

REPORT NUMBER: 111SB-MGA-2009-006

**SAFETY COMPLIANCE TESTING FOR
FMVSS NO. 111SB
SCHOOL BUS REARVIEW MIRRORS**

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

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



TEST DATES: OCTOBER 27, 2009 - OCTOBER 28, 2009

FINAL REPORT DATE: AUGUST 23, 2010

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: 
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Date: August 23, 2010

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Date: August 23, 2010

Final report accepted by: 

August 23, 2010
Date of Acceptance

Technical Report Documentation Page

1. Report No. 111SB-MGA-2009-006		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Final Report of FMVSS 111 Compliance Testing of 2009 Trans Tech Rondak School Bus NHTSA No.: C90903				5. Report Date August 23, 2010	
				6. Performing Organization Code MGA	
7. Author(s) Eric Peschman, Project Engineer Michael Janovicz, Program Manager				8. Performing Organization Report No. 111SB-MGA-2009-006	
9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105				10. Work Unit No.	
				11. Contract or Grant No. DTNH22-08-D-00075	
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 10/27/09 – 08/23/10	
				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-111SB-00 for the determination of FMVSS 111 compliance. Test failures identified were as follows: None					
17. Key Words Compliance Testing Safety Engineering FMVSS 111				18. Distribution Statement Copies of this report are available from: NHTSA, Technical Information Services (TIS) Mail Code: NPO-411 1200 New Jersey Avenue, S.E. Washington, D.C. 20590 FAX No.: (202) 493-2833 E-mail: tis@dot.gov	
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of Pages 43	22. Price

TABLE OF CONTENTS

<u>Section</u>		<u>Page No</u>
1	Purpose of Compliance Test	1
2	Test Data Summary	2
3	Compliance Test Data	5
	Data Sheet 1 - School Bus Inspection and Identification	6
	Data Sheet 2 - Mirror Location and Field of View	7
	Data Sheet 3 - Field of View Test	10
	Data Sheet 4 - Mounting Adequacy Test	11
	Data Sheet 5 - Reflectance Test	12
	Data Sheet 6 - Unit Magnification/Convex Mirror Test – All Mirrors	13
	Data Sheet 7 - Mirror Reflective Surface Area Test	17
4	Instrumentation and Equipment List	18
5	Photographs	19

SECTION 1
PURPOSE OF COMPLIANCE TEST

Tests were conducted on a 2009 Trans Tech Rondak School Bus, NHTSA No.: C90903, in accordance with the specifications of the Office of Vehicle Safety Compliance (OVSC) Test Procedure TP-111SB-00 to determine compliance to the requirements of Federal Motor Vehicle Safety Standard (FMVSS) 111SB, "School Bus Rearview Mirrors."

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 2009 Trans Tech Rondak School Bus, NHTSA No.: C90903, appears to meet all of the requirements of FMVSS 111SB. See Test Summary Data Sheets on the following pages.

FMVSS 111SB - SCHOOL BUS REARVIEW MIRRORS

TEST SUMMARY DATA SHEET

Test Vehicle: **2009 Trans Tech Rondak School Bus**
 Test Lab: **MGA Research Corporation**

NHTSA No.: **C90903**
 Test Dates: **10/27/2009 – 10/28/2009**

System A Mirrors

A. Driver Side Mirror #3 - Unit Magnification

	Pass/Fail	Comments
Mounting	Pass	--
Field of View	Pass	--
Surface Area	Pass	--
Reflectance	Pass	--
Unit Magnification	Pass	--

B. Passenger Side Mirror #4 - Unit Magnification

	Pass/Fail	Comments
Mounting	Pass	--
Field of View	Pass	--
Surface Area	Pass	--
Reflectance	Pass	--
Unit Magnification	Pass	--

C. Driver Side Mirror #5 - Convex

	Pass/Fail	Comments
Mounting	Pass	--
Field of View	Pass	--
Reflectance	Pass	--

D. Passenger Side Mirror #6 - Convex

	Pass/Fail	Comments
Mounting	Pass	--
Field of View	Pass	--
Reflectance	Pass	--

FMVSS 111SB - SCHOOL BUS REARVIEW MIRRORS

TEST SUMMARY DATA SHEET...continued

Test Vehicle: **2009 Trans Tech Rondak School Bus**
 Test Lab: **MGA Research Corporation**

NHTSA No.: **C90903**
 Test Dates: **10/27/2009 – 10/28/2009**

System B Mirrors

E. Driver Side Front Mirror #1 - Cross View

	Pass/Fail	Comments
Mounting	Pass	--
Field of View	Pass	--
Overlap with System A	Pass	--
Distance to Eye Point	Pass	--
No Surface Discontinuities	Pass	--
Surface Area	Pass	--
If Convex – Radius of Curvature	Pass	--
Radius of Curvature Label	Pass	--
Arc Separation	Pass	--
Reflectance	Pass	--

F. Passenger Side Front Mirror #2 - Cross View

	Pass/Fail	Comments
Mounting	Pass	--
Field of View	Pass	--
Overlap with System A	Pass	--
Distance to Eye Point	Pass	--
No Surface Discontinuities	Pass	--
Surface Area	Pass	--
If Convex – Radius of Curvature	Pass	--
Radius of Curvature Label	Pass	--
Arc Separation	Pass	--
Reflectance	Pass	--

