TP-217-06
Dec 20, 1996

U.S. DEPARTMENT OF TRANSPORTATION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

LABORATORY TEST PROCEDURE

FOR

FMVSS 217

School Bus Emergency Exits and Window Retention and Release

SAFETY ASSURANCE
Office of Vehicle Safety Compliance
Room 6115, NSA-30
400 Seventh Street, SW
Washington, DC 20590

OVSC LABORATORY TEST PROCEDURE No. 217
TABLE OF CONTENTS

PAGE

1. PURPOSE AND APPLICATION

The Office of Vehicle Safety Compliance (OVSC) provides contractor laboratories with Laboratory Test Procedures as guidelines for obtaining compliance test data. The data are used to determine if a specific vehicle or item of motor vehicle equipment meets the minimum performance requirements of the subject Federal Motor Vehicle Safety Standard (FMVSS). The purpose of the OVSC Laboratory Test Procedures is to present a uniform testing and data recording format, and provide suggestions for the use of specific equipment and procedures. If any contractor views any part of an OVSC Laboratory Test Procedure to be in conflict with a Federal Motor Vehicle Safety Standard (FMVSS) or observes deficiencies in a Laboratory Test Procedure, the contractor is required to advise the Contracting Officer's Technical Representative (COTR) and resolve the discrepancy prior to the start of compliance testing.

Every contractor is required to submit a detailed test procedure to the COTR before initiating the compliance test program. The procedure must include a step-by-step description of the methodology to be used. The contractor's test procedure shall contain a complete listing of test equipment with make and model number and a detailed check-off sheet. The list of test equipment shall include instrument accuracy and calibration dates. All equipment shall be calibrated in accordance with the manufacturer's instructions. There shall be no contradictions between the Laboratory Test Procedure and the contractor's in-house test procedure. Written approval of the in-house test procedures shall be obtained from the COTR before initiating the compliance test program. The OVSC Laboratory Test Procedures are not intended to limit or restrain a contractor from developing or utilizing any testing techniques or equipment which will assist in procuring the required compliance test data. These Laboratory Test Procedures do not constitute an endorsement or recommendation for use of any product or method. However, the application of any such testing technique or equipment is subject to prior approval of the COTR.

NOTE: The OVSC Laboratory Test Procedures, prepared for the limited purpose of use by independent laboratories under contract to conduct compliance tests for the OVSC, are not rules, regulations or NHTSA interpretations regarding the meaning of a FMVSS. The Laboratory Test Procedures are not intended to limit the requirements of the applicable FMVSS(s). In some cases, the OVSC Laboratory Test Procedures do not include all of the various FMVSS minimum performance requirements. Recognizing applicable test tolerances, the Laboratory Test Procedures may specify test conditions that are less severe than the minimum requirements of the standard. In addition, the Laboratory Test Procedures may be modified by the OVSC at any time without notice, and the COTR may direct or authorize contractors to deviate from these procedures, as long as the tests are performed in a manner consistent with the standard itself and within the scope of the contract. Laboratory Test Procedures may not be relied upon to create any right or benefit in any person. Therefore, compliance of a vehicle or item of motor vehicle equipment is not necessarily guaranteed if the manufacturer limits its certification tests to those described in the OVSC Laboratory Test Procedures.

2. SECURITY

The contractor shall provide appropriate security measures to protect OVSC test vehicles and government furnished property (GFP) from unauthorized personnel during the entire compliance testing program. The contractor is financially responsible for any acts of theft and/or vandalism that occur during storage of test vehicles and GFP. Any security problems that arise shall be reported by telephone to the Industrial Property Manager (IPM), Office of Contracts and Procurement (OCP), within two working days after the incident. A letter containing specific details of the security problem will be sent to the IPM (with copy to the COTR) within 48 hours.

The contractor shall protect and segregate the data that evolve from compliance testing before and after each vehicle test. No information concerning the vehicle safety compliance testing program shall be released to anyone except the COTR, unless specifically authorized by the COTR or the COTR's Branch or Division Chief.

NOTE: NO INDIVIDUALS, OTHER THAN CONTRACTOR PERSONNEL DIRECTLY INVOLVED IN THE COMPLIANCE TESTING PROGRAM OR OVSC PERSONNEL, SHALL BE ALLOWED TO WITNESS ANY VEHICLE COMPLIANCE TEST UNLESS SPECIFICALLY AUTHORIZED BY THE COTR.

3. GOOD HOUSEKEEPING

Contractors shall maintain the entire vehicle compliance testing area, test fixtures, and instrumentation in a neat, clean, and painted condition with test instruments arranged in an orderly manner consistent with good test laboratory housekeeping practices.

4. TEST SCHEDULING AND MONITORING

The contractor shall submit a vehicle test schedule to the COTR prior to testing. Tests shall be completed as required in the contract.

Scheduling of vehicle tests shall be adjusted to permit vehicles to be tested in accordance other FMVSSs, as may be required by the OVSC. All vehicle compliance testing shall be coordinated with the COTR in order to allow monitoring by the COTR and/or other OVSC personnel if desired.

5. EQUIPMENT AND INSTRUMENTATION

The following is a description of the **minimum** equipment and instrumentation needed to conduct tests to the requirements of FMVSS 217:

A. ELLIPSOID

Fabricate a simulated ellipsoid with the dimensions generated by revolving a 33 x 50 centimeters ellipse about the 33 cm minor axis. A suggested method is shown in Figure 1 below.

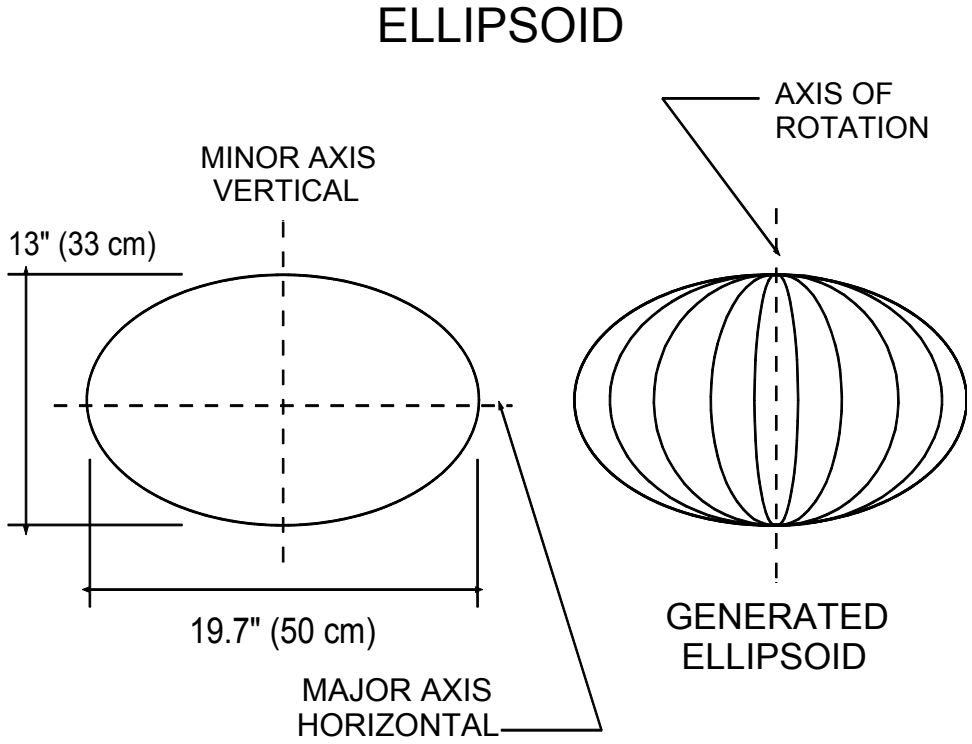


FIGURE 1

B. RECTANGULAR PARALLELEPIPED

Fabricate, for school buses over 10,000 lbs. GVWR, a parallelepiped whose dimensions are 114 centimeters high, 61 centimeters wide, and 30 centimeters deep. Fabricate, for school buses under 10,000 lbs., a parallelepiped whose dimensions are 114 centimeters high, 55 centimeters wide, and 15 centimeters deep.

5. EQUIPMENT AND INSTRUMENTATION....Continued

RECTANGULAR PARALLELEPIPED
(BUSES OVER 10,000 lbs)

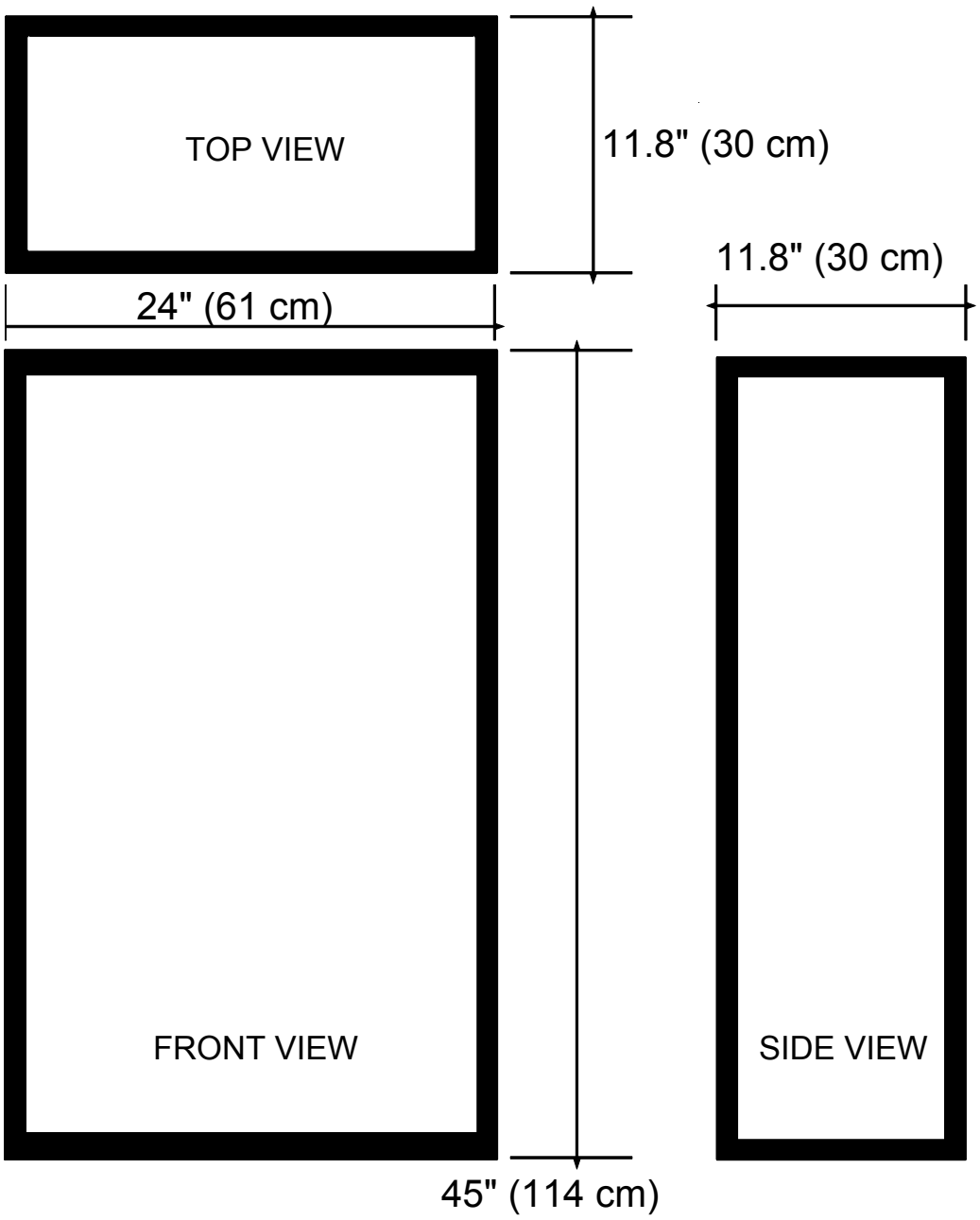


FIGURE 2

5. EQUIPMENT AND INSTRUMENTATION....Continued

EQUIPMENT FOR WINDOW RETENTION TEST

C. HEAD FORM

The headform will be assembled as shown in Figure 2:

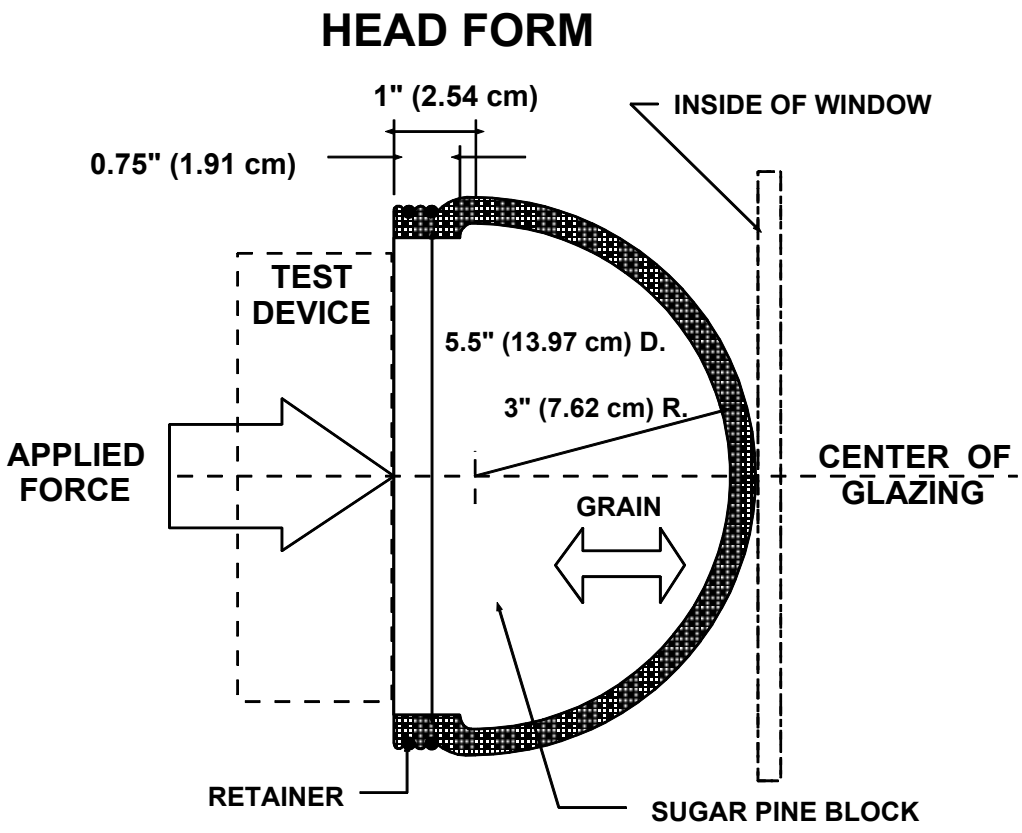


FIGURE 3

(1) Retainer design is optional.

