

REPORT NUMBER: 217-MGA-2007-001

**SAFETY COMPLIANCE TESTING FOR
FMVSS NO. 217
SCHOOL BUS EMERGENCY EXITS AND WINDOW
RETENTION AND RELEASE**

**LES ENTERPRISES MICHEL CORBEIL INC.
2006 CORBEIL SCHOOL BUS
NHTSA NO.: C60902**

**PREPARED BY:
MGA RESEARCH CORPORATION
5000 WARREN ROAD
BURLINGTON, WI 53105**

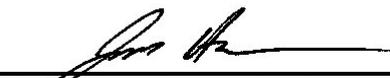


Final Report Date: April 26, 2007

FINAL REPORT

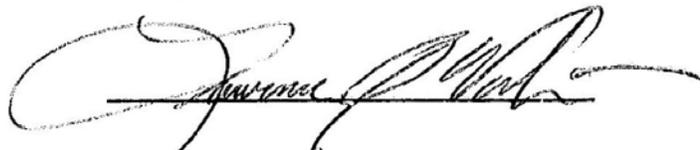
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400 SEVENTH STREET, SW, ROOM 6111
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Prepared by:  Date: April 26, 2007
James Hansen, Project Engineer

Reviewed by:  Date: April 26, 2007
Michael Janovicz, Program Manager

FINAL REPORT ACCEPTED BY:


April 26, 2007
Date of Acceptance

Technical Report Documentation Page

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16. Abstract Compliance tests were conducted on the subject 2006 Corbeil School Bus, NHTSA No. C60902 in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-217-06 for the determination of FMVSS 217 compliance. Test failures were as follows: None			
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SECTION 1
PURPOSE OF COMPLIANCE TEST

Tests were conducted on a MY2006 Corbeil School Bus, NHTSA No. C60902, in accordance with the specifications of the Office of Vehicle Safety Compliance (OVSC) Test Procedures TP-217-06 to determine compliance to the requirements of Federal Motor Vehicle Safety Standards (FMVSS) 217, "School Bus Emergency Exits and Window Retention and Release".

This program is sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-02-D-01057.

SECTION 2
TEST DATA SUMMARY

Based on the tests performed, the MY2006 Corbeil School Bus, NHTSA No. C60902 appeared to meet the requirements of FMVSS 217. See Data Sheet 1 for Test Summary on the following page.

**DATA SHEET 1
TEST SUMMARY**

GENERAL VEHICLE IDENTIFICATION

Model Year/Mfr. /Make/Model:	2006 Corbeil	
NHTSA No.:	C60902	
GVWR:	4,355 kg / 9,600 lbs	
Build Date for Bus Chassis:	04/06	
VIN:	1FDSE35L66DA60778	
Chassis VIN:	1FDSE35L66DA60778	
Seating Capacity:	(1 Driver, 20 Passengers)	
Type of Bus:	School Bus	
Tire Pressure from tire placard (at capacity):	Front: 380 kPa	Rear: 550 kPa
Odometer Reading:	485 Miles	

	PASS/FAIL
S5.1 WINDOW RETENTION	PASS
S5.2 PROVISION OF EMERGENCY EXITS	PASS
Meets minimum exit provisions	PASS
Meets all other exit requirements	PASS
Meets requirements for additional exits	PASS
S5.2.3.1.A EMERGENCY EXIT DOOR OPERATIONAL REQUIREMENTS	PASS
S5.3 EMERGENCY EXIT RELEASE	PASS
Forces to unlatch the emergency exits	PASS
Forces to open the emergency exits	PASS
S5.4 EMERGENCY EXIT OPENING	PASS
S5.5 EMERGENCY EXIT LABELING AND IDENTIFICATION	PASS
S5.5 TAPE REFLECTIVITY (49CFR 571.131)	NOT TESTED

