DEPARTMENT OF EDUCATION

Colorado State Board of Education

COLORADO MINIMUM STANDARDS GOVERNING SCHOOL TRANSPORTATION VEHICLES

1 CCR 301-25

[Editor's Notes follow the text of the rules at the end of this CCR Document.]

GENERAL

2251-R-1.00 Statement of Basis and Purpose.

The statutory authority for the Amendments to the Colorado Minimum Standards Governing School Transportation Vehicles (hereinafter "these rules"), adopted by the State Board of Education on May 10, 2007, is found in sections 22-51-108 and 42-4-1903 (1) (2) (3), C.R.S.

The purpose of these amendments is to upgrade the rules for Colorado minimum standards governing school transportation vehicles. The amendments will improve the safety of the students riding the school bus and the mechanical efficiency of the school bus. They are designed to meet or exceed changing needs of operation, the national recommended minimum standards, new federal safety and emission standards and utilize state-of-the-art industry advances.

2251-R-2.00 References

FMVSS-

Federal Motor Vehicle Safety Standards

49 C.F.R. Part 571, Current Revision

National Highway Traffic Safety Administration

U.S. Department of Transportation

SAE-

Society of Automotive Engineers, Inc.

Standards, Current Revision

UL-

Underwriters Laboratories, Inc.

Standard 299-82, Current Revision

FED. SPEC.-

Federal Specification TT-C-520b

Current Revision

General Services Administration

Specification and Consumer Information

NCST-

National School Transportation Specifications And Procedures Revision 2005

Recommendations Of The Fourteenth National Congress On School Transportation

The Missouri Safety Center, Warrensburg, Missouri

NBS-

National Bureau of Standards

Voluntary Product Standard 1-83, Current Revision

Office of Standards Reference Materials

SAHS-

Standard Alphabets for Highway Signs - Series B

Federal Highway Administration, Current Revision

U.S. Government Printing Office

NFPA-

National Fire Protection Association

Volume 2, National Fire Codes, Current Revision

2251-R-3.00 Responsibility of Suppliers.

3.01 School transportation vehicle dealers, distributors, and manufacturers each have a responsibility to comply with these rules after the effective date of these rules, September 1, 2007.

3.02 Dealers, distributors, or manufacturers which supply school transportation vehicles for use in the State of Colorado which do not meet the specifications herein stated shall be notified of noncompliance and a general notice will be sent to all school districts and school transportation operations within the State of Colorado advising that equipment supplied by such dealer, distributor, or manufacturer is not in compliance with these rules, September 1, 2007.

3.02 (a) If a dealer, distributor, or manufacturer has been notified of non-compliance in accordance with subsection 3.02 and replaces or modifies the equipment to meet these rules, September 1, 2007, a notification of compliance will be issued from the Colorado Department of Education within 30 days after proof of compliance.

2251-R-4.00 Effective Date of Specification.

4.01 School transportation vehicles manufactured on or after the effective date of these rules, September 1, 2007, for the purpose of transporting Colorado students shall meet or exceed these minimum standards contained herein.

4.02 School transportation vehicles transporting Colorado students may continue in use.

4.03 Only those buses that were manufactured, within the previous 20 years, may be purchased, leased, contracted, or otherwise obtained for the purpose of transporting Colorado students. These buses must met Colorado minimum standards that were in effect at the time of manufacture.

4.04 Only those small vehicles manufactured after September 1, 1994, may be purchased, leased, contracted, or otherwise obtained for the purpose of transporting Colorado students.

2251-R-5.00 School Transportation Vehicle Definitions.

5.01 School Transportation Vehicle means every motor vehicle which is owned by a public or governmental agency and operated for the transportation of students to or from school or school related events or which is privately owned and operated for compensation provided that such transportation service is sponsored and approved by the local board of education or school governing agency.

5.01 (a) This does not include informal or intermittent arrangements, such as sharing of actual gasoline expense or participation in a car pool.

5.01 (b) Vehicles that carry students as part of their operation as a common carrier under the jurisdiction of us department of transportation or public utilities commission are not included within the definition of school transportation vehicle.

5.02 A School Bus shall be a motor vehicle with motive power, built to FMVSS and the school bus standards contained herein, designed for carrying students on either routes or activity trips.

5.02 (a) **TYPE A** --Type "A" school bus is a conversion or body constructed upon a van-type compact truck or a front-section vehicle chassis, designed for carrying passengers with driver side door and GVWR of 21,000 pounds or less.

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

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

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

5.03 Small Vehicle shall be a motor vehicle with motive power, which does not meet the requirements of a Type A, B, C, or D school bus. These vehicles shall not transport more than the manufacturer's designated capacity. A small vehicle shall meet or exceed section 59.06 of these rules. These vehicles may be used to carry students on route or activity trips.

The preceding definition is not intended to include private motor vehicles used exclusively to carry members of the owner's household.

5.03 (a) Small vehicles shall bear name of school district/service provider plainly visible to each side.

5.04 Multifunction bus shall be a motor vehicle with motive power, built to federal multifunctional school activity bus standards, designed for carrying students. These buses may be used to carry students on activity trips. Multifunction buses of 15 or less capacity may also be used on route.

5.04 (a) Multifunction buses shall also meet the standards contained herein with the exception of:

16.00 Color: chassis

54.00 Color: body

63.01 Lettering “SCHOOL BUS”

63.06 Lettering “STOP ON FLASHING RED”

67.07 Alternately flashing warning signal lamps

77.00 Stop signal arm

2251-R-6.00 Testing and Certification.

6.01 Chassis manufacturers shall provide annual certification to the Colorado Department of Education that their product(s) meet these rules and all applicable FMVSS standards.

6.02 School bus body manufacturers shall provide annual certification to the Colorado Department of Education that their product(s) meet or exceed these rules and all applicable FMVSS in effect at the time of manufacture. Body manufacturers shall record and report to CDE the test results called for in Section 55 - Construction, of these rules. All school bus bodies shall meet applicable FMVSS and compliance with these standards shall be certified by the body manufacturer by the attachment of a plate or decal.

6.03 It will be the district's/service provider’s responsibility to ascertain whether all school buses purchased, leased, or under contract to the district meet all specifications of these rules. This verification should be obtained at the time of delivery, in addition to the statement of compliance in the purchase bid, contract for or lease agreement.

6.04 When selling a school bus, it is the district's responsibility to eliminate the district's name from the sides of the bus.

6.05 Used school bus dealers shall register with the Colorado department of education certifying that only school transportation vehicles meeting or exceeding Colorado standards will be sold. There shall be no fee to register.

6.06 All school transportation vehicles must meet and continue to meet applicable FMVSS.

2251-R-7.00 Chassis and Body Delivery Requirements.

7.01 The chassis and body manufacturer shall provide the following materials and information for direct delivery to the customer upon request:

7.01 (a) Line set tickets for each individual unit.

7.01 (b) A copy of the pre-delivery service performed and verified by a checkout form for each individual unit.

7.01 (c) Warranty book and statement of warranty for each individual unit.

7.01 (d) Service manual for each individual unit or identical units.

7.01 (e) Parts manual for each individual unit or identical units.

2251-R-8.00 (rule number reserved)

2251-R-9.00 (rule number reserved)

2251-R-10.00 (rule number reserved)

2251-R-11.00 (rule number reserved)

THE BUS CHASSIS

2251-R-12.00 Air Cleaner.

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

2251-R-13.00 Axles.

13.01 The front axle and rear differential, including suspension assemblies, shall have a gross axle weight rating at ground, at least equal to that portion of the load as would be imposed by the chassis manufacturer's maximum gross vehicle weight rating.

13.02 Rear axle shall be single-speed.

2251-R-14.00 Brakes.

14.01 All braking systems shall comply with FMVSS.

14.01 (a) The braking system capacity shall be comenserate with the braking requirements of the GVWR.

14.02 Vehicles with a maximum designed capacity of greater than 54 shall be equipped with full compressed air brake systems.

14.03 Air brakes: The following standards apply to air brake systems:

14.03 (a) Compressors: On buses using full compressed air brakes for service, emergency, and parking brakes, the compressor shall be a standard production model with a minimum 12 cubic foot per minute displacement.

