WEST VIRGINIA
SECRETARY OF STATE
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ADMINISTRATIVE LAW DIVISION

Form #5

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OFFICE OF WEST VIRGINIA SECRETARY OF STATE

NOTICE OF AGENCY ADOPTION OF A PROCEDURAL OR INTERPRETIVE RULE OR A LEGISLATIVE RULE EXEMPT FROM LEGISLATIVE REVIEW

AGENCY: West Virginia Board of Education TITLE NUMBER: 126

CITE AUTHORITY: W.Va. Const., Art. XII, §2, W.Va. Code §18-2-5, §18-5-13 and §17C-14-12

RULE TYPE: PROCEDURAL _____ INTERPRETIVE _____

EXEMPT LEGISLATIVE RULE X

CITE STATUTE(s) GRANTING EXEMPTION FROM LEGISLATIVE REVIEW
W.Va. Code §§29A-3B-1, et seq.; W.Va. Board of Education v. Hechler, 180 W.Va. 451, 376 S.E.2d 839 (1988)

AMENDMENT TO AN EXISTING RULE: YES X, NO ____

IF YES, SERIES NUMBER OF RULE BEING AMENDED: 89 (Policy 4334)

TITLE OF RULE BEING AMENDED: West Virginia Minimum Requirements for Design and Equipment of School Buses

IF NO, SERIES NUMBER OF NEW RULE BEING ADOPTED: _____

TITLE OF RULE BEING ADOPTED: _____

THE ABOVE RULE IS HEREBY ADOPTED AND FILED WITH THE SECRETARY OF STATE. THE EFFECTIVE DATE OF THIS RULE IS May 15, 1995.

Victor A. Barone

Victor A. Barone
Director, Legal Services

Title 126
Legislative Rule
Board of Education

SERIES 89
WEST VIRGINIA MINIMUM REQUIREMENTS FOR
DESIGN AND EQUIPMENT OF SCHOOL BUSES (4334)

§126-89-1. General

1.1. Scope - This legislative rule provides that the components and construction of school buses be reviewed and updated periodically.

1.2. Authority and related Code citation. W.Va. Const. Art. XII, §2, W.Va. Code §18-2-5, §18-5-13 and §17C-14-12.

1.3. Filing Date - April 14, 1995

1.4. Effective Date - May 15, 1995

1.5. Repeal of former rules - None - Revision of rule formerly filed in 1993.

§126-89-2. Incorporation by Reference

2.1. A copy of the Minimum Requirements is attached. Copies may be obtained in the office of the Secretary of State and in the West Virginia Department of Education, Bureau of Administrative Services.

2.2. Summary of Rules and Regulations - The state Department of Education has responsibility to establish Minimum Requirements for Design and Equipment of School Buses for the transportation of pupils in compliance with Chapter 18, Article 5, Section 13, Subsection 6 of the West Virginia Code. The Department of Education endeavors to carefully consider the selection of components and construction procedures which contribute to the safety, welfare and comfort of those being transported. The school buses are designed and equipped to extend educational opportunities to nearly all segments of society from early childhood to elderly and disabled.

Student transportation is an integral part of a comprehensive educational program. It is a very significant part of the challenge to provide a thorough and efficient system of education.

The revision of the West Virginia Minimum Requirements for Design and Equipment of School Buses updates and makes corrections, deletions or additions to meet or exceed federal highway safety standards and national standards for school buses now in effect.

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MINIMUM REQUIREMENTS FOR DESIGN AND EQUIPMENT OF SCHOOL BUSES

1995 REVISED EDITION

NOTE: Equivalency - Permission to use a device or material as an "equivalent" to that called for in the "Requirements" must be requested in writing by the manufacturer or owner. Any item supplied as an "equivalent" must have prior approval, in writing, from the State Director of School Transportation and Facilities.

New Products - During the first year of production, new products will be subjected to the experimental and field test evaluation procedures with written evaluation provided to the State Director of School Transportation and Facilities.

Changes - Any changes in design or equipment by counties after receipt of the school bus must have prior approval in writing from the State Director of School Transportation and Facilities.

SCHOOL BUS CHASSIS

AIR CLEANER

The engine intake air cleaner shall be dry element type and properly installed by the chassis manufacturer to meet engine specifications. Diesel chassis manufacturer shall provide air restriction indicator device which shall be dash mounted. EXCEPTION: Type A and B vehicles under 35 passengers, Type D vehicles with engine in rear required to have an air restriction indicator mounted in the engine compartment, clearly visible from the rear of the bus.

AXLES OR OTHER TYPES OF SUSPENSION

A. The front and rear axles including suspension assemblies, and all frame to ground components, shall have a gross axle weight rating at ground at least equal to that portion of the load as would be imposed by the chassis manufacturer's maximum gross vehicle weight rating. In no case shall capacities be less than those listed below:

MINIMUM GROSS AXLE WEIGHT RATING

TYPE	PUPIL CAPACITY Mfg. Rated	FRONT GAWR SUSPENSION/AXLE Or Other Front Suspension	REAR GAWR SUSPENSION/AXLE Or Other Rear Suspension
A	10-16	3,400	5,300
	17-24	3,850	7,200
B	16-23	4,000	7,900
	24-34	4,500	11,000
	35-36	5,000	12,000
	47-53	6,000	15,000
	59-60	7,000	17,000
	65-66	9,000	17,000
	71-76	9,000	19,000
	77	9,000	21,000
C	16-23	4,000	7,900
	24-34	4,500	11,000
	35-36	5,000	12,000
	47-53	6,000	15,000
	59-60	7,000	17,000
	65-66	9,000	17,000
	71-76	9,000	19,000
	77	9,000	21,000
D	Medium Duty Transit (Front Engine)		
	35-36	9,000	12,000
	47-54	9,000	15,000
	59-65	10,800	15,000
	71-72	10,800	19,000
	77-78	12,000	19,000
	Medium Duty Transit (Rear Engine)		
	47-58	9,000	17,000
	59-66	9,000	17,000
	67-72	10,800	19,000
	73-84	11,000	20,000
	Heavy Duty Transit (Front Engine)		
	47-54	12,000	15,000
	59-65	12,000	17,000
	71-72	12,000	19,000
	77-78	13,000	19,000
	83-90	13,000	21,000
	Heavy Duty Transit (Rear Engine)		
	47-54	9,000	19,000
	59-65	9,000	19,000
	71-72	9,000	22,000
	77-78	10,800	22,000
	83-90	12,000	21,000

B. All vehicles shall be equipped with appropriate GAWR axles or suspension systems and tires by chassis manufacturer.

C. Front axle shall be wide-track, heavy duty bus type and equipped with grease packed wheel bearings. Oil bath wheel bearings are optional.

D. A two-speed axle is permissible for evaluation upon written permission from State Director of School Transportation and Facilities.

F. All hydraulic brake systems must meet FMVSS 105. All air brake systems must meet FMVSS 121.

BRAKES

A. A braking system including service brake and parking brake, shall be provided.

B. Buses using air or vacuum in the operation of the brake system shall be equipped with warning signals, readily audible and visible to the driver, that will give a continuous warning when the air pressure available in the system for braking is 60 psi (pounds per square inch) or less, or the vacuum in the system available for braking is eight (8) inches of mercury or less. An illuminated gauge that will indicate to the driver the air pressure in pounds per square inch or the inches of mercury vacuum available for the operation of the brakes shall be provided.

1. Air brakes shall be installed on all chassis, 35 passengers and above. EXCEPTION: Electric Powered Vehicle.

2. All air-operated brake systems shall:

   a. Have automatic front wheel limiting valves when necessary to provide a balanced system, without premature front axle lockup on wet or slippery roads.

   b. Be S-Cam type on all wheels.

   c. Be equipped with shoe to drum clearance sensing automatic slack adjusters. The same brand of slack adjuster shall be used on all four wheels.

   d. Have at least 12 CFM air compressor, mounted on the ATA-TMC mounting bracket.

   e. Be protected by a desiccant type air dryer, with integral purge volume and integral discharge line turbo cutoff feature.

   f. Be equipped with a spring-loaded parking and emergency brake. A manual control, clearly identified, shall be within easy reach of the driver, in addition to a modulated control through the brake treadle valve.

g. Have at least 6" X 16 1/2" brake blocks on a 17,000 pound axle.

3. Vacuum-assist brake systems shall have a reservoir used exclusively for brakes that shall be adequate to ensure loss in vacuum at full stroke application of not more than 30 percent with the engine not running.

4. Any brake system dry reservoir shall be safeguarded by a check valve or equivalent device, that in the event of failure or leakage in its connection to the source of compressed air or vacuum, the stored dry air or vacuum shall not be depleted by the leakage or failure.

C. Buses using a hydraulic assist-booster in the operation of the brake system shall:

1. be equipped with warning signals, readily audible and visible to the driver, that will provide continuous warning in the event of a loss of fluid flow from the primary source, or loss of electric source powering the back-up system.

2. be equipped with source of hydraulic pressure, automatically initiated upon loss of power from primary source, and operating independently of the primary power source.

D. All brake lines, power and booster-assist lines shall be protected from excessive heat and vibration, and be installed to prevent chafing.

E. All brake systems shall be designed to permit visual inspection of brake lining wear without removal of any chassis components.

F. Disc type brakes installed by chassis manufacturers are permissible.

G. Electric, exhaust, or hydraulic retarders are approved. Installation of such retarders must be made by, or under the supervision of manufacturer.

BRAKES, PARKING

A. All chassis, equipped with hydraulic brakes, shall be equipped with Orschelin type hand brake lever, easily accessible from the driver's seat. EXCEPTION: Type A and B vehicles under 35 passengers - manufacturer's standard.

B. Parking brake, when applied, shall remain in applied position despite exhaustion of source of energy used for application or leakage of any kind.

BUMPER, FRONT

A. A one piece steel front bumper shall be furnished by chassis manufacturer as part of the chassis on Type A, B, and C vehicles unless energy absorbing or other bumper options necessitate installation by the body manufacturer. When Type D chassis are supplied to a body company by a chassis manufacturer, the body company shall supply the front bumper as part of the body installation.

B. Unless energy absorbing bumper is used, the front bumper shall be of pressed steel channel or equivalent material at least 3/16" thick and not less than 8" wide (high) and shall extend beyond forward-most part of the body, grille, hood, and fenders and shall extend to outer edges of the fenders at the bumper's top line.

C. Front bumper shall extend beyond forward-most part of body, grille, hood and fenders and shall extend to outer edge of fenders at bumper top line.

Optional:

D. An energy absorbing front bumper may be used providing its design shall incorporate a self-restoring energy absorbing system of sufficient strength to:

   1. Push another vehicle of similar gross vehicle weight (GVW) without permanent distortion to the bumper, chassis, or body; and

   2. Withstand repeated impacts without damage to the bumper, chassis, or body according to the following performance standards:

      a. 5 MPH fixed barrier impact (FMVSS cart & barrier test).

      b. 4.0 MPH corner impact at 30 degrees (Part 581 CFR Title 49, Ch V).

      c. 20.0 MPH into parked passenger car (Type B, C, and D vehicles of 18,000 lbs GVW or more).

E. The manufacturer of the energy absorbing system shall provide evidence from an approved test facility (capable of performing the above FMVSS tests) that their product conforms to the above. EXCEPTION: Type A and B vehicles under 35 passengers - bumper shall be manufacturer's standard; Type D vehicles - bumper shall be furnished by body manufacturer.

BUMPER, REAR

See pages 19-20.

CERTIFICATION

Chassis manufacturer shall certify to the State Director of School Transportation and Facilities that product meets all applicable federal requirements. Chassis seller shall certify to the State Director of School Transportation and Facilities that product meets all State Requirements.

CLUTCH

Clutch torque capacity shall not be less than the maximum net torque output of the engine.

COLOR

A. Chassis, including front bumper, shall be black. (Grille may be manufacturer's standard.)

B. Hood, cowl, and fenders shall be National School Bus Yellow. (SBMI-008) EXCEPTION: Hood may be painted low-luster yellow.

DIFFERENTIAL

A. Manufacturer's no-spin differential is permissible. A driver controlled traction differential may be supplied on rear axles of 19,000 pound capacity or greater.

B. Purchaser shall specify differential ratios when order is submitted to chassis dealer.

DRIVE SHAFT

A. Torque capacity of the drive shaft assembly shall exceed maximum engine torque as developed through lowest transmission gear reduction.

B. Each drive shaft section shall be protected by a metal guard or guards around circumference of drive shaft to prevent whipping through the floor or dropping to the ground if broken.

ELECTRICAL SYSTEM

A. Battery

1. Diesel Power: Two 8D-900 shall be provided with 430 reserve minutes measured per SEA 2-537H at 25 ampere rate. EXCEPTION: Type A and B vehicles under 35 passengers shall have a dual battery system of a minimum of 500-CCA per each battery.

2. Battery cables of sufficient length without splices shall be provided by the chassis manufacturer.

a. All cables shall conform to SAE Standard J541 with respect to electrical resistance.

b. All cable assemblies shall conform to American Trucking Association-Truck Maintenance Council (ATA-TMC) RP105.

c. Manufacturer shall assure continuous ground integrity.

3. Batteries for Type B, C and D vehicles shall be mounted in the body skirt by the body manufacturer. In this case the chassis manufacturer shall temporarily mount the battery on the chassis frame, with proper cables of appropriate length for mounting in final location by body manufacturer. All cables, mounting, etc., shall conform to the SBMI Design Objectives Booklet, May 1990 edition. Body manufacturer will be responsible for final cable and connections between batteries. EXCEPTION: Type D vehicles, rear engine, may have batteries mounted in engine compartment.

4. Both batteries will be utilized during engine starting.

B. Alternator

1. Type A vehicles shall have a minimum 80 amperes per hour alternator. On buses equipped with power lift, alternator minimum shall be 100 amperes. Minimum charging rate at manufacturer's recommended engine idle speed shall be 45% of alternator capacity.

2. Type B vehicles less than 35 passengers, shall have a minimum 105 amperes per hour alternator with a minimum charging rate of 50 amperes at manufacturer's recommended engine idle speed.

3. All Type B, C and D vehicles 35 passengers and above shall have an alternator with a minimum charging rate of at least 140 amperes (in accordance with SAE rating) with a minimum charging rate of 50 amperes at manufacturer's recommended engine idle speed (12 volt system), and shall be ventilated and voltage controlled and, if necessary, current-controlled. Alternator shall have at least a 7/8 inch diameter shaft, shall be mounted on a bracket that conforms to ATA-TMC RP101, heavy duty truck alternator mounting and be accessible from top side of engine compartment for servicing.

4. Belt drive shall be capable of handling the rated capacity of the alternator with no detrimental effect on other driven components.

5. For estimated electrical current draw see Appendix B.

C. Lamps and Signals - See pages 31-35.

D. Wiring

1. All wiring shall conform to current applicable recommended practices of the Society of Automotive Engineers, with the capability of carrying a 10% overload without damage to wiring circuits.

   All wiring shall use a standard color coding and each chassis shall be delivered with a wiring diagram that coincides with the wiring of the chassis.

2. Chassis manufacturer shall install a readily accessible terminal so that body and chassis electrical load can be recorded through the chassis ammeter without dismantling or disassembling chassis component(s).

3. Chassis voltmeter and wiring shall be compatible with generating capacity. Type A and B vehicles under 35 passengers may have ammeter in lieu of voltmeter.

