SURVIVAL FACTORS ATTACHMENT

CVSA Passenger Carrier Vehicle Emergency Exit Inspection Bulletin

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2022-04 – Passenger Carrier Vehicle Emergency Exit Inspection

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Summary

This inspection bulletin provides guidance on the inspection of emergency exits in passenger carrier vehicles.

Background

All manufacturers of commercial passenger-carrying motor vehicles are required to meet the National Highway Traffic Safety Administration's (NHTSA) Federal Motor Vehicle Safety Standards (FMVSS) for emergency egress in the U.S. and the Canadian Motor Vehicle Safety Standards (CMVSS) in Canada. These requirements minimize the likelihood of occupants being ejected from the passenger carrier vehicle in the event of a crash or other emergency and provide a means of readily accessible emergency egress. The Federal Motor Carrier Safety Administration (FMCSA) incorporated the NHTSA FMVSS 217 Standard into the Federal Motor Carrier Safety Regulations (FMCSRs) Part 393, Parts and Accessories Necessary for Safe Operation. Similarly, Canada incorporates CMVSS 217 into its federal, provincial and territorial requirements.

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NHTSA and Transport Canada allow manufacturers to design and provide exits at the manufacturer's discretion, provided they meet the minimum performance standards of the applicable FMVSS/CMVSS. Inspections of passenger carrier vehicles bearing the FMVSS/CMVSS certification label from the original manufacturer do not always require detailed measurements and calculations for each inspection. However, many passenger carrier vehicles undergo construction by second-stage manufacturers or modifiers and such customizations may block or render inoperative required emergency exit windows, hatches and/or doors. For these situations, being proficient in calculating exit space, determining size and location of emergency exits is required.

Determine the Applicability

United States

The emergency exit requirements are only applicable to a passenger carrier commercial motor vehicle in interstate commerce that meets the definition of a bus in FMVSS 571.3.

"Bus" means a motor vehicle with motive power, except a trailer, designed for carrying more than 10 persons. Therefore, if there are less than 11 designated seating positions, including the driver, the egress requirements are not applicable to the passenger-carrying commercial motor vehicle.

The original Safety Standard No. 217, Bus Emergency Exit and Window Retention and Release became effective on Sept. 1, 1973, and was upgraded to the current standard on Sept. 1, 1994. Therefore, this inspection process is only applicable to vehicles manufactured after Sept. 1, 1994, as referenced in 393.62(a).

Canada

The emergency exit requirements are only applicable to a bus meeting the definition of a commercial vehicle in NSC Standard 11B.

"bus" means a vehicle designed and constructed and used for the transportation of passengers with a designated seating capacity of more than 10, including the driver, but excluding the operation for personal use.

The applicable standards outlined in the NSC Standard are referenced in the Motor Vehicle Safety Regulations (MVSRs) Section 2(1). CMVSS 217 outlines the emergency exit standards in Canada. The original Safety Standard No. 217, Bus Window Retention, Release and Emergency Exits became effective in 1978.

Provisions (Methods) for Emergency Exits

United States

Buses in interstate commerce manufactured after Sept. 1, 1994, must comply with either the current FMVSS S5.2.2, Passenger Carrier Vehicle Inspection (PCVI) Method One, **or** FMVSS S5.2.3, PCVI Method Two (Option A or B) when calculating emergency exits. The original configuration of the bus, even if it was manufactured as a school bus, is irrelevant.

Buses with a gross vehicle weight rating (GVWR) less than 10,001 lbs. (4,536 kg) may meet the unobstructed opening requirement by providing exits (windows or doors) that open manually (without using remote controls or central power).

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Canada

Buses manufactured after Sept. 1, 1994, must comply with the current CMVSS 217(3)-(8). The original configuration of the bus, even if it was manufactured as a school bus, is irrelevant (See Appendix).

Buses with a GVWR less than 4,536 kg (10,001 lbs.) may meet the unobstructed opening requirement by providing exits (windows or doors) that open manually (without using remote controls or central power).

NOTE (U.S. and Canada): Before citing a motor carrier for failing to have the required exit space, ensure the passenger carrier vehicle ***fails to comply with all*** the minimum emergency exit inspection methods.

