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 November 11, 1998, is found in sections 22-51-108 and 42-4-1903 (1) (2) (3), C.R.S.

The purpose of this Amendment is to establish minimum standards for school transportation vehicles purchased for use in Colorado. These standards are necessary to improve the safety of the children riding the school bus and the mechanical efficiency of the school bus. The new standards meet or exceed the national recommended minimum 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 400 Commonwealth Drive Warrendale, PA 15096

UL- Underwriters Laboratories, Inc. Standard 299-82, Current Revision 333 Pfingsten Road Northbrook, IL 60062

FED. SPEC.- Federal Specification TT-C-520b Current Revision General Services Administration Specification and Consumer Information Distribution Center Building 197 Washington, D.C. 20407

NSSB- National Standards for School Buses, Revision 1995 Recommendations of the Twelfth National Conference on School Transportation, issued by the National Safety Council 444 North Michigan Avenue Chicago, Illinois 60611

NBS- National Bureau of Standards Voluntary Product Standard 1-83, Current Revision Office of Standards Reference Materials Washington, D.C. 20234

SAHS- Standard Alphabets for Highway Signs - Series B Federal Highway Administration, Current Revision U.S. Government Printing Office Washington, D.C. 20234

NFPA- National Fire Protection Association Volume 2, National Fire Codes, Current Revision Batterymarch Park, Quincy, MA 02269

For information regarding how the incorporated material may be obtained or examined, contact:

Colorado Department of Education School Transportation Unit 201 East Colfax Avenue, Room 202 Denver, CO 80203

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, February 1, 1999.

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, February 1, 1999.

3.03 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, February 1, 1999, 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, February 1, 1999, for the purpose of transporting Colorado school children shall meet or exceed these minimum standards contained herein.

4.02 School transportation vehicles manufactured before the effective date of these rules, which have been used exclusively for the purpose of transporting school children and which met or exceeded the Colorado Standards at the time, may continue in use.

4.03 Only those buses which were manufactured after January 1, 1978, may be purchased, leased, contracted, or otherwise obtained for the purpose of transporting Colorado school children. These buses must have met Colorado minimum standards 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 school children.

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 children to or from school or which is privately owned and operated for compensation but it does not include informal or intermittent arrangements, such as sharing of actual gasoline expense or participation in a car pool, for the transportation of children to or from school.

5.02 A School Bus shall be a motor vehicle with motive power, built to school bus standards, designed for carrying passengers, which at any time would be used to carry school children, providing that such transportation is sponsored and approved by the local board of education or school governing agency. Vehicles that carry school children 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 bus.

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.

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, midship, 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, or midship between the front and rear axles. 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 would be used to carry school children, provided that such transportation service is sponsored and approved by the local board of education or school governing agency. The preceding definition is not intended to include private motor vehicles used exclusively to carry members of the owner's household.

5.04 Activity Bus shall be a motor vehicle with motive power, designed for carrying passengers. The activity bus shall be used to carry school children exclusively to and from school related activities or events, provided that such transportation is sponsored and approved by the local board of education. The activity bus shall travel from one location to a second location without stopping to load or unload passengers or control traffic on a public highway. The preceding definition is not intended to preclude the use of school buses on school related activities or events.

5.04 (a) The body shall bear the words “ACTIVITY BUS” in letters at least 8 inches high on both the front and rear. The lettering shall be placed as high as possible without impairment of its visibility. Lettering shall conform to SAHS.

5.04 (b) Activity buses shall bear name of school or company on each side at least 5 inches in height.

2251-R-6.00 Testing and Certification.

6.01 Chassis manufacturers shall provide certification to the Colorado Department of Education that their product(s) meet these rules and all applicable FMVSS standards. Written certification shall be provided 30 days before or after July 1, of each calendar year.

6.02 School bus body manufacturers shall provide 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. Written certification shall be provided 30 days before or after July 1 of each calendar year. 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 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.

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:

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)

THE BUS CHASSIS

2251-R-11.00 Air Cleaner.

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

2251-R-12.00 Axles.

12.01 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.

12.02 Rear axle shall be single-speed.

2251-R-13.00 Brakes.

13.01 All braking systems shall comply with FMVSS.

13.02 Vehicles with a rated capacity of greater than 54 shall be equipped with full compressed air brake systems.

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

13.03 (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.

13.03 (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.

13.03 (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.

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

13.03 (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.

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

2251-R-14.00 Bumper, Front.

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

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

14.03 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 with a GVW less than 10,000 pounds.

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

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

2251-R-15.00 (rule number reserved)

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 NSSB.