14.03 (b) Three reservoirs or chambers (wet, primary, secondary) with a total capacity, which is equal to or greater than 12 times the total volume of all brake actuators at full travel.

14.03 (c) Moisture ejection valve: An automatic heated, moisture ejection valve or air drying system shall be properly installed. This is made to automatically eject moisture, sludge, and/or foreign matter and maintain clean, dry air lines.

14.03 (d) Control requirements: Control valve of the parking brake system shall be designed and constructed to conform with the following:

14.03 (d)(1) The parking brake control valve shall be visible to the driver and shall be mounted on the dash panel within 15 inches to the right of the steering column.

14.04 Anti-lock brake system shall control all four wheel positions individually.

2251-R-15.00 Bumper, Front.

15.01 Front bumper on all Type A, B and C school buses shall be furnished by the chassis manufacturer.

15.02 Front bumper of Type D school buses shall be furnished by the body manufacturer.

15.03 Front bumper shall be at least 3/16 inch thick of pressed steel channel, one piece construction or optional 3-piece breakaway construction and a minimum of eight inches wide (high) except Type A buses.

15.04 Front bumper shall be of extended design to offer maximum protection of fender lines without permitting snagging or hooking.

15.05 Front bumper shall be attached to the frame and extend forward of grille, head lamps, fender, or hood sections to provide maximum protection.

15.06 The bumper shall be of sufficient strength to ensure that the front of the bus may be lifted by means of a bumper type jack without permanent deformation of the bumper. Type A buses may use standard construction bumper.

2251-R-16.00 Color: Chassis.

16.01 Frame and bumper shall be painted black.

16.02 Cowl and fenders shall be painted National School Bus Yellow as defined in NCST.

2251-R-17.00 Cooling System.

17.01 Permanent ethylene-glycol base or environmentally safe equivalent anti-freeze shall be provided by chassis manufacturer to protect the cooling system to -30 degrees Fahrenheit (F) when tested at normal engine temperature and shall not be diluted by body company.

17.02 Cooling system shall be equipped with a coolant recovery system.

17.03 Cooling system shall be equipped with a visual fluid level indicator.

2251-R-18.00 Drive Shaft.

18.01 Each drive shaft or section thereof shall be equipped with adequate metal guard or guards to prevent whipping through floor or dropping to ground if broken.

2251-R-19.00 Electrical System.

19.01 The electrical system (including battery(ies) and alternator) shall be commensurate with all electrical needs of the bus, including accessories.

19.02 Battery and all cable required to complete circuits without splicing, even when drawer is extended for battery servicing, shall be provided by the chassis manufacturer and mounted for delivery to body plant.

2251-R-20.00 Exhaust System.

20.01 Exhaust pipe, muffler, and tail pipe shall not pass through the passenger portion of the bus body.

20.02 exhaust system must meet federal standards.

20.03 Tailpipe shall not exit the right side of the bus body.

20.04 Exhaust system shall be insulated from fuel tank and fuel tank connections by securely attached metal shield at any point where it is 12 inches or less from the fuel tank or fuel tank connections, except diesel fuel.

20.05 There shall be a switch inaccessible to the driver to manually start the diesel particulate filter regeneration process.

2251-R-21.00 Fenders, Front.

21.01 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.

21.02 Front fenders shall be braced and free from any body attachment.

2251-R-22.00 Frame.

22.01 Frame shall be designed to correspond with or exceed standard practice performance criteria for truck of same general load specifications used for severe service.

22.02 No holes shall be permitted in the chassis rails except those drilled at the chassis plant or authorized by the chassis manufacturer.

22.03 Welding to frame side rails which is necessary by design to strengthen, modify or alter basic vehicle configuration shall be performed and guaranteed by the body or chassis manufacturer making the modification.

2251-R-23.00 Fuel System

23.01 All fuel tank specifications shall conform to FMVSS 301.

23.02 Fuel tank shall be filled and vented entirely outside the passenger compartment.

23.03 Fuel filter with replaceable element shall be installed between fuel tank and engine.

23.04 Engine supply line shall not be mounted below fuel tank.

2251-R-24.00 Heating System.

24.01 Engine design shall provide inlet and outlet holes in accessible locations for attachment of bus heating system water lines. Heater outlets shall be of sufficient size to accommodate circulation of all coolant with no reduction of coolant lines.

2251-R-25.00 Horn.

25.01 Bus shall be equipped with horn(s) of standard make, each horn capable of producing complex sound in band of audio frequencies from 250 to 2000 cycles per second and having total sound level of 110 decibels as rated by horn manufacturer.

2251-R-26.00 Instruments and Instrument Panel.

26.01 Chassis shall be equipped with the following non-glare instruments and gauges. Lights in lieu of gauges are not acceptable.

26.01 (a) Standard speedometer with seven digit odometer,

26.01 (b) Voltmeter with a graduated scale to 16 volts.

26.01 (c) Oil pressure gauge.

26.01 (d) Water temperature gauge.

26.01 (e) Fuel gauge.

26.01 (f) Upper-beam headlamp indicator.

26.01 (g) Tachometer. The tachometer is not required for Type A and B school buses.

26.01 (h) Left and right turn-signal indicator.

26.01 (i) Chassis with air brake systems shall be equipped with a visible gauge and audible low-pressure indicator to warn driver if air pressure in brake system falls below 60 PSI.

26.01 (j) Chassis with air brake systems shall have a labeled visual indicator of park brake application visible to driver.

26.01 (k) Chassis with a hydraulic assist-brake system shall be equipped with warning signals, readily audible and visible to the driver, that will provide continuous warning in the event of a loss of fluid flow from primary source or loss of electric source powering the back-up system.

26.02 All instruments shall be easily readable by driver and accessible for maintenance.

2251-R-27.00 Lamps and Signals.

27.01 All lamps and their installation shall conform to current standards and recommended practices of applicable SAE and FMVSS standards.

2251-R-28.00 Openings.

28.01 All openings made by chassis manufacturer in floorboard and fire-wall shall be sealed by the chassis manufacturer to prevent gases from entering driver's compartment. Boot for the accelerator pedal, gear shift, and parking brake, when required, shall be supplied by the chassis manufacturer.

2251-R-29.00 Power or Gradeability.

29.01 The gross vehicle weight of any school bus shall not exceed 165 pounds per certified net horsepower of the engine at manufacturer's recommended maximum revolutions per minute (RPM).

2251-R-30.00 Retarder (optional)

30.01 Retarder manufacturers shall certify that their product system shall maintain the speed of the bus loaded to maximum GVW at 20 miles per hour on a 7 percent grade for 3.5 miles.

30.02 School buses equipped with electro-magnetic retarder(s) shall have increased electrical system capacity commensurate with the needs of the retarder system.

30.03 Pilot light(s) shall indicate when retarder is in operation.

2251-R-31.00 Steering Gear Assembly.

31.01 All school bus chassis in all passenger capacities shall be equipped with heavy-duty, truck-type integral power steering. Power steering components shall be compatible with the GVW rating for each capacity as shown in chassis manufacturer's literature.

31.02 No changes shall be made in steering apparatus that are not approved and guaranteed by chassis manufacturer.

31.03 There shall be a clearance of at least two inches between steering wheel and any other surface or control.

31.04 Chassis manufacturers shall provide and cover steering wheel column with a temporary plastic covering or equivalent, in order to provide protection from precipitation from time of manufacture until body is mounted.

2251-R-32.00 Suspension System.

32.01 Capacity of suspension assemblies shall be commensurate with chassis manufacturer's gross vehicle weight rating.

2251-R-33.00 Tires and Rims.

33.01 Minimum tire and rim sizes shall be in accordance with FMVSS 120.

33.02 Dual rear tires shall be provided on Type B, C, and D school buses.

33.03 All wheels shall be one piece disc type. Split or multi-piece rims are not acceptable.

2251-R-34.00 Tow Hooks Front.

34.01 Two heavy duty tow hooks or two eyes on Type C and D buses shall be furnished and factory installed, except on Type A and B buses. Hooks shall not extend beyond the front bumper on any school bus.

