

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.]

2251-R-1.00 Statement of Basis and Purpose.

The statutory authority for the Colorado Minimum Standards Governing School Transportation Vehicles (hereinafter referred to as “these rules” or “Minimum Standards”), adopted by the State Board of Education on (*insert effective date*) (hereinafter referred to as “effective date”), is found in sections 22-51-108 and 42-4-1904, C.R.S.

The purpose of these rules is to provide reasonable and adequate standards of safety for school transportation vehicles that promote the welfare of the students and afford reasonable protection to the public. The purpose of the amendments approved on (*insert effective date*) is to update the minimum standards to align with recent federal standard and reflect current industry practices, to streamline and consolidate rules and eliminate rules which are redundant of and potentially contradictory to federal standards, and to reduce regulatory burdens for school districts and charter schools.

The Commissioner, or designee, may provide an exemption to these Minimum Standards to the extent the Commissioner finds an exemption to be appropriate.

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

2251-R-3.00 Responsibility of Suppliers.

- 3.01 Dealers, distributors and manufacturers of school buses and multifunction buses each have a responsibility to comply with the Minimum Standards on or after the effective date of these rules.
- 3.02 Dealers, distributors or manufacturers which supply school buses and multifunction buses for use in the State of Colorado which do not meet the specifications of these rules 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 the Minimum Standards.

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

2251-R-4.00 Effective Date.

- 4.01 Except as indicated in 4.01(a), school transportation vehicles manufactured, per the date listed on the certification plate, on or after the effective date of these rules, for the purpose of transporting Colorado students shall meet or exceed the Minimum Standards.
- 4.01(a) Under federal law (49 USC 30112(a)), a new over-the-road motor coach (motor coach) bus may not be sold for the purpose of transporting school-age students to and from school or to school related events unless it meets all FMVSS requirements for school buses. Upon passage of a local board of education resolution, a school district may purchase a used over-the-road motor coach (motor coach) bus and/or attain a short-term rental of a motor coach bus from a contract carrier for the transportation of students to school related events. Such resolution shall specify that consideration was given to the standards of safety to promote the welfare of students, including recommendations of national transportation organizations. In no event shall a motor coach bus be used for the transportation of students to and from school or school to school. A board resolution is not necessary for transporting students on common carriers.
- 4.02 School transportation vehicles currently transporting Colorado students may continue in use.
- 4.03 Only school transportation vehicles that were manufactured, per the date listed on the certification plate, within the previous 20 years, may be purchased, leased, contracted, or otherwise obtained for the purpose of transporting Colorado students. These vehicles must meet Colorado minimum standards that were in effect at the time of manufacture.

2251-R-5.00 Definitions.

- 5.01 School District means a public school district organized pursuant to article 30 of title 22 of Colorado Revised Statutes or a board of cooperative services (BOCES) organized pursuant to article 5 of title 22 of Colorado Revised Statutes.
- 5.02 Local Board of Education means the board of education of a school district or the governing board of a BOCES.
- 5.03 Charter school means a public school organized pursuant to Section 22-30.5-103(2) of the Colorado Revised Statutes.
- 5.04 School Transportation Vehicle means every motor vehicle which is owned by a school district or charter school and operated for the transportation of students to and from school, from school to school, or to 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's governing board.
- 5.04(a) This does not include informal or intermittent arrangements, such as sharing of actual gasoline expense or participation in a car pool.
- 5.04(b) Exemption: Vehicles that carry students as part of their operation as a common carrier under the jurisdiction of United States Department of Transportation or Public Utilities Commission are not included within the definition of school transportation vehicle.