4. In addition to the main 100 amperes body circuit terminal, chassis manufacturer shall provide the following terminals for body connections:

   a. Tail lamps.

   b. Right turn signal.

   c. Left turn signal.

   d. Stop lamps.

   e. Back-up lamps.

   f. Instrument panel lights. (Rheostat controlled)

   g. Ignition circuit.

   h. Strobe light.

5. See pages 44-46.

EXHAUST SYSTEM

A. Exhaust pipe, muffler and tailpipe shall be outside the bus body and attached to the chassis, with hangers designed to accommodate expansion and contraction of the system without damage to the system or hanger(s).

B. Tailpipe shall be constructed of a corrosion-resistant tubing material at least equal in strength and durability to 16 gauge steel tubing.

C. Tailpipe shall extend to, but not beyond, the body limits on the left side of bus, behind the driver's compartment, as follows:

Type A Vehicles, Type B Vehicles (under 35 passengers) and Type D Rear Engine Vehicles	Manufacturer's standard
Type B Vehicles 35 passengers and above, and Type C & D Vehicles (47 passengers and up)	No more than 18 inches in front of left rear wheels

EXCEPTION: The exhaust system on vehicles designed for the transportation of special education pupils shall be routed to the left of the right frame rail to allow for the installation of a lift on the right side of the vehicle. Federal standards may be met by exhaust exiting at the rear of bus to allow for luggage compartments.

D. Size of tailpipe shall not be reduced after it leaves the muffler.

E. Muffler shall be constructed of aluminized or equivalent corrosion-resistant material.

FENDERS, FRONT

A. Type A and B vehicles shall be manufacturer's standard.

B. Type C vehicles.

1. Rubber fender extenders shall be provided. Unless fender design prevents spray from tires to the windshield and mirrors and deletion is approved by the State Director of School Transportation and Facilities.

2. Front fenders shall be properly braced and free from any body attachment. Adequate clearance shall be maintained between tires and fenders so that contact will not occur under any condition.

3. A fiberglass tilt hood shall be provided with wiring quick-disconnect in engine compartment, located at or near the radiator cradle. All electrical wiring between the fiberglass hood and the engine compartment shall pass through a common waterproof disconnect device to facilitate removal and/or replacement of the hood.

4. Mud flaps shall be furnished by body manufacturer. See page 37.

5. Fender/bumper design must prevent direct road spray between fender and front bumper, or a flap must be installed to prevent such spray.

FRAME

A. Frame or equivalent shall have design and strength characteristics to correspond at least to standard practice for trucks of same general load characteristics which are used for highway service.

B. Any secondary manufacturer that modifies the original chassis frame shall guarantee the performance of workmanship and materials resulting from such modification.

C. Any frame modification shall not be for the purpose of extending the wheelbase.

D. Holes in top or bottom flanges of frame side rail 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 manufacturers.

E. Frame lengths shall be provided in accordance with SBMI Design Objectives, May 1990 edition.

FUEL TANK

A. Fuel tank shall have a minimum capacity of 60 gallons with a 55 gallon actual draw, on all buses 47 passengers and above. It shall be filled and vented outside of the body. Construction will prevent the spillage or drainage of fuel on any part of the exhaust system. EXCEPTION: Type A vehicles - Fuel tank shall be manufacturer's standard. Type B vehicles under 35 passengers - Fuel tank shall be 30 gallon, with 25 gallon actual draw. Otherwise shall meet requirements of Type C and D vehicles.

B. No portion of the fuel system located to the rear of the engine compartment, except the filler tube, shall extend above the top of the chassis frame rail. EXCEPTION: Type A and B vehicles under 35 passengers.

C. Fuel lines shall be mounted to obtain maximum protection from the chassis frame. Engine supply line shall be taken from top of tank.

D. Fuel filter with replaceable element shall be installed between fuel tank and injector pump. Flexible gasoline-and-oil-proof connection shall be provided at engine end of fuel line.

E. Drain plug of at least 1/4 inch pipe thread shall be located in center of bottom of tank. EXCEPTION: Type A and B vehicles under 35 passengers.

F. Fill-pipe cap shall be designed to minimize spillage of fuel when bus turns corner in either direction. If venting of fuel tank is done other than through fill-pipe cap, cap shall be of non-vented type. (See provision for fuel systems in current Motor Carrier Safety Regulations.)

G. Fuel tank installation shall be in accordance with FMVSS 301 and 303. EXCEPTION: On vehicles constructed with a power lift, the fuel tank may be mounted on left chassis frame rail or behind rear wheel.

H. A port shall be provided in the fuel tank for auxiliary equipment.

FUEL, ALTERNATE

A. Alternate fuels are permissible provided they have been adequately tested for installation and use, both in the vehicle and in storage facilities, and meet all federal, state and industry safety requirements, regulations and standards.

B. Compressed Natural Gas (CNG) - See Appendix D.

GOVERNOR

A. Chassis engine shall be provided with an Engine RPM Governor. The governor shall be set at the manufacturer's recommended maximum engine speed. It shall not be used to control road speed. Combination engine and road speed governor is optional. EXCEPTION: Type A and B vehicles under 35 passengers.

B. If chassis is powered by diesel engine, or engine is remotely located from driver, a tachometer shall be installed so engine speed may be known to the driver. EXCEPTION: Type A and B vehicles under 35 passengers.

HEATING SYSTEM, PROVISION FOR

A. The chassis engine shall have plugged openings for the purpose of supplying hot water for the bus heater system. The opening shall be suitable for attaching 3/4 inch pipe thread/hose connector. The engine shall be capable of supplying water having a temperature of at least 170 degrees F, at a flow rate of 50 pounds per minute at the return end of 30 feet of one inch diameter automotive hot water heater hose. (SBMI Standard #001 - Standard Code for Testing and Rating Automotive Bus Hot Water Heating Ventilating Equipment.)

B. SAE 20R3 - Class D2 hose shall be used throughout the bus heating systems. Engine cooling system hose shall meet applicable SAE Standard.

C. Chassis manufacturers shall supply "heater bibb" connection for bus body supply and return lines. Connection will accept one inch inside diameter hose.

HORN(S)

A. Bus shall be equipped with dual horns of standard make, capable of producing complex sound in bands of audio frequencies between 250 and 2000 cycles per second with a sound level of 110 db at 3 feet, per SAE Standard J-377. (Measurement shall be made with meter set at flat response - C weighting.)

B. Air horns are permissible. See page 30.

C. Horn(s) shall be located above chassis frame rail.

INSTRUMENTS AND INSTRUMENT PANEL

A. Lights in lieu of gauges are not acceptable. Chassis shall be equipped with the following instruments and gauges:

1. Speedometer.

2. Odometer which will give accrued mileage including tenths of miles.

3. Voltmeter with graduated scale to 16 volts. EXCEPTION: Ammeter may be substituted on Type A and B vehicles under 35 passengers.

4. Oil pressure gauge shall be of a mechanical type, with red warning light to warn of low pressure.

5. Water temperature gauge, with red warning light to indicate overheating.

6. Fuel gauge.

7. Upper beam head lamp indicator.

8. Brake indicator gauge (air or vacuum). Light indicator in lieu of gauge is permissible on vehicles equipped with hydraulic-assist power brake.

9. Turn signal indicator.

10. Automatic transmission temperature gauge. EXCEPTION: Type A and B vehicles under 35 passengers.

11. Tachometer. EXCEPTION: Type A and B vehicles under 35 passengers.

12. Glow plug indicator light where appropriate.

13. Air restriction device which shall be dash mounted. EXCEPTION: Type A and B vehicles under 35 passengers. Type D vehicles with engine in rear required to have an air restriction indicator mounted in the engine compartment, clearly visible from the rear of the bus with rear access door open.

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

C. Instruments and gauges shall be mounted on instrument panel clearly visible to driver while in normal seated position in accordance with SBMI Design Objectives, May 1990 edition.

D. Instrument panel shall have lamps of sufficient candlepower to illuminate all instruments and gauges, and shift selector indicator for automatic transmission.

E. Radiator coolant level sight gauge shall be provided. Radiator shall be so equipped as to provide a visual fluid level inspection without removal of the radiator cap. The fluid level indicator must be positioned as to afford easy visibility from ground level.

LENGTH, OVERALL

Overall length shall not exceed 40 feet.

OIL FILTER

Oil filter of replaceable element or cartridge type shall be provided, and shall be connected by flexible oil lines if it is not of built-in or engine-mounted design. Oil filter shall have a capacity of approximately one (1) quart.

OPENINGS

All openings in floorboard or fire wall between chassis and passenger carrying compartment, such as gear shift lever and parking brake lever, shall be sealed.

PASSENGER LOAD

A. Actual gross vehicle weight (GVW) is the sum of the chassis weight, plus the body weight, plus the driver's weight, plus total seated pupil weight.

1. For purposes of calculation, the driver's weight is 150 pounds.

2. For purposes of calculation, the pupil's weight is 120 pounds.

B. Actual GVW shall not exceed the chassis manufacturer's gross vehicle weight rating (GVWR) for the chassis.

POWER AND GRADEABILITY

A. Gross vehicle weight (GVW) shall not exceed 185 pounds per certified net published horsepower of the engine at the manufacturer's recommended maximum number of revolutions per minute.

B. Heavy duty engine shall be furnished instead of standard-type engine of equal or approximate displacement. The following chart presents the minimum horsepower and/or torque requirements for engines to be used in chassis accommodating bus bodies of the respective capacities.

DIESEL POWER

Passenger Capacity	Minimum Gross Horsepower
Under 35	130 HP
35 - 47	160 HP
48 - 78	185 HP
79 - 84	205 HP
85 - 90	235 HP

1. All Type B vehicles, 35 passengers and above, and Type C and D vehicles shall be equipped with positive locking hand throttle, or a fast idle control device.

2. All engines shall be equipped with an automatic engine cooling fan. Automatic shutters may be used and coordinated to cycle properly with automatic fan.

3. An engine block heater of 1000 watts minimum shall be provided. A recessed and covered receptacle for the block heater shall be mounted in the front bumper. EXCEPTION: Type A and B vehicles under 35 passengers, manufacturer's standard. Type D vehicles, rear engine - receptacle shall be located in the rear. Type D vehicles, front engine - receptacle may be mounted to the bus body in front of the service door.

4. Electrical key shut down shall be required.

5. An original equipment, manufacturer's installed closed combustion fuel fired heater is permissible in lieu of a block heater if approved by an independent certified testing laboratory and with approval of the State Director of School Transportation and Facilities. See pages 51-52.

6. All available warranty information must be provided to the purchaser.

7. Noise acoustical abatement package is recommended. EXCEPTION: Rear engine vehicles.

SHOCK ABSORBERS

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

SPRINGS

A. Capacity of springs or suspension assemblies shall be equal to or exceed axle rating, except when otherwise specified in bid invitation.

B. Springs or suspension assemblies shall be designed to carry not more than 75 percent of gross vehicle weight (GVW) on rear tires and not more than 40 percent of GVW on front tires.

C. If rear springs are used, they shall be of progressive type.

D. If leaf-type springs are used, stationary eyes shall be protected by full wrapper leaf.

E. Wrapper leaves on rear springs are permissible.

F. Clearance between springs and tire, and between tires, shall provide ample space for use of tripleside dual chains.

G. Air suspension systems are permissible on rear axle only and are required on all vehicles with a special service (wheelchair lift) door.
EXCEPTION: Type A and B vehicles under 35 passengers, unless offered by chassis manufacturer.

STEERING GEAR

A. All chassis shall be equipped with heavy duty power steering of integral type with integral valves. Design shall provide a means of lubrication for all wear points, if wear points are not permanently lubricated.

B. Steering mechanism shall provide for easy adjustment for lost motion.

C. No changes shall be made in steering apparatus which are not approved by chassis manufacturer.

D. There shall be clearance of at least two (2) inches between steering wheel and cowl instrument panel, windshield, or any other surface.

E. All chassis accommodating 35 passenger bodies and above shall be equipped with a steering wheel having a minimum diameter of eighteen (18) inches.

TIRES AND RIMS

A. Standard profile tubeless tires, and rims of proper size with load ratings that equal or exceed axle ratings in these requirements shall be provided. In no case shall the tire and rim sizes be less than those shown in the following:

STANDARD PROFILE TIRES

PASSENGER CAPACITY		SIZE	LOAD RANGE (PLY)	RIM SIZE
Type A	16 - 24	225 x 75R16	D(8)	6.00
Type B	16 - 34	8 x R19.5	D(8)	6.00
Type B & C	35 - 54	9 x R22.5	F(12)	6.75
	55 - 60	10 x R22.5	G(14)	7.50
	61 - 77	11 x R22.5	G(14)	8.25
Type D	47 - 60	10 x R22.5	G(14)	7.50
	61 - 90	11 x R22.5	G(14)	8.25

B. Low profile tubeless radial tires are permissible as an option. In no case shall the tire and rim sizes be less than those shown in the following:

LOW PROFILE TIRES

PASSENGER CAPACITY		SIZE	LOAD RANGE (PLY)	RIM SIZE
Type A	16 - 24	LT 215/85R16	D(8)	6.00
Type B	16 - 34	225/70R19.5	F(12)	6.00
Type B & C	35 - 66	255/80R22.5 265/75R22.5	G(14)	7.50
	67 Up	275/80R22.5 295/75R22.5	G(14)	8.25
Type D	47-54	275/80R22.5 295/75R22.5	G(14)	8.25
	59-72	275/80R22.5 295/75R22.5	G(14)	8.25
	77-90	275/80R22.5 295/75R22.5	H(16)	8.25

C. Dual rear tires shall be provided.

D. First line steel belted radial tires are required.

TOW HOOKS

Front tow hooks shall be installed by chassis manufacturer and shall be at least 200 degrees spiral, have a minimum inside diameter of 2 1/2 inches and mounted parallel to bus frame rail. EXCEPTION: Type A and B vehicles under 35 passengers.

TRANSMISSION

A. A manual, five speed transmission shall be standard on all Type B vehicles 35 passengers and over, and all Type C vehicles. A manual, six speed transmission or an automatic transmission is an approved option. An automatic transmission shall be standard on all Type A and B vehicles under 35 passengers and all Type D vehicles. A manual, five speed or a manual, six speed transmission is an approved option on Type D vehicles.

B. All automatic transmissions shall be equipped with an external oil filter and a transmission temperature gauge shall be installed on the instrument panel. EXCEPTION: Type A and B vehicles under 35 passengers.

C. Automatic transmissions shall be equivalent to either the AT-545 four speed, for buses of 35 to 66 passenger capacity inclusive or the MT-643 four speed, for buses of 67 to 90 passenger capacity.

D. Manual-type transmission shall be synchromesh except in first and reverse gears. Its design shall provide not less than five (5) forward speeds and one (1) reverse speed for all buses of 35 passenger capacity and above. A choice of transmissions will be available for matching power train ratios for fuel efficiency. (Use of six-speed transmission is recommended on vehicles of 65 passenger capacity and above.)

E. All transmissions, on vehicles equipped with hydraulic brakes, shall be equipped with heavy duty, positive locking hand brake equivalent to the Orschelin brake. EXCEPTION: Type A and B vehicles under 35 passengers, manufacturer's standard.

TURNING RADIUS

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

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

UNDERCOATING

Chassis manufacturer shall coat undersides of all metal components with rust-proofing compound which meets or exceeds U. S. Department of Defense Specification MIL-C-62218A, using modified test procedures as defined under "Undercoating" of body requirements.

