EDUCATION DEPARTMENT[281]

Notice of Intended Action

Pursuant to the authority of Iowa Code section 256.7(5), the State Board of Education hereby proposes to amend Chapter 44, "School Buses," Iowa Administrative Code.

This chapter provides the rules concerning school bus regulation in our state. Approximately every five years, there is a comprehensive review of these rules and subsequent update to reflect best current practice. The major change in this update concerns combining elements of the rule that were previously separated. The bus chassis used to be bid out separately from the remainder of the bus so rules were split for both areas of the bus. Now, the common practice is for bus bids to be done comprehensively and these rules reflect that comprehensive change.

An agencywide waiver provision is provided in 281—Chapter 4.

Interested individuals may make written comments on the proposed amendments on or before 4:30 p.m. on Tuesday, March 11, 2014. Comments on the proposed amendments should be directed to Mike Cormack, Iowa Department of Education, Second Floor, Grimes State Office Building, Des Moines, Iowa 50319-0146; telephone (515)281-3399; or E-mail mike.cormack@iowa.gov.

A public hearing will be held on Tuesday, March 11, 2014, from 1:00 p.m. to 2:00 p.m. in the State Board Room, Second Floor, Grimes State Office Building, East 14th Street and Grand Avenue, Des Moines, Iowa, at which time persons may present their views either orally or in writing. Any persons intending to attend the public hearing and have special requirements, such as those related to hearing or mobility impairments,

should advise the Department of Education of their specific needs by calling (515)281-5295.

After analysis and review of this rule making, no impact on jobs has been found.

These amendments are intended to implement chapter 285 code provisions.

The following amendments are proposed.

ITEM 1. Amend 281---44.2 as follows**:**

281—44.2(285) School bus—type classifications. A bus owned, leased, contracted to or operated by a school or school district and regularly used to transport students to and from school or school-related activities, but not including a charter bus or transit bus, meets all applicable FMVSS, and is readily identified by alternately flashing lights, national school bus yellow paint, and the legend "School Bus."

44.2(1) *Type A.* A Type A school bus is a conversion or bus constructed utilizing a cutaway front-section vehicle with a left side driver's door. This definition includes two classifications: Type Awith a gross vehicle weight rating (GVWR) of 14,500 pounds or less; and Type A-2, with a GVWR greater than 14,500 and less than or equal to 21,500 pounds.

44.2(2) *Type B.* A Type B school bus is constructed utilizing a stripped chassis. The entrance door is behind the front wheels. This definition includes two classifications: Type B-1, with a GVWR of 10,000 pounds or less; and Type B-2, with a GVWR greater than 10,000 pounds.

44.2(3) *Type C.* A Type C school bus, also known as a conventional school bus, is constructed utilizing a chassis with a hood and front fender assembly. The entrance door

is behind the front wheels. This type of school bus also includes the cutaway truck chassis or truck chassis with cab with or without a left side door and with a GVWR greater than 21,500 pounds.

44.2(4) *Type D.* A Type D school bus, also known as a rear or front engine transit-style school bus, is constructed utilizing a stripped chassis. The entrance door is ahead of the front wheels.

44.2(5) *Type III.* Type III vehicles are not regular school buses but nonetheless are used to transport students in a school-related context and may be marked as a "school bus". A Type III vehicle is a passenger car (including a minivan, SUV, or station wagon), or van. The difference between a family automobile and an equivalent Type III vehicle is not the vehicle itself, but rather lies in its use: Type III vehicles are used by schools for purposes of pupil transportation. To qualify as a Type III vehicle, it must carry a maximum of nine or fewer people, including the driver; and weigh 10,000 pounds or less.

44.2(~~5~~ 6) *Specially equipped.* A specially equipped school bus is a school bus designed, equipped, or modified to accommodate students with special needs.

44.2(~~6~~ 7) *Multifunction school activity bus (MFSAB).* A multifunction school activity bus is a school bus whose purposes do not include transporting students to and from home or school bus stops as defined in 49 CFR 571.3. MFSABs meet all FMVSS for school buses except the traffic control requirements (alternately flashing signal and stop arm). MFSABs are not allowed for use by schools or school districts in the state of Iowa.

ITEM 2. Amend 281---44.3 as follows:

281—44.3(285) School bus body and chassis specifications.

44.3(1) *Air cleaner.*

a. The engine air intake cleaning system shall be furnished and properly installed by the chassis manufacturer to meet engine manufacturer's specifications.

b. The intake air system for diesel engines shall have an air cleaner restriction indicator properly installed by the chassis manufacturer to meet engine specifications.

~~44.4(1)~~ 44.3(2) *Aisle.*

a. All emergency doors shall be accessible by a 12-inch minimum aisle. Aisles shall be unobstructed at all times by any type of barrier, seat, wheelchair**,** ~~or~~ tie-down, or other object(s), with the exception of a flip seat that ~~unless a flip seat~~ is installed and occupied at a side emergency door position. The track of a track seating system is exempt from this requirement. A flip seat in the unoccupied (up) position shall not obstruct the 12-inch minimum aisle to any side emergency door.

b. The seat backs shall be slanted sufficiently to give aisle clearance of 15 inches at the top of the seat backs.

~~44.3(2)~~ 44.3(3) *Alternator.*

a. All alternators shall be a minimum of 130 amperes while maintaining a minimum of 50 amperes while at the manufacturer's suggested idle speed.

b. All Type C and Type D buses shall be equipped with a heavy-duty truck or bus-type alternator meeting SAE J180 or incorporating a pad-type mounting.

~~44.3(3)~~ 44.3(4) *Axles.* The front and rear axle and suspension systems shall have gross axle weight rating (GAWR) at ground commensurate with the respective front and rear

weight loads that will be imposed by the bus.

44.3(4) ~~*Backup warning alarm.* A backup warning alarm shall be installed on every school bus. Responsibility for installation of the alarm shall rest with the school bus body manufacturer unless other arrangements have been made between the body and chassis manufacturers. See also subrule 44.4(2).~~

~~44.4(2)~~ 44.3(5) *Backup warning alarm.* An automatic audible alarm shall be installed behind the rear axle on every school bus/vehicle and shall comply with the published Backup Alarm Standards (SAE J994B), providing a minimum of 112 dBA. A variable volume feature is not allowed.

~~44.4(3)~~ 44.3(6) *Battery compartment.*

a. Battery(ies) shall be furnished by the ~~chassis~~ manufacturer ~~unless the body manufacturer agrees to provide battery(ies)~~.

b. Battery(ies) shall be mounted in the body skirt of the vehicle and shall be accessible for convenient servicing from outside the bus. ~~When the battery is mounted as described in 281—44.3(285), t~~ The ~~body~~ manufacturer shall securely attach the battery(ies) on a slide-out or swing-out tray with a safety stop to prevent the battery(ies) from dropping to the ground at the outermost extremity of tray travel.

~~*d.*~~ *c.* The battery compartment door or cover shall be hinged at the top, bottom or forward side of the door. When hinged at the top, a fastening device shall be provided which will secure the door in an open position. The door or cover over the compartment opening shall completely cover and, as completely as practical, seal the opening and shall be secured by an adequate and conveniently operated latch or other type fastener to

prevent free leakage of the battery contents into the passenger compartment should the vehicle overturn. Battery cables installed by the ~~body~~ manufacturer shall meet ~~chassis manufacturer and~~ SAE requirements. Battery cables shall be of sufficient length to allow the battery tray to fully extend and to allow some slack in the cables. In Type A buses, if batteries cannot be installed under the hood, a battery compartment is required.

~~*c.*~~ *d.* The top surface area of the inside of the battery compartment (the area likely to come into contact with battery electrical terminals as the result of a blow to, and upward collapse of, the bottom of the battery box in the event of an accident or other event) shall be covered with a rubber matting or other impact-resistant nonconductive material. The matting shall be a minimum of 1/8-inch thick and cover the entire top inside surface of the battery box. The matting shall be securely installed to maintain its position at all times.

~~*f.*~~ *e*. The word "BATTERY" in 2-inch black letters shall be placed on the door covering the battery opening.

~~44.3(5)~~ 44.3(7) *Battery system.*

~~*a.*~~ A 12-volt battery system tested at 0 degrees Fahrenheit shall be provided which meets or exceeds the following capacity ratings:

~~(1)~~ *a***.** Gasoline engines (greater than 10,000 pounds GVWR): 150 minutes reserve and 500 cold cranking ampere capacity.

~~(2)~~ *b***.** Gasoline engines (10,000 pounds GVWR or less): 125 minutes reserve and 450 cold cranking ampere capacity.

~~(3)~~ *c.* Diesel engines (all): 200 minutes reserve and 1,000 cold cranking ampere

capacity, or a cold cranking ampere capacity not less than the engine manufacturer's minimum requirements, whichever is greater.

~~*b*. Since all batteries are to be secured in a sliding tray in the body, chassis manufacturers shall temporarily mount the battery on the chassis frame. Type A or B van conversion or cutaway front-section chassis may have the battery located in the forward engine compartment beneath the hood or temporarily mounted for final mounting in the body skirt by the body manufacturer. In these cases, the final location of the battery and the appropriate cable lengths shall be according to the SBMTC School Bus Design Objectives, August 1996 edition, or as mutually agreed upon by the chassis and body manufacturers. In all cases, however, the battery cable provided with the chassis shall have sufficient length to allow some slack.~~

~~44.4(4)~~ 44.3(8) *Body sizes.* Type A vehicles may be purchased with manufacturer's recommended seating capacities when the chassis is manufactured with rear dual tires.

~~44.3(6)~~ 44.3(9) *Brakes.*

a. Brakes, all, general requirements.

(1) The chassis brake system shall conform to the provisions of FMVSS No. 105, Hydraulic and Electric Brake Systems, No.106, Brake Hoses, and No. 121, Air Brake Systems, as applicable.

(2) The antilock brake system (ABS), provided in accordance with FMVSS No. 105 or No. 121, shall provide wheel speed sensors for each front wheel and for each wheel on at least one rear axle. The system shall provide antilock braking performance for each wheel equipped with sensors (Four Channel System).

(3) All brake systems shall be designed to permit visual inspection of brake lining wear without removal of any chassis component(s).

(4) The brake lines, booster-assist lines, and control cables shall be protected from excessive heat, vibration and corrosion and installed in a manner which prevents chafing.

(5) The parking brake system for either air or hydraulic service brake systems may be of a power-assisted design. The power parking brake actuator should be a device located on the instrument panel within reach of a seated 5th percentile female driver. As an option, the parking brake may be set by placing the automatic transmission shift control mechanism in the "park" position.

(6) The power-operated parking brake system may be interlocked to the engine key switch. Once the parking brake has been set and the ignition switch turned to the "off" position, the parking brake cannot be released until the key switch is turned back to the "on" position.

b. Hydraulic brakes, general requirements. Buses using a hydraulic-assist brake shall be equipped with audible and visible warning signals that provide a continuous warning to the driver indicating a loss of fluid flow from the primary source or a failure of the backup pump system.

c. Air brakes, general requirements.

(1) The air pressure supply system shall include a desiccant-type air dryer installed according to the manufacturer's recommendations. The air pressure storage tank system may incorporate an automatic drain valve.

(2) The ~~chassis~~ manufacturer shall provide an accessory outlet for <u>other</u> air-operated

systems installed in or on ~~by~~ the bus ~~body manufacturer~~. This outlet shall include a pressure protection valve to prevent loss of air pressure in the service brake reservoir.

(3) For air brake systems, an air pressure gauge capable of complying with commercial driver's license (CDL) pretrip inspection requirements shall be provided in the instrument panel.

(4) All air brake-equipped buses may be equipped with a service brake interlock. If the bus is equipped with a service brake interlock, the parking brake cannot be released until the brake pedal is depressed.

(5) Air brake systems shall include a system for anticompounding of the service brakes and parking brakes.

(6) Air brakes shall have a warning device that is both visible and audible and that provides warning to the driver whenever the air pressure falls below the level where warnings are required under FMVSS No. 121.

d. Brakes, all, specific requirements.

(1) The braking system shall include the service brake, an emergency brake that is part of the service brake system and controlled by the service brake pedal, and a parking brake meeting FMVSS at date of manufacture.

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

driver the air pressure in psi or the inches of mercury available for the operation of the brakes.

(3) Buses using a hydraulic-assist brake system shall be equipped with warning signals readily audible and visible to the driver. The warning signal shall provide continuous warning in the event of a loss of fluid flow from primary source and in the event of discontinuity in that portion of the vehicle electrical system that supplies power to the backup system.

(4) Brake system reservoirs.

1. Every brake system which employs air or vacuum shall include a reservoir of the following capacity, where applicable, for brake operation: Vacuum-assist brake systems shall have a reservoir used exclusively for brakes that shall adequately ensure a full-stroke application so that loss in vacuum shall not exceed 30 percent with the engine off. Brake systems on gas-powered engines shall include suitable and convenient connections for the installation of a separate vacuum reservoir.

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

3. Connection for auxiliary accessory reservoir. The brake system shall include a suitable and convenient connection for installation of an auxiliary air or vacuum reservoir by the ~~body~~ manufacturer.

(5) An air brake system is required on every chassis meeting one or more of the

following:

1. Wheelbase equal to or greater than 274 inches.

2. Designed seating capacity rating greater than 66 passengers. Designed seating capacity, also known as manufacturer's seating capacity, is the actual or theoretical passenger capacity of the vehicle if it were constructed with the maximum number of seating positions.

(6) An air brake system shall comply with the following system and component designs:

1. The system cannot be of wedge design.

2. The system shall include an air dryer system having design features equal to or exceeding the Bendix Westinghouse Model AD9. The system shall be self-purging and capable of removing oil, dirt, and moisture. The dryer system shall also be equipped with a heater to prevent the freezing of moisture within the system. All plumbing from air compressor to input of air dryer or after-cooler shall provide soft flow bends not producing sumps in the air compressor line having direct entry into the dryer. An automatic moisture ejector or "spitter valve" does not meet the above requirement.

3. Automatic slack adjusters are required to be installed at all wheel positions.

4. The air compressor shall produce a minimum output of 12.0 cubic feet per minute (CFM).

(7) Vehicles with 10,000 pounds GVWR or less shall be equipped with a hydraulic, dual-braking system of manufacturer's standard, with power assist.

(8) Antilock brake systems for either air or hydraulic brakes shall include control of

all axles in compliance with FMVSS 105 or 121.

~~44.3(7)~~ 44.3(10) *Bumper, front.*

a. All school buses shall be equipped with a front bumper painted glossy black. ~~The chassis manufacturer shall furnish the front bumper on all chassis unless there is a specific arrangement between the chassis manufacturer and body manufacturer that the body manufacturer will furnish the front bumper.~~

~~*b.* The bumper shall be not less than 8 inches wide (high), except on Type D buses where the front bumper shall be a minimum of 9 inches wide (high).~~

~~*c.* The front bumper shall be of pressed steel channel or equivalent material of sufficient structural and mounting strength to ensure that the front of the vehicle may be lifted by means of an air bumper-type jack, without permanent deformation of the bumper, bracketry, or chassis frame rail(s). The front bumper, except breakaway bumper ends, shall be of sufficient strength to permit pushing a vehicle of equal gross vehicle weight without permanent distortion to the bumper, chassis, or body.~~

~~*d.* On Type A vehicles less than 14,500 pounds GVWR, the front bumper may be of manufacturer's standard construction.~~

~~*e.* The bumper shall extend beyond the forward-most part of the body, grille, hood, and fenders (flush-mounted bumpers are not acceptable) and shall extend to the outer edges of the fenders at the bumper's top line. The bumper shall be curved, beveled, or have other design features at each end to prevent snagging or hooking and shall be bolted to the chassis frame so it can be conveniently removed for maintenance.~~

b. The front bumper on buses of Type A-2 (with GVWR greater than 14,500 pounds), Type B, Type C, and Type D shall be equivalent in strength and durability to pressed steel channel at least 3/16 inches thick and not less than 8 inches wide (high). It shall extend beyond the forward-mostpart of the body, grille, hood and fenders and shall extend to the outer edges of the fenders at the bumper's top line. Type A buses having a GVWR of 14,500 pounds or less may be equipped with an OEM-supplied front bumper. The front bumper shall be of sufficient strength to permit being pushed by another vehicle on a smooth surface with a 5 degree, (8.7 percent) grade, without permanent distortion. The contact point on the front bumper is intended to be between the frame rails, with as wide a contact area as possible. If the front bumper is used for lifting, the contact points shall be under the bumper attachments to the frame rail brackets unless the manufacturer specifies different lifting points in the owner's manual. Contact and lifting pressures should be applied simultaneously at both lifting points.

c. The front bumper, except breakaway bumper ends, shall be of sufficient strength to permit pushing a vehicle of equal gross vehicle weight, per Section B, without permanent distortion to the bumper, chassis or body.

d. The bumper shall be designed or reinforced so that it will not deform when the bus is lifted by a chain that is passed under the bumper (or through the bumper if holes are provided for this purpose) and attached to both tow hooks/eyes. For the purpose of meeting this specification, the bus shall be empty and positioned on a level, hard surface and both tow hooks/eyes shall share the load equally.

~~*f.*~~ *e.* Tow eyes or hooks are required on ~~chassis~~ Type B, C, and D buses of ~~14,500~~

14,501 pounds GVWR or greater. Two tow eyes or hooks shall be installed by the ~~chassis~~ manufacturer so as not to project beyond the front bumper. ~~Tow eyes or hooks shall be attached to the chassis frame in accordance with the chassis manufacturer's standards.~~

~~*g.*~~ *f.* The bumper shall be designed or reinforced so that it will not deform when the bus is lifted by a chain that is passed under the bumper (or through the bumper if holes are provided for this purpose) and attached to both tow eyes. For the purpose of meeting this standard, the bus shall be empty and positioned on a level, hard surface and both tow eyes shall share the load equally.

~~**44.4(5)** *Bumper, front.*~~

~~*a.* On a Type D school bus, if the chassis manufacturer does not provide a bumper, it shall be provided by the body manufacturer. The bumper will conform to the standards of 281—44.3(285).~~

~~*b.*~~ *g.* An optional energy-absorbing front bumper may be used, provided its design incorporates a self-restoring, energy-absorbing system of sufficient strength to:

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

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

- 7.5 mph fixed-barrier impact (FMVSS cart and barrier test).
- 4.0 mph corner impact at 30 degrees (Part 581, CFR Title 49).
- 20.0 mph into parked passenger car (Type B, C, and D buses of 18,000 lb GVWR or more).

(3) The manufacturer of the energy-absorbing system shall provide evidence of conformance to the above standards from an approved test facility capable of performing the above FMVSS tests.

~~44.3(8)~~ ~~*Bumper, rear.* A rear bumper of manufacturer's standard construction shall be provided by the chassis manufacturer on all Type A-2 chassis unless there is a specific arrangement between the chassis manufacturer and body manufacturer that the body manufacturer will furnish the rear bumper. The rear bumper shall be painted glossy black.~~

~~44.4(6)~~ **44.3(11)** *Bumper, rear*

a. All school buses shall be equipped with a rear bumper painted glossy black.

~~*a.*~~ *b.* The rear bumper shall be 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-2 vehicles and a minimum of 9½ inches wide (high) on Type A-1, B, C and D buses and shall be of sufficient strength to permit being pushed by another vehicle without permanent distortion. ~~Type A-2 vehicles with an overall body width of 80 inches or less may be equipped with the manufacturer's standard rear bumper.~~

~~*b.*~~ *c.* The rear bumper shall be wrapped around the back corners of the bus. It shall extend forward at least 12 inches, measured from the rear-most point of the body at the floor line, and shall be flush-mounted to the body side or protected with an end panel.

~~*c.*~~ *d.* The rear bumper shall be attached to the chassis frame in such a manner that it may be easily removed. It shall be braced so as to resist deformation of the bumper resulting from a rear or side impact. It shall be designed so as to discourage hitching of rides.

~~*d.*~~ *e.* The bumper shall extend at least 1 inch beyond the rear-most part of body surface measured at the floor line.

~~*e.*~~ *f.* Additions or alterations to the rear bumper, including the installation of trailer hitches, are prohibited.

~~*f.*~~ *g.* An optional energy-absorbing rear bumper may be used, provided a self-restoring, energy-absorbing bumper system attached to prevent the hitching of rides is of sufficient strength to:

(1) Permit pushing by another vehicle without permanent distortion to the bumper, chassis, or body.

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

- 2.0 mph fixed barrier impact (FMVSS cart and barrier test).
- 4.0 mph corner impact at 30 degrees (Part 581, CFR Title 49).
- 5.0 mph center impact (Part 581, CFR Title 49).

(3) The manufacturer of the energy-absorbing system shall provide evidence of conformance to the above standards from an approved test facility capable of performing the above FMVSS test.

~~**44.3(9)** *Certification, chassis.* The chassis manufacturer will, upon request, certify to the state agency having pupil transportation jurisdiction that the product(s) meets minimum standards on items not covered by certification issued under requirements of the National Traffic and Motor Vehicle Safety Act.~~

~~**44.4(7)**~~ **44.3(12)** *Certification.* The ~~body~~ manufacturer(s) shall, upon request, certify

to the ~~department of education~~ state agency having pupil transportation jurisdiction that the manufacturer's product(s) meets Iowa minimum standards on items not covered by FMVSS certification requirements of 49 CFR Part 567.

~~**44.4(8)** *Chains, tire.* See subrule 44.3(35).~~

~~**44.3(10)** *Clutch.*~~

~~*a.* Clutch torque capacity shall be equal to or greater than the engine torque output.~~

~~*b.* A starter interlock shall be installed to prevent actuation of the starter if the clutch is not depressed.~~

~~**44.3(11)**~~ **44.3(13)** *Color.*

a. Chassis ~~and front bumper~~ shall be black. Body cowl, hood, and fenders shall be national school bus yellow. The flat top surface of the hood may be nonreflective national school bus yellow; black is not acceptable.

b. Wheels and rims shall be gray, black, or national school bus yellow.

c. The grille must be gray, black, or national school bus yellow. Chrome is not acceptable.

~~**44.4(9)** *Color.* See also subrule 44.3(11).~~

~~*a.*~~ *c.* The school bus body shall be painted national school bus yellow. (See color standard, Appendix B, National School Transportation Specifications & Procedures Manual ~~2005~~ 2010, available from Missouri Safety Center, Central Missouri State University, Humphreys Suite 201, Warrensburg, Missouri 64093.)

~~*b.*~~ *d.* The body exterior trim shall be glossy black, including the rear bumper, exterior lettering, numbering, body trim, rub rails, lamp hoods (if any), and emergency door

arrow. This may also include the entrance door and window sashes. As an alternative, the rear bumper may be covered with a black retroreflective material as described in subrule ~~44.4(34)~~ 44.3(52). When the bus number is placed on the front or rear bumper, the number shall be yellow.

~~*c.*~~ *e.* As an option, the roof of the bus may be painted white extending down to within 6 inches above the drip rails on the sides of the body, except that the vertical portion of the front and rear roof caps shall remain yellow.

~~*d.*~~ *f.* Commercial advertising is forbidden on the exterior and in the interior of all school buses.

~~44.4(10)~~ 44.3(14) *Construction.*

a. The school bus body shall be constructed of materials certified to be durable under normal operating conditions and shall meet all applicable FMVSS at the date of manufacture as certified by the bus body manufacturer.

b. Construction shall be reasonably dustproof and watertight.

c. Body joints present in that portion of the Type A~~-2~~ school bus body furnished exclusively by the body manufacturer shall conform to the performance requirements of FMVSS 221. This does not include the body joints created when body components are attached to components furnished by the chassis manufacturer.

d. A flat floor system featuring no wheelwells and no step-up at the rear of the passenger compartment may be used in accordance with the following:

(1) The inside height of the body shall remain at least 72 inches, when measured in accordance with subrule ~~44.4(21)~~ 44.3(41) when this option is installed.

(2) If this option utilizes a raised floor that is stepped up behind the driver's area, the forward edge of the aisle shall have a white or yellow stripe and be labeled "Step Up" visible to passengers upon entering the aisle; and a label "Step Down" shall be visible to passengers as they exit the aisle. Minimum headroom of 72 inches shall be maintained at all times.

(3) A flat floor design shall provide for the additional option for a track-mounted seating system using button-type (L track) and a wheelchair securement system meeting Iowa specifications but mounting into the track of the track-seating system. Aisle clearances shall be maintained in accordance with these rules.