COMMENTS: NONE

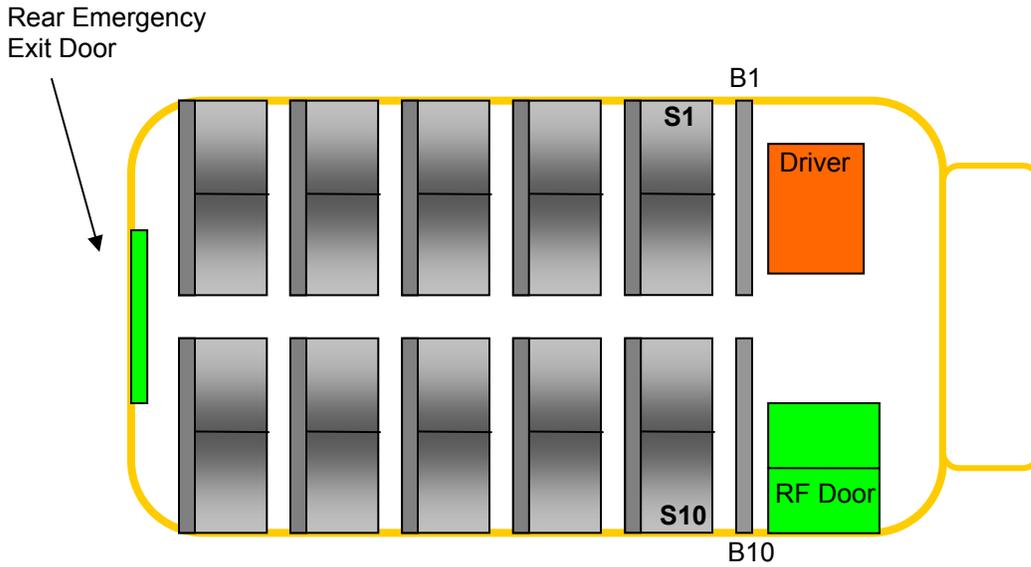
SECTION 3
COMPLIANCE TEST DATA

The following data sheets document the results of testing on the 2006 Corbeil School Bus, NHTSA No. C60902.

DATA SHEET 2
PROVISION OF EMERGENCY EXITS

Test Vehicle: **2006 CORBEIL SCHOOL BUS**
Test Lab: **MGA RESEARCH CORPORATION**

NHTSA No.: **C60902**
Test Date: **02/09/2007**



		Height (mm)	Width (mm)
1	Rear Exit Door	1364	865

Seating Capacity: 21 (Including Driver)

	PASS/FAIL
Bus meets minimum emergency exit provision, based upon Table 1	PASS

COMMENTS: NONE

DATA SHEET 2 (CONTINUED)
PROVISION OF EMERGENCY EXITS

		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)	PASS
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.	N/A
3	Rear Push Out Window – provides a minimum opening clearance 41 cm high and 122 cm wide (16" x 48")	N/A
4	Roof Exit – is hinged on its forward side, and operable from both the inside and outside the vehicle	N/A
5	There is an even number of side emergency exit windows on each side of bus.	N/A
6	The bus is not equipped with both sliding and push-out windows, (except for buses equipped with rear push out emergency exit windows).	N/A
7	A right side emergency exit door, if any, is located as near as practicable to the midpoint of the passenger compartment.	N/A

COMMENTS: NONE

Recorded By: 

Approved By: 

DATE: 02/09/2007

DATA SHEET 3
EMERGENCY EXIT DOOR OPERATIONAL REQUIREMENTS

Test Vehicle: **2006 CORBEIL SCHOOL BUS**
 Test Lab: **MGA RESEARCH CORPORATION**

NHTSA No.: **C60902**
 Test Date: **02/09/2007**

		PASS/FAIL
1	The engine starting system does NOT operate if any Emergency Exit is LOCKED	N/A
2	All Emergency Door and Roof Exits can be released by one person (from inside and outside of bus)	PASS
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.	PASS
4	Emergency exit release mechanism does not use remote controls or central power systems	PASS

COMMENTS: NONE

Recorded By: 

Approved By: 

DATE: 02/09/2007

DATA SHEET 4A

EMERGENCY EXIT IDENTIFICATION AND LABELING

Test Vehicle: **2006 CORBEIL SCHOOL BUS**
 Test Lab: **MGA RESEARCH CORPORATION**

NHTSA No.: **C60902**
 Test Date: **02/09/2007**

EMERGENCY EXIT LABELING - INTERIOR

Exit Location	Rear Door
Exit Description	Emergency Door
Letter Height (cm)	5.0
Background Color	White
Location Inside	Top of Door
Pass/Fail	PASS

OPERATING INSTRUCTIONS - INTERIOR

Exit Location	Rear Door
Instructions	To Open Lift Handle and Push Out
Letter Height (cm)	1.2
Letter Color	Black
Background Color	White
Distance From Release (cm)	11.0
Reflective Tape Color	N/A
Reflective Tape Width (cm)	N/A
Pass/Fail	PASS

COMMENTS: NONE

Recorded By: 

Approved By: 

DATE: 02/09/2007

DATA SHEET 4B

EMERGENCY EXIT IDENTIFICATION AND LABELING

Test Vehicle: **2006 CORBEIL SCHOOL BUS**
Test Lab: **MGA RESEARCH CORPORATION**

NHTSA No.: **C60902**
Test Date: **02/09/2007**

EMERGENCY EXIT LABELING - EXTERIOR

Exit Location	Rear Door
Exit Description	Emergency Door
Letter Height (cm)	5.0
Background Color	Yellow
Location Outside	Top of Door
Pass/Fail	PASS

