G. For after treatment systems that require Diesel Exhaust Fluid (DEF) to meet federally mandated emissions:

1. The composition of Diesel Exhaust Fluid (DEF) must comply with International Standard ISO 22241-1. Refer to engine manufacturer for any additional DEF requirements.

2. The DEF supply tank shall be sized to meet a minimum ratio of 3 diesel fills to 1 DEF fill.

FENDERS: FRONT

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

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

FIRE SUPPRESSION (OPTIONAL)

A. The chassis manufacturer may provide an automatic fire extinguisher system in the engine compartment.

B. Fire suppression system nozzles shall be located in the engine compartment, under the bus, in the electrical panel or under the dash, but they shall not be located in the passenger compartment. The system must include a lamp or buzzer to alert the driver that the system has been activated.

FLOOR AND FLOOR COVERINGS

A. The floor in the under-seat area, including the tops of the wheel housing, driver's compartment, and toe board, shall be covered with rubber floor covering or the equivalent, having a minimum overall thickness of point one eight of an inch (1/8") and calculated burn rate of 0.1 or less using the test measures, procedure and formulas in FMVSS 302 Flammability of Interior Materials. The driver's area on all Type A buses may be manufacturer's standard flooring and floor covering.

B. The floor covering in the aisle shall be of an aisle-type rubber or equivalent, wear-resistant and ribbed. The minimum overall thickness shall be 3/16 inch measured from the tops of the ribs.

C. The floor covering must be permanently bonded to the floor and must not crack

when subjected to sudden changes in temperature. Bonding or adhesive material shall be waterproof and shall be of a type recommended by the manufacturer of the floor-covering material. All seams must be sealed with a waterproof sealer.

D. On Types C and D buses, the manufacturer shall provide a screw-down plate to access the fuel tank sending unit that is secured and insulated. The plate shall be mounted so that access is readily available to repair personnel and so that the floor covering is not disturbed during the repair process.

FRAME

A. Frame lengths shall be established in accordance with the design criteria for the complete vehicle.

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

C. Frames shall not be modified for the purpose of extending the wheelbase.

D. Any secondary manufacturer that modifies the original chassis frame shall provide a warranty at least equal to the warranty offered by the original equipment manufacturer (OEM) and shall certify that the modification and other parts or equipment affected by the modification shall be free from defects in material and workmanship under normal use and service intended by the OEM.

FUEL SYSTEM

A. Fuel tank(s) having a minimum 25-gallon capacity shall be provided by the chassis manufacturer. Each tank shall be filled from and vented to the outside of the passenger compartment, and each fuel filler should be placed in a location where accidental fuel spillage will not drip or drain on any part of the exhaust system.

B. The fuel system shall comply with FMVSS No. 301, *Fuel System Integrity*.

C. All types of school buses with a design capacity of 53 and larger shall have a fuel capacity of not less than 60 gallons. Type C and D buses with a design capacity of 65 and larger may have a 100-gallon tank.

D. Fuel tank(s) may be mounted between the chassis frame rails or outboard of the frame rails on either the left or right side of the vehicle.

E. The actual draw capacity of each fuel tank shall be a minimum of 83 percent of the tank capacity.

F. Installation of alternative fuel systems, including fuel tanks and piping from the tank to the engine, shall comply with all applicable fire codes in effect on the date of manufacture of the bus.

G. Installation of Liquified Petroleum Gas (LPG) tanks shall comply with National Fire Protection Association (NFPA) 58, *Liquefied Petroleum Gas Code.*

H. Installation of Compressed Natural Gas (CNG) containers shall comply with FMVSS No. 304, *Compressed Natural Gas Fuel Container Integrity.*

I. The CNG Fuel System shall comply with FMVSS No. 303, *Fuel System Integrity of Compressed Natural Gas Vehicles.*

GOVERNOR

An electronic engine speed limiter shall be provided and set to limit engine speed, not to exceed the maximum revolutions per minute, as recommended by the engine manufacturer.

HANDRAILS

At least one handrail shall be installed. The handrail shall be a minimum of 1" diameter and be constructed from corrosion resistant material(s). The handrail(s) shall assist passengers during entry or exit and shall be designed to prevent entanglement, as evidenced by the passing of the NHTSA string and nut test.

HEATING SYSTEM, PROVISION FOR

The engine shall be capable of supplying coolant at a temperature of at least 170 degrees Fahrenheit at the engine coolant thermostat opening. The coolant flow rate shall be 50 pounds per minute at the return end of 30 feet of one inch inside diameter automotive hot water heater hose. (See SBMTC-001, *Standard Code for Testing and Rating Automotive Bus Hot Water Heating and Ventilating Equipment.*)

HEATING AND AIR CONDITIONING SYSTEMS

A. Heating system

1. The heater shall be hot water combustion type, electric heating element or heat pump.

2. The front heater shall be of fresh air, or combination fresh air and re- circulating type.

3. Heater hoses and clamps shall be adequately supported and shielded to protect hoses against excessive wear due to vibration. Heater lines, cores, and elements on the interior of the bus shall be shielded to prevent scalding or burning for the driver or passengers. Heater hoses conform to SAE J20r3, June 2006 E

4. Buses shall have a minimum of two heaters: one front and one rear.

5. Additional heaters may be re-circulating air type.

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

B. Auxiliary fuel-fired (Optional)

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

   a. The auxiliary heating system shall utilize the same type of fuel as specified for the vehicle engine;

   b. The heater(s) may be direct, hot air-type or may be connected to the engine coolant system;

   c. An auxiliary heating system, when connected to the engine coolant system, may be used to preheat the engine coolant or preheat and add supplementary heat to the heating system;

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

   e. All combustion heaters shall be in compliance with current Federal Motor Carrier Safety Regulations;

   f. The auxiliary heating system shall require low voltage.

   g. Auxiliary heating systems shall comply with FMVSS No. 301, *Fuel System Integrity,* and all other applicable FMVSS, as well as with SAE test procedures.

2. All forced-air heaters installed by body manufacturers shall bear a name plate that indicates the heater rating in accordance with Standards is the School Bus Manufacturers Technical Committee (SBMTC)-001, *Standard Code for Testing and Rating Automotive Bus Hot Water Heating and Ventilating Equipment.* The plate shall be affixed by the heater manufacturer and shall constitute certification that the heater performance is as shown on the plate.

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

4. Each hot water system installed by a body manufacturer shall include one shutoff 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 Types A and B buses, the valves may be installed in another accessible location.

5. All heaters of hot water type in the passenger compartment shall be equipped with a device, installed in the hot water pressure line, which regulates the water flow to all passenger heaters. The device shall be conveniently operated by the driver while seated. The driver and passenger heaters may operate independently of each other for maximum comfort.

6. On hot water type systems, accessible bleeder valves for removing air from the heater shall be installed in an appropriate place in the return lines of body company-installed heater.

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

C. Passenger Compartment Air Conditioning

The following specifications are applicable to all types of school buses that shall be equipped with air conditioning. This section is divided into three parts. Part 1 covers performance specifications, Part 2 covers test conditions and Part 3 covers other requirements applicable to all buses.

1. Performance Specifications