

## **49CFR571 FMVSS 217 Bus emergency exits and window retention and release**

### S1 Scope

This standard establishes requirements for the retention of windows other than windshields in buses, and establishes operating forces, opening dimensions, and markings for bus emergency exits.

### S2 Purpose

The purpose of this standard is to minimize the likelihood of occupants being thrown from the bus and to provide a means of readily accessible emergency egress.

### S3 Application : buses

### S4 Defintions

### S5 Requirements

1. Window retention
2. Provision of emergency exits
3. Emergency exit release
4. Emergency exit opening
5. Emergency exit identification

### S6 Test conditions

## **1. Window retention**

... each piece of window glazing and each surrounding window frame when tested ... shall be retained by its surrounding structure in a manner that prevents the formation of any opening large enough to admit the passage of a 4-inch diameter sphere under a force, including the weight of the sphere, of 5 pounds until any one of the following events occurs ...

## **2. Provision of emergency exits**

Buses other than school buses shall meet the requirements of either S5.2.2 or S5.2.3. School buses shall meet the requirements of S5.2.3.

A bus with GVWR of more than 10,000 pounds may satisfy the unobstructed openings requirement by providing at least one side door for each three passenger seating positions in the vehicle.

### S5.2.2. Buses other than school buses

- Buses shall provide unobstructed openings for emergency exit which collectively amount, in total square centimeters, to at least 432 times the number of designated seating positions on the bus.
- At least 40 percent of the total required area of unobstructed openings, computed in the above manner, shall be provided on each side of a bus.
- However, in determining the total unobstructed openings provided by a bus, no emergency exit, regardless of its area, shall be credited with more than 3,458 square centimeters of the total area requirement.

Buses with a GVWR of more than 10,000 pounds shall meet the unobstructed openings requirements by providing side exits and at least one rear exit that conforms to S5.3 through S5.5.

- The rear exit shall meet the requirements of S5.3 through S5.5 when the bus is upright and when the bus is overturned on either side, with the occupant standing facing the exit.

- When the bus configuration precludes installation of an accessible rear exit, a roof exit that meets the requirements of S5.3 through S5.5 when the bus is overturned on either side, with the occupant standing facing the exit, shall be provided in the rear half of the bus.

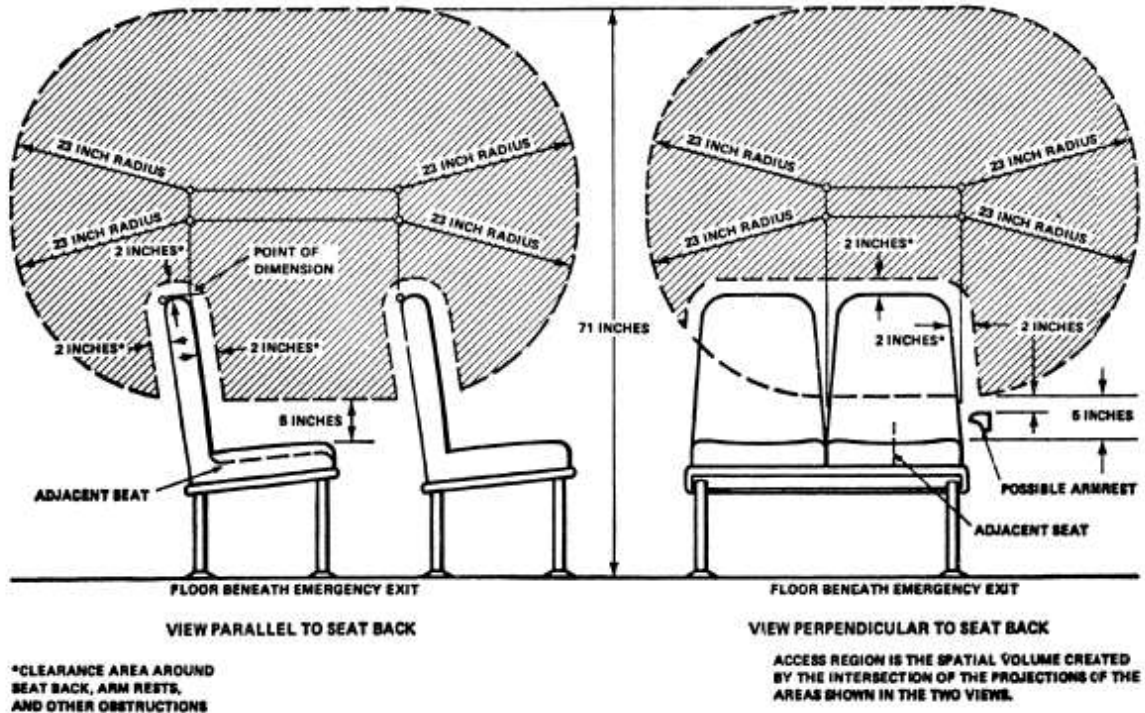
Buses with GVWR of 10,000 pounds or less may meet the unobstructed openings by providing:

