

MINIMUM STANDARDS FOR OREGON SCHOOL BUSES



2005

Revised 2007



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FOREWORD

The Oregon Department of Education is directed by Oregon statutes to adopt standards for school bus construction and equipment, which reflect national standards. Changes in the national standards, as well as in federal Motor Vehicle Safety Standards, Oregon laws and available school bus products all require revisions of Oregon rules to maintain their consistency and timeliness.

Uniform national standards were first adopted in 1939 and have been revised periodically, with the latest revision occurring at the Eleventh National Conference on School Bus Transportation held in May 2000. The Oregon school bus minimum standards were first adopted in 1949 by the Secretary of State. The rules have been revised many times and the latest were adopted by the State Board of Education in October 2007. The revised rules apply to all new buses purchased after October 26, 2007, and to all used buses introduced into an Oregon school system for the first time after that date.

The guiding principle in establishing these standards is to provide safe and economical school bus vehicles and equipment. All school bus chassis and bodies should be purchased with the assurance from the respective dealer that the bus will meet or exceed the minimum standards, and that it is subject to approval and inspection by the Oregon Department of Education.

For further information contact the Pupil Transportation Services staff, Oregon Department of Education, (503) 947-5600.

A handwritten signature in black ink, reading "Deborah Lincoln". The signature is fluid and cursive, with the first name "Deborah" and last name "Lincoln" clearly distinguishable.

Deborah Lincoln, Director
Pupil Transportation
and Fingerprinting

ACKNOWLEDGMENTS

These revised standards were prepared with the assistance of many people and organizations. The Oregon Department of Education is grateful for their contributions. We wish to thank the school bus chassis and body manufacturers and distributors, school administrators, transportation supervisors and school bus contractors for their invaluable help. We especially want to thank the individuals who attended the National Conference on School Transportation held at Central Missouri State University, 1995, 2000 and 2005, and helped formulate and adopt the national standards which form the base and the guideline for the Oregon minimum standards.

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GENERAL

STATUTORY AUTHORITY

ORS 820.100

- (1) The State Board of Education shall adopt and enforce such reasonable standards relating to school bus . . . construction and . . . equipment as the department deems necessary for safe and economical operation . . .
- (3) Rules adopted under this section:
 - (a) Must be consistent with requirements established by statute or by rule adopted under statutory authority that relate to the same subject.
 - (b) Shall be consistent with minimum uniform national standards, if such standards exist.
 - (c) May include different requirements for different classes or types of school buses or school activity vehicles.
 - (d) May include any exemptions determined appropriate under ORS 820.150.

OBJECTIVE

To maximize the availability of safe and economical vehicles for pupil transportation through adequate state school bus construction and equipment standards.

GOALS

To provide school bus construction and equipment standards that:

1. Specify baseline requirements for components, designs and performance where necessary.
2. Maintain adequate flexibility allowing higher levels of care to meet local needs.
3. Promote the construction of safe and economical buses through specifications consistent with pupil safety and applicable Oregon laws.

DEFINITION OF A SCHOOL BUS

ORS 801.460 “School bus” means a motor vehicle that is described by any of the following:

- (1) A vehicle that is marked with or displays the words “school bus.”
- (2) A vehicle that is used to transport students to or from school and may be used to transport students to or from authorized school activities or functions and that is not a vehicle described by any of the following:

- (a) A vehicle subject to regulation under ORS Chapter 825.
- (b) A vehicle regulated by a city under ORS 221.420.
- (c) A vehicle, commonly known as a private passenger car or private passenger van, that is used by the owner of the vehicle or a relative of the owner of the vehicle for personal transportation of students to or from school or school activities and is not used for compensation except for the sharing of expenses in a ridesharing arrangement or reimbursement of mileage.
- (d) A vehicle that is exempted from regulation as a school bus under ORS 820.150.

OAR 581-053-0002 (6) Regulations for Maintaining Standards Compliance

- (6) School buses and all other pupil transporting vehicles shall be maintained in safe operating condition and shall meet or exceed the minimum standards in effect at the time of purchase plus any subsequent rules applicable to the vehicle.

OAR 581-052-0002 (7) Regulations for Alterations in Bus Construction or Additions of Equipment

- (7) Any additions of vehicle equipment or alterations in the vehicle construction not provided for in the applicable minimum standards for Oregon school buses or school activity vehicles are prohibited without prior approval from the Oregon Department of Education.

OAR 581-053-0002 (16) Regulations for Rebuilding Buses

- (16) Schools or contractors planning to rebuild a school bus shall first secure approval from the Pupil Transportation Services, Oregon Department of Education. (This does not apply to repair of damage.) All rebuilt buses must meet current Oregon Minimum Standards for School Buses and applicable Federal Department of Transportation regulations.

OAR 581-053-0002 (8) Regulations for Bus Purchases

- (8) All school buses and school activity vehicles, which will be transporting students for the first time in a school system in Oregon, must conform, or be made to conform within thirty days of notice of nonconformity, to the Minimum Standards for Oregon School Buses or school activity vehicles currently in force as they apply to each vehicle. Written notification must be sent to the Superintendent of Public Instruction when relocating school or activity buses for a period exceeding 10 days. School and activity buses with a manufacture date prior to September 1, 1993 shall not be relocated. Type 21 activity vehicles may not enter into the fleet for the first time with a manufacture date prior to April 1, 1977. Oregon Department of Education personnel may give a written order that a vehicle is unsafe and shall not be used to transport students when there is a reason to believe that a deficiency is such that continued operation of the vehicle may jeopardize the safety of students or public. The vehicle owner shall notify the Oregon Department of Education that the deficiency is corrected before transporting students.

OAR 581-053-0002 (15) Regulations for Selling Used Buses

- (15) Schools or contractors selling a used school bus shall be responsible for removing all markings that would identify it as a school bus including the bus safety lights.

EXCEPTION: If the bus is sold for the purpose of transporting school children to and from school, the bus identification and bus safety lights need not be removed. If sold for the purpose of transporting workers, the bus safety lights need not be removed.

OAR 581-053-0002 (18) Regulations for Appeal for Variance

- (a) A school or contractor desiring to purchase a school bus or school activity vehicle which cannot meet all required minimum construction standards for school buses or school activity vehicles as applicable in Oregon must forward an "Appeal for Variance" request to the State Superintendent of Public Instruction, Salem, Oregon. This appeal must be made by the highest ranking official with the local operation, and contain at least the following information:
 - (A) The need for such a vehicle;
 - (B) Why a standard school bus or school activity vehicle will not suffice;
 - (C) List of items which will not meet applicable standards; and
 - (D) Passenger capacity of vehicle.
- (b) This variance provision is designed for unique changes or alterations necessary to accommodate special equipment or conditions.

ORS 820.130 Amended Regulations for License Approval

The Department of Transportation shall issue registration for a school bus when notified that the vehicle conforms to applicable rules under ORS 820.100 to 820.120 and that the vehicle is safe for operation on the highways.

Notification required by this section shall be from:

- (1) The Department of Education or its authorized representative regarding vehicles under its regulatory authority.

ORS 820.160 Illegal Display of School Bus Markings, Prohibition, Penalty

- (1) A person commits the offense of illegal display of school bus markings if the person displays the words "School Bus" on any vehicle unless the vehicle:
 - (a) Is used in transporting school children to or from school or an authorized school activity or function; and

NOTE: School Bus License Approval forms will be provided to bus body distributors by the Oregon Department of Education, Pupil Transportation.

- (b) Complies with the applicable requirements under rules established under ORS 820.100, 820.110 and 820.120.
- (2) The offense described in this section, illegal display of school bus markings, is a Class B traffic infraction.

ORS 820.170 Improper School Bus Markings; Penalty

- (1) A person commits the offense of improper school bus markings if the person displays the words "School Bus" on a vehicle without such words being marked in the front and in the rear in letters eight inches high or higher and of proportionate width.
- (2) The offense described in this section, improper school bus markings, is a Class D traffic infraction.

Effective Date for Standards

These standards became effective on July 1, 2004. The rules apply to all new school buses purchased after July 1, 2004, and for all used buses entering an Oregon fleet for the first time after July 1, 2004.

SCHOOL BUS DEFINITIONS FOR STANDARDS

OAR 581-053-0507 School Bus Definitions

- (1) A Type "A-1" school bus is a vehicle with a gross weight rating of 14,500 pounds or less.
- (2) A Type "A-2" school bus is a vehicle with a gross weight rating between 14,500 and 19,500 pounds, and a passenger capacity not to exceed 36.
- (3) A Type "B" school bus is a vehicle with a gross weight rating of more than 10,000 pounds, but less than 19,500 pounds. Most of the engine is beneath and/or behind the windshield and beside the driver's seat. The entrance door is behind the front wheels.
- (4) A Type "C" school bus is a vehicle with all or part of the engine is in front of the windshield and the entrance door is behind the front wheels.
- (5) A Type "D" school bus is a vehicle with the engine mounted in the front behind the windshield, midship, or rear. The entrance door is ahead of the front wheels.

MINIMUM STANDARDS FOR SCHOOL BUS CHASSIS

581-053-0512 Minimum Standards for School Bus Chassis

(1) Air Cleaner:

- (a) The engine intake air cleaner shall be furnished and properly installed by the chassis manufacturer to meet engine specifications.
- (b) All Type C and Type D buses equipped with diesel engines shall have an air cleaner restriction indicator properly installed by the chassis manufacturer to meet engine specifications.

(2) Axles:

The front and rear axles and suspension assemblies shall have a gross weight rating at least equal to that portion of the load as would be imposed by the chassis manufacturer's maximum gross weight rating for each axle.

(3) Air System:

All buses equipped with air systems for brakes shall provide and identify an appropriate air port for plumbing in air powered accessories.

(4) Air-Operated Accessories:

Air-operated accessories shall be plumbed into the vehicle's air supply system in compliance with all the following:

- (a) Safeguarded by a check valve or equivalent device located between the air supply system and the accessory to prevent air loss due to accessory failure. This shall include the supply line for a designated accessory air tank.
- (b) Connected to the air supply system in compliance with all applicable Federal Motor Vehicle Safety Standards.
- (c) Connected in the manner prescribed by the vehicle manufacturer.

(5) Brakes:

- (a) Air brakes are required on all buses having a manufacturer's gross vehicle weight rating of 26,001 pounds or greater.
- (b) An air or power actuated service braking system and parking brake shall be provided.
- (c) 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 8 inches of mercury or less. An illuminated gauge shall be provided 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 brake.

- (A) Vacuum-assist brake systems shall have a reservoir used exclusively for brakes, which shall be adequate to ensure loss in vacuum at full stroke application of not more than 30 percent with engine not running. Brake system on gas-powered chassis shall include suitable and convenient connections for the installation of separate vacuum reservoir.
- (B) Any brake system dry reservoir shall be so 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.
- (d) Buses using a hydraulic assist-booster in the operation of brake system shall be equipped with a warning signal, readily audible and visible to the driver, which will provide continuous warning in the event of a loss of fluid flow from primary source or loss of electric source powering the backup system.
- (e) The brake lines and booster-assist lines shall be protected from excessive heat and vibrations and be so installed as to prevent chafing.
- (f) All brake systems shall be designed to permit visual inspection of brake lining wear without removal of any chassis components except for inspection dust covers or wheels.
- (g) Air brake systems shall be equipped with manual drain valves on all air tanks. A provision shall be made to operate manual drain valve(s) on first (wet) reservoir(s) from the side of the bus unless one of the following options is provided:
 - (A) Automatic moisture ejector on the first (wet) reservoir.
 - (B) An air dryer that has the drying ability to insure an adequate margin of safety under normal and adverse operating conditions.
 - (C) Skirt-mounted controls for manual drain valve(s) shall not extend beyond the outer side of bus skirt panel.

(6) Bumper, Front:

- (a) Front bumper shall be furnished by chassis manufacturer as part of the chassis for Type A-1, A-2, B, and C buses. Type D buses shall have bumpers furnished by the body manufacturer.
- (b) Front bumper shall extend beyond forward-most part of body, grille, hood and fenders and shall extend to outer edges of fenders at bumper top line.
- (c) Front bumper, except breakaway bumper ends shall be of sufficient strength to permit pushing a vehicle of equal gross vehicle weight without permanent distortion to bumper, chassis or body.
- (d) An energy absorbing front bumper may be used providing its design shall incorporate a self-restoring energy absorbing system of sufficient strength to:
 - (A) Push another vehicle of similar GVW without permanent distortion to the bumper, chassis, or body.

- (B) Withstand repeated impacts without damage to the bumper, chassis, or body according to the following performance standards:
 - (i) 7.5 MPH fixed barrier impact (FMVSS cart and barrier test).
 - (ii) 4.0 MPH corner impact at 30 degrees (Part 581 CFR Title 49).
 - (iii) 20.0 MPH into parked passenger car (class B, C, and D buses of 18,000 pounds GVW or more).

- (C) The manufacturer of the energy absorbing system shall provide evidence from an approved test facility (capable of performing the above FMVSS test(s)) that their product conforms to the above.

(7) Chains, Automatic:

Automatic tire chains (traction) may be installed at drive wheels in conformance with manufacturing specifications and any applicable chassis manufacturer standards. (Note: Air-applied chain systems must comply with air-operated accessory requirement included in this rule.)

(8) Certification:

Chassis manufacturer will, upon request, certify to the state agency having pupil transportation jurisdiction that their product meets minimum standards on items not covered by certification issued under requirements of National Traffic and Motor Vehicle Safety Act.

(9) Clutch:

- (a) Clutch torque capacity shall be equal to or greater than, the engine torque output
- (b) A starter interlock shall be installed to prevent actuation of the starter if the clutch is not depressed on all busses manufactured after January 1, 1999.

(10) Color:

Chassis and front bumper shall be black; hood, cowl and fenders shall be in National School Bus Yellow. Hood may be painted low-luster yellow. Wheels may be painted either black or school bus yellow. (Silver lock rings are acceptable.) Type A-1, A-2, and B buses may have manufacturer standard color.

(11) Drive Shaft:

Drive shafts over 24 inches in length shall be protected by metal guard or guards around circumference of drive shaft to reduce the possibility of the shaft whipping through floor or dropping to ground if broken. Guards shall be mounted around front half of each drive shaft section.

(12) Electrical System:

(a) Battery:

- (A) Storage battery shall have a minimum cold cranking capacity rating equal to the cranking current required for 30 seconds at 0° Fahrenheit (-17.8c) and a minimum reserve capacity rating of 120 minutes at 25 amp. Higher capacities may be needed dependent upon optional equipment and local environmental conditions.

- (B) Since all batteries are to be secured in a sliding tray in the body, the battery shall be temporarily mounted on the chassis frame by the chassis manufacturer. This includes Type A-1, A-2 buses unless the battery(ies) are mounted assessable under the hood. In this case the final location of the battery and the appropriate cable lengths provided by the chassis manufacturer shall be according to the SBMI Design Objectives Booklet, May 1990 edition.

(b) Circuits:

An appropriate identifying diagram (color and number coded) for electrical circuits shall be provided to the body manufacturer for distribution to the end user for all buses purchased after September 1, 1993.

(c) Generator or Alternator:

- (A) All buses shall have a generator or alternator with a minimum rating of at least 100 amperes (in accordance with Society of Automotive Engineer rating) with minimum charging of 50 percent of maximum rated output at manufacturer's recommended engine idle speed (12 volt system), and shall be ventilated and voltage-controlled and, if necessary, current-controlled.
- (B) Direct-drive generator or alternator is permissible in lieu of belt drive. Belt drive shall be capable of handling the rated capacity of the generator or alternator with no detrimental effect on other drive components.
- (C) Dual belt drive or equivalent shall be used on Type C and D buses with generator or alternator.