WEIGHT DISTRIBUTION

Weight distribution of fully loaded bus on level surface shall not exceed the manufacturer's gross axle weight rating on any axle.

APPROXIMATE WEIGHTS OF SCHOOL BUSES *

PASSENGER CAPACITY	CURB WEIGHT	LOADED WEIGHT
35/36	11,480 pounds	15,830 pounds
47/48	12,875 pounds	18,665 pounds
53/54	13,570 pounds	20,080 pounds
59/60	14,905 pounds	22,135 pounds
65/66	15,755 pounds	23,705 pounds
71/72 - Type C	16,475 pounds	25,145 pounds
71/72 - Type D	19,794 pounds	28,584 pounds
77/78 - Type C	17,483 pounds	26,843 pounds
77/78 - Type D	20,569 pounds	30,077 pounds
83/84	21,379 pounds	31,609 pounds
89/90	21,379 pounds	32,329 pounds

* Information for West Virginia bridge and road restrictions.

AISLE

A. Minimum clearance of all aisles shall be 12 inches.

B. The seat backs shall be slanted sufficiently to give aisle clearance of 15 inches at tops of seat backs.

BATTERY

A. Battery shall be furnished by chassis manufacturer.

B. When battery is mounted as described in Electrical System, 1, Battery, of chassis requirements, the body manufacturer shall securely attach battery on a slide-out tray in a closed, vented compartment in the body skirt, whereby battery may be exposed to outside for convenient servicing. Cable length and routing, including travel of tray, shall permit the battery to slide completely outside of body limits for convenient removal and installation. Battery compartment door or cover shall be hinged at front or top, and secured by adequate and conveniently operated latch or fastener. (Battery tray shall have a safety stop to prevent dropping battery at outer extremity of tray travel.) Battery may be located in the engine compartment in rear engine buses. (When two Group D Batteries are used, connecting cables shall permit either or both battery tray(s) to slide to the full "OUT" position without damage to, or disconnecting, cables. Body manufacturer shall be responsible for final cable and connections between batteries.

BUMPER, FRONT

See page 5.

BUMPER, REAR

A. Bumper shall be of pressed steel channel at least 3/16 inch thick 9 1/2 inches wide (high) and of sufficient strength to permit pushing fully loaded bus by another vehicle without permanent distortion. EXCEPTION: Bumper for Type A vehicles may be 8" wide (high).

B. Bumper shall be wrapped around back corners of the bus, and 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 a manner that it may be easily removed, and braced to develop full strength of bumper section from rear or side impact, and shall be attached to prevent hitching of rides, or permanent distortion when rear of bus is lifted by attaching lifting device to bumper.

D. Bumper shall extend at least one (1) inch beyond rear-most part of body surface, measured at floor line. EXCEPTION: Type A vehicles.

CEILING

See Insulation, page 30, and Interior, page 31.

CHAINS

A. Automatic tire chains are permissible.

B. See Wheel Housings, page 43.

COLOR

A. The school bus body shall be painted uniform "National School Bus Yellow - Color Standard SBMI-008," in compliance with 1990 National Standards.

B. Primer shall be 3/4 - 1 mil and 1 1/2 - 2 mils of yellow paint.

C. Reflective material shall be installed on the bus. Material shall be automotive engineering grade or better, meeting initial reflectance values in FHWA FP-85 and retaining at least 50% of those values for a minimum of six years. Reflective materials and markings shall include any or all of the following:

1. "SCHOOL BUS" Signs: shall be marked with reflective National School Bus Yellow material comprising background for lettering of the front and rear "SCHOOL BUS" signs.

2. Sides of bus body - shall be marked with reflective National School Bus yellow material at least "2" but not more than 12" in width, extending the length of the bus body and located (vertically) as close as practicable to the floor line. Emergency window exits shall be marked with no greater than 2" in width strip of reflective National School Bus yellow material. Top, bottom and each side shall be outlined.

3. White colored roof areas are permissible.

CONSTRUCTION

A. Construction shall be of prime commercial quality steel or other metal, or material with strength at least equivalent to all-steel as certified by body manufacturer.

B. Construction shall provide reasonably dustproof and water-tight unit.

C. Floor shall be of prime commercial quality steel of at least 14 gauge or other material equivalent in strength to 14 gauge steel. (Type A, van conversion, manufacturer's standard.) Floor shall be covered with approximately 19/32 inch thickness plywood, at least five (5) ply, and shall equal or exceed properties of exterior type douglas fir plywood, C-D Grade, as specified in standard issued by Department of Commerce. (Commercial Standard CS45-60, Douglas Fir Plywood: A Recorded Voluntary Standard At The Trade as amended.)

   Floor shall be level from front to back and from side to side, except in wheel housing, toeboard and driver's seat platform areas.

D. All openings between chassis and passenger-carrying compartment made due to alterations by body manufacturer must be sealed. See Openings, page 13.

E. Floor Covering, see pages 26-27.

F. Body joints present in the portion of the Type A vehicle bodies furnished exclusively by the body manufacturer shall conform to the performance requirements of FMVSS 221, "School Bus Body Joint Strength." This does not include the body joints created when body components are attached to components furnished by the chassis manufacturer.

G. Type A vehicle bodies shall be equipped with restraining barriers conforming to FMVSS 222 "School Bus Passenger Seating - Crash Protection."

DEFROSTERS

A. Two (2) defrosters are required, one for each side of the bus. They shall be of sufficient capacity to keep windshield, window to left of driver, and glass area in entrance door clear of fog, frost and snow. Each defroster must draw heat from its own heater core or coil. The defroster for the right side of the bus shall be designed and mounted to not interfere with the operation of the service door. EXCEPTION: Type A and Type D vehicles may draw heat from a single source, if design accomplishes defrosting requirements specified.

B. The defrosting system shall conform to Society of Automotive Engineers Standards J-381 and 382.

C. Combustion-type defrosters are permissible if installed by the body manufacturer, or by an authorized dealer. See Heaters, pages 27-29.

D. At least two (2) auxiliary fans, six (6) inches in diameter shall be installed, suspended from above, one at each side of the windshield, where they can be adjusted for maximum effectiveness. Fan blades shall be covered with a protective cage. Each fan shall be controlled by a separate switch. EXCEPTION: Type A vehicles shall use one (1) fan. Location, manufacturer's standard.

E. Auxiliary fans are not to be considered as part of the primary defrosting and defogging system.

DOORS

A. Service Door

1. Service door shall be under control of driver, and designed to afford easy release and prevent accidental opening. When hand lever is used, no part shall come together to shear or crush fingers.

2. Service door shall be located on right side of bus opposite driver and within direct view of driver.

3. Service door shall have minimum horizontal opening of 24 inches and minimum vertical opening of 68 inches. Type A vehicles shall have a minimum opening area of 1200 square inches.

4. Service door shall be jack-knife type. EXCEPTION: Type A and B vehicles under 35 passengers and on models that cannot be equipped with jack-knife door (with three (3) step risers).

5. Lower as well as upper panels shall be of approved safety glass. Bottom of each lower glass panel shall not be more than 10 inches from the top surface of bottom step. Top of each upper glass panel shall not be more than 6 inches from top of door. Type A vehicles shall have upper panel (windows) of safety glass with an area of at least 350 - square inches.

6. There shall be no door to left of driver on Type C and D vehicles. Type A and B vehicles under 35 passengers may be equipped with chassis manufacturer's standard door.

7. All doors shall be equipped with padding at the top edge of each door opening. Pad shall be at least 3 inches wide and 1 inch thick and extend the full width of the door opening.

8. Power operated service door is permissible. Manual override system shall be provided.

9. Service door shall be equipped with a vandal lock. EXCEPTION: Type A van cutaway with lockable driver side door.

B. Emergency Door

NOTE: All buses must comply with FMVSS 217.

1. Emergency door shall be hinged on right side if located in the rear of bus and on front side if located on the left or right side of bus. It shall open outward and be labeled inside to indicate how it is to be opened. If double emergency doors are used on Type A vehicles, they shall be hinged on the outside edge and shall have a 3-point fastening device. A non-corrosive device shall be used that holds the weight of the door open at a nominal of 90 degrees with the bus in any position and prevents the emergency door from closing during emergencies and school bus evacuation drills.

2. Upper and lower portions of emergency door shall be equipped with approved safety glazing. Exposed area of upper glazing shall not be less than 400 square inches and lower glazing shall not be less than 350 square inches. See page 43, Windshield and Windows, A. EXCEPTION: Type A vehicles.

3. There shall be no steps leading to the emergency door.

4. Words, "EMERGENCY DOOR", both inside and outside in letters two (2) inches high shall be placed at the top of, or directly above the emergency door. Decals are not permitted. Padded header panels shall be installed above Emergency Door. Pad shall be at least 3 inches wide and 1 inch thick, and extend the full width of the door opening.

5. If emergency door is located on left side of bus:

   a. Window across rear shall be designed as emergency exit and shall be no less than 16 inches high and 54 inches wide on buses 80 or more inches wide. It shall be equipped with latch (or latches) on inside, and outside, connected with an electrical buzzer that will actuate when released. Outside control of latches shall be non-detachable and designed to prevent hitching rides.

   b. Paneling is required to cover space between top of rear divan seat and inside surface of emergency window at rear.

   c. Aisle to door clearance shall be maximum possible in context of FMVSS-222. A "flip up" seat shall be provided to maximize clearance during emergency exit.

6. Emergency door shall be designed to open from inside and outside of bus, and shall be equipped with fastening device which may be quickly released, but designed to offer protection against accidental release. Control from driver's seat shall not be permitted. Provisions for opening from outside shall consist of non-detachable device designed to prevent hitching-to, but to permit opening when necessary.

7. Emergency door shall be equipped with a slidebar cam-operated latch. The slidebar shall be approximately 1 1/4 inches wide and 3/8 inch thick, and shall have a minimum stroke of 1 1/4 inches. The slidebar shall be spring loaded and have a bearing surface of a minimum of one (1) inch with the door closed and the latch in a closed position. The latch shall be equipped with a suitable electric plunger-type switch and connected with a buzzer located in the driver's compartment. The switch shall be enclosed in a metal case, and wires leading from the switch shall be concealed in the bus body. The switch shall be installed to contact the farthest edge of the door latch plunger in such a manner that a maximum movement of 5/16 inch of the door latch plunger will close the circuit and activate the buzzer. Both the switch and buzzer shall be approved by Underwriters Laboratories, Inc.

8. Door latch shall be equipped with interior handle that extends to at least the center of the door. It shall lift up to release the latch, be protected by a metal guide and have printed instructions to indicate the direction of its operation. (Decals are not acceptable on interior of door.)

9. The outside handle shall be of such length to provide sufficient leverage to open door easily.

10. A vandal lock shall be installed on all emergency doors. It shall be wired into the ignition and/or starting circuit to prevent starting of the engine with the door locked. Must meet the requirements of FMVSS 217.

ELECTRICAL SYSTEM

A. Battery - See pages 6-7, Electrical System, and page 19.

B. Alternator - See page 7.

C. Lamps and Signals - See pages 31-35.

D. Wiring - See pages 44-46.

EMERGENCY EXITS

NOTE: All emergency exits must comply with FMVSS 217.

A. Type A, B, C, and D vehicles shall be equipped with the following number of emergency exits:

0 to 22 Passengers = 1 emergency exit per side and 1 roof hatch

23 to 53 Passengers = 2 emergency exits per side and 1 roof hatch

54 to 71 Passengers = 2 emergency window exits per side and 2 roof hatches

77 Passengers and above = 3 emergency window exits per side and 2 roof hatches

Emergency exit windows shall be "staggered" (not directly across from each other) when possible. See page 44.

B. Body shall be equipped with roof safety hatches that combine the following functions in each unit:

1. Multi-position, fresh air ventilation without static vents.

2. No alarms are required on roof hatches.

3. Release handle(s) permitting operation as emergency exit(s), accessible inside and outside the vehicle.

4. Reflective material around roof hatches shall match roof color.

C. When two units are required one unit shall be installed behind the rear axle and one unit in the front passenger compartment. Buses that have a center seam shall have one unit on the right side and one unit on the left side.

Each emergency exit shall comply with FMVSS 217. These emergency exits are in addition to the rear emergency door or exit.

In addition to the audible warning required on emergency doors by FMVSS 217 additional emergency exits may be likewise protected.

FIRE EXTINGUISHER

A. Each bus shall be equipped with at least one (1) pressurized, dry chemical-type fire extinguisher of total metal construction, refillable, securely mounted with spring steel friction fit bracket. A pressure gauge shall be mounted on the extinguisher to be easily read without removing the extinguisher from its mounted position.

B. The fire extinguisher shall be of a type approved by the Underwriters Laboratories, Inc., with a total rating of not less than 2A-10-BC. The operating mechanism shall be sealed with a type of seal which will not interfere with use of the fire extinguisher.

FIRST AID KIT

A. Bus shall have a removable, moisture and dustproof first aid kit mounted in full view in an accessible place within the driver's compartment. This place shall be properly identified.

B. The minimum requirement is a 35 unit kit with contents as follows:

Bandage Compress, (sterile gauze pads) 4 inch	5 units
Bandage Compress, (sterile gauze pads) 2 inch	6 units
Adhesive Absorbent Bandage (adhesive tape) 1 inch	5 units
Triangular Bandage, 40 inch	4 units
Gauze Bandage, 4 inch	5 units
Absorbent-Gauze Compress	6 units
Wire Splints	1 unit
Latex Gloves	1 Unit
Kindergarten Scissors	1 unit
Mouth-to-Mouth Airway (Plastic Breathing Shield)	1 unit

C. Mounting bracket shall be able to sustain a 20 G force load in any direction except upward.

FLOOR

See Construction, page 21.

FLOOR COVERING

A. Floor covering shall be of high quality, heavy duty, fire-resistant material and shall meet Federal Specifications ZZ-M-71b. Covering shall have a smooth sanded back with burlap removed.

B. Floor covering shall be permanently bonded to the floor and must not blister, crack or grow with reasonable use and maintenance. Bonding of adhesive material shall be waterproof and shall be of type recommended by the manufacturer of floor covering material. All seams or joints in flooring shall be neat and sealed with waterproof sealer.

C. Floor covering, including aisle area, shall be ribbed, non-skid type. Minimum overall thickness shall be 0.187 inch.

D. Covering for under seat area, top of wheel housing, driver's compartment and toeboard shall be smooth non-skid type and shall have a minimum thickness overall of 0.125 inch. Covering shall be securely bonded to contour of wheel housing.

E. Cove molding shall be used along side walls and rear corners. Metal or equivalent aisle joint strips shall be used to protect joints of flooring. However, painstaking care must be exercised to assure joints are properly fitted and sealed prior to fitting strips or molding to floor. Aisle strips shall be so shaped that the edges of same shall be drawn and held firmly to the flooring material. Welded seams are permissible.

F. Floor construction shall provide a properly sealed opening that measures a minimum of 6" X 6" for access to fuel gauge sending unit and/or in-tank fuel pump for all buses 35 passenger and above.

G. Floor covering shall not be black in color.

FUEL PORT DOOR

A. Body manufacturer shall furnish a fuel port door on Type B vehicles 35 passengers and above, and Type C and D vehicles.