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 be outside the passenger portion of the bus body and attached to chassis. Exhaust back pressure shall not exceed engine manufacturer maximum requirement.

20.02 Muffler shall be heavy-duty truck type of aluminized or stainless steel, or ceramic coated to offer maximum resistance to corrosion or oxidation.

20.03 Diameter of tail pipe shall not be reduced after it leaves muffler.

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.

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 Tank.

23.01 All fuel tank specifications shall conform with 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 dual horns 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 (rule number reserved)

2251-R-30.00 Power or Gradeability.

30.01 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-31.00 Retarder (optional)

31.01 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.

31.02 School buses equipped with electro-magnetic retarder(s) shall have increased electrical systern

capacity commensurate with the needs of the retarder system.

31.03 Pilot lights shall indicate when retarder is in operation.

2251-R-32.00 Suspension System.

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

32.02 If leaf-type rear springs are used, they shall be of progressive type.

2251-R-33.00 Steering Gear Assembly.

33.01 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.

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

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

33.04 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-34.00 Tires and Rims.

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

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

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

2251-R-35.00 Tow Hooks Front.

35.01 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-36.00 Transmission.

36.01 Manual type transmission shall be synchromesh for forward gear ratios 2nd and above.

2251-R-37.00 Undercoating.

37.01 Chassis manufacturer shall coat undersides of steel or metallic front fenders with rustproofing 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-38.00 Wiring.

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

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

38.03 Chassis manufacturer shall install a readily 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.

38.03 (a) main 100 amp body circuit

38.03 (b) tail lamps

38.03 (c) right turn signal

38.03 (d) left turn signal

38.03 (e) stop lamps

38.03 (f) back up lamps

38.03 (g) instrument panel lights

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 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, at customer option, 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. Battery compartment shall be labeled with the word “Battery”.

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 comers 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.

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 NSSB 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 except that front and rear roof caps shall remain NSBY.

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

54.02(a) Rear of bus body: strips of at least 1.75 inch 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 comers connecting these horizontal strips.

54.02(b) "School Bus" signs: Shall be marked with 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 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.

55.03 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 la. 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.

Pix of 1 a

a. First Cycle b. 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.

Pix for Figure 2

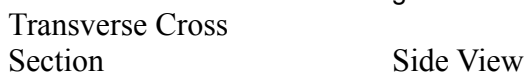

Figure 2. Arrangement of Hydraulic Jack for Rack-Loading of Two-Frame Assembly

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. 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 driver's 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 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. A separate interior handle shall be provided to pull the door shut from the inside.

58.01(a) When flip-up seat is located next to emergency door, the inside door handle must be enclosed or protected by a safety guard to prevent accidental opening.

58.02 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 which will not prevent opening from inside.

58.03 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.

58.04 Operation instructions for opening of door shall be lettered or decaled on the inside of the emergency door.

58.05 Emergency door shall bear words **"EMERGENCY EXIT"** both inside and outside in letters at least 2 inches high. Words shall be placed directly above the door or on the upper portion of the door.

58.06 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.

58.07 Rear emergency door shall contain upper and lower glass panels which comply with FMVSS 205. Glass in emergency door shall provide maximum area of visibility for safe operation of bus.

58.08 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.

58.09 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.

58.10 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 and shall meet FMVSS 217.

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

58.10 (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.

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

58.11 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 to passengers inside the bus and outside directly above, below, or on the window.

58.12 All designated emergency windows shall be equipped with a buzzer. When not fully latched, it shall activate a signal audible to the driver.

58.13 Ignition interlock for the vandal locks shall conform to FMVSS.

58.14 Emergency side windows shall be hinged at the front side.

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.

59.02 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.

59.03 First Aid Kit(s): The bus shall carry a first aid kit or kits which shall either be mounted securely in full view or the location plainly indicated by appropriate markings, in the drivers compartment. The kit(s) shall be mounted in such a manner that they can be removed if necessary. Buses with a manufacturer's rated seating capacity of 36 or less shall be equipped with one 24 unit kit. Buses rated more than 36 capacity shall be equipped with two 24 unit kits.

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' × 3' plain gauze pads	1
Gauze roller bandage 2' wide	2
Plain absorbent gauze - 1/2 square yard	4
Plain absorbent gauze - 24” × 72”	3
Triangular bandages	4
Scissors, tweezers	1
Space rescue blanket	1
Latex Or equivalent disposable gloves, pair	1
CPR mask or mouth to mouth airway	1
Moisture and dustproof kit of sufficient capacity to store the required items.	