SECTION 3
COMPLIANCE TEST DATA

FMVSS 111SB - DATA SHEET 1
SCHOOL BUS INSPECTION AND IDENTIFICATION

Test Vehicle: **2009 Trans Tech Rondak School Bus**
 Test Lab: **MGA Research Corporation**

NHTSA No.: **C90903**
 Test Dates: **10/27/2009 – 10/28/2009**

GENERAL VEHICLE IDENTIFICATION

Final Stage Manufacturer	Trans Tech Bus	Date of Mfg.	08/2009
Incomplete Vehicle Manufacturer	Ford Motor Company	Date of Mfg.	05/2008
GVWR (kg)	4,355	GAWR Front (kg)	1,837
VIN	1FD2E35L88DB33670	GAWR Rear (kg)	2,760

DESCRIPTION OF MIRRORS

Mirror No.	Type			Description	Manufacturer
	Unit Mag	Convex	Cross View		
1		X	X	Driver Side	Rosco Mirror
2		X	X	Passenger Side	
3	X			Driver Side	
4	X			Passenger Side	
5		X		Driver Side	
6		X		Passenger Side	

Recorded By: 

Approved By: 

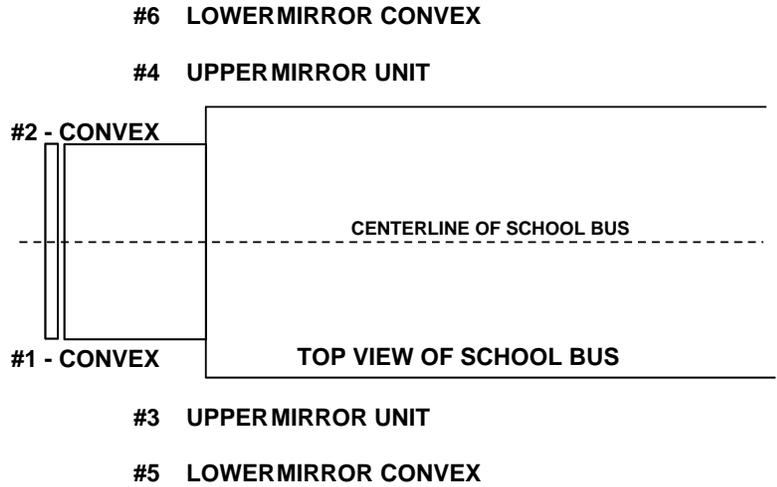
Date: October 27, 2009

FMVSS 111SB - DATA SHEET 2
MIRROR LOCATION AND FIELD OF VIEW

Test Vehicle: **2009 Trans Tech Rondak School Bus**
 Test Lab: **MGA Research Corporation**

NHTSA No.: **C90903**
 Test Dates: **10/27/2009 – 10/28/2009**

MIRROR DIAGRAM



MIRROR NO.	TYPE	MIRROR SYSTEM	CYLINDERS VIEWED (ENTIRE TOP SURFACE)
1	CROSS VIEW/CONVEX	B	A, B, C, D, E, F, G, H, I, J, L, M
2	CROSS VIEW/CONVEX	B	A, B, C, D, E, F, G, H, I, K, N, O, P
3	UNIT MAGNIFICATION	A	61 Meter Indicator
4	UNIT MAGNIFICATION	A	61 Meter Indicator
5	CONVEX	A	L, M
6	CONVEX	A	N, O, 61 Meter Indicator

SEE FIGURE ON NEXT PAGE

FMVSS 111SB - DATA SHEET 2...continued

MIRROR LOCATION AND FIELD OF VIEW

Test Vehicle: **2009 Trans Tech Rondak School Bus**
 Test Lab: **MGA Research Corporation**

NHTSA No.: **C90903**
 Test Dates: **10/27/2009 – 10/28/2009**

SYSTEM A AND DIRECT VISION

System A Mirrors	Pass/Fail
Entire top surface of cylinder N and the indicator 61 meters (200 feet) rearward of the mirror surface can be viewed in the photograph:	Pass
Entire top surface of cylinder M and indicator 61 meters (200 feet) rearward of the mirror surface can be viewed in the photograph:	Pass
Which test cylinders, A through P, can not be photographed directly from the driver's eye location within the semi-circle viewing area using no mirror system?	A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P

SYSTEM B ARC'S AND DISTANCE

Mirror Number (from data sheet 2)	Mirror Location	Distance from the Driver's Eye Point to the Center of the Mirror (cm)	3 Minutes of Arc (cm)	9 Minutes of Arc (cm)
#1	1	222.9	.19	--
#2	2	287.2	.25	.75

Distance determined in column 3 multiplied by 0.000873 yield 3 minutes of arc, for column 4, for that mirror as viewed from the driver's eye point; the distances determined in column 3 multiplied by 0.002618 yield 9 minutes of arc, for column 5, for that mirror as viewed from the driver's eye point. The minimum distance for any system B mirror between the driver's eye point and the center of the mirror is more than 95 centimeters (37.5 inches):