- 5.05 A School Bus shall be a motor vehicle, built to FMVSS and school bus standards contained herein, designed for transporting students on either to and from school, from school to school, or to school related events.
- 5.05(a) **TYPE A** --Type "A" school bus is a conversion or body constructed utilizing a cutaway front-section vehicle with a left side driver's door and a gross vehicle weight rating (GVWR) of 21,500 pounds or less.
- 5.05(b) **TYPE B** --Type "B" school bus is a body constructed and installed upon a stripped chassis. 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.
- 5.05(c) **TYPE C** --Type "C" school bus is constructed utilizing a chassis with a hood and fender assembly. This includes the cutaway truck chassis, including cab, with or without a left side driver door, and with a GVWR greater than 21,500 pounds. The entrance door is behind the front wheels.
- 5.05(d) **TYPE D** --Type "D" school bus is constructed utilizing a stripped chassis, 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.
- 5.06 Small Vehicle shall be a motor vehicle, which does not meet the requirements of a Type A, B, C or D school bus, designed for general purpose use. A small vehicle shall meet or exceed section 20.05 of these rules. These vehicles may be used to carry students to and from school, from school to school, or to school related events.
- 5.06(a) Small vehicles shall bear name of school district/service provider plainly visible on each side.
- 5.07 Multifunction bus shall be a motor vehicle, built to federal multifunctional school activity bus standards, designed for transporting students.
- 5.07(a) Multifunction buses shall also meet the standards contained in the Minimum Standards with the exception of:
- 5.07(a)(1) Color, as required by section 15.00 of these rules
- 5.07(a)(2) Lettering "SCHOOL BUS", as required by section 26.01 of these rules
- 5.07(a)(3) Lettering "STOP ON FLASHING RED" as required by section 26.06 of these rules
- 5.07(a)(4) Alternately flashing warning signal lamps, as required by section 29.07 of these rules
- 5.07(a)(5) Stop signal arm, as required by section 38.00 of these rules
- 5.07(a)(6) Retro-reflective material color, as required by section 15.02 of these rules.

2251-R-6.00 Testing and Certification.

- 6.01 School bus manufacturers shall provide annual certification to the Colorado Department of Education that their product(s) meet or exceed the Minimum Standards and all applicable FMVSS in effect at the time of manufacture. School bus manufacturers shall record and report to CDE the test results as required by Section 16 - Construction. All school bus bodies that meet applicable FMVSS and are in compliance with the Minimum Standards shall be certified by the school bus manufacturer by the attachment of a plate or decal.
- 6.02 It shall be the school district's/charter school's responsibility to ascertain whether all school buses purchased, leased, or under contract to the school district/charter school meet all specifications of the Minimum Standards. 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.
- 6.03 When selling a school transportation vehicle, it is the school district's/charter school's responsibility to eliminate the school district's/charter schools full name from the vehicle.
- 6.04 Used school bus dealers shall register with the Colorado Department of Education, School Transportation Unit, certifying that only school transportation vehicles meeting or exceeding Colorado Minimum Standards will be sold. There shall be no fee to register.
- 6.05 All school transportation vehicles must meet and continue to meet all applicable FMVSS in effect on the date of manufacture, per the date listed on the certification plate.

2251-R-7.00 Bus Delivery Requirements.

- 7.01 The bus 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 including chassis and body,
 - 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 (hard copy or electronic copy) for each individual unit or identical units for all major components of the bus (e.g., body, chassis, transmission, etc.), and
 - 7.01(e) Parts manual (hard copy or electronic copy) for each individual unit or identical units for all major components of the bus (e.g., body, chassis, transmission, etc.).

2251-R-8.00 Aisle.

- 8.01 Minimum aisle clearance between seats and to all emergency doors shall be 12 inches at seat level.
- 8.02 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-9.00 Axles.

- 9.01 Rear axle shall be single-speed.

2251-R-10.00 Battery.

- 10.01 On Type B, C and D, a drawer-type pull out tray shall be provided to facilitate servicing or removal of battery(ies) not used for the motive propulsion of the bus. The battery(ies) shall be enclosed by a vented compartment, provided with drain ports, a hold down carrier mounted so as to avoid blocking filler ports and a 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.
- 10.02 On Type A buses equipped with more than one battery, all batteries should be positioned in one location.
- 10.03 Batteries should be equipped with sufficient battery cable to allow the drawer-type pull out tray to fully extend.

