REPORT NUMBER: 217-MGA-2009-006

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

TRANS TECH BUS
2009 TRANS TECH RONDAK SCHOOL BUS
NHTSA NO.: C90903

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

TEST DATE: NOVEMBER 3, 2009

FINAL REPORT DATE: FEBRUARY 28, 2011

FINAL REPORT

PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
MAIL CODE: NVS-220
1200 NEW JERSEY AVENUE, S.E.
WASHINGTON, D.C. 20590

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Prepared by: _____ Date: February 28, 2011
Eric Peschman, Project Engineer

Reviewed by: _____ Date: February 28, 2011
Michael Janovicz, Program Manager

FINAL REPORT ACCEPTED BY:

Edward E. Chan
_____

Digitally signed by Edward E. Chan
DN: cn=Edward E. Chan, o=National Highway Traffic Safety Administration, ou=Office of Vehicle Safety Compliance, email=ed.chan@dot.gov, c=US
Date: 2011.02.28 10:45:51 -05'00'

February 28, 2011
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Technical Report Documentation Page

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12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Enforcement Office of Vehicle Safety Compliance Mail Code: (NVS-220) 1200 New Jersey Avenue, S.E. Washington, D.C. 20590		*13. Type of Report and Period Covered* Final Report 11/03/09 – 11/04/09 *14. Sponsoring Agency Code* NVS-220	
15. Supplementary Notes			
16. Abstract Compliance tests were conducted on the subject 2009 Trans Tech Rondak School Bus, NHTSA No.: C90903, 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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Form DOT F1700.7 (8-72)

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SECTION 1
PURPOSE OF COMPLIANCE TEST

Tests were conducted on a MY 2009 Trans Tech Rondak School Bus, NHTSA No.: C90903, 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.: DTNH22-08-D-00075.

SECTION 2
TEST DATA SUMMARY

Based on the tests performed, the MY 2009 Trans Tech Rondak School Bus, NHTSA No.: C90903, 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:	2009 Trans Tech Rondak School Bus	
NHTSA No.:	C90903	
GVWR:	4,355 kg / 9,600 lbs	
Build Date for Bus Chassis:	05/08	
VIN:	1FD2E35L88DB33670	
Seating Capacity:	(1 Driver, 14 Passengers)	
Type of Bus:	Type A	
Tire Pressure from tire placard (at capacity):	Front: 380 kPa	Rear: 550 kPa
Odometer Reading:	190.5 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

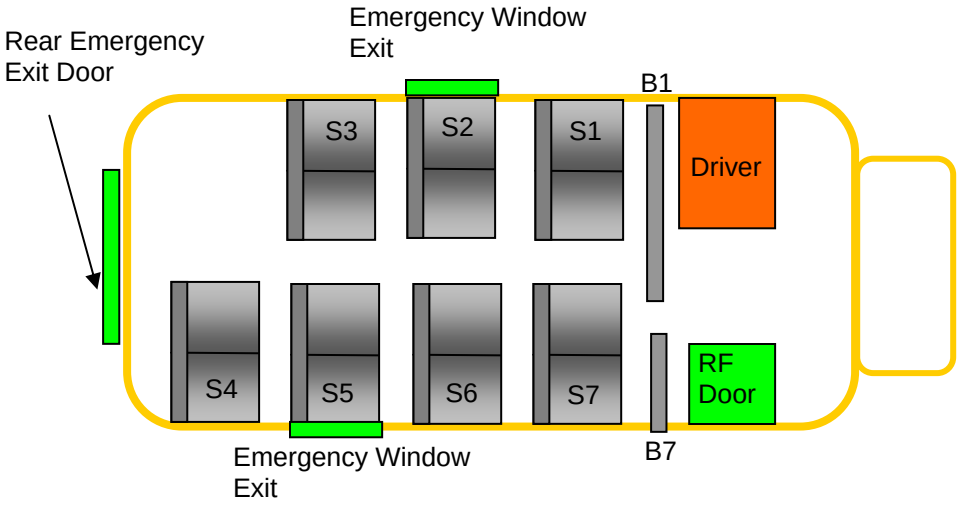
SECTION 3
COMPLIANCE TEST DATA

The following data sheets document the results of testing on the 2009 Trans Tech Rondak School Bus, NHTSA No.: C90903.

DATA SHEET 2

PROVISION OF EMERGENCY EXITS

Test Vehicle: **2009 TRANS TECH RONDAK SCHOOL BUS** NHTSA No.: **C90903**
Test Lab: **MGA RESEARCH CORPORATION** Test Date: **11/03/2009**



		Height (mm)	Width (mm)
1	S2 Window Exit Left Side	635	597
2	S5 Window Exit Right Side	635	597
3	Rear Emergency Exit Door	1310	913

Seating Capacity: 15 (Including Driver)

Requirements (S71.217 S5.2.3.1(2))	Pass/Fail
No additional exits required for seating capacity of 1 - 45.	**Pass**

Comments: None

DATA SHEET 2 (CONTINUED)

PROVISION OF EMERGENCY EXITS

	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), and is operable from both inside and outside of the vehicle.	**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, and each door is operable from both inside and outside of the vehicle.	**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 is operable from both inside and outside of the vehicle.	**N/A**
5	There is an even number of side emergency exit windows on each side of the bus.	**Pass**
6	The bus is not equipped with both sliding and push-out windows, (except for buses equipped with rear push out emergency exit windows).	**Pass**
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: November 3, 2009

DATA SHEET 3

EMERGENCY EXIT DOOR OPERATIONAL REQUIREMENTS

Test Vehicle: **2009 TRANS TECH RONDAK SCHOOL BUS** NHTSA No.: **C90903**
Test Lab: **MGA RESEARCH CORPORATION** Test Date: **11/03/2009**

	Requirements	Pass/Fail
1	The engine starting system does NOT operate if any Emergency Exit is LOCKED.	**Pass**
2	All Emergency Door and Roof Exits can be released by one person (from inside and outside of the 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: November 3, 2009

DATA SHEET 4A

EMERGENCY EXIT IDENTIFICATION AND LABELING

Test Vehicle: **2009 TRANS TECH RONDAK SCHOOL BUS** NHTSA No.: **C90903**
Test Lab: **MGA RESEARCH CORPORATION** Test Date: **11/03/2009**

EMERGENCY EXIT LABELING - INTERIOR

Exit Location	Left Side Window	Right Side Window	Rear Door
Exit Description	Emergency Window	Emergency Window	Emergency Door
Letter Height (cm)	5.0	4.8	5.0
Background Color	White	White	White
Location Inside	Above Window	Above Window	Above Door
Pass/Fail	**Pass**	**Pass**	**Pass**

EMERGENCY EXIT OPERATING INSTRUCTIONS - INTERIOR

Exit Location	Left Side Window	Right Side Window	Rear Door
Instructions	Pull Handle Below, Then Push Window Open at Bottom	Pull Handle Below, Then Push Window Open at Bottom	Emergency Door, To Open, Lift Handle and Push Out
Letter Height (cm)	1.3	1.3	1.2
Letter Color	Red	Red	Black
Background Color	Clear	Clear	White
Distance From Release (cm)	2.0	2.0	5.0
Reflective Tape Color	NA	NA	N/A
Reflective Tape Width (cm)	NA	NA	N/A
Pass/Fail	**Pass**	**Pass**	**Pass**

Comments: None

Recorded By: 

Approved By:  Date: November 3, 2009

DATA SHEET 4B

EMERGENCY EXIT IDENTIFICATION AND LABELING

Test Vehicle: **2009 TRANS TECH RONDAK SCHOOL BUS** NHTSA No.: **C90903**
Test Lab: **MGA RESEARCH CORPORATION** Test Date: **11/03/2009**

