**Section 440.520 State Requirements**

*Except for mirrors, which may project 152 mm (6 inches), a school bus shall not exceed 2.625 m (8 feet) in width, 4.429 m (13 feet 6 inches) in height, nor 13.78 m (42 feet) in length* (Sections 15-102 and 15-107 of the Code). Exceptions to the above are shown in Section 440.420 of this Part. Various portions of the bus chassis shall conform to the requirements set forth under the following subsections.

a) Air Cleaner.

1) A dry element type air cleaner shall be provided.

2) All diesel engine air filters shall include a latch-type restriction indicator that retains the maximum restriction developed during operation of the engine. The indicator should include a reset control so the indicator can be returned to zero when desired. Diesel-powered school buses that meet the definition of a Type I-A school bus, as defined in Section 440.220, are exempt from the restriction indicator requirement.

b) Axles. Must meet federal chassis requirements as indicated on the federal certification label as required by 49 CFR 567 and 49 CFR 568.

c) Battery. See Section 440.420(c) of this Part.

d) Brakes. See the FMVSS for requirements (49 CFR 571.105).

e) Bumper, Front. The front bumper shall be of channel type cross section, shall be formed from rolled steel at least 4.5 mm (.177 inches) thick, shall have not less than a 200 mm (7.9 inches) vertical face, and shall extend to protect the outer edges of the fenders, or the body of a forward control bus. The bumper shall be of sufficient strength to permit pushing another vehicle of equal gross weight without permanent distortion. Exception: For school buses that meet the definition of a Type I-A school bus, as defined in Section 440.220, the bumper may meet manufacturer's specifications when the Type I-A school bus is equipped with a driver side air bag.

f) Clutch. A bus having a manual shift transmission shall be equipped with the type and size of clutch recommended by the incomplete vehicle manufacturer for heavy duty service between the engine and transmission installed in the bus.

g) Color and Paint. See Section 440.420(i) of this Part.

h) Drive Shaft. A suitable guard shall be provided for each segment of the drive shaft to prevent accident or injury if the shaft breaks or becomes disconnected.

i) Engine. Type and displacement may be specified by the purchaser.

j) Exhaust System.

1) The exhaust pipe, muffler and tail pipe shall be outside the bus body and attached to the chassis.

AGENCY NOTE: As mandated by the United States Environmental Protection Agency (USEPA), diesel-powered engines manufactured after December 31, 2006 are required to meet stricter standards that will reduce emissions of particulate matter and nitrogen oxides into the atmosphere. School bus manufacturers may be required to modify exhaust systems to meet the USEPA requirements, e.g., mufflers may be replaced with after-treatment devices that significantly reduce toxins released into the atmosphere. Modifications to exhaust systems made in compliance with the USEPA requirements are acceptable provided they do not impact the safe operation of the school bus.

2) The exhaust system shall be insulated from any insulated wire, flammable material, brake hose or line, or fuel system component by a securely attached metal shield at any point where the exhaust system is 11.8 inches (300 mm) or less (four inches (101.6 mm) or less if diesel powered engine) from the components listed in this subsection (j)(2).

3) The tail pipe shall be extended to exit the exhaust gases either to the right or left side, or rear of the bus, except for prohibited zones as shown in Illustration C of this Part.

4) The tail pipe shall extend out to but not more than 1 inch (25.4 mm) beyond the perimeter of the body or the bumper.

5) The shielding of engine compartment components shall be governed by the chassis manufacturer's standards.

6) Each gas conducting component that is not of stainless steel shall be of commercial heat and corrosion resistant exhaust system material and shall be nonflexible.

7) For school buses that meet the definition of a Type I-A school bus, as defined in Section 440.220, the tail pipe may meet the chassis manufacturer's standard configuration. However, the tail pipe shall not exit beneath any fuel filler location or beneath any emergency exit door.

k) Frame. See Section 440.420(z)(1) of this Part.

l) Generating System. The generating system may utilize either mechanical rectification (commutator type) or diode rectification (alternator type).

1) The generator output shall be regulated automatically so as to provide for efficient battery charging without causing damaging potentials or currents in any part of the electrical system. Automatic means shall be provided to prevent battery discharge through the generator while the generator is not delivering current.

2) The generator in a nominal 12 volt system shall be able to deliver a continuous current of 60 amperes, or more, while its automatic regulating devices are connected and functioning properly and the engine is running no faster than the speed at which it delivers its maximum net torque at the engine flywheel.