NOTE: Refer to Appendix I for estimating required generator or alternator capacity.

(d) Wiring:

- (A) General—All wiring shall conform to current applicable recommended practices of the Society of Automotive Engineers. 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.
- (B) Chassis manufacturer shall install a readily accessible terminal strip or plug on the body side of the cowl, or at accessible location in engine compartment of vehicles designed without a cowl, which shall contain the following terminals for the body connections:
 - (i) Main 100 amp body circuit,
 - (ii) Tail lamps,
 - (iii) Right turn signal,
 - (iv) Left turn signal,
 - (v) Stop lamps,
 - (vi) Back up lamps,
 - (vii) Instrument panel lights.

(13) Engine Compartment:

- (a) Automatic/Manual Engine Fire Extinguishers: Automatic fire extinguisher systems may be installed in the engine compartment on buses. System must have a visible gauge easily read from the driver's seat and a manual activation switch clearly identified and located in the driver's compartment. The entire system must be UL (Underwriters Laboratories) Approved and assure protection from passenger compartment. Extinguisher system manual activation switch/control shall be safeguarded from accidental activation by a pull-pin or equivalent device. The extinguisher, if mounted in the passenger compartment, shall not be readily removable for use elsewhere, but dedicated for the engine compartment.

(14) Exhaust System:

- (a) Exhaust pipe, muffler, and tailpipe shall be outside bus body compartment and attached to chassis;
 - (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 meet one of the following options:
 - (A) Tailpipe may exit in the rear of the bus provided it:
 - (a) Does not create hand hold.
 - (b) Does not create a step.
 - (c) Exhaust is defused away from passenger compartment.
 - (B) Tailpipe may extend to, but not beyond the body limits on the left side of the bus forward or rearward of the rear tires outboard of chassis centerline as described in Section 14(c)(C) of this rule. If the tailpipe terminates forward of the rear tires it shall terminate not more than 24 inches or less than 6 inches forward of rear tires. No tailpipe shall terminate beneath any emergency exit or fuel fill receptacle.
 - (C) Type A-1, A-2, B, C, and D buses - 48.5 inches minimum from centerline of chassis
- NOTE: Tailpipe may not exit on the right side of vehicle. See OAR 581-53-517(41).
- (d) Exhaust system shall be properly insulated from fuel tank and connections by securely attached metal shield at any point where it is 12 inches or less from tank or tank connections on all gasoline or alternative fueled vehicles.
 - (e) Muffler shall be constructed of corrosion-resistant material.

(15) Fenders, Front, Type C Vehicles:

- (a) Total spread of outer edges of front fenders, measured at fender line, shall exceed total spread of front tires when front wheels are in straight-ahead position.
- (b) When equipped, front fenders shall be properly braced and free from any body attachments.

(16) Frame:

- (a) Frame or equivalent shall be of such design and strength characteristics as 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 manufacturer.
- (e) Frame lengths shall be provided in accordance with SMBI Design Objectives, May 1990 edition.

(17) Fuel Tank:

- (a) Fuel tank shall be provided by the chassis manufacturer. Buses with a passenger capacity of 58 or less shall be equipped with a fuel tank or tanks of minimum 30 gallon capacity with at least a 25 gallon actual draw. Buses with a capacity of 58 or more shall be equipped with a minimum 60 gallon fuel tank with an actual draw of 50 gallons or more. Type A-1, A-2, buses may be equipped with manufacturers' standard tank.
- (b) No portion of the fuel system, which is located rear of the engine compartment, except the filler tube, shall extend above the top of the chassis frame rail. Fuel lines shall be mounted to obtain maximum possible protection from the chassis frame.
- (c) Fuel filter with replaceable element shall be installed between fuel tank and engine.
- (d) Fuel tank installation shall be in accordance with SBMI Design Objectives effective May 1990 and in compliance with all applicable Federal Motor Vehicle Safety Standards.
 - (A) Type A-1, A-2, B, C, and D bus fuel tanks may be mounted on left chassis frame rail or behind rear wheels. Type D buses with rear engines may have the tank mounted ahead of the rear axle between the frame rails.
 - (B) Tank(s) shall be mounted, filled and vented outside of body. The tank(s) location shall not permit fuel spillage to drip or drain on any portion of the exhaust system.
- (e) Alternate engine fuel tank installation shall be in accordance with Oregon Department of Education specifications. Installation of liquefied Petroleum Gas (LPG) tanks shall comply with National Fire Protection Association (NFPA) 58, Liquefied Petroleum Gas code. Dual fuel systems must have approval from the Oregon Department of Education and meet EPA, and manufactures specifications.

(18) Governor:

- (a) An engine governor is permissible. However, when it is desired to limit road speed, road-speed governor should be installed.
- (b) When engine is remotely located from driver, governor shall be installed to limit engine speed to maximum revolutions per minute recommended by engine manufacturer.

(19) Heating System, Provision For:

The chassis engine shall have plugged openings for the purpose of supplying hot water for the bus heating system. The opening shall be suitable for attaching 3/4 inch pipe thread/hose connector. The engine shall be capable of supplying water having a temperature of at least 170° F at a flow rate of 50 pounds/per minute at the return end of 30 feet of 1 inch inside diameter automotive hot water heater hose. (SBMI Standard No. 001 - Standard Code for Testing and Rating Automotive Bus Hot Water Heating and Ventilating Equipment.)

(20) Horn:

Bus shall be equipped with horn or horns of standard make, each horn capable of producing complex sound in bands of audio frequencies between approximately 250 and 2,000 cycles per second and tested per SAC Standard J-377.

(21) Instruments and Instrument Panel:

- (a) Chassis shall be equipped with following instruments and gauges. (Lights in lieu of gauges are not acceptable except as noted):
 - (A) Speedometer.
 - (B) Odometer which will give accrued mileage including tenths of miles.
 - (C) Voltmeter: A graduated charge and discharge ammeter compatible with generating capacities is permitted in lieu of or in addition to a voltmeter.
 - (D) Oil-pressure gauge.
 - (E) Water temperature gauge.
 - (F) Fuel gauge.
 - (G) Upper beam headlight indicator.
 - (H) Air pressure or vacuum gauge according to brake system used: Light indicator or gauge required on vehicle equipped with hydraulic-over hydraulic brake system.
 - (I) Turn signal indicator.
 - (J) Tachometer, when engine is remotely located from driver.
 - (K) Glow plug indicator light, where appropriate.
- (b) All instruments shall be easily accessible for maintenance and repair.
- (c) Above instruments and gauges shall be mounted on instrument panel in such a manner that each is clearly visible to and lies within a 140 degree field of vision for a 95th percentile female anthropomorphic dummy while in normal seated position.
- (d) Instrument panel shall have lamps of sufficient candlepower to illuminate all instruments and gauges and shift selector indicator for automatic transmission.

(22) 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 built-in or engine mounted design. Oil filter shall have a capacity of at least one quart.

(23) Openings:

All openings in floorboard or firewall between chassis and passenger-carrying compartment, such as for gearshift lever and parking brake lever, shall be sealed. Access plates to cover openings shall have adequate gaskets and be fastened securely.

(24) Passenger Load:

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

(A) For purposes of calculation, the driver's weight is 150 pounds.

(B) For purposes of calculation, the pupil weight is 120 pounds per pupil.

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

(c) Manufacturer's gross vehicle weight rating and other chassis information shall be furnished by the manufacturer, the manufacturer's representative or seller to the Oregon Department of Education on forms furnished by the department.

(25) Power and Gradeability:

Gross vehicle weight (GVW) shall not exceed 165 pounds per net published horsepower of the engine at the manufacturer's recommended maximum number of revolutions per minute.

(26) Retarder System:

Retarder system, if installed, shall maintain the speed of the fully loaded school bus at 19.0 MPH on a seven percent grade for 3.6 miles without incurring damage to the retarder or vehicle.

(27) Shock Absorbers:

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

(28) Springs:

(a) Capacity of springs or suspension assemblies shall be commensurate with chassis manufacturer's gross vehicle weight rating;

(b) If rear springs are used, they shall be of progressive type. Front leaf springs shall have a stationary eye at one end and shall be protected by a wrapped leaf in addition to the main leaf.

(29) Steering Gear:

(a) Steering gear shall be approved by chassis manufacturer and designed to assure safe and accurate performance when vehicle is operated with maximum load and at maximum speed.

- (b) Steering mechanism that allows for external adjustment to correct for lost motion shall provide an accessible adjustment location.
- (c) No changes shall be made in steering apparatus, which are not approved by chassis manufacturer.
- (d) There shall be clearance of at least 2 inches between steering wheel and cowl, instrument panel, windshield, or any other surface.
- (e) Power steering of the integral type is required. Power steering shall be approved and installed by chassis manufacturer or authorized chassis representative.
- (f) The steering system shall be designed to provide for means for lubrication of all wear-points, if wear points are not permanently lubricated.

(30) Throttle:

The force required to operate the throttle shall not exceed 16 pounds throughout the full range of accelerator pedal travel.

(31) Tires and Rims:

- (a) Tires and rims of proper size and tires with load rating commensurate with chassis manufacturer's gross vehicle weight rating shall be provided. The use of multi-piece rims and/or tube type tires shall not be permitted on any school bus ordered after January 1, 1999;
- (b) Dual rear tires shall be provided. Type A vehicles may have single rear tires.
- (c) All tires on new buses shall be of same size. Load range of tires shall meet or exceed the gross axle weight rating as required by FMVSS 120.
- (d) If bus is equipped with spare tire and rim assembly, it shall be of the same size as those mounted on the vehicle.
- (e) A spare tire when carried shall be suitably mounted in an accessible location outside passenger compartment. Type A-1, and A-2 buses may have spare tire securely mounted in left rear corner of passenger compartment.
- (f) Recapped tires are prohibited on the front of the bus.
- (g) Regrooved tires are not permitted on any bus.
- (h) Minimum tread depth on tires shall be:
 - (A) Front axle—4/32 inch
 - (B) Rear axle—2/32 inch
 - (i) Tread depth shall be measured as follows: The minimum depth in any two adjacent major grooves at three locations spaced approximately equally around the outside of the tire but not on wear indicators.

(32) Tow Hooks:

Chassis manufacturer shall provide at least one front tow hook on Type C and D buses.

(33) Transmission:

- (a) Transmission shall have an input torque capacity greater than maximum net torque developed by engine.
- (b) When automatic or semiautomatic transmission is used, it shall provide for not less than three forward and one reverse speed. The shift selector, if applicable, shall provide a detent between each gear position when shift selector is not steering column mounted. Type C and D buses shall be equipped with a transmission temperature gauge.
- (c) When manual transmission is used, second gear and higher shall be synchronized. A minimum of three forward speeds and one reverse must be provided.

(34) Turning Radius:

- (a) Chassis with a wheel base of 264 inches or less shall have a right and left turning radius of not more than 42 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.

(35) Undercoating:

Chassis manufacturer shall coat undersides of front fenders with compound to protect surfaces and prevent rust which meets or exceeds federal specifications TT-C-520a, using modified test procedures as defined under "undercoating" of body standards.

(36) Weight Distribution:

- (a) Weight distribution of fully loaded bus on level surface shall be such as to not exceed the manufacturer's front gross axle weight rating (GAWR) and rear gross axle weight rating.
- (b) Weight distribution of fully loaded bus on level surface shall be such that not more than 75 percent of gross vehicle weight is on rear tires and not more than 35 percent is on front tires. Type B and D buses with engine inside front of body and entrance door ahead of front wheels shall have not more than 75 percent of gross vehicle weight on rear tires nor more than 50 percent on front tires. If entrance door is behind front wheels, not more than 75 percent of gross vehicle weight shall be on rear tires not more than 40 percent on front tires. With engine in rear, not more than 75 percent of gross vehicle weight shall be on rear tires or more than 40 percent on front tires.

MINIMUM STANDARDS FOR SCHOOL BUS BODIES

581-053-0517 Minimum Standards for School Bus Bodies

(1) Aisle:

- (a) Minimum clearance of all aisles shall be 12 inches.
- (b) Aisle supports of seat backs shall be slanted away from aisle sufficiently to give aisle clearance of 15 inches at tops of seat backs.

(2) Battery:

- (a) Battery is to be furnished by chassis manufacturer.
- (b) When battery is mounted as described in electrical section, Battery of Chassis Standard, i.e., the body manufacturer shall securely attach battery on slide-out or swing-out tray in closed, vented compartment in body skirt whereby battery may be accessible for convenient servicing and removal from the outside. Battery compartment door or cover shall be hinged at front or top and secured by adequate and conveniently operated latch or other type fastener. This includes Type A-1. A-2 buses unless the battery(ies) are mounted assessable under the hood;
- (c) Access to battery through body floor not permitted.
- (d) Buses may be equipped with a battery shut-off switch. The switch is to be placed in a location not readily accessible to the driver or passengers.

(3) Body Sizes:

It is the body supplier's responsibility to determine that the completed body-on-chassis type bus will fulfill weight distribution requirements as explained in OAR 581-053-0512, Bus Chassis, Section 30, Weight Distribution. Body manufacturer shall determine the vehicle's maximum designed and equipped passenger capacity and post it along with GVWR and vehicle compliance information.

(4) Bumper (Front):

See OAR 581-053-0512, Bus Chassis, Section (6) Bumper, Front. Deer guards may be added to a front bumper to protect the front grill. Deer guards may not be in any portion of the driver's forward view, including use of all mirrors.

(5) Bumper (Rear):

- (a) Rear bumper for all body on chassis units shall be of pressed steel channel or equivalent material at least 3/16-inch thick and 8 inches wide (high), and of sufficient strength to permit pushing by another vehicle without distortion. Type A-1 and A-2 buses (not body on chassis) may be manufacturers' standard.
- (b) Bumper for all body on chassis units shall wrap around back corners of bus. It shall extend forward at least 12 inches, measured from rear-most point of body at floor line. Type A-1 and A-2 buses (not body on chassis) may be manufacturers' standard.

- (c) Bumper shall be attached to chassis frame in such manner that it may be easily removed, shall be so braced as to develop full strength of bumper section from rear or side impact, and shall be so attached as to prevent the insertion of small fingers between the body and bumper.
- (d) Bumper shall extend beyond rear-most part of body surface at least one inch, measured at floor line.
- (e) An energy absorbing rear bumper may be used providing a self-restoring energy absorbing bumper system so attached as to prevent the hitching of rides and of sufficient strength to:
 - (A) Permit pushing by another vehicle without permanent distortion to the bumper, chassis, or body.
 - (B) Withstand repeated impacts without damage to the bumper, chassis, or body according to the following performance standards:
 - (i) 2.0 MPH fixed barrier impact (FMVSS cart and barrier test).
 - (ii) 4.0 MPH corner impact at 30 degrees (Part 581 CFR Title 49).
 - (iii) 5.0 MPH buses (Part 581 CFR Title 49).
 - (C) 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.

(6) Ceiling:

See Section (19), Insulation and Section (20), Interior of this rule.