OPERATING INSTRUCTIONS - EXTERIOR

Exit Location	Rear Door
Instructions	Arrow
Letter Height (cm)	---
Letter Color	---
Background Color	---
Distance From Release (cm)	1
Reflective Tape Color	Yellow
Reflective Tape Width (cm)	3.8 cm
Pass/Fail	PASS

COMMENTS: NONE

Recorded By: 

Approved By: 

DATE: 02/09/2007

DATA SHEET 4 (CONTINUED)
EMERGENCY EXIT IDENTIFICATION AND LABELING

Test Vehicle: **2006 CORBEIL SCHOOL BUS**
 Test Lab: **MGA RESEARCH CORPORATION**

NHTSA No.: **C60902**
 Test Date: **02/09/2007**

		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 (2") of a color that contrasts with its background.	PASS
2	Emergency Doors – The designation "Emergency Exit" or "Emergency Door" is located at the top of, or directly above the exit door on both inside and outside surfaces of the bus.	PASS
3	Roof Exits – The designation for roof exits is located on an inside surface of the exit, or within 30 cm (11.8") of the roof exit opening.	N/A
4	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.	N/A
5	Exit Operating Instructions indicate all motions required to unlatch and open the exit, in letters at least 1 cm (.39") high and of a color that contrast with its background and shall be located within 15 cm (5.9") of the release mechanism on the inside surface of the bus.	PASS
6	Each required Emergency Exit opening is outlined around its perimeter with a 2.5 cm (1") wide retroreflective tape of red, white, or yellow color.	PASS

COMMENTS: NONE

Recorded By: 

Approved By: 

DATE: 02/09/2007

DATA SHEET 5
TAPE RELECTIVITY TEST

Test Vehicle: **2006 CORBEIL SCHOOL BUS**
Test Lab: **MGA RESEARCH CORPORATION**

NHTSA No.: **C60902**
Test Date: **02/09/2007**

- _____ Color of retroreflective tape (white, red, or yellow)
- _____ Glass bead retroreflective element material – Fill in Part A
- _____ Prismatic retroreflective 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 A – Glass Bead				
Part B - Prismatic				

This section of tape passes the REFLECTIVITY requirement. Yes___ No___

COMMENTS: NOT TESTED

Recorded By: _____

Approved By: _____

Date:

DATA SHEET 6A

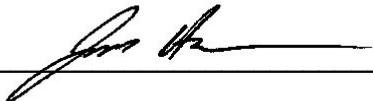
FORCE TESTS TO UNLATCH THE EMERGENCY EXITS - INTERIOR

Test Vehicle: **2006 CORBEIL SCHOOL BUS**
 Test Lab: **MGA RESEARCH CORPORATION**

NHTSA No.: **C60902**
 Test Date: **02/09/2007**

Exit Location	Exit Description	High/Low Force Area	Maximum Force Requirement Newtons	Actual Force Measured (N)	Motion(s) required to Release Exit	Actual Motion(s) to Release Exit	PASS/FAIL
Rear Door	Emergency Door	High	178	1. 32.4	Straight	Lift Handle	PASS
				2. 35.6			
				3. 30.9			
				Average: 33.0			

COMMENTS: NONE

Recorded By: 

Approved By: 

DATE: 02/09/2007

DATA SHEET 6B

FORCE TESTS TO UNLATCH THE EMERGENCY EXITS - EXTERIOR

Test Vehicle: **2006 CORBEIL SCHOOL BUS**
 Test Lab: **MGA RESEARCH CORPORATION**

NHTSA No.: **C60902**
 Test Date: **02/09/2007**

Exit Location	Exit Description	High/Low Force Area	Maximum Force Requirement Newtons	Actual Force Measured (N)	Motion(s) required to Release Exit	Actual Motion(s) to Release Exit	PASS/FAIL
Rear Door	Emergency Door	High	178	1. 88.6	Rotary	Turn Handle Counter Clockwise	PASS
				2. 82.1			
				3. 84.4			
				Average: 85.0			

COMMENTS: NONE

Recorded By: 

Approved By: 

DATE: 02/09/2007

DATA SHEET 7A

FORCE TESTS TO OPEN THE EMERGENCY EXITS - INTERIOR

Test Vehicle: **2006 CORBEIL SCHOOL BUS**
 Test Lab: **MGA RESEARCH CORPORATION**

NHTSA No.: **C60902**
 Test Date: **02/09/2007**

Exit Location	Exit Description	High/Low Force Area	Maximum Force Requirement Newtons	Actual Force Measured (N)	Motion(s) required to Open Exit	Actual Motion(s) to Open Exit	Passage of Ellipsoid or Parallelepiped	PASS/ FAIL
Rear Door	Emergency Door	High	178	1. 16.7	Straight	Push Out	114x55x15 Parallelepiped	PASS
				2. 16.4				
				3. 18.1				
				Average: 17.1				

