

Report No. 217-NVS-03-07

OFFICE OF VEHICLE SAFETY COMPLIANCE

FMVSS No. 217

"BUS EMERGENCY EXITS AND WINDOW RETENTION AND RELEASE"

Compliance Test Report

for a

2003 Blue Bird, 36 Passenger Transit Bus

NHTSA No. C30802



U.S. DEPARTMENT OF TRANSPORTATION  
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION  
OFFICE OF VEHICLE SAFETY COMPLIANCE  
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### Technical Report Documentation Page

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16. Abstract Tests were conducted on a 2003 Blue Bird, 36-passenger transit bus, NHTSA No. C30802, in accordance with the specification of the Office of Vehicle Safety Compliance (OVSC) Test Procedure TP 217TB 00 to determine compliance to the requirements of Federal Motor Vehicle Safety Standards (FMVSS) 217 "Bus Emergency Exits and Window Retention and Release".			
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## **SECTION 1.0 – PURPOSE OF COMPLIANCE TEST**

Tests were conducted on a model year 2003 Blue Bird, 36-passenger transit bus, NHTSA No. C30802, in accordance with the Office of Vehicle Safety Compliance (OVSC) Test Procedure TP-217TB-00 to determine compliance to the requirements of Federal Motor Vehicle Safety Standards (FMVSS) 217, "Bus Emergency Exits and Window Retention and Release".

## SECTION 2.0 – TEST SUMMARY

### DATA SHEET No. 1 TEST SUMMARY

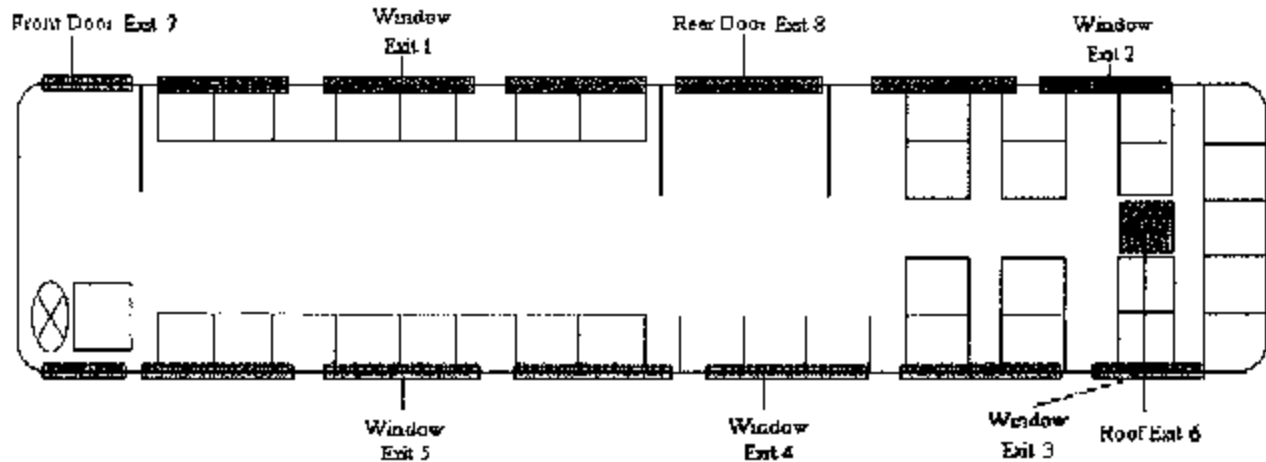
A 36-passenger, 2003 Blue Bird bus (VIN:1BAGJBXA63F214802) was tested to the requirements of Federal Motor Vehicle Safety Standard No. 217, "Bus Emergency Exits and Window Retention and Release" on June 26, 2003. The testing was performed by OVSC engineers. The bus was tested in accordance with the OVSC test procedure TP-217TB-00, dated June 25, 2002. The bus is equipped with two (2) emergency exit windows on the right side of the bus, three (3) emergency exit windows on the left side of the bus, two (2) emergency exit doors on the right side of the bus, and one (1) emergency roof exit located in the rear half of the bus. A summary of results is provided in the table below.

**Table 1 – Test Summary**

Section	Description	Pass/Fail	Reason
S5.2	Provision of Emergency Exits	Pass	
S5.3	Emergency Exit Release	Fail	Windows 4 and 5 exceed the 89 N limit of the standard.
S5.4	Emergency Exit Opening	Pass	
S5.5	Emergency Exit Identification	Pass	
S5.1	Window Retention	Not Tested	

**SECTION 3.0 – COMPLIANCE TEST DATA**

**DATA SHEET No. 2  
PROVISION OF EMERGENCY EXITS  
Schematic of Bus Floor Plan**



**Table 2 - Provision of Emergency Exits**

	<b>Emergency Exit Type &amp; Location</b>	<b>Size of Exit Opening (cm)</b>	<b>Actual Exit Area Measured (cm<sup>2</sup>)</b>	<b>Maximum Credit Area Allowed (cm<sup>2</sup>) (not to exceed 3,458)</b>
1	Window, Right-Front	139 x 68.5	9,521.5	3,458
2	Window, Right-Rear	121 x 68.5	8,288.5	3,458
3	Window, Left-Rear	121 x 68.5	8,288.5	3,458
4	Window, Left-Middle	121 x 68.5	8,288.5	3,458
5	Window, Left-Front	139 x 68.5	9,521.5	3,458
6	Roof, Rear	59 x 59	3,481	3,458
7	Door, Right-Front	87 x 205	17,835	3,458
8	Door, Right-Rear	105 x 234	24,570	3,458
				27,664