	Distance	Pass/Fail
Distance between center of System B mirror #1 and driver's eye point	222.9 cm	Pass
Distance between center of System B mirror #2 and driver's eye point	287.2 cm	Pass

Recorded By: 

Approved By: 

Date: October 27, 2009

FMVSS 111SB - DATA SHEET 3

FIELD OF VIEW TEST – PHOTOGRAPHS System B

Test Vehicle: **2009 Trans Tech Rondak School Bus**
 Test Lab: **MGA Research Corporation**

NHTSA No.: **C90903**
 Test Dates: **10/27/2009 – 10/28/2009**

		Pass/Fail
All test cylinders with entire top surface not directly visible from the driver's semi-circle eye location are able to be viewed with System B mirrors from the driver's semi-circle location:		Pass
All test cylinders with entire top surface not directly visible from the driver's semi-circle eye location but the image can be viewed with System B mirrors. The image is separated for the edge of the effective mirror surface of the mirror providing that image by a distance of not less than 3 minutes of arc:		Pass
If the entire top surface of test cylinder P is not directly visible from the driver's semi-circle eye location, the image can be viewed with System B mirrors from the driver's semi-circle eye location, where the angular size of the shortest dimension of that cylinder's image is not less than 3 minutes of arc, and the angular size of the longest dimension of that cylinder's image is not less than 9 minutes of arc:		Pass
Shortest arc length dimension	2.30 mm	
Longest arc length dimension	9.04 mm	
For each of the test cylinders whose entire top surface is not directly visible from the driver's eye location, System B provides a view of the ground that overlaps with the view of the ground provided by System A.		Pass

Recorded By: 

Approved By: 

Date: October 27, 2009

FMVSS 111SB - DATA SHEET 4

MOUNTING ADEQUACY TEST

Test Vehicle: **2009 Trans Tech Rondak School Bus**
 Test Lab: **MGA Research Corporation**

NHTSA No.: **C90903**
 Test Dates: **10/27/2009 – 10/28/2009**

MOUNTING SUPPORT OF ALL MIRRORS

Mirror No. (from data sheet 2)	Type	System	Stable Support
			Yes/No
1	Cross View/Convex	B	Yes
2	Cross View/Convex	B	Yes
3	Unit Magnification	A	Yes
4	Unit Magnification	A	Yes
5	Convex	A	Yes
6	Convex	A	Yes

	Pass/Fail
Outside mirrors free of sharp points or edges that could contribute to pedestrian injury.	Pass
System B mirrors have no discontinuities in the slope of the surface of the mirror.	Pass

Recorded By: 

Approved By: 

Date: October 27, 2009

FMVSS 111SB - DATA SHEET 5
REFLECTANCE TEST – ALL MIRRORS

Test Vehicle: **2009 Trans Tech Rondak School Bus**
 Test Lab: **MGA Research Corporation**

NHTSA No.: **C90903**
 Test Dates: **10/27/2009 – 10/28/2009**

Mirror No.	Type	Light meter reading from calibration (FC)	Light meter reading from light reflected by mirror (FC)	Pass/Fail	Observations
1	Crossview/Convex	89.2	68.8	Pass	None
2	Crossview/Convex	83.6	65.0	Pass	None
3	Unit Magnification	75.2	60.8	Pass	None
4	Unit Magnification	72.0	58.4	Pass	None
5	Convex	74.4	54.6	Pass	None
6	Convex	77.0	58.6	Pass	None

Note: Reflectance % = [Reflectance Reading / Calibration reading] x 100
 Minimum Requirement = 35 percent

Mirror No.	Type	Reflectance	Requirement
1	Crossview/Convex	77%	>35%
2	Crossview/Convex	78%	>35%
3	Unit Magnification	81%	>35%
4	Unit Magnification	81%	>35%
5	Convex	73%	>35%
6	Convex	76%	>35%

Recorded By: *Evo Leedman*

Approved By: *Michael Janoy*

Date: October 28, 2009

FMVSS 111SB - DATA SHEET 6

UNIT MAGNIFICATION/CONVEX MIRROR TEST – ALL MIRRORS

Test Vehicle: **2009 Trans Tech Rondak School Bus**
 Test Lab: **MGA Research Corporation**

NHTSA No.: **C90903**
 Test Dates: **10/27/2009 – 10/28/2009**

**CONVERSION DATA TABLE FROM SPHEROMETER DIAL
 READING TO RADIUS OF CURVATURE**

MIRROR NO. 1 (CONVEX)

Test Position	Dial Reading (inches)	Radius of Curvature (mm)	Deviation between the Average Radius of Curvature and the Test Position Radius of Curvature (mm)	Percent Deviation from the Average Radius of Curvature
1	0.05440	132.0	44.1	25.1%
2	0.03765	190.2	-14.1	-8.0%
3	0.02490	287.2	-111.1	-63.1%
4	0.05255	136.6	39.5	22.4%
5	0.03665	195.4	-19.2	-10.9%
6	0.05200	138.0	38.1	21.6%
7	0.03240	220.9	-44.8	-25.4%
8	0.05095	140.9	35.3	20.0%
9	0.05570	129.0	47.2	26.8%
10	0.03745	191.2	-15.1	-8.6%
Avg. Radius of Curvature – The summation of column 3 divided by 10: 176.1 mm			Greatest Percent Deviation from the Average Radius of Curvature, Column 5: -63.1%	