3) The generator in a nominal 12 volt system shall be able to deliver a continuous current of 20 amperes, or more, while its automatic regulating devices are connected and functioning properly and the engine is running no faster than the curb idle speed recommended by the engine manufacturer.

4) The generator in a nominal voltage system higher or lower than 12 volts shall be able to deliver at least the same continuous power (watts) as indicated under subsections (l)(2) and(3) of this Section, at the engine speeds indicated therein.

AGENCY NOTE: Where a bus must operate under adverse conditions such as low engine speeds, frequent periods of engine idle, and/or with high electrical load (frequent use of signals and interior lamps, high heater/defroster loads, etc.) for prolonged periods of time, the purchaser should specify a larger generator commensurate with operating conditions.

m) Horns.

1) At least one horn shall be installed giving an audible warning at a distance of 200 feet. The horns shall be controlled conveniently by the seated driver and tested in accordance with SAE Standard J377 (March 2001).

2) A siren, whistle, or bell may not be installed to attract attention of pedestrians or drivers outside the bus (Section 12-601(b) of the Code). This prohibition shall not be interpreted to prohibit use of such devices inside the bus body to provide warnings to the bus driver.

n) Instruments. The bus shall be equipped with at least the following nonglare illuminated instruments and gauges mounted for easy maintenance and repair and in such a manner that each is clearly visible to the seated driver:

1) Ampere meter or volt meter, with "charge" and "discharge" indications, provisions for 100 ampere, or more, continuous current indication, and arranged so as to remain unharmed by any ampere meter current flow resulting from the installed generator operating at its maximum output;

2) Gauge, Air Pressure or Vacuum (where air pressure or vacuum is utilized either to apply or to assist in applying the service brakes);

3) Gauge, Engine Coolant Temperature;

4) Gauge, Engine Oil Pressure;

5) Gauge, Fuel;

6) Odometer (may be combined with speedometer; may indicate kilometers traveled if such indication is shown, clearly and conspicuously);

7) Speedometer, with both miles per hour and kilometers per hour scales that are easily readable.

o) Lamps and Signals. See Section 440.420(u) of this Part.

p) Oil Filter. A "full flow" type engine oil filter of approximately 1 liter (1 quart) capacity shall be installed. The purchaser may specify additional "full flow" or "by-pass" type filters, or oil treatment devices.

q) Shock Absorbers. Two front and two rear double-acting shock absorbers of adequate capacity shall be installed.

r) Spare Tire (Optional). The spare tire and rim, if supplied, shall be of the same size designation and load rating as the largest tire and rim installed on the bus. Each spare tire and rim shall be suitably mounted in an accessible location outside the passenger compartment.

s) Springs and Suspension. Each spring and other component in any of the suspension systems shall be capable of supporting its share of the rated gross axle weight during normal operations. Where spring failure could result in total loss of control of the bus, suitable means shall be provided to make such total loss most unlikely.

t) Steering Mechanism. Power steering is optional. The steering mechanisms shall provide safe and accurate performance at maximum load and speed and shall be adjustable while installed on the completed bus. After the date of manufacture of the incomplete vehicle, the steering mechanisms shall not be modified unless such modification is done with the concurrence of the incomplete vehicle manufacturer and in accordance with the incomplete vehicle manufacturer's instructions.

u) Tow Hooks, Front (Optional). A front tow hook may not extend beyond the front of the front bumper. Each front tow hook not fastened securely to the chassis frame shall be connected to the frame by suitable braces.

v) Transmission. Unless otherwise specified by the purchaser, the transmission shall be manual-shift.

1) A manual-shift transmission shall provide not less than 4 forward gear ratios and 1 reverse gear ratio. A synchromesh shifting mechanism shall be provided for each forward gear ratio except for the highest ratio; i.e., "first gear" or "low gear". (Synchromesh may be specified for "first" or "reverse" gears at the purchaser's option.)

2) An automatic transmission may be specified by the purchaser. Such transmission shall provide not less than 3 forward gear ratios and 1 reverse gear ratio.

w) Undercoating. The entire underside of front fenders or wheel wells shall be coated with a fire-resistant undercoating material in order to seal joints and to reduce corrosion and noise. Nonmetallic components need not be coated.

x) Wiring. See Section 440.420(xx) of this Part.

(Source: Amended at 32 Ill. Reg. 17983, effective November 10, 2008)