2251-R-35.00 Undercoating.

35.01 Chassis manufacturer shall coat undersides of steel or metallic front fenders with rust-proofing compound for which compound manufacturer has issued notarized certification of compliance to chassis builder that compound meets or exceeds all performance and qualitative requirements of Fed. Spec. using modified test.

2251-R-36.00 Wiring.

36.01 All wiring shall conform to current applicable recommended practices of SAE.

36.02 All wiring shall use a standard color, number, or function coding and each chassis shall have available at no cost to the district/service provider. a wiring diagram that coincides with the wiring of the chassis. Type A bus chassis may be exempt from this requirement.

36.03 Chassis manufacturer shall install an accessible terminal strip or plug on the body side of the cowl, or at an accessible location in the engine compartment of vehicles designed without a cowl, that shall contain the following terminals for the body connections. Factory terminal strip from chassis manufacturer on Type A bus will be acceptable.

36.03 (a) main 100 amp body circuit

36.03 (b) tail lamps

36.03 (c) right turn signal

36.03 (d) left turn signal

36.03 (e) stop lamps

36.03 (f) back up lamps

36.03 (g) instrument panel lights

2251-R-37.00 (rule number reserved)

2251-R-38.00 (rule number reserved)

2251-R-39.00 (rule number reserved)

2251-R-40.00 (rule number reserved)

2251-R-41.00 (rule number reserved)

2251-R-42.00 (rule number reserved)

2251-R-43.00 (rule number reserved)

2251-R-44.00 (rule number reserved)

2251-R-45.00 (rule number reserved)

2251-R-46.00 (rule number reserved)

2251-R-47.00 (rule number reserved)

2251-R-48.00 (rule number reserved)

2251-R-49.00 (rule number reserved)

THE BUS BODY

2251-R-50.00 Aisle.

50.01 Minimum aisle clearance between seats shall be 12 inches at seat level and 15 inches at top of seats. This includes the aisles to all emergency doors.

50.02 The aisle to any side emergency exit door shall be unobstructed at all times by any type of barrier, seat, wheelchair or tiedown, unless a flip seat is installed and occupied. A flip seat in the unoccupied (up) position shall not obstruct the 12 inch minimum aisle to any side emergency exit door. The track of a track seating system shall be exempt from this requirement.

50.03 On forward control (front engine) Type D buses, the aisle passage area shall not be less than 12 inches, measured from floor level up, between engine cover and any other object. Hold down fastening devices used on engine cover shall be designed to prevent hooking or catching on shoes or clothing.

2251-R-51.00 Battery.

51.01 Body manufacturer shall provide, a drawer-type pull out tray to facilitate servicing or removal of battery(ies). The battery(ies) shall be enclosed by a vented compartment constructed of mill-applied zinc steel provided with drain ports, hold down carrier mounted so as to avoid blocking filler ports and latching device to prevent accidental opening. Under-coating shall be provided and applied to battery box. Battery tray is to be equipped with a safety device to keep tray from sliding completely out to prevent battery from being dropped.

2251-R-52.00 Bumper, Rear.

52.01 Rear bumper shall be of pressed steel channel or equivalent material, at least 3/16-inch thick, and shall be a minimum of 8 inches wide (high) on Type A buses, and shall be a minimum of 9 1/2" wide (high) on Type B, C, and D buses.

52.02 Rear bumper shall be wrapped around back corners of bus and extend forward at least 12 inches from rear-most point of body at floor line.

52.03 Bumper shall be fastened to chassis frame side rails in such a manner as to develop full strength of bumper section from rear or side impact. Bracing materials shall have an impact ratio comparable to that of bumper material and shall be fastened at the ends and radii of the bumper, attached to the side of the frame only and not to body at any point.

52.04 Rear bumper shall extend beyond rear-most part of body surface at least one inch, measured at floor lines.

52.05 No spaces, projections, or cut-outs that will permit a hand hold or foot hold shall be permitted.

52.06 Front ends of the bumper shall be enclosed by end caps or other protective metal or shall have the ends rounded or tucked in and shall be free from sharp edges or projections likely to cause injury or snagging.

52.07 A gasket, rubber or equivalent, shall be installed to close opening between the top of the rear bumper and body metal.

52.08 The bumper shall be of sufficient strength to permit being pushed by another vehicle of similar size. The bumper shall be of sufficient strength to ensure that the front of the bus may be lifted by means of a bumper type jack without permanent deformation of the bumper. Type a buses may use standard construction bumper.

2251-R-53.00 Capacity.

53.01 Capacities and seat spacing shall conform to and be in full compliance with applicable FMVSS.

2251-R-54.00 Color.

54.01 All exterior metal shall be painted National School Bus Yellow (NSBY) as specified in NCST with the exception of those areas listed below:

54.01 (a) Lettering and numbering (black, white, or yellow for bumper area)

54.01 (b) Bumpers (black)

54.01 (c) Rubrails may be black or yellow at purchaser option

54.01 (d) Background area for warning light system. (black)

54.01 (e) The roof of the bus may be painted white not to extend below the drip rails on the sides of the body.

54.01 (f) Student window frames, posts and service door frame may be black.

54.02 Retro-Reflective material shall be installed on the bus. Material shall be of reflective NSBY conforming to the requirements of FMVSS 571.131, Table 1. Retro-Reflective materials and markings shall include the following:

54.02 (a) Rear of bus body: strips of at least 1.75 inch Retro-Reflective NSBY material shall be applied horizontally above the rear windows and above the rear bumper extending from the rear emergency exit perimeter marking outward to the left and right rear corners of the bus with vertical strips applied at the corners connecting these horizontal strips.

54.02 (b) "School Bus" signs: Shall be marked with Retro-Reflective NSBY material comprising background for lettering of the front and/or rear "school bus" signs.

54.02 (c) Sides of bus body: Shall be marked with Retro-Reflective NSBY material at least 1.75 inches in width, extending the length of the bus body and located (vertically) as close as practicable to the floor line.

2251-R-55.00 Construction.

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

55.02 The floor shall be at least 14 gauge mill applied zinc-coated steel sheet and shall be on one plane. There shall be a main floor cross member of at least 10 gauge steel or equivalent placed at each side post extending the full width of the floor plate and permanently attached. There shall be a minimum of two intermediate floor cross members of at least 16 gauge steel equally between the main floor cross members and permanently attached.

55.02(a) Type a buses may use other metal or material with strength and corrosion resistance at least equivalent to all-steel construction as certified by the bus body manufacturer.

55.03 In addition to complying with the test procedures described in FMVSS 220, the body manufacturers shall record and report the downward vertical movement of the force at 0, 25, 50, 75, and 100% of the maximum force (both loading and unloading). The expected force deflection curve is illustrated schematically in Figure 1a. Low load nonlinearities may indicate joint conformation; high load nonlinearities may indicate yielding instructural members.

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

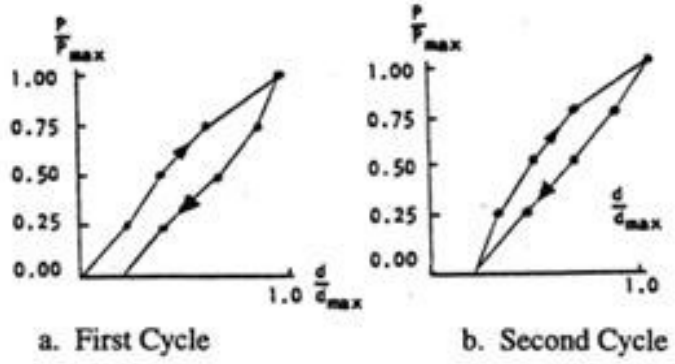


Figure 1. Static Load Test Load-Deflection Curves

55.04 A diagonal (racking) load test shall be performed on Type A, B, C, D school buses to assure adequate shear stiffness and strength of the bus body. Details of the test are provided below.

A two cycle loading sequence shall be conducted following the procedure described in Section 55.04.

