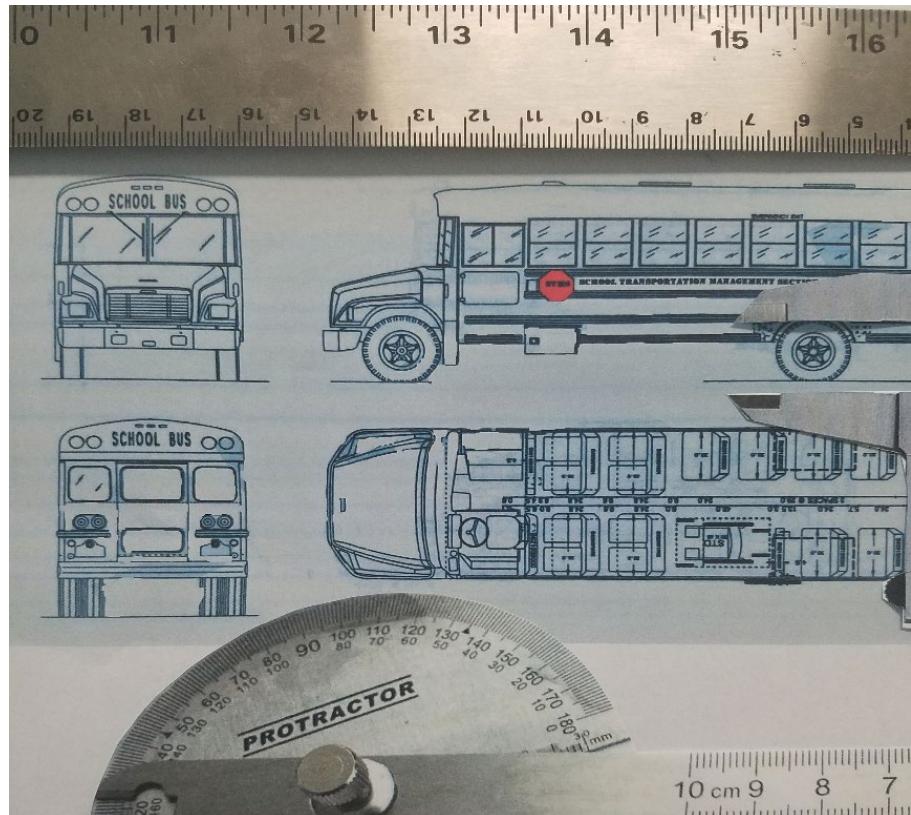


# **FLORIDA**

## **SCHOOL BUS SPECIFICATIONS**

### **Effective January 1, 2023**



FLORIDA DEPARTMENT OF  
**EDUCATION**  
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## **FOREWORD**

Florida School Bus Specifications are adopted as authorized under section (s.) 1006.25, Florida Statutes (F.S.), and rule 6A-3.003, Florida Administrative Code (F.A.C.). The effective date of this edition of the Florida School Bus Specifications is January 1, 2023.

# **GENERAL INFORMATION AND WARRANTY PROVISIONS**

All public school buses (bodies and chassis) owned, operated, rented, leased, and contracted for by any public school board or charter school in Florida, used to transport children to and from school or school-related events, and purchased after the effective date of this document, as specified in rule 6A-3.003, F.A.C., must:

1. Meet or exceed the minimum requirements of these specifications;
2. Meet all applicable Federal Motor Vehicle Safety Standards (FMVSS); and
3. Meet or exceed the 2015 National School Transportation Specifications and Procedures (also referred to herein as the 2015 National Specifications), except when in conflict with the requirements herein. In such cases, the requirements specified in this document shall prevail.

The requirements specified herein are the **minimum** requirements for school buses in Florida. The date used to determine the applicability of these specifications is defined as the date the vendor receives the purchase order or signs a valid sales contract with the purchaser.

All school bus chassis and body manufacturers must certify to the Commissioner of Education, Florida Department of Education (department), by letter that all school buses offered for sale to or use by the public school systems, including charter schools, in Florida meet or exceed all standards, specifications and requirements specified herein.

Used school buses purchased or operated by a public school board or charter school in Florida must meet or exceed all federal and state requirements for public school buses that were in effect on the date the vehicle was manufactured.

Under the authority of s. 316.615, F.S., certain capacity school buses owned, operated, or leased by nonpublic schools in Florida are required to meet the specifications prescribed herein.

## **DEFINITIONS:**

1. **School Bus (State Definition):** Section 1006.25, F.S., defines a “school bus” as “a motor vehicle regularly used for the transportation of prekindergarten disability program and kindergarten through grade 12 students of the public schools to and from school or to and from school activities, and is owned, operated, rented, contracted, or leased by any district school board...”
2. **School Bus (Federal Definition):** Title 49 CFR Part 571.3 defines “school bus” as “a bus that is sold or introduced in interstate commerce for purposes that include carrying students to and from school or related events.”
3. **Multi-Function School Activity Bus (MFSAB):** The state definition of MFSAB is defined by Florida school bus specifications as a school bus constructed to FMVSS and Florida school bus specifications to be used for school-related activities. MFSABs may not be used to transport students to and from school.
4. **MFSAB (Federal Definition):** Title 49 CFR Part 571.3 defines MFSAB as a school bus NOT used to transport students to and from home or school bus stops.

## **SCHOOL BUS TYPES:**

1. **Type A:** A school bus that is constructed using a cutaway front-section vehicle with a left side driver’s door. This definition includes two classifications: Type A-1, with a Gross Vehicle Weight Rating (GVWR) of 14,500 pounds or less, and Type A-2, with a GVWR greater than 14,500 pounds and less than or equal to 21,500 pounds.
2. **Type C:** A school bus that is constructed using a chassis with a hood and front fender assembly. The entrance door is behind the front wheels. This type also includes the cutaway truck chassis or truck chassis with cab, with or without a left side door, and with a GVWR greater than 21,500 pounds. It is also known as a conventional school bus.
3. **Type D:** A school bus that is constructed using a stripped chassis. The entrance door is ahead of the front wheels. This type bus is also known as a rear engine or front engine transit-style school bus.

### **MFSAB:**

This can be a Type A, C, or D school bus as described above, with the following exceptions:

- **Identification:** 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 *Florida School Bus Specifications* and shall meet reflectivity standards. The numbering on this bus may be of a contrasting color. The name of the school system shall be displayed in at least 6-inch letters on both sides of the bus in the beltline area. School or team lettering no larger than 6 inches high and logos no larger than 12 inches high may be placed below the beltline. **NO additional SIGNS OR LOGOS** shall be applied to any area of the bus, including the bumpers and the windows.
- **Color:** The local school board must determine and approve the color of the activity bus. The color scheme may use any combination of up to **three** colors. This combination may be in addition to an optional white roof. The color National School Bus Yellow shall not be used as a part of the color scheme. The bus wheels shall **not** be painted black or yellow; however, they may be painted one of the three colors selected for the bus body or may be unpainted aluminum-finished polished wheels.
- **Seating:** Type 2 lap/shoulder seat belts are required for all seating positions, including the driver’s seat.
- **Lighting and Warning Devices:** All activity buses shall meet state and federal standards for home-to-school bus lighting and warning device requirements, with the following exceptions:
  1. MFSABs shall not be equipped with alternately flashing amber and red student warning signal lamps used for loading and unloading students; and
  2. MFSABs shall not be equipped with stop arm signals or crossing control arms.

### **WARRANTIES AND PARTS AVAILABILITY FOR NEW VEHICLES:**

All warranties listed herein must apply to all school buses manufactured after the effective date of these specifications and sold through the state school bus bid purchase program. Body and chassis manufacturers' warranty policies must allow revision of warranty start date for each vehicle to the actual in-service date by the school district. Appropriate forms to update chassis warranties must be included in the owner-operator's packet supplied with the chassis and must be conveyed along with the body warranty by the body builder to the district upon delivery of the completed unit. Above requirements must apply to the basic warranties, all component warranties and any extended warranties offered or required. There must be no hours-of-use limitation on any warranty required in these specifications or the associated state bid for school buses.

Manufacturers offering school bus chassis or bodies for sale in the state of Florida must make available replacement parts for said buses for a period of no less than 120 months.

The minimum labor rate for all warranty related repairs must be **\$75.00** per hour.

### **CHASSIS WARRANTIES:**

1. The minimum chassis warranty shall be **12,000 miles or 12 months**.
2. The standard chassis warranty for Florida school bus bids shall be **100,000 miles or 60 months**.
3. Engines (including flywheel, flex plate, and harmonic balancer) on Types A, C, and D chassis must be included with both minimum chassis warranty and standard chassis warranty as described above.
4. Pricing requests will be added to the bid for the following extended engine warranty options:
  - a. Pricing for 60 months/150,000 miles;
  - b. Pricing for 60 months/200,000 miles; and
  - c. Pricing for 60 months/unlimited mileage.
5. Chassis frame rails, cross members, fuel tanks, front axle I-beams, and rear axle housings must be warranted for a period of 120 months, from the updated in-service date of the vehicle, 100 percent parts and labor.
6. Paint finish coats to chassis, hood, fenders, and cowl shall be warranted for 60 months/100,000 miles, 100 percent parts and labor, for adhesion, color retention, and gloss retention.
7. Color Retention: During the first 36 months from the in-service date, the color coat must not shift colors more than 4 ΔE from the centroid, as specified in School Bus Manufacturers Technical Council (SBMTC) publication, *SBMTC-008*. During the 60-month warranty period, the color coat must not shift color more than 8 ΔE from the centroid, as specified in *SBMTC-008*.

8. Gloss: During the first 36 months from the in-service date, the gloss reading must not fall below 60 at 60°. During the 60-month warranty period, the gloss reading must not drop below 30 at 60°.
  - a. All measurements must be the average of 12 readings taken at various points on the bus, but no reading must be more than three points under the stated minimum. All readings must be taken after the bus is thoroughly washed to remove road film and dust.

### **BODY WARRANTIES:**

1. The minimum body warranty shall be 12 months.
2. The standard body warranty for Florida school bus bids shall be for 60 months/100,000 miles, 100 percent parts and labor and shall include, but not be limited to, the following items:
  - a. The total air conditioner system on any bus so equipped, including parts and labor and excluding air filters used in normal preventive maintenance. Chassis engine-driven air conditioner compressor applications must be approved in writing by the engine manufacturer, who must state that the installation will not void or reduce the engine manufacturer's warranty or extended service liabilities in any way.
  - b. All mirror assemblies and mounting bracketry must be warranted against rust and corrosion and any reduction in clarity of view due to discoloration or other deterioration of the lens.
  - c. All bus body electrical wiring and switches, including, but not limited to, damage resulting from wiring or connectors becoming abraded, pierced by fasteners, shorted or otherwise damaged during manufacture or use.
  - d. Paint finish coats to body, hood, and cowl for adhesion, color retention, and gloss retention. Acceptable lower limits during the warranty period are as follows:
    - i. Adhesion: During the 60-month warranty period, paint and priming compounds must not fail to adhere to the bus with normal use and care.
    - ii. Color Retention: During the first 36 months of service, the color coat must not shift colors more than 4 ΔE from the centroid, as specified in *SBMTC-008*. During the 60-month warranty period, the color coat must not shift color more than 8 ΔE from the centroid, as specified in *SBMTC-008*.
    - iii. Gloss: During the first 36 months of service, the gloss reading must not fall below 60 at 60°. During the 60-month warranty period, the gloss reading must not drop below 30 at 60°.
    - iv. All measurements must be the average of 12 readings taken at various points on the bus, but no reading must be more than three points under the stated minimum. All readings must be taken after the bus is thoroughly washed to remove road film and dust.
  - e. All emergency exit roof hatches, including defects in material and workmanship and against leakage.
  - f. All passenger seat back cushions and seat frames, excluding vandalism of any exposed foam.
  - g. All powered entrance doors and operating and control systems.
3. Power lift warranty minimums are listed below, and are **not included** with the standard body warranty.

### **POWER LIFT WARRANTY:**

A statement of warranty must be provided with each lift assuring the quality of materials and workmanship of the product for at least 36 months from the updated in-service date of the vehicle. The minimum warranty must provide 100 percent parts coverage for 36 months and 100 percent labor coverage for 12 months.

### **MINIMUM WARRANTY OPTIONS:**

Each manufacturer or dealer may include as part of its bid package credit option allowances for districts that wish to forego the aforementioned standard and extended warranty plans and purchase the minimum/base warranty option package.

### **TECHNOLOGY AND EQUIPMENT, NEW:**

The intent of these specifications is to accommodate new technologies and equipment that will better facilitate student transportation. New technology and equipment are acceptable for use in all vehicles if:

1. Items do 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.)

2. Items do not diminish the safety of the bus interior.
3. Items do not create additional risk to students who are boarding or exiting the bus or are in or near the school bus loading zone.
4. Items do not require undue additional activity and/or responsibility for the driver.
5. Items generally increase efficiency and/or safety of the bus, provide for a safer or more pleasant experience for the occupants and pedestrians in the vicinity of the bus, and/or assist the driver by making his or her tasks easier to perform.

**CHANGES OR CLARIFICATION OF SPECIFICATIONS:**

*Florida School Bus Specifications* may be amended pursuant to the provisions of rule 6A-3.003, F.A.C. With the concurrence of the Florida Association for Pupil Transportation (FAPT), the School Bus Specifications Committee, and in accordance with Florida purchasing laws and the bus bid contract, the School Transportation Management Section may, at its discretion, grant variances or exemptions and issue clarifications of these specifications, as necessary, to provide safe, efficient and cost-effective equipment to Florida school districts and charter schools and provide for advances in technology.

Questions regarding the *Florida School Bus Specifications* should be directed to Director, School Transportation Management Section, Florida Department of Education, 325 West Gaines Street, Suite 834, Tallahassee, Florida 32399-0400 or may be sent via email to [SCHTRANS@fldoe.org](mailto:SCHTRANS@fldoe.org).

## **SECTION I**

# TYPE A SCHOOL BUS

## MINIMUM CHASSIS SPECIFICATIONS

### **ALTERNATOR:**

Type A buses shall have a minimum 130-amp alternator. Buses equipped with an electrically powered wheelchair lift and/or air conditioning shall be equipped with the highest rated capacity available from the chassis Original Equipment Manufacturer (OEM).

### **BATTERIES:**

The storage battery, or batteries, shall have a minimum cold cranking capacity rating (cold cranking amps) equal to the cranking current required for 30 seconds at 0 degrees Fahrenheit and a minimum reserve capacity rating of 120 minutes at 25 amps. Higher capacities may be required, depending upon optional equipment and local environmental conditions.

### **BRAKE, PARKING:**

On Type A chassis, the manufacturer's standard parking brake is acceptable. On Type A chassis with hydraulic brakes, the parking brake control must be mounted for easy access by the driver. On air brake models, the control valve to set the parking brakes on the rear wheels must be dash-mounted.

### **BRAKES, SERVICE:**

Hydraulic or air brakes are permissible.

### **BUMPER, FRONT:**

Type A buses may be equipped with an OEM-supplied front bumper.

### **ENGINE EQUIPMENT:**

1. A dry type air cleaner is required on all engines.
2. The engine must be equipped with full-flow, spin-on, or cartridge-type oil filter(s), with the filter header(s) mounted directly to engine.
3. An engine coolant recovery or deaeration system is required on all chassis. Type A diesel engines must include a means to visually check the coolant level without removing the deaeration tank cap or releasing pressure from the cooling system.
4. A warning system consisting of a light and a buzzer is required on diesel-powered Type A chassis to notify the driver of low engine oil pressure and/or coolant overheating.
5. A fuel filtration and water separator system is required on all Type A diesel engines and must remove contaminants from the fuel prior to entry into the engine. The system must have a clear sight bowl or be equipped with a water-in-fuel light to notify technicians of the presence of water, must provide a valve for draining trapped water from the system and must include an electric or manual priming pump.
6. An engine oil pressure gauge is required. It must provide accurate, easily discernible readings across the entire operating range, from hot idle to full oil pressure. The gauge on engines with idle oil pressure that under normal conditions is low must provide a clear distinction between no oil pressure and engine idle oil pressure. The gauge must be directly visible to the driver in the normal seated position and must not be mounted near the center of the dash where the service door control or its associated hardware could block visibility of the gauge.
7. Radiator and other engine coolant hoses supplied by the chassis manufacturer (not including heater hoses) must be constructed of silicone rubber or ethylene propylene diene monomer (EPDM) covering and aramid fiber reinforcement meeting or exceeding Society of American Engineers (SAE) standard J20R EC Class D-1. The silicone hose, if used, must include stainless steel shoe-type hose clamps or constant-torque clamps. Hoses must have markings, coloring, or other visible means of distinguishing them from the standard hoses.

