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REPORT NO. 105-83-TRC-03-001 – TRC20000113 – MID BUS INC.  
NIITSA C30903 - 2003 MID BUS GUIDE

FMVSS 105-83  
HYDRAULIC BRAKE SYSTEM COMPLIANCE TEST  
2003 MID BUS GUIDE, 24-PASSENGER SCHOOL BUS  
NIITSA C30903

TRANSPORTATION RESEARCH CENTER INC.  
East Liberty, Ohio 43319



APRIL 2003  
FINAL REPORT

Prepared Under Contract No. DTNH22-01-C-21025

PREPARED FOR:

U.S. DEPARTMENT OF TRANSPORTATION  
National Highway Traffic Safety Administration  
Enforcement

Office of Vehicle Safety Compliance  
400 Seventh Street, S.W.  
Room 6115 (NVS-221)  
Washington, D.C. 20590

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## TABLE OF CONTENTS

<u>SECTION</u>	<u>TITLE</u>	<u>PAGE</u>
	Notice	i
	Table of Contents	iii
1.0	Introduction	1
2.0	Vehicle Information Sheet	2
3.0	Test Summary	5
4.0	Vehicle Weight Sheet	15
5.0	Test Data (Sheets 4 –22A)	18
6.0	Test Completion Inspection	40
7.0	Reservoir Requirements, Volume Measurements and Calculations	47
Appendix A	Instrumentation Pre- and Post-Test Calibrations Daily Calibrations	51
Appendix B	Photographs	67
Appendix C	Copy of Manufacturer's Sticker	85
Appendix D	Discussion on Data	86
Appendix E	Contractor's Comments Procedure Modifications and Test Facility	88
Appendix F	Notice of Possible Non-Compliance	96
Appendix G	Conversion Sheet	98

## 1.0 INTRODUCTION

Tests were conducted on a 2003 MID BUS GUIDE; 24-PASSENGER SCHOOL BUS manufactured by MID BUS INC. to determine compliance with FMVSS 105-83 "Hydraulic Brake Systems."

All tests were conducted in accordance with the U.S. DOT, NHTSA Laboratory Procedure TP 105-83-02 and/or the corresponding Transportation Research Center Inc. (TRC Inc.) test procedure, which was submitted to NHTSA for their approval. The test procedure was clearly described in the submitted document and has not been repeated in this report.

All stops were performed manually.

TRC Inc. personnel using the following TRC facilities conducted all tests:

### 7.5-Mile Test Track

Instrument Check  
Burnish & Reburnish  
Fade & Recovery

### Skid Pad

Effectiveness  
Water Recovery  
Spike Stops  
Failed Stops  
Inoperative Power Assists

### Brake Slope

Parking Brake

### Brake Soak

Water Recovery

The test vehicle met all the requirements of FMVSS 105-83.

2.0 FMVSS 105-83 VEHICLE INFORMATION SHEET Date: 04/03/03  
 Vehicle: Make: Mid Bus NHTSA No. C30903  
 Model: Guide, CSD-7460-C-033097 GVWR: 12,000 lbs.  
 Model Year: 2003 Manufacture Date: 12/02  
 Body Style: 24-Passenger School Bus Wheelbase: 160 in.  
 VIN: 1GBJG31U431110295  
 Buses Chassis Mfr.: Chevrolet Motor Div. GAWR: Front: 4,300 lbs.  
 Only Manufacture Date: 09/02 Rear: 8,600 lbs.  
 Serial No.: N/A No. of Seats: 8 - Driver

Engine Type: Gasoline, Seq.PI, OHV, 16 Valve, V-8 Cyl., Piston, Vortec 6000  
 Displacement: 6.0 Liters HP: N/A  
 Engine Idle Speed: 668 RPM  
 Transmission Type: Automatic, 4-speed, 4WD  
 No. of Axles: Two  
 GAWR: Front: 4,300 lbs. Rear: 8,600 lbs.  
 Tires: Size: PT225/75R16, 110/107S Manufacturer: Uniroyal  
 Type: Laredo HD/H, All-Season, M+S, steel belted radial, tubeless  
 Recommended Pressure at GVWR: front 65 psi rear 65 psi

Brakes: Front: ( ) Drum (X) Disc  
 Rear: ( ) Drum (X) Disc

Actuation: Describe Hydraulic Circuit Split: Axle by axle  
 Power Unit: Hydraulic, Vacuum, etc. Hydraulic  
 Brake Power Assist Unit: Yes X No       
 Brake Power Unit w/Accumulator: Yes      No X  
 Power Assist or Power Unit w/Backup Yes      No X  
 Variable Proportioning System: Yes      No X  
 Antiskid Device: Mfg. TRW Yes X No     

Parking Mechanism: (see definition)  
 Description: Automatic transmission w/park detent  
 Master Cylinder: 1.457 in.  
 Pedal Ratio: 5.75:1

2.0 FMVSS 105-83 VEHICLE INFORMATION SHEET, continued

Front Brakes:

Wheel

Brake

Components: Type: Drum ( )

Disc (X)

<u>MATERIAL</u>	<u>CONSTRUCTION</u>	<u>MATERIAL</u>	<u>CONSTRUCTION</u>
( ) Cast Iron	( ) Cast ( ) Composite	(X) Cast Iron	(X) Integral Cast
( ) Steel	( ) Centrifuse	( ) Steel	( ) 2-piece
( ) Bi-Metal	( ) Pressed	( ) Bi-Metal	(X) Vented
( ) _____	( ) _____	( ) _____	( ) Unvented
			(X) Bonded Linings
Diameter:	Inside: <u>N/A</u>	Outside	<u>12.793 in.</u>
Thickness:	<u>Not Applicable N/A</u>	Include Vent	<u>1.497 in.</u>
Lining Code:	Primary:* <u>N/A</u>	Inboard:	<u>AK NS265H FF</u>
Or Color:	Secondary:* <u>N/A</u>	Outboard:	<u>AK NS265H FF</u>
Shoe Cage:	Left: <u>N/A</u> Reset To: <u>N/A</u>	Not Applicable	<u>N/A</u>
Diameter:	Right: <u>N/A</u> Reset To: <u>N/A</u>	Not Applicable	<u>N/A</u>

Dimensions:

Width:	Primary: <u>N/A</u>	Inboard	<u>1.816 in.</u>
	Secondary: <u>N/A</u>	Outboard	<u>1.822 in.</u>
Length:	Primary: <u>N/A</u>	Inboard	<u>8.175 in.</u>
	Secondary: <u>N/A</u>	Outboard	<u>8.185 in.</u>
Thickness:	Primary: <u>N/A</u>	Inboard	<u>0.476 in.</u>
	Secondary: <u>N/A</u>	Outboard	<u>0.475 in.</u>
Hydraulic	Wheel	Disc	
Piston Diam:	Cylinder <u>N/A</u>	Caliper	<u>2.355 in. (x2)</u>

\*May be Primary/Secondary or other: Not Applicable

Rear Brakes:

Wheel

Brake

Components: Type: Drum ( )

Disc (X)

<u>MATERIAL</u>	<u>CONSTRUCTION</u>	<u>MATERIAL</u>	<u>CONSTRUCTION</u>
( ) Cast Iron	( ) Cast ( ) Composite	(X) Cast Iron	(X) Integral Cast
( ) Steel	( ) Centrifuse	( ) Steel	( ) 2-piece
( ) Bi-Metal	( ) Pressed	( ) Bi-Metal	(X) Vented
( ) _____	( ) _____	( ) _____	( ) Unvented
			(X) Bonded Linings

2.0 FMVSS 105-83 VEHICLE INFORMATION SHEET, continued

Rear Brakes:

Wheel

Brake

Components:	Type: Drum ( )	Disc ( X )
Diameter:	Inside: <u>N/A</u>	Outside <u>12.788 in.</u>
Thickness:	<u>N/A</u>	Include Vent <u>1.185 in.</u>
Lining Code	Leading*: <u>N/A</u>	Inboard <u>AK NS265II FF</u>
Or Color:	Trailing*: <u>N/A</u>	Outboard <u>AK NS265H FF</u>
Shoe Cage	Left <u>N/A</u> Reset To <u>N/A</u>	Not Applicable
Diameter:	Right <u>N/A</u> Reset To <u>N/A</u>	Not Applicable

Dimensions of Linings:

Width:	Primary <u>N/A</u>	Inboard <u>1.769 in.</u>
	Secondary <u>N/A</u>	Outboard <u>1.762 in.</u>
Length:	Primary <u>N/A</u>	Inboard <u>7.318 in.</u>
	Secondary <u>N/A</u>	Outboard <u>7.318 in.</u>
Thickness:	Primary <u>N/A</u>	Inboard <u>0.469 in.</u>
	Secondary <u>N/A</u>	Outboard <u>0.464 in.</u>
Hydraulic	Wheel	Disc <u>2.119 in. (x2)</u>
Piston Diam:	Cylinder <u>N/A</u>	Caliper

\*May be Primary/Secondary or other: Not Applicable

Other Component Information:

Friction-Type Parking Brake: ( ) Hand-Operated  
( ) Foot-Operated

Non-Service Brake Type: ( ) Hand-Operated  
Parking Brake: ( X ) Foot-Operated

Will adjusters be locked out for this test series? ( ) Yes ( ) No ( X ) Not Appl.

Describe method used to lock out adjusters: Not Applicable

Note: If at any time the test series has begun, any brake system part requires replacement or the brake system requires adjustments other than permitted in burnish and reburnish procedures, discontinue testing and notify the COTR immediately.



3.0 Data Sheet No. 1.1 Summary of Tests (Sheet 1 of 9)

Veh.: 2003 MID BUS GUIDE

NHTSA No.: C30903

GVWR: 12,000 lbs.

<u>Test</u>	<u>Required Performance</u>	<u>Actual Performance*</u>	<u>P</u>	<u>F</u>	
Max. Speed in 2 miles	None	<u>97.1</u> mph avg.		<u>Not Appl.</u>	
First Effectiveness:	30 mph: Pedal Force, 15-150 lbs. Stopping distance, 88 ft. for one stop	<u>6</u> of six stops pass Best Stop: <u>51.3</u> ft., <u>83</u> lbs. PF (max)	<u>X</u>	<u>    </u>	
	60 mph: Pedal Force, 15-150 lb. Stopping distance, <u>388</u> ft. for one stop	<u>6</u> of six stops pass Best Stop: <u>176.3</u> ft., <u>114</u> lbs. PF (max)	<u>X</u>	<u>    </u>	
	Second Effectiveness:	30 mph: Pedal Force, 15-150 lbs. Stopping distance, <u>70</u> ft. for one stop	<u>6</u> of six stops pass Best Stop: <u>45.9</u> ft., <u>74</u> lbs. PF (max)	<u>X</u>	<u>    </u>
		60 mph: Pedal Force, 15-150 lbs. Stopping distance, <u>280</u> ft. for one stop	<u>6</u> of six stops pass Best Stop: <u>169.5</u> ft., <u>81</u> lbs. PF (max)	<u>X</u>	<u>    </u>
		80 mph: Pedal Force, 15-150 lbs. Stopping distance, <u>N/A</u> ft. for one stop	<u>N/A</u> of four stops pass Best Stop: <u>N/A</u> ft., <u>N/A</u> lbs. PF (max)	<u>Not Appl.</u>	<u>    </u>

\*Stopping Distance - Visual Data  
Pedal Force - Visual Data

3.0 Data Sheet No. 1.1 Summary of Tests (Sheet 2 of 9)

Veh.: 2003 MID BUS GUIDE

NHTSA No.: C30903

GVWR: 12,000 lbs.

<u>Test</u>	<u>Required Performance</u>	<u>Actual Performance*</u>	<u>P</u>	<u>F</u>	
Parking Brake REGULAR	Shall hold vehicle stationary for 5 minutes in both uphill and downhill direction on a 20% grade, both at LLVW and GVWR, with no more than 125 lbs. hand lever or 150 lbs. foot pedal force.	Held stationary for 5 minutes? Yes			
			Force (lbs.)		
		GVWR-Uphill	91	X	
		GVWR-Downhill	83	X	
		LLVW-Uphill	82	X	
		LLVW-Downhill	82	X	
		( X ) Foot Pedal ( ) Hand Lever			
Parking Brake	(1) Shall meet REGULAR PROCEDURE requirements with transmission in "Park." (2) Shall meet REGULAR PROCEDURE requirements on 20% slope with transmission in "Neutral." (3) Parking mechanism shall not disengage or suffer damage in front and rear 2 1/2 mph moving barrier impacts.	GVWR-30%-Uphill	Not Appl.		
		GVWR-30%-Downhill	" " "		
		GVWR-20%-Uphill	" " "		
		GVWR-20%-Downhill	" " "		
		LLVW-20%-Uphill	" " "		
		LLVW-20%-Downhill	" " "		
		LLVW-30%-Uphill	" " "		
		LLVW-30%-Downhill	" " "		
		MEETS MOVING BARRIER SPEC	Not Appl.		

3.0 Data Sheet No. 1.1 Summary of Tests (Sheet 3 of 9)

Veh.: 2003 MID BUS GUIDE

NHTSA No.: C30903

GVWR: 12,000 lbs.

<u>Test</u>	<u>Required Performance</u>	<u>Actual Performance*</u>	<u>P</u>	<u>F</u>
Third Effectiveness LLVW	60 mph: Pedal Force, 15-150 lbs. Stopping distance, <u>280</u> ft. for one of six stops	<u>6</u> of six stops pass Best Stop: <u>150.4</u> ft., <u>74</u> lbs. PF (max)	<u>X</u>	<u>---</u>
Partial Failure LLVW	60 mph: Pedal Force, 15-150 lbs. Stopping distance, <u>613</u> ft. for one of four stops with any sub-system failed.	<u>System #1</u> Inoperative: <u>4</u> of four stops pass Best Stop: <u>253.1</u> ft., <u>102</u> lbs. PF (max) <u>System #2</u> Inoperative: <u>4</u> of four stops pass Best Stop: <u>353.6</u> ft., <u>102</u> lbs. PF (max)	<u>X</u>	<u>---</u>
Partial Failure GVWR	60 mph: Pedal Force, 15-150 lbs. Stopping distance, <u>613</u> ft. for one of four stops with any sub-system failed.	<u>System #2</u> Inoperative: <u>4</u> of four stops pass Best Stop: <u>389.6</u> ft., <u>123</u> lbs. PF (max) <u>System #1</u> Inoperative: <u>4</u> of four stops pass Best Stop: <u>343.1</u> ft., <u>80</u> lbs. PF (max)	<u>X</u>	<u>---</u>
Partial Failure Antilock and/or Variable Proportioning Brake Systems GVWR	60 mph: Pedal Force, 15-150 lbs. Stopping distance, <u>613</u> ft. for one of four stops with any sub-system failed.	<u>ABS</u> Inoperative: <u>4</u> of four stops pass Best Stop: <u>196.9</u> ft., <u>58</u> lbs. PF (max) <u>Variable Prop.</u> Inoperative: <u>---</u> of four stops pass Best Stop: <u>---</u> ft., <u>---</u> lbs. PF (max)	<u>X</u>	<u>Not Appl.</u>

\*Stopping Distance - Visual Data  
Pedal Force - Visual Data

3.0 Data Sheet No. 1.1 Summary of Tests (Sheet 4 of 9)

Veh.: 2003 MID BUS GUIDE

NIITSA No.: C30903

GVWR: 12,000 lbs.

<u>Test</u>	<u>Required Performance</u>	<u>Actual Performance*</u>	<u>P</u>	<u>F</u>
Inoperative Power Unit	60 mph: Pedal Force, 15-150 lbs. Stopping distance, 613 ft. for one of four stops with power disconnected and reserve depleted.	<u>4</u> of four stops pass Best Stop: 410.3 ft., 142 lbs. PF (max)	<u>X</u>	<u>    </u>
Inoperative Power Unit Optional (Brake Power Assist Units)	Six stops from 60 mph: at specified decels. Seventh stop at no less than seven fpsps (554 ft.).	7th Stop: <u>    </u> fpsps <u>    </u> decel <u>    </u> lbs. PF	<u>Not Appl.</u>	
Inoperative Power Unit - Optional Procedure (Accumulator Systems)	Ten stops from 60 mph, at specified decelerations Eleventh stop at not less than seven fpsps (554 ft.).	11th Stop: <u>    </u> fpsps <u>    </u> decel <u>    </u> lbs. PF	<u>Not Appl.</u>	
Inoperative Power Unit - Optional Procedure (Backup Systems)	15 stops from 60 mph, at average deceleration of 12 fpsps (stopping distance 293 ft.) stops with any sub-system Failed.	<u>    </u> of fifteen stops within 293 ft. Worst Stop: <u>    </u> fpsps <u>    </u> decel <u>    </u> lbs. PF	<u>Not Appl.</u>	

\*Stopping Distance - Visual Data  
Pedal Force - Visual Data

3.0 Data Sheet No. 1.1 Summary of Tests (Sheet 5 of 9)

Veh.: 2003 MID BUS GUIDE

NHTSA No.: C30903

GVWR: 12,000 lbs.