PCV Inspection Procedure - Method One (see Appendix A)

Identify the seating capacity. This is done by locating the FMVSS/CMVSS certification label. Although the number of designated seating positions (DSP) is not required to be marked on the certification label, most manufacturers do so as they are required to use the DSP in calculating the vehicle's GVWR. In the event the seating capacity of the vehicle is not marked, a visual count of all seating positions, including the driver seat and folding or jump seats, is permissible.

1. **Identify all emergency exit openings on the front, sides, rear and top (roof) of the passenger carrier vehicle and measure the size of each exit opening.** Determine compliance with the minimal required emergency exit space.

   a. Calculate the collective (total amount of) exit space required for the seating capacity.
   b. Calculate 40% of the minimum exit space required for each side.
   c. Calculate the exit space provided on the passenger-carrying vehicle by entering the measurements of each emergency exit into the Method I Calculation Worksheet (Appendix A).

2. **After the required exit space is determined, inspect emergency exits for the following:**

   Location, Size and Operation

   a. Emergency exit space requirements. The passenger carrier vehicle must meet the required collective emergency exit space (393.62(a)-(571.217, S5.2.2.1) or 393.62(a)-(571.217, S5.2.2.3) for vehicles less than 10,001 lbs. (4,536 kg)). Failure to meet the minimum exit space will result in an out-of-service condition for a "required emergency exit missing."

   Note: Buses with a GVWR less than 10,001 lbs. (4,536 kg) may meet the unobstructed opening requirement by providing exits (windows or doors) that open manually (without using remote controls or central power).

   b. Side emergency exit space. At least 40% of the collective exit space shall be provided on each side of the commercial motor vehicle (393.62(a)-(571.217, S5.2.2.1) or 393.62(a)-(571.217, S5.2.2.3) for vehicles less than 10,001 lbs.). Failure to meet the minimum exit space will result in an out-of-service condition for a "required emergency exit missing."

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c. **Rear emergency exit.** In addition to side exits, at least one rear emergency exit is required in buses with a GVWR of more than 10,000 lbs. (4,536 kg). When the bus configuration cannot provide an accessible rear exit, a roof hatch in the rear half of the vehicle is required. When a rear exit door is blocked by interior modifications, a violation is not present if a roof hatch has been installed in the rear half of the vehicle in lieu of the rear door. If a rear exit door or roof hatch in the rear is not present, failure to meet the minimum exit space using any method will result in an out-of-service condition for a "required emergency exit missing" (393.62(a)-(571.217, S5.2.2.2)).

PCV Inspection Procedure - Method Two, Option A and B (U.S. only)

U.S. Applicability. The inspection procedures listed for compliance with the PCVI Method Two are intended for use on passenger carrier vehicles (11 or more DSPs) operating in interstate commerce that were certified by the manufacturer under Method Two Option A or Option B. This includes school buses operated by contractors in interstate commerce - outside of school bus operations (home to school or school to home), but are not intended for government-owned school buses driven by government employees.

Component inspection specific to school bus operations are not required in buses other than school buses certifying under Method Two and are not addressed in this inspection process (e.g., positive door opening devices, interior and exterior opening, engine starting system inoperative if an emergency exit is locked, etc.) However, all marking requirements are applicable to all passenger carrier vehicles more than 10,000 lbs. (4,536 kg) certified under Method Two, Option A or Option B.

1. **Identify the seating capacity.** The procedure for determining seating capacity is the same as described in Method One. Locate the FMVSS/CMVSS certification label. If the number of DSP is not marked on the certification label, a visual count of all seating positions, including the driver seat and folding or jump seats, is permissible. When a school bus remaining in the original manufactured design is removed from school bus operations and placed into interstate commerce transporting adults, the seating capacity of the manufacturer's pupil seating capacity of three occupants per bench seat will be reduced to two seating positions per bench seat.

   If the vehicle interior has been modified, the seating capacity may not be accurate with what was marked on the original FMVSS/CMVSS certification label. A vehicle modifier may place an additional certification label on the vehicle. However, this very rarely happens when a motor carrier modifies its own vehicles.

2. **Identify all emergency exit openings on front, sides, rear and top (roof) of bus.**

3. **Determine that the bus complies with either Option A or Option B of the minimum emergency exit provisions.**

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Option A - One rear emergency door and the additional exits, if any, specified by Table 1 below:

SEATING CAPACITY	TABLE 1 - ADDITIONAL EXITS REQUIRED
1 - 45	None
46 - 62	**1** left side exit door **or** **2** exit windows
63 - 70	**1** left side exit door **or** **2** exit windows and **1** roof exit
71 and ABOVE	**1** left side exit door **or** **2** exit windows, **1** roof exit, and any combination of door, roof or windows such that the total capacity credit specified in Table 3 for these exits, plus 70, is greater than the seating capacity of the bus

A commercial bus certifying under the PCVI Method Two Option A.