MIRROR NO. 2 (CONVEX)

Test Position	Dial Reading (inches)	Radius of Curvature (mm)	Deviation between the Average Radius of Curvature and the Test Position Radius of Curvature (mm)	Percent Deviation from the Average Radius of Curvature
1	0.05360	134.0	55.1	29.2%
2	0.03600	198.9	-9.8	-5.2%
3	0.01960	364.7	-175.6	-92.9%
4	0.05205	137.9	51.2	27.1%
5	0.03510	204.0	-14.9	-7.9%
6	0.05035	142.5	46.6	24.6%
7	0.03115	229.7	-40.6	-21.5%
8	0.04925	145.7	43.4	23.0%
9	0.05385	133.3	55.8	29.5%
10	0.03575	200.3	-11.2	-5.9%
Avg. Radius of Curvature – The summation of column 3 divided by 10: 189.1 mm			Greatest Percent Deviation from the Average Radius of Curvature, Column 5: -92.2%	

FMVSS 111SB - DATA SHEET 6...continued

UNIT MAGNIFICATION/CONVEX MIRROR TEST – ALL MIRRORS

Test Vehicle: **2009 Trans Tech Rondak School Bus**
 Test Lab: **MGA Research Corporation**

NHTSA No.: **C90903**
 Test Dates: **10/27/2009 – 10/28/2009**

**CONVERSION DATA TABLE FROM SPHEROMETER DIAL
 READING TO RADIUS OF CURVATURE**

MIRROR NO. 3 (UNIT MAGNIFICATION)

Test Position	Dial Reading (inches)	Radius of Curvature (mm)	Deviation between the Average Radius of Curvature and the Test Position Radius of Curvature (mm)	Percent Deviation from the Average Radius of Curvature
1	0.00000	NA	NA	NA
2	0.00000	NA	NA	NA
3	0.00000	NA	NA	NA
4	0.00000	NA	NA	NA
5	0.00000	NA	NA	NA
6	0.00000	NA	NA	NA
7	0.00000	NA	NA	NA
8	0.00000	NA	NA	NA
9	0.00000	NA	NA	NA
10	0.00000	NA	NA	NA
Avg. Radius of Curvature – the Summation of Column 3 divided by 10: N/A			Greatest Percent Deviation from the Average Radius of Curvature, Column 5: N/A	

MIRROR NO. 4 (UNIT MAGNIFICATION)

Test Position	Dial Reading (inches)	Radius of Curvature (mm)	Deviation between the Average Radius of Curvature and the Test Position Radius of Curvature (mm)	Percent Deviation from the Average Radius of Curvature
1	0.00000	N/A	N/A	N/A
2	0.00000	N/A	N/A	N/A
3	0.00000	N/A	N/A	N/A
4	0.00000	N/A	N/A	N/A
5	0.00000	N/A	N/A	N/A
6	0.00000	N/A	N/A	N/A
7	0.00000	N/A	N/A	N/A
8	0.00000	N/A	N/A	N/A
9	0.00000	N/A	N/A	N/A
10	0.00000	N/A	N/A	N/A
Avg. Radius of Curvature – the Summation of Column 3 divided by 10: N/A			Greatest Percent Deviation from the Average Radius of Curvature, Column 5: N/A	

FMVSS 111SB - DATA SHEET 6...continued

UNIT MAGNIFICATION/CONVEX MIRROR TEST – ALL MIRRORS

Test Vehicle: **2009 Trans Tech Rondak School Bus**
 Test Lab: **MGA Research Corporation**

NHTSA No.: **C90903**
 Test Dates: **10/27/2009 – 10/28/2009**

**CONVERSION DATA TABLE FROM SPHEROMETER DIAL
 READING TO RADIUS OF CURVATURE**

MIRROR NO. 5 (CONVEX)

Test Position	Dial Reading (inches)	Radius of Curvature (mm)	Deviation between the Average Radius of Curvature and the Test Position Radius of Curvature (mm)	Percent Deviation from the Average Radius of Curvature
1	0.01410	506.8	-4.7	-0.9%
2	0.01415	505.0	-2.9	-0.6%
3	0.01405	508.6	-6.5	-1.3%
4	0.01445	494.6	7.6	1.5%
5	0.01410	506.8	-4.7	-0.9%
6	0.01445	494.6	7.6	1.5%
7	0.01395	512.3	-10.1	-2.0%
8	0.01470	486.2	16.0	3.2%
9	0.01410	506.8	-4.7	-0.9%
10	0.01430	499.7	2.4	0.5%
Avg. Radius of Curvature – the Summation of Column 3 divided by 10: 502.1 mm			Greatest Percent Deviation from the Average Radius of Curvature, Column 5: 3.2%	