~~44.4(11)~~ 44.3(15) *Crossing control arms.*

a. Type A, B, and C school buses shall be equipped with a crossing control arm mounted on the right side of the front bumper, which shall not open more than 90 degrees. This requirement does not apply to Type D vehicles having transit-style design features.

b. The crossing control arm shall incorporate a system of quick-disconnect connectors (electrical, vacuum, or air) at the crossing control arm base unit and shall be easily removable to allow for towing of the bus.

c. All components of the crossing control arm and all connections shall be weatherproofed.

d. The crossing control arm shall be constructed of noncorrodible or nonferrous material or treated in accordance with the body sheet metal standard. See subrule 44.4(25).

e. There shall be no sharp edges or projections that could cause hazard or injury to students.

f. The crossing control arm shall extend a minimum of 70 inches from the front bumper when in the extended position. This measurement shall be taken from the arm assembly attachment point on the bumper. However, the crossing control arm shall not extend past the ends of the bumper when in the stowed position.

g. The crossing control arm shall extend simultaneously with the stop arm(s) by means of the stop arm controls.

h. The crossing control arm system shall be designed to operate in extreme weather conditions including freezing rain, snow and temperatures below 0 degrees Fahrenheit without malfunctioning. The crossing control arm itself shall be constructed of a material that will prevent the arm from prematurely extending or from failing to retract due to sustained wind or wind gusts of up to 40 miles per hour.

i. The chassis bumper mounting bracket must be designed for the specific model chassis on which it will be mounted to ensure that the unit mounts flush and operates properly.

j. A single, cycle-interrupt switch with automatic reset shall be installed in the driver's compartment and shall be accessible to the driver from the driver's seat.

k. The assembly may include a device attached to the bumper near the end of the arm to automatically retain the arm while in the stowed position. That device shall not interfere with normal operations of the crossing control arm.

~~44.3(12)~~ 44.3(16) *Daytime running lights (DRL).* ~~Rescinded IAB 10/11/06, effective~~

~~11/15/06.~~ See subrule 44.3(33)

~~**44.3(13)** *Defroster*. See subrules 44.3(22) and 44.4(18).~~

~~**44.4(12)**~~ 44.3(17) *Defrosters.*

a. Defrosting and defogging equipment shall direct a sufficient flow of heated air onto the interior surfaces of the windshield, the window to the left of the driver, and the glass in the viewing area directly to the right of the driver to eliminate frost, fog and snow.

b. The defrosting system shall conform to SAE Standard J381.

c. The defroster and defogging system shall be capable of furnishing heated outside ambient air; however, the part of the system furnishing additional air to the windshield, entrance door and step well may be of the recirculating air type.

d. Auxiliary fans are required; however, they are not considered defrosting or defogging systems. See also subrule ~~44.4(53)~~ 44.3(80).

e. Portable heaters shall not be used.

~~**44.4(13)**~~ 44.3(18) *Doors and exits.*

a. Service door.

(1) The service door shall be heavy-duty power or manually operated under the control of the driver and shall be designed to afford easy release and prevent accidental opening. When a hand lever is used, no parts shall come together to shear or crush fingers. Manual door controls shall not require more than 25 pounds of force to operate at any point throughout the range of operation. A power-operated door must provide for manual operation in case of power failure.

(2) The service door shall be located on the right side of the bus opposite the driver and within the driver's direct view and shall remain closed anytime the vehicle is in motion.

(3) The service door shall have a minimum horizontal opening of 24 inches and a minimum vertical opening of 68 inches. Type A~~-2~~ vehicles shall have a minimum opening of 1,200 square inches.

(4) The service door shall be of split or jackknife type. (Split door includes any sectioned door which divides and opens inward or outward.) If one section of the split door opens inward and the other opens outward, the front section shall open outward.

(5) Lower as well as upper panels shall be of approved safety glass. The bottom of each lower glass panel shall not be more than 10 inches from the top surface of the bottom step. The top of each upper glass panel shall not be more than 3 inches from the top of the door.

(6) The upper window panels of the service door shall be of insulated double glass. This standard applies to all vehicles equipped with a service door as described in ~~44.4(13)"*a.*"~~ 44.3(18)"*a.*"

(7) Vertical closing edges on split or folding entrance doors shall be equipped with flexible material to protect children's fingers.

(8) There shall be no door to the left of the driver on Type B, C or D vehicles. All Type A vehicles may be equipped with the chassis manufacturer's standard left side (driver's side) door.

(9) All doors shall be equipped with padding at the top edge of each door opening.

Padding shall be at least 3 inches wide and 1 inch thick and shall extend horizontally the full width of the door opening.

(10) Door hinges shall be secured to the body without the use of metal screws.

(11) There shall be no grab handle installed on the exterior of the service door.

(12) A door-locking mechanism may be installed in accordance with subrule ~~44.4(52).~~ 44.3(79).

(13) On power-operated service doors, the emergency release valve, switch or device to release the service door must be placed above or to the left or right of the service door and be clearly labeled**.** The emergency release valve, switch or device shall work in the absence of power.

b. Emergency doors.

(1) Emergency door(s) and other emergency exits shall comply with the requirements of FMVSS 217 and any of the requirements of these rules that exceed FMVSS 217.

(2) The upper portion of the emergency door shall be equipped with approved safety glazing, the exposed area of which shall be at least 400 square inches. The lower portion of the rear emergency doors on Type A-2, B, C and D vehicles shall be equipped with a minimum of 350 square inches of approved safety glazing.

(3) There shall be no steps leading to an emergency door.

(4) The emergency door(s) shall be equipped with padding at the top edge of each door opening. Padding shall be at least 3 inches wide and 1 inch thick and shall extend the full width of the door opening.

(5) There shall be no obstruction higher than ¼ inch across the bottom of any

emergency door opening.

c. Emergency exit requirements.

(1) Any installed emergency exit shall comply with the design and performance requirements of FMVSS 217, Bus Emergency Exits and Window Retention and Release, applicable to that type of exit, regardless of whether or not that exit is required by FMVSS 217, and shall comply with any of the requirements of these rules that exceed FMVSS 217.

(2) An emergency exit may include either an emergency door or emergency exit-type windows. Where emergency exit-type windows are used, they shall be installed in pairs, one on each side of the bus. Type A, B, C, and D vehicles shall be equipped with a total number of emergency exits as follows for the designed capacities of vehicles:

- 0 to 42 passenger = 1 emergency exit per side and 1 roof hatch.
- 43 to 78 passenger = 2 emergency exits per side and 2 roof hatches.
- 79 to 90 passenger = 3 emergency exits per side and 2 roof hatches.

These emergency exits are in addition to the rear emergency door or rear pushout window/side emergency door combination required by FMVSS 217. Additional emergency exits installed to meet the capacity-based requirements of FMVSS 217 may be included to comprise the total number of exits specified. All roof hatches shall have design features as specified in subrule ~~44.4(53)~~ 44.3(80).

(3) Side and rear emergency doors and each emergency window exit shall be equipped with an audible warning device.

(4) Roof hatches shall be equipped with an audible warning device.

(5) Rear emergency windows on Type D, rear engine buses shall have a lifting-assistance device that will aid in lifting and holding the rear emergency window open.

(6) Side emergency windows may be either top-hinged or vertically hinged on the forward side of the window. No side emergency exit window will be located above a stop sign.

(7) On the inside surface of each school bus, located directly beneath or above all emergency doors and windows, shall be a "DO NOT BLOCK" label in a color that contrasts with the background of the label. The letters on this label shall be at least 1 inch high.

~~44.3(14)~~ 44.3(19) *Drive shaft.* The drive shaft shall be protected by a metal guard or guards around the circumference of the drive shaft to reduce the possibility of its whipping through the floor or dropping to the ground if broken.

~~44.4(14)~~ 44.3(20) *Driver's compartment.*

a. The driver's seat supplied by the body company shall be a high-back seat with a minimum seat back adjustment of 15 degrees, not requiring the use of tools, and with a head restraint to accommodate a 95th percentile adult male, as defined in FMVSS 208. The driver's seat shall be secured with nuts, bolts, and washers or flange-headed nuts.

b. The driver's seat positioning and range of adjustments shall be designed to accommodate comfortable actuation of the foot control pedals by 95 percent of the male and female adult population.

c. See also subrule ~~44.4(37).~~ 44.3(56).

d. A driver's document compartment or pouch shall be provided. The document

compartment or pouch shall measure at least 17 inches by 12 inches by 4 inches. If a document pouch, rather than a covered compartment, is provided, it shall be located on the barrier behind the driver. It shall be constructed of a material of equal durability to that of the covering on the barrier and shall have a lid or cover with a latching device to hold the cover or lid closed.

e. A manual noise suppression switch shall be required and located in the control panel within easy reach of the driver while seated. The switch shall be labeled. This switch shall be an on/off type that deactivates body equipment that produces noise, including, at least, the AM/FM radio, heaters, air conditioners, fans, and defrosters. This switch shall not deactivate safety systems, such as windshield wipers, lighting systems, or two-way radio communication systems.

~~44.3(15)~~ 44.3(21) *Electrical system.* See subrule ~~44.3(41)~~ 44.3(85).

~~44.4(15)~~ 44.3(22) *Emergency equipment.*

a. All Type A, B, C, and D school buses shall be equipped with the following emergency equipment: first-aid kit, fire extinguisher, webbing cutter, body fluid cleanup kit, and triangular warning devices.

b. All emergency equipment shall be securely mounted so that, in the event the bus is overturned, this equipment is held in place. Emergency equipment, with the exception of the webbing cutter mounted in a location accessible to the driver, may be mounted in an enclosed compartment provided that the compartment is labeled in not less than 1-inch letters, stating the piece(s) of equipment contained herein.

c. Fire extinguishers shall meet the following requirements:

(1) The bus shall be equipped with at least one five-pound capacity, UL-approved, pressurized dry chemical fire extinguisher complete with hose. The extinguisher shall be located in the driver's compartment readily accessible to the driver and passengers and shall be securely mounted in a heavy-duty automotive bracket so as to prevent accidental release in case of a crash or in the event the bus overturns.

(2) A calibrated or marked gauge shall be mounted on the extinguisher to indicate the amount of pressure in the extinguisher and shall be easily read without moving the extinguisher from its mounted position. Plastic discharge heads and related parts are not acceptable.

(3) The fire extinguisher shall have a rating of 2A-10BC or greater. The operating mechanism shall be sealed with a type of seal which will not interfere with the use of the fire extinguisher.

(4) All fire extinguishers shall be inspected and maintained in accordance with the National Fire Protection Association.

(5) Each extinguisher shall have a tag or label securely attached that indicates the month and year the extinguisher received its last maintenance and the identity of the person performing the service.

d. First-aid kit.

(1) The bus shall have a removable moistureproof and dustproof first-aid kit in an accessible place in the driver's compartment. It shall be mounted and secured, and identified as a first-aid kit. The location for the first-aid kit shall be marked.

(2) ~~Multipurpose and passenger-type~~ Type III vehicles used as school buses shall be

equipped with a ten-unit first-aid kit containing the following items:

1 1-inch adhesive compress.

1 2-inch bandage compress.

1 4-inch bandage compress.

1 3-inch × 3-inch plain gauze pad.

1 gauze roller bandage (4-inch × 5 yards).

1 plain absorbent gauze compress (2 piece, 18-inch × 36-inch).

1 plain absorbent gauze compress (24-inch × 72-inch).

2 triangular bandages.

1 wire splint (instant splints may be substituted).

(3) A first-aid kit meeting the national standards (National Standards First Aid Kit) and containing the following items is required on all Type A, B, C and D school buses:

2 1-inch × 2½-yard adhesive tape rolls.

2 4 3-inch × 3-inch sterile gauze pads.

100 ¾-inch × 3-inch adhesive bandages.

8 2-inch bandage compresses.

10 3-inch bandage compresses.

2 2-inch × 6-foot sterile gauze roller bandages.

2 39-inch × 35-inch × 54-inch nonsterile triangular bandages with two safety pins.

3 36-inch × 36-inch sterile gauze pads.

3 sterile eye pads.

1 pair medical examination gloves.

1 mouth-to-mouth airway.

e. Body fluid cleanup kit. Each bus shall be equipped with a disposable, removable, and moistureproof body fluid cleanup kit in a disposable container which includes the following items:

(1) An EPA-registered liquid germicide (tuberculocidal) disinfectant;

(2) A fully disposable wiping cloth;

(3) A water-resistant spatula;

(4) Step-by-step directions;

(5) Absorbent material with odor counteractant;

(6) Two pairs of gloves (latex);

(7) One package towelettes;

(8) A discard bag (nonlabeled paper bag with a plastic liner and a twist tie). This bag shall be approximately 4 inches by 6 inches by 14 inches, and shall be of a nonsafety color (i.e., the bag shall not be red, orange, or yellow). The kit shall be mounted by a method that will retain it in place during normal school bus operation and shall be removable without the use of tools. The kit container shall be sealed with a breakable, nonreusable seal and must be accessible to the driver.

f. Triangular warning devices. Each school bus shall contain at least three reflectorized triangle road warning devices mounted in an accessible place. These devices must meet requirements in FMVSS 125.

g. Each bus shall be equipped with a durable webbing cutter having a full-width handgrip and a protected, replaceable or noncorrodible blade. This device shall be

mounted in an easily detachable manner and in a location accessible to the seated driver.

h. Axes are not allowed.

~~44.3(16)~~ 44.3(23) *Exhaust system.*

a. The exhaust pipe, muffler and tailpipe shall be outside the bus body compartment and attached to the chassis so as not to damage any other chassis component.

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

c. Chassis manufacturers shall furnish an exhaust system with tailpipe of sufficient length to extend at least 5 inches beyond the end of the chassis frame to the vertical line of the rear end of the body, but not beyond the rear bumper. The exhaust may exit at the left side or rear of the bus body provided that the exit is no more than 18 inches forward of the front edge of the rear wheelhouse opening. If designed to exit to the left side of the bus, the tailpipe shall extend at least 48.5 inches (51.5 inches if the body is to be 102 inches wide) outboard from the chassis centerline. Final positioning shall result in the exhaust system's extending to, but not beyond, the body limits on the left side of the bus.

d. On Type A-1 chassis greater than 15,000 pounds GVWR, Type C and Type D vehicles, the tailpipe shall not exit beneath a fuel fill or emergency door exit.

e. On Type A-2 and Type B chassis of 15,000 pounds GVWR or less, the tailpipe may be furnished with the manufacturer's standard tailpipe configuration.

f. The exhaust system on a chassis shall be adequately insulated from the fuel system.

g. The muffler shall be constructed of corrosion-resistant material.

h. The exhaust system on vehicles equipped with a power lift unit may be routed to the left of the right frame rail to allow for the installation of a power lift unit on the right side of the vehicle.

i. The tailpipe shall not exit beneath the fuel fill, lift door or emergency door.

~~44.3(17)~~ 44.3(24) *Fenders, front and hood.* This subrule does not apply to Type A~~-1, A-2~~ or D vehicles.

a. The total spread of outer edges of front fenders, measured at the fender line, shall exceed the total spread of front tires when the front wheels are in the straight-ahead position.

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

c. Chassis sheet metal shall not extend beyond the rear face of the cowl.

d. Front fenders and hood may be of manufacturer's standard material and construction.

e. The hood shall not require more than 20 pounds of force to open and shall include design features to secure the hood in an open position.

~~44.4(16)~~ 44.3(25) *Floor insulation and covering.*

a. The floor structure of Type A~~-2~~, B, C and D school buses shall be covered with an insulating layer of either a 5-ply minimum 5/8-inch-thick plywood, or a material of equal or greater strength and insulation R-value, having properties equal to or exceeding exterior-type softwood plywood, C-D grade as specified in standards issued by the United States Department of Commerce. All edges shall be sealed.

b. Type A~~-1~~ buses may be equipped with a minimum ½-inch-thick plywood meeting

the above requirements.

c. The floor in the under-seat area of Type B, C, and D buses, including tops of wheelhousings, driver's compartment and toeboard, shall be covered with an elastomer floor covering having a minimum overall thickness of 1/8 inch and a calculated burn rate of 0.1 or less using the test methods, procedures and formulas listed in FMVSS 302. The floor covering of the driver's area and toeboard area on all Type A buses may be the manufacturer's standard flooring and floor covering.

d. The floor covering in aisles of all buses shall be of a ribbed or other raised-pattern elastomer, having a coefficient of friction of 0.85, using ASTM 1894 or 0.65 using ASTM 2047, and a calculated burn rate of 0.1 or less using the test methods, procedures and formulas listed in FMVSS 302. Minimum overall thickness shall be 3/16 inch measured from tops of ribs.

e. Floor covering must be permanently bonded to the floor and must not crack when subjected to sudden changes in temperature. Bonding or adhesive material shall be waterproof and shall be of a type recommended by the manufacturer of the floor-covering material. All seams must be sealed with waterproof sealer.

f. On Type B, C and D buses, access to the fuel tank sending unit shall be provided. The access opening shall be large enough and positioned to allow easy removal of the sending unit. Any access opening in the body shall be capable of being sealed with a screw-down plate from within the body. When in place, the screw-down plate shall seal out dust, moisture and exhaust fumes. This plate shall not be installed under flooring material.

g. Cove molding **or watertight sealant** shall be used along the sidewalls and rear corners. All joints or seams in the floor covering shall be covered with nonferrous metal stripping or stripping constructed of material exhibiting equal durability and sealing qualities.

~~44.3(18)~~ 44.3(26) *Frame.*

a. The frame or equivalent shall have design and strength characteristics corresponding at least to standard practice for trucks of the same general load characteristics which are used for highway service.

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

c. Extensions of frame lengths are permissible only when alterations are behind the rear hanger of the rear spring or in front of the front hanger of front spring and shall not be for the purpose of extending the wheelbase.

d. Holes in top or bottom flanges or side units of the frame and welding to the frame shall not be permitted except as provided or accepted by the chassis manufacturer.

e. ~~Frame lengths shall be provided in accordance with SBMTC School Bus Design Objectives, August 1996 edition, except where body and chassis manufacturers are the same or have established mutual design criteria for the vehicle.~~ Frame lengths shall be established in accordance with the design criteria for the complete vehicle.

~~44.3(20)~~ 44.3(27) *Fuel system.*

a. All fuel tanks, including auxiliary fuel tanks, fuel tank filler pipes, and fuel tank

connections shall conform to all applicable FMVSS at the date of manufacture and shall be installed in accordance with SBMTC School Bus Design Objectives, August 1996 edition.

b. On all Type B, C, and D vehicles, the fuel tank shall comply with FMVSS 301, Fuel System Integrity, and with Motor Carrier Safety Regulations, Section 393.67, paragraphs (c) through (f), with reference to material and method of construction, leak testing and certification. On Type A-1 and A-2 vehicles, the fuel tank may be of the manufacturer's standard construction.

c. On chassis with a wheelbase greater than 170 inches, at least one fuel tank of 60-gallon capacity shall be provided and installed by the manufacturer. Chassis with a wheelbase of 170 inches or less shall be equipped with at least one fuel tank of 30-gallon minimum capacity, as provided and installed by the manufacturer.

d. Fuel tank(s) may be mounted between the chassis frame rails or outboard of the frame rails on either the left or right side of the vehicle by the manufacturer. Tanks shall be mounted directly to the chassis frame, filled, and vented outside the body, in a location where accidental fuel spillage will not drip or drain on any part of the exhaust system.

e. Fuel filtration shall be accomplished by means of the following:

(1) Gasoline-powered systems—one in-line fuel filter shall be installed between the fuel tank and the engine.

(2) Diesel-powered systems—one engine-mounted fuel filter with water/fuel separator shall be supplied and installed by the engine manufacturer.

f. The actual draw capacity of each fuel tank shall be 83 percent of the tank capacity.

g. Unless specific agreement has been made between the body and chassis manufacturers, fuel tanks and filler spouts shall not be located in spaces restricted by SBMTC School Bus Design Objectives, 1996 edition.

~~44.3(19)~~ 44.3(28) *Fuel system, alternative fuels* ~~*Fuels, alternative*~~*.* An alternative fuel is defined as propane (LPG), compressed natural gas (CNG), liquefied natural gas (LNG), electricity, hydrogen, methanol, ethanol, clean diesel, biodiesel, soydiesel, reformulated gasoline, or any type of hybrid system. Vehicles that operate on an alternative fuel shall meet the following requirements:

a. Chassis shall meet all standards of this rule.

b. Chassis shall meet all applicable FMVSS standards including, but not limited to, the fuel system integrity standards of FMVSS 301 or FMVSS 303 and FMVSS 304.

c. Original equipment manufacturers (OEMs) and conversion systems using compressed natural gas (CNG) shall comply with NFPA Standard 52 "Compressed Natural Gas Vehicular Fuel Systems" in effect at the time of installation. Fuel systems using liquefied petroleum gas (LPG) shall comply with the NFPA Standard 58 "Liquefied Petroleum Gases Engine Fuel Systems" in effect at the time of installation.

d. All alternative fuel buses shall travel a loaded range of not less than 200 miles, except those powered by electricity which shall travel not less than 80 miles.

e. Liquefied natural gas (LNG)-powered buses shall comply with NFPA Standard 57, "Liquefied Natural Gas Vehicular-Fueled Systems" and be equipped with an interior/exterior gas detection system. All natural gas-powered buses shall be equipped with a fire detection and suppression system.

f. All materials and assemblies used to transfer or store alternative fuels shall be installed outside the passenger/driver compartment.

g. The total weight shall not exceed the GVWR when loaded to rated capacity.

h. The manufacturer supplying the alternative fuel equipment must provide the owner and operator with adequate training and certification in fueling procedures, scheduled maintenance, troubleshooting, and repair of alternative fuel equipment.

i. All fueling equipment shall be designed specifically for fueling motor vehicles and shall be certified by the manufacturer as meeting all applicable federal, state and industry standards.

j. All on-board fuel supply containers shall meet all appropriate requirements of the ASME code, the DOT regulations, or applicable FMVSS and NFPA standards.

k. All fuel supply containers shall be securely mounted to withstand a static force of eight times their weight in any direction.

l. All safety devices that may discharge to the atmosphere shall be vented to the outside of the vehicle. The discharge line from the safety relief valve on all school buses shall be located in a manner appropriate to the characteristics of the alternative fuel. Discharge lines shall not pass through the passenger compartment. Discharge lines shall be kept clear with flapper-valve or other device which will allow low-pressure discharge but prevent clogging by foreign matter or insects.

m. A positive, quick-acting (¼ turn), shut-off control valve shall be installed in the gaseous fuel supply lines as close to the fuel supply containers as possible. The controls for this valve shall be placed in a location easily operable from the exterior of the vehicle.

The location of the valve control shall be clearly marked on the exterior surface of the bus.

n. A grounding system shall be required for grounding of the fuel system during maintenance-related venting.

o. Automatic engine shut-down systems are not permissible.

p. Storage batteries for hybrid power systems shall be protected from crash impacts and shall be encased in a nonconductive, acid-resistant compartment. This compartment must be well-ventilated to preclude the possibility of hydrogen gas buildup.

~~44.4(17)~~ 44.3(29) *Fuel system,* ~~*F*~~ *fuel fill opening and cover.* Where an opening in the school bus body skirt is needed for access to the fuel fill cap, the opening shall be large enough to permit filling the fuel tank without the need for special fuel nozzle adapters, a funnel, or other device. The opening shall be equipped with a forward hinged cover held closed by a spring or other conveniently operated device. The cover may be of a lockable design. Type A buses are exempt from the requirement of a cover.

~~**44.3(20)** *Fuel system.*~~

~~*a.* All fuel tanks, including auxiliary fuel tanks, fuel tank filler pipes, and fuel tank connections shall conform to all applicable FMVSS at the date of manufacture and shall be installed in accordance with SBMTC School Bus Design Objectives, August 1996 edition.~~

~~*b.* On all Type B, C, and D vehicles, the fuel tank shall comply with FMVSS 301, Fuel System Integrity, and with Motor Carrier Safety Regulations, Section 393.67, paragraphs (c) through (f), with reference to material and method of construction, leak-~~

~~testing and certification. On Type A-1 and A-2 vehicles, the fuel tank may be of the manufacturer's standard construction.~~

~~*c.* On chassis with a wheelbase greater than 170 inches, at least one fuel tank of 60-gallon capacity shall be provided and installed by the manufacturer. Chassis with a wheelbase of 170 inches or less shall be equipped with at least one fuel tank of 30-gallon minimum capacity, as provided and installed by the manufacturer.~~

~~*d.* Fuel tank(s) may be mounted between the chassis frame rails or outboard of the frame rails on either the left or right side of the vehicle by the manufacturer. Tanks shall be mounted directly to the chassis frame, filled, and vented outside the body, in a location where accidental fuel spillage will not drip or drain on any part of the exhaust system.~~

~~*e.* Fuel filtration shall be accomplished by means of the following:~~

~~(1) Gasoline-powered systems—one in-line fuel filter shall be installed between the fuel tank and the engine.~~

~~(2) Diesel-powered systems—one engine-mounted fuel filter with water/fuel separator shall be supplied and installed by the engine manufacturer.~~

~~*f.* The actual draw capacity of each fuel tank shall be 83 percent of the tank capacity.~~

~~*g.* Unless specific agreement has been made between the body and chassis manufacturers, fuel tanks and filler spouts shall not be located in spaces restricted by SBMTC School Bus Design Objectives, 1996 edition.~~

~~**44.3(21)**~~ **<u>44.3(30)</u>** *Governor.* An electronic engine speed limiter shall be provided and set to limit engine speed, not to exceed the maximum revolutions per minute as recommended by the engine manufacturer.