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

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

55.04 (a)(2) Each emergency exit of the vehicle provided in accordance with FMVSS 217 shall be capable of operation as specified in that standard during the full application of the force and after release of the force.

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

55.04 (b)(1) The vehicle shall be supported on a rigid surface along the lower edge of the frame or along the body sills in the absence of a frame.

55.04 (b)(2) The load shall be applied through a force application plate that is flat and rigid. The dimensions of the plate shall be chosen to assure that the plate edges never make contact with the vehicle skin during testing. A typical width is 18 inches, and a typical length is 20 inches less that the length of the vehicle's roof measured along its longitudinal centerline.

55.04 (b)(3) Place the force application plate in contact with the edge of the vehicle roof. Orient the plate so that its flat, rigid surface is perpendicular to a diagonal line connecting the most distant points on an interior cross section of the vehicle. The rear edge of the plate shall be positioned approximately 20 inches from the rear edge of the vehicle roof. A temporary stand may be used to support the plate until a force is applied.

55.04 (b)(4) Apply an evenly distributed force in a diagonally downward direction through the force application plate at any rate not more than 0.5 inch per second, until a force of 500 pounds has been applied.

55.04 (b)(5) Apply additional force in a diagonally downward direction through the force application plate at a rate of not more than 0.5 inch per second until the force specified in (a) has been applied, and maintain this application of force.

55.04 (b)(6) Measure the diagonal movement of any point on the force application plate which occurred during the application of force in accordance with (5) and open the emergency exits as specified in (a)(2).

55.04 (b)(7) Release all diagonal force applied through the force application plate and operate the emergency exits as specified in (a)(2).

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

55.04 (c)(1) Temperature: The ambient temperature is any level between 32 degrees F and 90 degrees F.

55.04 (c)(2) Windows and Doors: Vehicle windows, doors, and emergency exits are in the fully-closed position, and latched but not locked.

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

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

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

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

J = 2P J - maximum jack load for two-frame test assembly

P = load/frame

where P = DVW divided by N

DVW - dynamic vehicle weight

N - total number of bus body frames

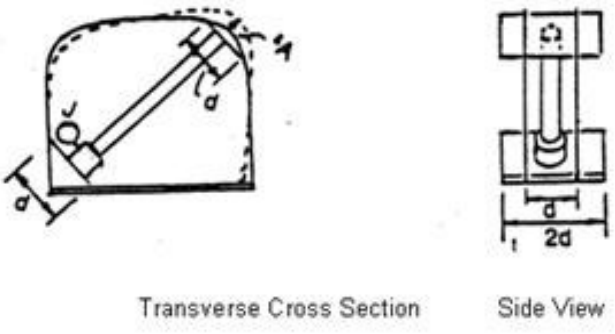
and DVW = DF x GVW

DF - dynamic factor, not less than 1.5

GVW - gross vehicle weight

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

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



Transverse Cross Section Side View

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

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

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

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

Manufacturers shall specify which testing method was used and submit appropriate certification information as called for in 6.02.

55.05 Subfloor shall be either 5 ply nominal 5/8 inches thick plywood, or a material of equal or greater strength and insulation R value and it will equal or exceed properties of exterior-type softwood plywood C-D grade, as specified in NBS Product Standard 1-83. Type A buses shall have nominal 1/2 inch thick plywood or equivalent material equal to or exceeding properties listed above.

55.06 Ceiling Panels: If the ceiling is so constructed to contain lap joints, the forward panel shall be lapped by the rear panel and the exposed edges shall be beamed, hemmed, or flanged or otherwise treated to eliminate sharp edges.

55.07 All body components shall be designed and constructed so as to avoid the entrapment of moisture and dust.

55.08 All openings between chassis and passenger-carrying compartment made for any reason by body manufacturer must be sealed.

2251-R-56.00 Defrosters.

56.01 A defroster system shall be installed of sufficient capacity to keep windshield area, left frontside window to rear of driver's vision, and service door glass area free of condensation or ice.

56.02 Adjustable 6 inch auxiliary fans may be installed to complement the defroster system used by the manufacturer. Such fans shall be controlled individually by two-speed switches located on control panel. Fan blades shall be covered with a protective cage.

The fans shall be located so as to not interfere with the driver’s horizontal line of sight vision.

56.03 The defrosting system shall conform to SAE Standards.

2251-R-57.00 Doors.

57.01 Service door shall be power or manually operated, under control of the driver, and so designed to afford easy release and to prevent accidental opening. When manual lever is used, no parts shall come together so as to shear or crush fingers.

57.02 Manual door controls shall not require more than 25 pounds of force to operate at any point throughout the range of operation as tested on a 10% grade both uphill and downhill. Power door controls shall be located within easy access of driver.

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

57.04 Power operated doors shall be equipped with a separate manual emergency release, readily accessible in the door area above or to the side of the service door or on dash, so that the door may be opened in the case of emergency. The release shall be plainly labeled with instruction for use.

57.05 There shall be a head bumper pad installed on the inside at the top of the entrance door. This pad shall be approximately 3 inches wide (high), at least 1 inch thick, and extend across the entire top of the entrance door opening.

2251-R-58.00 Emergency Exits.

58.01 All emergency exits shall conform to FMVSS 217.

58.02 Emergency door:

58.02 (a) Emergency door(s) shall be equipped with a 3-point latch mechanism.. Emergency door latch shall be equipped with suitable electric plunger-type switch connected with buzzer located in driver's compartment. Switch shall be enclosed in metal case and wires leading from switch shall be concealed in bus body. Switch shall be so installed that plunger contacts farthest edge of slide bar in such manner that any movement of slide bar will immediately close circuit on switch and activate buzzer.

58.02 (b) Ignition interlock for the vandal locks shall conform to FMVSS.

58.02 (c) Exterior door handle shall be of permanent hitch-proof design and mounted with enough clearance to permit opening without touching door surface and may be equipped with a lock that will not prevent opening from inside.

58.02 (d) All emergency door openings shall be completely weather stripped. There shall be no obstruction higher than 1/4 inch across the bottom of any emergency door opening.

58.02 (e) Operation instructions for opening of door shall be lettered or decaled on the inside of the emergency door.

58.02 (f) Emergency door shall bear words either **"EMERGENCY EXIT"** or **"EMERGENCY DOOR"** both inside and outside clearly visible in letters at least 2 inches high. Words shall be placed directly above the door or on the upper portion of the door.

58.02 (g) On all buses except rear engine transit school buses (Type D), and buses with a raised rear storage compartment, an emergency door shall be located in the rear of the bus body and centered with respect to the body. Door shall have a minimum horizontal opening of 24 inches and minimum vertical opening of 48 inches measured from floor level. Rear emergency door shall be hinged on right side and shall open outward.

58.02 (h) Rear emergency door shall contain upper and lower glass panels that comply with FMVSS 205. Glass in emergency door shall provide maximum area of visibility for safe operation of bus.

58.02 (i) There shall be a head bumper pad installed over the emergency door on the inside of the bus body. This pad shall be approximately 3 inches wide (high), at least 1 inch thick, and extend across the entire top of the emergency door opening. Padding shall be of the same materials as the padding used over the service door.

58.02 (j) Side emergency door: If engine or storage compartment is so located as to make it impossible to place door in center of rear end, the emergency door shall be located in the rear half of the left side of the bus body. The door shall not be located to reduce size of opening by wheel well. The door shall be hinged on the front side.

58.03 Rear emergency window: If engine or storage compartment is so located as to require a side emergency door, an emergency window shall be installed in the rear of the bus.

58.03 (a) The emergency window glass shall meet FMVSS 205. Glass shall be tempered unless specified laminated by the purchaser.

58.03 (b) The rear emergency window shall be hinged from top and provided with a hold open control to insure against accidental closing during an emergency.

58.03 (c) Emergency window in rear shall be equipped with latch on the inside and with a handle of hitch proof design that will permit opening from the outside.

58.04 All designated emergency windows shall bear words **"EMERGENCY EXIT"** in letters at least 2 inches high both inside and outside the window. Lettering shall be placed so as to be clearly visible both inside the bus and outside directly above, below, or on the window.