MIRROR NO. 6 (CONVEX)

Test Position	Dial Reading (inches)	Radius of Curvature (mm)	Deviation between the Average Radius of Curvature and the Test Position Radius of Curvature (mm)	Percent Deviation from the Average Radius of Curvature
1	0.01410	506.8	-6.7	-1.3%
2	0.01435	498.0	2.2	0.4%
3	0.01410	506.8	-6.7	-1.3%
4	0.01450	492.9	7.3	1.5%
5	0.01420	503.3	-3.1	-0.6%
6	0.01455	491.2	9.0	1.8%
7	0.01410	506.8	-6.7	-1.3%
8	0.01455	491.2	9.0	1.8%
9	0.01410	506.8	-6.7	-1.3%
10	0.01435	498.0	2.2	0.4%
Avg. Radius of Curvature – the Summation of Column 3 divided by 10: 500.2 mm			Greatest Percent Deviation from the Average Radius of Curvature, Column 5: 1.8%	

FMVSS 111SB - DATA SHEET 6...continued

UNIT MAGNIFICATION/CONVEX MIRROR TEST – ALL MIRRORS

Test Vehicle: **2009 Trans Tech Rondak School Bus**
 Test Lab: **MGA Research Corporation**

NHTSA No.: **C90903**
 Test Dates: **10/27/2009 – 10/28/2009**

UNIT MAGNIFICATION IN SYSTEM A

	Pass/Fail
At least one System A Mirror on the left and right sides of the bus is unit magnification - (0 Radius of Curvature)	Pass

**AVERAGE RADIUS OF CURVATURE
OF CONVEX MIRRORS USED IN SYSTEM B**

Mirror No.	Radius of Curvature	If needed, wording printed properly* Pass/Fail
1	176.1 mm	Pass
2	189.1 mm	Pass

* If any of the Convex Mirrors in System B have an average radius of curvature less than 889 mm, then the following words must be printed on a label in type face and colors that are clear and conspicuous to the driver:

“USE CROSS VIEW MIRRORS TO VIEW PEDESTRIANS WHILE BUS IS STOPPED. DO NOT USE THESE MIRRORS TO VIEW TRAFFIC WHILE BUS IS MOVING, IMAGES IN SUCH MIRRORS DO NOT ACCURATELY SHOW ANOTHER VEHICLE’S LOCATION.”

Recorded By: 

Approved By: 

Date: October 28, 2009

FMVSS 111SB - DATA SHEET 7
MIRROR REFLECTIVE SURFACE AREA TEST
SYSTEM A & B

Test Vehicle: **2009 Trans Tech Rondak School Bus**
 Test Lab: **MGA Research Corporation**

NHTSA No.: **C90903**
 Test Dates: **10/27/2009 – 10/28/2009**

DATA TABLE FOR SURFACE AREA

System A Mirrors Mirror No.	Area	Requirement Min. 323 cm ²	Pass/Fail
3	384 cm ²	323 cm ²	Pass
4	387 cm ²	323 cm ²	Pass
System B Mirrors Mirror No.	Area	Requirement Min. 258 cm ²	Pass/Fail
1	579 cm ²	258 cm ²	Pass
2	570 cm ²	258 cm ²	Pass

Recorded By: 

Approved By: 

Date: October 28, 2009

SECTION 4
INSTRUMENTATION AND EQUIPMENT LIST

Test Vehicle: **2009 Trans Tech Rondak School Bus**
Test Lab: **MGA Research Corporation**

NHTSA No.: **C90903**
Test Dates: **10/27/2009 – 10/28/2009**

	Digital Caliper	Light Meter	Tape Measure	Spherometer
Make	Starrett	AEMC	Stanley	MGA
Model	F2730-0	CA813	Powerlock 3M	001
Serial # (s)	021484579	04L1017Y	573	001
Range	0-50.8 mm	2000fc, 2000lux	0 to 8 m	2.25×10^{13} $(\text{cm} * \text{Hz}^{1/2}) \div W$
Accuracy	.001 mm	0.0 fc or 0.01 lux	1 mm	1.1×10^{-13} $W/H^{1/2}$
Cal. Date	10/05/09	05/22/09	09/25/09	Daily when used
Cal. Due Date	10/05/10	05/22/10	03/25/10	N/A

**SECTION 5
PHOTOGRAPHS**

TABLE OF PHOTOGRAPHS

<u>No.</u>		<u>Page No.</u>
1	Three-Quarter Left Front View of School Bus	20
2	Three-Quarter Left Rear View of School Bus	21
3	Vehicle Certification Label	22
4	Vehicle Information Label	23
5	Right Front Cross View Mirror and Mounting	24
6	Passenger Side Rearview Mirror and Mounting	25
7	Inside Rearview Mirror and Mounting	26
8	Left Front Cross View Mirror and Mounting	27
9	Driver Side Rearview Mirror and Mounting	28
10	Field of View Instrument Setup	29
11	Mirror #2 System B Field of View	30
12	Mirror #1 System B Field of View	31
13	Mirror #3 and #5 System A Field of View	32
14	Mirror #4 and #6 System A Field of View	33
15	View of Cylinder Setup from Front	34
16	Three-Quarter Right Front View of Cylinder Setup	35
17	Front View Looking Thru the Windshield View of Cylinder Setup	36
18	Reflectance Test Set-up	37
19	Label for Cross View Mirror Warning	38
20	Cross View Mirror With Reference to Seated Driver	39