This converted school bus no longer meets Method Two Option A due to the removal of the rear exit door. A roof hatch has been added to comply with Method One.

Option B - One side emergency door on the vehicle's left side and a rear push-out window and the additional exits, if any, specified by Table 2 below:

SEATING CAPACITY	TABLE 2 - ADDITIONAL EXITS REQUIRED
1 - 57	None
58 - 74	**1** right side exit door **or** **2** exit windows
75 - 82	**1** right side exit door **or** **2** exit windows and **1** roof exit
83 and ABOVE	**1** right side exit door **or** **2** exit windows, **1** roof exit, and any combination of door, roof or windows such that the total capacity credit specified in Table 3 for these exits, plus 82, is greater than the seating capacity of the bus

A commercial bus certifying under the PCVI Method Two Option B.

Providing transportation to adults will reduce the manufacturer's pupil seating capacity from three to two per seating surface. This bus does not require a roof hatch if the seating capacity is under 63 for Option A or under 75 for Option B.

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If the bus fails to provide the required emergency space as required by PCVI Method Two Option A or Option B, an out-of-service condition is present. Cite 393.62(a)-(571.217 S5.2.1) for failing to meet both the requirements of Method One and Method Two.

When the bus is inspected using PCVI Method Two Option A, the rear emergency exit door must be hinged on the right side, as required. If the hinges for the door are located on the left side, but the emergency door is otherwise operative, a violation is present. 393.62(a)-(571.217 S5.2.3.1(a))

When the bus is inspected using PCVI Method Two Option B, the left side emergency exit door must be hinged on the forward side, as required. If the hinges for the door are located on the rearward side, but the emergency door is otherwise operative, a violation is present. 393.62(a)-(571.217 S5.2.3.2(a))

4. **Determine compliance with location, size, operation, and emergency exit identification and labeling.**

   a. The size requirements for school bus exits use the same required passage dimension definition used for buses other than school buses. All emergency exits in buses used in interstate transportation in non-school bus operations certifying under Method Two must be inspected in the same manner as listed in the functional requirements below.

   b. Marking requirements listed in the FMVSS/CMVSS for school buses are specifically for school buses in school bus operations, yet those requirements are similar and will meet the requirements set forth in the inspection procedure, Emergency Exit Identification and Labeling.

Functional Requirements for All Methods (Canada and U.S.)

1. **Operation - Emergency exits must open and close as designed.** *Note: Inspectors are not permitted to open exits, the driver must operate each emergency exit.* The purpose of the FMVSS/CMVSS 217 Standard, is to minimize the likelihood of occupants being ejected from the bus in the event of a crash or other emergency and to provide a means of readily accessible emergency egress. Therefore, when inspecting the exit operation, ensure it:
   - Opens to allow for passage meeting the required exit space and
   - Closes securely

   An emergency exit may not be opened with a tool or remote control. (393.62(a)- (571.217 S5.3.2)). This would result in an out-of-service condition for “required/marked emergency exit inoperative.”

   For vehicles less than 10,000 lbs. (4,536 kg), emergency exits must operate manually without remote controls or the central power system of the commercial motor vehicle. (393.62(a)-(571.217 S5.2.2.3(a)). This would result in an out-of-service condition for “required/marked emergency exit inoperative.”

2. **Emergency exit release mechanism.** Each emergency exit must be released by operating one or two manual mechanisms located above the seat or arm rest located within that exit space, whichever is higher. The areas are outlined in the diagrams on the next page.