(7) Color and Retroflective Materials:

- (a) The school bus body shall be painted a uniform National School Bus Yellow. The body exterior paint trim, bumper, lamp hoods, and emergency door lettering shall be black. The roof of the bus may be painted white. The white color may extend across the roof down to the drip rails or within 6 inches above the passenger windows on the sides of the bus except that front and rear caps shall remain National School Bus Yellow. Retroflective material may be used as trim on rear bumper. Beltline lettering may be yellow.
- (b) Retroflective material approved by the Department of Education shall be installed as a background for the required school bus lettering both on the front and rear of the body of buses purchased after September 1, 1993. Maximum dimensions: 12" x 36", unless equipped with approved lighted school bus signs. Retroflective material shall have reflective values equal or greater than 3 M Scotchlite Diamond Grade and retain at least 50 percent of those values for a minimum of six years.
- (c) Additional retroflective material, if used, shall be automotive engineering grade or better, meeting initial reflectance values in FHWA FP-85 and retaining at least 50 percent of those values for a minimum of six years. Retroflective materials and markings, if used, may include any or all of the following:
 - (A) Front and rear bumper: may be marked diagonally 45 degrees down to centerline of pavement with two-inch wide strips of non-contrasting reflective material.
 - (B) Rear of the bus body may be marked with a strip of retroflective National School Bus Yellow matching material no greater than two inches wide to be applied to the back of the bus, extending from the left lower corner of the "SCHOOL BUS" lettering, across to the left side of the bus; then vertically down to the top of the bumper; across the bus on a line immediately

above the bumper to the right side, then vertically up to a point even with the strip placement on the left side, and concluding with a horizontal strip terminating at the right lower corner of the "SCHOOL BUS" letter.

- (C) Sides of bus body: may be marked with retroflective National School Bus Yellow matching material comprising background for letter at least six inches but no more than 12 inches in width, extending the length of the bus body and located (vertically) as close as practicable to the beltline. Two-inch wide reflective material having high intensity reflectance values (3M Scotchlite Diamond Grade or equivalent) may be substituted for the six inch to twelve inch wide materials.

(8) Construction:

- (a) Construction shall be of prime commercial quality steel, or other metal, or other material with strength at least equivalent to all-steel as certified by bus body manufacturer.
- (b) Construction shall provide a watertight and reasonably dustproof unit.
- (c) Must meet or exceed applicable federal motor vehicle safety standards for construction, effective April 1, 1977.

(9) Crossing Arm:

- (a) A crossing arm may be mounted on the front of a school bus in accordance with the following specifications:
 - (A) Installed on the front bumper as close as practicable to the right (curb) side, opening left to right and providing an extension of the curbside of bus;
 - (B) Arm shall be located at least 18 inches but not more than 24 inches above ground level and in the closed position; arm shall not cover numbers on license plate;
 - (C) Installed in a manner to limit the outward deployment to 90 degrees from the front bumper;
 - (D) Arm shall extend 70 inches from the front bumper in its extended position;
 - (E) Arm shall be activated through the existing bus safety light system assuring the driver is required to take no additional action to either deploy or retract the arm. No outward movement of the arm may occur before red flashing sequence begins;
 - (F) Override switches are prohibited;
 - (G) Crossing arm must be safeguarded from damage due to pushing or pulling by hand through the use of a clutch-like device or equivalent (double spring hinges are not acceptable);
 - (H) The arm may be equipped with an amber flashing light that functions only when the arm is in the fully extended position;
 - (I) Entire unit shall have no sharp edges or other projections that could injure children or others due to casual contact;
 - (J) Unit shall provide secure mounting opportunities to prevent misalignment or failure due to extreme weather conditions;
 - (K) Shall meet or exceed all requirements in SAE Standard J1133;

- (L) Shall be either air, vacuum, or electrically operated and in conformance to Section (39)(g) of this rule;
- (M) Crossing arm color shall either appear in an unpainted state or comply with trim requirements listed in Section (7)(a) of this rule.
- (N) All components and connections shall be weatherproofed.

(10) Defrosters:

- (a) Defrosting and defogging equipment shall direct a sufficient flow of heated air onto the windshield, the window to the left of the driver and the glass in the viewing area directly to the right of the driver to reduce the amount of frost, fog and snow.
- (b) The defroster units shall have separate blower motors, in addition to the heater motors. Type A-1 and A-2 buses may have manufacturers' standard defrosters.
- (c) A right front windshield and door defrosting unit with a separate hot water core and separate blower motors shall be provided on Type C buses.
- (d) The defrosting system shall conform to SAE performance standards J-381 and 382.
- (e) The defroster and defogging system shall be capable of furnishing heated outside ambient air, except that part of the system furnishing additional air to the windshield, entrance door and stepwell may be of the recirculating air type.
- (f) Auxiliary fans are not to be considered as a defrosting and defogging system.
 - (A) Auxiliary fans, if used, must be mounted above the windshield, so as not to interfere with the driver's vision of the roadway, mirrors or students outside the bus.
 - (B) The fan blades shall be covered with a protective cage.

(11) Doors:

- (a) Service Door:
 - (A) Service door shall be under control of driver, and so designed as to afford easy release and provide a positive latching device for manual operating door so as to afford easy release and prevent accidental opening. When hand lever is used, no part shall come together so as to shear or crush fingers.
 - (B) Service door shall be located on right side of bus opposite driver and within direct view.
 - (C) Service door shall have minimum horizontal opening of 24 inches and minimum vertical opening of 68 inches. Type A-1 and A-2 buses shall have a minimum opening of 1,200 square inches.
 - (D) Service door shall be of split type, sedan type or jack-knife type. (Split type door includes any sectioned door which divides and opens inward or outward.) If one section of split type door opens inward and other opens outward, front section shall open outward. Manual door controls shall not require more than 25 pounds of force to operate at any point throughout the range of operation;

- (E) If power operated, pressure shall be controlled by a regulator valve or switch and provision shall be made for opening the door manually in the event of driver disability or mechanical failure. Emergency release valve or switch for power operated doors shall be located in an accessible place, in plain view, as near the service door as practicable. Valve or switch shall be properly identified and "open" and "closed" position plainly marked.
- (F) Sedan type door which opens inward in normal use shall be equipped with an adequate device for emergency opening outward.
- (G) Lower as well as upper panels shall be of approved safety glass. Bottom of lower glass panel shall not be more than 10 inches from top surface of bottom step. Top of upper glass panel shall not be more than 6 inches from top of door. Type A-1 and A-2 buses shall have a minimum 350 square inch upper glass panel.
- (H) Vertical closing edges shall be equipped with flexible material to protect children's fingers. Type A-1 and A-2 buses may be equipped with chassis manufacturers' standard entrance door.
- (I) There shall be no door to left of driver. (This shall not be interpreted to conflict with emergency doors or windows.) Type A-1, A-2 and B buses may be equipped with manufacturers' left side driver's door.
- (J) All doors shall be equipped with an energy absorbing pad at the top edge of each door opening. Pad shall be at least 3" wide and 1" thick and extend the full width of the door opening. Pad not required on Type A-1, A-2 and B buses, left side driver's door.

(12) Emergency Exits:

- (a) All buses purchased after January 1, 1999 shall be equipped with required emergency exits and identification listed in 49 CFR Part 571 FMVSS 217 as it has been adopted by National Highway Traffic Safety Administration for June 9, 1995 implementation plus all applicable standards specified in this rule. These rule changes apply to buses ordered after July 1, 2004.
- (b) For buses equipped with a rear emergency door additional exits as listed below:
 - (A) Buses designed or equipped with a passenger capacity of 1-22 shall provide the following:
 - (i) 2 swing-out windows, one on each side of the bus approximately midpoint of the passenger compartment and One FMVSS 217 complying roof hatch; or
 - (ii) Side windows with a 12 inch vertical drop and One FMVSS 217 complying roof hatch.
 - (B) Buses designed or equipped with a passenger capacity of 23 to 45 shall provide:
 - (i) One FMVSS 217 complying left side emergency door and One FMVSS 217 complying roof hatch; or
 - (ii) Two FMVSS 217 complying swing-out windows one on each side of the bus approximately midpoint of the passenger compartment and One FMVSS 217 complying roof hatch.
 - (C) Buses designed or equipped with a passenger capacity of 46 to 62 shall provide:
 - (i) One FMVSS 217 complying left side emergency door and One FMVSS 217 complying roof hatch, or

- (ii) Four FMVSS 217 complying swing-out windows: two on each side of the bus approximately midpoint of the passenger compartment, but not immediately adjacent to each other and one FMVSS 217 complying roof hatch.
- (D) Buses designed or equipped with a passenger capacity of 63 and above shall provide:
- (i) One FMVSS 217 complying left side emergency door and One FMVSS 217 complying roof hatch; or
 - (ii) Four FVMSS 217 complying swing-out windows; two on each side of the bus approximately midpoint of the passenger compartment, but not immediately adjacent to each other and One FMVSS 217 complying roof hatch.
- (c) For buses equipped with a rear push-out window, a left side emergency door shall be provided and the following additional exits as listed below:
- (A) Buses designed or equipped with a passenger capacity of 1-22 shall provide one of the following:
- (i) Two swing-out windows, one on each side of the bus approximately midpoint of the passenger compartment and One FMVSS 217 complying roof hatch; or
 - (ii) Side windows with a 12 inch vertical drop and One FMVSS 217 complying roof hatch.
- (B) Buses designed or equipped with a passenger capacity of 23-45 shall provide:
- (i) Two FMVSS 217 complying swing-out windows and One FMVSS 217 complying roof hatch.
- (C) Buses designed or equipped with a passenger capacity of 46-57 shall provide:
- (i) One FMVSS 217 complying right side door and One FMVSS 217 complying roof hatch; or
 - (ii) Four FMVSS 217 complying swing-out windows and One FMVSS 217 complying roof hatch.
- (D) Buses designed or equipped with a passenger capacity of 58 and above shall provide:
- (i) One FMVSS 217 complying right side door and One FMVSS 217 complying roof hatch; or
 - (ii) Four FMVSS 217 complying swing-out windows; and One FMVSS 217 complying roof hatch.
- (d) Selection of the added exits (if any) necessary to comply with the “additional emergency exit area” requirements of FMVSS 217 shall be made by the vehicle purchaser in conformance to applicable rules.
- (e) Manufacturer shall identify all emergency exits used for calculations relating to FMVSS 217 compliance and list the daylight (clear) opening for each exit.
- (f) A document identifying the following shall be provided by the vehicle seller to the Oregon Department of Education and bus purchaser prior to the bus being introduced into a bus system for the first time:
- (A) Bus manufacturer,
 - (B) Bus identification number,

- (C) Bus designed and equipped passenger capacity,
 - (D) Bus purchaser and district(s) served,
 - (E) All emergency exits used for FMVSS 217 compliance, and
 - (F) Total square inches/square cm clear opening for each emergency exit provided in the bus.
- (g) Swing out windows shall provide a minimum clear opening of 18" x 24". If side emergency swing-out windows can be opened from outside the bus the words "Emergency Exit" shall be placed directly above the window in letters at least two inches high on the exterior of the bus. If the words "Emergency Exit" are placed on the exterior of the bus above swing-out windows inoperable from outside, the label must include the following statement in letters approximately one inch high "Operates From Inside Only."
- (h) Rear emergency door exits:
- (A) Type A-1 and A-2 buses with double rear emergency doors shall be hinged on the outside and have a three point fastening device.
 - (B) Upper portion of emergency door shall be equipped with approved safety glazing, exposed area of not less than 400 square inches.
 - (C) Lower portion of rear emergency door shall be equipped with approved safety glass and shall have an exposed area of not less than 350 square inches of approved safety glazing. Type A-1 and A-2 buses are not required to have lower rear emergency door glazing.
 - (D) There shall be no steps leading to emergency door.
 - (E) Clearance between outside emergency door handle and the emergency door shall not exceed 1/4 inch when handle is in closed position. Handle shall not provide a firm handhold to someone trying to "hitch" a ride. Handles shall be positioned to prevent snagging of clothing or pinching of fingers.
 - (F) Emergency door hinge shall not provide an opening for insertion of fingers when door is closed.
 - (G) If emergency door is lockable, provision must be made to prevent the bus from starting while the door is locked. An audible warning which does not affect engine operation shall be provided to alert the driver should the door be locked while the bus is in operation.
 - (H) An adequately padded head bumper shall be placed on the interior directly above any emergency exit door opening. The pad shall extend the full width of the door opening and shall be at least 3 inches wide and one inch thick.
- (i) Approximately one inch/three centimeter retroreflective exterior perimeter marking shall be yellow in color, of automotive engineering grade material, and in compliance with both the retroreflective requirement of FMVSS and durability specifications listed in National Minimum Standard for reflective material.
- (j) Roof emergency exit
- (A) Roof emergency exit, when required, shall be installed in a school bus body in accordance with FMVSS 217.

(B) A roof exit shall be waterproof and provide a minimum clear opening of 16" x 16"; and have an audible warning signal able to be heard at the drivers area. These rule changes apply to buses ordered after July 1, 2004.

(C) Roof exit may also serve as a roof ventilator; however, this may not be used in place of the required static vent.

(13) Emergency Equipment:

(a) Belt cutter:

Each bus equipped with passenger seat belts or webbed restraining devices shall have a belt cutter mounted in the driver's compartment, readily accessible and in plain view of the driver. Device shall be of a design offering protected cutting edges to prevent accidental or intentional injury to drivers or passengers.

(b) Emergency road reflectors:

(A) Each bus shall be equipped with at least three D.O.T. triangle reflectorized disabled vehicle warning devices.

(B) Reflectors must be in a container securely mounted with nut-and-bolt fasteners enhanced with large flat (fender) washers or held in place by a nut-and-bolt mounted metal bracket that also protects and secures the container lid. Both shall be located in an accessible location. Reflectors shall not be mounted in any engine compartment.

(C) If not mounted in plain view of the driver, the location shall be clearly designated.

(c) Body fluid cleanup kit:

Buses purchased after September 1, 1993 shall have a removable moisture proof and dust proof body fluid cleanup kit, mounted in an accessible place within the driver's compartment. This place shall be marked to identify its location. Contents shall include at least the following items:

(A) two pair rubber/latex gloves,

(B) two four-ounce packages of stabilized chlorine absorbent deodorant (or equivalent) capable of stabilizing at least 1 litre/36 fl. oz. of body fluids,

(C) one spatula for pick up of congealed fluid,

(D) one plastic bag in which to placed congealed fluid,

(E) one red plastic bag with tie, identified for infectious waste and as a biohazard,

(F) one two-ounce bottle of germicidal detergent to apply to a contaminated area,

(G) four paper towels to wipe up contaminated area,

(H) one one-ounce antiseptic alcohol hand rinse (or equivalent),

(I) one placard of step by step use instructions,

(J) Germicidal detergents, stabilized chlorine absorbent deodorant, alcohol hand rinse, or their equivalents shall provide documentation of EPA approval regarding their microbiological efficacy for at least the following:

- (i) Staphylococcus aureus;
- (ii) Pseudomonas aeruginosa;
- (iii) Salmonella choleraesuis;
- (iv) Streptococcus species;
- (v) Herpes simplex Type II;
- (vi) HIV (associated with AIDS);
- (vii) Fungi (athlete's foot);
- (viii) Poliovirus; and
- (ix) Tuberculosis.

(K) Documentation of efficacy for Hepatitis B may be hospital or test studies. The certified effective shelf life of these products shall be a minimum of 12 months. Product expiration date shall be clearly displayed on all time-sensitive products.

(d) Fire extinguishers:

(A) Each bus shall be equipped with at least one pressurized, dry, chemical type fire extinguisher, mounted in a bracket and located in the driver's compartment, readily accessible and in plain view of the driver. A pressure gauge shall be mounted on the extinguisher so as to be readily 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 rating of not less than 2 A-10 BC. The extinguisher shall have a minimum 5 pound capacity and equipped with a hose and nozzle.

(C) The operating mechanism shall be sealed with a type of seal which will not interfere with the use of the fire extinguisher.

(D) Extinguishers with plastic heads are not permitted.

(e) First aid kit:

(A) Each bus shall have a readily removable, moisture proof and dustproof first-aid kit container mounted in an accessible place within driver's compartment. If not mounted in plain view of the driver, the location shall be clearly designated.