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

COMMENTS: NONE

Recorded By: 

Approved By: 

DATE: 02/09/2007

DATA SHEET 7B

FORCE TESTS TO OPEN THE EMERGENCY EXITS - EXTERIOR

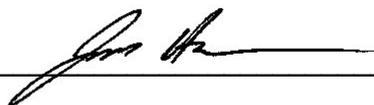
Test Vehicle: **2006 CORBEIL SCHOOL BUS**
 Test Lab: **MGA RESEARCH CORPORATION**

NHTSA No.: **C60902**
 Test Date: **02/09/2007**

Exit Location	Exit Description	High/Low Force Area	Maximum Force Requirement Newtons	Actual Force Measured (N)	Motion(s) required to Open Exit	Actual Motion(s) to Open Exit	Passage of Ellipsoid or Parallelepiped	PASS/ FAIL
Rear Door	Emergency Door	High	178	1. 19.2	Straight	Pull Out	114x55x15 Parallelepiped	PASS
				2. 16.2				
				3. 17.6				
				Average: 17.7				

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

COMMENTS: NONE

Recorded By: 

Approved By: 

DATE: 02/09/2007

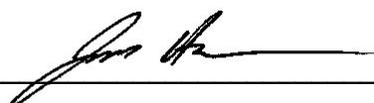
DATA SHEET 8
EMERGENCY EXIT EXTENSION

Test Vehicle: **2006 CORBEIL SCHOOL BUS**
Test Lab: **MGA RESEARCH CORPORATION**

NHTSA No.: **C60902**
Test Date: **02/09/2007**

		PASS/FAIL
1	Exit(s) can be extended by a single person.	PASS
2	Each emergency exit door is equipped with a positive door opening device that meets the requirements (outlined in Section S5.4.1 (3) of FMVSS 217).	PASS
3	There is a 30 cm (11.81") wide clear aisle space for each side emergency door exit.	N/A
4	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 (11.81") aisle clearance space	N/A
5	There is no seat or barrier which extend past the side door opening	N/A
6	There is no obstruction of door latch mechanism for the rear emergency door.	PASS

COMMENTS: NONE

Recorded By: 

Approved By: 

DATE: 02/09/2007

DATA SHEET 9
WINDOW RETENTION TEST

Test Vehicle: **2006 CORBEIL SCHOOL BUS**
Test Lab: **MGA RESEARCH CORPORATION**

NHTSA No.: **C60902**
Test Date: **02/09/2007**

1	Test Window Identification:	Rear Door Upper Glass		
2	Provide a detailed description of the window such as fixed, push out, single or double glazed, horizontal or vertical sliding, etc.	Fixed		
3	Provide the horizontal and vertical glazing dimensions for each panel.	460 mm x 704 mm		
4	Did the window pass the retention requirements? Describe how the window structure and glazing withstood the force per the PASS/FAIL criteria:	Max Displacement was Reached PASS		
5	Did the window pass the force tests to unlatch and open the exit after the completion of the retention test?	Unlatch Force Measured (N)	Open Force Measured (N)	Pass/ Fail
		1. 37.2	1. 17.2	PASS
		2. 34.5	2. 16.2	PASS
		3. 34.2	3. 19.7	PASS

COMMENTS: NONE

Recorded By: 

Approved By: 

DATE: 02/09/2007

DATA SHEET 9 (CONTINUED)

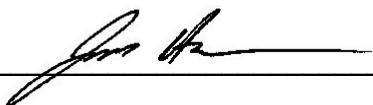
WINDOW RETENTION TEST

Test Vehicle: **2006 CORBEIL SCHOOL BUS**
 Test Lab: **MGA RESEARCH CORPORATION**

NHTSA No.: **C60902**
 Test Date: **02/09/2007**

1	Test Window Identification:	Left Window 5		
2	Provide a detailed description of the window such as fixed, push out, single or double glazed, horizontal or vertical sliding, etc.	Vertical Sliding Not Emergency Exit		
3	Provide the horizontal and vertical glazing dimensions for each panel.	240 mm X 645 mm		
4	Did the window pass the retention requirements? Describe how the window structure and glazing withstood the force per the PASS/FAIL criteria:	Max Displacement was Reached PASS		
5	Did the window pass the force tests to unlatch and open the exit after the completion of the retention test?	Unlatch Force Measured (N)	Open Force Measured (N)	Pass/ Fail
		NA	NA	NA
		NA	NA	NA
		NA	NA	NA