~~**44.4(18)**~~ **44.3(31)** *Heating and air conditioning.*

a. Each heater shall be hot-water or combustion type.

b. If only one heater is used, it shall be a fresh-air or combination fresh-air and recirculation type.

c. If more than one heater is used, additional heaters may be recirculating air type.

d. The heating system shall be capable of maintaining bus interior temperatures as specified in SAE test procedure J2233.

e. Auxiliary fuel-fired heating systems are permitted, provided they comply with the following:

(1) The auxiliary heating system shall utilize the same type of fuel as specified for the vehicle engine.

(2) Heater(s) may be direct hot air or connected to the engine's coolant system.

(3) An auxiliary heating system, when connected to the engine's coolant system, may be used to preheat the engine coolant or preheat and add supplementary heat to the bus's heating system.

(4) Auxiliary heating systems must be installed pursuant to the manufacturer's recommendations and shall not direct exhaust in a manner that will endanger bus passengers.

(5) Auxiliary heating systems which operate on diesel fuel shall be capable of operating on #1, #2 or blended diesel fuel without the need for system adjustment.

(6) The auxiliary heating system shall be low voltage.

(7) Auxiliary heating systems shall comply with all applicable FMVSS including

FMVSS 301 as well as SAE test procedures.

f. Heater hoses shall be adequately supported to guard against excessive wear due to vibration. The hoses shall not dangle or rub against the chassis or any sharp edges and shall not interfere with or restrict the operation of any engine function. Heater hoses shall conform to SAE Standard J20c. Heater lines on the interior of the bus shall be shielded to prevent scalding of the driver or passengers.

g. Each hot water system installed by a body manufacturer shall include one shut-off valve in the pressure line and one shut-off valve in the return line with both valves at the engine in an accessible location, except that on all Type A and B buses, the valves may be installed in another accessible location.

h. Each hot water heating system shall be equipped with a device that is installed in the hot water pressure line that regulates the water flow to all heaters and that is located for convenient operation by the driver while seated.

i. All combustion heaters shall be in compliance with current federal motor carrier safety regulations.

j. Accessible bleeder valves shall be installed in an appropriate place in the return lines of body company-installed heaters to remove air from the heater lines.

k. Access panels shall be provided to make heater motors, cores, and fans readily accessible for service. An outside access panel may be provided for the driver's heater.

l. Air-conditioning systems may be installed in accordance with the following:

(1) Evaporator cases, lines and ducting (as equipped) shall be designed so that all condensation is effectively drained to the exterior of the bus below floor level under all

conditions of vehicle movement without leakage on any interior portion of the bus.

(2) Any evaporator or ducting system shall be designed and installed so as to be free of injury-producing projections or sharp edges. Installation shall not reduce compliance with any FMVSS applicable to the school bus. Ductwork shall be installed so that exposed edges face the front of the bus and do not present sharp edges.

(3) Any evaporators used must be copper-cored (aluminum or copper fins acceptable), except that the front evaporator, if provided by a Type A chassis manufacturer, may be aluminum-cored.

(4) Air intake for any evaporator assembly(ies) except for the front evaporator of a Type A bus shall be equipped with replaceable air filter(s) accessible without disassembly of the evaporator case.

(5) On buses equipped for the transportation of persons with disabilities, the evaporator and ducting shall be placed high enough so that they will not obstruct existing or potential occupant securement shoulder strap upper attachment points. This clearance shall be provided along the entire length of the passenger area on both sides of the bus interior to allow for potential retrofitting of new wheelchair positions and occupant securement devices throughout the bus.

(6) The total system shall be warranted, including parts and labor, for at least two years and shall include, but not be limited to, compressor mounting bracketry and hardware and any belts which, directly or indirectly, drive the compressor(s). Air-conditioning compressor applications must be approved in writing by the chassis engine manufacturer, stating that the installations will not void or reduce the engine

manufacturer's warranty or extended service coverage liabilities in any way.

(7) All components requiring periodic servicing must be readily accessible for servicing.

(8) Parts and service manuals shall be provided for the entire system including, but not limited to, compressor(s), wiring (includes wiring diagram), evaporators, condensers, controls, hoses and lines.

(9) Electrical requirements for the air-conditioning system shall be provided to the customer prior to vehicle purchase or, in the case of an after-purchase installation, prior to installing the air-conditioning system to ensure that adequate electrical demands imposed by the air-conditioning system are capable of being met.

(10) The installed air-conditioning system should cool the interior of the bus down to at least 80 degrees Fahrenheit, measured at a minimum of three points, located 4 feet above the floor at the longitudinal centerline of the bus. The three points shall be: near the driver's location; at the midpoint of the body; and 2 feet forward of the emergency door, or for Type D rear engine buses, 2 feet forward of the end of the aisle. Test conditions will be those as outlined in the National School Transportation Specifications & Procedures Manual ~~2005~~ 2010, Missouri Safety Center, Central Missouri State University, Humphreys Suite 201, Warrensburg, Missouri 64093.

~~44.3(22)~~ 44.3(32) *Heating system, provisions for.*

a. The chassis engine shall have plugged openings for the purpose of supplying hot water for the bus heating system. The openings shall be suitable for attaching ¾-inch or metric equivalent pipe thread/hose connector.

b. The engine shall be capable of supplying water having a temperature of at least 170 degrees Fahrenheit at a flow rate of 50 pounds per minute at the return end of 30 feet of one-inch inside-diameter automotive hot water heater hose. Engine temperature performance shall be measured in accordance with the School Bus Manufacturer's Technical Council Standard Number 001—Procedures for Testing and Rating Automotive Bus Hot Water Heating and Ventilating Equipment, July 1996.

c. For Type A~~-2~~ vehicles with GVWR of 10,000 pounds or less, the chassis manufacturer shall provide a fresh-air front heater and defroster of recirculating hot water type. See also subrules ~~44.4(12) and 44.4(18)~~ 44.3(17) and 44.3(31).

~~44.3(23)~~ 44.3(33) *Headlamps.*

a. Buses shall be equipped with a minimum of two headlamps meeting FMVSS 108 with circuit protection.

b. The headlamp switch shall be of adequate ampere capacity to carry the load of the clearance and identification lamps in addition to the headlamps and tail lamps since these will be activated by the same switch.

c. There shall be a manually operated switch for selection of high- or low-beam distribution of the headlamps.

d. The headlight system must be wired separately from the body-controlled solenoid.

e. A daytime running lamp (DRL) system shall be provided.

~~44.4(19)~~ 44.3(34) *Hinges.* All exposed metal passenger-door hinges subject to corrosion shall be designed to allow lubrication without disassembly. All passenger-door hinges shall be securely bolted to the bus body. Metal screws are not acceptable.

~~**44.3(24)**~~ **44.3(35)** *Horn.* Chassis shall be equipped with a horn of standard make capable of producing a complex sound in a band of audio frequencies between approximately 250 and 2,000 cycles per second and tested in accordance with Society of Automotive Engineers Standard J377.

~~**44.4(20)**~~ **44.3(36)** *Identification.*

a. The body shall bear the words "SCHOOL BUS" in black letters at least 8 inches high on both front and rear of the body or on attached signs. The lettering shall be placed as high as possible without impairment of its visibility. The lettering shall conform to Series B of Standard Alphabets of Highway Signs. "SCHOOL BUS" lettering shall have a reflective background or, as an option, may be illuminated by backlighting.

b. The bus, whether school-owned or contractor-owned, shall have displayed at the beltline on each side of the vehicle the official name of the school in black standard unshaded letters at least 5 inches, but not more than 7 inches high.

Examples:

(1) Blank community school district.

(2) Blank independent school district.

(3) Blank consolidated school district.

If there is insufficient space due to the length of the name of the school district, the words "community," "independent," "consolidated," and "district" may be abbreviated. If, after these abbreviations, there is still insufficient space available, the words "community school district" may be replaced by the uppercase letters "CSD" upon prior approval by the school transportation consultant of the Iowa department of education.

c. The incorporated names of cities located within an officially reorganized school district may be placed on either side of the bus in a single line situated beneath the official school district name. The lettering shall not exceed 2 inches in height and shall be black. This paragraph shall apply only when the names of the cities are not included in the official school district name on the beltline.

d. Buses privately owned and operated by an individual or individuals and used exclusively for transportation of students shall bear the name of the owner, at the beltline on each side of the vehicle in black standard unshaded letters at least 5 inches, but not more than 7 inches high.

e. The words "RATED CAPACITY," along with the appropriate number indicating the rated pupil seating capacity of the bus, shall be printed to the left of the entrance door, at least 6 inches below the name of the school district and on the bulkhead of the bus above the right windshield. The letters shall be black in color and at least 2 inches in height. The word "CAPACITY" may be abbreviated and shown as "CAP." where necessary.

f. The number of the bus shall be printed in not less than 5-inch or more than 8-inch black letters, except as otherwise noted in this subrule, and shall be displayed on both sides, the front and the rear of the bus. The location of the bus number is at the discretion of the vehicle owner except that the number:

(1) Shall be located to the rear of the service door not more than 36 inches from the ground on the right side of the bus and at the same respective position on the left side of the bus.

(2) Shall be yellow if located on either the front or rear bumper.

(3) May be placed on the roof of the bus at a position representing the approximate lateral and longitudinal midpoint of the bus. The bus number shall be black and shall measure not less than 24 inches in length.

(4) Shall not be located on the same line as the name of the school district on either side of the bus, on the emergency door, or in a location that will interfere with the words "SCHOOL BUS."

g. Buses privately owned by individuals, a company, or a contractor shall also bear the name of the owner, followed by the word "OWNER" in not more than 2-inch characters printed approximately 6 inches below the bus capacity on the right side of the bus.

h. Symbols, characters or letters, for the purpose of vehicle or route identification by students, may be displayed in the lower, split-sash, glass portion of the third passenger window from the front on the service entrance side of the bus. Such symbols, characters or lettering, if used, shall not exceed 36 square inches. This requirement applies to all school buses regardless of date of purchase.

i. Symbols identifying the bus as equipped for or transporting students with special needs ~~may~~ shall be displayed. ~~See subrule 44.5(7).~~ See subrule 44.4(2)

j. The words "UNLAWFUL TO PASS WHEN LIGHTS FLASH" shall be displayed on the rear emergency door of the bus between the upper and lower window glass sections. The letters shall be black and not less than 2 inches nor more than 6 inches in height. If there is not sufficient space on the emergency door, letter size may be reduced

upon approval of the department of education.

k. The word "BATTERY" in 2-inch black letters shall be placed on the door covering the battery opening.

~~*k.*~~ *l.* Pressure-sensitive markings of vinyl material may be used for the above lettering in lieu of painting.

~~*l.*~~ *m.* Any lettering, including the name of the school's athletic team(s), numbers, drawings, bumper stickers, characters, or mascot symbols other than the bus manufacturer's registered trademarks or those specifically noted in paragraphs *"a"* through *"k"* above are prohibited.

~~**44.4(21)** *Inside height.* Inside body height shall be 72 inches or more, measured metal to metal, at any point on the longitudinal centerline from the front vertical bow to the rear vertical bow. Inside body height of Type A-2 buses shall be 62 inches or more.~~

~~**44.3(25)**~~ **44.3(37)** *Instruments and instrument panel.*

a. Chassis shall be equipped with an instrument panel having, as a minimum, the following instrumentation: (Lights in lieu of gauges are not acceptable except as noted.)

(1) Speedometer.

(2) Odometer with accrued mileage including tenths of miles unless tenths of miles are registered on a trip odometer.

(3) Voltmeter with graduated scale.

(4) Oil pressure gauge.

(5) Water temperature gauge.

(6) Fuel gauge.

(7) Upper-beam headlamp indicator.

(8) Air pressure gauge, where air brakes are used. A light indicator in lieu of a gauge is permitted on vehicles equipped with hydraulic-over-hydraulic brake system.

(9) Turn signal indicator.

(10) Glow-plug indicator light, where appropriate.

(11) Tachometer required on vehicles 14,500 pounds GVWR and greater.

b. Gauges shall be displayed as single-gauge installations or as gauges contained in a multifunction instrument display. The multifunction instrument display shall comply, as a minimum, with the following design criteria:

(1) The driver must be able to manually select any displayable function of the gauge on a multifunction display whenever desired.

(2) Whenever an out-of-limits condition occurs, which would be displayed on one or more functions of a multifunction gauge, the multifunction gauge controller should automatically display this condition on the instrument cluster. This should be in the form of an illuminated warning light as well as having the multifunction gauge automatically display the out-of-limits indications. Should two or more functions displayed on the multifunction gauge go out of limits simultaneously, the multifunction gauge should automatically sequence between those functions continuously until the condition(s) is corrected.

(3) The use of a multifunction instrument display does not relieve the requirement of audible warning devices as required in this subrule.

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

d. Instruments and gauges shall be mounted on the instrument panel so each is clearly visible to the driver in a normal seated position in accordance with SBMTC School Bus Design Objectives, August 1996 edition.

e. The instrument panel shall have rheostatically controlled lamps of sufficient candlepower to illuminate all instruments, gauges, and the shift selector indicator for automatic transmission.

~~44.4(22)~~ 44.3(38) *Insulation.*

a. Thermal insulation in the ceiling and walls shall be fire-resistant, UL-approved, and approximately 1½-inch thick with a minimum R-value of 5.5. Insulation shall be installed in such a way as to prevent it from sagging.

b. Roof bows shall be insulated in accordance with ~~44.4(22)~~ 44.3(38)"a."

~~44.4(23)~~ 44.3(39) *Interior.*

a. The interior of the bus shall be free of all unnecessary projections, including luggage racks and attendant handrails, to minimize the potential for injury. This standard requires inner lining on ceilings and walls. If the ceiling is constructed to contain lapped joints, the forward panel shall be lapped by the rear panel and exposed edges shall be beaded, hemmed, flanged, or otherwise treated to minimize sharp edges. Buses may be equipped with a storage compartment for tools, tire chains, and tow chains. See also subrule ~~44.4(44).~~44.3(64).

b. Radio speakers are permitted in the passenger compartment area only. No radio speaker, other than that which is necessary for use with two-way communication equipment, shall be located within the driver's compartment area. All radio speakers shall

be flush-mounted with the roof or side panels and shall be free of sharp edges which could cause injury to a child.

c. The driver's area forward of the foremost padded barriers shall permit the mounting of required safety equipment and vehicle operation equipment.

d. Every school bus shall be constructed so that the noise level taken at the ear of the occupant nearest to the primary vehicle noise source shall not exceed 85 dBA when tested according to the procedure found in Appendix B, National School Transportation Specifications & Procedures Manual ~~2005~~ 2010, Missouri Safety Center, Central Missouri State University, Humphreys Suite 201, Warrensburg, Missouri 64093.

e. An access panel must be provided, front and rear, so lights and wiring for the 8-light warning system may be repaired or serviced without removing ceiling panels.

f. Ceiling material designed to reduce noise within the driver compartment or passenger compartment may be installed by the manufacturer.

g. An electronic "child check" monitor shall be installed. This monitor shall operate in such a way as to require the driver to physically walk to the back of the bus to disengage the monitor system after having first shut off the engine of the bus.

h. Mobile wi-fi internet is allowed, in accordance with other provisions of subrule 44.3(39).

i. On board interior bus camera heads are allowed within the passenger area of the bus. Camera heads shall not extend more than 1" from the ceiling and shall have rounded edges as much as possible. Camera heads shall not be mounted directly above the aisle.

~~44.4(24)~~ 44.3(40) *Lamps and signals.*

a. All lamps and lamp components shall meet or exceed applicable standards established by the Society of Automotive Engineers (SAE), the American Association of Motor Vehicle Administrators (AAMVA), and FMVSS. These lamps shall be of incandescent or LED design.

b. Clearance lamps. The body shall be equipped with two amber lamps at the front and two red clearance lamps at the rear mounted at the highest and widest portion of the body.

c. Identification lamps. The bus shall be equipped with three amber identification lamps on the front and three red identification lamps on the rear. Each group shall be evenly spaced not less than 6 or more than 12 inches apart along a horizontal line near the top of the vehicle.

d. Intermediate side marker lamps. On all buses over 30 feet long, one amber side lamp is required on each side, located midway between the front and rear clearance lamps.

e. Stop/tail (brake) lamps. Buses shall be equipped with four combination, red, stop/tail lamps meeting SAE specifications. Each lamp shall have double filament lamp bulbs or LEDs that are connected to the headlamp and brake-operated stop lamp circuits. These should be positioned as follows:

(1) Two combination lamps with a minimum diameter of 7 inches or, if a shape other than round, a minimum of 38 square inches of illuminated area shall be mounted on the rear of the bus just to the inside of the turn signal lamps.

(2) Two combination lamps with a minimum diameter of 4 inches or, if a shape other

than round, a minimum of 12 square inches of illuminated area shall be placed on the rear of the body between the beltline and the floor line. The rear license plate lamp may be combined with one lower tail lamp. Stop lamps shall be activated by the service brakes and shall emit a steady light when illuminated. Type A-2 buses with bodies supplied by the chassis manufacturer may have the manufacturer's standard stop and tail lamps.

f. Items described in paragraphs *"b," "c," "d,"* and *"e"* shall be connected to the headlamp switch.

g. Backup lamps. The bus body shall be equipped with two white rear backup lamps. All vehicles shall be equipped with lamps at least 4 inches in diameter or, if a shape other than round, a minimum of 13 square inches of illuminated area. All lamps shall have a white or clear lens and shall meet SAE specifications. If backup lamps are placed on the same line as the brake lamps and turn signal lamps, they shall be to the inside.

h. Interior lamps. Interior lamps shall be provided which adequately illuminate the interior aisle and the step well. Step well lights shall be illuminated by a service door-operated switch, to illuminate only when headlights and clearance lights are on and the service door is open. In addition, the following interior lamps shall be provided:

(1) Supervisor's light. The rearmost ceiling light or a separate light may be used as a supervisor's light and shall be activated by a separate switch controlled by the driver.

(2) Driver's area dome light. This light shall have a separate switch controlled by the driver and shall illuminate the driver's compartment area.

(3) Body instrument panel lights shall be controlled by a rheostat switch.

(4) On buses equipped with a monitor for the front and rear lamps of the school bus,

the monitor shall be mounted in full view of the driver. If the full circuit current passes through the monitor, each circuit shall be protected by a fuse or circuit breaker against any short circuit or intermittent shorts.

i. License plate lamp. The bus shall be equipped with a rear license plate illuminator. This lamp may be combined with one of the tail lamps.

j. Reflectors. Reflectors shall be securely attached to the body with sheet metal screws or other method having equivalent securement properties and installed in accordance with the requirements of FMVSS 108; however, the vehicle shall, as a minimum, be equipped with the following:

(1) Two amber reflectors, one on each side at the lower front and corner of the body approximately at floor level and back of the door on the right side, and at a similar location on the left side. For all buses over 30 feet long, an additional amber reflector is required on each side at or near the midpoint between the front and rear side reflectors.

(2) Four red reflectors, one at each side at or near the rear and two on the rear, one at each side.

(3) Reflectors are to be mounted at a height not more than 42 inches or less than 30 inches above the ground on which the vehicle stands.

k. Warning signal lamps.

(1) Buses shall be equipped with two red lamps at the rear of the vehicle and two red lamps at the front of the vehicle.

(2) In addition to the four red lamps described above, four amber lamps shall be installed so that one amber lamp is located near each red signal lamp, at the same level,

but closer to the vertical centerline of the bus. The system of red and amber signal lamps shall be wired so that amber lamps are energized manually and the red lamps are automatically energized (sequential), with amber lamps being automatically de-energized, when the stop signal arm is extended or when the bus service door is opened. An amber pilot light and a red pilot light shall be installed adjacent to the driver controls for the flashing signal lamp to indicate to the driver which lamp system is activated.

(3) The area immediately around the lens of each alternately flashing signal lamp shall be black. In installations where there is no flat vertical portion of body immediately surrounding the entire lens of the lamp, there shall be a circular or square band of black immediately below and to both sides of the lens, on the body or roof area against which the signal lamp is seen from a distance of 500 feet along the axis of the vehicle. Black visors or hoods, with a minimum depth of 4 inches, may be provided.

(4) Red lamps shall flash at any time the stop signal arm is extended.

(5) All flashers for alternately flashing red and amber signal lamps shall be enclosed in the body in a readily accessible location.

(6) Strobe lights are permissible.

(7) Additional electronic/lighted warning devices mounted on the rear of the bus are allowed. Each design shall be evaluated and approved by Department of Education personnel per established criteria.

l. Turn signal lamps.

(1) The bus body shall be equipped with amber rear turn signal lamps that meet SAE specifications and are at least 7 inches in diameter or, if a shape other than round, a

minimum of 38 square inches of illuminated area. These signal lamps must be connected to the chassis hazard warning switch to cause simultaneous flashing of turning signal lamps when needed as a vehicular traffic hazard warning. Turn signal lamps are to be placed as far apart as practical and their centerline shall be approximately 8 inches below the rear window. Type A-2 conversion vehicle lamps must be at least 21 square inches in lens area and in the manufacturer's standard color.

(2) Buses shall be equipped with amber side-mounted turn signal lights. The turn signal lamp on the left side shall be mounted rearward of the stop signal arm and the turn signal lamp on the right side shall be mounted rearward of the service door.

m. A white flashing strobe light rated for outdoor use and weather-sealed shall be installed on the roof of the bus not less than 1 foot or more than ~~4 feet~~ 18 inches from the rear center of the bus. The strobe light shall be located to the rear of the rearmost emergency roof hatch to prevent the roof hatch from diminishing the effectiveness of the strobe light. In addition:

(1) The strobe light shall have a single clear lens emitting light 360 degrees around its vertical axis and may not extend above the roof more than the maximum legal height.

(2) The strobe light must be controlled by a separate switch with an indicator light which when lit will indicate that the strobe light is turned on.

(3) The light shall be used only in fog, rain, snow, or at times when visibility is restricted.

(4) Each model strobe shall be approved by the motor vehicle division, Iowa department of transportation.

44.3(41) *Measurements*

a. Interior body height shall be 72 inches or more, measured metal to metal, at any point on the longitudinal centerline from the front vertical bow to the rear vertical bow. Inside body height of Type A-2 buses shall be 62 inches or more.

b. Overall height, length and width of the bus shall not exceed the maximums allowed by the Iowa Department of Transportation.

~~**44.4(25)**~~ **44.3(42)** *Metal treatment.*

a. All metal, except high-grade stainless steel or aluminum, used in construction of the bus body shall be zinc-coated or aluminum-coated to prevent corrosion. This requirement applies to, but is not limited to, such items as structural members, inside and outside panels, door panels and floor sills. Excluded are such items as door handles, grab handles, interior decorative parts and other interior plated parts.

b. All metal parts that will be painted shall be, in addition to above requirements, chemically cleaned, etched, zinc-phosphate coated and zinc-chromate or epoxy primed to improve paint adhesion.

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

d. As evidence that the above requirements have been met, samples of materials and sections used in construction of the bus body subjected to a 1,000-hour salt spray test as provided for in the latest revision of ASTM Standard B-117 shall not lose more than 10

percent of material by weight.

~~44.4(26)~~ 44.3(43) *Mirrors.*

a. The interior mirror shall be either clear view laminated glass or clear view glass bonded to a backing that retains the glass in the event of breakage. The mirror shall have rounded corners and protected edges. All Type A buses shall have a minimum of a 6-inch × 16-inch mirror; and Type B, C, and D buses shall have a minimum of a 6-inch × 30-inch mirror.

b. Each school bus shall be equipped with exterior mirrors meeting the requirements of FMVSS 111. Mirrors shall be easily adjustable, but shall be rigidly braced so as to reduce vibration.

c. Heated right- and left-side rearview mirrors shall be provided.

d. Systems offering a design feature permitting the driver to remotely adjust rearview mirrors from the driver's compartment ~~may~~ shall be utilized.

e. The right side rearview mirrors must be unobstructed by the unwiped section of the windshield.

f. Heated cross-view mirrors shall be provided.

g. Stainless steel mirror brackets are allowed.

~~44.4(27)~~ 44.3(44) *Mounting.*

a. The chassis frame shall support the rear body cross member. Except where chassis components interfere, the bus body shall be attached to the chassis frame at each main floor sill in such manner as to prevent shifting or separation of the body from the chassis under severe operating conditions.

b. Isolators shall be placed at all contact points between the body and chassis frame and shall be secured by a positive means to the chassis frame or body to prevent shifting, separation, or displacement of the isolators under severe operating conditions.

c. The body front shall be attached and sealed to the chassis cowl to prevent entry of water, dust, and fumes through the joint between the chassis cowl and body.

d. The refurbishing or reconditioning of a body-on-chassis school bus is restricted to the repair and replacement of school bus body or chassis components. The original body and chassis, as certified by the original equipment manufacturers, shall be retained as a unit upon completion of repairs. It is not permissible to exchange or interchange school bus bodies and chassis. The refurbisher or reconditioner shall certify that the vehicle meets all state and federal construction standards in effect as of the date of manufacture and shall provide suitable warranty on all work performed. See also subrule ~~44.7(1).~~ 44.6(1).