(2) The 3.00 inch radius is SPHERICAL.

(3) The sugar pine block is covered as follows:

[a] Underlayer of 0.250 inch thick, plus or minus 0.025 inch; synthetic having a tensile strength of 250 psi, " 25 psi; and an elongation of 50 percent, " 10%.

b] Outer layer of NAPA goatskin, wet chamois, or 0.030 inch thick, plus or minus 0.003 inch synthetic skin with a tensile strength of 1000 psi, " 50 psi and an elongation of 100 percent, " 5 percent.

5. EQUIPMENT AND INSTRUMENTATION....Continued

D. FOUR INCH TEST SPHERE

Fabricate a 4 inch diameter sphere. Attach a handle to permit repeated attempts to pass the sphere through openings that could appear around the window retaining structure while load is being applied during the window retention tests. The sphere and handle must weigh less than 5 pounds.

E. FORCE MEASURING APPARATUS

A calibrated force measuring apparatus (load cell) shall be installed between the headform and the load input device to continuously measure the load rate. The apparatus must be capable of measuring 120 percent of the specified load.

F. DISPLACEMENT MEASURING APPARATUS

A calibrated displacement measuring device shall be used to continuously measure the outward (horizontal) displacement of the inner surface of the window glazing at the center of the force application.

G. TEMPERATURE RECORDING DEVICE

A temperature recording device capable of taking continuous, accurate temperature readings between 70EF and 85EF. To verify that temperature requirements are met, the device shall provide a permanent visual display of the temperature readings taken over a period of at least 4 hours.

H. LOAD INPUT DEVICE

A device capable of continuously applying a load outward and perpendicular to the inside surface of the window such that the load rate is 2 inches per minute (imp). Controlled or metered hydraulics, pneumatics, or electric screw jacks are examples of acceptable devices.

I. LOAD SYSTEM SUPPORT

A structural framework capable of supporting the load input device, head form and instrumentation. It is recommended that the support be capable of varying in height, width, and length in order to adjust to variations in window size and seat configuration.

J. MEASURING SCALE

Any standard length measuring scale can be used that is not subject to weather or damage effects producing variations that would exceed the specified tolerance.

K. TEST DATA PERMANENT RECORDING INSTRUMENT

A continuous recorder(s) with visual trace is recommended for the recording instrument.

5. EQUIPMENT AND INSTRUMENTATION....Continued

L. FORCE MEASURING DEVICE(S)

To measure the magnitude of force required to release and open (extend) the emergency exit, a force measuring device(s) with a range of at least 445 Newtons and an indicator for peak force readings, shall be used. The force measuring device(s) shall be capable of accurately measuring release forces and extension forces for each type of motion outlined in Section 10.6 of this test procedure.

6. GOVERNMENT FURNISHED PROPERTY (GFP)

6.1 ACCEPTANCE OF TEST VEHICLES

The Contractor is responsible for accepting test vehicles from either dealers or vehicle transporters. In both instances, the contractor acts in the OVSC's behalf when signing an acceptance of test vehicles. If a vehicle is delivered by a dealer, the contractor must check to verify the following:

A. All options listed on the "window sticker" are present on the test vehicle.

B. Tires and wheel rims are new and the same as listed.

C. There are no dents or other interior or exterior flaws.

D. The vehicle has been properly prepared and is in running condition.

E. The glove box contains an owner's manual, warranty document, consumer information, and extra set of keys.

F. Proper fuel filler cap is supplied on the test vehicle.

If a test vehicle is delivered by a government contracted transporter, the contractor shall check for damage which may have occurred during transit.
A "Vehicle Condition" form (see Section 12.3) will be supplied to the contractor by the COTR when a test vehicle is transferred from a new vehicle dealer or between test contracts. The upper half of the form describes the vehicle in detail, and the lower half provides space for a detailed description of the post test condition. Vehicle condition forms must be returned to the COTR with the copies of the final test report, or the reports will NOT be accepted.

6.2 NOTIFICATION OF COTR

A. Vehicle Delivery

The COTR must be notified within 24 hours after a vehicle has been delivered.

B. Notification of Failure

The COTR must be notified within 24 hours after the event of a test failure, i.e. requirements of the standard not met.

7. CALIBRATION OF TEST INSTRUMENTS

Before beginning the safety compliance test program, the contractor must implement and maintain a test instrumentation calibration system in accordance with established calibration practices. Guidelines for setting up and maintaining such calibration systems appear in MIL-C-45662A, "Calibration System Requirements". The calibration system shall be set up and maintained as follows:

A. Standards for calibrating the measuring and test equipment will be stored and used under appropriate environmental conditions to assure their accuracy and stability.

B. All measuring instruments and standards shall be calibrated by the contractor, or by a commercial facility, against a higher order standard at periodic intervals NOT TO EXCEED TWELVE (12) MONTHS! Records, showing the calibration traceability to the National Institute for Standards and Technology (NIST), shall be maintained for all measuring and test equipment.

C. All measuring and test equipment and measuring standards will be labeled with the following information:

(1) Date of calibration

(2) Date of next scheduled calibration

(3) Name of the technician who calibrated the equipment

D. The contractor shall provide a written calibration procedure that includes as a minimum the following information for all measurement and test equipment:

(1) Type of equipment, manufacturer, model number, etc.

(2) Measurement range

(3) Accuracy

(4) Calibration interval

(5) Type of standard used to calibrate the equipment (calibration traceability of the standard must be evident)

E. The contractor shall keep records of calibration for all test instrumentation in a manner that assures the maintenance of established calibration schedules. All such records shall be readily available for inspection when requested by the COTR. The calibration procedure must be approved by the COTR before the test program commences.

7. CALIBRATION OF TEST INSTRUMENTS....Continued

TEST EQUIPMENT ACCURACY

ITEM	RANGE	ACCURACY
Load Input Device (Hydraulic Actuator or equivalent)	0 to 22,240 Newtons	N/A (NO slippage or leakage)
*Force Transducer (Load Cell or equivalent)	0 to 6,672 Newtons	"1% ("67 Newtons)
*Displacement Measuring Device (Linear Pot. or equivalent)	0 to 10 inches	"0.1 inch
*Continuous Recorder of 5% of Max. Load	Readout capability	+2%
*DC Power Supply units attached	Adequate power for 0.05% @ 105-125v load regulation, 0.05% @ Full Load STABILITY - 0.1%	Line regulation
*Signal Conditioning and Calibration Unit (for calibration of Load Cell and Linear) Potentiometer used in test	Capable of providing signal conditioning	"0.5%
Digital Voltmeter or equivalent (to monitor or check load cell or linear potentiometer output)	Minimum of 4-digit readout	"0.1%
Hand Held Force Gauge (with follower needle)	0 to 445 Newtons	"1% F.S.
Tension or Compression Scale (with follower needle)	0 to 445 Newtons	"1% F.S.

*It is recommended that the total system be calibrated as a unit, and that system accuracy be "89 Newtons.

8. PHOTOGRAPHIC DOCUMENTATION

Photographs shall be glossy black and white or color, 8 inches x 10 inches, and properly focused for clear images. A legible label or placard identifying the test vehicle model, NHTSA number, and date shall appear in each photograph.
As a minimum, each vehicle final test report shall include the following photographs:

8. PHOTOGRAPHIC DOCUMENTATION....Continued

A. Exterior Views

1. Front view

2. Right side view

3. Left side of vehicle

4. Rear view

6. Vehicle's tire information label

B. Interior Views

1. Rear view depicting seating arrangement

2. Front view depicting seating arrangement

3. Views of exit identifications, exit instructions, referral labels and release mechanisms

4. Vehicle's certification label

5. View of parallelepiped or ellipsoid clearance of emergency exits

6. Pretest and post test view(s) of windows in retention test

7. View of loading fixture and all instrumentation used for window retention test

8. View(s) of window retention tests in progress

9. DEFINITIONS

ADJACENT SEAT

A designated seating position located so that some portion of its occupant space is not more than 25 centimeters from an emergency exit, for a distance of at least 38 centimeters measured horizontally and parallel to the exit.

9. DEFINITIONS....Continued

ADJOINING SEAT

A designated seating position located next to an adjacent seat

AUDIBLE ALARM

A sound that can be heard at each emergency door, and at the driver's position, when the ignition is on and the release mechanism of any emergency door is not closed

BUS

A motor vehicle with motive power, except a trailer, designed for carrying more than 10 persons

CONCISE OPERATING INSTRUCTIONS

Must indicate all the motions required to unlatch and extend the emergency exit

80 PERCENT OF GLAZING THICKNESS

(Defined as 80 percent of the TOTAL thickness) If it is a single pane, use 80 percent of its thickness. If it is a dual pane safety plate with a vinyl insert, use 80 percent of the total thickness. If it is a window designed with an airspace between two panes, use 80 percent of the total thickness of both panes excluding the airspace.

ELLIPSOID

A volume generated by revolving the perimeter of an ellipse about its minor axis of 33 centimeters (see Figure 1). The major axis is noted as 50 centimeters.

EMERGENCY EXIT

Any designated areas of egress (a push out window, the entrance door, or an exit door) which can be used during an emergency can be designated as an emergency exit if it meets the criteria of the standard.

9. DEFINITIONS....Continued

HEAD FORM TRAVEL TO 2 INCHES PER MINUTE (IMP)

The headform force and headform displacement shall each be permanently recorded. Rate of travel of the force media shall be nominally 2 ipm with an acceptable tolerance of plus or minus 0.75 ipm.

INTERLOCK

A mechanism that prevents starting the school bus engine until the emergency exit door(s) have been unlocked (from inside or outside) by a key, a combination, or operation of a remote switch

LEGIBILITY

Capable of being read or deciphered

LOCKED (INTERLOCK)

The release mechanism cannot be activated by a person at the door without a special device such as a key, or special information such as a combination.

MIDPOINT OF THE PASSENGER COMPARTMENT

Any point on a vertical transverse plane bisecting a line that is parallel to the vehicle centerline and that extends between the two vertical transverse planes defining the foremost and rearmost limits of the passenger compartment

MOTION

Any action, which has direction and force, used to release the emergency exit. The motion may be rotary, straight, upward, downward, inward, forward, rearward, rotational, or any combination of these. When used to extend the emergency exit, the motion is a push pull action, and in most cases will be straight and perpendicular to the unobstructed exit surface.

OCCUPANT

A person at least as large as a 5th-percentile adult female

9. DEFINITIONS....Continued

OCCUPANT SPACE

The space directly above the seat and footwell, bounded vertically by the ceiling and horizontally by the normally positioned seatback and the nearest obstruction of occupant motion in the direction the seat faces

PARALLELEPIPED CLEARANCE

During the test, the parallelepiped (shown in Figure 2) is oriented so that the 114 centimeter dimension is vertical, the 61 centimeter dimension is parallel to the opening, and the lower surface is in contact with the bus floor. Unobstructed passage of the parallelepiped has occurred when its rearmost surface coincides with the vertical transverse plane that intersects the outer surface of the bus body at the bottom of the door opening.

PASSENGER COMPARTMENT

Space within the school bus interior that is between a vertical transverse plane located 76 cm in front of the forwardmost passenger seating reference point, and a vertical transverse plane tangent to the rear interior wall of the bus at the vehicle centerline.