**Total Required Area = 37 Designated Seating Positions (DSPs) X 432 cm<sup>2</sup> = 15,984 cm<sup>2</sup>**

**Total Credit Area = 27,664 cm<sup>2</sup> (PASS)**

Each side of the bus must contain 40% of the Total Required Area (.40 X 15,984 cm<sup>2</sup>) = 6393.6 cm<sup>2</sup>

Total Credit Area-Left Side (3 exits)= (3 X 3,458 cm<sup>2</sup>) = 10,374 cm<sup>2</sup> (PASS)

Total Credit Area-Right Side (4 exits)- (4 X 3,458 cm<sup>2</sup>) = 13,832 cm<sup>2</sup> (PASS)

The bus has a rear roof exit and the configuration of the bus appears to preclude the installation of an accessible rear exit.

DATA SHEET No. 3

Table 3 - Access Regions and Forces Test to Release Exits

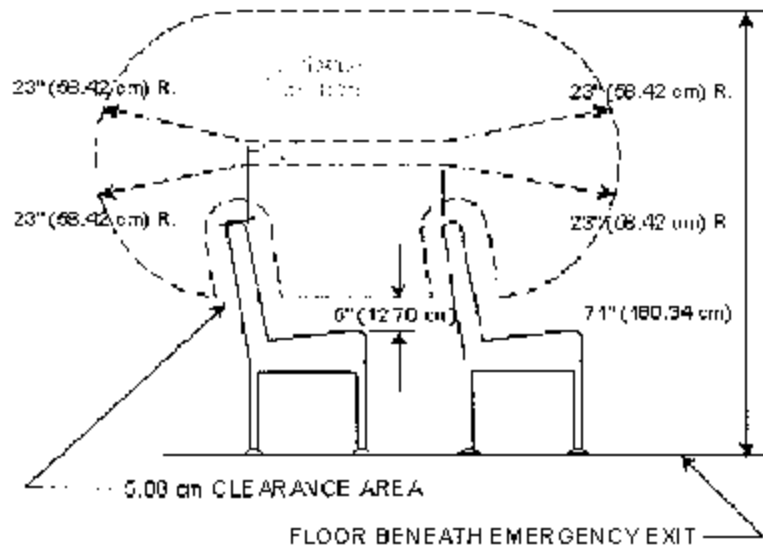
	Emergency Exit Type & Location	No. of Release Mechanisms	HIGH or LOW Access Region	Motions Required to Release Exit	Actual Motions to Release Exit	Peak Force Measured to Release Exit (N)	Max. Force Allowable (N)	Pass	Fall
1	Window, Right-Front - Exit 1	1	High + Low	Rotary or Straight	Rotary	1. 49	89	X	
						2. 34			
						3. 49			
						Avg. = 44			
2	Window, Right-Rear Exit 2	1	High + Low	Rotary or Straight	Rotary	1. 49	89	X	
						2. 49			
						3. 51.5			
						Avg. = 50			
4	Window, Left-Middle - Exit 4	1	High + Low	Rotary or Straight	Rotary	1. 81	89		X
						2. 98			
						3. 95.6			
						Avg. = 91.6			
5	Window, Left-Front - Exit 5	1	High + Low	Rotary or Straight	Rotary	1. 122.6	89		X
						2. 115			
						3. 73.8			
						Avg. = 103.8			

Note:

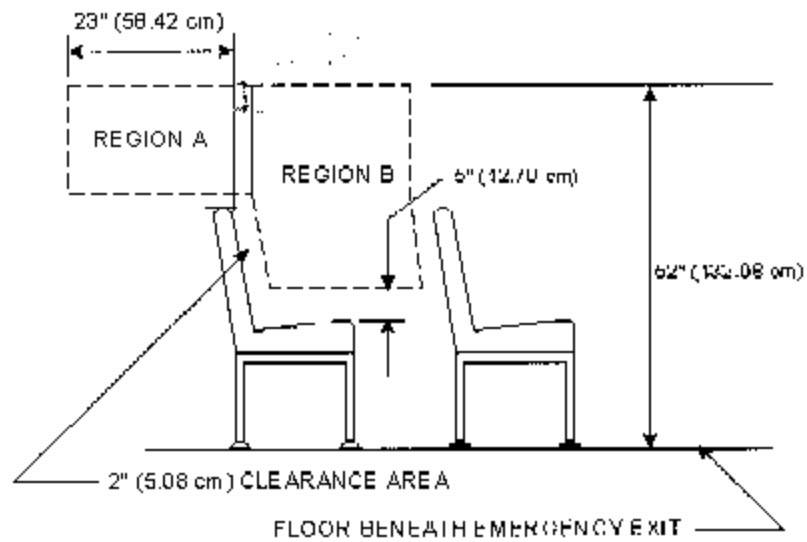
Each release mechanism tested was exercised three times prior to measuring the release force. The term exercised is used to describe the action whereby the release mechanism is released and the window opened and then returned to its original unreleased location.

The forces were measured using a Shimpo MF handheld force gauge. The force gauge has a hook at one end that allows for the attachment of the gauge onto the release mechanism. After the gauge is attached an engineer applies a force to the gauge which is transferred to the release mechanism. The engineer applies increasingly greater force until the release mechanism is released. The force measured is recorded and the gauge is zeroed for the next test.