2251-R-11.00 Brakes.

- 11.01 Type C and D buses shall be equipped with full compressed air brake systems. Both air drum brake and air disc break applications are acceptable.
- 11.02 Air brakes:
- 11.02(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.
- 11.02(b) 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.
- 11.02(c) Control requirements: Control valve of the parking brake system shall be designed and constructed to conform with the following:
- 11.02(c)(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.

2251-R-12.00 Bumpers.

- 12.01 Front bumper shall:
- 12.01(a) Be at least 3/16 inch thick of pressed steel channel, one piece construction with minimum of eight inch width (high), except Type A buses under 14,500 GWVR.
- 12.01(b) Be of extended design to offer maximum protection of fender lines without permitting snagging or hooking.
- 12.01(c) Be attached to the frame and extend forward of grille, head lamps, fender or hood sections to provide maximum protection.
- 12.01(c) 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.
- 12.02 Rear bumper shall:

- 12.02(a) 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 ½ inches wide (high) on Type B, C and D buses.
- 12.02(b) Be wrapped around back corners of bus and extend forward at least 12 inches from rear-most point of body at floor line.
- 12.02(c) 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.
- 12.02(d) Extend beyond rear-most part of body surface at least one inch, measured at floor lines.
- 12.02(e) Not allow any spaces, projections, or cut-outs that will permit a hand hold or foot hold.
- 12.02(f) Have the front ends enclosed by end caps or other protective metal or have the ends rounded or tucked in, and shall be free from sharp edges or projections likely to cause injury or snagging.
- 12.02(g) Have a gasket, rubber or equivalent, installed to close opening between the top of the rear bumper and body metal.
- 12.02(h) 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 rear of the bus may be lifted by means of a bumper type jack without permanent deformation of the bumper.

2251-R-13.00 Color.

- 13.01 All exterior metal shall be painted National School Bus Yellow (NSBY) with the exception of:
 - 13.01(a) Lettering and numbering shall be black, white, or yellow for bumper area.
 - 13.01(b) Bumpers and frame shall be black
 - 13.01(c) Rub rails may be black or yellow at purchaser option
 - 13.01(d) Background area for alternating flashing warning lamps shall be black
 - 13.01(e) The roof of the bus may be painted white, not to extend below the drip rails on the sides of the body.
 - 13.01(f) Student window frames, posts and service door frame may be black.
- 13.02 Retro-Reflective material shall be installed on the bus conforming to the requirements of FMVSS 131.
 - 13.02(a) Rear of bus body: strips of between 1 and 2 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 the horizontal strips.

- 13.02(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.
- 13.02(c) Sides of bus body: Shall be marked with Retro-Reflective NSBY material at least 1 ¾ inches in width, extending the length of the bus body and located (vertically) as close as practicable to the floor line.

2251-R-14.00 Construction.

- 14.01 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. 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.
- 14.02 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 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.
- 14.02(a) Type A buses 14,500 GVWR or less 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.
- 14.03 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 National Bureau of Standards (NBS) Product Standard 1-83. Type A buses, 14,500 GVWR or less, shall have nominal ½ inch thick plywood or equivalent material equal to or exceeding properties listed above.
- 14.04 Ceiling Panels: If the ceiling is constructed to contain lap joints, the forward panel shall be lapped by the rear panel and the exposed edges shall be beaded, hemmed, or flanged or otherwise treated to eliminate sharp edges.
- 14.05 All body components shall be designed and constructed so as to avoid the entrapment of moisture and dust.
- 14.06 All openings between chassis and passenger-carrying compartment made for any reason must be sealed.
- 14.07 On Type B, C, and D buses, the bus body shall meet the test standards of the Kentucky Pole test.
- 14.08 In addition to complying with FMVSS 220 test procedures, 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 structural members.
- 14.08(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.