~~44.4(28)~~ 44.3(45) *Mud flaps.*

a. Mud flaps or guards are required and shall be provided and installed by the body manufacturer or manufacturer's representative for both front and rear wheels.

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

c. Rear mud flaps or guards shall be comparable in size to the width of the rear wheelhousing and shall reach within approximately 9 inches of the ground when the bus is empty. They shall be mounted at a distance from the wheels to permit free access to

spring hangers for lubrication and maintenance and to prevent their being pulled off while the vehicle is in reverse motion or damaged by tire chains.

d. All mud flaps shall be constructed of rubber. Vinyl or plastic is not acceptable.

~~**44.3(26)**~~ **44.3(46)** *Oil filter.* An oil filter with a replaceable element or cartridge shall be of manufacturer's recommended capacity and shall be connected by flexible oil lines if it is not of built-in or engine-mounted design.

~~**44.3(27)**~~ **44.3(47)** *Openings.* All openings in the floorboard or fire wall between the chassis and passenger compartment, such as for gearshift selector and parking brake lever, shall be sealed.

~~**44.4(29)** *Overall length.* Overall length of the bus shall not exceed the maximum allowed by the Iowa department of transportation.~~

~~**44.4(30)** *Overall width.* Overall width of the bus shall not exceed the maximum allowed by the Iowa department of transportation.~~

~~**44.3(28)**~~ 44.3(48) *Passenger load.*

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

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

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

b. Actual gross vehicle weight (GVW) shall not exceed the chassis manufacturer's GVWR for the chassis, nor shall the actual weight carried on any axle exceed the chassis manufacturer's gross axle weight rating.

~~**44.4(31)** *Passenger securement.* See subrule 44.4(39).~~

~~44.4(39)~~ 44.3(49) *Passenger securement seating system.*

a. ~~Type A-1~~ All vehicles shall conform to all FMVSS at date of manufacture.

b. Unless otherwise required by FMVSS, school bus seats may be equipped with passenger securement systems for passengers with disabilities in accordance with 281—Chapter 41 when it is determined by the child's individual education program staffing team that special seating and positioning are necessary during transportation. When the staffing team determines that a passenger securement system is necessary to safely transport a student with a disability, the need shall be documented in the student's individual education plan (IEP).

c. When a child securement system is required in ~~44.4(39)~~ 44.3(49)*"b,"* the seat, including seat frame, seat cushion, belt attachment points, belts and hardware shall comply with all applicable FMVSS at the time of manufacture. When it is determined that the securement system is no longer necessary to provide seating assistance to a child with a disability, the securement system shall be removed from the seat frame.

d. Children transported in child safety seats shall be secured to ~~the~~ a school bus seat utilizing a seat belt ready seat frame, according to the child safety seat manufacturer's instructions.

~~44.4(32)~~ 44.3(50) *Public address system.* A public address system permitting interior and/or exterior communication with passengers~~, or both types of communication,~~ may be installed.

~~44.4(33)~~ 44.3(51) *Radio/communication system.* ~~In the interest of safety for the children transported and the effective management of the school transportation program,~~

~~a two-way radio communication system is highly recommended.~~ Each school bus shall have a communication system to allow communication between the driver of the bus and the school's base of operations for school transportation. This system shall be a two-way radio, cellular phone, or similar device as allowed by local and/or state policies regarding use of handheld communication equipment.

~~44.4(34)~~ 44.3(52) *Retroreflective material.*

a. Retroreflective material shall be provided in accordance with the following:

(1) The rear of the bus body shall be marked with strips of reflective NSBY material to outline the perimeter of the back of the bus using material which conforms with the "Retroreflective Sheeting Daytime Color Specification Proposal" of Appendix B, National School Transportation Specifications & Procedures Manual ~~2005~~ 2010, Central Missouri State University, Humphreys Suite 201, Warrensburg, Missouri 64093. The perimeter marking of rear emergency exits in accordance with FMVSS 217 and the use of reflective "SCHOOL BUS" signs partially accomplish the objective of this requirement. To complete the perimeter marking of the back of the bus, strips of at least 1¾-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; and vertical strips shall be applied at the corners connecting these horizontal strips.

(2) "SCHOOL BUS" signs, if not of lighted design, shall be marked with reflective NSBY material comprising background for lettering of the front and rear "SCHOOL BUS" signs.

(3) Sides of the bus body shall be marked with reflective NSBY material at least 1¾ inches in width, extending the length of the bus body and located within 6 inches above or below the floor line or on the beltline.

b. Front and rear bumpers may be marked diagonally 45 degrees down to centerline of pavement with 2-inch +/- ¼ inch wide strips of noncontrasting reflective material. This material shall appear black during daylight hours; however, it will be seen as a reflective material during periods of reduced light conditions when a direct light source strikes the material.

~~44.3(29)~~ 44.3(53) *Road speed control.* When it is desired to accurately control vehicle maximum speed, a road speed control device may be utilized. A vehicle cruise control may also be utilized.

~~44.4(35)~~ 44.3(54) *Rub rails.*

a. One rub rail located on each side of the bus at, or no more than 8 inches above, the seat level shall extend from the rear side of the entrance door completely around the bus body (except for emergency door or any maintenance access door) to the point of curvature near the outside cowl on the left side.

b. One rub rail located at, or no more than 10 inches above, the floor line shall cover the same longitudinal area as the upper rub rail, except at wheelhousings, and shall extend only to radii of the right and left rear corners.

c. Rub rails at or above the floor line shall be attached at each body post and all other upright structural members.

d. Each rub rail shall be 4 inches or more in width in its finished form, shall be of 16-

gauge steel or suitable material of equivalent strength, and shall be constructed in corrugated or ribbed fashion.

e. Rub rails shall be applied to outside body or outside body posts. Pressed-in or snap-on rub rails do not satisfy this requirement. For all buses using a rear luggage or rear engine compartment, rub rails need not extend around rear corners.

f. The bottom edge of the body side skirts shall be stiffened by application of a rub rail, or the edge may be stiffened by providing a flange or other stiffeners.

g. Rub rails shall be painted black or shall be covered with black retro-reflective material.

44.3(55) *Seating, crash barriers*

a. All school buses (including Type A) shall be equipped with restraining barriers which conform to FMVSS No. 222.

b. Crash barriers shall be installed conforming to FMVSS 222; however, all Type A-2 school bus bodies shall be equipped with padded crash barriers, one located immediately to the rear of the driver's seat and one at the service door entrance immediately to the rear of the step well.

c. Crash barriers and passenger seats may be constructed with materials that enable them to meet the criteria contained in the school bus seat upholstery fire block test specified in the National School Transportation Standards & Procedures Manual ~~2005~~ 2010, Central Missouri State University, Warrensburg, Missouri 64093. Fire block material, when used, shall include the covering of seat bottoms.

d. All crash/restraining barriers shall be the same height as the passenger seating

height in the bus.

~~44.4(36)~~ 44.3(56) ~~*Seat,*~~ *Seating, driver.*

a. Type A school buses shall be equipped with a driver's seat of manufacturer's standard design meeting FMVSS.

b. All Type B, C, and D school buses shall have a driver's seat equipped with a one-piece high back designed to minimize the potential for head and neck injuries in rear impacts, providing minimum obstruction to the driver's view of passengers and meeting applicable requirements of FMVSS 222. The height of the seat back shall be sufficient to provide the specified protection for a 5th percentile adult female up to a 95th percentile adult male, as defined in FMVSS 208. The seat shall be centered behind the steering wheel with a backrest a minimum distance of 11 inches behind the steering wheel. The seat shall be securely mounted to the floor of the bus with Grade 5 or better bolts and shall be secured with locking nuts or lock washers and nuts.

c. All air brake-equipped school buses may be equipped with an air suspension driver's seat meeting the following additional requirements:

(1) The air control for height adjustment shall be within easy reach of the driver in the seated position.

(2) The seat cushion shall be a minimum of 19½ inches wide, shall be fully contoured for maximum comfort, and shall have a minimum of four adjustment positions to allow changes in seat bottom angle.

(3) The backrest shall include adjustable lumbar support.

(4) The seat shall have a minimum of 7 inches of forward and rearward travel,

adjustable with the driver in the seated position. This requirement applies to the seat mechanism. Reduction of this requirement to no less than 4 inches due to barrier placement on 89-passenger capacity buses will be acceptable.

(5) The seat shall have a minimum of 4 inches of up and down travel.

(6) Seat back shall include adjustability of tilt angle.

(7) All adjustments shall be by fingertip controls without the use of tools.

(8) The seat shall comply with all applicable FMVSS.

44.4(37) ~~*Seat belt/shoulder harness system, driver.*~~ *d.* Buses shall be equipped with a Type 2 lap belt/shoulder harness seat belt assembly for the driver. This assembly may be integrated into the driver's seat. ~~The design shall incorporate a fixed female push-button type latch on the right side at seat level, and a male locking bar tongue on the left retracting side. The assembly shall be equipped with a single, dual-sensitive emergency locking retractor (ELR) for the lap and shoulder belt. This system shall be designed to minimize "cinching down" on air sprung and standard seats. The lap portion of the belt shall be anchored or guided at the seat frame by a metal loop or other such device attached to the right side of the seat to prevent the driver from sliding sideways out of the seat. There shall be a minimum of 7 inches of adjustment of the "D" loop of the driver's shoulder harness on a nonintegrated style of seat belt assembly. Shoulder belt tension shall be no greater than is necessary to provide reliable retraction of the belt and removal of excess slack~~. The seat belt assembly and anchorage shall meet applicable FMVSS. The design shall also meet the following additional requirements:

(1) The design shall incorporate a fixed female push-button type latch on the

right side at seat level, and a male locking bar tongue on the left retracting side.

(2) The assembly shall be equipped with a single, dual-sensitive emergency locking retractor (ELR) for the lap and shoulder belt. This system shall be designed to minimize "cinching down" on air sprung and standard seats.

(3) The lap portion of the belt shall be anchored or guided at the seat frame by a metal loop or other such device attached to the right side of the seat to prevent the driver from sliding sideways out of the seat.

(4) There shall be a minimum of 7 inches of adjustment of the "D" loop of the driver's shoulder harness on a nonintegrated style of seat belt assembly.

(5) Shoulder belt tension shall be no greater than is necessary to provide reliable retraction of the belt and removal of excess slack.

(6) The driver's seat belt assembly shall incorporate high visibility material.

~~44.4(38)~~ *~~Seats and crash barriers.~~* **44.3(57)** *Seating, passenger*

a. All seats, component parts, and seat anchorage shall comply with applicable federal requirements as of the date of their manufacture.

b. All seats shall have a minimum cushion depth of 15 inches ~~and a seat back height of 24 inches above the seating reference point~~ and shall comply with all other requirements of FMVSS 222.

c. In determining the rated seating capacity of the bus, allowable average rump width shall be:

(1) Thirteen inches where a three-three seating plan is used.

(2) Fifteen inches where a three-two seating plan is used.

d. The following knee room requirements shall apply to all school bus bodies:

(1) Knee room shall meet the requirements of FMVSS 222 and shall be measured, on Type A-2, B, C and D school buses, at the center of the transverse line of the seat and at seat cushion height. The distance from the front of a seat back (cushion) to the back surface of the cushion on the preceding seat shall be not less than 24 inches. The seat upholstery may be placed against the seat cushion padding, but without compressing the padding, before the measurement is taken.

(2) On Type A-1 school buses, seat spacing shall be of the manufacturer's standard spacing.

e. All seats shall be forward-facing with seat frames attached to the seat rail with two bolts, washers and nuts or flange-headed nuts. Each seat leg shall be secured to the floor by a minimum of two bolts, washers, and nuts. Flange-head nuts may be used in lieu of nuts and washers, or seats may be track-mounted in conformance with FMVSS 222. This information shall be on a label permanently affixed to the bus.

f. Jump seats or portable seats are prohibited; however, 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 an upright position. The seat cushion shall be designed to rise to a vertical position automatically when not occupied.

g. Seats~~,~~ and seat back cushions~~, and restraining barriers~~ shall be covered with a material having 42-ounce finished weight, 54-inch width, and finished vinyl coating of 1.06 broken twill or other material with equal tensile strength, tear strength, seam strength, adhesion strength, and resistance to abrasion, cold and flex separation.

h. All fabric seams shall be chain- or lock-stitch sewn with two threads, each equal to or exceeding the tensile strength of "F"-rated nylon thread.

~~*i.* Crash barriers shall be installed conforming to FMVSS 222; however, all Type A-2 school bus bodies shall be equipped with padded crash barriers, one located immediately to the rear of the driver's seat and one at the service door entrance immediately to the rear of the step well.~~

j. ~~Crash barriers and passenger seats may~~ Passenger seats shall be constructed with materials that enable them to meet the criteria contained in the school bus seat upholstery fire block test specified in the National School Transportation Standards & Procedures Manual ~~2005~~ 2010, Central Missouri State University, Warrensburg, Missouri 64093. Fire block material, when used, shall include the covering of seat bottoms.

k. Seat cushions ~~may~~ shall contain a positive locking mechanism that requires removal of a security device before the seat may be unlatched.

44.3(58) *Seating, passenger restraints*

a. Lap belts shall not be installed on passenger seats in large school buses (over 10,000 pounds GVWR) except in conjunction with child safety restraint systems that comply with the requirements of FMVSS No. 213, *Child Restraint Systems*.

b. Three-point (3-point) lap shoulder belts may be installed in all buses. If installed,

the restraint system shall include a flexible design feature, thus allowing three or two seating on the same 39-inch seat, depending on student size.

~~**44.3(30)**~~ **44.3(59)** *Shock absorbers.* Buses shall be equipped with double-action shock absorbers compatible with manufacturer's rated axle capacity at each wheel location.

~~**44.4(40)**~~ **44.3(60)** *Steps.*

a. The first step at the service door shall be not less than 10 inches and not more than 14 inches from the ground when measured from the top surface of the step to the ground, based on standard chassis specifications, except that on Type D vehicles, the first step at the service door shall be 11 inches to 16 inches from the ground. A step well guard/skid plate shall be installed by the manufacturer on all Type D vehicles.

b. Step risers shall not exceed a height of 10 inches. When plywood is used on a steel floor or step, the riser height may be increased by the thickness of the plywood.

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

d. Steps shall not protrude beyond the side body line.

e. A suitable device(s) shall be installed within the service entrance door area to assist passengers during entry or egress from the bus. The device(s) shall be designed so as to prevent injury or fatality to passengers from being dragged by the bus after becoming entangled in the device(s).

~~**44.4(41)**~~ **44.3(61)** *Step treads.*

a. All steps, including floor line platform area, shall be covered with an elastomer floor covering having a minimum overall thickness of 3/16 inch.

b. Grooved design step treads shall be such that grooves run at a 90-degree angle to

the long dimension of the step tread. The step covering shall be permanently bonded to a durable backing material that is resistant to corrosion.

c. Step treads shall have a l½-inch white or yellow nosing as an integral piece without any joint.

d. Step treads shall have abrasion resistance, slip resistance, weathering resistance, and flame resistance as outlined in the National School Transportation Specifications & Procedures Manual ~~2005~~ 2010, Missouri Safety Center, Central Missouri State University, Humphreys Suite 201, Warrensburg, Missouri 64093.

e. A 3-inch white or yellow rubber step edge at floor level, flush with the floor covering, shall be provided.

~~44.4(42)~~ 44.3(62) *Stirrup steps.*

a. There shall be at 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. Handles on the service door are prohibited.

b. Steps or cutouts are permitted in the front bumper only, in lieu of the stirrup steps, if the windshield and lamps are easily accessible for cleaning from that position.

~~44.4(43)~~ 44.3(63) *Stop signal arm.*

a. The stop signal arm shall be a flat 18-inch octagon exclusive of brackets for mounting. All lamps and lamp components shall comply with the requirements of FMVSS 131.

b. Both surfaces of the sign shall be covered with reflectorized material having a reflective capability equal to or exceeding that of 3M Corporation high-intensity sheeting.

c. The application of the reflective sheeting material shall be in accordance with the sheeting manufacturer's suggested application process. All copy shall be sharply defined and clean cut.

d. The stop arm blade shall be mounted in the area below the driver's window on the left side of the bus.

e. A second stop signal arm may be installed on the left side at or near the left rear corner of the school bus and shall meet the requirements of FMVSS 131.

~~*e.*~~ *f.* Each stop arm blade shall be automatically extended upon activation of the red warning signal lamp system and remain extended until the red signal lamps are deactivated. In addition, each stop arm blade shall be equipped with two double-faced, 4-inch, alternately flashing red lights. The use of strobe lamps in the stop arm blade is acceptable.

~~*f.*~~ *g.* A wind guard shall be installed which prevents air currents from circulating behind the blades.

~~*g.*~~ *h.* The stop arm shall be vacuum-, electric-, or air-operated; and the system must positively hold the sign in extended or retracted position to prevent whipping in the wind.

~~*h.*~~ *i.* If the air for an air-operated stop arm comes from the regular air brake system, the body manufacturer shall provide the necessary check valve and pressure reduction valve to safeguard the air supply for brake application.

~~*i.* A second stop signal arm may be installed on the left side at or near the left rear corner of the school bus and shall meet the requirements of FMVSS 131.~~

j. The two double-faced, 4-inch flashing lights may be replaced with an LED illuminated, high-visibility display, spelling out the word "STOP" visible to the front and rear. This lighting system shall comply with applicable FMVSS prior to installation.

~~44.4(44)~~ 44.3(64) *Storage compartments.*

a. An enclosed space shall be provided in the driver's compartment for storing manuals and bus driver records. See also subrule 44.3(20).

b. A storage container for tools, tire chains, and tow chains may be located either inside or outside the passenger compartment; but, if inside, it shall have a cover (seat cushion may not serve this purpose) capable of being securely latched and fastened to the floor, convenient to either the service or emergency door.

c. Luggage compartments located within the area comprising the wheelbase of the vehicle are allowed. Compartments shall include a door and a means of holding the door in an open position when the compartment is being loaded or unloaded.

~~44.3(31)~~ 44.3(65) *Suspensions.*

a. The capacity of springs or suspension assemblies shall be commensurate with the chassis manufacturer's GVWR rating.

b. Steel leaf rear springs shall be a progressive rate or multistage design. Front leaf springs shall have a stationary eye at one end and shall be protected by a wrapped leaf in addition to the main leaf. Parabolic or taper-leaf springs are acceptable.

c. Air suspension systems are acceptable. Air bags, hoses, hose routing, and all related hardware shall conform to the chassis manufacturer's recommendations.

~~**44.3(32)**~~ **44.3(66)** *Steering gear.*

a. The steering gear shall be approved by the chassis manufacturer and designed to ensure safe and accurate performance when the vehicle is operated with maximum load and at maximum speed.

b. If external adjustments are required, the steering mechanism shall be accessible.

c. No changes shall be made in the steering apparatus including addition of spinners or knobs which are not approved by the chassis manufacturer.

d. There shall be a clearance of at least 2 inches between the steering wheel and cowl, instrument panel, windshield, or any other surface.

e. Power steering is required and shall be of the integral type with integral valves.

f. The steering system shall be designed to provide a means for lubrication of all wear points, if wear points are not permanently lubricated.

g. Tilting and telescopic steering wheels are acceptable.

~~**44.3(33)** *Sun shield.* See subrule 44.4(45).~~

~~**44.4(45)**~~ **44.3(67)** *Sun shield.*

a. For Type B, C, and D vehicles, an interior adjustable transparent sun shield not less than 6 inches by 30 inches with a finished edge shall be installed in a position convenient for use by the driver.

b. On all Type A buses the sun shield shall be the manufacturer's standard.

~~**44.4(46)**~~ **44.3(68)** *Tailpipe.* See subrule ~~44.3(16).~~ **44.3(23)**

~~**44.3(34)**~~ **44.3(69)** *Throttle.*

a. The force required to operate the throttle shall not exceed 16 pounds throughout

the full range of accelerator pedal travel.

b. A driver-operated, mechanical or electronic variable-speed hand throttle, or a fast idle switch shall be provided on all Type C and D vehicles.

c. OEM adjustable pedals are acceptable as an option.

~~44.3(35)~~ 44.3(70) *Tires and rims.*

a. Tires and rims of the proper size and tires with a load rating commensurate with the chassis manufacturer's gross vehicle weight rating shall be provided.

b. Tires shall be of tubeless, steel-belted, radial (standard or low-profile) construction.

c. "Bud" type, hub-piloted steel rims are required. Multipiece and "Dayton" rims are prohibited.

d. Dual tires shall be provided on all vehicles listed in rule 281—44.2(285) except Type III.

e. All tires on a vehicle shall be of the same size, and the load range of the tires shall meet or exceed the GVWR as required by FMVSS 120.

f. Spare tires are not required; however, if specified, the spare tire shall be located outside the passenger compartment. The spare tire may not be attached to any part of the rear portion of the body including the emergency door, bumper or roof. If a tire carrier is required, it shall be suitably mounted in an accessible location outside the passenger compartment.

g. Recapped tires are permissible as replacements on equipment now in operation for use on rear wheels only, providing tires are guaranteed by the seller. Recapped tires are

not permissible where single rear wheels are used.

h. Tires, when measured on any two or more adjacent tread grooves, shall have a tread groove pattern depth of at least 4/32 of an inch on the front wheels and 2/32 of an inch on the rear wheels. No measurement shall be made where tire bars, humps, or fillets are located. On Type A-1 and Type A-2 buses with single front and rear wheels, the tread groove pattern depth shall be at least 4/32 of an inch. Where specific measurement points are provided by the tire manufacturer, they shall be utilized in determining tires approved for service. This requirement also applies to buses now in service.

i. Tire pressure equalizing systems for dual rear wheels are acceptable.

j. Traction-assisting devices including hopper-sanders**,** tire chains or automatic traction chains may be installed.

k. Wheel check indicators for lug nuts are allowed.

~~**44.3(36)**~~ **44.3(71)** *Tow hooks, front.* ~~See subrule 44.3(7).~~ Tow eyes or hooks are required on Type B, C and D buses of 14,501 pounds GVWR or greater. Two tow eyes or hooks shall be installed by the manufacturer so as not to project beyond the front bumper.

~~**44.4(47)** *Front tow hooks.* See paragraph 44.3(7)"*f.*"~~

~~**44.4(48)**~~ **44.3(72)** ~~*Rear tow hooks.*~~ *Tow hooks, rear.* Two rear tow hooks are required on all school buses. Rear tow hooks shall be attached to the chassis frame and located under the rear bumper so the hook portion is under the body.

44.3(73) *Traction-assisting devices.* Traction-assisting devices including hopper-sanders, tire chains or automatic traction chains may be installed.

~~**44.3(37)**~~ **44.3(74)** *Transmission.*

a. Automatic transmissions shall provide for not less than three forward speeds and one reverse speed. The shift lever, if applicable, shall provide a detent between each gear position when the gear selector quadrant and shift lever are not steering column-mounted.

~~*b.* An electronic control or similar device shall be installed to ensure that the automatic transmission cannot accidentally be moved out of the neutral or park gear position.~~

b. Automatic transmissions incorporating a parking pawl shall have a transmission shifter interlock controlled by the application of the service brake to prohibit accidental engagement of the transmission. All non-park pawl transmissions shall incorporate a park brake interlock that requires the service brake to be applied to allow release of the parking brake.

~~*c.* In manual transmissions, second gear and higher shall be synchronized except when incompatible with engine power. A minimum of three forward speeds and one reverse speed shall be provided.~~

~~**44.4(49)**~~ **44.3(75)** *Trash container and holding device.*

a. When a trash container is placed on the school bus, it shall comply with the following:

(1) Meet the requirements of FMVSS 302, Flammability of Interior Materials.

(2) Be no greater than ~~14-quart~~ 20-quart capacity.

(3) Be secured by a holding device that is designed to prevent movement and to allow easy removal and replacement.

b. The container shall be placed in an accessible location in the driver's compartment of the school bus subject to department of education approval. The container shall not obstruct the aisle of the bus, access to safety equipment or passenger use of the service entrance door.

~~44.3(38)~~ 44.3(76) *Turning radius.*

a. A chassis with a wheelbase of 264 inches or less shall have a right and left turning radius of not more than 42½ feet, curb-to-curb measurement.

b. A chassis with a wheelbase of 265 inches or more shall have a right and left turning radius of not more than 44½ feet, curb-to-curb measurement.