EMERGENCY EXIT LABELING – EXTERIOR (NOT REQUIRED FOR ROOF EXITS)

Exit Location	Left Side Window	Right Side Window	Rear Door
Exit Description	Emergency Window	Emergency Window	Emergency Door
Letter Height (cm)	5.0	5.0	4.8
Background Color	White	White	White
Location Outside	Above Window	Above Window	Top of Door
Pass/Fail	**Pass**	**Pass**	**Pass**

EMERGENCY EXIT RETROREFLECTIVE TAPE - EXTERIOR

Exit Location	Rear Door
Perimeter Outlined with Retroreflective Tape	Yes
Retroreflective Tape Color	White
Retroreflective Tape Width (cm)	2.5 cm
Pass/Fail	**Pass**

Comments: None

Recorded By:_____

Approved By:_____ Date: November 3, 2009

DATA SHEET 4 (CONTINUED)

EMERGENCY EXIT IDENTIFICATION AND LABELING

Test Vehicle: **2009 TRANS TECH RONDAK SCHOOL BUS** NHTSA No.: **C90903**
Test Lab: **MGA RESEARCH CORPORATION** Test Date: **11/03/2009**

	Requirements	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.	**Pass**
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: November 3, 2009

DATA SHEET 5

TAPE RELECTIVITY TEST

Test Vehicle: **2009 TRANS TECH RONDAK SCHOOL BUS** NHTSA No.: **C90903**
Test Lab: **MGA RESEARCH CORPORATION** Test Date: **11/03/2009**

_____ 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: **Tape Reflectivity Test Not Performed**

Recorded By:_____

Approved By:_____ Date:

DATA SHEET 6A

FORCE TESTS TO UNLATCH THE EMERGENCY EXITS - INTERIOR

Test Vehicle: **2009 TRANS TECH RONDAK SCHOOL BUS** NHTSA No.: **C90903**
Test Lab: **MGA RESEARCH CORPORATION** Test Date: **11/03/2009**

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
Left Side Window	Emergency Window	Both	178	1. 30.0 2. 21.7 3. 13.4 Average: 21.7	Pull Handle	Pull Up on Handle	**Pass**
Right Side Window	Emergency Window	Both	178	1. 38.5 2. 36.8 3. 35.8 Average: 37.0	Pull Handle	Pull Up on Handle	**Pass**
Rear Door	Emergency Door	High	178	1. 29.3 2. 38.0 3. 24.4 Average: 30.6	Lift Handle	Lift Up Handle	**Pass**

Comments: None

Recorded By: _____

Approved By: _____ Date: November 3, 2009

DATA SHEET 6B

FORCE TESTS TO UNLATCH THE EMERGENCY EXITS - EXTERIOR

Test Vehicle: **2009 TRANS TECH RONDAK SCHOOL BUS** NHTSA No.: **C90903**
Test Lab: **MGA RESEARCH CORPORATION** Test Date: **11/03/2009**

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. 68.5 2. 59.9 3. 62.3 Average: 63.6	Lift Up Handle	Lift Up Handle	**Pass**

Comments: None

Recorded By: _____

Approved By: _____ Date: November 3, 2009

DATA SHEET 7A

FORCE TESTS TO OPEN THE EMERGENCY EXITS - INTERIOR

Test Vehicle: **2009 TRANS TECH RONDAK SCHOOL BUS** NHTSA No.: **C90903**
Test Lab: **MGA RESEARCH CORPORATION** Test Date: **11/03/2009**

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
Left Side Window	Emergency Window	Both	178	1. 26.5 2. 28.1 3. 30.7 Average: 28.4	Push Outward	Push Outward	Ellipsoid	**Pass**
Right Side Window	Emergency Window	Both	178	1. 29.4 2. 28.9 3. 30.7 Average: 29.7	Push Outward	Push Outward	Ellipsoid	**Pass**
Rear Door	Emergency Door	High	178	1. 34.8 2. 32.6 3. 23.2 Average: 30.2	Push Outward	Push Outward	114x61x30 Parallelepiped	**Pass**

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: November 3, 2009

DATA SHEET 7B

FORCE TESTS TO OPEN THE EMERGENCY EXITS - EXTERIOR

Test Vehicle: **2009 TRANS TECH RONDAK SCHOOL BUS** NHTSA No.: **C90903**
Test Lab: **MGA RESEARCH CORPORATION** Test Date: **11/03/2009**

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. 28.1 2. 29.8 3. 29.6 Average: 29.2	Pull Outward	Pull Outward	114x61x30 Parallelepiped	**Pass**

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: November 3, 2009

DATA SHEET 8

EMERGENCY EXIT EXTENSION

Test Vehicle: **2009 TRANS TECH RONDAK SCHOOL BUS** NHTSA No.: **C90903**
Test Lab: **MGA RESEARCH CORPORATION** Test Date: **11/03/2009**

	Requirements	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 extends 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: November 3, 2009

DATA SHEET 9

WINDOW RETENTION TEST

Test Vehicle: **2009 TRANS TECH RONDAK SCHOOL BUS** NHTSA No.: **C90903**
Test Lab: **MGA RESEARCH CORPORATION** Test Date: **11/03/2009**

1	Test Window Identification:	Left Side, Upper Half		
2	Provide a detailed description of the window such as fixed, push out, single or double glazed, horizontal or vertical sliding, etc.	Vertical Slider, Single Glazed		
3	Provide the horizontal and vertical glazing dimensions for each panel.	292 mm X 578 mm		
4	Did the window pass the retention requirements? Describe how the window structure and glazing withstood the force per the PASS/FAIL criteria:	Glazing Shattered at 1488 N and 27.9 mm of Displacement. Maximum Calculated Displacement was 43.2 mm. **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)	Unlatch Force Measured (N)	Unlatch Force Measured (N)
		11.0	16.3	**Pass**
		9.4	18.9	**Pass**
		9.4	16.5	**Pass**

Comments: None

Recorded By: _____

Approved By: _____ Date: November 3, 2009

DATA SHEET 9 (CONTINUED)

WINDOW RETENTION TEST

Test Vehicle: **2009 TRANS TECH RONDAK SCHOOL BUS** NHTSA No.: **C90903**
Test Lab: **MGA RESEARCH CORPORATION** Test Date: **11/03/2009**

1	Test Window Identification:	Right Side, Lower Half		
2	Provide a detailed description of the window such as fixed, push out, single or double glazed, horizontal or vertical sliding, etc.	Vertical Slider, Single Glazed		
3	Provide the horizontal and vertical glazing dimensions for each panel.	267 mm X 578 mm		
4	Did the window pass the retention requirements? Describe how the window structure and glazing withstood the force per the PASS/FAIL criteria:	Glazing Shattered at 1258 N and 22.9 mm of Displacement. Maximum Calculated Displacement was 41.2 mm. **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
		54.3	16.3	**Pass**
		56.4	19.1	**Pass**
		50.9	18.4	**Pass**

Comments: None

Recorded By: 

Approved By:  Date: November 3, 2009

DATA SHEET 9 (CONTINUED)

WINDOW RETENTION TEST

Test Vehicle: **2009 TRANS TECH RONDAK SCHOOL BUS** NHTSA No.: **C90903**
Test Lab: **MGA RESEARCH CORPORATION** Test Date: **11/03/2009**

