EDUCATION DEPARTMENT[281]

Regulatory Analysis

Notice of Intended Action to be published: Iowa Administrative Code 281—Chapter 44
"School Buses"

Iowa Code section(s) or chapter(s) authorizing rulemaking: 285.9(1)
State or federal law(s) implemented by the rulemaking: Iowa Code chapter 285

Public Hearing

A public hearing at which persons may present their views orally or in writing will be held as follows:

January 2, 2024 9:30 to 10 a.m.	Room B100 Grimes State Office Building Des Moines, Iowa

Public Comment

Any interested person may submit written or oral comments concerning this Regulatory Analysis. Written or oral comments in response to this Regulatory Analysis must be received by the Department of Education no later than 4:30 p.m. on the date of the public hearing. Comments should be directed to:

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Purpose and Summary

This proposed rulemaking is intended to benefit people who operate or ride on Iowa's school buses. Each day, Iowa's school buses carry approximately 250,000 students.

The Department proposes removing rule language that recites statutory text, removing restrictive terms that do not contribute to health and safety, and removing obsolete or unnecessary requirements.

The Department proposes adding rule language specific to buses with alternate fuel sources, such as electric buses (proposed subrule 44.3(26)). Even with this additional language, the Department's proposal reduces the regulatory burden in this chapter.

In reviewing this chapter, the Department consulted with a broad group of stakeholders, including public safety officials, school leaders, school transportation directors, mechanics, and dealers.

Analysis of Impact

1. Persons affected by the proposed rulemaking:

- Classes of persons that will bear the costs of the proposed rulemaking:

School bus operators bear the costs of compliance with this proposed rulemaking.

- Classes of persons that will benefit from the proposed rulemaking:

School bus riders will benefit from this proposed rulemaking.

2. Impact of the proposed rulemaking, economic or otherwise, including the nature and amount of all the different kinds of costs that would be incurred:

- Quantitative description of impact:

There is no discernible qualitative impact.

- Qualitative description of impact:

Removing unnecessary language is a qualitative benefit of the proposed rulemaking.

3. Costs to the State:

- Implementation and enforcement costs borne by the agency or any other agency:

The Department enforces this chapter, with costs offset by inspection fees and a state appropriation.

- Anticipated effect on state revenues:

There is no anticipated effect on state revenue.

4. Comparison of the costs and benefits of the proposed rulemaking to the costs and benefits of inaction:

Inaction would retain obsolete and unnecessary rule language and fail to address a new market segment (electric buses).

5. Determination whether less costly methods or less intrusive methods exist for achieving the purpose of the proposed rulemaking:

The statute requires rules. The Department seeks to ensure any rules adopted are as limited as possible. The Department also needed to respond to a new market segment (electric buses).

6. Alternative methods considered by the agency:

- Description of any alternative methods that were seriously considered by the agency:

No alternative methods were considered.

- Reasons why alternative methods were rejected in favor of the proposed rulemaking:

The statute requires rules.

Small Business Impact

If the rulemaking will have a substantial impact on small business, include a discussion of whether it would be feasible and practicable to do any of the following to reduce the impact of the rulemaking on small business:

- Establish less stringent compliance or reporting requirements in the rulemaking for small business.
- Establish less stringent schedules or deadlines in the rulemaking for compliance or reporting requirements for small business.
- Consolidate or simplify the rulemaking's compliance or reporting requirements for small business.
- Establish performance standards to replace design or operational standards in the rulemaking for small business.
- Exempt small business from any or all requirements of the rulemaking.

If legal and feasible, how does the rulemaking use a method discussed above to reduce the substantial impact on small business?

There is no known impact on small business.

Text of Proposed Rulemaking

ITEM 1. Rescind 281—Chapter 44 and adopt the following **new** chapter in lieu thereof:

CHAPTER 44
SCHOOL BUSES

281—44.1(285) Requirements for manufacturers. In order to protect both the boards of education and manufacturers of school transportation vehicles and equipment from misunderstanding and confusion, all manufacturers shall provide equipment meeting all Iowa vehicle construction requirements described in this chapter as well as all applicable federal motor vehicle safety standards (FMVSS), which include the following:

101—Control location, identification, and illumination.
102—Transmission shift lever sequence, starter interlock, and transmission braking effect.
103—Windshield defrosting and defogging systems.
104—Windshield wiping and washing systems.
105—Hydraulic braking systems.
106—Brake hoses.
107—Reflecting surfaces.
108—Lamps, reflective devices, and associated equipment.
109—New pneumatic tires.

110—Tire selection and rims.
111—Rearview mirrors.
113—Hood latch systems.
116—Motor vehicle brake fluids.
119—New pneumatic tires for vehicles other than passenger cars.
120—Tire selection and rims for motor vehicles other than passenger cars.
121—Air brake systems.
124—Accelerator control systems.
131—School bus pedestrian safety devices.
205—Glazing materials.
206—Door locks and door retention components.
207—Seating systems.
208—Occupant crash protection.
209—Seat belt assemblies.
210—Seat belt assembly anchorages.
217—Bus window retention and release.
219—Windshield zone intrusion for vehicles with a GVWR of 10,000 pounds or less.
220—School bus rollover protection.
221—School bus body joint strength.
222—School bus passenger seating and crash protection.
301—Fuel system integrity.
302—Flammability of interior materials.
303—Fuel system integrity of compressed natural gas vehicles.
304—Compressed natural gas fuel container integrity.

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 (NSBY) paint, and the legend "School Bus." Schools and school districts in Iowa are not allowed to own or lease motor coaches but may charter them for activities.

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 A-1, with 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." To qualify as a Type III vehicle, the vehicle may carry a maximum of 12 or fewer people, including the driver, and weigh 10,000 pounds or less. These vehicles will be subject to school bus inspections per Iowa Code and rule.

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

44.2(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). These vehicles will be subject to school bus inspections per Iowa Code and rule.

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

44.3(1) *Aisle.* All emergency doors shall be accessible by a 12-inch minimum aisle. Aisles are to be unobstructed at all times by any type of barrier, seat, wheelchair, tie-down, or other object(s), with the exception of a flip seat that is installed and occupied at a side emergency door position. The track of a track-seating system is exempt from this subrule. A flip seat in the unoccupied (up) position is not to obstruct the 12-inch minimum aisle to any side emergency door.

44.3(2) *Axles.* The front and rear axle and suspension systems are to 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(3) *Backup warning alarm.* An automatic audible alarm shall be installed behind the rear axle on every school bus/MFSAB and comply with the published Backup Alarm Standards (SAE J994B), providing a minimum of 112 dBA. A variable volume feature is not allowed.

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

44.3(5) *Brakes.*

a. Brakes, all, general requirements.

(1) All buses will have either a parking pawl in the transmission or a parking brake interlock that requires the service brake to be applied to allow release of the parking brake.

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

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

(4) The parking brake system 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 driver. As an option, the parking brake may be set by placing the automatic transmission shift control mechanism in the "park" position.

(5) Every vehicle is to be equipped with a signal that provides a warning to the driver when a failure occurs in the vehicle's brake system. A warning signal will be audible and visible to the driver. A Type A vehicle under 10,000 lbs. GVWR may have a visible warning signal only.

(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. Air brakes, general requirements.

(1) The air pressure supply system will 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 manufacturer will provide an accessory outlet for other air-operated systems installed in or on the bus. This outlet is to 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) pre-trip inspection requirements will be provided in the instrument panel.

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

c. 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) 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.

(3) An air brake system is to comply with the following system and component designs:

1. The system cannot be of wedge design.

2. The system will include an air dryer system having design features equal to or exceeding the Bendix Westinghouse Model AD9. The system is to be self-purging and capable of removing oil, dirt, and moisture. The dryer system will 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 will provide soft flow bends not producing sumps in the air compressor line having direct entry into the dryer.

3. A system of automatic adjustment compensating for service brake wear is to be installed at all wheel positions.

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

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

44.3(6) *Bumper, front.*

a. All school buses will be equipped with a front bumper painted glossy black, a chrome front bumper, or a front bumper coated with a black corrosion-resistant texturized material.

b. The front bumper on buses of Type A-2 (with GVWR greater than 14,500 pounds), Type B, Type C, and Type D is to be equivalent in strength and durability to pressed steel channel at least 3/16 inches thick and not less than 8 inches wide (high). The front bumper will extend beyond the forward-most part of the body, grille, hood and fenders and 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 original equipment manufacturer (OEM)-supplied front bumper.