## **ENGINE PERFORMANCE REQUIREMENTS FOR TYPE A BUSES:**

Each bus must be furnished with a power train that meets or exceeds the following minimum criteria when tested at the gross vehicle weight rating (GVWR) required for a given bus capacity, and with all accessories (including air conditioner compressor(s), if equipped) on and operating:

1. Startability of 20 percent;
2. Gradeability of 5 percent at 25 miles per hour (MPH);
3. Gradeability of 1.5 percent at 50 MPH; and
4. Top speed of 70 MPH.

Performance must be measured with the actual completed vehicle (i.e., with the body installed, unloaded except for the driver and one passenger). The vehicle must be in drive, with the engine at idle, the service brakes applied, the emergency brakes released, and all accessories on and operating. Measurement of acceleration time must begin at the moment the throttle is applied (the throttle is to be immediately and rapidly depressed to full throttle).

**NOTE:** The chassis manufacturer should use the heaviest chassis/body combination meeting these specifications for the specific bus size to determine required power train components. This test is an on-road test and will be performed using the heaviest available chassis/body, depending on body(ies) supplied. At the discretion of the department, unanticipated factors or variations in test conditions affecting performance test results that are beyond the control of the chassis manufacturer may be taken into account. A Pro Link, a diagnostic computer, or a speed wheel are also acceptable tools for this test.

Maximum acceleration time (from zero mph), under the conditions specified above, must be as follows (measured in seconds):

TEST METHOD	0-10 MPH	0-20 MPH	0-30 MPH	0-40 MPH	0-50 MPH
ACTUAL	3.4	6.2	12.0	20.0	32.2

Manufacturers may offer additional engine configurations and horsepower ratings that exceed these requirements as optional equipment.

## **EXHAUST SYSTEM:**

The exhaust system on Type A buses must have a corrosion-resistant muffler and tailpipe. The tailpipe must exit to the left of left frame rail and behind the rear wheels. The chassis manufacturer must ensure that the exhaust design allows the exit location left of the left frame rail to be maintained after any modifications to frame length by the chassis or body manufacturer. Manufacturers must ensure that exhaust temperature exiting the tailpipe with the engine running during any normal loading or unloading activity will not produce first, second or third-degree burns on students or other individuals present. The bus must not automatically regenerate the diesel particulate filter while the bus is stationary.

## **FRAME SIDE MEMBERS:**

Frame side members must be of one-piece construction between the front and rear spring hangers. Frame rails of Type A chassis must have a minimum tensile strength of 50,000 pounds per square inch (PSI).

## **FRONT AXLE WHEEL SEALS:**

All Type A buses greater than 14,500 GVWR must have oil-lubricated front axles and seals.

## **FUEL TANK:**

The fuel tank filler spout must be located in an easily serviceable location.

## **HEADLIGHTS:**

Headlights must meet FMVSS and SAE standards. All buses must be equipped with Full-Time Lights (FTL) meeting the following requirements:

1. With the ignition switch off, the headlights will operate normally and the FTL system will not operate;
2. With the ignition switch on or in the “accessory” position, and with the engine not running, the FTL must not operate;
3. With the ignition switch on and the engine running with the headlight switch off, the FTL system must operate, providing low-beam headlights and tail, clearance, and identification (ID) lights;
4. In all cases, the headlight switch must override the FTL system when in the “on” position;
5. This system must include a buzzer that activates if the headlight system is on with the key switch in the “off” position.

## **IGNITION SYSTEM:**

All buses of like chassis manufacturer must have one key, regardless of the type of key supplied to Florida purchasers.

## **INSULATION:**

Type A chassis must include heat and noise insulation inside the bus covering the dash panel (fire wall) area to as great an extent as possible. Insulation must extend at least down to the point where the body floor connects to the fire wall, including the engine cover (doghouse), which may be insulated on the interior or exterior.

## **LINE-SET TICKET:**

The manufacturer must include with delivery of the vehicle a line-set ticket to accurately reflect all chassis components, the Gross Axle Weight Rating (GAWR) of both front and rear axles, and the gross vehicle weight rating (GVWR).

## **PAINT AND FINISH:**

School bus yellow paint must meet *SBMTC-008* for color and must have a finished gloss rating of at least 85 at 60°F and a distinctness of image rating of an average of at least 50, measured using the same method specified for gloss under **GENERAL INFORMATION AND WARRANTY PROVISIONS**. Paint must be applied for a total dry thickness of at least 1.8 mils over all painted surfaces. Trim, lettering and the bumper must be black, except that the bumper must be striped with reflective material in accordance with [National School Transportation Specifications and Procedures, Revised 2015](#). Steel rims for all buses with hub-piloted wheels must be National School Bus Yellow and powder-coated by the rim manufacturer. Lug nuts must not be painted. All stud-piloted rims must be painted black.

## **STEERING:**

A factory-installed tilt steering wheel/column is required.

## **TIRES AND RIMS:**

The chassis must be equipped with radial tubeless tires and must have dual rear wheels. Type A buses greater than 14,500 GVWR must use hub-piloted disc or aluminum wheels. Tires and rims must conform to current standards of the Tire and Rim Association.

## **TRANSMISSION, AUTOMATIC:**

An automatic transmission is required on all chassis. It shall be heavy-duty, with a minimum of four forward speeds, on all units. On Type A chassis, 30 capacity and larger, the transmission must be an Allison 1000 or 2000 or an approved equal. An external filter in the transmission oil cooler return line is required on Allison 1000 and 2000 equipped units. All Allison transmissions require OEM-approved synthetic transmission fluid and OEM filters.

Automatic transmissions incorporating a parking pawl must have a transmission shifter interlock controlled by the application of the service brake to prohibit accidental engagement of the transmission. All non-park pawl transmissions must incorporate a park brake interlock that requires the service brake to be applied to allow release of the parking brake.

Any requests for transmission substitutions must be approved in writing by the purchasing district and the department's School Transportation Management Section.

**VOLTAGE CONTROL:**

The voltage regulator must be solid state (transistorized) and readily accessible for service. A voltmeter with a graduated scale is required.

**WARRANTIES:**

See required warranties under **GENERAL INFORMATION AND WARRANTY PROVISIONS.**

**WIRING HARNESS:**

The wiring must be rated for 100 amps load and include complete wiring for the tail and stop lights. It must be designed with color coding for circuits. The fuse box door, if equipped, must have a positive latch.

## **TYPE A SCHOOL BUS OPTIONAL CHASSIS EQUIPMENT**

### **AIR-SPRUNG REAR SUSPENSION SYSTEM:**

There shall be an option for an air-ride or approved equivalent air-sprung rear suspension system, when available. Rear shock absorbers are also required with this option, as on standard suspension systems.

### **AUTOMATIC TRANSMISSION WARRANTY:**

There shall be an option for extension of the transmission warranty to 5 years, unlimited mileage, 100 percent parts and labor. Also see GENERAL INFORMATION AND WARRANTY PROVISIONS.

### **COLLISION MITIGATION:**

There shall be an option for passive and/or active electronic collision mitigation system(s), if available.

### **LOW-PROFILE RADIAL TIRES:**

There shall be an option for all-wheel-position, highway-ribbed, low-profile, tubeless radial tires of size, and load range meeting Tire and Rim Association Standards for the required GAWRs.

### **SPARE DISC WHEEL:**

There shall be an option for a spare disc wheel, which must be same size and type as the original rims.

### **STABILITY CONTROL:**

There shall be an option for electronic stability control meeting the minimum requirements of FMVSS No. 136, if available.

### **STRAIGHT FLOOR CHASSIS:**

There shall be an option for Type A chassis to accept straight floor bodies (i.e., bodies with no wheel wells). This type chassis must have a combination of axles, suspension, tires, wheels, and axle stops that ensures that the maximum upward travel of the rear suspension in normal straight-ahead driving does not protrude above the top of the frame rails.

### **TOW HOOKS OR TOW EYES:**

There must be two subcategories for this option: (1) two heavy-duty front tow hooks or tow eyes (each hook or eye must be installed by the chassis manufacturer in an approved manner to each frame rail); and (2) two heavy-duty rear tow hooks or tow eyes (each hook or eye must be installed by the chassis manufacturer in an approved manner to each frame rail).

## **SECTION II**

# **TYPE C AND TYPE D SCHOOL BUS MINIMUM CHASSIS SPECIFICATIONS**

## **ALTERNATOR:**

Types C and D chassis with internal combustion engines shall be equipped with a heavy-duty alternator having a minimum output rating of 200 amps or higher, and should produce a minimum current output of 50 percent of the rating at engine idle speed.

Buses equipped with an electrically powered wheelchair lift and/or air conditioning shall have a minimum alternator output of 240 amps and may be equipped with a device that increases the engine idle speed when the voltage drops to, or below, a pre-set level.

## **BATTERIES:**

The storage batteries shall have minimum cold cranking capacity rating (cold cranking amps) equal to the cranking current required for 30 seconds at 0 degrees Fahrenheit and a minimum reserve capacity rating of 120 minutes at 25 amps. Higher capacities may be required, depending upon optional equipment and local environmental conditions.

## **BRAKE, PARKING:**

On hydraulic brake models, a parking brake is required, with the control mounted for easy access by the driver. On air brake models, a dash-mounted control valve to spring-set the parking brake on the rear wheels is required.

## **BRAKES, SERVICE:**

Hydraulic brakes are acceptable on 29-35 capacity Type C buses. Air brakes are required on all Type C buses larger than 41 capacity, and all Type D front and rear engine buses.

## **BUMPER, FRONT:**

Types C and D buses must have a front bumper that is black, of full width channel type, and a minimum of 8 inches wide (vertically). The bumper must have sufficient structural and mounting strength to ensure that the front of the vehicle can be lifted by means of an air bumper-type jack, without permanent deformation of the bumper, brackets, or chassis frame rail(s).

## **ENGINE EQUIPMENT:**

1. Diesel engines must be available in at least one of the following two configurations:
  - a. Parent bore type block; in-line 6-cylinder design; minimum 6.4 liters displacement.
  - b. Wet sleeve type block; in-line 6-cylinder design; minimum 6.4 liters displacement.

**NOTE:** Additional engines of other configurations or displacements, including gasoline, propane and CNG (not in lieu of the above), meeting all other requirements listed herein may be offered, subject to approval by the department. Electric-powered configurations may be offered and are exempt from the engine requirements listed below.

2. A dry type air cleaner is required. An air filter restriction indicator is required on diesel engines. The restriction indicator must incorporate a system that does not allow unfiltered air into the engine if the indicator cracks or breaks.
3. The engine must be equipped with a full-flow, spin-on or cartridge-type oil filter(s), with the filter header(s) mounted directly to engine.
4. An engine coolant recovery or deaeration system is required on all chassis. Diesel engines must include a means for visually checking the coolant level without removing the deaeration tank cap or releasing pressure from the cooling system.
5. A warning system consisting of a light and a buzzer is required on gasoline, propane, CNG, and diesel-powered chassis to notify the driver of low engine oil pressure and/or coolant overheating.

6. A fuel filtration system with a water separator is required on diesel engines and must remove contaminants from the fuel prior to entry into the engine. The system must have a clear sight bowl or be equipped with a water-in-fuel light to notify technicians of the presence of water, must provide a valve for draining trapped water from the system, and must include an electric or a manual priming pump.
7. An engine oil pressure gauge and a coolant temperature gauge are required. The oil pressure gauge must provide accurate, easily discernible readings across the entire operating range, from hot idle to full oil pressure. Gauges on engines with idle oil pressure, which under normal conditions is low, must provide a clear distinction between no oil pressure and engine idle oil pressure. Gauges must be directly visible to the driver in the normal seated position and must not be mounted near the center of the dash where the service door control or associated hardware could block visibility of the gauges.
8. Radiator and other engine coolant hoses supplied by the chassis manufacturer (not including heater hoses) must be constructed of silicone rubber or ethylene propylene diene monomer (EPDM) covering and aramid fiber reinforcement meeting or exceeding SAEJ20R EC Class D-1. Silicone hose, if used, must include stainless steel shoe-type hose clamps or constant-torque clamps. Hoses must have markings, coloring or other visible means of distinguishing them from standard hoses.
9. Manufacturers must use the largest capacity oil pan available for each engine configuration in order to achieve the longest duration oil change interval.

#### **ENGINE PERFORMANCE REQUIREMENTS:**

Each bus must be furnished with a power train that meets or exceeds the following minimum criteria when tested at the GVWR required for a given bus capacity, and with all accessories (including air conditioning compressor(s), if equipped) on and operating:

1. Startability of 20 percent;
2. Gradeability of 5 percent at 25 miles per hour;
3. Gradeability of 1.5 percent at 50 miles per hour; and
4. Minimum top speed of 60 miles per hour.

**NOTE:** The chassis manufacturer should use the heaviest chassis/body combination meeting these specifications for the specific bus size to determine required power train components. This test is an on-road test and will be performed using the heaviest available chassis/body, depending on body or bodies supplied. At the discretion of the department, unanticipated factors or variations in test conditions affecting performance test results that are beyond the control of the chassis manufacturer may be taken into account. A Pro Link, a diagnostic computer or a speed wheel are also acceptable tools for this test.

Maximum acceleration time (from zero mph), must be as follows (measured in seconds): Performance must be measured with the actual completed vehicle (i.e., with body installed, unloaded except for the driver and one passenger). The vehicle must be in drive, with the engine at idle, the service brakes applied, the emergency brakes released, and all accessories on and operating. Measurement of acceleration time must begin at the moment the throttle is applied (the throttle is to be immediately and rapidly depressed to full throttle).

#### **29-77 Capacity Types C and D:**

TEST METHOD	0-10 MPH	0-20 MPH	0-30 MPH	0-40 MPH	0-50 MPH
ACTUAL	3.4	6.2	12.0	20.0	32.2

#### **78-90 Capacity Type D:**

TEST METHOD	0-10 MPH	0-20 MPH	0-30 MPH	0-40 MPH	0-50 MPH
ACTUAL	3.7	7.1	12.0	20.0	32.2

Manufacturers may offer additional engine configurations and horsepower ratings that exceed these requirements as optional equipment.

### **EXHAUST SYSTEM:**

The exhaust system must have a corrosion-resistant muffler and tailpipe. The tailpipe must exit to the left of left frame rail and behind the rear wheels. Manufacturers must ensure that exhaust temperature exiting the tailpipe with the engine running during any normal loading or unloading activity will not produce first, second, or third-degree burns on students or other individuals present. The bus must not automatically regenerate the diesel particulate filter while the bus is stationary. Also see Section III, Electrical Equipment and Wiring.

### **FRAME SIDE MEMBERS:**

Frame side members must be of one-piece construction between the front and rear spring hangers. Frame rails must have a minimum tensile strength of 50,000 pounds per square inch (PSI).

### **FRONT AXLE LUBRICATION:**

All buses must have oil-lubricated front axle hubs, providing an externally visible means of checking the lubricant level.

### **HEADLIGHTS:**

Headlights must meet FMVSS and SAE standards. All buses must be equipped with Full-Time Lights (FTL) meeting the following requirements:

1. With the ignition switch off, the headlights will operate normally and the FTL system will not operate.
2. With the ignition switch on or in the “accessory” position, and with the engine not running, the FTL must not operate.
3. With the ignition switch on and the engine running with the headlight switch off, the FTL system must operate, providing low-beam headlights and tail, clearance and identification (ID) lights.
4. In all cases, the headlight switch must override the FTL system when in the “on” position.
5. This system must include a buzzer that activates if the headlight system is on with the key switch in the “off” position.

### **HOOD:**

Engine hood on Type C buses must not require more than 20 pounds of force to open or close.

### **IGNITION SYSTEM:**

All ignition switches must be keyed alike. All buses of like chassis manufacturer and type must have one key.

