attached to the bus body either directly or in combination with the wheelchair/mobility aid securement system, by a method, which prohibits the transfer of weight or force from the wheelchair/mobility aid to the occupant in the event of an impact.
- G. When an occupied wheelchair/mobility aid is secured in accordance with the manufacturer's instructions, the securement and restraint system shall limit the movement of the occupied wheelchair/mobility aid to no more than 2 inches in any direction under normal driving conditions.
- H. The securement and restraint system shall incorporate an identification scheme, which will allow for the easy identification of the various components and their functions. It shall consist of one of the following, or combination thereof:
 - (1) The wheelchair/mobility aid securement (webbing or strap assemblies) and the occupant restraint belt assemblies shall be of contrasting color or color shade.
 - (2) The wheelchair/mobility aid securement device (webbing or strap assemblies) and occupant restraint belt assemblies shall be clearly marked to indicate the proper wheelchair orientation in the vehicle, and the name and location for each device or belt assembly; i.e., front, rear, lap belt, shoulder belt.
- I. All attachment or coupling devices designed to be connected or disconnected frequently shall be accessible and operable without the use of tools or other mechanical assistance.

- J. The securement and restraint system hardware and components shall be free of sharp or jagged areas and shall be of a non-corrosive material or treated to resist corrosion in accordance with Section 4.3(a) of FMVSS 209.
- K. The securement and restraint system shall be located and installed such that when an occupied wheelchair/mobility aid is secured, it does not block access to the lift door or emergency door.
- L. A device for storage of the securement and restraint system may be provided. When the system is not in use, the storage device shall allow for clean storage of the system, shall keep the system securely contained within the passenger compartment, shall provide reasonable protection from vandalism, and shall enable the system to be readily accessed for use.
- M. The entire securement and restraint system, including the storage device, shall meet the flammability standards established in FMVSS 302.
- N. Each securement device (webbing or strap assembly) and restraint belt assembly shall be permanently and legibly marked or incorporate a non-removable label or tag which states that it conforms to all applicable FMVSS requirements. In addition, the system manufacturer, or an authorized representative, upon request by the original titled purchaser, shall provide a notarized Certificate of Conformance, either original or photocopied, which states that the wheelchair/mobility aid securement and occupant restraint system meets all of the requirements as specified in FMVSS 222.
- O. The following information shall be provided with each vehicle equipped with a securement and restraint system:
 - (1) A phone number where information can be obtained about installation, repair, and parts. (Detailed written instructions and a parts list shall be available upon request.)
 - (2) Detailed instructions regarding use, including a diagram showing the proper placement of the wheelchair/mobility aids and positioning of securement devices and occupant restraints, including correct belt angles.
- P. The system manufacturer shall make available training materials to ensure the proper use and maintenance of the wheelchair/mobility aid securement and occupant restraint system. These may include instructional videos, classroom curriculum, system test results, or other related materials.

2. Wheelchair/mobility aid securement system

- A. Each securement system location shall consist of a minimum of four anchorage points. A minimum of two anchorage points shall be located in front of the

wheelchair/mobility aid and a minimum of two anchorage points shall be located in the rear. The securement anchorages shall be attached to the floor of the vehicle and shall not interfere with passenger movement or present any hazardous condition.

- B. Each securement system location shall have a minimum clear floor area of 30" x 48". Additional floor area may be required for some applications. Consultation between the user and the manufacturer is recommended to ensure adequate area is provided.
- C. The securement system shall secure common wheelchair/mobility aids and shall be able to be attached easily by a person having average dexterity and who is familiar with the system and wheelchair/mobility aid.
- D. As installed, each securement anchorage shall be capable of withstanding a minimum force of 3,000 pounds (13,344 Newtons) when applied as specified in FMVSS 222. When more than one securement device share a common anchorage, the anchorage shall be capable of withstanding the force indicated above, multiplied by the number of securement devices sharing that anchorage.
- E. Each securement device, if incorporating webbing or a strap assembly, shall comply with the requirements for Type 1 safety belt systems, in accordance with Sections 4.2, 4.3, and 4.4(a) of FMVSS 209.
- F. The securement system shall secure the wheelchair/mobility aid in such a manner that the attachments or coupling hardware will not become detached when any wheelchair/mobility aid component deforms, when one or more tires deflate, and without intentional operation of a release mechanism (e.g., a spring clip on a securement hook).
- G. Each securement device (webbing or strap assembly) shall be capable of withstanding a minimum force of 2,500 pounds when tested in accordance with FMVSS 209.
- H. Each securement device (webbing or strap assembly) shall provide a means of adjustment of manufacturer's design, to remove slack from the device or assembly.
- I. Each securement device, webbing, or strap assembly shall be of the automatic, retractable type.

3. Occupant restraint system

- A. A Type II-A occupant restraint system, which meets all applicable requirements of FMVSS 209 and 210, shall provide for restraint of the occupant.

- B. The occupant restraint system shall be made of materials, which do not stain, soil, or tear an occupant's clothing, and which are resistant to water damage and fraying.
- C. Each restraint system location shall have not less than one anchorage, of manufacturer's design, for the upper end of the upper torso restraint.
 - (1) The anchorage for each occupant's upper torso restraint shall be capable of withstanding a minimum force of 1,500 pounds (6,672 Newtons) when applied as specified in FMVSS 222.
- D. Each wheelchair/mobility aid location shall have not less than two floor anchorages for the occupant pelvic and the connected upper torso restraint.
 - (1) Each floor anchorage shall be capable of withstanding a minimum force of 3,000 pounds (13,344 Newtons) when applied as specified in FMVSS 222.
 - (2) When more than one occupant restraint share a common anchorage, the anchorage shall be capable of withstanding a minimum force of 3,000 pounds (13,344 Newtons) multiplied by the number of occupant restraints sharing the common anchorage in accordance with FMVSS 222.
- E. Each floor and wall anchorage which secures the occupant restraint to the vehicle and which is not permanently attached, shall be of a "positive latch" design, and shall not allow for any accidental disconnection.

Special Light

Doorways, in which lifts are installed, shall have, lighting as required by FMVSS 403 and 404.

Special Service Entrance

1. Power lift equipped bodies shall have a special service entrance to accommodate the power lift.
2. The special service entrance and door shall be located on the right side of the bus and shall be designed so as not to obstruct the regular service entrance.
3. The opening may extend below the floor through the bottom of the body skirt. If such an opening is used, reinforcements shall be installed at the front and rear of the floor opening to support the floor and give the same strength as other floor openings.
4. A drip molding shall be installed above the opening to effectively divert water from entrance.

5. Door posts and headers from entrance shall be reinforced sufficiently to provide support and strength equivalent to the areas of the side of the bus not used for special service entrance.

Special Service Entrance Doors

1. A single door or double doors may be used for the special service entrance.
2. A single door shall be hinged to the forward side of the entrance unless doing so would obstruct the regular service entrance. If, due to the above condition, the door is hinged to the rearward side of the doorway, the door shall utilize a safety mechanism, which will prevent the door from swinging, open should the primary door latch fail. If double doors are used the system shall be designed to prevent the door(s) from being blown open by the wind resistance created by the forward motion of the bus, and/or incorporate a safety mechanism to provide secondary protection should the primary latching mechanism(s) fail.
3. All doors shall have positive fastening devices to hold doors in the open position.
4. All doors shall be weather sealed on buses with double doors. They shall be so constructed that a flange on the forward door overlaps the edge of the rear door when closed.
5. When manually operated dual doors are provided, the rear door shall have at least a one-point fastening device to the header. The forward-mounted door shall have at least three-point fastening devices. One shall be to the header, one to the floor line of the body, and the other shall be into the rear door. The door and hinge mechanism shall be of a strength that is greater than or equivalent to the emergency exit door.
6. Door materials, panels and structural strength shall be equivalent to the conventional service and emergency doors. Color, rub rail extensions, lettering and other exterior features shall match adjacent sections of the body.
7. Each door shall have windows, set in a waterproof manner, which are visually similar in size and location to adjacent non-door windows. Glazing shall be of same type and tinting (if applicable) as standard fixed glass in other body location.
8. Door(s) shall be equipped with a device that will actuate a flashing visible signal located in the driver's compartment when the door(s) is open and ignition is in "on" position.
9. A switch shall be installed so that the lifting mechanism will not operate when the lift platform door(s) is closed.

10. Special service entrance doors shall be equipped with padding at the top edge of the door opening. Pad shall be at least three inches wide and one inch thick and extend the full width of the door opening.

Support Equipment and Accessories

1. Each bus shall contain at least one belt cutter properly secured in a location within reach of the driver while belted into his/her driver's seat. The belt cutter shall be durable, designed to eliminate the possibility of the operator or others being cut during use, and must have a full handgrip.
2. Special equipment or supplies which are used on the bus for mobility assistance, health support, or safety purposes shall meet any local, federal, or engineering standards which may apply, including proper identification.

Equipment which may be used for these purposes includes, but is not limited to:

- A. Wheelchairs and other mobile seating devices (see section on Securement System for Mobile Seating Devices/Occupant).
 - B. Crutches, walkers, canes, and other ambulating devices.
 - C. Medical support equipment. This may include respiratory devices such as oxygen bottles (which should be no larger than 22 cubic feet for liquid oxygen and 38 cubic feet for compressed gas), or ventilators. Tanks and valves should be located and positioned to protect them from direct sunlight, bus heater vents, or other heat sources. Other equipment may include intravenous, and fluid drainage apparatus. Appropriate medical placarding, if needed, shall be added by the LEA.
3. All portable equipment and special accessory items, including the equipment listed above, shall be secured at the mounting location to withstand a pulling force of five times the weight of the item, or shall be retained in an enclosed, latched compartment. The compartment shall be capable of withstanding forces applied to its interior equal to five times the weight of its contents without failure to the box's integrity and securement to the bus. Exception: If these standards provide specific requirements for securement of a particular type of equipment, the specific standard shall prevail (i.e., wheelchairs).

Technology and Equipment, New

It is the intent of these specifications to accommodate new technologies and equipment that will better facilitate the transportation of students with special needs. When a new technology, piece of equipment or component is desired to be applied to the school bus it must meet the following criteria:

- A. The technology, equipment, or component shall not compromise the effectiveness or integrity of any major safety system. (Examples of safety

systems include, but are not limited to, compartmentalization, the eight-lamp warning system, emergency exits and the approved color scheme.

- B. The technology, piece of equipment or component shall not diminish the safety of the interior of the bus.
- C. The technology, piece of equipment or component shall not create additional risk to students who are boarding or exiting the bus or are in or near the school bus loading zone.
- D. The technology, piece of equipment or component shall not require undue additional activity and/or responsibility for the driver.
- E. The technology, piece of equipment or component shall generally increase efficiency and/or safety of the bus, generally provide for a safer or more pleasant experience for the occupants and pedestrians in the vicinity of the bus or shall generally assist the driver and make his/her many tasks easier to perform.
- F. The technology, piece of equipment or component shall have prior written approval from the SDE School Bus Specifications Committee.

SECTION V - ALTERNATE FUEL SOURCE STANDARDS

1. The guidelines contained herein shall pertain only to the school buses approved by the Alabama State Board of Education to operate on alternative fuel sources and which meet the safe operation requirements of paragraph B-1.
 - A. Any company or individual servicing conversion equipment to school districts shall provide an approved certification program covering installation, personnel training, maintenance, repair, trouble-shooting and safety procedures for each responsible mechanic to assure that conversion and maintenance is performed only by personnel certified by the Alabama LP-Gas Board or other approved agency.

School systems considering the use of bio-diesel fuels shall secure written approval from the Alabama State Department of Education, Pupil Transportation Section, Montgomery, Alabama, 36130. The written request should, at a minimum, provide the SDE with specific information regarding the fuel designation (B-5 or B-20), the supplier, and the fuel blend.

Fuel blends containing used cooking oil will not be allowed.

- B. These companies or individuals shall submit to the Alabama State Department of Education, Pupil Transportation Section, Montgomery, Alabama, 36130, documentation certifying that the requirements of 1-A have been met.

SECTION VI - OPTIONS

Locking Fuel Compartment Door

Provide at the option of the purchaser a lock and key to secure the fuel compartment door.

Storage Compartment for Required Emergency Equipment

Provide at the option of the purchaser a storage compartment located in the driver's compartment to house the emergency equipment. It shall be a locked compartment with a warning buzzer attached so as to activate when the ignition switch is on and the compartment is locked.

SECTION VII – MULTIFUNCTIONAL SCHOOL ACTIVITY BUS (MFSAB)

DEFINITION:

A Multifunctional School Activity Bus (MFSAB) is a school bus constructed to Federal Motor Vehicle Safety Standards (FMVSS) and Alabama Minimum School Bus Specifications. It must be purchased or leased as a new bus and may only be used for extracurricular activities. **These buses may not be used to transport students to and from schools or between schools for the purpose of attendance.**

The following exceptions to the Alabama Minimum Specifications for School Buses for regular route buses shall be allowed for these vehicles.

Identification:

1. The bus body shall bear the words “**ACTIVITY BUS**” in a contrasting color at least 8 inches high in the area where “school bus” is normally positioned. Lettering and numbering shall conform to FMVSS and Alabama Minimum Specifications and shall meet reflectivity standards. Bus numbering on this bus may be of a contrasting color.
2. The name of the school system shall be displayed in at least five-inch letters on both sides of the bus in the beltline area. **NO SIGNS OR LOGOS** shall be applied to any area of the bus including the bumpers. The name of the school may be displayed in the beltline area. No signs, logos, or other items shall be displayed on the windows of the bus.

Color:

The local school with school system approval may determine the color of the activity bus. The color scheme may utilize any combination of up to **THREE** colors. This combination may be in addition to an optional white roof. The color National School Bus Yellow (SBMTC-008 Publication) shall not be used as a part of the color scheme.

School systems and/or vendors shall submit preliminary color schemes to the Alabama Department of Education, Pupil Transportation Section for approval **prior to the purchase or manufacture** of a Multifunctional School Activity Bus (MFSAB).

Seating:

Transit style seats, which meet all aspects of FMVSS 222 and 302, may be used in lieu of regular school bus seats.

Lighting and Warning Devices:

All activity buses shall meet state and federal standards for normal school bus lighting and warning device requirements with the following exceptions:

Multifunctional School Activity Buses (MFSAB) may not be equipped with alternately flashing amber or red signal lamps used for loading and unloading students.

Multifunctional School Activity Buses (MFSAB) may not be equipped with stop arm signals or crossing control arms.

INSPECTIONS:

Annual inspection by Alabama Department of Education (SDE) state school bus inspectors and monthly inspections by local school bus inspectors shall be performed on all Multifunctional School Activity Buses (MFSAB) as required by Alabama law and the Rules of the Alabama State Board of Education.

REGULATIONS:

These buses shall be owned by the local school system or leased from private school bus transportation contractors. All Alabama laws, Rules of the State Board of Education, and other applicable regulations pertaining to the operation of school buses and certification of school bus drivers shall apply to Multifunctional School Activity Buses.

ALABAMA MINIMUM SPECIFICATIONS 2008
QUICK REFERENCE CHART

****TYPE A-I SCHOOL BUS****

<p>Type A-I and A-II buses under 14,500 pounds GVWR shall be built to manufacturer's specifications. All type A buses under 14,500 pounds GVWR shall have four-wheel disc brakes.</p>
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****TYPE A-II SCHOOL BUS****

(Over 14,500 pounds)

CAPACITY	BRAKE LINING SIZE	GAWR FRONT	GAWR REAR	GVWR TOTAL	TIRE SIZE
10-47	4" Front 6" Rear	9,000	14,200	23,200	10R x 22.5 10 ply

Type A-II school buses exceeding 14,500 pounds GVWR shall have air brakes.

****TYPE C SCHOOL BUS****

10-47	4" Front 6" Rear	9,000	14,200	23,200	10R x 22.5 10 ply
48-54	4" Front 6" Rear	9,000	16,000	25,000	10R x 22.5 10 ply
55-72	4" Front 7" Rear	9,000	17,500	26,500	10R x 22.5 12 ply

Type C school buses exceeding 72 capacity shall have prior, written SDE approval.

****TYPE C-1 SCHOOL BUS****

10-36	Four-wheel disc	6,000	13,500	19,000 maximum	225 x 70R 19.5 - 12 Ply
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****TYPE D FRONT ENGINE****

10-53	4" Front 6" Rear	10,800	17,000	27,800	10R x 22.5 10 ply
54-66	5" Front 7" Rear	11,000	17,000	28,000	10R x 22.5 10 ply
68-78	5" Front 7" Rear	11,000	19,000	30,000	11R x 22.5 14 ply
79-84	6" Front 8" Rear	13,000	20,000	33,000	11R x 22.5 16 ply

****TYPE D REAR ENGINE****

42-66	5" Front 7" Rear	12,000	19,000	30,000	11R x 22.5 16 ply
68-78	6" Front 7" Rear	12,000	19,000	30,000	11R x 22.5 16 ply
79-84	6" Front 8" Rear	12,000	21,000	33,000	11R x 22.5 16 ply

Type D school buses exceeding 84-capacity shall have prior, written SDE approval.

Alabama Minimum Specifications for School Buses 2007



Alabama Department of Education
Division of Administrative and Financial Services
Pupil Transportation Section
Montgomery, Alabama
334-242-9730

Joseph B. Morton
State Superintendent of Education
Bulletin 2007, Number 34

The Alabama Minimum Specifications for School Buses can also be found on the Alabama State Department of Education website at www.alsde.edu. Look under “Sections” for Pupil Transportation, then “Publications”.



INTRODUCTION

Alabama law (32-5-8) requires the Alabama State Board of Education to adopt minimum standards to govern the specifications for all new school buses and the overall operation of all school buses in the state of Alabama. This responsibility also extends to the inspection of school buses being sold and operated in the state of Alabama. The primary reason for the development of specifications and the inspection of school buses is to enhance the safety of our school buses. We must ensure that Alabama school buses continue to provide the safest ride available for our most precious cargo—our children.

A heartfelt thanks goes to each member of the Alabama State Department of Education School Bus Specifications Committee for all their hard work and dedication to the task. School bus specifications always begin as a product of many individual thoughts and ideas. However, they culminate in standards, which help assure the safest school buses possible for Alabama's students as well as vehicles, which provide a true value for Alabama's taxpayers.

Additionally, special thanks must also be voiced for Alabama's school bus vendors and the many manufacturers in the school bus industry who assist in the Committee in the development of this document. Without their participation, the specifications would be significantly weakened.

Again, we appreciate the many individuals and companies who participated in the development of these specifications. After reviewing these current specifications, if you have any question or suggestions, please feel free to contact any of the committee members listed on the following page.

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ALABAMA
SCHOOL BUS INSPECTION
HANDBOOK



PREPARED BY
ALABAMA DEPARTMENT OF EDUCATION
DIVISION OF ADMINISTRATIVE AND FINANCIAL SERVICES
TRANSPORTATION SECTION
MONTGOMERY, ALABAMA

The *Alabama School Bus Inspection Handbook* was developed by the Alabama State Department of Education (SDE) Pupil Transportation Section as a standard for school bus *safety* inspections at the local school system level. This handbook is provided as a guideline for local school system school bus inspectors, shop foremen, technicians, maintenance supervisors, and transportation directors in conducting the monthly inspections required by Alabama law and the Rules of the Alabama State Board of Education.

The goal of this handbook is to provide uniform standards for state and local school bus inspections. The manual also identifies the critical items to be inspected on Alabama school buses, how they are to be inspected, and which items should remove a school bus from service until the item is repaired (“out of service” items).

Copies of the handbook have been distributed to all local school systems.

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ALABAMA MINIMUM SPECIFICATIONS FOR SCHOOL BUSES
EFFECTIVE October 1, 2006

SECTION I - GENERAL PROVISIONS

Standards

1. All school buses ordered by local education agencies beginning **October 1, 2006**, shall (1) meet the applicable Federal Motor Vehicle Safety Standards (FMVSS), and (2) meet Alabama minimum specifications for school buses. In the event of a conflict between the requirements of an applicable Federal Motor Vehicle Safety Standard, as referred to in this section, and the Alabama minimum specifications, the requirements of the FMVSS shall control. **School buses not meeting minimum specifications will not be certified by the Alabama State Department of Education (SDE). Under unusual circumstances and with adequate justification, exceptions to these specifications may be granted by the SDE administrator of pupil transportation.**

Certification

2. All school bus manufacturers shall certify to the SDE, in the form of a **durable, legible** certification label mounted in the driver's compartment in the vehicle, that all school buses meet or exceed all standards as specified herein and are in compliance with the applicable FMVSS. All manufacturers shall certify to the State of Alabama and local education agencies that all components on school buses are new from bumper to bumper at time of delivery. All chassis and body information shall appear on this certification label.

Used School Buses

3. Used school buses purchased for use by a school system in Alabama shall meet all of the legal Federal and Alabama requirements for school buses that were in effect on the date the vehicle was manufactured.

Bid Requirements

4. In order to be in compliance with the State Bid Law, school bus purchases shall be by competitive bidding. Bid forms to the body manufacturer shall contain certain options required by the chassis manufacturer, which may result in changes in normal Gross Vehicle Weight Rating (GVWR) or alterations to the body. For special needs buses, the school bus body manufacturer shall submit floor plans which include dimensions at the time bid quotations are submitted showing:
 1. Location of the emergency door, emergency windows and roof hatches.
 2. Aisle and staging areas and seat spacing.
 3. Track locations and/or wheelchair securement positions.

5. **Service Manual/Diagnostic Equipment**

Body and/or chassis suppliers, including integral (forward control) suppliers, shall provide each school district purchasing school buses with one complete set of the most current service manuals, as specified by the school system, available to include both body and chassis at no additional cost upon delivery of bus. Provisions for manuals and diagnostic equipment, including, but not limited to code books, software, and training, etc, shall be agreed upon during the pre-bid process. Diagnostic equipment cannot be used to determine low bidder.

6. **New Technology**

New technology not in the present specifications shall have prior written approval from the SDE School Bus Specifications Committee.

7. **School Bus Definitions**

School bus capacity is determined based on body size before modifications are made.

TYPE A: A Type A school bus is a conversion or body constructed upon a van-type or cutaway front-section vehicle with a left side driver's door designed for carrying more than 10 persons. This definition shall include two classifications: Type A-I with a GVWR of 10,000 or under; and Type A-II, with a GVWR over 10,000 pounds. All Type A buses shall have dual rear wheels. **Type A buses under 14,500 pounds GVWR shall have four-wheel disc brakes. Type A buses exceeding a GVWR of 14,500 pounds shall have air brakes.**

TYPE B: A Type B school bus is a conversion or body constructed and installed upon a van or front-section vehicle chassis, or stripped chassis, with a GVWR of more than 10,000 pounds and designed for carrying more than 10 persons. Part of the engine is beneath and/or behind the windshield and beside the driver's seat. The entrance door is behind the front wheels. All Type B buses 14,500 pounds or under shall have four-wheel disc brakes.

TYPE C: A Type C school bus is a body installed upon a flat back cowl chassis with a GVWR of more than 10,000 pounds and designed for carrying more than 10 persons. The entire engine is in front of the windshield and the entrance door is behind the front wheels. **Type C buses may not exceed 72-passenger capacity without prior, written SDE approval.**

TYPE C1 A Type C1 school bus is a body installed upon a flat back cowl chassis with a GVWR of more than 10,000 pounds and a maximum of 19,000 pounds and designed for carrying a maximum of 36 persons. This is a special category of a Type C school bus designed to be an alternate to a

Type A1, Type A2, or Type B. **This bus shall not exceed a maximum capacity of 36 persons.**

TYPE D: A Type D school bus is a body installed upon a chassis, with the engine mounted in the front, midship, or rear, with a gross vehicle weight rating of more than 10,000 pounds and designed for carrying more than 10 persons. The engine may be behind the windshield and beside the driver's seat, at the rear of the bus, behind the rear wheels, or midship between the front and rear axles. The entrance door is ahead of the front wheels.

Type D buses may not exceed 84-passenger capacity without prior, written SDE approval.

SECTION II - SCHOOL BUS CHASSIS STANDARDS

Air Cleaner

1. The engine intake air cleaner shall be furnished and properly installed by the chassis manufacturer to meet engine specifications.

The intake air system for diesel engines shall have an air cleaner restriction indicator properly installed by the chassis manufacturer to meet engine specifications.

Axles

1. The front and rear axles and suspension systems shall have a gross axle weight rating (GAWR) at ground commensurate with the respective front and rear weight loads of the bus loaded to the rated passenger capacity.
2. Vehicle minimum axle capacities at ground when loaded shall meet the body manufacturer's GVWR specified by the FMVSS. Axle assemblies shall have minimum capacities at ground as shown on the chart on the last page of this booklet.

Brakes

1. A braking system, including service brake and parking brake, shall be provided and shall comply with all CDL pretrip inspection requirements. All Type A-1 and A-II school buses below 14,500 pounds GVWR shall be built to manufacturer's specifications. Type C-1 school buses between 10,000 pounds GVWR and 19,000 pounds GVWR are exempt from air brake requirements, but shall have four-wheel disc brakes.
2. Buses using air in the operation of the brake system shall be equipped with warning signals, readily audible and visible to the driver, that will give a continuous warning when the air pressure available in the system for braking is 60 psi (pounds per square inch) or less. An air pressure gauge shall be provided in the instrument panel capable of complying with CDL pretrip inspection requirements.

3. Antilock brake systems for either air or hydraulic brakes shall include control of all axles in compliance with FMVSS 105 or 121.

A. Air brakes shall be installed on all chassis exceeding 14,500 pounds GVWR. **Exception:** Type C-1 school buses between 10,000 pounds GVWR and 19,000 pounds GVWR are exempt from air brake requirements, but shall have four-wheel disc brakes.

All air-operated brake systems shall:

- (1) Meet all FMVSS for air brakes.
- (2) Be S-cam type brakes on all wheels. The camshaft, when applying brakes, shall rotate in the same direction as the wheels. Automatic slack adjusters shall be the same design on all wheels. Dust covers shall be installed on all wheels unless deleted through local option at the time of the bid.
- (3) Have at least a 12 CFM air compressor.
- (4) Be equipped with a parking and emergency brake. A manual control, clearly identified, shall be within easy reach of the driver. The parking brake valve shall comply with CDL pretrip inspection requirements.
- (5) Have brake lining sizes as shown on the chart on the last page of this booklet.
- (6) Have a reservoir capacity, which is equal to or greater than two (2) times total volume of all brake activators at full travel.
- (7) Have air dryers installed. (Bendix AD-9, Midland DA33100 or prior written approved equal). Air dryers shall be serviceable at the local level.

B. Buses using a hydraulic assist-booster in the operation of the brake system shall be equipped with warning signals, readily audible and visible to the driver, that will provide continuous warning in the event of a loss of fluid flow from the primary source, or loss of electric source powering the back-up system.

- (1) The system shall be equipped with a source of hydraulic pressure, automatically initiated upon loss of power from primary source, and operating independently of the primary power source.
- (2) All brake systems shall be designed to permit visual inspection of brake lining wear without the removal of any chassis components.

Bumper, Front

1. The front bumper shall be furnished by the chassis manufacturer for all school bus types, unless there is specific agreement between the chassis manufacturer and the body manufacturer. When Type D chassis are supplied to a body company by a chassis manufacturer, the body company shall supply the front bumper as part of the body installation.
2. The front bumper shall be of pressed steel channel or equivalent material at least 3/16 inch thick, not less than 8 inches wide (high) and shall extend beyond forward-most part of the body, grille, hood, and fenders and shall extend to the outer edges of the fenders at the bumper's top line. Bumpers on Type A buses may be built to manufacturers' specifications.
3. Tow eyes or hooks shall be furnished and attached so as not to project beyond the front bumper. Tow eyes or hooks, attached to the frame chassis, shall be furnished by the chassis manufacturer. This installation shall be in accordance with the chassis manufacturer's standards. Type A buses are exempt from tow hook requirements.
4. The bumper shall be designed or reinforced so that it will not deform, when the bus is lifted by a chain that is passed under the bumper (or through the bumper if holes are provided for this purpose) and attached to both tow eyes. For the purpose of meeting this standard, the bus shall be empty and positioned on a level, hard surface, and both tow eyes shall share the load equally. Front bumper shall not be deformed when lifted by a bumper jack positioned on the bumper attachment points.

Certification

The chassis manufacturer shall certify to the SDE and local education agency having pupil transportation jurisdiction that their product meets minimum standards on items not covered by certification issued under requirements of the National Traffic and Motor Vehicle Safety Act.

Color

1. The chassis, including the front bumper, shall be black. The hood, cowl and fenders shall be in national school bus yellow. The hood may be painted with non-reflective paint.
2. Wheel rims shall be painted black, gray, or yellow on all buses.
3. Multifunctional School Activity Buses shall be exempt from these requirements. (See MFSAB specifications on page 51.)

Directional Lights

1. Each Type C chassis may be equipped with Type A front directional lights of the two-faced type mounted on the top of the fender and the hood side panel, or have

an amber turn signal and marker light that is an integral part of the headlight assembly. This turn signal/marker light shall be seen from the front and the side of the vehicle. An additional amber turn signal shall be mounted on the side of the fender to be visible to traffic driving beside the vehicle.

Drive Shaft

1. Torque capacity of the drive shaft assembly shall at least equal maximum engine torque as developed through lowest transmission gear reduction.
2. Each drive shaft shall be equipped with protective metal guard or guards to reduce the possibility of it whipping through the floor or dropping to ground if broken. (Body manufacturer is responsible for Mini Bus.)

Electrical System

1. Battery

- A. The storage batteries shall have a minimum *total* of 1,250 cold cranking amps at 0 degrees Fahrenheit. Type A buses shall be built to manufacturer's specifications.
- B. Since all batteries in Type B, C, and D buses are to be located in a sliding tray, the battery shall be temporarily mounted on the chassis frame by the chassis manufacturer.

In these cases, the final location of the battery and the appropriate cable lengths shall be according to the current SBMTC Design Objectives.

2. Alternator

- A. All Type A and B buses up to 15,000 lbs. GVWR shall have a minimum 130 amperes alternator.
- B. All C and D buses over 15,000 lbs. GVWR shall be equipped with a heavy-duty truck or bus-type alternator meeting SAE J 180 and having a minimum output rating of 145 amperes; The alternator shall be capable of producing a minimum of 50 percent of its maximum rated output at the engine manufacturer's recommended idle speed.
- C. All C and D, buses equipped with an air conditioner or electrical power lift shall have a minimum 200 amperes alternator.
- D. A direct-drive alternator is permissible in lieu of a belt drive. A belt drive shall be capable of handling the rated capacity of the alternator with no detrimental effect on other driven components.
- E. Refer to SBMTC Design Objectives, most current edition, for estimating required alternator capacity.

3. Wiring

- A. All wiring shall conform to current applicable recommended practices of the Society of Automotive Engineers.
 - (1) All wiring shall use standard colors and number coding and each chassis shall be delivered with a wiring diagram that coincides with the wiring of the chassis. All wires passing through metal openings shall be protected by a grommet or loom.
- B. The chassis manufacturer shall install a readily accessible terminal strip or plug on the body side of the cowl, or at an accessible location in the engine compartment of vehicles designed without a cowl, that shall contain the following terminals for the body connections:
 - (1) Main 100-amp body circuits
 - (2) Tail lamps
 - (3) Right turn signal
 - (4) Left turn signal
 - (5) Stop lamps
 - (6) Back-up lamps
 - (7) Instrument panel lights (rheostat controlled)
- C. Daytime running lamps shall be provided.

4. Circuits

- A. An appropriate identifying diagram (color and number coded) for electrical circuits shall be provided to the body manufacturer for distribution to the end user.

Engine Fire Extinguisher (Optional)

See Fire Suppression System page 21.

Engine

- 1. All buses shall be equipped with diesel engines with a minimum horsepower as follows:
 - 29 to 60 passengers – 170 hp motor minimum
 - 65 to above passengers – 190 hp motor minimum
 - Types A and B under 29 passenger – manufacturer's specifications
- 2. The engine heater may be installed as per the manufacturer's specifications.

Exhaust System

1. The exhaust pipe, muffler, and tail pipe shall be outside the bus body and attached to the chassis frame. The chassis manufacturer shall furnish an exhaust system with a tail pipe of sufficient length to exit the rear of the bus or at the left side of the bus body no more than eighteen inches forward of the front edge of the rear wheelhouse opening. If designed to exit at the rear of the bus, the tailpipe shall extend at least five (5) inches beyond the end of the chassis frame and through the bumper. If designed to exit on the side of the bus, the tailpipe shall extend to the skirtline. With the exception of special needs buses, Type A vehicles may have manufacturer's standard exhaust system.
2. The muffler and the tail pipe shall be constructed of aluminized, or equivalent corrosion-resistant material. The tail pipe shall be made of at least 16-gauge material and shall be mounted in such a way that it will not cause damage to brake lines.
3. The exhaust pipe shall be properly insulated from the fuel tank and connections thereof by a metal shield at any point where it is four inches or less from tank or connections.
4. The exhaust system on vehicles designed for the transportation of special needs pupils shall be routed **to the left of the left frame rail** to allow for the installation of a lift on the right side of the vehicle.
5. On Types B, C and D buses, no exhaust pipe shall exit beneath an emergency exit or the fuel fill.
6. Type D rear engine exhaust shall exit beneath the rear bumper to manufacturer's specifications.

Fenders, Hoods--Types B and C Vehicles

1. The total spread of outer edges of front fenders, measured at the fender line, shall exceed the total spread of the front tires when the front wheels are in a straight-ahead position.
2. Front fenders shall be properly braced and free from any body attachments.
3. A fiberglass tilt hood shall be provided. The hood opening and closing effort shall be minimized to aid the driver with pre-trip inspections and service. If the hood is not designed to remain secure in the open position, a safety prop will be required. The wiring harness shall be a "quick disconnect" type to aid with servicing.

Frame

1. The frame or equivalent shall be of such design and strength characteristics as to correspond at least to standard practice for trucks of the same general load characteristics, which are used for highway service.
2. Any secondary manufacturer that modifies the original chassis frame shall guarantee the performance of workmanship and materials resulting from such modification.
3. Any frame modification shall not be for the purpose of extending the wheelbase.
4. Holes in top or bottom flanges or side units of the frame, and welding to the frame, shall not be permitted except as provided or accepted by the chassis manufacturer.
5. Frame lengths shall be provided in accordance with current SBMTC Design Objectives.

Fuel Tank

1. All Types B, C, and D chassis above 170-inch wheelbase shall have a minimum 60-gallon fuel tank with a 55-gallon actual draw. The tank shall be filled and vented to the outside of the body, the location of which shall be so that accidental fuel spillage will not drip or drain on any part of the exhaust system.
Type C-1 school buses are exempt from this requirement.
2. No portion of the fuel system, which is located to the rear of the engine compartment, except the filler tube, shall extend above the top of the chassis frame rail. Fuel lines shall be mounted to obtain maximum possible protection from the chassis frame.
3. Fuel filters shall be installed as per manufacturer's specifications. Fuel filtration shall include water detection and separation. At least one fuel filter shall have a replaceable spin-on or cartridge-type element.
4. Fuel tank installation shall be in accordance with current SBMTC Design Objectives for location on the chassis right frame rail or between frame rails; the filler tube shall be located on the right side of the bus.
5. Type A buses may meet manufacturer's specifications.
6. The fuel tank on vehicles constructed with a power lift unit may be mounted on left chassis rail or behind rear wheels.
7. Installation of alternative fuel tanks shall comply with all applicable fire codes.
8. On Types B, C, and D vehicles, fuel tanks shall have interior baffles to help prevent buses from fuel starvation on inclines.

Governor

1. An engine governor is permissible. When it is desired to limit road speed, a road speed governor should be installed.
2. An electronic engine speed limiter shall be provided and set to limit engine speed not to exceed the maximum revolutions per minute as recommended by the engine manufacturer. For Type C and D buses, and where feasible on Type A buses, bus road speed shall not exceed a maximum of 70 miles per hour.

Heating System, Provision for

1. The chassis engine shall have plugged openings for the purpose of supplying hot water for the bus heating system. The opening shall be suitable for attaching a pipe thread/hose connector. The engine shall be capable of supplying water having a temperature of at least 170 degrees Fahrenheit at a flow rate of 50 pounds/per minute at the return end of 30 feet of one inch inside diameter automotive hot water heater hose (SBMI Standard No. 001--Standard Code for Testing and Rating Automotive Bus Hot Water Heating and Ventilating Equipment).

Horn

Buses shall be equipped with a horn or horns of standard make with each horn capable of producing a complex sound in bands of audio frequencies between 250 and 2,000 cycles per second and tested per the Society of Automotive Engineers Standard J--377. There shall be no air horns.

Instruments and Instrument Panel

1. Chassis shall be equipped with the following instruments and gauges (lights in lieu of gauges are not acceptable except as noted):
 - A. Speedometer
 - B. Odometer shall show accrued mileage to six digits not including tenths.
 - C. Tachometer
 - D. Voltmeter
 - (1) An ammeter with graduated charge and discharge with the ammeter and its wiring compatible with generating capacities is permitted in lieu of a voltmeter
 - E. Oil-pressure gauge
 - F. Water temperature gauge
 - G. Fuel gauge

H. Upper beam headlight indicator

I. Air brake indicator gauge

(1) A light indicator in lieu of a gauge is permitted on vehicles equipped with hydraulic-over-hydraulic brake system.

J. Turn signal indicator

K. Glow-plug indicator light where appropriate

L. A twelve-volt accessory outlet with cover

2. All instruments shall be easily accessible for maintenance and repair.
3. Instruments and gauges shall be mounted on the instrument panel in such a manner that each is clearly visible to the driver while in a normal seated position in accordance with current SBMTC Design Objectives.
4. The instrument panel shall have lamps of sufficient candlepower to illuminate all instruments and gauges and the shift selector indicator for an automatic transmission.

Oil Filter

An Oil filter with replaceable element shall be provided and connected by flexible oil lines if it is not of built-in or engine-mounted design. The oil filters shall have a capacity of at least one (1) quart.

Openings

All openings in the floorboard or firewall between the chassis and the passenger-carrying compartment, such as for gearshift selector and parking brake lever, shall be sealed.

Passenger Load

1. Actual GVW is the sum of the chassis weight, plus the body weight, plus the driver's weight, plus total seated pupil weight. For purposes of calculation, the driver's weight is 150 pounds. For purposes of calculation, the pupil weight is 120 pounds per pupil.
2. Actual GVW shall not exceed the chassis manufacturer's GVWR for the chassis, nor shall the actual weight carried on any axle exceed the chassis manufacturer's Gross Axle Weight Rating. (GAWR)

Retarder System (Optional)

A retarder system, if used, shall limit the speed of the fully loaded school bus at 19.0 mph or 30 km/hr on a 7% grade for 3.6 miles or 6 km.

Road Speed Control

When it is necessary to control vehicle maximum speed, a vehicle speed limiter shall be utilized. For Type C and D buses, and where feasible on Type A buses, bus road speed shall not exceed a maximum of 70 miles per hour.

Shock Absorbers

Buses shall be equipped with front and rear double-action shock absorbers compatible with the manufacturer's rated axle capacity at each wheel location.

Springs/Suspension Systems

1. The capacity of the springs or suspension assemblies shall be commensurate with the chassis manufacturer's GVWR.
2. Front springs shall be of the leaf type, shall have a stationary eye at one end, and shall be protected by a wrapper leaf in addition to the main leaf. Rear leaf springs shall be of the progressive type.
3. Air ride suspension may be used on the front and rear of Type C and D buses in lieu of leaf-type springs. Body and chassis parts must clear tires with air bags in fully deflated condition or steering wheel turned fully to the left or right. If brake dust covers are used, inspection holes of adequate size and location for easily viewing brake linings shall be provided.