- Devices that meet the requirements of S5.3 through S5.5 without using remote controls or central power systems;
- Windows that can be opened manually to a position that provides an opening large enough to admit unobstructed passage, keeping a major axis horizontal at all times, of an ellipsoid generated by rotating about its minor axis an ellipse having a major axis of 50 centimeters and a minor axis of 33 centimeters;
- Doors.

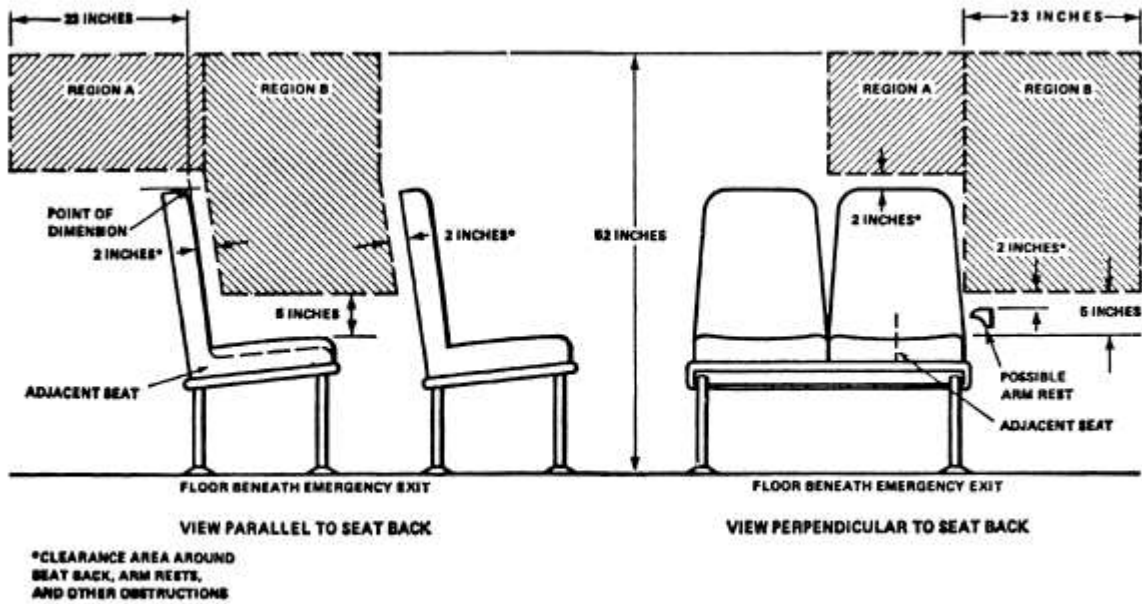
S5.2.3 School buses ...

### 3. Emergency exit release

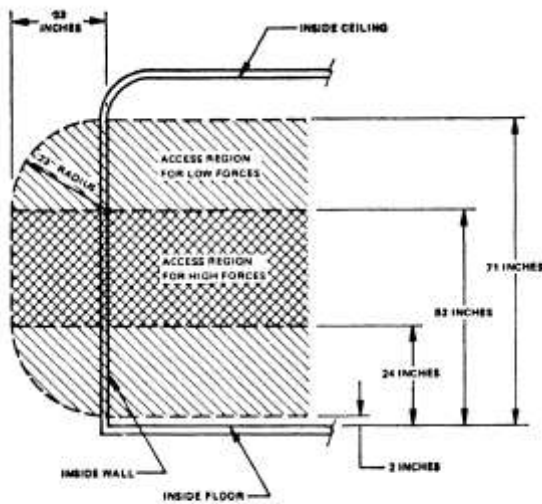
Each emergency exit shall be releasable by operating one or two mechanisms located within the regions specified in Figure 1, Figure 2, or Figure 3.