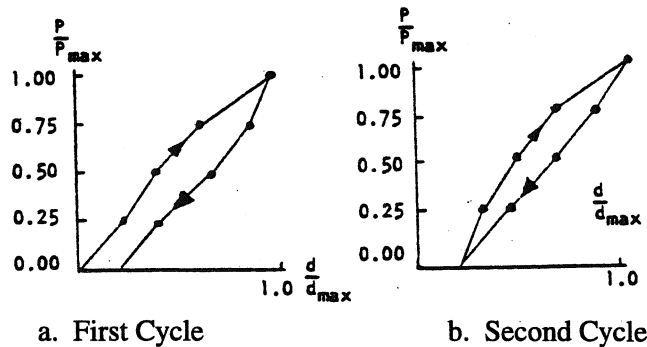


Figure 1. Static Load Test Load-Deflection Curves

14.09 A diagonal (racking) load test shall be performed on Type A, B, C and 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 14.08.

14.09(a) Requirements: When a force equal to $1\frac{1}{2}$ 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:

14.09(a)(1) The diagonal movement of the force at any point on the application plate shall not exceed $5\frac{1}{8}$ inches; and

14.09(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.

14.09(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.

14.09(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.

14.09(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. A typical length is 20 inches less than the length of the vehicle's roof measured along its longitudinal centerline.

14.09(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.

14.09(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.

- 14.09(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.
- 14.09(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).
- 14.09(b)(7) Release all diagonal force applied through the force application plate and operate the emergency exits as specified in 14.09(a)(2).
- 14.09(c) Test Conditions: The following conditions apply to the requirements specified in (3).
- 14.09(c)(1) Temperature: The ambient temperature is any level between 32 degrees Fahrenheit and 90 degrees Fahrenheit.
- 14.09(c)(2) Windows and Doors: Vehicle windows, doors and emergency exits are in the fully-closed position and latched but not locked.
- 14.09(d) An alternative method of testing for the racking load test shall be as follows:
- 14.09(d)(1) 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

$P = \text{load/frame}$

where $P = \text{DVW divided by } N$

DVW - dynamic vehicle weight

N - total number of bus body frames

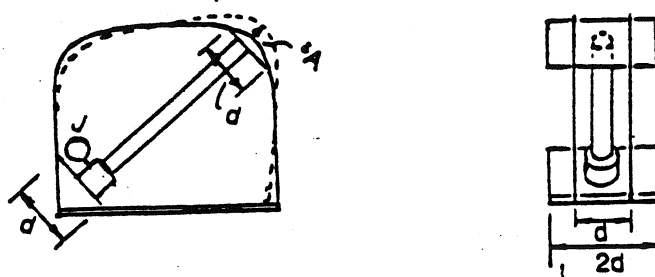
and $\text{DVW} = \text{DF} \times \text{GVW}$

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.

- 14.09(d)(2) When a complete bus body is rack-loaded, the total load DVW must be distributed uniformly along the bus body. One method is to mount 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 for DVW shall be the sum of all jack readings.



Transverse Cross Section

Side View

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

- 14.09(d)(2)(A) 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 normal bus body production.
- 14.09(d)(2)(B) A two-cycle loading sequence shall be conducted, with intermediate and final load and deflection readings recorded according to the procedure described.
- 14.09(d)(2)(C) The maximum deflection in line with the jack (A, maximum) shall not exceed 4 inches.
- 14.09(d)(3) Manufacturers shall specify which testing method was used and submit appropriate certification information as called for in 6.02.

2251-R-15.00 Cooling System.

- 15.01 Permanent ethylene-glycol base or environmentally safe equivalent anti-freeze shall be provided to protect the cooling system to -30 degrees Fahrenheit when tested at normal engine temperature.
- 15.02 Cooling system shall be equipped with a visual fluid level indicator.

2251-R-16.00 Defrosters.