### Access Regions for Low Force



### Access Regions for High Force



**DATA SHEET No. 4**  
**Table 4 - Access Regions and Forces Test to Open Exits**

	Emergency Exit Type & Location	HIGH or LOW Access Region	Motions Required to Open Exit	Actual Motions to Open Exit	Direction of Motion differs 90-180° from Release motion (Yes or No)	Peak Force Measured to Open Exit (N)	Max. Force Allowable (N)	Pass	Fail
1	Window, Right-Front - Exit 1	High + Low	Rotary Or Straight	Straight, Perpendicular to undisturbed surface	Yes	1. 73.6	267	X	
						2. 78.5			
						3. 73.6			
						Avg. = 75.2			
2	Window, Right-Rear - Exit 2	High + Low	Rotary Or Straight	Straight, Perpendicular to undisturbed surface	Yes	1. 49	267	X	
						2. 58.9			
						3. 39.2			
						Avg. = 49			
4	Window, Left-Middle - Exit 4	High + Low	Rotary Or Straight	Straight, Perpendicular to undisturbed surface	Yes	1. 68.7	267	X	
						2. 58.9			
						3. 49			
						Avg. = 59			
5	Window, Left-Front - Exit 5	High + Low	Rotary Or Straight	Straight, Perpendicular to undisturbed surface	Yes	1. 68.7	267	X	
						2. 58.9			
						3. 58.9			
						Avg. = 62			

A Shimpo MF handheld force gauge is used to measure the force to open the exit. The force gauge has a flat attachment on one end that provides a surface to place against the exit. The exit is released prior to measuring the force to open the exit. An engineer then applies an increasing force to the force gauge until the exit is opened allowing passage of the 33cm by 50cm ellipsoid. The force is recorded and the gauge is zeroed for the next test.

Data Sheet No. 5  
**Table 5 - Emergency Exit Identification**

	<b>Emergency Exit Type</b>	<b>Description of Designation Label or Placard</b>	<b>Description of Operating Instructions Label or Placard</b>	<b>(For Buses w/ adjacent seats) Description of labels to indicate location of nearest release mechanism</b>
1-5	Window Exits	"Emergency Exit"	"Pull out and down on red handle and push window out"	N/A
6	Roof Exit	"Emergency Exit"	"1 Turn, 2 Push"	N/A
7	Door Exit - Front	"Emergency Door"	"Turn to Release"	N/A
8	Door Exit - Rear	"Emergency Door"	"Open here, Turn Handle, Push Door Open"	N/A

**Pass/Fail**

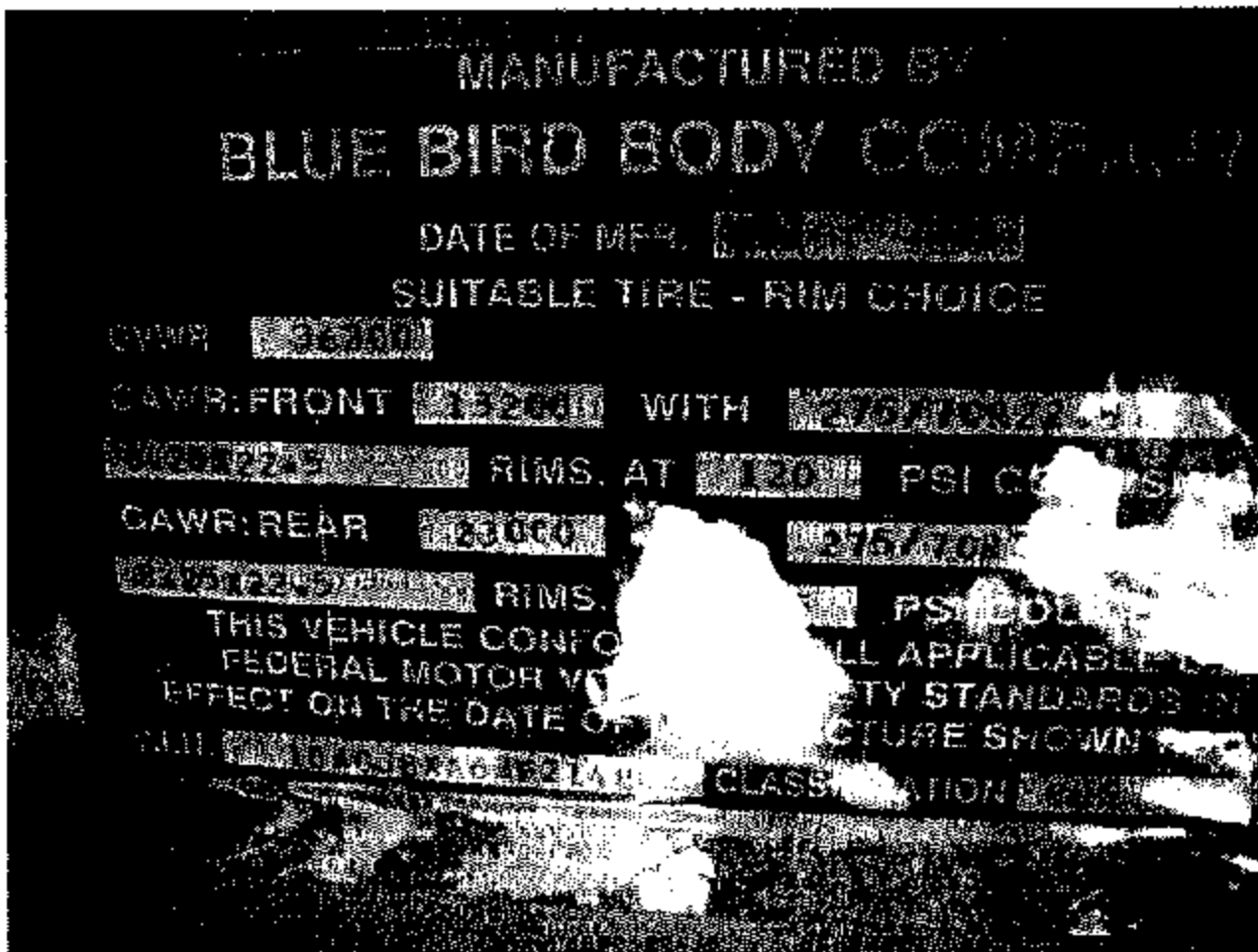
- P** 1. Each emergency exit has a permanently affixed, legible label or placard with the designation "Emergency Door" or "Emergency Exit."
- P** 2. Each emergency exit has a permanently affixed, legible label or placard describing the motion necessary to release (unlatch) and open the exit.
- P** 3. The label is within 16 cm of the nearest release mechanism.
- N/A** 4. For buses equipped with adjacent seats, a permanently affixed, legible label or placard has been placed with the occupant space to indicate the location of the nearest release mechanism.