58.04 (a) All designated emergency windows, when not fully latched, shall activate a signal audible to the driver.

58.04 (b) Emergency side windows shall be hinged at the front side.

58.05 The number of emergency exits a school bus shall be equipped with is shown in the following table. All other factors not listed in this section concerning the emergency exits shall be according to FMVSS 217. A district may choose to have more emergency exits installed.

Additional emergency doors may be installed in place of emergency windows according to FMVSS 217.

EMERGENCY EXITS TABLE

BUS CAPACITY	ROOF HATCH	LEFT SIDE EMERGENCY WINDOW	RIGHT SIDE EMERGENCY WINDOW
1-46	1	0	0
46-70	2	1	1
71-above	2	2	2

2251-R-59.00 Emergency Equipment.

59.01 The bus shall be equipped with at least one pressurized 5-pound dry-chemical fire extinguisher of a type approved by UL, with a total rating of not less than 2A10BC. The operating mechanism shall be sealed with a type of seal that will not interfere with use of the fire extinguisher.

59.01 (a) Fire extinguisher shall be mounted in the extinguisher manufacturer's bracket (automotive type) and located in the driver's compartment in full view of and readily accessible to the driver. A pressure gauge shall be so mounted on the extinguisher as to be easily read without removing the extinguisher from its mounted position.

59.02 First Aid Kit: The bus shall carry a first aid kit which shall either be mounted securely in full view or the location plainly indicated by appropriate markings, in the drivers compartment. Additional kits may be installed. The kit(s) shall be mounted in such a manner that they can be removed, if necessary.

59.02 (a) The kit shall be sealed. The seal verifies the integrity of the contents without opening the kit. The seal shall be designed to allow easy access to the kits contents.

Contents of the 24 unit First Aid Kit:

Item	Unit(s)
Adhesive Tape	1
1" adhesive bandage	2
2" bandage compress	1
3" bandage compress	1
4" bandage compress	1
3" x 3" plain gauze pads	1
Gauze roller bandage 2" wide	2
Plain absorbent gauze - 1/2 square yard	4
Plain absorbent gauze - 24" x 72"	3
Triangular bandages	4
Scissors, tweezers	1
Space rescue blanket	1
Non-latex disposable gloves, pair.	1
CPR mask or mouth to mouth airway	1

Moisture and dustproof kit of sufficient capacity to store the required items.

59.03 Emergency Reflectors (Section 42-4-230, C.R.S.): All buses shall carry three (3) emergency triangle reflectors in compliance with FMVSS 125, contained in a securely mounted case easily accessible to the driver.

59.04 Body fluid cleanup kit: Each school bus shall have a removable body fluid clean-up kit accessible to the driver.

Contents of the Basic Body Fluid Clean-up Kit:

Item	Unit(s)
Antiseptic towelette	1
Disinfectant towelette	1
Absorbing powder (capable of ½ gallon absorption)	1
Non-latex disposable gloves, pair	1
Disposable wiper towels	2
Disposable scoop bag with closure mechanism and scraper	1

Moisture and dustproof container of sufficient capacity to store the required items.

59.05 Small vehicles shall carry the following emergency equipment:

59.05 (a) Three (3) emergency triangle reflectors in a securely mounted case.

59.05 (b) One 24 unit first aid kit meeting the same list as the school bus.

59.05 (c) One securely mounted 2 1/2 pound dry chemical fire extinguisher of a type approved by UL, with a minimum rating of 1A10BC.

2251-R-60.00 Floor Coverings.

60.01 Floor in underseat area, including tops of wheel housings, driver's compartment, and toeboard shall be covered with fire-resistant rubber floor covering or equivalent having a minimum overall thickness of .125 inch.

60.02 Floor covering in aisle shall be aisle-type fire-resistant rubber or equivalent, non-skid, wear resistant, and ribbed. Minimum overall thickness shall be .1875 inch measured from tops of ribs.

60.03 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.

60.04 Cove molding shall be used along the side walls and rear corners and all floor seam separations shall be properly bonded or secured.

60.05 The entrance step treads, including the edge at floor level, shall be of the same quality as the aisle material. Step treads shall have an integral white nosing of 1-1/2 inch or more or use diagonal stripes. Treads shall be permanently bonded to the metal steps and sealed to prevent water from getting underneath the step tread.

60.06 A sealed and insulated plate shall be provided to access fuel tank sending unit. This plate shall not be installed under flooring material. Type A buses are exempt.

2251-R-61.00 Fuel Fill Cap Cover.

61.01 The fuel fill cap opening in the body skirt shall be equipped with a hinged cover held closed by a spring or other conveniently operated device. Type A buses are exempt.

2251-R-62.00 Heating System.

62.01 All school buses shall be equipped with two or more hot water heaters capable of delivering water to the system at a rate of six gallons per minute using an ambient temperature of 0 degree F to +10 degrees F and maintaining passenger compartment temperature of 50 degrees F. One of the heaters shall be located in the rear half of the bus on or behind the rear wheel axle line.

62.01(a) Lift equipped buses may place the rear heater under the last row of seats.

62.02 Buses shall be equipped with front heater(s) and integrated defroster system of capacity to provide heat for the front part of the bus (including driver' compartment) and to keep windshield area, service door glass, driver's left glass area, and stepwell clear of moisture, ice and snow.

62.04 Multi-speed switches shall operate all heater fans independently.

62.05 Heater cores and fans shall be completely encased but designed to permit servicing heater assembly by removing all or part of case.

62.06 Heater hose installation in the engine compartment shall include two shut-off valves able to shut off coolant completely when necessary.

62.06 (a) One mounted between the water pump outlet and heater hose connection.

62.06 (b) One mounted between the motor block and the return heater hose connection.

62.06 (c) Heater hoses shall be adequately supported to guard against excessive wear due to vibration. Hoses shall not rub against the chassis, body or other edges.

62.07 The body manufacturer shall add the required amount of permanent ethylene glycol base or environmentally safe equivalent anti-freeze after heaters have been connected to protect cooling system of bus to -30 degrees F tested at normal engine temperature.

62.08 There shall be a heater water flow regulating valve installed for convenient operation by the driver.

2251-R-63.00 Identification.

63.01 Body shall bear words **"SCHOOL BUS"** in black letters at least 8 inches high on both front and rear of body. Lettering shall be placed as high as possible without impairment of its visibility. Lettering shall conform to SAHS.

63.02 School buses shall bear name of school district/service provider on each side in black, standard unshaded letters, 5 inches in height. If there is insufficient space due to the length of the name of the school district, terms such as community, consolidated, and district may be abbreviated.

63.03 The manufacturer's rated pupil seating capacity shall be printed to the left of the entrance door on the lower skirt in 2 inch characters. The word capacity may be abbreviated. (Example: Cap. 48)

63.04 The numbering of individual buses for identification purposes is permissible.

63.05 Lettering and numerals shall be painted or may be pressure sensitive marking of similar performance quality.

63.06 **"STOP"** shall be printed on the rear of the bus in letters at least 8 inches high. **"ON FLASHING RED"** shall be printed below **"STOP,"** in letters at least 5 inches high. Letters shall be placed in area(s) visible to the approaching motorist.

63.07 The school district logo may be placed above the side window dripline or along the side of the bus but shall not interfere with any required lettering.

63.08 Only signs and lettering specifically permitted by state law or regulation, and any marking necessary for safety and identification, shall appear on the outside of the bus.

63.08 (a) Advertising, approved by the local school board, may appear only on the side(s) of the bus in the following areas:

63.08 (a)(1) The location and securement of the advertising shall have prior CDE approval.

63.08 (a)(2) The signs shall not extend from the body so as to allow a handhold or present a danger to pedestrians.

63.08 (a)(3) The signs shall not interfere with the operation of any door, window, required lettering, lamps, reflectors or other device.

63.08 (a)(4) The signs shall not be placed on side emergency door(s).

63.09 Battery compartment shall be labeled with the word "Battery".

63.10 Identification of fuel type shall be located adjacent to the fuel filler opening.

2251-R-64.00 Inside Height.

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

2251-R-65.00 Insulation.