- 16.01 A defroster system shall be installed of sufficient capacity to keep windshield area, left front side window to rear of driver's vision, and service door glass area free of condensation or ice.
- 16.02 The defrosting system shall conform to the requirements of the Society of Automotive Engineers, Inc. (SAE) J1945.

16.03 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.

16.03(a) The fans shall be located so as to not interfere with the driver's horizontal line of sight vision.

2251-R-17.00 Doors.

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

17.02 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.

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

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

17.05 There shall be a head bumper pad installed on the inside at the top of the entrance door. The 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-18.00 Drive Shaft.

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

2251-R-19.00 Emergency Exits.

19.01 All emergency exits shall conform to FMVSS 217.

19.02 The minimum number of emergency exits is shown in the following table. A district may choose to have more emergency exits installed. Emergency doors may be installed in place of emergency windows.

EMERGENCY EXITS TABLE

BUS CAPACITY	ROOF HATCH	LEFT SIDE EMERGENCY WINDOW	RIGHT SIDE EMERGENCY WINDOW
1 – 45	1	0	0
46 – 70	2	1	1
71 - above	2	2	2

19.03 Emergency door:

19.03(a) Emergency door(s) shall be equipped with a 3-point latch mechanism. The inside door handle shall be designed with a guard for protection against accidental release.

- 19.03(b) Exterior door handle shall be of permanent hitch-proof design and mounted with enough clearance to permit opening without touching door surface.
- 19.03(c) All emergency door openings shall be completely weather stripped. No obstruction shall be higher than 1/4 inch across the bottom of any emergency door opening.
- 19.03(d) A head bumper pad shall be installed over the emergency door on the inside of the bus body. The 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.

2251-R-20.00 Emergency Equipment.

- 20.01 The bus shall be equipped with at least one pressurized, 5-pound, dry-chemical fire extinguisher, 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.
- 20.01(a) Fire extinguisher shall be securely mounted in an extinguisher bracket (automotive type) and located 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.
- 20.02 First Aid Kit: The bus shall carry one first aid kit which shall be securely mounted in full view of the driver or with the location plainly indicated by appropriate markings. Additional kits may be installed. The kit(s) shall be mounted for easy removal.
- 20.02(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 kit's contents.

Contents of the 24 unit First Aid Kit:

Item	Unit(s)
Adhesive Tape	1
1 inch adhesive bandage	2
2 inch bandage compress	1
3 inch bandage compress	1
4 inch bandage compress	1
3 inch x 3 inch plain gauze pads	1
Gauze roller bandage 2 inch wide	2
Plain absorbent gauze – ½ square yard	4
Plain absorbent gauze – 24 inch x 72 inch	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.

- 20.03 Emergency Reflectors: All buses shall carry three (3) emergency triangle reflectors in compliance with Section 42-4-230, C.R.S. and with FMVSS 125, contained in a securely mounted case easily accessible to the driver or in a location plainly indicated by appropriate markings.

- 20.04 Body fluid cleanup kit: Each school bus shall have one 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	

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

- 20.05 Each bus shall be equipped with one 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.

- 20.06 Small vehicles shall carry the following emergency equipment:

20.06(a) Three (3) emergency triangle reflectors in a securely mounted case,

20.06(b) One 24 unit first aid kit as found in 20.02,

20.06(c) One securely mounted, 2 ½ pound, dry chemical fire extinguisher with a minimum rating of 1A10BC,

20.06(d) One 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.

20.06(e) One basic body fluid clean-up kit as found in 20.04,

- 20.07 Emergency equipment shall be securely mounted. Emergency equipment shall be clearly visible or in a location plainly indicated by appropriate markings.

2251-R-21.00 Exhaust System.

- 21.01 Tailpipe shall not exit the right side of the bus body.

- 21.02 Exhaust system shall be insulated in a manner to prevent any damage to any fuel system component.