<u>Test</u>	<u>Required Performance</u>	<u>Actual Performance*</u>	<u>P</u>	<u>F</u>
First Fade and Recovery (Baseline)	40-20 mph: Three snubs at 10 fpsps Pedal Force: 10-90 lbs.	Average Control Force (max) <u>20</u> lbs. PF	X	
First Fade and Recovery (Fade)	40-20 mph: Pedal Force: 15-150 lbs. (min) Snubs 1-5: 10 fpsps (min) Snubs 6-10: 5-10 fpsps decel	Snubs 1-5: <u>8.6</u> fpsps decel (min) <u>19</u> lbs. PF (max) Snubs 6-10: <u>9.7</u> fpsps decel (min) <u>15</u> lbs. PF (max)	X	
First Fade and Recovery (Recovery)	40-20 mph: Makes 5 snubs at not less than 10 fpsps (1) a maximum for the first four recovery stops of 150 pounds, and for the fifth stop, of 20 pounds more than the average control force for the baseline check (but no more than 100 lbs.; and (2) a minimum of (a) the average control force for the baseline check minus 10 lbs., or (b) the baseline check times 0.6, whichever is lower (but in no case less than 5 lbs.).  Allowable range: <u>10</u> to <u>40</u> pounds	Snubs 1-4: <u>15</u> lbs. PF (max) <u>10.0</u> fpsps decel (min) <del>5 snub</del> Step 5: <u>14</u> lbs. PF (max) <u>10.5</u> fpsps decel (min)	X	

\*Stopping Distance - Visual Data

Pedal Force - Visual Data

3.0 Data Sheet No. 1.1 Summary of Tests (Sheet 6 of 9)

Veh.: 2003 MID BUS GUIDE

NHTSA No.: C30903

GVWR: 12,000 lbs.

<u>Test</u>	<u>Required Performance</u>	<u>Actual Performance*</u>	<u>P</u>	<u>F</u>
Second Fade and Recovery (Baseline)	40-20 mph: Three snubs at 10 fpsps Pedal Force: 10-90 lbs.	Average Control Force (max) <u>20</u> lbs. PF	<u>X</u>	___
Second Fade and Recovery (Fade)	40-20 mph: Pedal Force: 15-150 lbs. (min) Snubs 1-10: 10 fpsps decel (min) Snubs 11-20: 10 fpsps decel	Snubs 1-10: <u>7.8</u> fpsps decel (min) <u>18</u> lbs. PF (max) <del>Snubs 11-15: 10</del> Snubs 11-20: <u>9.5</u> fpsps decel (min) <u>17</u> lbs. PF (max)	<u>X</u>	___
Second Fade and Recovery (Recovery)	40-20 mph: <del>snubs</del> Makes 5 stops at not less than 10 fpsps (1) a maximum for the first four recovery stops of 150 pounds, and for the fifth stop, of 20 pounds more than the average control force for the baseline check (but no more than 100 lbs.; and (2) a minimum of (a) the average control force for the baseline check minus 10 lbs., or (b) the baseline check times 0.6, whichever is lower (but in no case less than 5 lbs.).  Allowable range: 10 to 40 pounds	Snubs 1-4: <del>14.6</del> <u>13</u> lbs. PF (max) <u>9.8</u> fpsps decel (min)  Snub 5: <u>14</u> lbs. PF (max) <u>10.4</u> fpsps decel (min)	<u>X</u>	___
			<u>X</u>	___

\*Stopping Distance - Visual Data  
Pedal Force - Visual Data

3.0 Data Sheet No. 1.1 Summary of Tests (Sheet 7 of 9)

Veh.: 2003 MID BUS GUIDE

NHTSA No.: C30903

GVWR: 12,000 lbs.

<u>Test</u>	<u>Required Performance</u>	<u>Actual Performance*</u>	<u>P</u>	<u>F</u>
Fourth Effectiveness	30 mph: Pedal Force, 15-150 lbs. NA ft. for one of six stops	_____ of six stops pass Best Stop: _____ ft., _____ lbs. PF (max)		Not Appl.
	60 mph: Pedal Force, 15-150 lbs. Stopping distance, NA ft. for one of six stops	_____ of six stops pass Best Stop: _____ ft., _____ lbs. PF (max)		Not Appl.
	80 mph: Pedal Force: 15-150 lbs. Stopping distance: NA ft. for one of four stops	_____ of four stops pass Best Stop: _____ ft., _____ lbs. PF (max)		Not Appl.
	100 mph: Pedal Force, 15-150 lbs. Stopping distance, N/A ft. for one of four stops	_____ of four stops pass Best Stop: _____ ft., _____ lbs. PF (max)		Not Appl.

\*Stopping Distance - Visual Data

Pedal Force - Visual Data

3.0 Data Sheet No. 1.1 Summary of Tests (Sheet 7 continued of 9)

Veh.: 2003 MID BUS GUDE		NHTSA No.: C30903		GVWR: 12,000 lbs.	
Water Recovery (Baseline)	30 mph: Three stops at 10 fpsps Pedal Force: 10-90 lbs.	Avg. Sustained Control Force (max) <u>17</u> lbs. PF	<u>P</u> <u>X</u>	<u>F</u> <u>    </u>	
Water Recovery (Recovery)	30 mph: Make 5 stops at not less than 10 fpsps (1) maximum for the first four recovery stops at 150 pounds, and for the fifth stop, of 60 pounds more than the average control force for the baseline check (but no more than 110 lbs.); and (2) a minimum of (a) the average control force for the baseline check minus 10 lbs. or (b) the baseline check times 0.6, whichever is lower (but in no case less than 5 lbs.). Allowable range:	Stops 1-4: <del>16</del> <sup>28</sup> lbs. PF (max) <del>20</del> <sup>2</sup> fpsps decel (min) Stop 5: <u>28</u> lbs. PF (max) <u>8.4</u> fpsps decel (min)	<u>X</u> <u>X</u>	<u>    </u> <u>    </u>	
		<u>7</u> to <u>62</u> pounds	<u>X</u>	<u>    </u>	

\*Stopping Distance - Visual Data

Pedal Force - Visual Data

\*\*Recorded Data



3.0 Data Sheet No. 1.1 Summary of Tests (Sheet 8 of 9)

Veh.: 2003 MID BUS GUIDE

NHTSA No.: C30903

GVWR: 12,000 lbs.

<u>Test</u>	<u>Required Performance</u>	<u>Actual Performance*</u>	<u>P</u>	<u>F</u>
Spike Stops	30 mph: Vehicle shall be capable of making 10 spike stops.	<u>NA</u> stops completed  Max. pedal force ** _____ lbs. (peak) _____ lbs. avg.		<u>Not Appl.</u>
Post-Spike Effectiveness	60 mph: Pedal Force: 15-150 lbs. Stopping distance: <u>NA</u> ft. for one of six stops	____ of six stops pass Best Stop: _____ ft., _____ lb. PF (max.)		<u>Not Appl.</u>
Moving Barrier (For vehicles tested by the Optional Brake Procedure)	Parking mechanism shall not disengage or fracture when vehicle is subjected to front and rear 2-1/2 mph moving barrier impacts.	Front Impact: Vehicle Movement? Yes ____ No ____ Rear Impact: Vehicle Movement? Yes ____ No ____		<u>Not Tested</u>  <u>N/A</u>

\*Stopping Distance - Visual Data

Pedal Force - Visual Data

\*\*Manual Apply

3.0 Data Sheet No. 1.1 Summary of Tests (Sheet 9 of 9)

Veh.: 2003 MID BUS GUIDE

NHTSA No.: C30903

GVWR: 12,000 lbs.

<u>Test</u>	<u>Required Performance</u>	<u>Actual Performance*</u>		<u>P</u>	<u>F</u>				
<b>Final Inspect:</b>									
Lining	Firmly attached to backing.	Yes	<u>X</u>	No	<u>   </u>	<u>X</u>	<u>   </u>		
	Areas 90% of original.	Yes	<u>X</u>	No	<u>   </u>	<u>X</u>	<u>   </u>		
	Working surface free of lubricant or fluid.	Yes	<u>X</u>	No	<u>   </u>	<u>X</u>	<u>   </u>		
Mechanical	Components must be intact and functional.	Yes	<u>X</u>	No	<u>   </u>	<u>X</u>	<u>   </u>		
Hydraulic	Components must be leak-free.	Yes	<u>X</u>	No	<u>   </u>	<u>X</u>	<u>   </u>		
	Independent reservoirs must have adequate volume.	Yes	<u>X</u>	No	<u>   </u>	<u>X</u>	<u>   </u>		
	Total reservoir volume must be adequate.	Yes	<u>X</u>	No	<u>   </u>	<u>X</u>	<u>   </u>		
Indicator Lamp	Lit when key is ON or in "check" position.	Lit for check of function:		Yes	<u>X</u>	No	<u>   </u>	<u>X</u>	<u>   </u>
	Lit when following occur either	Lit for (A):		Yes	<u>   </u>	No	<u>X</u>	<u>Not Appl.</u>	
	(A), (C), or (D):	Lit for (B):		Yes	<u>X</u>	No	<u>   </u>	<u>X</u>	<u>   </u>
	or else	Lit for (C):		Yes	<u>X</u>	No	<u>   </u>	<u>X</u>	<u>   </u>
	(B), (C), or (D):	Lit for (D):		Yes	<u>X</u>	No	<u>   </u>	<u>X</u>	<u>   </u>
	(A) Gross pressure loss,	Yes		<u>X</u>	No	<u>   </u>	<u>X</u>	<u>   </u>	<u>   </u>
	(B) Unsafe fluid level,	Yes		<u>X</u>	No	<u>   </u>	<u>X</u>	<u>   </u>	<u>   </u>
(C) Electrical failure,	Yes		<u>X</u>	No	<u>   </u>	<u>X</u>	<u>   </u>	<u>   </u>	
(D) Parking brake on.	Yes		<u>X</u>	No	<u>   </u>	<u>X</u>	<u>   </u>	<u>   </u>	
	Color meets requirement	Yes	<u>X</u>	No	<u>   </u>	<u>X</u>	<u>   </u>	<u>   </u>	<u>   </u>
	Lettering meets requirement	Yes	<u>X</u>	No	<u>   </u>	<u>X</u>	<u>   </u>	<u>   </u>	<u>   </u>
(For vehicles without split service brake system)	Indicator lamp flashes and is accompanied by audible signal:	Yes	<u>   </u>	No	<u>   </u>	<u>N/A</u>			
		N/A	<u>   </u>						

4.0 Data Sheet No. 1.2 Vehicle Weight

Veh.: 2003 MID BUS GUIDE NHTSA No.: C30903 Date: 02/19/03  
 TIRE PRESSURE (cold): FRONT 65 psi REAR 65 psi  
 ODO. START 75 FINISH 1064

SCALE(S) USED: TRC Toledo-Mettler Platform

**VEHICLE WEIGHT (9.0 - S6.1)**

<u>Schedule</u>	<u>Requirements</u>
Obtain GVWR, LLVW, and axle weights within +0, -1%	None
GVWR <u>12,000</u> lbs. GAWR: Front <u>4,300</u> lbs. Rear <u>8,600</u> lbs. (front vehicle certification label)	Target Weight Front <u>4,000</u> lbs. Rear <u>8,000</u> lbs. GVWR = <u>12,000</u> lbs.

UNLOADED VEHICLE WEIGHT (UVW) - Actual Weight of Test Vehicle with Maximum Capacity of Engine Fuel, Oil, and Coolant.

Left Front 1,810 lbs. Right Front 1,640 lbs. Total Front 3,450 lbs.  
 Left Rear 2,310 lbs. Right Rear 2,280 lbs. Total Rear 4,590 lbs. Veh. 8,040 lbs.

LIGHT LOADED VEHICLE WEIGHT (LLVW)

Note 1: LLVW = UVW + 500 lbs.

Note 2: Weight distributed in front passenger seat area.

Note 3: Neither axle load at LLVW less than at UVW; ballasted as required

Left Front 1,990 lbs. Right Front 1,830 lbs. Total Front 3,820 lbs.  
 Left Rear 2,400 lbs. Right Rear 2,320 lbs. Total Rear 4,720 lbs. Veh. 8,540 lbs.

ACTUAL TEST LLVW

Left Front 1,950 lbs. Right Front 1,860 lbs. Total Front 3,810 lbs.  
 Left Rear 2,360 lbs. Right Rear 2,360 lbs. Total Rear 4,720 lbs. Veh. 8,530 lbs.  
 Load: Driver 160 lbs.+ Instrument 100 lbs. + Ballast 240 lbs. = 500 lbs.

4.0 Data Sheet No. 1.2 Vehicle Weight, continued

FULLY LOADED VEHICLE WEIGHT (GVWR)

Note 1: Vehicle loaded so axle loads proportional to GAWR shown above (target).

Note 2: But no axle weight to be less than at LLVW.

Load: Driver 160 lbs. + Instrument 100 lbs. - Ballast 3,700 lbs. = 3,960 lbs.  
Left Front 2,090 lbs. Right Front 1,910 lbs. Total Front 4,000 lbs.  
Left Rear 4,020 lbs. Right Rear 3,980 lbs. Total Rear 8,000 lbs. Veh. 12,000 lbs.

COMMENTS: None.

DATA INDICATES COMPLIANCE YES ( ) NO ( ) NO REQUIREMENTS (X)  
DRIVER Karen Easterday OBSERVER None  
RECORDED DATA PROCESSED BY R. Landes DATE 04/03/03  
APPROVING LABORATORY OFFICIAL K. Webster DATE 04/04/03

### Symbols for Brake Components

4	-	4 Wheel	G	-	Groan	DL	-	Deceleration (State FPSPS)
X	-	Skid	SQ	-	Squeal	PF	-	Pedal on Floor
L	-	Left	SQK	-	Squeak	SCP	-	Shoe Scrape
R	-	Right	PO	-	Pinchout	RB	-	Rubber Banding
R	-	Rear	P	-	Pull	O	-	Odor
F	-	Front	R	-	Shudder	NOX	-	No Skid
B	-	Both	M	-	Momentary			

INCIP	-	Incipient
INT or INIT	-	Initial Part of Stop
MID	-	Middle of Stop
END	-	End of Stop

### EXAMPLE

"BFMID" = Both front wheel lockup occurred at approximately middle of stop

Section 5.0 – Test Data  
Data Sheets 4 through 22A

Vehicle: 2003 MID BUS INC.

VEHICLE NUMBER: C10903

Transportation Research Center, Inc.

Make: MID BUS

10820 State Route 147

Model: GUIDE

East Liberty, Ohio 43019

Body Style: SCHOOL BUS 249

(531)666-2011 WWW.TRCPS.COM

Front Cold Tire Pressure: 65 (psi)

Rear Cold Tire Pressure: 65 (psi)

Date Tested: 02/05/03

### DATA SHEET 4 - SPEED VERSUS DISTANCE DETERMINATION

Testing Conditions: TNV DATA, Section 0001, 02/05/03, 12:59:29

Weather Conditions: 20°F

Wind: 13 MPH 237°

Start Odo.: 102

End Odo.: 119

Schedule:

GVNR, accelerate from 0 mph to maximum speed attainable in 2 miles or to 104 mph. Record times to speeds.

Performance Requirements:

Maximum Speed  
First Run South  
Second Run North

	MAX	0-40	0-60	0-80	AVE MPH
RUN	SFD	TIME	TIME	TIME	RUNS
#	(mph)	(second)	(second)	(second)	#1 & 2
1	98.3	9.0	17.5	33.6	97.1
2	95.9	9.5	18.5	37.4	

### INSTRUMENTATION CHECK (S7.2)

Testing Conditions:

INV DATA, Section 0010, 02/05/03, 13:13:38

Schedule:

GVNR, 10 Stops, 30.0 mph, 10 fpeps in gear, 150 200 Deg F IBT

Performance Requirements: None

STOP #	INITIAL SPD (mph)	Ave IBT Front (°F)	Ave IBT Rear (°F)	Stop Distance (feet)	Ave SUSTAINED PEDAL FORCE (lb)	AVERAGE DECELERATION (ft/sec <sup>2</sup> )	MAX PEDAL FORCE (lb)
1	30.1	183.0	154.5	113.2	18.1	8.7	23.0
2	29.5	190.0	159.5	113.4	19.2	8.8	22.1
3	29.6	177.0	152.5	122.7	16.4	8.1	19.9
4	29.4	180.0	155.0	103.5	18.0	9.6	22.1
5	30.2	186.0	159.0	124.4	18.5	8.0	21.3
6	30.2	170.5	148.5	108.0	18.8	9.7	31.1
7	30.1	168.5	145.0	116.6	18.4	9.1	22.0
8	30.0	159.5	141.5	102.1	18.3	10.4	25.6
9	30.0	167.0	136.0	106.7	17.5	10.1	27.0
10	30.1	171.0	137.5	110.0	17.0	9.9	25.8

DATA INDICATES COMPLIANCE: YRS ( ) NO ( ) NO REQUIREMENTS (X)

Driver: KARRN RASTREDAY Observer: NONE

Recorded Data Processed by: CHUCK JENNINS

Date: 03/21/03

Approving Laboratory Official: KEN WEBSTER

Date: 04/01/03

Vehicle: 2003 MID BUS INC.  
 Make: MID BUS  
 Model: GUIDE  
 Body Style: DCB00L BUS 24F  
 Front Cold Tire Pressure: 65 (psi)  
 Rear Cold Tire Pressure: 65 (psi)

MVTS# NUMBER: C30903

Transportation Research Center, Inc.  
 10820 State Route 347  
 East Liberty, Ohio 43319  
 (937)666-2011 www.trcpg.com

Date Tested: 02/05/03

**DATA SHEET 5 - FIRST EFFECTIVENESS AT GVWR (S7.3)**

Testing Conditions: INV DATA, Section 0015, 02/05/03, 14:02:10

Weather Conditions: 22°F Wind: 1 mph 312° Start Odo.: 119 End Odo.: 134

Schedule:

GVWR: 150 - 200°F Initial brake temperatures.  
 Initial Speeds 30 & 60 mph to zero  
 6 stops each speed with transmission in Neutral

Performance Requirements:

One Stop With:  
 Stopping Distance less than 88 ft @ 30mph  
 and less than 388 ft @ 60mph  
 Pedal Force <150 lbs.  
 Lock-Up of one wheel or less  
 Vehicle Must stay in lane of 12 ft.