COMMENTS: NONE

Recorded By: 

Approved By: 

DATE: 02/09/2007

SECTION 4
INSTRUMENTATION AND EQUIPMENT LIST

Test Vehicle: **2006 CORBEIL SCHOOL BUS**
Test Lab: **MGA RESEARCH CORPORATION**

NHTSA No.: **C60902**
Test Date: **02/09/2007**

Equipment	Description	Model/Serial No.	Cal. Date	Next Cal. Date
Head Form	MGA	217	When Used	When Used
A/D Interface	Metrabyte	DAS-1802	---	---
Sphere	MGA	Sphere – 1A	When Used	When Used
Load Cell	Interface	1210AF-62736	01/29/07	07/29/07
Inclinometer	Digital Protractor	Pro 360 / Comp Lab	10/04/07	04/04/07
Linear Potentiometer	Ametek	P40A/0504-21782	10/30/06	04/30/07
Digital Calipers	Mitutoyo	CD-6" cs/ 0441288	09/11/06	09/11/07
Steel Tape	Stanley	Powerlock / 278	09/26/07	03/26/07
Camera	Sony	DSC-S75	---	---
Ellipsoid	MGA	ELLIP – 1A	When Used	When Used
Parallelepiped	MGA	PARA – 1A	When Used	When Used
Force Gauge	Dillon	AFG/DMLC	09/12/06	03/12/07

**SECTION 5
PHOTOGRAPHS**

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Test Vehicle: **2006 CORBEIL SCHOOL BUS**
Procedure: **MGA RESEARCH CORPORATION**

NHTSA No.: **C60902**
Test Date: **02/09/2007**



Exterior Left Side View of School Bus

Test Vehicle: **2006 CORBEIL SCHOOL BUS**
Procedure: **MGA RESEARCH CORPORATION**

NHTSA No.: **C60902**
Test Date: **02/09/2007**



Exterior Right Front $\frac{3}{4}$ View of School Bus

Test Vehicle: **2006 CORBEIL SCHOOL BUS**
Procedure: **MGA RESEARCH CORPORATION**

NHTSA No.: **C60902**
Test Date: **02/09/2007**



Exterior Left Rear 3/4 View of School Bus

Test Vehicle: **2006 CORBEIL SCHOOL BUS**
Procedure: **MGA RESEARCH CORPORATION**

NHTSA No.: **C60902**
Test Date: **02/09/2007**

MFD.BY
Les Entreprises Michel Corbeil Inc.