(B) The first aid kit contains a minimum of 24 units which shall include the following:

- (i) One 1" adhesive compress—16 per unit;
- (ii) Two 2" bandage compress—4 per unit;
- (iii) Two 3" bandage compress—2 per unit;
- (iv) Two 4" bandage compress—1 per unit;
- (v) Two 3" x 3" plain gauze pads—4 per unit;
- (vi) Two 2" x 6 yards gauze roller bandage—1 per unit;
- (vii) Three 1/2 square yard gauze;
- (viii) Three 24" x 72" gauze;
- (ix) Four Triangular bandage;
- (x) One 1/2 x 5 yard adhesive tape—1 per unit;
- (xi) One round nose scissors and tweezers, Latex gloves—one pair; and
- (xii) One microshield for mouth to mouth airway (to lay on top of other contents).

(C) Specific local requirements may be substituted in lieu of 2 units of 1/2 square yard gauze.

(14) Floor:

- (a) Floor in underseat area, including tops of wheelhousing, driver's compartment and toeboard, shall be covered with rubber floor covering or equivalent having minimum overall thickness of .125 inch.
 - (A) Floor covering in aisle shall be of aisle-type fire-resistant rubber or equivalent, wear-resistant and ribbed. Minimum overall thickness shall be .1875 inch measured from tops of ribs.
 - (B) Floor covering must be permanently bonded to floor and must not crack when subjected to sudden changes in temperature. Bonding or adhesive material shall be waterproof and shall be of type recommended by manufacturer of floor-covering material. All seams must be sealed with waterproof sealer.
- (b) Edge of floor at stepwell shall be treated as a step edge and shall be protected as required in Section (37)(c) of this rule.
- (c) A vapor and liquid proof inspection plate provided for access to the fuel tank sending unit is permissible.
- (d) A subfloor of 5-ply plywood, at least 5/8 [19/32] inch nominal thickness or equivalent, may be installed over the standard school bus floor. Plywood shall equal or exceed properties of exterior-type softwood plywood, C-D grade as specified in standards issued by the Department of United States Commerce. Floor shall be level from front to back and from side to side except for wheelhousing, toeboard and driver's seat platform areas.
- (e) For Type A-1 and A-2 buses that are not constructed with a standard school bus floor, the existing metal floor in the passenger area shall be covered with not less than 1/2-inch nominal thickness exterior C-D grade plywood. All plywood seams shall extend from side to side (laterally), longitudinal seams not permitted.

(15) Heaters:

- (a) At least one heater of hot water type is required in all buses.
- (b) If only one heater is used, it shall be of fresh-air or combination fresh-air and recirculating type.
- (c) If more than one heater is used, additional heaters may be of recirculating air type.
- (d) The heating system shall be capable of maintaining throughout the bus a temperature of not less than 50 degree Fahrenheit at average minimum January temperature as established by the U.S. Department of Commerce, Weather Bureau, for the area in which the vehicle is to be operated.
- (e) All heaters installed by body manufacturers shall bear a name plate which shall indicate the heater rating in accordance with SBMI Standard No. 001, said plate to be affixed by the heater manufacturer which shall constitute certification that the heater performance is as shown on the plate.
- (f) Heater hoses shall be adequately supported to guard against excessive wear due to vibration. The hoses shall not dangle or rub against the chassis or sharp edges, and shall not interfere with or restrict the operation of any engine function. Heater hose shall conform to SAE J20c. Heater hoses on the interior of the bus shall be shielded to prevent scalding of the driver or passengers.

- (g) Each hot water heater system installed by a body manufacturer shall include a shutoff valve installed in the pressure and return lines near the engine in an accessible location. There shall be a water flow regulating valve or airflow regulating door for the front heater installed for convenient operation by the driver while seated;
- (h) Return heater lines on body company installed heaters shall be equipped with bleeder valves in an accessible location to allow for removal of heater line air.
- (i) Combustion type heaters may be installed and shall comply with all the following:
 - (A) The combustion type heater must be installed outside the passenger compartment.
 - (B) Exhaust exit from the heater must meet the same location requirements as for engine exhaust.
 - (C) The heater must have been tested by a qualified laboratory and certified as complying with the following regulations:
 - (i) Code of Federal Regulations, CFR 300-399, Transportation Heaters, 393.77 and CFR 49: Part 571, Transportation: Motor Vehicle Safety Standard 301; Fuel System Integrity;
 - (ii) American Institute of Electrical and Electronic Engineers, IEEE1: Temperature Limits in Rating Electrical Equipment;
 - (iii) UL 307A: Liquid Fuel-Burning Heating Appliances, UL 756C: Polymeric Materials—Use in Electrical Equipment, and UL 796: Printed Wiring Boards;
 - (iv) TE-12: Impact Testing of Vehicular Components.
 - (D) Provide isolation valves at the heater for both the coolant feeder and return lines.
 - (E) Heater must be equipped with a pressure relief valve preset to release any internal system pressure over 50 psi.
 - (F) An impact switch for the heater's electric fuel pump that will stop the pump with special inertial mechanics.
- (j) Portable heaters may not be used.

(16) Identification:

- (a) School bus bodies shall bear the words "School Bus" in black letters at least 8 inches high and of proportionate width on both front and rear of body. Lettering shall be placed as high as possible without impairment of its visibility.
- (b) A warning sign, calling attention to the school bus stop law shall be installed on the rear of all school buses. It shall be centered on the back of the bus and occupy the space, belt high, directly beneath the upper window in the rear door. Signs on transit type buses shall occupy approximately the same area. Signs on Type A buses with double rear door having obstructions such as door handles and recessed license plate holders that prevent sign centering shall be placed completely on the right side (rear) door in a manner that all reflective letters are located on that door and as high on the lower portion of the door as practicable in relationship to the door handle, but the top of the sign may be no more than four inches below handle shaft. Sign shall conform to the following:
 - (A) Decals with white reflectorized letters conforming to retroreflective requirements listed in Section (7)(c) of this rule mounted on a flat black background.

(B) Decal shall have lettering as shown below:

UNLAWFUL TO PASS (3 inches in height)

WHEN (1 inch in height)

RED LIGHTS FLASH (3 inches in height)

(C) Electronic Motorist alert sign may be installed on the rear of school buses. This sign shall illuminate and flash a message with a minimum of three inputs: (1) when the hazard warning lights are activated, illuminate and flash an amber caution alert message and or (2) when the amber School Bus Safety Lights are activated, illuminate and flash an amber caution alert message or (3) when the red School Bus Safety Lights are activated, illuminate and flash a red warning message to motorist. Assembly must be sealed weather tight construction approximately 23 1/2" X 8 3/4" X 1 3/8" in size

The minimum viewing angle from the rear of the bus shall be 30 degrees (15 degrees on each side of perpendicular axis). Hazard warning light display message shall be amber "CAUTION STOPPING"; School Bus Safety amber light display message shall be alternating amber "CAUTION" then "STOPPING"; School Bus Safety red light display message shall be alternating red "STOP" (within an octagon outline) then "DO NOT PASS". Frequency of standard alternating message flash and or alternating different message flash may be controlled by hazard warning and School Bus Safety Light flashers. Illumination intensity and quantity of L.E.D. lights shall be sufficient to result in a clear legible message.

(i) Mounting on front engine buses, device shall be located in the most attainable vertical center of rear emergency door, between upper and lower windows in the lowest possible mounting position.

(ii) Mounting on rear engine buses, device shall be vertically centered and horizontally adjacent to the left and right upper brakes lights as possibly.

(iii) Electronic Motorist alert sign may also be installed on the front of buses if they are mounted and used on the rear of buses. This sign must be wired and activated in same manor as the sign on the rear of buses. Sign shall be mounted on the front of the bus, below the windshield, vertically and horizontally centered as possible.

(D) It is prohibited for any school bus to display a warning sign which does not meet B or C in this section;

(c) The name of the school district IE:(and contractor company name if applicable) contractor company name shall be placed on the side of each bus. Such signs shall appear in the area directly below the side windows and the letters and figures in such signs shall not be less than 4 inches nor more than 6 inches in height and of proportionate width.

(d) School team name or contractor's insignia may be placed above the side windows on the front portion of the bus body. All such lettering must be approved by the Pupil Transportation Section of the Oregon Department of Education.

(e) At least one bus identification number at least four inches in height shall be placed on a flat vertical surface on each side and on the front and rear of the bus. At least one complete unit

number shall be visible from any point 50 feet from the bus. Symbols may be used in lieu of numbers. Type A-1 and A-2 bus numbers may be three inches in height. Bus identification numbers are not required if the school has only one route bus.

- (f) Only signs and lettering approved by state law or by the regulations of the Department of Education shall appear on the inside or outside of a school bus.

(17) Inside Height:

Clear inside body height shall be 72 inches or more measured at any point on the longitudinal center line from front vertical bow to rear vertical bow. Type A-1 and A-2 bus height shall be not less than 62 inches.

(18) Instruments, Gauges, Indicators:

Body manufacturer shall in no manner obstruct the driver's visibility of required instruments, gauges or indicators provided by the chassis manufacturer.

- (a) Body instrument panel lights shall be controlled by an independent rheostat switch.

(19) Insulation:

- (a) Ceiling and walls in all new buses purchased after September 1, 1985, shall be insulated with proper material to deaden sound and to reduce vibration to a minimum. Thermal insulation of fire-resistant and nonwater absorbing material approved by Underwriters Laboratories, Inc., is required in body ceiling and walls.
- (b) If floor insulation is desired it must be 5-ply, at 5/8-inch thick plywood as specified in Section (14) of this rule.

(20) Interior:

- (a) Interior of bus shall be free of all unnecessary projections likely to cause injury including luggage/book racks on buses purchased after September 1, 1993 or retrofitting occurring after that date. This standard 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) Ceiling of bus shall be free of all projections which can cause injury in the event of a collision or rollover. (See Section (30) of this rule.)
- (c) All materials used in the interior of a school bus body shall meet the requirements of Federal Motor Vehicle Safety Standard No. 302, Flammability of Interior Materials.
- (d) Construction of buses manufactured after September 1, 1993 shall assure 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 Appendix VI (Noise Test Procedure).

(21) Lamps and Signals:

- (a) All lamps on exterior of bus shall conform with and be installed as required by Oregon Motor Vehicle law and the Federal Motor Vehicle Safety Standard No. 108, effective January 1985.

(b) Headlamps:

When furnished by body manufacturer, shall be of proper intensity and adjustment as specified by Oregon Motor Vehicle law.

(c) Stop-tail lamps:

Buses shall be equipped with four combination red stop-tail lamps. Two combination lamps with a minimum 38 square inches of illuminated area shall be mounted on the rear of the bus on the beltline or immediately below. Two combination lamps with a minimum 12 square inches of illuminated area shall be placed on the rear of the body between the beltline and the floor line. Rear license plate lamp may be combined with one lower tail lamp. Stop lamps shall be activated by the service brakes and shall emit a steady light when illuminated. Type A-1 and A-2 buses with bodies supplied by chassis manufacturer may have manufacturer's standard stop and tail lamps.

(d) Clearance and identification lights:

Each bus shall be equipped with clearance and identification lights as required by Oregon Motor Vehicle law and Federal Motor Vehicle Safety Standard No. 108.

(e) Reflectors:

Each bus shall be equipped with reflectors as required by Oregon Motor Vehicle law and Federal Motor Vehicle Safety Standard No. 108.

(f) Directional signals:

Each bus shall be equipped with front and rear turn signal lamps that conform to requirements of the Oregon Motor Vehicle law. Lamps shall have a minimum illuminated area of 38 square inches. Lamps shall be amber in color whether mounted at the front or rear. Type A-1 and A-2 buses may be equipped with manufacturers standard front turn signals. Signal lamps shall be independent units and connected to chassis-supplied turn signal switch and four-way hazard warning switch to cause simultaneous flashing of turn signal lamps when needed as vehicular traffic hazard warning. A turn signal lamp with a minimum of 4 candlepower shall be mounted on each body side at approximately seat level height, located to the rear of the entrance door on the right side of the body and approximately the same location on the left side. These are to be connected to and function with the regular turn signal lamps. Type B buses may have the right side body turn signal forward of the entrance door.

(g) Back-up lamps:

Two back-up lamps shall be provided in accordance with Federal Motor Vehicle Safety Standard 108.

(h) Back-up warning alarm:

An automatic audible alarm shall be installed on the rear of all buses purchased after November 1, 1985, that complies with the Society of Automotive Engineers (SAE 994 Backup Alarm Standard). Alarm minimum shall be 107 db;

(i) Interior dome lamps:

Interior lamps shall be provided which will adequately illuminate interior aisles. There shall be at least one interior lamp for every two rows of passenger seats. One or two rear dome lamp(s)

shall be wired through a separate switch. Separate circuit for rear dome lamp(s) is not required on buses with less than five rows of seats.

(j) Stepwell lamp:

A stepwell lamp shall be provided which will adequately illuminate the entire stepwell. The lamp circuit shall be wired through the headlamp or clearance lamp system and shall be activated only when the door is opened.

(k) School Bus Safety Lights:

(A) Each school bus shall be equipped with a system meeting FMVSS 108 consisting of four red signal lamps designed to conform to SAE Standard J887, "School Bus Red Signal Lamps," July 1964, and four amber signal lamps designed to that standard, except for color, and except that their candle power shall be at least 2 1/2 times that specified for red signal lamps. Lamps shall have minimum of 17.25 square inches and shall be clearly visible in direct sunlight from a distance of 500 feet along axis of vehicle.

(B) The system shall be wired so that the system is activated by a manually operated spring-loaded switch clearly labeled and distinguishable from other switches. A circuit master switch is permitted if the manually operated activating switch and the master switch are together in one switch;

(C) For buses equipped with power controlled entrance doors, an additional spring loaded switch that will activate the red school bus safety lights prior to opening entrance door is permissible.

(D) The flashing mechanism shall be capable of carrying the full current load of the signal system.

(E) 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.

(F) Pilot lamps/monitors:

(i) Each bus shall be equipped with two, 3/8-inch illuminated pilot lamps—one amber and one red—to indicate when the respective amber or red system is actuated. Pilot lamps shall be placed within a 140° field of vision for a 95th percentile female anthropomorphic test dummy seated in a normal driving position. Pilot lamps shall also provide an unmistakable indication that the flasher system is operating and an unmistakable indication if any circuit is broken, any lamp is not operating or the system is not otherwise functioning normally unless a separate monitoring system performs all those functions; or

(ii) Each bus shall be equipped with a monitor system utilizing 3/8-inch illuminated red and amber lamps to indicate when the respective amber or red system is actuated. Monitor shall be placed within a 140° field of vision for a 50th percentile anthropomorphic test dummy seated in a normal driving position. Monitor shall also provide an unmistakable indication that the flasher system is operating and an unmistakable indication if any circuit is broken, any lamp is not operating or the system is not functioning normally.