- 21.03 There shall be a switch to manually start the diesel particulate filter regeneration process.

- 21.04 The tailpipe shall be flush with but not extend more than one inch beyond the perimeter of the body for side exit or the bumper for rear exit except when not needed by an electric powered bus.

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

2251-R-22.00 Floor Coverings.

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

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- 22.02 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.
- 22.03 Floor covering shall 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.
- 22.04 Cove molding shall be used along the side walls and rear corners. All floor seam separations shall be properly bonded or secured.
- 22.05 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 or yellow nosing of 1 ½ 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.
- 22.06 A sealed and insulated plate shall be provided when required to access fuel tank sending unit. The plate shall not be installed under flooring material. Type A buses 14,500 GVWR and under are exempt.

2251-R-23.00 Frame.

- 23.01 No holes shall be permitted in the chassis rails except when drilled at the manufacturing plant or authorized by the manufacturer.
- 23.02 Welding to frame side rails necessary by design to strengthen, modify or alter basic vehicle configuration shall be authorized and documented by the manufacturer.

2251-R-24.00 Fuel System.

- 24.01 All fuel tank specifications shall conform to FMVSS 301, FMVSS 303, FMVSS 305, National Fire Protection Association code 52, and/or National Fire Protection Association code 58, as applicable.
- 24.02 Engine supply line shall not be mounted below fuel tank.
- 24.03 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 except when not needed by an electric powered bus. Type A buses under 14,500 GVWR are exempt.

2251-R-25.00 Heating System.

- 25.01 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 Fahrenheit to +10 degrees Fahrenheit and maintaining passenger compartment temperature of 50 degrees Fahrenheit. One of the heaters shall be located in the rear half of the bus on or behind the rear wheel axle line.
- 25.01(a) Lift equipped buses may place the rear heater under the last row of seats or wall mount. The front heater may be wall mounted.
- 25.02 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's compartment) and to keep windshield area, service door glass, driver's left glass area and step well clear of moisture, ice and snow.

- 25.03 Heater cores and fans shall be completely encased but designed to permit servicing heater assembly by removing all or part of the case.
- 25.04 Heater hose installation in the engine compartment shall include two shut-off valves shutting off coolant completely when necessary.
- 25.04(a) One shut-off valve mounted between the water pump outlet and heater hose connection.
- 25.04(b) One shut-off valve mounted between the motor block and the return heater hose connection.
- 25.04(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.
- 25.05 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 Fahrenheit tested at normal engine temperature.
- 25.06 A heater water flow regulating valve shall be installed for convenient operation by the driver.

2251-R-26.00 Identification.

- 26.01 School buses shall bear words "**SCHOOL BUS**" in black letters at least 8 inches high on both front and rear of body. Lettering shall be placed without impairment of its visibility. All lettering shall conform to Standard Alphabets for Highway Signs, Series B 2000. Lettering shall have a retro-reflective NSBY material background (see 15.02B)
- 26.02 School buses shall bear name of school district/service provider on each side of the bus. The lettering must be 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.
- 26.03 The manufacturer's original rated capacity of the vehicle 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)
- 26.04 The numbering of individual buses for identification purposes is permissible.
- 26.05 Lettering and numerals shall be painted or may be pressure sensitive marking of similar performance quality.
- 26.06 "**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 4 ½ inches high. An LED message panel giving safety messages to alert motorists may be used instead of the above lettering. These letters shall be placed in area(s) visible to the approaching motorist.
- 26.07 The school district logo may be placed above the side window drip line or along the side of the bus, but shall not interfere with any required lettering.
- 26.08 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.
- 26.08(a) Advertising, approved by the local board of education or charter school's governing board, may appear only on the side(s) of the bus in the following areas:

- 26.08(a)(1) The location and securement of the advertising shall have prior written CDE approval.
- 26.08(a)(2) The signs shall not extend from the body so as to allow a handhold or present a danger to pedestrians.
- 26.08(a)(3) The signs shall not interfere with the operation of any door, window, required lettering, lamps, reflectors or other device.
- 26.08(a)(4) The signs shall not be placed on side emergency door(s).
- 26.08(a)(5) Advertising signs shall not interfere with retro-reflective tape on the side of the bus.

