

# Board of Education Agenda Item

Item: I.

Date: September 27, 2006

Topic: Final Review of Pupil Transportation Specifications for School Buses

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## Origin:

Topic presented for information only (no board action required)

Board review required by  
 State or federal law or regulation  
 Board of Education regulation  
 Other: \_\_\_\_\_

Action requested at this meeting  Action requested at future meeting: \_\_\_\_\_

## Previous Review/Action:

No previous board review/action

Previous review/action  
date May 24, 2006  
action First Review

## Background Information:

The Regulations Governing Pupil Transportation approved in January 2004, deleted the sections that detailed the specifications for school buses and made them a separate document that requires periodic approval by the Board of Education. This permits the Department of Education to revise and update the bus specifications more efficiently than would be permitted under the process for revising regulations. It also permits the specifications to be refreshed more frequently to recognize new or emerging technology. The specifications for school buses are presented to the Board of Education for approval as necessary. The specifications proposed in this item represent changes that are needed at this time. The current specifications were approved by the Board of Education in November 2004.

## Summary of Major Elements

The specifications (attached) have been updated and revised to include recent changes in equipment and technology. The changes were developed by the Department's Specifications Committee, which is

comprised of pupil transportation representatives from school divisions across the state. None of the changes represent significant deviations from standard industry practices. All of the recommended specifications comply with the safety requirements of the National Highway Traffic Safety Administration.

The proposed specifications were developed with the goal of improving safety. Knowing that it is difficult to design statewide specifications that encompass the specific needs of each division's fleet, the committee considered the geographic differences of our regions, the newer technology available for new school buses, the past track record of current specification configurations, specifically the overall cost of maintenance, and any components with a record of failure that caused safety to be compromised.

The committee also made comparisons with specifications of other states and adjusted the previous specifications to improve Virginia's minimum specifications and align Virginia's specifications with other Southeastern States. Also included in the proposed revisions are recommendations to incorporate changes adopted in May 2005, by the Fourteenth National Congress on School Transportation, "National School Transportation Specifications and Procedures."

The proposed specifications were posted on the Department's Web site for 30 days to provide school divisions and other interested parties with the opportunity to review them and offer comments. Comments were received from all three school bus dealers in Virginia, one school bus manufacturer, and five school divisions. The comments and the recommended actions from the specifications committee are compiled and attached to this document.

The majority of the comments dealt with mechanical issues, however, a few safety issues also were identified. The most significant safety issue identified has been addressed by requiring a non-sequential system for traffic warning lights on all new school buses. This change will allow the red lights to be activated whenever the door opens, thus avoiding situations when students are getting on or off the bus and the lights are not activated due to driver failure to initiate the warning light sequence. Another change will provide school divisions with the option of placing a second school bus traffic warning sign on the left, rear side of the bus if the bus is Type C or D with a passenger capacity of 64 students or larger. Finally, the specifications include an option for school divisions to add additional warning lights to the front sides of the school bus if the school division is participating in an approved pilot program. (NOTE: The pilot program is addressed in a separate item being presented to the Board of Education.)

Additions to the specifications are indicated in bold lettering and deletions are indicated by strikeovers.

### **Superintendent's Recommendation:**

The Superintendent of Public Instruction recommends that the Board of Education approve the proposed school bus specifications.

### **Impact on Resources:**

There is no impact on Department of Education's resources to initiate these specifications.

**Timetable for Further Review/Action:**

No additional review or action is needed.

# SPECIFICATIONS THE BUS CHASSIS

## 1. Air cleaner.

- A. The engine intake air cleaner system shall be furnished and properly installed by the chassis manufacturer to meet the engine manufacturer's specifications.
- B. An air cleaner restriction indicator shall be furnished and installed by chassis manufacturer.

## 2. Alternator.

- A. ~~All Type A and B buses up to 15,000 pounds gross vehicle weight rating (GVWR) shall have a minimum 90 ampere alternator.~~
- B. ~~Type B buses over 15,000 pounds GVWR and all Type C and D buses~~ **All buses** shall be equipped with a heavy duty truck or bus type alternator meeting Society of Automotive Engineers (SAE) J-180; having a minimum output rating of ~~400~~ **130** amperes, alternator shall be capable of producing a minimum of 50% of its maximum rated output at the engine manufacturer's recommended idle speed.
- C. Buses equipped with electrically powered wheelchair lift, air conditioning or other accessories may be equipped with a device that monitors the electrical system voltage and advances the engine idle speed when the voltage drops to, or below, a pre-set level.
- D. Belt drive shall be capable of handling the rated capacity of the alternator with no detrimental effect on other driven components. Direct-drive alternator is permissible in lieu of belt drive.

## 3. Axles.

- A. The front and rear axle and suspension systems shall have a gross axle weight rating at ground commensurate with the respective front and rear weight loads that will be imposed by the bus.
- B. Rear axle shall be single speed, full-floating type.

## 4. Battery.

- A. 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 24 amps. Higher capacities may be required, depending upon optional equipment and local environmental conditions.

- B. Batteries shall be mounted in a slide out tray on the left side of the body in a compartment designed for storage batteries.
- C. Exception: Type A units – Batteries may be located in standard manufacturer's position.
- D. **Buses may be equipped with a battery shut-off switch. The switch is to be placed in a location not readily accessible to the driver or passengers.**

## 5. Brakes

- A. Four-wheel brakes, adequate at all times to control bus when fully loaded, shall be provided in accordance with Federal Motor Vehicle Safety Standards.
- B. The chassis brake system shall conform to the provisions of Federal Motor Vehicle Safety Standards (FMVSS) numbers 105, 106, and 121 as applicable.
- C. Chassis shall be equipped with auxiliary brakes capable of holding vehicle on any grade on which it is operated under any conditions of loading on a surface free from snow or ice. Operating controls of such auxiliary brakes shall be independent of operating controls of service brakes.
- D. Buses having full compressed air systems shall be equipped with a minimum 12 cfm engine oil-fed air compressor.
  - 1. Air supply for air compressor shall be taken from the clean side of engine air cleaner system.
  - 2. A desiccant type air dryer with automatic purge and drain cycle and a heating element shall be installed on all air brake buses.
  - 3. Air brake systems shall include system for anti-compounding of the service and parking brakes.
- E. Buses using hydraulic brakes shall have power assist brakes. Hydraulic line pressure shall not exceed recommendation of chassis or brake manufacturer.

**6. Bumper, front.**

- A. Front bumper shall be heavy-duty, channel steel at least eight inches in height with 3/16- inch thickness, painted black, and shall be furnished by chassis manufacturer as part of chassis.
- B. Front bumper shall extend to outer edges of fenders at bumper top line (to assure maximum fender protection) and be of sufficient strength to permit pushing, lifting or towing without permanent distortion to bumper, chassis, or body.
- C. Exception: Type A vehicles having a GVWR of 14,500 pounds or less – bumper shall be manufacturer’s standard painted black.
- D. Exception: Type D vehicles – same as above, except that front bumper shall be furnished by body manufacturer.

**7. Clutch.**

- A. Torque capacity shall be equal to or greater than the engine torque output. Clutch facing shall be non-asbestos.
- B. A starter interlock shall be installed to prevent actuation of the starter if the clutch pedal is not depressed.

**8. Color.**

- A. Chassis, including wheels, and front bumper shall be black.
- B. Hood, cowl, and fenders shall be national school bus yellow.
- ~~C. Grill shall be national school bus yellow, if painted; otherwise it shall be chrome or anodized aluminum.~~
- C. D. All paint shall meet the lead-free standards.

**9. Drive Shaft.**

- A. Drive shaft shall be protected by metal guard or guards to prevent it from whipping through floor or dropping to ground if broken.

**10. Electrical System.**

- A. Battery. See Item 4.
- B. Alternator. See Item 2.

- C. Lights and signals. See Item 19.
- D. Wiring. See Item 78.
- E. Power terminal. Chassis manufacturer shall provide an electric power source terminal for bus body power connection. Wiring from the power source in wiring terminal shall have a current carrying capacity of 125 amperes continuous (minimum 4 gauge wire). If the bus is to be equipped with Air Conditioning or Wheelchair Lift, current carrying capacity shall be increased to 150 amperes continuous.

This conductor shall be routed to cover the least distance practicable between points of termination. It should be of continuous size protected by fusible links, fuses, circuit breakers, or a reset-able electronic circuit protection device, no more than ~~42~~ **24** inches from the battery. The terminal shall be of the single post-type, minimum of one-fourth inch (1/4") stud and located in an accessible location for service, subject to approval of the Department of Education.

- F. Light terminal. The chassis manufacturer shall provide a wire terminal adjacent to on in the under dash area of the left side panel accessible to the body company for connection of rear brake lights, tail lights, turn signal lights, and back-up lights. A terminal strip consisting of individual terminals with each terminal properly identified shall be provided to meet this requirement.
- G. Fuse. All fuses shall be located in fuse block and properly identified for the circuit protected.
- H. Each chassis circuit shall be color-coded and a diagram of the circuits shall be included with the chassis.
- I. Wiring harness. All conductors from the alternator to the battery shall be continuous in length. The conductors shall be sized to provide at least a 25% greater current carrying capacity than the design output of the alternator (minimum 4 gauge wire). The conductor between the alternator and the battery shall be routed in a manner that will provide the least distance between points of termination. A separate ground conductor from alternator to engine shall be provided (minimum four-gauge).
- J. **Buses using multiplexed electrical systems may meet the intent of these specifications without the use of specified equipment, subject to the approval of the Department of Education.**

**11. Engine.**

- A. The engine shall be of the internal-combustion, four-stroke cycle type.
- B. All gas-powered buses shall have an automatic fire extinguisher system in the engine compartment.
- C. **An electronic engine speed limiter shall be provided and set to limit engine speed, not to exceed the maximum revolutions per minute, as recommended by the engine manufacturer.**

**12. Exhaust System.**

- A. Exhaust pipe, muffler, and tail pipe shall be outside bus body attached to chassis.
- B. Tail pipe shall be constructed of seamless or electrically welded tubing of 16-gauge steel or equivalent, and shall extend at least five inches beyond **outer edge of rear bumper**. ~~chassis frame.~~
- C. Size of tail pipe shall not be reduced after it leaves muffler.
- D. Exhaust system shall be properly insulated from fuel tank and tank connections by securely attached metal shield at any point where it is 12 inches or less from tank or tank connections.
- E. Muffler shall be constructed of corrosion-resistant material.
- ~~F. Exception: Type A and B Vehicles less than 15,000 pounds (GVWR) — tail pipe may exit behind rear wheel.~~
- F. **Types A and B chassis may be furnished with the manufacturer's standard tailpipe configuration.**

**13. Fenders, front.**

- A. Total spread of outer edges of front fenders, measured at fender line, shall exceed total spread of front tires when front wheels are in straight-ahead position.
- B. Front fenders shall be properly braced and free from any body attachment.

**14. Frame.**

- ~~A. Frame shall be of such design as to correspond at least to standard practice for trucks of same general load characteristics that are used for severe service.~~
- ~~B. When frame side members are used, they shall be of one piece construction. If frame side members are extended, such extension shall be designed and furnished by chassis manufacturer with a guarantee, and installation shall be made by either chassis or body manufacturer and guaranteed by company making installation. Extensions of frame lengths are permissible only when such alterations are behind rear hanger of rear spring, and shall not be for purpose of extending wheelbase.~~
- ~~C. Holes in top or bottom flanges of frame side rails shall not be permitted except as provided in original chassis frame. There shall be no welding to frame side rails except by chassis or body manufacturer.~~

- A. Frame lengths shall be established in accordance with the design criteria for the complete vehicle.**
- B. Making holes in top or bottom flanges or side units of the frame and welding to the frame shall not be permitted except as provided or accepted by the chassis manufacturer.**
- C. Frames shall not be modified for the purpose of extending the wheel base.**
- D. Any secondary manufacturer that modifies the original chassis frame shall provide a warranty at least equal to the warranty offered by the original equipment manufacturer (OEM), and shall certify that the modification and other parts or equipment affected by the modification shall be free from defects in material and workmanship under normal use and service intended by the OEM.**

**15. Fuel tank.**

- A. Fuel tank having a minimum 30-gallon capacity shall be provided. The tank shall be filled and vented to the outside of the body and the fuel filler should be placed on the right side in a location where accidental fuel spillage will not drop or drain on any part of the exhaust system.**
- B. Fuel lines shall be mounted to the chassis frame in such a manner that the frame provides the maximum possible protection from damage.**

- C. Fuel tank may be mounted between the frame rails or outboard on the right side of the vehicle.
- D. The actual draw capacity of each fuel tank shall be a minimum of 83 percent of the tank capacity.
- E. Exception: Type A Vehicles – fuel tank shall be manufacturer’s standard, mounted, filled, and vented outside of body. **Special needs buses will allow for left side fuel filler.**

**16. Heating System, provision for.**

- A. The chassis engine shall have plugged openings for the purpose of supplying hot water for the bus heating system. The opening shall be suitable for attaching ¾ inch pipe thread/hose connector. The engine shall be capable of supplying water having a temperature of at least 170 °F at a flow rate of 50 pounds per minute at the return end of 30 feet of one-inch inside diameter automotive hot water heater hose. (SBMI Standards No. 001-Standard Code for Testing and Rating Automotive Bus Hot Water Heating and Ventilating Equipment.)
- B. **Exception: Type A buses shall be manufacturer’s standard.**

**17. Horn.**

- ~~A. Bus shall be equipped with dual horns of standard make which meet requirements of Federal Motor Vehicle Safety Standards, 49 CFR 571.~~
- A. **The bus shall be equipped with a horn(s) of standard make with the horn(s) capable of producing a complex sound in bands of audio frequencies between 250 and 2,000 cycles per second, and tested in accordance with SAE J377, *Horn – Forward Warning – Electric – Performance, Test, and Application.***

**18. Instrument and instrument panel.**

- A. Chassis shall be equipped with following instruments and gauges:
  1. Speedometer which will show speed;
  2. Odometer which will show accrued mileage, including tenths of miles, tenths of miles can be accrued with trip odometer;  
**Odometer is to be able to be read without using a key;**
  3. Ammeter or voltmeter with graduated scale;

4. Oil pressure gauge;
  5. Water temperature gauge;
  6. Fuel gauge;
  7. Upper-beam headlamp indicator; and
  8. Tachometer.
- B. All instruments or gauges shall be mounted on instrument panel in such manner that each is clearly visible to driver in normal seated position. Lights in lieu of gauges are not acceptable.
- C. Exception: Type A vehicles – the ammeter, or voltmeter and its wiring are to be compatible with generating capacity. Tachometer is not required.
- D. Multi-function gauges must have prior approval.

**19. Lights and signals.**

- A. Each chassis shall be equipped with not less than two headlights – beam controlled, and stop and tail lights, and two front turn signal lamps mounted on front fenders.
- B. Lights shall be protected by fuse or circuit breakers.
- C. Self-canceling directional signal switch shall be installed by the chassis manufacturer. The directional signals shall activate only when ignition is in “on” position.
- D. Daytime Running Lights (DRL) are required.
- E. Brake air pressure gauge (air brakes), brake indicator lamp (vacuum/hydraulic brakes), or brake indicator lamp (hydraulic/hydraulic);**
- F. Turn signal indicator; and**
- G. Glow-plug indicator lamp, where appropriate.**
- H. Instruments and controls must be illuminated as required by FMVSS No. 101, *Controls and Displays*.**

**20. Oil Filter.**

~~A. Oil filter of replaceable element type shall be provided and shall have oil capacity of at least one quart.~~

**A. An oil filter with a replaceable element shall be provided and connected by flexible oil lines if it is not a built-in or an engine-mounted design. The oil filter shall have a capacity in accordance with the engine manufacturer's recommendation.**

**21. Openings.**

~~A. All openings in floorboard or firewall between chassis and passenger-carrying compartment, such as for gearshift lever and auxiliary brake lever, shall be sealed. unless altered by body manufacturer. See Item 39J.~~

**22. Passenger load.**

A. Gross vehicle weight (i.e., wet weight, plus body weight, plus driver's weight of 150 pounds, plus weight of maximum seated pupil load based on not less than 120 pounds per pupil) shall not exceed maximum gross vehicle weight rating as established by manufacturer.

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

**C. The manufacturer's GVWR for a particular school bus shall be furnished by manufacturers in duplicate (unless more copies are requested) to the state agency having student transportation jurisdiction. The state agency shall, in turn, transmit such ratings to other state agencies responsible for development or enforcement of state standards for school buses.**

**23. Retarder system (Optional).**

~~A. Retarder system, if used, shall be approved by the Department of Education.~~

**A. A retarder system, if used, shall limit the speed of a fully loaded school bus to 19.0 mph on a 7 percent grade for 3.6 miles.**

**24. Shock absorbers.**

A. Bus shall be equipped with front and rear double-acting shock absorbers compatible with manufacturer's rated axle capacity.

**25. Springs.**

- A. Springs or suspension assemblies shall be of ample resiliency under all load conditions and of adequate strength to sustain loaded bus without evidence of overload.
- B. Springs or suspension assemblies shall be designed to carry their proportional share of gross vehicle weight.
- C. Rear springs shall be of progressive, variable, parabolic or air ride type.
- D. Stationary eye of the front spring shall be protected by full wrapper leaf in addition to main leaf.
- E. Exception: Type A vehicles – springs that are regular equipment on vehicle to be purchased may be used.
- F. The capacity of springs or suspension assemblies shall be commensurate with the chassis manufacturer's GVWR.**

**26. Steering gear.**

- A. Steering gear shall be approved by chassis manufacturer and designed to assure safe and accurate performance when vehicle is operated with maximum load and maximum speed.
- B. No changes shall be made in steering apparatus that are not approved by chassis manufacturer.
- C. There shall be clearance of at least two inches between steering wheel and cowl instrument panel, windshield, or any other surface.
- D. Power steering is required and shall be of the integral type with integral valves.
- E. The steering system shall be designed to provide a means for lubrication of all wear-points that are not permanently lubricated.**

**27. Tires and rims.**

- A. Tire and rim sizes, based upon current standards of Tire and Rim Association, shall be required.
- B. Total weight imposed on any tire shall not be above current standard of Tire and Rim Association.

- C. Dual rear tires shall be provided on all vehicles.
- D. All tires on given vehicles shall be of same size and ply rating.
- E. Spare tire, if required, shall be suitably mounted in accessible location outside passenger compartment.

**28. Towing Attachment Points**

- A. Rear towing devices (i.e. tow hooks, tow eyes, or other designated towing attachment points) shall be furnished to assist in the retrieval of buses that are stuck and/or for towing buses when a wrecker with a “wheel lift” or an “axle lift” is not available or cannot be applied to the towed vehicle.**
- B. Towing devices shall be attached to the chassis frame either by the chassis manufacturer or in accordance with the chassis manufacturer’s specifications.**
- C. Each rear towing device shall have a strength rating of 13,500 pounds with the force applied in the rearward direction, parallel to the ground, and parallel to the longitudinal axis of the chassis frame rail.**
- D. The towing devices shall be mounted such that they do not project rearward of the rear bumper.**

**29. Transmission.**

- A. Mechanical type transmission shall be synchromesh except first and reverse gears. Its design shall provide not less than four forward and one reverse speeds. With five-speed transmission, fifth gear shall be direct.
- B. Automatic transmissions are permissible when equipped with a parking pawl or approved parking brake system.

**30. Turning Radius.**

- A. Chassis with a wheel base of 264 inches or less shall have a right and left turning radius of not more than 42 ½ feet, curb to curb measurement.
- B. Chassis with a wheel base over 264 inches shall have a right and left turning radius of not more than 44 ½ feet curb to curb measurement.

**31. Weight distribution.**

- A. Shall be established by chassis manufacturers engineering department.

**32. Wheels.**

- A. Disc wheels are required.

**THE BUS BODY**

**33. Aisle.**

- A. Minimum clearance of all aisles, including aisle (or passageway between seats) leading to emergency door shall be 12 inches. Aisles shall be unobstructed at all times.
- B. Aisle supports of seat backs shall be slanted away from aisle sufficiently to give aisle clearance of 15 inches at top of seat backs.

**34. Back-up Alarm.**

- ~~A. An automatic audible alarm shall be installed behind the rear axle and shall comply with the published Backup Alarm Standards (SAE J994B), providing a minimum of 97 dba.~~
- A. An automatic audible alarm shall be installed behind the rear axle and shall comply with the published Backup Alarm Standards (SAE J994b), providing a minimum of 112 dBA, or shall 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.**

**35. Body sizes.**

Sizes are based on knee-room clearance between rows of forward-facing seats, overall width, center aisle width, and average rump width.