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

d. The bumper will 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.

e. 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 are to be installed by the bus manufacturer so as not to project beyond the front bumper.

f. 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:

1. 7.5 mph fixed-barrier impact (FMVSS cart and barrier test).
2. 4.0 mph corner impact at 30 degrees (Part 581, CFR Title 49).
3. 20.0 mph into parked passenger car (Type B, C, and D buses of 18,000 pounds GVWR or more).

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

44.3(7) *Bumper, rear.*

a. All school buses are to be equipped with a rear bumper painted glossy black or coated with a black corrosion-resistant texturized material.

b. The rear bumper is to be pressed steel channel or equivalent material, at least 3/16 inches thick and is to 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. The rear bumper will be of sufficient strength to permit its being pushed by another vehicle without permanent distortion to the bumper, body, or chassis.

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

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

e. The bumper is to extend at least 1 inch beyond the rear-most part of body surface measured at the floor line.

f. Additions or alterations to the rear bumper, including the installation of trailer hitches, are not allowed.

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; and

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

1. 2.0 mph fixed barrier impact (FMVSS cart and barrier test).
2. 4.0 mph corner impact at 30 degrees (Part 581, CFR Title 49).
3. 5.0 mph center impact (Part 581, CFR Title 49).

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

44.3(8) *Certification.* The manufacturer(s) will, upon request, certify to the department of education that the manufacturer's product(s) meets Iowa minimum standards on items not covered by FMVSS certification provisions of 49 CFR Part 567.

44.3(9) *Color.*

a. Chassis will be black. Body cowl, hood, and fenders will be National School Bus Yellow. The flat top surface of the hood may be nonreflective National School Bus Yellow or flat black.

b. Wheels and rims will be gray, black, or National School Bus Yellow. Aluminum wheels are also allowed.

c. The grille is to be gray, black, chrome, or National School Bus Yellow.

d. The school bus body will be painted National School Bus Yellow. (See color standard, Appendix B, National School Transportation Specifications and Procedures Manual 2015.)

e. The body exterior trim will be glossy black, including the 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. In addition, the rear bumper may be covered with a black retroreflective material as described in subrule 44.3(48). When the bus number is placed on the front or rear bumper, the number is to be National School Bus Yellow.

f. 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 is to remain National School Bus Yellow.

g. Commercial advertising is forbidden on the exterior and in the interior of all school buses.

44.3(10) *Construction.*

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

b. Construction will be reasonably dustproof and watertight.

c. Body joints present in that portion of the Type A school bus body furnished exclusively by the body manufacturer will conform to the performance requirements of FMVSS No. 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 wheel wells 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 remains at least 72 inches, when measured in accordance with subrule 44.3(39), 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 has a white or yellow stripe and is labeled "Step Up" visible to passengers upon entering the aisle; and a label "Step Down" is visible to passengers as they exit the aisle. Minimum headroom of 72 inches is maintained at all times.

(3) A flat floor design provides 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 are maintained in accordance with these rules.

44.3(11) *Crossing control arms.*

a. Type A, B, and C school buses are to be equipped, and Type D buses may be equipped, with a crossing control arm that is mounted on the right side of the front bumper and that will not open more than 90 degrees. When opened, the crossing control arm will extend in a line parallel to the body side and aligned with the right front wheel.

b. All components of the crossing control arm and all connections are weatherproofed.

c. The crossing control arm is constructed of noncorrodible or nonferrous material or treated in accordance with the body sheet metal standard. See subrule 44.3(40).

d. There are no sharp edges or projections that could cause hazard or injury to students.

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

f. The crossing control arm extends simultaneously with the stop arm(s) by means of the stop arm controls.

g. The crossing control arm system is designed to operate in extreme weather conditions, including freezing rain, snow and temperatures below 0 degrees Fahrenheit, without malfunctioning. The crossing control arm itself is 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.

h. To ensure that the unit mounts flush and operates properly, the chassis bumper mounting bracket is designed for the specific model chassis on which it will be mounted.

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

j. 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 is not to interfere with normal operations of the crossing control arm.

44.3(12) *Daytime running lights (DRL).* See subrule 44.3(31).

44.3(13) *Defrosters.*

a. Defrosting and defogging equipment 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 conforms to SAE J381.

c. The defroster and defogging system is 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 44.3(73).

e. Portable heaters shall not be used.

44.3(14) *Doors and exits.*

a. Service door.

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

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

(3) The service door has a minimum horizontal opening of 24 inches and a minimum vertical opening of 68 inches.

(4) The entrance door is a split-type door that opens outward.

(5) All glass panels are of approved safety glass as defined in subrule 44.3(75). The bottom of each lower glass panel is not more than 10 inches from the top surface of the bottom step. The top of each upper glass panel is not more than 3 inches from the top of the door.

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

(7) There is 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.

(8) All doors are equipped with padding at the top edge of each door opening. Padding is at least 3 inches wide and 1 inch thick and extends horizontally the full width of the door opening.

(9) A door-locking mechanism may be installed in accordance with subrule 44.3(72).

(10) On power-operated service doors, the emergency release valve, switch or device to release the service door is placed above the service door, to the right side of the driver console, or to the left or right of the service door and be clearly labeled. The emergency release valve, switch or device will work in the absence of power.

b. Emergency doors.

(1) Emergency door(s) and other emergency exits comply with the provisions of FMVSS No. 217 and any provision of these rules that exceed FMVSS No. 217.

(2) The exposed area of the upper panel of emergency doors is a minimum of 400 square inches of approved safety glazing. If installed, all other glass panels on emergency doors are of approved safety glazing.

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

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

(5) There is to be no obstruction higher than ¼ inch across the bottom of any emergency door opening. Fasteners used within the emergency exit opening are free of sharp edges or burrs.

c. Emergency exit requirements.

(1) Any installed emergency exit complies with the design and performance requirements of FMVSS No. 217, applicable to that type of exit, whether or not that exit is required by FMVSS No. 217, and complies with any of the requirements of these rules that exceed FMVSS No. 217.

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

1. 0 to 42 passengers = 1 emergency exit per side and 1 roof hatch.
2. 43 to 78 passengers = 2 emergency exits per side and 2 roof hatches.
3. 79 to 90 passengers = 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 No. 217. Additional emergency exits installed to meet the capacity-based requirements of FMVSS No. 217 may be included to comprise the total number of exits specified. All roof hatches are to have design features as specified in subrule 44.3(73).

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

(4) Roof hatches are equipped with an audible warning device and work appropriately without the wiring becoming disconnected from the switch.

(5) Rear emergency windows on Type D rear-engine buses 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, is to be a "DO NOT BLOCK" label in a color that contrasts with the background of the label. The letters on this label are at least 1 inch high.

44.3(15) *Drive shaft.* The drive shaft is 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.

44.3(16) *Driver's compartment.*

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

b. Mobile data terminals are allowed. Programs loaded on the data terminal will be specific to school bus operations such as passenger accountability, routing, navigation, emergency notification, tracking, messaging, and equipment monitoring.

(1) The data terminal is mounted within the driver's compartment in a location that allows the driver to see the data terminal display screen at a glance but does not obstruct the driver's view in any direction when the driver is seated in a normal driving position. This would include impeding the view of the road, mirrors, highway signs, signals, other instruments, entrance door, and passengers. The data terminal display screen and audio turn-by-turn instructions may remain active while the bus is in motion.

(2) Overhead mounting of the data terminal is not allowed. The device will not impede space within the aisle and will not be mounted in such a way as to be a snagging hazard in the student loading area of the service door.

(3) The data terminal is securely mounted to the vehicle when in use in such a way as to minimize sharp edges. The device may be removed when not in use.

(4) The data terminal is not to be connected to the passenger compartment sound system.

(5) Distractive manipulation of a data terminal is prohibited while the school bus is being driven. For the purposes of this subparagraph, "driven" means operating a school bus, with the motor running, including while temporarily stationary because of traffic, a traffic control device, or other momentary delays such as picking up or discharging students. "Driven" does not include operating a school bus, with or without the motor running, when the school bus is legally stopped or parked upon the highway for a prolonged period of time.

c. Commercially produced pedal blocks or OEM adjustable pedals are allowed.

44.3(17) *Electrical system.*

a. Battery, does not include electric powertrain batteries.

(1) The storage batteries have a minimum cold cranking capacity rating (cold cranking amps) equal to the cranking current required for 30 seconds at 0 degrees Fahrenheit and a minimum reserve capacity rating of 120 minutes at 25 amps. Higher capacities may be necessary, depending upon optional equipment and local environmental conditions.