### **INSULATION:**

Type C chassis must include full width and height heat and noise insulation on the inside or outside of the bus covering the dash panel (firewall) area to as great an extent as possible and at least up to the top of the firewall and down to the point that the body floor connects to the firewall, including the engine cover (doghouse). Type D Front Engine buses must include complete heat and noise insulation of the doghouse area.

### **LINE-SET TICKET:**

Manufacturer must include with delivery of vehicle a line-set ticket to accurately reflect all chassis components, GAWR of both front and rear axles, and GVWR.

### **PAINT AND FINISH, TYPES C and D CHASSIS:**

School bus yellow paint must meet SBMTC-008 for color and must have a finished gloss rating of at least 85 at 60°F and a distinctness of image rating of an average of at least 50 measured using the same method specified for gloss under GENERAL INFORMATION AND WARRANTY PROVISIONS. Paint must be applied for a total dry thickness of at least 1.8 mils over all painted surfaces. Trim, lettering and bumper must be black, except that bumper must be striped with reflective material in accordance with [National School Transportation Specifications and Procedures, Revised 2015](#) and Procedures or these specifications. Steel rims must be powder-coated, National School Bus Yellow, by the wheel manufacturer. Lug nuts must not be painted.

**NOTE:** MFSAB is excluded from the school bus yellow color requirement of this section; however, all other paint rating requirements shall apply. See MFSAB requirements under **GENERAL INFORMATION AND WARRANTY PROVISIONS** beginning on page 1.

**RADIATOR FILLER TUBE:**

The radiator filler must be located for ease of service from the engine compartment on Type C and Type D rear engine buses. It must be located for ease of service from outside the bus on Type D front engine buses.

**STABILITY CONTROL:**

Electronic stability control meeting the minimum requirements of FMVSS No. 136 is required.

**STEERING:**

A tilt steering wheel/column is required.

**TIRES AND RIMS:**

Chassis must be equipped with radial tubeless tires mounted on aluminum or hub-piloted disc wheels. Tires and rims must conform to current standards of the Tire and Rim Association (see Chassis Specifications Charts for sizes). See PAINT AND FINISH for wheel color information.

**TRANSMISSION, AUTOMATIC:**

An automatic transmission is required on all chassis as specified:

1. Type C 29-47 capacity, Allison PTS 2100, 5-speed or Ford 6R140, 5-speed or approved equal.
2. Type C 65-78 capacity, Allison PTS 2500, 5-speed or Ford 6R140, 5-speed or approved equal.
3. Type D 71 capacity front engine, Allison PTS 2500, 5-speed or approved equal.
4. Type D 78-89 capacity front engine, Allison PTS 2500, 5-speed or approved equal.
5. Type D 72 capacity rear engine, Allison PTS 2500, 5-speed or approved equal.
6. Type D 78-89 capacity rear engine, Allison PTS 3000, 6-speed or approved equal.

All requests for transmission substitutions must be approved in writing by the purchasing district and by the department's School Transportation Management Section.

Allison PTS 2000 series transmissions must include an external spin-on type, vertically mounted transmission fluid filter. The shifter must be dash- or console-mounted and must be either a T-handle or push-button design.

Allison PTS 3000 series transmissions must have at least 5 speeds enabled for front engine Type D and 6x speeds for rear engine Type D.

All transmissions require synthetic or OEM approved equal transmission fluid and must use OEM filters.

Automatic transmissions incorporating a parking pawl must have a transmission shifter interlock controlled by the application of the service brake to prohibit accidental engagement of the transmission. All non-park pawl transmissions must incorporate a park brake interlock that requires the service brake to be applied to allow release of the parking brake.

**WIRING HARNESS:**

All chassis electrical wiring must conform to current standards of the Society of Automotive Engineers, be coded by color, and be insulated and completely encased in convoluted loom or equivalent protective wrapping. In locations that prevent such looming, wires must be properly held in place by appropriate fasteners at intervals necessary to prevent possible damage to wire insulation. The fuse box door, if equipped, must have a positive latch. All chassis electrical circuits must be fused per the requirements of FMVSS. Buses using multiplexed electrical systems may meet the intent of these specifications without the use of specified equipment, subject to approval by the department.

**TYPE C CHASSIS:**

Maximum Design (Passenger) Capacity	29LT	29	47	65	71	77
Front Axle Weight Rating (pounds)	5,000	6,000	7,000	9,000	10,000	10,000
Rear Axle Weight Rating (pounds)	10,000	13,000	15,000	19,000	19,000	20,000
Cowl to axle, minimum (inches)	123	123	162	229	250	250
Tires – minimum size, Load Range; tubeless-radial ply*	225R-19.5F	10R-22.5-F	11R-22.5-G	11R-22.5-G	11R-22.5-G	11R-22.5-G
Disc wheels – minimum rim width (inches)	6.75	7.5	8.25	8.25	8.25	8.25
Hub-piloted disc wheels for tubeless radial tires	6 stud, 5 hand hold	6 stud, 5 hand hold	10 stud, 2 hand hold			
Minimum size fuel tank (gallons)	30	30	60	60	60	60
Allison transmission series (# of forward gears) ** Must include park pawl.	PTS 1000 or 2200 (5)**	PTS 2100 (5)	PTS 2100 (5)	PTS 2500 (5)	PTS 2500 (5)	PTS 2500 (5)

**TYPE D FORWARD CONTROL FRONT ENGINE:**

Maximum Design (Passenger) Capacity	71	77	83	89
Front Axle Weight Rating (pounds)	10,800	12,000	12,000	12,000
Rear Axle Weight Rating (pounds)	17,000	19,000	21,000	23,000
Tires – minimum size, Load Range acceptable*	11R-22.5G	11R-22.5G	11R-22.5-G	11R-22.5-G
Hub-piloted disc wheels-10 stud, minimum rim width (inches)	8.25, 2 hand hold	8.25, 2 hand hold	8.25, 2 hand hold	8.25, 2 hand hold
Minimum size fuel tank (gallons)	60	60	60	60
Allison transmission series (# of forward gears)	PTS 2500 (5)	PTS 3000 (5)	PTS 3000 (5)	PTS 3000 (5)

An automatic transmission is required on all chassis. See **TRANSMISSION, AUTOMATIC** for required specifications.

Maximum overall length of the bus must not exceed 45 feet, bumper to bumper.

\*Low-profile tubeless radial tires of size and load range meeting Tire and Rim Association Standards for the required GAWRs may be approved in lieu of standard conventional tubeless radial tires.

**TYPE D REAR ENGINE CHASSIS SPECIFICATIONS CHART:**

Maximum Design (Passenger) Capacity	72	78	84	90
Front Axle Weight Rating (pounds)	11,000	12,000	12,000	12,000
Rear Axle Weight Rating (pounds)	19,000	21,000	23,000	23,000
Tires – minimum size, Load Range acceptable *	11R-22.5-G	11R-22.5-G	11R-22.5-G	11R-22.5-G
Hub-piloted disc wheels-10 stud, minimum rim width (inches)	8.25, 2 hand hold			
Minimum size fuel tank (gallons)	60	60	60	60
Allison transmission series (# of forward gears)	PTS 2500 (5)	PTS 3000 (6)	PTS 3000 (6)	PTS 3000 (6)

Maximum length of vehicle must not exceed 45 feet, bumper to bumper.

\*Must meet Tire and Rim Association Standards. Low-profile tubeless radial tires of size and load range meeting Tire and Rim Association Standards for the required GAWRs may be approved in lieu of standard conventional tubeless radial tires.

# **TYPE C AND TYPE D SCHOOL BUS OPTIONAL CHASSIS EQUIPMENT SPECIFICATIONS**

## **AIR-SPRUNG FRONT SUSPENSION SYSTEM:**

There shall be an option for an air-ride or approved equivalent air-sprung front suspension system, when available. Front shock absorbers are also required with this option, as on standard suspension systems.

## **AIR-SPRUNG REAR SUSPENSION SYSTEM:**

There shall be an option for an air-ride or approved equivalent air-sprung rear suspension system, when available. Rear shock absorbers are also required with this option, as on standard suspension systems.

## **ALTERNATOR, HIGHER OUTPUT:**

There shall be an option for alternators having a minimum of 270 amps hot-rated output.

## **COLLISION MITIGATION:**

There shall be an option for passive and/or active electronic collision mitigation system(s), if available.

## **ELECTRIC SCHOOL BUS (ESB):**

This specification is for new electric school buses only and does not allow for the modification of any existing school bus.

### **COMPLIANCE WITH FMVSS:**

All electric systems shall be in full compliance with all applicable FMVSS and all Society of Automotive Engineers standards that are applicable at time of manufacture.

### **ADDITIONAL REQUIREMENTS:**

#### **CHARGING:**

1. Charging connection point shall be outside the passenger compartment.
2. While charging, the transmission/propulsion system shall be rendered inoperative.
3. Shall have AC or DC charging capabilities with standard SAE J1772 CCS1 connector.
4. Shall be V2G (Vehicle to Grid) capable.

#### **ELECTRIC POWER SOURCE (BATTERY):**

1. Shall not be located in or accessible from the interior of the school bus.
2. Shall be designed to prevent the passenger compartment from becoming energized.
3. All batteries shall be designed to prevent any dangerous fluids or fumes from entering the passenger area.
4. There shall be a disconnect switch or device to shut-off the high voltage components at the power source in the event of a crash.
5. Battery packs shall be liquid cooled.
6. Battery and electrical drive component warranty shall be a minimum of 5 years/100,000 miles

#### **HEATING:**

Heaters shall be capable of heating the passenger and driver's compartments.

#### **INSTRUMENT DISPLAY:**

The instrument display panel must also contain an indicator showing the state of charge (power and/or range).

**MARKINGS:**

1. The outer layer of insulation or wiring conduit for drive system high-voltage wiring shall be industry standard orange color.
2. All high-voltage components shall be labeled with a “high voltage” marking/warning.
3. An electric vehicle identifying label shall be affixed on the right rear corner of the bus body. An additional label shall be applied to the right side of the bus rearward of the entrance door and to the left side of the bus aft of the driver's window.

**POWER DISCONNECT:**

1. A power disconnect device or switch shall be provided.
2. This disconnect device or switch shall be clearly marked.
3. If located inside a compartment, the compartment shall be clearly marked.
4. This device or switch shall not be in or accessible from the passenger area.
5. There shall be a label affixed near the battery disconnect switch to identify its location for first responders.

**POWER REGENERATION:**

When the unit is in motion and the driver removes his/her foot from the accelerator, power regeneration occurs.

**PROPULSION SYSTEM /DRIVETRAIN**

1. Shall be of sufficient power and torque to propel the vehicle fully loaded up to at least 60 mph and no more than 70 mph.
2. The propulsion system may be mounted using a drivetrain or positioned in a way to provide power to the wheels.
3. All propulsion systems must be contained below the floor line and cannot come into contact with the road surface.
4. Propulsion system warranties shall be a minimum 5 years/100,000 miles.

**SEATING:**

All seats shall be mounted to minimize contact with batteries and underside of the bus if seat replacement is necessary.

**SOUND GENERATION:**

All electric school buses shall comply with FMVSS 141 and produce a constant sound level for pedestrian alert while in motion under 20 mph.

**HIGH CAPACITY FUEL TANK:**

There shall be an option for a fuel tank of higher capacity than the standard fuel tank, mounted on the right side or between the frame rails, when available.

**LOW-PROFILE RADIAL TIRES:**

There shall be an option for all-wheel-position, highway-ribbed, low-profile tubeless radial tires of size and load range meeting Tire and Rim Association Standards for the required GAWRs.

**SPARE DISC WHEEL:**

There shall be an option for a spare disc wheel, which must be same size, type, and color as the original rims.

**TOW HOOKS OR TOW EYES:**

There shall be an option for two heavy-duty tow hooks or tow eyes, installed by manufacturer on each frame rail at the front of the bus in an approved manner. The manufacturer may also offer rear-mounted tow hooks or tow eyes meeting these requirements.

**Straight Floor Chassis:**

There shall be an option for a chassis designed to accept straight floor bodies (i.e., bodies with no wheel wells). This type of chassis must have a combination of axles, suspension, tires, wheels, and axle stops that ensures that the maximum upward travel of the rear suspension in normal straight-ahead driving does not protrude above the top of the frame rails.

**Tires:**

There shall be an option for alternate brand, size, and tread designs of tires when available. Optional tires must meet GAWR requirements and Tire and Rim Association Standards.

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## **SECTION III**

# **MINIMUM SCHOOL BUS BODY SPECIFICATIONS**

The specifications set forth in this section apply to Types A, C, and D school buses. Special exceptions for Type D bodies are listed at the end of this section. The completed school bus must meet all Federal Motor Vehicle Safety Standards, requirements of the State of Florida and requirements of the [National School Transportation Specifications and Procedures, Revised 2015](#) (state specifications supersede national specifications). References to bus capacity within these specifications are for Maximum Design Capacity, as defined below under **BODY DATA PLATE**.

## **BATTERY DISCONNECT SWITCH:**

There must be a battery disconnect switch in the air conditioning (A/C) or battery compartment or within 3 feet of the battery box if no A/C box is available. This switch must be accessible and operable from the exterior of the bus. Electronic control modules may be connected to battery power per the manufacturer's discretion; however, any circuit that does not become an open circuit with the actuation of the battery disconnect switch must be fused appropriately at the power source and labeled so each circuit is easily identifiable.

## **BODY DATA PLATE:**

A durable data plate must be mounted inside the body in a clearly visible location. The body data plate information must include a listing of the "Maximum Design Capacity" and the "Equipped Capacity" of the body. Maximum Design Capacity must be the maximum number of passengers the bus (body shell size) can carry, based on 12.8 inches minimum seat width per passenger, with the minimum knee room (seat spacing) permitted by FMVSS No. 222. Equipped Capacity must be the actual passenger capacity of the finished body, as equipped by the manufacturer, based on:

1. The number of total passengers the installed bench seats are designed to carry; and
2. The number of wheelchair positions installed (based on wheelchair space dimensions contained in Section IV of these specifications); and
3. An example of the format to be used for Equipped Capacity is "28 + 3 WC," meaning 28 standard passenger seats plus 3 wheelchair positions.

## **BODY FLUID CLEANUP KIT:**

Each bus must be equipped with a disposable, sealed body fluid cleanup kit mounted by a method that will retain it under a load equivalent to 20 times the weight of the kit and must be removable without the use of tools. The kit must be accessible to the driver. The kit container must be sealed with a breakable, non-reusable seal, with the following items:

1. A U.S. Environmental Protection Agency (EPA) registered liquid germicide (tuberculocidal) disinfectant;
2. A fully disposable wiping cloth;
3. A water-resistant spatula;
4. Step-by-step directions;
5. Absorbent material with odor counteractant;
6. Two pairs of gloves (Nitrile);
7. One package towelettes; and
8. A discard bag (non-labeled paper bag with plastic liner and a twist tie). This bag must be approximately 4 x 6 x 14 inches and of a non-safety color (i.e., not red, orange, or yellow).

## **BUMPER, REAR:**

The rear bumper must be of pressed steel channel at least 3/16 inch thick, 8 inches wide (vertically), and flanged 2 inches at the top and bottom, or otherwise designed to furnish equal flexural strength. It must be of wraparound design and securely fastened to each chassis rail and braced from each end of bumper to chassis rail with heavy braces. The bumper must have the structure and strength necessary to allow the unloaded vehicle to be lifted with a bumper jack without deformation or damage. The contour of the bumper must fit the contour of the body in a manner to prevent

hitching to or riding on the bumper. An appropriate seal must be applied between the bumper and the body panel, unless the gap between the bumper and the body panel is 1/8 inch or less.

#### **DRIVER'S DOCUMENT COMPARTMENT:**

On Types C and D buses, a pouch on the front side of the driver's side crash barrier with minimum dimensions of 17 x 12 x 4 inches is required. This pouch must be located to the left side of the barrier for Type B and C buses, and to the right side of the barrier for Type D buses, accessible to the driver from the seated position. It must be made of the same material as the covering on the barrier and have a lid or cover with a latching device such as Velcro™ or snaps.