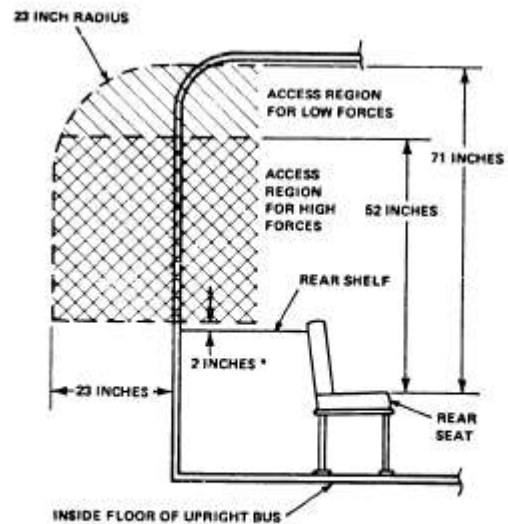
**FIGURE 1 LOW-FORCE ACCESS REGION FOR EMERGENCY EXITS HAVING ADJACENT SEATS**



**FIGURE 2 HIGH-FORCE ACCESS REGIONS FOR EMERGENCY EXITS HAVING ADJACENT SEATS**

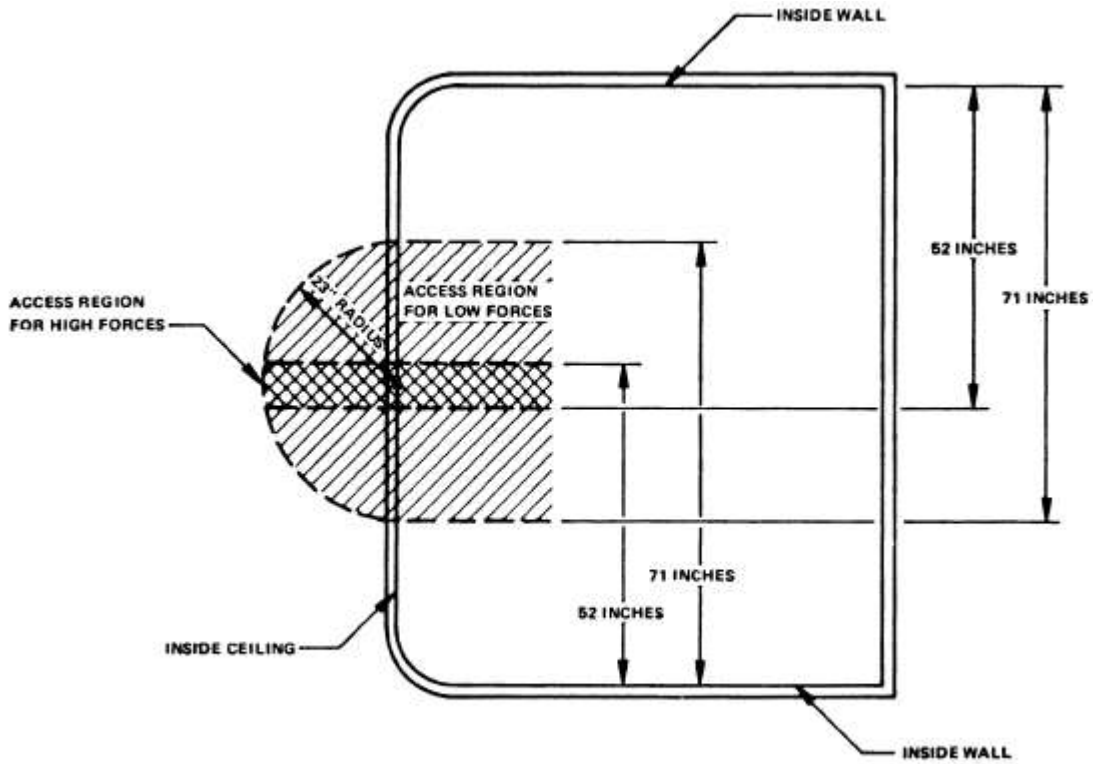


**3A. SIDE EMERGENCY EXIT**

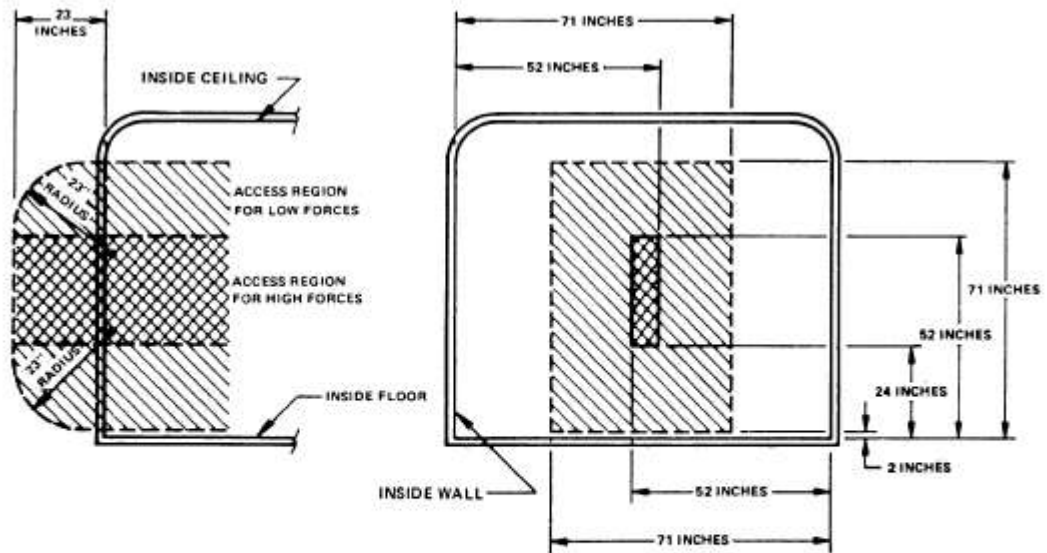


**\*TYPICAL CLEARANCE AROUND OBSTRUCTIONS**

**3C. REAR EMERGENCY EXIT WITH REAR OBSTRUCTION**



**3B. ROOF EMERGENCY EXIT**



**3D. REAR EMERGENCY EXIT WITHOUT REAR OBSTRUCTION**

**FIGURE 3 LOW AND HIGH-FORCE ACCESS REGIONS FOR EMERGENCY EXITS WITHOUT ADJACENT SEATS**

When tested ... each emergency exit shall allow manual release of the exit by a single occupant using force applications each of which conforms, at the option of the manufacturer, either to (a) or (b)

Each exit shall have not more than two release mechanisms.

- In the case of exits with one release mechanism, the mechanism shall require two force applications to release the exit.
- In the case of exits with two release mechanisms, each mechanism shall require one force application to release the exit.

At least one of the force applications for each exit shall differ from the direction of the initial motion to open the exit by not less than 90° and no more than 180°.

(a) Low-force application.

(1) *Location*. As shown in Figure 1 or Figure 3.

(2) *Type of motion*. Rotary or straight.

(3) *Magnitude*. Not more than 20 pounds.

(b) High force application.

(1) *Location*. As shown in Figure 2 or Figure 3.

(2) *Type of motion*. Straight, perpendicular to the undisturbed exit surface.

(3) *Magnitude*. Not more than 60 pounds.