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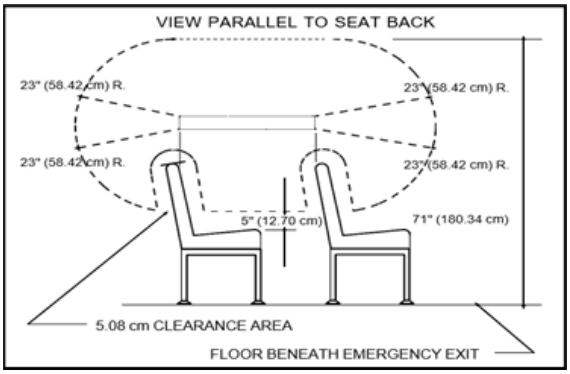
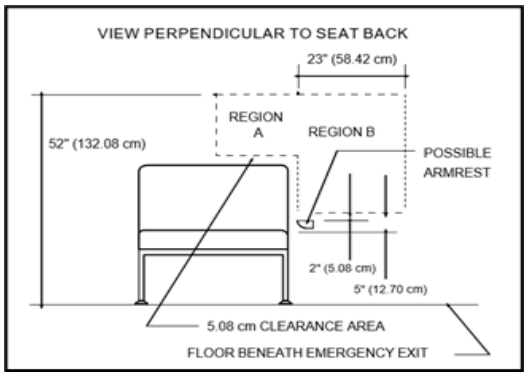
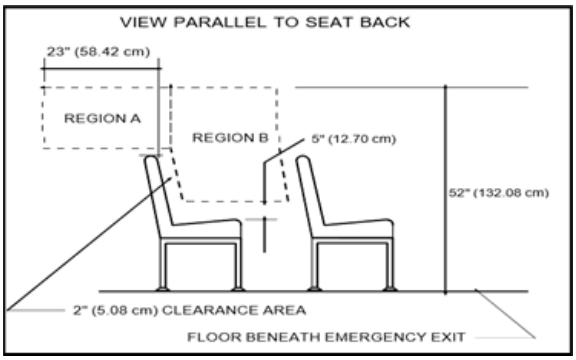
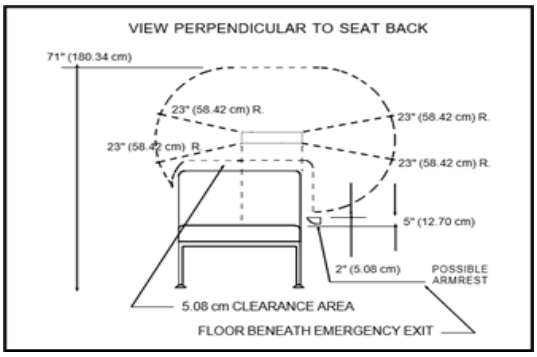


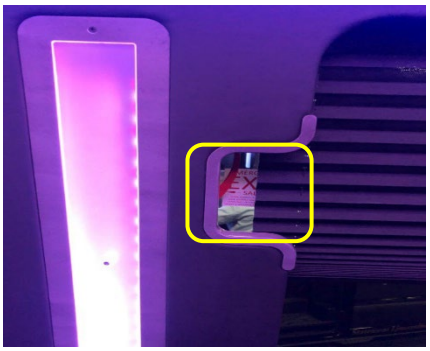






Buses often undergo interior restoration due to the age and use of the vehicle or for customizations to meet the needs of specific clientele or specialized services. During the modifications, seating may be replaced, or beauty panels, window treatments or other customizations may be added. These might hinder access to the original manufacturer's construction of the emergency exit release.

If the modifier fails to redesign the emergency exit to relocate the release mechanism(s) to the specified region(s) and the exit cannot be opened during the inspection process without the use of a tool, the mechanism is considered blocked, and an out-of-service condition is present for "required/marked emergency exit obstructed." If the exit is operative (without the use of a tool) but the release handle is not located within the required area, a violation is present. (393.62(a)-(571.217 S5.3.1))



Custom panel cut away to allow access for the release mechanism.

Custom panel and seat back blocking the release mechanism, making the exit inoperative.

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3. **Emergency exit opening.** Each emergency exit must allow for manual opening by a single occupant. After the release mechanism is operated, the opening must allow unobstructed passage of a 19.7 x 13-inch (50cm x 33cm) ellipsoid (geometric shape similar to a football). During interior restoration or customization, seating or other fabrications may be positioned differently. This may block access to the entire area of the emergency exit and reduce the size of the opening below the required minimum dimension. (393.62(a)-(S5.4.1)). This would result in an out-of-service condition for "required/marked emergency exit obstructed."

   NOTE: A violation is **NOT** present if the required ellipsoid dimension remains passable through the exit.

TV monitor and high back seat dividing the emergency exit space yet allowing passage through the exit.