Steering Gear

1. The steering gear shall be approved by the chassis manufacturer and designed to assure safe and accurate performance when the vehicle is operated with maximum load and at maximum speed.
2. If external adjustments are required, the steering mechanism must be accessible to accomplish the same.
3. No changes shall be made in the steering apparatus, which are not approved by the chassis manufacturer.
4. There shall be a clearance of at least two inches between the steering wheel and the cowl, instrument panel, windshield, or any other surface.
5. Power steering is required and shall be of the integral type with integral valves.
6. The steering system shall be designed to provide a means for lubrication of all wear-points, if wear-points are not permanently lubricated.

7. The steering wheel shall meet manufacturer's specifications.

Tires and Rims

1. Radial tubeless tires and rims of proper size and tires with a load rating commensurate with chassis manufacturer's GVWR shall be provided. Hubcaps are not permitted.
2. Dual rear tires shall be provided on all school buses.
3. All tires on any given vehicle shall be of the same size and the load range of said tires shall meet or exceed the gross axle weight rating as required by FMVSS 120. Low profile tires are acceptable. However, they must meet the load range and ply requirements as shown on the chart on the last page of this booklet. It is recommended that dish-type rims be used with low profile tires.
4. If the vehicle is equipped with a spare tire and rim assembly, it shall be of the same size as those mounted on the vehicle.
5. If a tire carrier is required, it shall be suitably mounted in an accessible location outside the passenger compartment.

Transmission

An automatic transmission shall be required on all buses. Type A buses may be built to manufacturer's specifications. Types B, C, and D buses must have a PTS 2500 series or prior approved equal. The automatic transmission shall have at least four forward-gear ratios, plus integral torque converter. The transmission shift quadrant shall provide at least four forward drive ranges plus neutral and reverse ranges. Within the range selected, ratio changes shall be effected automatically and at full engine power if desirable, and without use of an engine disconnect clutch. A PTS3000 or prior approved equal is required for chassis over 33,000 pounds GVWR.

Type C-1 school buses may use Allison PTS 1000 or PTS 2200 automatic transmission or prior approved equal.

Turning Radius

1. Chassis with a wheelbase of 264 inches or less shall have a right and left turning radius of not more than 42 and 1/2 feet, curb-to-curb measurement.
2. Chassis with a wheelbase of 265 inches or more shall have a right and left turning radius of not more than 44 and 1/2 feet, curb-to-curb measurement.

Undercoating

The chassis manufacturer, or agent thereof, shall coat the undersides of steel or metallic-constructed front fenders with rust-proofing compound for which compound manufacturers have issued notarized certification of compliance to the chassis builder that the compound meets or exceeds all performance and qualitative requirements of paragraph 3.4 of Federal Specification TT-C520B using modified test.

Weight Distribution

The weight distribution of a fully loaded bus on a level surface shall be such as not to exceed the manufacturer's front gross axle rating and rear gross axle weight rating.

SECTION III - SCHOOL BUS BODY STANDARDS

Air Conditioning

All special needs buses *shall* be equipped with air conditioning. Other buses **may** be equipped with an air conditioning unit at the discretion of the local school system.

All buses ordered with air conditioning shall meet the following minimum specifications:

1. Floor--All flooring shall be 5/8-inch exterior-grade plywood over steel flooring.
2. All buses shall have a white roof.
3. Windows--All windows shall be tinted with a minimum of 50% light transmission.
4. All buses shall meet insulation standards as per Alabama bus specifications.
5. **Optional** mud flaps to protect the condenser may be installed.

Minimum Btu air conditioning system per passenger size:

- | | |
|--------------------|-------------|
| 1. 10-30-passenger | 40,000 Btu |
| 2. 31-48-passenger | 53,000 Btu |
| 3. 49-60-passenger | 78,000 Btu |
| 4. 61-84-passenger | 100,000 Btu |

Aisle

1. All emergency doors shall be accessible by a 12-inch minimum aisle. The aisle shall be unobstructed at all times.
2. Seat backs shall be slanted sufficiently to give aisle clearance of 15 inches at the tops of seat backs.

Back-Up Warning Alarm

An automatic, audible alarm with a minimum of 87dbA and maximum of 112dbA shall be installed behind the rear axle and shall comply with the Society of Automotive Engineers published Back-up Alarm Standards (SAE 994). The alarm shall have a protective deflector shield.

Battery/Batteries

1. Batteries are to be furnished by the chassis manufacturer.
2. When the battery/batteries is mounted as described in the Chassis Standard, the body manufacturer shall securely attach the battery on a slide-out or swing-out tray

in a closed, vented compartment in the body skirt, so that the battery is accessible for convenient servicing from the outside. The battery compartment door or cover shall be hinged at the front and secured by an adequate and conveniently-operated latch or other type fastener.

Bumper (Front)

On a Type D school bus, if the chassis manufacturer does not provide a bumper, it shall be provided by the body manufacturer. The bumper will conform to the standards in the chassis section.

Bumper (Rear)

1. Bumpers shall be of pressed steel channel or equivalent material, at least 3/16-inch thick, and shall be a minimum of 9-1/2 inches wide (high) on all Types B, C, and D buses. Type A buses shall have a minimum of an 8-inch rear bumper.
2. Bumpers shall be wrapped around the back corners of the bus. It shall extend forward at least 12 inches, measured from the rear-most point of the body at the floor line.
3. Bumpers shall be attached to the chassis frame in such a manner that it may be easily removed. It shall be so braced as to withstand impact from a rear or side impact. It shall be so attached as to discourage hitching of rides.
4. Bumpers shall extend at least one inch beyond rear-most part of body surface measured at the floor line.
5. Tow eyes or hooks may be furnished on the rear and attached so they do not project beyond the rear bumper. The installation shall be in accordance with the chassis manufacturer's specifications.
6. The bottom of the rear bumper shall not be more than 30 inches above ground level.

Ceiling

See Insulation and Interior, Body Standard.

Certification

The body manufacturer shall certify to the SDE and local education agency having pupil transportation jurisdiction that their product meets minimum standards on items not covered by certification issued under requirements of the National Traffic and Motor Vehicle Safety Act.

Chains (Tire)

See Wheel Housing Body Standard.

Color

1. The school bus body shall be painted National School Bus Yellow.
2. The body exterior paint trim, bumper, lamp hoods and lettering shall be black.
3. The roof of the bus may be painted white not to extend below the drip rails on the sides of the body.
4. Multifunctional School Activity Buses (MFSAB) shall be exempt from this requirement. (See MFSAB specifications on page 51.)

Communication Systems

Each bus shall be equipped with a two-way, voice communication system capable of providing communication with the operational base. Where technologically feasible, the communication system shall also communicate with 911 operators. CB radio systems will not meet this requirement. **It is the responsibility of the local school system to comply with this specification.**

Construction

1. Construction shall be of prime commercial quality steel or other material with strength at least equivalent to all-steel as certified by the bus body manufacturer. All such construction materials shall be fire resistant.
2. Construction shall be dust proof and watertight, so the bus does not leak under normal operating conditions.
3. Body joints present in that portion of a Type A school bus body furnished exclusively by the body manufacturer shall conform to the performance requirements of FMVSS 221, "School Bus Body Joint Strength." This does not include the body joints created when body components are attached to components furnished by the chassis manufacturer.
4. Type A school bus bodies shall be equipped with restraining barriers conforming to FMVSS 222, "School Bus Passenger Seating--Crash Protection," Sections 5.2 and 5.3.

Crossing Control Arm

1. Buses shall be equipped with a crossing control arm mounted on the right side of the front bumper, which shall not open more than 90 degrees.
2. All components of the crossing control arm and all connections shall be weatherproofed.
3. The crossing control arm shall incorporate system connectors (electrical or air) at the gate and shall be easily removable to allow for towing of the bus.

4. The crossing control arm shall meet or exceed SAE Standard J1133.
5. The crossing control arm shall be constructed of non-corrosive or nonferrous material or treated in accordance with the body sheet metal standard (see Metal Treatment).
6. There shall be no sharp edges or projections that could cause hazard or injury to students.
7. The crossing control arm shall extend at least 70” from the front bumper when in the extended position.
8. The crossing control arms shall extend simultaneously with the stop arm(s) by means of the stop arm controls. An automatic recycling interrupt switch shall be installed to allow the driver to deactivate the control arm when necessary.
9. An electromagnetic device or a stowed bracket shall be installed to stabilize the arm when in the stored position.
10. Crossing control arm shall be Specialty Manufacturing Company, Part #58600, Transpec 4000 series, or prior approved equal.

Defrosters

1. The windshield defroster and defogging system shall provide defogging of the entire windshield, driver’s side window, and entrance door glasses by utilizing hot air taken from the heater core with vents across the entire windshield.
2. The defrosting system shall conform to Society of Automotive Engineers’ Standards J381 and J382.
3. The defroster and defogging system shall be capable of furnishing heated outside ambient air.
4. Auxiliary fans are not considered defrosting or defogging systems.
5. Portable heaters shall not be used.

Doors

1. Service Door:
 - A. The service door shall be in the driver’s control, and designed to afford easy release and provide a positive latching device on manual operating doors to prevent accidental opening. When a hand lever is used, no part shall come together that will shear or crush fingers. Manual door controls shall not require more than 25 pounds of force to operate at any point throughout the range of operation.

- B. The service door shall be located on the right side of the bus, opposite and within direct view of the driver.
- C. The service door shall have a minimum horizontal opening of 24 inches and a minimum vertical opening of 68 inches.
- D. The service door shall be a split type, both sections opening outward.
- E. Lower, as well as upper door panels, shall be of approved safety glass. The bottom of each lower glass panel shall not be more than 10 inches from the top surface of the bottom step. The top of each upper glass panel shall not be more than 6 inches from the top of the door.
- F. Vertical closing edges on split type entrance doors shall be equipped with flexible material to protect the children's fingers.
- G. There shall be no door to the left in driver compartment on Types B, C or D vehicles.
- H. All doors shall be equipped with padding at the top edge of each door opening. Pad shall be at least three inches wide and one inch thick and extend the full width of the door opening.
- I. If air or electric doors are used, the amber warning lights shall be activated from a momentary switch. A three-position switch shall activate the sequence as follows:
 - Position One – door closed; lights off.
 - Position Two – activate red lights, stop arm, and crossing control arm.
 - Position Three – red lights activated, door open, stop arm activated, and crossing control arm activated.

Emergency Exits

1. Emergency Door:

- A. The emergency door shall be hinged on the right side if in the rear end of bus and on the front side if on left or right side of the bus. It shall open outward and be labeled inside to indicate how it is to be opened. If double emergency doors are used on Type A vehicles, they shall be hinged on the outside edge and shall have a three-point fastening device. A device shall be used that holds the door open to prevent the emergency door from closing during emergencies and school bus evacuation drills. If emergency door locks are used, the vehicle ignition must be disabled until the emergency door lock is deactivated.
- B. The upper portion of the emergency door shall be equipped with approved safety glazing, the exposed area of which shall be at least 400 square inches. The lower portion of the rear emergency door on Types B, C, and D vehicles

shall be equipped with a minimum of 350 square inches of approved safety glazing.

- C. There shall be no steps leading to an emergency door.
- D. The words **EMERGENCY DOOR**, in letters at least two inches high, shall be placed at the top of or directly above the emergency door or on the door in the metal panel above the top glass, both inside and outside of the bus. The words **EMERGENCY EXIT** in letters at least 2 inches high shall be placed on the exterior body directly above each emergency window.
- E. The emergency door shall be equipped with padding at the top edge of each door opening. Padding shall be at least three inches wide and one inch thick, and extend the full width of the door opening.
- F. The side emergency door, if installed, must meet the requirements as set forth in FMVSS 217 (a), regardless of its use with any other combination of emergency exits.
 - (1) A left side emergency door shall have a 20 inch unobstructed passageway and no flip seat is to be used. A barrier shall be used just before the door opening.
- G. There shall be no obstruction higher than 1/4 inch across the bottom of any emergency door opening.

2. Additional Emergency Exits:

- A. All school buses shall be equipped with emergency exits in the following capacity vehicles:
 - 0 to 54 passenger: one emergency window exit per side and one roof hatch located midpoint.
 - 55 and above passenger: two emergency window exits per side, and two roof hatches.
- B. Each emergency exit shall comply with FMVSS 217. These emergency exits are in addition to the rear emergency door or exit. Roof hatches must be Transpec Standard Vent, Model 1970, Specialty Manufacturing 8600, 8900, or 9000 series or prior approved equal.
 - (1) Emergency exit windows shall be as evenly spaced as possible under FMVSS 217 guidelines and shall not be obstructed by any devices.

- C. In addition to the audible warning required on emergency doors by FMVSS 217, additional emergency exits shall also be like protected. Check FMVSS re: wording and decibel level of buzzer.
- D. School bus emergency exits shall be marked with a minimum one inch wide strip of retroreflective tape, either red, white or yellow in color, to be placed around the outside perimeter of the emergency exit opening, not the emergency exit itself.
The words **EMERGENCY EXIT**, in letters at least two inches high, shall be placed on the body directly above each emergency window.

Emergency Equipment

All emergency equipment shall be stored in the driver compartment with the exception of the warning devices.

1. Fire Extinguishers:

- A. The bus shall be equipped with at least one pressurized, dry chemical fire extinguisher complete with hose to meet Underwriters Laboratories, Inc., approval. A pressure gauge shall be mounted on the extinguisher and easily read without moving the extinguisher from its mounted position.

The bracket shall be a heavy-duty, snap-in, spring type. Band type holders are not acceptable.

- B. The fire extinguisher shall have a capacity of **five pounds** with an Underwriters Laboratories total rating of 2A10BC or greater. The operating mechanism shall be sealed with a type of seal that will not interfere with the use of the fire extinguisher.

- C. Fire extinguishers must comply with State Fire Codes.

2. First-Aid Kit:

- A. Bus shall have a removable, moisture proof and dust-proof first-aid kit mounted with a separate bracket in an accessible place in driver's compartment. This place shall be marked to indicate its location.

B. Contents shall include:

- 2 1" x 2 1/2 yards adhesive tape rolls
- 24 sterile gauze pads 3" x 3"
- 100 3/4" x 3" adhesive bandages
- 8 2" bandage compress
- 10 3" bandage compress
- 2 2" x 6" sterile gauze roller bandages
- 2 non-sterile triangular bandages approximately 40" x 36" x 54" with

- 2 safety pins
- 3 sterile gauze pads 36" x 36"
- 3 sterile eye pads
- 1 pair rounded-end scissors
- 1 pair latex gloves
- 1 mouth-to-mouth airway

3. Body Fluid Clean-up Kit:

- A. Each bus shall have a removable and moisture proof body fluid clean-up kit. It shall be properly mounted and identified as a body fluid clean-up kit. Must meet OSHA regulations.

4. Warning Devices:

- A. Each school bus shall contain at least three (3) reflectorized triangle road warning devices mounted in an accessible place in the driver's compartment or outside storage compartment. The mounting location in Type A vehicles is optional. These devices must meet requirements in FMVSS 125.

Fire Suppression (Optional)

When a fire suppression system is used, nozzles for suppression systems shall be located in the engine compartment, under the bus, in the electrical panel, or under the dash, but shall not be located in the passenger compartment. The system must include a light or buzzer to alert the driver that the system has been activated.

Floor and Floor Coverings

1. The floor in the underseat area, including the tops of the wheel housing, driver's compartment and toe board, shall be covered with a rubber floor covering or equivalent, having a minimum overall thickness of 1/8 inch.
2. The floor covering in the aisle shall be of aisle-type rubber or equivalent, wear resistant, and ribbed. The minimum overall thickness shall be 3/16 inch measured from tops of ribs.
3. The floor covering must be permanently bonded to the floor and must not crack when subjected to sudden changes in temperature. Bonding or adhesive material shall be waterproof and shall be of a type recommended by the manufacturer of the floor-covering material. All seams must be sealed with waterproof sealer.
4. For Type B, C and D school buses, the manufacturer shall provide a screw-down plate to access fuel tank sending unit that is secured and insulated. The plate shall be mounted so that access is readily available to repair personnel and so that the floor covering is not disturbed during the repair process.

5. The floor shall be of metal or alloy at least equal in strength to 14-gauge prime commercial quality steel and so constructed that exhaust gases cannot enter the passenger compartment.
6. All closures between the bus body and the engine compartment shall be fitted with gas-tight gaskets and pedal openings shall be closed bellows type, gas-tight boots.
7. There shall be a plate, of adequate size, provided to allow for transmission access or service.

Handrail(s)

At least one handrail shall be installed. The handrail(s) shall assist passengers during entry or exit, and shall be designed to prevent entanglement as evidenced by the passage of the NHTSA string and nut test.

Heaters

1. The heating system shall be capable of maintaining the temperature throughout the bus of not less than 55 degrees Fahrenheit during average minimum January temperatures as established by the U. S. Department of Commerce, Weather Bureau, for the area in which the vehicle is to be operated. Shall be capable of defrosting the total windshield area and the service door glass within thirty minutes after initial start with engine at idle speed. The system shall exceed SAE standards J-381 and J-382 performance requirements. **Fuel-fired auxiliary heaters will not be allowed.**

Heater performance shall be measured by the following:

A temperature measurement shall be taken at three locations within the body. These locations to be over the center aisle, thirty-six inches above the floor. The first location is to be thirty-nine inches from the windshield; the second location midpoint of the passenger compartment and the third will be thirty-nine inches from the rear emergency door.

After soaking the bus at twenty degrees F. for fifteen (15) hours, the bus will be started and after thirty (30) minutes, the temperature at each measuring point shall be fifty-five (55) degrees F.

2. If only one heater is used, it shall be a fresh-air or combination fresh-air and recirculation type.
3. If more than one heater is used, additional heaters shall be a recirculating-air type.
4. All heaters installed by body manufacturers shall bear a name plate that shall indicate the heater rating in accordance with SBMI Standard No. 001, with said

plate to be affixed by the heater manufacturer which shall constitute certification that the heater performance is as shown on the plate.

5. Heater hoses shall be adequately supported to guard against excessive wear due to vibration. The hoses shall not dangle or rub against the chassis or sharp edges and shall not interfere with or restrict the operation of any engine function. Heater hoses shall conform to the Society of Automotive Engineers' Standard J20c. Heater lines on the interior of the bus shall be shielded to prevent scalding of the driver or passengers.
6. Each hot water system installed by a body manufacturer shall include one shut-off valve in the pressure line and one shut-off valve in the return line with both valves at or near the engine in an accessible location.
7. There shall be a water flow-regulating valve, or an electronic valve actuator, installed in the pressure line for convenient operation by the driver while seated.
8. Accessible bleeder valves shall be installed in an appropriate place in the return lines of body company-installed heaters to remove air from the heater lines.
9. Access panels shall be provided to make heater motors, cores, and fans readily accessible for service. An outside access panel may be provided for the driver's heater.

Hinges

All exterior metal door hinges which do not have stainless steel, brass, or nonmetallic hinge pins or other designs that prevent corrosion shall be designed to allow lubrication to be channeled to the center 75% of each hinge loop without disassembly.

Identification

1. School bus bodies shall bear the words, **SCHOOL BUS**, in eight-inch black letters on National School Bus Yellow, on the front and back of the bus (lettering between flasher lights). (See page 51 for Multifunctional School Activity Bus identification requirements.) The name of the school system shall be on each side of the bus in at least 5-inch, black standard, unshaded letters. Lettering shall conform to "Series B" of Standard Alphabets for Highway Signs. Each bus shall be numbered on both sides, front left side and the rear, before being put into service. Bumper numbers may be white or yellow. An agreement between manufacturer and purchaser shall be reached at time order is placed as to who will put the numbers on the buses. Any other numbering shall be optional.
2. Only signs and lettering approved by state law or regulation, limited to the name of the owner or operator and any marking necessary for identification, shall appear on the bus.

3. School bus bodies shall display a high quality 6"x 9" warning sticker on permanent, adhesive, vinyl, bumper-sticker material. To increase visibility, this sticker shall be mounted just under the first or second rub rail at left side of the passenger entrance door. This sticker shall be worded as follows:

UNAUTHORIZED ENTRY ILLEGAL

Any person who attempts to enter a school bus without prior authorization of the driver or other appropriate school official and refuses to leave will be subject to prosecution that may result in fines of up to \$2,000 and up to one year in jail.

Alabama Code Sections 13A-10-2, 13A-7-4

4. Driver Alert Transpec Model 7500 or prior approved equal electronic signage warning traffic when the school bus stops to load or unload students and at railway grade crossings is required.

Inside Height

The inside body height shall be 72 inches or more, measured metal to metal, at any point on the longitudinal center line from the front vertical bow to the rear vertical bow. The inside body height of Type A buses shall be 62 inches or more.

Insulation

1. Ceilings and walls shall be insulated with proper material to deaden sound and reduce vibration to a minimum. If thermal insulation is specified, it shall be fire-resistant and approved by Underwriters Laboratories, Inc. If buses are equipped with air conditioning, walls and ceilings must be insulated to improve air conditioner efficiency.
2. If floor insulation is required, it shall be either 5-ply nominal 19/32 inches thick plywood, or a material of equal or greater strength and insulation R value, and it will equal or exceed properties of exterior-type softwood plywood, C-D Grade as specified in standard issued by U. S. Department of Commerce. When plywood is used, all exposed edges shall be sealed.

Interior

1. The interior of the bus shall be free of all unnecessary projections, which include luggage racks and attendant handrails, likely to cause injury. This standard requires inner lining on ceilings and walls. If the ceiling is constructed to contain lapped joints, the forward panel shall be lapped by the rear panel and exposed edges shall be beaded, hemmed, flanged, or otherwise treated to minimize sharp edges.
2. The driver's area forward of the foremost padded barriers will permit the mounting of required safety equipment and vehicle operation equipment.

3. Every school bus shall be constructed so that the noise level taken at the ear of the occupant nearest to the primary vehicle noise source shall not exceed 85 dbA when tested.
4. Any added equipment shall be flush mounted with the exception of the video system.

Lamps and Signals

1. Interior lamps shall be provided which an adequately illuminated aisle and step well. Step well lights shall be illuminated by a service door operated switch, to illuminate only when headlights and clearance lights are on and the service door is opened.
2. Clearance lamps shall automatically illuminate when the headlights are in the "on" position.
3. L.E.D. lighting may be used as an alternative to conventional lighting in all lamps and signals except headlamps.
4. Definition--School bus alternately flashing red and amber signal lamps are lamps mounted at the same horizontal level, intended to identify the vehicle as a school bus and to inform other users of the highway that such vehicle is preparing to stop, or is stopped, on the roadway to take on or to discharge schoolchildren.
 - A. Buses shall be equipped with two red lamps and two amber lamps at the rear of the vehicle and two red lamps and two amber lamps at the front of the vehicle. One amber lamp shall be located near each red signal lamp at the same level, but closer to the vertical centerline of the bus.
 - B. The signaling system, including red and amber signal lamps and a stop arm with alternating flashing lamps, shall be so designed and wired as to have the following characteristics:
 - (1) When the entrance door is closed, a manual push button may be depressed and the amber pilot light and amber warning lights will flash.
 - (2) When the entrance door is opened, the amber pilot and amber warning lights will go off, and the red pilot and red warning lights will flash; also, the stop arm will be extended and lights on the stop arm will flash.
 - (3) On closing the entrance door, all lights will go out and the stop arm retract automatically.
 - (4) If the entrance door is opened without depressing the manual push button, no lights will flash, nor will the stop arm be extended.

- C. The area around the lenses of alternately flashing signal lamps shall have a readily visible black border for contrast purposes. Hoods/guards may be provided over front and rear amber warning lights and red warning lights.
5. Bus body shall be equipped with amber rear turn signal lamps at least seven inches in diameter, or if in a shape other than round, a minimum of 38 square inches of illuminated area. These signal lamps must be connected to the chassis hazard warning switch to cause simultaneous flashing of signal lamps when needed as a vehicular traffic hazard warning.

Rear directional lights shall be mounted not more than 15 inches from the plane of the side of the body, and not more than 14 inches below the glass in the rear of the body. Buses shall be equipped with two red, brake/tail combination lights at least seven inches in diameter, or if in a shape other than round a minimum of 38 square inches of illuminated area and shall be mounted on the rear of the bus just inside the turn signal lamps. Type A conversion vehicle lamps must be 21 square inches in the lens area. Two combination lamps with a minimum diameter of four inches, or if a shape other than round, a minimum 12 square inches of illuminated area shall be placed on the rear of the body between the beltline and the floor line. The rear license plate lamp may be combined with one lower tail lamp. Stop lamps shall be activated by the service brakes and shall emit a steady light when illuminated. In addition to these requirements, all lamps and signals shall comply with applicable SAE specifications.

- A. All Type C and D buses shall have side turn indicators on both sides located within six inches of the floor line.
6. On all buses equipped with a monitor for the front and rear lamps of the school bus, the monitor shall be mounted in full view of the driver. If the full circuit current passes through the monitor, each circuit shall be protected by a fuse or circuit breakers or other equivalent technology against any short circuit or intermittent shorts.
 7. A white flashing strobe light shall be installed on the roof of a school bus not to exceed 1/3 the body length forward from the rear of the roof edge. This light shall have a single white lens emitting light 360 degrees around its vertical axis and may not extend above the roof more than the maximum legal height. A manual switch and a pilot light of low intensity must be included to indicate when the light is in operation. The pilot light shall be incorporated into the switch.
 8. If alternating headlights are used (i.e., wig-wag), they must operate in conjunction with the red overhead flashers and stop arm.

Metal Treatment

1. All metal used in construction of a bus body shall be zinc-coated or aluminum-coated or treated by an equivalent process before the bus is constructed. Included

are such items as structural members, inside and outside panels, door panels and floor sills. Excluded are such items as door handles, grab handles, interior decorative parts and other interior plated parts.

2. In addition to the above requirements, all metal parts that will be painted shall be chemically cleaned, etched, zinc-phosphate-coat and zinc-chrome or epoxy primed or conditioned by equivalent process.
3. 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, unvented or undrained areas and surfaces subjected to abrasion during vehicle operation.
4. As evidence that the above requirements have been met, samples of materials and sections used in construction of the bus body, when subjected to 1,000-hour salt spray test as provided for in latest revision of ASTM Standard B-117 "Standard Method of Salt Spray (Fog) Testing" shall not lose more than 10 percent of its material by weight.

Mirrors

1. Interior mirrors shall be either clear laminated glass or clear view glass bonded to a backing, which retains the glass in the event of breakage. Mirrors shall have rounded corners and protected edges. Type A buses shall have a minimum of a 6" x 16" mirror and Type B, C, and D buses shall have a minimum of a 6" x 30" mirror. It shall be securely attached on the windshield header and so located as to give the driver a clear view of the entire interior of the bus and the road behind.
2. Each school bus shall be equipped with a system of exterior mirrors as defined in FMVSS 111.
 - A. Rear vision mirrors shall be capable of providing a view along the left and right sides of the vehicle which will provide the driver with a view of the rear tires at ground level, a minimum distance of 200 feet to the rear of the bus and at least 12 feet perpendicular to the side of the bus at a distance of 32 feet back from the front bumper.
 - B. The crossview mirror system shall provide the driver with indirect vision of an area at ground level from the front bumper forward and the entire width of the bus to a point where the driver can see by direct vision. The crossview system shall also provide the driver with direct vision of the area at ground level around the left and right front corners of the bus to include the tires and service entrance on all types of buses to a point where it overlaps with the rear vision mirror system. A metal reinforcement plate shall be installed under the hood area of fiberglass hoods in order to reinforce crossview mirror mounting base area.

C. This system of mirrors shall be easily adjustable but be rigidly braced so as to reduce vibration.

3. Heated and/or remote controlled external, rearview mirrors may be used.

Mounting

1. The chassis frames shall support the rear body cross member. The bus body shall be attached to the chassis frame at each main floor sill, except where chassis components interfere, in such a manner as to prevent shifting or separation of the body from the chassis under severe operating conditions.

2. Insulation material shall be placed at all contact points between the body and chassis frame on Types A, B, C and D buses, and shall be so attached to the chassis frame or body that it will not move under severe operating conditions.

Noise Suppression Switch

There shall be a manual noise suppression switch installed in the control panel. The switch shall be labeled and alternately colored. This switch shall be an on/off-type (not momentary) that deactivates all body equipment that produces noise including at least the am/fm radio, heaters, air conditioners, fans and defrosters. This switch shall not deactivate safety systems such as windshield wipers, lighting or warning systems. For Type A buses, all radios or communication devices shall be ordered as a body accessory and must be wired thru the noise suppression switch.

Overall Length

The overall length of the bus shall not exceed 45 feet excluding accessories.

Overall Width

The overall width of the bus shall not exceed 102 inches excluding accessories.

Public Address System

Buses may be equipped with a public address system having interior and exterior speakers. Interior speakers shall be flush mounted with bulkhead. No internal speakers other than the driver's communication systems may be installed within four feet of the driver's seat back in its rearmost, upright position.

Retroreflective Material

1. The front and/or rear bumper may be marked diagonally 45 degrees down to the centerline of the pavement with 2" x 1/4" wide strips of non-contrasting retroreflective material.

2. The rear of the bus body shall be marked with strips of retroreflective National School Bus Yellow (NSBY) material to outline the perimeter of the back of the bus using material which conforms with the requirements of FMVSS 571.131 (Table I). The perimeter marking of rear emergency exits per FMVSS 217 and/or the use of retroreflective SCHOOL BUS signs partially accomplish the objective

of this requirement. To complete the perimeter marking of the back of the bus, strips of at least one-inch retroreflective NSBY material shall be applied horizontally above the rear windows and above the rear bumper, extending from the rear emergency exit perimeter marking outward to the left and rear corners of the bus. Vertical strips shall be applied at the corners connecting these horizontal strips.

3. **SCHOOL BUS** signs, if not of a lighted design, shall be marked with retroreflective NSBY material comprising a background for lettering of the front and/or rear **SCHOOL BUS** signs.
4. The sides of the bus body shall be marked with retroreflective NSBY material at least one inch in width, extending the length of the bus body and located (vertically) between the floor line and the belt line.

NOTE: Reflectivity of the stop signal arm is to be addressed under the Stop Signal Arm Section. Signs, if used, placed on the rear of the bus relating to school bus flashing signal lamps or railroad stop procedure may be of a retroreflective material [as specified by each state].

Rub Rails

1. There shall be one rub rail located on each side of the bus approximately at seat level which shall extend from the rear side of the entrance door completely around the bus body (except emergency door or any maintenance access door) to a point of curvature near the outside cowl on the left side.
2. There shall be one additional rub rail located approximately at the floor line which shall cover the same longitudinal area as the upper rub rail, except at the wheel housing, and shall extend only to radii of the right and left rear corners.
3. Rub rails above the floor line shall be attached at each body post and all other upright structural members.
4. Each rub rail shall be 4 inches or more in width in their finished form, shall be of 16-gauge metal or other suitable material of equivalent strength, suitable to protect body side panels from damage. Rub rails shall be constructed in a corrugated or ribbed fashion.
5. Rub rails shall be applied to the outside of the body or outside body posts. Pressed-in or snap-on rub rails do not satisfy this requirement. For Type A1 vehicles using a chassis manufacturer's body, or for Types A2, B, C, and D buses using rear luggage or rear engine compartments, rub rails need not extend around rear corners.
6. The bottom edge of the body side skirts shall be stiffened by application of a rub rail, or the edge may be stiffened by providing a flange or other stiffeners.

Seat Belt for Driver

1. The driver's seat shall be equipped with the seat belt anchored to the floor, housed in scabbard and equipped with an emergency locking retractor (one side only). The driver's seat shall be equipped with a Type II occupant protection (lap and shoulder belt). Adjustability of the mounting point for the driver's seat belt pillar loop shall be provided to accommodate all heights and weights of bus drivers without interference with the driver's face or neck. The requirements of FMVSS 209 and 210 shall be met. Integrated seat belts in the driver's seat may be used at the discretion of the local school system.
2. Each bus shall contain at least one belt cutter properly secured in a location within reach of the driver while belted into the driver's seat. The belt cutter shall be durable, designed to eliminate the possibility of the operator or others being cut during use, and must have a full hand-grip.

Seats and Crash Barriers

1. Seats shall be spaced to obtain a minimum of 24-inch hip-to-knee room measured horizontally at the seat cushion level at the transverse centerline of the seat. In making this measurement from the back of the seat cushion to the back of the seat or barrier in front, upholstery may be placed against padding both forward and rear but padding may not be compressed. Greater seat spacing may be specified on local bids not to exceed the maximum allowable per FMVSS 222.
2. In determining seating capacity of standard school buses, the allowable average rump width shall be 13 inches where a 3-3 seating plan is used, and thirteen (13) or 15 inches where 3-2 seating plan is used on specially-equipped buses.
3. All seats shall be bench style, forward facing and have a minimum depth of 15 inches. No transit or activity seat will be used. There shall be no armrest on student seats. No bus shall be equipped with jump seats or portable seats.
4. All seat frames attached to the seat rail shall be fastened with two (2) bolts, washers and nuts or flange-headed nuts. Each seat leg shall be secured to the floor by a minimum of two (2) bolts, washers and nuts. Flange-head nuts may be used in lieu of nuts and washers, or seats may be track-mounted in conformance with FMVSS 222. If track seating is installed, the manufacturer shall supply minimum and maximum seat spacing dimensions applicable to the bus, which comply with FMVSS 222. This information shall be on a label permanently affixed to the bus.
5. The forward most pupil seat on the right side of the bus shall be located so as not to interfere with the driver's vision, not farther forward than the barrier behind the driver or the rear of the driver's seat when adjusted to its rear-most position.

6. All seats and backs shall be a standard color unless changed by purchaser. Seat and back cushions of all seats shall be designed to safely support the designated number of passengers under normal road conditions encountered in school-bus service. Coverings of seat cushions shall be of a material having 42-ounce finished weight, 54-inch width, and finished vinyl coating of 1.06 broken twill or approved equal by presenting independent laboratory reports for approval.
7. The driver seat shall be of the high back, air **or** mechanical suspension, box pedestal-type with a minimum seat back adjustment of 15 degrees and with a head restraint to accommodate a 95 percentile adult male (95 percentile adult male as defined in FMVSS 208). The driver's seat shall be secured with nuts, bolts, and washers or flanged-headed nuts. The driver's seat shall have a minimum distance between the steering wheel and seatback of not less than eleven inches, with a minimum aft adjustment of six inches. The seat shall be contoured with adequate padding and support on the sides and shall have a cloth cover. It shall be designed to provide lumbar support and shall be positioned on the centerline of the steering wheel.
8. All restraining barriers and passenger seats shall be constructed with a materials that, *at a minimum*, meet the criteria contained in the School Bus Seat Upholstery Fire *Resistant* Test.
9. A driver storage pouch shall be provided on the front of the barrier behind driver's seat. This pouch shall be fire *resistant* and the same color as the bus seats.
10. Crash barriers shall be placed behind the driver's seat and step well. An aluminized courtesy panel on the right side of the bus shall extend to the floor and to the wall. Stanchions are not acceptable.
11. Passenger seats designed to accommodate a child or infant carrier seat shall comply with FMVSS 225. These seats shall be in compliance with NHTSA's "Guideline for the Safe Transportation of Pre-School-age Children in School Buses.

Steering Wheel

See Chassis Standard.

Steps

1. The first step at the service door shall be no less than 10 inches and no more than 14 inches from the ground measured from the top of the first step. Ground clearance shall be no less than 10 inches.
 - A. Type D vehicles shall have the first step at the service door 12 to 16 inches from the ground measured from the top of the first step.

2. The service door entrance shall use a three-step step well. Risers shall be of equal height and depth. When a plywood floor is used on steel, the differential may be increased by the thickness of plywood.
3. Steps shall be enclosed to prevent accumulation of ice and snow.
4. Steps shall not protrude beyond the side bodyline.

Step Treads

1. All steps, excluding the floor line platform area, shall be covered with a 3/16-inch pebble-tread-type, rubber floor covering or other materials equal in wear and abrasion resistance to top grade rubber.
2. The metal back of the tread, a minimum 24-gauge cold roll steel, shall be permanently bonded to ribbed rubber; the grooved design shall be such that said grooves run at 90-degree angles to the long dimension of the step treads.
3. A three-sixteenth-inch ribbed step tread shall have a 1 and 1/2 inch white nosing as an integral piece without any joint.
4. The rubber portion of step treads shall have the following characteristics:
 - A. Special compounding for good abrasion resistance and high coefficient of friction.
 - B. Flexibility so that it can be bent around a 1/2 inch mandrel both at 130 degrees Fahrenheit and 20 degrees Fahrenheit without breaking, cracking, or crazing.
 - C. Show a durometer hardness of 85 to 95.

Stirrup Step

There shall be one stirrup step on all Types B, C, and D buses on each side of the front of the body for use in cleaning the windshield and lamps. There shall be one handle on each side, at least eight inches in length suitably located for the driver to use while cleaning the windshield and lamps. The stirrup steps and the handles shall be of rust-resistant material. Transit buses shall have provisions for cleaning the windshield. Toe eyes in the bumper with a handle(s), above the windshield, are acceptable.

Stop Arm Signal

All stop arm signals shall be of the strobe-type and have high-intensity, retroreflective coating. The stop signal - arm(s) shall comply with the requirements of FMVSS 131.

Stop Arm Signal - Rear (Optional)

A rear stop arm is permissible when used in conjunction with the original stop arm. The rear stop arm location on dual stop arm-equipped buses shall be on the left side of the bus, as close as is practical to the left rear corner of the body. Airlines, if used, must not be readily accessible to students inside or outside of the bus.

Storage Compartment

A lockable, waterproof, exterior storage compartment shall be located on the bus body on the right side of the bus. The minimum size of the storage compartment shall be 12 inches high, 15 inches deep, and 25 inches wide and shall be marked "storage". Alternate storage compartment locations should be specified in local school system bid specifications. For Type A buses unable to meet this requirement, an appropriate waiver must be secured from the Alabama Department of Education, Pupil Transportation Section. If the storage compartment location cannot be on the right side, the alternate location must be approved by the school system during the bid process.

All lockable interior storage compartments containing emergency equipment shall be equipped with a warning buzzer installed so as to activate when the ignition switch is on and the compartment is locked. All such compartments shall be clearly labeled as to containing emergency equipment.

Sun Shield

Each Type B, C, and D school bus shall have an interior adjustable sun visor with minimum measurements of 6 inches by 30 inches. It shall be installed *in a position convenient for use by the driver*, anchored on both ends, and shall be tinted transparent plastic or phlex-o-glass. On all Type A buses the sun shield shall be the manufacturer's standard. An additional sun shield may be added over the left side driver window at option of the local school system.

Tailpipe

See Chassis Standard.

Traction-Assisting Devices

1. Where required or used, sanders shall:
 - A. Be of the hopper cartridge-valve type.
 - B. Have a metal hopper with all interior surfaces treated to prevent condensation of moisture.
 - C. Be of at least 100-pound (grit) capacity.
 - D. Have a cover on the filler opening of the hopper, which screws into place, sealing the unit airtight.
 - E. Have discharge tubes extending to the front of each rear wheel under the fender.
 - F. Have no-clogging discharge tubes with slush-proof, non-freezing rubber nozzles.

- G. Be operated by an electric switch with a telltale pilot light mounted on the instrument panel.
 - H. Be exclusively driver controlled.
 - I. Have a gauge to indicate the hopper needs refilling when it is down to one quarter full.
2. Automatic traction chains may be installed.

Trash Container and Holding Device

1. Where required or used, the trash container shall:
- A. Be of fire resistant polyethylene or equivalent material.
 - B. Be no greater than 14-quart capacity.
 - C. Be secured by a holding device that is designed to prevent movement and allow easy removal and replacement.
 - D. Be installed in an accessible location in the driver's compartment, not obstructing passenger use of the service door or access to emergency equipment.