POST AND ROOF BOW PANEL SPACE

The area between two adjacent post and roof bows.

"PUSH OUT WINDOW"

A vehicle window designed to open outward (usually perpendicular to the exit surface) to provide for emergency egress

REACH DISTANCE

This term refers to the space envelopes shown on the various Figures included in this test procedure. All movements required to release and open the emergency exits must occur within the space envelopes.

9. DEFINITIONS....Continued

REAR EXIT

An exit installed in the rearward wall of the passenger compartment.

REAR HALF OF THE BUS

One half of the bus occupant and driver area, provided that the driver is considered as being located in the passenger compartment: if the driver's position is partitioned from the occupant area, the measurement for length of passenger compartment is taken from aft side of the driver's partition.

REMOTE CONTROLS OR CENTRAL POWER SYSTEM

Some buses have at the driver's station remote controls or central controls to quickly release and/or open each emergency exit. These central systems are considered secondary controls, the primary exit release and opening mechanism being on or at the emergency exit. The release located at the emergency exit must be able to override the central control system within the applied force limitations.

ROOF EXIT

An exit installed in the ceiling or roof of the passenger compartment and located between the side walls

ROTARY FORCE (MOTION)

If the primary motion of the unlatching mechanism is a rotating shaft or hub, then the mechanism release force is termed "rotary motion" even though a long one sided handle moves through a small arc.

SCHOOL BUS

A bus sold, or introduced in interstate commerce, for purposes that include carrying students to and from school or related events, but does not include a bus designed and sold for operation as a common carrier in urban transportation.

9. DEFINITIONS....Continued

SIDE EXIT

An exit installed in the side wall of the bus passenger compartment between the floor and ceiling

SLIDING WINDOW

A bus window designed to open by moving vertically or horizontally to provide for emergency egress

STRAIGHT FORCE (MOTION)

The type of force that would be applied to a sliding bolt or pin; load that operates in one direction only

WINDOW DISPLACEMENT

Before applying any force to the window using the headform, a zero must be established with the headform in initial contact with undisturbed glazing surface.

WINDOW RETENTION FORCE

The total pounds of force applied using a device or apparatus that will provide a nominal force application rate of 2 ipm, plus or minus 0.75 ipm.

WINDOW TEST PANEL OR AREA

If an occupant's window assembly consists of one uninterrupted glazed surface, the test point shall be the center of the glazed surface. If the window assembly consists of a two part glazed surface (usually one part moveable for ventilation), then each separate panel must be tested for retention. The two panels are not tested simultaneously.

10. COMPLIANCE TEST EXECUTION

10.1 PRETEST CONDITIONS

A. A clean storage area maintained in accordance with good housekeeping standards will be used for storage of test vehicle(s) during any non-testing period. Vehicle(s) shall be properly protected from any conditions which would impair the test program or cause damage to test vehicle(s).

10. COMPLIANCE TEST EXECUTION....Continued

B. Upon receipt at the test laboratory, properly identify each vehicle with the assigned NHTSA number supplied by the COTR.

C. Inspect the vehicle's interior and exterior, including all windows, seats, doors, etc., to confirm that each system is complete and functional per the manufacturer's specifications. Any damage, misadjustment, or other unusual condition that could influence the test program or test results shall be recorded on the Report of Condition form. The NHTSA COTR shall be notified of any abnormal condition(s) that may affect the test results before beginning any test.

D. Place vehicle on a flat, horizontal floor surface.

E. Photograph the vehicle's certification label. Record the appropriate information on data sheets.

F. Check the vehicle's tire pressure and, if necessary, adjust to recommended operating pressures.

G. The inside and outside of the vehicle are kept at any temperature from 70EF to 85EF for a minimum of 4 hours immediately preceding the tests as well as during the tests.

H. For window retention test, windows are installed, closed and latched (where latches are provided) in the condition intended for normal bus operation.

I. For the emergency exit release and extension tests, windows are installed as in H., seats, armrests, and interior objects near the windows are installed as for normal use, and seats are in the upright position.

10.2 PROVISION OF EMERGENCY EXITS

A. Record the seating capacity.

B. Identify all emergency exit openings on front, sides, rear and top (roof) of bus. Draw a schematic of the bus floor plan indicating location of each exit. Measure the size of each exit opening. Record information on Data Sheet 2.

C. Determine that the school bus complies with either (a) or (b) of the following minimum emergency exit provisions. Record on Data Sheet 2.

(a) One Rear Emergency Door and the additional exits, if any, specified by Table 1.

10. COMPLIANCE TEST EXECUTION....Continued

TABLE 1

SEATING CAPACITY	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 & 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

(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.

TABLE 2

SEATING CAPACITY	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 & 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

10. COMPLIANCE TEST EXECUTION....Continued

TABLE 3

EXIT TYPE	CAPACITY CREDIT
Side Door	16
Window	8
Roof Exit	8

10. COMPLIANCE TEST EXECUTION....Continued

Side Emergency Door - hinged on its forward side. No more than one side emergency exit doors shall be located, in whole or in part, within the same post and roof bow panel space.

Rear Push out Rear Window - provides a minimum opening clearance 41 centimeters high and 122 centimeters wide

Roof Exit - is hinged on its forward side, and operable from both the inside and outside the vehicle

Record as PASS or FAIL on Data Sheet 2.

E. Requirements for Additional Exits

Verify the following;

1. There is an even number of side emergency exit windows on each side of bus.

2. The bus is not equipped with both sliding and push-out windows, (except for buses equipped with rear push out emergency exit windows).

3. A right side emergency exit door, if any, is located as near as practicable to the midpoint of the passenger compartment

Record as PASS or FAIL on Data Sheet 2.

10.3 EMERGENCY EXIT DOOR OPERATIONAL REQUIREMENTS

A. Determine if the engine starting system of a school bus does NOT operate if any Emergency Exit is LOCKED

B. Determine if all Emergency Exits can be released by one person (from inside and outside the bus)

C. When the Release Mechanism is NOT in the closed position and the vehicle ignition is in the "ON" position, determine if there is a continuous warning sound audible at the Driver's DSP and in the vicinity of the Emergency Door(s) having the unclosed mechanism

D. Determine if emergency exit release mechanism(s) does not use remote controls or central power systems

Record results on Data Sheet 3

10. COMPLIANCE TEST EXECUTION....Continued

10.4 EMERGENCY EXIT IDENTIFICATION & LABELING

Determine if all emergency exit labeling meets the following criteria.

A. Each required emergency exit shall have the designation "Emergency Door" or "Emergency Exit" as appropriate in letters at least 5 centimeters high of a color that contrasts with its background

(1) Emergency Doors

The designation is located at the top of, or directly above the exit door on both inside and outside surfaces of the bus.

(2) Roof Exits

The designation shall be located on an inside surface of the exit, or within 30 centimeters of the roof exit opening.

(3) Emergency Window Exits

The designation shall be located at the top of, or directly above, or at the bottom of the emergency window exit on both the inside and outside surfaces of the bus.

B. Concise operating instructions describing the motions necessary to unlatch and open the emergency exit, in letters at least 1 centimeter high of a color that contrasts with its background, shall be located within 15 centimeters of the release mechanism on the inside surface of the bus.

Example: (1) Lift to Unlatch, Push to Open

(2) Turn Handle, Push Out to Open

C. Each opening for a required emergency exit is outlined around its outer perimeter with a minimum 2.5 centimeters wide retro reflective tape, either red, white, or yellow in color.

Record on Data Sheet 4.

10.4 EMERGENCY EXIT IDENTIFICATION & LABELING

REFLECTIVITY TEST

Retroreflective tape must meet the criteria specified in the following two tables:

MINIMUM SPECIFIC INTENSITY PER UNIT AREA (SIA)
(CANDELAS PER FOOTCANDLE PER SQUARE FOOT)
TYPE III RETROREFLECTIVE MATERIAL

TABLE 4
Glass Bead Retroreflective Element Material

OBSERVATION ANGLE (E)	ENTRANCE ANGLE (E)	WHITE	RED	YELLOW
0.2	-4	250	45	170
0.2	+30	150	25	100
0.5	-4	95	15	62
0.5	+30	65	10	45

TABLE 5
Prismatic Retroreflective Element Material

OBSERVATION ANGLE (E)	ENTRANCE ANGLE (E)	WHITE	RED	YELLOW
0.2	-4	250	45	170
0.2	+30	150	25	100
0.5	-4	95	15	62
0.5	+30	65	10	45

10. COMPLIANCE TEST EXECUTION....Continued

PROCEDURE:

A. Remove a section of tape from the outer perimeter of the exit. Note in the comments section of Data Sheet 5 the location on the bus where the tape was removed from.

B. Identify the type of retroreflective material (glass bead or prismatic retroreflective element material).

C. The section of tape area should be wiped clean with a soft lint free cloth before color measurements.

D. The directed light source for illumination is to be a tungsten filament lamp operating at 2,854E Kelvin (K) color temperature.

E. Place the section of tape in a dark area 30.5 meters from the illumination source. Place a black drop cloth behind the section. The directed light source and the observation point should be at the angles identified in Tables 4 or 5. All incidence angle measurements shall be made with an accuracy of "1E. The zero (0E) position will be with the face of the reflective surface perpendicular to the light source as shown in Figure 4.

F. The observation point shall be located above the illumination source at the distances required for observation angles of 0.2E " 0.02E and 0.5E " 0.05E.

G. Measure the reflectivity of the tape with a calibrated sensitive foot candle meter or a light sensitive cell that can be traced to a National Institute of Standards and Technology (NIST) calibrated foot candle rating. Measure the total candlepower per incident foot candle at each observation point. The results measured at each position must equal or exceed the minimum required values listed in the tables.

H. Record results on Data Sheets 5.

10. COMPLIANCE TEST EXECUTION....Continued

REFLECTIVITY TEST DIAGRAM

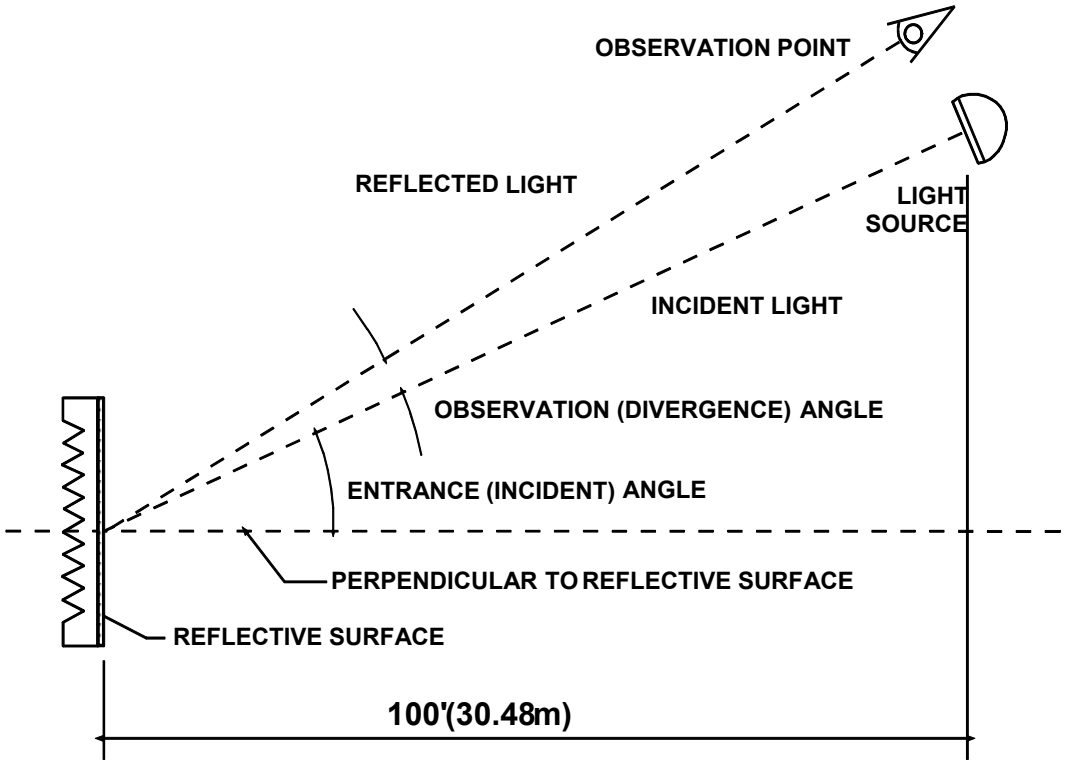


FIGURE 4

10.5 ACCESS REGIONS FOR EMERGENCY EXITS

Using Figures 5 thru 12;

A. Determine the access region, LOW FORCE or HIGH FORCE for the location of each emergency exit release mechanism. Record on Data Sheet 6 "Force Tests to Unlatch the Emergency Exit". Indicate region LOW or HIGH in the appropriate column.

B. Determine the access region, LOW FORCE or HIGH FORCE for the location of each emergency exit extension. Record on Data Sheet 7 "Force Tests to Open the Emergency Exit". Indicate region LOW or HIGH in the appropriate column.