65.01 Bus body shall be fully insulated in the roof including roof bows and all body panels. Insulation 1 inch minimum thickness shall be of fiber-glass or equal and shall be fire resistant.

2251-R-66.00 Interior.

66.01 Interior of bus shall be free of all projections likely to cause injury.

2251-R-67.00 Lamps and Signals.

67.01 All lamps, signals, reflectors and their installation shall conform to standards and recommendations of SAE and meet FMVSS. There shall be no lettering, symbols or arrows, except manufacturer's markings, on any lens.

67.02 Tail and stop (brake) lamps:

67.02 (a) Bus shall be equipped with four combination red stop/tail lamps. Two combination stop lamps shall have a lens diameter of at least 7 inches or 38.48 square inches, and shall have light intensity at least equal to Class A, Type I turn-signal units as established by SAE. Two combination tail lamps shall have a lens diameter of at least 4 inches.

67.02 (b) If the bus is equipped with a retarder, the four stop lamps shall be illuminated when the retarder is activated.

67.03 License plate lamp: Bus shall be equipped with rear license plate illuminator. This lamp may be combined with one of the tail lamps.

67.04 Interior lamps: Interior lamps shall be provided which adequately illuminate aisle. A separate lamp shall be provided in stepwell.

67.05 Back-up lamps: Back-up lamps of minimum diameter 7 inch or 38.48 square inches, or 4 inch led shall be provided.

67.06 Turn signal lamps:

67.06 (a) The bus shall be equipped with two amber turn signals in front and two amber turn signals in the rear. Both front and rear signals shall be at least 7 inches or a total of 38.48 square inches in diameter and meet the specifications of SAE. type a buses may be equipped with chassis manufacturer's front turn signal lamps.

67.06 (b) The four-way hazard switch shall activate the turn signal lamps only. This operation shall be independent of any other light system.

67.06 (c) On buses over 30 feet, a minimum of one additional turn signal shall be mounted on each side below window, behind the service door axis plane.

67.07 School bus alternately flashing warning signal lamps:

Definition: School bus alternately flashing warning signal lamps mounted at the same horizontal level, intended to identify vehicle as school bus and to inform other users of highway that such vehicle is stopped or about to stop on roadway to take on or discharge school children.

67.07 (a) All school buses shall be equipped with four red warning signal lamps designed to conform to SAE standards, and four amber warning signal lamps designed to conform to FMVSS.

67.07 (b) Right and left lamps shall flash alternately. Each lamp shall flash not less than 60 nor more than 120 flashes per minute.

67.07 (c) Flashing warning lamps are to have a signal area of not less than 7 inch (38.48 square inches) diameter per lens. The lamps shall give a distinct warning illumination of entire lens area when lighted for a distance of 500 feet when the bus is in bright sunlight.

67.07 (d) The amber flashing warning signal lamps shall be energized manually by a switch mounted on the driver control panel. The red flashing warning signal lamps shall be energized as set forth by FMVSS. The lamp units and switch systems shall also comply with the above standard. The flashing warning signal lamp system shall be a sequential mode type.

67.07 (e) The flashing warning signal lamp system shall have two pilot or indicator lights; one shall show amber light when the amber signal lamps are flashing and the other shall show red light when the red signal lamps are flashing.

67.07 (f) The vision of the front signal lamps to the front and rear signal lamps to the rear shall be unobstructed by any part of the vehicle.

67.07 (g) The area around the lens of each alternately flashing signal lamp shall be black.

67.07 (h) Visors shall be provided and securely mounted above the dual-lamp flashing warning signals to adequately shade and protect the dual-lamp assemblies from sunlight above but not to obstruct the rear and side effectiveness of the warning lamps. Led warning signal lamps are exempt.

67.08 Type D rear engine buses shall have 2 hazard lamps each visible to the rear when the engine door is open. These lamps shall be wired to be illuminated when the main hazard lamp circuit is energized.

67.09 A white flashing strobe light meeting SAE standards may be installed on the roof of a school bus. Amber lens may be used upon approval of local traffic regulatory authority. Light shall have a single clear lens emitting light 360 degrees around its vertical axis and may not extend above the roof more than 8 inches. A manual switch and a pilot light must be included to indicate when light is in operation. Lamp must not be capable of activating emergency traffic control light switches.

2251-R-68.00 Mirrors.

68.01 Interior mirror: Interior mirror shall be either laminated glass or glass bonded to a backing that retains the glass in the event of breakage. Mirror shall have rounded corners and protected edges. Type A bus shall have a minimum of 6" x 16" mirror and Type B, C, and D buses shall have a minimum of a 6" x 30" mirror.

68.02 Exterior mirrors: Each school bus shall be equipped with a system of exterior mirrors including crossover mirrors in compliance with FMVSS 111. This system of mirrors shall be rigidly braced so as to reduce vibration.

2251-R-69.00 Mounting, Body, and Chassis.

69.01 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 manner as to prevent shifting or separation of the body from the chassis under severe operating conditions.

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

69.03 Body front shall be attached and sealed to the chassis cowl to prevent entry of moisture and gases.

2251-R-70.00 Overall Length.

70.01 Overall length of school buses shall not exceed 40 feet (Section 42-4-504 C.R.S.).

2251-R-71.00 Overall Width.

71.01 Overall width of the school bus shall not exceed 8 feet, except under the provisions of Section 42-4-502 (5)(a) C.R.S.

2251-R-72.00 Rub Rails.

72.01 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 and/or access door) to point of curvature near outside cowl on left side.

72.02 There shall be one rub rail located approximately at floor line which shall cover same longitudinal areas as upper rub rail, except at wheel housing, and shall extend at least to radii of right and left rear corners.

72.03 There shall be one rub rail located on each side of bus at the bottom of the side skirts, or a side skirt stiffener of equivalent strength.

72.04 Rub rails shall be attached at each body post and all other upright structural members.

72.05 Rub rails shall be 4 inches or more in width, shall be of 16-gauge steel, or suitable material of equivalent strength and shall be constructed in corrugated or ribbed fashion and shall be self-draining.

72.06 Rub rails shall be applied outside body panels. Pressed-in or snap-on rub rails do not satisfy this requirement.

2251-R-73.00 Seat Belt for Driver.

73.01 A type 2 lap belt/shoulder harness seat belt shall be provided for the driver. The assembly shall be equipped with an emergency locking retractor (ELR) for the continuous belt system. The lap portion of the belt shall be guided or anchored where practical to prevent the driver from sliding sideways under it.

73.02 Adjustability of the mounting point for the driver seat belt pillar loop shall be provided to accommodate all heights and weights of bus drivers without interference with the driver's face or neck.

73.03 Each bus shall be equipped with a durable webbing cutter having a full width handgrip and a protected blade. The cutter shall be mounted in a location accessible to the seated driver.

2251-R-74.00 Seats/Restraining Barriers.

74.01 All seating and restraining barrier design and construction must meet the provisions of FMVSS 222. Type A school buses shall be equipped with restraining barriers conforming to FMVSS 222.

74.02 Lap belt ready seat frames shall be reinforced to meet FMVSS 210.

74.03 All seats shall be forward facing and shall be securely fastened to that part of the school bus body that supports them.

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

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

74.06 Seat material shall comply with FMVSS 302.

74.07 Passenger seat cushion retention system shall be employed to prevent passenger seat cushions from disengaging from seat frames or flipping forward in event of accident. Each seat cushion retention system shall be capable of withstanding vertical static load equal to minimum of 5 times weight of cushion.

74.08 Use of a flip seat at any side emergency door location in conformance with FMVSS 222, including required aisle width to side door, is acceptable. Any flip seat shall be free of sharp projections on the underside of the seat bottom. The underside of the flip-up seat bottoms shall be padded or contoured to reduce the possibility of snagged clothing or injury during use. Flip seats shall be constructed to prevent passenger limbs from becoming entrapped between the seat back and the seat cushion when in the upright position. The seat cushion shall be designed to rise to a vertical position automatically when not occupied.

74.09 If track seating is installed, the manufacturer shall supply minimum and maximum seat spacing dimensions for the bus that comply with FMVSS 222. This information shall be on a label affixed to the bus.