26.09 The exterior of the Battery compartment shall be labeled with the word "Battery".

26.10 Identification of fuel type shall be located outside and adjacent to the fuel filler opening.

2251-R-27.00 Insulation.

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

2251-R-28.00 Interior.

28.01 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 of 14,500 GVWR or less shall have 62 inches or more inside height, measured metal to metal. Neither measurement shall include air conditioning units.

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

2251-R-29.00 Lamps and Signals.

29.01 All lamps, signals, reflectors and their installation shall conform to the requirements of the Society of Automotive Engineers, Inc. (SAE) J1945. No lettering, symbols or arrows, except manufacturer's markings, shall be on any lens.

29.02 Tail and stop (brake) lamps:

29.02(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. Two combination tail lamps shall have a lens diameter of at least 4 inches or 12 ½ square inches.

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

29.03 Interior lamps: Interior lamps shall be provided which adequately illuminate aisle. A separate lamp shall be provided in step well.

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

29.05 Turn signal lamps:

29.05(a) The bus shall be equipped with two amber turn signals in front and two amber turn signals in the rear. Rear turn signals shall be at least 7 inches or a total of 38.48 square inches in diameter.

29.05(b) Type D buses will still be required to be equipped with two amber turn signals in front with a minimum diameter of 7 inches or 38.48 square inches.

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

29.06 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.

29.06(a) The amber flashing warning signal lamps shall be energized manually by a switch mounted on the driver control panel. The flashing warning signal lamp system shall be a sequential mode type.

29.06 (b) 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.

29.06 (c) The areas around the lens of each alternately flashing signal lamp shall be black.

29.06 (d) 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 not required to use visors.

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

29.08 A white flashing strobe light 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-30.00 Mirrors.

30.00 Exterior mirrors shall meet FMVSS 111.

2251-R-31.00 Mounting, Body, and Chassis.

31.01 Insulation material shall be placed at all attachment points between body and chassis frame on all buses, and shall be so attached to the chassis frame or body to prevent movement under severe operating conditions.

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

2251-R-32.00 Overall Size.

- 32.01 Overall length of school buses shall not exceed 40 feet pursuant to Section 42-4-504 C.R.S.
- 32.02 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-33.00 Retarder (optional, see Section 42-4-1901, C.R.S.)

- 33.01 Retarder manufacturers shall certify that their product system shall maintain the speed of the bus loaded to maximum GVW at 19.0 miles per hour on a 7 percent grade for 3.6 miles.
- 33.02 School buses equipped with electro-magnetic retarder(s) shall have increased electrical system capacity commensurate with the needs of the retarder system.
- 33.03 Indicator light(s) shall indicate when retarder is in operation.

2251-R-34.00 Rub Rails.

- 34.01 There shall be one rub rail located on each side of bus at approximately 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.
- 34.02 There shall be one rub rail located at approximately 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.
- 34.03 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.
- 34.04 Rub rails shall be attached at each body post and all other upright structural members.
- 34.05 Rub rails shall be 4 inches or more in width, 16-gauge steel, or equivalent strength, constructed in corrugated or ribbed fashion and shall be self-draining.
- 34.06 Rub rails shall be applied to the outside of the body panels. Pressed-in or snap-on rub rails do not satisfy this requirement.

2251-R-35.00 Seats/Restraining Barriers.

- 35.01 Type A school buses shall be equipped with restraining barriers conforming to FMVSS 222.
- 35.02 No bus shall be equipped with jump seats or portable seats.
- 35.03 Forward-most pupil seat on right side of bus shall be located not to interfere with driver's vision. The seat shall not be farther forward than the barrier behind driver or rear of driver's seat when adjusted to its rear-most position.
- 35.04 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.