Additional Instructions for Determining Access Regions

10. COMPLIANCE TEST EXECUTION....Continued

Release Mechanism

If the mechanism is located within both the high and low force areas, the permissible force is 178 newtons, if the type of operating motion is straight, perpendicular to the undisturbed exit surface, and, 89 newtons, if the type of operating motion is rotary or straight, but not perpendicular to the undisturbed exit surface.

Exit Extension

If the portion of the exit in the immediate area of the release mechanism is within both the high and low force areas, the permissible force is 178 newtons, if the type of extending motion is straight, perpendicular to the undisturbed exit surface, and, 89 newtons if the type of extending motion is rotary or straight, but not perpendicular to the undisturbed exit surface.

NOTE: Access volume is the spatial volume created by the intersection of the projections of the areas shown in the two views.

10. COMPLIANCE TEST EXECUTION....Continued

LOW FORCE ACCES REGIONS FOR EMERGENCY EXITS HAVING ADJACENT SEATS

VIEW PARALLEL TO SEAT BACK

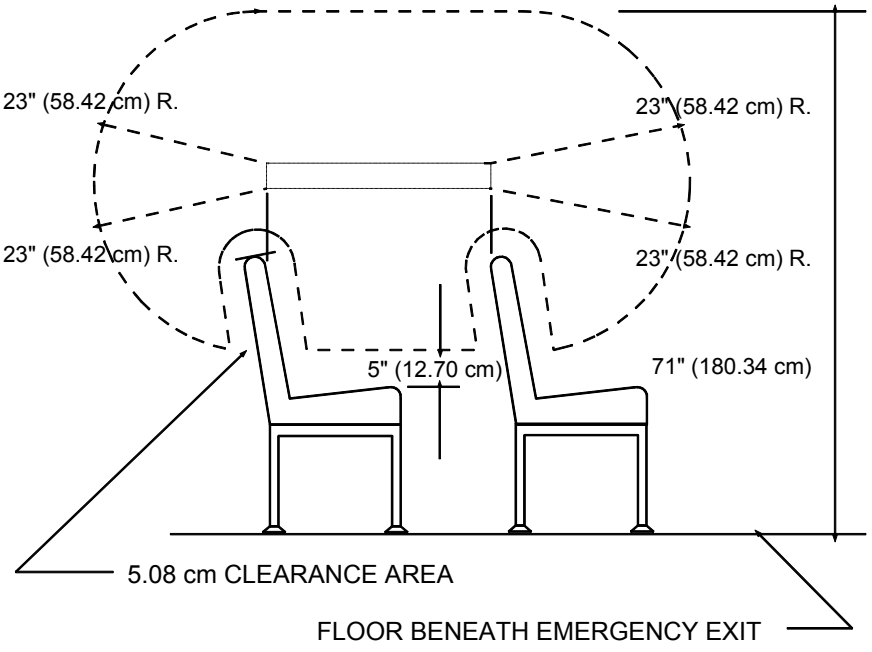


FIGURE 5

VIEW PERPENDICULAR TO SEAT BACK

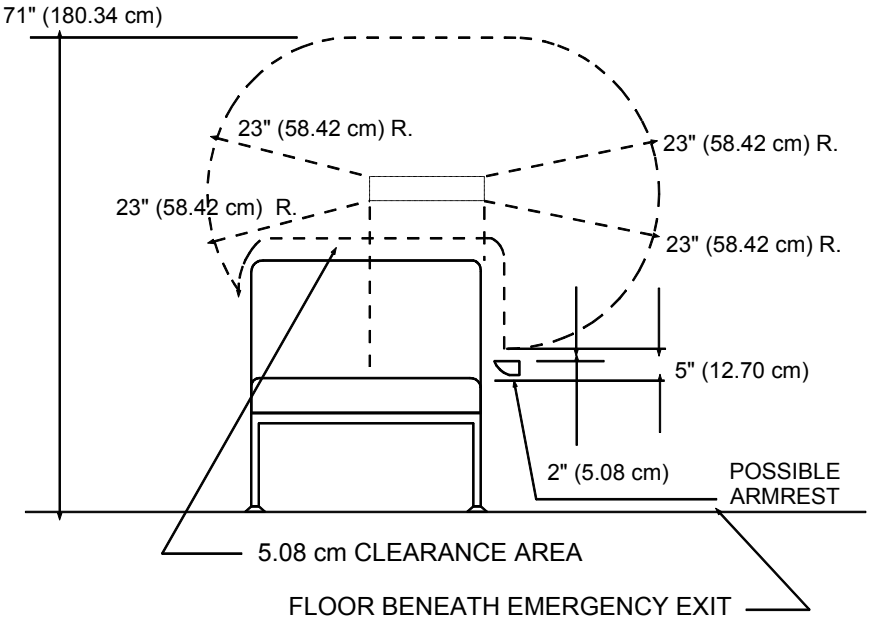


FIGURE 6

10. COMPLIANCE TEST EXECUTION....Continued

HIGH FORCE ACCES REGIONS FOR EMERGENCY EXITS HAVING ADJACENT SEATS

VIEW PARALLEL TO SEAT BACK

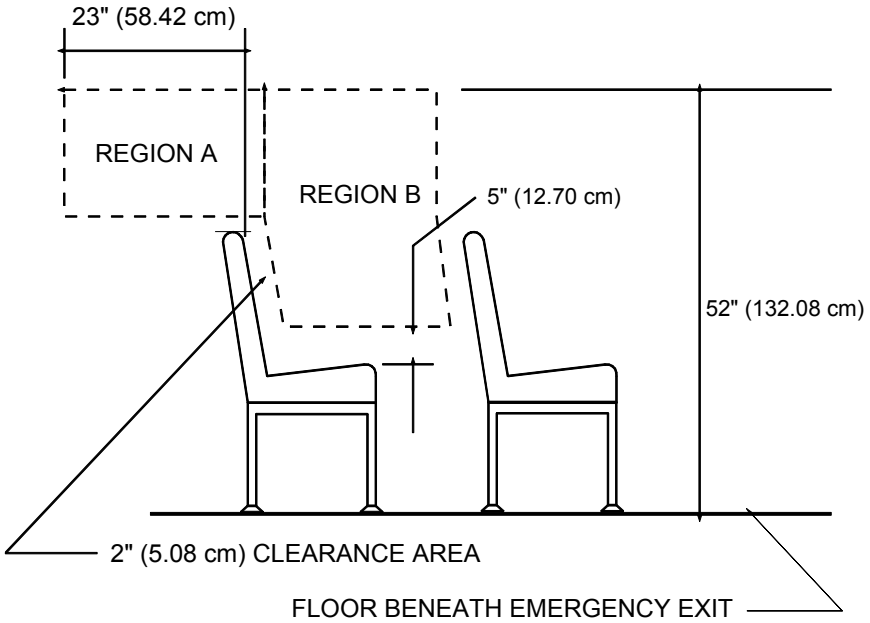


FIGURE 7

VIEW PERPENDICULAR TO SEAT BACK

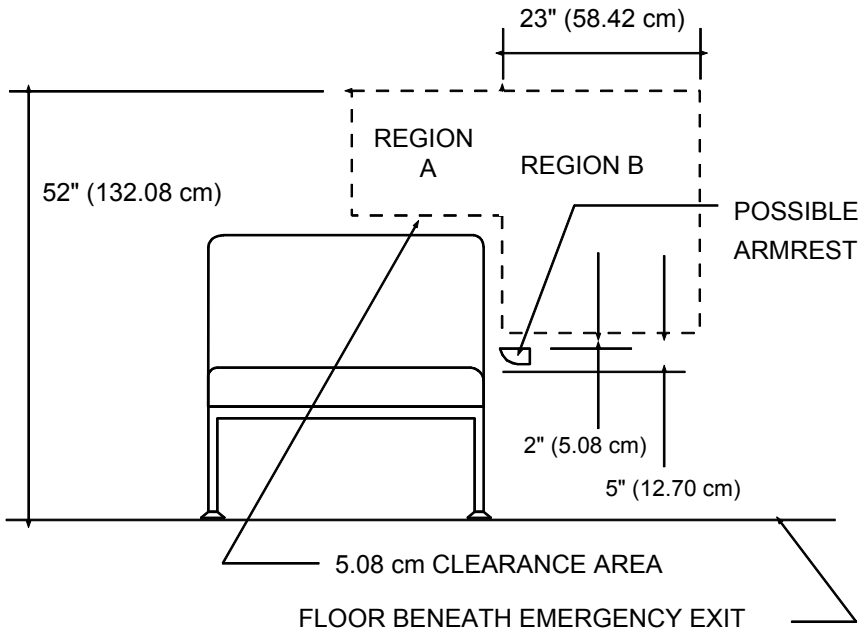


FIGURE 8

10. COMPLIANCE TEST EXECUTION....Continued

REAR EMERGENCY EXIT WITHOUT REAR OBSTRUCTION

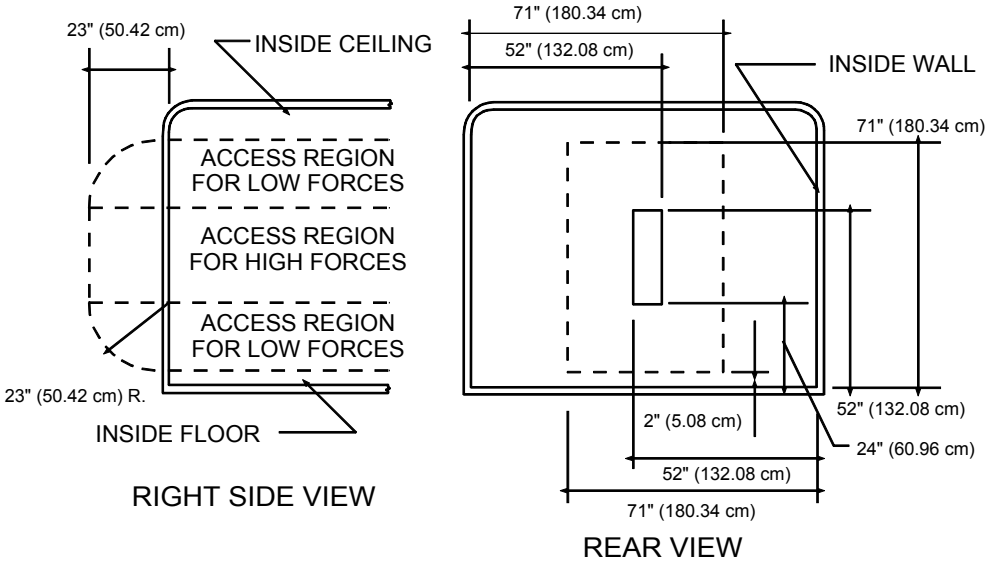


FIGURE 9

REAR EMERGENCY EXIT WITH REAR OBSTRUCTION

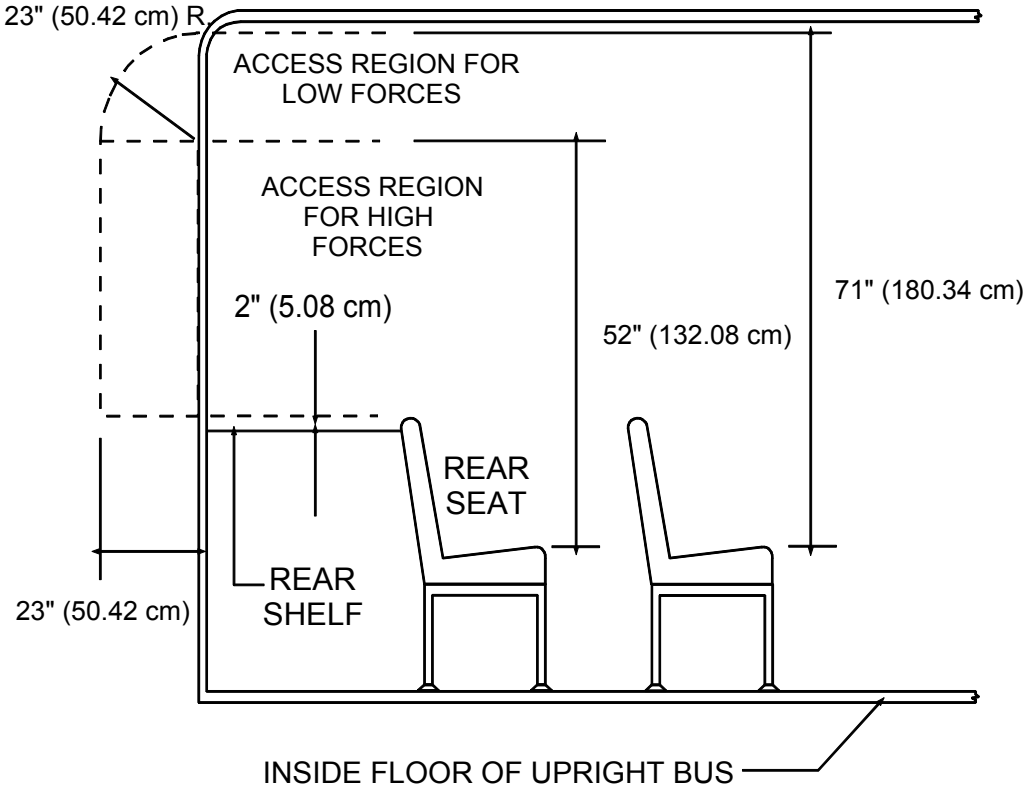


FIGURE 10

10. COMPLIANCE TEST EXECUTION....Continued

SIDE EMERGENCY EXIT

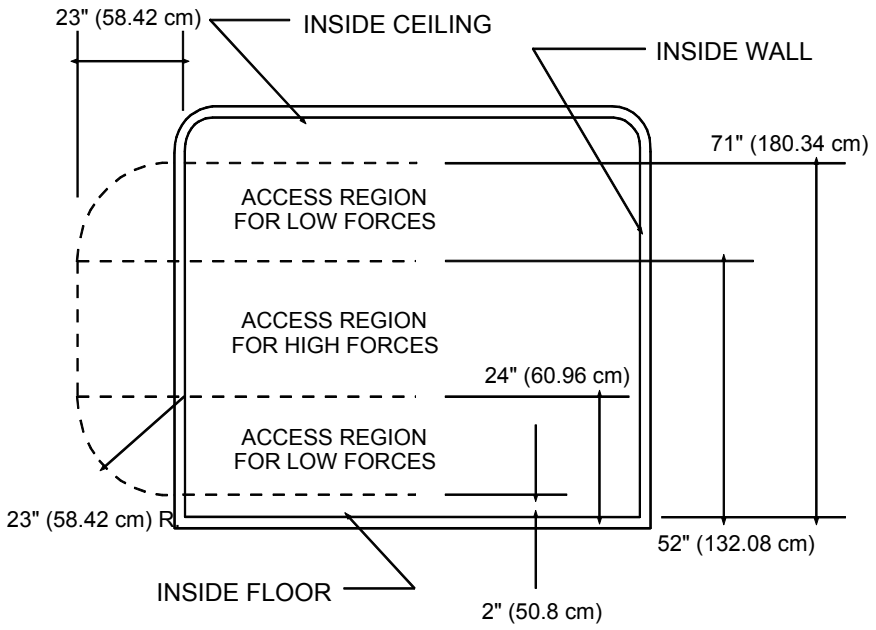


FIGURE 11

ROOF EMERGENCY EXIT

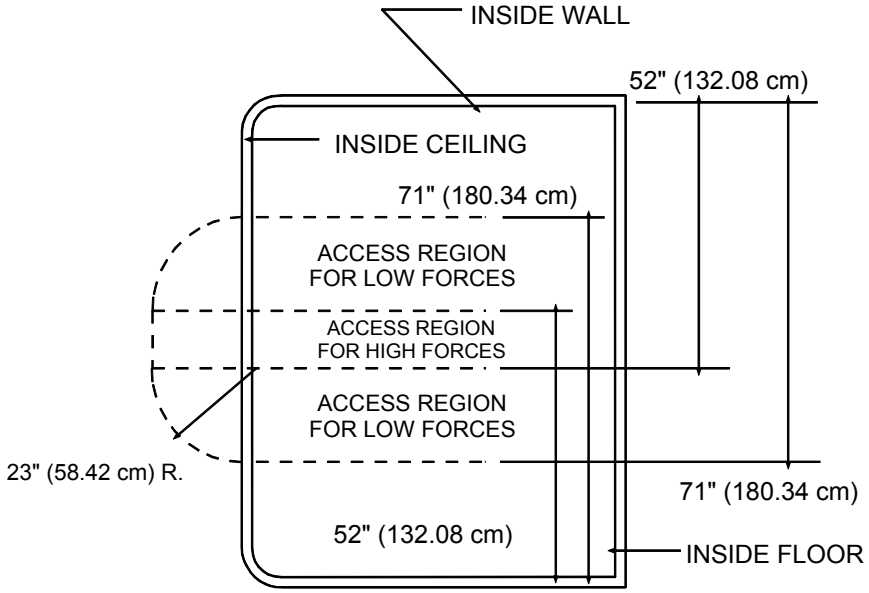


FIGURE 12

10. COMPLIANCE TEST EXECUTION....Continued

10.6 FORCE TESTS TO UNLATCH AND OPEN THE EMERGENCY EXIT

A. EMERGENCY WINDOW EXIT (except rear pushout window)

Emergency window exits must meet the following requirements for unlatching and opening the exit.

(1) LOW FORCE

(a) Low Force Tests to Unlatch Window Exit

For release mechanism(s) accessible within the LOW FORCE space envelopes, check the force(s) required to unlatch the emergency window exit(s) release mechanism(s) from inside the bus passenger compartment -- no more than two release mechanisms are allowed on each emergency exit. In the case of windows with one release mechanism, the mechanism shall require two force applications to open. In the case of windows with two release mechanisms, each mechanism shall require either one or two force applications to open. However, at least one of these force applications for each window shall differ by 90 to 180 degrees from the direction of the initial pushout or sliding motion of the emergency exit. The force must be applied in such a fashion as to minimize the magnitude required to release the exit. The magnitude of the force(s) cannot exceed 89 Newtons, and the type of motion(s) required for unlatching must be either ROTARY OR STRAIGHT.

(b) Low Force Tests to Open (extend) Window Exits

After each emergency window exit has been unlatched (released), for exits accessible within the LOW FORCE space envelopes, check the force required to manually extend (pushout and open or slide open) the window exit opening large enough to admit unobstructed passage of the previously described Ellipsoid. The magnitude of the force cannot exceed 89 Newtons, and the type of motion required to extend the exit must be either rotary or straight.

10. COMPLIANCE TEST EXECUTION....Continued

(2) HIGH FORCE

(a) High Force Tests to Unlatch Window Exit

For release mechanism(s) accessible within the HIGH FORCE space envelopes, check the force(s) required to unlatch the emergency window exit release mechanism(s) from inside the bus passenger compartment -- no more than two release mechanisms are allowed on each emergency exit. In the case of windows with one release mechanism, the mechanism shall require two force applications to open. In the case of windows with two release mechanisms, each mechanism shall require either one or two force applications to open. However at least one of these force applications for each window shall differ by 90 to 180 degrees from the direction of the initial motion of the emergency exit. The magnitude of the force(s) cannot exceed 178 Newtons, and the type of motion(s) required for unlatching must be straight and perpendicular to the undisturbed exit surface.

(b) High Force Tests to Open (extend) Window Exits

After the emergency exit has been unlatched (released), for exits accessible within the HIGH FORCE space envelopes, check the force required to manually extend (pushout and open or slide open) the window exit opening large enough to admit unobstructed passage of an Ellipsoid. The magnitude of the force cannot exceed 178 Newtons, and the type of motion required to extend the exit must be straight and perpendicular to the undisturbed exit surface.

NOTE: The emergency exit release mechanism force application can be measured using a calibrated force indicator (hand held manual unit with a force indicating dial), tension or compression, applied at the designated pressure point for a straight force application. If the release mechanism opening is a two step force procedure, each step or force is to be measured as a separate test.

10. COMPLIANCE TEST EXECUTION....Continued

B. EMERGENCY DOOR EXIT

Emergency door exits, rear and side, must meet HIGH FORCE requirements for both unlatching and opening.

(1) High Force Test to Unlatch Door