(2) The manufacturer will securely attach the battery on a slide-out or swing-out tray in a closed, vented compartment in the body skirt or chassis frame so that the battery is accessible for convenient servicing from the outside. When in the stored position, the tray is retained by a securing mechanism capable of holding the tray (with battery[ies]) in position. The battery compartment door or cover, if separate from the tray, is hinged at the front or top. It is secured by a positive operated latching system or other type fastener. The door may be an integral part of the battery slide tray. The door or cover will fit tightly to the body and not present sharp edges or snagging points. Battery cables meet Society of Automotive Engineers (SAE) requirements. Battery cables are of sufficient length to allow the battery tray to fully extend. Any chassis frame-mounted batteries will be relocated to a battery compartment on Type A buses.

(3) All batteries are to be secured in a sliding tray except that on van conversion or cutaway front-section chassis, batteries may be secured in accordance with the manufacturer's standard configuration. The battery cable provided with the chassis is of sufficient length to allow some slack and of sufficient gauge to carry the required amperage.

(4) 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) is covered with a rubber matting or other impact-resistant nonconductive material. The matting is a minimum of ⅛ inch thick and cover the entire top inside surface of the battery box. The matting is securely installed to maintain its position at all times.

(5) Buses may be equipped with a battery shut-off switch. The switch is to be placed in a location not readily accessible to the driver or passengers.

b. Alternator.

(1) All Type A and Type B buses with a GVWR of 15,000 pounds or less have a minimum 130-amp alternator. Buses equipped with an electrically powered wheelchair lift, air conditioning, or both are to be equipped with the highest rated capacity available from the chassis OEM.

(2) All buses over 15,000 pounds GVWR are equipped with a heavy-duty truck- or bus-type alternator that has a minimum output rating of 200 amps or higher and that produces a minimum current output of 50 percent of the rating at engine idle speed.

(3) Buses other than those described in subparagraph 44.3(17)*"b"*(1) equipped with an electrically powered wheelchair lift, air conditioning, or both shall have a minimum alternator output of 240 amps.

(4) A belt-driven alternator is capable of handling the rated capacity of the alternator with no detrimental effect on any other driven components. (For estimating required alternator capacity, see School Bus Manufacturers Technical Council's publication "School Bus Technical Reference," available at www.nasdpts.org.)

(5) A direct/gear-drive alternator is permissible in lieu of a belt-driven alternator.

c. Electrical components. Materials in electrical components shall contain no mercury.

d. Wiring, chassis.

(1) All wiring conforms to current applicable recommended practices of the Society of Automotive Engineers (SAE). All wiring uses color and at least one other method for identification. The other method is to be either a number code or name code, and each chassis will be delivered with a wiring diagram that illustrates the wiring of the chassis.

(2) The chassis manufacturer of an incomplete vehicle will install a readily accessible terminal strip or connector on the body side of the cowl or in an accessible location in the engine compartment of vehicles designed without a cowl. The strip or connector will 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).

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

(4) Wiring for the headlamp system will be separate from the electronic controlled body solenoid/module.

e. Wiring, body.

(1) All wiring conforms to current applicable SAE recommended practices.

(2) All wiring has an amperage capacity exceeding the design load by at least 25 percent. All wiring splices are to be accessible and noted as splices on the wiring diagram.

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

(4) The body power wire will be attached to a special terminal on the chassis.

(5) Each wire passing through metal openings will be protected by a grommet.

(6) Wires not enclosed within the body will be fastened securely at intervals of not more than 18 inches. All joints are to be soldered or joined by equally effective connectors, which are to be water-resistant and corrosion-resistant.

(7) Wiring will be arranged in circuits, as required, with each circuit protected by a fuse breaker or electronic protection device. A system of color- and number-coding will be used and an appropriate identifying diagram shall be provided to the end user, along with the wiring diagram provided by the chassis manufacturer. The wiring diagrams will be specific to the bus model supplied and include any changes to wiring made by the body manufacturer. The following body interconnecting circuits will be color-coded, as noted:

FUNCTION	COLOR
Left Rear Directional Lamp	Yellow
Right Rear Directional Lamp	Dark Green
Stop Lamps	Red
Back-Up Lamps	Blue
Tail Lamps	Brown
Ground	White
Ignition Feed, Primary Feed	Black

The color of the cables will correspond to SAE J1128, Low-Tension Primary Cable.

(8) Wiring will be arranged in at least six regular circuits, as follows:

1. Head, tail, stop (brake), clearance and instrument panel lamps;
2. Step well lamps, which are actuated when the entrance door is open;
3. Dome lamps;
4. Ignition and emergency door signal;
5. Turn signal lamps; and
6. Alternately flashing signal lamps.

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

(10) Heaters and defrosters will be wired on an independent circuit.

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

(12) Each body circuit will be coded by number or letter on a diagram of circuits and attached to the body in a readily accessible location.

(13) Buses may be equipped with a 12-volt power port in the driver's area.

(14) There will be a manual noise suppression switch installed in the control panel. The switch is to be labeled and alternately colored. This switch will 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 will not deactivate safety systems, such as windshield wipers or lighting systems.

44.3(18) *Emergency equipment.*

a. All Type A, B, C, and D school buses will be equipped with the following emergency equipment mounted forward of front barriers: first aid kit, fire extinguisher, webbing cutter, and body fluid cleanup kit. Three triangular warning devices are required in each vehicle and may be mounted in the driver's compartment or behind the rear seat.

b. All emergency equipment will 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 therein.

c. Fire extinguishers will meet the following provisions:

(1) The bus will be equipped with at least one 5-pound capacity, UL-approved, pressurized dry chemical fire extinguisher complete with hose. The extinguisher will 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 is to be mounted on the extinguisher to indicate the amount of pressure in the extinguisher and easily read without moving the extinguisher from its mounted position. Plastic discharge heads and related parts are not acceptable.

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

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

(5) Each extinguisher will 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. A first aid kit meeting the national recommendations (most current National School Transportation Specifications and Procedures Manual—first aid kit) is needed on all vehicles used for student transportation.

e. Body fluid cleanup kit. Each vehicle used for student transportation will be equipped with a disposable, removable, and moistureproof body fluid cleanup kit in a disposable container that 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;

(7) One package towelettes;

(8) A discard bag (unlabeled paper bag with a plastic liner and a twist tie). This bag is to be approximately 4 inches × 6 inches × 14 inches. The kit will be removable without the use of tools.

f. Each vehicle used for student transportation will be equipped with a durable webbing cutter having a full-width handgrip and a protected, replaceable or noncorrodible blade. One or more of these devices will be mounted in an easily detachable manner and in a location accessible to the seated driver.

g. Axes are not allowed.

44.3(19) *Exhaust system.*

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

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

c. The tailpipe may be flush with, or will not extend more than 2 inches beyond, the perimeter of the body for side-exit pipe or the bumper for rear-exit pipe. The exhaust system will be designed such that exhaust gas will not be trapped under the body of the bus.

d. The tailpipe will exit to the left or right of the emergency exit door in the rear of the vehicle or to the left side of the bus in front of or behind the rear drive axle or the tailpipe may extend through the bumper. The tailpipe exit location on all Type A-1 or B-1 buses may be in accordance with the manufacturer's standards. The tailpipe will not exit beneath any fuel filler location, emergency door or lift door.

e. The exhaust system on a chassis will be adequately insulated from the fuel system.

f. The muffler is to be constructed of corrosion-resistant material.

g. 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.

h. The design of the aftertreatment systems is not to allow active (non-manual) regeneration of the particulate filter during the loading and unloading of passengers. Manual regeneration systems will be designed such that unintentional operation will not occur.

i. For aftertreatment systems that require diesel exhaust fluid (DEF) to meet federally mandated emissions:

(1) The composition of diesel exhaust fluid (DEF) complies with International Standard ISO 22241-1. Refer to engine manufacturer for any additional DEF requirements.

(2) The DEF supply tank is sized to meet a minimum ratio of 3 diesel fills to 1 DEF fill.

44.3(20) *Fenders, front and hood.* This subrule does not apply to Type A or D vehicles.

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

b. Front fenders will be properly braced and not require attachment to any part of the body.

c. Chassis sheet metal will 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 will not require more than 20 pounds of force to open and include design features to secure the hood in an open position.

44.3(21) *Fire suppression system.* An automatic fire suppression system may be installed. Fire suppression system nozzles will be located in the engine compartment, under the bus, in the electrical panel or under the dash, but they are not to be located in the passenger compartment. The system is to include a lamp or buzzer to alert the driver that the system has been activated.

44.3(22) *Floor insulation and covering.*

a. The floor structure of Type A, B, C and D school buses will be covered with an insulating layer of either a 5-ply minimum ⅝-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 will be sealed.

b. Type A 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, will be covered with an elastomer floor covering having a minimum overall thickness of .125 inch and a calculated burn rate of 0.1 mm per minute or less using the test methods, procedures and formulas listed in FMVSS No. 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 the aisles will be of a ribbed or other raised-pattern elastomer and have a calculated burn rate of 0.1 mm per minute or less using the test methods, procedures and formulas listed in FMVSS No. 302. Minimum overall thickness is .187 inch measured from tops of ribs.