STOP #	SPD (mph)	AVG. FRONT TBT (°F)	AVG. REAR TBT (°F)	ACTUAL STOP DISTANCE (feet)	CORRECTED DISTANCE (ft @ 20°F)	MAX. PEDAL FORCE (lb)	AVG. PEDAL FORCE (lb)	MAX. DECEL (ft/sec <sup>2</sup> )	AVG. DECEL (ft/sec <sup>2</sup> )
1	29.8	163.0	140.0	52.4	52.1	77.1	39.4	29.3	14.1
2	29.8	174.5	156.5	51.6	52.3	74.3	41.7	35.4	13.0
3	30.0	177.0	167.0	52.4	52.3	83.7	47.1	30.0	12.1
4	30.0	182.0	180.0	51.3	51.2	83.4	44.5	32.3	12.8
5	30.1	185.5	185.5	57.7	57.2	86.0	44.9	29.9	14.1
6	29.7	188.5	190.5	52.1	53.3	68.2	41.4	31.3	12.7
1	59.7	175.5	153.0	189.7	191.7	75.0	51.0	32.7	16.9
2	60.0	181.0	181.0	194.8	194.5	124.8	82.3	32.5	19.1
3	59.7	159.0	160.5	180.0	181.6	112.3	69.3	33.8	18.1
4	59.7	181.5	180.5	188.8	189.5	122.0	72.3	37.1	18.0
5	60.2	171.5	181.0	177.9	176.9	107.5	60.5	36.8	17.4
6	59.6	176.5	185.0	176.3	178.5	113.0	61.6	33.1	17.8

STOP #	DRIVER	VEHICLE	STOP COMMENTS
#	(Wheel Lock up -	Direction of Stop -	Stay in Lane)
1	-	NOX	SOUTH YES
2	-	NOX	SOUTH YES
3	-	NOX	SOUTH YES
4	-	NOX	SOUTH YES
5	-	NOX	SOUTH YES
6	-	NOX	SOUTH YES
1	-	NOX	SOUTH YES
2	-	NOX	SOUTH YES
3	-	NOX	SOUTH YES
4	-	NOX	SOUTH YES
5	-	NOX	SOUTH YES
6	-	NOX	SOUTH YES

DATA INDICATES COMPLIANCE: YES (X) NO ( )

Driver: KAREN BASTRODAY Observer: NONE  
 Recorded Data Processed by: CRUCE JENKINS DATE: 03/21/03  
 Approving Laboratory Official: BEN WEBSTER Date: 04/01/03



Vehicle: 2003 MID BUS INC.

WVETA NUMBER: C30903

Transportation Research Center, Inc.

Make: MID BUS

10820 State Route 347

Model: 6010M

West Liberty, Ohio 43319

Body Style: SCB00L BUS 14F

(937)666-2011 www.trcpg.com

Front Cold Tire Pressure: 65 (psi)

Rear Cold Tire Pressure: 65 (psi)

Date Tested: 02/05/03

### DATA SHEET 6 - BURNISH AT GVWR (S7.4)

Testing Conditions: INV DATA, Section 0002, 02/05/03, 16:17:15

Weather Conditions: 16°F Wind: 8 mph 240°

Start Odo.: 156

End Odo.: 714

#### Schedule:

GVWR, 500 snubs in neutral, 40 - 20 mph,  
10 fpsps decel, 1 mile interval.

#### Performance Requirements:

Lock-up on 1 wheel, may be 12  
ft. lane. NOTE: Pedal Force  
may exceed 150 lb.

STOP #	SPEED (mph)	LEFT FRONT	RIGHT FRONT	LEFT REAR	RIGHT REAR	MAX. FORCE (lb)	AVG. PEDAL FORCE (lb)	AVG. DECEL (ft/sec <sup>2</sup> )
		IBT (°F)	IBT (°F)	IBT (°F)	IBT (°F)			
1	39.3	188	174	189	176	18.6	14.0	9.0
25	40.3	231	229	201	240	15.2	11.9	9.8
50	40.2	308	277	289	324	15.4	12.4	10.2
75	40.7	289	259	219	223	14.5	11.6	10.0
100	40.0	269	247	234	290	15.9	11.7	9.8
125	40.2	254	235	223	209	14.5	10.6	9.3
150	39.6	250	227	217	295	16.0	11.2	9.8
175	40.3	258	235	226	229	15.4	11.7	9.8
200	39.6	231	221	201	220	15.5	11.9	9.5
225	40.4	243	242	263	301	22.6	17.1	10.7
250	40.0	255	247	208	294	18.7	14.0	10.0
275	39.7	253	236	249	268	24.3	14.7	9.8
300	39.8	286	263	247	283	20.7	14.7	9.5
325	39.8	282	234	215	275	19.7	15.0	9.5
350	39.2	261	243	249	278	20.1	14.0	9.7
375	40.2	238	217	264	274	19.7	15.4	10.2
400	39.9	265	233	208	284	17.8	14.2	9.2
425	40.3	258	238	219	205	19.4	14.2	9.6
450	39.0	243	226	281	281	18.5	14.6	8.5
475	40.7	260	237	271	280	20.4	14.7	10.1
500	40.3	250	224	211	242	18.9	15.3	9.6

### BRAKE ADJUSTMENT

#### Schedule:

Adjust service brakes, record procedure and amount adjusted.

Left Front: DISC DISC BRAKE NO ADJUSTMENT REQUIRED  
 Right Front: DISC DISC BRAKE NO ADJUSTMENT REQUIRED  
 Left Rear: DISC DISC BRAKE NO ADJUSTMENT REQUIRED.  
 Right Rear: DISC DISC BRAKE NO ADJUSTMENT REQUIRED.

MANUFACTURER'S PROCEDURE: NO ADJUSTMENT REQUIRED.

DATA INDICATES COMPLIANCE: YES ( ) NO ( ) NO REQUIREMENTS (X)

Driver: KAREN BASTEDAY Observer: NONE

Recorded Data Processed by: CHUCK JENKINS

Date: 03/21/03

Approving Laboratory Official: KEN WEBSTER

Date: 04/01/03

Vehicle: 2003 MID BUS INC.  
 Make: MID BUS  
 Model: GULOR  
 Body Style: SCHOOL BUS 24F  
 Front Cold Tire Pressure: 65 psii  
 Rear Cold Tire Pressure: 65 psii

NETEX NUMBER: C30903

Transportation Research Center, Inc.  
 10820 State Route 347  
 East Liberty, Ohio 43319  
 (937)666-2011 www.trcpg.com

Date Tested: 03/11/03

**DATA SHEET 7 - SECOND EFFECTIVENESS AT GVWR (87.5)**

Testing Conditions: INV DATA, Section 0030, 02/13/03, 11:15:21

Weather Conditions: 32°F Wind: 12 mph 246° Start Odb: 716 End Odb: 728

Schedule:

GVWR, 150 - 200°F Initial brake temperatures,  
 6 Stops in neutral, 30, 50,  
 4 Stops AC - 0 mph

Performance Requirements:

One Stop with:  
 Stopping Distance less than 70 Ft@30mph,  
38V Ft@60mph, and 0 @20mph  
 Pedal force <150 lbs.  
 Lock-Up of one wheel or less  
 Vehicle must stay in lane of 12 ft.

STOP #	INIT SPD (mph)	LEFT		RIGHT		ACTUAL DISTANCE (feet)	CORRECTED DISTANCE (feet)	MAX PEDAL FORCE (lb)	AVG.		MAX. DECEL (ft/sec²)	AVG. DECEL (ft/sec²)
		FRONT (°F)	REAR (°F)	FRONT (°F)	REAR (°F)				PEDAL FORCE (lb)	DECEL (ft/sec²)		
1	29.7	167	171	177	120	49.0	50.1	72.7	40.0	29.3	12.8	
2	30.0	187	186	194	139	47.9	47.8	85.8	42.7	50.1	12.9	
3	29.9	167	162	174	138	45.9	46.3	73.6	37.9	32.7	12.3	
4	30.1	187	165	190	145	47.5	47.3	78.9	39.0	35.9	12.9	
5	29.3	170	160	178	142	47.5	49.7	73.1	40.1	32.7	13.3	
6	29.5	170	162	189	146	46.5	48.0	91.5	39.3	34.5	13.5	
1	60.7	190	197	194	151	188.4	183.9	84.2	53.3	31.1	16.3	
2	59.5	185	154	184	159	165.5	172.4	80.8	47.7	34.1	16.8	
3	59.9	182	131	185	149	176.6	177.0	82.3	50.1	33.6	16.8	
4	59.9	184	171	231	119	169.9	170.6	74.0	46.4	32.7	16.6	
5	59.9	187	158	192	138	172.4	174.0	71.9	44.6	33.1	16.9	
6	59.9	188	147	189	139	172.4	172.8	84.1	49.5	33.3	15.5	

STOP #	Wheel Lock up	Direction of Stop	Stay in Lane	
1	-	NOX	SOUTH	YES
2	-	NOX	SOUTH	YES
3	-	NOX	SOUTH	YES
4	-	NOX	SOUTH	YES
5	-	NOX	SOUTH	YES
6	-	NOX	SOUTH	YES
7	-	NOX	SOUTH	YES
2	-	NOX	SOUTH	YES
3	-	NOX	SOUTH	YES
4	-	NOX	SOUTH	YES
5	-	NOX	SOUTH	YES
6	-	NOX	SOUTH	YES

COMMENTS: 30 MPH STOPS NOT APPLICABLE TO THIS VEHICLE TYPE.

DATA INDICATES COMPLIANCE: YES (X) NO ( )

Driver: KAREN BASTEREAY Observer: NONE  
 Recorded Data Processed by: CHUCK JENKINS Date: 03/21/03  
 Approving Laboratory Official: KEV WEBSTER Date: 04/01/03

Vehicle: 2001 MID BUS TMC, NHTSA NUMBER: C30903

Make: MID BUS

Model: B01D3

Body Style: SCHOOL BUS 24P

Front Cold Tire Pressure: 65 (ps1)

Rear Cold Tire Pressure: 65 (ps1)

Transportation Research Center, Inc.

10820 State Route 347

East Liberty, Ohio 43319

(937)666-2011 www.trcpg.com

Date Tested: 02/14/03

### DATA SHEET 8 - FIRST REBURNISH AT GVWR (S7.6)

Testing Conditions: LNV DATA, Section 0029, 02/14/03, 06:43:55

Weather Conditions: 18°F Wind: 2 mph 18W"

Start Odo.: 744 End Odo.: 782

Schedule:

GVWR, 35 snubs 13 neutral, 40 - 20 mph,  
10 fpm/s decel, 1 mile interval.

Performance Requirements:

Lock-up <= 1 wheel, stay in 12  
Cl. load. NOTE: Pedal force  
may exceed 150 lb.

STOP #	LEFT		RIGHT		LEFT		RIGHT		MAX. PEDAL FORCE (lb)	AVG. PEDAL FORCE (lb)	AVG. DECEL (ft/sec <sup>2</sup> )
	INCH	FRONT	FRONT	REAR	REAR	REAR	REAR				
1	39.6	239	228	236	161	23.3	17.2	9.8			
10	40.1	352	284	384	252	18.4	13.4	10.4			
20	39.9	350	277	456	287	17.2	11.9	10.0			
30	40.2	343	277	484	307	17.0	11.7	9.8			
35	39.9	334	274	488	316	17.4	11.9	10.4			

### BRAKE ADJUSTMENT

Schedule:

Adjust service brakes; record procedure and amount adjusted.

Left Front: DISC DISC BRAKE NO ADJUSTMENT REQUIRED  
 Right Front: DISC DISC BRAKE NO ADJUSTMENT REQUIRED  
 Left Rear: DISC DISC BRAKE NO ADJUSTMENT REQUIRED.  
 Right Rear: DISC DISC BRAKE NO ADJUSTMENT REQUIRED.

MANUFACTURER'S PROCEDURE: NO ADJUSTMENTS REQUIRED.

COMMENTS: NONE.

DATA INDICATES COMPLIANCE: YES ( ) NO ( ) NO REQUIREMENTS (X)

Driver: KAREN EASTERDAY

Observer: NONE

Recorded Data Processed by: CBUCK JENKINS

Date: 03/21/03

Approving Laboratory Official: KEN WEBSTER

Date: 04/01/03

Vehicle: 2003 MID BUS INC.  
 Make: MID BUS  
 Model: GUIDE  
 Body Style: SCHOOL BUS 24F  
 Front Cold Tire Pressure: 65 (psi)  
 Rear Cold Tire Pressure: 65 (psi)

NHTSA NUMBER: C30903

Transportation Research Center, Inc.  
 10820 State Route 347  
 East Liberty, Ohio 43119  
 (937)666-2011 www.trcpg.com

Date Tested: 02/14/03

**DATA SHEET 9 - PARKING BRAKE AT GVWR & LLWV (S7.7.1)**

Testing Conditions: INV DATA, Section 0490, 02/14/03, 11:35:19

Testing Conditions: INV DATA, Section 0095, 02/14/03, 10:45:10

Parking Mechanism: AUTOMATIC TR

Service type: N/A

Non service type: FOOT OPERATED

Weather Conditions: 27°F Wind: 5 mph 134"

Start Odo.: 780

End Odo.: 786

Test Weight: Total:1200lbs. GVWR

Total:8540lbs. LLWV

Schedule:

GVWR & LLWV, IET +/-150°F, neutral, 20% grade, vehicle held on grade with service brake pedal force +/-150 lb., then parking brake applied and service brake released, 2 reapplications of force to service brake and parking brake allowed.

Performance Requirements:

Hold vehicle stationary for 5 minutes, GVWR & LLWV, uphill and downhill, park brake pedal force +/-150 lb. foot lever, +/-125 lb. hand lever.

NOTE: For vehicles with parking brake systems not utilizing the service brake friction elements, the friction elements of such systems are to be furnished prior to parking brake tests according to the manufacturer's published recommendation as furnished to the purchaser. If no recommendations are furnished, test the system in an unfurnished condition. If recommendations are furnished, record method used.

	MAX SERVICE	MIN P-FORCE	LEFT REAR	RIGHT REAR	AVG REAR	DRIVER VEHICLE STOP COMMENTS			
APPLY #	(lb)	TO HOLD (lb)	IBT (°F)	IBT (°F)	IBT (°F)	(No. Reapplications, Direction of Stop (Up/Down) - Brake holds/fails)			
1	147.9	91.2	141	108	124.5	0 REAPPLY	UPHILL	HOLDS	20%
2	145.6	87.9	137	110	126.5	0 REAPPLY	DOWNHILL	HOLDS	20%

	MAX SERVICE	MIN P-FORCE	LEFT REAR	RIGHT REAR	AVG REAR	DRIVER VEHICLE STOP COMMENTS			
APPLY #	(lb)	TO HOLD (lb)	IBT (°F)	IBT (°F)	IBT (°F)	(No. of Reapplications Direction of Stop (Up/Down) - Brake holds/fails)			
1	145.7	82.2	117	90	107.5	0 REAPPLY	UPHILL	HOLDS	20%
2	145.9	82.3	117	88	102.5	0 REAPPLY	DOWNHILL	HOLDS	20%

Is brake system indicator lamp activated: YES (X) NO ( )

REF: TO FURNISH PROCEDURE FOR NON-SERV. USE COMMENTS: NOT AVAILABLE.

COMMENTS: OPTIONAL PROCEDURE (DATA SHEET 10) NOT PERFORMED.