Check the force required to unlatch the emergency exit door from both inside and outside the bus passenger compartment. The release mechanism must be accessible within the HIGH FORCE space envelope (Buses with a GVWR of 10,000 pounds or less need not conform to the release mechanism accessibility location). The force must be applied as close to the end of the release mechanism as possible. The magnitude of the force cannot exceed 178 Newtons and the type of motion is UPWARD from inside the bus and at the discretion of the manufacturer from outside the bus. Buses with a GVWR of 10,000 pounds or less shall provide interior release mechanisms that operate by either an UPWARD OR PULL type motion. The pull type motion shall be used only when the release mechanism is recessed in such a manner that the handle, lever, or other activating device, before being pulled, does not protrude beyond the rim of the recessed receptacle.

(2) High Force Test to Open (Extend) Door

After the emergency exit has been unlatched (released), check the force required to manually extend (pushout and open) the exit to a position that provides an opening large enough to admit passage of a Parallelepiped. For school buses over 10,000 lb. GVWR, the parallelepiped dimensions shall be 114 cm high, 61 cm wide and 30 cm deep. For school buses under 10,000 lb. GVWR, the parallelepiped dimensions shall be 45 in. high, 22 in. wide and 6 in. deep. The exit door must be accessible within the HIGH FORCE space envelopes. The magnitude of the force cannot exceed 178 Newtons.

NOTE: On emergency exit doors, position the parallelepiped such that the 114 centimeter dimension (45 in. dimension for school buses under 10,000 lb. GVWR) is vertical, the 61 centimeter dimension (22 in. dimension for school buses under 10,000 lb. GVWR) parallel to the opening, and the lower surface is in contact with the bus floor at all times during testing.

10. COMPLIANCE TEST EXECUTION....Continued

C. EMERGENCY ROOF EXIT

Emergency roof exits must meet either the low force (1) or high-force (2) requirements for unlatching and opening the exits.

(1) LOW FORCE

(a) Low Force Tests to Unlatch Roof Exit

For release mechanism(s) accessible within the LOW FORCE space envelopes, check the force(s) required to unlatch the emergency roof exit from both inside and outside the bus passenger compartment -- no more than two release mechanisms are allowed on each emergency exit. In the case of roof exits with one release mechanism, the mechanism shall require two force applications to open. In the case of roof exits with two release mechanisms, each mechanism shall require either one or two force applications to open. However, at least one of these force applications for each roof exit shall differ by 90 to 180 degrees from the direction of the initial motion of the emergency exit. The magnitude of the force(s) cannot exceed 89 Newtons, and the type of motion(s) required for unlatching must be either rotary or straight or both.

(b) Low Force Tests to Open (Extend) Roof Exit

After the emergency roof exit has been unlatched (released), check the force required to manually extend (push out and open or slide open) the exit to a position that provides an opening at least 41 centimeters high and 41 centimeters wide. The exit must be accessible within the low force space envelopes. The magnitude of the force cannot exceed 89 Newtons, and the type of motion required to extend the exit must be either rotary or straight.

10. COMPLIANCE TEST EXECUTION....Continued

(2) HIGH FORCE

(a) High Force Tests to Unlatch Roof Exit

For release mechanism(s) accessible within the HIGH FORCE space envelopes, check the force(s) required to unlatch the emergency roof exit release mechanism(s) from both inside and outside the bus passenger compartment -- no more than two release mechanisms are allowed on each emergency exit. In the case of roof exits with one release mechanism, the mechanism shall require two force applications to open. In the case of roof exits with two release mechanisms, each mechanism shall require either one or two force applications to open. However, at least one of these force applications for each roof exit shall differ by 90 to 180 degrees from the direction of the initial push out motion of the emergency exit.

The magnitude of the force(s) cannot exceed 178 Newtons, and the type of motion(s) required for unlatching must be straight and perpendicular to the undisturbed exit surface.

(b) High Force Tests to Open (Extend) Roof Exit

After the emergency roof exit has been unlatched (released), check the force required to manually extend (push out and open) the exit to a position that provides an opening large enough to admit unobstructed passage of an ellipsoid. The exit must be accessible within the HIGH FORCE space envelopes. The magnitude of the force cannot exceed 178 Newtons, and the type of motion required to extend the exit must be straight and perpendicular to the undisturbed exit surface.

NOTE: For school buses whose roof exits' longitudinal centerline does not coincide with the longitudinal vertical plane passing through the longitudinal centerline of the school bus, the amount of offset shall be used to re-calculate the dimensions in Figure 12 to define the high force and low force space envelopes.

10. COMPLIANCE TEST EXECUTION....Continued

10.7 EMERGENCY EXIT EXTENSION REQUIREMENTS

Determine the following:

A. Each emergency exit is manually extendable by a single occupant, before and after the window retention tests.

B. Each emergency exit door shall be equipped with a positive door opening device that, after the release mechanism has been operated, before and after the window retention test, shall:

(1) Be able to support the weight of the door

(2) Keep the door from closing past the point at which the door is perpendicular to the side of the bus body

(3) Provide a means for release or override

(4) Perform the function specified in (1) and (2) of this section without the need for additional action beyond opening the door past the point at which the door is perpendicular to the side of the bus body

C. Minimum Side Emergency Exit - Aisle Clearance Specifications:

Except as provided in "D", no portion of a seat or restraining barrier shall be installed within the area bounded by the opening of a side emergency exit door, a vertical transverse plane tangent to the rearward edge of the door opening frame, a vertical transverse plane parallel to that plane at a distance of 30 centimeters forward of that plane, and a longitudinal vertical plane passing through the longitudinal centerline of the bus.