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

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

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

44.3(23) *Frame.*

a. The steel frame will have design and strength characteristics corresponding at least to standard practice for trucks of the same general load characteristics that are used for highway service.

b. Any secondary manufacturer that modifies the original chassis frame will 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 will 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 will not be permitted except as provided or accepted by the chassis manufacturer.

e. Frame lengths are to be established in accordance with the design criteria for the complete vehicle.

44.3(24) *Fuel system.*

a. The fuel system will comply with FMVSS No. 301, Fuel System Integrity. On Type A-1 and A-2 vehicles, the fuel tank may be of the manufacturer's standard construction.

b. On chassis with a wheelbase greater than 170 inches, at least one fuel tank of 60-gallon capacity will be provided and installed by the manufacturer. Chassis with a wheelbase of 170 inches or less will be equipped with at least one fuel tank of 25-gallon minimum capacity, as provided and installed by the manufacturer.

c. The 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 are to 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.

d. Fuel filtration is to be accomplished by means of the following:

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

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

44.3(25) *Fuel system, alternative fuels.* An alternative fuel is defined as liquefied petroleum gas (LPG), compressed natural gas (CNG), liquefied natural gas (LNG), electricity, hydrogen, methanol, ethanol, clean diesel, biodiesel, reformulated gasoline, or any type of hybrid system. Vehicles that operate on an alternative fuel are to meet the following provisions:

a. Chassis will meet all standards of this rule.

b. Chassis will meet all applicable FMVSS standards including the fuel system integrity standards of FMVSS No. 301 or FMVSS No. 303 and FMVSS No. 304.

c. OEMs and conversion systems using CNG or LPG will comply with NFPA standards in effect at the time of manufacture (Standard 52, "Compressed Natural Gas Vehicular Fuel Systems," and Standard 58, "Liquefied Petroleum Gases Engine Fuel Systems").

d. LNG-powered buses will 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 will be equipped with a fire detection and suppression system.

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

f. The total weight will not exceed the GVWR when loaded to rated capacity.

g. The manufacturer supplying the alternative fuel equipment are to provide the owner and operator with adequate training in fueling procedures, scheduled maintenance, troubleshooting, and repair of alternative fuel equipment. Overflow protection device (OPD) testing are to be done yearly by a tester trained in this procedure and whose training has been documented. Documentation of the annual OPD valve test will be a label or identification tag affixed to the step well of the bus, signed and dated by the test person with permanent marker. The label will indicate the expiration date of the successful test.

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

i. All fuel supply containers will be securely mounted.

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

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

l. A grounding system is required for grounding of the fuel system during maintenance-related venting.

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

n. Additional specific specifications for electric vehicles.

(1) All electric school bus systems will be in full compliance with all applicable FMVSS and all Society of Automotive Engineers (SAE) standards that are applicable at time of manufacture.

(2) Batteries of high voltage will meet manufacturer's specifications and comply with the following provisions:

1. The propulsion power source (batteries, fuel cells, etc.) will be located outside the passenger compartment and not be accessible from the interior of the school bus. The power source will be located in between or under chassis frame rails protected by a steel cage. Extended range power sources, if located outside the frame rails, will be protected by a steel cage.

2. High voltage batteries will have a main service disconnect device that does not allow high voltage outside the battery system. This disconnect device will not be in or accessible from the passenger area. Any disconnect device will be clearly marked on the bus body adjacent to each cutoff switch and easily recognized in the event of a crash.

3. High voltage batteries will be designed to prevent the passenger compartment from becoming energized.

4. All batteries will be designed to prevent any dangerous fluids or fumes from entering the passenger area.

5. All high voltage access areas, including the charging port, will be equipped with a lock or otherwise secured to prevent unauthorized access.

(3) Batteries of low voltage will have a low voltage battery shutoff switch installed in the vicinity of the low voltage battery compartment in an area not easily accessible to the driver or passengers. The location of the low voltage battery shutoff switch will be clearly labeled on the exterior of the vehicle.

(4) The charging system will comply with the following provisions:

1. The charging connection point will be outside the passenger compartment.

2. While charging, the transmission/propulsion system will be rendered inoperative.

3. The charging port will be located behind a door or an access panel in accordance with manufacturer standards, with the door or access panel clearly labeled with the location of the charging port. The port will include a status light to indicate the charging status of the battery.

(5) A DC-DC converter will be provided and deliver a minimum of 200 amps at 12VDC. The converter system will incorporate a ground fault interrupt (GFI) that disconnects/isolates the high voltage batteries in the event of a shorted circuit or water intrusion.

(6) Heaters will be capable of heating the passenger and driver's compartments to a comfortable temperature.

(7) The ignition switch circuit will be linked to the battery management system and will prevent the driving of the vehicle while it is connected to an external battery charging source and designed so that when the ignition switch is off, the high voltage is positively disconnected.

(8) The instrument panel will monitor and display battery health. This displayed information will include:

1. High voltage battery state of charge and range in miles.

2. Electric motor temperature.

3. Battery discharge and regeneration rates.

4. Battery health (as applicable: temperature, battery cell balancing, etc.).

(9) Electric vehicles will comply with all identification per subrule 44.3(34). The bus will also display specific electric vehicle markings as provided below.

1. The outer layer of insulation or wiring conduit for drive system high-voltage wiring will be industry standard orange color or otherwise labeled as "HIGH VOLTAGE".

2. All high-voltage components will be labeled with a "HIGH VOLTAGE" marking/warning. Each door, cover, or other panel or enclosed compartment that affords immediate access to any high voltage area will be plainly marked with a hazard warning label that reads "WARNING—HIGH VOLTAGE" or "DANGER—HIGH VOLTAGE". This label will be located in a highly conspicuous place.

3. An electric vehicle identifying label of no less than 2 inches in height will be affixed on the right rear corner of the bus body, on the right side of the bus rearward of the entrance door, and to the left side of the bus aft of the driver's window.

4. Additional lettering/imagery may be located on both sides of the bus along the roof cap starting above the service door and ending no further back than the forward edge of the second passenger window, but none is to be placed on/in any window.

5. Electric vehicle image graphics may be used in combination with words.

(10) The operating range will be OEM design and capable of operating with a range of 100 miles or more.

(11) The propulsion/drivetrain system is exempted from all internal combustion engine specifications.

(12) All seats will be mounted to eliminate contact with batteries and underside of the bus if seat replacement or reconfiguration is necessary.

(13) All electric school buses will produce adequate sound for pedestrian alert while in motion below 20 miles per hour.

(14) Overall system protection will include:

1. Wire, cable, and conductor insulation in the high voltage system will provide adequate insulation for the voltage used and for ambient temperatures ranging from -15°F to 120°F.

2. All high voltage circuits will provide adequate and automatic protection against electrical overloads or malfunctions caused by short circuits, charging/discharging faults, battery overheating, electrical overheating, degraded battery health, or other excessive current conditions through the use of fuses, circuit breakers, and ground fault interruption.

3. Prior to any type of automatic shutdown, a warning or maintenance indicator will display in the driver console to notify the driver of impending shutdown or the need for immediate maintenance and allow enough time to safely reposition and stop the bus via a gradual derating of propulsion prior to complete automatic shutdown.

44.3(26) *Fuel system, 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 will be large enough to permit filling the fuel tank without the need for special fuel nozzle adapters, a funnel, or other device. The opening will 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(27) *Governor.* An electronic engine speed limiter will be provided and set to limit engine speed, not to exceed the maximum revolutions per minute as recommended by the engine manufacturer.

44.3(28) *Handrails.* At least one handrail is to be installed. The handrail will be a minimum of 1 inch in diameter and be constructed from corrosion-resistant material(s). The handrail(s) will be designed to assist passengers during entry or exit and to prevent entanglement, as evidenced by the passing of the National Highway Traffic Safety Administration (NHTSA) string and nut test.

44.3(29) *Heating and air conditioning.*

a. The heater will be hot-water combustion type, electric heating element, or heat pump.

b. If only one heater is used, it will 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 will be capable of maintaining bus interior temperatures as specified in SAE test procedure J2233.

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

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

(2) 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.

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

(4) Auxiliary heating systems that operate on diesel fuel are to be capable of operating on #1, #2 or blended diesel fuel without the need for system adjustment.

(5) The auxiliary heating system is to be low voltage.

(6) Auxiliary heating systems will comply with all applicable FMVSS including FMVSS No. 301 as well as SAE test procedures.