Undercoating

1. The entire underside of the bus body, including floor sections, the cross member and below floor line side panels, shall be coated with rust-proofing the compound for which compound manufacturer has issued notarized certification of compliance to the bus body builder that the compound meets or exceeds all performance and qualitative requirements of paragraph 3.4 of Federal Specification TT-C-250b using modified test procedures for the following requirements*:
- A. Salt spray resistance-pass modified to 5% salt and 1000 hours.
 - B. Abrasion resistance-pass.
 - C. Fire resistance-pass.

*Test panels are to be prepared in accordance with paragraph 4.6.12 of TT-C-520b with the modified procedure requiring that the test be made on a 48-hour air-cured film at a thickness recommended by the compound manufacturer.

2. The undercoating compound shall be applied with suitable airless or conventional spray equipment to recommend film thickness and shall show no evidence of voids in cured film.

Ventilation

1. Auxiliary fans if installed shall meet the following requirements:

- A. Fans for left and right sides shall be placed in a location where they can be adjusted for maximum effectiveness and do not obstruct vision to any mirror.
NOTE: All Type A buses may be equipped with one fan.
 - B. Fans shall be a nominal 6" diameter.
 - C. Fan blades shall be covered with a protective cage. Each fan shall be controlled by a separate switch.
2. The body shall be equipped with a suitably controlled ventilating system of sufficient capacity to maintain the proper quantity of air under operating conditions, without having to open windows except in extremely warm weather.
 3. A static-type, non-closeable exhaust ventilator shall be installed in the roof.

Video Surveillance Equipment

1. Video equipment may be installed at the discretion of the local school system.
2. While video equipment does not have to be flush mounted, positioning of video surveillance equipment shall not interfere with the safe operation of the bus or student safety. It is recommended that the SDE be contacted prior to the installation of new video equipment.

Wheel Housing

1. The wheel-housing opening shall allow for easy tire removal and service.
2. The wheel housing shall be attached to the floor sheets in such a manner as to prevent any dust, water or fumes from entering the body. The wheel housing shall be constructed of at least 16-gauge steel or other material of equal tensile strength.
3. The inside height of the wheel housing above the floor line shall not exceed 12 inches.
4. The wheel housing shall provide clearance for installation and use of tire chains on single and dual (if so equipped) power-driving wheels.
5. No part of a raised wheel housing shall extend into the emergency door opening.

Windshield and Windows

1. All glass in the windshield, the windows, and doors shall be of approved safety glass so mounted that a permanent mark is visible and of sufficient quality as to prevent distortion of view in any direction.
2. Glass in the windshield shall be heat absorbent, laminated plate. The windshield shall be large enough to permit the driver to see the roadway clearly, shall be slanted to reduce glare, and shall be installed between the front corner posts that

are so designed and placed as to afford minimum obstruction to the driver's view of the roadway.

3. All full side windows shall open vertically so as to provide an unobstructed opening of not less than 9 inches high and 22 inches wide, obtained by lowering the window. Windows shall be a split-sash type and so installed as to provide an emergency exit. There shall be no horizontal, transit or activity-style windows in the student compartment.
4. All exposed edges of glass shall meet FMVSS requirements.
5. A tinted and shaded windshield with 73% light transmitted and a six-inch shaded band across the top shall be installed at the factory. Type A-I and A-II buses utilizing the chassis manufacturers one-piece windshield may be equipped with an O.E.M. shade band windshield with a band of approximately 4 inches in height.

Windshield Washers

A windshield washer system shall be provided that will service the entire wiped surface area.

Windshield Wipers

1. A windshield wiping system, two speed or variable speed, with an intermittent feature shall be provided. The wipers shall meet the requirements of FMVSS 104.
2. The wipers shall be operated by one or more air or electric motors of sufficient power to operate the wipers. Type A-I and A-II buses utilizing the chassis manufacturer's one-piece windshield may be equipped with two wipers driven by either one or two electric motors.

Wiring

1. All wiring shall conform to current standards of the Society of Automotive Engineers.
2. Circuits
 - A. Wiring shall be arranged in circuits as required with each circuit protected by a circuit breaker or electronic protection device. A system of color and number coding shall be used and an appropriate identifying diagram shall be provided to the end user along with the wiring diagram provided by the chassis manufacturer. **A system of color and number coding shall be used on buses. The following body interconnecting circuits shall be color-coded as noted:**

<u>Function</u>	<u>Color</u>
Left Rear Directional Light	Yellow
Right Rear Directional Light	Dark Green

Stoplights	Red
Back-up Lights	Blue
Taillights	Brown
Ground	White
Ignition Feed, Primary Feed	Black

The color of cables shall correspond to SAE J1128.

- B. Wiring shall be arranged in at least six regular circuits as follows:
- (1) Head, tail, stop (brake) and instrument panel lamps.
 - (2) Clearance and step well lamps. The step well lamp shall be actuated when the service door is opened.
 - (3) Dome lamp.
 - (4) Ignition and emergency exits signal.
 - (5) Turn signal lamps.
 - (6) Alternately flashing signal lamps.
- C. Any of the above combination circuits may be subdivided into additional independent circuits.
- D. Each heater and defroster shall have its own circuit breakers or other equivalent technology.
- E. Whenever possible, all other electrical functions (such as sanders and electric-type windshield wipers) shall be provided with independent and properly protected circuits.
- F. Each body circuit shall be coded by number or letter on a diagram of circuits and shall be attached to the body in readily accessible location.
- G. There shall be a manual noise suppression switch installed in the control panel. The switch shall be labeled and alternately colored. This switch shall be an on/off-type that deactivates all body equipment that produces noise including at least the am/fm radio, heaters, air conditioners, fans and defrosters. This switch shall not deactivate safety systems such as windshield wipers, lighting or warning systems. Noise suppression switch on Type AI buses shall be limited to bus body accessories.
3. The entire electrical system of the body shall be designed for the same voltage as the chassis on which the body is mounted.

4. All wiring shall have an amperage capacity equal to or exceeding the designed load. All wiring splices are to be done at an accessible location and noted as splices on the wiring diagram.
5. A body-wiring diagram of easily readable size shall be furnished with each bus body or affixed in an area convenient to the electrical accessory control panel.
6. The body power wire shall be attached to a special terminal on the chassis.
7. All wires passing through metal openings shall be protected by a grommet.
8. Wires and tubing shall be enclosed within body panels.

SECTION IV – (SPECIAL NEEDS) SCHOOL BUS STANDARDS

Introduction

Equipping buses to accommodate students with special needs is discretionary depending upon the needs of the passengers. While one bus may be fitted with a lift, another may have seat belts installed to secure child seats. Buses so equipped are not to be considered a separate class of school bus, but simply a regular school bus, which is equipped for special accommodations.

The specifications in this section are intended to be supplementary to specifications in the chassis and body sections. In general, specially equipped buses shall meet all the requirements of the preceding sections plus those listed in this section. It is recognized by the entire industry that the field of special transportation is characterized by varied needs for individual cases and by a rapidly emerging technology for meeting those needs. A flexible, “common sense”, approach to the adoption and enforcement of specifications for these vehicle, therefore, is prudent.

By federal regulation, buses, including school buses, are defined as vehicles designed to carry eleven or more (passengers including the driver). Vehicles designed with 10 or fewer passenger positions (including the driver) cannot be certified as buses. For this reason, the federal vehicle classification Multipurpose Passenger Vehicle, or MPV, must be used by manufacturers for these vehicles in lieu of the School Bus. In determining passenger capacity, wheelchair positions are counted as passenger positions. This classification system, while requiring compliance with a less stringent set of Federal Standards for MPV’s does not preclude state or local agencies or these specifications from requiring compliance of school bus-type MPV’s with the more stringent Federal Standards for school buses.

The following standards address modifications as they pertain to school buses that, with a standard seating arrangement prior to modification, would accommodate more than 10 persons. If by addition of a power lift, mobile seating device positions or other modifications, the capacity is reduced such that vehicles become MPV’s, the intent of these standards is to have these vehicles be required to meet the same standards they would have had to meet prior to such modifications, and such MPV’s are included in all references to school buses and requirements for school buses which follow:

Definition – Specially Equipped School Bus

A specially equipped school bus is any school bus that is *primarily* designed, equipped, or modified to accommodate students with special needs.

General Requirements

1. School buses designed for transporting students with special transportation needs shall comply with these specifications and with FMVSS applicable to their GVWR category.

2. Any school bus to be used for the transportation of children who are confined to a wheelchair or other mobile positioning device, or who require life support equipment which prohibits use of the regular service entrance, shall be equipped with a power lift, unless a ramp is needed for unusual circumstances related to passenger needs.

Air Conditioning

Special needs buses *shall* be equipped with air conditioning. *Refer to page 14, School Bus Body Standards, for minimum air conditioning standards.*

Aisles

All school buses equipped with a power lift shall provide a minimum 30-inch aisle leading from wheelchair position to at least one emergency door and the lift area.

Communication System

Each special needs bus shall be equipped with a two-way, voice communication system capable of providing communication with the operational base. Where technologically feasible, the communication system shall also communicate with 911 operators. CB radio systems will not meet this requirement. **It is the responsibility of the local school system to comply with this specification.**

Crash Barriers

1. Crash barrier shall be placed between the lift and any seat position (bench seat or wheelchair position). Stanchions are not acceptable.
2. There shall be a padded crash barrier approximately 8 inches in front of the forward edge of the seat cushion of all passenger seats that do not have another seat approximately 27 inches in front of them. There shall be a padded crash barrier or seat in front of any wheelchair position unless it is contiguous with and behind another wheelchair position. The forward-most barrier on both sides of the bus shall have a full-width, aluminized courtesy panel extending to the floor.

Evacuation Blanket

A fire-retardant, evacuation blanket, Tie Tech Evac-Aide Part # 1003, or prior approved equal, and storage pouch shall be provided. The location to secure the evacuation blanket shall be determined by the purchaser at the time of the bid.

Glazing

Tinted glazing may be installed in all doors, windows and windshield consistent with federal, state, and local regulations.

Identification

Buses with power lifts used for transporting physically handicapped students shall display three universal handicapped symbols located below the windowpane. Such emblems shall be white on blue background, shall not exceed 12 inches in size, and shall be of a high-intensity retroreflectorized material meeting U. S. Department of

Transportation FHWA FP-85 Standards. Symbols shall be located on the lift door, the rear of the bus, and the front *left side of the bus*.

Passenger Capacity Rating

In determining the passenger capacity of a school bus for purposes other than actual passenger load (i.e., vehicle classification, or various billing/reimbursement models), any location in a school bus intended for securing an occupied wheelchair/mobility aid during vehicle operations may be regarded as four designated seating positions. Similarly, each lift area may be regarded as four designated seating positions.

Power Lift

1. The option shall be provided to the local purchaser to have the lift located either in front of or behind the rear wheels, on the right side of the bus, but confined within the bus body when not extended.
2. All lifts shall be fully automatic with sufficient clearances to permit a wheelchair or other mobility user to reach a securement location.
3. The design load of the lift shall be at least 600 pounds. Working parts, such as cables, pulleys, and shafts, which can be expected to wear, and upon which the lift depends for support of the load, shall have a safety factor of at least 6 (six), based on the ultimate strength of the material. Non-working parts, such as the platform, frame, and attachment hardware, which would not be expected to wear, shall have a safety factor of at least 3 (three), based on the ultimate strength of the material.
4. The lifting mechanism and platform shall be able to lift a minimum of 800 pounds.
5. Controls shall be provided that enable the operator to activate the lift mechanism from either inside or outside the bus. The controls shall be interlocked with the vehicle brakes, transmission, or door, as required by FMVSS 403 and 404. The lift shall deploy to all levels (i.e., ground, curb, and intermediate positions) normally encountered in the operating environment. Where provided, each control for deploying, lowering, raising, and stowing the lift and lowering the roll-off barrier shall be of a momentary contact type requiring continuous manual pressure by the operator and shall not allow improper lift sequencing when the lift platform is occupied. The controls shall allow reversal of the lift operation sequence, such as raising or lowering a platform that is part way down, without allowing an occupied platform to fold or retract into the stowed position.
6. The lift shall incorporate an emergency method of deploying, lowering to ground level with a lift occupant, and raising and stowing the empty lift if the power to the lift fails. No emergency method, manual or otherwise, shall be capable of being operated in a manner that could be hazardous to the lift occupant or to the operator when operated according to manufacturer's instructions and shall not permit the platform to be stowed or folded when occupied. No manual emergency operation

shall require more than 2 (two) minutes to lower an occupied wheelchair to ground level.

7. Platforms stowed in a vertical position, and deployed platforms when occupied, shall have provisions to prevent their deploying, falling, or folding any faster than 12 inches per second or their dropping of an occupant in the event of a single failure of any load carrying component.
8. The lift platform shall be equipped with barriers to prevent any of the wheels of a wheelchair or mobility aid from rolling off the platform during its operation. A movable barrier or inherent design feature shall prevent a wheelchair or mobility aid from rolling off the edge closest to the vehicle until the platform is in its fully raised position. Each side of the lift platform, which extends beyond the vehicle in its raised position, shall have a barrier a minimum 1 and 1/2 inches high. Such barriers shall not interfere with maneuvering into or out of the aisle. The loading-edge barrier (outer barrier), which functions as a loading ramp when the lift is at ground level, shall be sufficient when raised or closed, or a supplementary system shall be provided, to prevent a power wheelchair or mobility aid from riding over or defeating it. The outer barrier of the lift shall automatically raise or close, or a supplementary system shall automatically engage, and remain raised, closed, or engaged at all times that the platform is more than 3 inches above the roadway or sidewalk and the platform is occupied. Alternatively, a barrier or system may be raised, lowered, opened, closed, engaged, or disengaged by the lift operator, provided an interlock or inherent design feature prevents the lift from rising unless the barrier is raised or closed or the supplementary system is engaged.
9. The platform surface shall be free of any protrusions over 1/4 inch high and shall be slip resistant. The platform shall have a minimum clear width of 28 and 1/2 inches at the platform, a minimum clear width of 30 inches measured from 2 inches above the platform surface to 30 inches above the surface of the platform, and a minimum clear length of 48 inches measured from 2 inches above the surface of the platform to 30 inches above the surface of the platform.
10. Any openings between the platform surface and the raised barriers shall not exceed 5/8 inches in width. When the platform is at vehicle floor height with the inner barrier (if applicable) down or retracted, gaps between the forward lift platform edge and the vehicle floor shall not exceed 1/2 inches horizontally and 5/8 inches vertically.
11. The outboard entrance ramp or loading-edge barrier used as a ramp and the transition plate from the inboard edge of the platform to the vehicle floor shall not exceed a slope of 1:8, measured on level ground, for a maximum rise of three inches, and the transition from roadway or sidewalk to ramp may be vertical without edge treatment up to 1/4 inches.

Thresholds between 1/4 inch and 1/2 inch high shall be beveled with a slope no greater than 1:2.

12. The lift platform (not including the entrance ramp) shall not deflect more than three degrees (exclusive of vehicle roll or pitch) in any direction between its unloaded position and its position when loaded with 60 pounds applied through a 26" by 26" test pallet at the centroid of the platform.
13. No part of the platform shall move at a rate exceeding 6 inches per second during lowering and lifting an occupant, and shall not exceed 12 inches per second during deploying or stowing. This requirement does not apply to the deployment or stowage cycles of lifts that are manually deployed or stowed. The maximum platform horizontal and vertical acceleration when occupied shall be 0.3 g.
14. The lift shall permit both inboard and outboard facing of wheelchair and mobility aid users.
15. Lifts shall accommodate persons using walkers, crutches, canes or braces, or who otherwise have difficulty using steps. The platform may be marked to indicate a preferred standing position.
16. Platforms on lifts shall be equipped with handrails on two sides, which move in tandem with the lift, and which shall be graspable and provide support to standees throughout the entire lift operation. Handrails shall have a usable component at least 8 inches long with the lowest portion a minimum 30 inches above the platform and the highest portion a maximum 38 inches above the platform. The handrails shall be capable of withstanding a force of 100 pounds concentrated at any point on the handrail without permanent deformation of the rail or its supporting structure. The handrails shall have a cross-sectional diameter between 1 and 1/4 inches and 1 and 1/2 inches or shall provide an equivalent grasping surface, and have eased edges with corner radii of not less than 1/8 inch. Handrails shall be placed to provide a minimum 1 and 1/2" knuckle clearance from the nearest adjacent surface. Handrails shall not interfere with wheelchair or mobility aid maneuverability when entering or leaving the vehicle. Any wheelchair frame utilizing a horizontal overhead support shall have padding at least 1" in thickness extending the full width of support.
17. A re-settable circuit breakers or other equivalent technology shall be installed between the power source and the lift motor if electrical power is used. It shall be located as close to the power source as possible, but not within the passenger/driver compartment.
18. Lift design shall prevent excessive pressure that could damage the lift system when the platform is fully lowered or raised, or that could jack the vehicle.

19. The following information shall be provided with each vehicle equipped with a lift:
 - A. A phone number where information can be obtained about installation, repair, and parts. (Detailed written instructions and a parts list shall be available upon request.)
 - B. Detailed instructions regarding use of the lift and readily visible when the lift door is open, including a diagram showing the proper placement and positioning of wheelchair/mobility aids on lift.
20. The lift manufacturer shall make available training materials to ensure the proper use and maintenance of the lift. These may include instructional videos, classroom curriculum, system test results, or other related materials.
21. Each lift shall be permanently and legibly marked or incorporate a non-removable label or tag which states that it conforms to all applicable requirements of the current National Standards for School Buses. In addition, the lift manufacturer, or an authorized representative, upon request of the original titled purchaser, shall provide a Notarized Certificate of Conformance, either original or photocopied, which states that the lift system meets all the applicable requirements of the current National Standards for School Buses.

Ramp

Emergency ramps may be used with prior approval from the SDE.

Regular Service Entrance

1. Steps
 - A. The first step at the service door shall be not less than 10 inches and not more than 14 inches from the ground when measured from the top of the step based on standard chassis specifications.
 - B. Type D vehicles shall have the first step at the service door 12 to 16 inches from the ground.
2. The service door entrance shall use a three-step step well. Risers shall be of equal height and depth. When a plywood floor is used on steel, the differential may be increased by thickness of plywood.
3. Steps shall be enclosed to prevent accumulation of ice and snow.
4. Steps shall not protrude beyond the side bodyline.
 - A. A grab handle not less than 20 inches in length shall be provided in an unobstructed location inside the doorway.

Restraining Devices

1. On power-lift equipped vehicles, seat frames may be equipped with attachments or devices to which belts, restraining harnesses or other devices may be attached. Attachment framework or anchorage devices, if installed, shall conform to FMVSS 210.
2. Seat belt assemblies may be installed on special needs buses, shall conform to FMVSS 209. Seat belt assemblies shall be color-coded, installed by the manufacturer, and must conform to FMVSS 209.
3. Child restraint systems, which are used to facilitate the transportation of children who in other modes of transportation would be required to use a child, infant, or booster seat, shall conform to FMVSS 213 and 222.
4. Passenger seats designed to accommodate a child or infant carrier seat shall comply with FMVSS 225. These seats shall be in compliance with NHTSA's **"Guideline for the Safe Transportation of Pre-School-Age Children in School Buses."**

Seating Arrangements

Flexibility in seat spacing to accommodate special circumstances shall be permitted to meet passenger requirements. All seating shall be forward facing.

Securement and Restraint System for Wheelchair/Mobility Aid and Occupant

For purposes of better understanding the various aspects and components of this section, the term securement or phrase securement system is used exclusively in reference to the device(s), which secure the wheelchair/mobility aid. The term restraint or phrase restraint system is used exclusively in reference to the device(s) used to restrain the occupant of the wheelchair/mobility aid. The phrase securement and restraint system is used to refer to the total system, which secures and restrains both the wheelchair/mobility aid and the occupant.

1. Securement and restraint system--general
 - A. The Wheelchair/Mobility Aid Securement and Occupant Restraint System shall be designed, installed, and operated to accommodate passengers in a forward-facing orientation within the bus and shall comply with all applicable requirements of FMVSS 222. Gurney-type devices shall be secured parallel to the side of each bus.
 - B. The securement and restraint system, including the system track, floor plates, pockets, or other anchorages shall be provided by the same manufacturer, or be certified to be compatible by manufacturers of all equipment/systems used.

- C. When a wheelchair/mobility aid securement device and an occupant restraint share a common anchorage, including occupant restraint designs that attach the occupant restraint to the securement device or the wheelchair/mobility aid, the anchorage shall be capable of withstanding the loads of both the securement device and occupant restraint applied simultaneously, in accordance with FMVSS 222 (see Sections 2 and 3 of this section).
- D. When a wheelchair/mobility aid securement device (webbing or strap assembly) is shared with an occupant restraint, the wheelchair/mobility aid securement device (webbing or strap assembly) shall be capable of withstanding a force twice the amount as specified in Section 4.4(a) of FMVSS 209 (see Sections 2 and 3 of this section).
- E. The bus body floor and sidewall structures where the securement and restraint system anchorages are attached shall have equal or greater strength than the load requirements of the system(s) being installed.
- F. The occupant restraint system shall be designed to be attached to the bus body either directly or in combination with the wheelchair/mobility aid securement system, by a method, which prohibits the transfer of weight or force from the wheelchair/mobility aid to the occupant in the event of an impact.
- G. When an occupied wheelchair/mobility aid is secured in accordance with the manufacturer's instructions, the securement and restraint system shall limit the movement of the occupied wheelchair/mobility aid to no more than 2 inches in any direction under normal driving conditions.
- H. The securement and restraint system shall incorporate an identification scheme, which will allow for the easy identification of the various components and their functions. It shall consist of one of the following, or combination thereof:
 - (1) The wheelchair/mobility aid securement (webbing or strap assemblies) and the occupant restraint belt assemblies shall be of contrasting color or color shade.
 - (2) The wheelchair/mobility aid securement device (webbing or strap assemblies) and occupant restraint belt assemblies shall be clearly marked to indicate the proper wheelchair orientation in the vehicle, and the name and location for each device or belt assembly; i.e., front, rear, lap belt, shoulder belt.
- I. All attachment or coupling devices designed to be connected or disconnected frequently shall be accessible and operable without the use of tools or other mechanical assistance.

- J. The securement and restraint system hardware and components shall be free of sharp or jagged areas and shall be of a non-corrosive material or treated to resist corrosion in accordance with Section 4.3(a) of FMVSS 209.
- K. The securement and restraint system shall be located and installed such that when an occupied wheelchair/mobility aid is secured, it does not block access to the lift door or emergency door.
- L. A device for storage of the securement and restraint system may be provided. When the system is not in use, the storage device shall allow for clean storage of the system, shall keep the system securely contained within the passenger compartment, shall provide reasonable protection from vandalism, and shall enable the system to be readily accessed for use.
- M. The entire securement and restraint system, including the storage device, shall meet the flammability standards established in FMVSS 302.
- N. Each securement device (webbing or strap assembly) and restraint belt assembly shall be permanently and legibly marked or incorporate a non-removable label or tag which states that it conforms to all applicable FMVSS requirements. In addition, the system manufacturer, or an authorized representative, upon request by the original titled purchaser, shall provide a notarized Certificate of Conformance, either original or photocopied, which states that the wheelchair/mobility aid securement and occupant restraint system meets all of the requirements as specified in FMVSS 222.
- O. The following information shall be provided with each vehicle equipped with a securement and restraint system:
 - (1) A phone number where information can be obtained about installation, repair, and parts. (Detailed written instructions and a parts list shall be available upon request.)
 - (2) Detailed instructions regarding use, including a diagram showing the proper placement of the wheelchair/mobility aids and positioning of securement devices and occupant restraints, including correct belt angles.
- P. The system manufacturer shall make available training materials to ensure the proper use and maintenance of the wheelchair/mobility aid securement and occupant restraint system. These may include instructional videos, classroom curriculum, system test results, or other related materials.

2. Wheelchair/mobility aid securement system

- A. Each securement system location shall consist of a minimum of four anchorage points. A minimum of two anchorage points shall be located in front of the

wheelchair/mobility aid and a minimum of two anchorage points shall be located in the rear. The securement anchorages shall be attached to the floor of the vehicle and shall not interfere with passenger movement or present any hazardous condition.

- B. Each securement system location shall have a minimum clear floor area of 30" x 48". Additional floor area may be required for some applications. Consultation between the user and the manufacturer is recommended to ensure adequate area is provided.
- C. The securement system shall secure common wheelchair/mobility aids and shall be able to be attached easily by a person having average dexterity and who is familiar with the system and wheelchair/mobility aid.
- D. As installed, each securement anchorage shall be capable of withstanding a minimum force of 3,000 pounds (13,344 Newtons) when applied as specified in FMVSS 222. When more than one securement device share a common anchorage, the anchorage shall be capable of withstanding the force indicated above, multiplied by the number of securement devices sharing that anchorage.
- E. Each securement device, if incorporating webbing or a strap assembly, shall comply with the requirements for Type 1 safety belt systems, in accordance with Sections 4.2, 4.3, and 4.4(a) of FMVSS 209.
- F. The securement system shall secure the wheelchair/mobility aid in such a manner that the attachments or coupling hardware will not become detached when any wheelchair/mobility aid component deforms, when one or more tires deflate, and without intentional operation of a release mechanism (e.g., a spring clip on a securement hook).
- G. Each securement device (webbing or strap assembly) shall be capable of withstanding a minimum force of 2,500 pounds when tested in accordance with FMVSS 209.
- H. Each securement device (webbing or strap assembly) shall provide a means of adjustment of manufacturer's design, to remove slack from the device or assembly.
- I. Each securement device, webbing, or strap assembly shall be of the automatic, retractable type.

3. Occupant restraint system

- A. A Type II-A occupant restraint system, which meets all applicable requirements of FMVSS 209 and 210, shall provide for restraint of the occupant.
- B. The occupant restraint system shall be made of materials, which do not stain, soil, or tear an occupant's clothing, and which are resistant to water damage and fraying.
- C. Each restraint system location shall have not less than one anchorage, of manufacturer's design, for the upper end of the upper torso restraint.
 - (1) The anchorage for each occupant's upper torso restraint shall be capable of withstanding a minimum force of 1,500 pounds (6,672 Newtons) when applied as specified in FMVSS 222.
- D. Each wheelchair/mobility aid location shall have not less than two floor anchorages for the occupant pelvic and the connected upper torso restraint.
 - (1) Each floor anchorage shall be capable of withstanding a minimum force of 3,000 pounds (13,344 Newtons) when applied as specified in FMVSS 222.
 - (2) When more than one occupant restraint share a common anchorage, the anchorage shall be capable of withstanding a minimum force of 3,000 pounds (13,344 Newtons) multiplied by the number of occupant restraints sharing the common anchorage in accordance with FMVSS 222.
- E. Each floor and wall anchorage which secures the occupant restraint to the vehicle and which is not permanently attached, shall be of a "positive latch" design, and shall not allow for any accidental disconnection.

Special Light

Doorways, in which lifts are installed, shall have, lighting as required by FMVSS 403 and 404.

Special Service Entrance

1. Power lift equipped bodies shall have a special service entrance to accommodate the power lift.
2. The special service entrance and door shall be located on the right side of the bus and shall be designed so as not to obstruct the regular service entrance.
3. The opening may extend below the floor through the bottom of the body skirt. If such an opening is used, reinforcements shall be installed at the front and rear of the floor opening to support the floor and give the same strength as other floor openings.

4. A drip molding shall be installed above the opening to effectively divert water from entrance.
5. Door posts and headers from entrance shall be reinforced sufficiently to provide support and strength equivalent to the areas of the side of the bus not used for special service entrance.

Special Service Entrance Doors

1. A single door or double doors may be used for the special service entrance.
2. A single door shall be hinged to the forward side of the entrance unless doing so would obstruct the regular service entrance. If, due to the above condition, the door is hinged to the rearward side of the doorway, the door shall utilize a safety mechanism, which will prevent the door from swinging, open should the primary door latch fail. If double doors are used the system shall be designed to prevent the door(s) from being blown open by the wind resistance created by the forward motion of the bus, and/or incorporate a safety mechanism to provide secondary protection should the primary latching mechanism(s) fail.
3. All doors shall have positive fastening devices to hold doors in the open position.
4. All doors shall be weather sealed on buses with double doors. They shall be so constructed that a flange on the forward door overlaps the edge of the rear door when closed.
5. When manually operated dual doors are provided, the rear door shall have at least a one-point fastening device to the header. The forward-mounted door shall have at least three-point fastening devices. One shall be to the header, one to the floor line of the body, and the other shall be into the rear door. The door and hinge mechanism shall be of a strength that is greater than or equivalent to the emergency exit door.
6. Door materials, panels and structural strength shall be equivalent to the conventional service and emergency doors. Color, rub rail extensions, lettering and other exterior features shall match adjacent sections of the body.
7. Each door shall have windows, set in a waterproof manner, which are visually similar in size and location to adjacent non-door windows. Glazing shall be of same type and tinting (if applicable) as standard fixed glass in other body location.
8. Door(s) shall be equipped with a device that will actuate a flashing visible signal located in the driver's compartment when the door(s) is open and ignition is in "on" position.
9. A switch shall be installed so that the lifting mechanism will not operate when the lift platform door(s) is closed.

10. Special service entrance doors shall be equipped with padding at the top edge of the door opening. Pad shall be at least three inches wide and one inch thick and extend the full width of the door opening.

Support Equipment and Accessories

1. Each bus shall contain at least one belt cutter properly secured in a location within reach of the driver while belted into his/her driver's seat. The belt cutter shall be durable, designed to eliminate the possibility of the operator or others being cut during use, and must have a full hand-grip.
2. Special equipment or supplies which are used on the bus for mobility assistance, health support, or safety purposes shall meet any local, federal, or engineering standards which may apply, including proper identification.

Equipment which may be used for these purposes includes, but is not limited to:

- A. Wheelchairs and other mobile seating devices (see section on Securement System for Mobile Seating Devices/Occupant).
 - B. Crutches, walkers, canes, and other ambulating devices.
 - C. Medical support equipment. This may include respiratory devices such as oxygen bottles (which should be no larger than 22 cubic feet for liquid oxygen and 38 cubic feet for compressed gas), or ventilators. Tanks and valves should be located and positioned to protect them from direct sunlight, bus heater vents, or other heat sources. Other equipment may include intravenous, and fluid drainage apparatus. Appropriate medical placarding, if needed, shall be added by the LEA.
3. All portable equipment and special accessory items, including the equipment listed above, shall be secured at the mounting location to withstand a pulling force of five times the weight of the item, or shall be retained in an enclosed, latched compartment. The compartment shall be capable of withstanding forces applied to its interior equal to five times the weight of its contents without failure to the box's integrity and securement to the bus. Exception: If these standards provide specific requirements for securement of a particular type of equipment, the specific standard shall prevail (i.e., wheelchairs).

Technology and Equipment, New

It is the intent of these specifications to accommodate new technologies and equipment that will better facilitate the transportation of students with special needs. When a new technology, piece of equipment or component is desired to be applied to the school bus it must meet the following criteria:

- A. The technology, equipment, or component shall not compromise the effectiveness or integrity of any major safety system. (Examples of safety systems include, but are not limited to, compartmentalization, the eight-lamp warning system, emergency exits and the approved color scheme.
- B. The technology, piece of equipment or component shall not diminish the safety of the interior of the bus.
- C. The technology, piece of equipment or component shall not create additional risk to students who are boarding or exiting the bus or are in or near the school bus loading zone.
- D. The technology, piece of equipment or component shall not require undue additional activity and/or responsibility for the driver.
- E. The technology, piece of equipment or component shall generally increase efficiency and/or safety of the bus, generally provide for a safer or more pleasant experience for the occupants and pedestrians in the vicinity of the bus or shall generally assist the driver and make his/her many tasks easier to perform.
- F. The technology, piece of equipment or component shall have prior written approval from the SDE School Bus Specifications Committee.

SECTION V - ALTERNATE FUEL SOURCE STANDARDS

1. The guidelines contained herein shall pertain only to the school buses approved by the Alabama State Board of Education to operate on alternative fuel sources and which meet the safe operation requirements of paragraph B-1.
 - A. Any company or individual servicing conversion equipment to school districts shall provide an approved certification program covering installation, personnel training, maintenance, repair, trouble-shooting and safety procedures for each responsible mechanic to assure that conversion and maintenance is performed only by personnel certified by the Alabama LP-Gas Board or other approved agency.
 - B. These companies or individuals shall submit to the Alabama State Department of Education, Pupil Transportation Section, Montgomery, Alabama, 36130, documentation certifying that the requirements of 1-A have been met.

SECTION VI - OPTIONS

Locking Fuel Compartment Door

Provide at the option of the purchaser a lock and key to secure the fuel compartment door.

Storage Compartment for Required Emergency Equipment

Provide at the option of the purchaser a storage compartment located in the driver's compartment to house the emergency equipment. It shall be a locked compartment with a warning buzzer attached so as to activate when the ignition switch is on and the compartment is locked.

SECTION VII – MULTIFUNCTIONAL SCHOOL ACTIVITY BUS (MFSAB)

DEFINITION:

A Multifunctional School Activity Bus (MFSAB) is a school bus constructed to Federal Motor Vehicle Safety Standards (FMVSS) and Alabama Minimum School Bus Specifications. It must be purchased or leased as a new bus and may only be used for extracurricular activities. **These buses may not be used to transport students to and from schools or between schools for the purpose of attendance.**

The following exceptions to the Alabama Minimum Specifications for School Buses for regular route buses shall be allowed for these vehicles.

Identification:

1. The bus body shall bear the words “**ACTIVITY BUS**” in a contrasting color at least 8 inches high in the area where “school bus” is normally positioned. Lettering and numbering shall conform to FMVSS and Alabama Minimum Specifications and shall meet reflectivity standards. Bus numbering on this bus may be of a contrasting color.
2. The name of the school system shall be displayed in at least five-inch letters on both sides of the bus in the beltline area. **NO SIGNS OR LOGOS** shall be applied to any area of the bus including the bumpers. The name of the school may be displayed in the beltline area. No signs, logos, or other items shall be displayed on the windows of the bus.

Color:

The local school with school system approval may determine the color of the activity bus. The color scheme may utilize any combination of up to **THREE** colors. This combination may be in addition to an optional white roof. The color National School Bus Yellow (SBMTC-008 Publication) shall not be used as a part of the color scheme.

School systems and/or vendors shall submit preliminary color schemes to the Alabama Department of Education, Pupil Transportation Section for approval **prior to the purchase or manufacture** of a Multifunctional School Activity Bus (MFSAB).

Seating:

Transit style seats, which meet all aspects of FMVSS 222 and 302, may be used in lieu of regular school bus seats.

Lighting and Warning Devices:

All activity buses shall meet state and federal standards for normal school bus lighting and warning device requirements with the following exceptions:

Multifunctional School Activity Buses (MFSAB) may not be equipped with alternately flashing amber or red signal lamps used for loading and unloading students.

Multifunctional School Activity Buses (MFSAB) may not be equipped with stop arm signals or crossing control arms.

INSPECTIONS:

Annual inspection by Alabama Department of Education (SDE) state school bus inspectors and monthly inspections by local school bus inspectors shall be performed on all Multifunctional School Activity Buses (MFSAB) as required by Alabama law and the Rules of the Alabama State Board of Education.

REGULATIONS:

These buses shall be owned by the local school system or leased from private school bus transportation contractors. All Alabama laws, Rules of the State Board of Education, and other applicable regulations pertaining to the operation of school buses and certification of school bus drivers shall apply to Multifunctional School Activity Buses.

ALABAMA MINIMUM SPECIFICATIONS 2007
QUICK REFERENCE CHART

****TYPE A-I SCHOOL BUS****

<p>Type A-I and A-II buses under 14,500 pounds GVWR shall be built to manufacturer's specifications. All type A buses under 14,500 pounds GVWR shall have four-wheel disc brakes.</p>
--

****TYPE A-II SCHOOL BUS****

(Over 14,500 pounds)

CAPACITY	BRAKE LINING SIZE	GAWR FRONT	GAWR REAR	GVWR TOTAL	TIRE SIZE
10-47	4" Front 6" Rear	9,000	14,200	23,200	10R x 22.5 10 ply

Type A-II school buses exceeding 14,500 pounds GVWR shall have air brakes.

****TYPE B SCHOOL BUS****

<p>Type B school buses shall be built to manufacturer's specifications. Exception: All Type B buses shall have four-wheel disc brakes.</p>

****TYPE C SCHOOL BUS****

10-47	4" Front 6" Rear	9,000	14,200	23,200	10R x 22.5 10 ply
48-54	4" Front 6" Rear	9,000	16,000	25,000	10R x 22.5 10 ply
55-72	4" Front 7" Rear	9,000	17,500	26,500	10R x 22.5 12 ply

Type C school buses exceeding 72 capacity shall have prior, written SDE approval.

****TYPE C-1 SCHOOL BUS****

10-36	Four-wheel disc	6,000	13,500	19,000 maximum	225 x 70R 19.5 - 12 Ply
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****TYPE D FRONT ENGINE****

10-53	4" Front 6" Rear	10,800	17,000	27,800	10R x 22.5 10 ply
54-66	5" Front 7" Rear	11,000	17,000	28,000	10R x 22.5 10 ply
68-78	5" Front 7" Rear	11,000	19,000	30,000	11R x 22.5 14 ply
79-84	6" Front 8" Rear	13,000	20,000	33,000	11R x 22.5 16 ply

****TYPE D REAR ENGINE****

42-66	5" Front 7" Rear	12,000	19,000	30,000	11R x 22.5 16 ply
68-78	6" Front 7" Rear	12,000	19,000	30,000	11R x 22.5 16 ply
79-84	6" Front 8" Rear	12,000	21,000	33,000	11R x 22.5 16 ply

Type D school buses exceeding 84-capacity shall have prior, written SDE approval.

Alabama Minimum Specifications for School Buses 2006



Alabama Department of Education
Division of Administrative and Financial Services
Pupil Transportation Section
Montgomery, Alabama
334-242-9730

Joseph B. Morton
State Superintendent of Education
Bulletin 2005, Number 34

The Alabama Minimum Specifications for School Buses can also be found on the Alabama State Department of Education website at www.alsde.edu. Look under “Sections” for Pupil Transportation, then “Publications”.

Alabama Minimum Specifications for School Buses 2006
Changes Document

Changes to the Alabama Minimum Specifications for School Buses 2005 occur on the following pages and headings. All changes appear in italics with the exception of deletions. For noted deletions refer to the 2005 specifications for comparison.

NOTE: Page numbers in 2005 specs and 2006 specs may not coincide.