#### **DRIVER'S SEAT:**

All school buses must have a driver's seat equipped with a one-piece high back designed to minimize the potential for head and neck injuries in rear impacts, provide minimum obstruction to the driver's view of passengers, and meet applicable requirements of FMVSS No. 222. The height of the seat back must be sufficient to provide the specified protection for up to the size of a 95th percentile adult male, as defined in FMVSS No. 208. The driver contact area of the cushion and seat back must be made of soil and wear-resistant cloth material, nylon, or an equivalent. The remainder of the seat may be of a different material. The seat must be centered behind the steering wheel, with the backrest a minimum distance of 11 inches behind the steering wheel. The seat must be securely mounted to ensure minimal flexing of the seat and the floor panel(s).

All school buses equipped with air brakes must also be equipped with an air suspension driver's seat meeting the following additional requirements:

1. The air control for the height adjustment must be within easy reach of the driver in the seated position.
2. The seat cushion must be a minimum of 19 1/2 inches wide, be fully contoured for maximum comfort, and have a minimum of two positions to allow adjustment of seat bottom angle.
3. The backrest must include adjustable lumbar support.
4. The seat must have a minimum of 7 inches fore and aft travel, adjustable with the driver in the seated position. This requirement applies to the seat mechanism.
5. The seat must have a minimum of 4 inches up and down travel.
6. The seat back must include adjustability of tilt angle.
7. All adjustments must be by fingertip controls not requiring the use of tools.
8. Air suspension seats must be dampened by dual shock absorbers that act independently.
9. The seat must comply with all applicable Federal Motor Vehicle Safety Standards.
10. All other buses must have a driver's seat equipped with a hydraulic and/or spring suspension base, and a minimum seat cushion width of 19 inches, and must meet the other requirements listed herein for air suspension seats.

The chassis manufacturer's standard driver's seat is acceptable for Type A buses. Also, see **GENERAL INFORMATION AND WARRANTY PROVISIONS.**

#### **DRIVER'S SEAT BELT:**

Buses must be equipped with a Type 2 lap belt/shoulder harness seat belt assembly for the driver. The design must incorporate a fixed female push-button latch on the right side at seat level, and a male locking bar tongue on the left, retracting side. The assembly must be equipped with a single, dual sensitive Emergency Locking Retractor (ELR) for the lap and shoulder belt. This system must be designed to minimize cinching down on suspension type seats. The lap portion of the belt must be anchored or guided at the seat frame by a metal loop or other means at the right side of the seat to prevent the driver from sliding sideways out of the seat. There must be a minimum of 7 inches of adjustment of the "D" loop of the driver's shoulder harness, designed to provide adequate adjustment for all sizes of drivers within the range of a 5th percentile female to a 95th percentile adult male, as defined in FMVSS No. 208. Shoulder belt tension must be no greater than is necessary to provide reliable retraction of the belt and removal of excess slack. The seat belt assembly and anchorage must meet applicable FMVSS. Seat belt material must be bright orange in color to provide maximum contrast with the driver's clothing.

**NOTE:** The driver's seat belt assembly for Type A buses must be the manufacturer's standard Type 2 driver seat belt, meeting applicable FMVSS for school buses of 10,000 pounds GVWR and less.

## **ELECTRICAL EQUIPMENT AND WIRING:**

All wiring must conform to current SAE standards, be coded by color and be insulated. All joints must be soldered or joined by equally effective fasteners. All wires connected directly to the battery must have the end terminals protected with heat-shrink tubing. Body wiring and connectors, including any battery cables routed by the body manufacturer, must be routed so as to eliminate the possibility of wiring and connectors becoming abraded, pierced by fasteners, shorted, or otherwise damaged during manufacture and use. All chassis and body electrical wiring must be completely encased in convoluted loom or equivalent protective wrapping. In locations that prevent such looming, wires must be properly held in place by appropriate fasteners at intervals necessary to prevent possible damage to wire insulation. A complete body wiring diagram showing the location of wires and the code of circuits for buses meeting Florida Specifications must be installed in each body. Additionally, for all school bus body optional electronic components installed in the bus, the body manufacturer must provide each district with at least one comprehensive parts and repair manual. Buses using multiplexed electrical systems may meet the intent of these specifications without the use of specified equipment subject to approval by the department. All requirements listed herein for Light Emitting Diode (LED) type lights must be for the latest generation LEDs available at the time of manufacture. Electrical components specified below must be provided, and wiring must be in circuits, as follows:

### **ACCESS PANEL, ELECTRICAL:**

All Type C and D buses must be equipped with an electrical access panel to provide access to body electrical components and circuits.

### **BACKUP LIGHTS; BACKUP ALARM and DECAL:**

There must be two backup lights of 4 inches in diameter, or 12.5 square inches, on the rear of all bodies meeting the following requirements:

1. They must be sealed LED lights;
2. They must use a plug connector; and
3. They must be set into the bus body (flush-mounted).

The body manufacturer must provide a backup alarm on each bus to provide audible warning that the bus is in reverse gear. The alarm must meet the requirements of SAE J994 and have a variable volume feature that allows the alarm to vary from 87 dBA to 112 dBA sound level, staying at least 5 dBA above the ambient noise level.

All buses must have a decal in full view of the driver indicating that the bus is equipped with a backup alarm.

### **BRAKE/TAIL LAMPS, LARGE:**

Buses must be equipped with two combination LED type brake/tail lamps of a minimum of 7 inches in diameter or 38 square inches, mounted as high and spaced as far apart laterally as practical, below the window line, but not less than 3 feet measured from the center of the lamps. Also, they must use a plug type connector meeting FMVSS and SAE standards.

### **BRAKE/TAIL LAMPS, SMALL:**

Buses must be equipped with two combination brake/tail lamps of 4 inches in diameter or 12.5 square inches, meeting FMVSS. Light intensity must at least equal Class A turn signal units. These lights must be LED lights with smooth exterior lens surfaces. They must use a plug connector and be set into the bus body.

### **CIRCUIT BREAKERS:**

All body electrical circuits must be fused per the requirements of FMVSS. The main body electrical circuit must be protected by a manually resettable circuit breaker or fusible link.

### **CLEARANCE AND IDENTIFICATION LIGHTS:**

All clearance and identification lights must meet current SAE requirements and FMVSS and must:

1. Be sealed LED lights.
2. Be surface-mounted with Lexan™, polycarbonate, or other non-corrosive material guard to prevent breakage. Lights set into the body do not require guards.
3. Use a plug connector.
4. Be activated by the headlight circuit.

### **CONTROL PANEL LIGHTING:**

The control panel or switches supplied by the body manufacturer must be illuminated and have a control for varying the illumination to the control panel or switches.

### **EMERGENCY EXIT BUZZER:**

Emergency door and emergency window buzzers must be connected to the accessory side of the ignition switch.

### **HEATER/DEFROSTER:**

There must be a heater mounted in the front of the bus. A supplemental heater may be installed in any bus. All heaters must provide heat throughout the bus body, provide defrosting for the windshield and entrance door, and have a minimum rating of 50K BTU. Defroster systems must meet the SAE Standard J381 performance requirement.

All heater hoses must meet or exceed SAEJ20R EC Class D-1 standards. If silicone hoses are used, shoe design hose clamps must be used. Heater lines on the interior of the bus must be fully shielded to prevent scalding of the driver or passengers in the event of a hose or connection failure. The modesty panels must not obstruct heat flow from the driver's area to the passenger area of the bus; this may be accomplished by ducting or other means that retains, to the extent practical, the required full width aluminized steel panel extending down to the floor. Also see **SEATING AND MODESTY PANELS**.

A 1/4 turn ballcock coolant flow regulating valve for the heater must be installed so that its control is accessible to the driver, but in such a location as to discourage tampering by students. This valve may be remotely located if a suitable remote control system is used. Also required are 1/4 turn ballcock coolant flow regulating shut-off valves, installed in the pressure and return lines as close to the engine as possible.

The windshield defroster and defogging system must provide defogging of the entire windshield, driver's side window and entrance door glasses by using hot air taken from the heater core. Bodies that do not have defrosters providing forced heated air by means of ducting across entire base of windshield must be equipped with an additional right-side mounted defroster fan that uses hot air from the heater. One electrical switch must be provided to simultaneously turn on or off any fan(s) providing hot air for defogging of the windshield, driver's side window, and entrance door glass.

**NOTE:** Type A buses must have a fresh air type heater and defroster system as installed by the chassis manufacturer.

### **INTERIOR LIGHTS:**

There must be at least four recessed flush-mounted interior lights in the passenger compartment of the bus, operated by one switch mounted on the control panel. If more than six lights are used, then an additional switch may be added to control these lights. There must also be two recessed flush-mounted interior lights mounted in the driver's area of the bus (to the left and right of the centerline of the bus), operated by a separate switch mounted on the control panel. Lenses for all interior lights must be Lexan™ or other polycarbonate material. All interior lights must be LED lights.

**LICENSE PLATE LAMP:**

Must be LED and may be combined with one of the required combination brake/tail lamps.

**MASTER SWITCH FOR BODY ELECTRICAL CIRCUITS AND OTHER SWITCHES:**

All bodies must be equipped with an electrical circuit master switch that will turn body circuits ON and OFF by means of a solenoid (relay) controlled by the ignition switch. There must also be a manual noise abatement switch installed in the control panel, labeled and alternately colored, and wired into the activation circuit for the master body circuit solenoid. This must be an on/off switch that deactivates all body equipment that produces noise, including, at least, the AM/FM radio, heaters, air conditioners, fans, and defrosters. This switch must not deactivate safety systems such as windshield wipers or lighting systems. On Types C and D buses there must also be a switch mounted in a location inaccessible to the driver to manually start the diesel particulate filter regeneration process. This switch must be appropriately labeled.

**POST-TRIP PASSENGER CHECK SYSTEM:****System Requirements:**

1. The bus must be equipped with a system to require the driver to walk to the rearmost interior of the bus after each trip to deactivate the system via a push button and to ensure that no passengers are left on the bus. The system must interconnect with the entrance door (and the driver's door on Type A buses) and immediately activate if the door is opened when the system is armed.
2. The system must have an indicator light in view of the driver that is illuminated when the system is armed. The system must be armed any time the bus is in service transporting students. This may be accomplished through the use of any reasonable method, such as recording a speed above 20 MPH or exceeding 10 minutes of operation with the door closed. In all cases, the system must arm itself after 10 minutes of operation, and/or any time the red student warning lights are activated.
3. The system may not be disarmed until the vehicle ignition switch has been switched to the "off" position. The system must not be activated if the ignition switch is placed in the accessory position or if the bus is restarted.
4. The system must turn on the interior lights when the ignition switch is turned to the "off" position. The lights must remain on for 60 seconds after system deactivation.
5. The system must not have a bypass.
6. The system must sound the vehicle horn and flash the headlights if the driver fails to deactivate the system within 60 seconds of turning the ignition off. Type A buses may activate the red student warning lights in lieu of the headlights.
7. The system must be disarmed by the use of a push button switch placed on the left rear bulkhead or above the left rear passenger window for Types A, C, and D front engine (FE) buses. The push button must be placed above the left rear passenger window for Type D rear engine (RE) buses. This button must be clearly marked.

**System Definitions:**

1. Armed = The system is functioning and is ready to alarm.
2. Disarmed = The system is off and inactive.
3. Activated = The horn is blowing and the lights are flashing.
4. Deactivated = The disarm switch at the rear of the bus has been operated by the driver.

**System Functionality:**

1. The system must be fully automatic in function and must not provide for manual bypass or override capability under any circumstances.
2. From the bus sitting still with ignition key in the “off” position:
  - a. With the ignition key switched to the “accessory” position, the system remains disarmed.
  - b. With the ignition key switched to the “on” position (engine remaining off), the system remains disarmed.
  - c. With the ignition key switched to the “on” position (engine running) and the bus operated under 20 MPH, the system remains disarmed.
  - d. With the ignition key switched to the “on” position (engine running) and the bus operated over 20 MPH or for more than 10 minutes of continuous operation (or other reasonable operational trigger mechanism), the system is armed.
3. From bus having been operated over 10 minutes, no longer moving, with the entrance door (and driver’s door, if equipped) closed, the ignition key in the “on” position (engine running) and the system armed:
  - a. With the ignition key switched to “off” position (engine off), the interior dome lights are immediately illuminated.
  - b. With the ignition key switched to the “off” position (engine off) and the ignition key switched back to the “on” position (engine off or restarted) within 60 seconds, the interior dome lights are extinguished and the system remains armed, but flashing lights and horn alarms are not activated.
  - c. With the ignition key switched to the “off” position (engine off), interior dome lights illuminated and entrance door (or driver’s door, if equipped) opened, flashing light and horn alarms are activated.
  - d. With the ignition key switched to the “off” position (engine off), interior dome lights illuminated and the driver taking no action for 60 seconds, the flashing lights and horn alarms are activated.
  - e. With the ignition key switched to the “off” position (engine off), interior dome lights illuminated, and driver walking to the rear of the bus and disarming the system within 60 seconds, the system is disarmed and no flashing lights and horn alarms are activated.
4. Once the flashing lights and horn alarms are activated, they can be deactivated only by disarming the system at the rear of the bus.
5. The interior dome lights are extinguished 60 seconds after the system is disarmed.

**STUDENT WARNING LIGHTS, STOP ARMS, STUDENT CROSSING ARM, AND SYSTEM CONTROLS AND OPERATION:****Student Warning Lights:**

Must be dual-mounted side by side on all corners of bus roof caps. Mounting must be as high as practical on the top and as near the outer edge of the bus as curvature permits. The lamps must be securely mounted. There must be a black background that is at least 1¼ inches wide. The lamps installed in the outboard locations must be red; the lamps installed in the inboard locations must be amber. The lamps must be clearly visible in bright sunlight for a minimum of 500 feet. Additionally, student warning lights must:

1. Have light assemblies of a flat back design. Cutouts in roof caps must be no larger than necessary to accommodate the student warning lights wires. A flush-mounted design is acceptable.
2. Use strobining LED bulbs.

- Be 7 inches in diameter or 38 square inches minimum.

**System Controls:**

Must be equipped with the following driver-actuated controls:

- Master switch – provides means for deactivating the entire system, as would be required when opening the door at a railroad grade crossing.
- Control switch – three positions: OFF, AMBER, and RED. The switch may be a rocker, pull-type, or other switch providing three positions. This switch must be separated from the master switch by at least 1 inch and colored red.
- Switch actuated by the service door.
- Controls must provide for the combinations of switch positions and conditions of student warning lights, stop arm(s), stop arm lights, and audible alarm, as indicated on the chart below.

**NOTE:** The system must not be designed in such a way that the operator is required to actuate the controls in a particular sequence to achieve the desired combination of conditions. For example, if the driver places the three-position switch in the AMBER position, with the master switch ON, it must not be required that the three-position switch be moved to RED or that the service door be opened in order to deactivate the AMBER lights. In this example, the driver must be able to deactivate the AMBER lights by going directly from the AMBER to the OFF position.

With Master Switch, Control Switch, and Service Door in the Following Positions:				Condition of Stop Arm(s), Stop Arm Lights, AMBER and RED Student Warning Lights and Audible Alarm Must Be:				
MASTER SWITCH POSITION (ON or OFF)	CONTROL SWITCH POSITION (three positions: OFF, AMBER or RED)	SERVICE DOOR POSITION		STOP ARMS, STOP ARM LIGHTS	AMBER STUDENT WARNING and PILOT LIGHTS	RED STUDENT WARNING and PILOT LIGHTS	AUDIBLE ALARM	
1 ON	OFF	CLOSED	1	RETRACTED, OFF	OFF	OFF	OFF	
2 ON	OFF	OPEN	2	RETRACTED, OFF	OFF	ON	ON	
3 ON	AMBER	CLOSED	3	RETRACTED, OFF	ON	OFF	OFF	
4 ON	AMBER	OPEN	4	RETRACTED, OFF	OFF	ON	ON	
5 ON	RED	CLOSED	5	EXTENDED, ON	OFF	ON	OFF	
6 ON	RED	OPEN	6	EXTENDED, ON	OFF	ON	OFF	
7 OFF	ANY POSITION	ANY POSITION	7	RETRACTED, OFF	OFF	OFF	OFF	

### **Student Crossing Arm:**

Is required and must be:

1. Air-operated on all air brake-equipped buses.
2. Electrically operated on all hydraulic brake buses.
3. Mounted to the far right side of the front bumper and open to an angle perpendicular to the bus.
4. Designed so that all components and connections are weatherproofed.
5. Removable with hand tools for towing of the bus.
6. Designed to meet or exceed SAE Standard J1133.
7. Constructed of noncorrosive or nonferrous material or treated in accordance with the body sheet metal standard.
8. Designed so that it has no sharp edges or projections that could cause hazard or injury to students.
9. Designed and equipped with a four-point mounting to the front bumper.
10. Designed so that the arm extends approximately 72 inches from the front bumper when in the extended position. The arm must be constructed of a yellow polycarbonate material or noncorrosive tubing painted yellow. Approximate dimensions of the arm must be 65 x 3 x 1 inches.
11. Designed and installed to extend simultaneously with the stop arms by means of the stop arm control and retract within 8t seconds of deactivation.
12. Equipped with a magnetic device or other assembly attached to the bumper at the end of the arm to provide a positive latch for the arm when not in use; this device must also reduce the tendency of the arm to rattle and vibrate when not in use.