1	Test Window Identification:	Rear Emergency Exit Door, Upper Window		
2	Provide a detailed description of the window such as fixed, push out, single or double glazed, horizontal or vertical sliding, etc.	Fixed, Single Glazed		
3	Provide the horizontal and vertical glazing dimensions for each panel.	445 mm X 610 mm		
4	Did the window pass the retention requirements? Describe how the window structure and glazing withstood the force per the PASS/FAIL criteria:	Glazing Shattered at 1089 N and 21.0 mm of Displacement. Maximum Calculated Displacement was 53.1 mm. **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
		58.3	27.5	**Pass**
		71.1	30.1	**Pass**
		75.2	30.6	**Pass**

Comments: None

Recorded By: _____

Approved By: _____ Date: November 3, 2009

SECTION 4

INSTRUMENTATION AND EQUIPMENT LIST

Test Vehicle: **2009 TRANS TECH RONDAK SCHOOL BUS** NHTSA No.: **C90903**
Test Lab: **MGA RESEARCH CORPORATION** Test Date: **11/03/2009**

Equipment	Description	Model/Serial No.	Cal. Date	Next Cal. Date
Load Cell	Interface	137778A	05/08/09	11/08/09
Inclinometer	Digital Protractor	Pro 360 / Comp Lab	05/13/09	11/13/09
Linear Potentiometer	Ametek	P-40A-HT / 0504-21782	09/23/09	03/23/10
Digital Calipers	Mitutoyo	CD-6” csx/04401288	07/08/09	01/08/10
Steel Tape	Stanley	Powerlock / 573	09/25/09	03/25/09
Ellipsoid	MGA	ELLIP – 1A	When Used	When Used
Parallelepiped	MGA	PARA – 1A	When Used	When Used
Force Gauge	Wagner	3026	09/01/09	03/01/10

SECTION 5
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

Test Vehicle:	**2009 TRANS TECH RONDAK SCHOOL BUS**	NHTSA No.:	**C90903**
Test Lab:	**MGA RESEARCH CORPORATION**	Test Date:	**11/03/09**

Exterior Front View of School Bus

Test Vehicle:	**2009 TRANS TECH RONDAK SCHOOL BUS**	NHTSA No.:	**C90903**
Test Lab:	**MGA RESEARCH CORPORATION**	Test Date:	**11/03/09**

Exterior Left Front ¾ View of School Bus

Test Vehicle:	**2009 TRANS TECH RONDAK SCHOOL BUS**	NHTSA No.:	**C90903**
Test Lab:	**MGA RESEARCH CORPORATION**	Test Date:	**11/03/09**

Exterior Right Front ¾ View of School Bus

Test Vehicle:	**2009 TRANS TECH RONDAK SCHOOL BUS**	NHTSA No.:	**C90903**
Test Lab:	**MGA RESEARCH CORPORATION**	Test Date:	**11/03/09**

Exterior Left Side View of School Bus

Test Vehicle:	**2009 TRANS TECH RONDAK SCHOOL BUS**	NHTSA No.:	**C90903**
Test Lab:	**MGA RESEARCH CORPORATION**	Test Date:	**11/03/09**

Exterior Right Side View of School Bus

Test Vehicle:	**2009 TRANS TECH RONDAK SCHOOL BUS**	NHTSA No.:	**C90903**
Test Lab:	**MGA RESEARCH CORPORATION**	Test Date:	**11/03/09**

Exterior Right Rear ¾ View of School Bus

Test Vehicle: **2009 TRANS TECH RONDAK SCHOOL BUS** NHTSA No.: **C90903**
Test Lab: **MGA RESEARCH CORPORATION** Test Date: **11/03/09**

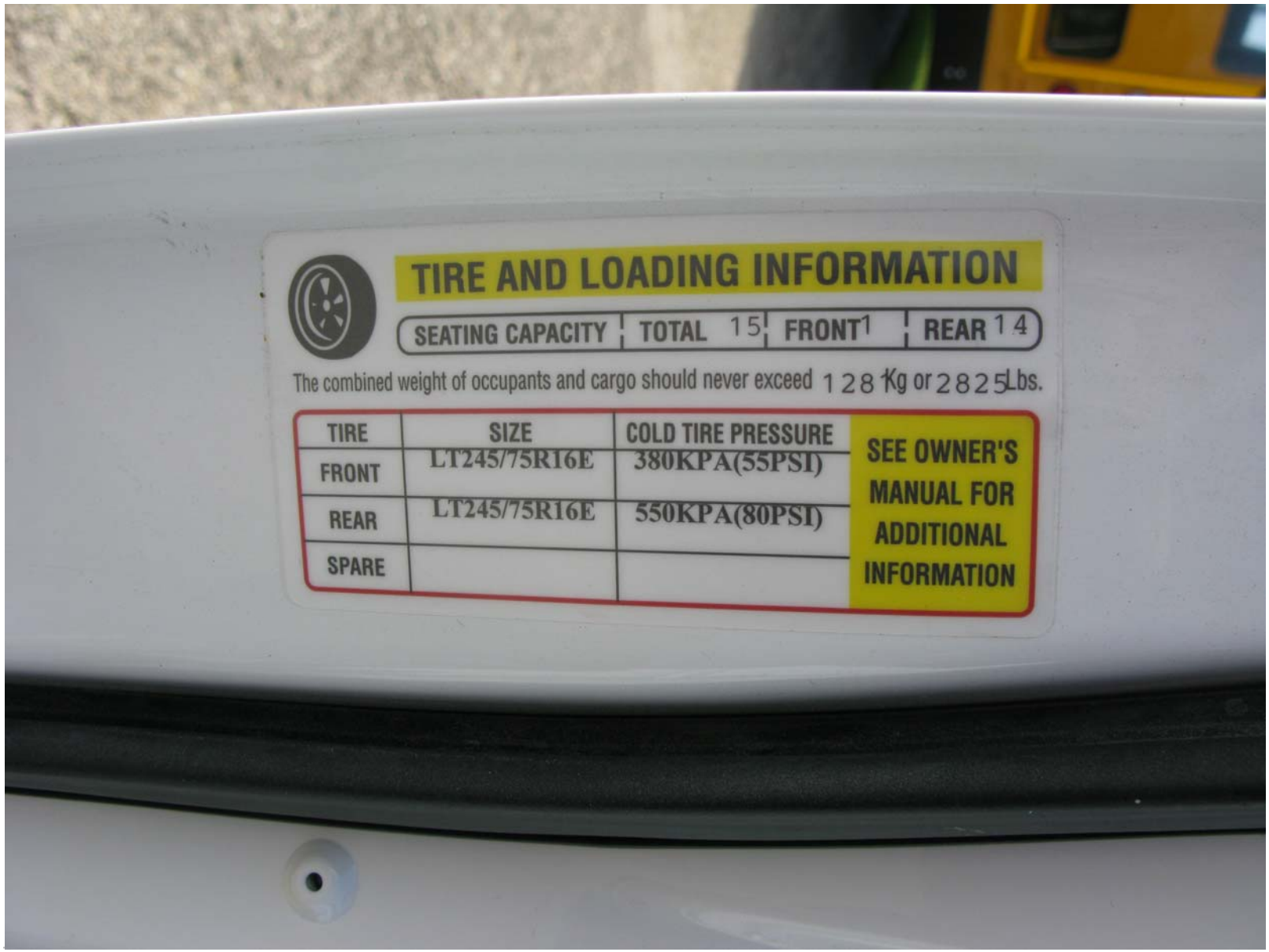
Exterior Rear View of School Bus

Certification Label

Test Vehicle:	**2009 TRANS TECH RONDAK SCHOOL BUS**	NHTSA No.:	**C90903**
Test Lab:	**MGA RESEARCH CORPORATION**	Test Date:	**11/03/09**