B. All diesel powered vehicles shall have a fuel door labeled "Diesel" within six inches of the door.

C. Locking device for door optional.

HEATERS

A. School bus heating systems shall meet the following performance standards:

1. Provide evenly distributed heat throughout the bus body.

2. Provide defrosting for windshield and entrance door.

B. Heaters shall have capabilities of providing evenly distributed heat creating a temperature rise to 50 degrees Fahrenheit inside body shell when soaked in ambient temperature of 0 degrees Fahrenheit for 15 hours.

C. Total heater electrical load shall be no more than 45 amperes.

D. Heater water flow shall be controlled by the installation of bulkhead mounted water shutoff valves. Water shutoff valves and bulkhead mounts shall require approval by the Office of School Transportation and Facilities. Valves shall have minimum unrestricted 3/4-inch internal port. Heater hose entrance through firewall or floor shall be through prior approved bulkhead fittings.

NOTE: BODY MANUFACTURER - shall work with chassis manufacturer to determine location requirements for the firewall mounted bulkhead fitting.

ENGINE MANUFACTURER - shall be responsible for installation of hose bibbs accessible to body company for attachment of body company's one-inch inside diameter heater hose.

E. Switching for heaters shall provide independent switching for each motor.

F. Hose between heaters shall be protected by metal raceway or conduit.

G. Heater performance shall be measured:

1. Temperature measurement taken 39" inward from side walls 39" inward from windshield and rear door, and 36" above floor. Heat shall be evenly distributed through the aisle area.

2. Temperature must rise to 50 degrees Fahrenheit inside (when soaked in ambient temperature of 0 degrees Fahrenheit for 15 hours) in 20 minutes when 170 degrees hot water is applied at the rate of three gallons per minute at a maximum of six (6) psi pressure.

3. Maximum current flow for heaters including defrosters shall not exceed 45 amperes.

H. Heater cores installed in school buses shall meet the following standards:

1. Static Pressure Test - 150 psi

2. Cycle Test - 20-50 psi hydraulic surge pressure 450,000 cycles minimum.

3. Core Flow Restriction - Total heater system flow restriction shall be measured at a flow rate of three (3) gallons/minute at a maximum of six (6) psi pressure when measuring heater performance.

I. Defrosters - Shall be included in the total electrical load for heaters and meet the following criteria:

1. Shall be able to defrost total windshield area in a reasonable period of time under all normal driving conditions.

2. Shall be directional to provide driver capability of defrosting in drive view area first.

3. Shall provide means of defrosting service door glass independent of windshield.

4. Defroster system shall have capability of mixing minimum 50% outside fresh air with defrosting air.

5. Defroster system shall meet SAE Standard J381-J382 performance requirement.

NOTE: All manufacturers shall demonstrate the capabilities of their heating and defrosting system at the time of pilot model inspection and by certified letter to the State Director of School Transportation and Facilities.

J. Heater Lines and Hose

1. Heater lines (pipe) shall be a minimum of 3/4 inch inside diameter.

2. All hose must be one (1) inch. EXCEPTION: Type A vehicles.

3. Hose clamps shall be "collar screw type."

4. Hose shall be adequately supported to guard against excessive wear due to vibration.

5. Hose shall not dangle or rub against sharp edges, nor interfere with or restrict the operation of any engine function.

6. All hose shall conform to SAE 20R3 - Class D2.

7. Heater cores and lines on the interior of bus shall be shielded to prevent scalding of passengers.

8. Any heater line or hose routed outside of bus body shall be insulated for the entire length of hose exposed to outside temperature.

K. Each hot water system shall have a readily accessible shutoff valve installed in the pressure and return lines the firewall (cowl) or on the engine. There shall be a water flow regulating valve installed for convenient operation by the driver. EXCEPTION: Type A and D vehicles - located at or near the engine.

L. An accessible service entrance to heaters shall be provided by an outside removable body panel or removable heater cover. Type C vehicles shall provide access to heater components on driver's side through outside access panel, if not readily accessible from interior of bus.

M. Each heater shall be attached to a separate circuit breaker.

HEIGHT, INSIDE

Inside body height shall be 72 inches or more, measured from the finished floor to the ceiling at any point on longitudinal center line from front vertical to rear vertical bow. Inside body height of Type A vehicles shall be 62 inches or more.

HORN(S)

A. If air horns are used, they shall be mounted above driver's window on left side of bus.

B. All buses shall be equipped with audible electrical warning device, automatically actuated when bus is in reverse gear. Device shall be of 109db, meeting SAE-J9946. Device shall be mounted behind rear axle, between frame rails, and shall emit intermittent sound.

IDENTIFICATION

A. Body shall bear words "SCHOOL BUS" in black letters at least eight (8) inches high on both front and rear of body. Lettering shall be placed as high as possible without impairment of its visibility. Lettering shall conform to "Series B" of Standard Alphabets for Highway Signs. Decals are permissible. "SCHOOL BUS" signs shall be marked with reflective National School Bus Yellow comprising background for lettering of the front and/or rear "SCHOOL BUS" signs.

B. Every bus shall be lettered "..... COUNTY SCHOOLS", on both sides of bus, and numbered on both sides and rear. Numbers on both sides shall be near front, in line with lettering. Lettering and numbering on sides of bus shall be at least six (6) inches high. Decals are permissible.

C. The number of the bus shall be 5 inches in height, in white or yellow, displayed on either the front bumper or the crossing arm.

INSULATION

A. Ceiling, walls, and bulkhead or bow cavities shall be fully insulated with proper material applied inside of outside panels by spray to deaden the sound and to reduce vibrations to a minimum.

B. Ceiling and walls shall be fully insulated with fiberglass or equivalent having a thickness of 1 1/2 inches. EXCEPTION: Fiberglass insulation of two (2) inch thickness may be used where it can be accommodated without being depressed. However, special attention must be given this factor of tolerance. Such thermal insulation shall be fire-resistant material of type approved by Underwriters Laboratories, Inc.

C. Noise abatement/acoustical package is permissible.

INTERIOR

A. Interior of bus shall be free of all unnecessary projections likely to cause injury. This requires inner lining on ceilings and walls. If ceiling is constructed so as to contain lapped joints, forward panel shall be lapped by rear panel and exposed edges shall be beaded, hemmed, flanged, or otherwise treated to minimize sharp edges.

B. An access panel shall be provided for servicing the eight-light system without removing ceiling panel.

C. Cowl shall not be modified, or accessories installed, to interfere with driver's visibility of gauges on instrument panel.

D. Flammability of interior materials shall meet FMVSS 302.

E. Interior color of seats, panels, head bumpers, and floor covering shall not be black.

F. Every school bus shall be constructed so that the noise level taken at the ear of the occupant nearest to the primary vehicle noise source shall not exceed 85 dBA when tested according to the procedure found in the Noise Test Procedure - National Minimum Requirements.

LAMPS AND SIGNALS

A. All lamps, including installation shall conform to current standards and recommendations of SAE, West Virginia Motor Vehicle Law and FMVSS 108.

B. Head Lamps

Head and tail lamps shall be combined on a single circuit, served by a separate circuit breaker. There shall be no other electrical load added to the head lamp circuit.

C. Clearance and Side-Marker Lamps

Clearance, side-marker, and identification lamps shall be armored type, combined in a circuit controlled by the same switch.

D. Tail and Stop (Brake) Lamps

1. In addition to the two (2) tail and stop combination lamps in the head lamp circuit, bus shall be equipped with two (2) seven (7) inch stop (brake) lamps, capable of emitting a red light plainly visible for distance of 500 feet to the rear. These lamps may be combination stop/tail lamps. The light intensity of these lamps shall at least equal that of Class A turn signal lamps as established by the Society of Automotive Engineers.

2. Tail lamps shall be mounted at least 40 inches from surface on which vehicle stands. Stop (brake) lamps shall be as high as practicable, but below window line; spaced as far apart laterally as practicable, but not less than three (3) feet. Measurements shall be taken from lamp centers.

E. Back-Up Lights

Two (2) back-up lights are required, one on each side of rear door. Bulb shall be 32 candlepower, with white lens and/or reflector capable of lighting roadway and objects to rear of bus for safe backing, during darkness.

NOTE: System must meet SAE J593 JUN 87 Standard.

F. License plate lamp shall be in combination with one of the tail lamps.

G. Interior Lamps

1. Interior lamps shall include two (2) rows of dome lamps installed on two circuits so that lamps in front half and lamps in rear half of bus are on separate circuits.

2. A stepwell lamp which adequately illuminates stepwell shall be provided. It shall be connected in the clearance light circuit and activated when the service door is opened.

H. School Bus Alternately Flashing Signal Lamps

- DEFINITIONS:

  - School bus red signal lamps are alternately flashing lamps mounted horizontally both front and rear, intended to identify a vehicle as a school bus and to inform other users of the highway that such vehicle is stopped on highway to take on or discharge school children.

  - School bus yellow signal lamps are alternately flashing lamps mounted horizontally both front and rear, intended to identify a vehicle as a school bus and to inform other users of the highway that such vehicle is about to stop on highway to take on or discharge school children.

1. Each school bus shall be equipped with a system consisting of four (4) red signal lamps designed to conform to SAE Standard J887, and four (4) amber signal lamps designed to that standard except for color, and except that their candlepower shall be at least 2 1/2 times that specified for red signal lamps. This system, stop arm, and crossing arm shall be wired through a master switch, but NOT through vehicle ignition switch.

2. Both red and amber signal lamps shall be installed in accordance with SAE Standard J887, except that each amber signal lamp shall be located near each red signal lamp, at the same level, but closer to the vertical centerline of the bus. Shields over lamps, painted black, with a minimum depth of four (4) inches shall be furnished.

3. The system shall be wired so that the amber signal lamps are activated only by hand operation and, if activated, are automatically deactivated, and red signal lamps are automatically activated when the bus entrance door is opened.

4. The flashing mechanism shall be capable of carrying the full current load of the signal system in continuous operation.

5. Right and left signal lamps shall flash alternately. Each signal lamp shall flash not less than 60, nor more than 120 flashes per minute. The "on" period shall be long enough to permit bulb filament to come up to full brightness.

6. There shall be a red pilot lamp which shall go on when the respective amber or red systems are actuated. The pilot lamp shall either go out or flash at an altered rate in the event the system is not functioning normally.

7. Signal lamp system shall require a separate control panel. Panel shall be constructed as small as practicable. Switches and red pilot lamp shall be located in conformance with the example below:

DRIVER SIDE	Momentary (Push) Activating Switch	Red Pilot Lamp	Master Switch	ENTRANCE DOOR

CONTROL PANEL

The panel shall be mounted above the door control on belt bar within easy unobstructed reach of the driver. The red pilot lamp shall be readily visible to the driver.

8. Signal lamp system shall operate as follows:

   a. With master switch on, entrance door closed, depress hand switch. Red pilot lamp and amber signals shall go on.

b. Open entrance door. Red pilot lamp and amber signal lamps shall go off, and red pilot lamp and red signal lamps shall go on. Stop arm, if air, vacuum, or electrically powered, shall automatically extend.

c. Close entrance door. Red pilot lamp and signal lamps shall go off, and stop arm, if air, vacuum, or electrically powered, shall retract immediately.

d. Open entrance door without depressing hand switch. Red pilot lamp and red signal lamps shall go on. Stop arm, if air, vacuum, or electrically powered, shall automatically extend.

e. With master switch off, depressing hand switch shall not actuate the amber signal system, nor shall opening entrance door actuate the red signal system and stop arm.

f. The signal lamp system shall operate with the vehicle ignition switch in either the on or off position.

9. Installation Requirements

a. Each flashing signal lamp shall be mounted with its axis substantially parallel to longitudinal axis of vehicle.

b. Front and rear alternately flashing signal lamps shall be spaced as far apart laterally as practicable.

c. Alternately flashing signal lamps shall be mounted at the front above the windshield and at the rear so that the lower edge of lens is not lower than top line of the side window.

d. Vertical and lateral vision of the front and rear alternately flashing warning lamps shall not be obstructed by any part of the body or lamphouse insofar as standard bus body construction shall permit.

e. Area around each lamp, extending approximately three (3) inches outward shall be painted black.

f. A separate fuse or circuit breaker, adequate to prevent damage to the system in the event of a dead short, shall be provided between the power source and the master switch.

g. All wiring from alternately flashing signal lamps to the door switch shall be at least 14 gauge and must meet SAE requirements.

I. Roof Mounted Strobe Light

A strobe light, white in color, shall be mounted on the roof of the school bus. The light shall be a maximum of 6-1/2" in height, located on the center line of the roof four (4) to six (6) feet from the rear of the bus, and rear of the roof hatch. The strobe light shall be a double flashing Class 1, with a high/low intensity feature, minimum of 10 joules.

J. Turn Signal Lamps

1. Bus body shall be equipped with Class A turn signal lamps that meet SAE J588C. They shall have a seven (7) inch diameter, arrow-faced lens. These signal lamps shall be independent units and be connected to chassis hazard warning switch to cause simultaneous flashing of turn signal lamps when needed as vehicular traffic hazard warning.

2. Type B, C and D vehicles shall have an armored light, mounted on right side behind service door and on left side behind stop arm signal, wired in the turn signal circuit.

K. Emergency Warning Device

Each school bus shall be supplied with a minimum of at least three (3) reflectorized triangle road warning devices in a container supplied by the body manufacturer.

METAL TREATMENT

A. All metal used in construction of bus body shall be zinc coated, aluminum-coated, or treated by equivalent process before bus is constructed. Excluded are such items as door handles, grab handles, interior decorative parts, and other interior plated parts.

B. All metal parts that will be painted shall be, in addition to other requirements, chemically cleaned, etched, zinc phosphate coated, and zinc chromate or epoxy primed or conditioned by equivalent process.

C. In providing for these requirements, particular attention shall be given lapped surfaces, welded connections of structural members, cut edges, punched or drilled hole areas in sheet metal, closed or box sections, unvented or undrained areas, and surfaces subjected to abrasion during vehicle operation.

D. As evidence that above requirements have been met, samples of materials and sections used in construction of bus body, when subjected to 1000-hour salt spray test as provided for in latest revision of ASTM designation; B-117 "Standard Method of Salt Spray (Fog) Testing", shall not lose more than 10 percent of material by weight.

MIRRORS

A. Interior Mirror

Interior mirror shall be either clear view laminated glass or clear view glass bonded to a backing which retains the glass in the event of breakage. Mirror shall be a minimum of 6" x 30". EXCEPTION: Type A vehicles may be 6" x 16".

B. Exterior Mirrors

1. Two heated adjustable driver exterior side-view mirrors shall be provided, one on the left and one on the right of the driver. The brackets used for the mirror system shall minimize mirror vibration and give the driver an unobstructed view of all exterior mirrors through the portion of the windshield, forward of all obstructions at least 14" forward of the windshield pillar post. Mirror glass to be heated be means of a self regulating heater. Body manufacturer to provide dash mounted on-off switch. Type D vehicles will view the drivers side mirror through the drivers side window.

   The exterior side view mirror system shall provide a field of view from behind the entrance door to a minimum of 200 feet to the rear of the bus. The mirror system shall also make the area from the top of the side windows to the ground on either side of the bus clearly visible to the school bus driver. The ground will be visible 12 feet to each side of the bus. Mirrors will be warranted for the same period of time, as the bus body and shall be warranty by the mirror manufacturer.

2. Crossview Mirror System - Shall provide the driver with indirect observation of all areas not under direct observation in front of as well as to both sides of the bus to a point where the view overlaps the side view mirror system.