### **Stop Arm Signals:**

For all 47 capacity and larger buses, there must be installed on the left outside of the body two approved octagonal stop-signal arms, each equipped with two double-faced alternately flashing LED strobe lights for signaling a student stop. All buses of less than 47 capacity must be equipped with one stop arm. Bodies to be mounted on chassis with hydraulic brakes must be equipped with electrically actuated stop arm(s). Air-powered stop arms must be provided as standard equipment on all buses equipped with air brakes. The rear stop arm location on buses equipped with dual stop arms must be the left side of the bus, as close as practical to the left rear corner of the body. The light lenses of all stop arms must be RED. Air lines must not be readily accessible to students inside or outside the bus and must be made of copper, steel or nonmetallic materials meeting SAE Standard J848D. Fittings must be brass. Stop signal arms must meet the applicable requirements of SAE J1133. For controls, see the requirements above under System Controls. Stop arms must retract within six seconds of deactivation. For color, see **LETTERING AND TRIM**.

### **STEP WELL LIGHT:**

A step well light must illuminate the bus entrance and be adequately protected. The step well light must be activated automatically when the service door is opened and the clearance lights are on. The step well light must be LED. See **SERVICE DOOR** for further operational requirements.

### **STROBE LIGHT:**

A required white flashing LED strobe lamp must be installed on the roof of a school bus at a location centered (laterally) and approximately 48 inches (longitudinally) from the rear edge of the rear roof cap. If the bus is equipped with a roof hatch or other roof-mounted equipment falling within the above-mentioned measurements, the strobe lamp may be located directly behind that equipment. The lamp shall have a single clear lens emitting light 360 degrees around its vertical axis, meeting the requirements of SAE J845. It may not extend above the roof more than the maximum legal vehicle height, as described in s. [316.515\(2\), F.S.](#) A manual switch and a pilot lamp shall be included to indicate when the lamp is in operation.

### **TURN SIGNAL LAMPS:**

Front turn signal lights must be amber LED lights (if available). Side turn signal lights must be amber LED lights on each side of the bus, mounted rearward of the service door on the right side and rearward of the front stop arm on the left side. All buses over 30 feet in length must have two amber LED turn signal lights mounted on each side of the bus. The rearmost side turn signals on buses over 30 feet long must be mounted at or rearward of the centerline of the rear axle. Rear turn signal lights must be plug-in LED lights that meet current SAE requirements and comply with FMVSS.

### **TWO-WAY RADIO:**

Use of a two-way radio communications system approved by the school district is acceptable.

### **VIDEO CAMERA MONITORING SYSTEMS:**

Districts may install video cameras in buses provided the installed system:

1. Is mounted securely in the bus;
2. Is outside the federal head impact zone (FMVSS No. 222);
3. Is located in an area not likely to cause student injury; and
4. Has no sharp edges or projections.

**NOTE:** This is the end of the **ELECTRICAL EQUIPMENT AND WIRING** section.

### **EMERGENCY EXITS:**

1. The emergency door on all Types A, C, and front engine Type D buses must be located at the center of the rear of the bus and have a minimum horizontal opening of 24 inches and vertical opening of 48 inches.
2. The emergency door must be hinged on the right-hand side using hinge(s) with a brass or rust-resistant rod.
3. The outside control must consist of a nondetachable opening device designed to prevent "hitching to."
4. The emergency door must be equipped with a slide bar, cam-operated latching device having a minimum stroke of 1 inch.
5. The switch for the warning system must be enclosed in a metal case or durable case of other material, with rounded, protected edges. Wires leading from the switch must be concealed in the bus body. The switch must be installed so that the plunger contacts the farthest edge of the slide bar in such a manner that any movement of slide bar will immediately close the switch circuit and activate the buzzer.
6. The door latch must be equipped with an interior handle that extends approximately to the center of the emergency door. It must lift up to release.
7. There must also be attached to the door, in such a way that it is visible inside and outside the bus, labeling as follows: "This door is equipped with a hold-open device. To release, open the door to its fully opened position." This sticker must be red on a white background, and the lettering must be a minimum height of 1/2 inch.

Each non-lift bus must also be equipped with push-out type emergency exit side windows of similar design to the standard side windows, except for the following:

1. The emergency window assemblies must be hinged on the forward side.
2. No emergency window may be placed next to any child safety seat.
3. Emergency windows must be installed in the following quantity on non-lift buses:
  - a. 0 to 40 capacity              1 window per side
  - b. 41 to 72 capacity              2 windows per side
  - c. 73 to 90 capacity              3 windows per side

Buses 35 capacity and smaller must be equipped with one roof hatch emergency exit/ventilator. Buses over 35 capacity must be equipped with two roof hatch emergency exit/ventilators. Specifications for roof hatches must be as follows (also see **GENERAL INFORMATION AND WARRANTY PROVISIONS**):

1. Hinge(s) must be located on forward and rearward side of hatch.

2. The design must provide a “partially open” position along the full width of the hatch adequate to allow air to enter or exit and, thereby, ventilate the bus by opening either the front or rear of the hatch. The hatch must allow for partial opening on any of its four sides and on all four sides simultaneously.

Buses equipped with a lift are not required to be equipped with push-out emergency exit windows unless mandated by FMVSS No. 217. Lift buses may be equipped with push-out type emergency exit windows based on the capacity of a comparably sized non-lift bus.

#### **EMERGENCY ROADSIDE REFLECTORS:**

There must be three reflector warning devices, meeting the requirements of FMVSS No. 125, mounted in a location accessible to driver in the front section of the bus, and stored in a container. The container must be sealed with a breakable, non-reusable seal.

#### **FIRE EXTINGUISHER:**

A dry-chemical fire extinguisher with a gauge and designed to restrain tampering must be mounted in a place accessible to the driver, preferably near the service door.

The fire extinguisher must bear the label of Underwriters Laboratories, Inc., showing a rating of no less than 2A-10BC.

#### **FIRST-AID KIT:**

The bus must carry a Grade A, moisture- and dust-proof first-aid kit, mounted in such a manner that it can be easily detached and made portable, in an accessible place in the driver's compartment. The container must be sealed with a breakable, non-reusable seal, and the contents must be as follows:

1-inch bandage compress (e.g., Band-Aids)	two packages
40-inch triangular bandage with two safety pins	one package
4 x 4-inch sterile gauze pads	two packages of six each
2-inch Kerlix rolled bandage	one roll, 6 yards in length
1-inch roll adhesive tape	one roll, 2 1/2 yards in length
Eye dressing packet	two packages

#### **FLOOR AND FLOOR COVERING:**

1. The floor must be level from front to back and from side to side except for the wheel housings, the toe board and the driver's seat platform.
2. All sills must be permanently attached to the floor.
3. The driver's compartment plate on conventional bodies must be removable, installed level with the bus floor. All components requiring servicing must be readily accessible. Openings in the bus floor to meet this requirement must be reinforced to maintain the full strength of the unpunctured floor.

**NOTE: Items 1-3 above do not apply to Type A Buses less than 14,500 GVWR.** For Type A buses less than 14,500 GVWR, the floor must provide adequate and firm support for seat legs and must have a minimum 1/2 inch marine grade or pressure-treated plywood, securely mounted to the floor. Basic floor construction of Type A buses must be the manufacturer's standard, meeting applicable FMVSS.

4. The floor covering must be resistant to ultraviolet light, ozone and moisture and have a minimum tensile strength of 1,200 pounds per square inch (PSI) and a minimum elongation of 100 percent. Floor covering must be abrasion-resistant and slip-resistant and have a minimum coefficient of friction of 0.85 as measured under American Society for Testing and Materials (ASTM) D1894 or 0.65 as measured under ASTM D2047.
5. The floor covering from the top step landing area to the emergency door (or rear seat on Type D rear engine buses) must be ribbed aisle, non-skid and wear-resistant, fire-resistant elastomer. Elastomer floor covering must meet Federal Specification ZZ-M-71d.

6. The landing area at the top of the steps must be ribbed elastomer, which must extend to the ribbed aisle floor cover. The leading horizontal edge, or nosing, must be white or yellow ribbed elastomer or other contrasting color and must have an integral 90 degree turn-down with a square leading edge matching the step treads.
7. All joints or seams in the floor covering must be covered with non-ferrous metal, minimum 1 inch wide, and the driver's compartment, except at the cowl, must have a special, approved molding. Alternate materials may be used if they provide equivalent durability. The molding must be securely attached to prevent a tripping hazard.
8. Manufacturers may use seamless one-piece floor rubber with an integral ribbed aisle meeting the requirements in items 4 and 5. Aisle molding is not required when the bus is equipped with one-piece floor rubber.
9. All holes in the chassis firewall and around the transmission cover and engine housing must be adequately sealed.
10. A commercially available truck bed liner material meeting the requirements in items 4 and 5 may be substituted for the required flooring material.

#### **FUEL FILLER OPENING:**

An opening of adequate size and design must be provided over fuel filler. Also see **LETTERING AND TRIM**.

#### **GRAB HANDLE AT ENTRANCE:**

A suitable grab handle or rail must be provided at the front entrance, securely mounted inside of the body. Grab handles must be made of round stainless steel, 1 inch outside diameter (OD). The grab handle and mounting must be designed to minimize the possibility of students' clothing or personal items becoming lodged or caught upon exiting the bus, in order to reduce the risk of injury or fatality to passengers from being dragged outside the bus.

#### **INSULATION AND SEALING OF JOINTS:**

The overlap of the edge of the exterior roof and side panels, and also the top edge of rub rails, must be sealed to prevent moisture, dust, and other contaminants from entering the joints and the bus.

#### **LETTERING AND TRIM:**

Trim on the three rub rails below the beltline and all lettering must be black (except for stop signs). Entrance door frames, pilaster panels and other trim panels may be painted black, if approved by the department. The letters of the words "SCHOOL BUS" on the top front and rear section of the bus body must be 8 inches high and correspond to the Series B, Standard Alphabet (see the [National School Transportation Specifications and Procedures, Revised 2015](#)). "(Name of District) DISTRICT SCHOOLS" on each side of the bus body at the beltline must be in 6-inch minimum letters. Private and charter schools may alternately affix the name of the school in the aforementioned format and location. Bus numbers must be a minimum of 6 inches in height and on each side and on the front bumper and rear of the bus body. "**EMERGENCY DOOR**" must be in 2-inch letters at the top or directly above the door, visible inside and outside of bus. Lettering to indicate the fuel type must be located on the body adjacent to the fuel filler opening using letters that are a minimum of 1 inch in height. The words "**STOP WHEN RED LIGHTS FLASH**" must be displayed on the back of all buses in 6-inch black letters. Also, see the lettering requirements for emergency exits, including roof hatches and push-out windows, under **EMERGENCY EXITS**.

The front stop signal arm (both sides of arm) and rear stop arm (rear side only) must have a red background with a reflectorized white border; the letters "**STOP**" must be in 6-inch white reflectorized letters. Both sides of the front stop arm and the rear side of the rear stop arm must have reflectorized red sheeting of high-intensity material. The front side of the rear stop arm must be painted red.

**NOTE:** Buses must include the lettering and trim specified above, and are limited to lettering, trim, symbols, markings, and coloration specified in the [National School Transportation Specifications and Procedures, Revised 2015](#).

### **LICENSE HOLDER:**

A license holder must be included on the left rear outside of the body, with a suitable method for mounting the license tag.

### **LOCKUP DEVICES:**

Any emergency door equipped with a locking device must have an ignition interlock that prevents starting the engine when the door is locked, meeting requirements of FMVSS No. 217. Emergency exit windows must not be operable (under normal conditions) from outside the bus and must not be equipped with any locking device.

### **MIRROR SYSTEM:**

1. **Interior Mirror:** Must provide adequate viewing of the entire length and width of the interior of the bus and be at least 6 x 30 inches. The mirror must meet the following requirements:
  - a. Meet or exceed American National Standards Institutes (ANSI) Z97.1 requirements for safety glazing in mobile environments and be bonded to the mirror housing;
  - b. Include a heavy-duty, single-piece mounting bracket that ensures stability;
  - c. Housing must be low-gloss black;
  - d. Incorporate an adjustment to allow the driver to reposition the mirror without the use of tools; and
  - e. Have a soft gasket type frame that is bonded to the housing.

**NOTE:** Interior mirror on Type A buses must be a minimum of 50 square inches and meet the above requirements.

2. **Exterior Mirrors:**

Each school bus must be equipped with a system of exterior mirrors complying with FMVSS No. 111 and meeting the following requirements:

- a. **Cross/Side-View Mirror System:** This mirror system must incorporate the following features and requirements:
  - i. Only one mirror is to be installed at each front corner of the bus.
  - ii. Mirrors must not reflect excessive glare from the bus headlights or the sun into the driver's eyes. Mirrors must be a 1/4 sphere or shaded 1/2 sphere design.
  - iii. Stainless steel or non-corrosive fasteners must be used in the construction of the mirror assembly and to hold the brackets to the body.
  - iv. Mirror stabilizer brackets on all Type C composite hoods must use through-the-fender rubber or nylon mounts with stainless steel caps to reduce mirror vibration and erosion of the hood material.
  - v. All exterior mirror fasteners, mounts and bracketry must be of non-corrosive material.
- b. **Rear Vision Mirror System:** A rear vision mirror system must be provided that incorporates the following features and requirements:
  - i. The system must consist of one flat and one convex mirror lens per side. Each mirror set must be mounted on a breakaway arm with a positive detent or lock.
  - ii. Each of the four required mirrors in the rear vision mirror system must be electrically operated and remotely controlled from the driver's location.
  - iii. All exterior mirror fasteners, mounts and bracketry must be stainless steel. Stainless steel or non-corrosive fasteners must be used in the construction of the mirror assembly and to hold the brackets to the body.
- c. **Overall Exterior Mirror System:** (cross/side-view and rear vision mirrors) must be isolated from vibration and be compliant with FMVSS No. 111.

### **NOISE REDUCTION PACKAGE:**

A noise reduction package is required and must include full insulation of the ceiling, walls, and front and rear of the bus, including body bows and engine compartment, plus minimum 1/2-inch marine grade or pressure-treated plywood or equivalent composite material securely mounted to the floor. Insulation material must be fire-resistant and of a type that will not harbor dampness.

### **PAINT AND FINISH:**

All National School Bus Yellow paint must meet the [National School Transportation Specifications and Procedures, Revised 2015](#) for color and have a finished gloss rating of at least 85 at 60°F and a distinctness of image (DOI) rating of an average of at least 50, measured using the same method specified for gloss under **GENERAL INFORMATION AND WARRANTY PROVISIONS**. Paint must be applied for a total dry thickness of at least 1.8 mils over all painted surfaces. School bus roofs must be painted white in color, and must meet the gloss and DOI ratings. White paint may extend to the leading and trailing edge of the roof caps, and may extend down to the drip rails. Trim, lettering and bumpers must be black except that bumpers must be striped in accordance with [National School Transportation Specifications and Procedures, Revised 2015](#) or these specifications. Also see **GENERAL INFORMATION AND WARRANTY PROVISIONS** for warranty requirements, **LETTERING AND TRIM** and **REFLECTIVE MARKINGS**.

### **PANELING, INTERIOR:**

Interior panel fastenings must minimize vibrations and rumble. A cove molding, which may be an extension of the body panels, must be installed covering the wall-to-floor joint beginning at the windshield post on the left side of the bus and extending along the walls around the corners to the service door on the right side. Molding must be securely fastened so that dirt will not readily work under it. The interior paneled area immediately below the window line must be aluminum-coated steel.