Vehicle Information Label

Test Vehicle:	**2009 TRANS TECH RONDAK SCHOOL BUS**	NHTSA No.:	**C90903**
Test Lab:	**MGA RESEARCH CORPORATION**	Test Date:	**11/03/09**



Tire Placard

Test Vehicle:	**2009 TRANS TECH RONDAK SCHOOL BUS**	NHTSA No.:	**C90903**
Test Lab:	**MGA RESEARCH CORPORATION**	Test Date:	**11/03/09**

Interior Front to Rear View Depicting Seating Arrangement

Exterior View of Left Side Window Exit

Interior View of Left Side Window Exit

Interior View of Left Side Window Exit Instructions

Test Vehicle:	**2009 TRANS TECH RONDAK SCHOOL BUS**	NHTSA No.:	**C90903**
Test Lab:	**MGA RESEARCH CORPORATION**	Test Date:	**11/03/09**

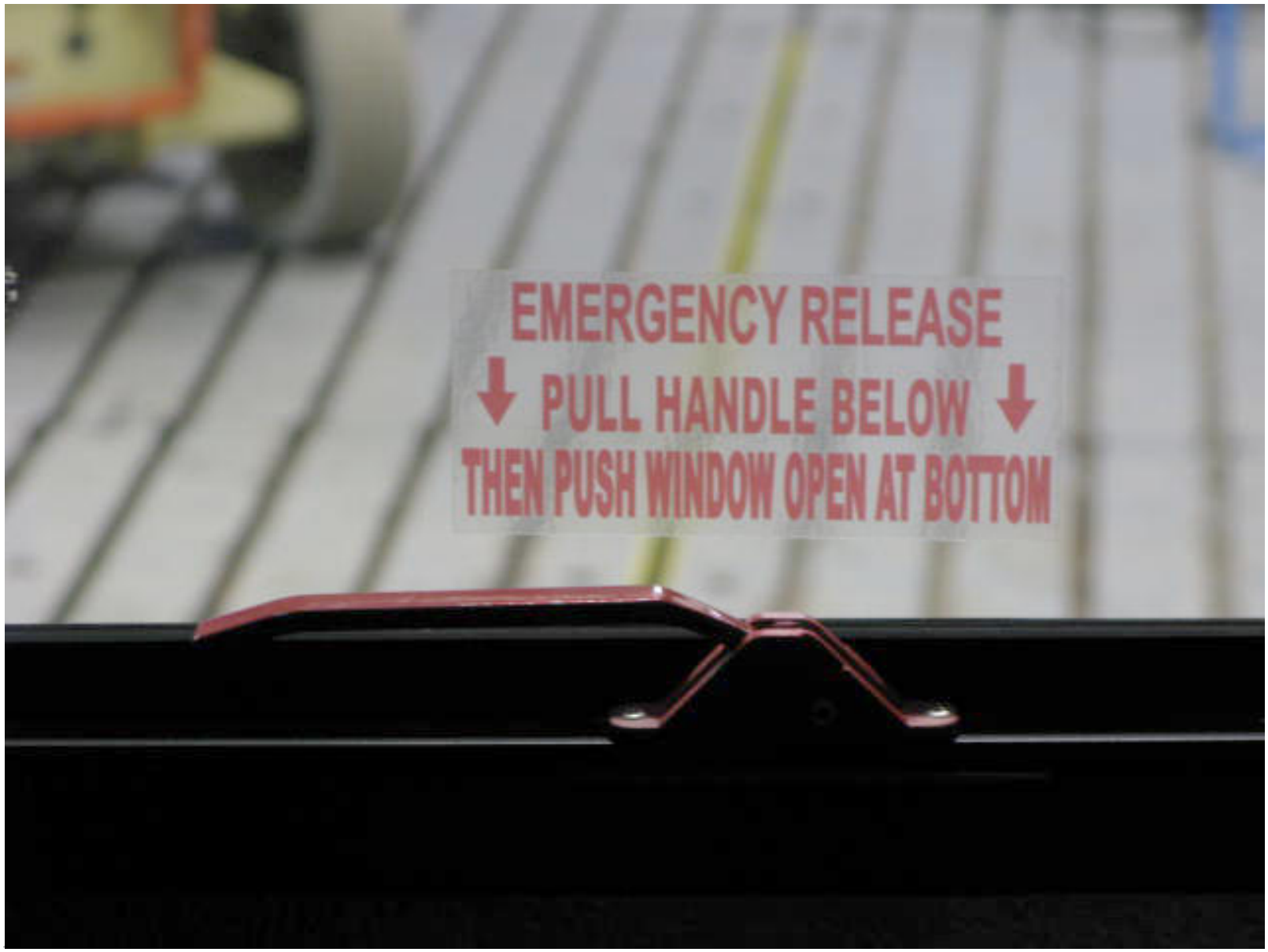
Left Side Window Exit Ellipsoid Clearance

Test Vehicle:	**2009 TRANS TECH RONDAK SCHOOL BUS**	NHTSA No.:	**C90903**
Test Lab:	**MGA RESEARCH CORPORATION**	Test Date:	**11/03/09**

Exterior View of Right Side Window Exit

Interior View of Right Side Window Exit

Test Vehicle:	**2009 TRANS TECH RONDAK SCHOOL BUS**	NHTSA No.:	**C90903**
Test Lab:	**MGA RESEARCH CORPORATION**	Test Date:	**11/03/09**



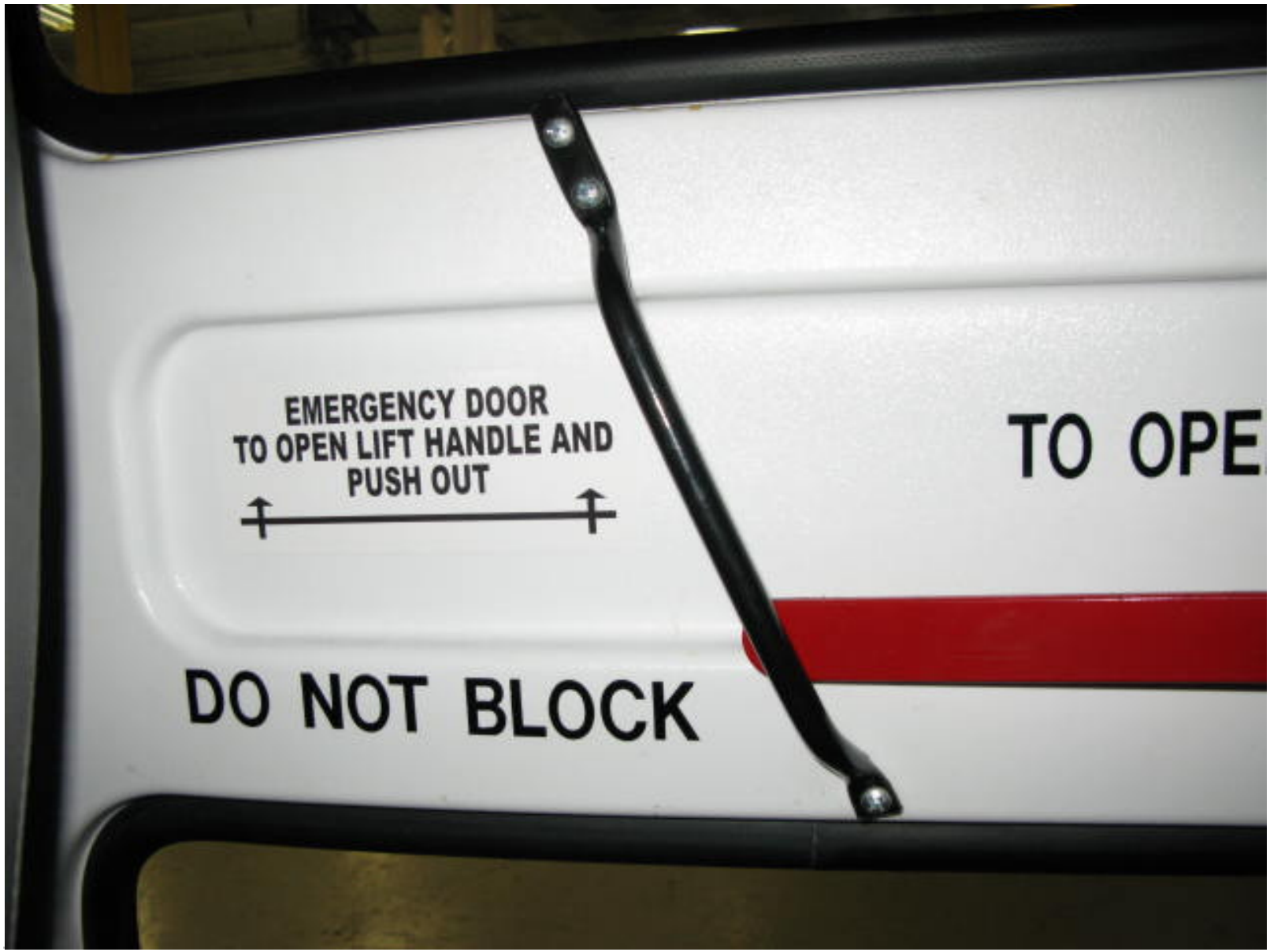
Interior View of Right Side Window Exit Instructions