3. Crossview mirror tripods to be U.S. produced stainless steel. Crossview main support arm will mount as closely to the most forward and outer fender surface, mirror main arm will pivot for proper viewing of crossover mirror. Two (2) brace arms will be provided, brace arms will not interfere with main support arm adjustment.

4. All exterior mirrors, as a system, must conform to FMVSS 111.

MOUNTING

Body to chassis mounting shall:

A. Provide adequate body to chassis insulation with permanently installed insulators.

B. Attach body to chassis with 7/16 inch u-bolts, in addition to the manufacturer's standard means of attachment. The u-bolts shall be fitted with lock washers and nuts and, after the nuts have been securely tightened, threads shall extend at least 1/2 inch past the nuts. The u-bolts shall be spaced along the length of the mating surfaces for maximum support and efficiency. EXCEPTION: Type A vehicles.

C. Have u-bolts for body sizes as follows:

1. Up to 46 passengers, four (4).

2. 47 through 64 passengers, six (6).

3. 65 through 89 passengers, eight (8).

MUD FLAPS

A. Mud flaps or guards are required and shall be provided by the body manufacturer for both front and rear wheels. They shall be constructed of heavy duty multi-ply mud flap material.

B. Front mud flaps or guards shall be of adequate size to protect body areas vulnerable to road debris from wheels, and mounted to be free of wheel movement at all times.

C. Rear mud flaps or guards shall be comparable in size to width of rear wheel housing, and shall reach within approximately nine (9) inches of the ground when bus is empty. They shall be mounted at a distance from the wheels that will permit free access to spring hangers for lubrication and maintenance, and to prevent their being pulled off while vehicle is in reverse motion, or damaged by tire chains. EXCEPTION: Type A vehicles exempt from mud flap requirement.

OVERALL LENGTH

Overall length of bus shall not exceed 40 feet.

OVERALL WIDTH

Overall width of bus shall not exceed 102 inches, excluding authorized safety equipment.

PUBLIC ADDRESS SYSTEMS

Public address systems and combination radio and tape players on school buses are permissible for directing and disciplining passengers. Inside speakers shall be recessed, or flush mount.

RADIO SYSTEMS

Two-way radio communication is recommended.

A. Mobile Unit Recommendations

1. FM-UHF 450-470 MHZ with capability of transmitting and receiving on at least three (3) channels.

2. Units shall be equipped with tone squelch (CTCSS).

3. Transmit power shall be no less than 25 watts and transmitter should meet EIA RS-152B standards.

4. Receiver sensitivity shall be no less than .25uV (12dBSINAD) and receiver should meet EIA RS-204C standards.

B. Base/Control Station Configuration - Should be compatible with recommended equipment and designed as required to cover specified service area.

RUB RAILS

A. There shall be at least three (3) black rub rails located as follows:

1. One at seat level.

2. One at floor level.

3. One at bottom of body skirt. EXCEPTION: Type A vehicles.

B. Rub rails shall extend from the rear of the entrance door completely around the bus to point of curvature near outside cowl on left side. At least one rub rail will extend around rear of bus. EXCEPTION: Type D vehicles with rear engine.

C. Rub rails shall be one piece except where broken by emergency door, wheel housings, battery box, access panels, corner of bus, etc. All ends shall be capped.

D. Rub rails shall be overlapped at body corners and securely attached at least twice to each body post and upright structural member within their length.

E. Rub rails shall be four (4) inches or more in width, of 16 gauge steel or suitable material of equivalent strength, and constructed in corrugated or ribbed fashion.

F. Rub rails shall be applied outside body or outside body posts. Pressed-in or snap-on rails do not satisfy this requirement.

SEAT BELT FOR DRIVER

A type 2 lap belt/shoulder harness seat belt shall be provided for the driver. The assembly shall be equipped with an emergency locking retractor (ELR) for the continuous belt system. The lap portion of the belt shall be guided or anchored where practical so as to prevent the driver from sliding laterally. Adjustable upper anchorage for the shoulder harness is required.

SEATS

A. All seats shall have minimum depth of fifteen (15) inches.

B. In determining seating capacity of bus, allowable rump width shall be:

1. thirteen (13) inches where 3-3 seating plan is used.

2. fifteen (15) inches where 3-2 seating plan is used.

C. All seats shall be forward-facing and anchorage shall comply with Federal Motor Vehicle Safety Standards 207, 210, and 222.

D. All passenger seat cushions shall be attached positively to front rail of seat frame so that seat may be tilted forward for cleaning bus, but seat will not be loose from frame rail.

E. Rear-most seat shall retain maximum allowable rump room.

F. No bus shall be equipped with jump seats or portable seats.

G. Forward-most pupil seat on right side of bus shall be located to not interfere with driver's vision, not farther forward than guard rail behind driver, or rear of driver's seat when adjusted to its rear-most position.

H. A modesty panel will be provided under the right front crash barrier that will permit flow of heat from stepwell heater but will not allow passengers to crawl into the stepwell area.

I. All restraining barriers and passenger seats shall meet the criteria contained in FMVSS 302.

1. Seat cushions shall be a thickness that will not depress more than 80 percent when a pupil weight of 360 pounds is applied, and it shall have rapid and adequate recovery. These cushions shall be high enough in the back to provide the proper joint with the seat back. These cushions shall have a mid-cushion height of approximately five (5) inches.

2. The seat cushion shall have a 1/2 inch thick moisture-resistant plywood base or approved equal.

J. Driver's seat shall be of the high-back type air ride with a minimum seat back adjustment of 15 degrees and with a head restraint to accommodate a 95 percentile adult male (95 percentile adult male as defined in FMVSS 208). The driver's seat shall be secured with nuts, bolts, and washers or flanged-headed nuts. EXCEPTION: Type A and B vehicles under 35 passengers.

K. Minimum distance between steering wheel and back rest of driver's seat shall be 11 inches. Driver's seat shall be cloth covered insert type and bolted to floor and shall have vertical adjustments, with fore-and-aft adjustment of not less than four (4) inches.

STEPS

A. First step at service door shall be not less than 12 inches and not more than 14 inches from ground, based on standard chassis specifications.

B. Service door entrance shall be equipped with three-step stepwell. Risers in each case shall be approximately equal. When plywood floor is used on steel, differential may be increased by thickness of plywood used.

1. A three-step stepwell is required. The first step at service door shall be approximately 12 to 14 inches from the ground when bus is empty, based on standard chassis specifications. See page 53, Regular Service Entrance Door, B. EXCEPTION: Type D vehicles - 12 to 16 inches.

2. A skidplate in front of stepwell is required on all Type D vehicles.

C. Steps shall be enclosed to prevent accumulation of ice and snow.

D. All steps, including floor line platform area, shall be covered with 3/16 inch rubber floor covering or other material equal in wear resistance and abrasion resistance to top grade rubber.

1. Metal back of tread, minimum 24 gauge cold roll steel, shall be permanently bonded to ribbed rubber; grooved design shall be such that said grooves run at 90 degree angle to long dimension of step tread.

2. Three-sixteenth inch ribbed step tread shall have a 1 1/2 inch white nosing as integral piece without any joint.

3. Rubber portion of step treads shall have following characteristics:

a. Special compounding for good abrasion resistance and high coefficient of friction.

b. Flexibility so that it can be bent around a 1/2 inch mandrel both at 130 degrees F and 20 degrees F without breaking, cracking, or crazing.

c. Show a durometer hardness 85 to 95.

E. Steps shall not protrude beyond side body line when entrance door is closed.

F. Stainless steel grab handle, sufficiently anchored, not less than 20 inches, designed with smooth contour to prevent catching of belts or articles of clothing shall be provided. EXCEPTION: Type A vehicles.

STIRRUP STEPS

There shall be at least one (1) folding stirrup step or recessed foothold and suitably located non-corrosive handles on each side of the front of the body for easy accessibility for cleaning the windshield and lamps, except when windshield and lamps are easily accessible from the ground. EXCEPTION: Type A vehicles. A step, in lieu of the stirrup steps, is permitted in or on the front bumper.

STOP SIGNAL ARM AND CROSSING CONTROL ARM

A. There shall be a stop signal arm installed on the left outside of the body which shall be equipped with a wind guard. Arm shall be of an octagonal shape with white letters and border, a red background, and be of reflective material. Two alternately flashing, high intensity, red strobe lamps, visible from both sides of the sign, meeting the requirements for gaseous discharge lamp container in SAE J1133, as amended shall be provided. The stop signal arm shall be vacuum, electric or air operated. The stop signal arm shall be capable of instantly reversing directions at anytime during its cycle and immediately returning to the open or closed position in response to the drivers command through the operation of the door.

B. A crossing control arm, mounted to the right front bumper of the bus, shall be required. The device shall be air powered as standard, with electric or vacuum power as an option. The crossing control arm shall be wired in conjunction with the stop signal arm and the alternately flashing signal lamp. It shall meet the requirements of FMVSS 131. EXCEPTION: Type A and B vehicles under 35 passengers.

STORAGE COMPARTMENT

Metal compartment of adequate strength and capacity for storage of tire chains, tow chains, and such tools as may be necessary for minor repairs shall be provided. Such storage compartment shall be located outside passenger compartment. The dimensions of this compartment shall be approximately 25 inches long, 16 inches wide and 12 inches high, mounted in right side of body skirt below floor located in front of rear axle assembly properly drained. EXCEPTION: Type A vehicles.

A door with hasp for lock, as well as a proper latch, shall be provided. Such compartment shall be constructed of highly non-corrosive metal, and provision for drainage of water resulting from snow and ice on tire chains shall be provided. EXCEPTION: Special Education bus compartment may be on left or right.

SUN SHIELD

Interior adjustable, transparent, tinted sun shield approximately 6" x 30" shall be provided. Sun shield must be capable of being turned to an angle of 180 degrees when not in use. EXCEPTION: Type A and B vehicles under 35 passengers, manufacturer's standard.

TAILPIPE

Tailpipe shall not extend beyond rear bumper. See pages 8-9, Exhaust Systems.

TOW HOOKS

A. Chassis manufacturer shall provide front tow hooks on Type C vehicles.

B. Body manufacturers shall provide rear tow hooks on Type C vehicles, and both front and rear tow hooks on Type A, B and D vehicles.

C. Tow hooks shall be at least 200 degrees spiral, have an inside diameter of approximately 2 1/2 inches, and be mounted parallel to frame rail. EXCEPTION: Type A vehicles shall be equipped with tow hooks adequate for towing vehicle.

UNDERCOATING

A. Entire underside of bus body, including floor sections, cross member, 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 builder that compound meets or exceeds all performance requirements of United States Department of Defense Specification MIL-C-62218A using modified test procedures* for following requirements:

1. Salt spray resistance - pass test modified to 5% salt and 1000 hours.

2. Abrasion resistance - pass.

3. Fire resistance - pass.

* Test panels are to be prepared in accordance with paragraph 4-6.12 of TT-C-520b with modified procedure requiring that tests be made on a 48 hour air cured film at thickness recommended by compound manufacturer.

B. Undercoating compound shall be applied with suitable airless or conventional spray equipment to recommended film thickness and shall show no evidence of voids in cured film.

VENTILATION

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 ventilation shall be installed in low-pressure area of roof.

C. Air conditioning which meets all applicable federal standards is an approved option.

WHEEL HOUSINGS

A. Wheel housings shall be of full open type.

B. Wheel house openings shall allow for easy tire removal and service.

C. Wheel housings shall be designed to support seat and passenger loads, and shall be attached to floor sheets in such manner to prevent any dust or water from entering the body.

D. Inside height of wheel housings above floor line shall not exceed 12 inches.

E. Wheel housing shall provide clearance for dual wheels as established by National Association of Chain Manufacturers.

F. Rubber fenders that adequately protect sides of body from tire spray shall be provided.

WIDTH

See page 37, Overall Width.

WINDSHIELD AND WINDOWS

A. All glass in windshield, windows, and doors shall be of approved safety glass (current Safety Code for Safety Glazing Motor Vehicles Operating on Land Highways Z-26.1) so mounted that permanent mark is visible, and of sufficient quality to prevent distortion of view in any direction. All glazing materials shall comply with FMVSS-205 and FMVSS-219.

B. Windshield shall have horizontal gradient band starting slightly above driver's line of vision and gradually decreasing in light transmission to 20 percent or less at top of windshield. EXCEPTION: Type A, B and D vehicles may use tinted windshield if gradient band is not available.

C. All buses are required to be equipped with split-sash windows.

D. Glass in all side and rear windows shall be of AS-3 grade or better, as specified by American Standards Association, Code Z-26.1.

E. Each full window shall provide unobstructed emergency opening of nine (9) inches high and 22 inches wide, obtained by lowering of window.

F. All exposed edges of glass shall be banded.

G. Each side of bus shall be equipped with a minimum of one hinged push-out type split-sash window. They shall be located approximately midway between front and rear passenger compartment and staggered. Emergency push-out windows shall have a positive latch and shall be so constructed and equipped as to actuate an audible signal when latch is moved. Words, "EMERGENCY EXIT," in letters at least two (2) inches high, shall be affixed on, or directly above emergency window on the inside and outside. DECALS NOT ACCEPTABLE. A decal "HANDLE INSIDE" may be affixed to the outside of emergency windows. See pages 24-25, Emergency Exits.

H. Latch shall be designed to latch positively and securely, with ease of release that would enable pupils to open in an emergency.

I. Window drip rail which does not interfere with size of window opening shall be furnished.

J. The driver's window shall be of sliding type. Double glazing is strongly recommended. EXCEPTION: Type A vehicles, manufacturer's standard.

WINDSHIELD WASHERS

A. A windshield washer reservoir shall be furnished, and shall be at least three (3) quart capacity unless space restrictions limit size of container. A collapsible bag is not acceptable except on Type A vehicles.

B. Solvent shall be directed onto windshield through jets in the wiper arm. EXCEPTION: Type A vehicles.

WINDSHIELD WIPERS

Bus shall be equipped with two (2) intermittent-speed wipers. Windshield wipers shall be powered by electric motors on all vehicles.

WIRING

A. All wiring and lights shall conform to current SAE standards and FMVSS 108.

B. Chassis to body current shall be controlled through a continuous duty solenoid of at least 105 ampere capacity.

C. Circuits

1. Wiring shall be arranged into at least the following circuits:

   a. Head, tail, stop (brake) and instrument panel lamps.

   b. Clearance, stepwell and body control panel. Stepwell lamp shall be activated when service door handle is in the unlatched position. Control panel lamps shall be on separate rheostat from instrument panel lights.

   c. Dome lamps.

   d. Starter motor.

   e. Ignition, emergency door signal and continuous duty solenoid.

   f. Turn signal lamps.

   g. Alternately flashing red signal lamps.

   h. Horns.

   i. Heater number 1.

   j. Heater number 2.

   k. Heater number 3.

   l. Electric wipers.

   m. Strobe Light

   n. Crossing Arm

2. Any of the above combination circuits may be subdivided into additional independent circuits.

3. Heaters and defrosters shall require at least one (1) additional independent circuit for each heater.

4. Whenever possible, all other electrical functions (such as electric-type windshield wipers) shall be provided with independent and properly protected circuits.

5. Each body circuit shall be color coded, and a diagram of the circuits shall be attached to the body in a readily accessible location.

6. All accessories, excluding lights, such as heaters, defrosters, etc., shall be wired to a continuous heavy duty solenoid (minimum 105 ampere) activated or energized through the ignition switch.

