

a. Standard Performance

The installed air conditioning system should cool the interior of the bus from 100 degrees to 80 degrees Fahrenheit, measured at three points (minimum) located four feet above the floor on the longitudinal centerline of the bus. The three required points shall be: (1) three feet above the center point of the horizontal driver seat surface, (2) at the longitudinal midpoint of the body, and (3) three feet forward of the rear emergency door or, for Type D rear-engine buses, three feet forward of the end of the aisle. Note for the Type A vehicles placement of the rear thermocouple should be centered in the bus over the rear axle. The independent temperature reading of each temperature probe inside the bus shall be within a range of  $\pm 3$  degrees Fahrenheit of the average temperature at the conclusion of the test.

b. High Performance

The installed air conditioning system should cool the interior of the bus from 100 degrees to 70 degrees Fahrenheit, measured at three points (minimum) located four feet above the floor on the longitudinal centerline of the bus. The three required points shall be:

(1) three feet above the center point of the horizontal driver seat surface, (2) at the longitudinal midpoint of the body, and (3) three feet forward of the rear emergency door or, for Type D rear-engine buses, three feet forward of the end of the aisle. Note for the Type A vehicles placement of the rear thermocouple should be centered in the bus over the rear axle. The independent temperature reading of each temperature probe inside the bus shall be within a range of  $\pm 3$  degrees Fahrenheit of the average temperature at the conclusion of the test.

2. Test Conditions

The test conditions under which the above performance standards must be achieved shall consist of (1) placing the bus in a room (such as a paint booth) where ambient temperature can be maintained at 100 degrees Fahrenheit; (2) heat-soaking the bus at 100 degrees Fahrenheit at a point measured two feet horizontally from the top of the windows on both sides of the bus, with windows open for two hours; and (3) closing windows, turning on the air conditioner with the engine running at  $1250 \pm 50$  RPM, and cooling the interior of the bus to 80 degrees Fahrenheit, (standard performance) or 70 degrees Fahrenheit (high performance), within 30 minutes while maintaining 100 degrees Fahrenheit outside temperature.

The manufacturer shall provide test results that show compliance with standard systems. If the bid specifies, the manufacturer shall provide facilities for the user or user's representative to confirm that a pilot model of each bus design meets the above performance requirements.

### 3. Other Requirements

- a. Evaporator cases, lines and ducting (as equipped) shall be designed in such a manner that all condensation is effectively drained to the exterior of the bus below the floor level under all conditions of vehicle movement and without leakage on any interior portion of the bus;
- b. Evaporators and ducting systems shall be designed and installed to be free of projections or sharp edges. Ductwork shall be installed so that exposed edges face the front of the bus and do not present sharp edges;
- c. On school buses equipped with Type-2 seatbelts having anchorages above the windows, the ducting (if used) shall be placed at a height sufficient to not obstruct occupant securement anchorages. This clearance shall be provided along the entire length (except at evaporator locations) of the passenger area on both sides of the bus interior;
- d. The body shall be equipped with insulation, including sidewalls, roof, firewall, rear, inside body bows and plywood or composite floor insulation to reduce thermal transfer;
- e. All glass (windshield, service and emergency doors, side and rear windows) shall be equipped with maximum integral tinting allowed by federal, state or ANSI standards for the respective locations, except that windows rear of the driver's compartment, if tinted, shall have approximately 28 percent light transmission;
- f. Electrical generating capacity shall be provided to accommodate the additional electrical demands imposed by the air conditioning system;
- g. Roofs shall be painted white to aid in heat dissipation; and
- h. Air intake for any evaporator assembly(ies), except for front evaporator of Type A-1, shall be equipped with replaceable air filter(s) accessible without disassembly of evaporator case.
- i. For all buses (except Type D rear engine transit) equipped with a rear evaporator assembly, evaporator shall not encroach upon head impact



zone, but may occupy an area of less than 26.5 inches from the rear wall and 14 inches from the ceiling.

- j. For Type D rear engine transit buses equipped with a rear evaporator over the davenport, the evaporator assembly may not interfere with rear exit window and may not extend above the rear seating row.