Test Vehicle:	**2009 TRANS TECH RONDAK SCHOOL BUS**	NHTSA No.:	**C90903**
Test Lab:	**MGA RESEARCH CORPORATION**	Test Date:	**11/03/09**

Right Side Window Exit Ellipsoid Clearance

Exterior View of Rear Emergency Exit Door

Interior View of Rear Emergency Exit Door



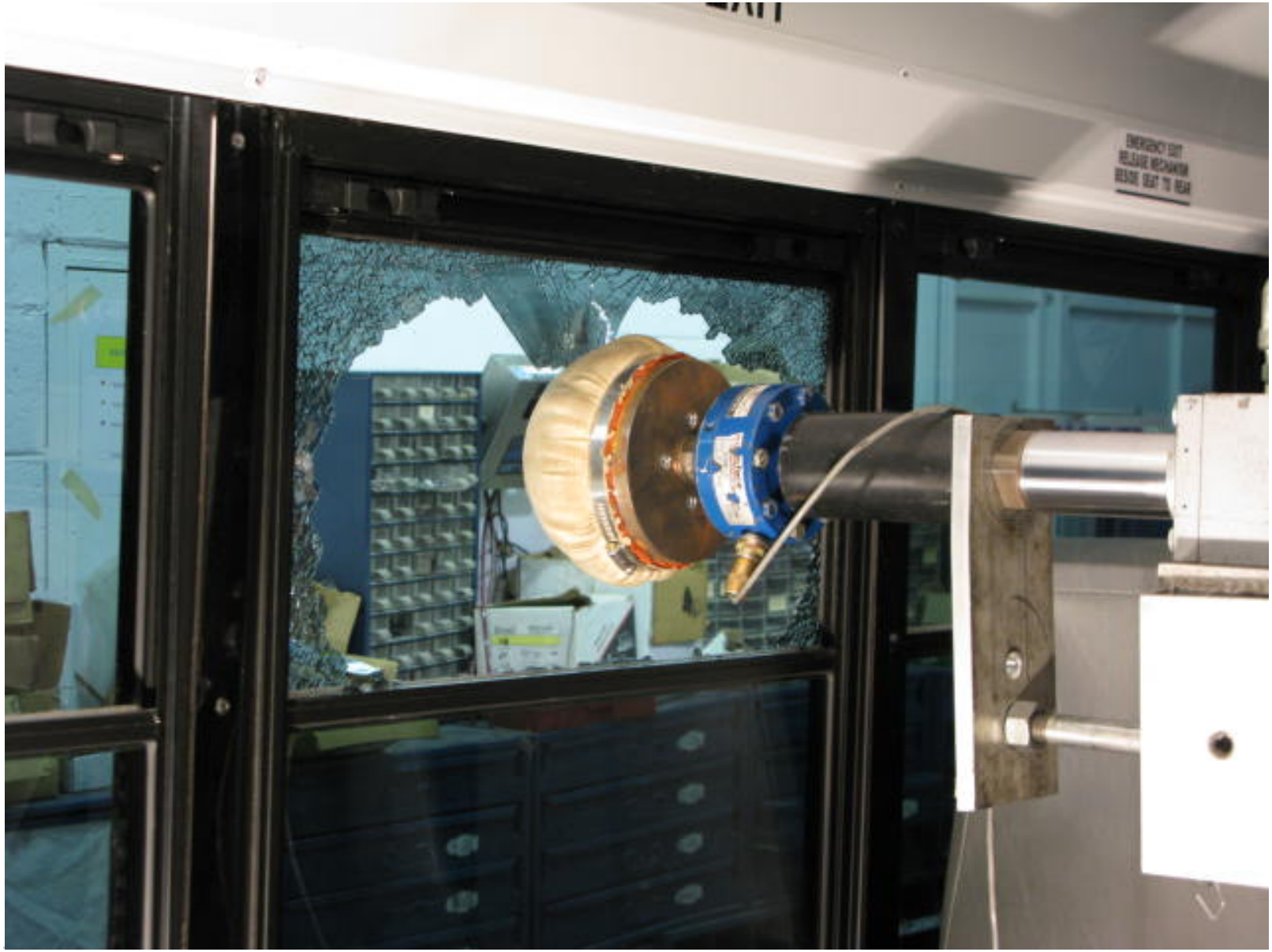
Interior View of Rear Emergency Exit Door Instructions

Test Vehicle:	**2009 TRANS TECH RONDAK SCHOOL BUS**	NHTSA No.:	**C90903**
Test Lab:	**MGA RESEARCH CORPORATION**	Test Date:	**11/03/09**