**SECTION 4.0 – INSTRUMENTATION AND EQUIPMENT LIST**

**INSTRUMENTATION AND EQUIPMENT LIST**

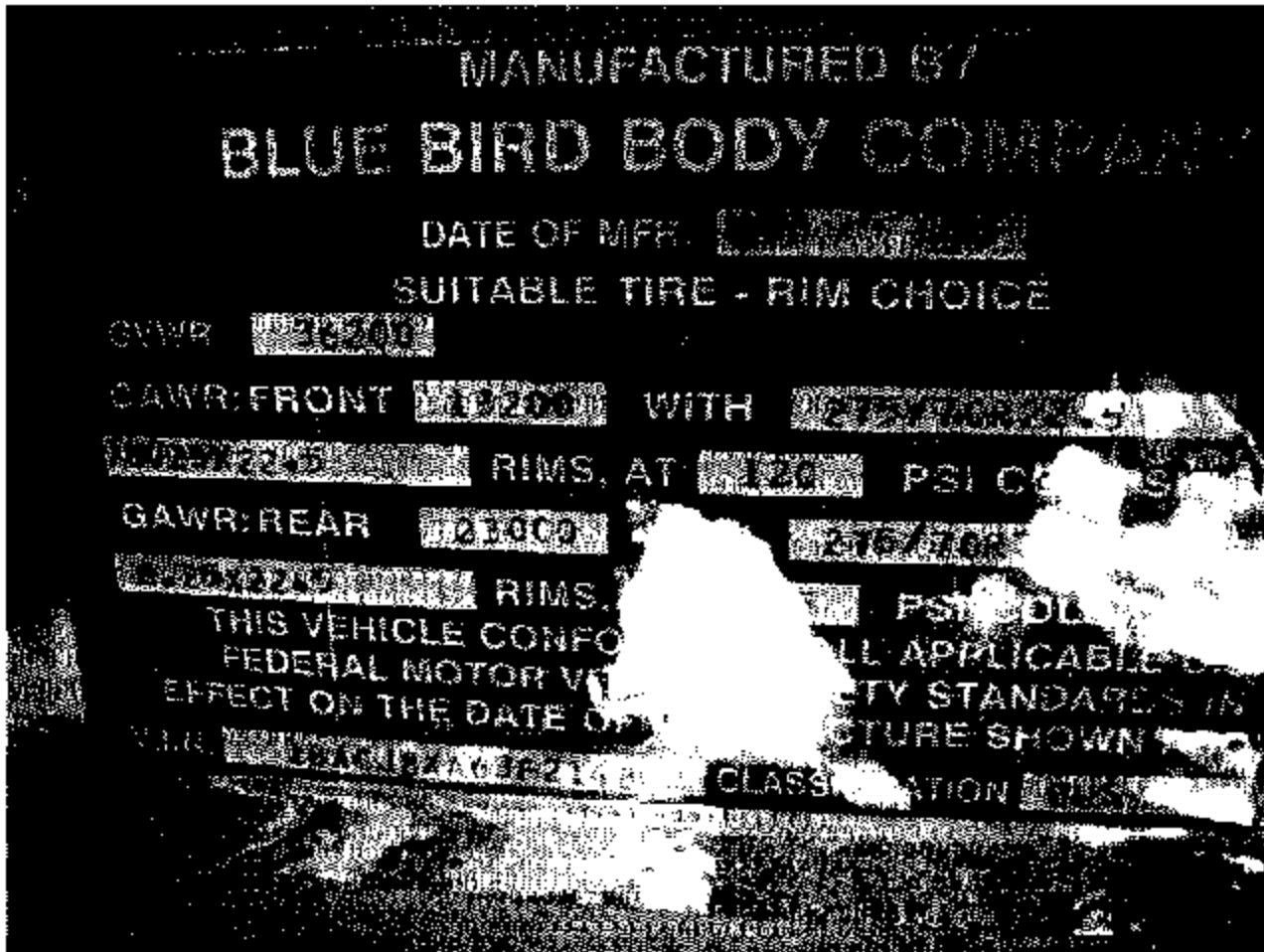
EQUIPMENT	DESCRIPTION	SERIAL NO.
Ellipsoid	Minor Axis = 33 cm Major Axis = 50 cm	N/A
Force gauge	Shimpo MF	505110
Craftsman 8m Tape Measure	Tape Measure	N/A