Test Vehicle: 2009 Trans Tech Rondak School Bus
Test Lab: MGA RESEARCH CORPORATION

NHTSA No.: C90903
Test Dates: 10/27/2009 – 10/28/2009



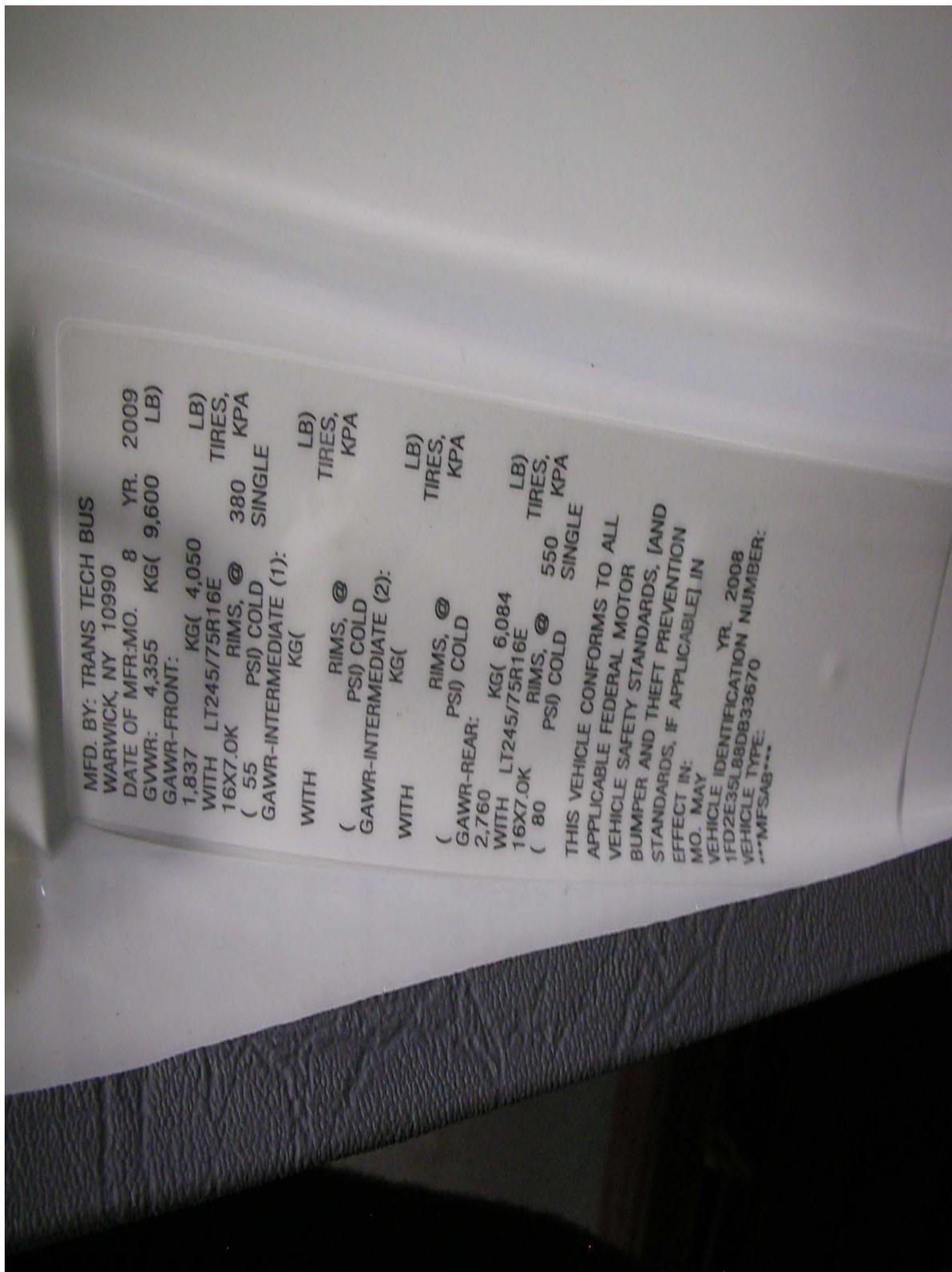
Three-Quarter Left Front View of School Bus

Test Vehicle: 2009 Trans Tech Rondak School Bus
Test Lab: MGA RESEARCH CORPORATION
NHTSA No.: C90903
Test Dates: 10/27/2009 – 10/28/2009



Three-Quarter Left Rear View of School Bus

Test Vehicle: 2009 Trans Tech Rondak School Bus NHTSA No.: C90903
 Test Lab: MGA RESEARCH CORPORATION Test Dates: 10/27/2009 – 10/28/2009