DATE OF MANUFACTURE 06/29/2006

INCOMPLETE VEHICLE MANUFACTURED BY:
FORD

DATE INC. VEH. MFD. 04/01/2006

GVWR 9,600.00

GVWR FRONT 3,550.00Lbs WITH RIMS

LT245/75R16E TIRES, 16 X 7.0K

@ 55.00 PSI COLD

GVWR REAR 6,084.00Lbs WITH RIMS

LT245/75R16E TIRES, 16 X 7.0K

@ 80.00 PSI COLD

THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S
FEDERAL MOTOR VEHICLE SAFETY STANDARDS IN
EFFECT IN 06/29/2006

VEHICLE IDENTIFICATION NUMBER:
1FDSE35L66DA60778

VEHICLE TYPE SCHOOL BUS

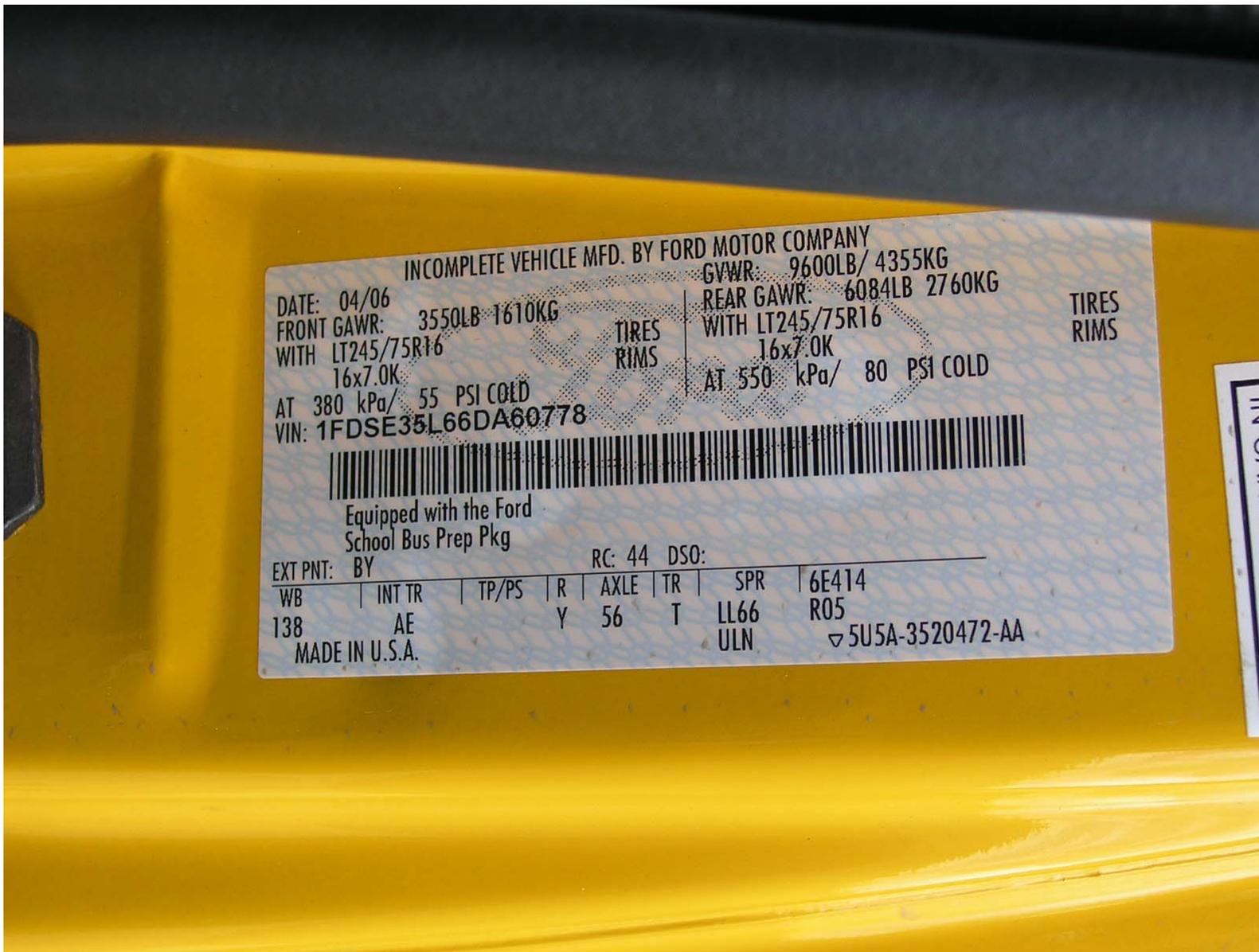
MODEL 754-NY-20-00WC-EMC

SERIAL GO-63959



Test Vehicle: 2006 CORBEIL SCHOOL BUS
Procedure: MGA RESEARCH CORPORATION

NHTSA No.: C60902
Test Date: 02/09/2007



Incomplete Vehicle Label

Test Vehicle: 2006 CORBEIL SCHOOL BUS
Procedure: MGA RESEARCH CORPORATION

NHTSA No.: C60902
Test Date: 02/09/2007



Tire Placard

Test Vehicle: **2006 CORBEIL SCHOOL BUS**
Procedure: **MGA RESEARCH CORPORATION**

NHTSA No.: **C60902**
Test Date: **02/09/2007**



Interior Front to Rear View Depicting Seating Arrangement

Test Vehicle: **2006 CORBEIL SCHOOL BUS**
Procedure: **MGA RESEARCH CORPORATION**

NHTSA No.: **C60902**
Test Date: **02/09/2007**



Interior Rear to Front View Depicting Seating Arrangement

Test Vehicle: **2006 CORBEIL SCHOOL BUS**
Procedure: **MGA RESEARCH CORPORATION**

NHTSA No.: **C60902**
Test Date: **02/09/2007**

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Rear Exit Door Identification (Outside View)

Test Vehicle: **2006 CORBEIL SCHOOL BUS**
Procedure: **MGA RESEARCH CORPORATION**

NHTSA No.: **C60902**
Test Date: **02/09/2007**

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Rear Exit Door Identification (Inside View)