DATA INDICATES COMPLIANCE: YES (X) NO ( )

Driver: KAREN WASTERDAY

Observer: NONE

Recorded Data Processed By: CHUCK JEMINS

Date: 03/31/03

Approving Laboratory Official: KEN WEBSTER

Date: 04/01/03

Vehicle: 2005 MID BUS INC.  
 Make: MID BUS  
 Model: GUIDE  
 Body Style: SCHOOL BUS 24P  
 Front Cold Tire Pressure: 65 (psi)  
 Rear Cold Tire Pressure: 65 (psi)

MVTA NUMBER: C30903

Transportation Research Center, Inc.  
 10820 State Route 347  
 East Liberty, Ohio 43319  
 19371660-3011 www.trcps.com

Date Tested: 02/14/03

**DATA SHEET 11 - Third Effectiveness (S7.8)**

Testing Conditions: INV DATA, Section 0035, 02/14/03, 11:26:22

Weather Conditions: 32°F Wind: 6 mph 113° Start Odo.: 788 End Odo.: 793

Schedule:

LLVM, 6 stops in neutral, 50-0 mph,  
 150 - 200°F FRT.

Performance Requirements:

One Stop with:  
 Stopping Distance less than 280 ft@60mph  
 Pedal force <150 lbs.  
 Lock-Up of one wheel or less  
 Vehicle Must stay in lane of 12 ft.

STOP #	INIT SPD (mph)	LEFT FRONT TRT (%)	RIGHT FRONT TRT (%)	LEFT REAR TRT (%)	RIGHT REAR TRT (%)	ACTUAL STOPPING DISTANCE (ft)	CORRECTED DISTANCE (SAE 299) (feet)	MAX PEDAL FORCE (lb)	AVG. PEDAL FORCE (lb)	AVG. DECEL (ft/sec <sup>2</sup> )	MAX. DECEL (ft/sec <sup>2</sup> )
1	59.8	173	169	168	119	150.4	151.6	73.8	39.8	19.5	39.9
2	50.1	190	183	178	134	154.6	161.5	77.9	51.6	20.3	43.5
3	59.8	179	170	161	125	164.7	165.6	80.9	63.8	26.3	39.9
4	50.2	184	173	166	127	175.3	174.1	80.0	68.7	22.9	41.4
5	50.5	179	172	167	126	171.8	170.3	81.1	64.8	23.6	39.1
6	55.2	172	159	154	130	165.5	169.0	62.2	50.2	26.6	36.9

STOP #	DRIVER	VEHICLE	STOP COMMENTS
#	[Wheel lock Up - Direction of Stop - Stay in Lane]		
1	-	NOX	SOUTH YES
2	-	NOX	SOUTH YES
4	-	NOX	SOUTH YES
4	-	NOX	SOUTH YES
5	-	NOX	SOUTH YES
6	-	NOX	SOUTH YES

COMMENTS: NONE

DATA INDICATES COMPLIANCE: YES (X) NO ( )

Driver: KAREN BATHURDAY Observer: NONE  
 Recorded Data Processed by: CRUCK JENKINS Date: 03/21/03  
 Approving Laboratory Official: KEM WEBSTER Date: 04/01/03

Vehicle: 2003 MID BUS INC.  
 Make: MID BUS  
 Model: GVDR  
 Body Style: SCHOOL BUS 24F  
 Front Cold Tire Pressure: 65 (psi)  
 Rear Cold Tire Pressure: 65 (psi)

NHTSA NUMBER: C30903

Transportation Research Center, Inc.  
 10820 State Route 347  
 East Liberty, Ohio 43019  
 19371666-2011 www.trcpg.com

Date Tested: 02/20/03

**DATA SHEET 12 - Partial Failure LLVW (S7.9)**

Testing Conditions: INV DATA, Section 0050, 02/20/03, 11:46:46  
 Testing Conditions: INV DATA, Section 0055, 02/20/03, 13:59:56

Weather Conditions: 34°F Wind: 7 mph 150° Start Odo.: 813 End Odo.: 835

Schedule:

LLVW, 4 stops in gear with each subsystem inoperative, 60 & 90 mph, 150-200' IBC.  
 Non-split system vehicle: 10 stops.

Performance Requirements:

One stop, 40 mph, 413 ft., pedal force <150 lbs., lockup allowed, stay in 22 ft. lane.  
 Warning light on at 50 lbs. pedal force manual, 25 lbs. power, or 225 psi.

System #1 Inoperative

STOP #	INIT SPD (mph)	LEFT		RIGHT		ACTUAL STOP DISTANCE (feet)	CORRECTED DISTANCE (SAB 299) (feet)	AVG. PEDAL FORCE (lb)	MAX. DECEL (ft/sec <sup>2</sup> )	MAX	
		FRONT IBT (%)	FRONT IRT (%)	REAR IRT (%)	REAR IRT (%)					PEDAL FORCE (lb)	AVG DECEL (ft/sec <sup>2</sup> )
1	59.8	170	160	51	43	261.0	263.7	52.9	25.7	77.6	12.9
2	60.0	182	167	45	39	268.3	268.0	59.3	26.2	109.6	12.3
3	59.6	211	179	46	39	253.1	256.7	77.0	24.7	102.4	13.9
4	59.7	181	157	54	45	259.6	261.9	87.6	25.0	127.3	12.8

STOP #	DRIVER VEHICLE STOP COMMENTS (Wheel Lock up - Direction of Stop - Stay in Lane)				
1	-		NOX	SOUTH	YES
2	-		NOX	SOUTH	YES
3	-		NOX	SOUTH	YES
4	-		NOX	SOUTH	YES

System #2 Inoperative

STOP #	INIT SPD (mph)	LEFT		RIGHT		ACTUAL STOP DISTANCE (feet)	CORRECTED DISTANCE (SAB 299) (feet)	AVG. PEDAL FORCE (lb)	MAX. DECEL (ft/sec <sup>2</sup> )	MAX	
		FRONT IBT (%)	FRONT IRT (%)	REAR IRT (%)	REAR IRT (%)					PEDAL FORCE (lb)	AVG DECEL (ft/sec <sup>2</sup> )
1	60.1	141	130	173	124	405.4	403.7	84.6	28.5	117.7	9.4
2	60.6	74	71	105	125	350.8	361.7	57.8	32.8	87.5	9.9
3	58.9	52	52	169	114	370.8	371.6	83.3	33.3	106.7	8.8
4	59.8	40	43	191	116	353.6	356.5	76.2	24.3	102.1	10.2

STOP #	DRIVER VEHICLE STOP COMMENTS (Wheel Lock up - Direction of Stop - Stay in Lane)				
1	-		NOX	SOUTH	YES
2	-		NOX	SOUTH	YES
3	-		NOX	SOUTH	YES
4	-		NOX	SOUTH	YES

COMMENTS:

System #1: Warning light on at 8/4 lb., M/C FWRD PRT DISCONNECTED, L/R PRT INOP  
 System #2: Warning light on at 8/4 lb., M/C FWRD PRT DISCONNECTED, L/R PRT INOP  
 PHOTO LEVEL SENSOR? YES (X) NO ( ) LAMP ON? YES (X) NO ( )  
 DATA INDICATED COMPLIANCE: YES (X) NO ( )

Driver: KAREN BASTARDAY Observer: NONE  
 Recorded Data Processed By: CHUCK JRMVMS Date: 03/23/03  
 Approving Laboratory Official: KIM BASTARDAY Date: 04/01/03

Vehicle: 2003 MID BUS INC.  
 Make: MID BUS  
 Model: GUIDE  
 Body Style: SCE00L BUS 24F  
 Front Cold Tire Pressure: 65 (psi)  
 Rear Cold Tire Pressure: 62 (psi)

NHTSA NUMBER: C10903

Transportation Research Center, Inc.  
 10020 State Route 347  
 East Liberty, Ohio 43319  
 (937)666-2011 www.trcpg.com

Date Tested: 02/21/03

**DATA SHEET 13 - Partial Failure GVWR (S7.9.3)**

Testing Conditions: INV DATA, Section 0050, 02/21/03, 09:13:33  
 Testing Conditions: INV DATA, Section 0065, 02/21/03, 11:32:35

Weather Conditions: 35°F Wind: 2 mph 141° Start Odo.: 846 End Odo.: 861

Schedule:

GVWR, 4 stops in gear with each subsystem  
 inoperative, 60.0 mph, 150-200° IBT.

Performance Requirements:

One stop, 60 mph, 512 ft. pedal force <150 lbs.,  
 lockup allowed, stay in 12 ft. lane.

System #2 Inoperative

STOP #	LEFT		RIGHT		ACTUAL		CORRECTED		AVG.		MAX	
	INIT SPD (mph)	IBT (°F)	FRONT IBT (°F)	REAR IBT (°F)	FRONT IBT (°F)	REAR IBT (°F)	STOP DISTANCE (feet)	(SAR 249) DISTANCE (feet)	PEDAL FORCE (lb)	DECEL (ft/sec²)	PEDAL FORCE (lb)	AVG DECEL (ft/sec²)
1	60.8	63	60	165	118	406.9	396.2	96.7	22.6	117.2	8.4	
2	59.9	50	44	177	145	396.7	398.6	104.6	19.6	129.8	8.6	
3	60.1	46	42	188	155	418.9	427.7	112.2	21.5	131.0	9.6	
4	60.2	41	41	184	147	389.6	386.8	100.7	23.8	123.0	10.0	

STOP # DRIVER VEHICLE STOP COMMENTS  
 (Wheel Lock up - Direction of Stop - Stay in Lane)

1	-	NOX	SOUTH	YES
2	-	NOX	SOUTH	YES
3	-	NOX	SOUTH	YES
4	-	NOX	SOUTH	YES

System #1 Inoperative

STOP #	LEFT		RIGHT		ACTUAL		CORRECTED		AVG.		MAX	
	INIT SPD (mph)	IBT (°F)	FRONT IBT (°F)	REAR IBT (°F)	FRONT IBT (°F)	REAR IBT (°F)	STOP DISTANCE (feet)	(SAR 249) DISTANCE (feet)	PEDAL FORCE (lb)	DECEL (ft/sec²)	PEDAL FORCE (lb)	AVG DECEL (ft/sec²)
1	60.3	166	171	168	143	349.3	346.0	63.8	17.1	74.6	10.0	
2	60.3	173	167	119	97	361.4	348.1	66.1	17.3	86.4	10.0	
3	59.9	174	169	89	70	343.3	343.8	68.4	17.7	79.8	10.4	
4	60.3	166	181	66	57	349.4	348.6	75.4	19.3	114.0	10.2	

STOP # DRIVER VEHICLE STOP COMMENTS  
 (Wheel Lock up - Direction of Stop - Stay in Lane)

1	-	NOX	SOUTH	YES
2	-	NOX	SOUTH	YES
3	-	NOX	SOUTH	YES
4	-	NOX	SOUTH	YES

COMMENTS: SYS. #1 - VEHICLE PULLS LEFT.

DATA INDICATES COMPLIANCE: YES (X) NO ( )

Driver: KAREN BASTENUAY Observer: NONE  
 Recorded Data Processed by: CHUCK JENNINGS Date: 03/21/03  
 Approving Laboratory Official: KEV WHESTER Date: 04/01/03

Vehicle: 2003 MID BUS INC.  
 Make: MID BUS  
 Model: GUIDE  
 Body Style: SCHOOL BUS 14F  
 Front Cold Tire Pressure: 65 (psi)  
 Rear Cold Tire Pressure: 65 (psi)

WVHA NUMBER: C10903

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 10820 STATE ROUTE 147  
 East Liberty, Ohio 43328  
 (937)666-2011 www.trcpg.com

Date Tested: 02/21/03

**DATA SHEET 14-ANTILOCK OR VARIABLE PROPORTIONING BRAKE SYSTEM (S7.9.4)**

Testing Conditions: TNV DATA, Section 0040, 02/21/03, 11:43:40

Weather Conditions: 37°F Wind: 6 mph 174° Start Odo.: 864 End Odo.: 867

Schedule:

CVPR, 4 stops in gear, 60 0 MPH,  
 antilock or variable prop failed, 150 200°F :AV

Performance Requirements:

One stop, 60 mph, 613 ft., pedal force <150 lbs.,  
 lockup allowed, stay in 12 ft. lane.

ABS FAILURE

STOP #	INIT SPD (mph)	LEFT		RIGHT		ACTUAL DISTANCE (feet)	CORRECTED DISTANCE (feet)	AVG. PEDAL FORCE (lb)	MAX PEDAL FORCE (lb)	AVG. DECEL (ft/sec <sup>2</sup> )	MAX. DECEL (ft/sec <sup>2</sup> )
		FRONT (°F)	REAR (°F)	FRONT (°F)	REAR (°F)						
1	59.5	188	193	139	87	252.9	255.7	31.6	43.8	13.0	21.2
2	60.1	185	180	140	110	204.7	204.1	36.8	53.2	15.9	30.9
3	60.0	192	195	170	142	196.9	195.8	32.4	58.2	14.7	31.7
4	60.8	194	186	192	165	222.4	216.8	32.5	47.1	15.4	25.2

STOP # DRIVER VEHICLE STOP COMMENTS  
 4 (Wheel Lock up - Direction of Stop - Stay in Lane)

STOP #	NOX	SOUTH	YES
1	NOX	SOUTH	YES
2	NOX	SOUTH	YES
3	RFX-HI	SOUTH	YES
4	NOX	SOUTH	YES

COMMENTS: NONE

IS ABS/VARIABLE PROP WARNING LAMP ACTIVATED? YES (X) NO ( )

DATA INDICATES COMPLIANCE: YES (X) NO ( )

Driver: KAREN BASTERDAY Observer: WGNB  
 Recorded Data Processed by: CHUCK JENKINS Date: 03/21/03  
 Approving Laboratory Official: KEN WEDYER Date: 04/01/03



Vehicle: 2003 MID BUS INC.  
 Make: MIC BUS  
 Model: GUINR  
 Body Style: SCHOOL BUS 24P  
 Front Cold Tire Pressure: 65 (psi)  
 Rear Cold Tire Pressure: 65 (psi)

NHTSA NUMBER: C30903

Transportation Research Center, Inc.  
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 East Liberty, Ohio 43319  
 19771666-2011 www.trcpg.com

Date Tested: 03/18/03

**DATASHEET 15-REGULAR PROCEDURE FOR FAILED BOOSTER OR PWR ASSIST(S7.10)**

Testing Conditions: IMV DATA, Section 0040, 03/18/03, 09:44:32

Weather Conditions: 19°F Wind: 11 mph 261° Start Odo.: 882 End Odo.: 890

Schedule:

GVWE, 4 stops in gear, 60.0 MPH,  
 antilock or variable prop failed, 150-200°F IBT

Performance Requirements:

One stop, 60 mph, 613 ft., pedal force <150 lbs.,  
 lockup allowed, stay in 17 ft. lane.

System #1 Inoperative

STOP #	INIT SPD (mph)	LEFT		RIGHT		ACQTIME DISTANCE (ft)	CORRECTED DISTANCE (ft)	MAX AVG.		MAX. DECEL (ft/sec <sup>2</sup> )	AVG DECEL (ft/sec <sup>2</sup> )
		FRONT (psi)	IBT (psi)	FRONT (psi)	IBT (psi)			PEDAL FORCE (lb)	PEDAL FORCE (lb)		
1	60.2	156	146	144	126	469.8	466.1	140.3	123.7	12.5	9.9
2	61.0	155	162	131	106	459.5	444.0	145.5	126.5	12.3	9.0
3	60.0	190	180	167	147	420.1	420.1	143.9	124.1	12.8	9.4
4	60.0	192	285	173	156	410.3	409.7	142.1	126.4	12.7	9.2

STOP #	DRIVER VEHICLE STOP COMMENTS		
	(Wheel Lock up	- Direction of Stop	- Stay in Lane)
1		NOX	SOUTH YES
2		NOX	SOUTH YES
3		NOX	SOUTH YES
4		NOX	SOUTH YES

COMMENTS: Disconnect primary source of power.  
 REMOVED POWER STEERING PUMP DRIVE BELT  
 DATA SHEET 16, OPTIONAL PROCEDURE, NOT PERFORMED.

DATA INDICATES COMPLIANCE: YES (X) NO ( )

Driver: KAREN EASTERDAY Observer: NOX  
 Recorded Data Processed by: CHUCK JENKINS Date: 03/21/03  
 Approving Laboratory Official: KEN WEBSTER Date: 04/01/03

Vehicle: 2003 MID BUS INC.

NHTSA NUMBER: C30\*03

Transportation Research Center, Inc.

Make: MID BUS

18820 State Route 347

Model: GUIDE

East Liberty, Ohio 43319

Body Style: SCHOOL BUS 24P

19371666-2011 www.crepp.com

Front Cold Tire Pressure: 65 (psi)

Date Tested: 03/11/03

Rear Cold Tire Pressure: 65 (psi)

**DATA SHEET 17 - FIRST FADE AND RECOVERY (BASELINE) (S7.11)**

Testing Conditions: TRV DATA, Section 0100, 03/11/03, 14:24:14

Schedule:

GVWR, 3 axles in neutral, 40 20 MPH,  
180-200°F IBT, 10 fpm decel

Performance Requirements:

Pedal force 10-90 lb., Lockup  
< 1 wheel, stay in 12 ft. lane.