(G) School Bus Safety Light system shall operate as follows:

- (i) With entrance door closed, depress activation switch. Amber pilot light and amber bus safety lights shall go on.
 - (ii) Open entrance door; amber bus safety lights shall go off, and red pilot light and red bus safety lights shall go on.
 - (iii) Close entrance door; pilot and bus safety lights shall go off.
 - (iv) Reopen entrance door without depressing hand switch; no bus safety lights shall go on. Depress hand switch, red pilot light and red bus safety lights shall go on.
- (H) There shall be a canceling switch that will deactivate the amber bus safety lights and flasher sequence if they are accidentally activated or if the driver discovers there is no need to make a stop after activating the switch.
- (I) Installation requirements:
- (i) 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. Each signal lamp shall be mounted with its axis substantially parallel to the longitudinal axis of the vehicle.
 - (ii) Front and rear alternately flashing bus safety lights shall be spaced as far apart laterally as practicable.
 - (iii) Alternately flashing bus safety lights shall be mounted at the front above the windshield and at the rear so that the lower edge of the lens is not lower than the top line of the side windows.
 - (iv) Vertical and lateral vision of the front and rear alternately flashing warning bus safety lights shall not be obstructed by any part of the body or lamphouse insofar as standard bus body construction will permit.
 - (v) Where practicable, the area around lens of each alternately flashing warning bus safety light and extending outward at least 3 inches or more shall be painted black.
 - (vi) Front amber school bus safety lights shall be visible (directly or indirectly) from the drivers area inside the bus.
 - (vii) A separate fuse or circuit breaker, adequate to prevent damage to the system in the event of a short circuit, shall be provided between the power source and flasher system.

(J) Strobe Lamp:

- (i) A white flashing lamp, approved by the Oregon Department of Education, may be installed on the longitudinal center of the roof on rear half of the bus no closer than one foot from the rear of the bus body. The lamp shall have a single clear lens emitting light 360 degrees around its vertical axis and may not extend above the roof more than 6 1/2 inches or maximum legal vehicle height.
- (ii) The lamp shall have a separate switch and be wired through the vehicle hazard lamp system. A pilot lamp to indicate when the light is in operation is required.

(22) Metal Treatment:

- (a) All metal used in construction of bus body shall be zinc- or aluminum-coated or treated by equivalent process before bus is constructed. Included are such items as structural members, inside and outside panels and floor sills; 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 above 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.

(23) Mirrors:

(a) Exterior Mirror Systems:

- (A) All buses purchased after September 1, 1993 shall be equipped with mirror systems complying with 49 CFR Part 571, FMVSS 111 as adopted by the National Highway Traffic Safety Administration for December 3, 1993 implementation, plus all applicable standards specified in this rule.
- (B) Manufacturer shall certify compliance with mirror and direct/indirect visibility standards listed in the aforementioned FMVSS 111 and provide copy to bus purchaser for all buses manufactured prior to January 1, 1994.

(b) Interior Mirror:

- (A) 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 breakages. Mirror shall be a minimum of 6" x 30." Mirror shall have rounded corners and protected edges.
- (B) Type A buses shall be equipped with a mirrors shall be a minimum of 6" x 16". Mirror shall have rounded corners and protected edges;
- (C) Bus seller shall certify compliance with mirror and direct/indirect visibility standards listed in the aforementioned FMVSS 111 and provide a copy to used bus purchasers when certification is not available from manufacturer for all buses manufactured prior to January 1, 1994.

(24) Mounting:

- (a) Chassis frame shall support rear body cross member. Bus body shall be attached to chassis frame at each main floor sill, except where chassis components interfere, in such a manner as to prevent shifting or separation of body from chassis under severe operating conditions.
- (b) Body front shall be attached and sealed to chassis in such manner as to prevent entry of water, dust or fumes through joint between chassis cowl and body.
- (c) When floor is provided by bus body manufacturer, adequate insulating padding shall be placed at all contact points between body and chassis frame. Insulating material shall be approximately 1/4-inch thick and shall be so attached as to prevent movement under severe operating conditions.

(25) Mud Flaps:

- (a) Mud flaps or splash aprons are required for rear wheels on all school buses and shall be provided by the body manufacturer.

- (b) Flaps shall be of heavy-duty rubberized material or equivalent and shall extend at least the full width of tires from a point above the center of the tires to a point not more than 10 inches above the surface of the highway when such vehicle is empty.

(26) Overall Length:

Maximum length for school buses shall be limited to 40 feet. (See OAR 581-053-0512, Bus Chassis, Section (33) Turning Radius; ORS 818.080.)

(27) Overall Width:

Overall width of bus shall not exceed the maximum permitted by Oregon Motor Vehicle Laws.

(28) Overhang:

Body shall be so mounted as to comply with requirements described in chassis weight distribution standard. Body length extending beyond the rear axle shall not exceed three-fourths the length of the vehicle's wheel base per Oregon Vehicle Code.

(29) Racks:

The installation of any kind of exterior luggage rack outside the bus is prohibited. This does not prohibit enclosed luggage compartments.

(30) Radios and Public Address Systems:

- (a) Interior speakers mounted in the ceiling panels or side panels shall be either flush mounted or may protrude not more than 1 1/2 inches if the speaker housing is free of any corners or projections which can cause injury by striking with the head or in the event of a collision or rollover. Speakers protruding more than 1 1/2 inches may be mounted in the vertical end panels above the windshield or back windows as long as speakers are free of corners or projections which could cause injury.
- (b) Speakers shall not be placed above any aisle.
- (c) Buses purchased after November 1, 1985, shall be equipped with a public address system having interior and exterior speakers and a switch to separate from inside and outside.

(31) Rub Rails:

- (a) There shall be one rub rail located on each side of bus approximately at seat level which shall extend from rear side of entrance door completely around bus body (except for emergency door and access panel(s)) to point of curvature near outside cowl on left side.
- (b) There shall be one rub rail located approximately at floor line which shall cover same longitudinal area as upper rub rail, except at wheelhousing, and shall extend only to radii of right and left rear corners.
- (c) Both rub rails shall be attached at each body post and all other upright structural members.
- (d) Both rub rails shall be 4 inches or more in width, shall be of 16-gauge steel, suitable material of equivalent strength, and shall be constructed in corrugated or ribbed fashion.
- (e) Both rub rails shall be applied to the outside body or outside body posts. Pressed-in or snap-on rub rails do not satisfy this requirement. For Type A-1 and A-2 buses using chassis

manufacturer's body, or Type B, C and D buses using rear luggage or engine compartment, rub rails need not extend around rear corners.

(32) Sanders:

Where used, sanders shall:

- (a) Be of hopper cartridge-valve type.
- (b) Have metal hopper with all interior surfaces treated to prevent condensation of moisture.
- (c) Be of at least 100 pound (grit) capacity.
- (d) Have cover on filler opening of hopper, which screws into place, sealing unit airtight.
- (e) Have discharge tubes extending to front of each rear wheel under fender.
- (f) Have no-clogging discharge tubes with slush-proof, nonfreezing rubber nozzles.
- (g) Be operated by electric switch with telltale light mounted on instrument panel.
- (h) Be exclusively driver-controlled.

(33) Seat Belt:

- (a) A Type 2 lap belt/shoulder harness seat belt shall be provided for the driver, a driver's seat with an integrated Type 2 lap/shoulder belt may be substituted. Each belt section shall be booted to keep belt and the button or buckle type latch off floor when not in use. Shoulder belt assemblies on Type B, C, and D buses shall provide for a height adjustment of at least four inches at its upper point of attachment to the bus. Belt shall be anchored or guided in a manner at the seat frame to prevent the driver from sliding sideways when belt is in use. Locking retractors may be either an ELR (Emergency Locking Retractor) or an ALR (Automatic Locking Retractor). All ALR equipped buses received after July 1, 1989, must include an approved anti-cinching device.
- (b) Seat belts for passengers: Passenger seat belts may be installed in school buses with a GVWR of more than 10,000 pounds. The attachments, belts and installation shall meet the requirements of Federal Motor Vehicle Safety Standard Nos. 208, 209 and 210 as they apply to school buses with a GVWR of 10,000 pounds or less.

(34) Seats and Crash Barriers:

- (a) Seats and barriers shall meet requirements of Federal Motor Vehicle Safety Standard No. 222.
- (b) All seats shall have minimum depth of 15 inches.
- (c) In determining seating capacity of bus, the minimum allowable rump width shall be 13 inches.
- (d) Seat, seat back cushion and crash barrier shall be covered with a material having a minimum 42-ounce finished weight, 54-inch width and finished vinyl coating of 1.06 broken twill, or other material with equal tensile strength, tear strength, seam strength, adhesion strength, resistance to abrasion, resistance to cold, and flex separation. Material shall meet or exceed the criteria contained in the School Bus Seat Upholstery Fire Block Test for all buses purchased after September 1, 1993. (See Appendix)

- (e) All seats shall be forward facing and shall be securely fastened to that part(s) of bus which support them with a nut-and-bolt type of fastener. Each seat leg shall be secured to the floor by a minimum of two nut-and-bolt type fasteners of at least grade 5 SAE strength. Sheet metal screw-type fasteners without a nut are not acceptable, except in areas where it is not possible to install a nut-and-bolt type fastener. Type A-1 and A-2 bus seat fasteners shall meet the requirements of Federal Motor Vehicle Safety Standards 209 and 210.
- (f) No bus shall be equipped with jump seats or portable seats. Flip-up seats at side emergency exit doors are allowed.
- (g) Seat spacing shall not be less than 24 inches between the front of the back of each seat and the rear of the back of the seat immediately ahead. This shall be measured at cushion height on a plane parallel to the center line of the bus.
- (h) Driver's seat shall be so located in relationship to the steering wheel that the driver may assume a natural position while driving, have a clear view of the road, and sufficient leg room to operate safely and effectively the brake and clutch pedals and accelerator without cramping or interference. Minimum distance between steering wheel and back rest of driver's seat shall be 11 inches. Driver's seat shall have a fore-and-aft adjustment of not less than four inches and shall on Type B, C, and D buses be capable of being raised and lowered at least three inches and shall be strongly attached to comply with acceptable installation procedures:
 - (A) Driver's seat supplied by the body company shall be a high back suspension seat with a minimum seat back adjustment of 15 degrees, not requiring the use of tools, and with a head restraint to accommodate a 95th percentile female anthropomorphic dummy as defined in FMVSS 208. The driver's seat shall be secured with nuts, bolts, and washers or flanged headed nuts;
 - (B) Driver's seat positioning and range of adjustment shall be designed to accommodate comfortable actuation of the foot control pedal by 95 percent of the adult female population.
- (i) Each passenger seat and drivers seat shall have a positive type retention system to prevent the seat cushion from disengaging from the seat frame at the front and rear in the event of an accident or rollover.

(35) Steering Wheel:

(See OAR 581-053-0512(29) Steering Gear also.) Steering wheel outside circumference shall have at least 2 inches of clearance at all points.

(36) Steps:

- (a) Service door entrance may be equipped with two-step or three-step stepwell. Risers in each case shall be approximately equal and shall not exceed 10 inches in height. When plywood floor is used on steel, differential may be increased by thickness of plywood used.
 - (A) First step at service door shall be not less than 10 inches and not more than 14 inches from ground, based on standard chassis specifications.
 - (B) Type D buses shall be equipped with a three-step stepwell. First step at service door shall not be less than 12 inches and not more than 16 inches from the ground based on standard chassis specifications.

- (b) Steps shall be enclosed to prevent accumulation of ice and snow.
- (c) Steps shall not protrude beyond side body line.
- (d) Steps (if any) on Type A-1 and A-2 buses not manufactured originally as school buses may be chassis manufacturer's standard.
- (e) At least one grab handle not less than 20 inches in length shall be provided to assist passengers during entry or egress in unobstructed locations inside doorway. Grab handle shall be designed, installed and maintained to minimize the opportunity for entanglement of passenger clothing and belongings.

(37) Step Treads:

- (a) All steps, including floor line platform area, shall be covered with 3/16-inch rubber floor covering or other materials equal in wear resistance and abrasion resistance to top grade rubber.
- (b) Metal back of tread, minimum 24-gauge cold roll steel, shall be permanently bonded to ribbed rubber.
- (c) 3/16-inch ribbed step tread shall have a 1 1/2-inch white nosing as integral piece without any joint.
- (d) Rubber portion of step treads shall have the following characteristics:
 - (A) Special compounding for good abrasion resistance and high coefficient of friction.
 - (B) Flexibility so that it can be bent around a 1/2-inch mandrel both at 130 degrees F and 20 degrees F without breaking, cracking or crazing.
 - (C) Show a durometer hardness 85 to 95.

(38) Steps, Windshield Access:

There shall be at least one folding step or recessed foothold and suitably located 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. Standard does not apply to chassis not originally manufactured as school buses.

(39) Stop Signal Arms:

All buses purchased after September 1, 1993 and all buses in service after August 1, 1995 shall be equipped with stop signal arms mounted in accordance with the following requirements:

- (a) Shall meet all applicable requirements of the Federal Motor Vehicle Safety Standard 49 CFR 571.131.
- (b) Shall be installed on the left side of the bus; the vertical center of the stop blade shall be at least 7 inches but not more than 14 inches below the window line, on the first body post to the rear of the driver or as close as practicable.
- (c) Shall be a octagon shaped sign 18 inches wide and 18 inches long exclusive of the mounting bracket. A windguard shall be provided. All sheet metal parts shall be 16 gauge metal or heavier.

- (d) Shall have the word "STOP" on both sides in white letters six inches high and of proportionate width on a red background. The outer edge shall have a white border one-half inch wide. All other parts of the assembly shall be painted black.
- (e) Shall be equipped with two 4-inch, double faced alternating flashing red lamps to be mounted near the perimeter of the sign with a minimum of 12 inches spacing between lamp centers. The stop arm and lamps shall be wired to the circuit of the flashing red warning lamps mounted on the front and rear of the bus and shall operate simultaneously with the red bus safety lamps. Lamps shall have be LED or strobe **ORS 820.105**;
- (f) May be reflectorized.
 - (A) Reflectorized material shall be of automotive engineering grade or better.
 - (B) Reflectorized material may be retroreflective or reflective.
- (g) Shall be either air, vacuum, or electrically operated.
 - (A) Air operated stop arms:
 - (i) Air may be supplied from an air accessory tank or from the first (wet) tank.
 - (ii) If source is from the first (wet) tank a pressure protection valve shall be installed to prevent the tank air supply from falling below 60 pounds.
 - (iii) Stop arm system must have a pressure regulating valve.
 - (iv) All fittings shall be brass.
 - (B) Vacuum operated stop arms:
 - (i) Vacuum shall be supplied from a separate accessory tank. Tank shall be protected by a check valve.
 - (ii) All fittings shall be brass.

(40) Sun Visor:

Interior adjustable sun visor, not less than 6 by 30 inches in size, shall be installed above windshield in position convenient for use by driver. If transparent visor is used, it shall be of such material so as not to prevent distinguishing between the colors of red and green traffic signals. Vehicles not originally manufactured as school buses may be equipped with manufacturer's standard visor. Buses purchased after November 1, 1985, shall have visors with protected edges.

(41) Tail Pipe:

(See OAR 581-053-0512, Bus Chassis, Section (14).

(42) Tool Compartment:

A metal container of adequate strength and capacity for storage of tire chains, tow chains and such tools as may be necessary, may be provided. Container may be located inside or outside of passenger compartment. If inside, it shall have a cover and positive type latch to prevent opening in event of a severe impact or bus rollover, and shall be attached to the floor with a nut and bolt fastener, or may be securely attached to a seat frame under a seat.

(43) Tow Hooks:

- (a) Type C buses shall be equipped with two rear tow hooks, or one center tow hook tied to both frame rails, that have sufficient strength to pull or be pulled by another vehicle of the same GVWR. Tow hooks shall be installed in order that no permanent distortion to the body or chassis will result if the bus must be towed. (See also OAR 581-053-0512, Bus Chassis, Section (31) Tow Hooks.)
- (b) Type D vehicles shall be equipped with two rear tow hooks or tow eyes, and at least one front tow hook or eye, mounted or capable of immediate mounting. Hooks or eyes shall have sufficient strength to pull or be pulled by another vehicle of the same GVWR.