59.04 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.

59.05 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
latex (or equivalent) 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.	

59.06 Small vehicles shall carry the following emergency equipment:

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

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

59.06 (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 underse at 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 secured and insulated plate shall be provided to access fuel tank sending unit. 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.

62.03 Hot water heaters shall bear the name plate rating in accordance with NSSB.

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 or company 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) The capacity shall also be shown inside above the windshield.

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.

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).

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 7 inch or 38.48 square inches, minimum diameter 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 38.48 square inches, in diameter and meet the specifications of SAE.

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 that standard except for color and except the candle power requirement shall be 2-1/2 times greater. The school bus shall have two (2) double-lamp assemblies at the front of the vehicle and two (2) double-lamp assemblies at the rear of the vehicle. Double-lamp assemblies shall display one amber lamp and one red lamp.

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 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. The area around the lens of each alternately flashing signal lamp and extended outward approximately 3 inches shall be painted black. In installations where there is not a flat vertical portion of the body immediately surrounding entire lens of lamp, a circular band of black approximately 3 inches wide, immediately below and to both sides of the lens, shall be painted on the body or roof area against which signal lamp is seen from a distance of 500 feet along the axis of vehicle.

67.07 (g) 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.

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 clear view laminated glass or clear view glass bonded to a backing which 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' × 16' mirror and Type B, C, and D buses shall have a minimum of a 6' × 30' mirror.

68.02 Exterior mirrors: Each school bus shall be equipped with a system of exterior mirrors including crossover mirrors (as defined in FMVSS). 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 96 inches, except under the provisions of Section 42-4-502 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.

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.

74.03 All seats shall be forward facing and shall be securely fastened to that part of the school bus body which 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 Backs of all sets of similar size shall be of same width at top and of same height from floor and shall slant at same angle with floor.

74.08 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.

74.09 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.

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 rail 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 Stirrup Steps.

76.01 There shall be a least one folding stirrup step or recessed foothold and suitably located handles on each side of the front of the body for easy accessibility for cleaning the windshield and lamps except when windshield and lamps are easily accessible from the ground. Steps are permitted in or on the front bumper, in lieu of the stirrup steps, if the windshield and lamps are easily accessible for cleaning from that position.

2251-R-77.00 Stop Signal Arm.

77.01 The stop signal arm shall be a flat 18 inch octagon, exclusive of brackets for mounting. The stop signal arm shall contain two alternately flashing red lamps, one located near the top and one located near the bottom of the sign which show both to the front and to the rear. The flashing red lamps shall be connected to the alternately flashing warning signal lamps master control system. The arm shall meet applicable FMVSS requirements.

77.02 It shall have the word **"STOP"** printed on both sides in white letters at least 6 inches high, with a brush stroke of approximately 7/8 inch width, on a bright red background. The outer edge shall be painted white 1/2 inch wide.

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

77.04 The sign shall be mounted outside the bus on the driver side below the driver window. 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.

77.05 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 which 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, double bracketed 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 Tail pipe shall not extend beyond body perimeter, after the body is attached to the chassis, and shall also comply with Section 20, subsections 20.01 through 20.04 of these rules.

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, 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, so mounted that permanent mark is visible, and of sufficient 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.

85.03 Push-out type, split-sash windows may be used.

85.04 All exposed edges of glass shall be banded.

2251-R-86.00 Windshield Washers.

86.01 The bus shall be equipped with windshield washers which 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 of sufficient power to operate wipers. 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 A separate fuse or circuit breaker shall be provided for each circuit except starter motor and ignition circuits.

88.04 All wires shall be installed within body. They shall be insulated and protected by covering of fibrous loom or equivalent which will protect them from external damage and minimize dangers from short circuits. Whenever wires pass through body member, additional protection in form of appropriate type of insert shall be provided.

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 SCHOOL BUSES

2251-R-90.00 Introduction.

90.01 Equipping buses to accommodate students with special needs 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. Special 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 Definition.

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

2251-R-92.00 General Requirements.

92.01 School buses equipped for transporting students with special transportation needs shall comply with FMVSS.

92.02 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-93.00 Power Lift.

93.01 Load. The working load of the lift shall be at least 600 pounds, with a minimum peak load of 800 pounds. 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 6, based on the ultimate strength of the material. Non-working parts, such as platform, frame, and attachment hardware which would not be expected to wear, shall have a safety factor of at least 3, based on the ultimate strength of the material.

93.02 School buses with a power lift shall have increased electrical system capacity commensurate with the needs of the lift system.