Only one side of double door opens when release is activated. The one door opening allows adequate passage of the ellipsoid through the exit.

4. **Unobstructed Access.** If an interior customization or other obstruction hinders access to the marked and/or required emergency exit, an out-of-service condition is present for "required/marked emergency exit obstructed" (393.62(a)-(571.217 S5.2.2.1)). For buses less than 10,001 lbs. (4,536 kg), 393.62(a)-(571.217 S5.2.2.3).

   NOTE: If a customization or obstruction does not lower the required collective exit space or reduce the minimum exit dimension, a violation is not present.

Exit designed to press down pins and lift window out of track. TV and panels installed to allow access and removal as designed.

TV installation and panels fail to leave access to pins or enough space for window to lift out of track. This exit will not open.

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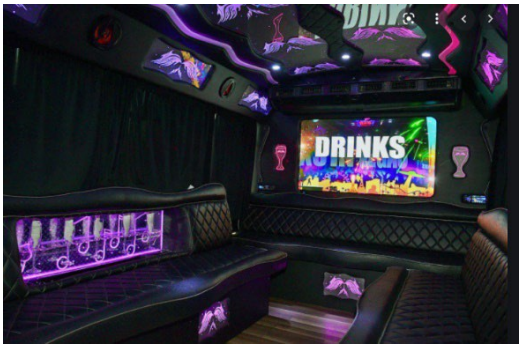
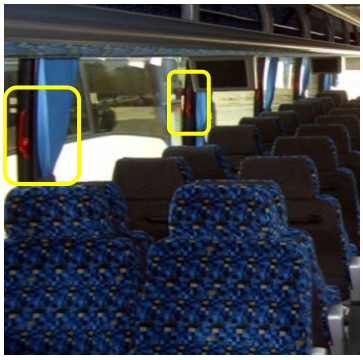
Exit obstructed by wooden plantation shutters.

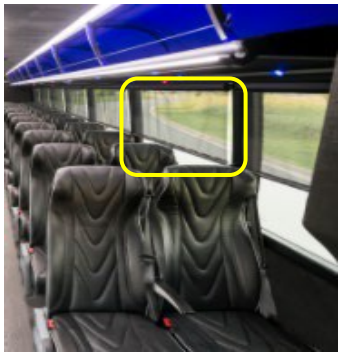


Rear door blocked by large television and perimeter seating. No roof hatch has been installed to comply with rear exit requirement.

NOTE: Sunshades - Many motorcoaches and other passenger carrier vehicles are equipped with sunshades or curtains for the purpose of passenger comfort. In most instances, this type of window treatment(s) will not hinder the exit access or exit handle operation. A violation is **NOT** present if the shade or curtain can be moved out of the way in the event of an emergency.



Typical fabric passenger window curtain



Fabric roll-up passenger window screen

Emergency designation on black-out shade bar

5. **Emergency Exit Identification and Labeling** ***(Does not apply to windows/doors in buses with a GVWR of 10,000 lbs./4,536 kg or less)***

   a. **Determine if all emergency exit labeling meet the following:** Each **REQUIRED** ***(as determined by the emergency exit calculation/formula)*** emergency exit shall have the designation "Emergency Door" or "Emergency Exit" as appropriate. During transportation, passengers may pick at the emergency label or other required markings until they are partially missing or completely peeled away. Motor carriers shall replace decals when needed. If a required decal is completely missing or fully obstructed, an out-of-service condition exists for "required emergency exit not properly marked." If only a portion of the required messaging is missing, a violation is present (393.62(e)-(571.217 S5.5.1)).

   NOTE: A required exit marking placed where it is not visible/legible from the standing specified position (e.g., due to the overhead luggage compartment) is a violation only, since it can still be seen from the two other specified (seated) positions (see 5.d. reference specified positions) (393.62(e)-(571.217 S5.5.2)).

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Some secondary manufacturers of limousines and custom coaches are placing red lights over emergency exit windows in lieu of the designation marking. This may be done in addition to the required labeling but does not meet the marking requirements in FMVSS/CMVSS 217.

Front Entrance (Service) Doors: Many passenger carrier vehicle front entrance doors (service) doors are locked by an internal system rather than manual door handles. In the event of a malfunction in the electrical system, or an inoperative door circuit, a valve is provided inside and/or outside to exit the bus. These valves may be marked "Emergency Door Release or Emergency Exit" with instructions indicating a direction to turn the knob to release the door. Even though the valve is provided as an emergency release, the entrance door may not necessarily be a required exit and therefore not marked as an emergency door or emergency exit.