D. Minimum Side Emergency Exit - Flip-up Seat Clearance Specifications:

A seat bottom may be located within the area described in "C" of this section if the seat bottom pivots and automatically assumes and retains a vertical position when not in use, so that no portion of the seat bottom is within the area described in "C" when the seat bottom is vertical.

E. Minimum Side Emergency Exit - Seat or Restraining Barrier Clearance Specifications:

No portion of a seat or restraining barrier located forward of the area described in "C" of this section and between the door opening and a longitudinal vertical plane passing through the longitudinal centerline of the bus shall extend rearward of a vertical transverse plane tangent to the forwardmost portion of a latch mechanism on the door.

10. COMPLIANCE TEST EXECUTION....Continued

MINIMUM SIDE EMERGENCY EXIT CLEARANCE SPECIFICATIONS

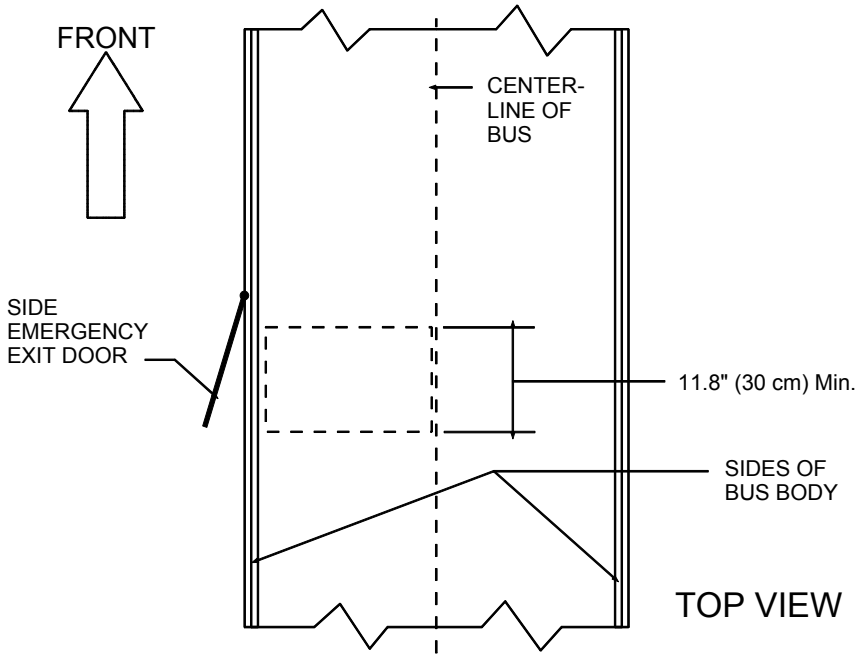
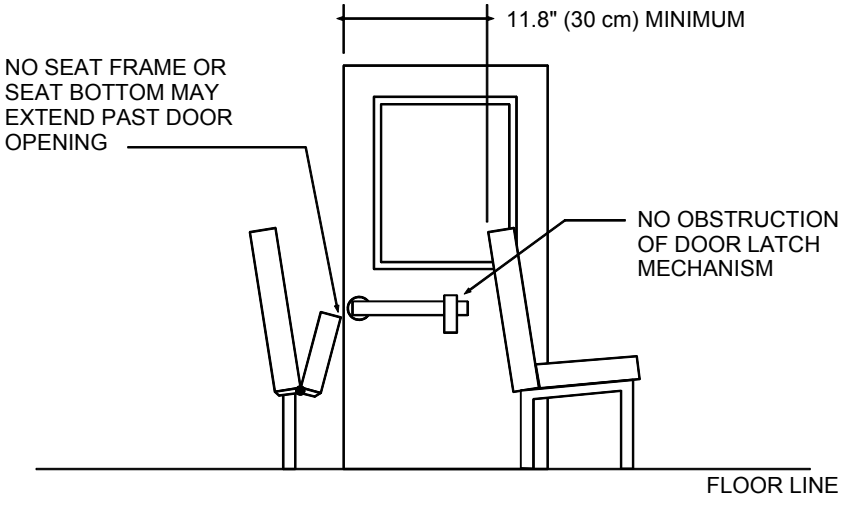


FIGURE 13

MINIMUM SIDE EMERGENCY EXIT FLIP-UP
SEAT CLEARANCE SPECIFICATIONS

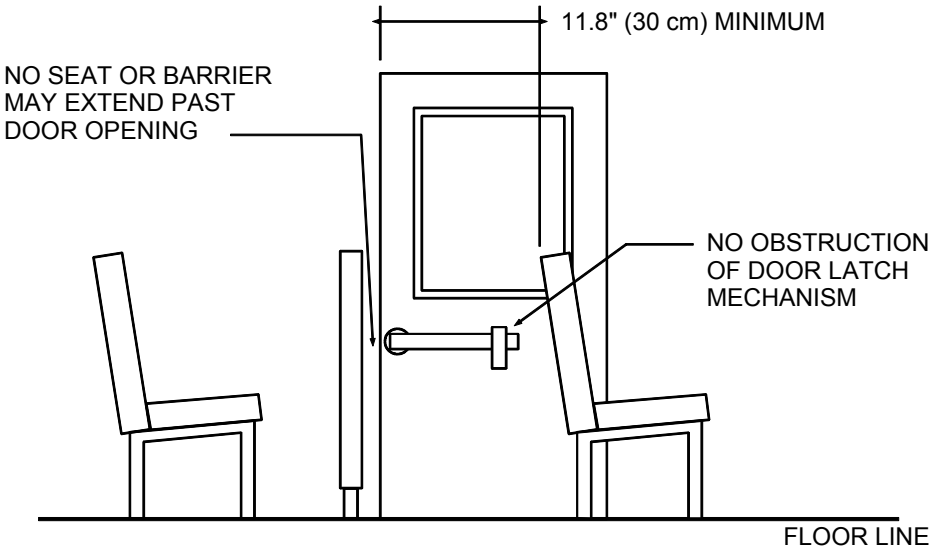


RIGHT SIDE VIEW

FIGURE 14

10. COMPLIANCE TEST EXECUTION....Continued

MINIMUM SIDE EMERGENCY
EXIT CLEARANCE SPECIFICATIONS



RIGHT SIDE VIEW

FIGURE 15

10.8 WINDOW RETENTION TEST

A. Select the window for retention test. If window is a two part assembly, each panel will be tested separately. This would require testing another window assembly.

B. Provide a detailed description of the window, such as fixed, push out, single or double glazed, or vertical sliding, etc. Record on Data Sheet 9

C. Measure the window and record data of each panel size on Data Sheet 9 (windows with less than an 8 inch horizontal or vertical dimension do not apply).

D. Exercise window exit release mechanism and extension. Check for proper action.

E. Close and latch the window being tested as well as the two adjacent windows. Double check for proper lock position.

F. Adjust position of load input device to achieve a "zero position" at center of window to be tested with headform, so that it will push outward and perpendicular to the undisturbed inside surface and is lightly touching the undisturbed inner glazing surface.

10. COMPLIANCE TEST EXECUTION....Continued

G. Connect the calibrated load cell and displacement measuring device(s) to the power supply, signal conditioning and recording system. Set zero position and slope of force line to achieve a nominal 2 ipm ("0.75 imp) displacement rate. Record zero settings.

H. Photograph test setup.

I. Turn on recorder and run zero position data and turn off.

J. Mark slope of force data trace to achieve a nominal 2 ipm rate of movement of headform. The plot shall note the minimum/maximum limits plus maximum travel of headform (see Figure 18). Also, on a separate plot, mark the 1200 pound force limit as well as the maximum displacement **D** permitted by the formula:

$$D = \frac{\sqrt{L}}{2}$$

where: D = Window panel displacement

L = minimum horizontal or vertical surface dimension of the window panel (in inches) measured through the center of the area of the entire sheet of window glazing

J. Turn power source, recorder and plotters on and start test. Apply power continuously until one of the following three limits is achieved:

(1) 1200 pounds force is reached

(2) Shattering of the glazing occurs (or at least 80% of the glazing thickness has developed cracks running from the load contact region to the periphery at two or more points)

(3) The maximum displacement **D** is achieved

10. COMPLIANCE TEST EXECUTION....Continued

K. Continuously check large openings forming about the structure by attempts at passing the 4-in. sphere through the opening. Apply no more 5 pound force at each attempted pass.

L. **PASS/FAIL Criteria**: If the window retention structure fails before any of the limits of Item J are attained, it is considered a failure. If the window structure withstands the force and any one of the three items of Item J is attained, it is considered a pass. If one panel of a two panel window assembly fails to pass, the entire window assembly is a FAIL.

M. Photograph test in progress.

N. If the window is two panel assembly, repeat steps C through K above for the other panel. This would require testing another window position because of the interaction of the two window halves.

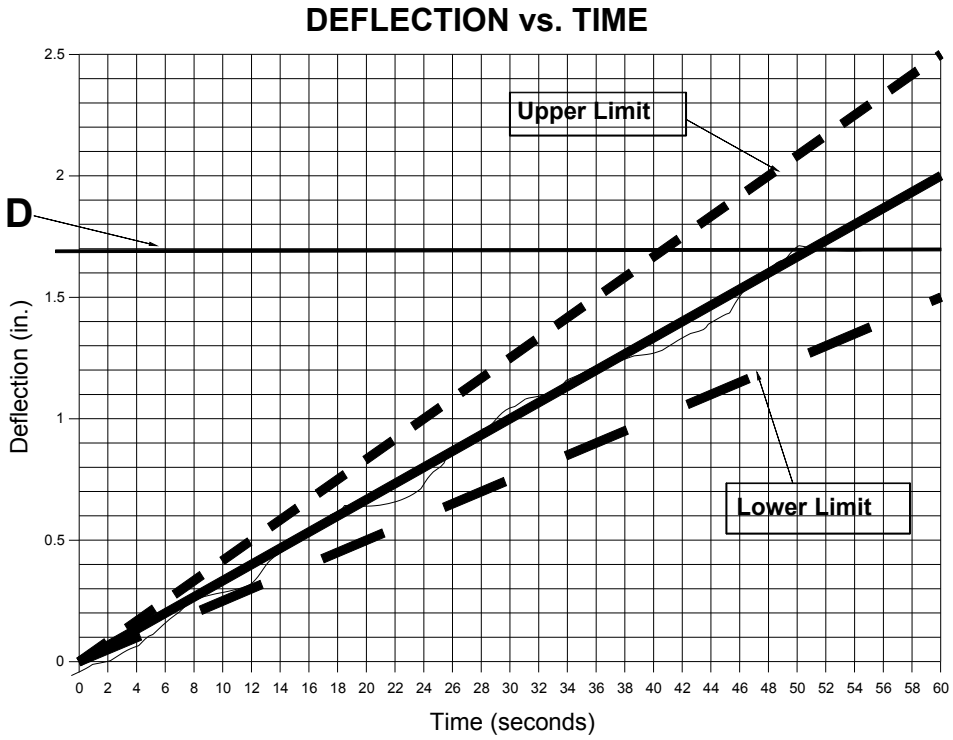
O. Terminate the tests and photograph the results.

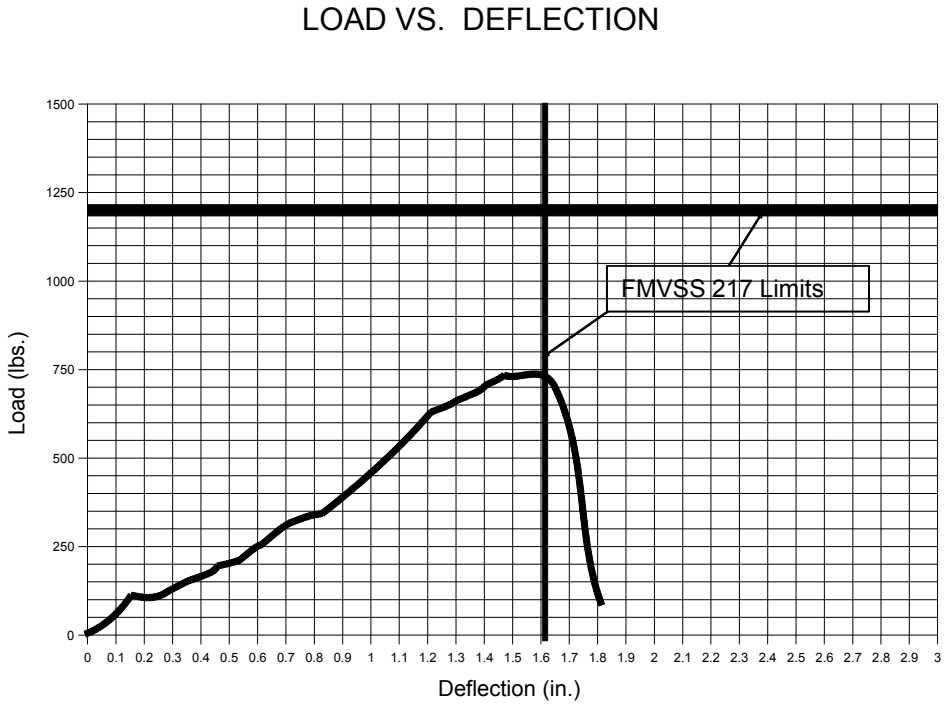
P. Remove load support fixture, and repeat the force tests to unlatch and open the emergency exits.