STOP #	INIT SpH [mph]	LEFT FRONT	RIGHT FRONT	LEFT REAR	RIGHT REAR	MAX PEDAL FORCE [lb]	AVG. PEDAL FORCE [lb]	MAX. DECEL [ft/sec <sup>2</sup> ]	AVE DECEL [ft/sec <sup>2</sup> ]	AVG MAX PEDAL FORCE [lb]
		[°F]	[°F]	[°F]	[°F]					
1	40.1	158	146	147	124	20.1	17.8	12.9	10.6	19.7
2	39.4	191	183	182	142	18.6	15.7	12.0	8.9	
3	39.6	194	162	176	144	19.9	15.4	16.4	9.7	

COMMENTS: NONE.

DATA INDICATES COMPLIANCE: YES (X) NO ( )

Driver: KAREN BASTERDAY

Observer: NONE

Recorded Data Processed by: CHUCK JENKINS

Date: 03/21/03

Approving Laboratory Official: KEN WEBSTER

Date: 04/01/03

Vehicle: 2003 MID BUS INC. NHTSA NUMBER: C30903

Make: MID BUS

Model: GUIDE

Body Style: SCHOOL BUS 24P

Front Cold Tire Pressure: 65 (psi)

Rear Cold Tire Pressure: 65 (psi)

Transportation Research Center, Inc.

10820 State Route 347

East Liberty, Ohio 43019

(937)666-2011 www.ttcopg.com

Date Tested: 03/11/03

DATA SHEET 17A - FIRST FADE AND RECOVERY (FADE) (\$7.11)

Testing Conditions: INV DATA, Section 0101, 03/11/03, 15:12:54

Procedure:

CVPR, 10 snubs in neutral, 40 - 20 MPH,  
130-150°F IBT, 10 Epps decel,  
30 second interval.

Performance Requirements:

5 snubs at 10 Epps, 5 snubs at  
10 Epps, pedal force > 150 lbs.;  
Terminate reading at 5 mph.

STOP #	SND (mph)	LEFT	RIGHT	LEFT	RIGHT	MAX	AVG.	MAX. DECEL (ft/sec <sup>2</sup> )	AVG	APPLICATION TIME (second)	TOTAL ELAPSED TIME (min:sec)
		FRONT (°F)	FRONT (°F)	REAR (°F)	REAR (°F)	PEDAL FORCE (lb)	PEDAL FORCE (lb)		SUSTAINED (ft/sec <sup>2</sup> )		
1	39.4	135	120	127	110	18.9	14.7	11.4	8.6	2.31	4.55
2	40.7	189	194	164	147	19.0	15.7	12.6	9.8	0.45	
3	39.8	219	218	202	150	18.6	15.4	13.1	10.0	0.36	
4	40.1	202	263	245	177	17.1	14.6	11.7	9.4	0.30	
5	40.4	334	312	288	205	17.8	14.4	12.0	9.3	0.45	
6	40.0	183	163	326	235	16.7	13.2	12.8	9.8	0.40	
7	40.3	451	423	364	263	14.9	12.9	13.1	10.0	0.19	
8	39.9	473	360	401	284	15.2	12.6	12.7	9.6	0.33	
9	41.0	509	497	434	316	16.1	13.4	12.5	10.1	0.33	
10	40.0	540	532	473	338	15.4	12.5	11.8	9.7	0.32	

COMMENTS: NONE

DATA INDICATES COMPLIANCE: YES (X) NO ( )

Driver: KAREN BASTERDAY

Observer: NONE

Recorded Data Processed by: CHUCK JIMKINS

Date: 03/27/01

Approving Laboratory Official: KEN WEBSTER

Date: 04/01/03

Vehicle: 2003 MID BUS INC.

Vehicle Number: 030903

Transportation Research Center, Inc.

Make: MID BUS

10820 State Route 347

Model: GUIDE

East Liberty, Ohio 43319

Body Style: SCHOOL BUS 24P

(937)666-2011 www.tropg.com

Front Cold Tire Pressure: 65 (psi)

Rear Cold Tire Pressure: 65 (psi)

Date Tested: 03/11/03

**DATA SHEET 17B - FIRST FADE AND RECOVERY (RECOVERY) (S7.11)**

Testing Conditions: INV DATA, Section 0102, 03/11/03, 15:19:24

Weather Conditions: 39°F Wind: 19 mph 165°

Start Odc.: 919

End Odc.: 929

Schedule:

CVWR, 5 snubs in neutral, 40 - 20 MPH.  
10 fpsps decel. 1.5 mile interval.

Performance Requirements:

5 snubs at 10 fpsps, snubs 1-4 pedal force  
< 150 lbs., snub 5 pedal force +20  
lb. to lever of -10 or .6 times the  
average baseline pedal force, pedal force  
range: Max. 39.7 lb. Min 9.7 lb.

STOP	INIT SPD (mph)	LEFT		RIGHT		MAX		AVG.	
		FRONT	REAR	FRONT	REAR	FRONT	REAR	FRONT	REAR
1	40.1	495	512	462	259	35.1	6.3	9.5	
2	40.0	481	436	414	122	14.6	11.1	10.0	
3	40.8	366	388	387	117	14.9	12.8	10.6	
4	39.9	341	367	369	218	13.6	11.7	10.0	
5	40.0	341	351	361	106	14.0	12.0	10.5	

COMMENTS: STOP #1-LOW AVG DECEL-DAS CONTINUED TO LOG

DATA INDICATES COMPLIANCE: YES (X) NO ( )

Driver: KAREN BASTERDAY

Observer: NONE

Recorded Data Processed by: CRUCY JENNINS

Date: 03/21/03

Approving Laboratory Official: KEN WEBSTER

Date: 04/01/03

Vehicle: 2003 MID BUS INC.  
 Make: MID BUS  
 Model: GUIDE  
 Body Style: SCHOOL BUS 24P  
 Front Cold Tire Pressure: 65 (psi)  
 Rear Cold Tire Pressure: 65 (psi)

NHTSA NUMBER: G30903

Transportation Research Center, Inc.  
 10620 State Route 347  
 East Liberty, Ohio 43319  
 19371666-2011 www.trcpg.com

Date Tested: 03/12/03

**DATA SHEET 18 - SECOND REBURNISH AT GVWR (\$7.12)**

Testing Conditions: INV DATA, Section 0025, 03/12/03, 08:50:40

Weather Conditions: 44°F Wind: 9 mph 235° Start Odb.: 943 End Odb.: 981

Schedule:

GVWR, 35 stops in neutral, 40 - 20 mph,  
 1.0 gape decel, 230 - 250°F IAT or  
 1 mile interval.

Performance Requirements:

Lock-up <= 1 wheel, stay in 1/2  
 ft. lane. NCTB: Pedal Force  
 max 150 lb.

STOP #	SPD (mph)	LEFT	RIGHT	LEFT	RIGHT	MAX.	AVG.	AVG. DECEL (ft/sec <sup>2</sup> )
		FRONT IRT (°F)	FRONT IRT (°F)	REAR IRT (°F)	REAR IRT (°F)	PEDAL FORCE (lb)	PEDAL FORCE (lb)	
1	46.0	216	210	213	154	19.4	13.7	6.5
10	41.0	349	369	379	322	15.8	12.1	9.6
20	39.9	358	389	445	372	14.2	11.5	9.3
30	40.3	346	382	459	374	13.6	11.3	9.1
35	39.8	342	396	440	365	14.0	11.7	9.7

**BRAKE ADJUSTMENT**

Schedule:

Adjust service brakes; record procedure and amount adjusted.

Left Front: DISC DISC BRAKE NO ADJUSTMENT REQUIRED  
 Right Front: DISC DISC BRAKE NO ADJUSTMENT REQUIRED  
 Left Rear: DISC DISC BRAKE NO ADJUSTMENT REQUIRED  
 Right Rear: DISC DISC BRAKE NO ADJUSTMENT REQUIRED.

MANUFACTURER'S PROCEDURE: ADJUSTMENT NOT REQUIRED.

COMMENTS: NONE

DATA INDICATES COMPLIANCE: YES ( ) NO ( ) NO REQUIREMENTS (K)

Driver: KAREN EASTERDAY Observer: NONE

Recorded Data Processed by: CHUCK JENKINS Date: 03/21/03  
 Approving Laboratory Official: KEN WEBSTER Date: 03/21/03

Vehicle: 2003 MID BUS INC.

NETSA NUMBER: C30403

Transportation Research Center, Inc.

Make: MID BUS

10820 State Route 347

Model: GUIDE

East Liberty, Ohio 43319

Body Style: SCHOOL BUS 24P

(937)666-2011 www.trcpg.com

Front Cold Tire Pressure: 65 (psia)

Date Tested: 03/12/03

Rear Cold Tire Pressure: 65 (psia)

### DATA SHEET 19 - SECOND FADE AND RECOVERY (BASELINE) (S7.13)

Testing Conditions: INV DATA, Section 0103, 03/12/03, 10:47:17

Schedule:

SWER, 3 shifts in gear, 40-20 MPH, 150-200'  
1BT, 10 ipaps decel.

Performance Requirements:

Pedal force 10-90 lb., lockup  
-> 1 wheel, stay in 12 ft. lane.

STOP #	INIT	LEFT FRONT	RIGHT FRONT	LEFT REAR	RIGHT REAR	MAX PEDAL	AVG PEDAL	AVG DECEL	MAX DECEL	AVG OF MAX PEDAL
	SPEED (mph)	1BT (°F)	1BT (°F)	1BT (°F)	1BT (°F)	FORCE (lb)	FORCE (lb)	(ft/sec²)	(ft/sec²)	FORCE (lb)
1	39.8	161	145	167	132	20.6	16.7	9.7	11.9	20.3
2	40.3	181	173	192	155	20.2	15.8	10.7	12.9	
3	40.4	184	170	191	160	20.1	17.0	10.0	12.1	

COMMENTS: NONE

DATA INDICATES COMPLIANCE: YES (X) NO [ ]

Driver: KAREN MASTERDAY

Observer: NONE

Recorded Data Processed By: CHUCK JENKINS

Date: 03/01/03

Approving Laboratory Official: KEN WEBSTER

Date: 04/01/03

Vehicle: 2003 MID BUS INC.  
 Make: MID BUS  
 Model: GUIDE  
 Body Style: SCHOOL BUS 24P  
 Front Cold Tire Pressure: 65 (psi)  
 Rear Cold Tire Pressure: 65 (psi)

MBTA NUMBER: C30903

Transportation Research Center, Inc.  
 10920 State Route 347  
 East Liberty, Ohio 43119  
 19371666-2011 www.trcpg.com

Date Tested: 03/12/03

**DATA SHEET 19A - SECOND FADE AND RECOVERY (FADE) (S7.13)**

Testing Conditions: INV DATA, Section 0106, 03/12/03, 12:14:35

Schedule:

GVWR: 20 snubs in neutral, 40 - 20 MPH,  
 150-200°F IHT, 10 tpsps decel,  
 30 second interval.

Performance Requirements:

20 snubs at 10 tpsps,  
 pedal force <= 150lb,  
 terminate reading at 5 mph.

STOP #	INIT	RIGHT FRONT	LEFT FRONT	RIGHT REAR	LEFT REAR	MAX PEDAL FORCE	AVG. PEDAL FORCE	AVG. SUSTAINED DECEL	MAX DECEL	APPLICATION TIME	TOTAL ELAPSED TEST TIME
	SPD (mph)	IHT (°F)	IHT (°F)	IHT (°F)	IHT (°F)	(lb)	(lb)	(ft/sec²)	(ft/sec²)	(seconds)	(minutes)
1	40.4	136	119	139	131	17.7	14.4	7.8	10.9	2.73	5.00
2	39.8	178	155	174	145	18.9	16.9	9.8	13.8	0.59	
3	39.0	226	196	216	164	18.8	16.1	10.0	12.0	0.47	
4	39.7	272	238	257	185	17.2	14.4	9.9	12.0	0.52	
5	39.8	314	284	300	216	15.1	13.2	9.3	11.7	0.37	
6	40.2	362	333	345	248	15.2	13.0	9.9	12.2	0.32	
7	40.1	404	380	389	279	14.3	12.3	10.0	12.4	0.22	
8	40.2	444	422	429	309	14.1	11.8	10.2	13.3	0.19	
9	40.3	491	467	466	326	15.1	11.9	10.4	14.5	0.29	
10	40.2	517	505	504	361	14.5	12.4	10.2	12.8	0.29	
11	40.0	546	538	537	388	15.7	13.6	10.4	13.4	0.25	
12	39.7	578	569	570	408	14.7	12.7	9.7	12.1	0.31	
13	40.5	606	600	603	431	15.9	13.8	9.6	13.4	0.28	
14	40.0	635	631	636	453	16.4	14.1	9.9	14.9	0.28	
15	40.0	659	656	663	472	15.6	13.4	9.8	12.1	0.30	
16	40.1	681	677	687	492	16.3	14.3	9.7	12.8	0.24	
17	39.9	702	697	713	513	16.8	15.1	10.2	13.5	0.21	
18	40.0	725	718	730	535	16.1	13.2	9.6	14.9	0.19	
19	39.5	740	735	760	556	16.5	14.2	9.5	11.6	0.28	
20	39.9	754	746	760	575	17.3	14.9	10.4	13.1	0.29	

Comments: NONE

DATA INDICATES COMPLIANCE: Y ( ) NO ( )

Driver: KAREN BASTRODAY      Observer: NONE  
 Recorded Data Processed by: CHRIS JAKKINS      Date: 03/21/03  
 Approving Laboratory Official: KEN WEBSTER      Date: 04/01/03

Vehicle: 2001 MID BUS INC.

NHTSA NUMBER: C30903

Transportation Research Center, Inc.

Make: MID BUS

10620 State Route 347

Model: GUIDE

East Liberty, Ohio 43315

Body Style: SCHOOL BUS 24P

(614) 666-2011 www.trcpg.com

Front Cold Tire Pressure: 65 (psi)

Date Tested: 03/12/03

Rear Cold Tire Pressure: 65 (psi)

### DATA SHEET 19B - SECOND FADE AND RECOVERY (RECOVERY) (S7.13)

Testing Conditions: 1KV DATA, Section 0107, 03/12/03, 11:36:36

Weather Conditions: 47°F Wind: 12 mph 227°

Start Odo.: 984 End Odo.: 1002

#### Schedule:

GVWR, 5 snubs in gear, 40-20 MPH,  
10 trips decel. Pedal Force 10-90 lb,  
1 mile interval.

#### Performance Requirements:

5 snubs at 10 fpm, stop 5 pedal force  
≤ 150lb; stop 5 pedal force +20  
lb. to lesser of -10 or .6 X the  
average baseline pedal force. Pedal force  
range: Max. 40.3 lb. Min 10.3 lb.

STOP #	INIT	LEFT FRONT	RIGHT FRONT	LEFT REAR	RIGHT REAR	MAX PEDAL FORCE	AVG. PEDAL FORCE	AVG DECEL
	SPD (mph)	(°F)	(°F)	(°F)	(°F)	(lb)	(lb)	(ft/sec²)
1	39.9	640	635	503	574	14.6	12.0	9.8
2	40.2	561	543	628	544	12.7	11.0	9.8
3	39.9	511	485	598	514	13.2	11.1	10.1
4	39.6	457	437	560	459	14.3	10.7	10.0
5	40.3	409	292	520	428	14.0	11.6	10.4

Comment: NONE

DATA INDICATES COMPLIANCE: YES (X) NO ( )

Driver: HAREN EASTERDAY

Observer: NONE

Recorded Data Processed by: CHUCK JENNINGS

Date: 03/21/03

Approving Laboratory Official: KEN WEBSTER

Date: 04/01/03



Vehicle: 2003 MID BUS INC. NHTSA NUMBER: C30903

Make: MID BUS

Model: GUIDE

Body Style: SCHOOL BUS 24P

Front Cold Tire Pressure: 65 (psi)

Rear Cold Tire Pressure: 65 (psi)

Transportation Research Center, Inc.

10870 State Route 747

East Liberty, Ohio 43319

(937)666-2011 www.trcpg.com

Date Tested: 03/12/03

### DATA SHEET 20 - THIRD REBURNISH AT GVWR (57.14)

Testing Conditions: IMV DATA, Section 0110, 03/12/03, 12:53:47

Weather Conditions: 50°F Wind: 13 mph 102°

Start Od.: 1003 End Od.: 1042

Schedule:

GVWR, 35 snubs in neutral, 30 - 30 mph,  
10 fpsps decel, 1 mile interval

Performance Requirements:

Lock-up on 1 wheel, stay in 12  
ft. lane. NOTE: Pedal Force  
may exceed 150 lb.