2251-R-75.00 Steps.

75.01 First step at service door shall be not less than 10 inches (12 inch for Type D) and not more than 14 inches (16 inches for Type D) from ground, based on standard chassis specifications.

75.02 Step risers shall not exceed a height of 10 inches. When plywood is used on the top step, the riser height may be increased by the thickness of the wood.

75.03 An assist grab rails not less than 20 inches in length designed to provide maximum loading assistance shall be provided in an unobstructed location inside doorway.

75.04 Surface of steps shall be of non-skid material.

2251-R-76.00 (reserved)

2251-R-77.00 Stop Signal Arm.

77.01 The stop signal arm shall meet FMVSS 131.

77.02 The stop signal arm shall be reflectorized in accordance with FMVSS 131.

77.03 Rubber spacers shall be installed on either the side of the bus or the stop arm so as to prevent sign from making abrasive contact with the side of the bus.

77.04 Wind guard shall be provided to keep sign in retracted position.

2251-R-78.00 Storage Compartment.

78.01 A metal container of adequate strength and capacity for the storage of tire chains, tow chains, and such tools as may be necessary for minor emergency repairs while bus is en route may be provided. Such storage container may be located either inside or outside the passenger compartment, but, if inside, it shall be secured and it shall have cover other than seat cushion that shall be securely fastened to it in such a manner as to prevent the contents from spilling in case the bus overturns.

2251-R-79.00 Sun Visor.

79.01 An interior, adjustable, sun visor shall be installed not less than 6 inches wide and 30 inches long. Type A school buses shall have a sun visor according to manufacturer's standard.

2251-R-80.00 Tail Pipe.

80.01 The tail pipe may be flush with but shall not extend more than one inch beyond the perimeter of the body for side exit or the bumper for rear exit.

80.02 Tailpipe shall not exit beneath any fuel filler location or beneath any emergency door or lift door.

2251-R-81.00 Tow Hooks Rear.

81.01 The school bus shall be equipped with two heavy-duty tow hooks or eyes fastened securely to the rear of the frame and shall not protrude beyond outer edge of the bumper.

2251-R-82.00 Undercoating.

82.01 Entire underside of bus body, including floor sections, cross members, and below floor line side panels, shall be coated with rust-proofing compound for which compound manufacturer has issued notarized certification of compliance to bus body manufacturer that compound meets or exceeds all performance requirements of Fed. Spec.

2251-R-83.00 Ventilation.

83.01 Buses, in excess of 20 feet in length, shall be equipped with a multi-speed powered exhaust roof ventilator or powered vent fan in roof hatch, mounted in the rear half of the bus.

2251-R-84.00 Wheel Housings.

84.01 Wheel house openings shall be of full-open type.

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

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

84.04 Wheel housings shall provide clearance for installation and use of tire chains on single and dual power wheels.

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

84.06 No part of a raised wheel housing shall extend into the emergency door opening.

2251-R-85.00 Windshield and Windows.

85.01 All glass in windshield, windows, and doors shall be of approved safety glass, and of a quality to prevent distortion of view in any direction as specified in FMVSS.

85.02 Each full side window shall provide unobstructed emergency opening at least 9 inches high and 22 inches wide, obtained by lowering of window. If full drop windows are used, they shall be blocked so that when, in a down position, the opening between the window header and top of glass is not more than 12 inches.

2251-R-86.00 Windshield Washers.

86.01 The bus shall be equipped with windshield washers that shall conform to FMVSS and body manufacturer's recommendations.

86.02 For Type C and D buses, the system reservoir capacity shall be a minimum of one gallon.

2251-R-87.00 Windshield Wipers.

87.01 A windshield wiping system, two-speed or more, shall be provided.

87.02 The wipers shall be operated by one or more air or electric motors. If one motor is used, the wipers shall work in tandem to give full sweep of windshield.

87.03 All wiper controls shall be located within easy reach of the driver and designed, when in stop position, to move blades from the driver's direct view.

2251-R-88.00 Wiring.

88.01 All wiring shall conform to current standards of SAE.

88.02 Circuits:

88.02 (a) Wiring shall be arranged in at least nine regular circuits, as follows:

88.02 (a)(1) Head, tail, stop, and instrument panel lamps,

88.02 (a)(2) Clearance lamps,

88.02 (a)(3) Dome and step-well lamps,

88.02 (a)(4) Starter motor,

88.02 (a)(5) Ignition and emergency door signal,

88.02 (a)(6) Turn signal lamps,

88.02 (a)(7) Alternately flashing warning signal lamps,

88.02 (a)(8) Horn,

88.02 (a)(9) Heaters and defrosters.

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

88.02 (c) All other electrical functions (such as electric-type windshield wipers) shall be provided with independent and properly protected circuits.

88.02 (d) Each body circuit shall be color or number coded and a diagram of circuits shall be attached to the body in a readily accessible location. Number coding is permitted only if the number is a permanent part of the insulation and is repeated at intervals of not more than 6 inches.

88.03 Each circuit shall have adequate circuit protection.

88.04 All wires shall be installed within body. They shall be insulated so as to protect them from external damage and minimize dangers from short circuits. Whenever wires pass through body member, additional protection in form of appropriate type of insert shall be provided.

88.05 Wires not enclosed within body shall be enclosed in a protective jacket and fastened securely at intervals of not more than 18 inches. All joints shall be soldered or joined by equal effective connectors. The protective jackets shall be assembled to provide maximum protection against moisture and dust.

2251-R-89.00 (rule number reserved)

SPECIALLY EQUIPPED BUSES

2251-R-90.00 Introduction.

90.01 This section applies to school buses and multifunction buses.

Equipping buses to accommodate students with disabilities is dependent upon the needs of the passengers. Buses may be fitted with various equipment to accommodate those needs. Buses so equipped are not to be considered a separate class of school bus, but simply a regular school bus equipped for special accommodations. Transportation considerations and needs of a student entitled to transportation as a related service should be addressed in the student's individual education program (IEP).

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

2251-R-91.00 Aisles.

91.01 All buses equipped with a power lift or ramp shall provide a minimum 30 inch aisle leading from any wheelchair to at least one emergency door and to the lift area.

2251-R-92.00 Definition.

92.01 A specially equipped bus is any bus designed, equipped, or modified to accommodate students with special transportation needs.

2251-R-93.00 General Requirements.

93.01 Buses equipped for transporting students with special transportation needs shall comply with FMVSS.

93.02 In the instance where a regular service entrance cannot be accessed, the bus shall be equipped with a power lift, unless a ramp is needed for unusual circumstances related to passenger needs.

2251-R-94.00 Identification.

94.01 Buses with power lifts or ramps shall display the International Symbol of Accessibility on all four sides of the bus. The symbols shall be a minimum of 6 inches and not exceed 12 inches. Such emblems shall be white on blue background.

2251-R-95.00 Lift Equipped Entrance.

95.01 There shall be adequate illumination for normal operation of the lift, to include the lift and adjacent area, both when deployed at the vehicle floor level and at ground level.

95.02 A drip molding shall be installed above the opening to effectively divert water from entrance.

95.03 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 lift equipped entrance.

95.04 A single door or double doors may be used for the lift equipped entrance.

95.04 (a) A single door shall be hinged to the forward side of the entrance, unless doing so would obstruct the service entrance. If, due to the above condition, the door is hinged to the rearward side doorway, the door shall utilize a safety mechanism which will prevent the door from swinging open should the primary door latch fail.

95.04 (b) If double doors are used, the system shall be designed to prevent the door(s) from being blown open by the wind resistance created by the forward motion of the bus, and/or incorporate a safety mechanism to provide secondary protection should the primary latching mechanism(s) fail.

95.05 All doors shall have positive fastening devices to hold doors in the open position.

95.06 All doors shall be weather sealed.

95.07 The forward-mounted door shall have at least three-point fastening devices.

95.08 Door materials, panels and structural strength shall be equivalent to the service and emergency doors. Color, rub rail extensions, lettering and other exterior features shall match adjacent sections of the body.