**36. Bumper, rear.**

- A. Rear bumper shall be of pressed steel channel at least 3/16 inch by 9 ½ inches.
- B. It shall be wrapped around back corners of bus. It shall extend forward at least 12 inches, measured from rear-most point of body at floor line.
- C. Bumper shall be attached to chassis frame in such manner that it may be easily removed, shall be so braced as to develop full strength of bumper section from rear or side impact, and shall be so attached as to prevent hitching of rides.

- D. Rear bumper shall extend beyond rear-most part of body surface at least one inch, measured at floor line.
- E. Exception: Type A vehicles – Rear bumper shall be standard type furnished by chassis manufacturer as part of chassis on conversions. Body manufacturer will furnish bumper on cutaway chassis.

**37. Color.**

- A. School bus body including hood, cowl, external speakers and fenders shall be painted uniform color – national school bus yellow.
- B. Grill shall be national school bus yellow, **silver, or gray**, if painted; otherwise it shall be chrome or anodized aluminum.
- C. Rear bumper, body trim, and rub rails shall be painted black. **Must meet color requirements specific to bus. (See “Bus Chassis” specific specifications.)**
- D. The roof of the bus may be painted white extending down to the drip rails on the sides of the body except that front and rear roof caps shall remain national school bus yellow.
- E. All paint shall meet the lead-free standards.
- F. Retro-reflective tape. Material shall be Type V or better, as determined by the American Society of Testing Materials (ASTM: D4956-90). “Standard specifications for reflective sheeting for traffic control.”
  1. ~~The material shall retain at least 50% of reflective values for a minimum of seven years.~~
  2. ~~Reflective materials and markings shall include all of the following:~~
    - a. ~~On the rear, a strip of reflective yellow material two inches in width to be applied on the back of the bus, extending from the left lower corner of the “SCHOOL BUS” lettering, across to left side of the bus, then vertically down to the top of the bumper, across the bus on a line immediately above the bumper on the right side, then vertically up to a point even with a horizontal strip terminating at the right lower corner of the “SCHOOL BUS” lettering.~~

- ~~b. "SCHOOL BUS" signs shall be marked with reflective yellow material comprising background for lettering of the front and rear "SCHOOL BUS" signs.~~
  - ~~e. Sides of the bus body shall be marked with reflective yellow material, two inches in width, extending the length of the bus body and located (vertically) as close as practicable to the beltline.~~
- ~~3. On activity buses reflective material shall be installed on the rear and sides, following the same specifications in subdivisions 2a and 2c of this subsection. There will be no "SCHOOL BUS" signs on either the front or the rear of the activity bus. Color of the reflective material shall match, as closely as possible, the color of the bus body.~~
- a. The rear of the bus body shall be marked with strips of retro reflective NSBY material to outline the perimeter of the back of the bus using material which conforms with the requirements of FMVSS No. 131, *School Bus Pedestrian Safety Devices, Table 1*. The perimeter marking of rear emergency exits per FMVSS No. 217, *Bus Emergency Exits and Window Retention and Release*, and/or the use of retro reflective "SCHOOL BUS" signs partially accomplishes the objective of this requirement. To complete the perimeter marking of the back of the bus, strips of at least 1 ¾ inch retro reflective NSBY material shall be applied horizontally above the rear windows and above the rear bumper, extending from the rear emergency exit perimeter, marking outward to the left and right rear corners of the bus. Vertical strips shall be applied at the corners connecting these horizontal strips.**
  - b. "SCHOOL BUS" signs, if not a lighted design, shall be marked with retro reflective NSBY material comprising background for lettering of the front and/or rear "SCHOOL BUS" signs.**
  - c. Sides of the bus body shall be marked with at least 1 ¾ inch retro reflective NSBY material, extending the length of the bus body and located (vertically) between the floor line and the beltline.**

d. **If used, signs placed on the rear of the bus relating to school bus flashing signal lamps or railroad stop procedures may be retro reflective material, as specified.**

4. OPTION: Rear bumpers on school or activity buses may be marked with a maximum three-inch wide continuous black strip of reflective material which continues around corners to the ends of the bumpers.

**38. Communication system – optional equipment.**

A. Communication systems. If communication systems are used on school buses, the systems shall be subject to written policies adopted by the local school board. Installation shall be subject to the Department of Education Fleet Assessment.

1. The radio mounting shall be in the driver's compartment in a safe, secure location, so as not to interfere with normal bus operation.
2. Mounting shall be permanent. Temporary mountings will not be acceptable.
3. Wiring shall be protected by a proper fuse or circuit breaker and permanently connected to an accessory circuit shut off by ignition switch. Plug-in type connections are not acceptable.
4. Antenna shall be permanently mounted ~~to cowl or roof~~ so as not to interfere with driver's vision of roadway. Antenna lead-in cable shall be permanently secured with the proper clamps, grommets, and sealant. Antenna cable may not pass through window opening.

B. Public address system. For use by driver, the system contains an inside speaker and/or an external speaker that is of special use when driver needs to caution pupils about surrounding dangers at school bus stops. Inside speakers shall be recessed type.

C. AM/FM radios and cassette players. If AM/FM radios or cassette players are installed, they shall be properly mounted by the body manufacturer or local shop personnel. All wiring shall be properly connected and concealed and any speakers shall be of recessed type.

**No internal speakers, other than the driver's communication systems, may be installed within 4 feet of the driver's seat back in its rearmost upright position.**

- D. ~~Video~~-Camera. Both equipment and installation shall be subject to the Department of Education annual fleet assessment.
1. Equipment shall not extend more than six inches from the front header panel into the driver's compartment.
  2. Camera boxes shall be mounted securely to the header without use of brackets or other supports.
  3. Mounted equipment shall be located on the left side of the front header and shall not interfere with passenger ingress and egress.

**39. Construction, Type B, C, and D vehicles.**

- A. Construction of body shall meet all requirements of FMVSS 220 (roll-over), 49 CFR § 571.220, FMVSS 221 (Joint Strength), 49 CFR § 571.221, and all other applicable federal standards.
- B. Construction shall be of prime commercial quality steel or other material with strength at least equivalent to all-steel as certified by bus body manufacturer. All such construction materials shall be fire resistant.
- C. Construction shall provide reasonable dust proof and watertight unit.
- D. Bus body (including roof bows, body posts, strainers, stringers, floor, inner and outer linings, rub rails and other reinforcements) shall be of sufficient strength to support entire weight of fully loaded vehicle on its top or side if overturned. Bus body as unit shall be designed and built to provide impact and penetration resistance.
- E. Side posts and roof bows. There shall be a body side post and roof bow fore and aft of each window opening. This may be a continuous bow or two separate pieces effectively joined.
- F. Floor shall be of prime commercial quality steel of at least 14-gauge or other metal or other material at least equal in strength to 14-gauge steel. Floor shall be level from front to back and from side to side except in wheel housing, toe board, and driver's seat platform areas. When plywood is used, it shall be of ½-inch exterior B.B. Grade or equivalent and securely fastened to the existing steel floor.
- G. Roof strainers. Two or more roof strainers or longitudinal members shall be provided to connect roof bows, to reinforce flattest portion of roof skin, and to space roof bows. These strainers may be installed between roof bows or applied externally. They shall extend from windshield header and, when combined with rear emergency doorpost, are to function as

longitudinal members extending from windshield header to rear floor body cross member. At all points of contact between strainers or longitudinal members and other structural material, attachment shall be made by means of welding, riveting or bolting.

H. Side strainers. There shall be one or more side strainers or longitudinal members to connect vertical structural members and to provide impact and penetration resistance in event of contact with other vehicles or objects. Such strainers shall be formed (not in flat strip) from metal of at least 16-gauge and three inches wide.

1. Side strainers shall be installed in area between bottom of window and bottom of seat frame and shall extend completely around bus body except for door openings and body cowl panel. Side strainers shall be fastened to each vertical structural member in any one or any combination of the following methods as long as stress continuity of members is maintained:

a. Installed between vertical members;

b. Installed behind panels but attached to vertical members; and,

c. Installed outside external panels.

2. Fastening method employed shall be such that strength of strainers is fully utilized.

3. Side strainers or longitudinal members may be combined with one of required rub rails (see Item 61), or be in form of additional rub rail, as long as separate conditions and physical requirements for rub rails are met. No portion of side strainer or longitudinal member is to occupy same vertical position as rub rail.

I. Floor sills. There shall be one main body sill at each side post and two intermediate body sills on approximately 10-inch centers. All sills shall be of equal height, not to exceed three inches. All sills shall extend width of body floor except where structural members or features restrict area.

Main body sill shall be equivalent to or heavier than 10-gauge and each intermediate body sill shall be equivalent to or heavier than 16-gauge, or each of all sills shall be equivalent to or greater than 14-gauge. All sills shall be permanently attached to floor.

Connections between sides and floor system shall be capable of distributing loads from vertical posts to all floor sills.

- J. All openings between chassis and passenger-carrying compartment made due to alternations of body manufacturer shall be sealed. (See Item 58).
- K. A cover shall be provided for the opening to the fuel tank fill pipe.
- L. A moisture and rustproof removable panel shall be provided in the floor for access to the fuel tank sender gauge. It shall be designed for prolonged use and adequate fastening to the floor.

**40. Construction, Type A Vehicles.**

- A. Construction of body shall meet all requirements of FMVSS 220 (Roll-over), 49 CFR § 571.220, and all other applicable federal standards.
- B. Body joints created by body manufacturer shall meet the 60% joint strength provision required in FMVSS 221.49, CFR § 571.221, for Type B, C, and D buses.
- C. Construction shall be of prime commercial quality steel or other material with strength at least equivalent to all steel as certified by bus body manufacturer. All such construction materials shall be fire resistant.
- D. Construction shall provide reasonably dustproof and watertight unit.
- E. Bus body (including roof bows, body posts, strainers, stringers, floor, inner and outer linings, rub rails and other reinforcements) shall be of sufficient strength to support entire weight of fully loaded vehicle on its top or side if overturned. Bus body as unit shall be designed and built to provide impact and penetration resistance.
- F. Floor. Plywood of ½ inch exterior B.B. Grade or equivalent shall be applied over the existing steel floor and securely fastened. Floor shall be level from front to back and from side to side except in wheel housing, toe board, and driver seat platform areas.

Exception: Plywood may be deleted when provisions of subsection D and subdivision H 1 of Item 40 for Type C and D buses are met.

- G. Roof strainers. Two or more roof strainers or longitudinal members shall be provided to connect roof bows to reinforce flattest portion of roof skin, and to space roof bows. These strainers may be installed between roof bows or applied externally. They shall extend from windshield header to rear body header over the emergency door. At all points of contact between strainers of longitudinal members and other structural material, attachment shall be made by means of welding, riveting, or bolting.

After load as called for in Static Load Test Code has been removed, none of the following defects shall be evident:

1. Failure or separation at joints where strainers are fastened to roof bows;
2. Appreciable difference in deflection between adjacent strainers and roof bows;
3. Twisting, buckling, or deformation of strainer cross-section.

H. Side strainers. There shall be one longitudinal side strainer mounted at shoulder level (window sill level) and extending from front main vertical post to rear corner post. This member shall be attached to each vertical structural member. Such strainer shall be formed of metal (not in flat strip).

1. There shall be one longitudinal side strainer installed in the area between bottom of window and bottom of seat frame extending from front main vertical post to rear corner post. The member shall be attached to each vertical structural member.
2. Strainers may be fastened in any one or any combination of the following methods as long as stress continuity of members is maintained:
  - a. Installed between vertical members;
  - b. Installed behind panels but attached to vertical members;  
or,
  - c. Installed outside external panels.
3. Fastening method employed shall be such that strength of strainers is fully utilized.

I. Area between floor and window line shall be restructured inside to include at least four vertical formed reinforcement members extending from floor to window line rail. They shall be securely attached at both ends.

J. Rear corner reinforcements. Rear corner framing of the bus body between floor and window sill and between emergency door post and last side post shall consist of at least one structural member applied horizontally to provide additional impact and penetration resistance equal to that provided

by frame members in areas of sides of body. Such member shall be securely attached at each end.

- K. All openings between chassis and passenger carrying compartment made due to alterations by body manufacturers shall be sealed. (See Item 58.)

#### 41. Defrosters.

~~A. Defrosters shall be of sufficient capacity to keep windshield clear of fog, ice, and snow and to defog the window to the left of the driver. (See Item 46.) An auxiliary fan of sufficient capacity to defog the entrance door glass shall be installed above the windshield on the right side. An additional fan to the left of the driver is permissible. Fans shall be placed so as not to block driver's view of outside rearview mirrors.~~

**A. Defrosting and defogging equipment shall direct a sufficient flow of heated air onto the windshield, the window to the left of the driver and the glass in the viewing area directly to the right of the driver to eliminate frost, fog and snow. (Exception: The requirements of this standard do not apply to the exterior surfaces of double pane storm windows.)**

**B. The defrosting system shall conform to SAE J381, *Windshield Defrosting Systems Test Procedure and Performance Requirements – Trucks, Buses, and Multipurpose Vehicles.***

**C. The defroster and defogging system shall be capable of furnishing heated, outside ambient air, except that the part of the system furnishing additional air to the windshield, entrance door and step well may be the recirculating air type.**

D. Exception: Type A vehicle, Auxiliary fan is not required.

#### 42. Doors.

A. Service Door.

1. Service door shall be manually or power-operated, under control of driver, and so designed as to afford easy release and prevent accidental opening. No parts shall come together so as to shear or crush fingers.
2. Service door shall be located on right side of bus opposite driver and within his direct view.

3. Service door shall have minimum horizontal opening of 24 inches and minimum vertical opening of 68 inches.
4. Service door shall be of split-type, outward opening type.
5. All door glass shall be approved safety glass. Bottom of lower glass panel shall not be more than 10 inches from the bottom of the door. Top of upper glass panel shall not be more than three inches from top of door **opening**.
6. Vertical closing edges shall be equipped with flexible material to protect children's fingers.
7. All doors shall be equipped with padding at the top of each door opening. Pad shall be at least three inches wide and one-inch thick and extend the full width of the door opening.

B. Rear Emergency Door Type B, C, and D vehicles.

1. Emergency door shall be located in center of rear end of bus.
2. Rear emergency door shall have minimum horizontal opening of 24 inches and minimum vertical opening of 45 inches measured from floor level.
3. Rear emergency door shall be hinged on right side and shall open outward and be equipped with an adequate strap or stop to prevent door from striking lamps or right rear of body. Such strap or stop shall allow door to open at least at a 90-degree angle from closed position.

Exception: Type D vehicles with rear engines – Emergency door shall be located on the left side, shall be hinged on the front side and open outward. Door shall meet all requirements of FMVSS 217, 49 § 571.217.

- ~~4. Upper portion of rear emergency door shall be equipped with approved safety glass, exposed area of which shall not be less than 400 square inches. Lower portion of door shall be equipped with approved safety glass, area of which shall not be less than 12 inches in height and 20 inches in width. This glass shall be protected by a metal guard on the inside. This guard shall be free of any sharp edges that may cause injury to passengers.~~
- 4. The upper portion of the emergency door shall be equipped with approved safety glazing, the exposed area of which shall**

**be at least 400 square inches. The lower portion of the rear emergency door on Types A, B, C and D vehicles shall be equipped with a minimum of 240 square inches of approved safety glazing. This glass shall be protected by a metal guard on the inside. This guard shall be free of any sharp edges that may cause injury to passengers.**

5. There shall be no steps leading to emergency door.
6. When not fully latched, emergency door shall actuate signal audible to driver by means of mechanism actuated by latch.
7. Words "EMERGENCY DOOR," both inside and outside in black letters two inches high, painted or vinyl, shall be **in compliance with FMVSS 217**. ~~installed directly above emergency door. Words may be placed on the top of door outside if space is available.~~
8. The emergency door shall be designed to open from inside and outside bus. It shall be equipped with a slide bar and cam-operated lock located on left side of door and fastened to the door framing.

The slide bar shall be approximately 1 ¼ inches wide and 3/8 inch thick and shall have a minimum stroke of 1 ¼ inches. The slide bar shall have a bearing surface of a minimum of ¾ inch with the door lock in a closed position. Control from driver's seat shall not be permitted. Provision for opening from outside shall consist of non-detachable device so designed as to prevent hitching-to, but to permit opening when necessary. Door lock shall be equipped with interior handle and guard that extended approximately to center of door. It shall lift up to release lock.

9. All doors shall be equipped with padding at the top edge of each door opening. Pad shall be at least three inches wide and one inch thick and extend the full width of the door opening.

C. Rear emergency door, Type A vehicles.

1. Emergency door shall be located in center of rear end of bus and shall be equipped with fastening device for opening from inside and outside body, which may be quickly released but is designed to offer protection against accidental release. Control from driver's seat shall not be permitted. Provision for opening from outside shall consist of device designed to prevent hitching-to but to permit opening when necessary.

- ~~2. When not fully closed, emergency door shall actuate signal audible to driver.~~
- ~~3. Emergency door shall be marked "EMERGENCY DOOR" on inside and outside in painted or vinyl black letters two inches high immediately above the emergency door.~~
- ~~4. There shall be no steps leading to emergency door.~~
2. 5. No seat or other object shall be placed in bus which restricts passageway to emergency door to less than 12 inches.
- ~~6. All doors shall be equipped with padding at the top edge of each door opening. Pad shall be at least three inches wide and one inch thick and extend the full width of the door opening.~~

D. Security locking system. A locking system designed to prevent vandalism, which is approved by the Pupil Transportation Service, Department of Education, may be installed provided it is equipped with an interlock in the chassis starting circuit and an audible alarm to indicate to the driver when an emergency exit is locked while the ignition is in the "on" position. A cutoff switch on the interlock circuit or a lock and hasp on emergency exits shall not be permitted.

### 43. Emergency equipment.

#### A. Fire Extinguisher.

1. The bus shall be equipped with one dry-chemical fire extinguisher of at least five-pound capacity with pressure indicator, mounted in extinguisher manufacturer's bracket of automotive type, and located in full view and in an accessible place in the front of the bus.
2. **The fire extinguisher shall bear label of Underwriters' Laboratories, Inc., showing a rating of not less than 2A 10-B C, or greater.**
- ~~3. The fire extinguisher shall have a rating of 2-A:10-BC, or greater. The operating mechanism shall be secured with a type of seal that will not interfere with the use of the fire extinguisher.~~
3. 4. Fire extinguisher shall have aluminum, brass, or steel valves, heads, check stems, siphon tubes, levers, safety pins, chain,

handles and metal hanging brackets. Plastic shall not be used for those named parts.

B. First Aid Kit.

1. Bus shall carry Grade A metal first-aid kit, unit-type, mounted in full view and in accessible place in the front of the bus and identified as a first-aid kit.

2. The first-aid kit shall contain the following items:

Item	Unit
Bandage compress (sterile gauze pads) 4-inch	3
Bandage compress (sterile gauze pads) 2-inch	2
Adhesive absorbent bandage (nonadhering pad) 1 x 3 inch	2
Triangular bandage, 40-inch	2
Gauze bandage, 4 inch	2
Absorbent-gauze compress	1
Antiseptic applicator (swab type) 10 per unit (Zephiran Chloride/Green Soap type)	2
Bee sting applicator (swab type) 10 per unit	1
<b>Pair medical non-latex examination gloves</b>	<b>1</b>
<b>Mouth-to-mouth airway</b>	<b>1</b>

C. Warning Devices

1. Bus shall be equipped with a kit containing three reflectorized triangular warning devices meeting requirements FMVSS 125, 49 CFR § 571.125.

2. Kit shall be securely mounted.

D. Body Fluid Clean-up Kit

1. Each bus shall carry a Grade A metal or rigid plastic kit, mounted in an accessible place and identified as a body fluid clean-up kit with a directions for use sheet attached to the inside cover.

2. The kit shall be moisture proof and properly mounted or secured in a storage compartment.

3. Contents shall include but not be limited to the following items:

a. One pair non - latex gloves

b. One pick-up spatula or scoop

- c. One face mask
- d. Infectious liquid spill control powder
- e. Anti-microbial hand wipes – individually wrapped
- f. Germicidal disinfectant wipes – tuberculocidal
- g. Plastic disposal bag with tie

B. Seat Belt Cutter

~~1. Buses with installed seat belts for passengers shall also be equipped with a Seat Belt Cutter, installed in the driver's area.~~

- 1. **Each bus shall be equipped with a durable webbing cutter having a full width handgrip and a protected, replaceable or non-corrodible blade. The required belt cutter shall be mounted in a location accessible to the seated driver in an easily detachable manner.**

**44. Emergency exits.**

A. Each emergency exit shall comply with FMVSS 217, 49 CFR § 571.217, regarding the number of exits, types of exists and location of exits based on the capacity of the vehicle.