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

g. Each hot water system installed by a body manufacturer will 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 will 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 will comply with current Federal Motor Carrier Safety Regulations.

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

k. Access panels will be provided to make heater motors, cores, elements, 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) will 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 will be designed and installed so as to be free of injury-producing projections or sharp edges. Installation will not reduce compliance with any FMVSS applicable to the school bus. Ductwork will be installed so that exposed edges face the front of the bus and do not present sharp edges.

(3) Any evaporators used are to 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 will 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 will be placed high enough so that they will not obstruct existing or potential occupant securement shoulder strap upper attachment points. This clearance will 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 air-conditioning system will be warranted, including parts and labor, for at least two years and include compressor-mounting bracketry and hardware and any belts which, directly or indirectly, drive the compressor(s). Air-conditioning compressor applications are to 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 are to be readily accessible for servicing.

(8) Parts and service manuals are to be provided for the entire system including compressor(s), wiring (includes wiring diagram), evaporators, condensers, controls, hoses and lines.

(9) Electrical requirements for the air-conditioning system will 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 are 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 and Procedures Manual 2015.

44.3(30) *Heating system, provisions for.*

a. The engine is to be capable of supplying coolant per SBMTC-001, Standard Code for Testing and Rating Automotive Bus Hot Water Heating and Ventilating Equipment, of the School Bus.

b. For Type A vehicles with GVWR of 10,000 pounds or less, the chassis manufacturer will provide a fresh-air front heater and defroster of recirculating hot water type. See also subrules 44.3(13) and 44.3(29).

44.3(31) *Headlamps.*

a. The headlamp switch will 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.

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

c. The headlight system will be wired separately from the body-controlled solenoid.

d. A daytime running lamp (DRL) system will be provided.

44.3(32) *Hinges.* All exposed metal passenger-door hinges subject to corrosion will be designed to allow lubrication without disassembly. All passenger-door hinges will be securely bolted to the bus body. Metal screws are not acceptable.

44.3(33) *Horn.* The bus is to be equipped with a horn(s) of standard make and tested in accordance with SAE J377, Horn—Forward Warning—Electric—Performance, Test, and Application.

44.3(34) *Identification.*

a. The body will 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 is to be placed as high as possible without impairment of its visibility. The lettering will conform to Series B of Standard Alphabets of Highway Signs. "SCHOOL BUS" lettering will have a reflective background or, as an option, may be illuminated by backlighting.

b. The bus, whether school-owned or contractor-owned, will have displayed at the beltline on each side of the vehicle the official public school district or nonpublic school name in black standard unshaded letters at least 5 inches high, 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".

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

d. The words "RATED CAPACITY," along with the appropriate number indicating the rated pupil seating capacity of the bus, are to 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 will be black in color and at least 2 inches in height. The word "CAPACITY" may be abbreviated and shown as "CAP." where necessary.

e. The number of the bus will be printed in not less than 5-inch nor more than 8-inch black letters, except as otherwise noted in this subrule, and 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) Will 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) Will 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 will be black and measure not less than 24 inches in length.

(4) Will 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."

f. Buses privately owned by individuals, a company, or a contractor will 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.

g. Symbols, characters or letters, for the purpose of vehicle or route identification by students, may be displayed below the belt line or 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, will not exceed 36 square inches. This provision applies to all school buses regardless of date of purchase.

h. Symbols identifying the bus as equipped for or transporting students with special needs will be displayed. See subrule 44.4(2).

i. The words "UNLAWFUL TO PASS WHEN LIGHTS FLASH" is to be displayed on the rear emergency door of the bus between the upper and lower window glass sections. The letters are to 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.

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

k. Pressure-sensitive markings of vinyl material may be used for the lettering mentioned in this subrule in lieu of painting.

l. Any lettering, including the name of the school's athletic team(s), numbers, drawings, bumper stickers, characters, holiday decorations, or mascot symbols other than the bus manufacturer's registered trademarks or those specifically noted in paragraphs 44.3(35)*"a"* through *"k"* above are prohibited.

m. Fuel type will be clearly displayed in 2-inch letters either on the fuel door or directly above the fuel door. Examples:

Gasoline or Gasoline Only

Diesel or Diesel Fuel or Diesel Only

Propane or Propane Only

Diesel Exhaust Fluid (DEF)

n. A "No Trespassing" sign may be affixed to the face of the top step in 2-inch black letters on a white background.

44.3(35) *Instruments and instrument panel.*

a. Chassis will 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) High-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 will be displayed as single-gauge installations or as gauges contained in a multifunction instrument display. The multifunction instrument display will 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 pursuant to this subrule.

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

d. Instruments and gauges will be mounted on the instrument panel so each is clearly visible to the driver in a normal seated position.

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

44.3(36) *Insulation.*

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

b. Roof bows will be insulated in accordance with paragraph 44.3(36)*"a."*

44.3(37) *Interior.*

a. The interior of the bus is to 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 will be lapped by the rear panel and exposed edges will 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 44.3(61).

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, will be located within the driver's compartment area. All radio speakers will be flush-mounted with the roof or side panels and free of sharp edges.

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

d. Every school bus will be constructed so that the noise level taken at the ear of the occupant nearest to the primary vehicle noise source does not exceed 85 dBA when tested according to the procedure found in Appendix B, National School Transportation Specifications and Procedures Manual 2015.

e. An access panel will 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 will be installed. This monitor will 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 and USB ports are allowed, in accordance with other provisions of subrule 44.3(37).

i. On-board interior bus camera heads are allowed within the passenger area of the bus. Camera heads are not to extend more than 1½ inches from the ceiling and are to have rounded edges as much as possible. Camera heads will not be mounted directly above the aisle. Exterior cameras are allowed.

j. Electronic student detection systems are allowed on both the interior and exterior of the bus. Interior systems will detect students left behind after the bus is shut off. Exterior systems will detect students in the danger zones.

44.3(38) *Lamps and signals.*

a. All lamps and lamp components will 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 will be of incandescent or LED design.

b. Clearance lamps. The body will be equipped with two amber clearance 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 will be equipped with three amber identification lamps on the front and three red identification lamps on the rear. Each group will 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 necessary on each side, located midway between the front and rear clearance lamps.

e. Stop/tail (brake) lamps. Buses will be equipped with four combination, red stop/tail lamps meeting SAE specifications. Each lamp will 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 will 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 will be mounted 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 will be activated by the service brakes and 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 44.3(38)*"b," "c," "d,"* and *"e"* will be connected to the headlamp switch.

g. Backup lamps. The bus body will be equipped with two white rear backup lamps. All vehicles will 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 will have a white or clear lens and meet SAE specifications. If backup lamps are placed on the same line as the brake lamps and turn signal lamps, they will be to the inside. Exterior perimeter lighting behind rear axle, activated by reverse switch, is allowed.

h. Interior lamps. Interior lamps will be provided that adequately illuminate the interior aisle and the step well. Step well lights and exterior boarding lights are required and will 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 will be provided:

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

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

(3) Body instrument panel lights will 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 will be mounted in full view of the driver. If the full circuit current passes through the monitor, each circuit will be protected by a fuse or circuit breaker against any short circuit or intermittent shorts.

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

j. Reflectors. Reflectors will be securely attached to the body with sheet metal screws or another method having equivalent securement properties and installed in accordance with the requirements of FMVSS No. 108; however, the vehicle will, 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 necessary 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 will 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 will 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 will 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 will 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 is to be black. In installations where there is no flat vertical portion of body immediately surrounding the entire lens of the lamp, there will 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 will flash at any time the stop signal arm is extended.

(5) All flashers for alternately flashing red and amber signal lamps will 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 will be evaluated and approved by Iowa department of education personnel per established criteria.

(8) Supplemental warning lights may be installed by the vehicle owner. The supplemental warning lights may be mounted to the front and rear of all Type A, B, C and D school buses and will meet the following provisions:

1. Will be wired into the existing 8-way warning light system, operate only with the existing red lights of that system, and use the same flash pattern.

2. Will be a four-light system (two front, two rear) and will not be mounted directly to either the front or rear bumper.

- Front lights will be located between the outer edge of the grill opening and the outer edge of the headlight(s), and sit horizontally rather than vertically. The lens of the light will be approximately perpendicular to the ground and to the outside edge of the bus body.
- Rear lights will be located 1 inch to 3 inches above the bumper, with a maximum of 4 inches above the bumper; will be located at least 1 inch inboard from the outside edge of the bus, but left and right of the emergency door; and will sit horizontally rather than vertically. The lens of the light will be approximately perpendicular to the ground and to the outside edge of the bus body.

l. Turn signal lamps.