93.03 Controls. Controls shall be provided that enable the operator to activate the lift mechanism from either inside or outside the bus. The lift shall deploy to all levels (i.e., ground, curb, and intermediate positions) normally encountered in the operating environment. Where provided, each control for deploying, lowering, raising, and stowing the lift and lowering the roll-off barrier shall be of a momentary contact type requiring continuous manual pressure by the operator and shall not allow improper lift sequencing when the lift platform is occupied. The controls shall allow reversal of the lift operation sequence, such as raising or lowering a platform that is part way down, without allowing an occupied platform to fold or retract into the stowed position.

93.04 Emergency operation. The lift shall incorporate an emergency method of deploying, lowering to the ground level with a lift occupant, and raising and stowing the empty lift if the power to the lift fails. No emergency method, manual or otherwise, shall be capable of being operated in a manner that could be hazardous to the lift occupant or to the operator when operated according to manufacturer's instructions and shall not permit the platform to be stowed or folded when occupied. No manual emergency operation shall require more than 2 minutes to lower an occupied wheelchair to ground level.

93.05 Platforms, when occupied, shall have provisions to prevent their deploying, falling, or folding any faster than 12 inches per second and have provisions to prevent their dropping of an occupant in the event of a single failure of any load carrying component.

93.06 Platform barriers. The lift platform shall be equipped with barriers to prevent any of the wheels of a wheelchair or mobility aid from rolling off the platform during its operation. A movable barrier or inherent design feature shall prevent a wheelchair or mobility aid from rolling off the edge closest to the vehicle until the platform is in its fully raised position.

93.06 (a) Each side of the lift platform which extends beyond the vehicle in its raised position shall have a barrier a minimum 1.5 inches high. Such barriers shall not interfere with maneuvering into or out of the aisle.

93.06 (b) The loading-edge barrier (outer barrier), which functions as a loading ramp when the lift is at ground level, shall be sufficient when raised or closed, or a supplementary system shall be provided to prevent a power wheelchair or mobility aid from riding over or defeating it. The outer barrier of the lift shall automatically raise or close, or a supplementary system shall automatically engage, and remain raised, closed, or

engaged at all times that the platform is more than 3 inches above ground level and the platform is occupied. Alternatively, a barrier or system may be raised, lowered, opened, closed, engaged, or disengaged by the lift operator, provided an interlock or inherent design feature prevents the lift from rising unless the barrier is raised or closed or the supplementary system is engaged.

93.07 Handrails. Platforms on lifts shall be equipped with handrails on two sides, which move in tandem with the lift, and which shall be graspable and provide support to standee through the entire lift operation. Handrails shall be placed to provide a minimum 1.5 inch knuckle clearance from the nearest adjacent surface. Handrails shall not interfere with wheelchair or mobility aid maneuverability when entering or leaving the vehicle.

2251-R-94.00 Ramps.

94.01 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.

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

94.03 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.

94.04 Provisions shall be made to secure ramp to side of bus for use without danger of detachment and ramp shall be connected to bus at floor level in such a manner as to permit easy access of wheels of wheelchair to floor of bus.

94.05 Ramp shall be at least 80 inches in length.

2251-R-95.00 Aisles.

95.01 All school buses equipped with a power lift or ramp shall provide a 30 inch aisle leading from any wheelchair/mobility aid position to at least one emergency door and to the lift area.

2251-R-96.00 Identification.

96.01 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.

2251-R-97.00 Restraining Devices.

97.01 Lap belt ready seat frames shall be reinforced to meet FMVSS. All restraining devices shall conform to FMVSS.

2251-R-98.00 Seating Arrangements.

98.01 To accommodate special devices for passenger requirements, flexibility is permitted in seat spacing, not to exceed FMVSS. All seating shall be forward-facing.

2251-R-99.00 Securement and Restraint System for Wheelchair/mobility Aid and Occupant.

99.01 For purposes of better understanding the various aspects and components of this section, the term "securement" or phrase "securement system" is used exclusively in reference to the device(s) which secure the wheelchair/mobility aid. The term "restraint" or phrase "restraint system" is used exclusively in reference to the device(s) used to restrain the occupant of the Wheelchair/mobility

aid. The phrase "securement and restraint system" is used to refer to the total system which secures and restrains both the wheelchair/mobility aid and the occupant.

99.02 Securement and restraint system. The wheelchair/mobility aid securement and occupant restraint system shall be designed, installed, and operated to accommodate passengers in a forward-facing orientation within the bus and shall comply with all applicable requirements of FMVSS.