- 1. Side Emergency exit doors
  - a. A dedicated aisle of at least 12 inches in width, referenced to the rear of the emergency exit door is required.
  - b. Side emergency exit doors shall be hinged on the forward edge.
  - c. When not fully latched, side emergency exit door shall actuate a signal audible to the driver by means of a mechanism actuated by the latch when the ignition switch is on.
  - d. A security locking system designed to prevent vandalism may be installed provided it meets all specifications of Item 42 D.

2. Roof exits/vents

- a. All vehicles shall be equipped with a minimum of one emergency roof exit/vent approved by the Department of Education.
- b. When not fully latched, this exit shall actuate a signal audible to the driver by means of a mechanism actuated by the latch when the ignition switch is on.
- c. A roof exit/vent security locking system designed to prevent vandalism may be installed provided it meets all specifications of Item 42 D.
- d. When a single roof exit is installed, it shall be located as near as practicable to the longitudinal midpoint of the passenger compartment, and shall be installed such that the centerline of the hatch is on the longitudinal centerline of the bus.
- e. If two roof exits are utilized, they shall be located as near as practicable to the points equidistant between the longitudinal midpoint of the passenger compartment and the front and the rear of the passenger compartment.

NOTE: No removal or cutting of any roof structural component shall occur during installation. If the installation required by subdivisions 2 d and 2 e of this section cannot be accomplished as described, then prior approval by the Department of Education will be required through a written request from the local school division.

- f. Roof exits/vents shall have rustproof hardware.
- g. Roof exits/vents shall be hinged in the front and be equipped with an outside release handle.

3. Emergency exit windows.

- a. Push-out emergency windows are permissible, if required by FMVSS 217, 49 CFR § 571.217.
- b. When not fully latched, the emergency exit window shall actuate a signal audible to the driver by means of a mechanism actuated by the latch.

- c. No emergency exit window shall be located directly in front of a side emergency exit door.

**45. Floor covering.**

- A. Floor in under seat area, including tops of wheel housings, driver's compartment and toe board shall be covered with fire-resistant rubber floor covering or an approved equivalent, having minimum overall thickness of .125 inch. Driver's compartment and toe board area shall be trimmed with molding strips behind the cowl face line.
- B. Floor covering in aisle shall be of aisle-type fire resistant rubber or an approved equivalent, nonskid, wear-resistant and ribbed. Minimum overall thickness shall be .1875 inch measured from tops of ribs **and have a calculated burn rate of 0.1 or less, using the test methods, procedures and formulas listed in FMVSS No. 302.** Rubber floor covering shall meet federal specifications ZZ-M71d.
- C. Floor covering shall be permanently bonded to floor, and shall not crack when subjected to sudden changes in temperature. Bonding or adhesive material shall be waterproof and shall be of the type recommended by manufacturer of floor-covering material. All seams shall be sealed with waterproof sealer.
- D. All floor covering seams shall be covered with trim and fastened with screws.
- E. **On Types B, C, and D buses, a flush-mounted, screw-down plate that is secured and sealed shall be provided to access the fuel tank sending unit and/or fuel pump. This plate shall not be installed under flooring material.**

**46. Handrails**

**At least 1 handrail shall be installed. The handrail(s) shall assist passengers during entry or exit, and shall be designed to prevent entanglement, as evidenced by the passing of the NHTSA string and nut test.**

**47. Heaters.**

- A. Hot water heaters of fresh air or combination fresh air and recirculating type, with power defrosters, are required.
- B. Heaters shall bear nameplate rating affixed by heater manufacturer on top of heater shell.

- C. Heaters shall be capable of maintaining inside temperature of 50° F, with an outside temperature of 20° F when the bus is loaded to one-half capacity.
- D. The heater wiring shall be connected to the cold side of the ignition switch through a continuous duty solenoid relay.
- E. The power defroster shall deliver a sufficient amount of heated air distributed through a windshield duct, nozzle or nozzles to defog and de-ice the entire windshield, and to defog the driver's window. The duct, nozzle, or nozzles shall be designed to prevent objects from being placed in any manner that would obstruct the flow of air.
- F. Water circulation cut-off valves in the supply and return lines, a minimum of ¾ inch diameter, shall be at or near the engine. A water flow-regulating valve in the pressure line for convenient operation by the driver is also required. All valves shall be ¼ turn ball type.
- G. Heater hoses, including those in engine compartment, shall be supported in such manner that hose chafing against other objects will not occur nor shall suspended water lines interfere with routine vehicle maintenance.
- H. All water hoses in driver or passenger area shall be shielded.
- I. An auxiliary heater of recirculating type, having a minimum capacity of 60,000 BTU output, shall be installed under the second seat behind the wheel housing. There shall be a grille or guard over exposed heater cores to prevent damage by pupils' feet.
- J. Exception: Type A and D vehicles.
  - 1. Front heater with high output and defroster shall be furnished by the chassis manufacturer.
  - 2. The body manufacturer shall provide an additional under seat heater near the rear of the bus.
- K. All heater cores shall be the coiled tubing fin type approved by the Department of Education.

#### 48. Hinges

**All exterior metal door hinges shall be designed to allow lubrication to be channeled to the center 75% of each hinge loop without disassembly, unless they are constructed of stainless steel, brass or non-metallic hinge pins or other designs that prevent corrosion.**

**49. Identification of school buses.**

- A. For purposes of identification, school buses shall be lettered as follows:
1. Lettering shall be placed according to Diagrams 7 and 8. Lettering shall be of black paint or vinyl and conform to “Series B” for Standard Alphabets for Highway Signs.
  2. Both the front and rear of the body shall bear the words, “SCHOOL BUS” in black letters eight inches in height.
  3. All school buses shall have a black painted or vinyl number four inches high on the rear of the body, on the right side just back of the entrance door, and on the left side just back of the warning sign. The number shall also be placed on the front of the bus in a location approved by the Department of Education. **Symbols or letters are not to exceed 64 121 square inches of total display near the entrance door, displaying information for identification by the students of the bus or route served.**
  4. The name of the school division shall be on each side of the bus in black letters four inches high – as “... COUNTY PUBLIC SCHOOLS,” OR “....CITY PUBLIC SCHOOLS.”
  5. Options:
    - a. The bus number may be placed in the center of the bus roof with black (12-inch minimum) numbers.
    - b. A black number (four-inch maximum) may be placed on the inside rear header. It shall not interfere with emergency door lettering.
    - c. **Identification of fuel type in 2 inch lettering adjacent to the fuel filler opening.**

**50. Inside height.**

- A. Inside body height shall be 72 inches or more, measured metal to metal, at any point on longitudinal center line from front vertical bow to rear vertical bow.
- B. Exception: Type A conversion van – Inside body height shall be 62 inches minimum.

**51. Insulation.**

- A. Ceilings and walls shall be coated with proper materials to deaden sounds and to reduce vibrations to a minimum. ~~Fiberglass~~ thermal insulation (minimum R-value of 5.5) shall be used to insulate walls and roof between inner and outer panels.

**52. Interior.**

- A. Interior of bus shall be free of all unnecessary projections likely to cause injury. This standard requires inner lining on ceilings and walls. Ceiling panels shall be constructed so as to contain lapped joints with all exposed edges hemmed to minimize sharpness. If lateral panels are used, forward panels shall be lapped by rear panels.

**53. License Plates**

- A. **All vehicles shall be constructed so that mounting and securing of license plates will be compliant with FMVSS and Code of Virginia, Section 46.2-716.**

**54. Lights and Signals.**

- A. No lights or signals other than specified here shall be installed on school buses, except those required by federal regulations. All lights and reflectors shall be approved by the Superintendent, Department of State Police, Commonwealth of Virginia.
  - 1. Clearance lights. Body shall be equipped with two red clearance lamps at rear, two amber clearance lamps at front, and intermediate side marker lamps on buses 30 feet or more in length controlled by headlight switch. They ~~shall~~ **may** be of armour type.
  - 2. Identification lamps. Three amber lamps shall be mounted on front and three red lamps on rear of body controlled by the headlight switch.
  - 3. Stop and tail lamps. Bus shall be equipped with two matched stop and tail lamps of heavy duty type, which shall be in combination, emitting red light plainly visible from a distance of at least 500 feet to rear, and mounted on rear end with their centers not less than 12 nor more than 24 inches from plane side of body, and not less than six or more than 18 inches below D-glass in rear of body. They shall be approximately seven inches in diameter or, if a shape other than round, a minimum 38 square inches of illuminated area and

shall meet SAE specifications. These lights shall be on the same horizontal line with the turn signal units and shall not flash.

4. ~~Back-up lamps. Back-up lamps shall be mounted on the rear of the body and shall be illuminated when the ignition switch is energized and reverse gear is engaged.~~ **The bus body shall be equipped with 2 white rear backup lamps that are at least 4 inches in diameter or, if a shape other than round, a minimum of 12 square inches of illuminated area and shall meet FMVSS No. 108. If backup lamps are placed on the same horizontal line as the brake lamps and turn signal lamps, they shall be to the inside.**
5. Interior lamps. Interior lamps shall be provided which adequately illuminate aisles and step well.
6. Turn signal units. Bus shall be equipped with Class A, flashing turn signal units of heavy-duty type. These signals shall be independent units equipped with amber lenses on all faces. The turn signals/directional signal units shall activate only when ignition is in “on” position. A pilot light or lights shall indicate when these lights are activated. The front lights shall be mounted near the front corners of chassis on each side. The rear lights shall be seven inches in diameter, or if a shape other than round, the lights must be 38 square inches in area and mounted not less than six nor more than 18 inches from plane of the side of the body and not less than six nor more than 18 inches below D-glass in rear of body. They shall be on the same horizontal line with the stop and tail lights required in 3 above. ~~Turn signal lens shall contain directional arrows made into the lens or light.~~
  - a. In addition to the turn signals described above, two amber lenses metal turn signal lamps of armour-type with a minimum of four candlepower each shall be mounted on the body side at approximate seat level height and located just to the rear of the entrance door on the right side of the body and approximately the same location on the left side. They are to be connected to and function with the regular turn signal lamps. Such lamps shall provide 180° angle vision and if painted, they shall be black.
  - b. Exception: Type A – Turn signals shall be chassis manufacturer’s standard.
7. Hazard warning signal. The turn signal units shall also function as the hazard warning system. The system shall operate

independently of the ignition switch and, when energized, shall cause all turn signal lamps to flash simultaneously.

8. Reflex reflectors. (Class A) Two amber lights and two amber reflectors (they may be combined) shall be mounted, one on each side, near the front of the chassis. Two three-inch red reflectors shall be mounted, one on each side near the rear of the body and two three-inch red reflectors shall be mounted on the rear above the bumper. Two intermediate amber three-inch reflectors, one on each side near the middle of the bus, shall be mounted on buses 30 feet or more in length. They shall be mounted on panel above floor line rub rail.
9. School bus traffic warning lights.
  - a. **A non-sequential system for the traffic warning lights shall be installed that allow the red lights to activate when the door opens.**
  - b. Buses shall be equipped with four red lights and four amber lights. One amber light shall be located near each red light, at the same level, but closer to the vertical centerline of the bus. All lights shall comply with SAE standards for school bus warning lamps.
  - c. The traffic warning light system shall be wired so that the amber lights are activated manually by a hand operated switch. When door is opened, amber lights automatically will be deactivated and red lights, warning sign with flashing lights and crossing control arm shall be activated. When door is closed, all lights shall be deactivated. No lights shall come on when door is reopened unless the manual switch is depressed. There shall also be a cancellation switch in case lights are accidentally activated or when no stop needs to be made.
  - d. The control circuit shall be connected to the cold side of the ignition switch with the master push button cancel switch mounted on the accessory console, clearly distinguished, visible and accessible to the driver.
  - e. The flasher and the relay shall be fastened in a compartment in the driver area and be easily accessible for servicing. The location of the flasher shall be approved by the Department of Education.

- f. System shall contain an amber pilot light for amber lamps and a red pilot light for red lamps, clearly visible to the driver, to indicate when system is activated.
  - g. Three-inch black painted border around the lamps is required ~~if not~~ **and must be** equipped with a black painted housing.
  - h. All electrical connections shall be soldered or connected by an acceptable SAE method.
  - i. All switches and pilot lights shall be properly identified by labels.
  - j. There shall be an interrupt feature in the system to interrupt the traffic warning sign and the crossing control arm when their use is not desired. This feature shall consist of a double throw relay and a ~~push button~~ momentary switch.
  - k. Manual switch, cancel switch and interrupt switch shall be ~~push button or flip type~~ momentary switches.
  - l. Additional side-mounted warning lights. Option for school divisions approved for participation in the Board of Education's approved pilot program. Additional warning lights may be mounted on the front sides of the school bus above the entrance door and the driver's window. Lights must work in conjunction with the standard warning light system and must meet FMVSS and SAE standards or must be of a type approved by the Department of State Police.**
5. School bus traffic warning sign must conform to FMVSS 131.
- a. Warning sign shall be mounted on the left side near the front of the bus immediately below the window line.
  - b. Sign shall be of the octagon series, 18 inches in diameter, and be equipped with wind guard. The sign shall have a red background with a ½ inch white border, and the word "STOP" on both sides in white letters, six inches high and one inch wide. The sign shall be reflective.
  - c. Sign shall have double-faced alternately flashing red lights, four inches in diameter, located at the top and bottom most portions of the sign, one above the other.

- d. The sign shall be connected and energized through the red traffic warning lamps.
  - e. Air operated signs require air pressure regulator in addition to control valve. Source of supply shall be the main air tank with a pressure protection valve at the tank.
  - f. Sign and components shall comply with all provisions of SAEJ 1133.
  - g. A second school bus traffic warning sign on the left side near the rear of the bus, may be mounted on all 64, or larger sized passenger Type C and D school buses.**
11. School bus crossing control arm.
- a. An approved crossing control arm shall be mounted on the right end of the front bumper with mounting brackets appropriate for the bumper configuration.
  - b. The arm shall be activated in conjunction with the traffic warning sign.
  - c. The arm when in the stored position shall have a magnetic or other suitable latch to secure the arm against the bumper.
  - d. Source of supply for air-operated arms shall be the main air supply tank with pressure protection valve at tank.
  - e. Appropriate grommets or a loom shall be used where wires or tubes go through holes in bumper and firewall.
12. Strobe warning light.
- a. A white flashing strobe light shall be installed on the center rear one-third portion of the roof a minimum of 42 inches from the rear of the roof edge, **or** located aft of the rearmost roof hatch. Light shall have a single clear lens emitting light 360 degrees around its vertical axis. A manual switch and a pilot light must be included to indicate when the light is in operation.
  - b. The strobe light shall operate when the bus transports students during periods of reduced visibility caused by atmospheric conditions other than darkness. These lights

may also be used anytime the bus is transporting school children.

**55. Metal treatment.**

- A. All metal parts that will be painted shall be chemically cleaned, etched, zinc-phosphate-coated, and zinc-chromate or epoxy-primed or conditioned by equivalent process.

**56. Mirrors.**

- A. Interior rear view mirror at least 6 x 30 inches, metal encased safety glass of at least 1/8 inch thickness, which will afford good view of pupils and roadway to rear and shall be installed in such a way that vibration will be reduced to a minimum. It shall have rounded corners and protected edges.
- B. Exception: Type A - Interior mirror to be 6 x 16 inches.
- C. All buses shall have a mirror system that conforms to FMVSS 111, 49 CFR § 271.111 as amended.
- D. Thermostatically controlled heated exterior mirrors are permissible.
- E. Motorized exterior mirrors may be used.

**57. Mounting.**

- A. Chassis frame shall extend to rear edge of rear body cross member. Bus body shall be attached to chassis frame in such manner as to prevent shifting or separation of body from chassis under severe operating conditions.
- B. Body front shall be attached and sealed to chassis cowl in such manner as to prevent entry of water, dust, and fumes through joint between chassis cowl and body.
- C. Insulating material shall be placed at all contact points between body and chassis frame **on Types A, B, C and D buses**. Insulating material shall be approximately 1/4 inch thick and shall be so attached to chassis frame or body member that it will not move under severe operating conditions.
- ~~D. Exception: Type A Standard does not apply.~~

**58. Openings.**

- A. Any openings in body or front fenders of chassis resulting from change necessary to furnish required components shall be sealed. (See Item 21 and Item 40 K.)

**59. Overall length.**

- A. Overall length of bus shall not exceed 40 feet.

**60. Overall width.**

- A. Overall width of bus shall not exceed 100 inches, including traffic-warning sign in closed position. Outside rearview mirrors are excluded.

**61. Rub Rails.**

- A. There shall be one rub rail located on each side of the bus at seat cushion level which extends from the rear side of the entrance door completely around the bus body (except the emergency door or any maintenance access door) to the point of curvature near the outside cowl on the left side, or to the front corner of the bus body.
- B. There shall be one additional rub rail located on each side at, or no more than 10 inches above, the floor line. The rub rail shall cover the same longitudinal area as the upper rub rail, except at the wheel housings, and it shall extend only to the radii of the right and left rear corners.
- C. Both rub rails shall be attached at each body post and at all other upright structural members.
- D. Each rub rail shall be four inches or more in width in their finished form, shall be constructed of 16-gauge steel or suitable material of equivalent strength and shall be constructed in corrugated or ribbed fashion.
- E. Both rub rails shall be applied outside the body or outside body posts. (Pressed-in or snap-on rub rails do not satisfy this requirement.) For Type A-1 vehicles using the body provided by the chassis manufacturer or for types A-2, B, C and D using the rear luggage or rear engine compartment, rub rails need not extend around the rear corners.
- F. There shall be a rub rail or equivalent bracing located horizontally at the bottom edge of the body side skirts.

**62. Seat belt for driver.**

- A. A locking retractor type 2-lap belt/shoulder harness seat belt shall be provided for the driver. Each belt section shall be booted so as to keep the buckle and button-type latch off the floor and within easy reach of the driver. Belt shall be anchored in such a manner or guided at the seat frame so as to prevent the driver from sliding sideways from under the belt.

**63. Seats.**

- A. All seats shall have minimum depth of 14 inches.
- B. In determining seating capacity of bus, allowable average rump width shall be 13 inches. (See Item 35.)
- C. All seats shall conform to FMVSS 222.
- D. Seating plans for buses with wheelchair positions see Item 80 and Item 85. All school bus seating shall be of a three (3) to three (3) arrangement with the exception of the last row seat to the left of any rear emergency door. This seat shall be of a maximum width of 26" limiting it to two (2) passengers. There shall be provided a full width barrier in front of each seating position. Type D, Rear engine buses shall be exempt from the last row requirements.
- E. Floor track seat securement may be used.
- F. Passenger seat cushion retention system shall be employed to prevent passenger seat cushions from disengaging from seat frames in event of accident. Each seat cushion retention system shall be capable of withstanding vertical static load equal to minimum of five times weight of cushion. System shall also be capable of withstanding forward or rearward static load equal to 20 times weight of cushion.
- G. No bus shall be equipped with jump seats or portable seats.
- H. Seat spacing shall ~~provide a minimum of 25 inch knee room at center of seat, when measured horizontally from back to back, at cushion level.~~ **meet FMVSS 222.**
- I. Seat and back cushions of all seats shall be designed to safely support designated number of passengers under normal road conditions encountered in school bus service. Covering of seat cushions shall be of material having 42 ounce finished weight, 54-inch width, and finished vinyl coating of 1.06 broken twill. Material on polyester drill and polyester cotton twill knit backing with equal vinyl coating which meets or exceeds the laboratory test results for the 42 ounce 1.06 covering may

be used. Padding and veering on all seats shall comply with provisions of FMVSS 302, 49 CFR § 571.302.

- J. Minimum distance between steering wheel and backrest of driver's seat shall be 11 inches. Driver's seat shall have fore-and-aft adjustment of not less than four inches and up and down adjustment of three inches. It shall be manually adjustable and strongly attached to floor.
- K. Minimum of 36-inch headroom for sitting position above top of undepressed cushion line of all seats shall be provided. Measurement shall be made vertically not more than seven inches from sidewall at cushion height and at fore-and-aft center of cushion.
- L. Backs of all seats of similar size shall be of same width at top and of same height from floor and shall slant at same angle with floor.
- M. Seat back heights shall be between 19 and 24 inches measured from cushion level.