Manufacturers are at liberty to provide the type, size and location of emergency exits as they determine appropriate. However, the exits must meet the FMVSS/CMVSS 217 standard. If the exit space provided by other marked emergency exits meet the required collective amount, including the 40% on each side, the entrance door is not a "required" exit and therefore is not subject to marking. If the required exit space is **NOT** provided by marked operative emergency exits, either collective or for the right side 40% space requirement, the entrance door would be a required exit and a missing emergency exit label would be an out-of-service condition for "required emergency exit not properly marked."

Door release valve inside a motorcoach at the entrance door.

Exterior door release valve at the entrance door of a custom limousine.

b. Operating Instructions. Concise operating instructions describing the motions necessary to unlatch and open the emergency exit must be located within 6 inches (150 mm) of the release mechanism. If the instructions are damaged but still convey the message or are not within the required distance, a violation is present. If the instructions are damaged to the point that they no longer convey the message or are completely missing, an out-of-service condition exists for "required emergency exit not properly marked." (393.62(e)-(571.217 S5.5.1))

Examples: (1) Lift to Unlatch, Push to Open, (2) Turn Handle, Push Out to Open

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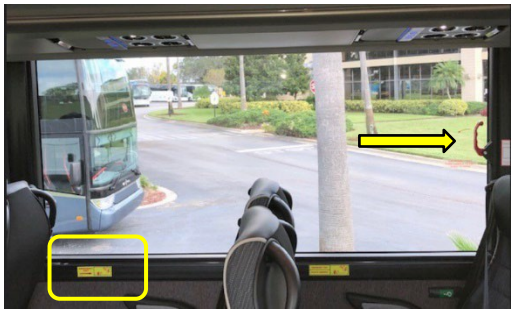
c. **Release Handle Labels.** Buses may be manufactured with more than one row of seats within the area of the emergency exit space. Determine whether an emergency exit release mechanism is located in the occupant space of each seat within the exit area. If a release mechanism is not present, a label must be placed within the occupant space to indicate the location of the nearest release mechanism for that exit. If the marking is missing, a violation is present. (393.62(e)-(571.217 S5.5.1))

Example: "Emergency Exit Instructions Located Next to Seat Ahead"



Two rows of seats occupy the exit space. There is only one release mechanism to open the exit located in the space to the right. A marking indicating the location of the release mechanism has been placed in the exit space of the seat to the left.

Two rows of seats occupy the exit space. There is only one release mechanism to open the exit located in the space to the right. A marking indicating the location of the release mechanism is missing in the exit space of the seat to the left.

d. **Legible markings.** Each required exit marking must, at a minimum, be legible (capable of being read or deciphered) when the only source of light is normal nighttime illumination from all specified locations near the emergency exit. These locations include:

- the seat(s) adjacent to (within) the emergency exit space
- a seat beside the seat adjacent to the exit
- standing in the aisle beside these seats even when they are occupied

If the exit has no seats within the exit space, the markings must meet the legibility requirements for occupants standing in the aisle nearest to the emergency exit.

If required exit markings (5.a and 5.b) are not legible/visible (not including obstructions) from the required positions during normal nighttime illumination, an out-of-service condition exists for "required emergency exit not properly marked." (393.62(e)-(571.217 S5.5.2))

e. **Markings used in addition to those required.** Many manufacturers or motor carriers apply labels to non-opening and/or non-emergency exit windows to indicate the location of the nearest emergency exit. This is not a marking requirement in the FMCSRs or FMVSS/CMVSS 217.

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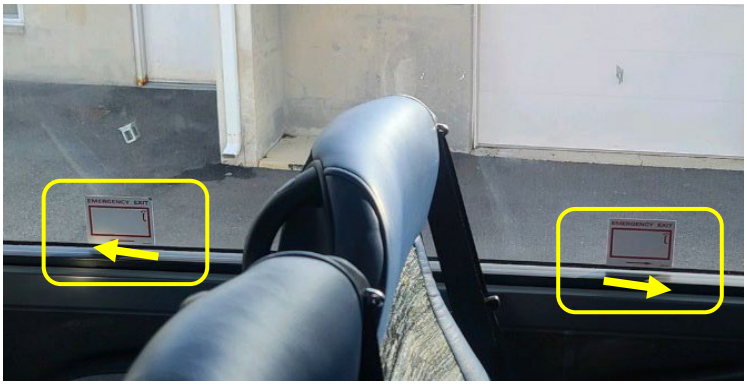
The additional marking use is considered permissible (it is not a violation if the label is present or not). These labels are provided at the discretion of the manufacturer or the motor carrier and may not be present in all buses.