STOP	INJT SPD (mph)	GRPT	RIGHT	LRRT	RIGHT	AVG.	
		FRONT IBT (°F)	FRONT IBT (°F)	REAR IBT (°F)	REAR IBT (°F)	PEDAL FORCE (lb)	AVG. DECEL (ft/sec <sup>2</sup> )
1	40.0	256	247	267	202	12.9	8.7
10	39.8	349	312	399	323	11.2	9.4
20	40.0	351	326	442	350	11.7	10.1
30	40.0	330	319	427	346	11.2	8.8
35	40.1	339	337	421	338	11.2	9.7

### BRAKE ADJUSTMENT

Schedule:

Adjust service brakes: record procedure and amount adjusted.

Left Front: DISC DISC BRAKE NO ADJUSTMENT REQUIRED

Right Front: DISC DISC BRAKE NO ADJUSTMENT REQUIRED

Left Rear: DISC DISC BRAKE NO ADJUSTMENT REQUIRED.

Right Rear: DISC DISC BRAKE NO ADJUSTMENT REQUIRED.

MANUFACTURER'S PROCEDURE, NO ADJUSTMENT REQUIRED.

COMMENTS: NONE

DATA INDICATES COMPLIANCE: YES ( ) NO ( ) NO REQUIREMENTS (X)

Driver: KAREN RASTREDA

Observer: NONE

Recorded Data Processed by: CROCK JENKINS

Date: 03/21/03

Approving Laboratory Official: KEN WEBSTER

Date: 04/01/03

Vehicle: 2003 MID BUS IMP  
 Make: MID BUS  
 Model: GUIDE  
 Body Style: SCHOOL BUS 24P  
 Front Cold Tire Pressure: 65 (psi)  
 Rear Cold Tire Pressure: 65 (psi)

NHTSA FORM NO. C10907

Transportation Research Center, Inc  
 10820 State Route 347  
 East Liberty, Ohio 43319  
 (937)666-2011 www.trcpg.com

Date Tested: 03/12/03

**DATA SHEET 22 - WATER RECOVERY (BASELINE) (\$7.16)**

Testing Conditions: INV DATA, section 0125, 03/12/03, 16:02:53

Schedule:

GVWR, 1 stops in gear, 30.0 mph,  
 150-200\*P 1BT, 10 fpspp decel.

Performance Requirements:

Pedal force 10-90 lb., lock-up  
 =4 wheel, stay in 12 ft. lane.

STOP #	INIT SPD (mph)	LEFT	RIGHT	LEFT	RIGHT	MAX.	AVG.	MAX.	AVG.	MAX
		FRONT 1BT (%F)	FRONT 1BT (%F)	REAR 1BT (%F)	REAR 1BT (%F)	PEDAL FORCE (lb)	PEDAL FORCE (lb)			
1	30.1	163	153	172	141	13.8	9.4	9.1	5.4	17.2
2	30.6	189	178	196	160	10.0	14.6	11.9	0.0	
3	30.0	185	184	197	170	20.0	15.9	13.2	8.0	

COMMENTS: NONE

DATA INDICATES COMPLIANCE: YES (X) NO ( )

Driver: KAREN MASTERDAY      Observer: NONE  
 Recorded Data Processed by: CHUCK JENKINS      Date: 03/21/03  
 Approving Laboratory Official: KEN WEBSTER      Date: 04/01/03

Vehicle: 2003 MID BUS TWC. NHTSA NUMBER: C30903  
 Make: MID BUS  
 Model: QUINN  
 Body Style: SCHOOL BUS 24P  
 Front Cold Tire Pressure: 65 (psia)  
 Rear Cold Tire Pressure: 65 (psia)

Transportation Research Center, Inc.  
 10820 State Route 347  
 East Liberty, Ohio 43319  
 (937) 666-2811 www.trcpg.com

Date Tested: 07/12/03

**DATA SHEET 22A - WATER RECOVERY (RECOVERY) (\$7.16)**

Testing Conditions: IVT DATA, Section 0130, 03/12/03, 16:10:49

Weather Conditions: 51°F Wind: 1 mph 275° Start Odo.: 1049 End Odo.: 1051

Schedule:

Drive for 3 min., at 5mph in any combination of forward and reverse directions in 6 inches of water

GVMR, 5 stops in gear, 20-0 mph, 10 fpm decel. Stops initiated as soon as 30 mph is reached.

Performance Requirements:

5 stops at 10 fpm, stops 1-4 pedal force <= 150lb; stop 5 pedal force <= 5 lb. max. slip force (5th stop only) baseline -10 lb. or times .6, whichever is lower but >5 lb. Pedal force range: max 2 lb min 7 lb

STOP #	INIT SPD (mph)	MAX AVG		AVR DECEL (ft/sec <sup>2</sup> )	Max Decel (ft/sec <sup>2</sup> )
		PEDAL FORCE (lb)	PRDAL FORCE (lb)		
1	30.3	16.1	11.2	7.0	13.3
2	30.5	17.6	13.8	7.8	12.1
3	30.2	24.5	18.3	7.1	12.0
4	30.3	27.9	21.2	8.2	12.9
5	29.9	28.3	20.1	8.4	14.3

COMMENTS: NONE

DATA INDICATES COMPLIANCE: YES (X) NO ( )

Driver: KAREN BARKERDAY Observer: NONE  
 Recorded Data Processed by: CHUCK JENKINS Date: 03/21/03  
 Approving Laboratory Official: KEN WEBSTER Date: 04/01/03

**TEST COMPLETION INSPECTION (S7.18)**

Requirements: No fracture of any components such as brake springs, brake shoe or disc pads facing. All mechanical components shall be intact and functional. Friction facing tearout shall not exceed 10% of the lining on any single frictional element. No visible brake fluid or lubricant on the friction surface of the brake. No leakage at any system reservoir cover, seal, or filler opening.

**Friction Material Condition:****Primary/Inner/Primary**

LF Normal appearance and color  
 RF Normal appearance and color  
 LR Normal appearance and color  
 RR Normal appearance and color

**Secondary/Outer Secondary**

LF Normal appearance and color  
 RF Normal appearance and color  
 LR Normal appearance and color  
 RR Normal appearance and color

**Drum (or Rotor) Condition:**

LF Normal appearance and color  
 RF Normal appearance and color  
 LR Normal appearance and color  
 RR Normal appearance and color

**Brake Fluid/Lubricant Inside Brakes:**

LF None  
 RF None  
 LR None  
 RR None

**Hydraulic Component Condition:**

LF Normal appearance; no leakage  
 RF Normal appearance; no leakage  
 LR Normal appearance; no leakage  
 RR Normal appearance; no leakage  
 Master Cylinder: Normal appearance; no leakage

**Mechanical Component Condition:**

Brake Pedal: Good  
 Power Brake: Good  
 Stoplights: Good  
 Linkages: Good

Comments: None

DATA INDICATES COMPLIANCE Yes ( X ) No ( ) No Requirements ( )  
 DRIVER Karen Easterday OBSERVER None  
 RECORDED DATA PROCESSED BY R. Landes DATE 04/03/03  
 APPROVING LABORATORY OFFICIAL K. Webster DATE 04/04/03

## MASTER CYLINDER RESERVOIR

<u>Reservoir Compartments</u>			P	F
(1) Does master cylinder have a reservoir compartment for each subsystem?	Yes <u>X</u> No _____	Master cylinder shall have a reservoir compartment for each subsystem.	<u>X</u>	_____
(2) Does loss of fluid in one compartment result in complete loss for another compartment?	Yes _____ No <u>X</u>	Loss of fluid from one compartment shall not cause complete loss from another compartment.	<u>X</u>	_____

Reservoir Capacity

Shall conform to requirements (1) or (2), state units. (1) For reservoirs having completely separate compartments for each subsystem.

Subsystem 1

Subsystem reservoir capacity	<u>Not Appl.</u>	Shall have a minimum capacity equivalent to the fluid displacement resulting when all wheel cylinders or caliper pistons serviced by that portion of the reservoir move from a new lining, fully retracted position to a fully worn, properly adjusted, fully applied position.	<u>Not Appl.</u>
Fluid Displaced	<u>Not Appl.</u>		

Subsystem 2

Subsystem reservoir capacity		Same as above	<u>Not Appl.</u>
Fluid displaced	<u>Not Appl.</u>		

6.0 Data Sheet No. 1.23 - Test Completion Inspection, continued

Veh.: 2003 MID BUS GUIDE

NHTSA No.: C30903

Date: 03/17/03

(2) For reservoirs utilizing a portion of the reservoir for a common supply to two or more subsystems.

			P	F
Total minimum capacity for the entire master cylinder reservoir.	<u>902 ml</u>	Shall have total minimum capacity for entire reservoir for displacement resulting from all subsystem wheel cylinders or caliper positions moving from new lining to full worn condition as above. Shall have minimum reservoir volume in partial compartment equal to at least the volume displaced by the master cylinder piston servicing the subsystem.	<u>X</u>	_____
Fluid displaced	<u>466.7 ml*</u>		<u>X</u>	_____
<u>Subsystem 1</u> Minimum volume in partial compartment	<u>150 ml</u>			
Fluid displaced	<u>19.3 ml</u>			
<u>Subsystem 2</u> Minimum volume in partial compartment	<u>106 ml</u>	Same as above.	X	_____
Fluid displaced	<u>12.3 ml</u>			

## 6.0 Data Sheet No. 1.23 - Test Completion Inspection, continued

Veh.: 2003 MID BUS GUIDE

NHTSA No.: C30903

Date: 03/17/03

## MASTER CYLINDER PISTON DISPLACEMENT

<u>Reservoir Compartments</u>		<u>P</u>	<u>F</u>
Fluid displaced by three strokes of master cylinder piston.			
Primary (Subsystem No. 1)	<u>58 ml</u>		
Secondary (Subsystem No. 2)	<u>37 ml</u>		
Fluid displaced per stroke.			
Primary	<u>19.3 ml</u>	<u>X</u>	<u>---</u>
Secondary	<u>12.3 ml</u>		
Fluid available in partial compartment			
Subsystem No. 1	<u>150 ml</u>	<u>X</u>	<u>---</u>
Subsystem No. 2	<u>106 ml</u>	<u>X</u>	<u>---</u>
<u>Brake Power Unit Reservoir</u>			
Volume displaced in charging system piston or accumulator to normal operating pressure plus wheel cylinder or caliper piston displacement.	<u>---</u>		
			Shall have a capacity at least equal to the fluid displacement required to charge the system pistons or accumulators to normal operating pressure plus displacement when wheel cylinders or caliper pistons move from new lining to full worn condition as above.
			<u>Not Appl.</u>

6.0 Data Sheet No. 1.23 - Test Completion Inspection, continued

Veh.: 2003 MID BUS GUIDE

NHTSA No.: C30903

Date: 03/17/03

Reservoir Labeling

P F

Exact copy of reservoir label:  
On reservoir cap -\*WARNING. CLEAN  
FILLER CAP BEFORE REMOVING.  
USE ONLY DOT 3 FLUID FROM A SEALED  
CONTAINER.

Label shall read:  
"Warning, clean filler  
cap before removing;  
use only \*fluid from  
a sealed container."

X ---

\*Fluid type specified in  
49 CFR 571.116.

Measure letter height 1/8 in.

Letters shall be at least  
1/8 inch high.

X ---

Describe label attachment method  
and location.  
Embossed on the top of the master cylinder  
reservoir.

Label shall be  
permanently  
affixed, engraved, or  
embossed and located  
so as to be visible by  
direct view either on or  
within four inches of  
the brake fluid reservoir  
filler plug or cap.

X ---

Does the lettering contrast  
with the background? Yes ---  
No X

If label is not  
engraved or embossed,  
letters shall be of a color  
that contrasts with the  
background.

X ---



**BRAKE SYSTEMS INDICATOR LAMP**

**Functional Requirement:**

Split service brake systems - with ignition on, lamp must light either for conditions (a) and (d) or (b) and (d). If vehicle is so equipped, must also light for (c). DO NOT TEST BULB CHECK.

Non-split systems - same as for split systems plus for (a), must light and sound alarm when supply pressure falls to 50% normal.

<u>Condition:</u>	<u>Performance</u>	<u>P</u>	<u>F</u>
(a) In event of hydraulic leak, must meet 1 of 4 criteria below:			
(1) Pressure differential $\leq$ 225 psi	<u>Not Appl.</u> psi		<u>Not Appl.</u>
(2) Non power-assisted brakes, pedal force $\leq$ 50 lbs.	<u>Not Appl.</u> lb.	" "	" "
(3) Power-assisted brakes, pedal force $\leq$ 25 lbs.	<u>Not Appl.</u> lb.	" "	" "
(4) Supply pressure to brake power unit	Normal psi		
$\leq$ 50% normal pressure	Lamp on @ <u>Not Appl.</u> psi	" "	" "
Lamp on psi/Normal psi x 100	<u>Not Appl.</u> %	" "	" "
(b) If any reservoir falls below safe level or 25% capacity, whichever is greater.	Resvr. full <u>902 ml</u>	( ) @ safe lev.	
(Lamp on cc/Full cc) x 100	Lamp on <u>646 ml</u>	(X) above level	
	@ <u>71 %</u>	<u>X</u>	<u>    </u>
(c) If total electrical failure of anti-skid or variable proportioning system.	( ) not so eq	<u>X</u>	<u>    </u>
	( X ) not so eq	<u>Not Appl.</u>	
	( ) varbl. propn. not electrical		
(d) If parking brake applied .....		<u>X</u>	<u>    </u>

6.0 Data Sheet No. 1.23 - Test Completion Inspection, continued

Veh.: 2003 MID BUS GUIDE

NHTSA No.: C30903

Date: 03/18/03

**Labeling Requirement:**

(For purposes of this inspection only): Lamps shall be noticeable to the driver in daylight when lighted, shall remain lighted (ignition on) as long as condition exists, and shall be labeled as indicated below.

<u>Condition:</u>	<u>Performance</u>	<u>P</u>	<u>F</u>
(a & b) Hydraulic failure indicator labeled Brake _____	( X ) BRAKE,	<u>Info. only</u>	___
(1) Noticeable to the driver	( X ) Y, ( ) N	<u>X</u>	___
(2) Remain lighted (with leak, turn ign. off & on)	( X ) Y, ( ) N	<u>X</u>	___
(3) Lens or lettering shall be red - color of lens, coloring of lettering	<u>Black</u> <u>Red</u>	<u>X</u>	___
(4) Lettering at least 1/8" high (1/4" non-split) (for a & b only)	<u>1/8 in.</u>	<u>X</u>	___
(c) Antilock or electrical proportioning failure ( ) ANTILOCK, " <u>ABS</u> " within symbol (1), (2), (3) may be yellow (X) Y, ( ) N, & (4) OK ( ) not so eq	( ) BRAKE,	<u>Info. only</u>	___
(d) Parking brake applied, indicator labeled ( ) PARK BRAKE, ( ) PARK, ( ) _____ (1), (2), (3), (4) OK (X) Y, ( ) N, & (4) OK	( X ) BRAKE,	<u>X</u> <u>Info. only</u> <u>X</u>	___

## 7.0 Data Sheet No. 1.25 Calculation of Minimum Reservoir Volume Requirements

Veh.: 2003 MID BUS GUIDE

NHTSA No.: C30903

Date: 03/15/03

LOCATION	TYPE	DESCRIPTION	MIN. THICKNESS	THICKNESS TO FULLY WORN (1)	
Left Front	Drum	( ) Primary	( ) Pre-Test	<u>0.476 in.</u>	<u>0.050 in.</u>
	Disc	(X) Primary	( ) Post-Test	<u>0.462 in.</u>	
		Inboard	(X)	Δ	
	Secondary	( )	Pre-Test	<u>0.475 in.</u>	
	Secondary	( )	Post-Test	<u>0.464 in.</u>	
	Outboard	(X)	Δ	<u>0.011 in.</u>	

## Lining Clearance:

Diametral<sup>(2)</sup> Not Appl. Inboard 0.01 in. Outboard 0.01 in.

Wheel Cylinder Dia<sup>(3)</sup> Not Appl. Caliper Piston Dia<sup>(3)</sup> 2.355 in. (x2)  
 Shoe Cage Dia<sup>(4)</sup> Not Appl. Center Point of Brake Assembly to  
 Center Point of W.C. Not Appl.

Right Rear	Drum	( ) Primary	( ) Pre-Test	<u>0.469 in.</u>	<u>0.040 in.</u>
	Disc	(X) Leading	( ) Post-Test	<u>0.457 in.</u>	
		Inboard	(X)	Δ	
	Secondary	( )	Pre-Test	<u>0.464 in.</u>	
	Trailing	( )	Post-Test	<u>0.453 in.</u>	
	Outboard	(X)	Δ	<u>0.011 in.</u>	

## Lining Clearance:

Diametral<sup>(2)</sup> Not Appl. Inboard 0.02 in. Outboard 0.02 in.

Wheel Cylinder Dia<sup>(3)</sup> Not Appl. Caliper Piston Dia<sup>(3)</sup> 2.119 in. (x2)  
 Shoe Cage Dia<sup>(4)</sup> Not Appl. Center Point of Brake Assembly to  
 Center Point of W.C. Not Appl.