(1) The bus body will 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 will 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 will be approximately 8 inches below the rear window. Type A-2 conversion vehicle lamps will be at least 21 square inches in lens area and in the manufacturer's standard color.

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

m. A white flashing strobe light rated for outdoor use and weather-sealed will be installed on the roof of the bus not less than 1 foot or more than 18 inches from the rear center of the bus. The strobe light will 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 will have a single clear lens emitting light 360 degrees around its vertical axis and will not extend above the roof more than the maximum legal height pursuant to Iowa Code section 321.456.

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

(3) The light will be used in fog, rain, snow, or at times when visibility is restricted. The light may also be used as determined to be appropriate.

(4) Each model strobe light will meet the provisions of SAE J845 Class 1.

n. Pedestrian safety crossing lights are allowed and will activate automatically in conjunction with the stepwell and boarding lights.

44.3(39) *Measurements.*

a. Interior body height will 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 will be 62 inches or more.

b. Overall height, length and width of the bus will not exceed the maximums allowed by the department of transportation.

44.3(40) *Metal treatment.*

a. All metal, except high-grade stainless steel or aluminum, used in construction of the bus body will be zinc-coated or aluminum-coated to prevent corrosion. This provision applies 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 will 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 provisions, particular attention will 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 will be subjected to cyclic corrosion testing as outlined in SAE J1563.

44.3(41) *Mirrors.*

a. The interior mirror will 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 will have rounded corners and protected edges. All Type A buses will have a minimum of a 6-inch × 16-inch mirror; and Type B, C, and D buses will have a minimum of a 6-inch × 30-inch mirror.

b. Each school bus will be equipped with exterior mirrors meeting the requirements of FMVSS No. 111. Mirrors will be easily adjustable, but rigidly braced so as to reduce vibration.

c. All exterior mirrors will be heated.

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

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

f. Stainless steel mirror brackets are allowed.

g. An interior mirror utilizing a secondary screen linked to an exterior camera is allowed. However, the secondary screen must revert to a mirror status when the bus is moving forward.

44.3(42) *Mounting.*

a. The chassis frame will support the rear body cross member. Except where chassis components interfere, the bus body will 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 will be placed at all contact points between the body and chassis frame and 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 will 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 limited to the repair and replacement of school bus body or chassis components. The original body and chassis, as certified by the OEMs, will 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 will certify that the vehicle meets all state and federal construction standards in effect as of the date of manufacture and will provide suitable warranty on all work performed. See also subrule 44.6(1).

44.3(43) *Mud flaps.*

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

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

c. Rear mud flaps or guards will be comparable in size to the width of the rear wheelhousing and reach within approximately 9 inches of the ground when the bus is empty. They will be mounted at a distance from the wheels to permit free access to spring hangers for lubrication and maintenance and to prevent their being damaged by tire chains or being pulled off while the vehicle is in reverse motion.

d. All mud flaps will be constructed of rubber or a rubber composite. Vinyl or plastic is not acceptable.

44.3(44) *Openings.* All openings in the floorboard or fire wall between the chassis and passenger compartment, such as for gearshift selector and parking brake lever, will be sealed.

44.3(45) *Passenger securement seating system.*

a. All vehicles will conform to all FMVSS at date of manufacture.

b. Unless otherwise provided by FMVSS, school bus seats may be equipped with passenger securement systems for passengers with disabilities in accordance with 281—Chapter 41 when the child's individual education program staffing team determines that special seating and positioning are necessary during transportation. When a child securement system is necessary, the seat, including seat frame, seat cushion, belt attachment points, belts and hardware, will comply with all applicable FMVSS at the time of manufacture.

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

44.3(46) *Public address system.* A public address system permitting interior, exterior or both interior and exterior communication with passengers may be installed.

44.3(47) *Radio/communication system.* Each school bus will 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 will be a two-way radio, cellular phone, or similar device as allowed by local and state policies regarding use of handheld communication equipment.

44.3(48) *Retroreflective material.*

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

(1) The rear of the bus body is marked with strips of reflective NSBY material to outline the perimeter of the back of the bus using material that conforms with the requirements of FMVSS No. 131. The perimeter marking of rear emergency exits per FMVSS No. 217 or the use of retroreflective "SCHOOL BUS" signs partially accomplish the objective of this provision. To complete the perimeter marking of the back of the bus, strips of retroreflective NSBY material, a minimum of 1 inch and a maximum of 2 inches in width, is 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. Vertical strips are applied at the corners connecting these horizontal strips. Multifunction school activity buses (MFSABs) are exempt from these color requirements.

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

(3) Sides of the bus body are 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 will 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(49) *Road speed control.* A road speed control device or a vehicle cruise control may be utilized.

44.3(50) *Rub rails.*

a. One rub rail located on each side of the bus at, or no more than 8 inches above, the seat level will 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 will cover the same longitudinal area as the upper rub rail, except at wheelhousings, and will extend only to radii of the right and left rear corners.

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

d. Each rub rail will be 4 inches or more in width in its finished form, be of 16-gauge steel or suitable material of equivalent strength, and be constructed in corrugated or ribbed fashion.

e. Rub rails will be applied to outside body or outside body posts. Pressed-in or snap-on rub rails do not satisfy this provision. 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 will be stiffened by application of a rub rail, or the edge may be stiffened by providing a flange or other stiffeners.

g. Rub rails will be painted black or be covered with black retroreflective material.

44.3(51) *Seating, crash barriers.*

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

b. Crash barriers will be installed conforming to FMVSS No. 222; however, all Type A-2 school bus bodies will 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 will be constructed with materials that enable the crash barriers and passenger seats to meet the criteria contained in the School Bus Seat Upholstery Fire Block Test specified in the National School Transportation Specifications and Procedures Manual 2015. Fire block material, when used, will include the covering of seat bottoms.

d. All crash/restraining barriers will be the same height as the passenger seating height in the bus.

44.3(52) *Seating, driver.* Buses will 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 seat belt assembly and anchorage will meet applicable FMVSS. The design will also meet the following additional provisions:

a. The lap portion of the belt will 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.

b. There will 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.

c. The driver's seat belt assembly will incorporate high-visibility material. An audible alarm is also allowed.

44.3(53) *Seating, passenger.*

a. All seats, component parts, seat anchorage, cushion depth, seat back height, rump width, and seat-to-seat or seat-to-barrier measurements will comply with applicable federal requirements as of the date of manufacture, including FMVSS No. 217 and No. 222.

b. Seat-to-seat and seat-to-barrier measurements will be on a label permanently affixed to the bus.

c. Jump seats or portable seats are prohibited; however, use of a flip seat at any side emergency door location in conformance with FMVSS No. 222, including required aisle width to side door, is acceptable. Any flip seat will be free of sharp projections on the underside of the seat bottom. The underside of the flip-up seat bottoms will be padded or contoured to reduce the possibility of snagged clothing or injury during use. Flip seats will 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 will be designed to rise to a vertical position automatically when not occupied.

d. Passenger seats will be constructed with materials that enable them to meet the criteria contained in the School Bus Seat Upholstery Fire Block Test specified in the most current National School Transportation Specifications and Procedures Manual. Fire block material, when used, will include the covering of seat bottoms.

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

f. For Type C and D buses, the distance between the rearmost portion of the seat backs of the rear row of seats and outside rear of the bus body (rear seat buffer zone), measured at the floor line, will be at least 8 inches. For Type A buses, the distance will be at least 6 inches.

44.3(54) *Seating, passenger restraints.*

a. Lap belts will 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 provisions of FMVSS No. 213, Child Restraint Systems.

b. Three-point lap-shoulder belts will be installed in all new buses. The restraint system shall include a flexible design feature, thus allowing three-two seating on the same 39-inch seat, depending on student size.

44.3(55) *Shock absorbers.* Buses will be equipped with double-action shock absorbers compatible with manufacturer's rated axle capacity at each wheel location.

44.3(56) *Steering gear.*

a. The steering gear will 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 necessary, the steering mechanism will be accessible.

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

d. There will 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 will be of the integral type with integral valves. Electric power-assisted steering systems are allowed.

f. The steering system will 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(57) *Steps.*

a. The first step at the service door will 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 will be 11 inches to 16 inches from the ground. A step well guard/skid plate will be installed by the manufacturer on all Type D vehicles.

b. Step risers will 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 will be enclosed to prevent accumulation of ice and snow. See subparagraph 44.4(2)*"g"*(1) for exception.

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

44.3(58) *Step treads.*

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

b. The step covering will be permanently bonded to a durable backing material that is resistant to corrosion.

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

d. Step treads will have abrasion resistance, slip resistance, weathering resistance, and flame resistance as outlined in the National School Transportation Specifications and Procedures Manual 2015.