Pictograph and text clearly indicating this non-opening window is not an emergency exit and the location where the exit may be found.

Green pictograph indicating an exit is located to the front of this occupant's space.

f. **Improper use of additional markings.** If a manufacturer or motor carrier chooses to provide additional marking (for non-emergency/non-opening windows) to indicate the location of the nearest emergency exit, the marking must differ from those used to identify an emergency exit. The use of markings placed on non-opening/non-emergency windows may not be identical to markings used to satisfy the requirements in the FMCSRs/FMVSS/CMVSS. If a marking used to satisfy the requirements of 393.62 is placed on a non-opening/non-emergency window, an out-of-service condition exists for "marked emergency exit inoperative." Such markings may be misconstrued as an operative exit and confuse passengers in an emergency situation. (393.62(a)-(571.217 S5.3-S5.4) – Side emergency exit window fails to meet the required standard.)



These markings, placed on a non-opening window, do not clearly differentiate between an actual emergency exit and where one can be located.

This same marking would be acceptable when found in the occupant space of an emergency window with a single release mechanism to the right.

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Guidance

When inspecting passenger carrier vehicles, follow the inspection guidance in this bulletin and ensure that all emergency exit requirements of the applicable FMVSS/CMVSS 217 Standard are compliant.

Ensure that the exits meet the requirements of either Method One (FMVSS/CMVSS) or Method Two (FMVSS) for the required number of exits, minimum marking requirements and appropriate operating release mechanisms (handles, bars, etc.).

This inspection guidance is not intended to cover all vehicle and/or component manufacturer requirements. The emergency exit compliance of a commercial passenger carrier vehicle is based on visual field inspection, not the application of laboratory test procedures that were used to determine if a specific vehicle or item of motor vehicle equipment meets the minimum performance requirements of the FMVSS/CMVSS.

For U.S. inspectors, if during an inspection, a component exhibits questionable performance (e.g., excessive force is needed to unlatch and open the emergency exit), submit detailed information to the FMCSA Commercial Passenger Carrier Safety Division at MCSEP@dot.gov for further investigation.

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Appendix A

Method 1 Calculation Worksheet

I. **Calculate Total Emergency exit space required:**

A. Number of designated seating positions, including driver. _____

B. Multiply by 67 square inches per seat. X 67 sq. in.

C. Equals total emergency exit space required. =_____sq.in.

II. **Calculate Minimum 40% required for each side:**

A. Total exit space required. (from line I.C. above) _____sq.in.

B. Multiply by 40%. X .40

C. Equals exit space **required on each side** of bus. =_____sq.in.

III. **Calculate existing exit space on bus:**

A. Left Side:
Number of Doors _____ (Max 536 sq. in. each) Door Total _____sq.in.
+
Exit windows (Maximum 536 sq. in. each)

1) _____ length X _____height = _____sq.in.

2) _____ length X _____height = _____sq.in.

3) _____ length X _____height = _____sq.in.

4) _____ length X _____height = _____sq.in. Window Total_____sq.in.

Left side subtotal _____sq.in.

B. Right Side:
Number of Doors _____ (Max 536 sq. in. each) Door Total _____sq.in.

Exit windows (Maximum 536 sq. in. each)

1) _____ length X _____height = _____sq.in.

2) _____ length X _____height = _____sq.in.

3) _____ length X _____height = _____sq.in.

4) _____ length X _____height = _____sq.in. Window Total _____sq. in.

Right side subtotal _____sq. in.

C. Rear/Roof Exits:
Rear exit door/window (if any, Maximum 536 sq. in. each) _____sq.in.

+ Roof Hatches_____ length x _____ width = sq. in (max 536) _____sq.in.

Rear/Roof Subtotal _____sq.in.

Total Exit Space Provided (Add Subtotals from A. B. and C.) _____sq.in.
(Must meet or exceed Total Exit space required in I. C)

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