Q. Record results on Data Sheet 9.

10. COMPLIANCE TEST EXECUTION....Continued

WINDOW RETENTION TEST PLOTS





11. TEST DATA AND TEST VEHICLE DISPOSITION

The contractor shall make all vehicle preliminary compliance test data available to the COTR at the test site within 4 hours after the test. Final test data, including digital printouts and computer generated plots (if applicable), shall be furnished to the COTR according to the contract requirements. Additionally, the contractor shall analyze the preliminary test results as directed by the COTR. All backup data sheets, strip charts, recordings, plots, technician's notes, etc., shall be either sent to the COTR or destroyed at the conclusion of each delivery order, purchase order, etc.

11.1 TEST DATA LOSS

A compliance test is not to be conducted unless and until all the various test conditions specified in the OVSC laboratory test procedure have been met. Failure of a contractor to obtain the required test data and to maintain acceptable limits on test parameters in the manner outlined in the OVSC laboratory test procedure shall require a retest at the expense of the contractor. Retest costs will include the cost of the replacement vehicle and the service costs of conducting the retest. The original GFP will become the property of the contractor after the retest has been successfully conducted.

11.2 TESTED VEHICLE(S)

The contractor is responsible for providing necessary protection to the bus interior during storage following completion of testing (such as weather resistant protective coverings over open and/or broken windows or doors, etc.).

12. REPORTS

This section lists reports, other than final test reports, which the contractor shall submit to the COTR according to schedule. The following report forms are provided as examples. The contractor is not restricted form using other forms or expanding the forms outlined in this section as long as the content of the report remains unaltered.

12.1 MONTHLY STATUS REPORTS

The contractor shall submit a Monthly Test Status Report and a Vehicle Status Report to the COTR. The Vehicle Status Report shall be submitted until all vehicles or items of equipment are disposed of. Samples of the required Monthly Status Report forms are as follows.

12. REPORTS....Continued

MONTHLY TEST STATUS REPORT
FMVSS 217
DATE OF REPORT: _____

No.	BUS NHTSA No., MAKE & MODEL	COMPLIANCE TEST DATE	PASS/ FAIL	DATE REPORT SUBMITTED	DATE INVOICE SUBMITTED	INVOICE PAYMENT DATE
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

12. REPORTS....Continued

MONTHLY VEHICLE STATUS REPORT
FMVSS 217
DATE OF REPORT: _____

No.	BUS NHTSA No., MAKE & MODEL	DATE OF DELIVERY	ODOMETER READING	TEST COMPLETE DATE	BUS SHIPMENT DATE	ODOMETER READING
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

12. REPORTS....Continued

12.2 LABORATORY NOTICE OF TEST FAILURE REPORT

Any indication of a test failure shall be communicated by telephone to the COTR within 24 hours, with written notification mailed within 48 hours (Sat./Sun. excluded). A Notice of Test Failure Report (see sample form below) with a copy of the particular compliance-test data sheet(s) and preliminary data plot(s) shall be included.

LABORATORY NOTICE OF TEST FAILURE TO OVSC

FMVSS NO.: 217 TEST DATE: _____
LABORATORY: _____
CONTRACT NO.: _____ DELV. ORDER NO.: _____
LABORATORY PROJECT ENGINEER'S NAME: _____
BUS DESCRIPTION: _____

NHTSA NO.: _____ VIN: _____
MFR: _____

TEST FAILURE DESCRIPTION: _____
_____
_____

S217 REQUIREMENT, PARAGRAPH S___ :_____
_____
_____

NOTIFICATION TO NHTSA (COTR): _____
DATE: _____ BY: _____

REMARKS:

12. REPORTS....Continued

12.3 VEHICLE CONDITION REPORT

A "Vehicle Condition Report" form must be submitted to the COTR with the copies of the Final Test Report. The first page of the form shall be completed when the test vehicle arrives at the testing laboratory. The second page of the form is completed after the test. The forms shall be LEGIBLE (hand written forms are unacceptable) and COMPLETE (all information requested is filled out).

REPORT OF VEHICLE CONDITION BEFORE TESTING

CONTRACT NO.: DTNH22 - _____ DATE:_____
FROM: _____
TO: _____

MODEL YEAR/MAKE/MODEL/BODY STYLE:_____

NHTSA NO.: _____ BODY COLOR: _____ VIN: _____

ODOMETER READINGS: ARRIVAL - _____ miles DATE - _____

PURCHASE PRICE: $ _____ DEALER'S NAME: _____

ENGINE DATA: _____ Cylinders ____ Liters ____ Cubic inches

TRANSMISSION DATA: _____ Automatic ____ Manual ____ No. of speeds

FINAL DRIVE DATA: _____ Rear Drive ____ Front Drive ____ 4 Wheel Drive

TIRE DATA: Size _____ Mfr. _____

LIST OTHER PERTINENT OPTIONAL OR SPECIAL EQUIPMENT PACKAGES BELOW

12. REPORTS....Continued:

REPORT OF VEHICLE CONDITION AT THE COMPLETION OF TESTING
Equipment that is no longer on the test vehicle as noted on the initial vehicle condition report:

Explanation for equipment removal:

Overall Condition of Test Vehicle:

REMARKS:

RECORDED BY: _____ DATE: _____

APPROVED BY: _____

13. FINAL TEST REPORTS

13.1 REQUIREMENTS

The Final Test Report and associated documentation (including photographs) are relied upon as the chronicle of the compliance test. The Final Test Report will be released to the public domain after review and acceptance by the COTR. For these reasons, each final report must be a complete document capable of standing by itself.

The contractor should use DETAILED descriptions of all compliance-test events. Any events not directly associated with the standard but of technical interest should also be included. The contractor should include as much DETAIL as possible in the report.

Instructions for preparing the first three pages of the final test report are provided here for the purpose of standardization.

13.2 COPIES

In the case of a test failure, SEVEN copies of the Final Test Report shall be submitted to the COTR for acceptance within three weeks of test completion. Format of the Final Test Report to be used by all contractors can be found in the "Report Section."

Where there has been no indication of a test failure, THREE copies of each Final Test Report shall be submitted to the COTR within three weeks of test completion.

Payment of contractor's invoices for completed compliance tests may be withheld until the Final Test Report is accepted by the COTR. Contractors are requested to NOT submit invoices before the COTR is provided copies of the Final Test Report.

Contractors are required to submit the first Final Test Report in draft form within two weeks after the compliance test is conducted. The contractor and the COTR will then be able to discuss the details of both test conduct and report content early in the compliance-test program.

Contractors are required to PROOFREAD all Final Test Reports before submittal to the COTR. The OVSC will not act as a report quality-control office for contractors. Reports containing a significant number of errors will be returned to the contractor for correction, and a "hold" will be placed on invoice payment for the particular test.

13. FINAL TEST REPORTS....Continued

13.3 FIRST THREE PAGES

A. FRONT COVER

A heavy paperback cover (or transparency) shall be provided for protection of the final report. Information required on the cover is:

(1) Final Report Number (such as 217-ABC-9X-001), where –

217 is the FMVSS tested
ABC are the initials for the laboratory
9X is the fiscal year of the test program (or 0X after year 1999)
001 is the group number (001 for the 1st test,
002 for the 2nd test, etc.)

(2) Final Report Title And Subtitle, such as –

SAFETY COMPLIANCE TESTING FOR FMVSS 217
Bus Emergency Exits And Window Retention and Release
* *
World Motors Corporation
199X XYZ Transit Bus
NHTSA No. CX0901

(3) Contractor's Name and Address (such as

COMPLIANCE TESTING LABORATORIES, INC.
4335 West Dearborn Street
Detroit, Michigan 48090

NOTE: DOT SYMBOL WILL BE PLACED BETWEEN ITEMS (3) AND (4)

(4) Date of Final Report completion

(5) The words "FINAL REPORT"

(6) The sponsoring agency's name and address, as follows:

U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Safety Assurance
Office of Vehicle Safety Compliance
400 Seventh Street, SW
Room 6111 (NSA-30)
Washington, DC 20590

13. FINAL TEST REPORTS....Continued

B. FIRST PAGE AFTER FRONT COVER

A disclaimer statement and an acceptance signature block for the COTR shall be provided as follows:

This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Prepared By: _____

Approved By: _____

Approval Date: _____

FINAL REPORT ACCEPTANCE BY OVSC:

Accepted By: _____

Acceptance Date: _____

13. FINAL TEST REPORTS....Continued

C. SECOND PAGE AFTER FRONT COVER

A completed Technical Report Documentation Page (Form DOT F1700.7) shall be completed for those items that are applicable with the other spaces left blank. Sample data for the applicable block numbers of the title page follows.

Block 1 — REPORT NUMBER

217-ABC-9X-001

Block 2 — GOVERNMENT ACCESSION NUMBER

Leave blank

Block 3 — RECIPIENT'S CATALOG NUMBER

Leave blank

Block 4 — TITLE AND SUBTITLE

Final Report of FMVSS 217 Compliance
Testing of 199X World XYZ Transit Bus
NHTSA No. CX0901

Block 5 — REPORT DATE

March 1, 199X (or 200X after year 1999)

Block 6 — PERFORMING ORGANIZATION CODE

ABC

Block 7 — AUTHOR(S)

John Smith, Project Manager
Bill Doe, Project Engineer

Block 8 — PERFORMING ORGANIZATION REPORT NUMBER

ABC-DOT-XXX-001

13. FINAL TEST REPORTS....Continued

Block 9 — PERFORMING ORGANIZATION NAME AND ADDRESS

ABC Laboratories
105 Main Street
Detroit, MI 48070

Block 10 — WORK UNIT NUMBER

Leave blank

Block 11 — CONTRACT OR GRANT NUMBER

DTNH22-9X-D-12345

Block 12 — SPONSORING AGENCY NAME AND ADDRESS

United States Department of Transportation
National Highway Traffic Safety Administration
Safety Assurance
Office of Vehicle Safety Compliance
Mail Code: NSA-30
400 Seventh Street, SW, Room 6111
Washington, DC 20590

Block 13 — TYPE OF REPORT AND PERIOD COVERED

Final Test Report
Feb. 15 to Mar. 15, 199X (or 200X after year 1999)

Block 14 — SPONSORING AGENCY CODE

NSA-30

Block 15 — SUPPLEMENTARY NOTES

Leave blank

13. FINAL TEST REPORTS....Continued

Block 16 — ABSTRACT

Compliance tests were conducted on the subject 199X World XYZ Transit Bus in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-217-0X for the determination of FMVSS 217 compliance. Test failures identified were as follows:

None

NOTE: Above wording must be shown with appropriate changes made for a particular compliance test. Any questions should be resolved with the COTR.

Block 17 — KEY WORDS

Compliance Testing
Safety Engineering
FMVSS 217

Block 18 — DISTRIBUTION STATEMENT

Copies of this report are available from:

NHTSA Technical Information Services (TIS)
Room 5108 (NAD-40)
400 Seventh St., SW
Washington, DC 20590
Telephone No. 202-366-4946

Block 19 — SECURITY CLASSIFICATION OF REPORT

Unclassified

Block 20 — SECURITY CLASSIFICATION OF PAGE

Unclassified

13. FINAL TEST REPORTS....Continued

Block 21 — NUMBER OF PAGES

Add appropriate number

Block 22 — PRICE

Leave blank

13.4 TABLE OF CONTENTS

Final test report Table of Contents shall include the following:

Section 1 — Purpose of Compliance Test

Section 2 — Test Data Summary

Section 3 — Compliance Test Data

Section 4 — Instrumentation and Equipment List

Section 5 — Photographs

13. FINAL TEST REPORTS...Continued

A. Section 1 - PURPOSE OF COMPLIANCE TEST

This section briefly outlines the purpose for conducting the test and states the appropriate test procedure used. The following is provided as an example;

Tests were conducted on a 199X ABC, 80 passenger school bus, NHTSA No. CSXXXX, in accordance with the specifications of the Office of Vehicle Safety Compliance (OVSC) Test Procedure TP-217-XX to determine compliance to the requirements of Federal Motor Vehicle Safety Standards (FMVSS) 217 "Bus Emergency Exits and Window Retention and Release".

This program is sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract No. DTNH22-XX-X-XXXXX.

NOTE: This section should be double-spaced and requires an entire separate page.

B. Section 2 - TEST DATA SUMMARY

This section gives a brief summary of the test results followed by Data Sheet 1.