Test Vehicle: 2006 CORBEIL SCHOOL BUS
Procedure: MGA RESEARCH CORPORATION

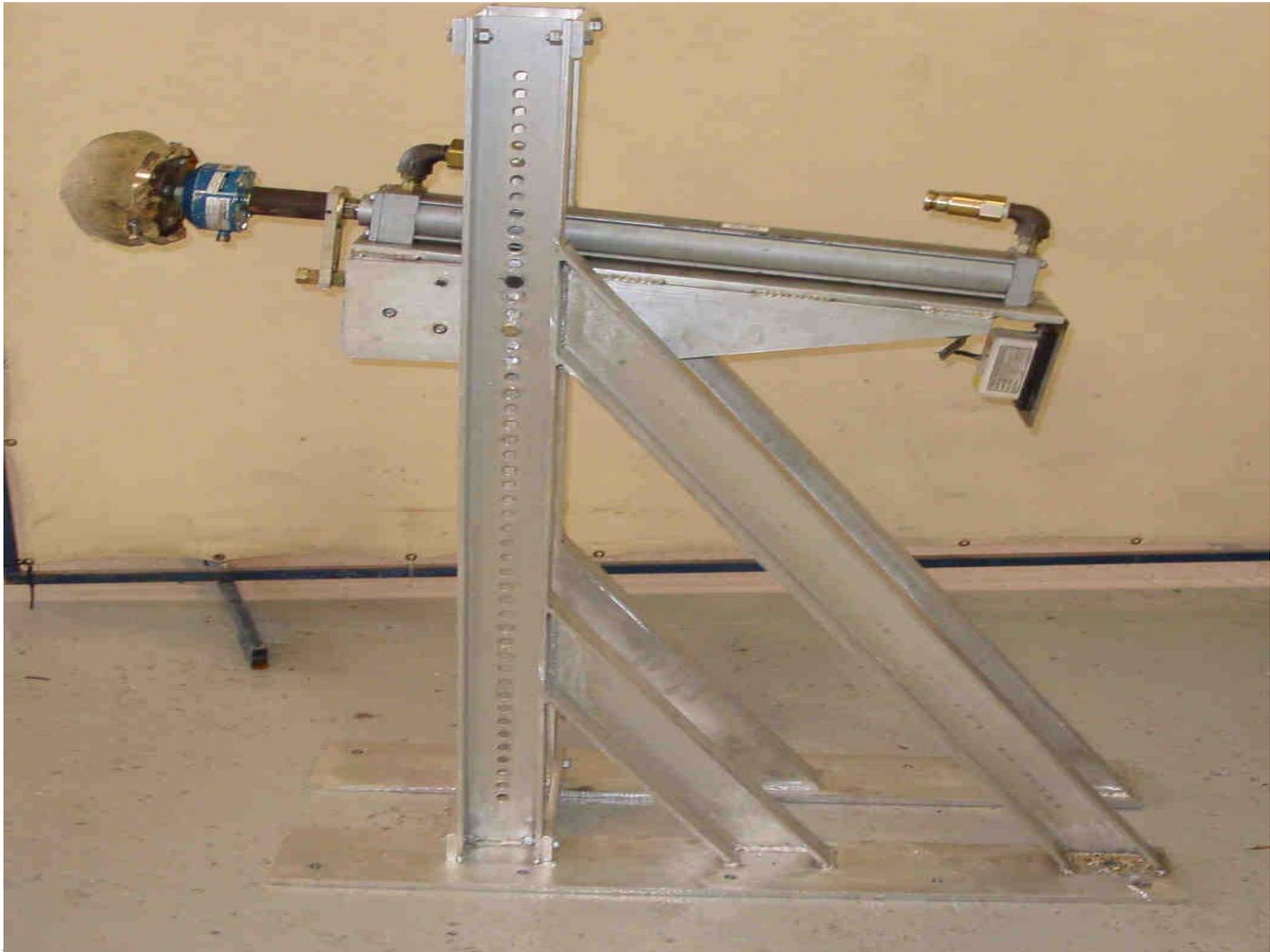
NHTSA No.: C60902
Test Date: 02/09/2007



Rear Door Emergency Exit Parallelepiped Clearance

Test Vehicle: **2006 CORBEIL SCHOOL BUS**
Procedure: **MGA RESEARCH CORPORATION**

NHTSA No.: **C60902**
Test Date: **02/09/2007**



Loading Fixture

Test Vehicle: **2006 CORBEIL SCHOOL BUS**
Procedure: **MGA RESEARCH CORPORATION**

NHTSA No.: **C60902**
Test Date: **02/09/2007**



Retention Test of Left Side Window (Pre-Test)

Test Vehicle: **2006 CORBEIL SCHOOL BUS**
Procedure: **MGA RESEARCH CORPORATION**

NHTSA No.: **C60902**
Test Date: **02/09/2007**



Retention Test of Left Side Window (Post-Test)

Test Vehicle: **2006 CORBEIL SCHOOL BUS**
Procedure: **MGA RESEARCH CORPORATION**

NHTSA No.: **C60902**
Test Date: **02/09/2007**



Retention Test of Rear Door Window (Pre-Test)

Test Vehicle: **2006 CORBEIL SCHOOL BUS**
Procedure: **MGA RESEARCH CORPORATION**

NHTSA No.: **C60902**
Test Date: **02/09/2007**



Retention Test of Rear Door Window (Post-Test)