Page	Section	General Description of Change
<i>1</i>	<i>Section I, Item 5</i>	<i>Updated wording regarding service manual/diagnostic equipment.</i>
<i>2</i>	<i>Section I, Item 7</i>	<i>School bus definition/new type C-1 definition.</i>
<i>3</i>	<i>Section II, Axles</i>	<i>New language concerning chassis axles.</i>
<i>3</i>	<i>Section II, Brakes</i>	<i>Deleted reference to vacuum. Item 1 Type C-1 requires four-wheel disc.</i>
<i>5</i>	<i>Section II, Color</i>	<i>Item 3 added MFSAB exemption for school bus yellow.</i>
<i>6</i>	<i>Section II, Electrical</i>	<i>Item 2A, B, and C. New minimum amperage requirements.</i>
<i>7</i>	<i>Section II, Electrical</i>	<i>Item 3c. Daytime running lamps required.</i>
<i>7</i>	<i>Section II, Engine Fire Suppression</i>	<i>New section. Engine fire suppression systems optional. Also, see page 21? – Fire Suppression</i>
<i>9</i>	<i>Section II, Governor</i>	<i>Item 2, New language on engine speed and road speed.</i>
<i>11</i>	<i>Section II, Passenger Load</i>	<i>Item 2, New language on GVWR and GAWR. Deleted Item 3.</i>
<i>11</i>	<i>Section II, Power and Gradeability</i>	<i>Deleted entire section.</i>
<i>11</i>	<i>Section II, Retarder System</i>	<i>New wording. Changed “maintain” to “limit”.</i>
<i>12</i>	<i>Section II, Road Speed Control</i>	<i>New section. New language concerning road speed control.</i>
<i>13</i>	<i>Section II, Transmission</i>	<i>Allows Allison PTS 1000 automatic transmission for Type C-1.</i>
<i>15</i>	<i>Section III, Bumper Rear</i>	<i>New Item 6, Rear bumper height.</i>
<i>16</i>	<i>Section III, Color</i>	<i>Item 4 added MFSAB exemption for school bus yellow.</i>
<i>16</i>	<i>Section III, Communication Systems</i>	<i>Requires two-way voice communication on all buses. Local system responsible for compliance with this requirement.</i>
<i>17</i>	<i>Section III, Doors</i>	<i>Removed outdated language concerning Type A doors.</i>
<i>19</i>	<i>Section III, Emergency Exits</i>	<i>Section 2, Additional Emergency Exits. New language concerning # of emergency exit required for 0 to 54 passengers.</i>
<i>21</i>	<i>Section III, Fire Suppression Systems</i>	<i>New section. Fire suppression systems optional.</i>
<i>22</i>	<i>Section III, Handrails</i>	<i>New section. Handrail specifications.</i>

23	<i>Section III, Hinges</i>	<i>New section. Hinge specifications.</i>
23	<i>Section III, Identification</i>	<i>Item 3, Unauthorized Entry sign required.</i>
25	<i>Section III, Lamps and Signals</i>	<i>Item 2, New language concerning operation of clearance lamps.</i>
27	<i>Section III, Mirrors</i>	<i>Item 2D, Heated and/or remote control mirrors allowed.</i>
28	<i>Section III, Noise Suppression Switch</i>	<i>New requirement for noise suppression switch.</i>
28	<i>Section III, Public Address</i>	<i>New requirement. Placement of interior speakers.</i>
28	<i>Section III, Reflectivity</i>	<i>Requires retroreflective material.</i>
29	<i>Section III, Rub Rails</i>	<i>Items 3 – 6, New wording regarding rub rails.</i>
30	<i>Section III, Seat Belt for Driver</i>	<i>Allows integrated seat belt systems in driver seat.</i>
31	<i>Section III, Seats and Crash Barriers</i>	<i>Item 7, requires air or mechanical suspension box pedestal-type driver seat.</i>
31	<i>Section III, Steps</i>	<i>Items 1 and 1A, New minimum step height and clearance requirement.</i>
32	<i>Section III, Storage Compartment</i>	<i>New language for storage compartments on Type A buses.</i>
36	<i>Section III, Windshield Washers</i>	<i>New language concerning wiped area of windshield.</i>
36	<i>Section III, Wiring</i>	<i>Item 2A Circuits, new wording for electronic protection devices.</i>
37	<i>Section III, Wiring</i>	<i>Item G Circuits, requires noise suppression switch.</i>
39	<i>Section IV, Special Needs Introduction</i>	<i>Definition of a specially equipped school bus.</i>
40	<i>Section IV, Special Needs</i>	<i>Requires two-way voice communication on all buses. Local system responsible for compliance with this requirement.</i>
45	<i>Section IV, Special Needs</i>	<i>Item 4, new language on Preschool-Age Seating.</i>
51	<i>Section IV, Special Needs</i>	<i>New section - Technology and Equipment – New</i>
56	<i>Quick Reference Chart</i>	<i>Type C-1 specifications – new section</i>



INTRODUCTION

Alabama law (32-5-8) requires the Alabama State Board of Education to adopt minimum standards to govern the specifications for all new school buses and the overall operation of all school buses in the state of Alabama. This responsibility also extends to the inspection of school buses being sold and operated in the state of Alabama. The primary reason for the development of specifications and the inspection of school buses is to enhance the safety of our school buses. We must ensure that Alabama school buses continue to provide the safest ride available for our most precious cargo—our children.

A heartfelt thanks goes to each member of the Alabama State Department of Education School Bus Specifications Committee for all their hard work and dedication to the task. School bus specifications always begin as a product of many individual thoughts and ideas. However, they culminate in standards, which help assure the safest school buses possible for Alabama's students as well as vehicles, which provide a true value for Alabama's taxpayers.

Additionally, special thanks must also be voiced for Alabama's school bus vendors and the many manufacturers in the school bus industry who assist in the Committee in the development of this document. Without their participation, the specifications would be significantly weakened.

Again, we appreciate the many individuals and companies who participated in the development of these specifications. After reviewing these current specifications, if you have any question or suggestions, please feel free to contact any of the committee members listed on the following page.

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ALABAMA MINIMUM SPECIFICATIONS FOR SCHOOL BUSES
EFFECTIVE October 1, 2005

SECTION I - GENERAL PROVISIONS

Standards

1. All school buses ordered by local education agencies beginning **October 1, 2005**, shall (1) meet the applicable Federal Motor Vehicle Safety Standards (FMVSS), and (2) meet Alabama minimum specifications for school buses. In the event of a conflict between the requirements of an applicable Federal Motor Vehicle Safety Standard, as referred to in this section, and the Alabama minimum specifications, the requirements of the FMVSS shall control. **School buses not meeting minimum specifications will not be certified by the Alabama State Department of Education (SDE).**

Certification

2. All school bus manufacturers shall certify to the SDE, in the form of a **durable, legible** certification label mounted in the driver's compartment in the vehicle, that all school buses meet or exceed all standards as specified herein and are in compliance with the applicable FMVSS. All manufacturers shall certify to the State of Alabama and local education agencies that all components on school buses are new from bumper to bumper at time of delivery. All chassis and body information shall appear on this certification label.

Used School Buses

3. Used school buses purchased for use by a school system in Alabama shall meet all of the legal Federal and Alabama requirements for school buses that were in effect on the date the vehicle was manufactured.

Bid Requirements

4. In order to be in compliance with the State Bid Law, school bus purchases shall be by competitive bidding. Bid forms to the body manufacturer shall contain certain options required by the chassis manufacturer, which may result in changes in normal Gross Vehicle Weight Rating (GVWR) or alterations to the body. For special needs buses, the school bus body manufacturer shall submit floor plans which include dimensions at the time bid quotations are submitted showing:
 1. Location of the emergency door, emergency windows and roof hatches.
 2. Aisle and staging areas and seat spacing.
 3. Track locations and/or wheelchair securement positions.
5. **Service Manual/Diagnostic Equipment**
Body and/or chassis suppliers, including integral (forward control) suppliers, shall provide each school district purchasing school buses with one complete set of the

most current service manuals, *as specified by the school system*, available to include both body and chassis at no additional cost upon delivery of bus. *Provisions for manuals and diagnostic equipment, including, but not limited to code books, software, and training, etc, shall be agreed upon during the pre-bid process. Diagnostic equipment cannot be used to determine low bidder.*

6. New Technology

New technology not in the present specifications shall have prior written approval from the SDE School Bus Specifications Committee.

7. School Bus Definitions

School bus capacity is determined based on body size before modifications are made.

TYPE A: A Type A school bus is a conversion or body constructed upon a van-type or cutaway front-section vehicle with a left side driver's door designed for carrying more than 10 persons. This definition shall include two classifications: Type A-I with a GVWR of 10,000 or under; and Type A-II, with a GVWR over 10,000 pounds. All Type A buses shall have dual rear wheels. **Type A buses under 14,500 pounds GVWR shall have four-wheel disc brakes.**

Type A buses exceeding a GVWR of 14,500 pounds shall have air brakes.

TYPE B: A Type B school bus is a conversion or body constructed and installed upon a van or front-section vehicle chassis, or stripped chassis, with a GVWR of more than 10,000 pounds and designed for carrying more than 10 persons. Part of the engine is beneath and/or behind the windshield and beside the driver's seat. The entrance door is behind the front wheels. All Type B buses 14,500 pounds or under shall have four-wheel disc brakes.

TYPE C: A Type C school bus is a body installed upon a flat back cowl chassis with a GVWR of more than 10,000 pounds and designed for carrying more than 10 persons. The entire engine is in front of the windshield and the entrance door is behind the front wheels.

Type C buses may not exceed 72-passenger capacity without prior, written SDE approval.

TYPE C1 *A Type C1 school bus is a body installed upon a flat back cowl chassis with a GVWR of more than 10,000 pounds and a maximum of 19,000 pounds and designed for carrying a maximum of 36 persons. This is a special category of a Type C school bus designed to be an alternate to a Type A1, Type A2, or Type B. This bus shall not exceed a maximum capacity of 36 persons.*

TYPE D: A Type D school bus is a body installed upon a chassis, with the engine mounted in the front, midship, or rear, with a gross vehicle weight rating of more than 10,000 pounds and designed for carrying more than 10 persons. The engine may be behind the windshield and beside the driver's seat, at the rear of the bus, behind the rear wheels, or midship between the front and rear axles. The entrance door is ahead of the front wheels.

Type D buses may not exceed 84-passenger capacity without prior, written SDE approval.

SECTION II - SCHOOL BUS CHASSIS STANDARDS

Air Cleaner

1. The engine intake air cleaner shall be furnished and properly installed by the chassis manufacturer to meet engine specifications.

The intake air system for diesel engines shall have an air cleaner restriction indicator properly installed by the chassis manufacturer to meet engine specifications.

Axles

1. *The front and rear axles and suspension systems shall have a gross axle weight rating (GAWR) at ground commensurate with the respective front and rear weight loads of the bus loaded to the rated passenger capacity.*
2. *Vehicle minimum axle capacities at ground when loaded shall meet the body manufacturer's GVWR specified by the FMVSS. Axle assemblies shall have minimum capacities at ground as shown on the chart on the last page of this booklet.*

Brakes

1. A braking system, including service brake and parking brake, shall be provided and shall comply with all CDL pretrip inspection requirements. All Type A-1 and A-II school buses below 14,500 pounds GVWR shall be built to manufacturer's specifications. *Type C-1 school buses between 10,000 pounds GVWR and 19,000 pounds GVWR are exempt from air brake requirements, but shall have four-wheel disc brakes.*
2. Buses using air *in the operation of the* brake system shall be equipped with warning signals, readily audible and visible to the driver, that will give a continuous warning when the air pressure available in the system for braking is 60 psi (pounds per square inch) or less. An air pressure gauge shall be provided in the instrument panel capable of complying with CDL pretrip inspection requirements.
3. Antilock brake systems for either air or hydraulic brakes shall include control of all axles in compliance with FMVSS 105 or 121.

- A. Air brakes shall be installed on **all** chassis exceeding 14,500 pounds GVWR. ***Exception:*** *Type C-1 school buses between 10,000 pounds GVWR and 19,000 pounds GVWR are exempt from air brake requirements, but shall have four-wheel disc brakes.*

All air-operated brake systems shall:

- (1) Meet all FMVSS for air brakes.
 - (2) Be S-cam type brakes on all wheels. The camshaft, when applying brakes, shall rotate in the same direction as the wheels. Automatic slack adjusters shall be the same design on all wheels. Dust covers shall be installed on all wheels unless deleted through local option at the time of the bid.
 - (3) Have at least a 12 CFM air compressor.
 - (4) Be equipped with a parking and emergency brake. A manual control, clearly identified, shall be within easy reach of the driver. The parking brake valve shall comply with CDL pretrip inspection requirements.
 - (5) Have brake lining sizes as shown on the chart on the last page of this booklet.
 - (6) Have a reservoir capacity, which is equal to or greater than two (2) times total volume of all brake activators at full travel.
 - (7) Have air dryers installed. (Bendix AD-9, Midland DA33100 or prior written approved equal). Air dryers shall be serviceable at the local level.
- B. Buses using a hydraulic assist-booster in the operation of the brake system shall be equipped with warning signals, readily audible and visible to the driver, that will provide continuous warning in the event of a loss of fluid flow from the primary source, or loss of electric source powering the back-up system.
- (1) The system shall be equipped with a source of hydraulic pressure, automatically initiated upon loss of power from primary source, and operating independently of the primary power source.
 - (2) All brake systems shall be designed to permit visual inspection of brake lining wear without the removal of any chassis components.

Bumper, Front

1. The front bumper shall be furnished by the chassis manufacturer for all school bus types, unless there is specific agreement between the chassis manufacturer and the

body manufacturer. When Type D chassis are supplied to a body company by a chassis manufacturer, the body company shall supply the front bumper as part of the body installation.

1. The front bumper shall be of pressed steel channel or equivalent material at least 3/16 inch thick, not less than 8 inches wide (high) and shall extend beyond forward-most part of the body, grille, hood, and fenders and shall extend to the outer edges of the fenders at the bumper's top line. Bumpers on Type A buses may be built to manufacturers' specifications.
2. Tow eyes or hooks shall be furnished and attached so as not to project beyond the front bumper. Tow eyes or hooks, attached to the frame chassis, shall be furnished by the chassis manufacturer. This installation shall be in accordance with the chassis manufacturer's standards. Type A buses are exempt from tow hook requirements.
3. The bumper shall be designed or reinforced so that it will not deform, when the bus is lifted by a chain that is passed under the bumper (or through the bumper if holes are provided for this purpose) and attached to both tow eyes. For the purpose of meeting this standard, the bus shall be empty and positioned on a level, hard surface, and both tow eyes shall share the load equally. Front bumper shall not be deformed when lifted by a bumper jack positioned on the bumper attachment points.

Certification

The chassis manufacturer shall certify to the SDE and local education agency having pupil transportation jurisdiction that their product meets minimum standards on items not covered by certification issued under requirements of the National Traffic and Motor Vehicle Safety Act.

Color

1. The chassis, including the front bumper, shall be black. The hood, cowl and fenders shall be in national school bus yellow. The hood may be painted with non-reflective paint.
2. Wheel rims shall be painted black, gray, or yellow on all buses.
3. *Multifunctional School Activity Buses shall be exempt from these requirements. (See MFSAB specifications on page 51.)*

Directional Lights

1. Each Type C chassis may be equipped with Type A front directional lights of the two-faced type mounted on the top of the fender and the hood side panel, or have an amber turn signal and marker light that is an integral part of the headlight assembly. This turn signal/marker light shall be seen from the front and the side of

the vehicle. An additional amber turn signal shall be mounted on the side of the fender to be visible to traffic driving beside the vehicle.

Drive Shaft

1. Torque capacity of the drive shaft assembly shall at least equal maximum engine torque as developed through lowest transmission gear reduction.
2. Each drive shaft shall be equipped with protective metal guard or guards to reduce the possibility of it whipping through the floor or dropping to ground if broken. (Body manufacturer is responsible for Mini Bus.)

Electrical System

1. Battery

- A. The storage batteries shall have a minimum of 1,250 cold cranking amps at 0 degrees Fahrenheit. Type A buses shall be built to manufacturer's specifications.
- B. Since all batteries in Type B, C, and D buses are to be located in a sliding tray, the battery shall be temporarily mounted on the chassis frame by the chassis manufacturer.

In these cases, the final location of the battery and the appropriate cable lengths shall be according to the current SBMTC Design Objectives.

2. Alternator

- A. All Type A and B buses up to 15,000 lbs. GVWR shall have a minimum 130 amperes alternator.
- B. All C and D buses over 15,000 lbs. GVWR shall be equipped with a heavy-duty truck or bus-type alternator meeting SAE J 180 and having a minimum output rating of 145 amperes; The alternator shall be capable of producing a minimum of 50 percent of its maximum rated output at the engine manufacturer's recommended idle speed.
- C. All C and D, buses equipped with an air conditioner or electrical power lift shall have a minimum 200 amperes alternator.
- D. A direct-drive alternator is permissible in lieu of a belt drive. A belt drive shall be capable of handling the rated capacity of the alternator with no detrimental effect on other driven components.
- E. Refer to SBMTC Design Objectives, *most current* edition, for estimating required alternator capacity.

3. Wiring

A. All wiring shall conform to current applicable recommended practices of the Society of Automotive Engineers.

(1) All wiring shall use standard colors and number coding and each chassis shall be delivered with a wiring diagram that coincides with the wiring of the chassis. All wires passing through metal openings shall be protected by a grommet or loom.

B. The chassis manufacturer shall install a readily accessible terminal strip or plug on the body side of the cowl, or at an accessible location in the engine compartment of vehicles designed without a cowl, that shall contain the following terminals for the body connections:

- (1) Main 100-amp body circuits
- (2) Tail lamps
- (3) Right turn signal
- (4) Left turn signal
- (5) Stop lamps
- (6) Back-up lamps
- (7) Instrument panel lights (rheostat controlled)

C. Daytime running lamps shall be provided.

4. Circuits

A. An appropriate identifying diagram (color and number coded) for electrical circuits shall be provided to the body manufacturer for distribution to the end user.

Engine Fire Extinguisher (Optional)

See Fire Suppression System page 21.

Engine

1. All buses shall be equipped with diesel engines with a minimum horsepower as follows:

29 to 60 passengers – 170 hp motor minimum

65 to above passengers – 190 hp motor minimum

Types A and B under 29 passenger – manufacturer's specifications

2. The engine heater may be installed as per the manufacturer's specifications.

Exhaust System

1. The exhaust pipe, muffler, and tail pipe shall be outside the bus body and attached to the chassis frame. The chassis manufacturer shall furnish an exhaust system

with a tail pipe of sufficient length to exit the rear of the bus or at the left side of the bus body no more than eighteen inches forward of the front edge of the rear wheelhouse opening. If designed to exit at the rear of the bus, the tailpipe shall extend at least five (5) inches beyond the end of the chassis frame and through the bumper. If designed to exit on the side of the bus, the tailpipe shall extend to the skirtline. With the exception of special needs buses, Type A vehicles may have manufacturer's standard exhaust system.

2. The muffler and the tail pipe shall be constructed of aluminized, or equivalent corrosion-resistant material. The tail pipe shall be made of at least 16-gauge material and shall be mounted in such a way that it will not cause damage to brake lines.
3. The exhaust pipe shall be properly insulated from the fuel tank and connections thereof by a metal shield at any point where it is four inches or less from tank or connections.
4. The exhaust system on vehicles designed for the transportation of special needs pupils shall be routed **to the left of the left frame rail** to allow for the installation of a lift on the right side of the vehicle.
5. On Types B, C and D buses, no exhaust pipe shall exit beneath an emergency exit or the fuel fill.
6. Type D rear engine exhaust shall exit beneath the rear bumper to manufacturer's specifications.

Fenders, Hoods--Types B and C Vehicles

1. The total spread of outer edges of front fenders, measured at the fender line, shall exceed the total spread of the front tires when the front wheels are in a straight-ahead position.
2. Front fenders shall be properly braced and free from any body attachments.
3. A fiberglass tilt hood shall be provided. The hood opening and closing effort shall be minimized to aid the driver with pre-trip inspections and service. If the hood is not designed to remain secure in the open position, a safety prop will be required. The wiring harness shall be a "quick disconnect" type to aid with servicing.

Frame

1. The frame or equivalent shall be of such design and strength characteristics as to correspond at least to standard practice for trucks of the same general load characteristics, which are used for highway service.

2. Any secondary manufacturer that modifies the original chassis frame shall guarantee the performance of workmanship and materials resulting from such modification.
3. Any frame modification shall not be for the purpose of extending the wheelbase.
4. Holes in top or bottom flanges or side units of the frame, and welding to the frame, shall not be permitted except as provided or accepted by the chassis manufacturer.
5. Frame lengths shall be provided in accordance with current SBMTC Design Objectives.

Fuel Tank

1. All Types B, C, and D chassis above 170-inch wheelbase shall have a minimum 60-gallon fuel tank with a 55-gallon actual draw. The tank shall be filled and vented to the outside of the body, the location of which shall be so that accidental fuel spillage will not drip or drain on any part of the exhaust system.
Type C-1 school buses are exempt from this requirement.
2. No portion of the fuel system, which is located to the rear of the engine compartment, except the filler tube, shall extend above the top of the chassis frame rail. Fuel lines shall be mounted to obtain maximum possible protection from the chassis frame.
3. Fuel filters shall be installed as per manufacturer's specifications. Fuel filtration shall include water detection and separation. At least one fuel filter shall have a replaceable spin-on or cartridge-type element.
4. Fuel tank installation shall be in accordance with current SBMTC Design Objectives for location on the chassis right frame rail or between frame rails; the filler tube shall be located on the right side of the bus.
5. Type A buses may meet manufacturer's specifications.
6. The fuel tank on vehicles constructed with a power lift unit may be mounted on left chassis rail or behind rear wheels.
7. Installation of alternative fuel tanks shall comply with all applicable fire codes.
8. On Types B, C, and D vehicles, fuel tanks shall have interior baffles to help prevent buses from fuel starvation on inclines.

Governor

1. An engine governor is permissible. When it is desired to limit road speed, a road speed governor should be installed.

2. *An electronic engine speed limiter shall be provided and set to limit engine speed not to exceed the maximum revolutions per minute as recommended by the engine manufacturer. For Type C and D buses, and where feasible on Type A buses, bus road speed shall not exceed a maximum of 70 miles per hour.*

Heating System, Provision for

1. The chassis engine shall have plugged openings for the purpose of supplying hot water for the bus heating system. The opening shall be suitable for attaching a pipe thread/hose connector. The engine shall be capable of supplying water having a temperature of at least 170 degrees Fahrenheit at a flow rate of 50 pounds/per minute at the return end of 30 feet of one inch inside diameter automotive hot water heater hose (SBMI Standard No. 001--Standard Code for Testing and Rating Automotive Bus Hot Water Heating and Ventilating Equipment).

Horn

Buses shall be equipped with a horn or horns of standard make with each horn capable of producing a complex sound in bands of audio frequencies between 250 and 2,000 cycles per second and tested per the Society of Automotive Engineers Standard J--377. There shall be no air horns.

Instruments and Instrument Panel

1. Chassis shall be equipped with the following instruments and gauges (lights in lieu of gauges are not acceptable except as noted):
 - A. Speedometer
 - B. Odometer shall show accrued mileage to six digits not including tenths.
 - C. Tachometer
 - D. Voltmeter
 - (1) An ammeter with graduated charge and discharge with the ammeter and its wiring compatible with generating capacities is permitted in lieu of a voltmeter
 - E. Oil-pressure gauge
 - F. Water temperature gauge
 - G. Fuel gauge
 - H. Upper beam headlight indicator
 - I. *Air* brake indicator gauge

- (1) A light indicator in lieu of a gauge is permitted on vehicles equipped with hydraulic-over-hydraulic brake system.
 - J. Turn signal indicator
 - K. Glow-plug indicator light where appropriate
 - L. A twelve-volt accessory outlet with cover
2. All instruments shall be easily accessible for maintenance and repair.
 3. Instruments and gauges shall be mounted on the instrument panel in such a manner that each is clearly visible to the driver while in a normal seated position in accordance with current SBMTC Design Objectives.
 4. The instrument panel shall have lamps of sufficient candlepower to illuminate all instruments and gauges and the shift selector indicator for an automatic transmission.

Oil Filter

An Oil filter with replaceable element shall be provided and connected by flexible oil lines if it is not of built-in or engine-mounted design. The oil filters shall have a capacity of at least one (1) quart.

Openings

All openings in the floorboard or firewall between the chassis and the passenger-carrying compartment, such as for gearshift selector and parking brake lever, shall be sealed.

Passenger Load

1. Actual GVW is the sum of the chassis weight, plus the body weight, plus the driver's weight, plus total seated pupil weight. For purposes of calculation, the driver's weight is 150 pounds. For purposes of calculation, the pupil weight is 120 pounds per pupil.
2. Actual GVW shall not exceed the chassis manufacturer's GVWR for the chassis, *nor shall the actual weight carried on any axle exceed the chassis manufacturer's Gross Axle Weight Rating. (GAWR)*

Retarder System (Optional)

A retarder system, if used, shall *limit* the speed of the fully loaded school bus at 19.0 mph or 30 km/hr on a 7% grade for 3.6 miles or 6 km.

Road Speed Control

When it is necessary to control vehicle maximum speed, a vehicle speed limiter shall be utilized. For Type C and D buses, and where feasible on Type A buses, bus road speed shall not exceed a maximum of 70 miles per hour.

Shock Absorbers

Buses shall be equipped with front and rear double-action shock absorbers compatible with the manufacturer's rated axle capacity at each wheel location.

Springs/Suspension Systems

1. The capacity of the springs or suspension assemblies shall be commensurate with the chassis manufacturer's GVWR.
2. Front springs shall be of the leaf type, shall have a stationary eye at one end, and shall be protected by a wrapper leaf in addition to the main leaf. Rear leaf springs shall be of the progressive type.
3. Air ride suspension may be used on the front and rear of Type C and D buses in lieu of leaf-type springs. Body and chassis parts must clear tires with air bags in fully deflated condition or steering wheel turned fully to the left or right. If brake dust covers are used, inspection holes of adequate size and location for easily viewing brake linings shall be provided.

Steering Gear

1. The steering gear shall be approved by the chassis manufacturer and designed to assure safe and accurate performance when the vehicle is operated with maximum load and at maximum speed.
2. If external adjustments are required, the steering mechanism must be accessible to accomplish the same.
3. No changes shall be made in the steering apparatus, which are not approved by the chassis manufacturer.
4. There shall be a clearance of at least two inches between the steering wheel and the cowl, instrument panel, windshield, or any other surface.
5. Power steering is required and shall be of the integral type with integral valves.
6. The steering system shall be designed to provide a means for lubrication of all wear-points, if wear-points are not permanently lubricated.
7. The steering wheel shall meet manufacturer's specifications.

Tires and Rims

1. Radial tubeless tires and rims of proper size and tires with a load rating commensurate with chassis manufacturer's GVWR shall be provided. Hubcaps are not permitted.
2. Dual rear tires shall be provided on all school buses.
3. All tires on any given vehicle shall be of the same size and the load range of said tires shall meet or exceed the gross axle weight rating as required by FMVSS 120. Low profile tires are acceptable. However, they must meet the load range and ply requirements as shown on the chart on the last page of this booklet. It is recommended that dish-type rims be used with low profile tires.
4. If the vehicle is equipped with a spare tire and rim assembly, it shall be of the same size as those mounted on the vehicle.
5. If a tire carrier is required, it shall be suitably mounted in an accessible location outside the passenger compartment.

Transmission

An automatic transmission shall be required on all buses. Type A buses may be built to manufacturer's specifications. Types B, C, and D buses must have a PTS 2500 series or prior approved equal. The automatic transmission shall have at least four forward-gear ratios, plus integral torque converter. The transmission shift quadrant shall provide at least four forward drive ranges plus neutral and reverse ranges. Within the range selected, ratio changes shall be effected automatically and at full engine power if desirable, and without use of an engine disconnect clutch. A PTS3000 or prior approved equal is required for chassis over 33,000 pounds GVWR.

Type C-1 school buses may use Allison PTS 1000 or PTS 2200 automatic transmission or prior approved equal.

Turning Radius

1. Chassis with a wheelbase of 264 inches or less shall have a right and left turning radius of not more than 42 and 1/2 feet, curb-to-curb measurement.
2. Chassis with a wheelbase of 265 inches or more shall have a right and left turning radius of not more than 44 and 1/2 feet, curb-to-curb measurement.

Undercoating

The chassis manufacturer, or agent thereof, shall coat the undersides of steel or metallic-constructed front fenders with rust-proofing compound for which compound manufacturers have issued notarized certification of compliance to the chassis builder that the compound meets or exceeds all performance and qualitative requirements of paragraph 3.4 of Federal Specification TT-C520B using modified test.

Weight Distribution

The weight distribution of a fully loaded bus on a level surface shall be such as not to exceed the manufacturer's front gross axle rating and rear gross axle weight rating.

SECTION III - SCHOOL BUS BODY STANDARDS

Air Conditioning

Buses may be equipped with an air conditioning unit if the local education agency (LEA) desires.

All buses ordered with air conditioning shall meet the following minimum specifications:

1. Floor--All flooring shall be 5/8-inch exterior-grade plywood over steel flooring.
2. All buses shall have a white roof.
3. Windows--All windows shall be tinted with a minimum of 50% light transmission.
4. All buses shall meet insulation standards as per Alabama bus specifications.
5. **Optional** mud flaps to protect the condenser may be installed.

Minimum Btu air conditioning system per passenger size:

- | | |
|--------------------|-------------|
| 1. 10-30-passenger | 40,000 Btu |
| 2. 31-48-passenger | 53,000 Btu |
| 3. 49-60-passenger | 78,000 Btu |
| 4. 61-84-passenger | 100,000 Btu |

Aisle

1. All emergency doors shall be accessible by a 12-inch minimum aisle. The aisle shall be unobstructed at all times.
2. Seat backs shall be slanted sufficiently to give aisle clearance of 15 inches at the tops of seat backs.

Back-Up Warning Alarm

An automatic, audible alarm with a minimum of 87dbA and maximum of 112dbA shall be installed behind the rear axle and shall comply with the Society of Automotive Engineers published Back-up Alarm Standards (SAE 994). The alarm shall have a protective deflector shield.

Battery/Batteries

1. Batteries are to be furnished by the chassis manufacturer.
2. When the battery/batteries is mounted as described in the Chassis Standard, the body manufacturer shall securely attach the battery on a slide-out or swing-out tray in a closed, vented compartment in the body skirt, so that the battery is accessible for convenient servicing from the outside. The battery compartment door or cover shall be hinged at the front and secured by an adequate and conveniently-operated latch or other type fastener.

Bumper (Front)

On a Type D school bus, if the chassis manufacturer does not provide a bumper, it shall be provided by the body manufacturer. The bumper will conform to the standards in the chassis section.

Bumper (Rear)

1. Bumpers shall be of pressed steel channel or equivalent material, at least 3/16-inch thick, and shall be a minimum of 9-1/2 inches wide (high) on all Types B, C, and D buses. Type A buses shall have a minimum of an 8-inch rear bumper.
2. Bumpers shall be wrapped around the back corners of the bus. It shall extend forward at least 12 inches, measured from the rear-most point of the body at the floor line.
3. Bumpers shall be attached to the chassis frame in such a manner that it may be easily removed. It shall be so braced as to withstand impact from a rear or side impact. It shall be so attached as to discourage hitching of rides.
4. Bumpers shall extend at least one inch beyond rear-most part of body surface measured at the floor line.
5. Tow eyes or hooks may be furnished on the rear and attached so they do not project beyond the rear bumper. The installation shall be in accordance with the chassis manufacturer's specifications.
6. *The bottom of the rear bumper shall not be more than 30 inches above ground level.*

Ceiling

See Insulation and Interior, Body Standard.

Certification

The body manufacturer shall certify to the SDE and local education agency having pupil transportation jurisdiction that their product meets minimum standards on items not covered by certification issued under requirements of the National Traffic and Motor Vehicle Safety Act.

Chains (Tire)

See Wheel Housing Body Standard.

Color

1. The school bus body shall be painted National School Bus Yellow.
2. The body exterior paint trim, bumper, lamp hoods and lettering shall be black.

3. The roof of the bus may be painted white not to extend below the drip rails on the sides of the body.
4. *Multifunctional School Activity Buses (MFSAB) shall be exempt from this requirement. (See MFSAB specifications on page 51.)*

Communication Systems

*Each bus shall be equipped with a two-way, voice communication system capable of providing communication with the operational base. Where technologically feasible, the communication system shall also communicate with 911 operators. CB radio systems will not meet this requirement. **It is the responsibility of the local school system to comply with this specification.***

Construction

1. Construction shall be of prime commercial quality steel or other material with strength at least equivalent to all-steel as certified by the bus body manufacturer. All such construction materials shall be fire resistant.
2. Construction shall be dust proof and watertight, so the bus does not leak under normal operating conditions.
3. Body joints present in that portion of a Type A school bus body furnished exclusively by the body manufacturer shall conform to the performance requirements of FMVSS 221, "School Bus Body Joint Strength." This does not include the body joints created when body components are attached to components furnished by the chassis manufacturer.
4. Type A school bus bodies shall be equipped with restraining barriers conforming to FMVSS 222, "School Bus Passenger Seating--Crash Protection," Sections 5.2 and 5.3.

Crossing Control Arm

1. Buses shall be equipped with a crossing control arm mounted on the right side of the front bumper, which shall not open more than 90 degrees.
2. All components of the crossing control arm and all connections shall be weatherproofed.
3. The crossing control arm shall incorporate system connectors (electrical or air) at the gate and shall be easily removable to allow for towing of the bus.
4. The crossing control arm shall meet or exceed SAE Standard J1133.
5. The crossing control arm shall be constructed of non-corrosive or nonferrous material or treated in accordance with the body sheet metal standard (see Metal Treatment).

6. There shall be no sharp edges or projections that could cause hazard or injury to students.
7. The crossing control arm shall extend at least 70" from the front bumper when in the extended position.
8. The crossing control arms shall extend simultaneously with the stop arm(s) by means of the stop arm controls. An automatic recycling interrupt switch shall be installed to allow the driver to deactivate the control arm when necessary.
9. An electromagnetic device or a stowed bracket shall be installed to stabilize the arm when in the stored position.
10. Crossing control arm shall be Specialty Manufacturing Company, Part #58600, Transpec 4000 series, or prior approved equal.

Defrosters

1. The windshield defroster and defogging system shall provide defogging of the entire windshield, driver's side window, and entrance door glasses by utilizing hot air taken from the heater core with vents across the entire windshield.
2. The defrosting system shall conform to Society of Automotive Engineers' Standards J381 and J382.
3. The defroster and defogging system shall be capable of furnishing heated outside ambient air.
4. Auxiliary fans are not considered defrosting or defogging systems.
5. Portable heaters shall not be used.

Doors

1. Service Door:
 - A. The service door shall be in the driver's control, and designed to afford easy release and provide a positive latching device on manual operating doors to prevent accidental opening. When a hand lever is used, no part shall come together that will shear or crush fingers. Manual door controls shall not require more than 25 pounds of force to operate at any point throughout the range of operation.
 - B. The service door shall be located on the right side of the bus, opposite and within direct view of the driver.
 - C. The service door shall have a minimum horizontal opening of 24 inches and a minimum vertical opening of 68 inches.

- D. The service door shall be a split type, both sections opening outward.
- E. Lower, as well as upper door panels, shall be of approved safety glass. The bottom of each lower glass panel shall not be more than 10 inches from the top surface of the bottom step. The top of each upper glass panel shall not be more than 6 inches from the top of the door.
- F. Vertical closing edges on split type entrance doors shall be equipped with flexible material to protect the children's fingers.
- G. There shall be no door to the left in driver compartment on Types B, C or D vehicles.
- H. All doors shall be equipped with padding at the top edge of each door opening. Pad shall be at least three inches wide and one inch thick and extend the full width of the door opening.
- I. If air or electric doors are used, the amber warning lights shall be activated from a momentary switch. A three-position switch shall activate the sequence as follows:
 - Position One – door closed; lights off.
 - Position Two – activate red lights, stop arm, and crossing control arm.
 - Position Three – red lights activated, door open, stop arm activated, and crossing control arm activated.

Emergency Exits

1. Emergency Door:

- A. The emergency door shall be hinged on the right side if in the rear end of bus and on the front side if on left or right side of the bus. It shall open outward and be labeled inside to indicate how it is to be opened. If double emergency doors are used on Type A vehicles, they shall be hinged on the outside edge and shall have a three-point fastening device. A device shall be used that holds the door open to prevent the emergency door from closing during emergencies and school bus evacuation drills. If emergency door locks are used, the vehicle ignition must be disabled until the emergency door lock is deactivated.
- B. The upper portion of the emergency door shall be equipped with approved safety glazing, the exposed area of which shall be at least 400 square inches. The lower portion of the rear emergency door on Types B, C, and D vehicles shall be equipped with a minimum of 350 square inches of approved safety glazing.
- C. There shall be no steps leading to an emergency door.

- D. The words **EMERGENCY DOOR**, in letters at least two inches high, shall be placed at the top of or directly above the emergency door or on the door in the metal panel above the top glass, both inside and outside of the bus. The words **EMERGENCY EXIT** in letters at least 2 inches high shall be placed on the exterior body directly above each emergency window.
- E. The emergency door shall be equipped with padding at the top edge of each door opening. Padding shall be at least three inches wide and one inch thick, and extend the full width of the door opening.
- F. The side emergency door, if installed, must meet the requirements as set forth in FMVSS 217 (a), regardless of its use with any other combination of emergency exits.
- (1) A left side emergency door shall have a 20 inch unobstructed passageway and no flip seat is to be used. A barrier shall be used just before the door opening.
- G. There shall be no obstruction higher than 1/4 inch across the bottom of any emergency door opening.

2. Additional Emergency Exits:

- A. All school buses shall be equipped with emergency exits in the following capacity vehicles:
- *0 to 54 passenger: one emergency window exit per side and one roof hatch located midpoint.*
 - *55 and above passenger: two emergency window exits per side, and two roof hatches.*
- B. Each emergency exit shall comply with FMVSS 217. These emergency exits are in addition to the rear emergency door or exit. Roof hatches must be Transpec Standard Vent, Model 1970, Specialty Manufacturing 8600, 8900, or 9000 series or prior approved equal.
- (1) Emergency exit windows shall be as evenly spaced as possible under FMVSS 217 guidelines and shall not be obstructed by any devices.
- C. In addition to the audible warning required on emergency doors by FMVSS 217, additional emergency exits shall also be like protected. Check FMVSS re: wording and decibel level of buzzer.
- D. School bus emergency exits shall be marked with a minimum one inch wide strip of *retroreflective* tape, either red, white or yellow in color, to be placed

around the outside perimeter of the emergency exit opening, not the emergency exit itself.

The words **EMERGENCY EXIT**, in letters at least two inches high, shall be placed on the body directly above each emergency window.

Emergency Equipment

All emergency equipment shall be stored in the driver compartment with the exception of the warning devices.

1. Fire Extinguishers:

- A. The bus shall be equipped with at least one pressurized, dry chemical fire extinguisher complete with hose to meet Underwriters Laboratories, Inc., approval. A pressure gauge shall be mounted on the extinguisher and easily read without moving the extinguisher from its mounted position.

The bracket shall be a heavy-duty, snap-in, spring type. Band type holders are not acceptable.

- B. The fire extinguisher shall have a capacity of **five pounds** with an Underwriters Laboratories total rating of 2A10BC or greater. The operating mechanism shall be sealed with a type of seal that will not interfere with the use of the fire extinguisher.

- C. Fire extinguishers must comply with State Fire Codes.

2. First-Aid Kit:

- A. Bus shall have a removable, moisture proof and dust-proof first-aid kit mounted with a separate bracket in an accessible place in driver's compartment. This place shall be marked to indicate its location.

B. Contents shall include:

- 2 1" x 2 1/2 yards adhesive tape rolls
- 24 sterile gauze pads 3" x 3"
- 10 3/4" x 3" adhesive bandages
- 8 2" bandage compress
- 100 3" bandage compress
- 2 2" x 6" sterile gauze roller bandages
- 2 non-sterile triangular bandages approximately 40" x 36" x 54" with 2 safety pins
- 3 sterile gauze pads 36" x 36"
- 3 sterile eye pads
- 1 pair rounded-end scissors
- 1 pair latex gloves
- 1 mouth-to-mouth airway

3. Body Fluid Clean-up Kit:

- A. Each bus shall have a removable and moisture proof body fluid clean-up kit. It shall be properly mounted and identified as a body fluid clean-up kit. Must meet OSHA regulations.

4. Warning Devices:

- A. Each school bus shall contain at least three (3) reflectorized triangle road warning devices mounted in an accessible place in the driver's compartment or outside storage compartment. The mounting location in Type A vehicles is optional. These devices must meet requirements in FMVSS 125.

Fire Suppression (Optional)

When a fire suppression system is used, nozzles for suppression systems shall be located in the engine compartment, under the bus, in the electrical panel, or under the dash, but shall not be located in the passenger compartment. The system must include a light or buzzer to alert the driver that the system has been activated.