~~**44.3(39)** *Undercoating.* Chassis manufacturers or their agents shall coat the undersides of steel or metallic-constructed front fenders with a rustproofing compound for which compound manufacturers have issued notarized certification of compliance to the chassis builder that the compound meets or exceeds all performance and qualitative requirements of Paragraph 3.4 of Federal Specification TT-C-520B, using modified tests.~~

~~**44.4(50)**~~ **44.3(77)** *Undercoating.*

a. The entire underside of the bus body, including floor sections, cross member and below floor line side panels, and chassis front fenders shall be coated with rustproofing material ~~compound~~ for which the material ~~compound~~ manufacturer has issued to the bus body manufacturer a notarized certification to the bus body manufacturer that materials meet or exceed all performance requirements of SAE J1959. ~~notarized certification of compliance to the bus body builder that the compound meets or exceeds all performance and qualitative requirements of paragraph 3.4 of Federal Specification TT-C-520b using~~

~~modified test procedures* for the following requirements:~~

~~(1) Salt spray resistance—pass test modified to 5 percent salt and 1000 hours.~~

~~(2) Abrasion resistance—pass.~~

~~(3) Fire resistance—pass.~~

~~*Test panels to be prepared in accordance with paragraph 4.6.12 of TT-C-520b with modified procedure requiring that test be made on a 48-hour air cured film at thickness recommended by compound manufacturer.~~

b. Undercoating material ~~compound~~ shall be applied with suitable airless or conventional spray equipment to the undercoating material manufacturer's recommended film thickness and shall show no evidence of voids in cured film.

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

d. If chassis is built as a separate unit, the chassis manufacturer or their agents shall be responsible for providing undercoating to the chassis areas.

~~44.4(51)~~ 44.3(78) *Vacuum check valve.* A vacuum check valve shall be provided and installed on the chassis by the school bus body manufacturer for connecting vacuum accessory items.

~~44.4(52)~~ 44.3(79) *Vandal lock.*

a. The school bus may be equipped with a vandal locking system for securing the service entrance and emergency door(s).

b. The vandal locking system shall include the following design features:

(1) The entrance door is to be locked by an exterior key with a dead bolt, a remote control (cable) device or an electric device. The system must prevent the door from being

accidentally locked by any motion the bus may encounter during its normal operation. This does not apply to Type A vehicles with a left-side driver's door.

(2) When the bus is equipped with a rear-mounted engine, the emergency door and rear emergency exit window are to be locked by an interior slide bolt which shall activate a buzzer when the door or emergency exit window is locked and the ignition of the bus is turned on. The locking mechanism must be capable of being locked or unlocked without the use of a separate key or other similar device.

(3) The engine starting system of the bus shall not operate if the rear or side emergency door or rear emergency exit window over the rear engine compartment is locked from either the inside or outside of the bus.

(4) Hasp-type devices may not be attached to the bus for the purpose of securing any door or window.

~~44.4(53)~~ 44.3(80) *Ventilation.*

a. The body ventilation system on Type A, B, C and D buses shall include one static, nonclosing exhaust vent in the low-pressure area of the roof and one or more combination roof ventilation/emergency escape hatches in accordance with ~~44.4(13) "*b.*"~~ 44.3(18). The ventilation system shall be capable of being controlled and shall have sufficient capacity to maintain a proper quantity of air under operating conditions without the opening of windows except in extremely warm weather.

b. Each combination roof ventilation/emergency escape hatch shall be installed by the school bus body manufacturer or the body manufacturer's approved representative and shall have the following design and installation features:

(1) Multiposition fresh air ventilation.

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

(3) An audible warning system which sounds an alarm in the driver's compartment area when the emergency roof hatch is unlatched shall be installed as a design feature by the manufacturer.

(4) When more than one ventilation/emergency roof hatch is required, one shall be installed forward of the intersection of the horizontal and longitudinal midpoints of the bus in a low-pressure area of the roof. The second unit shall be installed on the roof in a location behind the rear axle. When only one ventilation/emergency roof hatch is required, it shall be installed in a low-pressure area of the roof at or near the longitudinal midpoint of the bus.

(5) Ventilation/emergency escape hatches may include static-type nonclosable ventilation.

c. Auxiliary fans shall be installed and shall meet the following requirements:

(1) Two adjustable fans shall be installed on Type B, C and D buses. Fans for left and right sides shall be placed in a location where they can be adjusted for maximum effectiveness and do not obstruct vision to any mirror.

(2) Fans shall be a nominal 6-inch diameter except where noted below.

(3) Fan blades shall be covered with a protective cage. Each fan shall be controlled by a separate switch capable of two-speed operation.

(4) Type A buses shall have at least one fan having a nominal diameter of at least 4

inches meeting the above requirements.

~~44.4(54)~~ 44.3(81) *Wheelhousings.*

a. The wheelhousing opening shall allow for easy tire removal and service.

b. The wheelhousing shall be attached to the floor sheets in such a manner as to prevent any dust, water or fumes from entering the body. Wheelhousings shall be constructed of at least 16-gauge steel or other material capable of withstanding passenger or other expected loads applied internally or externally without deformation.

c. The inside height of the wheelhousing above the floor line shall not exceed 12 inches.

d. The wheelhousing shall provide clearance for installation and use of tire chains on single and dual (if so equipped) power-driving wheels.

e. No part of a raised wheelhousing shall extend into the emergency door opening.

~~44.4(55)~~ 44.3(82) *Windshield and windows.*

a. All glass in windshield, windows, and doors shall be of approved safety glass consistent with American National Standard, Safety Code for Safety Glazing Materials for Glazing Motor Vehicles Operating on Land Highways, Z-26.1, mounted so the permanent mark is visible, and of sufficient quality to prevent distortion of view in any direction.

b. Glass in windshields may be heat-absorbing and may contain a shaded band across the top. Location of “fade out” shall be above the upper limit for maximum visibility.

c. Each full side window, other than emergency exits designated to comply with FMVSS 217, shall be split-sash type and shall provide an unobstructed emergency

opening of at least 9 inches but not more than 13 inches high and 22 inches wide, obtained by lowering the window. When the driver's window consists of two sections, both sections shall be capable of being moved or opened.

d. Insulated double glass is required in both sections of the left-side driver's window and in the upper glass portion(s) of the service entrance door.

e. Window glass forward of the service door and in the driver's direct line of sight for observing exterior rearview mirrors and traffic shall be of insulated double glass. The door glass in Type A-2 vehicles equipped with a manufacturer's standard van-type, right-side service door may be of the manufacturer's standard design.

f. The school bus body manufacturer may design and install a protective device over the inside, lower window glass of a rear emergency door to protect it from being damaged or broken during normal operation. The protective device shall be securely mounted by the manufacturer, shall be free of projections which might harm passengers, and shall permit visibility through the device to the area outside and to the rear of the bus.

g. Tinted glazing capable of reducing the amount of light passing through a window may be installed consistent with rules established by the Iowa Department of Public Safety ~~department of public safety~~ relating to automotive window transparency standards, except that the following windows shall be of AS-II clear glass rating:

(1) ~~Both sections of the window~~ All glass to the immediate left of the driver.

(2) All glass forward of the driver and service door. ~~and including the left-side driver's window~~.

~~(3) The entire windshield area shall be of AS-I rating.~~

~~(4)~~ (3) All glass in the service entrance door.

h. The entire windshield area shall be of AS-I rating.

~~**44.3(40)**~~ **44.3(83)** *Windshield washer~~/wiper~~ system.*

a. ~~On Type A-1 vehicles, wet-arm-type windshield wipers and washer system shall be provided by the chassis manufacturer.~~ All buses shall be equipped with electric wet-arm windshield washers which conform to the body manufacturer's recommendation as to type and size for the bus on which they are to be used. The windshield washer system on Type A vehicles may be of the manufacturer's standard design. On Type A-2 vehicles, the windshield ~~wiper/~~washer system shall be of the manufacturer's standards.

~~*b.* A two-speed or variable speed windshield wiping system, with an intermittent feature, shall be provided and shall be operated by a single switch.~~

~~*c.* The wipers shall meet the requirements of FMVSS No. 104.~~

~~*d.*~~ *b.* ~~Wiper~~ **Washer** control(s) shall be located within easy reach of the driver**.** ~~and shall be designed to move the blades from the driver's direct view when the wiper control is in the "off" position.~~

~~*e.* Wiper blades and arms shall be heavy duty and of manufacturer's standard length for the vehicle.~~

~~**44.4(56)** *Windshield washers.* Buses shall be equipped with electric wet-arm windshield washers which conform to the body manufacturer's recommendation as to type and size for the bus on which they are to be used. The windshield washer system on Type A vehicles may be of the manufacturer's standard design.~~

~~44.4(57)~~ 44.3(84) *Windshield ~~wipers.~~ wiper system.*

a. For Type A vehicles, windshield wipers shall be supplied by the chassis manufacturer and shall be of the manufacturer's standard design. ~~Windshield wipers shall meet the requirements of FMVSS 104.~~

b. Type B, C and D buses shall be equipped with two positive-action, two-speed or variable-speed electric or air windshield wipers. Windshield wipers shall have an intermittent wiping feature and shall be operated by a single switch.

c. 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 a full sweep of the windshield.

d. Wiper control(s) shall be located within easy reach of the driver and shall be designed to move the blades from the driver's view when the wiper control is in the "off" position.

e. Windshield wipers shall meet the requirements of FMVSS 104.

~~44.3(41)~~ 44.3(85) *Wiring.*

a. All wiring shall conform to current, applicable SAE-recommended standards and practices.

b. All wiring shall use a standard color or number coding system or a combination of color and number. Each chassis shall be delivered with a wiring diagram that illustrates the wiring of the chassis.

c. The chassis manufacturer of an incomplete vehicle shall install a readily accessible terminal strip or plug on the body side of the cowl, or in an accessible location

in the engine compartment of vehicles designed without a cowl, that shall contain the following terminals for the body connections:

(1) Main 100-amp body circuit.

(2) Tail lamps.

(3) Right turn signal.

(4) Left turn signal.

(5) Stop lamps.

(6) Backup lamps.

(7) Instrument panel lights (rheostat controlled by headlamp switch).

d. Circuits.

(1) An appropriate identifying diagram (coded by color or number or both) for electrical circuits shall be provided to the body manufacturer for distribution to the end user.

(2) The headlight system must be wired separately from the body-controlled solenoid.

~~**44.4(58)** *Wiring.*~~

~~*a.* All wiring shall conform to current SAE standards.~~

~~*b.* Circuits:~~

~~(1)~~ (3) Wiring shall be arranged in circuits, as required, with each circuit protected by a fuse or circuit breaker or circuit protection device. ~~All wiring shall use a standard color or number coding system or a combination of color and number coding. Each chassis shall be delivered with a wiring diagram that illustrates the wiring of the chassis.~~

~~(2)~~ (4) A master wiring diagram shall be supplied for each vehicle provided by the

body manufacturer. Chassis wiring diagrams, including any changes to wiring made by the body manufacturer, shall also be supplied to the end user.

~~(3)~~ (5) The following body interconnecting circuits shall be color-coded as noted and the color of cables shall correspond to SAE J 1128:

FUNCTION	COLOR
Left Rear Directional Light	Yellow
Right Rear Directional Light	Dark Green
Stoplights	Red
Backup Lights	Blue
Taillights	Brown
Ground	White
Ignition Feed, Primary Feed	Black

~~The color of cables shall correspond to SAE J 1128.~~

~~c.~~ *e.* Wiring shall be arranged in at least six regular circuits as follows:

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

(2) Clearance and step well lamps which shall be actuated when the service door is opened.

(3) Dome lamp.

(4) Ignition and emergency door signal.

(5) Turn signal lamps.

(6) Alternately flashing signal lamps.

~~d.~~ *f.* Any of the above combination circuits may be subdivided into additional independent circuits.

~~e.~~ *g.* Whenever heaters and defrosters are used, at least one additional circuit shall be installed.

~~f.~~ *h.* Whenever possible, all other electrical functions, such as sanders and electric-type windshield wipers, shall be provided with independent and properly protected circuits.

~~g.~~ *i.* Each body circuit shall be coded by number or letter on a diagram of circuits which shall be attached to the body in a readily accessible location.

~~h.~~ ***j.*** The entire electrical system of the body shall be designed for the same voltage as the chassis on which the body is mounted.

~~i.~~ *k.* All wiring shall have an amperage capacity exceeding the design load by at least 25 percent. All wiring splices are to be made at an accessible location and noted as splices on wiring diagram.

~~j.~~ *l.* A body wiring diagram, of a size which can be easily read, shall be furnished with each bus body or affixed in an area convenient to the electrical accessory control panel.

~~k.~~ *m.* The body power wire shall be attached to a special terminal on the chassis.

~~l.~~ *n.* All wires passing through metal openings shall be protected by a grommet.

~~m.~~ *o.* Wires not enclosed within the body shall be fastened securely at intervals of not more than 18 inches. All joints shall be soldered or joined by equally effective connectors, which shall be water-resistant and corrosion-resistant.

~~**281—44.4(285) School bus body.**~~

~~**44.4(1)** *Aisle.*~~

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

~~*b.* The seat backs shall be slanted sufficiently to give aisle clearance of 15 inches at the top of the seat backs.~~

~~**44.4(2)** *Backup warning alarm.* An automatic audible alarm shall be installed behind the rear axle and shall comply with the published Backup Alarm Standards (SAE J994B), providing a minimum of 112 dBA. A variable volume feature is not allowed.~~

~~**44.4(3)** *Battery compartment.*~~

~~*a.* Battery(ies) shall be furnished by the chassis manufacturer unless the body manufacturer agrees to provide battery(ies).~~

~~*b.* Battery(ies) shall be mounted in the body skirt of the vehicle and shall be accessible for convenient servicing from outside the bus. When the battery is mounted as described in 281—44.3(285), the body manufacturer shall securely attach the battery(ies) on a slide-out or swing-out tray with a safety stop to prevent the battery(ies) from dropping to the ground at the outermost extremity of tray travel.~~

~~*c.* The battery compartment shall have minimum dimensions of 25 inches wide, 14 inches deep, and 10 inches high.~~

~~*d*. The battery compartment door or cover shall be hinged at the top, bottom or forward side of the door. When hinged at the top, a fastening device shall be provided which will secure the door in an open position. The door or cover over the compartment opening shall completely cover and, as completely as practical, seal the opening and shall be secured by an adequate and conveniently operated latch or other type fastener to prevent free leakage of the battery contents into the passenger compartment should the vehicle overturn. Battery cables installed by the body manufacturer shall meet chassis manufacturer and SAE requirements. Battery cables shall be of sufficient length to allow the battery tray to fully extend. In Type A buses, if batteries cannot be installed under the hood, a battery compartment is required.~~

~~*e*. The top surface area of the inside of the battery compartment (the area likely to come into contact with battery electrical terminals as the result of a blow to, and upward collapse of, the bottom of the battery box in the event of an accident or other event) shall be covered with a rubber matting or other impact-resistant nonconductive material. The matting shall be a minimum of 1/8-inch thick and cover the entire top inside surface of the battery box. The matting shall be securely installed to maintain its position at all times.~~

~~*f*. The word "BATTERY" in 2-inch black letters shall be placed on the door covering the battery opening.~~

~~**44.4(4)** *Body sizes.* Type A vehicles may be purchased with manufacturer's recommended seating capacities when the chassis is manufactured with rear dual tires.~~

~~**44.4(5)** *Bumper, front.*~~

~~*a.* On a Type D school bus, if the chassis manufacturer does not provide a bumper, it shall be provided by the body manufacturer. The bumper will conform to the standards of 281—44.3(285).~~

~~*b.* An optional energy-absorbing front bumper may be used, provided its design incorporates a self-restoring, energy-absorbing system of sufficient strength to:~~

~~(1) Push another vehicle of similar GVWR without permanent distortion to the bumper, chassis, or body; and~~

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

~~● 7.5 mph fixed-barrier impact (FMVSS cart and barrier test).~~

~~● 4.0 mph corner impact at 30 degrees (Part 581, CFR Title 49).~~

~~● 20.0 mph into parked passenger car (Type B, C, and D buses of 18,000 lb GVWR or more).~~

~~(3) The manufacturer of the energy-absorbing system shall provide evidence of conformance to the above standards from an approved test facility capable of performing the above FMVSS tests.~~

~~**44.4(6)** *Bumper, rear.*~~

~~*a.* The rear bumper shall be 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-2 vehicles and a minimum of 9½ inches wide (high) on Type A-1, B, C and D buses and shall be of sufficient strength to permit being pushed by another vehicle without permanent~~

~~distortion. Type A-2 vehicles with an overall body width of 80 inches or less may be equipped with the manufacturer's standard rear bumper.~~

~~*b*. The rear bumper shall be wrapped around the back corners of the bus. It shall extend forward at least 12 inches, measured from the rear-most point of the body at the floor line, and shall be flush-mounted to the body side or protected with an end panel.~~

~~*c*. The rear bumper shall be attached to the chassis frame in such a manner that it may be easily removed. It shall be braced so as to resist deformation of the bumper resulting from a rear or side impact. It shall be designed so as to discourage hitching of rides.~~

~~*d*. The bumper shall extend at least 1 inch beyond the rear-most part of body surface measured at the floor line.~~

~~*e*. Additions or alterations to the rear bumper, including the installation of trailer hitches, are prohibited.~~

~~*f*. An optional energy-absorbing rear bumper may be used, provided a self-restoring, energy-absorbing bumper system attached to prevent the hitching of rides is of sufficient strength to:~~

~~(1) Permit pushing by another vehicle without permanent distortion to the bumper, chassis, or body.~~

~~(2) Withstand repeated impacts without damage to the bumper, chassis, or body according to the following FMVSS performance standards:~~

- ~~2.0 mph fixed barrier impact (FMVSS cart and barrier test).~~
- ~~4.0 mph corner impact at 30 degrees (Part 581, CFR Title 49).~~

- ~~5.0 mph center impact (Part 581, CFR Title 49).~~

~~(3) The manufacturer of the energy-absorbing system shall provide evidence of conformance to the above standards from an approved test facility capable of performing the above FMVSS test.~~

~~**44.4(7)** *Certification*. The body manufacturer shall, upon request, certify to the department of education that the manufacturer's product(s) meets Iowa standards on items not covered by FMVSS certification requirements of 49 CFR Part 567.~~

~~**44.4(8)** *Chains, tire*. See subrule 44.3(35).~~

~~**44.4(9)** *Color*. See also subrule 44.3(11).~~

~~*a*. The school bus body shall be painted national school bus yellow. (See color standard, Appendix B, National School Transportation Specifications & Procedures Manual 2005, available from Missouri Safety Center, Central Missouri State University, Humphreys Suite 201, Warrensburg, Missouri 64093.)~~

~~*b*. The body exterior trim shall be glossy black, including the rear bumper, exterior lettering, numbering, body trim, rub rails, lamp hoods (if any), and emergency door arrow. This may also include the entrance door and window sashes. As an alternative, the rear bumper may be covered with a black retroreflective material as described in subrule 44.4(34). When the bus number is placed on the front or rear bumper, the number shall be yellow.~~

~~*c*. As an option, the roof of the bus may be painted white extending down to within 6 inches above the drip rails on the sides of the body, except that the vertical portion of the front and rear roof caps shall remain yellow.~~

~~*d*. Commercial advertising is forbidden on the exterior and in the interior of all school buses.~~

~~**44.4(10)** *Construction*.~~

~~*a*. The school bus body shall be constructed of materials certified to be durable under normal operating conditions and shall meet all applicable FMVSS at the date of manufacture as certified by the bus body manufacturer.~~

~~*b*. Construction shall be reasonably dustproof and watertight.~~

~~*c*. Body joints present in that portion of the Type A-2 school bus body furnished exclusively by the body manufacturer shall conform to the performance requirements of FMVSS 221. This does not include the body joints created when body components are attached to components furnished by the chassis manufacturer.~~

~~*d*. A flat floor system featuring no wheelwells and no step-up at the rear of the passenger compartment may be used in accordance with the following:~~

~~(1) The inside height of the body shall remain at least 72 inches, when measured in accordance with subrule 44.4(21) when this option is installed.~~

~~(2) If this option utilizes a raised floor that is stepped up behind the driver's area, the forward edge of the aisle shall have a white stripe and be labeled "Step Up" visible to passengers upon entering the aisle; and a label "Step Down" shall be visible to passengers as they exit the aisle. Minimum headroom of 72 inches shall be maintained at all times.~~

~~(3) A flat floor design shall provide for the additional option for a track-mounted seating system using button-type (L track) and a wheelchair securement system meeting Iowa specifications but mounting into the track of the track-seating system. Aisle~~

~~clearances shall be maintained in accordance with these rules.~~

~~**44.4(11)** *Crossing control arms.*~~

~~*a.* Type A, B, and C school buses shall be equipped with a crossing control arm mounted on the right side of the front bumper, which shall not open more than 90 degrees. This requirement does not apply to Type D vehicles having transit-style design features.~~

~~*b.* The crossing control arm shall incorporate a system of quick-disconnect connectors (electrical, vacuum, or air) at the crossing control arm base unit and shall be easily removable to allow for towing of the bus.~~

~~*c.* All components of the crossing control arm and all connections shall be weatherproofed.~~

~~*d.* The crossing control arm shall be constructed of noncorrodible or nonferrous material or treated in accordance with the body sheet metal standard. See subrule 44.4(25).~~

~~*e.* There shall be no sharp edges or projections that could cause hazard or injury to students.~~

~~*f.* The crossing control arm shall extend a minimum of 70 inches from the front bumper when in the extended position. This measurement shall be taken from the arm assembly attachment point on the bumper. However, the crossing control arm shall not extend past the ends of the bumper when in the stowed position.~~

~~*g.* The crossing control arm shall extend simultaneously with the stop arm(s) by means of the stop arm controls.~~

~~*h*. The crossing control arm system shall be designed to operate in extreme weather conditions including freezing rain, snow and temperatures below 0 degrees Fahrenheit without malfunctioning. The crossing control arm itself shall be constructed of a material that will prevent the arm from prematurely extending or from failing to retract due to sustained wind or wind gusts of up to 40 miles per hour.~~

~~*i*. The chassis bumper mounting bracket must be designed for the specific model chassis on which it will be mounted to ensure that the unit mounts flush and operates properly.~~

~~*j*. A single, cycle-interrupt switch with automatic reset shall be installed in the driver's compartment and shall be accessible to the driver from the driver's seat.~~

~~**44.4(12)** *Defrosters.*~~

~~*a*. Defrosting and defogging equipment shall direct a sufficient flow of heated air onto the interior surfaces of the windshield, the window to the left of the driver, and the glass in the viewing area directly to the right of the driver to eliminate frost, fog and snow.~~

~~*b*. The defrosting system shall conform to SAE Standard J381.~~

~~*c*. The defroster and defogging system shall be capable of furnishing heated outside ambient air; however, the part of the system furnishing additional air to the windshield, entrance door and step well may be of the recirculating air type.~~

~~*d*. Auxiliary fans are required; however, they are not considered defrosting or defogging systems. See also subrule 44.4(53).~~

~~*e*. Portable heaters shall not be used.~~

~~**44.4(13)** *Doors and exits.*~~

~~*a.* Service door.~~

~~(1) The service door shall be heavy-duty power or manually operated under the control of the driver and shall be designed to afford easy release and prevent accidental opening. When a hand lever is used, no parts shall come together to shear or crush fingers. Manual door controls shall not require more than 25 pounds of force to operate at any point throughout the range of operation. A power-operated door must provide for manual operation in case of power failure.~~

~~(2) The service door shall be located on the right side of the bus opposite the driver and within the driver's direct view.~~

~~(3) The service door shall have a minimum horizontal opening of 24 inches and a minimum vertical opening of 68 inches. Type A-2 vehicles shall have a minimum opening of 1,200 square inches.~~

~~(4) The service door shall be of split or jackknife type. (Split door includes any sectioned door which divides and opens inward or outward.) If one section of the split door opens inward and the other opens outward, the front section shall open outward.~~

~~(5) Lower as well as upper panels shall be of approved safety glass. The bottom of each lower glass panel shall not be more than 10 inches from the top surface of the bottom step. The top of each upper glass panel shall not be more than 3 inches from the top of the door.~~

~~(6) The upper window panels of the service door shall be of insulated double glass. This standard applies to all vehicles equipped with a service door as described in~~

~~44.4(13)~~ ~~"*a.*"~~

~~(7) Vertical closing edges on split or folding entrance doors shall be equipped with flexible material to protect children's fingers.~~

~~(8) There shall be no door to the left of the driver on Type B, C or D vehicles. All Type A vehicles may be equipped with the chassis manufacturer's standard left side (driver's side) door.~~

~~(9) All doors shall be equipped with padding at the top edge of each door opening. Padding shall be at least 3 inches wide and 1 inch thick and shall extend horizontally the full width of the door opening.~~

~~(10) Door hinges shall be secured to the body without the use of metal screws.~~

~~(11) There shall be no grab handle installed on the exterior of the service door.~~

~~(12) A door-locking mechanism may be installed in accordance with subrule 44.4(52).~~

~~(13) On power-operated service doors, the emergency release valve, switch or device to release the service door must be placed above or to the left or right of the service door and be clearly labeled.~~