C. Section 3 - COMPLIANCE TEST DATA

This section requires the reporting of all information recorded on the following Data Sheets;

(1) Data Sheet 2 - PROVISION OF EMERGENCY EXITS

(2) Data Sheet 3 - EMERGENCY EXIT DOOR OPERATIONAL REQUIREMENTS

(3) Data Sheet 4 - EMERGENCY EXIT IDENTIFICATION AND LABELING

(4) Data Sheet 5 - TAPE REFLECTIVITY TEST

(5) Data Sheet 6 - FORCE TEST TO UNLATCH THE EMERGENCY EXIT

13. FINAL TEST REPORTS....Continued

(6) Data Sheet 7 - FORCE TEST TO OPEN THE EMERGENCY EXIT

(7) Data Sheet 8 - EMERGENCY EXIT EXTENSION

(8) Data Sheet No. 9 - WINDOW RETENTION TEST

D. Section 4 - INSTRUMENTATION AND EQUIPMENT LIST

This section obtains a list of all the instrumentation and equipment used during the tests, including a description of the items, serial numbers and calibration dates. The following table is provided as an example.

TABLE 1
EQUIPMENT AND INSTRUMENTATION LIST

EQUIPMENT	DESCRIPTION	SERIAL NO.	CAL. DATE	NEXT CAL. DATE
Ellipsoid	Minor Axis = 33 cm Major Axis = 50 cm	N/A	N/A	N/A
Parallelepiped	Height = 114 cm Width = 61 cm Depth = 30 cm	N/A	N/A	N/A
Force gauge	Model a1x1	454545	00/00/00	00/00/00
Displacement Transducer	Xr7 q	656565	00/00/00	00/00/00
ABC Load Cell	Model 1111	1234	00/00/00	00/00/00
Plotter #1	Model A	0202020	each use	
Plotter #2	Model B	0101010	each use	
XYZ Signal Conditioner	Model 2222	5678	00/00/00	00/00/00

E. Section 5 - PHOTOGRAPHS

This section obtains all photographs taken during the test as required by section 8 - Photographic Documentation.

14. DATA SHEETS

Data Sheets are provided as tools to document test data in the Final Test Report format outlined in the previous section. The contractor is not restricted from using other tools or expanding the data sheets provided in this section. However, for consistency and uniformity in reporting data, the contractor shall format all final test reports in the order outlined in section 13 of this test procedure.

14. DATA SHEETS.....Continued

DATA SHEET 1
TEST SUMMARY

TEST VEHICLE INFORMATION

MODEL YEAR/MAKE/MODEL: _____

NHTSA NO.: _____ ; GVWR: _____ lbs.

BUILD DATE for BUS CHASSIS: _____

VIN: _____; CHASSIS VIN: _____

SEATING CAPACITY: ____ ; TYPE of BUS: _____

TIRE PRESSURE from tire placard (AT CAPACITY): _____

ODOMETER READING: _____ miles

		PASS	FAIL
1.	PROVISION OF EMERGENCY EXITS		
	A. Meets minimum exit provisions	_____	_____
	B. Meets all other exit requirements	_____	_____
	C. Meets requirements for additional exits	_____	_____
2.	EMERGENCY EXIT DOOR OPERATIONAL REQUIREMENTS	_____	_____
3.	EMERGENCY EXIT LABELING AND IDENTIFICATION	_____	_____
4.	TAPE REFLECTIVITY	_____	_____
5.	FORCES TO UNLATCH THE EMERGENCY EXIT	_____	_____
6.	FORCES TO OPEN THE EMERGENCY EXIT	_____	_____
7.	EMERGENCY EXIT EXTENSION	_____	_____
8.	WINDOW RETENTION	_____	_____

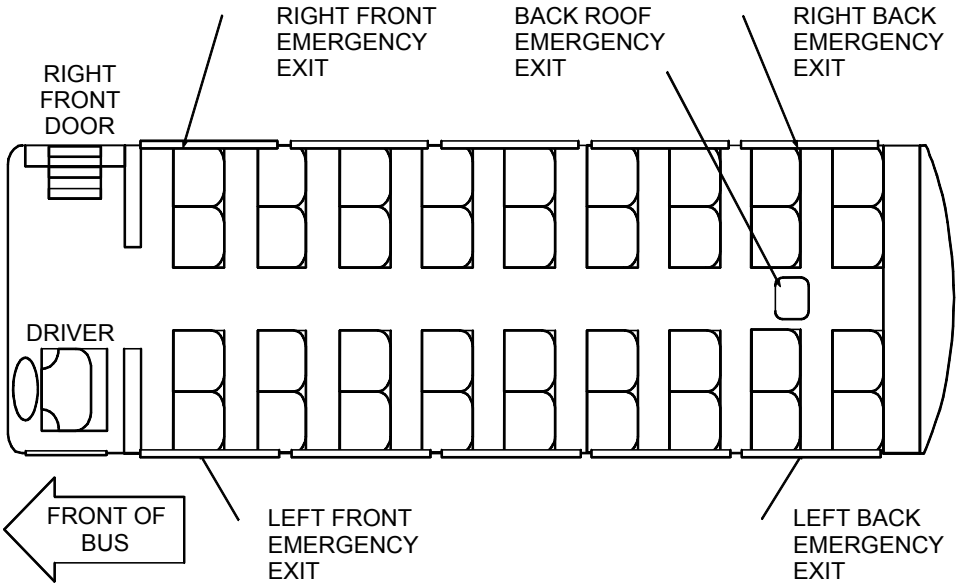
REMARKS:

14. DATA SHEETS....Continued

DATA SHEET 2

PROVISION OF EMERGENCY EXITS

SCHOOL BUS FLOORPLAN LAYOUT



TOP VIEW

		HEIGHT	WIDTH
1.	Rear Door	_____	_____
2.	Rt./Left Side Door	_____	_____
3.	Exit Window A	_____	_____
4.	Exit Window B	_____	_____
5.	Exit Window C	_____	_____
6.	Roof Exit - front	_____	_____
7.	Roof Exit - rear	_____	_____

Seating Capacity _____

	PASS	FAIL
Bus meets minimum emergency exit provisions? (based upon Tables 1 or 2)	_____	_____

14. DATA SHEETS....Continued

DATA SHEET 2
PROVISION OF EMERGENCY EXITS

EXIT REQUIREMENTS			**PASS**	**FAIL**
1.	Rear Emergency Door - opens outward and is hinged on the right side (either side, if the bus has a GVWR of 10,000 pounds or less)			
2.	Side Emergency Door - hinged on its forward side. No more than one side emergency exit door is located, in whole or in part, within the same post and roof bow panel space.			
3.	Rear Push out Window - provides a minimum opening clearance 41 cm high and 122 cm wide			
4.	Roof Exit - is hinged on its forward side, and operable from both the inside and outside the vehicle			
REQUIREMENTS FOR ADDITIONAL EXITS				
5.	There is an even number of side emergency exit windows on each side of bus.			
6.	The bus is not equipped with both sliding and push-out windows, (except for buses equipped with rear push out emergency exit windows).			
7.	A right side emergency exit door, if any, is located as near as practicable to the midpoint of the passenger compartment			

REMARKS:

RECORDED BY: _____ DATE: _____

APPROVED BY: _____

14. DATA SHEETS....Continued

DATA SHEET 3
EMERGENCY EXIT DOOR OPERATIONAL REQUIREMENTS

NHTSA NO.: _____ ; MAKE/MODEL: _____

			PASS	FAIL
1.	The engine starting system does NOT operate if any Emergency Exit is LOCKED			
2.	All Emergency Exits can be released by one person (from inside and outside of bus)			
3.	When the Release Mechanism is NOT in the closed position and the vehicle ignition is in the "ON" position, there is a continuous warning sound audible at the Driver's DSP and in the vicinity of the Emergency Door(s) having the unclosed mechanism			
4.	Emergency exit release mechanism does not use remote controls or central power systems			

REMARKS:

RECORDED BY: _____ DATE: _____

APPROVED BY: _____

14. DATA SHEETS....Continued

DATA SHEET 4
EMERGENCY EXIT IDENTIFICATION AND LABELING

NHTSA NO.: _____ ; MAKE/MODEL: _____

			PASS	FAIL
1.	Each required Emergency Exit is labeled with the words "Emergency Exit" or "Emergency Door" as appropriate in letters at least 5 cm high of a color that contrasts with its background			
	A. **EMERGENCY DOORS** The designation ”Emergency Exit” or “Emergency Door” is located at the top of, or directly above the exit door on both inside outside surfaces			
	B. **ROOF EXITS** The designation for roof exits is located on an inside surface of the exit, or within 30 cm of the roof exit opening.			
	C. **EMERGENCY WINDOW EXITS** The designation is located at the top of, or directly above, or at the bottom of the emergency window exit on both the inside and outside surfaces of the bus.			
2.	Exit Operating Instructions indicate all motions required to unlatch and open the exit, in letters at least 1 cm high and of a color that contrast with its background, shall be located within 15 cm of the release mechanism on the inside surface of the bus			
3.	Each required Emergency Exit opening is outlined around its perimeter with a 2.5 cm wide retro reflective tape of red, white, or yellow color			

REMARKS:

RECORDED BY: _____ DATE: _____

APPROVED BY: _____

14. DATA SHEETS....Continued

DATA SHEET 5
TAPE REFLECTIVITY TEST

_____ Color of retro reflective tape (white, red or yellow)

_____ Glass bead retro reflective element material - Fill in Part A

_____ Prismatic retro reflective element material - Fill in Part B

SPECIFIC INTENSITY PER UNIT AREA
(Candela Per foot candle Per Square Foot)

OBSERVATION ANGLE	ENTRANCE ANGLE	MIN. REQD. INTENSITY	RECORDED INTENSITY	PASS	FAIL
PART 1 – GLASS BEAD					
0.2E	-4E				
0.2E	+30E				
0.5E	-4E				
0.5E	+30E				
0.2E	-4E				
0.2E	+30E				
0.5E	-4E				
0.5E	+30E				

This section of tape passes the REFLECTIVITY requirement.
YES- _____ NO-_____

REMARKS:

RECORDED BY: _____; DATE: _____

APPROVED BY: _____

14. DATA SHEETS....Continued

DATA SHEET 6
FORCE TESTS TO OPEN THE EMERGENCY EXIT

NHTSA NO.: _____ ; MAKE/MODEL: _____

EXIT LOCATION	EXIT DESCRIPTION	HIGH/LOW FORCE AREA	MAXIMUM FORCE REQUIREMENT	ACTUAL FORCE MEASURED
				1.
				2.
				3.
				AVERAGE=
				1.
				2.
				3.
				AVERAGE=
				1.
				2.
				3.
				AVERAGE=
				1.
				2.
				3.
				AVERAGE=

EXIT LOCATION	MOTION(S) REQUIRED TO OPEN EXIT	ACTUAL MOTION(S) TO OPEN EXIT	PASS	FAIL

14. DATA SHEETS....Continued

DATA SHEET 7
FORCE TESTS TO OPEN THE EMERGENCY EXIT

NHTSA NO.: _____ ; MAKE/MODEL: _____

EXIT LOCATION	EXIT DESCRIPTION	HIGH/LOW FORCE AREA	MAXIMUM FORCE REQUIREMENT	ACTUAL FORCE MEASURED
				1.
				2.
				3.
				AVERAGE=
				1.
				2.
				3.
				AVERAGE=
				1.
				2.
				3.
				AVERAGE=
				1.
				2.
				3.
				AVERAGE=

EXIT LOCATION	MOTION(S) REQUIRED TO OPEN EXIT	ACTUAL MOTION(S) TO OPEN EXIT	PASSAGE OF ELLIPSOID OR PARALLELEPIPED	PASS	FAIL

14. DATA SHEETS....Continued

Describe in the comments section if more than one force and motion are required to unlatch the exit.

REMARKS:

RECORDED BY: _____ ; DATE: _____

APPROVED BY: _____

14. DATA SHEETS....Continued

DATA SHEET 8
EMERGENCY EXIT EXTENSION

		PASS	FAIL
1.	Exit(s) can be extended by a single person.	_____	_____
2.	Each emergency exit door is equipped with a positive door opening device that meets the requirements (outlined in section 10.7 of the test procedure).	_____	_____
3.	There is a 30 cm wide clear aisle space for each side emergency door exit.	_____	_____
4.	There is no seat or barrier which extend past the side door opening	_____	_____
5.	**For flip-up seat adjacent to the side emergency door exit** it automatically assumes and retain a vertical position when not in use, so that no portion of the seat bottom is within the 30 cm aisle clearance space	_____	_____
6.	There is no obstruction of door latch mechanism for the the side emergency door.	_____	_____

REMARKS:

RECORDED BY: _____ ; DATE: _____

APPROVED BY: _____

14. DATA SHEETS....Continued

DATA SHEET 9
WINDOW RETENTION TEST

NHTSA NO.: _____; MAKE/MODEL: _____

1. Test Window Identification: _____
_____

2. Provide a detailed description of the window such as fixed, push out, single or double glazed, horizontal or vertical sliding, etc.
_____
_____

4. Provide the horizontal and vertical glazing dimensions for each panel.
_____
_____

5. Did the window pass the retention requirements? Describe how the window structure and glazing withstood the force per the **PASS/FAIL** criteria:
_____
_____

6. Did the window pass the force tests to unlatch and open the exit after the completion of the retention test?
_____
_____
_____

NOTE: MAKE A SEPARATE DATA SHEET FOR EACH WINDOW TESTED

REMARKS:

RECORDED BY: _____ DATE: _____

APPROVED BY: _____