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

f. Step treads will have a calculated burn rate of .01 mm per minute or less using the test methods, procedures and formulas listed in FMVSS No. 302, Flammability of Interior Materials.

g. A spray-on application type material that meets all other step tread requirements may be used in lieu of the floor covering described in paragraph 44.3(58)*"a."* The material will be applied not only to the interior surfaces of the service door step treads but also to the exterior if the exterior is not covered by undercoating.

44.3(59) *Stirrup steps.*

a. There will 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.

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.

44.3(60) *Stop signal arm.*

a. The stop signal arm will be a flat 18-inch octagon exclusive of brackets for mounting. Stop arms or other warning devices will not extend more than 30 inches beyond the side of the bus body. All lamps and lamp components will comply with the requirements of FMVSS No. 131.

b. Both surfaces of the sign will 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 will be in accordance with the sheeting manufacturer's suggested application process. All copy will be sharply defined and clean cut.

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

e. A second stop signal arm will be installed on the left side at or near the left rear corner of Type C and D school buses and meet the requirements of FMVSS No. 131.

f. Each stop arm blade will 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 will be equipped with two double-faced, 4-inch, alternately flashing red lights. The use of strobe lamps in the stop arm blade is acceptable.

g. A wind guard will be installed that prevents air currents from circulating behind the blades.

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

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

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 will comply with applicable FMVSS prior to installation.

44.3(61) *Storage compartments.*

a. A storage container for tools, tire chains, and tow chains may be located either inside or outside the passenger compartment; but, if inside, it will 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.

b. Luggage compartments are allowed. Compartments will include a door and a means of holding the door in an open position when the compartment is being loaded or unloaded.

44.3(62) *Suspensions.* The capacity of springs or suspension assemblies will be commensurate with the chassis manufacturer's GVWR rating.

44.3(63) *Sun shield.*

a. For Type B, C, and D vehicles, an interior adjustable transparent sun shield not less than 6 inches × 30 inches with a finished edge will be installed in a position convenient for use by the driver. An interior adjustable transparent driver's side mounted sun shield of manufacturer's specification is allowed.

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

44.3(64) *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 (GVWR) will be provided.

b. Tires will 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. Manufactured non-ferrous spacers are required between steel and aluminum rims.

d. Dual tires will be provided on all vehicles listed in rule 281—44.2(285), except Type III and Type A1 vehicles.

e. All tires on a vehicle will be of the same size, and the load range of the tires will meet or exceed the GVWR as specified in FMVSS No. 120.

f. Spare tires are not necessary; however, if specified, the spare tire will be located outside the passenger compartment. The spare tire will 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 necessary, it will 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, will 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 will be made where tire bars, humps, or fillets are located. On Type A-1 and Type A-2 buses, the tread groove pattern depth will be at least 4/32 of an inch. Where specific measurement points are provided by the tire manufacturer, they will be utilized in determining tires approved for service. This provision also applies to buses now in service.

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

j. Wheel check indicators for lug nuts are allowed.

44.3(65) *Tow hooks, front.* Tow eyes or hooks are necessary on Type B, C and D buses of 14,501 pounds GVWR or greater. Two tow eyes or hooks will be installed by the manufacturer so as not to project beyond the front bumper.

44.3(66) *Tow hooks, rear.* Two rear tow hooks are necessary on all school buses. Rear tow hooks will be attached to the chassis frame and located under the rear bumper so the hook portion is under the body.

44.3(67) *Traction-assisting devices.* Traction-assisting devices including hopper-sanders, tire chains or automatic traction chains may be installed.

44.3(68) *Transmission.*

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

b. Automatic transmissions will have a transmission shifter interlock controlled by the application of the service brake to prohibit accidental engagement of the transmission.

44.3(69) *Trash container and holding device.*

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

(1) Meet the requirements of FMVSS No. 302, Flammability of Interior Materials.

(2) Be no greater than 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 will be placed in an accessible location in the driver's compartment of the school bus subject to department of education approval. The container will not obstruct the aisle of the bus, access to safety equipment or passenger use of the service entrance door.

c. Trash containers meeting the requirements of paragraph 44.3(69)*"a"* are allowable behind the rear seat.

44.3(70) *Turning radius.*

a. A chassis with a wheelbase of 264 inches or less will 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 will have a right and left turning radius of not more than 44½ feet, curb-to-curb measurement.

44.3(71) *Undercoating.*

a. The entire underside of the bus body, including floor sections, cross member and below floor line side panels, and chassis front fenders will be coated with rustproofing material for which the material manufacturer has issued to the bus body manufacturer a notarized certification that materials meet or exceed all performance standards of SAE J1959, Sept. 2003 Edition.

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

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

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

44.3(72) *Vandal lock.*

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

b. The vandal locking system will 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 is to prevent the door from being accidentally locked by any motion the bus may encounter during its normal operation. This provision 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 that will activate a buzzer when the door or emergency exit window is locked and the ignition of the bus is turned on. The locking mechanism is to 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 will 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 is not to be attached to the bus for the purpose of securing any door or window.

44.3(73) *Ventilation.*

a. The body ventilation system on Type A, B, C and D buses will include one or more combination roof ventilation/emergency escape hatches in accordance with subrule 44.3(14). The ventilation system will be capable of being controlled and 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 will be installed by the school bus body manufacturer or the body manufacturer's approved representative and will 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 that sounds an alarm in the driver's compartment area when the emergency roof hatch is unlatched will be installed as a design feature by the manufacturer.

(4) When more than one ventilation/emergency roof hatch is necessary, one will 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 will be installed on the roof in a location behind the rear axle. When only one ventilation/emergency roof hatch is necessary, it will 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 will be installed and meet the following provisions:

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

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

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

(4) Type A buses will have at least one fan that has a nominal diameter of at least 4 inches and meets the above requirements.

44.3(74) *Wheelhousings.*

a. The wheelhousing will be attached to the floor sheets in such a manner as to prevent any dust, water or fumes from entering the bus body. Wheelhousings will 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.

b. The inside height of the wheelhousing above the floor line will not exceed 12 inches.

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

44.3(75) *Windshield and windows.*

a. All glass in windshield, windows, and doors will be of approved safety glass consistent with American National Standard, Safety Code for Safety Glazing Materials for Glazing Motor Vehicles Operating on Land Highways, ANSI/SAE Z-26.1-1990, 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" will be above the upper limit for maximum visibility.

c. Each full side window, other than emergency exits designated to comply with FMVSS No. 217, will be split-sash type and provide an unobstructed emergency opening of at least 9 inches high, 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 will be capable of being moved or opened.

d. 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 will be securely mounted by the manufacturer, be free of projections that might harm passengers, and permit visibility through the device to the area outside and to the rear of the bus.

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

(1) All glass to the immediate left of the driver.

(2) All glass forward of the driver and service door.

(3) All glass in the service entrance door.

44.3(76) *Windshield washer system.*

a. All buses will be equipped with electric wet-arm windshield washers that 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 and A-2 vehicles may be of the manufacturer's standard design.

b. The washer control(s) will be located within easy reach of the driver.

44.3(77) *Windshield wiper system.*

a. For Type A vehicles, windshield wipers will be supplied by the chassis manufacturer and be of the manufacturer's standard design.

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

c. The wipers will be operated by one or more electric motors of sufficient power to operate wipers. If one motor is used, the wipers will work in tandem to give a full sweep of the windshield.

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

e. Windshield wipers will meet the requirements of FMVSS No. 104.

281—44.4(285) Construction of vehicles for children with mobility disabilities. The following apply to vehicles constructed for the transportation of children with mobility disabilities of such severity that the children are unable to use the regular service door entrance. Vehicles constructed for transporting these children will meet all FMVSS relating to school bus construction and Iowa school bus construction requirements as described in rules 281—44.1(285) and 281—44.3(285). The following standards also apply:

44.4(1) *General provisions.*

a. Certification of these vehicles as multipurpose passenger vehicles due to capacity rating do 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) through 281—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 provisions as of date of manufacture. All equipment will be supplied by the original manufacturer and installed per the original manufacturer's specification. Alteration that would return the vehicle to conventional passenger seating will 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 use a wheelchair or other restraining devices that prevent use of the regular service entrance will be equipped with a power lift located on the right side of the bus body located either forward of or behind the rear wheels on a Type A, B, C, or D bus.

d. The actual rated seating capacity following modification of a vehicle will be placed at locations indicated in paragraph 44.3(34)*"e."*

44.4(2) *Specific provisions.*

a. Aisle. Aisles leading from the wheelchair placements to the special service door and either the service door or one 30-inch wide emergency door will be a minimum of 30 inches in width.