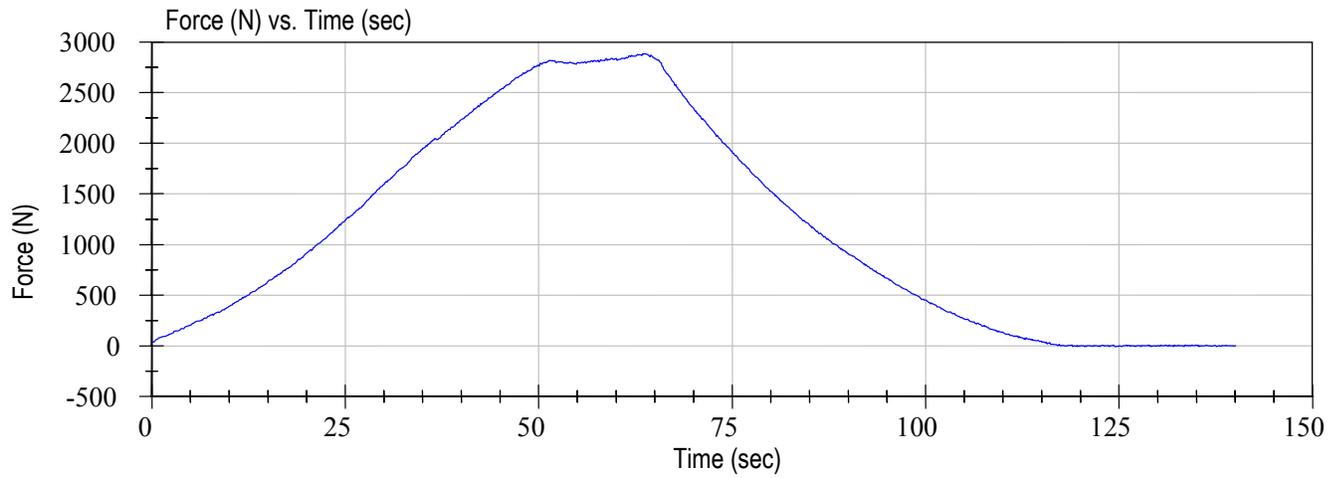
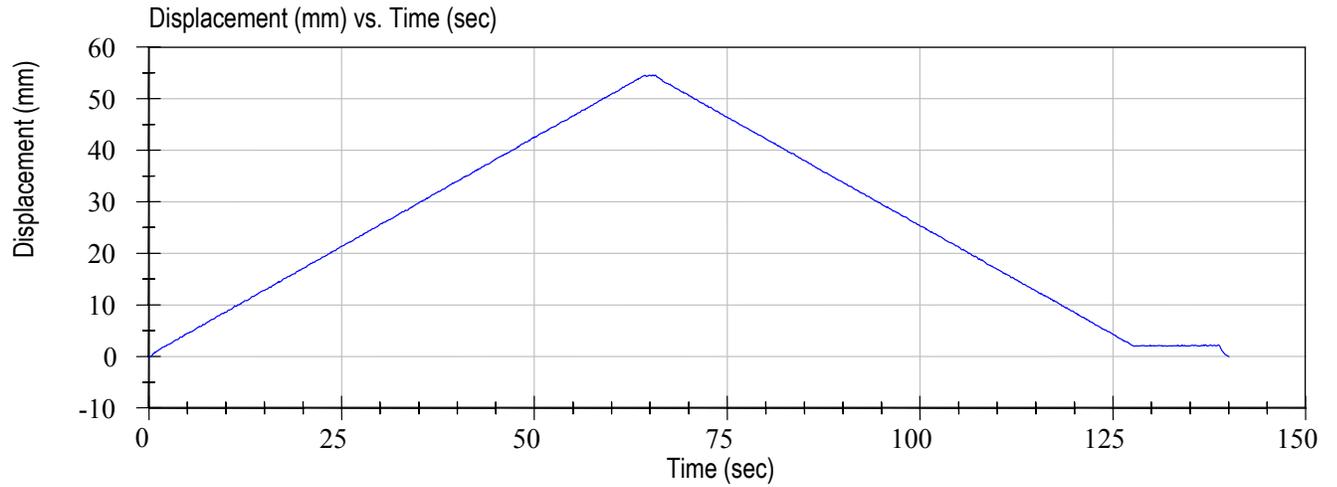
SECTION 6
TEST PLOTS

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Test Desc: FMVSS 217 Window Retention
Component ID: Corbeil Rear Emergency
Door Upper Window

Test Date: 3/7/2007
NHTSA No: C60902





Test Desc: FMVSS 217 Window Retention
Component ID: Corbeil
Left Rear Window

Test Date: 3/7/2007
NHTSA No: C60902