Floor and Floor Coverings

1. The floor in the underseat area, including the tops of the wheel housing, driver's compartment and toe board, shall be covered with a rubber floor covering or equivalent, having a minimum overall thickness of 1/8 inch.
2. The floor covering in the aisle shall be of aisle-type rubber or equivalent, wear resistant, and ribbed. The minimum overall thickness shall be 3/16 inch measured from tops of ribs.
3. The floor covering must be permanently bonded to the floor and must not crack when subjected to sudden changes in temperature. Bonding or adhesive material shall be waterproof and shall be of a type recommended by the manufacturer of the floor-covering material. All seams must be sealed with waterproof sealer.
4. For Type B, C and D school buses, the manufacturer shall provide a screw-down plate to access fuel tank sending unit that is secured and insulated. The plate shall be mounted so that access is readily available to repair personnel and so that the floor covering is not disturbed during the repair process.
5. The floor shall be of metal or alloy at least equal in strength to 14-gauge prime commercial quality steel and so constructed that exhaust gases cannot enter the passenger compartment.
6. All closures between the bus body and the engine compartment shall be fitted with gas-tight gaskets and pedal openings shall be closed bellows type, gas-tight boots.

7. There shall be a plate, of adequate size, provided to allow for transmission access or service.

Handrail(s)

At least one handrail shall be installed. The handrail(s) shall assist passengers during entry or exit, and shall be designed to prevent entanglement as evidenced by the passage of the NHTSA string and nut test.

Heaters

1. The heating system shall be capable of maintaining the temperature throughout the bus of not less than 55 degrees Fahrenheit during average minimum January temperatures as established by the U. S. Department of Commerce, Weather Bureau, for the area in which the vehicle is to be operated. Shall be capable of defrosting the total windshield area and the service door glass within thirty minutes after initial start with engine at idle speed. The system shall exceed SAE standards J-381 and J-382 performance requirements. **Fuel-fired auxiliary heaters will not be allowed.**

Heater performance shall be measured by the following:

A temperature measurement shall be taken at three locations within the body. These locations to be over the center aisle, thirty-six inches above the floor. The first location is to be thirty-nine inches from the windshield; the second location midpoint of the passenger compartment and the third will be thirty-nine inches from the rear emergency door.

After soaking the bus at twenty degrees F. for fifteen (15) hours, the bus will be started and after thirty (30) minutes, the temperature at each measuring point shall be fifty-five (55) degrees F.

2. If only one heater is used, it shall be a fresh-air or combination fresh-air and recirculation type.
3. If more than one heater is used, additional heaters shall be a recirculating-air type.
4. All heaters installed by body manufacturers shall bear a name plate that shall indicate the heater rating in accordance with SBMI Standard No. 001, with said plate to be affixed by the heater manufacturer which shall constitute certification that the heater performance is as shown on the plate.
5. Heater hoses shall be adequately supported to guard against excessive wear due to vibration. The hoses shall not dangle or rub against the chassis or sharp edges and shall not interfere with or restrict the operation of any engine function. Heater hoses shall conform to the Society of Automotive Engineers' Standard J20c.

Heater lines on the interior of the bus shall be shielded to prevent scalding of the driver or passengers.

6. Each hot water system installed by a body manufacturer shall include one shut-off valve in the pressure line and one shut-off valve in the return line with both valves at or near the engine in an accessible location.
7. There shall be a water flow-regulating valve, or an electronic valve actuator, installed in the pressure line for convenient operation by the driver while seated.
8. Accessible bleeder valves shall be installed in an appropriate place in the return lines of body company-installed heaters to remove air from the heater lines.
9. Access panels shall be provided to make heater motors, cores, and fans readily accessible for service. An outside access panel may be provided for the driver's heater.

Hinges

All exterior metal door hinges which do not have stainless steel, brass, or nonmetallic hinge pins or other designs that prevent corrosion shall be designed to allow lubrication to be channeled to the center 75% of each hinge loop without disassembly.

Identification

1. School bus bodies shall bear the words, **SCHOOL BUS**, in eight-inch black letters on National School Bus Yellow, on the front and back of the bus (lettering between flasher lights). *(See page 51 for Multifunctional School Activity Bus identification requirements.)* The name of the school system shall be on each side of the bus in *at least* 5-inch, black standard, unshaded letters. Lettering shall conform to "Series B" of Standard Alphabets for Highway Signs. Each bus shall be numbered on both sides, left front bumper, and the rear before being put into service. Bumper numbers may be white or yellow. An agreement between manufacturer and purchaser shall be reached at time order is placed as to who will put the numbers on the buses. Any other numbering shall be optional.
2. Only signs and lettering approved by state law or regulation, limited to the name of the owner or operator and any marking necessary for identification, shall appear on the bus.
3. *School bus bodies shall display a high quality 6"x 9" warning sticker on permanent, adhesive, vinyl, bumper-sticker material. To increase visibility, this sticker shall be mounted just under the first or second rub rail at left side of the passenger entrance door. This sticker shall be worded as follows:*

UNAUTHORIZED ENTRY ILLEGAL

Any person who attempts to enter a school bus without prior authorization of the driver or other appropriate school official and refuses to leave will be subject to prosecution that may result in fines of up to \$2,000 and up to one year in jail.

Alabama Code Sections 13A-10-2, 13A-7-4

4. Driver Alert Transpec Model 7500 or prior approved equal electronic signage warning traffic when the school bus stops to load or unload students and at railway grade crossings is required.

Inside Height

The inside body height shall be 72 inches or more, measured metal to metal, at any point on the longitudinal center line from the front vertical bow to the rear vertical bow. The inside body height of Type A buses shall be 62 inches or more.

Insulation

1. Ceilings and walls shall be insulated with proper material to deaden sound and reduce vibration to a minimum. If thermal insulation is specified, it shall be fire-resistant and approved by Underwriters Laboratories, Inc. If buses are equipped with air conditioning, walls and ceilings must be insulated to improve air conditioner efficiency.
2. If floor insulation is required, it shall be either 5-ply nominal 19/32 inches thick plywood, or a material of equal or greater strength and insulation R value, and it will equal or exceed properties of exterior-type softwood plywood, C-D Grade as specified in standard issued by U. S. Department of Commerce. When plywood is used, all exposed edges shall be sealed.

Interior

1. The interior of the bus shall be free of all unnecessary projections, which include luggage racks and attendant handrails, likely to cause injury. This standard requires inner lining on ceilings and walls. If the ceiling is constructed to contain lapped joints, the forward panel shall be lapped by the rear panel and exposed edges shall be beaded, hemmed, flanged, or otherwise treated to minimize sharp edges.
2. The driver's area forward of the foremost padded barriers will permit the mounting of required safety equipment and vehicle operation equipment.
3. Every school bus shall be constructed so that the noise level taken at the ear of the occupant nearest to the primary vehicle noise source shall not exceed 85 dbA when tested.

4. Any added equipment shall be flush mounted with the exception of the video system.

Lamps and Signals

1. Interior lamps shall be provided which an adequately illuminated aisle and step well. Step well lights shall be illuminated by a service door operated switch, to illuminate only when headlights and clearance lights are on and the service door is opened.
2. *Clearance lamps shall automatically illuminate when the headlights are in the "on" position.*
3. L.E.D. lighting may be used as an alternative to conventional lighting in all lamps and signals except headlamps.
4. Definition--School bus alternately flashing red and amber signal lamps are lamps mounted at the same horizontal level, intended to identify the vehicle as a school bus and to inform other users of the highway that such vehicle is preparing to stop, or is stopped, on the roadway to take on or to discharge schoolchildren.
 - A. Buses shall be equipped with two red lamps and two amber lamps at the rear of the vehicle and two red lamps and two amber lamps at the front of the vehicle. One amber lamp shall be located near each red signal lamp at the same level, but closer to the vertical centerline of the bus.
 - B. The signaling system, including red and amber signal lamps and a stop arm with alternating flashing lamps, shall be so designed and wired as to have the following characteristics:
 - (1) When the entrance door is closed, a manual push button may be depressed and the amber pilot light and amber warning lights will flash.
 - (2) When the entrance door is opened, the amber pilot and amber warning lights will go off, and the red pilot and red warning lights will flash; also, the stop arm will be extended and lights on the stop arm will flash.
 - (3) On closing the entrance door, all lights will go out and the stop arm retract automatically.
 - (4) If the entrance door is opened without depressing the manual push button, no lights will flash, nor will the stop arm be extended.
 - C. The area around the lenses of alternately flashing signal lamps shall have a *readily visible black border for contrast purposes*. Hoods/guards may be provided over front and rear amber warning lights and red warning lights.

5. Bus body shall be equipped with amber rear turn signal lamps at least seven inches in diameter, or if in a shape other than round, a minimum of 38 square inches of illuminated area. These signal lamps must be connected to the chassis hazard warning switch to cause simultaneous flashing of signal lamps when needed as a vehicular traffic hazard warning.

Rear directional lights shall be mounted not more than 15 inches from the plane of the side of the body, and not more than 14 inches below the glass in the rear of the body. Buses shall be equipped with two red, brake/tail combination lights at least seven inches in diameter, or if in a shape other than round a minimum of 38 square inches of illuminated area and shall be mounted on the rear of the bus just inside the turn signal lamps. Type A conversion vehicle lamps must be 21 square inches in the lens area. Two combination lamps with a minimum diameter of four inches, or if a shape other than round, a minimum 12 square inches of illuminated area shall be placed on the rear of the body between the beltline and the floor line. The rear license plate lamp may be combined with one lower tail lamp. Stop lamps shall be activated by the service brakes and shall emit a steady light when illuminated. In addition to these requirements, all lamps and signals shall comply with applicable SAE specifications.

- A. All Type C and D buses shall have side turn indicators on both sides located within six inches of the floor line.

6. On all buses equipped with a monitor for the front and rear lamps of the school bus, the monitor shall be mounted in full view of the driver. If the full circuit current passes through the monitor, each circuit shall be protected by a fuse or circuit breakers or other equivalent technology against any short circuit or intermittent shorts.
7. A white flashing strobe light shall be installed on the roof of a school bus not to exceed 1/3 the body length forward from the rear of the roof edge. This light shall have a single white lens emitting light 360 degrees around its vertical axis and may not extend above the roof more than the maximum legal height. A manual switch and a pilot light of low intensity must be included to indicate when the light is in operation. The pilot light shall be incorporated into the switch.
8. If alternating headlights are used (i.e., wig-wag), they must operate in conjunction with the red overhead flashers and stop arm.

Metal Treatment

1. All metal used in construction of a bus body shall be zinc-coated or aluminum-coated or treated by an equivalent process before the bus is constructed. Included are such items as structural members, inside and outside panels, door panels and floor sills. Excluded are such items as door handles, grab handles, interior decorative parts and other interior plated parts.

2. In addition to the above requirements, all metal parts that will be painted shall be chemically cleaned, etched, zinc-phosphate-coat and zinc-chrome or epoxy primed or conditioned by equivalent process.
3. 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, unvented or undrained areas and surfaces subjected to abrasion during vehicle operation.
4. As evidence that the above requirements have been met, samples of materials and sections used in construction of the bus body, when subjected to 1,000-hour salt spray test as provided for in latest revision of ASTM Standard B-117 "Standard Method of Salt Spray (Fog) Testing" shall not lose more than 10 percent of its material by weight.

Mirrors

1. Interior mirrors shall be either clear laminated glass or clear view glass bonded to a backing, which retains the glass in the event of breakage. Mirrors shall have rounded corners and protected edges. Type A buses shall have a minimum of a 6" x 16" mirror and Type B, C, and D buses shall have a minimum of a 6" x 30" mirror. It shall be securely attached on the windshield header and so located as to give the driver a clear view of the entire interior of the bus and the road behind.
2. Each school bus shall be equipped with a system of exterior mirrors as defined in FMVSS 111.
 - A. Rear vision mirrors shall be capable of providing a view along the left and right sides of the vehicle which will provide the driver with a view of the rear tires at ground level, a minimum distance of 200 feet to the rear of the bus and at least 12 feet perpendicular to the side of the bus at a distance of 32 feet back from the front bumper.
 - B. The crossview mirror system shall provide the driver with indirect vision of an area at ground level from the front bumper forward and the entire width of the bus to a point where the driver can see by direct vision. The crossview system shall also provide the driver with direct vision of the area at ground level around the left and right front corners of the bus to include the tires and service entrance on all types of buses to a point where it overlaps with the rear vision mirror system. A metal reinforcement plate shall be installed under the hood area of fiberglass hoods in order to reinforce crossview mirror mounting base area.
 - C. This system of mirrors shall be easily adjustable but be rigidly braced so as to reduce vibration.
3. *Heated and/or remote controlled external, rearview mirrors may be used.*

Mounting

1. The chassis frames shall support the rear body cross member. The bus body shall be attached to the chassis frame at each main floor sill, except where chassis components interfere, in such a manner as to prevent shifting or separation of the body from the chassis under severe operating conditions.
2. Insulation material shall be placed at all contact points between the body and chassis frame on Types A, B, C and D buses, and shall be so attached to the chassis frame or body that it will not move under severe operating conditions.

Noise Suppression Switch

There shall be a manual noise suppression switch installed in the control panel. The switch shall be labeled and alternately colored. This switch shall be an on/off-type (not momentary) that deactivates all body equipment that produces noise including at least the am/fm radio, heaters, air conditioners, fans and defrosters. This switch shall not deactivate safety systems such as windshield wipers, lighting or warning systems. For Type A buses, all radios or communication devices shall be ordered as a body accessory and must be wired thru the noise suppression switch.

Overall Length

The overall length of the bus shall not exceed 45 feet excluding accessories.

Overall Width

The overall width of the bus shall not exceed 102 inches excluding accessories.

Public Address System

Buses may be equipped with a public address system having interior and exterior speakers. Interior speakers shall be flush mounted with bulkhead. *No internal speakers other than the driver's communication systems may be installed within four feet of the driver's seat back in its rearmost, upright position.*

Retroreflective Material

1. The front and/or rear bumper may be marked diagonally 45 degrees down to the centerline of the pavement with 2" x 1/4" wide strips of non-contrasting retroreflective material.
2. The rear of the bus body shall be marked with strips of retroreflective National School Bus Yellow (NSBY) material to outline the perimeter of the back of the bus using material which conforms with the requirements of FMVSS 571.131 (Table I). The perimeter marking of rear emergency exits per FMVSS 217 and/or the use of retroreflective SCHOOL BUS signs partially accomplish the objective of this requirement. To complete the perimeter marking of the back of the bus, strips of at least one-inch retroreflective NSBY material shall be applied

horizontally above the rear windows and above the rear bumper, extending from the rear emergency exit perimeter marking outward to the left and rear corners of the bus. Vertical strips shall be applied at the corners connecting these horizontal strips.

3. **SCHOOL BUS** signs, if not of a lighted design, shall be marked with *retroreflective* NSBY material comprising a background for lettering of the front and/or rear **SCHOOL BUS** signs.
4. The sides of the bus body shall be marked with *retroreflective* NSBY material at least one inch in width, extending the length of the bus body and located (vertically) between the floor line and the belt line.

NOTE: Reflectivity of the stop signal arm is to be addressed under the Stop Signal Arm Section. Signs, if used, placed on the rear of the bus relating to school bus flashing signal lamps or railroad stop procedure may be of a *retroreflective* material [as specified by each state].

Rub Rails

1. There shall be one rub rail located on each side of the bus approximately at seat level which shall extend from the rear side of the entrance door completely around the bus body (except emergency door *or any maintenance access door*) to a point of curvature near the outside cowl on the left side.
2. There shall be one additional rub rail located approximately at the floor line which shall cover the same longitudinal area as the upper rub rail, except at the wheel housing, and shall extend only to radii of the right and left rear corners.
3. *Rub rails above the floor line* shall be attached at each body post and all other upright structural members.
4. *Each* rub rail shall be 4 inches or more in width in their finished form, shall be of 16-gauge *metal* or *other* suitable material of equivalent strength, *suitable to protect body side panels from damage*. *Rub rails* shall be constructed in a corrugated or ribbed fashion.
5. Rub rails shall be applied to the outside of the body or outside body posts. Pressed-in or snap-on rub rails do not satisfy this requirement. For Type A1 vehicles using a chassis manufacturer's body, or for Types A2, B, C, and D buses using rear luggage or rear engine compartments, rub rails need not extend around rear corners.
6. *The bottom edge of the body side skirts shall be stiffened by application of a rub rail, or the edge may be stiffened by providing a flange or other stiffeners.*

Seat Belt for Driver

1. The driver's seat shall be equipped with the seat belt anchored to the floor, housed in scabbard and equipped with an emergency locking retractor (one side only). The driver's seat shall be equipped with a Type II occupant protection (lap and shoulder belt). Adjustability of the mounting point for the driver's seat belt pillar loop shall be provided to accommodate all heights and weights of bus drivers without interference with the driver's face or neck. The requirements of FMVSS 209 and 210 shall be met. *Integrated seat belts in the driver's seat may be used at the discretion of the local school system.*
2. Each bus shall contain at least one belt cutter properly secured in a location within reach of the driver while belted into the driver's seat. The belt cutter shall be durable, designed to eliminate the possibility of the operator or others being cut during use, and must have a full hand-grip.

Seats and Crash Barriers

1. Seats shall be spaced to obtain a minimum of 24-inch hip-to-knee room measured horizontally at the seat cushion level at the transverse centerline of the seat. In making this measurement from the back of the seat cushion to the back of the seat or barrier in front, upholstery may be placed against padding both forward and rear but padding may not be compressed. Greater seat spacing may be specified on local bids not to exceed the maximum allowable per FMVSS 222.
2. In determining seating capacity of standard school buses, the allowable average rump width shall be 13 inches where a 3-3 seating plan is used, and thirteen (13) or 15 inches where 3-2 seating plan is used on specially-equipped buses.
3. All seats shall be bench style, forward facing and have a minimum depth of 15 inches. No transit or activity seat will be used. There shall be no armrest on student seats. No bus shall be equipped with jump seats or portable seats.
4. All seat frames attached to the seat rail shall be fastened with two (2) bolts, washers and nuts or flange-headed nuts. Each seat leg shall be secured to the floor by a minimum of two (2) bolts, washers and nuts. Flange-head nuts may be used in lieu of nuts and washers, or seats may be track-mounted in conformance with FMVSS 222. If track seating is installed, the manufacturer shall supply minimum and maximum seat spacing dimensions applicable to the bus, which comply with FMVSS 222. This information shall be on a label permanently affixed to the bus.
5. The forward most pupil seat on the right side of the bus shall be located so as not to interfere with the driver's vision, not farther forward than the barrier behind the driver or the rear of the driver's seat when adjusted to its rear-most position.
6. All seats and backs shall be a standard color unless changed by purchaser. Seat and back cushions of all seats shall be designed to safely support the designated

number of passengers under normal road conditions encountered in school-bus service. Coverings of seat cushions shall be of a material having 42-ounce finished weight, 54-inch width, and finished vinyl coating of 1.06 broken twill or approved equal by presenting independent laboratory reports for approval.

7. The driver seat shall be of the high back, *air or mechanical suspension, box pedestal-type* with a minimum seat back adjustment of 15 degrees and with a head restraint to accommodate a 95 percentile adult male (95 percentile adult male as defined in FMVSS 208). The driver's seat shall be secured with nuts, bolts, and washers or flanged-headed nuts. The driver's seat shall have a minimum distance between the steering wheel and seatback of not less than eleven inches, with a minimum aft adjustment of six inches. The seat shall be contoured with adequate padding and support on the sides and shall have a cloth cover. It shall be designed to provide lumbar support and shall be positioned on the centerline of the steering wheel.
8. All restraining barriers and passenger seats shall be constructed with a materials that meets the criteria contained in the School Bus Seat Upholstery Fire Block Test.
9. A driver storage pouch shall be provided on the front of the barrier behind driver's seat. This pouch shall be fire retardant and the same color as the bus seats.
10. Crash barriers shall be placed behind the driver's seat and step well. An aluminized courtesy panel on the right side of the bus shall extend to the floor and to the wall. Stanchions are not acceptable.
11. Passenger seats designed to accommodate a child or infant carrier seat shall comply with FMVSS 225. These seats shall be in compliance with NHTSA's "Guideline for the Safe Transportation of Pre-School-age Children in School Buses.

Steering Wheel

See Chassis Standard.

Steps

1. The first step at the service door shall be no less than 10 inches and no more than 14 inches from the ground measured from the *top* of the first step. *Ground clearance shall be no less than 10 inches.*
 - A. Type D vehicles shall have the first step at the service door 12 to 16 inches from the ground measured from the *top* of the first step.
2. The service door entrance shall use a three-step step well. Risers shall be of equal height and depth. When a plywood floor is used on steel, the differential may be increased by the thickness of plywood.

3. Steps shall be enclosed to prevent accumulation of ice and snow.
4. Steps shall not protrude beyond the side bodyline.

Step Treads

1. All steps, excluding the floor line platform area, shall be covered with a 3/16-inch pebble-tread-type, rubber floor covering or other materials equal in wear and abrasion resistance to top grade rubber.
2. The metal back of the tread, a minimum 24-gauge cold roll steel, shall be permanently bonded to ribbed rubber; the grooved design shall be such that said grooves run at 90-degree angles to the long dimension of the step treads.
3. A three-sixteenth-inch ribbed step tread shall have a 1 and 1/2 inch white nosing as an integral piece without any joint.
4. The rubber portion of step treads shall have the following characteristics:
 - A. Special compounding for good abrasion resistance and high coefficient of friction.
 - B. Flexibility so that it can be bent around a 1/2 inch mandrel both at 130 degrees Fahrenheit and 20 degrees Fahrenheit without breaking, cracking, or crazing.
 - C. Show a durometer hardness of 85 to 95.

Stirrup Step

There shall be one stirrup step on all Types B, C, and D buses on each side of the front of the body for use in cleaning the windshield and lamps. There shall be one handle on each side, at least eight inches in length suitably located for the driver to use while cleaning the windshield and lamps. The stirrup steps and the handles shall be of rust-resistant material. Transit buses shall have provisions for cleaning the windshield. Toe eyes in the bumper with a handle(s), above the windshield, are acceptable.

Stop Arm Signal

All stop arm signals shall be of the strobe-type and have high-intensity, *retroreflective* coating. The stop signal - arm(s) shall comply with the requirements of FMVSS 131.

Stop Arm Signal - Rear (Optional)

A rear stop arm is permissible when used in conjunction with the original stop arm. The rear stop arm location on dual stop arm-equipped buses shall be on the left side of the bus, as close as is practical to the left rear corner of the body. *Airlines, if used, must not be readily accessible to students inside or outside of the bus.*

Storage Compartment

A lockable, waterproof, exterior storage compartment shall be located on the bus body on the right side of the bus. The minimum size of the storage compartment shall be 12 inches high, 15 inches deep, and 25 inches wide and shall be marked "storage".

Alternate storage compartment locations should be specified in local school system bid specifications. *For Type A buses unable to meet this requirement, an appropriate waiver must be secured from the Alabama Department of Education, Pupil Transportation Section. If the storage compartment location cannot be on the right side, the alternate location must be approved by the school system during the bid process.*

Sun Shield

Each Type B, C, and D school bus shall have an interior adjustable sun visor with minimum measurements of 6 inches by 30 inches. It shall be installed centered immediately above the windshield and anchored on both ends, and shall be tinted transparent plastic or phlex-o-glass. On all Type A buses the sun shield shall be the manufacturer's standard. An additional sun shield may be added over the left side driver window at option of the local school system.

Tailpipe

See Chassis Standard.

Traction-Assisting Devices

1. Where required or used, sanders shall:
 - A. Be of the hopper cartridge-valve type.
 - B. Have a metal hopper with all interior surfaces treated to prevent condensation of moisture.
 - C. Be of at least 100-pound (grit) capacity.
 - D. Have a cover on the filler opening of the hopper, which screws into place, sealing the unit airtight.
 - E. Have discharge tubes extending to the front of each rear wheel under the fender.
 - F. Have no-clogging discharge tubes with slush-proof, non-freezing rubber nozzles.
 - G. Be operated by an electric switch with a telltale pilot light mounted on the instrument panel.
 - H. Be exclusively driver controlled.
 - I. Have a gauge to indicate the hopper needs refilling when it is down to one quarter full.
2. Automatic traction chains may be installed.

Trash Container and Holding Device

1. Where required or used, the trash container shall:
 - A. Be of fire resistant polyethylene or equivalent material.
 - B. Be no greater than 14-quart capacity.
 - C. Be secured by a holding device that is designed to prevent movement and allow easy removal and replacement.
 - D. Be installed in an accessible location in the driver's compartment, not obstructing passenger use of the service door or access to emergency equipment.

Undercoating

1. The entire underside of the bus body, including floor sections, the cross member and below floor line side panels, shall be coated with rust-proofing the compound for which compound manufacturer has issued notarized certification of compliance to the bus body builder that the compound meets or exceeds all performance and qualitative requirements of paragraph 3.4 of Federal Specification TT-C-250b using modified test procedures for the following requirements*:
 - A. Salt spray resistance-pass modified to 5% salt and 1000 hours.
 - B. Abrasion resistance-pass.
 - C. Fire resistance-pass.

*Test panels are to be prepared in accordance with paragraph 4.6.12 of TT-C-520b with the modified procedure requiring that the test be made on a 48-hour air-cured film at a thickness recommended by the compound manufacturer.

2. The undercoating compound shall be applied with suitable airless or conventional spray equipment to recommend film thickness and shall show no evidence of voids in cured film.

Ventilation

1. Auxiliary fans if installed shall meet the following requirements:
 - A. Fans for left and right sides shall be placed in a location where they can be adjusted for maximum effectiveness and do not obstruct vision to any mirror.
NOTE: All Type A buses may be equipped with one fan.
 - B. Fans shall be a nominal 6" diameter.
 - C. Fan blades shall be covered with a protective cage. Each fan shall be controlled by a separate switch.

2. The body shall be equipped with a suitably controlled ventilating system of sufficient capacity to maintain the proper quantity of air under operating conditions, without having to open windows except in extremely warm weather.
3. A static-type, non-closeable exhaust ventilator shall be installed in the roof.

Video Surveillance Equipment

1. Video equipment may be installed at the discretion of the local school system.
2. While video equipment does not have to be flush mounted, positioning of video surveillance equipment shall not interfere with the safe operation of the bus or student safety. It is recommended that the SDE be contacted prior to the installation of new video equipment.

Wheel Housing

1. The wheel-housing opening shall allow for easy tire removal and service.
2. The wheel housing shall be attached to the floor sheets in such a manner as to prevent any dust, water or fumes from entering the body. The wheel housing shall be constructed of at least 16-gauge steel or other material of equal tensile strength.
3. The inside height of the wheel housing above the floor line shall not exceed 12 inches.
4. The wheel housing shall provide clearance for installation and use of tire chains on single and dual (if so equipped) power-driving wheels.
5. No part of a raised wheel housing shall extend into the emergency door opening.

Windshield and Windows

1. All glass in the windshield, the windows, and doors shall be of approved safety glass so mounted that a permanent mark is visible and of sufficient quality as to prevent distortion of view in any direction.
2. Glass in the windshield shall be heat absorbent, laminated plate. The windshield shall be large enough to permit the driver to see the roadway clearly, shall be slanted to reduce glare, and shall be installed between the front corner posts that are so designed and placed as to afford minimum obstruction to the driver's view of the roadway.
3. All full side windows shall open vertically so as to provide an unobstructed opening of not less than 9 inches high and 22 inches wide, obtained by lowering the window. Windows shall be a split-sash type and so installed as to provide an emergency exit. There shall be no horizontal, transit or activity-style windows in the student compartment.

4. All exposed edges of glass shall meet FMVSS requirements.
5. A tinted and shaded windshield with 73% light transmitted and a six-inch shaded band across the top shall be installed at the factory. Type A-I and A-II buses utilizing the chassis manufacturers one-piece windshield may be equipped with an O.E.M. shade band windshield with a band of approximately 4 inches in height.

Windshield Washers

A windshield washer system shall be provided that will service *the entire wiped surface area*.

Windshield Wipers

1. A windshield wiping system, two speed or variable speed, with an intermittent feature shall be provided. *The wipers shall meet the requirements of FMVSS 104.*
2. The wipers shall be operated by one or more air or electric motors of sufficient power to operate the wipers. Type A-I and A-II buses utilizing the chassis manufacturer's one-piece windshield may be equipped with two wipers driven by either one or two electric motors.

Wiring

1. All wiring shall conform to current standards of the Society of Automotive Engineers.
2. Circuits
 - A. Wiring shall be arranged in circuits as required with each circuit protected by a circuit breaker or *electronic protection device*. A system of color and number coding shall be used and an appropriate identifying diagram shall be provided to the end user along with the wiring diagram provided by the chassis manufacturer. **A system of color and number coding shall be used on buses. The following body interconnecting circuits shall be color-coded as noted:**

<u>Function</u>	<u>Color</u>
Left Rear Directional Light	Yellow
Right Rear Directional Light	Dark Green
Stoplights	Red
Back-up Lights	Blue
Taillights	Brown
Ground	White
Ignition Feed, Primary Feed	Black

The color of cables shall correspond to SAE J1128.

- B. Wiring shall be arranged in at least six regular circuits as follows:
- (1) Head, tail, stop (brake) and instrument panel lamps.
 - (2) Clearance and step well lamps. The step well lamp shall be actuated when the service door is opened.
 - (3) Dome lamp.
 - (4) Ignition and emergency exits signal.
 - (5) Turn signal lamps.
 - (6) Alternately flashing signal lamps.
- C. Any of the above combination circuits may be subdivided into additional independent circuits.
- D. Each heater and defroster shall have its own circuit breakers or other equivalent technology.
- E. Whenever possible, all other electrical functions (such as sanders and electric-type windshield wipers) shall be provided with independent and properly protected circuits.
- F. Each body circuit shall be coded by number or letter on a diagram of circuits and shall be attached to the body in readily accessible location.
- G. *There shall be a manual noise suppression switch installed in the control panel. The switch shall be labeled and alternately colored. This switch shall be an on/off-type that deactivates all body equipment that produces noise including at least the am/fm radio, heaters, air conditioners, fans and defrosters. This switch shall not deactivate safety systems such as windshield wipers, lighting or warning systems. Noise suppression switch on Type AI buses shall be limited to bus body accessories.*
3. The entire electrical system of the body shall be designed for the same voltage as the chassis on which the body is mounted.
 4. All wiring shall have an amperage capacity equal to or exceeding the designed load. All wiring splices are to be done at an accessible location and noted as splices on the wiring diagram.
 5. A body-wiring diagram of easily readable size shall be furnished with each bus body or affixed in an area convenient to the electrical accessory control panel.

6. The body power wire shall be attached to a special terminal on the chassis.
7. All wires passing through metal openings shall be protected by a grommet.
8. Wires and tubing shall be enclosed within body panels.

SECTION IV – (SPECIAL NEEDS) SCHOOL BUS STANDARDS

Introduction

Equipping buses to accommodate students with special needs is discretionary depending upon the needs of the passengers. While one bus may be fitted with a lift, another may have seat belts installed to secure child seats. Buses so equipped are not to be considered a separate class of school bus, but simply a regular school bus, which is equipped for special accommodations.

The specifications in this section are intended to be supplementary to specifications in the chassis and body sections. In general, specially equipped buses shall meet all the requirements of the preceding sections plus those listed in this section. It is recognized by the entire industry that the field of special transportation is characterized by varied needs for individual cases and by a rapidly emerging technology for meeting those needs. A flexible, “common sense”, approach to the adoption and enforcement of specifications for these vehicle, therefore, is prudent.

By federal regulation, buses, including school buses, are defined as vehicles designed to carry eleven or more (passengers including the driver). Vehicles designed with 10 or fewer passenger positions (including the driver) cannot be certified as buses. For this reason, the federal vehicle classification Multipurpose Passenger Vehicle, or MPV, must be used by manufacturers for these vehicles in lieu of the School Bus. In determining passenger capacity, wheelchair positions are counted as passenger positions. This classification system, while requiring compliance with a less stringent set of Federal Standards for MPV’s does not preclude state or local agencies or these *specifications* from requiring compliance of school bus-type MPV’s with the more stringent Federal Standards for school buses.

The following standards address modifications as they pertain to school buses that, with a standard seating arrangement prior to modification, would accommodate more than 10 persons. If by addition of a power lift, mobile seating device positions or other modifications, the capacity is reduced such that vehicles become MPV’s, the intent of these standards is to have these vehicles be required to meet the same standards they would have had to meet prior to such modifications, and such MPV’s are included in all references to school buses and requirements for school buses which follow:

Definition – Specially Equipped School Bus

A specially equipped school bus is any school bus that is designed, equipped, or modified to accommodate students with special needs.

General Requirements

1. School buses designed for transporting students with special transportation needs shall comply with *these specifications* and with FMVSS applicable to their GVWR category.

2. Any school bus to be used for the transportation of children who are confined to a wheelchair or other mobile positioning device, or who require life support equipment which prohibits use of the regular service entrance, shall be equipped with a power lift, unless a ramp is needed for unusual circumstances related to passenger needs.

Air Conditioning

Special needs buses may be equipped with air conditioning if the local education agency (LEA) desires. (See page 14)

Aisles

All school buses equipped with a power lift shall provide a minimum 30-inch aisle leading from wheelchair position to at least one emergency door and the lift area.

Communication System

*Each special needs bus shall be equipped with a two-way, voice communication system capable of providing communication with the operational base. Where technologically feasible, the communication system shall also communicate with 911 operators. CB radio systems will not meet this requirement. **It is the responsibility of the local school system to comply with this specification.***

Crash Barriers

1. Crash barrier shall be placed between the lift and any seat position (bench seat or wheelchair position). Stanchions are not acceptable.
2. There shall be a padded crash barrier approximately 8 inches in front of the forward edge of the seat cushion of all passenger seats that do not have another seat approximately 27 inches in front of them. There shall be a padded crash barrier or seat in front of any wheelchair position unless it is contiguous with and behind another wheelchair position. The forward-most barrier on both sides of the bus shall have a full-width, aluminized courtesy panel extending to the floor.

Evacuation Blanket

A fire-retardant, evacuation blanket, Tie Tech Evac-Aide Part # 1003, or prior approved equal, and storage pouch shall be provided. The location to secure the evacuation blanket shall be determined by the purchaser at the time of the bid.

Glazing

Tinted glazing may be installed in all doors, windows and windshield consistent with federal, state, and local regulations.

Identification

Buses with power lifts used for transporting physically handicapped students shall display three universal handicapped symbols located below the windowpane. Such emblems shall be white on blue background, shall not exceed 12 inches in size, and shall be of a high-intensity *retro*reflectorized material meeting U. S. Department of

Transportation FHWA FP-85 Standards. Symbols shall be located on the lift door, the rear of the bus and the front bumper.

Passenger Capacity Rating

In determining the passenger capacity of a school bus for purposes other than actual passenger load (i.e., vehicle classification, or various billing/reimbursement models), any location in a school bus intended for securing an occupied wheelchair/mobility aid during vehicle operations may be regarded as four designated seating positions. Similarly, each lift area may be regarded as four designated seating positions.

Power Lift

1. The option shall be provided to the local purchaser to have the lift located either in front of or behind the rear wheels, on the right side of the bus, but confined within the bus body when not extended.
2. All lifts shall be fully automatic with sufficient clearances to permit a wheelchair or other mobility user to reach a securement location.
3. The design load of the lift shall be at least 600 pounds. Working parts, such as cables, pulleys, and shafts, which can be expected to wear, and upon which the lift depends for support of the load, shall have a safety factor of at least 6 (six), based on the ultimate strength of the material. Non-working parts, such as the platform, frame, and attachment hardware, which would not be expected to wear, shall have a safety factor of at least 3 (three), based on the ultimate strength of the material.
4. The lifting mechanism and platform shall be able to lift a minimum of 800 pounds.
5. Controls shall be provided that enable the operator to activate the lift mechanism from either inside or outside the bus. The controls shall be interlocked with the vehicle brakes, transmission, or door, as required by FMVSS 403 and 404. The lift shall deploy to all levels (i.e., ground, curb, and intermediate positions) normally encountered in the operating environment. Where provided, each control for deploying, lowering, raising, and stowing the lift and lowering the roll-off barrier shall be of a momentary contact type requiring continuous manual pressure by the operator and shall not allow improper lift sequencing when the lift platform is occupied. The controls shall allow reversal of the lift operation sequence, such as raising or lowering a platform that is part way down, without allowing an occupied platform to fold or retract into the stowed position.
6. The lift shall incorporate an emergency method of deploying, lowering to ground level with a lift occupant, and raising and stowing the empty lift if the power to the lift fails. No emergency method, manual or otherwise, shall be capable of being operated in a manner that could be hazardous to the lift occupant or to the operator when operated according to manufacturer's instructions and shall not permit the platform to be stowed or folded when occupied. No manual emergency operation

shall require more than 2 (two) minutes to lower an occupied wheelchair to ground level.

7. Platforms stowed in a vertical position, and deployed platforms when occupied, shall have provisions to prevent their deploying, falling, or folding any faster than 12 inches per second or their dropping of an occupant in the event of a single failure of any load carrying component.
8. The lift platform shall be equipped with barriers to prevent any of the wheels of a wheelchair or mobility aid from rolling off the platform during its operation. A movable barrier or inherent design feature shall prevent a wheelchair or mobility aid from rolling off the edge closest to the vehicle until the platform is in its fully raised position. Each side of the lift platform, which extends beyond the vehicle in its raised position, shall have a barrier a minimum 1 and 1/2 inches high. Such barriers shall not interfere with maneuvering into or out of the aisle. The loading-edge barrier (outer barrier), which functions as a loading ramp when the lift is at ground level, shall be sufficient when raised or closed, or a supplementary system shall be provided, to prevent a power wheelchair or mobility aid from riding over or defeating it. The outer barrier of the lift shall automatically raise or close, or a supplementary system shall automatically engage, and remain raised, closed, or engaged at all times that the platform is more than 3 inches above the roadway or sidewalk and the platform is occupied. Alternatively, a barrier or system may be raised, lowered, opened, closed, engaged, or disengaged by the lift operator, provided an interlock or inherent design feature prevents the lift from rising unless the barrier is raised or closed or the supplementary system is engaged.
9. The platform surface shall be free of any protrusions over 1/4 inch high and shall be slip resistant. The platform shall have a minimum clear width of 28 and 1/2 inches at the platform, a minimum clear width of 30 inches measured from 2 inches above the platform surface to 30 inches above the surface of the platform, and a minimum clear length of 48 inches measured from 2 inches above the surface of the platform to 30 inches above the surface of the platform.
10. Any openings between the platform surface and the raised barriers shall not exceed 5/8 inches in width. When the platform is at vehicle floor height with the inner barrier (if applicable) down or retracted, gaps between the forward lift platform edge and the vehicle floor shall not exceed 1/2 inches horizontally and 5/8 inches vertically.
11. The outboard entrance ramp or loading-edge barrier used as a ramp and the transition plate from the inboard edge of the platform to the vehicle floor shall not exceed a slope of 1:8, measured on level ground, for a maximum rise of three inches, and the transition from roadway or sidewalk to ramp may be vertical without edge treatment up to 1/4 inches.

Thresholds between 1/4 inch and 1/2 inch high shall be beveled with a slope no greater than 1:2.