(44) Under carriage luggage compartments:

Luggage compartments may be installed on the outside of the bus mounted below the floor level or in the rear of the bus. Access to compartments must be from the outside only. Compartment doors must have a positive retention to hold the doors open. Compartment doors must be lockable. These rules changes apply to buses ordered after July 1, 2004.

(45) 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 and qualitative requirements of paragraph 3.4 of Federal Specification TT-C-520b using modified test procedures* for following requirements:
 - (A) Salt spray resistance—pass test modified to five percent salt and 1,000 hours
 - (B) Abrasion resistance—pass
 - (C) Fire resistance—pass
- (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.

(46) 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 nonclosable exhaust ventilation shall be installed in low-pressure area of roof.

(47) Video surveillance cameras:

May be mounted inside or on either the forward or rear bulkhead, or to the ceiling in compliance with the following requirements:

- (a) Surface mounted camera/camera housing/recording devices shall be mounted as far forward (if forward mounted) or as far rearward (if rear mounted) as possible and directly above the center of the windshield/rear window, and shall not:
 - (A) Extend into the passenger compartment more than 9 inches;

- (B) Extend down from the ceiling more than five inches;
 - (C) Be more than five inches;
 - (D) Interfere with the rear view mirror or sun visor.
- (b) Recording devices or their housings shall not be mounted overhead in the passenger compartment;
 - (c) Video camera/housings (not recorders) may be mounted overhead in the passenger compartment, provided they are over the seating area, but not over any part of the aisle, all edges must be rounded and/or protected with enclosure of shatterproof construction.
 - (d) Flush mounted camera/housings may be mounted in any position in the front or rear bulkhead or ceiling provided that any modification to the body, in order to achieve flush mounting does not compromise the structural integrity of the body panels;
 - (e) All video related devices mounted to the interior bus body shall be securely fastened in a manner to prevent separation from the bus body in the event of collision or mishap;
 - (f) Recording devices/housings must allow ready access for camera and video recording medium removal without the use of tools;
 - (g) All electrical connections shall be made with UL approved wiring and terminals, and protected by grommets any place it passes through metal panels. Any electrical load added to the vehicle's electrical system shall be protected with appropriate over current device (fuse).

(48) Weight Distribution:

- (a) Weight distribution of fully loaded bus on level surface shall be such as to not exceed the manufacturer's front Gross Axle Weight Rating (GAWR) and rear Gross Axle Weight Rating.
- (b) Weight distribution of fully loaded bus on level surface shall be such that not more than 75 percent of gross vehicle weight is on rear tires and not more than 35 percent is on front tires. Type B and D buses with engine inside front of body and entrance door ahead of front wheels shall have not more than 75 percent of gross vehicle weight on rear tires or more than 50 percent on front tires. If entrance door is behind front wheels, not more than 75 percent of gross vehicle weight shall be on rear tires not more than 40 percent on front tires. With engine in rear, not more than 75 percent of gross vehicle weight shall be on rear tires or more than 40 percent on front tires.

(49) Wheelhousing:

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

(50) Windshield and Windows:

- (a) All glass in windshield, windows and doors shall be of approved safety glass so mounted that its identification mark is visible and of a quality to prevent distortion in any direction. All glazing materials shall be on the approved list of the Oregon Department of Motor Vehicles.
- (b) Windshield shall be of safety plate glass AS-1 grade as specified by American National Standards Institute Safety Code Z26.1-1966.
- (c) Windshield glass may be heat absorbing and may have a horizontal gradient band starting slightly above the line of the operator's vision and gradually decreasing in light transmission to 20 percent or less at the top of the windshield in compliance with Federal Motor Vehicle Safety Standard 205.
- (d) Glass in all side windows, doors and rear windows shall be AS-2 or better grade, as specified in Z26.1-1966, or AS-4 coated abrasion resistant rigid plastic meeting requirements of Federal Motor Vehicle Safety Standard 205. Rigid plastic cannot be used for windshields or windows immediately to the left or right of the driver.
- (e) Side windows shall conform to the following:
 - (A) Buses shall provide full drop or split sash windows which provide an unobstructed opening of at least 12 inches and not more than 14 inches in height, obtained by lowering the sash, and at least 22 inches in width. Type A-1, A-2 buses may have a full drop or split sash windows which provide an unobstructed opening of at least 9 inches and not more than 13 inches in height, obtained by lowering the sash, and at least 22 inches in width, provided the bus has 2 swing-out windows.
 - (B) One window on each side of the bus may be less than 22 inches in with.

(51) Windshield Washers:

Bus shall be equipped with electric or air operated windshield washers.

(52) Windshield Wipers:

Bus shall be equipped with two windshield wipers of air or electric type, that meets FMVSS 104 powered by motor or motors of at least two speeds and with sufficient power to operate wipers under severe weather conditions. Type A-1 and A-2 bus manufacturer's standard is permitted.

(53) Wind Deflectors:

May be installed according to manufacturer's standards on the rear roof to deflect snow, dust and dirt from the rear window.

(54) Wiring:

- (a) All wiring shall conform to current standards of Society of Automotive Engineers.
- (b) Circuits
 - (A) Wiring shall be arranged in circuits, as required, with a circuit protection system. A system of color or number coding shall be used for all buses purchased after September 1, 1993 and

an appropriate identifying diagram shall be provided the end user along with the wiring diagram provided by the chassis manufacturer. The following interconnecting circuits shall be color coded as noted:

- (i) Left rear directional light—yellow;
- (ii) Right rear directional light—dark green;
- (iii) Stop lights—red;
- (iv) Back-up lights—blue;
- (v) Taillights—brown;
- (vi) Ground—white;
- (vii) Ignition feed, primary feed—black;
- (viii) The color of cables shall correspond to SAE J1128.

(B) Wiring shall be arranged in at least seven regular circuits, as follows:

- (i) Head, tail, stop (brake) and instrument panel lamps;
- (ii) Clearance and stepwell lamps (stepwell lamp shall be activated when service door is opened);
- (iii) Dome lamp;
- (iv) Ignition and emergency door signal;
- (v) Turn signal lamps;
- (vi) School Bus Safety Lights;
- (vii) Heaters and defrosters.

(C) Any of above combination circuits may be subdivided into additional independent circuits.

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

- (c) The entire electrical system of the body shall be designed for the same voltage as the chassis on which the body is mounted.
- (d) All wiring shall have an amperage capacity equal to or exceeding the designed load. All wiring splices are to be done at an accessible location and noted as splices on wiring schematic.
- (e) Each body circuit shall be coded by number or letter on a diagram of easily readable size and be furnished with each bus body or affixed in an area convenient to the electrical accessory control panel.
- (f) Body power wire is to be attached to special terminal on the chassis.
- (g) All wires passing through metal openings shall be protected by a grommet.
- (h) Wires not enclosed within body shall be fastened securely at intervals of not more than 18 inches. All joints shall be soldered or joined by equally effective connectors and shall be moisture and corrosion resistant.

MINIMUM STANDARDS FOR SCHOOL BUSES DESIGNED TO TRANSPORT CHILDREN WITH DISABILITIES

581-053-0527 Minimum Standards for School Buses Designed to Transport Children with Disabilities

(1) Modification or alteration statement:

Vehicles used for the transportation of children with disabilities shall meet all minimum standards for Oregon school buses, except for alterations and equipment necessary to accommodate special needs.

- (a) No modification or alteration of a school bus shall be performed if such modification or alteration would cause the vehicle to be constructed or equipped in violation with any Federal Motor Vehicle Safety Standard effective at the time of original chassis manufacture.
- (b) Design of special equipment not covered in the minimum standards is subject to approval by the Oregon Department of Education.
- (c) With respect to vehicles constructed or modified for transportation of children with disabilities, this rule presents the standards for special equipment, and exceptions in minimum standards for school buses.
 - (A) For determining standard requirements, the passenger and gross vehicle weight rating classification for any vehicle to transport exceptional children will be determined as if the vehicle were equipped with a standard seating arrangement prior to modification.
 - (B) Any school bus that is used specifically for the transportation of children who use wheelchairs and/or other mechanical restraining devices prohibiting use of the regular service entrance, shall be equipped with a power lift. Type A buses may be equipped with ramps. See Section (10).

(2) Aisles:

Aisles leading to emergency door(s) from wheelchair area shall be at least 30 inches wide to permit passage of a wheelchair. Special lift doors are not considered emergency doors unless in compliance with all right side emergency door requirements.

(3) Child Safety Seats/Systems:

- (a) Child safety seats/systems used for transporting infants, toddlers, or others requiring added support shall conform to specific strength and performance standards or dynamic test standards identified in Federal Motor Vehicle Safety Standard 213 for protection of a child up to 50 pounds.
- (b) Child safety seats/systems shall bear a label specifying compliance with all applicable Federal Motor Vehicle Safety Standards at the time of their manufacture.
- (c) Child safety seats/systems shall be secured to the school bus seat by either seat belts or special restraining devices as defined in Section (13) of this rule.

(4) Fuel Tank:

Fuel tanks may be relocated when necessary, but must maintain full compliance with Federal Motor Vehicle Safety Standard 301.

(5) Glazing:

All windows may be tinted.

(6) Guard Panel:

Guard panel shall be installed at both rear and front edges of lift door opening extending into bus. Enclosure walls of equal or greater strength installed front and rear of the lift are an acceptable alternative. If elevator-type lift (body floor section serving as a lift platform) is used, a covered chain shall be installed extending across platform opening. The chain shall be positively attached at the rear point of attachment and a hook and eye at the front of the lift mechanism.

(7) Identification:

Buses designed and used for transporting children with disabilities may display universal handicapped symbols located near service entrance door and at the rear of the vehicle below the window line. Such emblems shall be white on blue, shall not exceed 12 inches square in size, and may be reflectorized.

(8) Lights:

- (a) Dome Lights: There shall be the equivalent of at least one dome light for every two full body sections (approximately every 54 inches) behind the regular service entrance door.
- (b) An interior light shall be placed over lift area and activated by a door switch. Circuit may be wired through stepwell light circuit.

(9) Oxygen (personal):

- (a) Tank(s) of compressed oxygen being transported may not have a capacity greater than 22 cubic feet.
 - (A) Tank(s) shall be Department of Transportation approved and shall have certification label affixed.
 - (B) Tank(s) valve(s) and regulators shall be protected from breakage.
 - (C) Tank(s) shall be securely attached to the bus in a manner to avoid being a hazard for students and away from intense heat.
- (b) Container(s) of liquid oxygen being transported may not have a capacity greater than 23 cubic feet.
 - (A) Container(s) shall be Department of Transportation approved and shall have certification label affixed.
 - (B) Container(s) shall be securely attached to the bus in a manner to avoid being a hazard for students and to prevent damage and exposure to intense heat.

(10) Power Lift:

- (a) General: Vehicle lifts and installations shall comply with the requirements set forth in FMVSS 403, *Platform Lift Systems for Motor Vehicles*, and FMVSS 404, *Platform Lift Installations in Motor Vehicles*. This rule change applies to buses ordered after December 27, 2004.
- (b) Lifting mechanism shall be located on the right side of the bus and be capable of lifting a minimum load of 800 pounds.
- (c) When the platform is in the fully up position, it shall be locked in position mechanically by means other than a support, or lug in the door.
- (d) Controls shall be provided that enable the operator to activate the lift mechanism from either inside or outside of the bus. There shall be a means of preventing the lift platform from falling while in operation due to a power failure. If equipped with a control switch flex cord, the cord shall be installed to minimize entanglement with lift mechanism.
- (e) Power lifts shall be so equipped that they may be manually raised and lowered in the event of power failure of the power lift mechanism.
- (f) Lift travel shall allow the lift platform to rest securely on the ground.
- (g) All edges of the platform shall be designed to restrain wheelchair and prevent operator's feet from being entangled during the raising and lowering process.
- (h) Lift platform shall have a minimum usable area of 30 inches by 48 inches.
- (i) Platform shall be fitted on both sides with full width barriers which extend above the floor line of the lift platform.
- (j) A restraining device shall be affixed to the outer edge (curb end) of the platform that will prohibit the wheelchair from rolling off the platform when the lift is in any position other than fully extended to ground or desired platform level. Minimum height of device/barrier shall be four inches.
- (k) A self-adjusting, skid resistant plate shall be installed on the outer edge of the platform to minimize the incline from the lift platform to the ground level. This plate, if so designed, may also suffice as the restraining device described in paragraph (h) above. The lift platform must be skid resistant.
- (l) A circuit breaker or fuse shall be installed between power source and lift motor if electrical power is used.
- (m) The lift mechanism shall be equipped with adjustable limit switches or bypass valves to prevent excessive pressure from building in the hydraulic system when the platform reaches the full up position or full down position.
- (n) Sharp corners or projections of the lift which are likely to cause injury to passengers in the event of a collision or rollover shall be padded with impact absorbing material.
- (o) There shall be no exposed areas on lift mechanism or adjacent to lift that could cause injury to children while lift is in motion.
- (p) Power unit for lift shall be located so as not to restrict or impair center aisle space or foot and leg room between seats.

- (q) If body floor section serves as a portion of the lift platform, the adjacent under-floor areas on three sides shall be closed off with shields when platform is in the lowered position.
- (r) Platform shall be confined within the perimeter of the school bus body when not extended, in no way attached to the exterior sides of the bus.
- (s) Platform shall provide at least one handrail in compliance with requirements specified in PL 101-376.

(11) Ramps:

In lieu of a power lift, a ramp device may be installed on Type A buses.

- (a) Ramp shall be of sufficient strength and rigidity to support wheelchair, occupant and attendant. It shall be equipped with protective flange on each longitudinal side to keep wheelchair on ramp.
- (b) Floor of ramp shall be covered with nonskid material.
- (c) Ramp shall be of weight, and equipped with handle(s), to permit one person to put ramp in place and return it to storage place.
- (d) Provisions shall be made to secure ramp to side of bus for use without danger of detachment, and ramp shall be connected to bus at floor level in such manner as to permit easy access of wheels on wheelchair to floor of bus.
- (e) Ramp shall be at least 80 inches in length, and width of the ramp shall be adequate to accommodate wheelchairs up to 30 inches wide. Ramp shall be of one piece, or two 40-inch sections hinged to allow for storage.
- (f) Dustproof and waterproof enclosed container shall be provided if ramp is stored under floor.

(12) Ramp Door:

- (a) Special ramp door opening shall be located on right side of bus and be not less than 30 inches in width.
- (b) Doors must meet the standards specified for "special service entrance doors" or be standard hinged cargo doors supplied and installed at the factory.
- (c) Side cargo-type sliding doors are acceptable on production line vans providing that the doors slide outside and along the body wall and lock in the closed position at two points opposite each other.

(13) Special Restraining Devices:

- (a) Webbed straps/belts not less than 1.8 inches wide and having a breaking strength when tested under procedures listed in 49 CFR 571.209 S5.1(b) of not less than 6,000 pounds or 2,720 kilograms. Webbing shall comply with requirements listed in 49 CFR 571.209 for elongation, resistance to abrasion, light, and microorganisms as well as colorfastness.
- (b) Hardware, including buckles, retractor, bolts, and attachment devices shall comply with all applicable standards listed in 49 CFR 571.209 S4.3.
- (c) Belts/straps shall be secured to the vehicle either at points designated by the manufacturer for the attachment of seat belts in compliance with 49 CFR 571.210 S4.3.1 and S5 or through nut

and bolt fasteners attached through the floor, each capable of withstanding a pulled force of at least 5,000 pounds.

- (d) Belts/straps shall be clearly identified with labels or other permanent markings as: "SPECIAL RESTRAINING DEVICES."