SECTION 5.0 – PHOTOGRAPHS

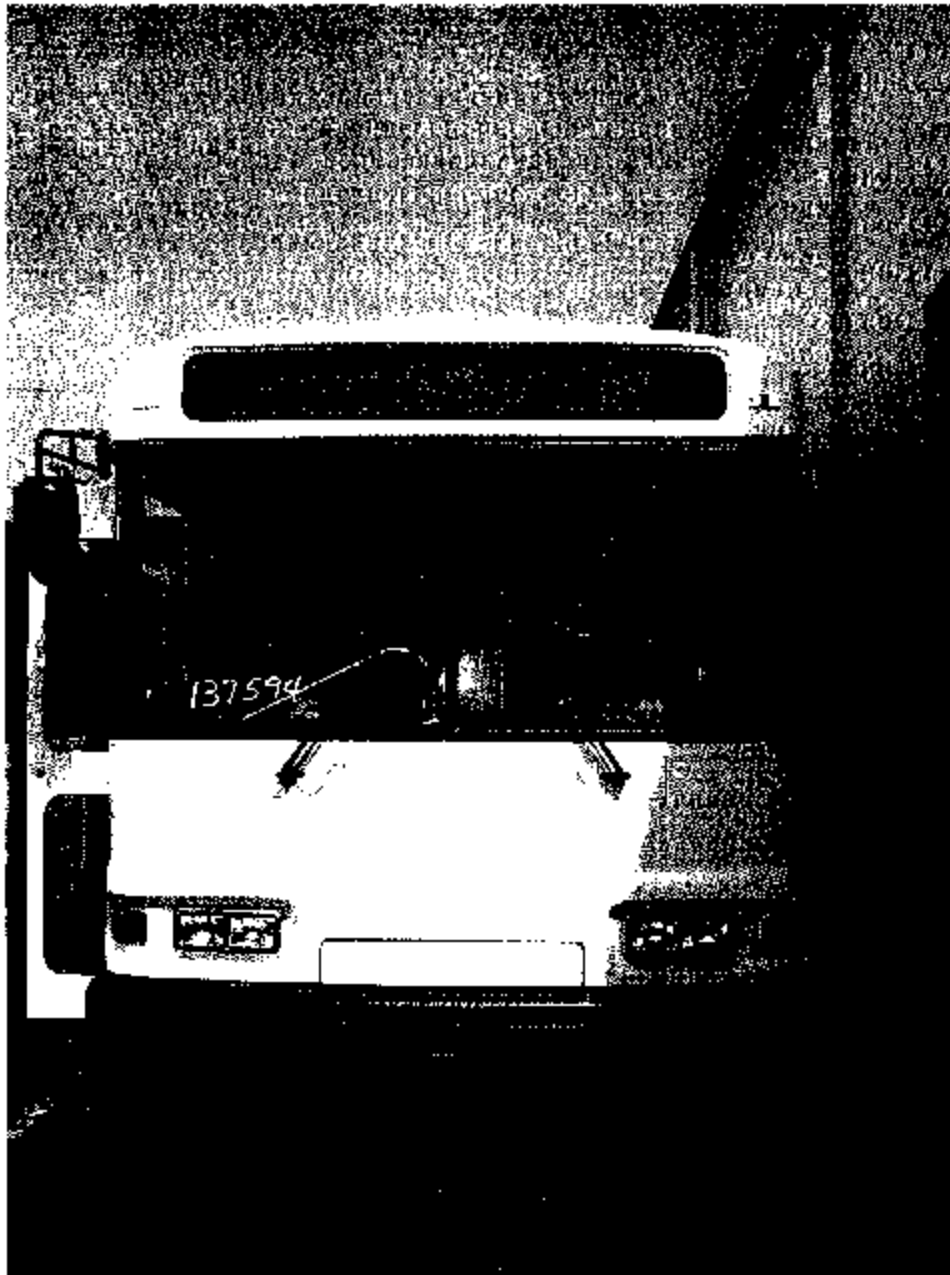


Photograph 1 – Certification Label

SECTION 5.0 – PHOTOGRAPHS



Photograph 1 – Certification Label



Photograph 2 – Exterior Front View



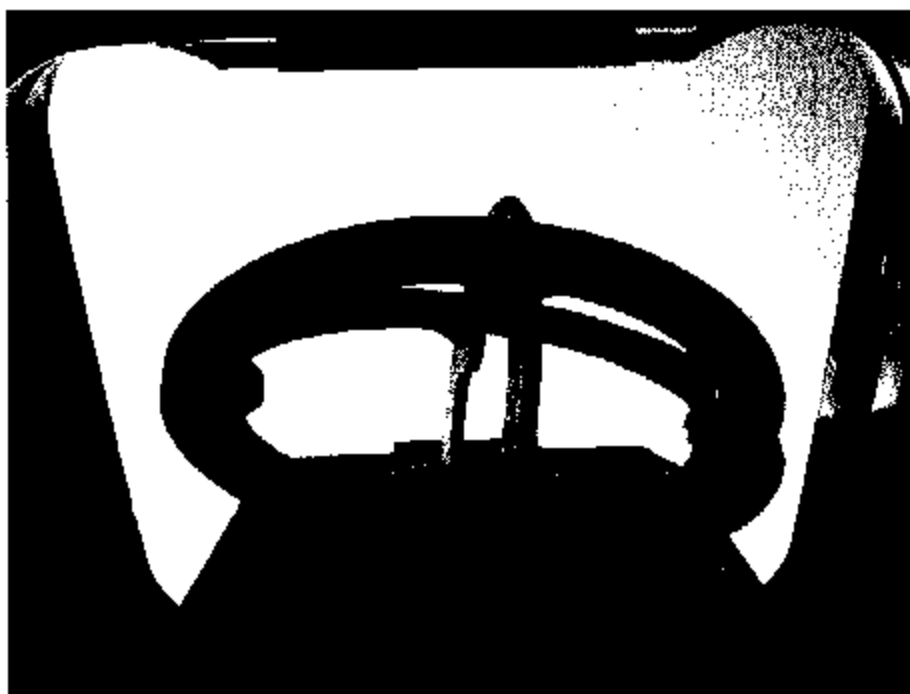
Photograph 3 – Interior View looking Rearward