7.0 Data Sheet No. 1.25 Calculation of Minimum Reservoir Volume Requirements, continued

---

Subsystem 1 consists of: LF ( X ) LR ( ) RF ( X ) RR ( ) Operative  
 Subsystem 2 consists of: LF ( ) LR ( X ) RF ( ) RR ( X ) Operative

(1) Manufacturer's Recommendations ( X ) (2) Drum Brakes, Measured At Horizontal  
 Rear - 0.04 in. ( X ) Centerline  
 Manufacturer's Data: Not Appl.

Front - 0.05 in. ( X ) (4) Reset Position

(3) Manufacturer's Data: Metal Lining Foundation Thickness  
 Front - 2.362 in. (x2) Front - 0.295 in. (nominal)  
 Rear - 2.125 in. (x2) Rear - 0.322 in. (nominal)

Note: Manufacturer's new lining thickness specifications: Fronts - 0.48 in.  
 Rears - 0.48 in.

### Procedure and Calculations for Determining Master Cylinder Volume Requirement

The procedure followed for determining the minimum volume requirements is outlined in the example shown below. The required data is taken from the previous page. Both measured and manufacturer's provided data utilized to obtain the greatest amount of fluid volume.

$$\text{Disc Brake: } V_r = (\Delta t_i + t_{ic} + \Delta t_o + t_{oc}) \times \frac{\pi d^2}{4}$$

Where:  
 $V_r$  = Volume required per wheel  
 $\Delta t$  = Change in thickness (average)  
 $i$  = Inboard  
 $o$  = Outboard  
 $d$  = Caliper cylinder diameter  
 $C$  = Average radial drum-to-lining clearance

Front

$$\text{Disc Brake: } V_r = (\Delta t_i + t_{ic} + \Delta t_o + t_{oc}) \times \frac{\pi d^2}{4}$$

$$\Delta t_i = 0.43 \text{ in.}$$

$$\Delta t_o = 0.43 \text{ in.}$$

$$t_{ic} + t_{oc} = 0.02 \text{ in.}$$

$$d = 2.362 \text{ in.}$$

$$\begin{aligned} V_r &= (0.43 + 0.01 + 0.43 + 0.01) \frac{\pi (2.362)^2}{4} \\ &= 0.88 (4.382) \\ &= 3.856 \text{ in.}^3 = 63.20 \text{ ml} \times 2 \text{ Pistons per Caliper} = 126.40 \text{ ml} \end{aligned}$$

Rear

$$\text{Disc Brake: } V_r = (\Delta t_i + t_{ic} + \Delta t_o + t_{oc}) \times \frac{\pi d^2}{4}$$

$$\Delta t_i = 0.44 \text{ in.}$$

$$\Delta t_o = 0.44 \text{ in.}$$

$$t_{ic} + t_{oc} = 0.04 \text{ in.}$$

$$d = 2.125 \text{ in.}$$

$$\begin{aligned} V_r &= (0.44 + 0.02 + 0.44 + 0.02) \frac{\pi (2.125)^2}{4} \\ &= 0.92 (3.547) \\ &= 3.263 \text{ in.}^3 = 53.48 \text{ ml} \times 2 \text{ Pistons per Caliper} = 106.96 \end{aligned}$$

$$\text{Total Volume required } 2(126.40) + 2(106.96) = 466.7 \text{ ml}$$

APPENDIX A

Instrumentation  
Pre- & Post-Test Calibrations  
Daily Calibrations

**INSTRUMENTATION - FMVSS 105-83 CALIBRATION (12 MONTH MAX. INTERVAL)**

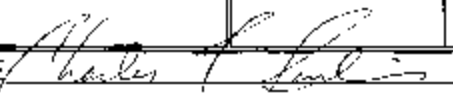
VEHICLE: 2003 MID BUS GUIDE;

NHTSA NO.: C30903;

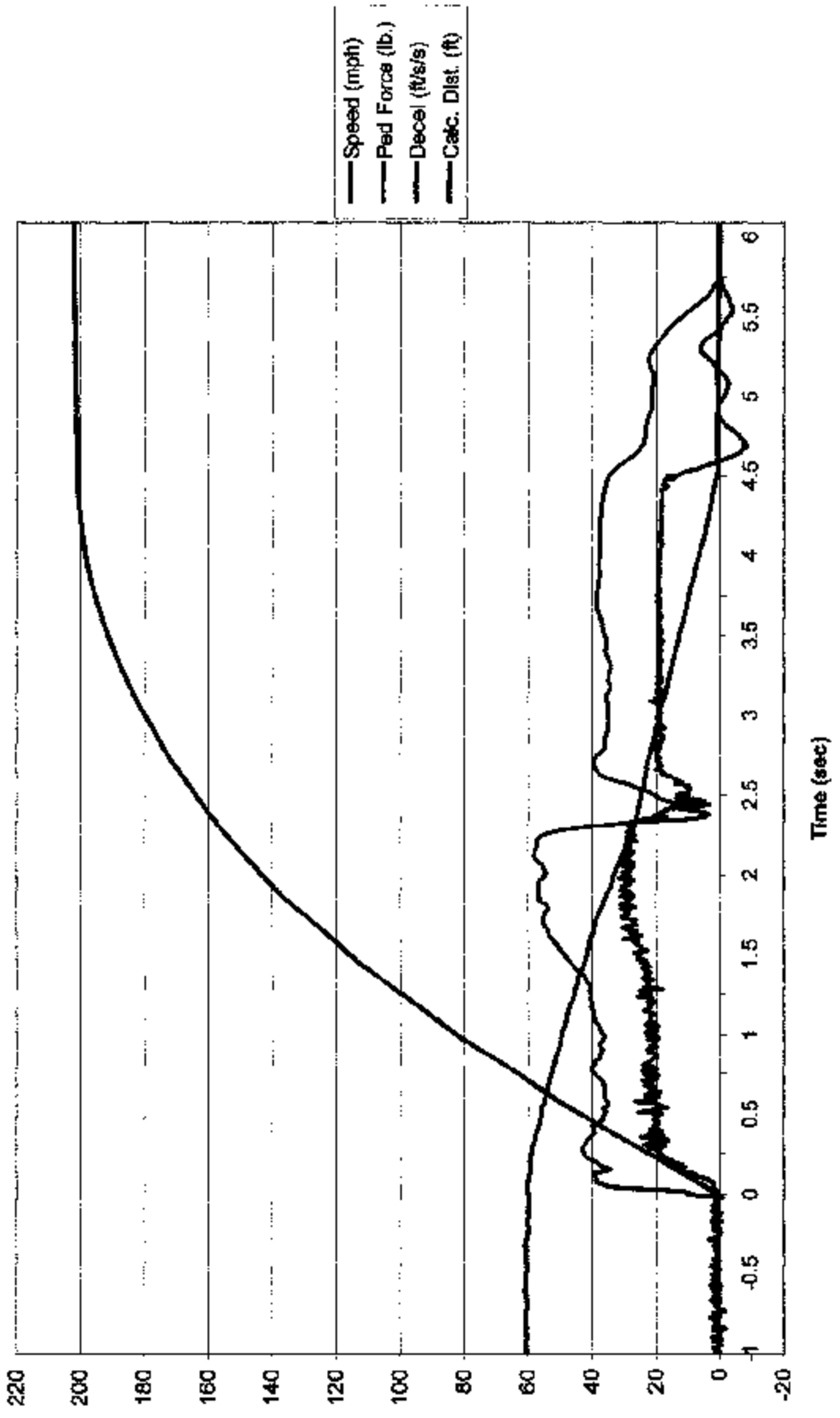
DATE: 02/03/03

INSTRUMENT	SERIAL NUMBER	CALIBRATION DATE	NEXT CALIBRATION
Data Acquisition System - Link Engr. 2082	975016	09/13/02	09/15/03
Computer - Dell Latitude LM/Link Engrg.	TRC-43207	Not Applicable	Not Applicable
Software - Link Engrg. Rev Data	TRC Propr.	NA	NA
LF Torque Wheel	Not Utilized		
RF Torque Wheel	Not Utilized		
LR Torque Wheel	Not Utilized		
RR Torque Wheel	Not Utilized		
Stopwatch - Accusplit	SW-ST03	11/05/02	11/05/03
Tire Pressure Air Gage - Ashcroft	AG-05	11/05/02	11/05/03
Frequency Counter - Hewlett Packard	M-1128A00670	09/19/02	09/19/03
Pedal Force Transducer - Sensor Devel.	169755	Each Test	Each Test
Asst. Pipe-Handle Steel Weights - Ohaus	LBS-0001	02/06/02	02/06/03
Park Brake Force Transducer - Interface	LC-41721	Each Test	Each Test
LF Hydraulic Pressure Transducer	Not Utilized		
RF Hydraulic Pressure Transducer	Not Utilized		
LR Hydraulic Pressure Transducer	Not Utilized		
RR Hydraulic Pressure Transducer	Not Utilized		
Accelerometer - Setra (+ or - 15 g) 141A	A-1055763	Each Test	Each Test
Fifth Wheel - ADAT DRS-06 Radar	140.0119	Each Test	Each Test
Wind Velocity - Davis Scientific	021023N09	10/29/02	10/02/03
Ambient Temperature Gauge - Davis Sci.	021024N11	10/24/02	10/24/03
LF Brake Thermocouple - Temprel/Link	T52-0B-24K	Ea. Test w/Link	Ea. Test w/Link
RF Brake Thermocouple - Temprel/Link	T52-0B-24K	Ea. Test w/Link	Ea. Test w/Link
LR Brake Thermocouple - Temprel/Link	T52-0B-24K	Ea. Test w/Link	Ea. Test w/Link
RR Brake Thermocouple - Temprel/Link	T52-0B-24K	Ea. Test w/Link	Ea. Test w/Link
Lock-up Detection System	TRC Propr.	Each Test	Each Test
Vehicle Weight - Toledo-Mettler Scales	7561RD4011 SN 116641-1KD	02/11/03	05/11/03

QUALITY ASSURANCE

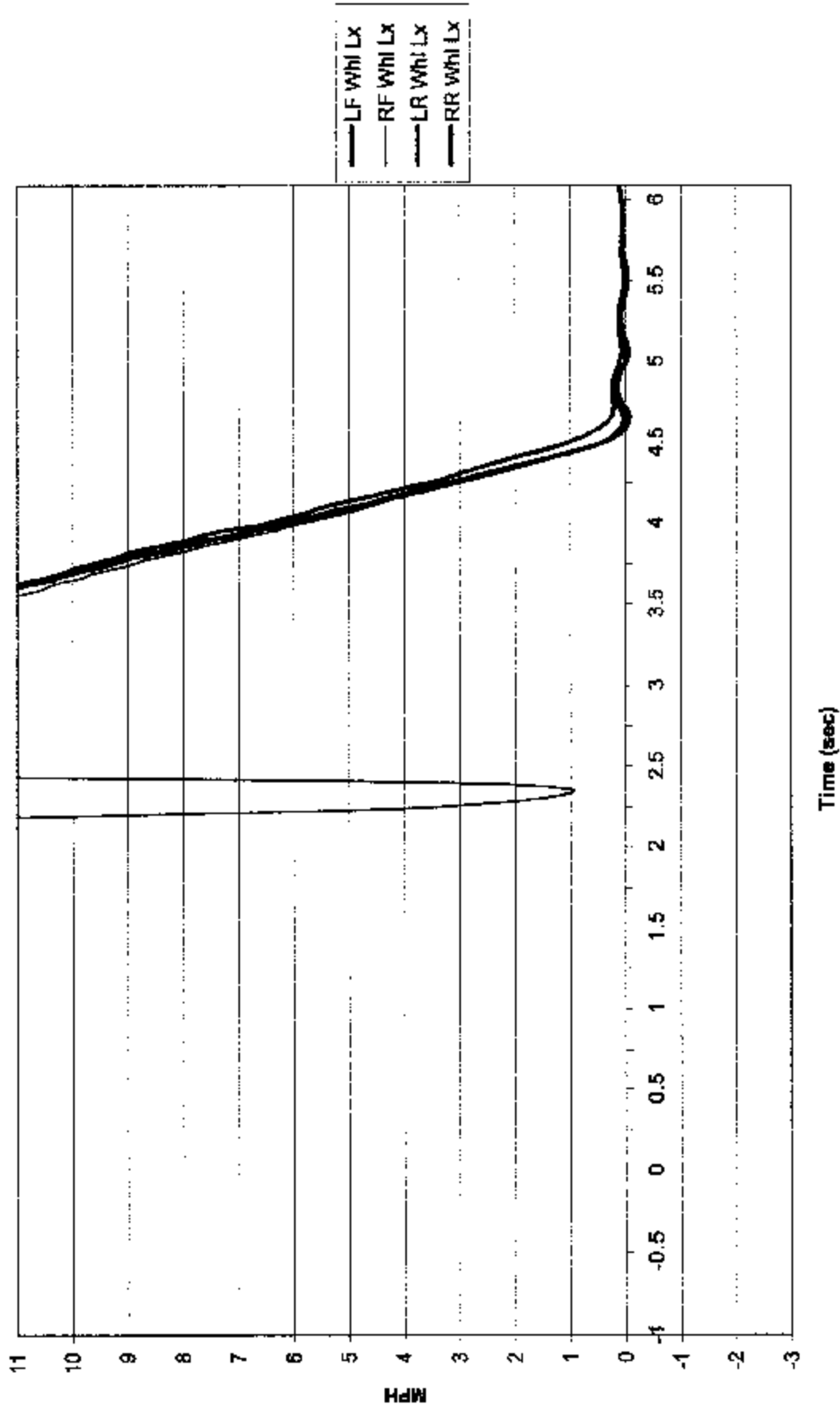


2003 Mid Bus Guide, ABS Inoperative @ 60 MPH, Stop #3, NHTSA No. C30903

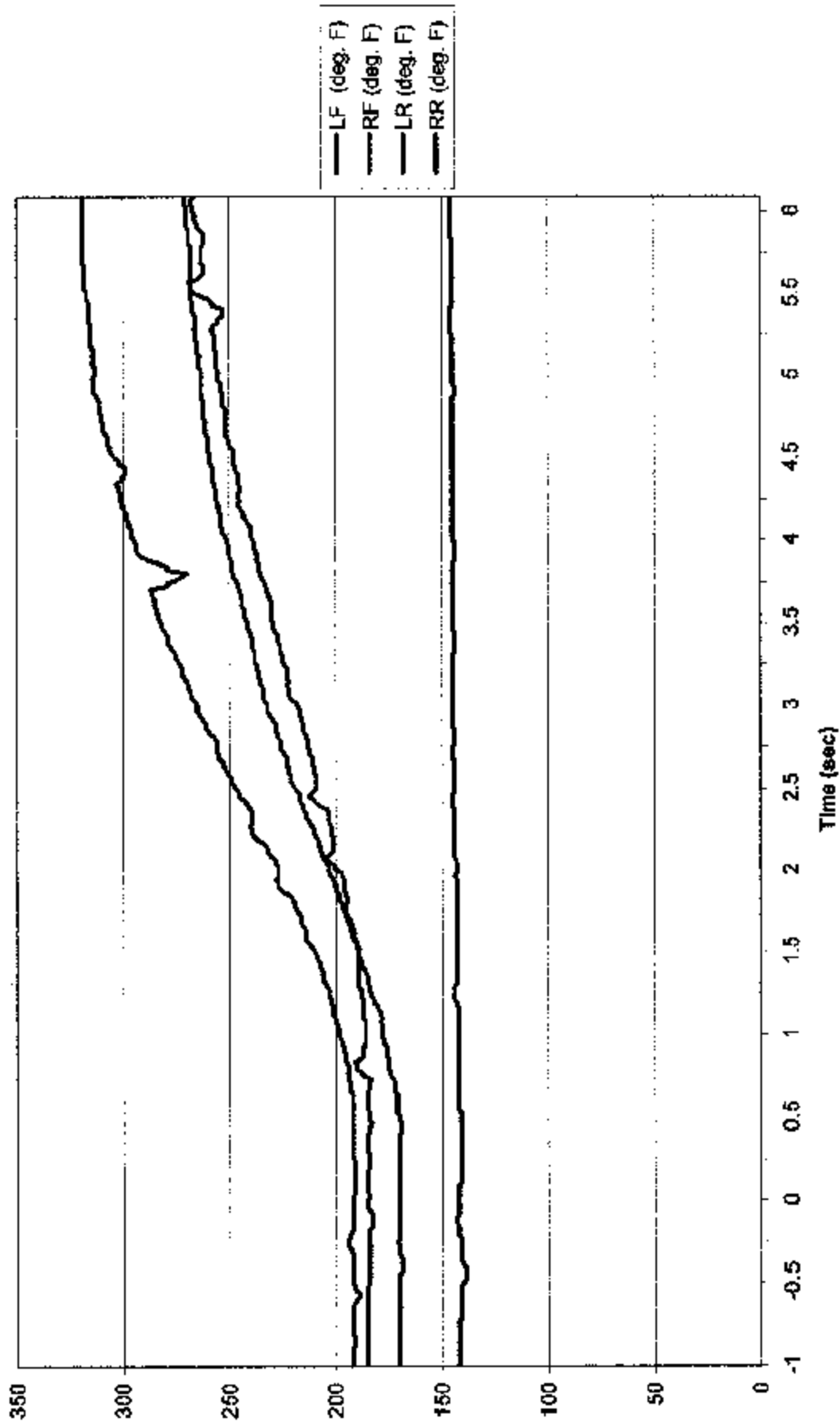




2003 Mid Bus Guide, ABS Inoperative @ 60 MPH, Stop #3, NHTSA No. C30903



2003 Mid Bus Guide, ABS Inoperative @ 60 MPH, Stop #3, NHTSA No C30903



## PRE-TEST CALIBRATION

INSTRUMENTATION CALIBRATION

FMVSS 105-83

<u>X</u>	Pre-Test Calibration	Technician	<u>Karen Easterday</u>
	Post-Test Calibration	Date	<u>02/03/03</u>
	Test Vehicle No. <u>C30903</u>	Approved By	<u>Randy Landes</u>