12. The lift platform (not including the entrance ramp) shall not deflect more than three degrees (exclusive of vehicle roll or pitch) in any direction between its unloaded position and its position when loaded with 60 pounds applied through a 26" by 26" test pallet at the centroid of the platform.
13. No part of the platform shall move at a rate exceeding 6 inches per second during lowering and lifting an occupant, and shall not exceed 12 inches per second during deploying or stowing. This requirement does not apply to the deployment or stowage cycles of lifts that are manually deployed or stowed. The maximum platform horizontal and vertical acceleration when occupied shall be 0.3 g.
14. The lift shall permit both inboard and outboard facing of wheelchair and mobility aid users.
15. Lifts shall accommodate persons using walkers, crutches, canes or braces, or who otherwise have difficulty using steps. The platform may be marked to indicate a preferred standing position.
16. Platforms on lifts shall be equipped with handrails on two sides, which move in tandem with the lift, and which shall be graspable and provide support to standees throughout the entire lift operation. Handrails shall have a usable component at least 8 inches long with the lowest portion a minimum 30 inches above the platform and the highest portion a maximum 38 inches above the platform. The handrails shall be capable of withstanding a force of 100 pounds concentrated at any point on the handrail without permanent deformation of the rail or its supporting structure. The handrails shall have a cross-sectional diameter between 1 and 1/4 inches and 1 and 1/2 inches or shall provide an equivalent grasping surface, and have eased edges with corner radii of not less than 1/8 inch. Handrails shall be placed to provide a minimum 1 and 1/2" knuckle clearance from the nearest adjacent surface. Handrails shall not interfere with wheelchair or mobility aid maneuverability when entering or leaving the vehicle. Any wheelchair frame utilizing a horizontal overhead support shall have padding at least 1" in thickness extending the full width of support.
17. A re-settable circuit breakers or other equivalent technology shall be installed between the power source and the lift motor if electrical power is used. It shall be located as close to the power source as possible, but not within the passenger/driver compartment.
18. Lift design shall prevent excessive pressure that could damage the lift system when the platform is fully lowered or raised, or that could jack the vehicle.

19. The following information shall be provided with each vehicle equipped with a lift:
 - A. A phone number where information can be obtained about installation, repair, and parts. (Detailed written instructions and a parts list shall be available upon request.)
 - B. Detailed instructions regarding use of the lift and readily visible when the lift door is open, including a diagram showing the proper placement and positioning of wheelchair/mobility aids on lift.
20. The lift manufacturer shall make available training materials to ensure the proper use and maintenance of the lift. These may include instructional videos, classroom curriculum, system test results, or other related materials.
21. Each lift shall be permanently and legibly marked or incorporate a non-removable label or tag which states that it conforms to all applicable requirements of the current National Standards for School Buses. In addition, the lift manufacturer, or an authorized representative, upon request of the original titled purchaser, shall provide a Notarized Certificate of Conformance, either original or photocopied, which states that the lift system meets all the applicable requirements of the current National Standards for School Buses.

Ramp

Emergency ramps may be used with prior approval from the SDE.

Regular Service Entrance

1. Steps
 - A. The first step at the service door shall be not less than 10 inches and not more than 14 inches from the ground when measured from the *top* of the step based on standard chassis specifications.
 - B. Type D vehicles shall have the first step at the service door 12 to 16 inches from the ground.
2. The service door entrance shall use a three-step step well. Risers shall be of equal height and depth. When a plywood floor is used on steel, the differential may be increased by thickness of plywood.
3. Steps shall be enclosed to prevent accumulation of ice and snow.
4. Steps shall not protrude beyond the side bodyline.
 - A. A grab handle not less than 20 inches in length shall be provided in an unobstructed location inside the doorway.

Restraining Devices

1. On power-lift equipped vehicles, seat frames may be equipped with attachments or devices to which belts, restraining harnesses or other devices may be attached. Attachment framework or anchorage devices, if installed, shall conform to FMVSS 210.
2. Seat belt assemblies may be installed on special needs buses, shall conform to FMVSS 209. Seat belt assemblies shall be color-coded, installed by the manufacturer, and must conform to FMVSS 209.
3. Child restraint systems, which are used to facilitate the transportation of children who in other modes of transportation would be required to use a child, infant, or booster seat, shall conform to FMVSS 213 and 222.
4. *Passenger seats designed to accommodate a child or infant carrier seat shall comply with FMVSS 225. These seats shall be in compliance with NHTSA's "Guideline for the Safe Transportation of Pre-School-Age Children in School Buses."*

Seating Arrangements

Flexibility in seat spacing to accommodate special circumstances shall be permitted to meet passenger requirements. All seating shall be forward facing.

Securement and Restraint System for Wheelchair/Mobility Aid and Occupant

For purposes of better understanding the various aspects and components of this section, the term securement or phrase securement system is used exclusively in reference to the device(s), which secure the wheelchair/mobility aid. The term restraint or phrase restraint system is used exclusively in reference to the device(s) used to restrain the occupant of the wheelchair/mobility aid. The phrase securement and restraint system is used to refer to the total system, which secures and restrains both the wheelchair/mobility aid and the occupant.

1. Securement and restraint system--general
 - A. The Wheelchair/Mobility Aid Securement and Occupant Restraint System shall be designed, installed, and operated to accommodate passengers in a forward-facing orientation within the bus and shall comply with all applicable requirements of FMVSS 222. Gurney-type devices shall be secured parallel to the side of each bus.
 - B. The securement and restraint system, including the system track, floor plates, pockets, or other anchorages shall be provided by the same manufacturer, or be certified to be compatible by manufacturers of all equipment/systems used.

- C. When a wheelchair/mobility aid securement device and an occupant restraint share a common anchorage, including occupant restraint designs that attach the occupant restraint to the securement device or the wheelchair/mobility aid, the anchorage shall be capable of withstanding the loads of both the securement device and occupant restraint applied simultaneously, in accordance with FMVSS 222 (see Sections 2 and 3 of this section).
- D. When a wheelchair/mobility aid securement device (webbing or strap assembly) is shared with an occupant restraint, the wheelchair/mobility aid securement device (webbing or strap assembly) shall be capable of withstanding a force twice the amount as specified in Section 4.4(a) of FMVSS 209 (see Sections 2 and 3 of this section).
- E. The bus body floor and sidewall structures where the securement and restraint system anchorages are attached shall have equal or greater strength than the load requirements of the system(s) being installed.
- F. The occupant restraint system shall be designed to be attached to the bus body either directly or in combination with the wheelchair/mobility aid securement system, by a method, which prohibits the transfer of weight or force from the wheelchair/mobility aid to the occupant in the event of an impact.
- G. When an occupied wheelchair/mobility aid is secured in accordance with the manufacturer's instructions, the securement and restraint system shall limit the movement of the occupied wheelchair/mobility aid to no more than 2 inches in any direction under normal driving conditions.
- H. The securement and restraint system shall incorporate an identification scheme, which will allow for the easy identification of the various components and their functions. It shall consist of one of the following, or combination thereof:
 - (1) The wheelchair/mobility aid securement (webbing or strap assemblies) and the occupant restraint belt assemblies shall be of contrasting color or color shade.
 - (2) The wheelchair/mobility aid securement device (webbing or strap assemblies) and occupant restraint belt assemblies shall be clearly marked to indicate the proper wheelchair orientation in the vehicle, and the name and location for each device or belt assembly; i.e., front, rear, lap belt, shoulder belt.
- I. All attachment or coupling devices designed to be connected or disconnected frequently shall be accessible and operable without the use of tools or other mechanical assistance.

- J. The securement and restraint system hardware and components shall be free of sharp or jagged areas and shall be of a non-corrosive material or treated to resist corrosion in accordance with Section 4.3(a) of FMVSS 209.
- K. The securement and restraint system shall be located and installed such that when an occupied wheelchair/mobility aid is secured, it does not block access to the lift door or emergency door.
- L. A device for storage of the securement and restraint system may be provided. When the system is not in use, the storage device shall allow for clean storage of the system, shall keep the system securely contained within the passenger compartment, shall provide reasonable protection from vandalism, and shall enable the system to be readily accessed for use.
- M. The entire securement and restraint system, including the storage device, shall meet the flammability standards established in FMVSS 302.
- N. Each securement device (webbing or strap assembly) and restraint belt assembly shall be permanently and legibly marked or incorporate a non-removable label or tag which states that it conforms to all applicable FMVSS requirements. In addition, the system manufacturer, or an authorized representative, upon request by the original titled purchaser, shall provide a notarized Certificate of Conformance, either original or photocopied, which states that the wheelchair/mobility aid securement and occupant restraint system meets all of the requirements as specified in FMVSS 222.
- O. The following information shall be provided with each vehicle equipped with a securement and restraint system:
 - (1) A phone number where information can be obtained about installation, repair, and parts. (Detailed written instructions and a parts list shall be available upon request.)
 - (2) Detailed instructions regarding use, including a diagram showing the proper placement of the wheelchair/mobility aids and positioning of securement devices and occupant restraints, including correct belt angles.
- P. The system manufacturer shall make available training materials to ensure the proper use and maintenance of the wheelchair/mobility aid securement and occupant restraint system. These may include instructional videos, classroom curriculum, system test results, or other related materials.

2. Wheelchair/mobility aid securement system

- A. Each securement system location shall consist of a minimum of four anchorage points. A minimum of two anchorage points shall be located in front of the

wheelchair/mobility aid and a minimum of two anchorage points shall be located in the rear. The securement anchorages shall be attached to the floor of the vehicle and shall not interfere with passenger movement or present any hazardous condition.

- B. Each securement system location shall have a minimum clear floor area of 30" x 48". Additional floor area may be required for some applications. Consultation between the user and the manufacturer is recommended to ensure adequate area is provided.
- C. The securement system shall secure common wheelchair/mobility aids and shall be able to be attached easily by a person having average dexterity and who is familiar with the system and wheelchair/mobility aid.
- D. As installed, each securement anchorage shall be capable of withstanding a minimum force of 3,000 pounds (13,344 Newtons) when applied as specified in FMVSS 222. When more than one securement device share a common anchorage, the anchorage shall be capable of withstanding the force indicated above, multiplied by the number of securement devices sharing that anchorage.
- E. Each securement device, if incorporating webbing or a strap assembly, shall comply with the requirements for Type 1 safety belt systems, in accordance with Sections 4.2, 4.3, and 4.4(a) of FMVSS 209.
- F. The securement system shall secure the wheelchair/mobility aid in such a manner that the attachments or coupling hardware will not become detached when any wheelchair/mobility aid component deforms, when one or more tires deflate, and without intentional operation of a release mechanism (e.g., a spring clip on a securement hook).
- G. Each securement device (webbing or strap assembly) shall be capable of withstanding a minimum force of 2,500 pounds when tested in accordance with FMVSS 209.
- H. Each securement device (webbing or strap assembly) shall provide a means of adjustment of manufacturer's design, to remove slack from the device or assembly.
- I. Each securement device, webbing, or strap assembly shall be of the automatic, retractable type.

3. Occupant restraint system

- A. A Type II-A occupant restraint system, which meets all applicable requirements of FMVSS 209 and 210, shall provide for restraint of the occupant.

- B. The occupant restraint system shall be made of materials, which do not stain, soil, or tear an occupant's clothing, and which are resistant to water damage and fraying.
- C. Each restraint system location shall have not less than one anchorage, of manufacturer's design, for the upper end of the upper torso restraint.
 - (1) The anchorage for each occupant's upper torso restraint shall be capable of withstanding a minimum force of 1,500 pounds (6,672 Newtons) when applied as specified in FMVSS 222.
- D. Each wheelchair/mobility aid location shall have not less than two floor anchorages for the occupant pelvic and the connected upper torso restraint.
 - (1) Each floor anchorage shall be capable of withstanding a minimum force of 3,000 pounds (13,344 Newtons) when applied as specified in FMVSS 222.
 - (2) When more than one occupant restraint share a common anchorage, the anchorage shall be capable of withstanding a minimum force of 3,000 pounds (13,344 Newtons) multiplied by the number of occupant restraints sharing the common anchorage in accordance with FMVSS 222.
- E. Each floor and wall anchorage which secures the occupant restraint to the vehicle and which is not permanently attached, shall be of a "positive latch" design, and shall not allow for any accidental disconnection.

Special Light

Doorways, in which lifts are installed, shall have, lighting as required by FMVSS 403 and 404.

Special Service Entrance

1. Power lift equipped bodies shall have a special service entrance to accommodate the power lift.
2. The special service entrance and door shall be located on the right side of the bus and shall be designed so as not to obstruct the regular service entrance.
3. The opening may extend below the floor through the bottom of the body skirt. If such an opening is used, reinforcements shall be installed at the front and rear of the floor opening to support the floor and give the same strength as other floor openings.
4. A drip molding shall be installed above the opening to effectively divert water from entrance.

5. Door posts and headers from entrance shall be reinforced sufficiently to provide support and strength equivalent to the areas of the side of the bus not used for special service entrance.

Special Service Entrance Doors

1. A single door or double doors may be used for the special service entrance.
2. A single door shall be hinged to the forward side of the entrance unless doing so would obstruct the regular service entrance. If, due to the above condition, the door is hinged to the rearward side of the doorway, the door shall utilize a safety mechanism, which will prevent the door from swinging, open should the primary door latch fail. If double doors are used the system shall be designed to prevent the door(s) from being blown open by the wind resistance created by the forward motion of the bus, and/or incorporate a safety mechanism to provide secondary protection should the primary latching mechanism(s) fail.
3. All doors shall have positive fastening devices to hold doors in the open position.
4. All doors shall be weather sealed on buses with double doors. They shall be so constructed that a flange on the forward door overlaps the edge of the rear door when closed.
5. When manually operated dual doors are provided, the rear door shall have at least a one-point fastening device to the header. The forward-mounted door shall have at least three-point fastening devices. One shall be to the header, one to the floor line of the body, and the other shall be into the rear door. The door and hinge mechanism shall be of a strength that is greater than or equivalent to the emergency exit door.
6. Door materials, panels and structural strength shall be equivalent to the conventional service and emergency doors. Color, rub rail extensions, lettering and other exterior features shall match adjacent sections of the body.
7. Each door shall have windows, set *in a waterproof manner*, which are visually similar in size and location to adjacent non-door windows. Glazing shall be of same type and tinting (if applicable) as standard fixed glass in other body location.
8. Door(s) shall be equipped with a device that will actuate a flashing visible signal located in the driver's compartment when the door(s) is open and ignition is in "on" position.
9. A switch shall be installed so that the lifting mechanism will not operate when the lift platform door(s) is closed.

10. Special service entrance doors shall be equipped with padding at the top edge of the door opening. Pad shall be at least three inches wide and one inch thick and extend the full width of the door opening.

Support Equipment and Accessories

1. Each bus shall contain at least one belt cutter properly secured in a location within reach of the driver while belted into his/her driver's seat. The belt cutter shall be durable, designed to eliminate the possibility of the operator or others being cut during use, and must have a full hand-grip.
2. Special equipment or supplies which are used on the bus for mobility assistance, health support, or safety purposes shall meet any local, federal, or engineering standards which may apply, including proper identification.

Equipment which may be used for these purposes includes, but is not limited to:

- A. Wheelchairs and other mobile seating devices (see section on Securement System for Mobile Seating Devices/Occupant).
 - B. Crutches, walkers, canes, and other ambulating devices.
 - C. Medical support equipment. This may include respiratory devices such as oxygen bottles (which should be no larger than 22 cubic feet for liquid oxygen and 38 cubic feet for compressed gas), or ventilators. Tanks and valves should be located and positioned to protect them from direct sunlight, bus heater vents, or other heat sources. Other equipment may include intravenous, and fluid drainage apparatus. Appropriate medical placarding if needed shall be added by the LEA.
3. All portable equipment and special accessory items, including the equipment listed above, shall be secured at the mounting location to withstand a pulling force of five times the weight of the item, or shall be retained in an enclosed, latched compartment. The compartment shall be capable of withstanding forces applied to its interior equal to five times the weight of its contents without failure to the box's integrity and securement to the bus. Exception: If these standards provide specific requirements for securement of a particular type of equipment, the specific standard shall prevail (i.e., wheelchairs).

Technology and Equipment, New

It is the intent of these specifications to accommodate new technologies and equipment that will better facilitate the transportation of students with special needs. When a new technology, piece of equipment or component is desired to be applied to the school bus it must meet the following criteria:

- A. *The technology, equipment, or component shall not compromise the effectiveness or integrity of any major safety system. (Examples of safety*

systems include, but are not limited to, compartmentalization, the eight-lamp warning system, emergency exits and the approved color scheme.

- B. The technology, piece of equipment or component shall not diminish the safety of the interior of the bus.*
- C. The technology, piece of equipment or component shall not create additional risk to students who are boarding or exiting the bus or are in or near the school bus loading zone.*
- D. The technology, piece of equipment or component shall not require undue additional activity and/or responsibility for the driver.*
- E. The technology, piece of equipment or component shall generally increase efficiency and/or safety of the bus, generally provide for a safer or more pleasant experience for the occupants and pedestrians in the vicinity of the bus or shall generally assist the driver and make his/her many tasks easier to perform.*
- F. The technology, piece of equipment or component shall have prior written approval from the SDE School Bus Specifications Committee.*

SECTION V - ALTERNATE FUEL SOURCE STANDARDS

1. The guidelines contained herein shall pertain only to the school buses approved by the Alabama State Board of Education to operate on alternative fuel sources and which meet the safe operation requirements of paragraph B-1.
 - A. Any company or individual servicing conversion equipment to school districts shall provide an approved certification program covering installation, personnel training, maintenance, repair, trouble-shooting and safety procedures for each responsible mechanic to assure that conversion and maintenance is performed only by personnel certified by the Alabama LP-Gas Board or other approved agency.
 - B. These companies or individuals shall submit to the Alabama State Department of Education, Pupil Transportation Section, Montgomery, Alabama, 36130, documentation certifying that the requirements of 1-A have been met.

SECTION VI - OPTIONS

Locking Fuel Compartment Door

Provide at the option of the purchaser a lock and key to secure the fuel compartment door.

Storage Compartment for Required Emergency Equipment

Provide at the option of the purchaser a storage compartment located in the driver's compartment to house the emergency equipment. It shall be a locked compartment with a warning buzzer attached so as to activate when the ignition switch is on and the compartment is locked.

SECTION VII – MULTIFUNCTIONAL SCHOOL ACTIVITY BUS (MFSAB)

DEFINITION:

A Multifunctional School Activity Bus (MFSAB) is a school bus constructed to Federal Motor Vehicle Safety Standards (FMVSS) and Alabama Minimum School Bus Specifications. It must be purchased or leased as a new bus and may only be used for extracurricular activities. **These buses may not be used to transport students to and from schools or between schools for the purpose of attendance.**

The following exceptions to the Alabama Minimum Specifications for School Buses for regular route buses shall be allowed for these vehicles.

Identification:

1. The bus body shall bear the words “**ACTIVITY BUS**” in *a contrasting color* at least 8 inches high in the area where “school bus” is normally positioned. Lettering and numbering shall conform to FMVSS and Alabama Minimum Specifications and shall meet reflectivity standards. Bus numbering on this bus may be of a contrasting color.
2. The name of the school system shall be displayed in *at least five-inch* letters on both sides of the bus in the beltline area. **NO SIGNS OR LOGOS** shall be applied to any area of the bus including the bumpers. The name of the school may be displayed in the beltline area. No signs, logos, or other items shall be displayed on the windows of the bus.

Color:

The local school with school system approval may determine the color of the activity bus. The color scheme may utilize any combination of up to **THREE** colors. This combination may be in addition to an optional white roof. The color National School Bus Yellow (SBMTC-008 Publication) shall not be used as a part of the color scheme.

School systems and/or vendors shall submit preliminary color schemes to the Alabama Department of Education, Pupil Transportation Section for approval **prior to the purchase or manufacture** of a Multifunctional School Activity Bus (MFSAB).

Seating:

Transit style seats, which meet all aspects of FMVSS 222 and 302, may be used in lieu of regular school bus seats.

Lighting and Warning Devices:

All activity buses shall meet state and federal standards for normal school bus lighting and warning device requirements with the following exceptions:

Multifunctional School Activity Buses (MFSAB) may not be equipped with alternately flashing amber or red signal lamps used for loading and unloading students.

Multifunctional School Activity Buses (MFSAB) may not be equipped with stop arm signals or crossing control arms.

INSPECTIONS:

Annual inspection by Alabama Department of Education (SDE) state school bus inspectors and monthly inspections by local school bus inspectors shall be performed on all Multifunctional School Activity Buses (MFSAB) as required by Alabama law and the Rules of the Alabama State Board of Education.

REGULATIONS:

These buses shall be owned by the local school system or leased from private school bus transportation contractors. All Alabama laws, Rules of the State Board of Education, and other applicable regulations pertaining to the operation of school buses and certification of school bus drivers shall apply to Multifunctional School Activity Buses.

ALABAMA MINIMUM SPECIFICATIONS 2006
QUICK REFERENCE CHART

****TYPE A-I SCHOOL BUS****

<p>Type A-I and A-II buses under 14,500 pounds GVWR shall be built to manufacturer's specifications. All type A buses under 14,500 pounds GVWR shall have four-wheel disc brakes.</p>
--

****TYPE A-II SCHOOL BUS****

(Over 14,500 pounds)

CAPACITY	BRAKE LINING SIZE	GAWR FRONT	GAWR REAR	GVWR TOTAL	TIRE SIZE
10-47	4" Front 6" Rear	9,000	14,200	23,200	10R x 22.5 10 ply

Type A-II school buses exceeding 14,500 pounds GVWR shall have air brakes.

****TYPE B SCHOOL BUS****

<p>Type B school buses shall be built to manufacturer's specifications. Exception: All Type B buses shall have four-wheel disc brakes.</p>

****TYPE C SCHOOL BUS****

10-47	4" Front 6" Rear	9,000	14,200	23,200	10R x 22.5 10 ply
48-54	4" Front 6" Rear	9,000	16,000	25,000	10R x 22.5 10 ply
55-72	4" Front 7" Rear	9,000	17,500	26,500	10R x 22.5 12 ply

Type C school buses exceeding 72 capacity shall have prior, written SDE approval.

****TYPE C-1 SCHOOL BUS****

10-36	Four-wheel disc	6,000	13,500	19,000 maximum	225 x 70R 19.5 - 12 Ply
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****TYPE D FRONT ENGINE****

10-53	4" Front 6" Rear	10,800	17,000	27,800	10R x 22.5 10 ply
54-66	5" Front 7" Rear	11,000	17,000	28,000	10R x 22.5 10 ply
68-78	5" Front 7" Rear	11,000	19,000	30,000	11R x 22.5 14 ply
79-84	6" Front 8" Rear	13,000	20,000	33,000	11R x 22.5 16 ply

****TYPE D REAR ENGINE****

42-66	5" Front 7" Rear	12,000	19,000	30,000	11R x 22.5 16 ply
68-78	6" Front 7" Rear	12,000	19,000	30,000	11R x 22.5 16 ply
79-84	6" Front 8" Rear	12,000	21,000	33,000	11R x 22.5 16 ply

Type D school buses exceeding 84-capacity shall have prior, written SDE approval.

Alabama Minimum Specifications for School Buses 2005



Alabama Department of Education
Division of Administrative and Financial Services
Pupil Transportation Section
Montgomery, Alabama
334-242-9730

Joseph B. Morton
State Superintendent of Education
Bulletin 2005, Number 34

The Alabama Minimum Specifications for School Buses can also be found on the Alabama Department of Education website at www.alsde.edu. Look under “Sections” for “Pupil Transportation”.

No person shall be denied employment, be excluded from participation in, be denied the benefits of, or be subjected to discrimination in any program or activity on the basis of disability, sex, race, religion, national origin, color, or age. Ref: Sec. 1983, Civil Rights Act, 42 U.S.C.; Title VI and VII, Civil Rights Act of 1964; Rehabilitation Act of 1973, Sec. 504; Age Discrimination in Employment Act; Equal Pay Act of 1963; Title IX of the Education Amendment of 1972: Title IX Coordinator, P.O. Box 302101, Montgomery, Alabama 36130-2101 or call (334) 242-8444.

Alabama Minimum Specifications for School Buses 2005
Changes Document

Changes to the Alabama Minimum Specifications for School Buses 2004 occur on the following pages and headings. All changes appear in italics with the exception of deletions. For noted deletions refer to the 2004 specifications for comparison.

NOTE: Page numbers in 2004 specs and 2005 specs may not coincide.

Page	Section	General Description of Change
2	School Bus Definitions	#7 Capacity based on body size before modifications
4	Front Bumper	#2 Change minimum thickness to 3/16 inch
5	Color	#2 Allows yellow wheel rim color
5	Directional Lights	#1 Modifications concerning front directional lights
7	Electrical System	#4B Requirement for headlight to be wired through solenoid deleted
7	Engine	#1 Requires 190 hp for 65-passenger and above
9	Fuel Tank	#3 Changes minimum fuel filtration requirements
10	Instruments-Instrument Panel	#1-B Deletes requirement for odometer showing tenths
12	Tires and rims	Hubcaps not permitted
13	Transmission	Changes Allison transmission number specification
14	Back-up Warning Alarm	Allows variable volume alarm; requires shield
15	Color	#3 Changes wording concerning white roof paint
17	Crossing Control Arm	#10 Indicates new part numbers for Specialty & Transpec
19	Emergency Exits	#2-B Indicates new part numbers for Specialty & Transpec
19	Emergency equipment	Clarifies emergency equipment location
21	Floor & Floor Coverings	#4 Exempts Type A Buses from fuel access plate
21,22	Heaters	#1 Requires heating system performance specification
22	Heaters	#8 Allows electronic valve actuator
23	Identification	#3 Requires Transpec Model 7500 Driver Alert System
24	Lamps & Signals	#2 Allows LED lighting all lamps except headlamps
25	Lamps & Signals	3C Changes border around alternately flashing signal lamps
25	Lamps & Signals	#4 Changes wording concerning rear signal lamps
29	Seat & Crash barriers	#7 Upgrades drivers seat
30	Seat & Crash barriers	#9 Requires storage pouch for driver
30	Step Treads	#1 Requires "pebble tread-type" stepwell covering
31	Stop Arm Signal	Requires "high intensity" reflective coating
39	Power Lift	#5 Changes language relative to FMVSS 403 & 404
47	Special Light	Changes language relative to FMVSS 403 & 404



INTRODUCTION

Alabama law (32-5-8) requires the Alabama State Board of Education to adopt minimum standards to govern the specifications for all new school buses and the overall operation of all school buses in the state of Alabama. This responsibility also extends to the inspection of school buses being sold and operated in the state of Alabama. The primary reason for the development of specifications and the inspection of school buses is to enhance the safety of our school buses. We must ensure that Alabama school buses continue to provide the safest ride available for our most precious cargo—our children.

A heartfelt thanks goes to each member of the Alabama State Department of Education School Bus Specifications Committee for all their hard work and dedication to the task. School bus specifications always begin as a product of many individual thoughts and ideas. However, they culminate in standards, which help assure the safest school buses possible for Alabama's students as well as vehicles, which provide a true value for Alabama's taxpayers.

Special thanks must also be voiced for Alabama's school bus dealers and to our school bus manufacturers and others in the school bus industry who assist in the Committee in the development of this document. Without their participation, the specifications process would be significantly weakened.

Again, we appreciate the many individuals and companies who participated in the development of these specifications. After reviewing these current specifications, if you have any question or suggestions, please feel free to contact any of the committee members listed on the following page.

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**SECTION VIII - ALABAMA MINIMUM SPECIFICATIONS QUICK
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ALABAMA MINIMUM SPECIFICATIONS FOR SCHOOL BUSES
EFFECTIVE October 1, 2004

SECTION I - GENERAL PROVISIONS

Standards

1. All school buses ordered by local education agencies beginning **October 1, 2004**, shall (1) meet the applicable Federal Motor Vehicle Safety Standards (FMVSS), and (2) meet Alabama minimum specifications for school buses. In the event of a conflict between the requirements of an applicable Federal Motor Vehicle Safety Standard, as referred to in this section, and the Alabama minimum specifications, the requirements of the FMVSS shall control. **School buses not meeting minimum specifications will not be certified by the Alabama State Department of Education (SDE).**

Certification

2. All school bus manufacturers shall certify to the SDE, in the form of a **durable, legible** certification label mounted in the driver's compartment in the vehicle, that all school buses meet or exceed all standards as specified herein and are in compliance with the applicable FMVSS. All manufacturers shall certify to the State of Alabama and local education agencies that all components on school buses are new from bumper to bumper at time of delivery. All chassis and body information shall appear on this certification label.

Used School Buses

3. Used school buses purchased for use by a school system in Alabama shall meet all of the legal Federal and Alabama requirements for school buses that were in effect on the date the vehicle was manufactured.

Bid Requirements

4. In order to be in compliance with the State Bid Law, school bus purchases shall be by competitive bidding. Bid forms to the body manufacturer shall contain certain options required by the chassis manufacturer, which may result in changes in normal Gross Vehicle Weight Rating (GVWR) or alterations to the body. For special needs buses, the school bus body manufacturer shall submit floor plans which include dimensions at the time bid quotations are submitted showing:
 1. Location of the emergency door, emergency windows and roof hatches.
 2. Aisle and staging areas and seat spacing.
 3. Track locations and/or wheelchair securement positions.
5. **Service Manual/Diagnostic Equipment**
Body and/or chassis suppliers, including integral (forward control) suppliers, shall provide each school district purchasing school buses with one complete set of the

most current service manuals available to include both body and chassis at no additional cost upon delivery of bus. Diagnostic equipment (manuals, code books, software and training) shall be made available to local school systems at time of bid opening.

6. **New Technology**

New technology not in the present specifications shall have prior written approval from the SDE School Bus Specifications Committee.

7. **School Bus Definitions**

For school buses used to transport special needs students, bus capacity is determined based on body size before modifications are made.

TYPE A: A Type A school bus is a conversion or body constructed upon a van-type or cutaway front-section vehicle with a left side driver's door designed for carrying more than 10 persons. This definition shall include two classifications: Type A-I with a GVWR of 10,000 or under; and Type A-II, with a GVWR over 10,000 pounds. All Type A buses shall have dual rear wheels. **Type A buses under 14,500 pounds GVWR shall have four-wheel disc brakes.**
Type A buses exceeding a GVWR of 14,500 pounds shall have air brakes.

TYPE B: A Type B school bus is a conversion or body constructed and installed upon a van or front-section vehicle chassis, or stripped chassis, with a GVWR of more than 10,000 pounds and designed for carrying more than 10 persons. Part of the engine is beneath and/or behind the windshield and beside the driver's seat. The entrance door is behind the front wheels. All Type B buses 14,500 pounds or under shall have four-wheel disc brakes.

TYPE C: A Type C school bus is a body installed upon a flat back cowl chassis with a GVWR of more than 10,000 pounds and designed for carrying more than 10 persons. The entire engine is in front of the windshield and the entrance door is behind the front wheels.
Type C buses may not exceed 72-passenger capacity without prior, written SDE approval.

TYPE D: A Type D school bus is a body installed upon a chassis, with the engine mounted in the front, midship, or rear, with a gross vehicle weight rating of more than 10,000 pounds and designed for carrying more than 10 persons. The engine may be behind the windshield and beside the driver's seat, at the rear of the bus, behind the rear wheels, or midship between the front and rear axles. The entrance door is ahead of the front wheels.
Type D buses may not exceed 84-passenger capacity without prior, written SDE approval.

SECTION II - SCHOOL BUS CHASSIS STANDARDS

Air Cleaner

1. The engine intake air cleaner shall be furnished and properly installed by the chassis manufacturer to meet engine specifications.

The intake air system for diesel engines shall have an air cleaner restriction indicator properly installed by the chassis manufacturer to meet engine specifications.

Axles

1. The front axle shall be a wide-track, heavy-duty type or shall have a GVWR at ground equal to or exceeding that portion of the total load, which is supported by the front axle.
2. The rear axle shall be a full-floating, heavy-duty type and shall have a GVWR at ground equal to or exceeding that portion of the total load, which is supported by the rear axle. A small vehicle rear axle may be semi-floating. A diesel-powered vehicle rear axle ratio shall meet manufacturer's recommendations.
3. Vehicle minimum axle capacities at ground when loaded shall meet the body manufacturer's GVWR specified by the FMVSS. Axle assemblies shall have minimum capacities at ground as shown on the chart on the last page of this booklet.

Brakes

1. A braking system, including service brake and parking brake, shall be provided and shall comply with all CDL pretrip inspection requirements. All Type A-1 and A-II school buses below 14,500 pounds GVWR shall be built to manufacturer's specifications.
2. Buses using air or vacuum in the operation of the brake system shall be equipped with warning signals, readily audible and visible to the driver, that will give a continuous warning when the air pressure available in the system for braking is 60 psi (pounds per square inch) or less or the vacuum in the system available for braking is eight (8) inches of mercury or less. An air pressure gauge shall be provided in the instrument panel capable of complying with CDL pretrip inspection requirements.
3. Antilock brake systems for either air or hydraulic brakes shall include control of all axles in compliance with FMVSS 105 or 121.
 - A. Air brakes shall be installed on **all** chassis exceeding 14,500 pounds GVWR. All air-operated brake systems shall:
 - (1) Meet all FMVSS for air brakes.

- (2) Be S-cam type brakes on all wheels. The camshaft, when applying brakes, shall rotate in the same direction as the wheels. Automatic slack adjusters shall be the same design on all wheels. Dust covers shall be installed on all wheels unless deleted through local option at the time of the bid.
 - (3) Have at least a 12 CFM air compressor.
 - (4) Be equipped with a parking and emergency brake. A manual control, clearly identified, shall be within easy reach of the driver. The parking brake valve shall comply with CDL pretrip inspection requirements.
 - (5) Have brake lining sizes as shown on the chart on the last page of this booklet.
 - (6) Have a reservoir capacity, which is equal to or greater than two (2) times total volume of all brake activators at full travel.
 - (7) Have air dryers installed. (Bendix *AD-9*, Midland DA33100 or prior written approved equal). Air dryers shall be serviceable at the local level.
- B. Buses using a hydraulic assist-booster in the operation of the brake system shall be equipped with warning signals, readily audible and visible to the driver, that will provide continuous warning in the event of a loss of fluid flow from the primary source, or loss of electric source powering the back-up system.
- (1) The system shall be equipped with a source of hydraulic pressure, automatically initiated upon loss of power from primary source, and operating independently of the primary power source.
 - (2) All brake systems shall be designed to permit visual inspection of brake lining wear without the removal of any chassis components.

Bumper, Front

1. The front bumper shall be furnished by the chassis manufacturer for all school bus types, unless there is specific agreement between the chassis manufacturer and the body manufacturer. When Type D chassis are supplied to a body company by a chassis manufacturer, the body company shall supply the front bumper as part of the body installation.
2. *The front bumper shall be of pressed steel channel or equivalent material at least 3/16 inch thick, not less than 8 inches wide (high) and shall extend beyond forward-most part of the body, grille, hood, and fenders and shall extend to the outer edges of the fenders at the bumper's top line. Bumpers on Type A buses may be built to manufacturers' specifications.*

3. Tow eyes or hooks shall be furnished and attached so as not to project beyond the front bumper. Tow eyes or hooks, attached to the frame chassis, shall be furnished by the chassis manufacturer. This installation shall be in accordance with the chassis manufacturer's standards. Type A buses are exempt from tow hook requirements.
4. The bumper shall be designed or reinforced so that it will not deform, when the bus is lifted by a chain that is passed under the bumper (or through the bumper if holes are provided for this purpose) and attached to both tow eyes. For the purpose of meeting this standard, the bus shall be empty and positioned on a level, hard surface, and both tow eyes shall share the load equally. Front bumper shall not be deformed when lifted by a bumper jack positioned on the bumper attachment points.

Certification

The chassis manufacturer shall certify to the SDE and local education agency having pupil transportation jurisdiction that their product meets minimum standards on items not covered by certification issued under requirements of the National Traffic and Motor Vehicle Safety Act.

Color

1. The chassis, including the front bumper, shall be black. The hood, cowl and fenders shall be in national school bus yellow. The hood may be painted with non-reflective paint.
2. Wheel rims shall be painted black, gray, *or yellow* on all buses.

Directional Lights

1. Each Type C chassis *may* be equipped with Type A front directional lights of the two-faced type mounted on the top of the fender and the hood side panel, *or have an amber turn signal and marker light that is an integral part of the headlight assembly. This turn signal/marker light shall be seen from the front and the side of the vehicle. An additional amber turn signal shall be mounted on the side of the fender to be visible to traffic driving beside the vehicle.*

Drive Shaft

1. Torque capacity of the drive shaft assembly shall at least equal maximum engine torque as developed through lowest transmission gear reduction.
2. Each drive shaft shall be equipped with protective metal guard or guards to reduce the possibility of it whipping through the floor or dropping to ground if broken. (Body manufacturer is responsible for mini-bus.)

Electrical System

1. Battery

- A. The storage batteries shall have a minimum of 1,250 cold cranking amps at 0 degrees Fahrenheit. Type A buses shall be built to manufacturer's specifications.
- B. Since all batteries in Type B, C, and D buses are to be located in a sliding tray, the battery shall be temporarily mounted on the chassis frame by the chassis manufacturer.

In these cases, the final location of the battery and the appropriate cable lengths shall be according to the current SBMTC Design Objectives.

2. Alternator

- A. All Type A and B buses up to 15,000 lbs. GVWR shall have a minimum 100 amperes alternator.
- B. Type B buses over 15,000 lbs. GVWR and all C and D buses shall be equipped with a heavy-duty truck or bus-type alternator meeting SAE J 180 and having a minimum output rating of 120 amperes; The alternator shall be capable of producing a minimum of 50 percent of its maximum rated output at the engine manufacturer's recommended idle speed.
- C. All buses equipped with an air conditioner or electrical power lift shall have a minimum 124 amperes alternator.
- D. A direct-drive alternator is permissible in lieu of a belt drive. A belt drive shall be capable of handling the rated capacity of the alternator with no detrimental effect on other driven components.
- E. Refer to SBMTC Design Objectives, 1996 edition, for estimating required alternator capacity.

3. Wiring

- A. All wiring shall conform to current applicable recommended practices of the Society of Automotive Engineers.
 - (1) All wiring shall use standard colors and number coding and each chassis shall be delivered with a wiring diagram that coincides with the wiring of the chassis. All wires passing through metal openings shall be protected by a grommet or loom.
- B. The chassis manufacturer shall install a readily accessible terminal strip or plug on the body side of the cowl, or at an accessible location in the engine

compartment of vehicles designed without a cowl, that shall contain the following terminals for the body connections:

- (1) Main 100-amp body circuits
- (2) Tail lamps
- (3) Right turn signal
- (4) Left turn signal
- (5) Stop lamps
- (6) Back-up lamps
- (7) Instrument panel lights (rheostat controlled by head lamp switch)

4. Circuits

- A. An appropriate identifying diagram (color and number coded) for electrical circuits shall be provided to the body manufacturer for distribution to the end user.

Engine

1. *All buses shall be equipped with diesel engines with a minimum horsepower as follows:*

29 to 60 passengers – 170 hp motor minimum

65 to above passengers – 190 hp motor minimum

Types A and B under 29 passenger – manufacturer's specifications

2. The engine heater may be installed as per the manufacturer's specifications.

Exhaust System

1. The exhaust pipe, muffler, and tail pipe shall be outside the bus body and attached to the chassis frame. The chassis manufacturer shall furnish an exhaust system with a tail pipe of sufficient length to exit the rear of the bus or at the left side of the bus body no more that eighteen inches forward of the front edge of the rear wheelhouse opening. If designed to exit at the rear of the bus, the tailpipe shall extend at least five (5) inches beyond the end of the chassis frame. If designed to exit on the side of the bus, the tailpipe shall extend to the skirtline. With the exception of special needs buses, Type A vehicles may have manufacturer's standard exhaust system.
2. The muffler and the tail pipe shall be constructed of aluminized, or equivalent corrosion-resistant material. The tail pipe shall be made of at least 16-gauge material and shall be mounted in such a way that it will not cause damage to brake lines.
3. The exhaust pipe shall be properly insulated from the fuel tank and connections thereof by a metal shield at any point where it is four inches or less from tank or connections.

4. The exhaust system on vehicles designed for the transportation of special needs pupils shall be routed **to the left of the left frame rail** to allow for the installation of a lift on the right side of the vehicle.
5. On Types B, C and D buses, no exhaust pipe shall exit beneath an emergency exit or the fuel fill.
6. Type D rear engine exhaust shall exit beneath the rear bumper to manufacturer's specifications.