~~*b.* Emergency doors.~~

~~(1) Emergency door(s) and other emergency exits shall comply with the requirements of FMVSS 217 and any of the requirements of these rules that exceed FMVSS 217.~~

~~(2) The upper portion of the emergency door shall be equipped with approved safety glazing, the exposed area of which shall be at least 400 square inches. The lower portion of the rear emergency doors on Type A-2, B, C and D vehicles shall be equipped with a~~

~~minimum of 350 square inches of approved safety glazing.~~

~~(3) There shall be no steps leading to an emergency door.~~

~~(4) The emergency door(s) shall be equipped with padding at the top edge of each door opening. Padding shall be at least 3 inches wide and 1 inch thick and shall extend the full width of the door opening.~~

~~(5) There shall be no obstruction higher than ¼ inch across the bottom of any emergency door opening.~~

~~*c.* Emergency exit requirements.~~

~~(1) Any installed emergency exit shall comply with the design and performance requirements of FMVSS 217, Bus Emergency Exits and Window Retention and Release, applicable to that type of exit, regardless of whether or not that exit is required by FMVSS 217, and shall comply with any of the requirements of these rules that exceed FMVSS 217.~~

~~(2) An emergency exit may include either an emergency door or emergency exit-type windows. Where emergency exit-type windows are used, they shall be installed in pairs, one on each side of the bus. Type A, B, C, and D vehicles shall be equipped with a total number of emergency exits as follows for the designed capacities of vehicles:~~

- ~~0 to 42 passenger = 1 emergency exit per side and 1 roof hatch.~~
- ~~43 to 78 passenger = 2 emergency exits per side and 2 roof hatches.~~
- ~~79 to 90 passenger = 3 emergency exits per side and 2 roof hatches.~~

~~These emergency exits are in addition to the rear emergency door or rear pushout window/side emergency door combination required by FMVSS 217. Additional~~

~~emergency exits installed to meet the capacity-based requirements of FMVSS 217 may be included to comprise the total number of exits specified. All roof hatches shall have design features as specified in subrule 44.4(53).~~

~~(3) Side and rear emergency doors and each emergency window exit shall be equipped with an audible warning device.~~

~~(4) Roof hatches shall be equipped with an audible warning device.~~

~~(5) Rear emergency windows on Type D, rear engine buses shall have a lifting assistance device that will aid in lifting and holding the rear emergency window open.~~

~~(6) Side emergency windows may be either top-hinged or vertically hinged on the forward side of the window. No side emergency exit window will be located above a stop sign.~~

~~(7) On the inside surface of each school bus, located directly beneath or above all emergency doors and windows, shall be a "DO NOT BLOCK" label in a color that contrasts with the background of the label. The letters on this label shall be at least 1 inch high.~~

~~**44.4(14)** *Driver's compartment.*~~

~~*a*. The driver's seat supplied by the body company shall be a high-back seat with a minimum seat back adjustment of 15 degrees, not requiring the use of tools, and with a head restraint to accommodate a 95th percentile adult male, as defined in FMVSS 208. The driver's seat shall be secured with nuts, bolts, and washers or flange-headed nuts.~~

~~*b*. The driver's seat positioning and range of adjustments shall be designed to accommodate comfortable actuation of the foot control pedals by 95 percent of the male~~

~~and female adult population.~~

~~*c*. See also subrule 44.4(37).~~

~~*d*. A driver's document compartment or pouch shall be provided. The document compartment or pouch shall measure at least 17 inches by 12 inches by 4 inches. If a document pouch, rather than a covered compartment, is provided, it shall be located on the barrier behind the driver. It shall be constructed of a material of equal durability to that of the covering on the barrier and shall have a lid or cover with a latching device to hold the cover or lid closed.~~

~~*e*. A manual noise suppression switch shall be required and located in the control panel within easy reach of the driver while seated. The switch shall be labeled. This switch shall be an on/off type that deactivates body equipment that produces noise, including, at least, the AM/FM radio, heaters, air conditioners, fans, and defrosters. This switch shall not deactivate safety systems, such as windshield wipers, lighting systems, or two-way radio communication systems.~~

~~**44.4(15)** *Emergency equipment.*~~

~~*a*. All Type A, B, C, and D school buses shall be equipped with the following emergency equipment: first-aid kit, fire extinguisher, webbing cutter, body fluid cleanup kit, and triangular warning devices.~~

~~*b*. All emergency equipment shall be securely mounted so that, in the event the bus is overturned, this equipment is held in place. Emergency equipment may be mounted in an enclosed compartment provided that the compartment is labeled in not less than 1-inch letters, stating the piece(s) of equipment contained herein.~~

~~*c.* Fire extinguishers shall meet the following requirements:~~

~~(1) The bus shall be equipped with at least one five-pound capacity, UL-approved, pressurized dry chemical fire extinguisher complete with hose. The extinguisher shall be located in the driver's compartment readily accessible to the driver and passengers and shall be securely mounted in a heavy-duty automotive bracket so as to prevent accidental release in case of a crash or in the event the bus overturns.~~

~~(2) A calibrated or marked gauge shall be mounted on the extinguisher to indicate the amount of pressure in the extinguisher and shall be easily read without moving the extinguisher from its mounted position. Plastic discharge heads and related parts are not acceptable.~~

~~(3) The fire extinguisher shall have a rating of 2A-10BC or greater. The operating mechanism shall be sealed with a type of seal which will not interfere with the use of the fire extinguisher.~~

~~(4) All fire extinguishers shall be inspected and maintained in accordance with the National Fire Protection Association.~~

~~(5) Each extinguisher shall have a tag or label securely attached that indicates the month and year the extinguisher received its last maintenance and the identity of the person performing the service.~~

~~*d.* First-aid kit.~~

~~(1) The bus shall have a removable moistureproof and dustproof first-aid kit in an accessible place in the driver's compartment. It shall be mounted and secured, and identified as a first-aid kit. The location for the first-aid kit shall be marked.~~

~~(2) Multipurpose and passenger-type vehicles used as school buses shall be equipped with a ten-unit first-aid kit containing the following items:~~

~~1 1-inch adhesive compress.~~

~~1 2-inch bandage compress.~~

~~1 4-inch bandage compress.~~

~~1 3-inch × 3-inch plain gauze pad.~~

~~1 gauze roller bandage (4-inch × 5 yards).~~

~~1 plain absorbent gauze compress (2-piece, 18-inch × 36-inch).~~

~~1 plain absorbent gauze compress (24-inch × 72-inch).~~

~~2 triangular bandages.~~

~~1 wire splint (instant splints may be substituted).~~

~~(3) A first-aid kit meeting the national standards (National Standards First Aid Kit) and containing the following items is required on all Type A, B, C and D school buses:~~

~~2 1-inch × 2½-yard adhesive tape rolls.~~

~~24 3-inch × 3-inch sterile gauze pads.~~

~~100 ¾-inch × 3-inch adhesive bandages.~~

~~8 2-inch bandage compresses.~~

~~10 3-inch bandage compresses.~~

~~2 2-inch × 6-foot sterile gauze roller bandages.~~

~~2 39-inch × 35-inch × 54-inch nonsterile triangular bandages with two safety pins.~~

~~3 36-inch × 36-inch sterile gauze pads.~~

~~3 sterile eye pads.~~

~~1 pair medical examination gloves.~~

~~1 mouth-to-mouth airway.~~

~~*e.* Body fluid cleanup kit. Each bus shall be equipped with a disposable, removable, and moistureproof body fluid cleanup kit in a disposable container which includes the following items:~~

~~(1) An EPA-registered liquid germicide (tuberculocidal) disinfectant;~~

~~(2) A fully disposable wiping cloth;~~

~~(3) A water-resistant spatula;~~

~~(4) Step-by-step directions;~~

~~(5) Absorbent material with odor counteractant;~~

~~(6) Two pairs of gloves (latex);~~

~~(7) One package towelettes;~~

~~(8) A discard bag (nonlabeled paper bag with a plastic liner and a twist tie). This bag shall be approximately 4 inches by 6 inches by 14 inches, and shall be of a nonsafety color (i.e., the bag shall not be red, orange, or yellow). The kit shall be mounted by a method that will retain it in place during normal school bus operation and shall be removable without the use of tools. The kit container shall be sealed with a breakable, nonreusable seal and must be accessible to the driver.~~

~~*f.* Triangular warning devices. Each school bus shall contain at least three reflectorized triangle road warning devices mounted in an accessible place. These devices must meet requirements in FMVSS 125.~~

~~*g.* Each bus shall be equipped with a durable webbing cutter having a full-width handgrip and a protected, replaceable or noncorrodible blade. This device shall be~~

~~mounted in an easily detachable manner and in a location accessible to the seated driver.~~

~~*h*. Axes are not allowed.~~

~~**44.4(16)** *Floor insulation and covering.*~~

~~*a*. The floor structure of Type A-2, B, C and D school buses shall be covered with an insulating layer of either a 5-ply minimum 5/8-inch-thick plywood, or a material of equal or greater strength and insulation R-value, having properties equal to or exceeding exterior-type softwood plywood, C-D grade as specified in standards issued by the United States Department of Commerce. All edges shall be sealed.~~

~~*b*. Type A-1 buses may be equipped with a minimum ½-inch-thick plywood meeting the above requirements.~~

~~*c*. The floor in the under-seat area of Type B, C, and D buses, including tops of wheelhousings, driver's compartment and toeboard, shall be covered with an elastomer floor covering having a minimum overall thickness of 1/8 inch and a calculated burn rate of 0.1 or less using the test methods, procedures and formulas listed in FMVSS 302. The floor covering of the driver's area and toeboard area on all Type A buses may be the manufacturer's standard flooring and floor covering.~~

~~*d*. The floor covering in aisles of all buses shall be of a ribbed or other raised-pattern elastomer, having a coefficient of friction of 0.85, using ASTM 1894 or 0.65 using ASTM 2047, and a calculated burn rate of 0.1 or less using the test methods, procedures and formulas listed in FMVSS 302. Minimum overall thickness shall be 3/16 inch measured from tops of ribs.~~

~~*e*. Floor covering must be permanently bonded to the floor and must not crack when~~

~~subjected to sudden changes in temperature. Bonding or adhesive material shall be waterproof and shall be of a type recommended by the manufacturer of the floor-covering material. All seams must be sealed with waterproof sealer.~~

~~*f.* On Type B, C and D buses, access to the fuel tank sending unit shall be provided. The access opening shall be large enough and positioned to allow easy removal of the sending unit. Any access opening in the body shall be capable of being sealed with a screw-down plate from within the body. When in place, the screw-down plate shall seal out dust, moisture and exhaust fumes. This plate shall not be installed under flooring material.~~

~~*g.* Cove molding shall be used along the sidewalls and rear corners. All joints or seams in the floor covering shall be covered with nonferrous metal stripping or stripping constructed of material exhibiting equal durability and sealing qualities.~~

~~**44.4(17)** *Fuel fill opening and cover*. Where an opening in the school bus body skirt is needed for access to the fuel fill cap, the opening shall be large enough to permit filling the fuel tank without the need for special fuel nozzle adapters, a funnel, or other device. The opening shall be equipped with a forward hinged cover held closed by a spring or other conveniently operated device.~~

~~**44.4(18)** *Heating and air conditioning.*~~

~~*a.* Each heater shall be hot-water or combustion type.~~

~~*b.* If only one heater is used, it shall be a fresh-air or combination fresh-air and recirculation type.~~

~~*c.* If more than one heater is used, additional heaters may be recirculating air type.~~

~~*d*. The heating system shall be capable of maintaining bus interior temperatures as specified in SAE test procedure J2233.~~

~~*e*. Auxiliary fuel-fired heating systems are permitted, provided they comply with the following:~~

~~(1) The auxiliary heating system shall utilize the same type of fuel as specified for the vehicle engine.~~

~~(2) Heater(s) may be direct hot air or connected to the engine's coolant system.~~

~~(3) An auxiliary heating system, when connected to the engine's coolant system, may be used to preheat the engine coolant or preheat and add supplementary heat to the bus's heating system.~~

~~(4) Auxiliary heating systems must be installed pursuant to the manufacturer's recommendations and shall not direct exhaust in a manner that will endanger bus passengers.~~

~~(5) Auxiliary heating systems which operate on diesel fuel shall be capable of operating on #1, #2 or blended diesel fuel without the need for system adjustment.~~

~~(6) The auxiliary heating system shall be low voltage.~~

~~(7) Auxiliary heating systems shall comply with all applicable FMVSS including FMVSS 301 as well as SAE test procedures.~~

~~*f*. Heater hoses shall be adequately supported to guard against excessive wear due to vibration. The hoses shall not dangle or rub against the chassis or any sharp edges and shall not interfere with or restrict the operation of any engine function. Heater hoses shall conform to SAE Standard J20c. Heater lines on the interior of the bus shall be shielded to~~

~~prevent scalding of the driver or passengers.~~

~~*g*. Each hot water system installed by a body manufacturer shall include one shut-off valve in the pressure line and one shut-off valve in the return line with both valves at the engine in an accessible location, except that on all Type A and B buses, the valves may be installed in another accessible location.~~

~~*h*. Each hot water heating system shall be equipped with a device that is installed in the hot water pressure line that regulates the water flow to all heaters and that is located for convenient operation by the driver while seated.~~

~~*i*. All combustion heaters shall be in compliance with current federal motor carrier safety regulations.~~

~~*j*. Accessible bleeder valves shall be installed in an appropriate place in the return lines of body company-installed heaters to remove air from the heater lines.~~

~~*k*. Access panels shall be provided to make heater motors, cores, and fans readily accessible for service. An outside access panel may be provided for the driver's heater.~~

~~*l*. Air-conditioning systems may be installed in accordance with the following:~~

~~(1) Evaporator cases, lines and ducting (as equipped) shall be designed so that all condensation is effectively drained to the exterior of the bus below floor level under all conditions of vehicle movement without leakage on any interior portion of the bus.~~

~~(2) Any evaporator or ducting system shall be designed and installed so as to be free of injury-producing projections or sharp edges. Installation shall not reduce compliance with any FMVSS applicable to the school bus. Ductwork shall be installed so that exposed edges face the front of the bus and do not present sharp edges.~~

~~(3) Any evaporators used must be copper-cored (aluminum or copper fins acceptable), except that the front evaporator, if provided by a Type A chassis manufacturer, may be aluminum-cored.~~

~~(4) Air intake for any evaporator assembly(ies) except for the front evaporator of a Type A bus shall be equipped with replaceable air filter(s) accessible without disassembly of the evaporator case.~~

~~(5) On buses equipped for the transportation of persons with disabilities, the evaporator and ducting shall be placed high enough so that they will not obstruct existing or potential occupant securement shoulder strap upper attachment points. This clearance shall be provided along the entire length of the passenger area on both sides of the bus interior to allow for potential retrofitting of new wheelchair positions and occupant securement devices throughout the bus.~~

~~(6) The total system shall be warranted, including parts and labor, for at least two years and shall include, but not be limited to, compressor mounting bracketry and hardware and any belts which, directly or indirectly, drive the compressor(s). Air-conditioning compressor applications must be approved in writing by the chassis engine manufacturer, stating that the installations will not void or reduce the engine manufacturer's warranty or extended service coverage liabilities in any way.~~

~~(7) All components requiring periodic servicing must be readily accessible for servicing.~~

~~(8) Parts and service manuals shall be provided for the entire system including, but not limited to, compressor(s), wiring (includes wiring diagram), evaporators, condensers,~~

~~controls, hoses and lines.~~

~~(9) Electrical requirements for the air-conditioning system shall be provided to the customer prior to vehicle purchase or, in the case of an after-purchase installation, prior to installing the air-conditioning system to ensure that adequate electrical demands imposed by the air-conditioning system are capable of being met.~~

~~(10) The installed air-conditioning system should cool the interior of the bus down to at least 80 degrees Fahrenheit, measured at a minimum of three points, located 4 feet above the floor at the longitudinal centerline of the bus. The three points shall be: near the driver's location; at the midpoint of the body; and 2 feet forward of the emergency door, or for Type D rear engine buses, 2 feet forward of the end of the aisle. Test conditions will be those as outlined in the National School Transportation Specifications & Procedures Manual 2005, Missouri Safety Center, Central Missouri State University, Humphreys Suite 201, Warrensburg, Missouri 64093.~~

~~**44.4(19)** *Hinges.* All exposed metal passenger-door hinges subject to corrosion shall be designed to allow lubrication without disassembly. All passenger-door hinges shall be securely bolted to the bus body. Metal screws are not acceptable.~~

~~**44.4(20)** *Identification.*~~

~~*a.* The body shall bear the words "SCHOOL BUS" in black letters at least 8 inches high on both front and rear of the body or on attached signs. The lettering shall be placed as high as possible without impairment of its visibility. The lettering shall conform to Series B of Standard Alphabets of Highway Signs. "SCHOOL BUS" lettering shall have a reflective background or, as an option, may be illuminated by backlighting.~~

~~*b*. The bus, whether school-owned or contractor-owned, shall have displayed at the beltline on each side of the vehicle the official name of the school in black standard unshaded letters at least 5 inches, but not more than 7 inches high.~~

~~Examples:~~

~~(1) Blank community school district.~~

~~(2) Blank independent school district.~~

~~(3) Blank consolidated school district.~~

~~If there is insufficient space due to the length of the name of the school district, the words "community," "independent," "consolidated," and "district" may be abbreviated. If, after these abbreviations, there is still insufficient space available, the words "community school district" may be replaced by the uppercase letters "CSD" upon prior approval by the school transportation consultant of the Iowa department of education.~~

~~*c*. The incorporated names of cities located within an officially reorganized school district may be placed on either side of the bus in a single line situated beneath the official school district name. The lettering shall not exceed 2 inches in height and shall be black. This paragraph shall apply only when the names of the cities are not included in the official school district name on the beltline.~~

~~*d*. Buses privately owned and operated by an individual or individuals and used exclusively for transportation of students shall bear the name of the owner, at the beltline on each side of the vehicle in black standard unshaded letters at least 5 inches, but not more than 7 inches high.~~

~~*e*. The words "RATED CAPACITY," along with the appropriate number indicating~~

~~the rated pupil seating capacity of the bus, shall be printed to the left of the entrance door, at least 6 inches below the name of the school district and on the bulkhead of the bus above the right windshield. The letters shall be black in color and at least 2 inches in height. The word "CAPACITY" may be abbreviated and shown as "CAP." where necessary.~~

~~*f.* The number of the bus shall be printed in not less than 5-inch or more than 8-inch black letters, except as otherwise noted in this subrule, and shall be displayed on both sides, the front and the rear of the bus. The location of the bus number is at the discretion of the vehicle owner except that the number:~~

~~(1) Shall be located to the rear of the service door not more than 36 inches from the ground on the right side of the bus and at the same respective position on the left side of the bus.~~

~~(2) Shall be yellow if located on either the front or rear bumper.~~

~~(3) May be placed on the roof of the bus at a position representing the approximate lateral and longitudinal midpoint of the bus. The bus number shall be black and shall measure not less than 24 inches in length.~~

~~(4) Shall not be located on the same line as the name of the school district on either side of the bus, on the emergency door, or in a location that will interfere with the words "SCHOOL BUS."~~

~~*g.* Buses privately owned by individuals, a company, or a contractor shall also bear the name of the owner, followed by the word "OWNER" in not more than 2-inch characters printed approximately 6 inches below the bus capacity on the right side of the~~

~~bus.~~

~~*h.* Symbols, characters or letters, for the purpose of vehicle or route identification by students, may be displayed in the lower, split-sash, glass portion of the third passenger window from the front on the service entrance side of the bus. Such symbols, characters or lettering, if used, shall not exceed 36 square inches. This requirement applies to all school buses regardless of date of purchase.~~

~~*i.* Symbols identifying the bus as equipped for or transporting students with special needs may be displayed. See subrule 44.5(7).~~

~~*j.* The words "UNLAWFUL TO PASS WHEN LIGHTS FLASH" shall be displayed on the rear emergency door of the bus between the upper and lower window glass sections. The letters shall be black and not less than 2 inches nor more than 6 inches in height. If there is not sufficient space on the emergency door, letter size may be reduced upon approval of the department of education.~~

~~*k.* Pressure-sensitive markings of vinyl material may be used for the above lettering in lieu of painting.~~

~~*l.* Any lettering, including the name of the school's athletic team(s), numbers, drawings, bumper stickers, characters, or mascot symbols other than the bus manufacturer's registered trademarks or those specifically noted in paragraphs "*a*" through "*k*" above are prohibited.~~

~~**44.4(21)** *Inside height.* Inside body height shall be 72 inches or more, measured metal to metal, at any point on the longitudinal centerline from the front vertical bow to the rear vertical bow. Inside body height of Type A-2 buses shall be 62 inches or more.~~

~~**44.4(22)** *Insulation.*~~

~~*a*. Thermal insulation in the ceiling and walls shall be fire-resistant, UL-approved, and approximately 1½-inch thick with a minimum R-value of 5.5. Insulation shall be installed in such a way as to prevent it from sagging.~~

~~*b*. Roof bows shall be insulated in accordance with 44.4(22)"*a*."~~

~~**44.4(23)** *Interior.*~~

~~*a*. The interior of the bus shall be free of all unnecessary projections, including luggage racks and attendant handrails, to minimize the potential for injury. This standard requires inner lining on ceilings and walls. If the ceiling is constructed to contain lapped joints, the forward panel shall be lapped by the rear panel and exposed edges shall be beaded, hemmed, flanged, or otherwise treated to minimize sharp edges. Buses may be equipped with a storage compartment for tools, tire chains, and tow chains. See also subrule 44.4(44).~~

~~*b*. Radio speakers are permitted in the passenger compartment area only. No radio speaker, other than that which is necessary for use with two-way communication equipment, shall be located within the driver's compartment area. All radio speakers shall be flush-mounted with the roof or side panels and shall be free of sharp edges which could cause injury to a child.~~

~~*c*. The driver's area forward of the foremost padded barriers shall permit the mounting of required safety equipment and vehicle operation equipment.~~

~~*d*. Every school bus shall be constructed so that the noise level taken at the ear of the occupant nearest to the primary vehicle noise source shall not exceed 85 dBA when~~

~~tested according to the procedure found in Appendix B, National School Transportation Specifications & Procedures Manual 2005, Missouri Safety Center, Central Missouri State University, Humphreys Suite 201, Warrensburg, Missouri 64093.~~

~~*e.* An access panel must be provided, front and rear, so lights and wiring for the 8-light warning system may be repaired or serviced without removing ceiling panels.~~

~~*f.* Ceiling material designed to reduce noise within the driver compartment or passenger compartment may be installed by the manufacturer.~~

~~*g.* An electronic "child check" monitor shall be installed. This monitor shall operate in such a way as to require the driver to physically walk to the back of the bus to disengage the monitor system after having first shut off the engine of the bus.~~

~~**44.4(24)** *Lamps and signals.*~~

~~*a.* All lamps and lamp components shall meet or exceed applicable standards established by the Society of Automotive Engineers (SAE), the American Association of Motor Vehicle Administrators (AAMVA), and FMVSS. These lamps shall be of incandescent or LED design.~~

~~*b.* Clearance lamps. The body shall be equipped with two amber lamps at the front and two red clearance lamps at the rear mounted at the highest and widest portion of the body.~~

~~*c.* Identification lamps. The bus shall be equipped with three amber identification lamps on the front and three red identification lamps on the rear. Each group shall be evenly spaced not less than 6 or more than 12 inches apart along a horizontal line near the top of the vehicle.~~

~~*d*. Intermediate side marker lamps. On all buses over 30 feet long, one amber side lamp is required on each side, located midway between the front and rear clearance lamps.~~

~~*e*. Stop/tail (brake) lamps. Buses shall be equipped with four combination, red, stop/tail lamps meeting SAE specifications. Each lamp shall have double filament lamp bulbs or LEDs that are connected to the headlamp and brake-operated stop lamp circuits. These should be positioned as follows:~~

~~(1) Two combination lamps with a minimum diameter of 7 inches or, if a shape other than round, a minimum of 38 square inches of illuminated area shall be mounted on the rear of the bus just to the inside of the turn signal lamps.~~

~~(2) Two combination lamps with a minimum diameter of 4 inches or, if a shape other than round, a minimum of 12 square inches of illuminated area shall be placed on the rear of the body between the beltline and the floor line. The rear license plate lamp may be combined with one lower tail lamp. Stop lamps shall be activated by the service brakes and shall emit a steady light when illuminated. Type A-2 buses with bodies supplied by the chassis manufacturer may have the manufacturer's standard stop and tail lamps.~~

~~*f*. Items described in paragraphs "*b*," "*c*," "*d*," and "*e*" shall be connected to the headlamp switch.~~

~~*g*. Backup lamps. The bus body shall be equipped with two white rear backup lamps. All vehicles shall be equipped with lamps at least 4 inches in diameter or, if a shape other than round, a minimum of 13 square inches of illuminated area. All lamps shall have a white or clear lens and shall meet SAE specifications. If backup lamps are placed on the~~