95.09 Each door shall have windows set in rubber that are visually similar in size and location to adjacent non-door windows. Glazing shall be of same type and tinting (if applicable) as standard fixed glass in other body locations.

95.10 Door(s) shall be equipped with a device that will actuate and maintain an audible or flashing signal located in the driver's compartment when door(s) is not securely closed and ignition is in "on" position.

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

95.12 Lift equipped entrance doors shall be equipped with padding at the top edge of the door opening. Padding shall be at least 3 inches wide and 1 inch thick and extend the full width of the door opening.

2251-R-96.00 Power Lift.

96.01 General: Vehicle lifts and installation shall comply with the requirements set forth in FMVSS 403, *PLATFORM LIFT SYSTEMS FOR MOTOR VEHICLES,* and FMVSS 404, *PLATFORM LIFT INSTALLATION IN MOTOR VEHICLES.*

96.02 Design load: The design load of the lift shall be 800 pounds at a minimum. Working parts, such as cables, pulleys and shafts, which can be expected to wear, and upon which the lift depends for support of the load, shall have a safety factor of at least six, based on the ultimate strength of the material. Non-working parts, such as platform, frame and attachment hardware, that would not be expected to wear, shall have a safety factor of at least three, based on the ultimate strength of the material.

96.03 Lift capacity: The lifting mechanism and platform shall be capable of operating effectively with a wheelchair and occupant mass of 800 pounds at a minimum.

96.04 In addition, controls, emergency operations, platforms, platform barriers, handrails, etc shall comply with FMVSS 403.

96.05 Documentation: The following information shall be provided with each vehicle equipped with a lift:

93.05 (a) A phone number where information may be obtained about installation, repairs and parts. (Detailed written instructions and a parts list shall be available upon request.)

96.06 Training materials: The lift manufacturer shall make training materials available to insure proper use and maintenance of the lift. These may include instructional videos, classroom curriculum, system test results or other related materials.

2251-R-97.00 Ramps.

97.01 If a ramp is used, it shall be of sufficient strength and rigidity to support wheel chair (electric or other), occupant, and attendant. It shall be equipped with protective flange on each longitudinal side to keep wheelchair on ramp.

97.02 Floor of ramp shall be covered with non-skid material.

97.03 Ramp shall be of weight, equipped with handle or handles, to permit one person to put ramp in place and to return it to storage place.

97.04 A ramp device may be used in lieu of a mechanical lift if the ramp meets all the requirements of the Americans with Disabilities Act (ADA) as found in 36 CFR § 1192.23, *VEHICLE RAMP* .

97.05 A ramp device that does not meet the specifications of ADA, but does meet the specifications of 94.01 through 94.04 of this section may be installed and used, only when a power lift system is not adequate to load and unload students.

97.06 ramps used for emergency evacuation purposes may be installed in raised floor buses by manufacturers.

2251-R-98.00 Restraining Devices.

98.01 Lap belt ready seat frames shall be reinforced to meet FMVSS. All child restraint systems, child restraint anchorage systems, seat belt assemblies and seat belt assembly anchorages shall meet FMVSS.

2251-R-99.00 Seating Arrangements.

99.01 To accommodate special devices for passenger requirements, flexibility is permitted in seat spacing, not to exceed FMVSS.

2251-R-101.00 Securement And Restraint System For Wheelchairs And Wheelchair Seated Occupants

For purposes of understanding the various aspects and components of this section, the term *securement and tiedown* and the phrases *securement system or tiedown system* are used exclusively in reference to the devices that anchor the wheelchair to the vehicle. The term *restraint* and the phrase *restraint system* are used exclusively in reference to the equipment that is intended to limit the movement of the wheelchair occupant in a crash or sudden maneuver. The term *wheelchair tiedown and occupant restraint system (WTORS)* is used to refer to the total system that secures the wheelchair and restrains the wheelchair occupant.

101.01 A wheelchair tiedown and occupant restraint system installed in specially equipped buses shall be designed, installed, and operated for use with forward-facing wheelchair-seated passengers and shall comply with all applicable requirements of FMVSS 222, *School Bus Passenger Seating and Crash Protection.*

101.02 WTORS, including the anchorage track, floor plates, pockets or other anchorages, shall be provided by the same manufacturer or shall be certified to be compatible by manufacturers of all equipment/systems used.

101.03 Wheelchair securement positions shall be located such that wheelchairs and their occupants do not block access to the lift door.

101.04 The WTORS, including the storage device, shall meet the flammability standards established in FMVSS 302.

101.05 The following information shall be provided with each bus equipped with a securement and restraint system:

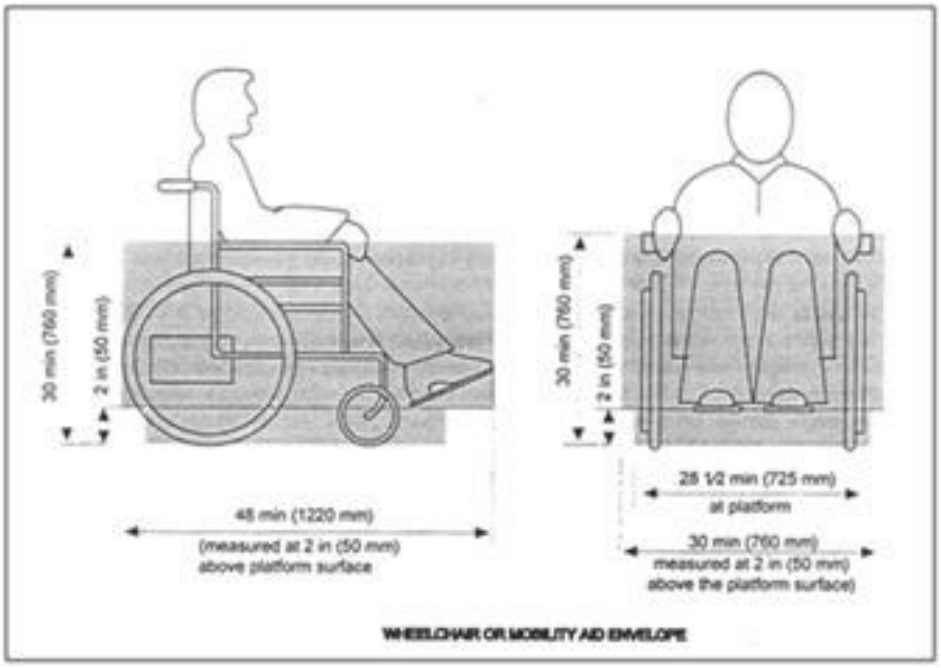
101.05 (a) phone number where information can be obtained about installation, repair and parts. (detailed written instructions and a parts list shall be available upon request.)

101.05 (b) Detailed instructions regarding use, including a diagram showing the proper placement of the wheelchair/mobility aids and positioning of securement devices and occupant restraints, including correct belt angles.

101.06 The WTORS manufacturer shall make training materials available to ensure the proper use and maintenance of the WTORS. These may include instructional videos, classroom curriculum, system test results or other related materials.

101.07 Wheelchair securement/tiedowns shall comply with FMVSS 222.

101.08 Each wheelchair position in a specially equipped bus shall have a minimum clear floor area of 30 inches laterally by 48 inches longitudinally. Additional floor area may be required for some wheelchairs. Consultation between the user and the manufacturer is recommended to ensure that adequate area is provided.



101.09 If longitudinal track systems are used, four rows of tracking must be installed.

2251-R-102.00 Service Entrance

102.01 On power lift equipped vehicles, steps shall be the full width of the step well, excluding the thickness of the doors in the open position.

102.02 Suitable hand rails shall be provided on both sides of entrance area to assist passengers during ingress and egress. this device shall allow for easy grasping or holding and shall have no openings or pinch points that might entangle clothing, accessories or limbs.

2251-R-103.00 Support Equipment and Accessories.

103.01 Each bus shall be equipped with a durable webbing cutter having a full width handgrip and a protected blade. The cutter shall be mounted in a location accessible to the seated driver.

Editor's Notes

History

Entire rule eff. 07/01/2007.