(14) 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.
- (c) The opening may extend below the floor through the bottom of the body skirt. If such an opening is used, reinforcements shall be installed at the front and rear of the floor opening to support the floor and give the same strength as other floor openings.
- (d) Entrance shall be of sufficient width and depth to accommodate various mechanical lifts and related accessories as well as the lifting platform. The minimum clear opening width shall be adequate to accommodate the minimum platform defined in Section 10 of this rule.
- (e) Door posts and headers from entrance shall be reinforced sufficiently to provide support and strength equivalent to the areas of the side of the bus not used for service doors.
- (f) A drip molding shall be installed above the opening to effectively divert water from entrance.
- (g) A soft energy absorbing cushion not less than three inches wide and one inch thick shall be located inside the bus at the lowest point possible of the upper door sill. The cushion shall be at least as wide as the lift platform.

(15) Special Service Entrance Doors:

- (a) A single door or double door may be used for special entrances;
- (b) A single door shall be hinged to the forward side of the entrance. If double doors are used, the system shall be designed to prevent the door(s) from being blown open by the aerodynamic forces created by the forward motion of the bus, and/or shall incorporate a safety mechanism to provide secondary protection should the primary latching mechanism(s) fail;
- (c) All doors shall open outwardly.
- (d) All doors shall have positive non-hitchable fastening devices to hold doors in the open position.
- (e) All doors shall be weather sealed and on buses with double doors, they shall be so constructed that a flange on the forward door overlaps the edge of the rear door when closed.
- (f) When manually operated dual doors are provided the rear door leaf shall have at least a one-point fastening device to the header. The forward mounted door shall have at least three-point fastening devices. One shall be to the header, one to the floor line of the body, and the other shall be into the rear door. These locking devices shall afford maximum safety when the doors are in the closed position. The door and hinge mechanism shall be of a strength that will provide for the same type of use as that of a standard entrance door.

- (g) If optional power doors are installed the design shall permit manual release of the doors for opening and closing by the attendant from the platform inside the bus.
- (h) 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.
- (i) Each door shall have windows set in a waterproof manner that are visually similar in size and location to adjacent non-door windows. Glazing shall be of the same type and tinting (if applicable) as standard fixed glass in other body locations;
- (j) Door(s) shall be equipped with a device that will activate a green flashing signal located in the driver's compartment when door(s) is not securely closed and ignition is in "on" position.
- (k) A switch shall be installed so that the lifting mechanism will not operate when the lift platform door(s) is closed.
- (l) Buses equipped with special service entrance doors not currently in use for service to students with disabilities or power lift equipped, must assure:
 - (A) Door must be in compliance with all requirements for right side emergency door, or all of the following:
 - (i) Be sealed and inoperable;
 - (ii) Have no handles, and
 - (iii) Have the words NOT AN EXIT placed in letters at least two inches high above the door on both the interior and exterior of the bus.

(16) Seating Arrangements:

- (a) Flexibility in seat placement and spacing to accommodate special needs or devices may be permitted due to change of passenger requirements.
- (b) Rear-facing seats may be installed if necessary for exit access or student monitoring. If rear-facing seats are installed they shall comply with all applicable elements of Federal Motor Vehicle Safety Standard 222 and be equipped with a lap belt meeting requirements listed in FMVSS 208, 209, and 210.

(17) Steps:

Vehicles equipped with power lifts shall provide service door steps extending the full width of the stepwell.

(18) Student Securement Systems:

- (a) All child securement systems provided in the bus shall be used in compliance with all applicable standards and rules, including those addressing mobile seating devices.
- (b) Any exemption from student securement system requirements shall be acceptable only when provided by a doctor on a form consistent with ORS 811.220.

(19) Wheeled Mobility Device—Fastening Devices:

- (a) Adjustable and accessible positive fastening devices shall be provided, attached to floor or walls or both, that will securely hold wheelchairs or other type of ambulatory (mobility) devices in the event the vehicle is overturned and to prevent the wheels from leaving the floor in case of a sudden movement. All floor-mounted attachment devices shall be affixed with nut and bolt

fasteners, except in areas where it is not practicable. Buses purchased after September 1, 1993, equipped to transport mobile seating devices or buses retrofitted for that purpose after that date, shall provide mobility-device securement straps and hardware in compliance with FMVSS 222 adopted by National Highway Traffic Safety Administration for January 17, 1994 implementation.

- (b) Wheelchairs or other devices designed solely for use by passengers with disabilities or convalescent passengers may be positioned in a direction other than forward-facing only at the specific direction of the student's IEP when forward-facing positions are available.
- (c) Buses equipped to transport mobile seating devices purchased after September 1, 1993, or buses retrofitted after that date to transport mobile seating devices shall have a Federal Motor Vehicle Safety Standard complying barrier placed forward (front of bus) of each mobile seating device placed in a position other than forward facing. Barriers shall be located as close as practicable to the forward side of the mobile seating device.
- (d) No fastening device shall be attached to any door.
- (e) Additional fastening devices may be installed to restrain the student due to the many different configurations of chairs and exceptionalities.
- (f) Three-wheeled mobile seating devices shall not be occupied during transport.

APPENDIX

APPENDIX 1 CURRENT DRAW TABLE FORTYPE A BUSES

CONSTANT LOADS	ACTUAL CURRENT DRAW (AMPS) PER UNIT	X	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. Underseat Heater, Large**	12.2	x	1	=	12.2
7. Underseat Heater, Small	6.1	x	1	=	6.1
Intermittent Loads					
<i>(Values of Current draw shown are 35% of actual)</i>					
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	2	=	1.4
12. Back Up Lamps	0.7	x	2	=	1.4
ELECTRICAL LOAD VALUE				=	60.7

*Includes Cab Heater Defroster System, Windshield Wiper-washer System, etc.

**Not included in total electrical load value.

NOTE: To determine the electrical load (in amperes) for a typical school bus, the following formula is recommended:

$$\text{CONSTANT LOAD} + 35\% \text{ OF INTERMITTENT LOAD} = \text{TOTAL LOAD}$$

APPENDIX II

CURRENT DRAW TABLE FOR TYPES B, C, AND D BUSES

CONSTANT LOADS	ACTUAL CURRENT DRAW (AMPS) PER UNIT	X	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 PA 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. Underseat Heater, Large	12.2	x	1	=	12.2
15. Underseat Heater, Small*	6.1	x	1	=	6.1
16. Defroster Fan	3.0	x	1	=	3.0
Intermittent Loads					
<i>(Values of Current draw shown are 35% of actual)</i>					
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
ELECTRICAL LOAD VALUE				=	118.6

*Not included in total electrical load value.

NOTE: To determine the electrical load (in amperes) for a typical school bus, the following formula is recommended:

Placement of Reflective Markings

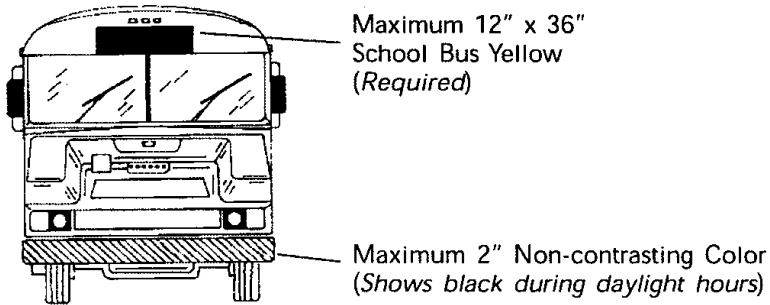


FIGURE 1

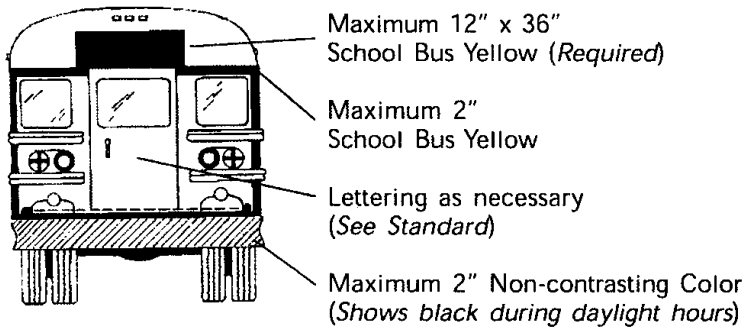
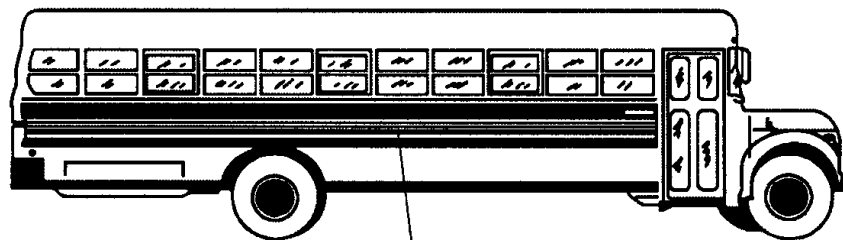


FIGURE 2



6"-12" Width
School Bus Yellow

FIGURE 3

APPENDIX IV

EMERGENCY EXIT CRITERIA

Federal Motor Vehicle Requirements FMVSS217		Oregon Department of Education Requirements	
REAR DOOR PLUS			
None		1-22	Passengers 2 SOW & 1 RH or 12 inch windows & 1 RH
None		23-45	Passengers 1 LSD & 1 RH or 2 SOW & 1 RH
46-62	Passenger 1LSD or 2 SOW	46-62	Passenger 1 LSD & 1 RH or 4 SOW & 1 RH
63-70	Passenger 1 LSD or 2 SOW & 1 RH	63 & Above	Passenger 1 LSD & 1 RH or 4 SOW & 1RH & Combination of D, W, H
71 & Above	Passenger 1 LSD or 2 SOW & 1 RH & & Combination of D, W, H		
REAR PUSH OUT WINDOW PLUS LSD PLUS			
None		1-22	Passenger 2 SOW & 1 RH or 12 inch windows & 1 RH
None		23-45	Passenger 2 SOW & 1 RH
None		46-57	Passenger 1 RSD & 1 RH or 4 SOW & 1 RH
58-74	Passenger 1 RSD or 2 SOW	58 & Above	Passenger 1 RSD & 1 RH or 4 SOW & 1 RH & Combination of D,W,H
75-82	Passenger 1 RSD or 2 SOW & 1 RH		
83 & Above	Passenger 1 RSD or 2 SOW & 1 RH & Combination of D,W,H		

Definitions: LSD: Left Side Door
RH: Roof Hatch

SOW: Swing Out Windows

RSD: Right Side Door

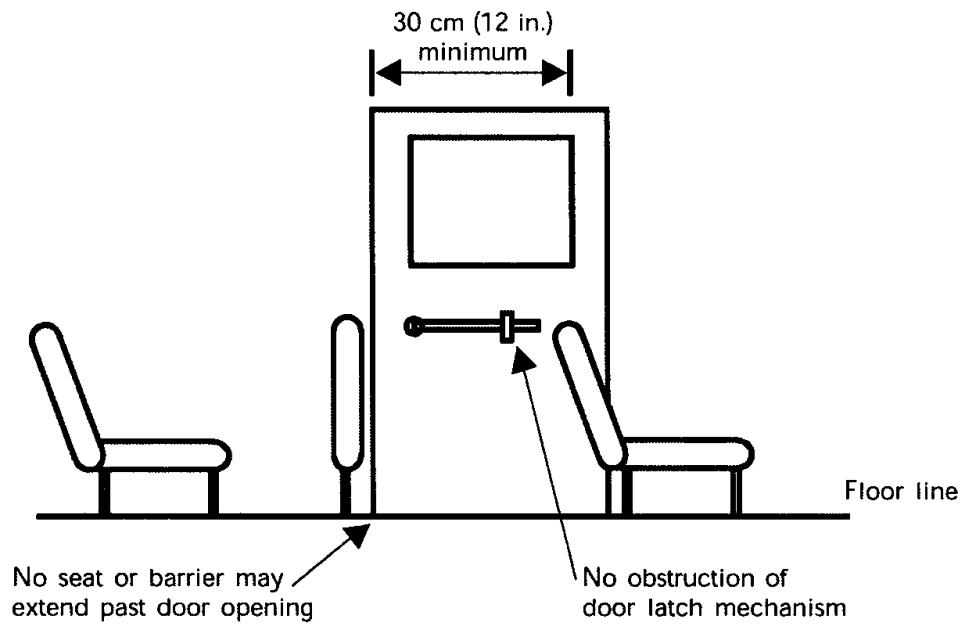


FIGURE 4

Minimum Side Emergency Exit Clearance Specifications

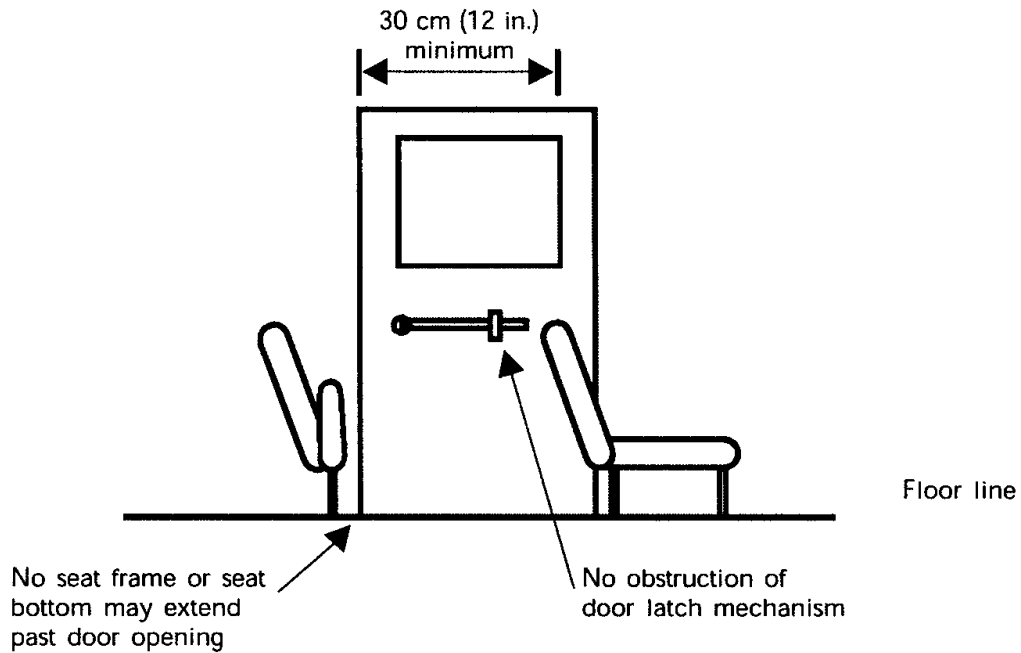


FIGURE 5

Minimum Side Emergency Exit Flip-up Seat Clearance Specifications

MIRROR PLACEMENT PERFORMANCE TEST CRITERIA

FMVSS 111

(S13.2) The driver's eye location is the eye location of a 25th percentile adult female, when seated in the driver's seat as follows:

- (a) The center point of the driver's eye location is the point located 68.58 centimeters (27 inches) vertically above the intersection of the seat cushion and the seat back at the longitudinal centerline of the seat.
- (b) Adjust the driver's seat to the midway point between the forward-most and rear-most positions, and if separately adjustable in the vertical direction, adjust to the lowest position. If an adjustment position does not exist at the midway point, use the closest adjustment position to the rear of the midpoint. If a seat back is adjustable, adjust the seat back angle to the manufacturer's nominal design riding position in accordance with the manufacturer's recommendations.

(S13.3) Adjustable mirrors are adjusted before the test in accordance with the manufacturer's recommendations. Such mirrors are not moved or readjusted at any time during the test.