MFD. BY: TRANS TECH BUS
 WARWICK, NY 10990
 DATE OF MFR:MO. 8 YR. 2009
 GVWR: 4,355 KG(9,600 LB)
 GAWR-FRONT:
 1,837 KG(4,050 LB)
 WITH LT245/75R16E
 16X7.0K RIMS, @ 380 KPA
 (55 PSI) COLD SINGLE
 GAWR-INTERMEDIATE (1):
 KG(LB)
 WITH RIMS, @ TIRES,
 (PSI) COLD KPA
 GAWR-INTERMEDIATE (2):
 KG(LB)
 WITH RIMS, @ TIRES,
 (PSI) COLD KPA
 GAWR-REAR:
 2,760 KG(6,084 LB)
 WITH LT245/75R16E
 16X7.0K RIMS, @ 550 KPA
 (80 PSI) COLD SINGLE
 THIS VEHICLE CONFORMS TO ALL
 APPLICABLE FEDERAL MOTOR
 VEHICLE SAFETY STANDARDS, [AND
 BUMPER AND THEFT PREVENTION
 STANDARDS, IF APPLICABLE] IN
 EFFECT IN:
 MO. MAY
 VEHICLE IDENTIFICATION NUMBER:
 1FDZE35L88DB33670
 VEHICLE TYPE:
 MFSAB

Vehicle Certification Label

Test Vehicle: 2009 Trans Tech Rondak School Bus NHTSA No.: C90903
 Test Lab: MGA RESEARCH CORPORATION Test Dates: 10/27/2009 - 10/28/2009

INCOMPLETE VEHICLE MFD. BY FORD MOTOR COMPANY

DATE: 05/08	FRONT GAWR: 4050LB 1837KG	TIRES	GAWR: 9600LB/ 4355KG
WITH LT245/75R16E	16x7.0K	RIMS	REAR GAWR: 6084LB 2760KG
AT 380 kPa/ 55 PSI COLD	VIN: 1FD2E35L88DB33670		WITH LT245/75R16E
			16x7.0K
			AT 550 kPa/ 80 PSI COLD

Equipped with the Ford School Bus Prep Pkg

EXT PNT. BY	INT TR	TP/PS	R	AXLE	TR	SPR	8E414
WB 138	AE	7	56	T	RR11	R05	
MADE IN U.S.A.					UIN		5U5A-3520172-AA

Vehicle Information Label

Test Vehicle: 2009 Trans Tech Rondak School Bus
Test Lab: MGA RESEARCH CORPORATION
NHTSA No.: C90903
Test Dates: 10/27/2009 – 10/28/2009



Right Front Cross View Mirror and Mounting

Test Vehicle: 2009 Trans Tech Rondak School Bus
Test Lab: MGA RESEARCH CORPORATION
NHTSA No.: C90903
Test Dates: 10/27/2009 – 10/28/2009



Passenger Side Rearview Mirror and Mounting

Test Vehicle: 2009 Trans Tech Rondak School Bus
Test Lab: MGA RESEARCH CORPORATION
NHTSA No.: C90903
Test Dates: 10/27/2009 – 10/28/2009



Inside Rearview Mirror and Mounting

Test Vehicle: 2009 Trans Tech Rondak School Bus
Test Lab: MGA RESEARCH CORPORATION
NHTSA No.: C90903
Test Dates: 10/27/2009 – 10/28/2009



Left Front Cross View Mirror and Mounting

Test Vehicle: 2009 Trans Tech Rondak School Bus
Test Lab: MGA RESEARCH CORPORATION
NHTSA No.: C90903
Test Dates: 10/27/2009 – 10/28/2009



Driver Side Rearview Mirror and Mounting

Test Vehicle: 2009 Trans Tech Rondak School Bus
Test Lab: MGA RESEARCH CORPORATION
NHTSA No.: C90903
Test Dates: 10/27/2009 – 10/28/2009



Field of View Instrument Setup

Test Vehicle: 2009 Trans Tech Rondak School Bus
Test Lab: MGA RESEARCH CORPORATION
NHTSA No.: C90903
Test Dates: 10/27/2009 – 10/28/2009



Mirror #2 System B Field of View

Test Vehicle: 2009 Trans Tech Rondak School Bus
Test Lab: MGA RESEARCH CORPORATION
NHTSA No.: C90903
Test Dates: 10/27/2009 – 10/28/2009



Mirror #1 System B Field of View

Test Vehicle: 2009 Trans Tech Rondak School Bus
Test Lab: MGA RESEARCH CORPORATION
NHTSA No.: C90903
Test Dates: 10/27/2009 – 10/28/2009



Mirror #3 and #5 System A Field of View

Test Vehicle: 2009 Trans Tech Rondak School Bus
Test Lab: MGA RESEARCH CORPORATION
NHTSA No.: C90903
Test Dates: 10/27/2009 – 10/28/2009



Mirror #4 and #6 System A Field of View

Test Vehicle: 2009 Trans Tech Rondak School Bus
Test Lab: MGA RESEARCH CORPORATION
NHTSA No.: C90903
Test Dates: 10/27/2009 – 10/28/2009



View of Cylinder Setup from Front

Test Vehicle: 2009 Trans Tech Rondak School Bus
Test Lab: MGA RESEARCH CORPORATION
NHTSA No.: C90903
Test Dates: 10/27/2009 – 10/28/2009