~~same line as the brake lamps and turn signal lamps, they shall be to the inside.~~

~~*h*. Interior lamps. Interior lamps shall be provided which adequately illuminate the interior aisle and the step well. Step well lights shall be illuminated by a service door-operated switch, to illuminate only when headlights and clearance lights are on and the service door is open. In addition, the following interior lamps shall be provided:~~

~~(1) Supervisor's light. The rearmost ceiling light or a separate light may be used as a supervisor's light and shall be activated by a separate switch controlled by the driver.~~

~~(2) Driver's area dome light. This light shall have a separate switch controlled by the driver and shall illuminate the driver's compartment area.~~

~~(3) Body instrument panel lights shall be controlled by a rheostat switch.~~

~~(4) On buses equipped with a monitor for the front and rear lamps of the school bus, the monitor shall be mounted in full view of the driver. If the full circuit current passes through the monitor, each circuit shall be protected by a fuse or circuit breaker against any short circuit or intermittent shorts.~~

~~*i*. License plate lamp. The bus shall be equipped with a rear license plate illuminator. This lamp may be combined with one of the tail lamps.~~

~~*j*. Reflectors. Reflectors shall be securely attached to the body with sheet metal screws or other method having equivalent securement properties and installed in accordance with the requirements of FMVSS 108; however, the vehicle shall, as a minimum, be equipped with the following:~~

~~(1) Two amber reflectors, one on each side at the lower front and corner of the body approximately at floor level and back of the door on the right side, and at a similar~~

~~location on the left side. For all buses over 30 feet long, an additional amber reflector is required on each side at or near the midpoint between the front and rear side reflectors.~~

~~(2) Four red reflectors, one at each side at or near the rear and two on the rear, one at each side.~~

~~(3) Reflectors are to be mounted at a height not more than 42 inches or less than 30 inches above the ground on which the vehicle stands.~~

~~*k.* Warning signal lamps.~~

~~(1) Buses shall be equipped with two red lamps at the rear of the vehicle and two red lamps at the front of the vehicle.~~

~~(2) In addition to the four red lamps described above, four amber lamps shall be installed so that one amber lamp is located near each red signal lamp, at the same level, but closer to the vertical centerline of the bus. The system of red and amber signal lamps shall be wired so that amber lamps are energized manually and the red lamps are automatically energized (sequential), with amber lamps being automatically de-energized, when the stop signal arm is extended or when the bus service door is opened. An amber pilot light and a red pilot light shall be installed adjacent to the driver controls for the flashing signal lamp to indicate to the driver which lamp system is activated.~~

~~(3) The area immediately around the lens of each alternately flashing signal lamp shall be black. In installations where there is no flat vertical portion of body immediately surrounding the entire lens of the lamp, there shall be a circular or square band of black immediately below and to both sides of the lens, on the body or roof area against which the signal lamp is seen from a distance of 500 feet along the axis of the vehicle. Black~~

~~visors or hoods, with a minimum depth of 4 inches, may be provided.~~

~~(4) Red lamps shall flash at any time the stop signal arm is extended.~~

~~(5) All flashers for alternately flashing red and amber signal lamps shall be enclosed in the body in a readily accessible location.~~

~~(6) Strobe lights are permissible.~~

~~*l.* Turn signal lamps.~~

~~(1) The bus body shall be equipped with amber rear turn signal lamps that meet SAE specifications and are at least 7 inches in diameter or, if a shape other than round, a minimum of 38 square inches of illuminated area. These signal lamps must be connected to the chassis hazard warning switch to cause simultaneous flashing of turning signal lamps when needed as a vehicular traffic hazard warning. Turn signal lamps are to be placed as far apart as practical and their centerline shall be approximately 8 inches below the rear window. Type A-2 conversion vehicle lamps must be at least 21 square inches in lens area and in the manufacturer's standard color.~~

~~(2) Buses shall be equipped with amber side-mounted turn signal lights. The turn signal lamp on the left side shall be mounted rearward of the stop signal arm and the turn signal lamp on the right side shall be mounted rearward of the service door.~~

~~*m.* A white flashing strobe light rated for outdoor use and weather-sealed shall be installed on the roof of the bus not less than 1 foot or more than 4 feet from the rear center of the bus. The strobe light shall be located to the rear of the rearmost emergency roof hatch to prevent the roof hatch from diminishing the effectiveness of the strobe light. In addition:~~

~~(1) The strobe light shall have a single clear lens emitting light 360 degrees around its vertical axis and may not extend above the roof more than the maximum legal height.~~

~~(2) The strobe light must be controlled by a separate switch with an indicator light which when lit will indicate that the strobe light is turned on.~~

~~(3) The light shall be used only in fog, rain, snow, or at times when visibility is restricted.~~

~~(4) Each model strobe shall be approved by the motor vehicle division, Iowa department of transportation.~~

~~**44.4(25)** *Metal treatment*.~~

~~*a*. All metal, except high-grade stainless steel or aluminum, used in construction of the bus body shall be zinc-coated or aluminum-coated to prevent corrosion. This requirement applies to, but is not limited to, such items as structural members, inside and outside panels, door panels and floor sills. Excluded are such items as door handles, grab handles, interior decorative parts and other interior plated parts.~~

~~*b*. All metal parts that will be painted shall be, in addition to above requirements, chemically cleaned, etched, zinc-phosphate coated and zinc-chromate or epoxy primed to improve paint adhesion.~~

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

~~*d*. As evidence that the above requirements have been met, samples of materials and~~

~~sections used in construction of the bus body subjected to a 1,000-hour salt spray test as provided for in the latest revision of ASTM Standard B-117 shall not lose more than 10 percent of material by weight.~~

~~**44.4(26)** *Mirrors.*~~

~~*a.* The interior mirror shall be either clear view laminated glass or clear view glass bonded to a backing that retains the glass in the event of breakage. The mirror shall have rounded corners and protected edges. All Type A buses shall have a minimum of a 6-inch × 16-inch mirror; and Type B, C, and D buses shall have a minimum of a 6-inch × 30-inch mirror.~~

~~*b.* Each school bus shall be equipped with exterior mirrors meeting the requirements of FMVSS 111. Mirrors shall be easily adjustable, but shall be rigidly braced so as to reduce vibration.~~

~~*c.* Heated right- and left-side rearview mirrors shall be provided.~~

~~*d.* Systems offering a design feature permitting the driver to remotely adjust mirrors from the driver's compartment may be utilized.~~

~~*e.* The right side rearview mirrors must be unobstructed by the unwiped section of the windshield.~~

~~**44.4(27)** *Mounting.*~~

~~*a.* The chassis frame shall support the rear body cross member. Except where chassis components interfere, the bus body shall be attached to the chassis frame at each main floor sill in such manner as to prevent shifting or separation of the body from the chassis under severe operating conditions.~~

~~*b*. Isolators shall be placed at all contact points between the body and chassis frame and shall be secured by a positive means to the chassis frame or body to prevent shifting, separation, or displacement of the isolators under severe operating conditions.~~

~~*c*. The body front shall be attached and sealed to the chassis cowl to prevent entry of water, dust, and fumes through the joint between the chassis cowl and body.~~

~~*d*. The refurbishing or reconditioning of a body-on-chassis school bus is restricted to the repair and replacement of school bus body or chassis components. The original body and chassis, as certified by the original equipment manufacturers, shall be retained as a unit upon completion of repairs. It is not permissible to exchange or interchange school bus bodies and chassis. The refurbisher or reconditioner shall certify that the vehicle meets all state and federal construction standards in effect as of the date of manufacture and shall provide suitable warranty on all work performed. See also subrule 44.7(1).~~

~~**44.4(28)** *Mud flaps.*~~

~~*a*. Mud flaps or guards are required and shall be provided and installed by the body manufacturer or manufacturer's representative for both front and rear wheels.~~

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

~~*c*. Rear mud flaps or guards shall be comparable in size to the width of the rear wheelhousing and shall reach within approximately 9 inches of the ground when the bus is empty. They shall be mounted at a distance from the wheels to permit free access to spring hangers for lubrication and maintenance and to prevent their being pulled off~~

~~while the vehicle is in reverse motion or damaged by tire chains.~~

~~*d.* All mud flaps shall be constructed of rubber. Vinyl or plastic is not acceptable.~~

~~**44.4(29)** *Overall length.* Overall length of the bus shall not exceed the maximum allowed by the Iowa department of transportation.~~

~~**44.4(30)** *Overall width.* Overall width of the bus shall not exceed the maximum allowed by the Iowa department of transportation.~~

~~**44.4(31)** *Passenger securement.* See subrule 44.4(39).~~

~~**44.4(32)** *Public address system.* A public address system permitting interior or exterior communication with passengers, or both types of communication, may be installed.~~

~~**44.4(33)** *Radio system.* In the interest of safety for the children transported and the effective management of the school transportation program, a two-way radio communication system is highly recommended.~~

~~**44.4(34)** *Retroreflective material.*~~

~~*a.* Retroreflective material shall be provided in accordance with the following:~~

~~(1) The rear of the bus body shall be marked with strips of reflective NSBY material to outline the perimeter of the back of the bus using material which conforms with the "Retroreflective Sheeting Daytime Color Specification Proposal" of Appendix B, National School Transportation Specifications & Procedures Manual 2005, Central Missouri State University, Humphreys Suite 201, Warrensburg, Missouri 64093. The perimeter marking of rear emergency exits in accordance with FMVSS 217 and the use of reflective "SCHOOL BUS" signs partially accomplish the objective of this requirement.~~

~~To complete the perimeter marking of the back of the bus, strips of at least 1¾-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; and vertical strips shall be applied at the corners connecting these horizontal strips.~~

~~(2) "SCHOOL BUS" signs, if not of lighted design, shall be marked with reflective NSBY material comprising background for lettering of the front and rear "SCHOOL BUS" signs.~~

~~(3) Sides of the bus body shall be marked with reflective NSBY material at least 1¾ inches in width, extending the length of the bus body and located within 6 inches above or below the floor line or on the beltline.~~

~~*b.* Front and rear bumpers may be marked diagonally 45 degrees down to centerline of pavement with 2-inch +/- ¼ inch wide strips of noncontrasting reflective material. This material shall appear black during daylight hours; however, it will be seen as a reflective material during periods of reduced light conditions when a direct light source strikes the material.~~

~~**44.4(35)** *Rub rails.*~~

~~*a.* One rub rail located on each side of the bus at, or no more than 8 inches above, the seat level shall extend from the rear side of the entrance door completely around the bus body (except for emergency door or any maintenance access door) to the point of curvature near the outside cowl on the left side.~~

~~*b.* One rub rail located at, or no more than 10 inches above, the floor line shall cover~~

~~the same longitudinal area as the upper rub rail, except at wheelhousings, and shall extend only to radii of the right and left rear corners.~~

~~*c*. Rub rails at or above the floor line shall be attached at each body post and all other upright structural members.~~

~~*d*. Each rub rail shall be 4 inches or more in width in its finished form, shall be of 16-gauge steel or suitable material of equivalent strength, and shall be constructed in corrugated or ribbed fashion.~~

~~*e*. Rub rails shall be applied to outside body or outside body posts. Pressed-in or snap-on rub rails do not satisfy this requirement. For all buses using a rear luggage or rear engine compartment, rub rails need not extend around rear corners.~~

~~*f*. The bottom edge of the body side skirts shall be stiffened by application of a rub rail, or the edge may be stiffened by providing a flange or other stiffeners.~~

~~**44.4(36)** *Seat, driver*.~~

~~*a*. Type A school buses shall be equipped with a driver's seat of manufacturer's standard design meeting FMVSS.~~

~~*b*. All Type B, C, and D school buses shall have a driver's seat equipped with a one-piece high back designed to minimize the potential for head and neck injuries in rear impacts, providing minimum obstruction to the driver's view of passengers and meeting applicable requirements of FMVSS 222. The height of the seat back shall be sufficient to provide the specified protection for a 5th percentile adult female up to a 95th percentile adult male, as defined in FMVSS 208. The seat shall be centered behind the steering wheel with a backrest a minimum distance of 11 inches behind the steering wheel. The~~

~~seat shall be securely mounted to the floor of the bus with Grade 5 or better bolts and shall be secured with locking nuts or lock washers and nuts.~~

~~*c.* All air brake-equipped school buses may be equipped with an air suspension driver's seat meeting the following additional requirements:~~

~~(1) The air control for height adjustment shall be within easy reach of the driver in the seated position.~~

~~(2) The seat cushion shall be a minimum of 19½ inches wide, shall be fully contoured for maximum comfort, and shall have a minimum of four adjustment positions to allow changes in seat bottom angle.~~

~~(3) The backrest shall include adjustable lumbar support.~~

~~(4) The seat shall have a minimum of 7 inches of forward and rearward travel, adjustable with the driver in the seated position. This requirement applies to the seat mechanism. Reduction of this requirement to no less than 4 inches due to barrier placement on 89-passenger capacity buses will be acceptable.~~

~~(5) The seat shall have a minimum of 4 inches of up and down travel.~~

~~(6) Seat back shall include adjustability of tilt angle.~~

~~(7) All adjustments shall be by fingertip controls without the use of tools.~~

~~(8) The seat shall comply with all applicable FMVSS.~~

~~**44.4(37)** *Seat belt/shoulder harness system, driver*. Buses shall be equipped with a Type 2 lap belt/shoulder harness seat belt assembly for the driver. This assembly may be integrated into the driver's seat. The design shall incorporate a fixed female push-button type latch on the right side at seat level, and a male locking bar tongue on the left~~

~~retracting side. The assembly shall be equipped with a single, dual-sensitive emergency locking retractor (ELR) for the lap and shoulder belt. This system shall be designed to minimize "cinching down" on air sprung and standard seats. The lap portion of the belt shall be anchored or guided at the seat frame by a metal loop or other such device attached to the right side of the seat to prevent the driver from sliding sideways out of the seat. There shall be a minimum of 7 inches of adjustment of the "D" loop of the driver's shoulder harness on a nonintegrated style of seat belt assembly. Shoulder belt tension shall be no greater than is necessary to provide reliable retraction of the belt and removal of excess slack. The seat belt assembly and anchorage shall meet applicable FMVSS.~~

~~**44.4(38)** *Seats and crash barriers.*~~

~~*a.* All seats, component parts, and seat anchorage shall comply with applicable federal requirements as of the date of their manufacture.~~

~~*b.* All seats shall have a minimum cushion depth of 15 inches and a seat back height of 24 inches above the seating reference point and shall comply with all other requirements of FMVSS 222.~~

~~*c.* In determining the rated seating capacity of the bus, allowable average rump width shall be:~~

~~(1) Thirteen inches where a three-three seating plan is used.~~

~~(2) Fifteen inches where a three-two seating plan is used.~~

~~*d.* The following knee room requirements shall apply to all school bus bodies:~~

~~(1) Knee room shall meet the requirements of FMVSS 222 and shall be measured, on Type A-2, B, C and D school buses, at the center of the transverse line of the seat and at~~

~~seat cushion height. The distance from the front of a seat back (cushion) to the back surface of the cushion on the preceding seat shall be not less than 24 inches. The seat upholstery may be placed against the seat cushion padding, but without compressing the padding, before the measurement is taken.~~

~~(2) On Type A-1 school buses, seat spacing shall be of the manufacturer's standard spacing.~~

~~*e.* All seats shall be forward-facing with seat frames attached to the seat rail with two bolts, washers and nuts or flange-headed nuts. Each seat leg shall be secured to the floor by a minimum of two bolts, washers, and nuts. Flange-head nuts may be used in lieu of nuts and washers, or seats may be track-mounted in conformance with FMVSS 222. This information shall be on a label permanently affixed to the bus.~~

~~*f.* Jump seats or portable seats are prohibited; however, 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 an upright position. The seat cushion shall be designed to rise to a vertical position automatically when not occupied.~~

~~*g.* Seats, seat back cushions, and restraining barriers shall be covered with a material having 42-ounce finished weight, 54-inch width, and finished vinyl coating of 1.06 broken twill or other material with equal tensile strength, tear strength, seam strength,~~

~~adhesion strength, and resistance to abrasion, cold and flex separation.~~

~~*h*. All fabric seams shall be chain- or lock-stitch sewn with two threads, each equal to or exceeding the tensile strength of "F"-rated nylon thread.~~

~~*i*. Crash barriers shall be installed conforming to FMVSS 222; however, all Type A-2 school bus bodies shall be equipped with padded crash barriers, one located immediately to the rear of the driver's seat and one at the service door entrance immediately to the rear of the step well.~~

~~*j*. Crash barriers and passenger seats may be constructed with materials that enable them to meet the criteria contained in the school bus seat upholstery fire block test specified in the National School Transportation Standards & Procedures Manual 2005, Central Missouri State University, Warrensburg, Missouri 64093. Fire block material, when used, shall include the covering of seat bottoms.~~

~~*k*. Seat cushions may contain a positive locking mechanism that requires removal of a security device before the seat may be unlatched.~~

~~**44.4(39)** *Passenger securement seating system.*~~

~~*a*. Type A-1 vehicles shall conform to all FMVSS at date of manufacture.~~

~~*b*. Unless otherwise required by FMVSS, school bus seats may be equipped with passenger securement systems for passengers with disabilities in accordance with 281—Chapter 41 when it is determined by the child's individual education program staffing team that special seating and positioning are necessary during transportation. When the staffing team determines that a passenger securement system is necessary to safely transport a student with a disability, the need shall be documented in the student's~~

~~individual education plan (IEP).~~

~~*c*. When a child securement system is required in 44.4(39)"*b*," the seat, including seat frame, seat cushion, belt attachment points, belts and hardware shall comply with all applicable FMVSS at the time of manufacture. When it is determined that the securement system is no longer necessary to provide seating assistance to a child with a disability, the securement system shall be removed from the seat frame.~~

~~*d*. Children transported in child safety seats shall be secured to the school bus seat according to the child safety seat manufacturer's instructions.~~

~~**44.4(40)** *Steps*.~~

~~*a*. The first step at the service door shall be not less than 10 inches and not more than 14 inches from the ground when measured from the top surface of the step to the ground, based on standard chassis specifications, except that on Type D vehicles, the first step at the service door shall be 11 inches to 16 inches from the ground. A step well guard/skid plate shall be installed by the manufacturer on all Type D vehicles.~~

~~*b*. Step risers shall not exceed a height of 10 inches. When plywood is used on a steel floor or step, the riser height may be increased by the thickness of the plywood.~~

~~*c*. Steps shall be enclosed to prevent accumulation of ice and snow.~~

~~*d*. Steps shall not protrude beyond the side body line.~~

~~*e*. A suitable device(s) shall be installed within the service entrance door area to assist passengers during entry or egress from the bus. The device(s) shall be designed so as to prevent injury or fatality to passengers from being dragged by the bus after becoming entangled in the device(s).~~

~~**44.4(41)** *Step treads.*~~

~~*a.* All steps, including floor line platform area, shall be covered with an elastomer floor covering having a minimum overall thickness of 3/16 inch.~~

~~*b.* Grooved design step treads shall be such that grooves run at a 90-degree angle to the long dimension of the step tread. The step covering shall be permanently bonded to a durable backing material that is resistant to corrosion.~~

~~*c.* Step treads shall have a 1½-inch white nosing as an integral piece without any joint.~~

~~*d.* Step treads shall have abrasion resistance, slip resistance, weathering resistance, and flame resistance as outlined in the National School Transportation Specifications & Procedures Manual 2005, Missouri Safety Center, Central Missouri State University, Humphreys Suite 201, Warrensburg, Missouri 64093.~~

~~*e.* A 3-inch white rubber step edge at floor level, flush with the floor covering, shall be provided.~~

~~**44.4(42)** *Stirrup steps.*~~

~~*a.* There shall be at 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. Handles on the service door are prohibited.~~

~~*b.* Steps or cutouts are permitted in the front bumper only, in lieu of the stirrup steps, if the windshield and lamps are easily accessible for cleaning from that position.~~

~~**44.4(43)** *Stop signal arm.*~~

~~*a.* The stop signal arm shall be a flat 18-inch octagon exclusive of brackets for~~

~~mounting. All lamps and lamp components shall comply with the requirements of FMVSS 131.~~

~~*b*. Both surfaces of the sign shall be covered with reflectorized material having a reflective capability equal to or exceeding that of 3M Corporation high-intensity sheeting.~~

~~*c*. The application of the reflective sheeting material shall be in accordance with the sheeting manufacturer's suggested application process. All copy shall be sharply defined and clean cut.~~

~~*d*. The stop arm blade shall be mounted in the area below the driver's window on the left side of the bus.~~

~~*e*. Each stop arm blade shall be automatically extended upon activation of the red warning signal lamp system and remain extended until the red signal lamps are deactivated. In addition, each stop arm blade shall be equipped with two double-faced, 4-inch, alternately flashing red lights. The use of strobe lamps in the stop arm blade is acceptable.~~

~~*f*. A wind guard shall be installed which prevents air currents from circulating behind the blade.~~

~~*g*. The stop arm shall be vacuum-, electric-, or air-operated; and the system must positively hold the sign in extended or retracted position to prevent whipping in the wind.~~

~~*h*. If the air for an air-operated stop arm comes from the regular air brake system, the body manufacturer shall provide the necessary check valve and pressure reduction valve to safeguard the air supply for brake application.~~

~~*i*. A second stop signal arm may be installed on the left side at or near the left rear~~

~~corner of the school bus and shall meet the requirements of FMVSS 131.~~

~~*j*. The two double-faced, 4-inch flashing lights may be replaced with an LED illuminated, high-visibility display, spelling out the word "STOP" visible to the front and rear. This lighting system shall comply with applicable FMVSS prior to installation.~~

~~**44.4(44)** *Storage compartments.*~~

~~*a*. An enclosed space shall be provided in the driver's compartment for storing manuals and bus driver records.~~

~~*b*. A storage container for tools, tire chains, and tow chains may be located either inside or outside the passenger compartment; but, if inside, it shall have a cover (seat cushion may not serve this purpose) capable of being securely latched and fastened to the floor, convenient to either the service or emergency door.~~

~~**44.4(45)** *Sun shield.*~~

~~*a*. For Type B, C, and D vehicles, an interior adjustable transparent sun shield not less than 6 inches by 30 inches with a finished edge shall be installed in a position convenient for use by the driver.~~

~~*b*. On all Type A buses the sun shield shall be the manufacturer's standard.~~

~~**44.4(46)** *Tailpipe.* See subrule 44.3(16).~~

~~**44.4(47)** *Front tow hooks.* See paragraph 44.3(7)*"f."*~~

~~**44.4(48)** *Rear tow hooks.* Two rear tow hooks are required on all school buses. Rear tow hooks shall be attached to the chassis frame and located under the rear bumper so the hook portion is under the body.~~

~~**44.4(49)** *Trash container and holding device.*~~

~~*a.* When a trash container is placed on the school bus, it shall comply with the following:~~

~~(1) Meet the requirements of FMVSS 302, Flammability of Interior Materials.~~

~~(2) Be no greater than 14-quart capacity.~~

~~(3) Be secured by a holding device that is designed to prevent movement and to allow easy removal and replacement.~~

~~*b.* The container shall be placed in an accessible location in the driver's compartment of the school bus subject to department of education approval. The container shall not obstruct the aisle of the bus, access to safety equipment or passenger use of the service entrance door.~~

~~**44.4(50)** *Undercoating.*~~

~~*a.* The entire underside of the bus body, including floor sections, cross member and below floor line side panels, shall be coated with rustproofing compound for which the compound manufacturer has issued notarized certification of compliance to the bus body builder that the compound meets or exceeds all performance and qualitative requirements of paragraph 3.4 of Federal Specification TT-C-520b using modified test procedures* for the following requirements:~~

~~(1) Salt spray resistance—pass test modified to 5 percent salt and 1000 hours.~~

~~(2) Abrasion resistance—pass.~~

~~(3) Fire resistance—pass.~~

~~*Test panels to be prepared in accordance with paragraph 4.6.12 of TT-C-520b with~~

~~modified procedure requiring that test be made on a 48-hour air cured film at thickness recommended by compound manufacturer.~~

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

~~**44.4(51)** *Vacuum check valve*. A vacuum check valve shall be provided and installed on the chassis by the school bus body manufacturer for connecting vacuum accessory items.~~

~~**44.4(52)** *Vandal lock*.~~

~~*a*. The school bus may be equipped with a vandal locking system for securing the service entrance and emergency door(s).~~

~~*b*. The vandal locking system shall include the following design features:~~

~~(1) The entrance door is to be locked by an exterior key with a dead bolt, a remote control (cable) device or an electric device. The system must prevent the door from being accidentally locked by any motion the bus may encounter during its normal operation. This does not apply to Type A vehicles with a left-side driver's door.~~