### **REFLECTIVE MARKING PACKAGE:**

There must be installed a reflective marking package as specified in the [National School Transportation Specifications and Procedures, Revised 2015](#). Striping must be installed longitudinally along the length of the body at the vertical location immediately below the seat level rub rails, but high enough so as to clear wheel wells, whenever possible. Short breaks in the striping at rivet locations are acceptable. Reflective markings are also required for all emergency exits, as specified in FMVSS No. 217.

### **RUB RAILS:**

1. There must be a rub rail on each side of the bus approximately at seat level, which must extend from the entrance door post around the bus body (except for emergency door) to the point of curvature near the cowl on the left side.
2. There must be rub rails located approximately at the floor line and the bottom of the outer skirt, which must cover the same longitudinal area as the upper rub rail, except at wheel housings, but extend only to the right and left corners.
3. Rub rails must be applied outside of body panels. Pressed-in or snap-in rub rails do not satisfy this requirement.

### **SEATING, MODESTY PANELS (RESTRAINING BARRIERS), LAP BELTS, AND WEBBING CUTTERS:**

1. Passenger seats must be mounted facing forward and provide a minimum of 12.8 inches of seat width per passenger seating position. The aisle must be 12 inches wide at a minimum. This plan of body seating must be used to determine seating capacity (see **BODY DATA PLATE**).
2. Seat spacing must meet the requirements of FMVSS No. 222. The first seat on each side of all Types A, C and D buses must be equipped with FMVSS No. 225-compliant child safety seat anchorage points. All 39-inch FMVSS No. 225-compliant passenger seats must be equipped with two sets of anchorage points per bench seat. All passenger seats compliant with FMVSS No. 225 with a seat width of less than 36 inches must be equipped with one set of anchorage points per bench seat.
3. All passenger seats compliant with FMVSS No. 225 must be spaced to provide the maximum knee room (seat spacing) permitted by FMVSS No. 222. The rest of the passenger seats must provide for a minimum of 24 inches of knee room.
4. Seat padding must be secured to the frame so that it will not snag. Screws and bolts used in seat back construction must not be exposed.
5. Restraining barriers and passenger seats, including the seat back and the entire bottom cushion (including underside), must be covered with blue vinyl-coated material. All passenger seat assemblies and barriers

must meet the requirements of the [National School Transportation Specifications and Procedures, Revised 2015](#). Buses must have an FMVSS-compliant padded restraining barrier in front of the forward-most passenger seat on each side of the bus. Also see Section V for restraining barrier requirements for buses equipped with wheelchair lifts. Restraining barriers at the entrance side and the driver's side must have a full-width, aluminized steel panel below the padded section extending down to the floor, except as specified under heater/defroster specifications (see **ELECTRICAL EQUIPMENT AND WIRING**).

6. All Type A school buses sold through the State of Florida school bus bid must be equipped with Type II, three-point seat belts in all passenger seating positions. These belt systems must meet the requirements of [National School Transportation Specifications and Procedures, Revised 2015](#).
7. All Types C and D buses must be equipped with lap belts in all passenger seating positions, meeting the following requirements:
  - a. All belts and anchorages must comply with FMVSS Nos. 209 and 210.
  - b. Belts must be manufacturer's standard style lap belts. The nonadjustable buckle end of each belt must be the aisle-side connection point on each passenger seat.
  - c. Each two-part belt must be separately color coded to aid in proper connection.
  - d. Any belt system with parts that can be manually disassembled without the use of tools and any system that is subject to easy vandalism shall not be approved for use in Florida school buses.
  - e. Retractable seat belts are permissible at the purchaser's option. If this system is specified, the retractor must be emergency locking type, and the retractor must be mounted below the seat bight. Seat bight is defined as the area close to and including the intersection of the surfaces of the vehicle seat cushion and the seat back.
  - f. All federal requirements supersede any of these requirements.
  - g. School districts may install restraining systems that differ from these requirements as necessary to accommodate pre-school age children and children with special needs. Such systems must comply with FMVSS Nos. 209, 210, and 213, as applicable, and must be approved by the body manufacturer.
8. All buses must also be equipped with a durable webbing cutter having a full width handgrip and a protected, replaceable blade. The required belt cutter must be mounted in a location accessible to the driver in the seated position and be easily detachable.

#### **SERVICE DOOR:**

1. The service door must be a split or jackknife type located at the right front of the bus. Doors must be securely hinged with approved heavy-duty hinges with a brass or rust-resistant rod adequately fastened to the adjoined member. Doors must have a 1-1/2 inch minimum safety gap sealed with a safety flap of approved quality. The door must extend to the bottom step and be fitted with suitable weather strip to keep water from entering the step well.
2. An air-operated entrance door must be provided on all buses equipped with air brakes. This system must have a manually operated override to enable the driver to manually open the door in the event of loss of power. Air-powered entrance doors must operate in accordance with the following table:

Ignition Switch Position	Door Position	Emergency Dump Switch Position	Door Position / Status	Step Well Light Condition
Off	Any	On	Neutral	Off
Off	Any	Off	Neutral	Off
On	Closed	Off	Closed/Active	Off
On	Opened	Off	Open/Active	On
On	Closed	On	Neutral	Off
On	Opened	On	Neutral	On

3. When the key switch is in the "off" position, the air door system must not create a battery draw. All air-powered door systems must provide a rebuildable air cylinder and operate reliably in all weather and temperature conditions. All air-powered door systems must include a method of manually adjusting the opening and closing speed and force of the doors.
4. Hydraulic brake buses must have an electrically controlled entrance door.

5. The service door must have a minimum horizontal opening of 24 inches and a minimum vertical opening of 68 inches. Immediately above the door opening there must be secured to the body panel a high-density foam rubber pad, a minimum of 3 inches in width, or an equivalent approved safety cushion.
6. Doors must be designed and weather strips mounted so that there is no binding or tendency for stripping to dislodge during door operation. One or two glassed-in openings must be provided in each door half with glass of same grade as specified for side windows and mounted in rubber. The bottom of the lower glass panel must not be more than 30 inches from the ground when the bus is unloaded. The top of the upper glass panel must not be more than 6 inches from the top of the door.

#### **SIZES OF BODIES:**

The height of Types C and D bus bodies, from the top of the finished floor to the underside of the ceiling, at the center of the body, must be a minimum of 76 inches.

#### **STEP WELL:**

A step well of at least three steps must be built in the right front assembly, enclosed with doors extending to the bottom step. Each step must be covered with abrasion-resistant "Pebble-Top" elastomer, the base of which must be at least 3/16 inches thick, with an overall thickness of 5/16 inch, bonded to a durable polymer base and otherwise constructed to provide substantial support, including the leading horizontal edge, which must be "Pebble-Top" type, and white or a color that contrasts with the step tread by at least 70 percent. The polymer backing must have an integral 90-degree turndown with a square leading edge for slip resistance. The lower (first) step height must be between 10 and 16 inches above the ground for all Types A, C, and D buses. Each step must be the full width of the step well at the point where the step is located. Half steps or partial steps are not acceptable.

**NOTE:** Two steps are acceptable on Type A buses.

#### **STRUCTURAL DESIGN and TESTING:**

1. All Types A, C, and D bodies must meet the requirements of FMVSS No. 221 and the requirements of the [National School Transportation Specifications and Procedures, Revised 2015](#) Side Intrusion Test.
2. Each manufacturer of Types A, C or D bodies must certify that representative configurations of its buses produced to meet these specifications comply with the testing and requirements of the Colorado Racking Load Test. See **Colorado Racking Load Test** in Appendix B.
3. Each manufacturer of Types A, C or D bodies must certify that representative configurations of its buses produced to meet these specifications comply with the testing and requirements of the Kentucky Pole Test. See **Kentucky Pole Test** in Appendix C.
4. All bus bodies must be constructed to be in square and level. There must be no more than 1 inch of difference from side to side at the front and rear of the bus body (not counting any chassis lean or twist). All bodies must be mounted such that all designed body contact points are in contact with the chassis frame. All bodies must be centered on the chassis within plus or minus 1/2 inch.

#### **SUN SHIELD:**

A dual sun shield system must be provided, consisting of two independently mounted sun shields. One must be mounted above the windshield and the other above the driver's window. Each visor must have a tinted Plexiglas sun shield, minimum 6 x 24 inches, and rounded bull-nosed perimeter edges.

**NOTE:** The manufacturer's standard sun visor is acceptable on Type A buses.

#### **VANDAL BOX, SIDE MOUNTED**

There must be installed on all Types C and D buses an equipment compartment on the ceiling above the driver's side window, measuring approximately 1,600 cubic inches. The compartment must have a door with a positive latch and a keyed-alike lock. No safety equipment shall be mounted inside this compartment.

## **WINDOWS:**

1. All Types A, C, and D buses must have tinted glass that provides the maximum tinting allowed by federal and American National Standards Institute (ANSI) standards for the windshield, the driver's side window(s) and the service door glass. Tinted glass in all windows rear of the driver's compartment must have a light transmission of approximately 28 percent.
2. An adjustable split sash window with safety glass must be mounted in the side of the bus body between each framing post. Permanent marks showing the grade of glass must be visible.
3. Movable windows must be controlled by an approved lock having a finger-touch opener, providing for ease of operation and with no sharp projections. Window latches must be replaceable or rebuildable without disassembling the complete window frame or removing the window from the body. In addition, individual window latches or repair parts must be available and part numbers included in the required body parts catalog. Window seals and visors or drip molding must be installed and provide ample protection from leakage.
4. For ventilation, the driver's window must be adjustable and equipped with a positive latch that can be secured from the inside of bus.
5. The rear door must have two windows, one upper and one lower, installed in a waterproof manner.
6. Rear side windows located at each side of the emergency door must be installed in a waterproof manner. The glass area must be large enough to provide desirable vision to the rear and must be of the same quality and grade as side windows.

## **WINDSHIELD:**

The front body section in the area of the windshield must provide for corner vision. Glass must be laminated safety polished plate with dark tint at top, installed in a waterproof manner and slanted to reduce glare. Glass must meet current SAE specifications and FMVSS. Light tint may be used in all Type D buses in lieu of dark tint at the top.

## **WINDSHIELD STEPS AND HANDLES:**

A step and appropriate grab handle must be installed on each front corner of the body to facilitate cleaning the windshield. The handle must be stainless steel, chrome plated or non-ferrous metal, or may be made of non-metallic material of sufficient structural and mounting strength and resistant to weathering and deterioration, and must provide for secure mounting and adequate hand hold.

**NOTE:** Steps and handles are not required on Type A buses under 21,500 GVWR.

## **WINDSHIELD WIPERS AND WASHERS:**

1. Electric windshield wipers must be standard on all buses. All wipers by design and installation must provide desirable vision for drivers. Blades and arms must be of sufficient length to clear the windshield glass in the driver's direct view. One switch must control both wipers, and the switch must be located within easy reach from driver's seat, preferably on the turn signal stalk. The system must incorporate a variable delay wipe feature to allow drivers to adjust the speed and frequency of the wipers. The wiper system must be designed to move the blades away from the driver's direct view when in the parked position.
2. Windshield washers must be electrically operated. The washer reservoir must be made of hard plastic or other approved material and have a capacity of at least 1/2 gallon. Flexible plastic bags are not acceptable.

**NOTE:** The manufacturer's standard windshield wipers are acceptable on Type A buses.

## SCHOOL BUS BODY EXCEPTIONS

### **TYPE D FRONT ENGINE BODY EXCEPTIONS:**

1. The distance between the restraining barrier at the rear of the entrance step well and the engine cover must be a minimum of 13 inches.
2. A step, in lieu of stirrup steps, is permitted in or on the front bumper on both sides.
3. The engine cover must provide an adequate seal to the bus floor area to keep engine fumes from entering the passenger compartment and must be insulated to retard transfer of heat and engine noise. The engine cover must be hinged and equipped with a prop rod or other device so that it can be held securely in the fully open position to allow access to the engine.

### **TYPE D REAR ENGINE BODY EXCEPTIONS:**

1. The engine compartment must be constructed to permit servicing of the engine, having one or two doors opening at the rear and louvered, with removable panels on each side of engine compartment. The engine compartment must be sealed at top and front to retard heat transfer and prevent engine fumes from entering the passenger compartment. Provisions must be made for easy removal of the engine through the rear compartment.
2. Mud flaps must be installed at the rear of the dual wheels.
3. A step, in lieu of stirrup steps, is permitted in or on the front bumper on both sides.
4. Type D Rear Engine buses are exempted from the requirement for an additional electrical compartment for air conditioner circuitry, provided the air conditioner control boards are installed in the rear package shelf area in a covered box.
5. There must be an engine access panel underneath the rear seat of all rear engine buses designed to provide access to the engine.

## **OPTIONAL BODY EQUIPMENT SPECIFICATIONS**

### **AUTOMATIC VEHICLE LOCATION AND STUDENT TRACKING SYSTEM:**

There shall be an approved option for a system that uses the Global Positioning System (GPS) to determine and wirelessly report the location of the bus in approximately real time. The system may also include an additional feature that will identify individual students as they board or disembark from the bus and report the locations and times.

### **AUXILIARY DRIVER FAN:**

There shall be an approved option for a 6-inch or header-mounted squirrel cage fan to be installed and mounted to the left side of the windshield, when possible, in a location approved by the department.

### **BAGGAGE COMPARTMENTS:**

There shall be an approved option for baggage compartments on all bodies when available. This body option must include a lock and be keyed alike with any other body option requiring use of a key.

### **BATTERY DISCONNECT SWITCH LABELING:**

There shall be an approved option for a label to be placed on the exterior of the bus on the cover of the compartment housing the battery disconnect switch. The label background must be white with red 1-inch letters with the wording “MAIN BATTERY DISCONNECT.”

### **BUS LOCKUP SYSTEM:**

There shall be an approved option whereby a bus can be locked at the emergency door as well as the entrance door. An ignition interlock is required for the emergency door to prevent starting the bus if the emergency door or rear window (on RE units) is locked. This body option must be keyed alike with any other body option requiring use of a key.

### **CEILING PANELS:**

There shall be an option for full-width perforated interior ceiling panels extending from the rear header panel forward to at least the front of the engine compartment.

### **DRIVER'S SEAT WITH INTEGRATED SEAT BELT:**

There shall be an approved option for a driver's seat with a seat belt integrated into the seat back, meeting the requirements of DRIVER'S SEAT AND SEAT BELT in this section.

### **EXTERIOR LIGHT MONITOR:**

A system of monitoring exterior lights on the front and rear of the bus from the driver's seated position is approved as an option. Such systems must include:

1. Student warning lamps, both RED and AMBER, front and rear;
2. Tail lamps;
3. Backup lamps;
4. Rear turn signal lamps; and
5. Stop lamps.

A system that monitors only electrical circuits and does not indicate whether the bulb is operational is not acceptable.

### **FUEL / DEF DOOR:**

A lock with two keys may be installed in the fuel/DEF supply service doors of the body skirt. This body option must be keyed alike with any other body option requiring use of a key. Fuel/DEF Doors may be color-coded to reflect fuel type.

### **INFANT SEATING:**

There shall be an approved option for passenger seating designed to safely transport newborns, infants or toddlers, meeting all applicable FMVSS. Such seats may include C.E. White Child Restraint Seats and other systems, as approved by the department.

### **INTERIOR OVERHEAD STORAGE COMPARTMENTS (MFSAB ONLY):**

There shall be an approved option for interior overhead storage compartments that meet the following criteria:

1. Head protection requirements of FMVSS No. 222, School Bus Passenger Seating and Crash Protection, where applicable;
2. Be completely enclosed and equipped with latching door (both door and latch sufficient to withstand a pushing force of 50 pounds applied at the inside center of the door);
3. Have all corners and edges rounded, with a minimum radius of 1 inch, or be padded equivalent to door header padding;
4. Be attached to the bus sufficiently to withstand a force equal to 20 times the maximum rated capacity of the compartment; and
5. Have no protrusions greater than 1/4-inch.

The driver's area forward of the foremost padded barriers will permit the mounting of required safety equipment and vehicle operation equipment.