#### **4. Emergency exit opening**

After the release mechanism has been operated, each emergency exit shall ... allow manual opening by a single occupant to a position that provides an opening large enough to admit unobstructed passage, keeping a major axis horizontal at all times, of an ellipsoid generated by rotating about its minor axis an ellipse having a major axis of 50 centimeters and a minor axis of 33 centimeters.

#### **5. Emergency exit identification**

In buses ... each emergency exit door shall have the designation "Emergency Door" or "Emergency Exit," and every other emergency exit shall have the designation "Emergency Exit" followed by concise operating instructions describing each motion necessary to unlatch and open the exit, located within 16 centimeters of the release mechanism.

When a release mechanism is not located within an occupant space of an adjacent seat, a label meeting the requirements of S5.5.2 that indicates the location of the nearest release mechanism shall be placed within the occupant space.

... each marking shall be legible, when the only source of light is the normal nighttime illumination of the bus interior, to occupants having corrected visual acuity of 20/40 (Snellen ratio) seated in the adjacent seat, seated in the seat directly adjoining the adjacent seat, and standing in the aisle location that is closest to that adjacent seat. The marking shall be legible from each of these locations when the other two corresponding locations are occupied.

If the exit has no adjacent seat, the marking must meet the legibility requirements of S5.5.2 for occupants standing in the aisle location nearest to the emergency exit, except for a roof exit, which must meet the legibility requirements for occupants positioned with their backs against the floor opposite the roof exit.