~~(2) When the bus is equipped with a rear-mounted engine, the emergency door and rear emergency exit window are to be locked by an interior slide bolt which shall activate a buzzer when the door or emergency exit window is locked and the ignition of the bus is turned on. The locking mechanism must be capable of being locked or unlocked without the use of a separate key or other similar device.~~

~~(3) The engine starting system of the bus shall not operate if the rear or side~~

~~emergency door or rear emergency exit window over the rear engine compartment is locked from either the inside or outside of the bus.~~

~~(4) Hasp-type devices may not be attached to the bus for the purpose of securing any door or window.~~

~~**44.4(53)** *Ventilation.*~~

~~*a.* The body ventilation system on Type A, B, C and D buses shall include one static, nonclosing exhaust vent in the low-pressure area of the roof and one or more combination roof ventilation/emergency escape hatches in accordance with 44.4(13)"*b.*" The ventilation system shall be capable of being controlled and shall have sufficient capacity to maintain a proper quantity of air under operating conditions without the opening of windows except in extremely warm weather.~~

~~*b.* Each combination roof ventilation/emergency escape hatch shall be installed by the school bus body manufacturer or the body manufacturer's approved representative and shall have the following design and installation features:~~

~~(1) Multiposition fresh air ventilation.~~

~~(2) Release handle(s) permitting operation as an emergency exit(s), accessible inside and outside the vehicle.~~

~~(3) An audible warning system which sounds an alarm in the driver's compartment area when the emergency roof hatch is unlatched shall be installed as a design feature by the manufacturer.~~

~~(4) When more than one ventilation/emergency roof hatch is required, one shall be installed forward of the intersection of the horizontal and longitudinal midpoints of the~~

~~bus in a low-pressure area of the roof. The second unit shall be installed on the roof in a location behind the rear axle. When only one ventilation/emergency roof hatch is required, it shall be installed in a low-pressure area of the roof at or near the longitudinal midpoint of the bus.~~

~~(5) Ventilation/emergency escape hatches may include static-type nonclosable ventilation.~~

~~*c.* Auxiliary fans shall be installed and shall meet the following requirements:~~

~~(1) Two adjustable fans shall be installed on Type B, C and D buses. Fans for left and right sides shall be placed in a location where they can be adjusted for maximum effectiveness and do not obstruct vision to any mirror.~~

~~(2) Fans shall be a nominal 6-inch diameter except where noted below.~~

~~(3) Fan blades shall be covered with a protective cage. Each fan shall be controlled by a separate switch capable of two-speed operation.~~

~~(4) Type A buses shall have at least one fan having a nominal diameter of at least 4 inches meeting the above requirements.~~

~~**44.4(54)** *Wheelhousings.*~~

~~*a.* The wheelhousing opening shall allow for easy tire removal and service.~~

~~*b.* The wheelhousing shall be attached to the floor sheets in such a manner as to prevent any dust, water or fumes from entering the body. Wheelhousings shall be constructed of at least 16-gauge steel or other material capable of withstanding passenger or other expected loads applied internally or externally without deformation.~~

~~*c.* The inside height of the wheelhousing above the floor line shall not exceed 12~~

~~inches.~~

~~*d.* The wheelhousing shall provide clearance for installation and use of tire chains on single and dual (if so equipped) power-driving wheels.~~

~~*e.* No part of a raised wheelhousing shall extend into the emergency door opening.~~

~~**44.4(55)** *Windshield and windows.*~~

~~*a.* All glass in windshield, windows, and doors shall be of approved safety glass consistent with American National Standard, Safety Code for Safety Glazing Materials for Glazing Motor Vehicles Operating on Land Highways, Z-26.1, mounted so the permanent mark is visible, and of sufficient quality to prevent distortion of view in any direction.~~

~~*b.* Glass in windshields may be heat-absorbing and may contain a shaded band across the top. Location of "fade out" shall be above the upper limit for maximum visibility.~~

~~*c.* Each full side window, other than emergency exits designated to comply with FMVSS 217, shall be split-sash type and shall provide an unobstructed emergency opening of at least 9 inches but not more than 13 inches high and 22 inches wide, obtained by lowering the window. When the driver's window consists of two sections, both sections shall be capable of being moved or opened.~~

~~*d.* Insulated double glass is required in both sections of the left-side driver's window and in the upper glass portion(s) of the service entrance door.~~

~~*e.* Window glass forward of the service door and in the driver's direct line of sight for observing exterior rearview mirrors and traffic shall be of insulated double glass. The door glass in Type A-2 vehicles equipped with a manufacturer's standard van-type, right-~~

~~side service door may be of the manufacturer's standard design.~~

~~*f.* The school bus body manufacturer may design and install a protective device over the inside, lower window glass of a rear emergency door to protect it from being damaged or broken during normal operation. The protective device shall be securely mounted by the manufacturer, shall be free of projections which might harm passengers, and shall permit visibility through the device to the area outside and to the rear of the bus.~~

~~*g.* Tinted glazing capable of reducing the amount of light passing through a window may be installed consistent with rules established by the Iowa department of public safety relating to automotive window transparency standards, except that the following windows shall be of AS-II clear glass rating:~~

~~(1) Both sections of the window to the immediate left of the driver.~~

~~(2) All glass forward of and including the left-side driver's window.~~

~~(3) The entire windshield area shall be of AS-I rating.~~

~~(4) All glass in the service entrance door.~~

~~**44.4(56)** *Windshield washers.* Buses shall be equipped with electric wet-arm windshield washers which conform to the body manufacturer's recommendation as to type and size for the bus on which they are to be used. The windshield washer system on Type A vehicles may be of the manufacturer's standard design.~~

~~**44.4(57)** *Windshield wipers.*~~

~~*a.* For Type A vehicles, windshield wipers shall be supplied by the chassis manufacturer and shall be of the manufacturer's standard design. Windshield wipers shall meet the requirements of FMVSS 104.~~

~~*b*. Type B, C and D buses shall be equipped with two positive-action, two-speed or variable-speed electric or air windshield wipers. Windshield wipers shall have an intermittent wiping feature.~~

~~*c*. 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 a full sweep of the windshield.~~

~~*d*. Wiper control(s) shall be located within easy reach of the driver and shall be designed to move the blades from the driver's view when the wiper control is in the "off" position.~~

~~**44.4(58)** *Wiring.*~~

~~*a*. All wiring shall conform to current SAE standards.~~

~~*b*. Circuits:~~

~~(1) Wiring shall be arranged in circuits, as required, with each circuit protected by a fuse or circuit breaker or circuit protection device. All wiring shall use a standard color or number coding system or a combination of color and number coding. Each chassis shall be delivered with a wiring diagram that illustrates the wiring of the chassis.~~

~~(2) A master wiring diagram shall be supplied for each vehicle provided by the body manufacturer. Chassis wiring diagrams, including any changes to wiring made by the body manufacturer, shall also be supplied to the end user.~~

~~(3) The following body interconnecting circuits shall be color-coded as noted:~~

~~FUNCTION~~	~~COLOR~~

~~FUNCTION~~	~~COLOR~~
~~Left Rear Directional Light~~	~~Yellow~~
~~Right Rear Directional Light~~	~~Dark Green~~
~~Stoplights~~	~~Red~~
~~Backup Lights~~	~~Blue~~
~~Taillights~~	~~Brown~~
~~Ground~~	~~White~~
~~Ignition Feed, Primary Feed~~	~~Black~~

~~The color of cables shall correspond to SAE J 1128.~~

~~*c*. Wiring shall be arranged in at least six regular circuits as follows:~~

~~(1) Head, tail, stop (brake) and instrument panel lamps.~~

~~(2) Clearance and step well lamps which shall be actuated when the service door is opened.~~

~~(3) Dome lamp.~~

~~(4) Ignition and emergency door signal.~~

~~(5) Turn signal lamps.~~

~~(6) Alternately flashing signal lamps.~~

~~*d*. Any of the above combination circuits may be subdivided into additional independent circuits.~~

~~*e*. Whenever heaters and defrosters are used, at least one additional circuit shall be~~

~~installed.~~

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

~~*g.* Each body circuit shall be coded by number or letter on a diagram of circuits which shall be attached to the body in a readily accessible location.~~

~~*h.* The entire electrical system of the body shall be designed for the same voltage as the chassis on which the body is mounted.~~

~~*i.* All wiring shall have an amperage capacity exceeding the design load by at least 25 percent. All wiring splices are to be made at an accessible location and noted as splices on wiring diagram.~~

~~*j.* A body wiring diagram, of a size which can be easily read, shall be furnished with each bus body or affixed in an area convenient to the electrical accessory control panel.~~

~~*k.* The body power wire shall be attached to a special terminal on the chassis.~~

~~*l.* All wires passing through metal openings shall be protected by a grommet.~~

~~*m.* Wires not enclosed within the body shall be fastened securely at intervals of not more than 18 inches. All joints shall be soldered or joined by equally effective connectors, which shall be water-resistant and corrosion-resistant.~~

ITEM 3: Amend 281---44.4 as follows:

281~~—44.5~~ <u>44.4</u>(285) Construction of vehicles for children with mobility problems. The following shall apply to vehicles constructed for the transportation of children with mobility problems of such severity that the children are prohibited from utilizing the

regular service door entrance. Vehicles constructed for transporting these children shall meet all FMVSS relating to school bus construction and Iowa school bus construction requirements as described in rules 281—44.1(285) and 281—~~44.4~~ **44.3**(285). The following standards shall also apply:

~~**44.5(1)**~~ **44.4(1)** *General requirements.*

a. Certification of these vehicles as multipurpose passenger vehicles due to capacity rating shall not relieve the manufacturer of the responsibility to provide a completed vehicle meeting all FMVSS for school buses as well as rules 281—44.1(285) to 281—~~44.4~~ 44.3(285) relating to the construction of a school bus.

b. Alteration of the interior of the vehicle is permissible if all seats and barriers, component parts, anchorages, wheelchair securement devices, and placement of seats and barriers and wheelchair securement devices comply with federal requirements as of date of manufacture. All equipment must be supplied by the original manufacturer and installed per the original manufacturer's specification. Alteration which would return the vehicle to conventional passenger seating shall include removal of all wheelchair securement devices, removal of the power lift, and rendering the special service door inoperable.

c. Any school bus that is used for the transportation of children who are confined to a wheelchair or other restraining devices which prohibit use of the regular service entrance shall be equipped with a power lift located on the right side of the bus body and forward f the rear wheels on a Type B, C, or D bus. Wheelchair lift placement behind the rear wheels is allowed on Type A buses only. See paragraph 44.5(2)*"f."*

d. The actual rated seating capacity following modification of a vehicle shall be placed at locations indicated in paragraph ~~44.4(20)*"d."*~~ 44.3(36)*"e."*

e. Ramps are not permitted.

~~**44.5(2)**~~ **44.4(2)** *Specific requirements.*

a. Aisle.

(1) Aisles leading from wheelchair placement(s) to the special service door and the service door shall at all times be a minimum of 30 inches wide.

(2) Aisles leading to all the emergency doors from wheelchair placement(s) shall at all times be at least 20 inches in width.

b. Barriers.

(1) Barriers shall comply with and be installed as required by federal standards as of date of manufacture.

(2) A heavy-duty padded barrier or stanchion shall be provided immediately to the rear of the step well opening extending from the side wall of the bus to approximately the aisle to prevent a person from accidentally falling into the step well opening from floor level. A barrier or stanchion as mentioned above shall also be placed directly behind the driver.

(3) The power lift mechanism shall be padded and protected to prevent a child from accidentally getting any part of the child's body caught in the power lift mechanism or special service door at any time.

(4) All crash/restraining barriers shall be the same height as the passenger seating height in the bus.

c. Glazing. Tinted glazing may be installed in all doors, windows, and windshield.

d. Heaters. An additional heater(s) may be installed in the rear portion of the bus on or behind wheel wells.

e. Identification. Buses with wheelchair lifts used for transporting physically handicapped children shall display universal handicapped symbols located on the front and rear of the vehicle below the window line. Emblems shall be white on blue, shall not exceed 12 × 12 inches in size, and may be reflectorized.

f. Power lift.

(1) The lifting mechanism shall be able to lift a minimum payload of 800 pounds.

(2) The power lift shall be located on the right side of the body and in no way be attached to the exterior sides of the bus, but should be confined within the perimeter of the school bus body when not extended. The power lift shall be located forward of the rear wheels of the vehicle on Type B, C and D buses. Wheelchair lift placement behind the rear wheels is allowed on Type A buses only.

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

(4) All lift controls shall be portable and conveniently located on the inside of the bus near the special service door opening. Controls shall be easily operable from inside or outside the bus by either a platform standee or person seated in a wheelchair when the lift is in any position. A master cut-off switch <u>controlling on/off power to the lift</u> shall be located in the driver's compartment. There shall be a means of preventing the lift platform from falling while in operation due to a power failure.

(5) Power lifts shall be equipped so they may be manually raised or lowered in the event of power failure of the power lift mechanism.

(6) The platform shall accommodate a wheelchair which is 30 inches wide. The platform shall be not less than 44 inches long, including guard panels or rails.

(7) The power lift platform shall be covered with skid-resistant material or be designed to prevent slipping.

(8) The lift platform shall be constructed to permit vision through that portion of the platform covering the window of the special service door when the platform is in the "up" position.

(9) All edges of the platform shall be designed to restrain a wheelchair and to prevent the operator's feet from being entangled during the raising and lowering process.

(10) The platform shall be fitted on both sides with full width shields which extend above the floor line of the lift platform.

(11) An operating safety barrier shall be affixed to the outer edge (curb end) of the platform that will prohibit the wheelchair from rolling off the platform when the lift is in any position other than fully extended to ground level. The barrier shall not be capable of being manually operated.

(12) A self-adjusting, skid-resistant plate shall be installed on the outer edge of the platform to minimize the incline from the lift platform to the ground level. This plate, if so designed, may also suffice as the restraining device described in subparagraph (11) above.

(13) The power lift shall be designed so the lift will not operate unless the

special service door(s) is opened and the lift platform is in the “down” or horizontal position.

(14) The lift travel shall allow the lift platform to rest securely on the ground.

(15) A circuit breaker, fuse, or other electrical protection device shall be installed between the power source and the lift motor if electrical power is used.

(16) When hydraulic pressure is used in the lifting process, the system shall be equipped with adjustable limit switches or bypass valves to prevent excessive pressure from building in the hydraulic system when the platform reaches the full “up” position or full “down” position.

(17) All exposed parts of the power lift which are in direct line with the forward or rearward travel of a wheelchair student or attendant shall be padded with energy-absorbing material.

g. Ramps. Ramps are not permitted.

h. Regular service entrance.

(1) An additional fold-out or slide-out step may be provided which will provide for the step level to be no more than 6 inches from the ground level to assist persons with handicapping conditions that prohibit the use of the standard entrance step. This step, when stored and not in use, shall not impede or in any way block the normal use of the entrance.

(2) On power lift-equipped vehicles, service entrance steps shall be the full width of the step well, excluding the thickness of the doors in the open position.

(3) In addition to the standard handrail required in all buses, an additional handrail may be provided on all specially equipped school buses. If so equipped, this rail shall be located on the opposite side of the entrance door from the required rail and shall meet the same requirements for handrails.

i. Seating and seating arrangements.

(1) All seat spacing, seats, and related components shall comply with applicable federal standards as of date of manufacture.

(2) All seats shall be forward facing. Side-facing seats are prohibited.

(3) Seat frames may be equipped by the school bus body manufacturer with rings or other devices to which passenger restraint systems may be attached.

j. Special light. Light(s) shall be placed inside the bus to sufficiently illuminate the lift area and shall be activated from the door area.

k. Special service opening.

(1) There shall be an enclosed service opening located on the right side (curb side) of the body forward of the rear wheels to accommodate a wheelchair lift on Type B, C and D buses. This service opening may be placed on the right side (curb side) of the body behind the rear wheels on Type A buses only to accommodate a wheelchair lift in that location.

(2) The opening shall be at least 52 inches high and 40 inches wide and with doors open shall be of sufficient width to allow for the installation of various power lifts and related accessories as well as a lifting platform at least 32 inches wide.

(3) The opening shall be positioned far enough to the rear of the regular service door

opening to prevent interference of the special service door(s) opening with the regular service doors.

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

(5) Doorposts, headers, and all floor sections around this special opening shall be reinforced to provide strength and support equivalent to adjacent side wall and floor construction of an unaltered model.

(6) A header pad at least 3 inches wide, extending the width of special service door, shall be placed above the opening on the inside of the bus.

l. Special service door(s).

(1) All doors shall open outwardly.

(2) All doors shall have positive fastening devices to hold doors in the open position.

(3) All doors shall be equipped with heavy-duty hinges and shall be hinged to the side of the bus.

(4) All doors shall be weather sealed; and on buses with double doors, each door shall be of the same size and constructed so a flange on the forward door overlaps the edge of the rear door when closed.

(5) If optional power doors are installed, the design shall permit release of the doors for opening and closing by the attendant from the platform inside the bus.

(6) When manually operated 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 shall be to the floor line of

the body, and the other shall be into the rear door. These locking devices shall afford maximum safety when the doors are in the closed position. The door and hinge mechanism shall be of a strength that will provide the same type of use as that of a standard entrance door.

(7) If the door is made of one-piece construction, the door shall be equipped with a slidebar, cam-operated locking device.

(8) Each door shall have installed a safety glass window, set in a waterproof manner, and aligned with the lower line of adjacent sash and as nearly as practical to the same size as other bus windows.

(9) 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.

(10) The door(s) shall be equipped with a device(s) that will actuate a flashing visible signal located in the driver's compartment when the door(s) is not securely closed. (An audible signal is not permitted.)

m. Special student restraining devices.

(1) Each wheelchair station shall be equipped with a lap and torso restraint system that meets applicable FMVSS.

(2) Special restraining devices such as shoulder harnesses, lap belts, and chest restraint systems may be installed to the seats providing that the devices do not require the alteration in any form of the school bus seat, seat cushion, framework, or related seat components. These restraints must be for the sole purpose of restraining passengers.

(3) All child safety restraint systems shall comply with the requirements of FMVSS No. 213, *Child Restraint Systems*.

n. Wheelchair securement systems.

(1) Securement systems for wheelchairs shall meet or exceed applicable FMVSS.

(2) All wheelchair securement systems or devices shall be placed in the vehicle so that, when secured, both wheelchair and occupant are facing toward the front of the vehicle. Fastening devices resulting in a side-facing wheelchair and occupant are not permissible.

(3) Straps or seat-belt devices running through the wheels of the wheelchair or around the student seated in the wheelchair for the purpose of securing the wheelchair to the floor are not acceptable.

(4) The wheelchair securement system(s) shall be located in a school bus so that when a wheelchair is not secured in place the floor attachment system shall not extend above the floor level more than ½ inch.

281—~~44.6~~ 44.5(285) ~~Family-type or multipurpose passenger~~ Type III vehicles.

~~44.6(1)~~ 44.5(1) *General information.* These vehicles may be used as a school bus in accordance with the following general requirements:

a. The vehicle shall be an original equipment manufacturer's (OEM) product and manufactured as a family-type or multipurpose passenger vehicle (MPV).

(1) Vehicles classified as pickups are not allowed for use as student transportation.

(2) Vehicles used exclusively for driver's education are exempt from these requirements.

b. The manufacturer's rated capacity of this vehicle, which shall be determined only by the original equipment manufacturer (OEM) on the date of manufacture, shall not exceed nine persons including the driver. The capacity rating may not be changed or modified except by the original equipment manufacturer. Secondary stage or vehicle conversion manufacturers shall not establish vehicle capacity.

c. Alteration of this vehicle, following manufacture by the OEM, is prohibited. This includes, but is not limited to, the addition or removal of seats, ramps, wheelchair securement devices and power lifts.

EXCEPTION: OEM options or other manufacturer's accessories not in violation of these standards may be installed.

d. The vehicle shall not carry more passengers than there are seat belts as installed by the manufacturer.

e. The vehicle shall not be painted the color known as national school bus glossy yellow.

f. The vehicle shall not be equipped with a stop arm or flashing warning signal lamps.

g. This vehicle must load and unload students off the traveled portion of the roadway.

~~44.6(2)~~ 44.5(2) *Special equipment.*

a. Interior liner. An interior liner that covers all exposed ceiling girders, sidewall posts, or other structural projections must be provided and installed by the manufacturer.

b. The vehicle, while transporting students to and from school, shall display a sign,

visible to the rear, with the words “SCHOOL BUS.” The sign shall be national school bus glossy yellow with black letters 6 inches high. The sign shall be a type that can be removed, dismounted, or covered when the vehicle is not transporting pupils to and from school.

c. A sign with the words “THIS VEHICLE STOPS AT ALL RAILROAD CROSSINGS,” visible to the rear, may be used where appropriate and not in conflict with current statutes. If used, the words shall be black letters on a yellow background. The sign shall be of a type that can be dismounted, turned down, or covered when the vehicle is not transporting pupils to and from school.

d. Special brake lamps. The vehicle may be equipped with two roof-mounted lights not greater than 4 inches in diameter and positioned horizontally on the roof at least 36 inches apart. The lights shall be connected to the brake lamp circuit of the vehicle’s electrical system and shall operate only when the brakes are applied. When lit, the lamps shall be red and shall be visible only to the rear.

e. First-aid kit. The vehicle shall carry a minimum ten-unit first-aid kit. See ~~44.4(15)*“d”*(2).~~ **44.3(22*)”d”(*2).**

f. Fire extinguisher. The vehicle shall carry a dry chemical fire extinguisher of at least 2½-pound capacity with a rating of 2A-10BC. The extinguisher shall be equipped with a calibrated or marked gauge. Plastic discharge heads and related parts are not acceptable.

g. Each vehicle shall be equipped with a durable webbing cutter having a full-width handgrip and a protected, replaceable or noncorrodible blade. This device shall be

mounted in a location accessible to the seated driver in an easily detachable manner.

h. Each vehicle shall be equipped with a body fluid cleanup kit.

i. Each vehicle shall be equipped with a backup alarm beeper capable of a minimum of 112 db. NOTE: This is effective for 2007 model year vehicles and newer.

i. Trailer hitches are allowed on Type III vehicles in accordance with the manufacturer's rated towing capacity. Students are not allowed to be transported in the vehicle when the vehicle is being used to tow.

~~44.6(3)~~ 44.5(3) *Applicability of standards.* The above standards apply to all vehicles (except as noted in 44.6(2)"*i*") of this type and those currently in service used to transport students to and from school.

281—~~44.7~~ 44.6(285) Repair, replacement of school bus body and chassis components following original equipment manufacture.

~~44.7(1)~~ 44.6(1) *Body and chassis repair following an accident.*

a. A school bus that has been involved in an accident in which there is damage to the body or chassis components may be repaired to the extent that such repair is possible and that the damaged component can be returned to the original equipment manufacturer's specification and function.

b. The individual or company making the repairs shall certify to the vehicle's owner that all repairs have been made in accordance with the original vehicle or component manufacturer's recommendations using original equipment manufacturer's materials and parts, or their guaranteed equal.

c. Repairs shall not cause the vehicle to no longer comply with any FMVSS in effect

and applicable at the time the vehicle or component was manufactured.

~~44.7(2)~~ 44.6(2) *New technology and equipment approval procedure.* It is the intent of these rules to accommodate new technologies and equipment which will better facilitate the transportation of students to and from school and related activities. A new technology, piece of equipment or component that meets the following criteria may be adopted under the following conditions pending formal rule adoption:

a. The technology, equipment or component shall not compromise the effectiveness or integrity of any major safety system, unless it completely replaces the system.

b. It shall not diminish the safe environment of the interior of the bus.

c. It shall not create additional risk to students who are boarding or exiting the bus or are in or near the school bus loading zone.

d. It shall not create undue additional activity or responsibility for the driver.

e. It shall not generally decrease the safety or efficiency of the bus.

f. It shall generally provide for a safer or more pleasant experience for the occupants and pedestrians in the vicinity of the bus or generally assist the driver or make the driver's many tasks easier to perform.

g. A pilot test for the purpose of evaluating the performance of the new technology, product or vehicle component may be conducted at the direction of the school transportation consultant with the approval of the director of the ~~department of education~~ Department of Education. The pilot test shall include a minimum of five, but not more than ten, applications of the technology, product or component at locations and over a period of time to be mutually agreed upon by the department and the manufacturer of the

product.

h. The cost of the technology, product or vehicle component and its installation shall be the responsibility of the manufacturer unless other arrangements are made prior to testing or evaluation.

i. An evaluation of the product's performance shall be conducted by department staff, and if the product is determined to meet the criteria listed in ~~44.7~~ 44.6(2)*"a"* to *"f,"* measures shall be taken as soon as practicable to formally approve the product.

j. A technology, product or component not recommended for approval by the department shall immediately be removed from vehicles upon which pilot tests were being conducted; and its use shall be discontinued by schools or individuals serving as pilot test sites, upon receipt of written notice from the ~~department of education~~ Department of Education.

These rules are intended to implement Iowa Code sections 285.8 and 321.373.