**64. Barrier.**

- A. A padded barrier shall be installed at rear of driver's seat in such a position as not to interfere with adjustment of driver's seat.
- B. A padded barrier shall be installed at rear of entrance step well. Barrier to coincide with length of the right front seat cushion with minimum width of 26 inches and shall have a modesty panel to extend from bottom of barrier to floor.

**65. Steps.**

- A. First step at service door shall be not less than 10 inches and not more than 14 inches from ground, based on standard chassis specifications.
- B. Service door entrance may be equipped with two-step or three-step step well. Risers in each case shall be approximately equal.
- C. Steps shall be enclosed to prevent accumulation of ice and snow.
- D. Steps shall not protrude beyond side bodyline.
- E. Grab handle not less than 20 inches in length shall be provided in unobstructed location inside doorway, but shall not be attached so that it will interfere with the opening of the glove compartment door. This handle shall be designed to eliminate exposed ends that would catch

passenger clothing and shall be so placed in a position to aid small children entering the bus.

- F. Step covering. All steps, including floor line platform area, shall be covered with 3/16 inch rubber metal-backed treads with at least 1 ½ inch white nosing (or three inch white rubber step edge with metal back at floor line platform area).
1. Step tread minimum overall thickness shall be 3 /16 inch.
  2. Backing of tread shall be permanently bonded to rubber no-slip surface.
  3. 3/16 inch step tread shall have a 1 ½ inch white nosing as integral piece without any joint
  4. Rubber portion of step treads shall have following characteristics:
    - a. Special compounding for good abrasion resistance and high co-efficient of friction
    - b. Flexibility so that it can be bent around a ½ inch mandrel both at 20° F and 130° F without breaking, cracking, or crazing
    - c. Show a durometer hardness 85 to 95.
    - d. Have the surface constructed in a manner to prevent slippage.

## 66. Stirrup Steps.

- A. ~~There shall be one folding stirrup step and suitably located handle on each side of front of body for easy accessibility for cleaning windshield and lamps.~~
- B. ~~Exception: Type A vehicles Standard does not apply.~~

**If the windshield and lamps are not easily accessible from the ground, there may be at least 1 folding stirrup step or recessed foothold installed on each side of the front of the body for easy accessibility for cleaning. There also may be a grab handle installed in conjunction with the step. Steps are permitted in or on the front bumper in lieu of the stirrup steps if the windshield and lamps are easily accessible for cleaning from that position.**

**67. Storage and luggage compartments.**

- A. Vehicles may be equipped with luggage compartments or tool compartments in the body skirt provided they do not reduce ground clearance to less than 14 ½ inches from bottom of compartment and that the addition of the compartments does not exceed the vehicles' GVWR.

**68. Sun Shield.**

- A. Interior adjustable transparent sun shield, darkest shade available, not less than 6 x 30 inches shall be installed in position convenient for use by driver.
- B. Exception: Type A vehicles – Manufacturer's standard is acceptable.

**69. Tail pipe.**

- A. Tail pipe shall extend to but not more than 1½ 2 inches beyond outer edge of rear bumper. (See Item 12 B.)

**70. Trash Container and Hold Device**

**When requested or used, the trash container shall be secured by a holding device that is designed to prevent movement and to allow easy removal and replacement. It shall be soft, pliable, and installed in an accessible location in the driver's compartment, not obstructing passenger access to the entrance door.**

**71. Undercoating.**

- A. Entire underside of bus body, including floor sections, cross members, and below floor line side panels, shall be coated with rust-proofing compound for which compound manufacturer has issued notarized certification of compliance to bus body building that compounds meet or exceed all performance requirements of Federal Specification TT-C-520 b using modified test procedures for following requirements:
  - 1. Salt spray resistance – pass test modified to 5.0% salt and 1,000 hours
  - 2. Abrasion resistance - pass
  - 3. Fire resistance - pass
- B. Undercoating compound shall be applied with suitable airless or conventional spray equipment to recommend film thickness and shall

show no evidence of voids in cured film. Undercoating is expected to prevent rust under all bus service conditions for minimum of five years.

**72. Ventilation and air conditioning.**

- A. Body shall be equipped with suitable, controlled ventilating system of sufficient capacity to maintain proper quantity of air under operating conditions without opening of windows except in extremely warm weather.
- B. Static-type, non-closable, exhaust roof ventilators shall be installed in low-pressure area of roof panel.
- C. Air conditioning units may be installed on an optional basis. Application requires heavier electrical components and assessment by the Department of Education, on an individual unit basis.
- D. **Auxiliary fans shall meet the following requirements:**
  - 1. **Fans for left and right sides of the windshield shall be placed in a location where they can be adjusted for maximum effectiveness and where they do not obstruct vision to any mirror. Note: Type A buses may be equipped with one fan;**
  - 2. **Fans shall have 6-inch (nominal) diameter; and**
  - 3. **Fan blades shall be enclosed in a protective cage. Each fan shall be controlled by a separate switch.**

**73. Water test.**

- A. Each and every school bus body, after it is mounted on chassis ready for delivery, shall be subjected to a thorough water test in which water under pressure equal to a driving rain is forced against the entire bus body from various directions. Any leaks detected are to be repaired before the bus is declared ready for delivery.

**74. Wheel housings.**

- A. Wheel housings shall be of full open type.
- B. Wheel housings shall be designed to support seat and passenger loads and shall be attached to floor sheets in such manner as to prevent any dust or water from entering the body. **Wheel housings shall be constructed of 16-gauge (or thicker) steel.**

- C. Inside height of wheel housings above floor line shall not exceed ~~10~~**12** inches.
- D. No part of a raised wheel housing shall extend into the emergency door opening.**
- E. Wheel housings shall provide clearance for dual wheels as established by National Association of Chain Manufacturers. Mounting of housings in the wheel area must be free of protruding screws and bolts.
- F. Exception: Type A vehicles – Standard does not apply to conversion vans.

**75. Windshield and Windows.**

- A. All glass in windshield, windows, and doors shall be of approved safety glass, so mounted that permanent mark is visible, and of sufficient quality to prevent distortion of view in any direction. Windshield shall be AS1 and all other glass shall be AS2.
- B. Plastic glazing material of a thickness comparable to AS2 glass, meeting ANSI Standard Z 26.1 and FMVSS 205, 49 CFR § 571.205, may be used in side windows behind the driver's compartment.
- C. Windshield shall have horizontal shade band consistent with SAE J-100 or have full tinted glass.
- D. Each full side window shall provide unobstructed emergency opening at least nine inches high and 22 inches wide, obtained either by lowering of window or by use of knock-out type split-sash windows.
- E. Approved tinted glass or plastic glazing material may be used.
- F. Type A-2 – Per manufacturer's specifications**

**76. Windshield washers.**

- A. Windshield washers meeting federal requirements shall be provided and shall be controlled by a switch located on instrument panel. Reservoir shall be mounted outside passenger compartment.

**77. Windshield wipers.**

- A. Bus shall be equipped with variable-speed windshield wipers of air or electric-type powered by a motor or motors of sufficient power to operate wipers.

- B. Blades and arms shall be of such size that minimum blade length will be 12 inches with longer blades being used whenever possible.
- ~~C. Wiper motor and arm linkage shall be shielded to prevent objects from being placed against them.~~
- C. The wipers shall meet the requirements of FMVSS No. 104, Windshield Wiping and Washing Systems.**

**78. Wiring.**

- A. All wiring shall conform to current standards of Society of Automotive Engineers.
- B. Circuits
  - 1. Wiring shall be arranged in at least 12 regular circuits as follows:
    - a. Head, tail, stop (brake) and instrument panel lamps
    - b. Clearance lamps
    - c. Dome and step well lamps
    - d. Starter motor
    - e. Ignition
    - f. Turn-signal units
    - g. Alternately flashing red signal lamps
    - h. Horns
    - i. Heater and defroster
    - j. Emergency door buzzer
    - k. Auxiliary fan
    - l. Booster pump
  - 2. Any of the above combination circuits may be subdivided into additional independent circuits.

3. Whenever possible, all other electrical functions (such as electric-type windshield wipers) shall be provided with independent and properly protected circuits.
  4. Each body circuit shall be color coded or numbered and a diagram of the circuits shall be attached to the body in a readily accessible location.
- C. A circuit breaker shall be provided for each circuit except starter motor and ignition circuits.
  - D. A continuous duty solenoid relay operated by the ignition switch, for Circuits i, j, k, and l.
  - E. All wires within body shall be insulated and protected by covering of fibrous loom (or equivalent) that will protect them from external damage and minimize dangers from short circuits. Whenever wires pass through body member, additional protection in form of appropriate type of insert shall be provided.
  - F. All light circuits shall be such as to provide, as nearly as possible, bulb design voltage at light bulb terminals.
  - G. Wires shall be fastened securely at intervals of not more than 24 inches. All joints shall be soldered or jointed by equally effective connectors.
  - H. Buses using multiplexed electrical systems may meet the intent of these specifications without the use of specified equipment, subject to the approval of the Department of Education.
  - I. **There shall be a manual noise suppression switch installed in the control panel. The switch shall be labeled and alternately colored. This switch shall be an on/off type that deactivates body equipment that produces noise, including, at least, the AM/FM radio, heaters, air conditioners, fans and defrosters. This switch shall not deactivate safety systems, such as windshield wipers or lighting systems.**

## SPECIFICATIONS FOR LIFT-GATE SCHOOL BUSES

### 79. General Requirements.

- A. School buses or school vehicles designed for transporting children with special transportation needs shall comply with Virginia's standards applicable to school buses and Federal Motor Vehicle Safety Standards as applicable to their GVWR category.

- B. Any school bus that is used for the transportation of children, who are confined to a wheelchair or other restraining devices that prohibit use of the regular service entrance, shall be equipped with a power lift, unless a ramp is needed for unusual circumstances.
- C. Lift shall be located on the right side of the body, in no way attached to the exterior sides of the bus but confined within the perimeter of the school bus body when not extended.

**80. Aisles.**

- A. All aisles leading to the emergency door from wheelchair area shall be a minimum of 30 inches in width. **A wheelchair securement position shall never be located directly in front of (blocking) a power lift door location.**

**81. Communications.**

- A. Special education buses shall be equipped with a two-way communication system. (See Item 38 A.)

**82. Fastening devices.**

- A. Unless otherwise specified below, fastening devices shall conform to FMVSS 222, 49 CFR § 571.222, as amended.
  - 1. Wheelchair fastening devices shall be provided and attached to the floor or walls or both to enable securement of wheelchairs in the vehicle. The devices shall be of the type that requires human intervention to unlatch or disengage. The fastening devices shall be designed to withstand forces up to 3,000 pounds per tie down leg or clamping mechanism or 12,000 pounds total for each wheelchair.
  - 2. Additional fastening devices may be needed to assist the student due to the many different configurations of chairs and exceptionalities.

**83. Heaters.**

- A. An additional heater shall be installed in the rear portion of the bus behind wheel wells as required in Item 53 I, except a 50,000 minimum BTU heater may be used in bodies originally designed for 31-66 passenger capacity and 34,000 minimum BTU heater may be used in bodies of 30

passengers or less. Hose to rear heater, when under body shall be encased in metal tube.

**84. Identification.**

- A. Buses with wheelchair lifts used for transporting children with physical disabilities shall display universal handicapped symbols located on the front and rear of the vehicle below the window line. Such emblems shall be white on blue, shall be a minimum of nine inches and a maximum of 12 inches in size, and ~~shall be reflectorized~~ **shall be of a high-intensity retro reflective material meeting the requirements of Federal Highway Administration (FHWA) FP-85, *Standard Specifications for Construction of Road and Bridges on Federal Highway Projects.*** They shall be placed so as not to cover lettering, lamps or glass.

**85. Passenger Capacity Rating.**

**In determining the passenger 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.**

**86. Power Lift.**

- A. Lifting mechanism shall be able to lift minimum payload of 800 pounds. A clear opening and platform to accommodate at least a 30-inch wide wheelchair shall be provided.
- B. When the platform is in the fully up position, it shall be locked in position mechanically and also shall have an additional support, or lug in the door to prevent the lift from resting against the door.
- C. Controls shall be provided that enable the operator to activate the lift mechanism from either inside or outside of the bus. There shall be a means of preventing the lift platform from falling while in operation due to a power failure.
- D. Power lifts shall be so equipped that they may be manually raised in the event of power failure of the power lift mechanism.
- E. Lift travel shall allow the lift platform to rest securely on the ground.

- F. All edges of the platform shall be designed to restrain wheelchair and to prevent operator's feet from being entangled during the raising and lowering process.
- G. Up and down movements of the lift platform shall be perpendicular to the plane of the bus body in all positions.
- H. A restraining device shall be affixed to the outer edge (curb end) of the platform that will prohibit the wheelchair from rolling off the platform when the lift is in any position other than fully extended to ground level.
- I. A self-adjusting, skid resistant plate shall be installed on the outer edge of the platform to minimize the incline from the lift platform to the ground level. This plate, if so designed, may also suffice as the restraining device described in subsection H above. The lift platform shall be skid resistant.
- J. A circuit breaker or fuse energized through the ignition side of the accessory solenoid shall be installed between power source and lift motor if electrical power is used.
- K. The lift mechanism shall be equipped with adjustable limit switches or bypass valves to prevent excessive pressure from building in the hydraulic system when the platform reaches the full up position or full down position.
- L. Handrails shall be required.
- M. Sharp or protruding edges or components shall be padded.
- N. A safety cut off master switch may be installed.

**87. Ramps.**

- A. When a power lift system is not adequate to load and unload students having special and unique needs, a ramp device may be installed.
  - 1. If a ramp is used, it shall be of sufficient strength and rigidity to support the special device, occupant, and attendants. It shall be equipped with a protective flange on each longitudinal side to keep special device on the ramp.
  - 2. Floor of ramp shall be of nonskid construction.
  - 3. Ramp shall be of weight and design, and equipped with handles, to permit one person to put ramp in place and return it to its storage place.

**88. Regular service entrance.**

- A. In Type D vehicles, there shall be three step risers, of equal height, in the entrance well.
- B. An additional foldout step may be provided which will provide for the step level to be no more than six inches from the ground level.
- C. Three step risers in Type C vehicles are optional.

**89. Restraining devices.**

- A. Seat frames may be equipped with attachments or devices to which restraining harnesses or other devices may be attached. Attachment framework or anchorage devices, if installed, shall conform to FMVSS 210, 49 CFR § 571.210, **and FMVSS No. 213.**

**90. Seating arrangements.**

- A. Flexibility in seat spacing to accommodate special devices shall be permitted due to the constant changing of passenger requirements.
- B. There shall be a padded barrier forward of any standard seating position and between lift-gate and first seat to rear of lift-gate. A wheelchair position immediately forward of lift-gate shall have a barrier between lift and wheelchair. (See Item 64.)

**91. Special light.**

- A. Lights shall be placed inside the bus to sufficiently illuminate lift area and shall be activated from door area. An outside light to be activated when lift door is open and deactivated when lift door is closed is permissible.

**92. Special service entrance.**

- A. Bus bodies may have a special service entrance constructed in the body to accommodate a wheelchair lift for the loading and unloading of passengers.
- B. The opening to accommodate the special service entrance shall be at any convenient point on the right (curb side) of the bus and far enough to the rear to prevent the doors, when open, from obstructing the right front regular service door (excluding a regular front service door lift).

- C. The opening shall not extend below the floor level. Outboard type lifts shall be used.
- D. The opening, with doors open, shall be of sufficient width to allow the passage of wheelchairs. The minimum clear opening through the door and the lift mechanism shall be 30 inches in width.
- E. A drip molding shall be installed above the opening to effectively divert water from entrance.
- F. Entrance shall be of sufficient width and depth to accommodate various mechanical lifts and related accessories as well as the lifting platform.
- G. Doorposts and headers from entrance shall be reinforced sufficiently to provide support and strength equivalent to the areas of the side of the bus not used for service doors.
- H. Special service entrance doors shall be equipped with padding at the top edge of the door opening. Pad shall be at least three inches wide and one inch thick and extend the full width of the door opening.

**93. Special service entrance doors.**

- ~~A.~~ ~~A single door may be used if the width of the door opening does not exceed 43 inches.~~ **A single door of a minimum 43 inches may be used.**
- ~~B.~~ ~~Two doors shall be used if any door opening would have to exceed 43 inches.~~
- ~~B. C.~~ All doors shall open outwardly.
- ~~C. D.~~ All doors shall have positive fastening devices approved by Pupil Transportation Services to hold doors in the open position.
- ~~D. E.~~ All doors shall be weather sealed and on buses with double doors, they shall be so constructed that a flange on the forward door overlaps the edge of the rear door when closed.
- ~~E. F.~~ When dual doors are provided, the rear door shall have at least a one-point fastening device to the header. The forward mounted door shall have at least three-point fastening devices. One shall be to the header, one to the floor line of the body, and the other shall be into the rear door. These locking devices shall afford maximum safety when the doors are in the closed position. The door and hinge mechanism shall be of a strength that will provide for the same type of use as that of a standard entrance door.

- F. ~~G~~. Door materials, panels, and structural strength shall be equivalent to the conventional service and emergency doors. Color, rub rail extensions, lettering and other exterior features shall match adjacent sections of the body.
- G. ~~H~~. Each door shall have windows set in a waterproof manner compatible within one inch of the lower line of adjacent sash.
- H. ~~I~~. Doors shall be equipped with a device that will actuate a flashing visible signal located in the driver's compartment when doors are not securely closed and ignition is in "on" position.
- I. ~~J~~. A switch shall be installed so that the lifting mechanism will not operate when the lift platform doors are closed.

**94. Special optional equipment.**

- A. Special seats for attendants may be installed on an optional basis. The location, restraints, and so forth shall be assessed and approved on an individual unit basis. All equipment shall be secured properly.

## **Addendum**

### **Air Conditioning (Optional)**

The following specifications are applicable to all types of school buses that may be equipped with air conditioning.

#### 1. Performance Specifications

The installed air conditioning system should cool the interior of the bus from 100 degrees to 80 degrees Fahrenheit, measured at three points (minimum) located four feet above the floor on the longitudinal centerline of the bus. The three required points shall be: (1) near the driver's location, (2) at the longitudinal midpoint of the body, and (3) two feet forward of the emergency door, or for Type D rear-engine buses, 2 feet forward of the end of the aisle.

The test conditions under which the above performance must be achieved shall consist of (1) placing the bus in a room (such as a paint booth) where ambient temperature can be maintained at 100 degrees Fahrenheit; (2) soaking the bus at 100 degrees Fahrenheit with windows open for a t least one hour; and (3) closing windows, turning on the air conditioner with the engine running at the chassis manufacturer's recommended low idle speed, and cooling the interior of the bus to 80 degrees Fahrenheit, or lower, within 30 minutes while maintaining 100 degrees Fahrenheit outside temperature.

Alternately, and at the user's discretion, this test may be performed under actual summer conditions, which consist of temperatures above 85 degrees Fahrenheit, humidity above 50% with normal sun loading of the bus and the engine running at the engine manufacturer's recommended low idle speed. After a minimum of one hour of heat-soaking, the system shall be turned on and must provide a minimum of a 20 degree temperature drop in the 30 minutes time limit.

The manufacturer shall provide facilities for the user or user's representative to confirm that a pilot model of each bus design meets the above performance requirements.