Photograph 4 – Interior View looking Forward



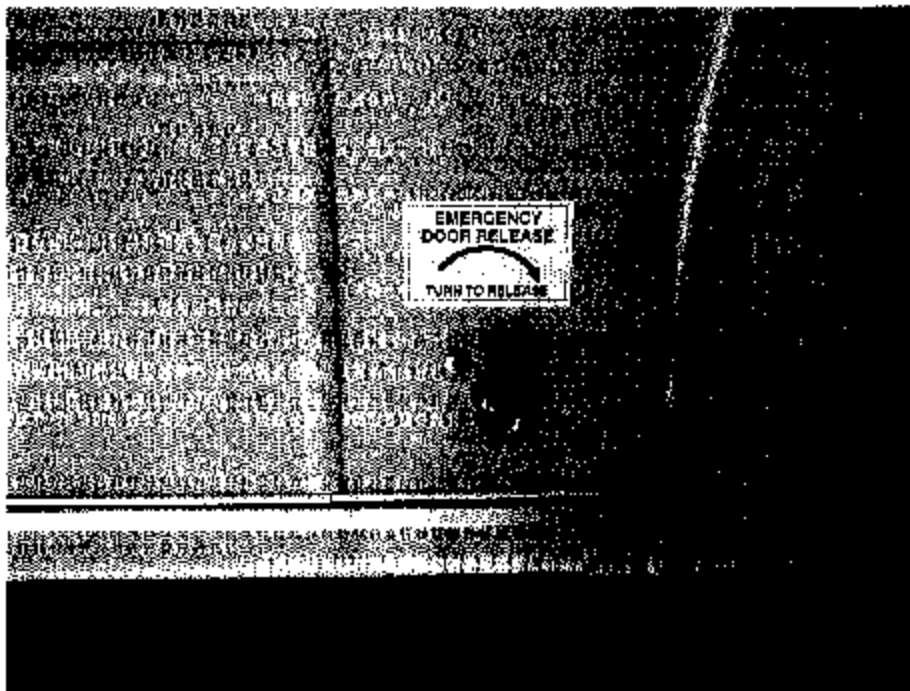
Photograph 5 – Ellipsoid passage through Emergency Exit Window



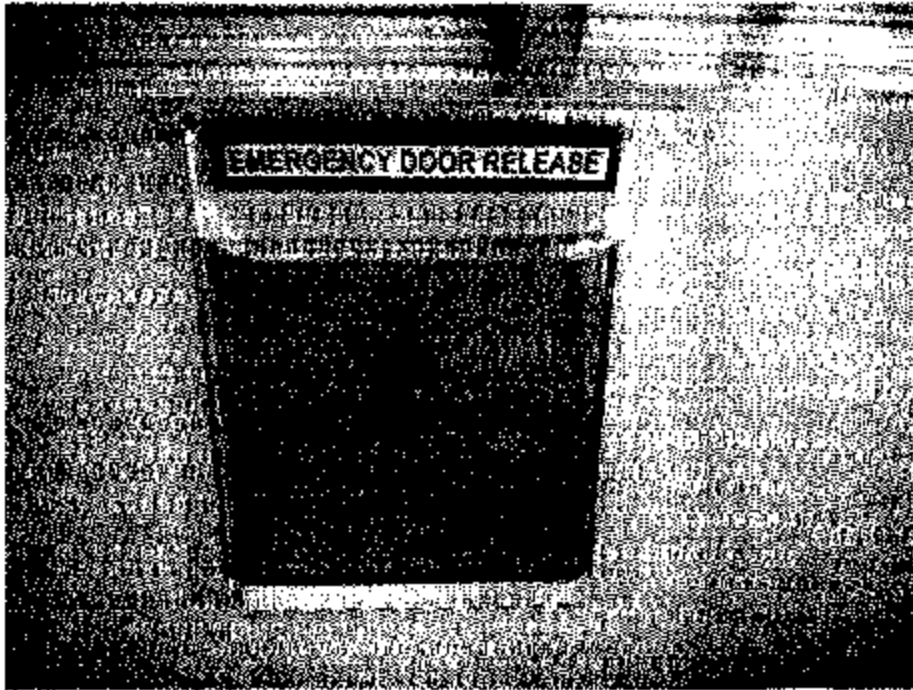
Photograph 6 - Ellipsoid Passage through the Roof Emergency Exit