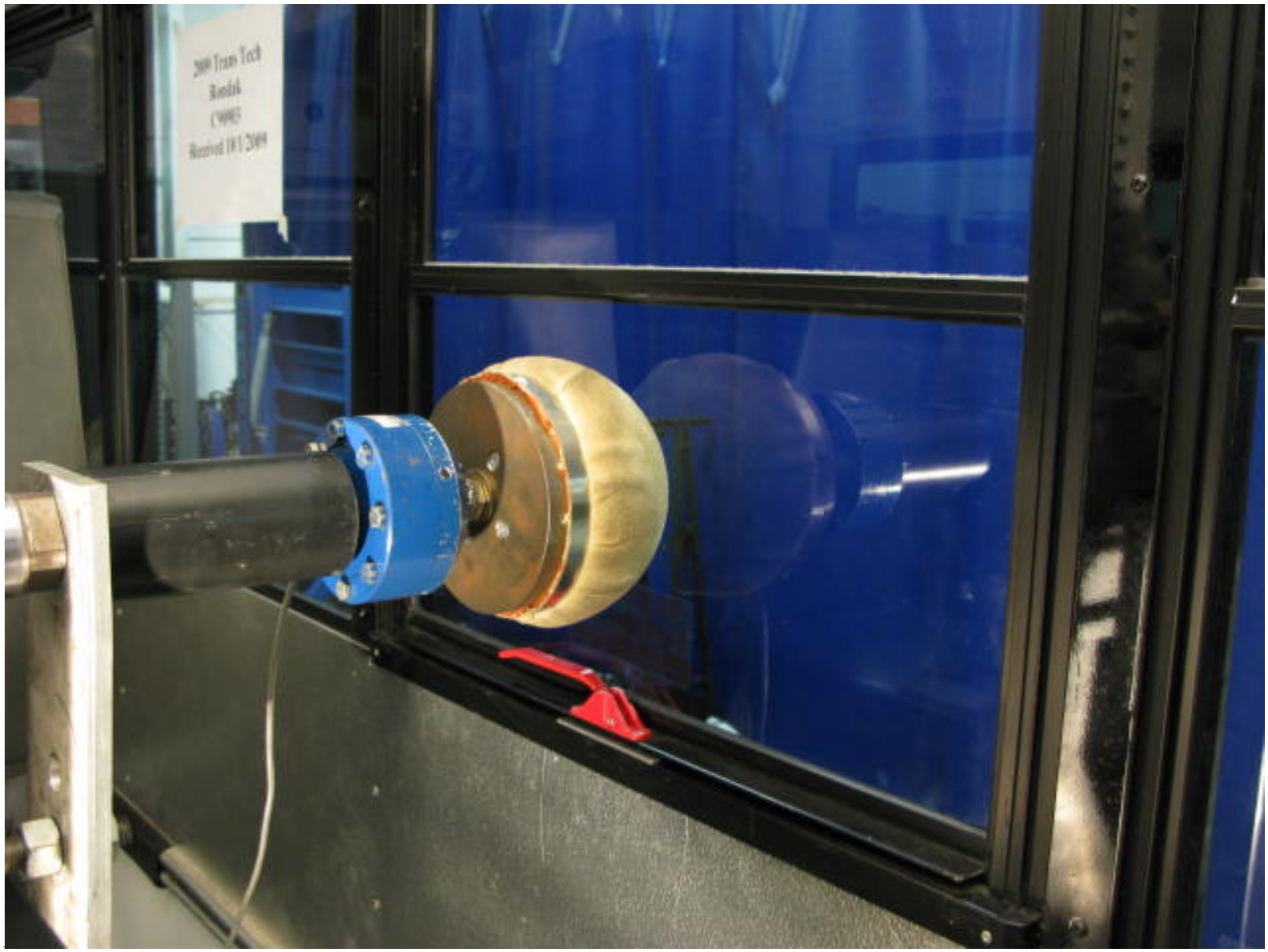
Rear Emergency Exit Door Parallelepiped Clearance

Test Vehicle:	**2009 TRANS TECH RONDAK SCHOOL BUS**	NHTSA No.:	**C90903**
Test Lab:	**MGA RESEARCH CORPORATION**	Test Date:	**11/03/09**

Retention Test of Left Side Window Exit, Upper Half (Pre-Test)

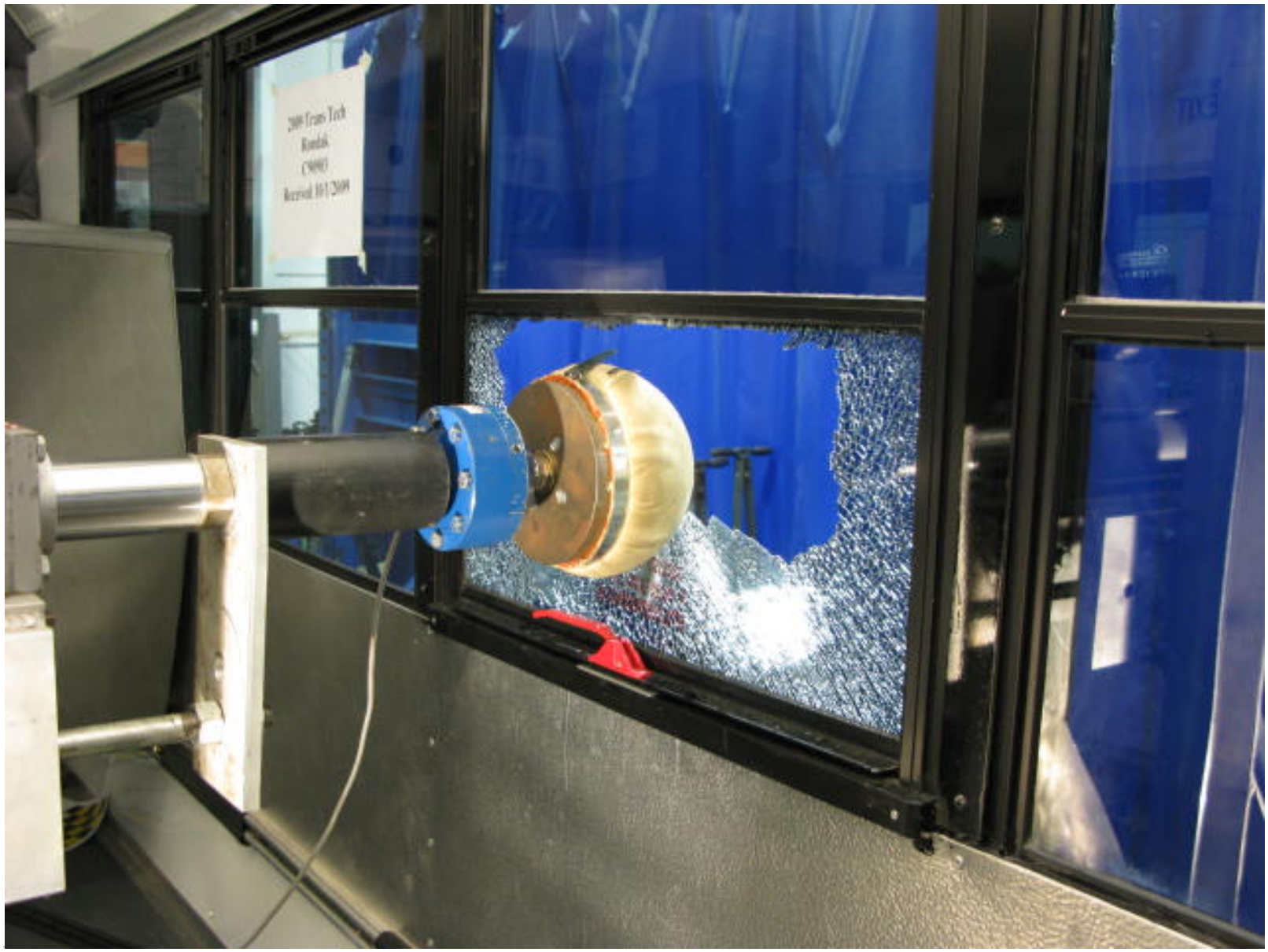


Retention Test of Left Side Window Exit, Upper Half, Upper Half (Post-Test)



Retention Test of Right Side Window Exit, Lower Half (Pre-Test)

Test Vehicle:	**2009 TRANS TECH RONDAK SCHOOL BUS**	NHTSA No.:	**C90903**
Test Lab:	**MGA RESEARCH CORPORATION**	Test Date:	**11/03/09**



Retention Test of Right Side Window Exit, Lower Half (Post-Test)

Test Vehicle:	**2009 TRANS TECH RONDAK SCHOOL BUS**	NHTSA No.:	**C90903**
Test Lab:	**MGA RESEARCH CORPORATION**	Test Date:	**11/03/09**

Retention Test of Rear Exit Door, Upper Window (Pre-Test)

Test Vehicle:	**2009 TRANS TECH RONDAK SCHOOL BUS**	NHTSA No.:	**C90903**
Test Lab:	**MGA RESEARCH CORPORATION**	Test Date:	**11/03/09**

Retention Test of Rear Exit Door, Upper Window (Post-Test)