# **2006 School Bus Type Specifications**

## **NOTICE**

**These Specifications define certain, but not all, components required on school bus chassis purchased by public school divisions.**

**Any variation from the specifications, in the form of additional equipment or changes in style of equipment, without prior approval of the Pupil Transportation Service, Department of Education, is prohibited.**

**The responsibility for compliance with these school bus specifications rests with dealers and manufacturers. If any dealers or manufacturers sell school bus vehicles that do not conform to any or all of these specifications, a general notice will be sent to all school divisions advising that equipment supplied by such dealer or manufacturer will be disapproved for school transportation until further notice. A copy of the notice will be sent to the dealer or manufacturer and will remain in effect until full compliance by the dealer or manufacturer is assured.**

**MINIMUM SPECIFICATIONS FOR 2006 SCHOOL BUS CHASSIS TO MEET  
REQUIREMENTS OF VIRGINIA STATE BOARD OF EDUCATION**

**TYPE "A" 16 & 24 PASSENGER CONVENTIONAL**

<b><u>GVWR</u></b>	<b>10,000 (MINIMUM)</b>
<b><u>WHEELS</u></b>	<b>DISC 16 x 6</b>
<b><u>TIRES</u></b>	<b>RADIAL FRONT AND DUAL RADIAL REAR</b>
<b><u>FRAME</u></b>	<b>PER MANUFACTURER STANDARDS FOR SEVERE SERVICE</b>
<b><u>STEERING</u></b>	<b>POWER – MEETING VIRGINIA SPECIFICATIONS</b>
<b><u>FRONT BUMPER</u></b>	<b>HEAVY DUTY PAINTED BLACK</b>
<b><u>FRONT AXLE</u></b>	<b>GVWR AT GROUND COMMENSURATE WITH FRONT; WEIGHT LOADS THAT WILL BE IMPOSED BY BUS</b>
<b><u>REAR AXLE</u></b>	<b>GVWR AT GROUND COMMENSURATE WITH REAR; WEIGHT LOADS THAT WILL BE IMPOSED BY BUS</b>
<b><u>BRAKES</u></b>	<b>POWER, WITH ANTI LOCK BRAKE SYSTEM</b>
<b><u>SUSPENSION</u></b>	<b>PER MANUFACTURER STANDARDS FOR SEVERE SERVICE</b>
<b><u>ENGINE</u></b>	<b>INTERNAL COMBUSTION (ECM SET TO MAXIMUM OF 55 MPH)</b>
<b><u>TRANSMISSION</u></b>	<b>AUTOMATIC W/PARKING PAWL OR APPROVED PARKING BRAKE SYSTEM</b>
<b><u>DRIVE SHAFT</u></b>	<b>GREASE FITTINGS ON ALL SHAFTS, GUARDS ON ALL SHAFTS</b>
<b><u>FUEL TANK</u></b>	<b>30 GALLON</b>
<b><u>AIR CLEANER</u></b>	<b>PER ENGINE MANUFACTURER SPECIFICATIONS WITH RESTRICTION INDICATOR</b>
<b><u>OIL FILTER</u></b>	<b>REPLACEABLE, 1 QUART CAPACITY</b>
<b><u>BATTERY</u></b>	<b>600 CCA</b>
<b><u>ALTERNATOR</u></b>	<b>130 AMP</b>
<b><u>HORN</u></b>	<b>DUAL ELECTRIC</b>

**LIGHTS**

**PER FMVSS AND DAYTIME RUNNING LIGHTS**

**GAUGES**

**SPEEDOMETER, TACHOMETER, FUEL, OIL PRESSURE, COOLANT TEMP. AND VOLTMETER**

**COLOR**

**FRAME, WHEELS, BUMPER, RAILS, AND LETTERINGS – BLACK;  
BALANCE YELLOW**

1. 16 Passenger Base Bus (Gasoline Engine – must have automatic fire extinguisher system – V8 – Min) Bus offered must have successfully completed a pilot program and approved by the Virginia Department of Education.
2. 16 Passenger Base Bus (Diesel Engine) Bus offered must have successfully completed a pilot program and approved by the Virginia Department of Education.
3. 24 Passenger Base Bus (Gasoline Engine – must have automatic fire extinguisher system – V8 – Min) Bus offered must have successfully completed a pilot program and approved by the Virginia Department of Education.
4. 24 Passenger Base Bus (Diesel Engine) Bus offered must have successfully completed a pilot program and approved by the Virginia Department of Education.

**MINIMUM SPECIFICATIONS FOR 2006 SCHOOL BUS CHASSIS TO MEET  
REQUIREMENTS OF VIRGINIA STATE BOARD OF EDUCATION**

**TYPE “C” 35 PASSENGER CONVENTIONAL**

<b><u>GVWR</u></b>	21,000
<b><u>WHEELS</u></b>	8-STUD DISC – 22.5” X 6.75”
<b><u>TIRES</u></b>	9R22.5 – 12 PLY
<b><u>FRAME</u></b>	ONE PIECE SIDE MEMBER – FRONT TOW HOOKS
<b><u>STEERING</u></b>	POWER – MEETING VIRGINIA SPECIFICATIONS
<b><u>FRONT BUMPER</u></b>	3/16” STEEL
<b><u>FRONT AXLE</u></b>	6,000 LB.
<b><u>REAR AXLE</u></b>	15,000 LB.
<b><u>BRAKES</u></b>	HYDRAULIC DISC W/ABS (WITH ALLISON 2200 PTS ONLY) – OR - FULL AIR – 13.2 CFM COMPRESSOR – AIR DRYER (5 SPEED DIRECT OR ALLISON 2100 PTS ONLY)
<b><u>SUSPENSION</u></b>	FRT. SPRINGS 3,000 LB. EA. @ GRD. REAR SPRINGS 7,500 LB. EA. @ GRD. FRT. AND REAR SHOCK ABSORBERS
<b><u>ENGINE</u></b>	175 H.P. ELECTRONIC HAND THROTTLE ECM SET TO MAXIMUM OF 55 MPH
<b><u>TRANSMISSION</u></b>	5 SPEED DIRECT, ALLISON 2200 PTS, OR ALLISON 2100 PTS, SEE BRAKES FOR AUTHORIZED CONFIGURATIONS.
<b><u>DRIVE SHAFT</u></b>	GUARDS ON ALL SHAFTS
<b><u>FUEL TANK</u></b>	60 GALLON
<b><u>AIR CLEANER</u></b>	DRY ELEMENT TYPE WITH RESTRICTION GAUGE
<b><u>OIL FILTER</u></b>	1-QUART – PER MANUFACTURER
<b><u>BATTERY</u></b>	750CCA
<b><u>ALTERNATOR</u></b>	130AMP 4 GA. CHARGING AND GROUND CIRCUITS
<b><u>HORN</u></b>	PER FMVSS
<b><u>LIGHTS</u></b>	PER FMVSS AND DAYTIME RUNNING LIGHTS
<b><u>GAUGES</u></b>	SPEEDOMETER, TACHOMETER, FUEL, OIL PRESSURE, COOLANT TEMP. & VOLTMETER
<b><u>COLOR</u></b>	FRAME, WHEELS, BUMPER, RAILS AND LETTERING – BLACK - - BACK OF MIRRORS, NON GLOSS BLACK - -BALANCE YELLOW

**MINIMUM SPECIFICATIONS FOR 2006 SCHOOL BUS CHASSIS TO MEET  
REQUIREMENTS OF VIRGINIA STATE BOARD OF EDUCATION**

**TYPE "D" 42 PASSENGER ENGINE FRONT**

<b><u>GVWR</u></b>	27,800
<b><u>WHEELS</u></b>	10-STUD DISC – 22.5" X 7.5"
<b><u>TIRES</u></b>	11R22.5 – 14 PLY
<b><u>FRAME</u></b>	ONE PIECE SIDE MEMBER – FRONT TOW HOOKS
<b><u>STEERING</u></b>	POWER – MEETING VIRGINIA SPECIFICATIONS
<b><u>FRONT BUMPER</u></b>	3/16" STEEL
<b><u>FRONT AXLE</u></b>	10,800 LB.
<b><u>REAR AXLE</u></b>	17,000 LB.
<b><u>BRAKES</u></b>	FULL AIR– 13.2 CF COMP– 16.5" X 5" FRT– 16.5" X 7" REAR–AIR DRYER
<b><u>SUSPENSION</u></b>	FRT. SPRINGS 5,400 LB. EA. @ GRD. REAR SPRINGS 8,500 LB. EA. @ GRD. FRT. AND REAR SHOCK ABSORBERS
<b><u>ENGINE</u></b>	190 H.P. ELECTRONIC HAND THROTTLE ECM SET TO MAXIMUM OF 55 MPH
<b><u>TRANSMISSION</u></b>	ALLISON 2500 PTS
<b><u>DRIVE SHAFT</u></b>	GUARDS ON ALL SHAFTS
<b><u>FUEL TANK</u></b>	60 GALLON
<b><u>AIR CLEANER</u></b>	DRY ELEMENT TYPE WITH RESTRICTION GAUGE
<b><u>OIL FILTER</u></b>	1-QT. PER MANUFACTURER
<b><u>BATTERY</u></b>	750CCA
<b><u>ALTERNATOR</u></b>	130AMP 4 GA. CHARGING AND GROUND CIRCUITS
<b><u>HORN</u></b>	PER FMVSS
<b><u>LIGHTS</u></b>	PER FMVSS AND DAYTIME RUNNING LIGHTS
<b><u>GAUGES</u></b>	SPEEDOMETER, TACHOMETER, FUEL, OIL PRESSURE, COOLANT TEMP. & VOLTMETER
<b><u>COLOR</u></b>	FRAME, WHEELS, BUMPER, RAILS AND LETTERING – BLACK - - BACK OF MIRRORS, NON GLOSS BLACK - -BALANCE YELLOW

**MINIMUM SPECIFICATIONS FOR 2006 SCHOOL BUS CHASSIS TO MEET  
REQUIREMENTS OF VIRGINIA STATE BOARD OF EDUCATION**

**TYPE "C" 53 PASSENGER CONVENTIONAL**

<b><u>GVWR</u></b>	25,000
<b><u>WHEELS</u></b>	8-STUD DISC – 22.5" X 6.75"
<b><u>TIRES</u></b>	9R22.5 – 12 PLY
<b><u>FRAME</u></b>	ONE PIECE SIDE MEMBER – FRONT TOW HOOKS
<b><u>STEERING</u></b>	POWER – MEETING VIRGINIA SPECIFICATIONS
<b><u>FRONT BUMPER</u></b>	3/16" STEEL
<b><u>FRONT AXLE</u></b>	8,000 LB.
<b><u>REAR AXLE</u></b>	17,000 LB.
<b><u>BRAKES</u></b>	HYDRAULIC DISC W/ABS (WITH ALLISON 2400 ONLY) – OR - FULL AIR – 13.2 CFM COMPRESSOR – AIR DRYER (5 SPEED DIRECT OR ALLISON 2000 ONLY)
<b><u>SUSPENSION</u></b>	FRT. SPRINGS 4,000 LB. EA. @ GRD. REAR SPRINGS 8,500 LB. EA. @ GRD. FRT. AND REAR SHOCK ABSORBERS
<b><u>ENGINE</u></b>	175 H.P. ELECTRONIC HAND THROTTLE ECM SET TO MAXIMUM OF 55 MPH
<b><u>TRANSMISSION</u></b>	5 SPEED DIRECT, ALLISON 2200 PTS, OR ALLISON 2100 PTS, SEE BRAKES FOR AUTHORIZED CONFIGURATIONS.
<b><u>DRIVE SHAFT</u></b>	GUARDS ON ALL SHAFTS
<b><u>FUEL TANK</u></b>	60 GALLON
<b><u>AIR CLEANER</u></b>	DRY ELEMENT TYPE WITH RESTRICTION GAUGE
<b><u>OIL FILTER</u></b>	1-QT. PER MANUFACTURER
<b><u>BATTERY</u></b>	750CCA
<b><u>ALTERNATOR</u></b>	130AMP 4 GA. CHARGING AND GROUND CIRCUITS
<b><u>HORN</u></b>	PER FMVSS
<b><u>LIGHTS</u></b>	PER FMVSS AND DAYTIME RUNNING LIGHTS
<b><u>GAUGES</u></b>	SPEEDOMETER, TACHOMETER, FUEL, OIL PRESSURE, COOLANT TEMP. & VOLTMETER
<b><u>COLOR</u></b>	FRAME, WHEELS, BUMPER, RAILS AND LETTERING – BLACK - - BACK OF MIRRORS, NON GLOSS BLACK - -BALANCE YELLOW

**MINIMUM SPECIFICATIONS FOR 2006 SCHOOL BUS CHASSIS TO MEET  
REQUIREMENTS OF VIRGINIA STATE BOARD OF EDUCATION**

**TYPE "D" 53 PASSENGER ENGINE FRONT**

<b><u>GVWR</u></b>	27,800
<b><u>WHEELS</u></b>	10-STUD DISC – 22.5" X 7.5"
<b><u>TIRES</u></b>	11R22.5 – 14 PLY
<b><u>FRAME</u></b>	ONE PIECE SIDE MEMBER – FRONT TOW HOOKS
<b><u>STEERING</u></b>	POWER – MEETING VIRGINIA SPECIFICATIONS
<b><u>FRONT BUMPER</u></b>	3/16" STEEL
<b><u>FRONT AXLE</u></b>	10,800 LB.
<b><u>REAR AXLE</u></b>	17,000 LB.
<b><u>BRAKES</u></b>	FULL AIR– 13.2 CF COMP– 16.5" X 5" FRT– 16.5" X 7" REAR–AIR DRYER
<b><u>SUSPENSION</u></b>	FRT. SPRINGS 5,400 LB. EA. @ GRD. REAR SPRINGS 8,500 LB. EA. @ GRD. FRT. AND REAR SHOCK ABSORBERS
<b><u>ENGINE</u></b>	190 H.P. ELECTRONIC HAND THROTTLE ECM SET TO MAXIMUM OF 55 MPH
<b><u>TRANSMISSION</u></b>	ALLISON 2500 PTS
<b><u>DRIVE SHAFT</u></b>	GUARDS ON ALL SHAFTS
<b><u>FUEL TANK</u></b>	60 GALLON
<b><u>AIR CLEANER</u></b>	DRY ELEMENT TYPE WITH RESTRICTION GAUGE
<b><u>OIL FILTER</u></b>	1-QT. PER MANUFACTURER
<b><u>BATTERY</u></b>	750CCA
<b><u>ALTERNATOR</u></b>	130AMP 4 GA. CHARGING AND GROUND CIRCUITS
<b><u>HORN</u></b>	PER FMVSS
<b><u>LIGHTS</u></b>	PER FMVSS AND DAYTIME RUNNING LIGHTS
<b><u>GAUGES</u></b>	SPEEDOMETER, TACHOMETER, FUEL, OIL PRESSURE, COOLANT TEMP. & VOLTMETER
<b><u>COLOR</u></b>	FRAME, WHEELS, BUMPER, RAILS AND LETTERING – BLACK - - BACK OF MIRRORS, NON GLOSS BLACK - -BALANCE YELLOW

**MINIMUM SPECIFICATIONS FOR 2006 SCHOOL BUS CHASSIS TO MEET  
REQUIREMENTS OF VIRGINIA STATE BOARD OF EDUCATION**

**TYPE "C" 65 PASSENGER CONVENTIONAL**

<b><u>GVWR</u></b>	27,500
<b><u>WHEELS</u></b>	10-STUD DISC – 22.5" X 7.5"
<b><u>TIRES</u></b>	10R22.5 – 12 PLY
<b><u>FRAME</u></b>	ONE PIECE SIDE MEMBER – FRONT TOW HOOKS
<b><u>STEERING</u></b>	POWER – MEETING VIRGINIA SPECIFICATIONS
<b><u>FRONT BUMPER</u></b>	3/16" STEEL
<b><u>FRONT AXLE</u></b>	10,000 LB.
<b><u>REAR AXLE</u></b>	17,500LB.
<b><u>BRAKES</u></b>	FULL AIR – 13.2 CF COMPRESSOR –AIR DRYER
<b><u>SUSPENSION</u></b>	FRT. SPRINGS 5,000 LB. EA. @ GRD. REAR SPRINGS 8,750LB. EA. @ GRD. FRT. AND REAR SHOCK ABSORBERS
<b><u>ENGINE</u></b>	175 H.P. ELECTRONIC HAND THROTTLE ECM SET TO MAXIMUM OF 55 MPH
<b><u>TRANSMISSION</u></b>	5 SPEED DIRECT OR ALLISON 2500 PTS
<b><u>DRIVE SHAFT</u></b>	GUARDS ON ALL SHAFTS
<b><u>FUEL TANK</u></b>	60 GALLON
<b><u>AIR CLEANER</u></b>	DRY ELEMENT TYPE WITH RESTRICTION GAUGE
<b><u>OIL FILTER</u></b>	1-QT. PER MANUFACTURER
<b><u>BATTERY</u></b>	750CCA
<b><u>ALTERNATOR</u></b>	130AMP 4 GA. CHARGING AND GROUND CIRCUITS
<b><u>HORN</u></b>	PER FMVSS
<b><u>LIGHTS</u></b>	PER FMVSS AND DAYTIME RUNNING LIGHTS
<b><u>GAUGES</u></b>	SPEEDOMETER, TACHOMETER, FUEL, OIL PRESSURE, COOLANT TEMP. & VOLTMETER
<b><u>COLOR</u></b>	FRAME, WHEELS, BUMPER, RAILS AND LETTERING – BLACK - - BACK OF MIRRORS, NON GLOSS BLACK - -BALANCE YELLOW

**MINIMUM SPECIFICATIONS FOR 2006 SCHOOL BUS CHASSIS TO MEET  
REQUIREMENTS OF VIRGINIA STATE BOARD OF EDUCATION**

**TYPE "C" 65 PASSENGER CONVENTIONAL  
HYDRAULIC BRAKE**

<b><u>GVWR</u></b>	26,000
<b><u>WHEELS</u></b>	10-STUD DISC – 22.5" X 7.5"
<b><u>TIRES</u></b>	10R22.5 – 12 PLY
<b><u>FRAME</u></b>	ONE PIECE SIDE MEMBER – FRONT TOW HOOKS
<b><u>STEERING</u></b>	POWER – MEETING VIRGINIA SPECIFICATIONS
<b><u>FRONT BUMPER</u></b>	3/16" STEEL
<b><u>FRONT AXLE</u></b>	10,000 LB.
<b><u>REAR AXLE</u></b>	17,500LB.
<b><u>BRAKES</u></b>	HYDRAULIC DISC W/ABS
<b><u>SUSPENSION</u></b>	FRT. SPRINGS 5,000 LB. EA. @ GRD. REAR SPRINGS 8,750LB. EA. @ GRD. FRT. AND REAR SHOCK ABSORBERS
<b><u>ENGINE</u></b>	175 H.P. ELECTRONIC HAND THROTTLE ECM SET TO MAXIMUM OF 55 MPH
<b><u>TRANSMISSION</u></b>	ALLISON 2200 PTS
<b><u>DRIVE SHAFT</u></b>	GUARDS ON ALL SHAFTS
<b><u>FUEL TANK</u></b>	60 GALLON
<b><u>AIR CLEANER</u></b>	DRY ELEMENT TYPE WITH RESTRICTION GAUGE
<b><u>OIL FILTER</u></b>	1-QT. PER MANUFACTURER
<b><u>BATTERY</u></b>	750CCA
<b><u>ALTERNATOR</u></b>	130AMP 4 GA. CHARGING AND GROUND CIRCUITS
<b><u>HORN</u></b>	PER FMVSS
<b><u>LIGHTS</u></b>	PER FMVSS AND DAYTIME RUNNING LIGHTS
<b><u>GAUGES</u></b>	SPEEDOMETER, TACHOMETER, FUEL, OIL PRESSURE, COOLANT TEMP. & VOLTMETER
<b><u>COLOR</u></b>	FRAME, WHEELS, BUMPER, RAILS AND LETTERING – BLACK - - BACK OF MIRRORS, NON GLOSS BLACK - -BALANCE YELLOW

**MINIMUM SPECIFICATIONS FOR 2006 SCHOOL BUS CHASSIS TO MEET  
REQUIREMENTS OF VIRGINIA STATE BOARD OF EDUCATION**

**TYPE "D" 65 PASSENGER ENGINE FRONT**

<b><u>GVWR</u></b>	29,000
<b><u>WHEELS</u></b>	10-STUD DISC – 22.5" X 7.5"
<b><u>TIRES</u></b>	11R22.5 – 14 PLY
<b><u>FRAME</u></b>	ONE PIECE SIDE MEMBER – FRONT TOW HOOKS
<b><u>STEERING</u></b>	POWER – MEETING VIRGINIA SPECIFICATIONS
<b><u>FRONT BUMPER</u></b>	3/16" STEEL
<b><u>FRONT AXLE</u></b>	12,000 LB.
<b><u>REAR AXLE</u></b>	17,000 LB.
<b><u>BRAKES</u></b>	FULL AIR– 13.2 CF COMP– 16.5" X 5" FRT– 16.5" X 7" REAR–AIR DRYER
<b><u>SUSPENSION</u></b>	FRT. SPRINGS 6,000 LB. EA. @ GRD. REAR SPRINGS 8,500 LB. EA. @ GRD. FRT. AND REAR SHOCK ABSORBERS
<b><u>ENGINE</u></b>	190 H.P. ELECTRONIC HAND THROTTLE ECM SET TO MAXIMUM OF 55 MPH
<b><u>TRANSMISSION</u></b>	ALLISON 2500 PTS
<b><u>DRIVE SHAFT</u></b>	GUARDS ON ALL SHAFTS
<b><u>FUEL TANK</u></b>	60 GALLON
<b><u>AIR CLEANER</u></b>	DRY ELEMENT TYPE WITH RESTRICTION GAUGE
<b><u>OIL FILTER</u></b>	1-QT. PER MANUFACTURER
<b><u>BATTERY</u></b>	750CCA
<b><u>ALTERNATOR</u></b>	130AMP 4 GA. CHARGING AND GROUND CIRCUITS
<b><u>HORN</u></b>	PER FMVSS
<b><u>LIGHTS</u></b>	PER FMVSS AND DAYTIME RUNNING LIGHTS
<b><u>GAUGES</u></b>	SPEEDOMETER, TACHOMETER, FUEL, OIL PRESSURE, COOLANT TEMP. & VOLTMETER
<b><u>COLOR</u></b>	FRAME, WHEELS, BUMPER, RAILS AND LETTERING – BLACK - - BACK OF MIRRORS, NON GLOSS BLACK - -BALANCE YELLOW