D. A separate circuit breaker shall be provided for each circuit except starter motor and ignition circuits.

E. All wires within body shall be insulated and protected by covering of fibrous loom (or equivalent) which will protect them from external damage and minimize danger from short circuits. Wires shall be properly held in place by appropriate fasteners at intervals necessary to avoid possible damage to wire insulation. Whenever wires pass through body member, additional protection in form of appropriate type of insert shall be provided.

F. All wiring, switches and electrical connections shall be capable of carrying 10 percent more current than required in the circuit without evidence of overheating or damage.

NOTE: All available warranty information must be provided to the purchaser and to the State Director of School Transportation and Facilities.

TRAINING REQUIREMENTS

IN THE EVENT MAJOR CHANGES ARE MADE IN SYSTEMS OR SUBSYSTEMS, THE SUCCESSFUL BIDDER MAY BE REQUIRED TO PROVIDE TRAINING FOR COUNTY SCHOOL BUS MECHANICS AND SUPERVISORS.

SUCH TRAINING, IF REQUIRED, WILL BE SPECIFIED IN INVITATIONS TO BID, AND WILL INDICATE THE TYPE, EXTENT AND LOCATION OF CLASSES TO BE CONDUCTED.

SPECIAL TRANSPORTATION VEHICLE

INTRODUCTION TO SPECIAL EDUCATION

SCHOOL BUS OR MPV

The specifications in this section are intended to be supplementary to specifications in the chassis and body sections. In general, special transportation buses must meet all the requirements of the preceding sections, plus those listed in this section. Since it is recognized by the entire industry that the field of transportation for exceptional students is characterized by special needs for individual cases, and by a rapidly emerging technology for meeting those needs, a flexible, common-sense approach to the adoption and enforcement of specifications for these vehicles is prudent.

By federal regulations, buses, including school buses, are defined as vehicles designed to carry ten or more passengers. Vehicles with less than ten passenger positions (including the driver) cannot be certified as buses. For this reason, the federal vehicle classification Multipurpose Passenger Vehicle, or MPV, must be used by manufacturers in some cases for these vehicles in lieu of the classification School Bus. In determining passenger capacity, wheelchair positions are counted as passenger positions. This classification system while requiring compliance with a different set of federal standards for school buses does not preclude the use of National School Bus Yellow paint or school bus warning lamp systems.

GENERAL REQUIREMENTS

I. Vehicles constructed for transporting students with special transportation needs shall comply with current FMVSS 222 and **West Virginia Minimum Requirements for Design and Equipment of School Buses.**

II. Bodies may, at the option of the manufacturer, incorporate a section approximately 35 inches, or nine (9) inches in addition to the standard 28 inch section if necessary to provide maximum utilization of space for seats and wheelchairs. Proper bracing shall be added as specified in the body standards.

III. Any school bus that is used specifically for the transportation of students who are confined to a wheelchair and/or other mechanical restraining devices prohibiting their use of the regular service entrance, shall be equipped with a power lift.

IV. 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. (Rear emergency door lift may be installed only with written permission from the State Director of School Transportation and Facilities.)

V. A vehicle equipped with a power lift must contain adequate space and proper restraining devices for a minimum of one wheelchair bound passenger.

AISLE

Aisle leading to emergency door from wheelchair area shall be of sufficient width to permit passage of wheelchairs (30 inches minimum).

FASTENING DEVICES

A. Belt Cutter - Bus shall contain a belt cutter for use in emergencies, including evacuations. Belt cutter should be designed to eliminate the possibility of the operator or others being cut during use, and should be secured in a location of safekeeping such as a first-aid kit.

B. Wheelchair Restraints

1. Each mobile seating device must be in a forward facing direction secured with a four point tie-down system with two tie-downs at the rear and two tie-downs at the front of the device.

2. The wheelchair securement system including all hardware (attachment bolts, track, etc.) shall have been successfully tested to meet minimum impact forces of a 20 G, 30 MPH deceleration to simulate a frontal impact on the transport vehicle.

3. All attachments of the securing system to the mobile seating device and to the floor track or equivalent shall be a "positive" attachment type which prohibits the possible accidental disengagement of the mobile seating device from the secured mode.

4. All attachments or coupling systems which are designed to be connected and disconnected frequently must be operable by an adult person without the use of tools or other mechanical assistance.

5. All hardware and components of the securement system must be free of sharp or jagged areas and be made of corrosion resistant material or treated to resist corrosion.

6. All tie-downs used in the securement system for a mobile seating device must be identical in construction thereby eliminating the possibility that tie-downs might be installed in the wrong location.

7. All permanently attached anchor receptacles must provide multiple position attachment, commonly described as "track".

8. All tie-downs used in the securement system for a mobile seating device must be capable of adjustment in useful length of from 18" minimum to 34" maximum in order to provide sufficient flexibility to fit a majority of possible applications.

9. All tie-downs used in mobile seating devices must be manufactured using synthetic fiber woven webbing capable of being cut to release the mobile seating device in case of an emergency condition which would preclude using the normal release function of the tie-downs.

10. All securement straps for mobile seating devices must be marked with the maximum weight of seating device suitable for use with the securement system.

C. Occupant Restraints

1. An occupant restraint must be included as part of each securement system. The occupant securement must consist of a pelvic restraint and an upper torso restraint.

2. The occupant restraint system including all hardware (attachment bolts, track, etc.) shall have been successfully tested in combination with a mobile seating device securement system as defined in section 1.0 to meet minimum impact forces of 20 G., 30 MPH deceleration to simulate a frontal impact on the transport vehicle.

3. All occupant restraint system attachments or coupling hardware must be a "positive" attachment type which prohibit the possible accidental disengagement of the restraint system.

4. All attachment or coupling systems designed to be connected and disconnected frequently must be operable by an adult person without the use of tools or other mechanical assistance.

5. The mobile seating device restraint should be independent of the occupant restraint and designed so that the weight of the wheelchair is not absorbed by the occupant.

6. Adjustment devices, quick release buckles and webbing, used in the construction of the occupant restraint system must meet requirements of applicable sections of FMVSS 209 and 222.

7. The pelvic restraint must be easily adjusted to fit a range of occupant sizes and contain a quick release buckle. The upper torso restraint must be adjustable to fit a range of occupant sizes and be easily attached and disengaged from the pelvic restraint.

D. The manufacturer of the restraint systems must supply detailed instructions regarding the installation and use of the system, including mounting of attachment hardware or track, suggested angles for attaching tie-downs and proper placement and positioning of the occupant restraint.

E. Padding or elimination of projections of structure or other similar elements must be considered in areas adjacent to the securement area of the mobile seating device.

F. Restraining Devices - Seat frames shall be equipped with attachments or devices to which belts, restraining harnesses, or other devices may be attached. Attachment framework or anchorage devices, if installed, shall conform with FMVSS 210.

G. Automobile type safety seats shall be provided as appropriate for the very young.

GLAZING

Tinted glass may be installed in all doors, windows and windshield. Tinted plastic, that complies with all applicable standards, may be installed in windows to the rear of the driver's compartment.

HEATERS

A. Bus bodies shall have a minimum of one (1) heat exchanger in rear section of bus.

B. Bodies may also be equipped with an auxiliary, diesel fuel fired/air or coolant heater.

1. All auxiliary heaters must comply with Federal Motor Vehicle Standard 301 and be approved by an independent certified testing laboratory.

2. All auxiliary heaters shall utilize a low pressure, single fuel line system drawing fuel directly from the existing bus fuel tank.

3. All auxiliary heaters shall be equipped with a resettable dual overheat cut-out.

4. All auxiliary heaters shall have both low voltage cut-out and high voltage cut-out.

5. Auxiliary coolant heaters on Type C and D vehicles shall have a high thrust circulation pump.

6. Auxiliary coolant heaters on Type C and D vehicles shall have a dual ignition system, utilizing both electronic spark and glow plug.

7. Auxiliary coolant heaters on Type C and D vehicles shall be equipped with a high-temperature automatic monitoring switch with a temperature range of 178 degrees F to 194 degrees F for passenger comfort.

8. Auxiliary coolant heaters shall provide the following heat output requirements:

   a. Type A Vehicles - Minimum 17,000 BTU

   b. Type B Vehicles, under 35 passengers - Minimum 24,000 BTU

   c. Type B Vehicles, 35 passengers and above, Type C and D Vehicles - Minimum 41,000 BTU

See Heaters, pages 27-29.

POWER LIFT

A. Lifting mechanism shall be able to lift minimum pay load of eight hundred (800) pounds.

B. When the platform is in the fully up position, it shall be locked in position mechanically or hydraulically by means other than a support, or lug in the door.

C. Lift structure must have adequate padding or barriers for passenger protection. The lift structure shall not interfere with driver's vision. (The lift platform is exempt from being padded.)

D. Lift control device to be mounted on the lift door in an accessible location provided by the manufacturer. There shall be a means of preventing the lift platform from falling while in operation due to a power failure.

E. Power lifts shall be so equipped that they may be manually operated in the event of power failure or failure of the power lift mechanism.

F. Lift travel shall allow the lift platform to rest securely on the ground. Full and smooth deployment through the full range of travel. The lift platform shall be 32" x 42" minimum of clear and usable space.

G. The front and sides of the platform shall be designed to restrain wheelchair during the raising and lowering process.

H. For maximum safety of the wheelchair user, require both sides of the platform to be fitted with folding hand rail assembles which extend above the floor line of the lift platform a minimum of 18 inches and are a minimum of 24 inches in length.

I. A restraining device shall be affixed between the hand rails on each side of the lift platform to prohibit the wheelchair and occupant from rolling off the platform when the lift is in any position other than fully extended to ground level.

J. A self-adjusting, skid-resistant plate, a minimum of 3 inches in height 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 I., the preceding paragraph. The lift platform must be skid-resistant.

K. A circuit breaker or fuse shall be installed between power source and lift motor if electrical power is used.

L. The lift mechanism shall be equipped with switches or by-pass valves to prevent excessive pressure from building in the system when the platform reaches the full up or down position. If lift is not powered down a mechanism shall be installed to prevent a rapid descent to ground level.

M. An actuating switch shall be installed in the circuit to prevent the lift mechanism from operating when doors are closed.

N. When floor section is cut away for lift, a covered chain shall be installed to protect lift opening when lift is in lowered position.

O. The lift manufacturer shall provide upon request, proof of product liability insurance in the amount of $2,000,000.

P. The lift manufacturer shall provide service seminars for maintenance and service personnel.

REGULAR SERVICE ENTRANCE DOOR

A. Stainless steel grab rails shall be placed on each side of this entrance in a manner to afford the greatest advantage to small pupils.

B. Entrance shall have three (3) step risers of equal height, with the first no less than 12 inches or more than 14 inches above ground level. (Outward opening doors are permissible, if necessary to meet this requirement.) EXCEPTION: Type A and B vehicles under 35 passengers may use two (2) step risers if riser does not exceed nine (9) inches in height. Type D vehicles - 12 to 16 inches.

RESTRAINING DEVICES, PASSENGER SEATS

Seat frames shall be equipped with attachments or devices to which belts, restraining harnesses, or other devices may be attached. Attachment framework or anchorage devices, if installed, shall conform with FMVSS 210.

SEATING ARRANGEMENTS

Flexibility in seat size and spacing to accommodate special devices shall be permitted due to the constant changing of passenger requirements. All seating shall be forward facing.

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 door(s), when open, from obstructing the right front regular service door (excluding a regular front service door lift).

C. The opening may extend below the floor through the bottom of the body skirt. If such opening is used, reinforcements shall be installed at the front and rear of the floor opening to support the floor and give it the same strength as the floor throughout the bus.

D. The opening, with doors open, shall be of sufficient width to allow the passage of wheelchairs. The minimum clear opening shall be forty (40) inches in width, and fifty-six (56) inches in height.

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. Door posts and headers for 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.

SPECIAL SERVICE ENTRANCE DOORS

A. A single door may be used if the width of the door opening does not exceed forty-four (44) inches.

B. Two doors shall be used if any single door opening would have to exceed forty-four (44) inches.

C. All doors shall open outwardly.

D. All doors shall have flat folding, positive fastening, devices to hold doors in the open position.

E. All doors shall be weather sealed. On buses with double doors, they shall be so constructed that a flange on the forward door overlaps the edge of the rear door when closed.

If optional power doors are installed, the design shall permit release of the doors for opening and closing by the attendant from the platform inside the bus. A manual override system must be provided.

F. When manually operated dual doors are provided, the rear door shall have at least a one point fastening device to the header.

1. 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.

2. These locking devices shall afford maximum safety when the doors are in the closed position.

3. 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.

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.

H. Each door shall have windows set in rubber compatible within one inch of the lower line of adjacent sash.

I. Door(s) shall be equipped with a device that will actuate a green flashing visible signal located in the driver's compartment when door(s) is not securely latched and ignition is in "on" position.

J. A switch shall be installed so that the lifting mechanism will not operate when the lift platform door(s) is closed.

K. When frame mounted power lift is used, door panels shall extend to bottom of body skirt. When ramps are used, doors shall extend to cover the ramp container.

L. A light or lights shall be located in the special service door area to illuminate the platform and approach area when lift is in the "full-down" position.

SUSPENSION

The chassis shall be equipped with air ride suspension on all units equipped with special service entrance doors. EXCEPTION: Type A and B vehicles under 35 passengers, unless offered by chassis manufacturer.

APPENDIX A

HIGHWAY SAFETY PROGRAM STANDARD NO. 17

Pupil Transportation Safety

I. SCOPE

This standard establishes minimum requirements for a State highway safety program for pupil transportation safety; including the identification, operation, and maintenance of school buses; training of personnel; and administration.

II. PURPOSE

The purpose of this standard is to reduce, to the greatest extent possible, the danger of death or injury to school children while they are being transported to and from school.

III. DEFINITIONS

"Type 1 school vehicle" means any motor vehicle with motive power, except a trailer, used to carry more than 16 pupils to and from school. This definition includes vehicles that are at any time used to carry school children and school personnel exclusively, and does not include vehicles that only carry school children along with other passengers as part of the operations of a common carrier.

"Type 2 school vehicle" means any motor vehicle used to carry 16 or less pupils to or from school. This does not include private motor vehicles used to carry members of the owner's household.

IV. REQUIREMENTS

Each State, in cooperation with its school districts and its political subdivisions, shall have a comprehensive pupil transportation safety program to assure that school vehicles are operated and maintained so as to achieve the highest possible level of safety.

ADMINISTRATION

A. There shall be a single State agency having primary administrative responsibility for pupil transportation, and employing at least one full-time professional to carry out its responsibilities for pupil transportation.

B. The responsible State agency shall develop an operating system for collecting and reporting information needed to improve the safety of school vehicle operation, in accordance with Safety Program Standard No. 10, "Traffic Records," § 204.4.

IDENTIFICATION

Each State shall establish and maintain compliance with the following requirements for identification and equipment of school vehicles. The use of stop arms is at the option of the State.