Photograph 7 – Emergency Exit Window Label



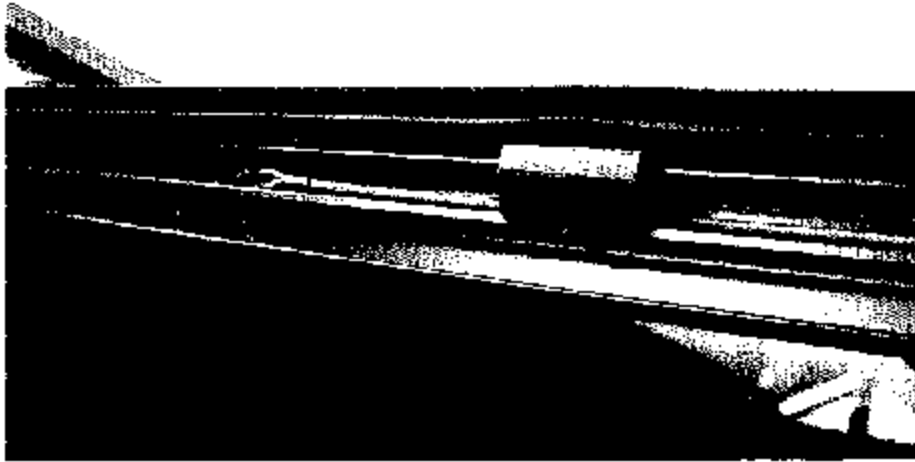
Photograph 8 – Emergency Exit Door Label



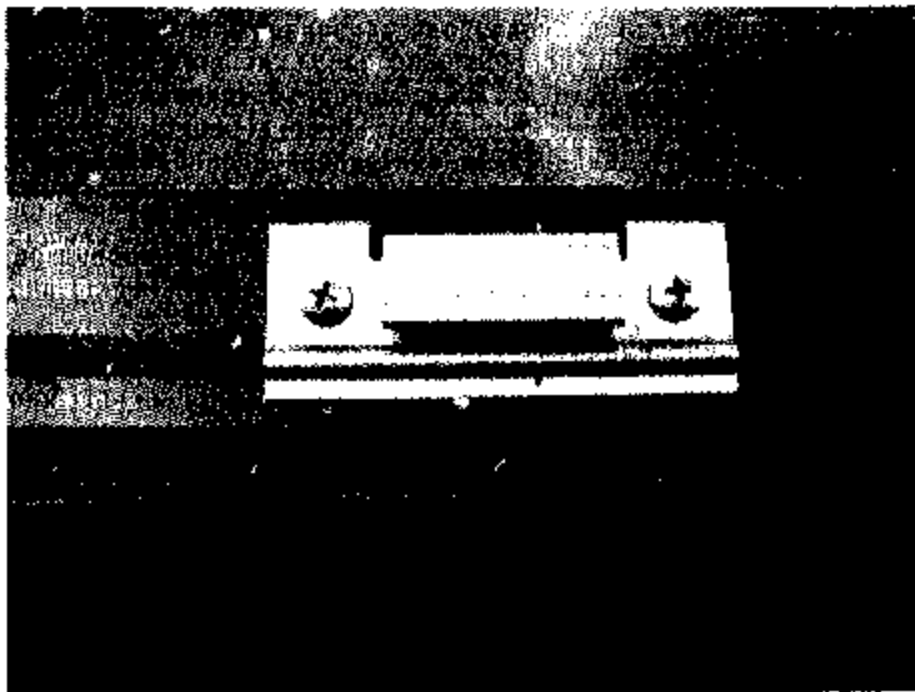
Photograph 9 - Emergency Exit Door Label



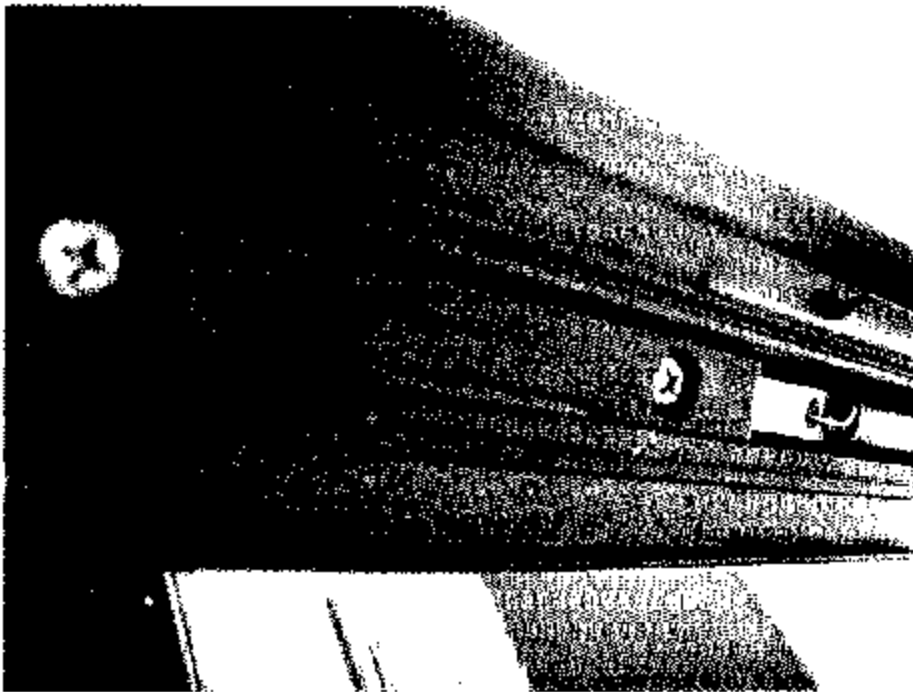
Photograph 10 - Emergency Roof Exit Label