(1) Aisles leading from wheelchair placements to all other doors will be at least 20 inches in width.

(2) A wheelchair securement position will not be located directly in front of a power lift door.

b. Barriers.

(1) Barriers will comply with and be installed as required by federal standards as of date of manufacture.

(2) A heavy-duty padded barrier or stanchion will 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 will also be placed directly behind the driver.

(3) The power lift mechanism will 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 will 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 children with physical disabilities will display the International Symbol of Accessibility located on the front and rear of the vehicle below the window line. Emblems will be white on blue, shall not exceed 12 × 12 inches in size, and may be reflectorized.

f. Power lift.

(1) The power lift will meet all FMVSS and ADA requirements at the time of manufacture.

(2) The power lift may be located either forward of or behind the rear wheels of the vehicle on the right side of Type A, B, C and D buses.

(3) All lift controls will be portable and conveniently located on the inside of the bus near the special service door opening. Controls will be easily operable from inside or outside the bus. A master cut-off switch controlling on/off power to the lift will be located in the driver's compartment. There will be a means of preventing the lift platform from falling while in operation due to a power failure.

(4) Power lifts will be equipped so they may be manually raised or lowered in the event of power failure of the power lift mechanism.

(5) All edges of the platform will be designed to restrain a wheelchair and to prevent the operator's feet from being entangled during the raising and lowering process.

(6) A circuit breaker, fuse, or other electrical protection device will be installed between the power source and the lift motor if electrical power is used.

(7) When hydraulic pressure is used in the lifting process, the system will 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.

(8) All exposed parts of the power lift that are in direct line with the forward or rearward travel of a wheelchair student or attendant will be padded with energy-absorbing material.

(9) Power lifts are not allowed on vehicles with single rear wheels.

g. Ramps. Ramps are not permitted on Type A, B, C, and D buses.

h. Regular service entrance.

(1) An additional fold-out or slide-out step may be provided that will provide for the step level to be no more than 6 inches from the ground level to assist persons with disabilities that prohibit the use of the standard entrance step. This step, when stored and not in use, will not impede or in any way block the normal use of the entrance.

(2) On power lift-equipped vehicles, service entrance steps will 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 will be located on the opposite side of the entrance door from the required rail and will meet the same provisions for handrails.

i. Seating and seating arrangements.

(1) All seat spacing, seats, and related components will comply with applicable federal standards as of date of manufacture.

(2) All seats are to 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) will be placed inside the bus to sufficiently illuminate the lift area and activated from the door area.

k. Special service opening.

(1) There will be an enclosed service opening located on the right side (curb side) of the body to accommodate a wheelchair lift on Type A, B, C and D buses.

(2) The opening will be at least 52 inches high and 40 inches wide and with doors open will 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 will 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 will be installed above the opening to effectively divert water from the entrance.

(5) Doorposts, headers, and all floor sections around this special opening will 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, will be placed above the opening on the inside of the bus.

l. Special service door(s).

(1) All doors will open outwardly.

(2) All doors will have positive fastening devices to hold doors in the open position.

(3) All doors will be equipped with heavy-duty hinges and will be hinged to the side of the bus.

(4) All doors will be weather sealed; and on buses with double doors, each door will 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 will 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 will have at least a one-point fastening device to the header. The forward-mounted door will have at least three-point fastening devices: One will be to the header, one will be to

the floor line of the body, and the other will be into the rear door. These locking devices will afford maximum safety when the doors are in the closed position. The door and hinge mechanism is to 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 will be equipped with a slidebar, cam-operated locking device.

(8) Each door will 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 will be equivalent to the conventional service and emergency doors. Color, rub rail extensions, lettering, and other exterior features will match adjacent sections of the body.

(10) The door(s) will 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 will 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 are for the sole purpose of restraining passengers.

(3) All child safety restraint systems will comply with the requirements of FMVSS No. 213, Child Restraint Systems.

n. Wheelchair securement systems.

(1) Securement systems for wheelchairs will meet or exceed applicable FMVSS.

(2) All wheelchair securement systems or devices will 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) will be located in a school bus so that when a wheelchair is not secured in place the floor attachment system does not extend above the floor level more than ½ inch.

281—44.5(285) Type III vehicles.

44.5(1) *General information.* These vehicles may be used for student transportation in accordance with the following general provisions:

a. The vehicle will be an OEM product and manufactured as a family-type or multipurpose passenger vehicle (MPV). Vehicles used exclusively for driver's education are exempt from these provisions.

b. The manufacturer's rated capacity of this vehicle, which is determined only by the OEM on the date of manufacture, will not exceed 12 persons including the driver. The capacity rating may not be changed or modified except by the OEM, dealer, or remanufacturer. Secondary stage or vehicle conversion manufacturers will not establish vehicle capacity. Seating capacities that vary from the OEM are required by NHTSA to be identified by an alterer's certification and information label that shall be affixed to the frame of the driver's door.

(1) Vehicles with a capacity of ten or fewer passengers including the driver may be acquired new or used.

(2) Vehicles with a capacity of 11 or 12 passengers, including the driver, may only be acquired used. For purposes of this subrule, "used" means a vehicle that has had a title transfer from a dealer to one or more previous retail owners.

c. Alteration of a vehicle, following manufacture by the OEM, is prohibited. This includes the addition or removal of seats, wheelchair securement devices, and power lifts. Ramps are allowed on the passenger side of the vehicle only and will comply with all applicable FMVSS and ADA requirements. The following exceptions apply:

(1) OEM options or other manufacturer's accessories not in violation of these standards may be installed.

(2) Seats may be added or removed as long as the seating capacity does not exceed the capacity as certified by the OEM or on the label installed according to paragraph 44.5(1)*"b."*

d. The vehicle will not carry more passengers than there are seat belts as installed by the manufacturer.

e. The vehicle will not be painted the color known as national school bus glossy yellow.

f. The vehicle will not be equipped with a stop arm or flashing warning signal lamps.

g. This vehicle will load and unload students off the traveled portion of the roadway.

44.5(2) *Special equipment.*

a. Interior liner. An interior liner that covers all exposed ceiling girders, sidewall posts, or other structural projections is to be provided and installed by the manufacturer.

b. The vehicle, while transporting students to and from school, will display a sign, visible to the rear, with the words "SCHOOL BUS." The sign will be national school bus glossy yellow with black letters 6 inches high. The sign will 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 will be black letters on a yellow background. The sign will 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 will be connected to the brake lamp circuit of the vehicle's electrical system and will operate only when the brakes are applied. When lit, the lamps will be red and visible only to the rear.

e. First aid kit. A first aid kit meeting the national recommendations (most current National School Transportation Specifications and Procedures Manual—first aid kit) is required on all vehicles used for student transportation.

f. Fire extinguisher. The vehicle will carry a dry chemical fire extinguisher of at least 2½-pound capacity with a rating of 2A-10BC. The extinguisher will be equipped with a calibrated or marked gauge. Plastic discharge heads and related parts are not acceptable.

g. Each vehicle will be equipped with a durable webbing cutter having a full-width handgrip and a protected, replaceable or noncorrodible blade. This device will be mounted in a location accessible to the seated driver in an easily detachable manner.

h. Each vehicle will be equipped with a body fluid cleanup kit.

i. Each vehicle will 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.

j. 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.

44.5(3) *Applicability of standards.* The above standards apply to all vehicles (except as noted in paragraph 44.5(2)*"i"*) of this type and those currently in service used to transport students.

281—44.6(285) Repair, replacement of school bus body and chassis components following original equipment manufacture.

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 OEM's specification and function.

b. The individual or company making the repairs is to certify to the vehicle's owner that all repairs have been made in accordance with the original vehicle or component manufacturer's recommendations using OEM's materials and parts, or their guaranteed equal.

c. Repairs are not to cause the vehicle to no longer comply with any FMVSS in effect and applicable at the time the vehicle or component was manufactured.

44.6(2) *New technology and equipment approval procedure.* It is the intent of these rules to accommodate new technologies and equipment that 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 will not compromise the effectiveness or integrity of any major safety system, unless it completely replaces the system.

b. It will not diminish the safe environment of the interior of the bus.

c. It will 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 will not create undue additional activity or responsibility for the driver.

e. It will not generally decrease the safety or efficiency of the bus.

f. It will 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. The pilot test will 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 is 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 paragraphs 44.6(2)*"a"* to *"f,"* measures will be taken as soon as practicable to formally approve the product.

j. A technology, product or component not recommended for approval by the department will immediately be removed from vehicles upon which pilot tests were being conducted; and its use will be discontinued by schools or individuals serving as pilot test sites, upon receipt of written notice from the department of education.

These rules are intended to implement Iowa Code sections 285.8 and 321.373.