### **LETTERING:**

Districts may add an **American flag decal** to the exterior of the bus. If used, it must be no more than 6 x 10 inches in size and located in front of the district name on the beltline of the bus. Also see United States Public Law 4 U.S.C. § 7. Districts may add one employee recruitment sign and/or "No Right Turn on Red" sign no larger than 6" x 12" on the back of the bus between the beltline and the rear bumper, provided it does not obstruct any other required signage or windows.

### **POWDER-COATED WINDOW FRAMES:**

There shall be an approved option for electrostatically powder-coated black window frames on all types of buses to reduce friction and improve ease of operation of passenger side windows.

### **PUBLIC ADDRESS SYSTEM (P.A.), RADIO:**

There shall be an approved option for a public address system/AM/FM stereo radio with four speakers inside the bus and one heavy-duty weatherproof P.A. speaker outside the bus. This option must have controls to permit the driver to select inside or outside speakers, and the radio must be mounted in the driver's compartment so that all controls are readily accessible to the driver from the normal seated position. Interior speakers must be flush-mounted. Outside speaker must be mounted under the hood or in another protected location at the front of the bus. An AM/FM stereo radio with four speakers may be offered separately. No internal speakers other than those used for the driver's communication system may be installed within 4 feet of the back of the driver's seat when the seat is in its rearmost upright position.

### **REAR HEATER:**

There shall be an approved option for an additional heater mounted to provide heat in the rear of the body. This option must be installed under a passenger seat or otherwise be protected to eliminate damage to the unit and injury to the students.

### **RED LIGHT ABOVE EMERGENCY DOOR:**

There shall be an approved option for a small red light to be mounted above the emergency door on the interior of the bus that is activated when the clearance lights are on.

**THREE-POINT SEAT BELTS AND THREE-POINT SEAT BELT SEATS:**

There shall be an approved option for three-point seat belts in two- and three-passenger seats, as approved by the department.

## **SECTION IV**

# **POWER LIFT EQUIPPED SCHOOL BUS MINIMUM SPECIFICATIONS**

## **INTRODUCTION AND GENERAL REQUIREMENTS FOR EXCEPTIONAL CHILD BUSES:**

Exceptional child bus body structure and equipment must conform to the regular bus body specifications in Section III and meet the additional requirements of this section. All school buses equipped with wheelchair lifts must meet or exceed the requirements of FMVSS Nos. [403](#) and [404](#), the [National School Transportation Specifications and Procedures, Revised 2015](#), and all requirements listed herein, which prevail in the event of a conflict.

### **DEFINITION:**

An exceptional child bus is any school bus that is designed, equipped and/or modified to accommodate students with special transportation needs requiring a power lift.

### **GENERAL REQUIREMENTS:**

Exceptional child specially equipped school buses shall comply with the [National School Transportation Specifications and Procedures, Revised 2015](#) and with the FMVSS applicable to their GVWR category. Any school bus to be used for the transportation of children who use a wheelchair or other mobile positioning device, or who require life-support equipment that prohibits use of the regular service entrance, shall be equipped with a power lift.

### **AISLES:**

All school buses equipped with a power lift shall provide a minimum 30-inch pathway leading from any wheelchair position to at least one 30-inch wide emergency exit door. A wheelchair securement position shall never be located directly in front of (blocking) a power lift door location.

### **GLAZING:**

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

### **IDENTIFICATION:**

Exceptional child specially equipped school buses shall display the International Symbol of Accessibility below the window line pursuant to appendices A-1 and A-2. Such emblems shall be white on blue background, shall not exceed 12 inches square in size and shall be of a high-intensity retroreflective material.

### **OCCUPANT RESTRAINT SYSTEM:**

If the upper torso belt anchorage is higher than 44 inches measured from the vehicle floor, an adjustment device, as part of the occupant restraint system, shall be supplied (See [FMVSS No. 222](#), S5.4.3 and S5.4.4.).

### **PASSENGER CAPACITY RATING:**

In determining the capacity of a school bus for purposes other than actual passenger load (e.g., vehicle classification or various billing/reimbursement models), any location in a school bus intended for securement of a wheelchair during vehicle operation shall be regarded as four designated seating positions, and each lift area shall count as four designated seating positions.

### **POWER LIFTS:**

1. The power lift shall be located on the right side of the bus body only.
2. Vehicle lifts and installations shall comply with the requirements set forth in:
  - a. [FMVSS No. 403](#), Platform Lift Systems for Motor Vehicles; and
  - b. [FMVSS No. 404](#), Platform Lift Installations in Motor Vehicles.
3. Design loads: The design load of the lift shall be at least 800 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, based on the ultimate strength of the material. Non-working parts, such as platform, frame and attachment hardware that would not be expected to wear, shall have a safety factor of at least 3, based on the ultimate strength of the material.
4. Lift capacity: The lifting mechanism and platform shall be capable of operating effectively with a wheelchair and occupant mass of at least 800 pounds.
  5. Documentation: The following information shall be provided with each vehicle equipped with a lift:
  6. 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.)
  7. Detailed instructions regarding use of the lift shall be readily visible when the lift door is open, including a diagram showing the proper placement and positioning of wheelchair/mobility aids on the lift.
  8. Training materials: The lift manufacturer shall make training materials available to ensure the proper use and maintenance of the lift. These may include instructional videos, classroom curriculum, system test results or other related materials.
  9. Identification and certification: Each lift shall be permanently and legibly marked or shall incorporate a non-removable label or tag that states it conforms to all applicable requirements of the current National School Transportation Specifications and Procedures. In addition, and upon request of the original titled purchaser, the lift manufacturer or an authorized representative 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 School Transportation Specifications and Procedures.

#### **REGULAR SERVICE ENTRANCE:**

1. On power lift-equipped vehicles, steps shall be the full width of the step well, excluding the thickness of the doors in the open position.
2. In addition to the handrail required in section III, an additional handrail is required on all specially equipped school buses. This handrail shall be located on the opposite side of the entrance door from the handrail required in section III and shall meet the same requirements for handrails.

#### **RESTRAINING BARRIERS WITH MODESTY PANELS:**

1. There must be a padded restraining barrier with a modesty panel located immediately rearward of the lift if there are wheelchair spaces or regular seating located rearward of the lift and on the same side of the bus.
2. There must be a padded restraining barrier with a modesty panel meeting FMVSS spacing requirements located forward of all passenger seats that do not have another seat properly spaced in front of them.
3. There must be a padded restraining barrier or seat in front of any wheelchair position unless it is contiguous with and behind another wheelchair position.
4. The forwardmost restraining barrier on both sides of the bus must have a full width aluminized modesty panel extending to the floor. If the right front of the passenger area immediately behind the stepwell is not equipped with a restraining barrier due to placement of the wheelchair lift in that location, it must be equipped with a padded stanchion from floor to ceiling with an aluminized modesty panel.

#### **RESTRAINING DEVICES:**

1. On power lift-equipped school buses with a GVWR of 10,000 pounds or more, seat frames may be equipped with attachment points to which belt assemblies can be attached for use with child safety restraint systems (CSRSs) that comply with [FMVSS No. 213](#), Child Restraint Systems.
2. Any belt assembly anchorage shall comply with [FMVSS No. 210](#), Seat Belt Assembly Anchorages.
3. Alternatively, a child restraint anchorage system that complies with [FMVSS No. 225](#), Child Restraint Anchorage Systems, may be installed.
4. Seat belt assemblies shall conform to [FMVSS No. 209](#), Seat Belt Assemblies.
5. Child safety 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 No. 213](#).

#### **SEATING ARRANGEMENTS:**

1. Flexibility in seat spacing to accommodate special devices shall be permitted to meet passenger requirements.

2. All seating shall meet the requirements of [FMVSS No. 222](#), School Bus Passenger Seating and Crash Protection.

## **SECUREMENT AND RESTRAINT SYSTEM FOR WHEELCHAIRS AND WHEELCHAIR-SEATED OCCUPANTS:**

1. For purposes of understanding the various aspects and components of this section, the terms “securement,” “tie down,” “securement system,” and “tie down system” are used exclusively in reference to the devices that anchor the wheelchair to the vehicle.
2. The terms “restraint” and “restraint system” are used exclusively in reference to the equipment that is intended to limit the movement of the wheelchair occupant in a crash or sudden maneuver.
3. The term “wheelchair tie down and occupant restraint system (WTORS)” is used to refer to the total system that secures the wheelchair and restrains the wheelchair occupant.

### **SPECIAL LIGHT:**

Doorways in which lifts are installed shall be equipped with an LED light that provides a minimum of 20 lumens of illumination on the floor of the bus immediately adjacent to the lift during lift operation.

### **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.
4. 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. A drip molding shall be installed above the special service entrance to effectively divert water from the entrance.
5. Door posts and headers at the special service entrance shall be reinforced sufficiently to provide support and strength equivalent to the areas of the side of the bus not used for the 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 this would obstruct the regular service entrance. If the door is hinged to the rearward side of the doorway, the door shall use a safety mechanism that will prevent it 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 aerodynamic forces created by the forward motion of the bus, and/or shall 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 them in the “open” position when the special service entrance is in use.
4. All doors shall be weather-sealed.
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 one-point fastening devices—to the header, to the floor line of the body, and into the rear door. The door and hinge mechanism shall have strength that is greater than, or equivalent to, the strength of the emergency exit door.
6. Door materials, panels and structural components shall have strength 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 that are visually similar in size and location to adjacent non-door windows. Glazing shall be of the same type and tinting (if applicable) as standard fixed glass in other body locations.
8. Door(s) shall be equipped with a device that will actuate an audible or visible signal located in the driver’s compartment when the door(s) is not securely closed and the ignition is in the “on” position.
9. A switch shall be installed so that the lift 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. The padding shall be at least 3-inches wide and 1-inch thick and shall extend the full width of the door opening.
11. Power lift LED landing light is required on the exterior of the bus to provide illumination for lift operation.

#### **SUPPORT EQUIPMENT AND ACCESSORIES:**

1. In addition to the webbing cutter required in section III, each power-lift-equipped bus that is set up to accommodate wheelchairs with webbing attached shall contain an additional webbing cutter properly secured in a location to be determined by the purchaser. The webbing cutter shall meet the requirements listed in section III.
2. Special equipment or supplies that are used in the bus for mobility assistance, health support or safety shall meet local, federal and engineering standards that may apply, including requirements for proper identification. Equipment that may be used for these purposes includes, but is not limited to:
  - a. Wheelchairs and other mobile seating devices. (See subsection on Securement and Restraint System for Wheelchairs and Wheelchair-seated Occupants.)
  - b. Crutches, walkers, canes and other ambulating devices to assist ambulation.
  - c. Medical support equipment. This may include respiratory devices, such as oxygen bottles (which should be no larger than 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.
3. Each exceptional child bus that is set up to accommodate wheelchairs or other assistive restraint devices should be equipped with an emergency evacuation device that is certified and tested to withstand at least a 300-pound load when used as an emergency stretcher or drag. This evacuation device shall be properly secured to the bus in a location to be determined by the purchaser.
4. If transporting oxygen, refer to AMD Standard 003 available online at <http://www.safeambulances.org/wp-content/uploads/2018/04/2014-AMD-Standards-001-027.pdf> for oxygen tank retention requirements.

#### **WHEELCHAIR TIE DOWNS OCCUPANT RESTRAINT SYSTEMS (WTORS)**

##### **GENERAL REQUIREMENTS:**

1. A WTORS installed in specially equipped school buses shall be designed, installed and operated for use with forward-facing wheelchair-seated passengers and shall comply with all applicable requirements of [FMVSS No. 222](#), School Bus Passenger Seating and Crash Protection, and [SAE J2249](#), WTORS for Use in Motor Vehicles.
2. The WTORS, including the anchorage track, floor plates, pockets, or other anchorages, shall be provided by the same manufacturer or shall be certified to be compatible by manufacturers of all equipment/systems used.
3. Wheelchair securement positions shall be located such that wheelchairs and their occupants do not block access to the lift door.
4. A device for storage of the WTORS shall be provided. When the system is not in use, the storage device shall allow for clean storage of the system, keep the system securely contained within the passenger compartment, provide reasonable protection from vandalism and enable the system to be readily accessed for use.
5. The WTORS, including the storage device, shall meet the flammability standards established in [FMVSS No. 302](#), Flammability of Interior Materials.
6. The following information shall be provided with each vehicle equipped with a securement and restraint system:
  - 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, including a diagram showing the proper placement of the wheelchair/mobility aids and positioning of securement devices and occupant restraints, including correct belt angles.
7. The WTORS manufacturer shall make training materials available to ensure the proper use and maintenance of the WTORS. These may include instructional videos, classroom curriculum, system test results or other related materials.

#### **WHEELCHAIR SECUREMENT/TIE DOWN:**

1. Each wheelchair position in an exceptional child bus shall have a minimum clear floor area of 30 inches laterally by 48 inches longitudinally pursuant to [FMVSS No. 222](#), S5.4.1 and S5.4.2.
2. Additional floor area may be required for some wheelchairs. Consultation between the user and the manufacturer is recommended to ensure that adequate area is provided.

# **POWER LIFT EQUIPPED SCHOOL BUS OPTIONAL EQUIPMENT SPECIFICATIONS**

## **Straight Floor / Flat Floor:**

1. There shall be an approved option on any size bus, when available, for an unobstructed straight floor design (i.e., no wheel wells and no step-up at the rear of the driver's compartment). Minimum headroom of Types C and D buses equipped with this option must remain 76 inches as per standard body specifications.
2. There shall be an approved option on any size bus, when available, for an unobstructed flat floor design in the passenger compartment. If this option uses a raised floor that is stepped up behind the driver's area, the forward edge of the aisle must have a white stripe labeled "Step Up" as viewed upon entering the aisle, and a "Step Down" label must be visible upon exiting the aisle.
3. Minimum headroom of Types C and D buses equipped with this option must remain 76 inches as per standard body specifications.
4. The bus must be equipped with 39-inch seats except for locations where lift bus specifications require a 30-inch aisle.

## **Track Seating:**

1. There shall be an approved option for a track-mounted seating system using button track (L track) and a wheelchair securement system meeting Florida specifications that mounts into the track-seating track.
2. The overhead track for the shoulder harness attachment must be present at every possible wheelchair position.
3. The bus must be equipped with 39-inch seats, except when lift bus specifications require a 30-inch aisle.
4. All floor tracking must be anodized aluminum or other material of equal strength that will resist corrosion in Florida's environment.
5. This option must include additional options, as follows:
  - a. Purchase of individual track seating seats;
  - b. Delete a seat, add a wheelchair position with wheelchair tie-downs; and
  - c. Delete a wheelchair position (tie-downs) and add a standard seat.

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## **SECTION V**

# AIR CONDITIONER SPECIFICATIONS

## **PERFORMANCE SPECIFICATIONS:**

The installed air conditioner system must meet the high performance standards described in [National School Transportation Specifications and Procedures, Revised 2015](#). Performance test reports shall be made available upon request by the purchasing district or the department.

## **SYSTEM REQUIREMENTS FOR ALL BUSES:**

### **Evaporators and Ducting:**

1. Air intake for any evaporator assembly(ies), except for the front evaporator of Type A buses, must be equipped with replaceable air filter(s) accessible without disassembly of evaporator case.
2. No portion of the air conditioner system may block the driver's view through any window, except that vertical covering in the rear corners of the bus interior for hoses and/or wiring may intrude on the rear quarter window by no more than 2 inches.

### **Controls, Wiring, Hoses, and Miscellaneous Hardware:**

All system operating controls, including on-off switches, blower switches and thermostat controls, must be accessible to the driver in a seated position.

### **Body:**

1. All Type C and Type D front-engine buses equipped with air conditioners must also be equipped with a compartment mounted next to the battery box with external access for mounting circuit breakers and control circuitry for the air conditioner.
2. Type D rear-engine buses are exempt from the requirement for an additional electrical compartment for air conditioner circuitry provided the air conditioner control boards are installed in the rear package shelf area in a covered box.

**NOTE:** Control boards may optionally be mounted inside the bus within the evaporator case or behind the dash on all Type C and D buses. Any control boards mounted inside the bus must be easily accessible.