**MINIMUM SPECIFICATIONS FOR 2006 SCHOOL BUS CHASSIS TO MEET  
REQUIREMENTS OF VIRGINIA STATE BOARD OF EDUCATION**

**TYPE "D" 66 PASSENGER ENGINE REAR**

<b><u>GVWR</u></b>	29,800
<b><u>WHEELS</u></b>	10-STUD DISC – 22.5" X 7.5"
<b><u>TIRES</u></b>	11R22.5 – 14 PLY
<b><u>FRAME</u></b>	ONE PIECE SIDE MEMBER – FRONT TOW HOOKS
<b><u>STEERING</u></b>	POWER – MEETING VIRGINIA SPECIFICATIONS
<b><u>FRONT BUMPER</u></b>	3/16" STEEL
<b><u>FRONT AXLE</u></b>	10,800 LB.
<b><u>REAR AXLE</u></b>	19,000 LB.
<b><u>BRAKES</u></b>	FULL AIR– 13.2 CF COMP– 16.5" X 5" FRT– 16.5" X 7" REAR–AIR DRYER
<b><u>SUSPENSION</u></b>	FRT. SPRINGS 5,400 LB. EA. @ GRD. REAR SPRINGS 9,500 LB. EA. @ GRD. FRT. AND REAR SHOCK ABSORBERS
<b><u>ENGINE</u></b>	190 H.P. ELECTRONIC HAND THROTTLE ECM SET TO MAXIMUM OF 55 MPH
<b><u>TRANSMISSION</u></b>	ALLISON 2500 PTS
<b><u>DRIVE SHAFT</u></b>	GUARDS ON ALL SHAFTS
<b><u>FUEL TANK</u></b>	60 GALLON
<b><u>AIR CLEANER</u></b>	DRY ELEMENT TYPE WITH RESTRICTION GAUGE
<b><u>OIL FILTER</u></b>	1-QT. PER MANUFACTURER
<b><u>BATTERY</u></b>	750CCA
<b><u>ALTERNATOR</u></b>	130AMP 4 GA. CHARGING AND GROUND CIRCUITS
<b><u>HORN</u></b>	PER FMVSS
<b><u>LIGHTS</u></b>	PER FMVSS AND DAYTIME RUNNING LIGHTS
<b><u>GAUGES</u></b>	SPEEDOMETER, TACHOMETER, FUEL, OIL PRESSURE, COOLANT TEMP. & VOLTMETER
<b><u>COLOR</u></b>	FRAME, WHEELS, BUMPER, RAILS AND LETTERING – BLACK - - BACK OF MIRRORS, NON GLOSS BLACK - -BALANCE YELLOW

**MINIMUM SPECIFICATIONS FOR 2006 SCHOOL BUS CHASSIS TO MEET  
REQUIREMENTS OF VIRGINIA STATE BOARD OF EDUCATION**

**TYPE "D" 71 PASSENGER ENGINE FRONT**

<b><u>GVWR</u></b>	29,000
<b><u>WHEELS</u></b>	10-STUD DISC – 22.5" X 7.5"
<b><u>TIRES</u></b>	11R22.5 – 14 PLY
<b><u>FRAME</u></b>	ONE PIECE SIDE MEMBER – FRONT TOW HOOKS
<b><u>STEERING</u></b>	POWER – MEETING VIRGINIA SPECIFICATIONS
<b><u>FRONT BUMPER</u></b>	3/16" STEEL
<b><u>FRONT AXLE</u></b>	12,000 LB.
<b><u>REAR AXLE</u></b>	17,000 LB.
<b><u>BRAKES</u></b>	FULL AIR– 13.2 CF COMP– 16.5" X 5" FRT– 16.5" X 7" REAR–AIR DRYER
<b><u>SUSPENSION</u></b>	FRT. SPRINGS 6,000 LB. EA. @ GRD. REAR SPRINGS 8,500 LB. EA. @ GRD. FRT. AND REAR SHOCK ABSORBERS
<b><u>ENGINE</u></b>	190 H.P. ELECTRONIC HAND THROTTLE ECM SET TO MAXIMUM OF 55 MPH
<b><u>TRANSMISSION</u></b>	ALLISON 2500 PTS
<b><u>DRIVE SHAFT</u></b>	GUARDS ON ALL SHAFTS
<b><u>FUEL TANK</u></b>	60 GALLON
<b><u>AIR CLEANER</u></b>	DRY ELEMENT TYPE WITH RESTRICTION GAUGE
<b><u>OIL FILTER</u></b>	1-QT. PER MANUFACTURER
<b><u>BATTERY</u></b>	750CCA
<b><u>ALTERNATOR</u></b>	130AMP 4 GA. CHARGING AND GROUND CIRCUITS
<b><u>HORN</u></b>	PER FMVSS
<b><u>LIGHTS</u></b>	PER FMVSS AND DAYTIME RUNNING LIGHTS
<b><u>GAUGES</u></b>	SPEEDOMETER, TACHOMETER, FUEL, OIL PRESSURE, COOLANT TEMP. & VOLTMETER
<b><u>COLOR</u></b>	FRAME, WHEELS, BUMPER, RAILS AND LETTERING – BLACK - - BACK OF MIRRORS, NON GLOSS BLACK -BALANCE YELLOW

**MINIMUM SPECIFICATIONS FOR 2006 SCHOOL BUS CHASSIS TO MEET  
REQUIREMENTS OF VIRGINIA STATE BOARD OF EDUCATION**

**TYPE "C" 71 PASSENGER CONVENTIONAL**

<b><u>GVWR</u></b>	29,000
<b><u>WHEELS</u></b>	10-STUD DISC – 22.5" X 7.5"
<b><u>TIRES</u></b>	10R22.5 – 12 PLY
<b><u>FRAME</u></b>	ONE PIECE SIDE MEMBER – FRONT TOW HOOKS
<b><u>STEERING</u></b>	POWER – MEETING VIRGINIA SPECIFICATIONS
<b><u>FRONT BUMPER</u></b>	3/16" STEEL
<b><u>FRONT AXLE</u></b>	10,000 LB.
<b><u>REAR AXLE</u></b>	19,000LB.
<b><u>BRAKES</u></b>	FULL AIR – 13.2 CF COMPRESSOR –AIR DRYER
<b><u>SUSPENSION</u></b>	FRT. SPRINGS 5,000 LB. EA. @ GRD. REAR SPRINGS 9,500LB. EA. @ GRD. FRT. AND REAR SHOCK ABSORBERS
<b><u>ENGINE</u></b>	190 H.P. ELECTRONIC HAND THROTTLE ECM SET TO MAXIMUM OF 55 MPH
<b><u>TRANSMISSION</u></b>	ALLISON 2500 PTS
<b><u>DRIVE SHAFT</u></b>	GUARDS ON ALL SHAFTS
<b><u>FUEL TANK</u></b>	60 GALLON
<b><u>AIR CLEANER</u></b>	DRY ELEMENT TYPE WITH RESTRICTION GAUGE
<b><u>OIL FILTER</u></b>	1-QT. PER MANUFACTURER
<b><u>BATTERY</u></b>	750CCA
<b><u>ALTERNATOR</u></b>	130AMP 4 GA. CHARGING AND GROUND CIRCUITS
<b><u>HORN</u></b>	PER FMVSS
<b><u>LIGHTS</u></b>	PER FMVSS AND DAYTIME RUNNING LIGHTS
<b><u>GAUGES</u></b>	SPEEDOMETER, TACHOMETER, FUEL, OIL PRESSURE, COOLANT TEMP. & VOLTMETER
<b><u>COLOR</u></b>	FRAME, WHEELS, BUMPER, RAILS AND LETTERING – BLACK - - BACK OF MIRRORS, NON GLOSS BLACK - -BALANCE YELLOW

**MINIMUM SPECIFICATIONS FOR 2006 SCHOOL BUS CHASSIS TO MEET  
REQUIREMENTS OF VIRGINIA STATE BOARD OF EDUCATION**

**TYPE "D" 72PASSENGER ENGINE REAR**

<b><u>GVWR</u></b>	29,800
<b><u>WHEELS</u></b>	10-STUD DISC – 22.5" X 7.5"
<b><u>TIRES</u></b>	11R22.5 – 14 PLY
<b><u>FRAME</u></b>	ONE PIECE SIDE MEMBER – FRONT TOW HOOKS
<b><u>STEERING</u></b>	POWER – MEETING VIRGINIA SPECIFICATIONS
<b><u>FRONT BUMPER</u></b>	3/16" STEEL
<b><u>FRONT AXLE</u></b>	10,800 LB.
<b><u>REAR AXLE</u></b>	19,000 LB.
<b><u>BRAKES DRYER</u></b>	FULL AIR– 13.2 CF COMP– 16.5" X 5" FRT– 16.5" X 7" REAR–AIR
<b><u>SUSPENSION</u></b>	FRT. SPRINGS 5,400 LB. EA. @ GRD. REAR SPRINGS 9,500 LB. EA. @ GRD. FRT. AND REAR SHOCK ABSORBERS
<b><u>ENGINE</u></b>	190 H.P. ELECTRONIC HAND THROTTLE ECM SET TO MAXIMUM OF 55 MPH
<b><u>TRANSMISSION</u></b>	ALLISON 2500 PTS
<b><u>DRIVE SHAFT</u></b>	GUARDS ON ALL SHAFTS
<b><u>FUEL TANK</u></b>	60 GALLON
<b><u>AIR CLEANER</u></b>	DRY ELEMENT TYPE WITH RESTRICTION GAUGE
<b><u>OIL FILTER</u></b>	1-QT. PER MANUFACTURER
<b><u>BATTERY</u></b>	750CCA
<b><u>ALTERNATOR</u></b>	130AMP 4 GA. CHARGING AND GROUND CIRCUITS
<b><u>HORN</u></b>	PER FMVSS
<b><u>LIGHTS</u></b>	PER FMVSS AND DAYTIME RUNNING LIGHTS
<b><u>GAUGES</u></b>	SPEEDOMETER, TACHOMETER, FUEL, OIL PRESSURE, COOLANT TEMP. & VOLTMETER
<b><u>COLOR</u></b>	FRAME, WHEELS, BUMPER, RAILS AND LETTERING – BLACK - - BACK OF MIRRORS, NON GLOSS BLACK -BALANCE YELLOW

**MINIMUM SPECIFICATIONS FOR 2006 SCHOOL BUS CHASSIS TO MEET  
REQUIREMENTS OF VIRGINIA STATE BOARD OF EDUCATION**

**TYPE "D" 77 PASSENGER ENGINE FRONT**

<b><u>GVWR</u></b>	32,000
<b><u>WHEELS</u></b>	10-STUD DISC – 22.5" X 8.25"
<b><u>TIRES</u></b>	11R22.5 – 14 PLY
<b><u>FRAME</u></b>	ONE PIECE SIDE MEMBER – FRONT TOW HOOKS
<b><u>STEERING</u></b>	POWER – MEETING VIRGINIA SPECIFICATIONS
<b><u>FRONT BUMPER</u></b>	3/16" STEEL
<b><u>FRONT AXLE</u></b>	13,000 LB.
<b><u>REAR AXLE</u></b>	19,000LB.
<b><u>BRAKES</u></b>	FULL AIR– 13.2 CF COMP– 16.5" X 5" FRT– 16.5" X 7" REAR–AIR DRYER
<b><u>SUSPENSION</u></b>	FRT. SPRINGS 6,500 LB. EA. @ GRD. REAR SPRINGS 9,500 LB. EA. @ GRD. FRT. AND REAR SHOCK ABSORBERS
<b><u>ENGINE</u></b>	210 H.P. ELECTRONIC HAND THROTTLE ECM SET TO MAXIMUM OF 55 MPH
<b><u>TRANSMISSION</u></b>	ALLISON 2500 PTS
<b><u>DRIVE SHAFT</u></b>	GUARDS ON ALL SHAFTS
<b><u>FUEL TANK</u></b>	60 GALLON
<b><u>AIR CLEANER</u></b>	DRY ELEMENT TYPE WITH RESTRICTION GAUGE
<b><u>OIL FILTER</u></b>	1-QT. PER MANUFACTURER
<b><u>BATTERY</u></b>	750CCA
<b><u>ALTERNATOR</u></b>	130AMP 4 GA. CHARGING AND GROUND CIRCUITS
<b><u>HORN</u></b>	PER FMVSS
<b><u>LIGHTS</u></b>	PER FMVSS AND DAYTIME RUNNING LIGHTS
<b><u>GAUGES</u></b>	SPEEDOMETER, TACHOMETER, FUEL, OIL PRESSURE, COOLANT TEMP. & VOLTMETER
<b><u>COLOR</u></b>	FRAME, WHEELS, BUMPER, RAILS AND LETTERING – BLACK - - BACK OF MIRRORS, NON GLOSS BLACK -BALANCE YELLOW

**MINIMUM SPECIFICATIONS FOR 2006 SCHOOL BUS CHASSIS TO MEET  
REQUIREMENTS OF VIRGINIA STATE BOARD OF EDUCATION**

**TYPE "C" 77 PASSENGER CONVENTIONAL**

<b><u>GVWR</u></b>	31,000
<b><u>WHEELS</u></b>	10-STUD DISC – 22.5" X 8.2.5"
<b><u>TIRES</u></b>	11R22.5 – 14 PLY
<b><u>FRAME</u></b>	ONE PIECE SIDE MEMBER – FRONT TOW HOOKS
<b><u>STEERING</u></b>	POWER – MEETING VIRGINIA SPECIFICATIONS
<b><u>FRONT BUMPER</u></b>	3/16" STEEL
<b><u>FRONT AXLE</u></b>	10,000 LB.
<b><u>REAR AXLE</u></b>	21,000LB.
<b><u>BRAKES</u></b>	FULL AIR – 13.2 CF COMPRESSOR –AIR DRYER
<b><u>SUSPENSION</u></b>	FRT. SPRINGS 5,000 LB. EA. @ GRD. REAR SPRINGS 10,500LB. EA. @ GRD. FRT. AND REAR SHOCK ABSORBERS
<b><u>ENGINE</u></b>	210 H.P. ELECTRONIC HAND THROTTLE ECM SET TO MAXIMUM OF 55 MPH
<b><u>TRANSMISSION</u></b>	ALLISON 2500 PTS
<b><u>DRIVE SHAFT</u></b>	GUARDS ON ALL SHAFTS
<b><u>FUEL TANK</u></b>	60 GALLON
<b><u>AIR CLEANER</u></b>	DRY ELEMENT TYPE WITH RESTRICTION GAUGE
<b><u>OIL FILTER</u></b>	1-QT. PER MANUFACTURER
<b><u>BATTERY</u></b>	750CCA
<b><u>ALTERNATOR</u></b>	130AMP 4 GA. CHARGING AND GROUND CIRCUITS
<b><u>HORN</u></b>	PER FMVSS
<b><u>LIGHTS</u></b>	PER FMVSS AND DAYTIME RUNNING LIGHTS
<b><u>GAUGES</u></b>	SPEEDOMETER, TACHOMETER, FUEL, OIL PRESSURE, COOLANT TEMP. & VOLTMETER
<b><u>COLOR</u></b>	FRAME, WHEELS, BUMPER, RAILS AND LETTERING – BLACK - - BACK OF MIRRORS, NON GLOSS BLACK - -BALANCE YELLOW

**MINIMUM SPECIFICATIONS FOR 2006 SCHOOL BUS CHASSIS TO MEET  
REQUIREMENTS OF VIRGINIA STATE BOARD OF EDUCATION**

**TYPE "D" 78 PASSENGER ENGINE REAR**

<b><u>GVWR</u></b>	33,000
<b><u>WHEELS</u></b>	10-STUD DISC – 22.5" X 7.5"
<b><u>TIRES</u></b>	11R22.5 – 14 PLY
<b><u>FRAME</u></b>	ONE PIECE SIDE MEMBER – FRONT TOW HOOKS
<b><u>STEERING</u></b>	POWER – MEETING VIRGINIA SPECIFICATIONS
<b><u>FRONT BUMPER</u></b>	3/16" STEEL
<b><u>FRONT AXLE</u></b>	12,000 LB.
<b><u>REAR AXLE</u></b>	21,000 LB.
<b><u>BRAKES DRYER</u></b>	FULL AIR– 13.2 CF COMP– 16.5" X 5" FRT– 16.5" X 7" REAR–AIR
<b><u>SUSPENSION</u></b>	FRT. SPRINGS 6,000 LB. EA. @ GRD. REAR SPRINGS 10,500 LB. EA. @ GRD. FRT. AND REAR SHOCK ABSORBERS
<b><u>ENGINE</u></b>	210 H.P. ELECTRONIC HAND THROTTLE ECM SET TO MAXIMUM OF 55 MPH
<b><u>TRANSMISSION</u></b>	ALLISON 3000 PTS
<b><u>DRIVE SHAFT</u></b>	GUARDS ON ALL SHAFTS
<b><u>FUEL TANK</u></b>	60 GALLON
<b><u>AIR CLEANER</u></b>	DRY ELEMENT TYPE WITH RESTRICTION GAUGE
<b><u>OIL FILTER</u></b>	1-QT. PER MANUFACTURER
<b><u>BATTERY</u></b>	750CCA
<b><u>ALTERNATOR</u></b>	130AMP 4 GA. CHARGING AND GROUND CIRCUITS
<b><u>HORN</u></b>	PER FMVSS
<b><u>LIGHTS</u></b>	PER FMVSS AND DAYTIME RUNNING LIGHTS
<b><u>GAUGES</u></b>	SPEEDOMETER, TACHOMETER, FUEL, OIL PRESSURE, COOLANT TEMP. & VOLTMETER
<b><u>COLOR</u></b>	FRAME, WHEELS, BUMPER, RAILS AND LETTERING – BLACK - - BACK OF MIRRORS, NON GLOSS BLACK -BALANCE YELLOW

**MINIMUM SPECIFICATIONS FOR 2006 SCHOOL BUS CHASSIS TO MEET  
REQUIREMENTS OF VIRGINIA STATE BOARD OF EDUCATION**

**TYPE "D" 83 PASSENGER ENGINE FRONT**

<b><u>GVWR</u></b>	32,000
<b><u>WHEELS</u></b>	10-STUD DISC – 22.5" X 8.25"
<b><u>TIRES</u></b>	11R22.5 – 14 PLY
<b><u>FRAME</u></b>	ONE PIECE SIDE MEMBER – FRONT TOW HOOKS
<b><u>STEERING</u></b>	POWER – MEETING VIRGINIA SPECIFICATIONS
<b><u>FRONT BUMPER</u></b>	3/16" STEEL
<b><u>FRONT AXLE</u></b>	13,000 LB.
<b><u>REAR AXLE</u></b>	19,000LB.
<b><u>BRAKES DRYER</u></b>	FULL AIR– 13.2 CF COMP– 16.5" X 5" FRT– 16.5" X 7" REAR–AIR
<b><u>SUSPENSION</u></b>	FRT. SPRINGS 6,500 LB. EA. @ GRD. REAR SPRINGS 9,500 LB. EA. @ GRD. FRT. AND REAR SHOCK ABSORBERS
<b><u>ENGINE</u></b>	210 H.P. ELECTRONIC HAND THROTTLE ECM SET TO MAXIMUM OF 55 MPH
<b><u>TRANSMISSION</u></b>	ALLISON 3000 PTS
<b><u>DRIVE SHAFT</u></b>	GUARDS ON ALL SHAFTS
<b><u>FUEL TANK</u></b>	60 GALLON
<b><u>AIR CLEANER</u></b>	DRY ELEMENT TYPE WITH RESTRICTION GAUGE
<b><u>OIL FILTER</u></b>	1-QT. PER MANUFACTURER
<b><u>BATTERY</u></b>	750CCA
<b><u>ALTERNATOR</u></b>	130AMP 4 GA. CHARGING AND GROUND CIRCUITS
<b><u>HORN</u></b>	PER FMVSS
<b><u>LIGHTS</u></b>	PER FMVSS AND DAYTIME RUNNING LIGHTS
<b><u>GAUGES</u></b>	SPEEDOMETER, TACHOMETER, FUEL, OIL PRESSURE, COOLANT TEMP. & VOLTMETER
<b><u>COLOR</u></b>	FRAME, WHEELS, BUMPER, RAILS AND LETTERING – BLACK - - BACK OF MIRRORS, NON GLOSS BLACK -BALANCE YELLOW