99.03 The securement and restraint system, including the system track, floor plates, pockets, or other anchorages shall be provided by the same manufacturer, or be certified to be compatible by manufacturers of all equipment/systems used. The system shall be installed so as to allow full use of all positions of the system anchorages.

99.04 When a wheelchair/mobility aid securement device and an occupant restraint share a common anchorage, including occupant restraint designs that attach the occupant restraint to the securement device or the wheelchair/mobility aid, the anchorage shall be capable of withstanding the loads of both the securement device and occupant restraint applied simultaneously, in accordance with FMVSS.

99.05 When a wheelchair/mobility aid securement device (webbing or strap assembly) is shared with an occupant restraint, the wheelchair/mobility aid securement device (webbing or strap assembly) shall be capable of withstanding a force twice the amount as specified in FMVSS.

99.06 The bus body floor and sidewall structures where the securement and restraint system anchorages are attached shall have equal or greater strength than the load requirements of the system(s) being installed.

99.07 The securement and restraint system shall incorporate an identification scheme which shall allow for the easy identification of the various components and their functions. It shall consist of one of the following, or combination thereof:

99.07 (a) The wheelchair/mobility aid securement device (webbing or strap assemblies) and the occupant restraint belt assemblies shall be of contrasting color or color shade.

99.07 (b) The wheelchair/mobility aid securement device (webbing or strap assemblies) and the occupant restraint belt assemblies shall be clearly marked to indicate the proper wheelchair orientation in the vehicle, and the name and location for each device or belt assembly, i.e., front, rear, lap belt, shoulder belt, etc.

99.08 The securement and restraint system shall be located and installed such that when an occupied wheelchair/mobility aid is secured, it is not adjacent to the lift.

99.09 Each securement device (webbing or strap assembly) and restraint belt assembly shall be permanently and legibly marked or incorporate a non-removable label or tag which states that it conforms to all applicable FMVSS requirements.

99.10 The following information shall be provided with each vehicle equipped with a securement and restraint system:

99.10 (a) Detailed instructions regarding installation, repair, and a parts list.

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

99.11 The system manufacturer shall make available training materials to ensure the proper use and

maintenance of the wheelchair/mobility aid securement and occupant restraint system. These may include instructional videos, classroom curriculum, system test results, or other related materials.

99.12 Wheelchair/mobility aid securement system. Each securement system location shall consist of a minimum of four anchorage points. A minimum of two anchorage points shall be located in front of the wheelchair/mobility aid and a minimum of two anchorage points shall be located in the rear. The securement anchorages shall be attached to the floor of the vehicle and shall not interfere with passenger movement or present any hazardous condition.

99.12 (a) The securement system shall secure the wheelchair/mobility aid in such a manner that the attachments or coupling hardware will not become detached when any wheelchair/mobility aid component deforms, when one or more tires deflate, and without intentional operation of a release mechanism (e.g., a spring clip on a securement hook).

99.13 Dynamic testing. The wheelchair/mobility aid securement and occupant restraint system shall be subjected to, and successfully pass, a dynamic sled test as spelled out in the current NSSB.

2251-R-100.00 Special Service Entrance.

100.01 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.

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

100.03 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 special service entrance.

100.04 A single door or double doors may be used for the special service entrance.

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

100.04 (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.

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

100.06 All doors shall be weather sealed.

100.07 When dual doors are provided, the rear door shall have at least a one-point fastening device to the header. The forward-mounted door shall have at least three-point fastening devices. One shall be to the header, one to the floor line of the body, and the other shall be into the rear door. The door and hinge mechanism shall be of a strength that is greater than or equivalent to the emergency exit door.

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

100.09 Each door shall have windows set in rubber which 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.

100.10 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.

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

100.12 Special service 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-101.00 Support Equipment and Accessories.

101.01 Each bus which is set to accommodate wheelchair/mobility aids, safety vests, car seats, or other similar assistive or restraint devices shall have a durable webbing cutter with a protected blade. The cutter shall be properly secured in a location within reach of the driver while belted into his/her driver's seat.

2251-R-102.00 Emergency Waiver of Specifications.

102.01 The Colorado Board of Education may temporarily waive specific non-statutory standard(s) when the Board finds that vehicles meeting the minimum standards are not available, and also find that the safety of children would not be adversely affected by the nonconformity.

102.01 (a) Any agency or district applying for temporary waiver shall provide the Board with:

102.01 (a)(1) Reasons for temporary waiver of the standards,

102.01 (a)(2) Statement of the specific variation from the minimum standards,

102.01 (a)(3) Compensating factors with respect to non-conformity.