Three-Quarter Right Front View of Cylinder Setup

Test Vehicle: 2009 Trans Tech Rondak School Bus
Test Lab: MGA RESEARCH CORPORATION
NHTSA No.: C90903
Test Dates: 10/27/2009 – 10/28/2009



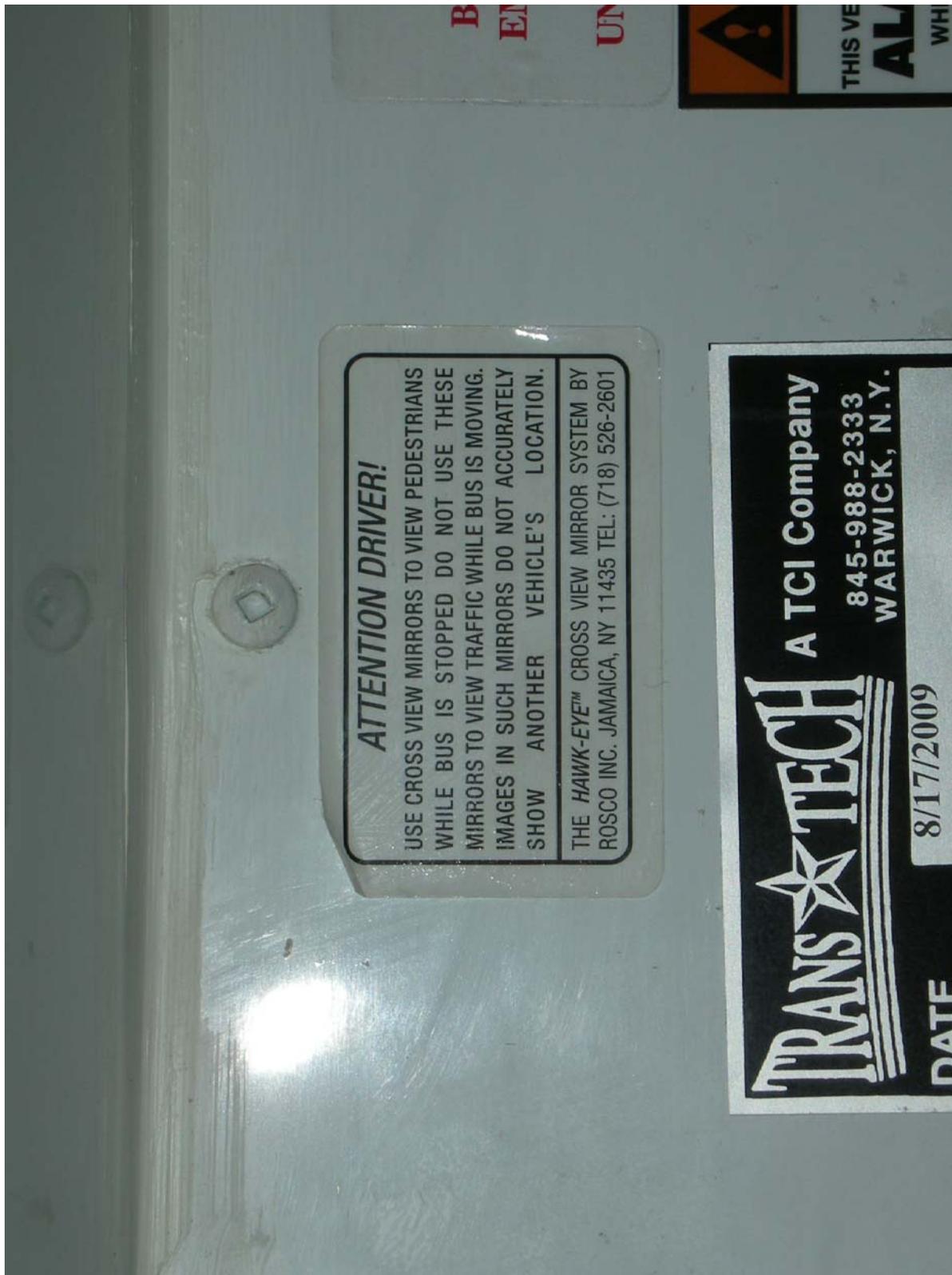
Front View Looking Thru the Windshield View of Cylinder Setup

Test Vehicle: 2009 Trans Tech Rondak School Bus
Test Lab: MGA RESEARCH CORPORATION
NHTSA No.: C90903
Test Dates: 10/27/2009 – 10/28/2009



Reflectance Test Set-up

Test Vehicle: 2009 Trans Tech Rondak School Bus
Test Lab: MGA RESEARCH CORPORATION
NHTSA No.: C90903
Test Dates: 10/27/2009 – 10/28/2009



Label for Cross View Mirror Warning

Test Vehicle: 2009 Trans Tech Rondak School Bus
Test Lab: MGA RESEARCH CORPORATION
NHTSA No.: C90903
Test Dates: 10/27/2009 – 10/28/2009



Cross View Mirror With Reference to Seated Driver