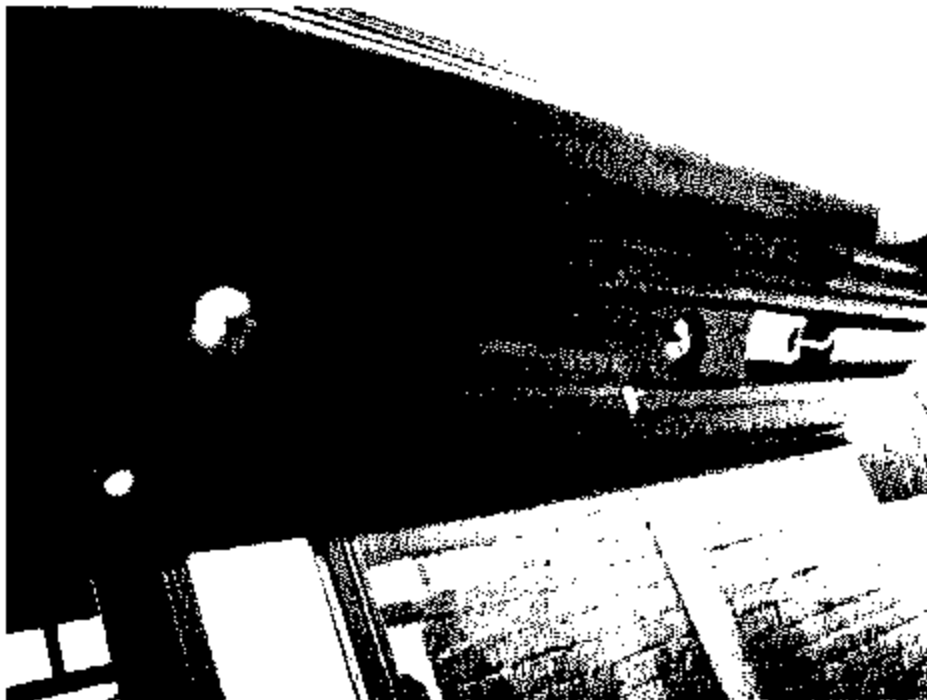
Photograph 11 – Wedge Block in place on Window 4



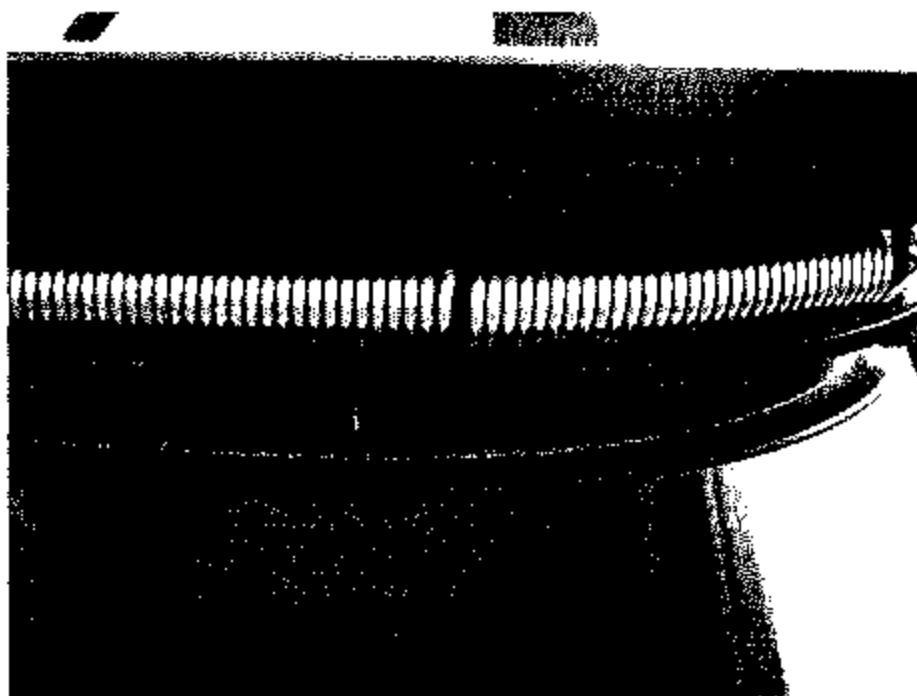
Photograph 12 – Retention Spring for Window 4



Photograph 13 Typical Release Bolt



Photograph 14 – Irregularly shaped Release Bolt on Window 4



Photograph 15 – Irregular Spring - Window 4