35.05 School bus student seats and seat spacing shall meet FMVSS 222.

35.06 School bus seat materials shall meet FMVSS 302.

2251-R-36.00 Steering Gear Assembly.

36.01 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.

36.02 No changes shall be made in steering apparatus that are not authorized in writing by manufacturer.

36.03 There shall be a clearance of at least 2 inches between steering wheel and any other surface or control.

2251-R-37.00 Steps.

37.01 First service door step shall be not less than 10 inches from the ground (12 inch for Type D) and not more than 14 inches from the ground (16 inches for Type D).

37.02 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.

37.03 An assist hand rail not less than 20 inches in length designed to provide maximum loading assistance, shall be provided in an unobstructed location inside doorway.

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

2251-R-38.00 Stop Signal Arm.

38.01 The stop signal arm shall meet FMVSS 131.

38.02 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.

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

2251-R-39.00 Storage Compartment.

39.01 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 in route may be provided. The storage container may be located either inside or outside the passenger compartment. If inside, the storage compartment shall be securely fastened to prevent the contents from spilling and shall have a latched or secured cover other than a seat cushion.

2251-R-40.00 Sun Visor.

40.01 An interior, adjustable, sun visor shall be installed not less than 6 inches wide and 30 inches long. Type A school buses 14,500 GVWR or less shall have a sun visor according to manufacturer's standard size.

2251-R-41.00 Tires and Rims.

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

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

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

2251-R-42.00 Tow Hooks.

42.01 Two front heavy duty tow hooks or two eyes 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.

42.02 Two rear heavy-duty tow hooks or eyes shall be fastened securely to the rear of the frame and shall not protrude beyond outer edge of the bumper.

2251-R-43.00 Undercoating.

43.01 The entire underside of the bus body, including floor sections, cross members, and below floor line side panels, shall be coated with rust-proofing material meeting or exceeding performance requirements of Society of Automotive Engineers, Inc. (SAE) J1945.

43.02 The undercoating material shall be applied with suitable airless or conventional spray equipment as per manufacturer recommended film thickness and shall show no evidence of voids in the cured film.

43.03 The undercoating material shall not cover any exhaust components of the chassis.

2251-R-44.00 Ventilation.

44.01 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-45.00 Windshield Wipers and Washers.

45.01 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.

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

45.03 For Type A over 14,500 GVWR, B, C and D buses, the system reservoir capacity shall be a minimum of one gallon.

2251-R-46.00 Wiring.

46.01 Wiring: All wiring shall conform to the requirements of the Society of Automotive Engineers, Inc. (SAE) J1945.

46.01(a) An appropriate identifying diagram (color plus a name or number code) for all chassis electrical circuits shall be provided to the body manufacturer for distribution to the end user.

46.01(b) A body wiring diagram, sized to be easily read, shall be furnished with each bus body or affixed to an area convenient to the electrical accessory control panel.

46.01(c) Each wire passing through metal openings shall be protected by a grommet.

2251-R-47.00 Specially Equipped Buses.

- 47.01 Equipping buses to accommodate students with disabilities is dependent upon the needs of the passengers. Buses equipped with equipment to accommodate the student needs are not to be considered a separate class of school bus, but a regular school bus equipped for special accommodations. 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. A flexible, "common-sense" approach to the adoption and enforcement of specifications is prudent.
- 47.02 Buses equipped for transporting students with special transportation needs shall comply with applicable FMVSS.
- 47.02(a) Buses with power lifts shall comply with FMVSS 403, *Platform Lift Systems for Motor Vehicles*, and FMVSS 404, *Platform Lift Installation in Motor Vehicles*
- 47.02(b) 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*.
- 47.02(c) 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.
- 47.02(d) 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. 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* and FMVSS 302 *Flammability of Interior Materials*.

Editor's Notes

History

Entire rule eff. 07/01/2007.

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