A. Type 1 school vehicles shall:

1. be identified with the words "SCHOOL BUS" printed in letters not less than 8 inches high, located between the warning lamps as high as possible without impairing visibility of the lettering from both front and rear of the vehicle;

2. be painted National School Bus Glossy Yellow, in accordance with the colorimetric specifications of Federal Standard No. 595a, Color 13432, except that the hood shall be either that color or lusterless black, matching Federal Standard No. 595a, Color 37038;

3. have bumpers of glossy black, matching Federal Standard No. 595a, Color 17038; unless, for increased night visibility, they are covered with a retroflective material;

4. be equipped with a system of signal lamps that conforms to the school bus requirements of Federal Motor Vehicle Safety Standard 108, 49 CFR 571.21; and

5. have a system of mirrors that will give the seated driver a view of the roadway to each side of the bus, and of the area immediately in front of the front bumper, in accordance with the following procedure: When a rod, 20 inches long, is placed upright on the ground at any point along a traverse line 1 foot forward of the forward-most point of a school bus, and extending the width of the bus, at least 7 1/2 inches of the length of the rod shall be visible to the driver, either by direct view or by means of an indirect visibility system.

B. Any school vehicle meeting the identification requirements of A. 1-4 (above) that is permanently converted for use wholly for purposes other than transporting pupils to or from school shall be painted a color other than National School Bus Glossy Yellow, and shall have the stop arms and equipment required by section A. 1-4 (above) removed.

C. Type 1 school vehicles operated on a public highway and transporting primarily passengers other than school pupils shall have the words "SCHOOL BUS" covered, removed, or otherwise concealed, and the stop arms and equipment required by section A. 4 (above) shall not be operable through the usual controls.

D. Type 2 school vehicles shall either:

1. Comply with all the requirements for Type 1 school vehicles; or

2. Be of a color other than National School Bus Glossy Yellow, have none of the equipment specified (Identification - A. 4) and not have the words "SCHOOL BUS" in any location on the exterior of the vehicle, or in any interior location visible to a motorist.

The State shall establish conditions under which one or the other of the above two specifications for Type 2 vehicles shall apply.

OPERATION

Each State shall establish and maintain compliance with the following requirements for operating school vehicles:

A. Personnel

1. Each state shall develop a plan for selecting, training, and supervising persons whose primary duties involve transporting school pupils, in order to assure that such persons will attain a high degree of competence in, and knowledge of, their duties.

2. Every person who drives a Type 1 or Type 2 school vehicle occupied by school pupils shall, as a minimum:

   a. have a valid state driver's license to operate such a vehicle(s);

   b. meet all special physical, mental, and moral requirements established by the State agency having primary responsibility for pupil transportation; and

   c. be qualified as a driver under the Motor Carrier Safety Regulations of the Federal Highway Administration 49 CFR 391, if he or his employer is subject to those regulations.

B. Pupil Instruction

At least twice during each school year, each pupil who is transported in a school vehicle shall be instructed in safe riding practices, and participate in emergency evacuation drills.

C. Vehicle Operation

1. Each State shall develop plans for minimizing highway use hazards to school vehicle occupants, other highway users, pedestrians, and property, including but not limited to:

   a. careful planning an annual review of routes for safety hazards;

b. planning routes to assure maximum use of buses, and avoid standees;

c. providing loading and unloading zones off the main traveled part of highways, wherever it is practicable to do so;

d. establishing restricted loading and unloading areas for school buses at, or near schools;

e. requiring the driver of a vehicle meeting or overtaking a school bus that is stopped on a highway to take on or discharge pupils, and on which the red warning signals specified (Identification - A. 4) are in operation, to stop his vehicle before it reaches the school bus and not proceed until the warning signals are deactivated; and

f. prohibiting, by legislation or regulation, operation of any vehicle displaying the words "SCHOOL BUS," unless it meets the equipment and identification requirements of this standard.

2. Use of flashing warning signal lamps while loading or unloading pupils shall be at the option of the State. Use of red warning signal lamps for any other purpose, and at any time other than when the school vehicle is stopped to load or discharge passengers shall be prohibited.

3. When vehicles are equipped with stop arms, such devices shall be operated only in conjunction with red signal lamps.

4. Seating

a. Seating shall be provided that will permit each occupant to sit in a seat in a plan view lateral location, intended by the manufacturers to provide seating accommodation for a person at least as large as a 5th percentile adult female, as defined in 49 CFR 57.3.

b. Bus routing and seating plans shall be coordinated so as to eliminate standees when a school vehicle is in motion.

c. There shall be no auxiliary seating accommodations such as temporary or folding jump seats in school vehicles.

d. Drivers of school vehicles equipped with lap belts shall be required to wear them whenever the vehicle is in motion.

e. Passengers in Type 2 school vehicles equipped with lap belts shall be required to wear them whenever the vehicle is in motion.

VEHICLE MAINTENANCE

Each State shall establish and maintain compliance with the following requirements for vehicle maintenance:

A. School vehicles shall be maintained in safe operating conditions through a systematic preventive maintenance program.

B. All school vehicles shall be inspected at least semiannually, in accordance with Highway Safety Program manual Vol. 1, published by the Department of Transportation January 1969. School vehicles subject to the Motor Carrier Safety Regulations of the Federal Highway Administration shall be inspected and maintained in accordance with those regulations (49 CFR Parts 393 and 396).

C. School vehicle drivers shall be required to perform daily pretrip inspections of their vehicles, and to report promptly and in writing any defects or deficiencies discovered that may affect the safety of the vehicle's operation or result in its mechanical breakdown. Pretrip inspection and condition reports for school vehicles subject to the Motor Carrier Safety Regulations of the Federal Highway Administration shall be performed in accordance with those regulations (49 CFR 392.7, 392.8, and 396.7).

V. PROGRAM EVALUATION

The pupil transportation safety program shall be evaluated at least annually by the State agency having primary administrative responsibility for pupil transportation. The National Highway Traffic Safety Administration shall be furnished a summary of each evaluation.

APPENDIX B

ELECTRICAL CURRENT DRAW

PROCEDURE FOR DETERMINING VEHICLE ELECTRICAL LOAD VALUE

The vehicle electrical load shall be the minimum electrical load value as determined from the applicable SBMI Current Draw Table included in this Appendix, with the following exceptions:

* 1. The SBMI minimum electrical load value shall increase by a total of the current draw (in amperes) of all components ordered in excess of the SBMI current draw table.

* 2. The SBMI approved minimum electrical load value may reduced by a total of the current draw (in amperes) for any item omitted from the vehicles ordered.

* A chassis supplier shall consider these exceptions only when annotations for bids (or quotations) indicate a revised minimum electrical load value.

APPENDIX B (contd.)

SBMI CURRENT DRAW TABLE FOR TYPE A VEHICLES

CONSTANT LOADS	ACTUAL CURRENT DRAW (AMPS.) PER UNIT		NO. OF UNITS		TOTAL CURRENT DRAW (AMPS.)
1. Chassis-Mounted Components*	40.0	X	1	=	40.0
2. Tail Lights	0.6	X	2	=	1.2
3. Clearance Lights	0.3	X	4	=	1.2
4. Identification (cluster)	0.3	X	6	=	1.8
5. Body Instrument Panel	0.3	X	1	=	0.3
6. Under Seat Heater, Large +	12.2	X	1	=	12.2
7. Under Seat Heater, Small	6.1	X	1	=	6.1
INTERMITTENT LOADS					
(Values of current draw shown are 35% of actual)					
8. Flashing Warning Signal System (lamps and motor)	2.2	X	2	=	4.4
9. Stepwell and Dome Lights	0.3	X	5	=	1.5
10. Stop (brake) Lamps	0.7	X	2	=	1.4
11. Directional Signals	0.7	X	s	=	1.4
12. Back Up Lamps	0.7	X	2	=	1.4
SBMI APPROVED MINIMUM ELECTRICAL LOADS VALUE					60.7

*Includes Cab Heater Defroster System, Windshield Wiperwasher System, etc.
+Not included in total electrical load value.

SBMI CURRENT DRAW TABLE FOR TYPE B, C AND D VEHICLES

CONSTANT LOADS	ACTUAL CURRENT DRAW (AMPS.) PER UNIT		NO. OF UNITS		TOTAL CURRENT DRAW (AMPS.)
1. Chassis-Mounted Components (Industry Average)	15.0	X	1	=	15.0
2. Tail Lights	0.6	X	2	=	1.2
3. Clearance Lights	0.3	X	4	=	1.2
4. Identification (Cluster)	0.3	X	6	=	1.8
5. Intermediate Marker Lamps	0.3	X	2	=	0.6
6. Body Instrument Panel	0.3	X	1	=	0.3
7. Illuminated School Bus (Destination) Sign	4.1	X	1	=	4.1
8. Radio and/or P.A. System	1.0	X	1	=	1.0
9. Windshield Wiper Motor	6.0	X	2	=	12.0
10. Primary Front Heater	24.0	X	1	=	24.0
11. Primary Windshield Defroster	9.5	X	1	=	9.5
12. Supplementary Front Heater	9.5	X	1	=	9.5
13. Supplementary Windshield Defroster	9.5	X	1	=	9.5
14. Under Seat Heater, Large	12.2	X	1	=	12.2
15. Under Seat Heater, Small*	6.1	X	1	=	6.1
16. Defroster Fan	3.0	X	1	=	3.0
INTERMITTENT LOADS (Values of Current Draw Shown are 35% of Actual)					
17. Flashing Warning Signal System (Lamps and Motor	2.2	X	2	=	4.4
18. Stepwell and Dome Lights	0.3	X	7	=	2.1
19. Stop (brake) Lamps	0.7	X	4	=	2.8
20. Directional Signals	0.7	X	3	=	2.1
21. Back up Lamps	0.7	X	2	=	1.4
22. Windshield Washers	0.9	X	1	=	0.9
SBMI APPROVED MINIMUM ELECTRICAL LOADS VALUE					118.6

*Not included in Total Electrical Load Value

APPENDIX C

SCHOOL BUS TYPE

DEFINITIONS

TYPE A

A Type "A" school bus is a conversion or body constructed upon a van-type compact truck or a front-section vehicle, with a gross weight rating of 10,000 pounds or less, designed for carrying more than ten (10) persons.

TYPE B

A Type "B" school bus is a conversion or body constructed and installed upon a van or front-section vehicle chassis, or stripped chassis, with a vehicle weight rating of more than 10,000 pounds, designed for carrying more than ten (10) persons. Part of the engine is beneath and/or behind the windshield and beside the driver's seat. The entrance door is behind the front wheels.

TYPE C

A Type "C" school bus is a body installed upon a flat back cowl chassis with a gross vehicle weight rating of more than 10,000 pounds, designed for carrying more than ten (10) persons. All of the engine is in front of the windshield and the entrance door is behind the front wheels.

TYPE D

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

APPENDIX D

SPECIFICATIONS FOR COMPRESSED NATURAL GAS (CNG) BUSES

CNG - FUEL CONVERSION

Conversion and maintenance is to be performed only under the supervision of an individual who has satisfactorily completed a training program provided by a CNG original equipment manufacturer. A training program shall involve the mechanics of installation, maintenance, repair, trouble shooting and safety procedures.

CNG VESSELS ON SCHOOL BUS

A. Each CNG fuel supply vessel shall be constructed and inspected in accordance with ANSI/NFPA 52-1992 standards and shall have a rated service pressure of not less than 3000 psi at 70 degrees F. The fuel supply vessel shall not be filled beyond the working pressure stamped on the vessel neck and displayed on a label near the filler connection; corrected for the ambient temperature at time of filling as prescribed by ANSI/NFPA 52-1992 Edition, Sec. 2-4.1.1, 2-4.2, 2-4.4, and 2-4.5.

B. Shall be fitted with ANSI/NFPA 52-1992, Sec. 2-5 and 2-9 and ANSI/AGA NGV2-1992, Sec. 1-10, approved vessel valves with an approved fused burst disc for the DOT approved vessel.

C. Vessel valves shall be protected by guards or expanded steel grating of 3/16" minimum.

D. Steel vessels must have protective paint coating.

MOUNTING VESSELS TO SCHOOL BUS

All safety devices that may discharge shall be vented to the outside of the vehicle as follows:

A. Fuel supply vessels installed within a closed compartment shall be vented to the outside of the vehicle with a flexible bag. Such bag shall be constructed of material that is non-flammable or self-extinguishing. The bag shall be shielded or installed in a protected location to prevent damage from unsecured objects and abrasion.

B. The vent or vents for the bag shall have an opening area of not less than three square inches, and shall not exit into the wheel well.

C. Bolts - 5/8" diameter grade 8 bolts shall be used for brackets holding vessels to main frame, body or channel iron.

D. There shall be a minimum of 2 bolts per bracket assembly. Nuts with suitable locking washers, aircraft type steel locking nuts or nuts with safety wire capability shall be used.

E. If channel iron is used minimum specifications are 4" x 5/16".

F. Channel iron to be attached to main frame with body clamps or U-bolts and 5/8" bolts, grade 8 steel.

G. Vessels are to be installed with as much road clearance as practicable, but not lower than the center line of the drive axle. If CNG vessels are mounted inboard of frame rails in the vicinity of the drive shaft, protective drive shaft loops shall be installed within 12" of the universal joints.

FUEL LINES

Fuel lines shall be permanently secured at intervals of not more than 2 feet with aviation type clamps, and:

A. Shall be placed in such a manner as to minimize the possibility of damage due to vibrations, strains or wear.

B. Any fuel line passing through, under or over a structural member shall be protected by rubber grommets or tubing. Loops in the fuel lines shall be provided at appropriate stress points.

C. All fuel lines shall meet or exceed SAE heavy duty hydraulic brake line specifications with a minimum working pressure of 3600 psi and a maximum burst pressure of at least 10,000 psi, hydrostatically tested.

D. An automatic natural gas shutoff valve or solenoid shall be provided as an integral part of the regulator package assembly.

E. A manual shutoff valve shall be installed between the vessels and the regulator. This shut-off valve shall be readily accessible to the driver, be protected from rocks and other forms of debris, and be on the curb side of the bus where possible. Such shut-off valve shall be clearly marked with reflective material. If access is gained by cutting a hole in the side of the bus, suitable protective material shall be placed around the edge of the hole. Wherever possible, the manual shut-off valve should be located as close as possible to the CNG vessels.

F. Vapor hose from regulator to mixer shall have a rating of at least 20 psi and be wire or fiber reinforced and flame tested.

G. First stage regulator shall have an inlet rating of at least 3000 psi and a pressure safety factor of at least four (4).

VEHICLE REFUELING CONNECTION

A. The fueling systems shall be equipped with a backflow check valve that will prevent the return flow of gas from vessel(s) to the filling connection.

B. All school buses shall be fitted with a refueling interlock system to prevent the bus from being moved on its own power during a refueling operation.

C. The fueling connection shall meet the standards of ANSI/NFPA 52-1992, Sec. 2-11.1 through 2-11.4.

D. The filler hose vent valve on the refueling probe shall be directed away from the operator.

REFUELING

A. Shall be done only by trained drivers and personnel.

B. Engine must be shut off during refueling.

C. No source of ignition or flame within 20 feet during refueling.

FITTINGS

All fittings or attachments shall be inspected monthly for leaks, wear, tightness or undue stress as applicable, and records maintained of the same. Soap water solution or portable leak detectors are recommended for CNG fittings.

LABELING REQUIRED

A. CNG vessel area labels showing CNG vessel I.D., hydrostatic test data and CNG vessel master manual shut-off valve location.