Fenders, Hoods--Types B and C Vehicles

1. The total spread of outer edges of front fenders, measured at the fender line, shall exceed the total spread of the front tires when the front wheels are in a straight-ahead position.
2. Front fenders shall be properly braced and free from any body attachments.
3. A fiberglass tilt hood shall be provided. The hood opening and closing effort shall be minimized to aid the driver with pre-trip inspections and service. If the hood is not designed to remain secure in the open position, a safety prop will be required. The wiring harness shall be a "quick disconnect" type to aid with servicing.

Frame

1. The frame or equivalent shall be of such design and strength characteristics as to correspond at least to standard practice for trucks of the same general load characteristics, which are used for highway service.
2. Any secondary manufacturer that modifies the original chassis frame shall guarantee the performance of workmanship and materials resulting from such modification.
3. Any frame modification shall not be for the purpose of extending the wheelbase.
4. Holes in top or bottom flanges or side units of the frame, and welding to the frame, shall not be permitted except as provided or accepted by the chassis manufacturer.
5. Frame lengths shall be provided in accordance with current SBMTC Design Objectives.

Fuel Tank

1. All Types B, C, and D chassis above 170-inch wheelbase shall have a minimum 60-gallon fuel tank with a 55-gallon actual draw. The tank shall be filled and vented to the outside of the body, the location of which shall be so that accidental fuel spillage will not drip or drain on any part of the exhaust system.

2. No portion of the fuel system, which is located to the rear of the engine compartment, except the filler tube, shall extend above the top of the chassis frame rail. Fuel lines shall be mounted to obtain maximum possible protection from the chassis frame.
3. *Fuel filters shall be installed as per manufacturer's specifications. Fuel filtration shall include water detection and separation.* At least one fuel filter shall have a replaceable spin-on or cartridge-type element.
4. Fuel tank installation shall be in accordance with current SBMTC Design Objectives for location on the chassis right frame rail or between frame rails; the filler tube shall be located on the right side of the bus.
5. Type A buses may meet manufacturer's specifications.
6. The fuel tank on vehicles constructed with a power lift unit may be mounted on left chassis rail or behind rear wheels.
7. Installation of alternative fuel tanks shall comply with all applicable fire codes.
8. On Types B, C, and D vehicles, fuel tanks shall have interior baffles to help prevent buses from fuel starvation on inclines.

Governor

1. An engine governor is permissible. When it is desired to limit road speed, a road speed governor should be installed.
2. When the engine is remotely located from the driver, a governor shall be installed to limit engine speed to maximum revolutions per minute recommended by the engine manufacturer, or a tachometer shall be installed so the engine speed may be known to the driver.

Heating System, Provision for

1. The chassis engine shall have plugged openings for the purpose of supplying hot water for the bus heating system. The opening shall be suitable for attaching a pipe thread/hose connector. The engine shall be capable of supplying water having a temperature of at least 170 degrees Fahrenheit at a flow rate of 50 pounds/per minute at the return end of 30 feet of one inch inside diameter automotive hot water heater hose (SBMI Standard No. 001--Standard Code for Testing and Rating Automotive Bus Hot Water Heating and Ventilating Equipment).

Horn

Buses shall be equipped with a horn or horns of standard make with each horn capable of producing a complex sound in bands of audio frequencies between 250 and 2,000

cycles per second and tested per the Society of Automotive Engineers Standard J--377. There shall be no air horns.

Instruments and Instrument Panel

1. Chassis shall be equipped with the following instruments and gauges (lights in lieu of gauges are not acceptable except as noted):
 - A. Speedometer
 - B. *Odometer shall show accrued mileage to six digits not including tenths.*
 - C. Tachometer
 - D. Voltmeter
 - (1) An ammeter with graduated charge and discharge with the ammeter and its wiring compatible with generating capacities is permitted in lieu of a voltmeter
 - E. Oil-pressure gauge
 - F. Water temperature gauge
 - G. Fuel gauge
 - H. Upper beam headlight indicator
 - I. Brake indicator gauge (vacuum or air)
 - (1) A light indicator in lieu of a gauge is permitted on vehicles equipped with hydraulic-over-hydraulic brake system
 - J. Turn signal indicator
 - K. Glow-plug indicator light where appropriate
 - L. A twelve-volt accessory outlet with cover
2. All instruments shall be easily accessible for maintenance and repair.
3. Instruments and gauges shall be mounted on the instrument panel in such a manner that each is clearly visible to the driver while in a normal seated position in accordance with current SBMTC Design Objectives.

4. The instrument panel shall have lamps of sufficient candlepower to illuminate all instruments and gauges and the shift selector indicator for an automatic transmission.

Oil Filter

An Oil filter with replaceable element shall be provided and connected by flexible oil lines if it is not of built-in or engine-mounted design. The oil filters shall have a capacity of at least one (1) quart.

Openings

All openings in the floorboard or firewall between the chassis and the passenger-carrying compartment, such as for gearshift selector and parking brake lever, shall be sealed.

Passenger Load

1. Actual GVW is the sum of the chassis weight, plus the body weight, plus the driver's weight, plus total seated pupil weight.
 - A. For purposes of calculation, the driver's weight is 150 pounds.
 - B. For purposes of calculation, the pupil weight is 120 pounds per pupil.
2. Actual GVW shall not exceed the chassis manufacturer's GVWR for the chassis.
3. The manufacturer's GVWR shall be furnished in duplicate (unless more are requested) by the manufacturers to the state agency having pupil transportation jurisdiction. The state agency shall, in turn, transmit such ratings to each other state agency responsible for the development or enforcement of state standards for school buses.

Power and Gradeability

Gross Vehicle Weight (GVW) shall not exceed 185 pounds per published net horsepower of the engine at the manufacturer's recommended maximum number of revolutions per minute.

Retarder System (Optional)

A retarder system, if used, shall maintain the speed of the fully loaded school bus at 19.0 mph or 30 km/hr on a 7% grade for 3.6 miles or 6 km.

Shock Absorbers

Buses shall be equipped with front and rear double-action shock absorbers compatible with the manufacturer's rated axle capacity at each wheel location.

Springs

1. The capacity of the springs or suspension assemblies shall be commensurate with the chassis manufacturer's GVWR.

3. Front springs shall be of the leaf type, shall have a stationary eye at one end, and shall be protected by a wrapper leaf in addition to the main leaf. Rear leaf springs shall be of the progressive type.
3. Air ride suspension may be used on the front and rear of Type C and D buses in lieu of leaf-type springs. Body and chassis parts must clear tires with air bags in fully deflated condition or steering wheel turned fully to the left or right. If brake dust covers are used, inspection holes of adequate size and location for easily viewing brake linings shall be provided.

Steering Gear

1. The steering gear shall be approved by the chassis manufacturer and designed to assure safe and accurate performance when the vehicle is operated with maximum load and at maximum speed.
2. If external adjustments are required, the steering mechanism must be accessible to accomplish the same.
3. No changes shall be made in the steering apparatus, which are not approved by the chassis manufacturer.
4. There shall be a clearance of at least two inches between the steering wheel and the cowl, instrument panel, windshield, or any other surface.
5. Power steering is required and shall be of the integral type with integral valves.
6. The steering system shall be designed to provide a means for lubrication of all wear-points, if wear-points are not permanently lubricated.
7. The steering wheel shall meet manufacturer's specifications.

Tires and Rims

1. Radial tubeless tires and rims of proper size and tires with a load rating commensurate with chassis manufacturer's GVWR shall be provided. *Hubcaps are not permitted.*
2. Dual rear tires shall be provided on all school buses.
3. All tires on any given vehicle shall be of the same size and the load range of said tires shall meet or exceed the gross axle weight rating as required by FMVSS 120. Low profile tires are acceptable. However, they must meet the load range and ply requirements as shown on the chart on the last page of this booklet. It is recommended that dish-type rims be used with low profile tires.

4. If the vehicle is equipped with a spare tire and rim assembly, it shall be of the same size as those mounted on the vehicle.
5. If a tire carrier is required, it shall be suitably mounted in an accessible location outside the passenger compartment.

Transmission

An automatic transmission shall be required on all buses. Type A buses may be built to manufacturer's specifications. Types B, C, and D buses must have a *PTS 2500* series or prior-approved equal. The automatic transmission shall have at least four forward-gear ratios, plus integral torque converter. The transmission shift quadrant shall provide *at least* four forward drive ranges plus neutral and reverse ranges. Within the range selected, ratio changes shall be effected automatically and at full engine power if desirable, and without use of an engine disconnect clutch. A *PTS 3000* or prior-approved equal is required for chassis over 33,000 pounds GVWR.

Turning Radius

1. Chassis with a wheelbase of 264 inches or less shall have a right and left turning radius of not more than 42 and 1/2 feet, curb-to-curb measurement.
2. Chassis with a wheelbase of 265 inches or more shall have a right and left turning radius of not more than 44 and a 1/2 feet, curb-to-curb measurement.

Undercoating

The chassis manufacturer, or agent thereof, shall coat the undersides of steel or metallic-constructed front fenders with rust-proofing compound for which compound manufacturers have issued notarized certification of compliance to the chassis builder that the compound meets or exceeds all performance and qualitative requirements of paragraph 3.4 of Federal Specification TT-C520B using modified test.

Weight Distribution

The weight distribution of a fully loaded bus on a level surface shall be such as not to exceed the manufacturer's front gross axle rating and rear gross axle weight rating.

SECTION III - SCHOOL BUS BODY STANDARDS

Air Conditioning

Buses may be equipped with an air conditioning unit if the local education agency (LEA) desires.

All buses ordered with air conditioning shall meet the following minimum specifications:

1. Floor--All flooring shall be 5/8-inch exterior-grade plywood over steel flooring.
2. All buses shall have a white roof.

3. Windows--All windows shall be tinted with a minimum of 50% light transmission.
4. All buses shall meet insulation standards as per Alabama bus specifications.
5. **Optional** mud flaps to protect the condenser may be installed.

Buses ordered with air conditioning shall also meet the following minimum alternator specifications:

- | | |
|---------------------------------|-----------------|
| 1. 40,000 to 53,000 Btu system | 124 amp minimum |
| 2. 53,001 to 108,000 Btu system | 160 amp minimum |

Minimum Btu air conditioning system per passenger size:

- | | |
|--------------------|-------------|
| 1. 10-30-passenger | 40,000 Btu |
| 2. 31-48-passenger | 53,000 Btu |
| 3. 49-60-passenger | 78,000 Btu |
| 4. 61-84-passenger | 100,000 Btu |

Aisle

1. All emergency doors shall be accessible by a 12-inch minimum aisle. The aisle shall be unobstructed at all times.

2. Seat backs shall be slanted sufficiently to give aisle clearance of 15 inches at the tops of seat backs.

Back-Up Warning Alarm

An automatic, audible alarm with *a minimum of 87 dbA and maximum of 112 dbA* shall be installed behind the rear axle and shall comply with the Society of Automotive Engineers published Back-up Alarm Standards (SAE 994). *The alarm shall have a protective deflector shield or be installed in a location to protect it from mud or debris.*

Battery/Batteries

1. Batteries are to be furnished by the chassis manufacturer.

2. When the battery/batteries is mounted as described in the Chassis Standard, the body manufacturer shall securely attach the battery on a slide-out or swing-out tray in a closed, vented compartment in the body skirt, so that the battery is accessible for convenient servicing from the outside. The battery compartment door or cover shall be hinged at the front and secured by an adequate and conveniently-operated latch or other type fastener.

Bumper (Front)

On a Type D school bus, if the chassis manufacturer does not provide a bumper, the bumper shall be provided by the body manufacturer. The bumper will conform to the standards in the chassis section.

Bumper (Rear)

1. Bumpers shall be of pressed steel channel or equivalent material, at least 3/16-inch thick, and shall be a minimum of 9-1/2 inches wide (high) on all Types B, C, and D buses. Type A buses shall have a minimum of an 8-inch rear bumper.
2. Bumpers shall be wrapped around the back corners of the bus. It shall extend forward at least 12 inches, measured from the rear-most point of the body at the floor line.
3. Bumpers shall be attached to the chassis frame in such a manner that it may be easily removed. It shall be so braced as to withstand impact from a rear or side impact. It shall be so attached as to discourage hitching of rides.
4. Bumpers shall extend at least one inch beyond rear-most part of body surface measured at the floor line.
5. Tow eyes or hooks may be furnished on the rear and attached so they do not project beyond the rear bumper. The installation shall be in accordance with the chassis manufacturer's specifications.

Ceiling

See Insulation and Interior, Body Standard.

Certification

The body manufacturer shall certify to the SDE and local education agency having pupil transportation jurisdiction that their product meets minimum standards on items not covered by certification issued under requirements of the National Traffic and Motor Vehicle Safety Act.

Chains (Tire)

See Wheel Housing Body Standard.

Color

1. The school bus body shall be painted National School Bus Yellow.
2. The body exterior paint trim, bumper, lamp hoods and lettering shall be black.
3. The roof of the bus may be painted white *not to extend below the drip rails on the sides of the body.*

Construction

1. Construction shall be of prime commercial quality steel or other material with strength at least equivalent to all-steel as certified by the bus body manufacturer. All such construction materials shall be fire resistant.

2. Construction shall be dust proof and watertight, so the bus does not leak under normal operating conditions.
3. Body joints present in that portion of a Type A school bus body furnished exclusively by the body manufacturer shall conform to the performance requirements of FMVSS 221, "School Bus Body Joint Strength." This does not include the body joints created when body components are attached to components furnished by the chassis manufacturer.
4. Type A school bus bodies shall be equipped with restraining barriers conforming to FMVSS 222, "School Bus Passenger Seating--Crash Protection," Sections 5.2 and 5.3.

Crossing Control Arm

1. Buses shall be equipped with a crossing control arm mounted on the right side of the front bumper, which shall not open more than 90 degrees.
2. All components of the crossing control arm and all connections shall be weatherproofed.
3. The crossing control arm shall incorporate system connectors (electrical or air) at the gate and shall be easily removable to allow for towing of the bus.
4. The crossing control arm shall meet or exceed SAE Standard J1133.
5. The crossing control arm shall be constructed of non-corrosive or nonferrous material or treated in accordance with the body sheet metal standard (see Metal Treatment).
6. There shall be no sharp edges or projections that could cause hazard or injury to students.
7. The crossing control arm shall extend a minimum of 70" from the front bumper when in the extended position.
8. The crossing control arms shall extend simultaneously with the stop arm(s) by means of the stop arm controls. An automatic recycling interrupt switch shall be installed to allow the driver to deactivate the control arm when necessary.
9. An electromagnetic device *or a stowed bracket* shall be installed to stabilize the arm when in the stored position.
10. Crossing control arm shall be *Specialty Manufacturing Company, Part #58600, Part # 68600, Transpec 4000 series*, or prior-approved equal.

Defrosters

1. The windshield defroster and defogging system shall provide defogging of the entire windshield, driver's side window, and entrance door glasses by utilizing hot air taken from the heater core with vents across the entire windshield.
2. The defrosting system shall conform to Society of Automotive Engineers' Standards J381 and J382.
3. The defroster and defogging system shall be capable of furnishing heated outside ambient air.
4. Auxiliary fans are not considered defrosting or defogging systems.
5. Portable heaters shall not be used.

Doors

1. Service Door:
 - A. The service door shall be in the driver's control, and designed to afford easy release and provide a positive latching device on manual operating doors to prevent accidental opening. When a hand lever is used, no part shall come together that will shear or crush fingers. Manual door controls shall not require more than 25 pounds of force to operate at any point throughout the range of operation.
 - B. The service door shall be located on the right side of the bus, opposite and within direct view of the driver.
 - C. The service door shall have a minimum horizontal opening of 24 inches and a minimum vertical opening of 68 inches. Type A vehicles shall have a minimum opening area of 1200 square inches.
 - D. The service door shall be a split type, both sections opening outward.
 - E. Lower, as well as upper door panels, shall be of approved safety glass. The bottom of each lower glass panel shall not be more than 10 inches from the top surface of the bottom step. The top of each upper glass panel shall not be more than 6 inches from the top of the door. Type A vehicles shall have an upper panel (windows) of safety glass with an area of at least 350 square inches.
 - F. Vertical closing edges on split type entrance doors shall be equipped with flexible material to protect the children's fingers. Type A vehicles may be equipped with the chassis manufacturer's standard entrance door.
 - G. There shall be no door to the left in driver compartment on Types B, C or D vehicles.

- H. All doors shall be equipped with padding at the top edge of each door opening. Pad shall be at least three inches wide and one inch thick and extend the full width of the door opening.
- I. If air or electric doors are used, the amber warning lights shall be activated from a momentary switch. A three-position switch shall activate the sequence as follows:
 - Position One – door closed; lights off.
 - Position Two – activate red lights, stop arm, and crossing control arm.
 - Position Three – red lights activated, door open, stop arm activated, and crossing control arm activated.

Emergency Exits

1. Emergency Door:

- A. The emergency door shall be hinged on the right side if in the rear end of bus and on the front side if on left or right side of the bus. It shall open outward and be labeled inside to indicate how it is to be opened. If double emergency doors are used on Type A vehicles, they shall be hinged on the outside edge and shall have a three-point fastening device. A device shall be used that holds the door open to prevent the emergency door from closing during emergencies and school bus evacuation drills. If emergency door locks are used, the vehicle ignition must be disabled until the emergency door lock is deactivated.
- B. The upper portion of the emergency door shall be equipped with approved safety glazing, the exposed area of which shall be at least 400 square inches. The lower portion of the rear emergency door on Types B, C, and D vehicles shall be equipped with a minimum of 350 square inches of approved safety glazing.
- C. There shall be no steps leading to an emergency door.
- D. The words **EMERGENCY DOOR**, in letters at least two inches high, shall be placed at the top of or directly above the emergency door or on the door in the metal panel above the top glass, both inside and outside of the bus. The words **EMERGENCY EXIT** in letters at least 2 inches high shall be placed on the exterior body directly above each emergency window.
- E. The emergency door shall be equipped with padding at the top edge of each door opening. Padding shall be at least three inches wide and one inch thick, and extend the full width of the door opening.
- F. The side emergency door, if installed, must meet the requirements as set forth in FMVSS, Standard 217 (a), regardless of its use with any other combination of emergency exits.

- (1) A left side emergency door shall have a 20 inch unobstructed passageway and no flip seat is to be used. A barrier shall be used just before the door opening.
- G. There shall be no obstruction higher than 1/4 inch across the bottom of any emergency door opening.

2. Additional Emergency Exits:

- A. All school buses shall be equipped with emergency exits in the following capacity vehicles:
 - 0 to 22 passenger: one emergency window exit per side and one roof hatch located midpoint.
 - 23 to 54 passenger: one emergency window exit per side located midpoint and two roof hatches
 - 55 and above passenger: two emergency window exits per side, and two roof hatches.
- B. Each emergency exit shall comply with FMVSS 217. These emergency exits are in addition to the rear emergency door or exit. Roof hatches must be either *Transpec Standard Vent Model 1900 series, Speciality Manufacturing 8600, 8900, 9000 series*, or prior-approved equal.
 - (1) Emergency exit windows shall be as evenly spaced as possible under FMVSS 217 guidelines and shall not be obstructed by any devices.
- C. In addition to the audible warning required on emergency doors by FMVSS 217, additional emergency exits shall also be like protected. Check FMVSS re: wording and decibel level of buzzer.
- D. School bus emergency exits shall be marked with a minimum one inch wide strip of retro-reflective tape, either red, white or yellow in color, to be placed around the outside perimeter of the emergency exit opening, not the emergency exit itself.

The words **EMERGENCY EXIT**, in letters at least two inches high, shall be placed on the body directly above each emergency window.

Emergency Equipment

All emergency equipment shall be stored in the driver compartment with the exception of the warning devices.

1. Fire Extinguishers:
 - A. The bus shall be equipped with at least one pressurized, dry chemical fire extinguisher complete with hose to meet Underwriters Laboratories, Inc.,

approval. A pressure gauge shall be mounted on the extinguisher and easily read without moving the extinguisher from its mounted position.

The bracket shall be a heavy-duty, snap-in, spring type. Band type holders are not acceptable.

B. The fire extinguisher shall have a capacity of **five pounds** with an Underwriters Laboratories total rating of 2A10BC or greater. The operating mechanism shall be sealed with a type of seal that will not interfere with the use of the fire extinguisher.

C. Fire extinguishers must comply with State Fire Codes.

2. First-Aid Kit:

A. Bus shall have a removable, moisture proof and dust-proof first-aid kit mounted with a separate bracket in an accessible place in driver's compartment. This place shall be marked to indicate its location.

B. Contents shall include:

- 2 1" x 2 1/2 yards adhesive tape rolls
- 24 sterile gauze pads 3" x 3"
- 10 3/4" x 3" adhesive bandages
- 8 2" bandage compress
- 100 3" bandage compress
- 2 2" x 6" sterile gauze roller bandages
- 2 non-sterile triangular bandages approximately 40" x 36" x 54" with 2 safety pins
- 3 sterile gauze pads 36" x 36"
- 3 sterile eye pads
- 1 pair rounded-end scissors
- 1 pair latex gloves
- 1 mouth-to-mouth airway

3. Body Fluid Clean-up Kit:

A. Each bus shall have a removable and moisture proof body fluid clean-up kit. It shall be properly mounted and identified as a body fluid clean-up kit. Must meet OSHA regulations.

4. Warning Devices:

A. Each school bus shall contain at least three (3) reflectorized triangle road warning devices mounted in an accessible place in the driver's compartment or outside storage compartment. The mounting location in Type A vehicles is optional. These devices must meet requirements in FMVSS 125.

Floor and Floor Coverings

1. The floor in the underseat area, including the tops of the wheel housing, driver's compartment and toe board, shall be covered with rubber floor covering or equivalent, having a minimum overall thickness of .125 inch.
2. The floor covering in the aisle shall be of aisle-type rubber or equivalent, wear-resistant and ribbed. The minimum overall thickness shall be .187 inch measured from tops of ribs.
3. The floor covering must be permanently bonded to the floor and must not crack when subjected to sudden changes in temperature. Bonding or adhesive material shall be waterproof and shall be of a type recommended by the manufacturer of the floor-covering material. All seams must be sealed with waterproof sealer.
4. *For Type B, C and D school buses*, the manufacturer shall provide a screw-down plate to access fuel tank sending unit that is secured and insulated. The plate shall be mounted so that access is readily available to repair personnel and so that the floor covering is not disturbed during the repair process.
5. The floor shall be of metal or alloy at least equal in strength to 14-gauge prime commercial quality steel and so constructed that exhaust gases cannot enter the passenger compartment.
6. All closures between the bus body and the engine compartment shall be fitted with gas-tight gaskets and pedal openings shall be closed bellows type, gas-tight boots.
7. There shall be a plate, of adequate size, provided to allow for transmission access or service.

Heaters

1. *The heating system shall be capable of maintaining the temperature throughout the bus of not less than 55 degrees Fahrenheit during average minimum January temperatures as established by the U. S. Department of Commerce, Weather Bureau, for the area in which the vehicle is to be operated. Shall be capable of defrosting the total windshield area and the service door glass within thirty minutes after initial start with engine at idle speed. (See also, Defroster specification Items 1 and 2 on page 17) The system shall exceed SAE standards J-381 and J-382 performance requirements. **Fuel-fired auxiliary heaters will not be allowed.***

Heater performance shall be measured by the following:

A temperature measurement shall be taken at three locations within the body. These locations to be over the center aisle, thirty-six inches above the floor. The

first location is to be thirty-nine inches from the windshield; the second location midpoint of the passenger compartment and the third will be thirty-nine inches from the rear emergency door.

After soaking the bus at twenty degrees F. for fifteen (15) hours, the bus will be started and after thirty (30) minutes, the temperature at each measuring point shall be fifty-five (55) degrees F.

2. If only one heater is used, it shall be a fresh-air or combination fresh-air and recirculation type.
3. If more than one heater is used, additional heaters shall be a recirculating-air type.
4. All heaters installed by body manufacturers shall bear a name plate that shall indicate the heater rating in accordance with SBMI Standard No. 001, with said plate to be affixed by the heater manufacturer which shall constitute certification that the heater performance is as shown on the plate.
6. Heater hoses shall be adequately supported to guard against excessive wear due to vibration. The hoses shall not dangle or rub against the chassis or sharp edges and shall not interfere with or restrict the operation of any engine function. Heater hoses shall conform to the Society of Automotive Engineers' Standard J20c. Heater lines on the interior of the bus shall be shielded to prevent scalding of the driver or passengers.
7. Each hot water system installed by a body manufacturer shall include one shut-off valve in the pressure line and one shut-off valve in the return line with both valves at or near the engine in an accessible location.
8. There shall be a water flow-regulating valve, *or an electronic valve actuator*, installed in the pressure line for convenient operation by the driver while seated.
9. Accessible bleeder valves shall be installed in an appropriate place in the return lines of body company-installed heaters to remove air from the heater lines.
10. Access panels shall be provided to make heater motors, cores, and fans readily accessible for service. An outside access panel may be provided for the driver's heater.

Identification

1. School bus bodies shall bear the words, **SCHOOL BUS**, in eight-inch black letters on National School Bus Yellow, on the front and back of the bus (lettering between flasher lights). The name of the school system shall be on each side of the bus in 5-inch, black standard, unshaded letters. Lettering shall conform to "Series B" of Standard Alphabets for Highway Signs. Each bus shall be numbered on both sides, left front bumper, and the rear before being put into service. Bumper

numbers may be white or yellow. An agreement between manufacturer and purchaser shall be reached at time order is placed as to who will put the numbers on the buses. Any other numbering shall be optional.

2. Only signs and lettering approved by state law or regulation, limited to the name of the owner or operator and any marking necessary for identification, shall appear on the bus.
3. *Driver Alert Transpec Model 7500, or prior-approved equal, electronic signage warning traffic when the school bus stops to load or unload students and at railway grade crossings is required.*

Inside Height

The inside body height shall be 72 inches or more, measured metal to metal, at any point on the longitudinal center line from the front vertical bow to the rear vertical bow. The inside body height of Type A buses shall be 62 inches or more.

Insulation

1. Ceilings and walls shall be insulated with proper material to deaden sound and reduce vibration to a minimum. If thermal insulation is specified, it shall be fire-resistant and approved by Underwriters Laboratories, Inc. If buses are equipped with air conditioning, walls and ceilings must be insulated to improve air conditioner efficiency.
2. If floor insulation is required, it shall be either 5-ply nominal 19/32 inches thick plywood, or a material of equal or greater strength and insulation R value, and it will equal or exceed properties of exterior-type softwood plywood, C-D Grade as specified in standard issued by U. S. Department of Commerce. When plywood is used, all exposed edges shall be sealed.

Interior

1. The interior of the bus shall be free of all unnecessary projections, which include luggage racks and attendant handrails, likely to cause injury. This standard requires inner lining on ceilings and walls. If the ceiling is constructed to contain lapped joints, the forward panel shall be lapped by the rear panel and exposed edges shall be beaded, hemmed, flanged, or otherwise treated to minimize sharp edges.
2. The driver's area forward of the foremost padded barriers will permit the mounting of required safety equipment and vehicle operation equipment.
3. Every school bus shall be constructed so that the noise level taken at the ear of the occupant nearest to the primary vehicle noise source shall not exceed 85 dbA when tested.

4. Any added equipment shall be flush mounted with the exception of the video system.

Lamps and Signals

1. Interior lamps shall be provided which an adequately illuminated aisle and step well. Step well lights shall be illuminated by a service door operated switch, to illuminate only when headlights and clearance lights are on and the service door is opened.
2. *L.E.D. lighting may be used as an alternative to conventional lighting in all lamps and signals except headlamps.*
3. Definition--School bus alternately flashing red and amber signal lamps are lamps mounted at the same horizontal level, intended to identify the vehicle as a school bus and to inform other users of the highway that such vehicle is preparing to stop, or is stopped, on the roadway to take on or to discharge schoolchildren.
 - A. Buses shall be equipped with two red lamps and two amber lamps at the rear of the vehicle and two red lamps and two amber lamps at the front of the vehicle. One amber lamp shall be located near each red signal lamp at the same level, but closer to the vertical centerline of the bus.
 - B. The signaling system, including red and amber signal lamps and a stop arm with alternating flashing lamps, shall be so designed and wired as to have the following characteristics:
 - (1) When the entrance door is closed, a manual push button may be depressed and the amber pilot light and amber warning lights will flash.
 - (2) When the entrance door is opened, the amber pilot and amber warning lights will go off, and the red pilot and red warning lights will flash; also, the stop arm will be extended and lights on the stop arm will flash.
 - (3) On closing the entrance door, all lights will go out and the stop arm retract automatically.
 - (4) If the entrance door is opened without depressing the manual push button, no lights will flash, nor will the stop arm be extended.
 - C. The area around the lenses of alternately flashing signal lamps shall *have a black border at least one inch wide*. Hoods/guards *may* be provided over front and rear amber warning lights and red warning lights.
4. *Bus body shall be equipped with amber rear turn signal lamps at least seven inches in diameter, or if in a shape other than round, a minimum of 38 square inches of illuminated area. These signal lamps must be connected to the chassis*

hazard warning switch to cause simultaneous flashing of signal lamps when needed as a vehicular traffic hazard warning.

Rear directional lights shall be mounted not more than 15 inches from the plane of the side of the body, and not more than 14 inches below the glass in the rear of the body. Buses shall be equipped with two *red*, brake/tail combination lights at least seven inches in diameter, *or if in a shape other than round a minimum of 38 square inches of illuminated area and shall be mounted on the rear of the bus just inside the turn signal lamps.* Type A conversion vehicle lamps must be 21 square inches in the lens area. Two combination lamps with a minimum diameter of four inches, or if a shape other than round, a minimum 12 square inches of illuminated area shall be placed on the rear of the body between the beltline and the floor line. The rear license plate lamp may be combined with one lower tail lamp. Stop lamps shall be activated by the service brakes and shall emit a steady light when illuminated. *In addition to these requirements, all lamps and signals shall comply with applicable SAE specifications.*

- A. All Type *C and D* buses shall have side turn indicators on both sides located within six inches of the floor line.
5. On all buses equipped with a monitor for the front and rear lamps of the school bus, the monitor shall be mounted in full view of the driver. If the full circuit current passes through the monitor, each circuit shall be protected by a fuse or circuit breakers or other equivalent technology against any short circuit or intermittent shorts.
6. A white flashing strobe light shall be installed on the roof of a school bus not to exceed 1/3 the body length forward from the rear of the roof edge. This light shall have a single white lens emitting light 360 degrees around its vertical axis and may not extend above the roof more than the maximum legal height. A manual switch and a pilot light of low intensity must be included to indicate when the light is in operation. The pilot light shall be incorporated into the switch.
7. If alternating headlights are used (i.e., wig-wag), they must operate in conjunction with the red overhead flashers and stop arm.

Metal Treatment

1. All metal used in construction of a bus body shall be zinc-coated or aluminum-coated or treated by an equivalent process before the bus is constructed. Included are such items as structural members, inside and outside panels, door panels and floor sills. Excluded are such items as door handles, grab handles, interior decorative parts and other interior plated parts.
2. In addition to the above requirements, all metal parts that will be painted shall be chemically cleaned, etched, zinc-phosphate-coat and zinc-chrome or epoxy primed or conditioned by equivalent process.

3. 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, unvented or undrained areas and surfaces subjected to abrasion during vehicle operation.
4. As evidence that the above requirements have been met, samples of materials and sections used in construction of the bus body, when subjected to 1,000-hour salt spray test as provided for in latest revision of ASTM Standard B-117 "Standard Method of Salt Spray (Fog) Testing" shall not lose more than 10 percent of its material by weight.

Mirrors

1. Interior mirrors shall be either clear laminated glass or clear view glass bonded to a backing, which retains the glass in the event of breakage. Mirrors shall have rounded corners and protected edges. Type A buses shall have a minimum of a 6" x 16" mirror and Type B, C, and D buses shall have a minimum of a 6" x 30" mirror. It shall be securely attached on the windshield header and so located as to give the driver a clear view of the entire interior of the bus and the road behind.
2. Each school bus shall be equipped with a system of exterior mirrors as defined in FMVSS 111.
 - A. Rear vision mirrors shall be capable of providing a view along the left and right sides of the vehicle which will provide the driver with a view of the rear tires at ground level, a minimum distance of 200 feet to the rear of the bus and at least 12 feet perpendicular to the side of the bus at a distance of 32 feet back from the front bumper.
 - B. The crossview mirror system shall provide the driver with indirect vision of an area at ground level from the front bumper forward and the entire width of the bus to a point where the driver can see by direct vision. The crossview system shall also provide the driver with direct vision of the area at ground level around the left and right front corners of the bus to include the tires and service entrance on all types of buses to a point where it overlaps with the rear vision mirror system. A metal reinforcement plate shall be installed under the hood area of fiberglass hoods in order to reinforce crossview mirror mounting base area.
 - C. This system of mirrors shall be easily adjustable but be rigidly braced so as to reduce vibration.

Mounting

1. The chassis frames shall support the rear body cross member. The bus body shall be attached to the chassis frame at each main floor sill, except where chassis

components interfere, in such a manner as to prevent shifting or separation of the body from the chassis under severe operating conditions.

2. Insulation material shall be placed at all contact points between the body and chassis frame on Types A, B, C and D buses, and shall be so attached to the chassis frame or body that it will not move under severe operating conditions.

Overall Length

The overall length of the bus shall not exceed 40 feet excluding accessories.

Overall Width

The overall width of the bus shall not exceed 102 inches excluding accessories.

Public Address System

Buses may be equipped with a public address system having interior and exterior speakers. Interior speakers shall be flush mounted with bulkhead.

Reflective Material

1. The front and/or rear bumper may be marked diagonally 45 degrees down to the centerline of the pavement with 2" x 1/4" wide strips of non-contrasting reflective material.
2. The rear of the bus body shall be marked with strips of reflective National School Bus Yellow (NSBY) material to outline the perimeter of the back of the bus using material which conforms with the requirements of FMVSS 571.131 (Table I). The perimeter marking of rear emergency exits per FMVSS 217 and/or the use of reflective SCHOOL BUS signs partially accomplish the objective of this requirement. To complete the perimeter marking of the back of the bus, strips of at least one-inch reflective NSBY material shall be applied horizontally above the rear windows and above the rear bumper, extending from the rear emergency exit perimeter marking outward to the left and rear corners of the bus. Vertical strips shall be applied at the corners connecting these horizontal strips.
3. **SCHOOL BUS** signs, if not of a lighted design, shall be marked with reflective NSBY material comprising a background for lettering of the front and/or rear **SCHOOL BUS** signs.
4. The sides of the bus body shall be marked with reflective NSBY material at least one inch in width, extending the length of the bus body and located (vertically) between the floor line and the belt line.

NOTE: Reflectivity of the stop signal arm is to be addressed under the Stop Signal Arm Section. Signs, if used, placed on the rear of the bus relating to school bus flashing signal lamps or railroad stop procedure may be of a reflective material [as specified by each state].

Rub Rails

1. There shall be one rub rail located on each side of the bus approximately at seat level which shall extend from the rear side of the entrance door completely around the bus body (except emergency door) to a point of curvature near the outside cowl on the left side.
2. There shall be one rub rail located approximately at the floor line which shall cover the same longitudinal area as the upper rub rail, except at the wheel housing, and shall extend only to radii of the right and left rear corners.
3. Both rub rails shall be attached at each body post and all other upright structural members.
4. Both rub rails shall be 4 inches or more in width in their finished form, shall be of 16-gauge steel or suitable material of equivalent strength, and shall be constructed in a corrugated or ribbed fashion.
5. Both rub rails shall be applied to the outside of the body or outside body posts. Pressed-in or snap-on rub rails do not satisfy this requirement. For Types A and B vehicles using a chassis manufacturer's body, or for Types C, and D buses using rear luggage or rear engine compartments, rub rails need not extend around rear corners.
6. There shall be a rub rail or equivalent bracing located horizontally at the bottom edge of the body side skirts.

Seat Belt for Driver

1. The driver's seat shall be equipped with the seat belt anchored to the floor, housed in scabbard and equipped with an emergency locking retractor (one side only). The driver's seat shall be equipped with a Type II occupant protection (lap and shoulder belt). Adjustability of the mounting point for the driver's seat belt pillar loop shall be provided to accommodate all heights and weights of bus drivers without interference with the driver's face or neck. The requirements of FMVSS 209 and 210 shall be met.
2. Each bus shall contain at least one belt cutter properly secured in a location within reach of the driver while belted into the driver's seat. The belt cutter shall be durable, designed to eliminate the possibility of the operator or others being cut during use, and must have a full hand-grip.

Seat and Crash Barriers

1. Seats shall be spaced to obtain a minimum of 24-inch hip-to-knee room measured horizontally at the seat cushion level at the transverse centerline of the seat. In making this measurement from the back of the seat cushion to the back of the seat or barrier in front, upholstery may be placed against padding both forward and rear

but padding may not be compressed. Greater seat spacing may be specified on local bids not to exceed the maximum allowable per FMVSS 222.

2. In determining seating capacity of standard school buses, the allowable average rump width shall be 13 inches where a 3-3 seating plan is used, and thirteen (13) or 15 inches where 3-2 seating plan is used on specially-equipped buses.
3. All seats shall be bench style, forward facing and have a minimum depth of 15 inches. No transit or activity seat will be used. There shall be no armrest on student seats. No bus shall be equipped with jump seats or portable seats.
4. All seat frames attached to the seat rail shall be fastened with two (2) bolts, washers and nuts or flange-headed nuts. Each seat leg shall be secured to the floor by a minimum of two (2) bolts, washers and nuts. Flange-head nuts may be used in lieu of nuts and washers, or seats may be track-mounted in conformance with FMVSS 222. If track seating is installed, the manufacturer shall supply minimum and maximum seat spacing dimensions applicable to the bus, which comply with FMVSS 222. This information shall be on a label permanently affixed to the bus.
5. The forward most pupil seat on the right side of the bus shall be located so as not to interfere with the driver's vision, not farther forward than the barrier behind the driver or the rear of the driver's seat when adjusted to its rear-most position.
6. All seats and backs shall be a standard color unless changed by purchaser. Seat and back cushions of all seats shall be designed to safely support the designated number of passengers under normal road conditions encountered in school-bus service. Coverings of seat cushions shall be of a material having 42-ounce finished weight, 54-inch width, and finished vinyl coating of 1.06 broken twill or approved equal by presenting independent laboratory reports for approval.
7. The driver seat shall be of the high back, *box pedestal-type* with a minimum seat back adjustment of 15 degrees and with a head restraint to accommodate a 95 percentile adult male (95 percentile adult male as defined in FMVSS 208). The driver's seat shall be secured with nuts, bolts, and washers or flanged-headed nuts. *The driver's seat shall have a minimum distance between the steering wheel and seatback of not less than eleven inches, with a minimum aft adjustment of six inches. The seat shall be contoured with adequate padding and support on the sides and shall have a cloth cover. It shall be designed to provide lumbar support and shall be positioned on the centerline of the steering wheel.*
8. All restraining barriers and passenger seats shall be constructed with a material that meets the criteria contained in the School Bus Seat Upholstery Fire Block Test.

9. *A driver storage pouch shall be provided on the front of the barrier behind driver's seat. This pouch shall be fire retardant and the same color as the bus seats.*
10. Crash barriers shall be placed behind the driver's seat and step well. An aluminized courtesy panel on the right side of the bus shall extend to the floor and to the wall. Stanchions are not acceptable.

Steering Wheel

See Chassis Standard.