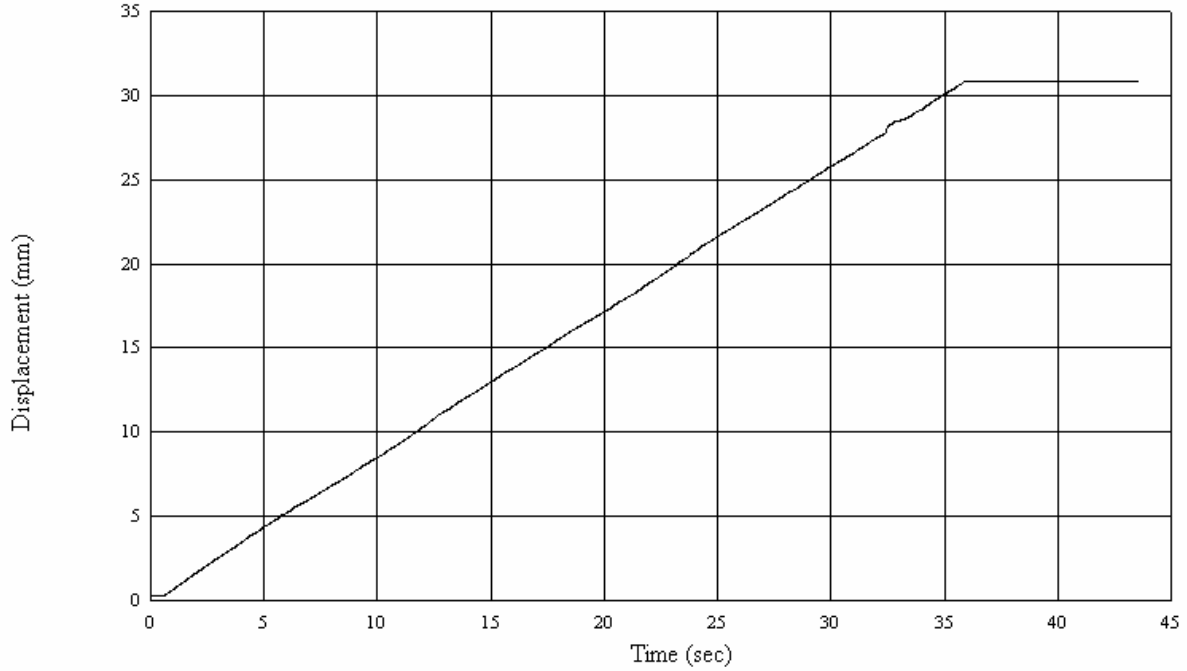
SECTION 6
TEST PLOTS

Displacement (mm) vs Time (sec)

Test Description: FMVSS 217 Displacement vs. Time
Component ID: 2009 Trans Tech Rondak School Bus
Left Emergency Window Exit (Upper Pane)

Test Date: 11/03/09
NHTSA No.: C90903

Maximum: 30.9 mm @ 41.1 sec Minimum: 0.3 mm @ 0.3 sec

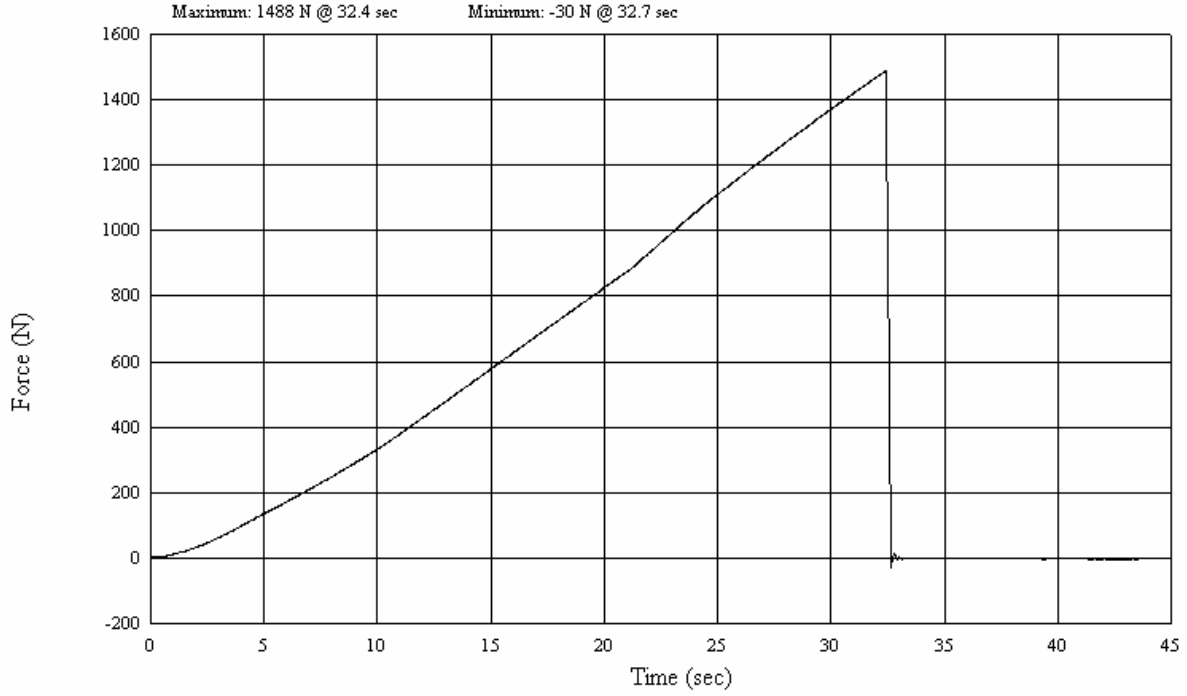


Force (N) vs Time (sec)

Test Description: FMVSS 217 Force vs. Time
Component ID: 2009 Trans Tech Rondak School Bus
Left Emergency Window Exit (Upper Pane)

Test Date: 11/03/09
NHTSA No.: C90903

Maximum: 1488 N @ 32.4 sec Minimum: -30 N @ 32.7 sec

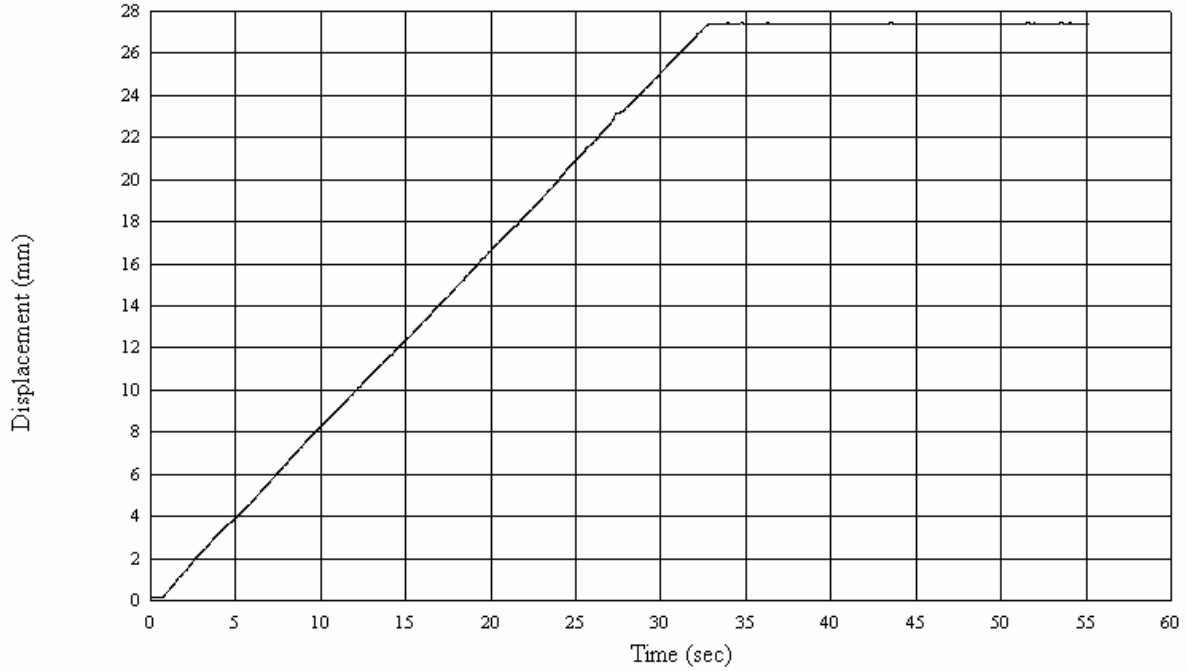


Displacement (mm) vs Time (sec)