**MINIMUM SPECIFICATIONS FOR 2006 SCHOOL BUS CHASSIS TO MEET  
REQUIREMENTS OF VIRGINIA STATE BOARD OF EDUCATION**

**TYPE "D" 84 PASSENGER ENGINE REAR**

<b><u>GVWR</u></b>	33,000
<b><u>WHEELS</u></b>	10-STUD DISC – 22.5" X 8.25"
<b><u>TIRES</u></b>	11R22.5 – 14 PLY
<b><u>FRAME</u></b>	ONE PIECE SIDE MEMBER – FRONT TOW HOOKS
<b><u>STEERING</u></b>	POWER – MEETING VIRGINIA SPECIFICATIONS
<b><u>FRONT BUMPER</u></b>	3/16" STEEL
<b><u>FRONT AXLE</u></b>	12,000 LB.
<b><u>REAR AXLE</u></b>	21,000 LB.
<b><u>BRAKES</u></b>	FULL AIR– 13.2 CF COMP– 16.5" X 5" FRT– 16.5" X 7" REAR–AIR DRYER
<b><u>SUSPENSION</u></b>	FRT. SPRINGS 6,000 LB. EA. @ GRD. REAR SPRINGS 10,500 LB. EA. @ GRD. FRT. AND REAR SHOCK ABSORBERS
<b><u>ENGINE</u></b>	210 H.P. ELECTRONIC HAND THROTTLE ECM SET TO MAXIMUM OF 55 MPH
<b><u>TRANSMISSION</u></b>	ALLISON 3000 PTS
<b><u>DRIVE SHAFT</u></b>	GUARDS ON ALL SHAFTS
<b><u>FUEL TANK</u></b>	60 GALLON
<b><u>AIR CLEANER</u></b>	DRY ELEMENT TYPE WITH RESTRICTION GAUGE
<b><u>OIL FILTER</u></b>	1-QT. PER MANUFACTURER
<b><u>BATTERY</u></b>	750CCA
<b><u>ALTERNATOR</u></b>	130AMP 4 GA. CHARGING AND GROUND CIRCUITS
<b><u>HORN</u></b>	PER FMVSS
<b><u>LIGHTS</u></b>	PER FMVSS AND DAYTIME RUNNING LIGHTS
<b><u>GAUGES</u></b>	SPEEDOMETER, TACHOMETER, FUEL, OIL PRESSURE, COOLANT TEMP. & VOLTMETER
<b><u>COLOR</u></b>	FRAME, WHEELS, BUMPER, RAILS AND LETTERING – BLACK - - BACK OF MIRRORS, NON GLOSS BLACK -BALANCE YELLOW

**School Bus Specifications**  
**Comment Period: June 12 – July 12, 2006**

<b>Original Proposed</b>	<b>Comment Received</b>	<b>Recommendation from Specifications Committee</b>
<p><b>2. Alternator.</b>  A. All Type A and B buses up to 15,000 pounds gross vehicle weight rating - (GVWR) shall have a minimum 90 ampere alternator.</p>	<p>A. All Type A and B buses up to 15,000 pounds gross vehicle weight rating (GVWR) shall have a minimum 130 ampere alternator.</p> <p>Recommend that ampere be increased to 130 amps. The 130 amps alternator is standard on the Type A product and is capable of operating the current amp draw of the vehicle. A 90 amps alternator, if installed, may be insufficient to perform as needed.</p> <p>We feel that the minimum should be increased by 25% in all applications. History has proven undersized alternators have continual maintenance and reliability problems. The best insurance is to oversize the alternator to some degree.</p> <p>Delete all of Item A.</p>	<p>Recommend to delete “A.”</p>
<p><b>2. Alternator</b>  B. Type B buses over 15,000 pounds GVWR and all Type C and D buses shall be equipped with a heavy duty truck or bus type alternator meeting Society of Automotive Engineers (SAE) J-180; having a minimum output rating of 100 amperes, alternator shall be capable of producing a minimum of 50% of its maximum rated output at the engine manufacturer’s recommended idle speed.</p>	<p>B. Type B buses over 15,000 pounds GVWR and all Type C and D buses shall be equipped with a heavy duty truck or bus type alternator meeting Society of Automotive Engineers (SAE) J-180; having a minimum output rating of 160 amperes, alternator shall be capable of producing a minimum of 50% of its maximum rated output at the engine manufacturer’s recommended idle speed.</p>	<p>Recommend to change language as follows:</p> <p>“A. All buses shall be equipped with a heavy duty truck or bus type alternator, having a minimum output rating of 130 amperes. The alternator shall be capable of producing a minimum of 50% of its maximum rated output at the engine manufacturer’s recommended idle speed.”</p>

**School Bus Specifications**  
**Comment Period: June 12 – July 12, 2006**

**Recommendation from  
Specifications Committee**

**Original Proposed**

**Comment Received**

	<p>Delete Item “A”. Change “B” to read:  All buses shall be equipped with a heavy duty truck or bus type alternator, having a minimum output rating of 125 amperes. The alternator shall be capable of producing a minimum of 50% of its maximum rated output at the engine manufacturer’s recommended idle speed.</p> <p>You have a requirement for an SAE J-180 alternator mounting system. We no longer offer this system on the MB, Cat or Cummins engines. We have gone to a “pad mount” system, which attaches the alternator directly to the side of the engine block. This will improve the performance of the alternator and the belt life. Engine manufacturers are making this change across the board where feasible.</p> <p>You also list the minimum alternator rating for the Type C and D buses as 100 amps. We recommend that this be increased to at least 160 amps. 100 amps will not be sufficient to cover the load requirements on these buses.</p>	
<p><b>5. Brakes</b>  D.2. A desiccant type air dryer with automatic purge and drain cycle and a heating element shall be installed on all air brake</p>	<p>Change this to a spin-on type filter. These are just as effective, yet reduce the change time to 10 minutes versus over 1 hour. At least make</p>	<p>Recommend keeping language as proposed.</p>

**School Bus Specifications**  
**Comment Period: June 12 – July 12, 2006**

**Recommendation from  
Specifications Committee**

<b>Original Proposed</b>	<b>Comment Received</b>	
buses.	the spin-on type an approved option.	
<p><b>6. Bumper, front</b>  B. Front bumper shall extend to outer edges of fenders at bumper top line (to assure maximum fender protection) and be of sufficient strength to permit pushing, lifting or towing without permanent distortion to bumper, chassis, or body.</p>	<p>B. Front bumper shall extend to outer edges of fenders at bumper top line (to assure maximum fender protection) and provide contact points for lifting/tow or as instructed in operators manual if other lift/tow points are recommended. The bumper will be of sufficient strength to permit pushing, lifting or towing without permanent distortion to bumper, chassis, or body.</p> <p>You state here, "...be of sufficient strength to permit pushing, lifting or towing without permanent distortion to bumper, chassis, or body." We request that this wording be modified to better reflect the buses of today. Pushing is limited because of crossing arms mounted on the bumper and cross view mirrors protruding beyond the bumper. Lifting and towing are becoming unique to each vehicle manufacturer. We suggest the following wording. "...be of sufficient strength and shall provide contact points for lifting and towing as instructed by manufacturers specifications without permanent distortion to bumper, chassis, or body."</p>	<p>Recommend leaving language as proposed.</p>
<p><b>8. Color</b></p>		

**School Bus Specifications**  
**Comment Period: June 12 – July 12, 2006**

<b>Original Proposed</b>	<b>Comment Received</b>	<b>Recommendation from Specifications Committee</b>
<p>C. Grill shall be national school bus yellow, if painted; otherwise it shall be chrome or anodized aluminum.</p>	<p>C. Grill shall be manufacturer standard, subject to annual DOE assessment.</p> <p>Grill color here is specified as yellow, if painted or chrome or anodized aluminum. Our request is that we remove this requirement and go with the manufacturer’s standard color on all bus types. Using the manufacturer’s standard may help reduce some added expense for additional painting.</p>	<p>Recommend deleting this statement as it is covered in Item 37.B.</p>
<p><b>10. Electrical System</b></p> <p>E. (second paragraph) This conductor shall be routed to cover the least distance practicable between points of termination. It should be of continuous size protected by fusible links, fuses, circuit breakers, or a reset-able electronic circuit protection device, no more than 12 inches from the battery. The terminal shall be of the single post-type, minimum of one-fourth inch (1/4”) stud and located in an accessible location for service, subject to approval of the Department of Education.</p>	<p>Here it is stated that it should be “protected by fusible link, fuses, circuit breakers, or a reset-able electronic circuit protection device, no more than 12’ from the battery.” On Type D products, we will provide uninterrupted service from the battery to the starter. The required circuit protection is located on a flat heat sink surface in close proximity to the starter. It is not within 12’ of the battery but will give protection. Would this be acceptable? We respectfully request the removing of the phrase “no more than 12 inches from the battery” to allow for this design.</p> <p>We should add a provision to add a grounding terminal free of paint and designed to accept ‘star’ type washers. This will provide a designated point for grounding electrical devices without drilling ground points</p>	<p>Recommend the following language:  “E. (Second paragraph). This conductor shall be routed to cover the least distance practicable between points of termination. It should be of continuous size protected by fusible links, fuses, circuit breakers, or a reset-able electronic circuit protection device, no more than 24 inches from the battery. The terminal shall be of the single post-type, minimum of one-fourth inch (1/4”) stud and located in an accessible location for service, subject to approval of the Department of Education.”</p>

**School Bus Specifications**  
**Comment Period: June 12 – July 12, 2006**

<b>Original Proposed</b>	<b>Comment Received</b>	<b>Recommendation from Specifications Committee</b>
<p><b>11. Engine</b>            B. All gas-powered buses shall have an automatic fire extinguisher system in the engine compartment.</p>	<p>elsewhere.</p> <p>The current Jomar system used to meet this spec is ineffective, a maintenance nightmare, and very expensive. The safety aspects designed into the few gas powered buses used today is adequate. When the Jomar system activates and empties any fire continues if the source of ignition still exists. Most such fires are caused by electrical problems so the ignition source is still active once the Jomar system empties.</p> <p>Add C. An electronic engine speed limiter shall be provided and set to limit engine speed, not to exceed the maximum revolutions per minute, as recommended by the engine manufacturer.</p>	<p>Recommend leaving language as proposed.</p> <p>Add the following language:</p> <p>C. An electronic engine speed limiter shall be provided and set to limit engine speed, not to exceed the maximum revolutions per minute, as recommended by the engine manufacturer.</p>
<p><b>12. Exhaust System</b>            B. Tail pipe shall be constructed of seamless or electrically welded tubing of 16-gauge steel or equivalent, and shall extend at least five inches beyond chassis frame. (See Item 68.)</p>	<p>B. Tail pipe shall be constructed of seamless or electrically welded tubing of 16-gauge or equivalent.</p> <p>The last phrase here requires at least 5” beyond the end of the chassis frame rail. We respectfully request that this statement be removed from the exhaust requirements. The</p>	<p>Recommend language be changed as follows:</p> <p>“A. Tail pipe shall be constructed of seamless or electrically welded tubing of 16-gauge steel or equivalent, and shall extend to but more than 2 inches beyond outer edge of rear bumper.”</p>

**School Bus Specifications**  
**Comment Period: June 12 – July 12, 2006**

**Recommendation from  
Specifications Committee**

**Original Proposed**

**Comment Received**

<p><b>15. Fuel Tank</b>  A. Fuel tank having a minimum 30-gallon capacity shall be provided. The tank shall be filled and vented to the outside of the body and the fuel filler should be placed on the right side in a location where accidental fuel spillage will not drop or drain on any part of the exhaust system.</p>	<p>critical item will be the body requirement (#68) where it should be flush or two inches beyond outer edge of the rear bumper. The end of the frame rail may vary and could contradict the requirement on the body side.</p> <p>Add “Exception: Special needs buses will allow for left side fuel filler.”</p> <p>The requirement here is that all fuel fill openings be on the right side of the bus. We request that you grant an exception here for special needs buses that have a lift installed in the same vicinity as the fuel fill. On the Thomas product, all rear lifts will move the fuel fill to the left side. This will prevent interference in installation and operation of the bus. It will also remove the concern of a fuel tank access away from the door area. We choose to not have any fuel fill openings near any doors as a designed benefit.</p>	<p>Recommend the following language be added to “E.”  “Special needs buses will allow for left side fuel filler.”</p>
<p><b>16. Heating System, Provision for</b>  A. The chassis engine shall have plugged openings for the purpose of supplying hot water for the bus heating system. The opening shall be suitable for attaching ¾ inch pipe thread/hose connector. The engine shall be capable of supplying water having a temperature of at least 170° F</p>	<p>How will we test to determine if this meets specs?</p> <p>Add “Exception: Type A shall be manufacturers standard.”</p>	<p>Recommend adding the following language:  “B. Exception: Type A buses shall be manufacturer’s standard.”</p>

**School Bus Specifications**  
**Comment Period: June 12 – July 12, 2006**

<b>Original Proposed</b>	<b>Comment Received</b>	<b>Recommendation from Specifications Committee</b>
<p>at a flow rate of 50 pounds per minute at the return end of 30 feet on one-inch inside diameter automotive hot water heater hose. (SBMI Standards No. 001- Standard Code for Testing and Rating Automotive Bus Hot Water Heating and Ventilating Equipment.)</p>	<p>The Type A manufacturers are going to a 5/8" connector in this installation instead of the required 3/4". We would request that the committee consider making an exception here for the Type A bus. With the new 2007 EPA engine requirements there may be difficulty in finding an engine manufacturer meeting the 170 deg. water and flow rate requirements.</p>	
<p><b>17. Horn</b>  A. The bus shall be equipped with a horn(s) of standard make with the horn(s) capable of producing a complex sound in bands of audio frequencies between 250 and 2,000 cycles per second, and tested in accordance with SAE J377, <i>Horn – Forward Warning – Electric – Performance, Test, and Application.</i></p>	<p>Are dual horns required?</p>	<p>Answer to question is “No, dual horns are not required.”</p>
<p><b>37. Color</b>  B. Grill shall be national school bus yellow, if painted; otherwise it shall be chrome or anodized aluminum.</p> <p>D. The roof of the bus may be painted white extending down to the drip rails on the</p>	<p>Grill color here is specified as yellow, if painted, or chrome or anodized aluminum. Our request is that we remove this requirement and go with the manufacturer’s standard color on all bus types. Using the manufacturer’s standard may help reduce some added expense for additional painting.</p> <p>D. The roof of the bus may be painted white extending down to the drip rails on the sides</p>	<p>Recommend changing language to read:  “B. Grill shall be national school bus yellow, silver, or gray, if painted; otherwise it shall be chrome or anodized aluminum.”</p> <p>Recommend leaving the language as proposed.</p>



**School Bus Specifications**  
**Comment Period: June 12 – July 12, 2006**

Original Proposed	Comment Received	Recommendation from Specifications Committee
<p><b>38. Communication system – optional Equipment</b>  A. 4. Antenna shall be permanently mounted to cowl or roof so as not to interfere with driver’s vision of roadway. Antenna lead-in cable shall be permanently secured with the proper clamps, grommets, and sealant. Antenna cable may not pass through window opening.</p>	<p>A.4. Antenna shall be permanently mounted as not to interfere with driver’s vision of roadway. Antenna lead-in cable shall be permanently secured with the proper clamps, grommets and sealant. Antenna cable may not pass through window opening.</p> <p>Placement of antennas for 2-way devices must also meet FCC safety standards which require some flexibility in placement location.</p>	<p>Recommend to change language as follows:    “A.4. Antenna shall be permanently mounted as not to interfere with driver’s vision of roadway. Antenna lead-in cable shall be permanently secured with the proper clamps, grommets and sealant. Antenna cable may not pass through window opening.”</p>
<p><b>38. Communication system – optional Equipment</b>  B. Public address system. For use by driver, the system contains an inside speaker and an external speaker that is of special use when driver needs to caution pupils about surrounding dangers at school bus stops. Inside speakers shall be recessed type.</p>	<p>B. Public address system. For use by driver, the system contains an inside speaker and/or an external speaker that is of special use when driver needs to caution pupils about surrounding dangers at school bus stops. Inside speakers shall be recessed type.</p>	<p>Recommend to change language as follows:    “B. Public address system. For use by driver, the system contains an inside speaker and/or an external speaker that is of special use when driver needs to caution pupils about surrounding dangers at school bus stops. Inside speakers shall be recessed type.”</p>
<p><b>39. Construction, Type B, C, and D Vehicles</b>  F. Floor shall be of prime commercial quality steel of at least 14-gauge or other metal or other material at least equal in strength to 14-gauge steel. Floor shall be level from front to back and from side to side except in wheel housing, toe board, and</p>	<p>The plywood floor shall be ½” and exterior B-B grade. The B-B grade designates a finished surface on both sides (Sanded). We currently use as standard a C-D grade. This grade is sufficient enough to be laid on the floor and covered with floor covering. It will not be</p>	<p>Recommend leaving the language as proposed.</p>

**School Bus Specifications**  
**Comment Period: June 12 – July 12, 2006**

<b>Original Proposed</b>	<b>Comment Received</b>	<b>Recommendation from Specifications Committee</b>
<p>driver's seat platform areas. When plywood is used, it shall be of ½-inch exterior B.B. grade or equivalent and securely fastened to the existing steel floor.</p>	<p>exposed to the occupants riding on the bus. To upgrade to a B-B grade will increase cost to the bus with no additional benefit to the operator. We request that you consider changing this requirement to C-D grade plywood.</p>	
<p><b>42. Doors</b>  A.5. All door glass shall be approved safety glass. Bottom of lower glass panel shall not be more than 10 inches from the bottom of the door. Top of upper glass panel shall not be more than three inches from top of door.</p> <p>B.4. The upper portion of the emergency door shall be equipped with approved safety glazing, the exposed area of which shall be at least 400 square inches. The lower portion of the rear emergency door on Types A, B, C and D vehicles shall be equipped with a minimum of 240 square inches of approved safety glazing.</p>	<p>The specifications state the “top of upper glass panel shall not be more than three inches from top of door.” We respectfully request that you add the word “opening” to the end of the sentence. On our new door design, we are not within 3” of the top of the door but we are within 3” of the top of the door opening. The new door will extend above the bottom of the door header.</p> <p>Keep the metal guard protecting the glass!</p>	<p>Recommend language as follows:</p> <p>“A.5. All door glass shall be approved safety glass. Bottom of lower glass panel shall not be more than 10 inches from the bottom of the door. Top of upper glass panel shall not be more than three inches from top of door opening.”</p> <p>Recommend the following language:</p> <p>“B.4. The upper portion of the emergency door shall be equipped with approved safety glazing, the exposed area of which shall be at least 400 square inches. The lower portion of the rear emergency door on Types A, B, C and D vehicles shall be equipped with a minimum of 240 square inches of approved safety glazing. This glass shall be protected by a metal guard on the inside. This guard shall be free of any sharp edges that may cause injury to passengers.”</p>