## **HINGES**

All exterior metal door hinges shall be designed to allow lubrication to be channeled to the center 75% of each hinge loop without disassembly, unless they are constructed of stainless steel, brass or non-metallic hinge pins or other designs that prevent corrosion.

## **HORN**

The bus shall be equipped with a horn(s) of standard make with the horn(s) capable of producing a complex sound in bands of audio frequencies between 250 and 2,000 cycles per second, and tested in accordance with SAE J377, *Horn—Forward Warning—Electric—Performance, Test, and Application*.

## **IDENTIFICATION**

- A. The body shall bear the words "SCHOOL BUS" in black letters at least eight (8) inches high on both front and rear of the body or on signs attached thereto. Lettering shall be placed as high as possible without impairment of its visibility. Letters shall conform to "Series B" of Standard Alphabets for Highway Signs. "SCHOOL BUS" lettering shall have a reflective background, or as an option, may be illuminated by backlighting. MFSABS are exempt from these requirements.
- B. Required lettering and numbering shall include:
  - 1. District, contractor name or cooperative shall displayed at the beltline in letters that are a minimum of 5 inches in height.
  - 2. The bus identification number displayed on the sides, on the rear and on the front shall be black or contrasting unshaded numbers not less than 5 inches high.
- C. Other lettering, numbering or symbols that may be displayed on the exterior of the bus shall be limited to:
  - 1. Bus identification number on top of the bus, in addition to required numbering on the sides, rear and front;

2. The location of the battery(ies) identified by the word "BATTERY" or "BATTERIES" on the battery compartment door in two-inch lettering.
3. Symbols or letters not to exceed 64 square inches of total display near the entrance door, displaying information for identification by the students of the bus or route served.
4. Manufacturer, dealer or school identification or logos.
5. Symbols identifying the bus as equipped for or transporting students with special needs as noted in SPECIALLY EQUIPPED SCHOOL BUS SPECIFICATIONS.
6. Electronic warning sign related to school bus flashing signal.
7. Lettering relating to railroad stop procedures; and
8. Identification of fuel type in 1-inch lettering adjacent to the fuel filler opening.
9. Manufacturer's identification of the Diesel Exhaust Fluid (DEF) compartment, if applicable.

D. Only signs and lettering approved by state law, regulation, or authority shall appear on the bus.

### **INSIDE HEIGHT**

The inside body height shall be seventy-two inches (72") or more, measured metal to metal, at any point on longitudinal centerline from the front vertical bow to the rear vertical bow. The inside body height of Type A-1 buses shall be sixty-two inches (62") or more. Inside height measurement does not apply to air conditioning equipment.

### **INSTRUMENTS AND INSTRUMENT PANEL**

- A. The chassis shall be equipped with the instruments and gauges listed below:

**Note:** Telltale warning lamps in lieu of gauges are not acceptable, except as noted.

1. Speedometer

2. Odometer that can be read without using a key and that will give accrued mileage (to seven digits), including tenths of miles, unless tenths of miles are registered on a trip odometer.

3. Tachometer

**Note:** For Type C and D buses, a tachometer shall be installed so as to be visible to the driver while seated in a normal driving position.

4. Voltmeter

**Note:** An ammeter with graduated charge and discharge indications is permitted in lieu of a voltmeter; however, when used, the ammeter wiring must be compatible with the current flow of the system.

5. Oil pressure gauge

6. Water temperature gauge

7. Fuel gauge

8. DEF gauge (if quipped).

9. High beam headlamp indicator.

10. Brake air pressure gauge (air brakes), brake indicator lamp (vacuum/hydraulic brakes), or brake indicator lamp (hydraulic/hydraulic).

11. Turn signal indicator; and

12. Glow-plug indicator lamp, where appropriate

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

C. The instruments and gauges shall be mounted on the instrument panel so that each is clearly visible to the driver while seated in a normal driving position.

D. Instruments and controls must be illuminated as required by FMVSS No. 101, *Controls and Displays*.

E. Multi-Function Gauge (MFG)