B. Engine compartment labels to include CNG warning and instructions to mechanics including the following:

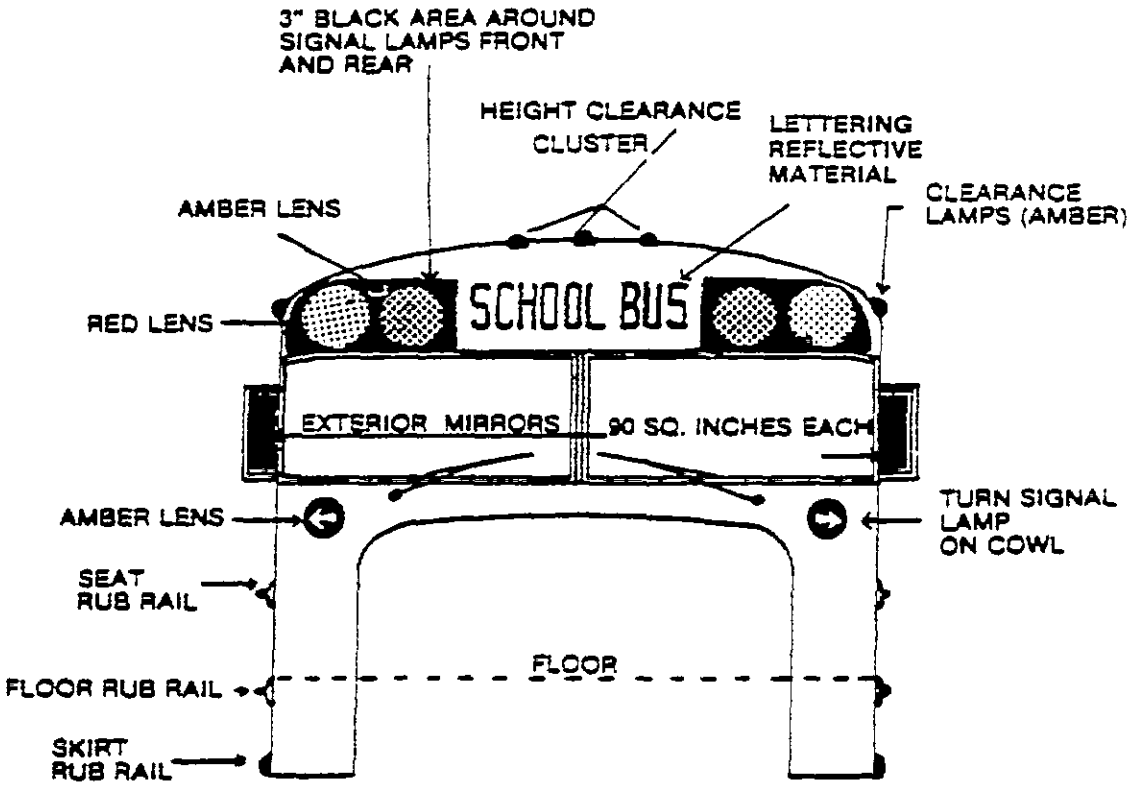
1. CNG Fueled Vehicle.
2. System Service Pressure.
3. Installers name or company.
4. Vessel retest date(s) or expiration.
5. Total vessel water volume in gallons (liters).

CNG EQUIPMENT

Manufacturers wishing to deal in CNG equipment in West Virginia must meet all applicable federal and state requirements.

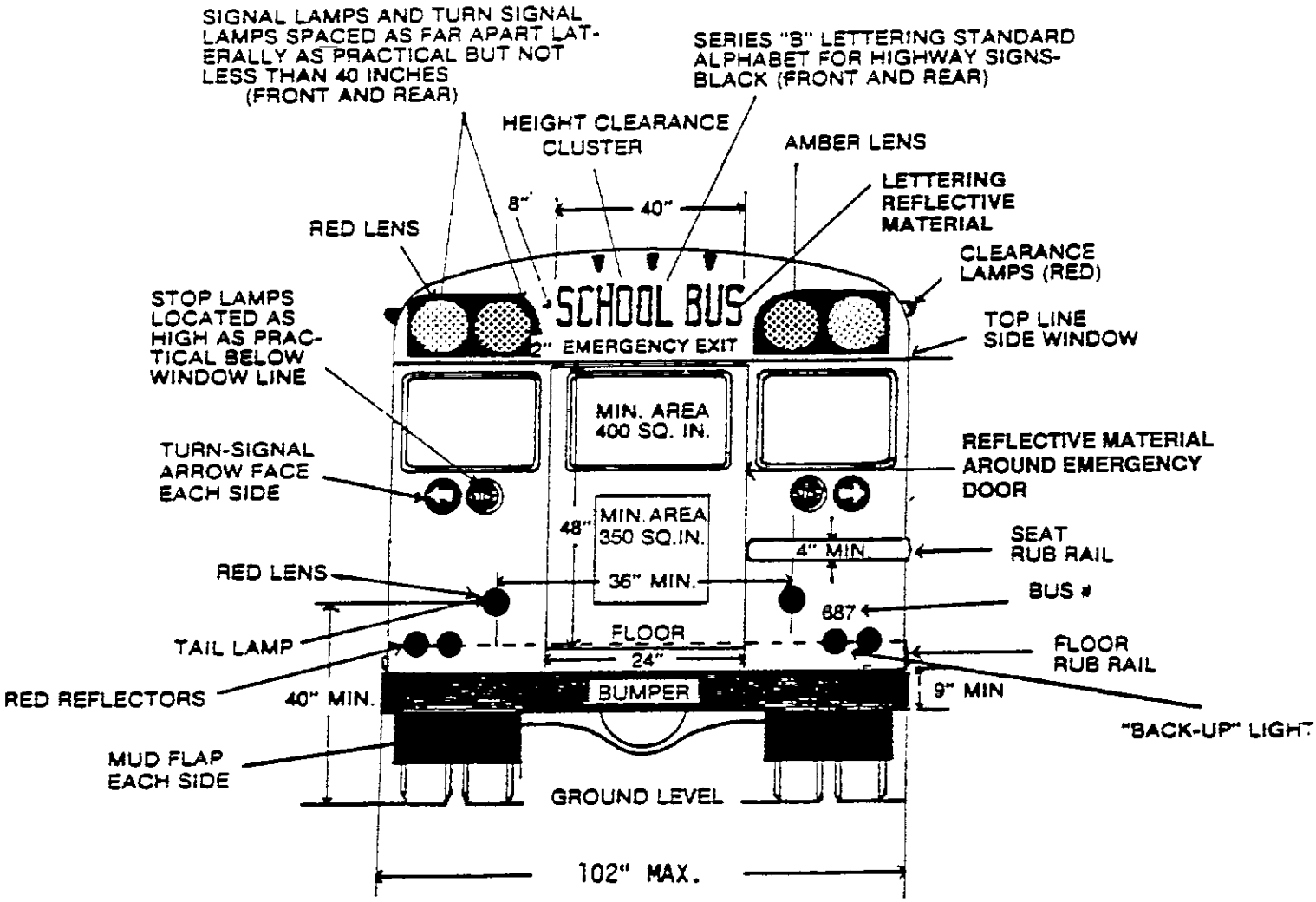
LIMIT OF FLAMMABILITY

Natural gas introduced into any system covered by this standard shall have a distinctive odor potent enough for its presence to be detected down to a concentration in air of not over 1/5 of the lower limit of flammability.



FRONT ELEVATION

Fig. No. 1



REAR ELEVATION

Fig No. 2

FORM HD 201
(10-66)

FISCAL NOTE WORKSHEET

HD NO _____ DRAFT NO _____ BILL NO _____ SOLUTION NO _____

SUBJECT: W. Va. Minimum Requirements for Design and Equipment of School Buses FUND General

SOURCE OF REVENUE: ☐ GENERAL ☐ SPECIAL ☐ OTHER (SPECIFY) _____

COST ESTIMATE BASED ON: ☐ AN ORIGINAL ESTIMATE ☐ BUDGET BILL ☐ OTHER (SPECIFY) _____

INCOME ESTIMATE BASED ON: ☐ AN ORIGINAL ESTIMATE ☐ BUDGET BILL ☐ OTHER (SPECIFY) _____

SHOW OVER-ALL EFFECT IN ITEMS 1 AND 2 AND ITEM 3 GIVE EXPLANATION OF BREAKDOWN BY FISCAL YEAR INCLUDING LONG-RANGE EFFECT

	ANNUAL		FISCAL YEAR		
EFFECT OF PROPOSAL	INCREASE	DECREASE	CURRENT	NEXT	THEREAFTER
1.ESTIMATED TOTAL COST	$ -0-	$	$	$	$
PERSONAL SERVICES CURRENT EXPENSES REPAIRS AND ALTERATIONS EQUIPMENT OTHER	$	$			
2. ESTIMATED TOTAL REVENUES	$ -0-	$	$	$	$

3. EXPLANATION OF ABOVE ESTIMATES (INCLUDING LONG-RANGE EFFECT):

No additional cost for implementation.

DATE 01/13/95

AGENCY Department of Education

AUTHORIZED REPRESENTATIVE

2314t/0044t

EXECUTIVE SUMMARY

WEST VIRGINIA BOARD OF EDUCATION

POLICY NUMBER AND TITLE: Policy 4334
West Virginia Minimum Requirements for Design and Equipment of School Buses

PUBLIC COMMENT PERIOD ENDED: March 6, 1995

BACKGROUND:

In accordance with Policy 4334 this revision of the present requirements, revised in 1993, brings them into compliance with new federal standards, and technological developments that have been made available since the last revision. Recommendations for this revision are made by the State Director of School Transportation and Facilities, with assistance and cooperation of county superintendents, county transportation directors, county maintenance personnel and representatives from manufacturers of school bus chassis and bodies.

PURPOSE:

The revision is to update and make corrections, deletions or additions to West Virginia Minimum Requirements for Design and Equipment of School Buses to meet or exceed federal highway safety standards and national standards for school buses now in effect.

CONTENTS:

Policy 4334, West Virginia Minimum Requirements for Design and Equipment of School Buses, is being revised to bring the requirements into compliance with new federal standards and technological developments that have been made available.

IMPACT:

The revision of the minimum requirements will update components and construction of school buses which will contribute to the safety, welfare and comfort of those transported.

COMMENTS RECEIVED:

During the comment period only five comments were received from individuals which would involve minor changes. A summary of these comments is attached.

COMMENTS AND SUGGESTIONS LOG

POLICY 4334

WEST VIRGINIA MINIMUM REQUIREMENTS FOR DESIGN AND EQUIPMENT OF SCHOOL BUSES

Action
N: No Response
NA: Not Accepted
A: Accepted

Type
- Negative
+ Positive
. Neutral

Page	Date Received	Individual/Company	Comments/Suggestions	Action/Type	Rational
	Jan. 30, 1995	David Nalker, Pres. Mountain International	MD6030 Transmission is not readily available and is expensive	A+	Continue to use MT643
	Jan. 31, 1995	Arthur I. Boreman El. Sch. Faculty Senate	Indicated approval of Minimum Requirements	A+	
	Feb. 1, 1995	James Bailey, Tr. Dir. Roane County Schools	Continue to specify brake chamber sizes	NA.	Federal Standar Specify Brake Performance
	Feb. 2, 1995	Vernon Wright, Engineer Blue Bird Body Co.	MD6030 Transmission is not readily available and is expensive	A+	Continue to use MT643
	Feb. 21, 1995	Paul Clayton, Tr. Dir. Pendleton Co. Sch.	Need more windwhield area covered by wipers to see mirrors	A.	Articulated wip not available c conventional un
			Crossing control arms need a brace to to prevent vibration	A+	Manufacturers a working on a device to preve vibration

2353t

Foreword

This publication establishes minimum requirements for design and equipment of school buses for the transportation of pupils in compliance with Chapter 18, Article 5, Section 13, Subsection 6 of the West Virginia Code. Careful consideration has been given to the selection of components and construction procedures which contribute to safety, welfare and comfort.

Student transportation is an integral part of a comprehensive educational program. It is a very significant part of the challenge of providing a thorough and efficient system of education. In 1994, nationally over 23 million students were transported daily in 390,000 school buses for an annual cumulative mileage of over 4.2 billion miles. In West Virginia over 245,000 students were transported daily in 3,100 school buses for an annual mileage of close to 41 million miles at a cost of approximately $108 million.

West Virginia consistently demonstrates national leadership in providing safe school buses for the transportation of students in our public schools. For many years, school buses in West Virginia have exceeded the national norm in regard to their design and equipment. For the past several years our buses have been equipped with safety features such as stop arms, roof hatches, strobe lights, and other safety features. Many states are only today equipping their buses with these features that have been standard on West Virginia school buses for some time.

On behalf of the West Virginia Board of Education and the West Virginia Department of Education, I commend the members of the revision committee and all who assisted directly or indirectly in developing these requirements. Your efforts will continue to make West Virginia school buses among the best built in the United States and will contribute to the health, safety, and welfare of all who ride them.

Henry Marockie
State Superintendent of Schools

Preface

The intent of the West Virginia Board of Education is that these requirements shall meet or exceed Federal Highway Safety Standards and National Minimum Standards for School Buses now in effect. Federal standards and West Virginia Motor Vehicle laws shall govern instances not specifically covered in these requirements.

The West Virginia Board of Education is authorized to adopt these requirements under the provisions of Chapter 18, Article 2, Section 5, and Chapter 17C, Article 14, Section 12 of the West Virginia Code.

These requirements represent a revision of the present requirements, bringing them into compliance with new federal standards, and technological developments. Recommendations for this revision were made by the State Director of School Transportation, with the assistance and cooperation of county superintendents, county transportation directors, and representatives from manufacturers of school bus chassis and bodies.

There is on file in the Office of School Transportation and Facilities a letter of approval of the revised requirements from the Commissioner of Motor Vehicles.

REVISION COMMITTEE

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State Director
School Transportation
and
Facilities

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State Coordinator of School
Transportation & Facilities

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Jack Parsons
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(Plus all the volunteer help we can get)

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TO: ~~Vic Barone~~ Cecil Dolin

AGENCY: Education

FROM: JUDY COOPER, DIRECTOR, ADMINISTRATIVE LAW DIVISION

DATE: August 7, 1995

THE ATTACHED RULE FILED BY YOUR AGENCY HAS BEEN ENTERED INTO OUR COMPUTER SYSTEM. PLEASE REVIEW, PROOF AND RETURN IT WITH ANY CORRECTIONS. IF THERE ARE NO CORRECTIONS, PLEASE SIGN THIS MEMO AND RETURN IT TO THIS OFFICE. YOU WILL BE SENT A FINAL VERSION OF THE RULE FOR YOUR RECORDS.

PLEASE RETURN EITHER THE CORRECTED RULE OR THIS FORM WITHIN TEN (10) WORKING DAYS OF THE DATE YOU RECEIVED THIS REQUEST. CALL IF YOU HAVE ANY QUESTIONS.

SERIES: 89 TITLE: 126 Education

* THE ATTACHED RULE HAS BEEN REVIEWED AND IS CORRECT.

SIGNED: _____

TITLE OF PERSON SIGNING: _____

DATE: _____

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* THE ATTACHED RULE HAS BEEN REVIEWED AND NEEDS CORRECTING. THE CORRECTIONS HAVE BEEN MARKED.

SIGNED: ✓ Cecil C. Dolin

TITLE OF PERSON SIGNING: Director, School Transportation and Facilities

DATE: Sept. 1, 1995

NOTE: IF YOU ARE NOT THE PERSON WHO HANDLES THIS RULE, PLEASE FORWARD TO THE CORRECT PERSON.