**School Bus Specifications**  
**Comment Period: June 12 – July 12, 2006**

<b>Original Proposed</b>	<b>Comment Received</b>	<b>Recommendation from Specifications Committee</b>
<p>B.7. Words “EMERGENCY DOOR,” both inside and outside in black letters two inches high, painted or vinyl, shall be installed directly above emergency door. Words may be placed on the top of door outside if space is available.</p> <p>C. Rear emergency door, Type A vehicles:</p>	<p>B.7. Words “EMERGENCY DOOR,” both inside and outside in black letters two inches high, painted or vinyl, shall be in compliance with FMVSS 217.</p> <p>We respectfully request that the requirements in this section meet the requirements of FMVSS 217. Additional statements are not necessary.</p> <p>Change this to read “Exception: Type A vehicles”. Delete items 2, 3, 4, 6, and re-number #5 to #2. This change will be consistent with other exception specifications for Type A vehicles.</p> <p>We respectfully request that Section C, referring to Type A emergency doors, be removed from the specifications. Except for a couple of wording changes, this section is a duplication of Section B, Rear emergency doors for Type B, C, and D vehicles. We propose that Section B Rear emergency doors be used as the specifications for all buses.</p>	<p>Recommend the following language:</p> <p>“B.7. Words “EMERGENCY DOOR,” both inside and outside in black letters two inches high, painted or vinyl, shall be in compliance with FMVSS 217.”</p> <p>Recommend deleting items 2, 3, 4, 6. Language would read:</p> <p>“C. Rear emergency door, Type A vehicles:</p> <ol style="list-style-type: none"> <li>1. Emergency door shall be located in center of rear end of bus and shall be equipped with fastening device for opening from inside and outside body, which may be quickly released but is designed to offer protection against accidental release. Control from driver’s seat shall not be permitted. Provision for opening from outside shall consist of device designed to</li> </ol>





**School Bus Specifications**  
**Comment Period: June 12 – July 12, 2006**

**Recommendation from  
Specifications Committee**

**Original Proposed**

**Comment Received**

	<p>insulation. Thomas, as well as other manufacturers, are not using a “polyester” type insulation material. Polyester has better qualities and is more environmentally friendly than fiberglass. We recommend changing the requirement from fiberglass to polyester.</p>	
<p><b>53. Lights and Signals</b></p> <p>A.6. Turn signal units. Bus shall be equipped Class A, flashing turn signal units of heavy-duty type. These signals shall be independent units equipped with amber lenses on all faces. The turn signal/directional signal units shall activate only when ignition is in “on” position. A pilot light or lights shall indicate when these lights are activated. The front lights shall be mounted near the front corners of chassis on each side. The rear lights shall be seven inches in diameter, or if a shape other than round, the lights must be 38 square inches in area and mounted not less than six nor more than 18 inches from plane of the side of the body and not less than six nor more than 18 inches below D-glass in rear of body. They shall be on the same horizontal line with the stop and tail lights required in 3 above. Turn signal lens shall contain directional arrows</p>	<p>Recommend installation for fog lights for use during inclement weather.</p> <p>A.6. Turn signal units. Bus shall be equipped with Class A, flashing turn signal units of heavy-duty type. These signals shall be independent units equipped with amber lenses on all faces. The turn signal/directional signal units shall activate only when ignition is in “on” position. A pilot light or lights shall indicate when these lights are activated. The front lights shall be mounted near the front corners of chassis on each side. The rear lights shall be seven inches in diameter, or if a shape other than round, the lights must be 38 square inches in area and mounted not less than six nor more than 18 inches from plane of the side of the body and not less than six nor more than 18 inches below D-glass in rear of body. They shall be on the same horizontal line with the stop and tail lights required in 3 above.</p>	<p>Recommend the following language:</p> <p>“A.6. Turn signal units. Bus shall be equipped with Class A, flashing turn signal units of heavy-duty type. These signals shall be independent units equipped with amber lenses on all faces. The turn signal/directional signal units shall activate only when ignition is in “on” position. A pilot light or lights shall indicate when these lights are activated. The front lights shall be mounted near the front corners of chassis on each side. The rear lights shall be seven inches in diameter, or if a shape other than round, the lights must be 38 square inches in area and mounted not less than six nor more than 18 inches from plane of the side of the body and not less than six nor more than 18 inches below D-glass in rear of body. They shall be on the same horizontal line with the stop and tail lights required in 3 above.”</p>

**School Bus Specifications**  
**Comment Period: June 12 – July 12, 2006**

**Recommendation from  
Specifications Committee**

<b>Original Proposed</b>	<b>Comment Received</b>	
<p>made into the lens or light.</p> <p>A.8. Reflex reflectors. (Class A) Two amber lights and two amber reflectors (they may be combined) shall be mounted, one on each side, near the front of the chassis. Two three-inch red reflectors shall be mounted, one on each side near the rear of the body and two three-inch red reflectors shall be mounted on the rear above the bumper. Two intermediate amber three-inch reflectors, one on each side near the middle of the bus, shall be mounted on buses 30 feet or more in length. They shall be mounted on panel above floor line rub rail.</p> <p>A.9. School bus traffic warning lights</p>	<p>Signal lenses, from my standpoint, I think the lenses with a portion blacked out to form an arrow may be helpful to ensure a differentiation from the big amber warning lights. I can see how that would make our bus drivers intention to turn clearer to motorists who is looking at so many lights to begin with. I question are we reducing the amount of light too much beyond what is necessary. I hope others more experienced than myself would be engaged for their opinion and discuss this change.</p> <p>A.8. Reflex reflectors. (Class A) Two amber lights and two amber reflectors (they may be combined) shall be mounted, one on each side, near the front of the chassis. Two three-inch red reflectors shall be mounted, one on each side near the rear of the body and two three-inch red reflectors shall be mounted on the rear above the bumper. Two intermediate amber three-inch reflectors, one on each side near the middle of the bus, shall be mounted on buses 30 feet or more in length. They shall be mounted on panel below floor line rub rail.</p> <p>Warning light switch – Rocker type switch located to the driver’s right front on the dash panel. If you push the top of the rocker switch</p>	<p>Recommends leaving language as proposed.</p> <p>a. A non-sequential system for the traffic warning lights shall be installed that allow the red lights to activate when the door opens.</p>

**School Bus Specifications**  
**Comment Period: June 12 – July 12, 2006**

**Recommendation from  
Specifications Committee**

**Original Proposed**

**Comment Received**

<p>A.9.f. A three-inch black painted border around the lamps is required if not equipped with a black painted housing.</p>	<p>it begins the sequential light system with the amber lights. The bottom of this same switch is the cancel for the warning light system. A driver not watching very closely, or while distracted could reach for the switch to activate the lights and actually depress the bottom of the rocker switch which would serve to cancel a system that is not yet activated. Would like the cancel switch to be a separate switch and located in a location separated from the activation switch.</p> <p>Require all buses to have a “fail-safe” system whereby the red flashing warning lights will be tied directly to opening the bus door.</p> <p>The functions of Activation vs. cancellation be separated into two switches. I have no problem with the style of switch, i.e., the rocker switch. The type switch has worked very well for us. But it is imperative that the functions be separated from the same switch.</p> <p>I am not overly happy the proposed removal of the hoods on the 8-way lights. I must agree with the Virginia State highway Patrol that the visibility is a problem.</p>	<p>Recommend the following language:</p> <p>“A.9.F. A three-inch black painted border around the lamps is required and must be equipped with a black painted housing.”</p>
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**School Bus Specifications**  
**Comment Period: June 12 – July 12, 2006**

<b>Original Proposed</b>	<b>Comment Received</b>	<b>Recommendation from Specifications Committee</b>
<p>A.9.i. There shall be an interrupt feature in the system to interrupt the traffic warning sign and the crossing control arm when their use is not desired. This feature shall consist of a double throw relay and a push button momentary switch.</p> <p>A.9.j. Manual switch, cancel switch and interrupt switch shall be push button or flip type momentary switches.</p> <p>A.10. School bus traffic warning sign must conform to FMVSS 131.</p>	<p>A.9.i. There shall be an interrupt feature in the system to interrupt the traffic warning sign and the crossing control arm when their use is not desired. This feature shall consist of a double throw relay and a momentary switch.</p> <p>A.9.j. Manual switch, cancel switch and interrupt switch shall be momentary switches.</p> <p>In this section, the specification reads “manual switch, cancel switch and interrupt switch shall be push button or flip-type momentary switches.” There are several other references to switch types through Section 9, School bus traffic warning lights. The important thing to the driver should be that each switch be present and easily identified and accessible. What is the importance of the switch type? Most switches that are used in school bus body applications are rocker type or paddle switches. We respectfully request that letter J be removed and that the designation be switch only without specifying type.</p> <p>A.10.b. Sign shall be of the octagon series, 18</p>	<p>Recommend the following language:</p> <p>“A.9.i. There shall be an interrupt feature in the system to interrupt the traffic warning sign and the crossing control arm when their use is not desired. This feature shall consist of a double throw relay and a momentary switch.”</p> <p>Recommend the following language:</p> <p>“A.9.j. Manual switch, cancel switch and interrupt switch shall be momentary switches.”</p> <p>Recommend leaving language as proposed.</p>

**School Bus Specifications**  
**Comment Period: June 12 – July 12, 2006**

<b>Original Proposed</b>	<b>Comment Received</b>	<b>Recommendation from Specifications Committee</b>
<p>A.10.b. Sign shall be of the octagon series, 18 inches in diameter, and be equipped with wind guard. The sign shall have a red background with a ½ inch white border, and the word “STOP” on both sides in white letters, six inches high and one inch wide. The sign shall be reflective.</p> <p>A.12 Strobe warning light  a. A white flashing strobe light shall be installed on the center rear one-third portion of the roof a minimum of 42 inches from the rear of the roof edge, located aft of the rearmost roof hatch. Light shall have a</p>	<p>inches in diameter, and be equipped with wind guard. The sign shall have a red background with a ½ inch white border, and the word “STOP” on both sides in white letters, six inches high and one inch wide. The sign shall be reflective. LED lighted “STOP” is permissible.</p> <p>It would be good to use the LED Stop sign.</p> <p>Can we add the second warning sign for buses over a certain size. Maybe 64 pass and up. In such application one side of the sign will be blank.</p> <p>Add an item “g. A second school bus traffic warning sign on the left side near the rear of the bus, may be mounted on all 71, or larger sized passenger Type C and D school buses.” This change allows the mounting of another stop sign at the left side of the rear of the bus, to warn traffic that the bus is picking and/or dropping students.</p> <p>The current specs requires the strobe light be located at least 42” from the rear of the body and aft of the rearmost roof hatch. This will not work on a 53 passenger unit as the rearmost roof hatch sits approximately 36”</p>	<p>Recommend the following language:  “A.10.g. A second school bus traffic warning sign on the left side near the rear of the bus, may be mounted on all 64, or larger sized passenger Type C and D school buses.”</p> <p>Recommend the following language:  “a. A white flashing strobe light shall be installed on the center rear one-third portion of the roof a minimum of 42 inches from the rear of the roof edge or located aft of the rearmost roof hatch. Light shall have a single clear lens</p>

**School Bus Specifications**  
**Comment Period: June 12 – July 12, 2006**

<b>Original Proposed</b>	<b>Comment Received</b>	<b>Recommendation from Specifications Committee</b>
<p>single clear lens emitting light 360 degrees around its vertical axis. A manual switch and a pilot light must be included to indicate when the light is in operation.</p>	<p>from the rear of the body. This is only an issue on 53 passenger and smaller bodies requiring 2 roof hatches. The location language of the strobe light will need some sort of modification (delete the 42” requirement or allow the light to be located forward of the rearmost roof hatch). We have very little leeway with respect to location of hatches due to FMVSS 217. In the past (very limited experience due to the (1) hatch requirement on this size body) we have located the light to the rear of the hatch, but DOE might want to define exactly where this light should be located on these smaller bodies.</p> <p>Add the word “or” between the words “edge” and ‘located’. The sentence will read “A white flashing strobe light shall be installed on the center rear one-third portion of the roof a minimum of 42 inches from the rear of the roof edge or located aft of the rearmost roof hatch.” This change makes sure that when a bus is equipped with two roof emergency hatches, the strobe light will be mounted behind the furthest hatch.</p>	<p>emitting light 360 degrees around its vertical axis. A manual switch and a pilot light must be included to indicate when the light is in operation.</p>
<p><b>62. Seats</b>  D. Seating plans for buses with wheelchair positions see Item 76 and Item 81. All school bus seating shall be of a three</p>	<p>It would be nice to have the option of 45/30 seating used in other states. This actually increases the available capacity of the bus use</p>	<p>Recommend keeping language as proposed.</p>

**School Bus Specifications**  
**Comment Period: June 12 – July 12, 2006**

**Recommendation from  
Specifications Committee**

**Original Proposed**

**Comment Received**

<p>(3) to three (3) arrangement with the exception of the last row seat to the left of any rear emergency door. This seat shall be of a maximum width of 26” limiting it to two (2) passengers. There shall be provided a full width barrier in front of each seating position. Type D, Rear engine buses shall be exempt from the last row requirements.</p>	<p>in certain applications.</p>	
<p><b>66. Storage and luggage compartments</b></p> <p>A. Vehicles may be equipped with luggage compartments or tool compartments in the body skirt provided they do not reduce ground clearance to less than 14 ½ inches from bottom of compartment and that the addition of the compartments does not exceed the vehicles’ GVWR.</p>	<p>Recommend an overhead storage to the left of the driver. Items required by students that must be stored inside the bus such as tissues, wipes and the driver’s personal items!</p> <p>A. Vehicles may be equipped with luggage compartments or tool compartments in the body skirt provided they maintain panel ground clearance that is equal to or higher than the vehicles rear axle center line and that the addition of the compartments does not exceed the vehicles’ GVWR.</p> <p>In the specifications, you have a minimum ground clearance of 11” to the bottom of any storage compartment. In most cases this is an attainable number. There are many variables that will figure in when one is trying to calculate ground clearance. Suspensions, tire sizes, axle sizes, and skirt lengths. Event the location of the box occasionally comes into</p>	<p>Storage and luggage compartments are an option. They must be enclosed and should not block drivers or students ingress or egress.</p> <p>Recommend leaving language as proposed.</p>

**School Bus Specifications**  
**Comment Period: June 12 – July 12, 2006**

**Recommendation from  
Specifications Committee**

**Original Proposed**

**Comment Received**

<p><b>73. Wheel housing</b>  B. Wheel housings shall be designed to support seat and passenger loads and shall be attached to floor sheets in such manner as to prevent any dust or water from entering the body. Wheel housings shall be constructed of 16-gauge (or thicker) steel.</p>	<p>play. We respectfully request that approval be granted for a minimum ground clearance of 11” when circumstances may require extra storage underneath.</p> <p>We respectfully request that the Type A product be given an exemption for the wheel house assembly material. On the Thomas product, no part of the passenger seat or passenger load is attached to the wheel house, therefore no additional strength is needed here. Because of weight restrictions on the Type A bus, the wheelhouse may need to be made from aluminum.</p>	<p>Recommend leaving language as proposed.</p>
<p><b>75. Windshield washers.</b>  A. Windshield washers meeting federal requirements shall be provided and shall be controlled by a switch located on instrument panel. Reservoir shall be mounted outside passenger compartment.</p>	<p>A. Windshield washers meeting federal requirements shall be provided and shall be controlled by a switch accessible to the driver. Reservoir shall be mounted outside passenger compartment.</p> <p>This section requires that the windshield washer “...be controlled by a switch located on the instrument panel.” The location of this switch should not matter as long as it is in close proximity to the wiper switch. We have several models that are coming with the switch located on the turn signal stalk, with the wiper switch. It is an integral part of the steering column assembly, the same as in your</p>	<p>Recommend leaving language as proposed.</p>

**School Bus Specifications**  
**Comment Period: June 12 – July 12, 2006**

**Recommendation from  
Specifications Committee**

**Original Proposed**

**Comment Received**

<p><b>92. Special Service Entrance Door.</b>  A. A single door may be used if the width of the door opening does not exceed 43 inches.</p>	<p>passenger car. We request that this installation be acceptable.</p> <p>A. A single door or double doors may be used for the special service entrances.</p> <p>Your specification requires that “A single door may be used if the width of the door opening does not exceed 43 inches.” A double or two doors will be required for openings wider than this. We currently have a single door on the C2 that has a clear opening width of 44 ½”. As we see lifts grow and increase in capacity, we have seen the need to increase the width of the door opening. With an ever larger door opening, there may eventually be a need for two doors. We do not believe that we are there yet. A concern over a large single door would be the weight of the door itself, the hinges capability to handle this weight, and the operator’s ability to handle the door. The 46” wide door that we are using is easy to operate and is not a heavy door. The requirement for two doors, as opposed to one will mean more sealing area. There will be more of a concern for water and air to pass around the doors. There will be more opportunity for wind noise. You may have door alignment problems between the door</p>	<p>A. A single door of a minimum 43 inches may be used.</p>

**School Bus Specifications**  
**Comment Period: June 12 – July 12, 2006**

<b>Original Proposed</b>	<b>Comment Received</b>	<b>Recommendation from Specifications Committee</b>
<p style="text-align: center;">B. Two doors shall be used if any door opening would have to exceed 43 inches.</p>	<p>openings and each door leaf. Increased difficulty in securing the doors in a close position. A single door will be a more stable door. It is our recommendation that you remove the dimensions and state that a single door should be used. If two doors are used, then they should meet the additional criteria listed in this section.</p> <p style="text-align: center;">Delete this item.</p>	<p style="text-align: center;">Delete this item.</p>

**School Bus Specifications**  
**Comment Period: June 12 – July 12, 2006**

**Original Proposed**  
**Additional Proposed Changes**

**Comment Received**

**Recommendation from**  
**Specifications Committee**

<p>Type A 16 and 24 passenger</p>	<p>Current: Roof is white          Is it intended for all Type A 16 and 24 passenger buses to be equipped with white roofs as a required spec?</p> <p>It would be nice to have Type A buses on the approved list not still listed as pilots. These, although not quite as safe as a regular school bus are an improvement over transporting students in cars. We all have more and more students being transported to private educational providers. The type-A's are invaluable.</p>	<p>Type A buses are being added to the specifications.</p>
<p>All annual chassis specs          GVWR ##### lb.          Front Axle ##### lb.          Rear Axle ##### lb.</p>	<p>Suggest that actual GVWR and axle pound ratings not be specified by bus type on the annual minimum spec sheets, as GVWR, front axle and rear axle minimum weight ratings are covered under 3A and 22B and C of the chassis specifications.</p> <p>Axle rating should be left up to the manufacturers as they are bound by Federal regulations.</p>	<p>Recommend no changes from proposed.</p>
<p>Suspension Frt. Springs ##### lb.          Rear springs ##### lb.</p>	<p>Suggest that actual spring pound ratings not be specified by bus type on the annual minimum</p>	<p>Recommend no changes from proposed.</p>

**School Bus Specifications**  
**Comment Period: June 12 – July 12, 2006**

<b>Original Proposed</b>	<b>Comment Received</b>	<b>Recommendation from Specifications Committee</b>
	spec sheets, as front axle and rear axle minimum weight ratings are covered under 22 B & C and 25 F of the chassis specifications.	
Color: Frame, wheels, bumper, rails and lettering – black – back of mirrors, non gloss black – balance yellow	Color: Frame, wheels, bumper rails, trim and letters – black – back of mirrors, non gloss black – balance yellow	Recommend no changes to proposed language.
International BE-200	Approve the International BE-200. This is an improvement over the Type A and can eventually replace the A bus. This bus is safer than the standard Type-A.	Recommend leaving as a pilot.
Fuel Tanks	Type C 35 passenger CD 35 gallon fuel tank 60 gallon N/A Type D 42 passenger CE 35 gallon fuel tank 60 gallon N/A Type D 54 passenger FE 35 gallon fuel tank 60 gallon N/A  Change the FUEL TANK specifications to read “30”. This change makes sure that the minimum requirements are following, Page 6, #15.	Recommend minimum 30 gallon fuel tank.
Passenger Capacity	Type D 53 passenger FE should be 54 passenger FE Type D 65 passenger FE should be 66 passenger FE Type D 77 passenger FE should be 78 passenger FE Type D 83 passenger FE should be 84 passenger FE	Recommend leaving as proposed.

**School Bus Specifications**  
**Comment Period: June 12 – July 12, 2006**

<b>Original Proposed</b>	<b>Comment Received</b>	<b>Recommendation from Specifications Committee</b>
BE, Type C, Spec	Can this bus not be added to state specs in passenger capacity from 14 – 30 passenger? As you know, we are in the process of doing pilots on this bus. Our first bus was delivered 12/6/05. My understanding is the pilot has to be in effect for one year. We do not want to miss this next year in BE sales. There are customers wanting to buy this bus but do not want the hassle of the pilot program.	Recommend continuation of pilot program.

The proposal from Fairfax County to install additional lights on the side of the bus over the door and driver’s window.

Letters received supporting this proposal 5

E-mail from Norfolk not supporting these lights