### **Warranty and Serviceability:**

Warranty - Air conditioner compressor applications must be approved in writing by the chassis engine manufacturer and state that the installation will not void or reduce the engine manufacturer's warranty or extended service coverage liabilities in any way. Also see **GENERAL INFORMATION AND WARRANTY PROVISIONS.**

### **Serviceability:**

All components requiring periodic servicing must be readily accessible for servicing including, but not limited to:

1. Refrigerant service ports;
2. Sight glasses, which must be directly visible;
3. Any manually resettable circuit breakers;
4. Evaporator air filters – removable and serviceable; and
5. All major component serial numbers must be readily visible.

**Parts and Service Manuals:**

A comprehensive operator's, maintenance and parts manual(s) must be provided for the entire system, or available via Internet access from the manufacturer's website for each A/C system purchased. Parts manuals must be designed so that all replaceable parts are illustrated by line drawings and numbered on the illustration, with a part description on a separate list under the corresponding part number. Part descriptions should be annotated appropriately with the part number, a proper description (part name) and the quantity required for the application listed in the drawings. The service manual or manufacturer's website must also include an overall A/C system diagram with component plumbing, locations and identities indicated for diagnostic purposes.

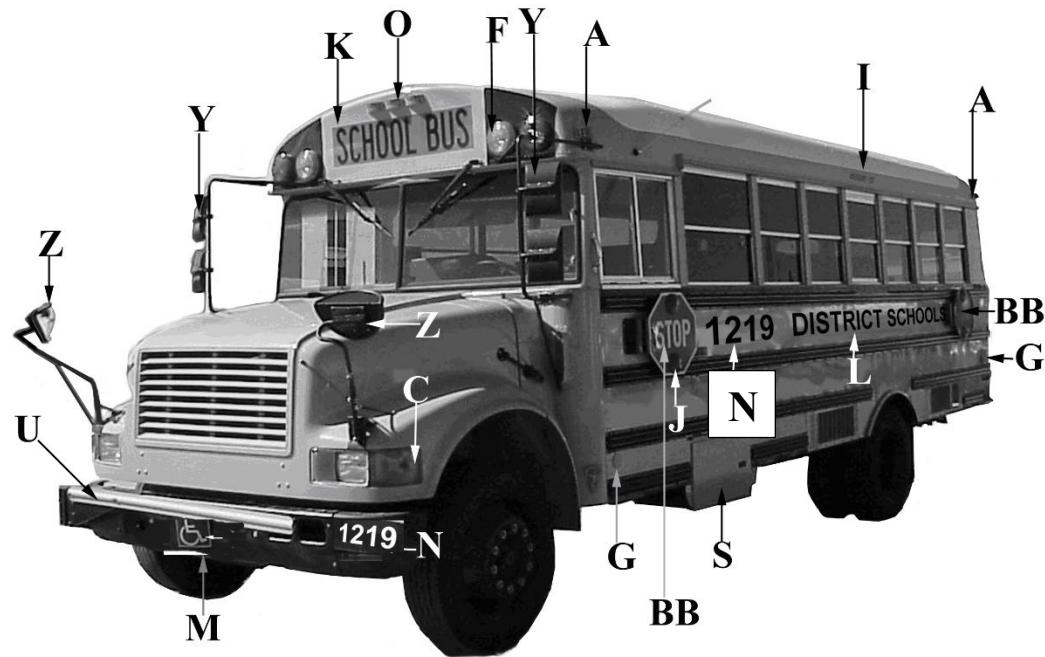
**Parts and Tools Availability:**

1. All system parts and required special service tools must be readily available, and a list of suppliers must be provided to each school district shop purchasing that brand of air conditioner.
2. Suspension Capacity and Ground Clearance - Ground clearance at the lowest point of the air-conditioning system must be no less than the ground clearance of the bus at the step well.
3. Air conditioner system manufacturers must provide information and data, as needed, to assist in establishing chassis engine performance requirements and in determining chassis electrical components or specifications that may be needed to accommodate the additional electrical demands imposed by the air-conditioning system.

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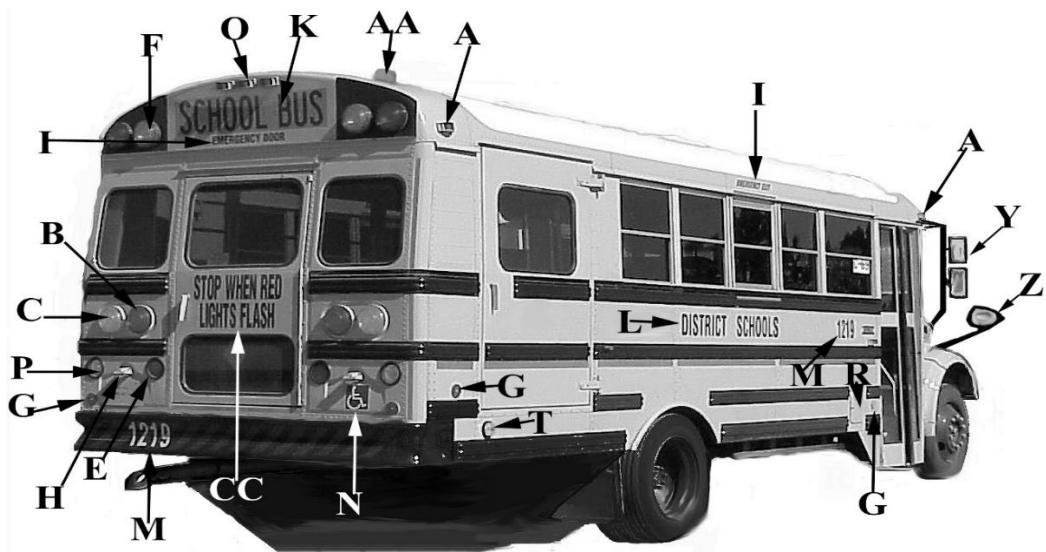
**APPENDIX A**

**MINIMUM LETTERING  
AND LIGHTING  
REQUIREMENTS**



### **MINIMUM LETTERING AND LIGHTING REQUIREMENTS:**

A	LED Clearance Lights	L	(Name of District) District Schools, Each Side, Belt Line, 6-inch lettering
BB	Octagonal Stop Arm	M	Universal Handicapped Symbol, Wheelchair Lift Equipped Bus symbol can be placed anywhere on the front bumper, the size must be 6 by 6 inches minimum.
C	LED Front Turn Signals, (amber lenses)	N	Bus Numbers, 6-inch lettering
F	LED Pupil Warning Lights, Side by Side Amber and Red, Flat Back Design	O	LED Identification Lamps
G	Reflectors	S	Battery Disconnect Switch Decal (optional)
I	Emergency Exit, 2-inch lettering	U	Pupil Crossing Arm
J	Double-Faced Flashing Red LED Lights	Y	Rear View Mirror System
K	SCHOOL BUS, Front and Rear, 8-inch lettering on retro-reflective yellow background	Z	Cross/Side View Mirror System



### **MINIMUM LETTERING AND LIGHTING REQUIREMENTS:**

A	LED Clearance Lights	N	Bus Numbers, 6-inch lettering
B	Seven-inch LED Brake/Tail Lights	M	Universal Handicapped Symbol, Wheelchair Lift Equipped Buses, minimum 6 by 6 inches
C	Seven-inch LED Turn Signals (amber lenses)	O	LED Identification Lamps
E	Four-inch LED Stop/Tail Lights	P	LED Back-up Lights
F	LED Pupil Warning Lights, Side-by-side Amber and Red, Flat Back Design	R	Fuel Door, 1-inch letters, DEF Door
G	Reflectors	T	Wheelchair Lift LED Landing Light
H	LED License Plate Lamp	Y	Rear View Mirror System
I	Emergency Exit Signs, 2-inch lettering	Z	Cross/Side View Mirror System
K	SCHOOL BUS, Front and Rear, 8-inch lettering on retro-reflective yellow background	AA	Roof-mounted White Flashing LED Strobe Light
L	(Name of District) District Schools (each side, belt line), 6-inch letters	CC	Rear Door Lettering, 6-inch lettering

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## **APPENDIX B**

### **COLORADO RACKING LOAD TEST**

## COLORADO RACKING LOAD TEST

The Colorado Racking Test shall be required on or before the acceptance date of the first bus of the respective configuration.

### **TEST PROCEDURE:**

In addition to complying with the test procedures described in FMVSS No. 220, the body manufacturers shall record and report the downward vertical movement of the force at 0, 25, 50, 75, and 100 percent of the maximum force (both loading and unloading). The expected force deflection curve is illustrated schematically in Figure 1a. Low load nonlinearities may indicate joint deformation; high load nonlinearities may indicate yielding in structural members.

A second load cycle shall be performed following the procedure given in the first paragraph. The expected force-deflection curve is illustrated schematically in Figure 1b. Any hysteresis following the initial shakedown will be revealed by this second cycle.

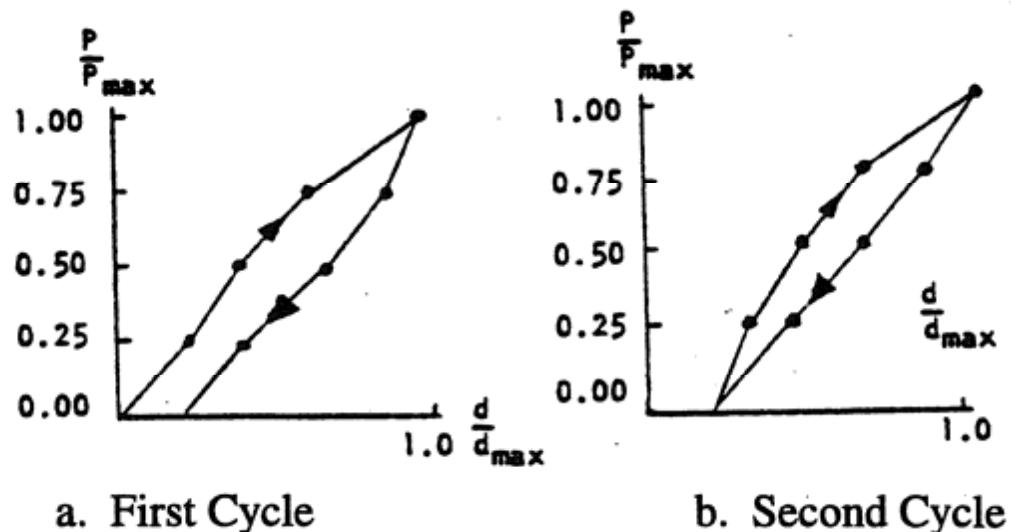


Figure 1. Static Load Test Load-Deflection Curves

A diagonal (racking) load test must be performed on Types A, B, C, and D school buses to ensure adequate shear stiffness and strength of the bus body. Details of the test are provided below:

A two-cycle loading sequence shall be conducted following the described procedure.

**(a) Requirements:** When a force equal to 1 1/2 times the gross vehicle weight (GVW) is applied to the edge of the roof of the vehicle's body structure through a force application plate, as specified in Test Procedures (b):

1. The diagonal movement of the force at any point on the application plate shall not exceed 5 1/8 inches; and

2. Each emergency exit of the vehicle provided in accordance with FMVSS No. 217 shall be capable of operation as specified in that standard during the full application of the force and after release of the force.

**(b) Test Procedures:** Each vehicle shall be capable of meeting the requirements of (1) and (2) when tested in accordance with the procedures set forth below.

1. The vehicle shall be supported on a rigid surface along the lower edge of the frame or along the body sills in the absence of a frame.
2. The load shall be applied through a force application plate that is flat and rigid. The dimensions of the plate shall be chosen to assure that the plate edges never make contact with the vehicle skin during testing. A typical width is 18 inches, and a typical length is 20 inches less than the length of the vehicle's roof measured along its longitudinal centerline.
3. Place the force application plate in contact with the edge of the vehicle roof. Orient the plate so that its flat, rigid surface is perpendicular to a diagonal line connecting the most distant points on an interior cross-section of the vehicle. The rear edge of the plate shall be positioned approximately 20 inches from the rear edge of the vehicle roof. A temporary stand may be used to support the plate until a force is applied.
4. Apply an evenly distributed force in a diagonally downward direction through the force application plate at any rate not more than 0.5 inch per second, until a force of 500 pounds has been applied.
5. Apply additional force in a diagonally downward direction through the force application plate at a rate of not more than 0.5 inch per second until the force specified in (a) has been applied, and maintain this application of force.
6. Measure the diagonal movement of any point on the force application plate that occurred during the application of force in accordance with (b)(5), and open the emergency exits as specified in (a)(2).
7. Release all diagonal force applied through the force application plate, and operate the emergency exits as specified in (a)(2).

**(c) Test Conditions:** The following conditions apply to the requirements specified in (3).

1. Temperature: The ambient temperature is between 32 degrees F and 90 degrees F.
2. Windows and Doors: Vehicle windows, doors, and emergency exits are in the fully-closed position and latched but not locked.

**(d) An alternative method** of testing for the racking load test shall be as follows:

The racking load shall be applied along a line connecting the most distant points on a transverse cross-section of the bus interior. It produces a shear distortion of the cross-section, as shown in figure 2.

A representative method of loading that employs a hydraulic jack to load a two-frame test assembly is illustrated in figure 2.

The maximum jack load for the two-frame assembly is determined by the following formula:

$$J = 2P \quad J - \text{maximum jack load for two-frame test assembly}$$

P = load/frame

where P = Dynamic Vehicle Weight (DVW) divided by N

DVW - dynamic vehicle weight

N - total number of bus body frames

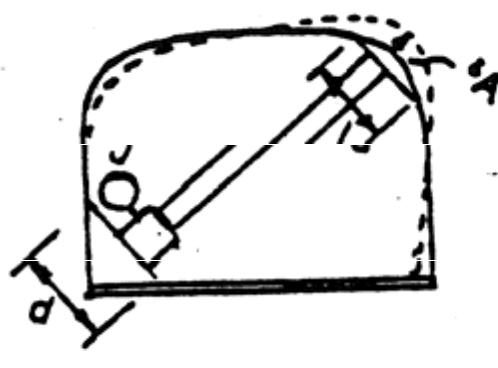
and DVW = DF x GVW

DF - dynamic factor, not less than 1.5

GVW - gross vehicle weight

Thus, for a DF = 1.5, a GVW = 22,000 pounds-force (lbf) and N= 11, the dynamic vehicle weight is DVW = 33,000 lbf, the load/frame is P = 3000 lbf and the maximum jack load is J = 6000 lbf.

When a complete bus body is rack-loaded, the total load DVW must be distributed uniformly along the bus body. This may be accomplished by mounting a series of hydraulic jacks along the length of the bus interior. Seats may be removed to facilitate jack mounting. The rack load will be considered to be uniformly distributed when the variation in the hydraulic jack readings is less than 10 percent. A maximum load is the sum of all jack readings and shall equal DVW.



Transverse Cross Section

Side View

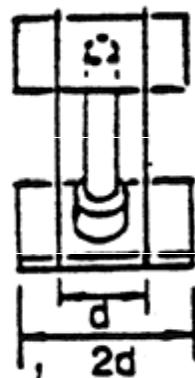


Figure 2. Arrangement of Hydraulic Jack for Rack-Loading of Two-Frame Assembly

The test may be performed on a complete bus body or on a representative section composed of at least two complete frames (body posts plus roof bows) and floor. Standard seats may be installed in the test section in a manner identical to that of the full bus body. Fabrication procedures for the test assembly shall be identical to those used in normal bus body production.

A two-cycle loading sequence shall be conducted, with intermediate and final load and deflection readings recorded, according to the procedure described.

The maximum deflection in line with the jack (A, maximum) shall not exceed 4 inches.

Manufacturer shall specify which testing method was used and submit appropriate certification information.

## **APPENDIX C**

### **KENTUCKY POLE TEST PROCEDURES**

## **KENTUCKY POLE TEST**

The Kentucky Pole Test shall be required on or before the acceptance date of the first bus of the respective configuration.

### **TEST PROCEDURE:**

The body shall be impacted at any point along the roof line on the outside surface, using an 8-inch diameter cylinder, 48 inches long, at a 30 to 45 degree angle, 1 to 3 inches above the top window line. The cylinder shall impact the roofline with the 48 inches dimension in a vertical plane with a force not to exceed 10 inches maximum to 8 inches minimum penetration of the body panels into the passenger compartment after impact.

The manufacturer shall submit appropriate certification information.

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