Test Description: FMVSS 217 Displacement vs. Time
Component ID: 2009 Trans Tech Rondak School Bus
Right Emergency Window Exit (Lower Pane)

Test Date: 11/03/09
NHTSA No.: C90903

Maximum: 27.5 mm @ 51.6 sec Minimum: 0.1 mm @ 0.3 sec

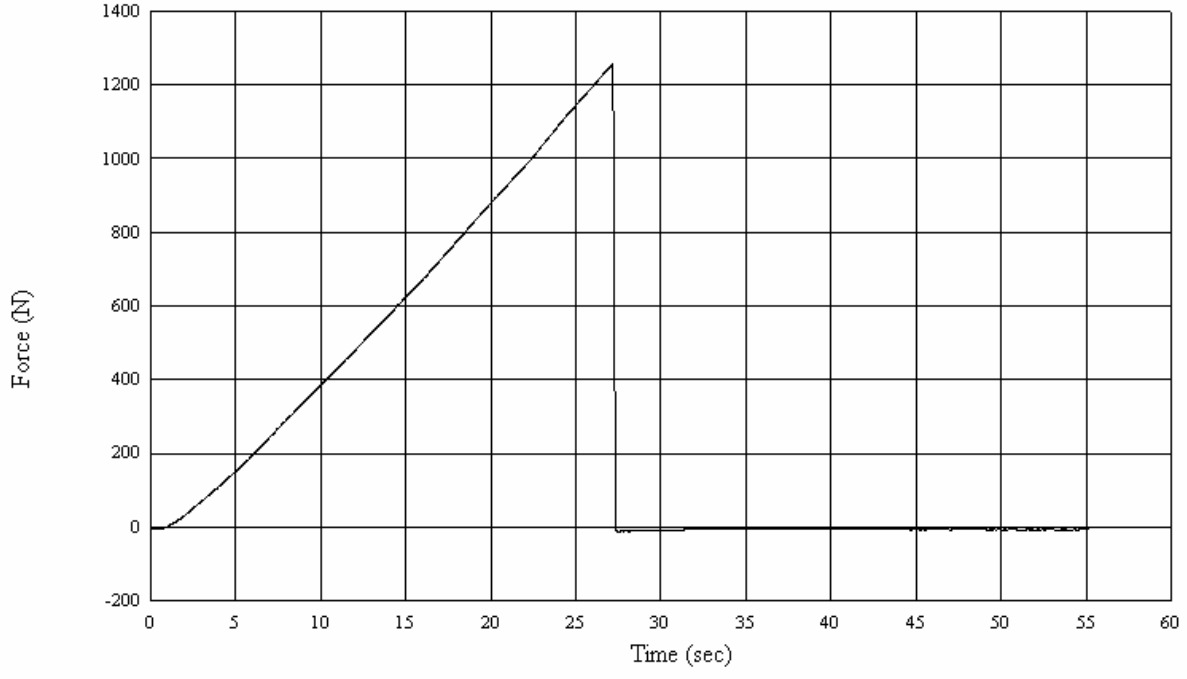


Force (N) vs Time (sec)

Test Description: FMVSS 217 Force vs. Time
Component ID: 2009 Trans Tech Rondak School Bus
Right Emergency Window Exit (Lower Pane)

Test Date: 11/03/09
NHTSA No.: C90903

Maximum: 1258 N @ 27.2 sec Minimum: -13 N @ 27.6 sec

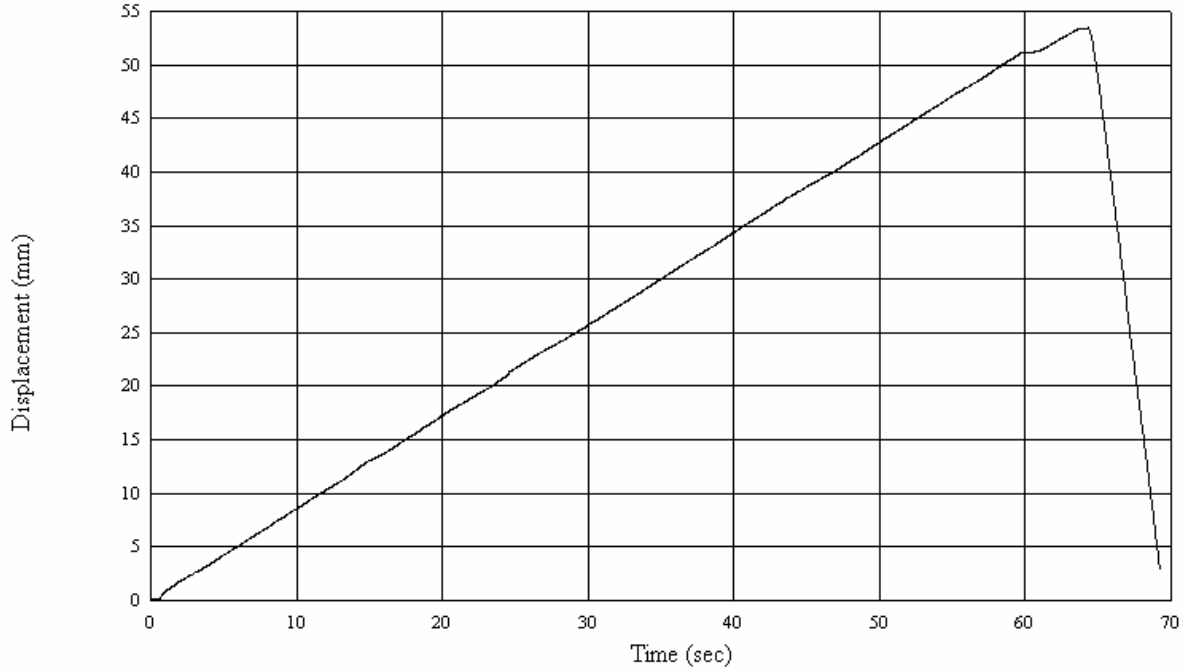


Displacement (mm) vs Time (sec)

Test Description: FMVSS 217 Displacement vs. Time
Component ID: 2009 Trans Tech Rondak School Bus
Rear Emergency Exit Door, Upper Window

Test Date: 11/03/09
NHTSA No.: C90903

Maximum: 53.4 mm @ 64 sec Minimum: 0.1 mm @ 0 sec



Force (N) vs Time (sec)

Test Description: FMVSS 217 Force vs. Time
Component ID: 2009 Trans Tech Rondak School Bus
Rear Emergency Exit Door, Upper Window

Test Date: 11/03/09
NHTSA No.: C90903

Maximum: 1089 N @ 25 sec Minimum: -5 N @ 66 sec