(S13.4) Place a 35 mm or larger format camera, or video camera, so that its image plane is located at the center point of the driver's eye location or at any single point within a semicircular area established by a 15.24 centimeter (6 inch) radius parallel to and forward of the center point (see figure 8). With the camera at any single location on or within that semicircle look through the camera and the windows of the bus and determine whether the entire top surface of each cylinder is directly visible (see figure 7).

(S13.5) For each cylinder whose entire top surface is determined under paragraph 13.4 of this section not to be directly visible at the driver's eye location.

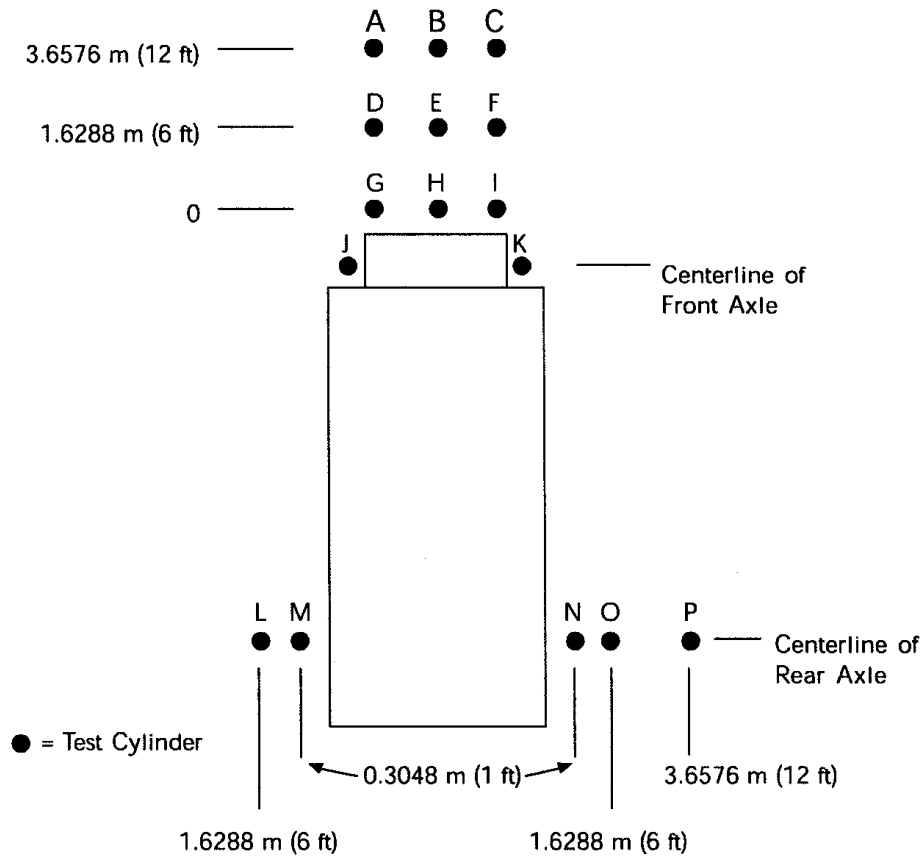


FIGURE 6

Location of Test Cylinders for School Bus Field-of-View Test

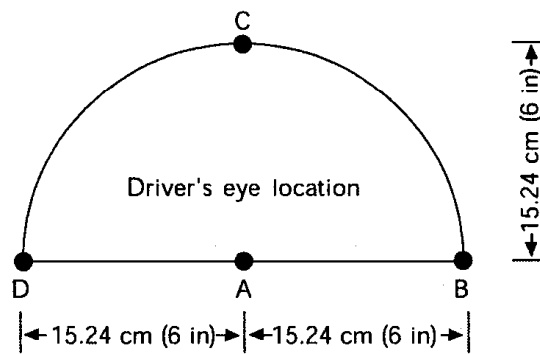


FIGURE 7

Camera Locations for School Bus Field-of-View Test

SCHOOL BUS SEAT UPHOLSTERY FIRE BLOCK TEST

A. Test Chamber

Cross Section

The suggested test chamber is same cross section as bus body in which seats are used with rear section on each end. If bus section is not used, cross section to be 91" +/- 1" in width x 75" +/- 3" in height. There shall be a door, which does not provide ventilation, in the center of each end of the test chamber. The doors shall be 38" +/- 3" in width and 53" +/- 3" in height and include a latch to keep the doors closed during the test. See Figure 8.

Length

Length of chamber shall allow 3 rows of seats at the minimum spacing recommended by the installer or required by Federal Motor Vehicle Safety Standards. See Figure 8, Detail A.

In order that different types of seats may be tested in the same chamber, a length tolerance of plus 45" is allowed.

Ventilation

One ventilation opening shall be in each end of the test chamber and shall be 325 square inches +/- 25 square inches. The bottom of the opening shall be 30" +/- 3" above the chamber floor. Ventilation openings shall be on the same side of the test chamber. See Figure 8.

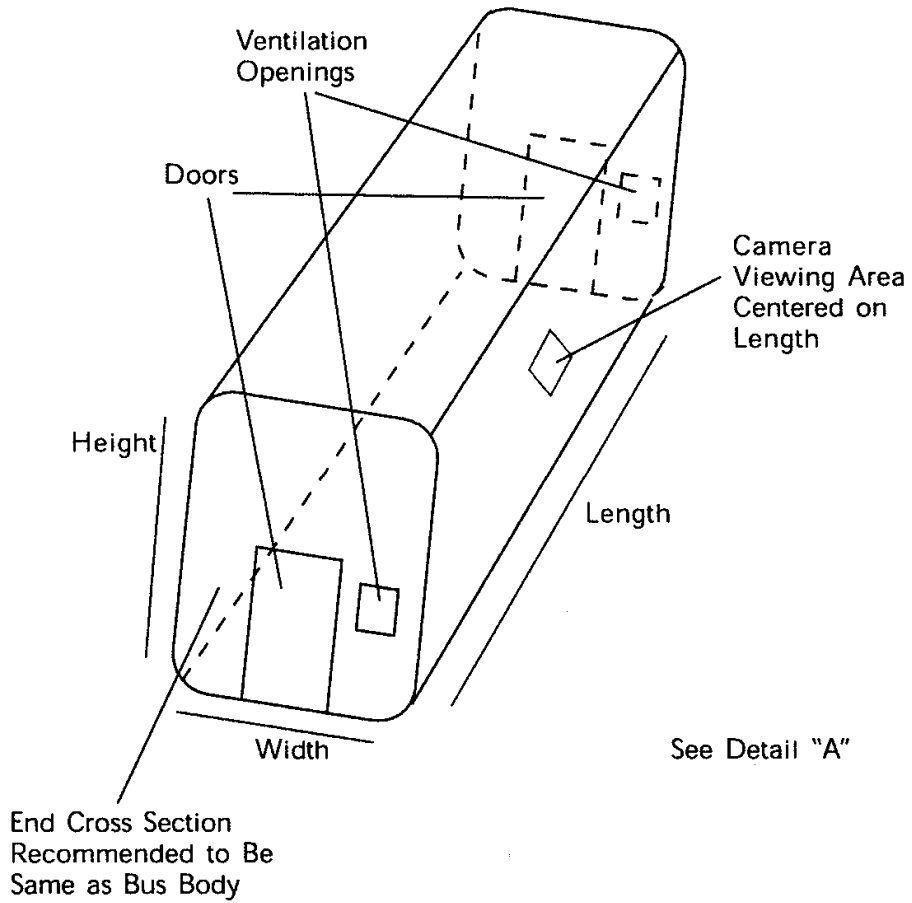
There shall be no ventilation openings along the length of the test chamber.

A forced air ventilation system may not be used.

Baffles shall be used to prevent wind from blowing directly into the ventilation openings.

Camera View Area

An opening covered with glass shall be provided at the midpoint of the chamber length for camera viewing. The opening shall allow the camera to view the seat parallel to the seat width. See Figure 8.



Detail "A"

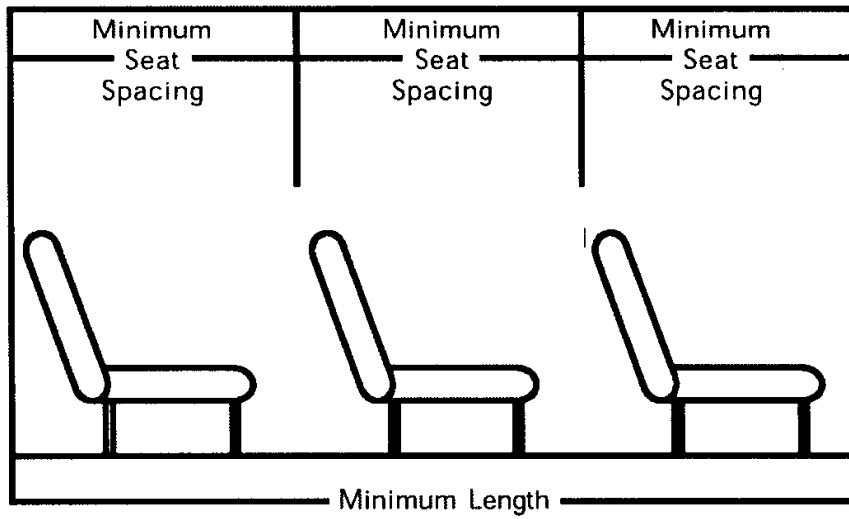


FIGURE 8

B. Test Sample

Sample shall be fully-assembled seat.

Record the weight of all padding and upholstery prior to assembly. Record the weight of the fully-assembled seat.

C. Ignition Source

A paper grocery bag whose dimensions are approximately 7" x 11" x 18" is used to contain double sheets of newsprint (black print only, approximately 22" x 28"). The total combined weight of bag and newspaper shall be 7 oz. +/- .5 oz.

D. Test Procedure

1. Install 3 seats in test chamber at minimum spacing per installer recommendation or FMVSS requirement. Seats shall be perpendicular to the dimension indicated as "length" in Figure 8. Install so that seat frames will not fall during test. Seat width shall be determined so that maximum passenger capacity per row (2 seats) for the seat style shall be tested.
2. For each test, position ignition source in the following positions outlined. Widest seat in the center row shall be tested.

Position A

Position ignition source with 18" dimension in contact with seat cushion and touching seat back. Center bag on top of cushion. See Figure 9.

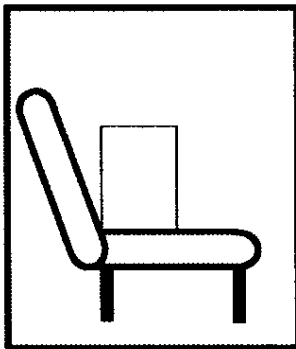


FIGURE 9

Position B

Position ignition source on floor behind seat with 18" dimension on floor and parallel to seat width centered on width so that rear of bag does not extend beyond rear of seat back. See Figure 10.

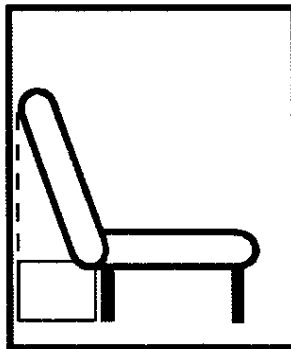


FIGURE 10

Position C

Position ignition source on floor on aisle side of seat with 18" dimension on floor and perpendicular to seat width touching seat let with centerline of bag at center of seat back. See Figure 11.

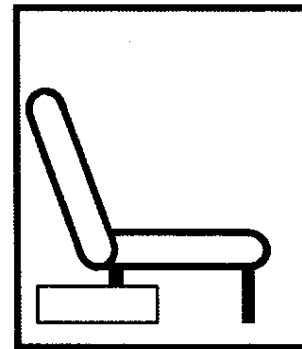


FIGURE 11

3. A wooden match shall be used to light the ignition source. Time the test beginning where the ignition source is on fire until all flame is out.
4. After each ignition source position test, weigh seat assembly including loose materials on the seat. Do not include loose material which has fallen off the seat onto the floor.

E. Performance Criteria

For each ignition source position test, the seat tested must meet all of the following criteria. A new seat specimen may be used for each ignition source position test.

1. Maximum time from ignition to flameout shall be 8 minutes.
2. Flame shall not spread to any other seat with ignition source in Position A and Position C.
3. Weight loss may not exceed 10% of pretest weight of padding and upholstery.

APPENDIX VII

NOISE TEST PROCEDURE

- A. The vehicle is located so that no other vehicle or signboard, building, hill, or other large reflecting surface is within 50 feet of the occupant's seating position.
- B. All vehicle doors, windows, and ventilators are closed.
- C. All power-operated accessories are turned off.
- D. The driver is in his normal seated driving position and the person conducting the test is the only other person in the vehicle.
- E. A sound level meter is used that is set at the "A-weighting fast" meter response and meets the requirements of:
 - 1. The American National Standards Institute, Standard ANSI S1.4-1971. "Specifications for Sound Level Meters," for Type 1 Meters; or
 - 2. The International Electrotechnical Commission (IEC), Publication No. 179 (1973). "Precision Sound Level Meters."
- F. The microphone is located so that it points vertically upward 6 inches to the right and directly in line with and on the same plane as the occupant's ear adjacent to the primary noise source.

Handrail Inspection Tool and Procedure

HANDRAIL INSPECTION TOOL AND PROCEDURE

The inspection tool (Figure 12) is inexpensive and the procedure for detecting potentially fatal handrail designs is quite simple. The inspection tool is a standard 1/2" hex nut measuring 3/4" across the flats. This nut is tied to 1/8" thick cotton cord measuring 36" in length with overhand knots. The drawstring should have a minimum length of 30" when tied to the nut and attached so that a pull of at least ten pounds does not separate the nut from or break the drawstring.

Steps to conduct a handrail inspection are:

- Stand on the ground outside of the bus
- Drop the inspection tool between the handrail and step well wall, simulating the typical way students exit the bus
- Draw the inspection tool through the handrail in a smooth, continuous slow motion
- Repeat this procedure several times (minimum of three times)

NOTE: It is important to drop the inspection tool over the handrail in such a way as to simulate a child exiting the bus. This is a *drop and drag* test. Do not create a snagging situation by placing the nut in an area that would not be exposed to a drawstring or other articles.

INSPECTION RESULTS

- Take the bus out of service and repair it if the inspection tool catches or snags anywhere on the handrail.
- If the nut separates from the drawstring or the drawstring breaks, reassemble the tool and retest. If the inspection tool pulls freely without catching or snagging, the bus should not be rejected.

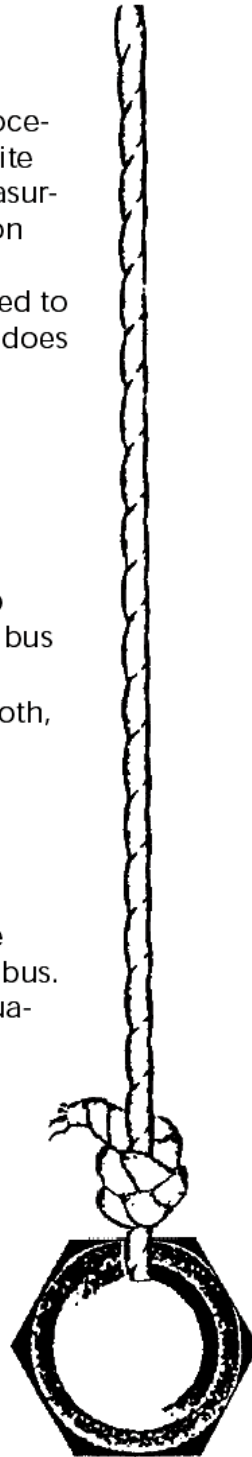


FIGURE 12