Steps

1. The first step at the service door shall be no less than 10 inches and no more than 14 inches from the ground measured from the bottom of the first step.
 - A. Type D vehicles shall have the first step at the service door 12 to 16 inches from the ground measured from the bottom of the first step.
2. The service door entrance shall use a three-step step well. Risers shall be of equal height and depth. When a plywood floor is used on steel, the differential may be increased by the thickness of plywood.
3. Steps shall be enclosed to prevent accumulation of ice and snow.
4. Steps shall not protrude beyond the side bodyline.
5. A suitable device (or devices) shall be designed to prevent injury or fatality to passengers from being dragged. At least one such device shall assist passengers during entry or egress, and be of such design as to eliminate entanglement.

Step Treads

1. *All steps, including the floor line platform area, shall be covered with a 3/16-inch pebble-tread-type, rubber floor covering or other materials equal in wear and abrasion resistance to top grade rubber.*
2. The metal back of the tread, a minimum 24-gauge cold roll steel, shall be permanently bonded to ribbed rubber; the grooved design shall be such that said grooves run at 90-degree angles to the long dimension of the step treads.
3. A three-sixteenth-inch ribbed step tread shall have a 1 and 1/2 inch white nosing as an integral piece without any joint.
4. The rubber portion of step treads shall have the following characteristics:
 - A. Special compounding for good abrasion resistance and high coefficient of friction.

- B. Flexibility so that it can be bent around a 1/2 inch mandrel both at 130 degrees Fahrenheit and 20 degrees Fahrenheit without breaking, cracking, or crazing.
- C. Show a durometer hardness of 85 to 95.

Stirrup Step

There shall be one stirrup step on all Types B, C, and D buses on each side of the front of the body for use in cleaning the windshield and lamps. There shall be one handle on each side, at least eight inches in length suitably located for the driver to use while cleaning the windshield and lamps. The stirrup steps and the handles shall be of rust-resistant material. Transit buses shall have provisions for cleaning the windshield. Toe eyes in the bumper with a handle(s), above the windshield, are acceptable.

Stop Arm Signal

All stop arm signals shall be of the strobe-type and *have high-intensity*, reflective coating. The stop signal - arm(s) shall comply with the requirements of FMVSS 131.

Stop Arm Signal - Rear (Optional)

A rear stop arm is permissible when used in conjunction with the original stop arm. The rear stop arm location on dual stop arm-equipped buses shall be on the left side of the bus, as close as is practical to the left rear corner of the body. Vacuum or air lines if used must not be readily accessible to students inside or outside of the bus.

Storage Compartment

A lockable, waterproof, exterior storage compartment shall be located on the bus body on the right side of the bus. The minimum size of the storage compartment shall be 12 inches high, 15 inches deep, and 25 inches wide and shall be marked "storage". Alternate storage compartment locations should be specified in local school system bid specifications.

Sun Shield

Each Type B, C, and D school bus shall have an interior adjustable sun visor with minimum measurements of 6 inches by 30 inches. It shall be installed centered immediately above the windshield and anchored on both ends, and shall be tinted transparent plastic or phlex-o-glass. On all Type A buses the sun shield shall be the manufacturer's standard. An additional sun shield may be added over the left side driver window at option of the local school system.

Tailpipe

See Chassis Standard.

Traction-Assisting Devices

1. Where required or used, sanders shall:
 - A. Be of the hopper cartridge-valve type.

- B. Have a metal hopper with all interior surfaces treated to prevent condensation of moisture.
 - C. Be of at least 100-pound (grit) capacity.
 - D. Have a cover on the filler opening of the hopper, which screws into place, sealing the unit airtight.
 - E. Have discharge tubes extending to the front of each rear wheel under the fender.
 - F. Have no-clogging discharge tubes with slush-proof, non-freezing rubber nozzles.
 - G. Be operated by an electric switch with a telltale pilot light mounted on the instrument panel.
 - H. Be exclusively driver controlled.
 - I. Have a gauge to indicate the hopper needs refilling when it is down to one quarter full.
2. Automatic traction chains may be installed.

Trash Container and Holding Device

1. Where required or used, the trash container shall:
- A. Be of fire resistant polyethylene or equivalent material.
 - B. Be no greater than 14-quart capacity.
 - C. Be secured by a holding device that is designed to prevent movement and allow easy removal and replacement.
 - D. Be installed in an accessible location in the driver's compartment, not obstructing passenger use of the service door or access to emergency equipment.

Undercoating

1. The entire underside of the bus body, including floor sections, the cross member and below floor line side panels, shall be coated with rust-proofing the compound for which compound manufacturer has issued notarized certification of compliance to the bus body builder that the compound meets or exceeds all performance and qualitative requirements of paragraph 3.4 of Federal Specification TT-C-250b using modified test procedures for the following requirements*:
- A. Salt spray resistance-pass modified to 5% salt and 1000 hours.
 - B. Abrasion resistance-pass.

C. Fire resistance-pass.

*Test panels are to be prepared in accordance with paragraph 4.6.12 of TT-C-520b with the modified procedure requiring that the test be made on a 48-hour air-cured film at a thickness recommended by the compound manufacturer.

2. The undercoating compound shall be applied with suitable airless or conventional spray equipment to recommend film thickness and shall show no evidence of voids in cured film.

Ventilation

1. Auxiliary fans if installed shall meet the following requirements:
 - A. Fans for left and right sides shall be placed in a location where they can be adjusted for maximum effectiveness and do not obstruct vision to any mirror.
NOTE: All Type A buses may be equipped with one fan.
 - B. Fans shall be a nominal 6” diameter.
 - C. Fan blades shall be covered with a protective cage. Each fan shall be controlled by a separate switch.
2. The body shall be equipped with a suitably controlled ventilating system of sufficient capacity to maintain the proper quantity of air under operating conditions, without having to open windows except in extremely warm weather.
3. A static-type, non-closeable exhaust ventilator shall be installed in the roof.

Video Surveillance Equipment

1. Video equipment may be installed at the discretion of the local school system.
2. While video equipment does not have to be flush mounted, positioning of video surveillance equipment shall not interfere with the safe operation of the bus or student safety. It is recommended that the SDE be contacted prior to the installation of new video equipment.

Wheel Housing

1. The wheel-housing opening shall allow for easy tire removal and service.
2. The wheel housing shall be attached to the floor sheets in such a manner as to prevent any dust, water or fumes from entering the body. The wheel housing shall be constructed of at least 16-gauge steel or other material of equal tensile strength.
3. The inside height of the wheel housing above the floor line shall not exceed 12 inches.

4. The wheel housing shall provide clearance for installation and use of tire chains on single and dual (if so equipped) power-driving wheels.
5. No part of a raised wheel housing shall extend into the emergency door opening.

Windshield and Windows

1. All glass in the windshield, the windows, and doors shall be of approved safety glass so mounted that a permanent mark is visible and of sufficient quality as to prevent distortion of view in any direction.
2. Glass in the windshield shall be heat absorbent, laminated plate. The windshield shall be large enough to permit the driver to see the roadway clearly, shall be slanted to reduce glare, and shall be installed between the front corner posts that are so designed and placed as to afford minimum obstruction to the driver's view of the roadway.
3. All full side windows shall open vertically so as to provide an unobstructed opening of not less than 9 inches high and 22 inches wide, obtained by lowering the window. Windows shall be a split-sash type and so installed as to provide an emergency exit. There shall be no horizontal, transit or activity-style windows in the student compartment.
4. All exposed edges of glass shall meet FMVSS requirements.
5. A tinted and shaded windshield with 73% light transmitted and a six-inch shaded band across the top shall be installed at the factory. Type A-I and A-II buses utilizing the chassis manufacturers one-piece windshield may be equipped with an O.E.M. shade band windshield with a band of approximately 4 inches in height.

Windshield Washers

A windshield washer system shall be provided that will service both windshields.

Windshield Wipers

1. A windshield wiping system, two speed or variable speed, with an intermittent feature shall be provided.
2. The wipers shall be operated by one or more air or electric motors of sufficient power to operate the wipers. Type A-I and A-II buses utilizing the chassis manufacturer's one-piece windshield may be equipped with two wipers driven by either one or two electric motors.

Wiring

1. All wiring shall conform to current standards of the Society of Automotive Engineers.
2. Circuits

- A. Wiring shall be arranged in circuits as required with each circuit protected by a circuit breaker or other equivalent technology. A system of color and number coding shall be used and an appropriate identifying diagram shall be provided to the end user along with the wiring diagram provided by the chassis manufacturer. **A system of color and number coding shall be used on buses. The following body interconnecting circuits shall be color-coded as noted:**

<u>Function</u>	<u>Color</u>
Left Rear Directional Light	Yellow
Right Rear Directional Light	Dark Green
Stoplights	Red
Back-up Lights	Blue
Taillights	Brown
Ground	White
Ignition Feed, Primary Feed	Black

The color of cables shall correspond to SAE J1128.

- B. Wiring shall be arranged in at least six regular circuits as follows:
- (1) Head, tail, stop (brake) and instrument panel lamps.
 - (2) Clearance and step well lamps. The step well lamp shall be actuated when the service door is opened.
 - (3) Dome lamp.
 - (4) Ignition and emergency exits signal.
 - (5) Turn signal lamps.
 - (6) Alternately flashing signal lamps.
- C. Any of the above combination circuits may be subdivided into additional independent circuits.
- D. Each heater and defroster shall have its own circuit breakers or other equivalent technology.
- E. Whenever possible, all other electrical functions (such as sanders and electric-type windshield wipers) shall be provided with independent and properly protected circuits.

- F. Each body circuit shall be coded by number or letter on a diagram of circuits and shall be attached to the body in readily accessible location.
3. The entire electrical system of the body shall be designed for the same voltage as the chassis on which the body is mounted.
 4. All wiring shall have an amperage capacity equal to or exceeding the designed load. All wiring splices are to be done at an accessible location and noted as splices on the wiring diagram.
 5. A body-wiring diagram of easily readable size shall be furnished with each bus body or affixed in an area convenient to the electrical accessory control panel.
 6. The body power wire shall be attached to a special terminal on the chassis.
 7. All wires passing through metal openings shall be protected by a grommet.
 8. Wires and tubing shall be enclosed within body panels.

SECTION IV – SPECIALLY EQUIPPED SCHOOL BUS STANDARDS

Introduction

Equipping buses to accommodate students with special needs is discretionary depending upon the needs of the passengers. While one bus may be fitted with a lift, another may have seat belts installed to secure child seats. Buses so equipped are not to be considered a separate class of school bus, but simply a regular school bus, which is equipped for special accommodations.

The specifications in this section are intended to be supplementary to specifications in the chassis and body sections. In general, specially equipped buses shall meet all the requirements of the preceding sections plus those listed in this section. It is recognized by the entire industry that the field of special transportation is characterized by varied needs for individual cases and by a rapidly emerging technology for meeting those needs. A flexible, “common sense”, approach to the adoption and enforcement of specifications for these vehicle, therefore, is prudent.

By federal regulation, buses, including school buses, are defined as vehicles designed to carry eleven or more (passengers including the driver). Vehicles designed with 10 or fewer passenger positions (including the driver) cannot be certified as buses. For this reason, the federal vehicle classification Multipurpose Passenger Vehicle, or MPV, must be used by manufacturers for these vehicles in lieu of the School Bus. In determining passenger capacity, wheelchair positions are counted as passenger positions. This classification system, while requiring compliance with a less stringent set of Federal Standards for MPV’s does not preclude state or local agencies or these National Standards from requiring compliance of school bus-type MPV’s with the more stringent Federal Standards for school buses.

The following standards address modifications as they pertain to school buses that, with a standard seating arrangement prior to modification, would accommodate more than 10 persons. If by addition of a power lift, mobile seating device positions or other modifications, the capacity is reduced such that vehicles become MPV’s, the intent of these standards is to have these vehicles be required to meet the same standards they would have had to meet prior to such modifications, and such MPV’s are included in all references to school buses and requirements for school buses which follow:

General Requirements

1. School buses designed for transporting students with special transportation needs shall comply with National Standards and with FMVSS applicable to their GVWR category.
2. Any school bus to be used for the transportation of children who are confined to a wheelchair or other mobile positioning device, or who require life support equipment which prohibits use of the regular service entrance, shall be equipped with a power lift, unless a ramp is needed for unusual circumstances related to passenger needs.

Air Conditioning

Special needs buses may be equipped with air conditioning if the local education agency (LEA) desires. (See page 14)

Aisles

All school buses equipped with a power lift shall provide a minimum 30-inch aisle leading from wheelchair position to at least one emergency door and the lift area.

Communication

All special needs school buses shall be equipped with an electronic, two-way, voice communication device. The system shall be provided by either the LEA or the manufacturer.

Crash Barriers

1. Crash barrier shall be placed between the lift and any seat position (bench seat or wheelchair position). Stanchions are not acceptable.
2. There shall be a padded crash barrier approximately 8 inches in front of the forward edge of the seat cushion of all passenger seats that do not have another seat approximately 27 inches in front of them. There shall be a padded crash barrier or seat in front of any wheelchair position unless it is contiguous with and behind another wheelchair position. The forward-most barrier on both sides of the bus shall have a full-width, aluminized courtesy panel extending to the floor.

Evacuation Blanket

A fire-retardant evacuation blanket, Tie Tech Evac-Aide Part # 1003, or prior-approved equal, and storage pouch shall be provided. The location to secure the evacuation blanket shall be determined by the purchaser at the time of the bid.

Glazing

Tinted glazing may be installed in all doors, windows and windshield consistent with federal, state, and local regulations.

Identification

Buses with power lifts used for transporting physically handicapped students shall display three universal handicapped symbols located below the windowpane. Such emblems shall be white on blue background, shall not exceed 12 inches in size, and shall be of a high-intensity reflectorized material meeting U. S. Department of Transportation FHWA FP-85 Standards. Symbols shall be located on the lift door, the rear of the bus and the front bumper.

Passenger Capacity Rating

In determining the passenger capacity of a school bus for purposes other than actual passenger load (i.e., vehicle classification, or various billing/reimbursement models), any location in a school bus intended for securing an occupied wheelchair/mobility aid

during vehicle operations may be regarded as four designated seating positions. Similarly, each lift area may be regarded as four designated seating positions.

Power Lift

1. The option shall be provided to the local purchaser to have the lift located either in front of or behind the rear wheels, on the right side of the bus, but confined within the bus body when not extended.
2. All lifts shall be fully automatic with sufficient clearances to permit a wheelchair or other mobility user to reach a securement location.
3. The design load of the lift shall be at least 600 pounds. Working parts, such as cables, pulleys, and shafts, which can be expected to wear, and upon which the lift depends for support of the load, shall have a safety factor of at least 6 (six), based on the ultimate strength of the material. Non-working parts, such as the platform, frame, and attachment hardware, which would not be expected to wear, shall have a safety factor of at least 3 (three), based on the ultimate strength of the material.
4. The lifting mechanism and platform shall be able to lift a minimum of 800 pounds.
5. Controls shall be provided that enable the operator to activate the lift mechanism from either inside or outside the bus. *The controls shall be interlocked with the vehicle brakes, transmission, or door, when required by FMVSS 403 and 404.* The lift shall deploy to all levels (i.e., ground, curb, and intermediate positions) normally encountered in the operating environment. Where provided, each control for deploying, lowering, raising, and stowing the lift and lowering the roll-off barrier shall be of a momentary contact type requiring continuous manual pressure by the operator and shall not allow improper lift sequencing when the lift platform is occupied. The controls shall allow reversal of the lift operation sequence, such as raising or lowering a platform that is part way down, without allowing an occupied platform to fold or retract into the stowed position.
6. The lift shall incorporate an emergency method of deploying, lowering to ground level with a lift occupant, and raising and stowing the empty lift if the power to the lift fails. No emergency method, manual or otherwise, shall be capable of being operated in a manner that could be hazardous to the lift occupant or to the operator when operated according to manufacturer's instructions and shall not permit the platform to be stowed or folded when occupied. No manual emergency operation shall require more than 2 (two) minutes to lower an occupied wheelchair to ground level.
7. Platforms stowed in a vertical position, and deployed platforms when occupied, shall have provisions to prevent their deploying, falling, or folding any faster than 12 inches per second or their dropping of an occupant in the event of a single failure of any load carrying component.

8. The lift platform shall be equipped with barriers to prevent any of the wheels of a wheelchair or mobility aid from rolling off the platform during its operation. A movable barrier or inherent design feature shall prevent a wheelchair or mobility aid from rolling off the edge closest to the vehicle until the platform is in its fully raised position. Each side of the lift platform, which extends beyond the vehicle in its raised position, shall have a barrier a minimum 1 and 1/2 inches high. Such barriers shall not interfere with maneuvering into or out of the aisle. The loading-edge barrier (outer barrier), which functions as a loading ramp when the lift is at ground level, shall be sufficient when raised or closed, or a supplementary system shall be provided, to prevent a power wheelchair or mobility aid from riding over or defeating it. The outer barrier of the lift shall automatically raise or close, or a supplementary system shall automatically engage, and remain raised, closed, or engaged at all times that the platform is more than 3 inches above the roadway or sidewalk and the platform is occupied. Alternatively, a barrier or system may be raised, lowered, opened, closed, engaged, or disengaged by the lift operator, provided an interlock or inherent design feature prevents the lift from rising unless the barrier is raised or closed or the supplementary system is engaged.
9. The platform surface shall be free of any protrusions over 1/4 inch high and shall be slip resistant. The platform shall have a minimum clear width of 28 and 1/2 inches at the platform, a minimum clear width of 30 inches measured from 2 inches above the platform surface to 30 inches above the surface of the platform, and a minimum clear length of 48 inches measured from 2 inches above the surface of the platform to 30 inches above the surface of the platform.
10. Any openings between the platform surface and the raised barriers shall not exceed 5/8 inches in width. When the platform is at vehicle floor height with the inner barrier (if applicable) down or retracted, gaps between the forward lift platform edge and the vehicle floor shall not exceed 1/2 inches horizontally and 5/8 inches vertically.
11. The outboard entrance ramp or loading-edge barrier used as a ramp and the transition plate from the inboard edge of the platform to the vehicle floor shall not exceed a slope of 1:8, measured on level ground, for a maximum rise of three inches, and the transition from roadway or sidewalk to ramp may be vertical without edge treatment up to 1/4 inches.

Thresholds between 1/4 inch and 1/2 inch high shall be beveled with a slope no greater than 1:2.

12. The lift platform (not including the entrance ramp) shall not deflect more than three degrees (exclusive of vehicle roll or pitch) in any direction between its unloaded position and its position when loaded with 60 pounds applied through a 26" by 26" test pallet at the centroid of the platform.

13. No part of the platform shall move at a rate exceeding 6 inches per second during lowering and lifting an occupant, and shall not exceed 12 inches per second during deploying or stowing. This requirement does not apply to the deployment or stowage cycles of lifts that are manually deployed or stowed. The maximum platform horizontal and vertical acceleration when occupied shall be 0.3 g.
14. The lift shall permit both inboard and outboard facing of wheelchair and mobility aid users.
15. Lifts shall accommodate persons using walkers, crutches, canes or braces, or who otherwise have difficulty using steps. The platform may be marked to indicate a preferred standing position.
16. Platforms on lifts shall be equipped with handrails on two sides, which move in tandem with the lift, and which shall be graspable and provide support to standees throughout the entire lift operation. Handrails shall have a usable component at least 8 inches long with the lowest portion a minimum 30 inches above the platform and the highest portion a maximum 38 inches above the platform. The handrails shall be capable of withstanding a force of 100 pounds concentrated at any point on the handrail without permanent deformation of the rail or its supporting structure. The handrails shall have a cross-sectional diameter between 1 and 1/4 inches and 1 and 1/2 inches or shall provide an equivalent grasping surface, and have eased edges with corner radii of not less than 1/8 inch. Handrails shall be placed to provide a minimum 1 and 1/2" knuckle clearance from the nearest adjacent surface. Handrails shall not interfere with wheelchair or mobility aid maneuverability when entering or leaving the vehicle. Any wheelchair frame utilizing a horizontal overhead support shall have padding at least 1" in thickness extending the full width of support.
17. A re-settable circuit breakers or other equivalent technology shall be installed between the power source and the lift motor if electrical power is used. It shall be located as close to the power source as possible, but not within the passenger/driver compartment.
18. Lift design shall prevent excessive pressure that could damage the lift system when the platform is fully lowered or raised, or that could jack the vehicle.
19. The following information shall be provided with each vehicle equipped with a lift:
 - A. A phone number where information can be obtained about installation, repair, and parts. (Detailed written instructions and a parts list shall be available upon request.)

- B. Detailed instructions regarding use of the lift and readily visible when the lift door is open, including a diagram showing the proper placement and positioning of wheelchair/mobility aids on lift.
20. The lift manufacturer shall make available training materials to ensure the proper use and maintenance of the lift. These may include instructional videos, classroom curriculum, system test results, or other related materials.
 21. Each lift shall be permanently and legibly marked or incorporate a non-removable label or tag which states that it conforms to all applicable requirements of the current National Standards for School Buses. In addition, the lift manufacturer, or an authorized representative, upon request of the original titled purchaser, shall provide a Notarized Certificate of Conformance, either original or photocopied, which states that the lift system meets all the applicable requirements of the current National Standards for School Buses.

Ramp

Emergency ramps may be used with prior approval from the SDE.

Regular Service Entrance

1. Steps

- A. The first step at the service door shall be not less than 10 inches and not more than 14 inches from the ground when measured from the bottom of the step based on standard chassis specifications.

(1) A Type D vehicle shall have the first step at the service door 12 to 16 inches from the ground.

2. The service door entrance shall use a three-step step well. Risers shall be of equal height and depth. When a plywood floor is used on steel, the differential may be increased by thickness of plywood.
3. Steps shall be enclosed to prevent accumulation of ice and snow.
4. Steps shall not protrude beyond the side bodyline.
5. A grab handle not less than 20 inches in length shall be provided in an unobstructed location inside the doorway.

Restraining Devices

1. On power-lift equipped vehicles, seat frames may be equipped with attachments or devices to which belts, restraining harnesses or other devices may be attached. Attachment framework or anchorage devices, if installed, shall conform to FMVSS 210.

2. Seat belt assemblies may be installed on special needs buses, and shall conform to FMVSS 209. Seat belt assemblies shall be color-coded, installed by the manufacturer, and must conform to FMVSS 209.
3. Child restraint systems, which are used to facilitate the transportation of children who in other modes of transportation would be required to use a child, infant, or booster seat, shall conform to FMVSS 213 and 222.

Seating Arrangements

Flexibility in seat spacing to accommodate special circumstances shall be permitted to meet passenger requirements. All seating shall be forward facing.

Securement and Restraint System for Wheelchair/Mobility Aid and Occupant

For purposes of better understanding the various aspects and components of this section, the term securement or phrase securement system is used exclusively in reference to the device(s), which secure the wheelchair/mobility aid. The term restraint or phrase restraint system is used exclusively in reference to the device(s) used to restrain the occupant of the wheelchair/mobility aid. The phrase securement and restraint system is used to refer to the total system, which secures and restrains both the wheelchair/mobility aid and the occupant.

1. Securement and restraint system--general
 - A. The Wheelchair/Mobility Aid Securement and Occupant Restraint System shall be designed, installed, and operated to accommodate passengers in a forward-facing orientation within the bus and shall comply with all applicable requirements of FMVSS 222. Gurney-type devices shall be secured parallel to the side of each bus.
 - B. The securement and restraint system, including the system track, floor plates, pockets, or other anchorages shall be provided by the same manufacturer, or be certified to be compatible by manufacturers of all equipment/systems used.
 - C. When a wheelchair/mobility aid securement device and an occupant restraint share a common anchorage, including occupant restraint designs that attach the occupant restraint to the securement device or the wheelchair/mobility aid, the anchorage shall be capable of withstanding the loads of both the securement device and occupant restraint applied simultaneously, in accordance with FMVSS 222 (see Sections 2 and 3 of this section).
 - D. When a wheelchair/mobility aid securement device (webbing or strap assembly) is shared with an occupant restraint, the wheelchair/mobility aid securement device (webbing or strap assembly) shall be capable of withstanding a force twice the amount as specified in Section 4.4(a) of FMVSS 209 (see Sections 2 and 3 of this section).

- E. The bus body floor and sidewall structures where the securement and restraint system anchorages are attached shall have equal or greater strength than the load requirements of the system(s) being installed.
- F. The occupant restraint system shall be designed to be attached to the bus body either directly or in combination with the wheelchair/mobility aid securement system, by a method, which prohibits the transfer of weight or force from the wheelchair/mobility aid to the occupant in the event of an impact.
- G. When an occupied wheelchair/mobility aid is secured in accordance with the manufacturer's instructions, the securement and restraint system shall limit the movement of the occupied wheelchair/mobility aid to no more than 2 inches in any direction under normal driving conditions.
- H. The securement and restraint system shall incorporate an identification scheme, which will allow for the easy identification of the various components and their functions. It shall consist of one of the following, or combination thereof:
 - (1) The wheelchair/mobility aid securement (webbing or strap assemblies) and the occupant restraint belt assemblies shall be of contrasting color or color shade.
 - (2) The wheelchair/mobility aid securement device (webbing or strap assemblies) and occupant restraint belt assemblies shall be clearly marked to indicate the proper wheelchair orientation in the vehicle, and the name and location for each device or belt assembly; i.e., front, rear, lap belt, shoulder belt.
- I. All attachment or coupling devices designed to be connected or disconnected frequently shall be accessible and operable without the use of tools or other mechanical assistance.
- J. The securement and restraint system hardware and components shall be free of sharp or jagged areas and shall be of a non-corrosive material or treated to resist corrosion in accordance with Section 4.3(a) of FMVSS 209.
- K. The securement and restraint system shall be located and installed such that when an occupied wheelchair/mobility aid is secured, it does not block access to the lift door or emergency door.
- L. A device for storage of the securement and restraint system may be provided. When the system is not in use, the storage device shall allow for clean storage of the system, shall keep the system securely contained within the passenger compartment, shall provide reasonable protection from vandalism, and shall enable the system to be readily accessed for use.

- M. The entire securement and restraint system, including the storage device, shall meet the flammability standards established in FMVSS 302.
- N. Each securement device (webbing or strap assembly) and restraint belt assembly shall be permanently and legibly marked or incorporate a non-removable label or tag which states that it conforms to all applicable FMVSS requirements. In addition, the system manufacturer, or an authorized representative, upon request by the original titled purchaser, shall provide a notarized Certificate of Conformance, either original or photocopied, which states that the wheelchair/mobility aid securement and occupant restraint system meets all of the requirements as specified in FMVSS 222.
- O. The following information shall be provided with each vehicle equipped with a securement and restraint system:
 - (1) A phone number where information can be obtained about installation, repair, and parts. (Detailed written instructions and a parts list shall be available upon request.)
 - (2) Detailed instructions regarding use, including a diagram showing the proper placement of the wheelchair/mobility aids and positioning of securement devices and occupant restraints, including correct belt angles.
- P. The system manufacturer shall make available training materials to ensure the proper use and maintenance of the wheelchair/mobility aid securement and occupant restraint system. These may include instructional videos, classroom curriculum, system test results, or other related materials.

2. Wheelchair/mobility aid securement system

- A. Each securement system location shall consist of a minimum of four anchorage points. A minimum of two anchorage points shall be located in front of the wheelchair/mobility aid and a minimum of two anchorage points shall be located in the rear. The securement anchorages shall be attached to the floor of the vehicle and shall not interfere with passenger movement or present any hazardous condition.
- B. Each securement system location shall have a minimum clear floor area of 30" x 48". Additional floor area may be required for some applications. Consultation between the user and the manufacturer is recommended to ensure adequate area is provided.
- C. The securement system shall secure common wheelchair/mobility aids and shall be able to be attached easily by a person having average dexterity and who is familiar with the system and wheelchair/mobility aid.

- D. As installed, each securement anchorage shall be capable of withstanding a minimum force of 3,000 pounds (13,344 Newtons) when applied as specified in FMVSS 222. When more than one securement device share a common anchorage, the anchorage shall be capable of withstanding the force indicated above, multiplied by the number of securement devices sharing that anchorage.
- E. Each securement device, if incorporating webbing or a strap assembly, shall comply with the requirements for Type 1 safety belt systems, in accordance with Sections 4.2, 4.3, and 4.4(a) of FMVSS 209.
- F. The securement system shall secure the wheelchair/mobility aid in such a manner that the attachments or coupling hardware will not become detached when any wheelchair/mobility aid component deforms, when one or more tires deflate, and without intentional operation of a release mechanism (e.g., a spring clip on a securement hook).
- G. Each securement device (webbing or strap assembly) shall be capable of withstanding a minimum force of 2,500 pounds when tested in accordance with FMVSS 209.
- H. Each securement device (webbing or strap assembly) shall provide a means of adjustment of manufacturer's design, to remove slack from the device or assembly.
- I. Each securement device, webbing, or strap assembly shall be of the automatic, retractable type.

3. Occupant restraint system

- A. A Type II-A occupant restraint system, which meets all applicable requirements of FMVSS 209 and 210, shall provide for restraint of the occupant.
- B. The occupant restraint system shall be made of materials, which do not stain, soil, or tear an occupant's clothing, and which are resistant to water damage and fraying.
- C. Each restraint system location shall have not less than one anchorage, of manufacturer's design, for the upper end of the upper torso restraint.
 - (1) The anchorage for each occupant's upper torso restraint shall be capable of withstanding a minimum force of 1,500 pounds (6,672 Newtons) when applied as specified in FMVSS 222.
- D. Each wheelchair/mobility aid location shall have not less than two floor anchorages for the occupant pelvic and the connected upper torso restraint.

- (1) Each floor anchorage shall be capable of withstanding a minimum force of 3,000 pounds (13,344 Newtons) when applied as specified in FMVSS 222.
 - (2) When more than one occupant restraint share a common anchorage, the anchorage shall be capable of withstanding a minimum force of 3,000 pounds (13,344 Newtons) multiplied by the number of occupant restraints sharing the common anchorage in accordance with FMVSS 222.
- E. Each floor and wall anchorage which secures the occupant restraint to the vehicle and which is not permanently attached, shall be of a “positive latch” design, and shall not allow for any accidental disconnection.

Special Light

Doorways, in which lifts are installed, shall have, lighting as written in the 2000 National School Transportation Specifications and Procedures manual until the implementation of FMVSS 403 and 404.

Special Service Entrance

1. Power lift equipped bodies shall have a special service entrance to accommodate the power lift.
2. The special service entrance and door shall be located on the right side of the bus and shall be designed so as not to obstruct the regular service entrance.
3. The opening may extend below the floor through the bottom of the body skirt. If such an opening is used, reinforcements shall be installed at the front and rear of the floor opening to support the floor and give the same strength as other floor openings.
4. A drip molding shall be installed above the opening to effectively divert water from entrance.
5. Door posts and headers from entrance shall be reinforced sufficiently to provide support and strength equivalent to the areas of the side of the bus not used for special service entrance.

Special Service Entrance Doors

1. A single door or double doors may be used for the special service entrance.
2. A single door shall be hinged to the forward side of the entrance unless doing so would obstruct the regular service entrance. If, due to the above condition, the door is hinged to the rearward side of the doorway, the door shall utilize a safety mechanism, which will prevent the door from swinging, open should the primary door latch fail. If double doors are used the system shall be designed to prevent the door(s) from being blown open by the wind resistance created by the forward

motion of the bus, and/or incorporate a safety mechanism to provide secondary protection should the primary latching mechanism(s) fail.

3. All doors shall have positive fastening devices to hold doors in the open position.
4. All doors shall be weather sealed on buses with double doors. They shall be so constructed that a flange on the forward door overlaps the edge of the rear door when closed.
5. When manually operated dual doors are provided, the rear door shall have at least a one-point fastening device to the header. The forward-mounted door shall have at least three-point fastening devices. One shall be to the header, one to the floor line of the body, and the other shall be into the rear door. The door and hinge mechanism shall be of a strength that is greater than or equivalent to the emergency exit door.
6. Door materials, panels and structural strength shall be equivalent to the conventional service and emergency doors. Color, rub rail extensions, lettering and other exterior features shall match adjacent sections of the body.
7. Each door shall have windows set in rubber, which are visually similar in size and location to adjacent non-door windows. Glazing shall be of same type and tinting (if applicable) as standard fixed glass in other body location.
8. Door(s) shall be equipped with a device that will actuate a flashing visible signal located in the driver's compartment when the door(s) is open and ignition is in "on" position.
9. A switch shall be installed so that the lifting mechanism will not operate when the lift platform door(s) is closed.
10. Special service entrance doors shall be equipped with padding at the top edge of the door opening. Pad shall be at least three inches wide and one inch thick and extend the full width of the door opening.

Support Equipment and Accessories

1. Each bus shall contain at least one belt cutter properly secured in a location within reach of the driver while belted into his/her driver's seat. The belt cutter shall be durable, designed to eliminate the possibility of the operator or others being cut during use, and must have a full hand-grip.
2. Special equipment or supplies which are used on the bus for mobility assistance, health support, or safety purposes shall meet any local, federal, or engineering standards which may apply, including proper identification.

Equipment which may be used for these purposes includes, but is not limited to:

- A. Wheelchairs and other mobile seating devices (see section on Securement System for Mobile Seating Devices/Occupant).
 - B. Crutches, walkers, canes, and other ambulating devices.
 - C. Medical support equipment. This may include respiratory devices such as oxygen bottles (which should be no larger than 22 cubic feet for liquid oxygen and 38 cubic feet for compressed gas), or ventilators. Tanks and valves should be located and positioned to protect them from direct sunlight, bus heater vents, or other heat sources. Other equipment may include intravenous, and fluid drainage apparatus. Appropriate medical placarding if needed shall be added by the LEA.
3. All portable equipment and special accessory items, including the equipment listed above, shall be secured at the mounting location to withstand a pulling force of five times the weight of the item, or shall be retained in an enclosed, latched compartment. The compartment shall be capable of withstanding forces applied to its interior equal to five times the weight of its contents without failure to the box's integrity and securement to the bus. Exception: If these standards provide specific requirements for securement of a particular type of equipment, the specific standard shall prevail (i.e., wheelchairs).

SECTION V - ALTERNATE FUEL SOURCE STANDARDS

1. The guidelines contained herein shall pertain only to the school buses approved by the Alabama State Board of Education to operate on alternative fuel sources and which meet the safe operation requirements of paragraph B-1.
 - A. Any company or individual servicing conversion equipment to school districts shall provide an approved certification program covering installation, personnel training, maintenance, repair, trouble-shooting and safety procedures for each responsible mechanic to assure that conversion and maintenance is performed only by personnel certified by the Alabama LP-Gas Board or other approved agency.
 - B. These companies or individuals shall submit to the Alabama State Department of Education, Pupil Transportation Section, Montgomery, Alabama, 36130, documentation certifying that the requirements of 1-A have been met.

SECTION VI - OPTIONS

Lock Fuel Compartment Door

Provide at the option of the purchaser a lock and key to secure the fuel compartment door.

Storage Compartment for Required Emergency Equipment

Provide at the option of the purchaser a storage compartment located in the driver's compartment to house the emergency equipment. It shall be a locked compartment with a warning buzzer attached so as to activate when the ignition switch is on and the compartment is locked.

Engine Fire Suppression System

Provide at the option of the purchaser an engine fire suppression system for either special needs or regular route buses. System shall be a **JOMAR**, vehicle fire suppression system or approved equal.

SECTION VII – MULTIFUNCTIONAL SCHOOL ACTIVITY BUS (MFSAB)

DEFINITION:

A Multifunctional School Activity Bus (MFSAB) is a school bus constructed to Federal Motor Vehicle Safety Standards (FMVSS) and Alabama Minimum School Bus Specifications. It must be purchased or leased as a new bus and may only be used for extracurricular activities. **These buses may not be used to transport students to and from schools or between schools for the purpose of attendance.**

The following exceptions to the Alabama Minimum Specifications for School Buses for regular route buses shall be allowed for these vehicles.

Identification:

1. The bus body shall bear the words “**ACTIVITY BUS**” in black letters at least 8 inches high in the area where “school bus” is normally positioned. Lettering shall conform to FMVSS and Alabama Minimum Specifications and shall meet reflectivity standards.
2. The name of the school system shall be displayed in six-inch letters on both sides of the bus in the beltline area. **NO SIGNS OR LOGOS** shall be applied to any area of the bus including the bumpers. The name of the school may be displayed in the beltline area. No signs, logos, or other items shall be displayed on the windows of the bus.

Color:

The local school with school system approval may determine the color of the activity bus. The color scheme may utilize any combination of up to **THREE** colors. This combination may be in addition to an optional white roof. The color National School Bus Yellow (SBMTC-008 Publication) shall not be used as a part of the color scheme.

School systems and/or vendors shall submit preliminary color schemes to the Alabama Department of Education, Pupil Transportation Section for approval **prior to the purchase or manufacture** of a Multifunctional School Activity Bus (MFSAB).

Seating:

Transit style seats, which meet all aspects of FMVSS 222 and 302, may be used in lieu of regular school bus seats.

Lighting and Warning Devices:

All activity buses shall meet state and federal standards for normal school bus lighting and warning device requirements with the following exceptions:

Multifunctional School Activity Buses (MFSAB) may not be equipped with alternately flashing amber or red signal lamps used for loading and unloading students.

Multifunctional School Activity Buses (MFSAB) may not be equipped with stop arm signals or crossing control arms.

INSPECTIONS:

Annual inspection by Alabama Department of Education (SDE) state school bus inspectors and monthly inspections by local school bus inspectors shall be performed on all Multifunctional School Activity Buses (MFSAB) as required by Alabama law and the Rules of the Alabama State Board of Education.

REGULATIONS:

These buses shall be owned by the local school system or leased from private school bus transportation contractors. All Alabama laws, Rules of the State Board of Education, and other applicable regulations pertaining to the operation of school buses and certification of school bus drivers shall apply to Multifunctional School Activity Buses.

LAST NUMBERED PAGE

ALABAMA MINIMUM SPECIFICATIONS 2003
QUICK REFERENCE CHART

****TYPE A-I SCHOOL BUS****

Type A-I and A-II buses under 14,500 pounds GVWR shall be built to manufacturer's specifications.
 All type A buses under 14,500 pounds GVWR shall have four-wheel disc brakes.

****TYPE A-II SCHOOL BUS****
(Over 14,500 pounds)

CAPACITY	BRAKE LINING SIZE	GAWR FRONT	GAWR REAR	GVWR TOTAL	TIRE SIZE
10-47	4" Front 6" Rear	9,000	14,200	23,200	10R x 22.5 10 ply

Type A-II school buses exceeding 14,500 pounds GVWR shall have air brakes.

****TYPE B SCHOOL BUS****

Type B school buses shall be built to manufacturer's specifications.
 Exception: All Type B buses shall have four-wheel disc brakes.

****TYPE C SCHOOL BUS****

8-47	4" Front 6" Rear	9,000	14,200	23,200	10R x 22.5 10 ply
48-54	4" Front 6" Rear	9,000	16,000	25,000	10R x 22.5 10 ply
55-72	4" Front 7" Rear	9,000	17,500	26,500	10R x 22.5 12 ply

Type C school buses exceeding 72 capacity shall have prior, written SDE approval.

****TYPE D FRONT ENGINE****

8-53	4" Front 6" Rear	10,800	17,000	27,800	10R x 22.5 10 ply
54-66	5" Front 7" Rear	11,000	17,000	28,000	10R x 22.5 10 ply
68-78	5" Front 7" Rear	11,000	19,000	30,000	11R x 22.5 14 ply
79-84	6" Front 8" Rear	13,000	20,000	33,000	11R x 22.5 16 ply

****TYPE D REAR ENGINE****

42-66	5" Front 7" Rear	12,000	19,000	30,000	11R x 22.5 16 ply
68-78	6" Front 7" Rear	12,000	19,000	30,000	11R x 22.5 16 ply
79-84	6" Front 8" Rear	12,000	21,000	33,000	11R x 22.5 16 ply

Type D school buses exceeding 84-capacity shall have prior, written SDE approval.