INSTRUMENT	CALIBRATION PROCEDURE	DESIRED VALUE	INDICATED VALUE	RECORDED VALUE	ALLOWED DEVIATION
Velocity Meter	7.83 KHz Input	70 mph	<u>70.0</u> mph	<u>70.0</u> mph	.1 mph
5th Wheel Distance Meter	Drive Measured Distance	1000 ft.	<u>1000.0</u> ft.	<u>1000.0</u> ft.	10 ft.
		500 ft.	<u>500.3</u> ft.	<u>500.3</u> ft.	5 ft.
		250 ft.	<u>249.7</u> ft.	<u>249.7</u> ft.	2.5 ft.
	@ <10 mph	100 ft.	<u>100.3</u> ft.	<u>100.3</u> ft.	1 ft.
5th Wheel Velocity Meter	Drive Measured Mile @	30 mph	<u>120.00</u> sec.	<u>30.0</u> mph	1 sec./1 mph
	Constant Speed	60 mph/60 sec.	<u>60.00</u> sec.	<u>60.0</u> mph	1 sec./1 mph
Pedal Force Transducer	Cal. Value	87.0 lbs.	<u>87.0</u> lbs.	<u>87.0</u> lbs.	1.5 lbs.
	Dead Weight	0 lbs.	<u>0.0</u> lbs.	<u>0.0</u> lbs.	1.5 lbs.
		25 lbs.	<u>24.8</u> lbs.	<u>24.8</u> lbs.	1.5 lbs.
		50 lbs.	<u>49.8</u> lbs.	<u>49.8</u> lbs.	1.5 lbs.
		75 lbs.	<u>74.7</u> lbs.	<u>74.7</u> lbs.	1.5 lbs.
		100 lbs.	<u>99.7</u> lbs.	<u>99.7</u> lbs.	1.5 lbs.
		125 lbs.	<u>124.7</u> lbs.	<u>124.7</u> lbs.	1.5 lbs.
		150 lbs.	<u>149.9</u> lbs.	<u>149.9</u> lbs.	1.5 lbs.
		175 lbs.	<u>175.0</u> lbs.	<u>175.0</u> lbs.	1.5 lbs.
200 lbs.	<u>200.0</u> lbs.	<u>200.0</u> lbs.	1.5 lbs.		
Accelerometer	Tilt To Known Angles to Simulate Decel	0 fpsps	<u>0.0</u> fpsps	<u>0.1</u> fpsps	.5 fpsps
		10 fpsps	<u>10.0</u> fpsps	<u>10.0</u> fpsps	.5 fpsps
		20 fpsps	<u>20.0</u> fpsps	<u>20.0</u> fpsps	.5 fpsps
		25 fpsps	<u>25.0</u> fpsps	<u>25.0</u> fpsps	.5 fpsps
		32.2 fpsps	<u>32.2</u> fpsps	<u>32.2</u> fpsps	.5 fpsps

INSTRUMENTATION CALIBRATION, continued

FMVSS 105-83

<u>X</u>	Pre-Test Calibration	Technician	<u>Karen Easterday</u>
<u>      </u>	Post-Test Calibration	Date	<u>02/03/03</u>
<u>      </u>	Test Vehicle No. <u>C30903</u>	Approved By	<u>Randy Landes</u>

Lock-Up  
Detector

0 Wheel	Light "ON"		
Speed	LFX	<u>  X  </u>	Yes
Simulation	RFX	<u>  X  </u>	Yes
@ over	LRX	<u>  X  </u>	Yes
10 mph	RRX	<u>  X  </u>	Yes

DAILY CALIBRATION

DAILY CALIBRATIONS (1 of 3)

Vehicle: 2009 Mid Bus Guide

NHTSA No.: C30903

Deceleration Calibration Data for Unit 3050

Desired full scale value is: 32.2 ft/s

Allowed deviation is: + or - 0.5 ft/s

Accelerometer

Level to zero, then tilt to full scale

"Date" "stp"	"Time" "stp"	Zero "Decel"	Cal "Decel"
2/3/2003	8:58:48	-0.02	32.14
2/5/2003	8:56:28	-0.04	32.17
2/6/2003	9:09:13	0.05	32.16
2/13/2003	8:28:43	0.04	32.08
2/13/2003	15:12:17	-0.07	32.07
2/14/2003	8:18:20	0.05	32.21
2/14/2003	14:42:06	0.01	32.23
2/20/2003	10:06:24	0.06	32.25
2/20/2003	15:12:07	0.08	32.36
2/21/2003	8:51:19	-0.02	32.22
2/21/2003	15:08:50	0.09	32.22
3/10/2003	8:54:55	-0.03	32.22
3/10/2003	15:25:08	-0.01	32.29
3/11/2003	10:24:42	0.05	32.01
3/11/2003	15:43:08	-0.02	32.13
3/12/2003	8:16:38	-0.02	32.17
3/12/2003	14:22:45	0.04	32.02
3/14/2003	11:00:31	0.01	32.23

PRE-TEST CAL.

POST-TEST CAL.

Pre-Test Linearity Check 02/03/03

Actual (ft/s)	Rec. (ft/s)
0.0	0.0
10.0	10.0
20.0	20.0
25.0	25.0
32.2	32.2

Post-Test Linearity Check 03/14/03

Actual (ft/s)	Rec. (ft/s)
0.0	0.0
10.0	10.0
20.0	20.0
25.0	25.0
32.2	32.2

Distance Calibration for 3050

Desired value is: 1000 ft

Allowed deviation is: 10 ft

Light beam  
distance sensor

Drive from 0 to 60 to 0 mph  
on a measured 1000 ft.

"Date" "stp"	"Time" "stp"	Distance for 1000 feet
2/3/2003	15:12:26	1000.0
2/3/2003	15:14:22	500.3
2/3/2003	15:15:58	249.7
2/3/2003	15:17:59	100.9
2/5/2003	9:07:31	1001.2
2/13/2003	8:35:55	1000.4
2/13/2003	15:19:43	999.8
2/14/2003	8:31:14	1000.8
2/14/2003	15:31:16	1000.0
2/20/2003	10:17:51	1001.7
2/20/2003	15:16:51	1000.5
2/21/2003	9:05:25	1000.3
2/21/2003	15:13:46	999.3
3/10/2003	9:01:32	1000.8
3/10/2003	15:30:56	999.1
3/11/2003	10:33:25	1000.2
3/11/2003	15:17:42	999.6
3/12/2003	8:24:05	1000.7
3/12/2003	14:26:13	999.7
3/14/2003	8:39:53	1000.1
3/14/2003	8:42:10	500.2
3/14/2003	8:43:31	249.4
3/14/2003	8:44:57	100.1

PRE-TEST CAL. 100

PRE-TEST CAL. 500

PRE-TEST CAL. 250

PRE-TEST CAL. 100

POST-TEST CAL.

POST-TEST CAL.

POST-TEST CAL.

POST-TEST CAL.

DAILY CALIBRATIONS CONTINUED (2 of 3)

VEHICLE: 2003 Mid Bus Guide

NHTSA No.: C30903

Wheel Tachometer Calibrations for Unit 3050

Wheel tachometer calibrations: all wheel speeds should be 10 mi/h

Date	Time	Zero	@ 15mi/h		Zero	@ 15mi/h		Zero	@ 15mi/h	
		LF	LF	RF	RF	LR	LR	RR	RR	
2/3/2003	15:38:54	0.0	10.9	0.0	10.9	0.0	10.9	0.0	10.6	10.6
2/5/2003	9:03:06	0.0	10.9	0.0	10.9	0.0	10.9	0.0	10.2	10.2
2/8/2003	9:13:45	0.0	10.5	0.0	10.5	0.0	10.5	0.0	10.3	10.3
2/13/2003	11:08:38	0.0	10.8	0.0	10.5	0.0	10.7	0.0	10.7	10.7
2/13/2003	15:17:44	0.0	12.2	0.0	11.9	0.0	12.2	0.0	12.0	12.0
2/14/2003	8:25:15	0.0	10.6	0.0	10.2	0.0	10.6	0.0	10.1	10.1
2/14/2003	15:27:57	0.0	10.8	0.0	10.4	0.0	10.7	0.0	10.3	10.3
2/20/2003	10:12:08	0.0	10.5	0.0	10.2	0.0	10.4	0.0	10.2	10.2
2/20/2003	15:18:23	0.0	10.7	0.0	10.4	0.0	10.5	0.0	10.4	10.4
2/21/2003	8:53:01	0.0	11.1	0.0	10.8	0.0	10.9	0.0	10.7	10.7
2/21/2003	15:12:26	0.0	10.8	0.0	10.5	0.0	10.7	0.0	10.4	10.4
3/10/2003	8:58:41	0.0	10.7	0.0	10.4	0.0	10.7	0.0	10.5	10.5
3/10/2003	15:27:07	0.0	10.6	0.0	10.1	0.0	10.4	0.0	10.1	10.1
3/11/2003	10:31:40	0.0	12.5	0.0	12.4	0.0	12.6	0.0	12.3	12.3
3/11/2003	15:45:23	0.0	11.0	0.0	10.7	-0.6	10.4	0.0	10.6	10.6
3/12/2003	8:19:49	0.0	11.1	0.0	10.7	0.0	11.1	0.0	10.4	10.4
3/12/2003	14:24:53	0.0	10.9	0.0	10.1	0.0	10.3	0.0	10.2	10.2
3/14/2003	8:35:40	0.0	11.5	0.0	10.1	0.0	10.4	0.0	10.2	10.2

When driven over 10 mi/hr and the wheel tach generators are shunted to zero volts, do all four wheel lock indicators align?  Yes,  No.

Pedal Force Meter Calibration for Unit 3050

Target shunt calibration is 87 lbs.

Desired recorded value is: 87.0 lbs.

Allowed deviation is: 1.5 lbs.

Date	Time	Zero	Cal Val
stp	stp	Force	Force lbs.
2/3/2003	13:35:00	-1.2	200.2
2/5/2003	8:55:04	-0.3	87.2
2/6/2003	9:06:34	-0.2	87.2
2/13/2003	8:26:59	-0.1	87.2
2/13/2003	15:15:35	-0.1	87.2
2/14/2003	8:22:34	-0.1	87.2
2/14/2003	14:47:50	-0.1	87.2
2/20/2003	10:04:19	-0.1	87.3
2/20/2003	15:13:53	-0.1	87.1
2/21/2003	8:56:40	-0.1	87.2
2/21/2003	15:10:54	-0.1	87.2
3/10/2003	8:53:54	-0.1	87.2
3/10/2003	15:23:59	-0.1	87.2
3/11/2003	10:23:01	-0.1	87.2
3/11/2003	15:44:48	-0.1	87.1
3/12/2003	8:15:28	-0.1	87.2
3/12/2003	14:21:54	-0.1	87.2
3/14/2003	11:20:59	-0.1	200.4

Pre-Test Linearity Check - 02/03/03

Actual Force (lb)	Recorded Force (lb)
0	0
50	49.8
100	99.7
150	149.9

Post-Test Linearity Check - 03/14/03

Actual Force (lb)	Recorded Force (lb)
0	0.1
50	49.9
100	99.9
150	150.0



**DAILY CALIBRATIONS CONTINUED (3 of 3)**

VEHICLE: 2003 Mid Bus Guide

NHTSA No. C30903

Dynamic Speed Calibration for Unit 3050

Desired speed value is: 60 mi/h

Allowed deviation is: 1.0 mi/h

Desired time value is: 60 seconds

Allowed deviation is: + or - 1.0 seconds

Light beam speed sensor Drive vehicle at a steady 60 mi/h through a mile.

"Date"	"Time"	"Speed"	Time'	
stp	stp	mi/h	sec	
2/3/2003	15:29:03	60.3	60.00	PRE-TEST CAL. 60
2/3/2003	15:31:44	30.2	120.00	PRE-TEST CAL. 30
2/5/2003	9:11:08	60.5	60.00	
2/13/2003	8:39:15	60.6	59.93	
2/13/2003	15:23:24	60.6	59.71	
2/14/2003	8:34:26	60.2	60.12	
2/14/2003	15:34:59	60.1	59.93	
2/20/2003	10:21:26	60.1	60.00	
2/20/2003	15:20:28	60.6	59.65	
2/21/2003	9:07:06	60.0	60.00	
2/21/2003	15:17:05	60.4	59.78	
3/10/2003	9:04:50	60.2	60.01	
3/10/2003	15:34:37	60.4	60.05	
3/11/2003	10:36:35	60.2	59.82	
3/11/2003	15:50:40	60.5	59.75	
3/12/2003	8:27:23	60.3	60.00	
3/12/2003	14:29:24	60.3	60.00	
3/14/2003	8:49:47	60.2	60.00	POST-TEST CAL. 60
3/14/2003	8:53:24	30.1	120.00	POST-TEST CAL. 30

## POST-TEST CALIBRATION

POST-TEST CALIBRATION

FMVSS 105-83

<u>X</u>	Pre-Test Calibration	Technician	<u>Karen Easterday</u>
	Post-Test Calibration	Date	<u>03/14/03</u>
	Test Vehicle No. <u>C30903</u>	Approved By	<u>R. Landes</u>

INSTRUMENT	CALIBRATION PROCEDURE	DESIRED VALUE	INDICATED VALUE	RECORDED VALUE	ALLOWED DEVIATION
Velocity Meter	7.90 KHz Input	70 mph	<u>70.0</u> mph	<u>70.0</u> mph	.1 mph
5th Wheel Distance Meter	Drive Measured	1000 ft.	<u>1000.0</u> ft.	<u>1000.0</u> ft.	10 ft.
	Distance	500 ft.	<u>500.2</u> ft.	<u>500.2</u> ft.	5 ft.
	Distance	250 ft.	<u>249.4</u> ft.	<u>249.4</u> ft.	2.5 ft.
	@ <10 mph	100 ft.	<u>100.1</u> ft.	<u>100.1</u> ft.	1 ft.
5th Wheel Velocity Meter	Drive Measured	30 mph	<u>120.00</u> sec.	<u>30.0</u> mph	1 sec./1 mph
	Mile @ Constant Speed	120 sec.			
		60 mph/60 sec.	<u>60.00</u> sec.	<u>60.0</u> mph	1 sec./1 mph
Pedal Force Transducer	Cal. Value	<u>87.0</u> lbs.	<u>87.9</u> lbs.	<u>87.9</u> lbs.	1.5 lbs.
	Dead Weight	0 lbs.	<u>0.1</u> lbs.	<u>0.1</u> lbs.	1.5 lbs.
		25 lbs.	<u>24.9</u> lbs.	<u>24.9</u> lbs.	1.5 lbs.
		50 lbs.	<u>49.9</u> lbs.	<u>49.9</u> lbs.	1.5 lbs.
		75 lbs.	<u>74.7</u> lbs.	<u>74.7</u> lbs.	1.5 lbs.
		100 lbs.	<u>99.9</u> lbs.	<u>99.9</u> lbs.	1.5 lbs.
		125 lbs.	<u>124.8</u> lbs.	<u>124.8</u> lbs.	1.5 lbs.
		150 lbs.	<u>150.0</u> lbs.	<u>150.0</u> lbs.	1.5 lbs.
		175 lbs.	<u>175.0</u> lbs.	<u>175.0</u> lbs.	1.5 lbs.
200 lbs.	<u>200.0</u> lbs.	<u>200.0</u> lbs.	1.5 lbs.		
Accelerometer	Tilt To Known Angles to Simulate Decel	0 fpsps	<u>0.0</u> fpsps	<u>0.0</u> fpsps	.5 fpsps
		10 fpsps	<u>10.0</u> fpsps	<u>10.0</u> fpsps	.5 fpsps
		20 fpsps	<u>20.0</u> fpsps	<u>20.0</u> fpsps	.5 fpsps
		25 fpsps	<u>25.0</u> fpsps	<u>25.0</u> fpsps	.5 fpsps
		32.2 fpsps	<u>32.2</u> fpsps	<u>32.2</u> fpsps	.5 fpsps

INSTRUMENTATION CALIBRATION, CONTINUED

FMVSS 105-83

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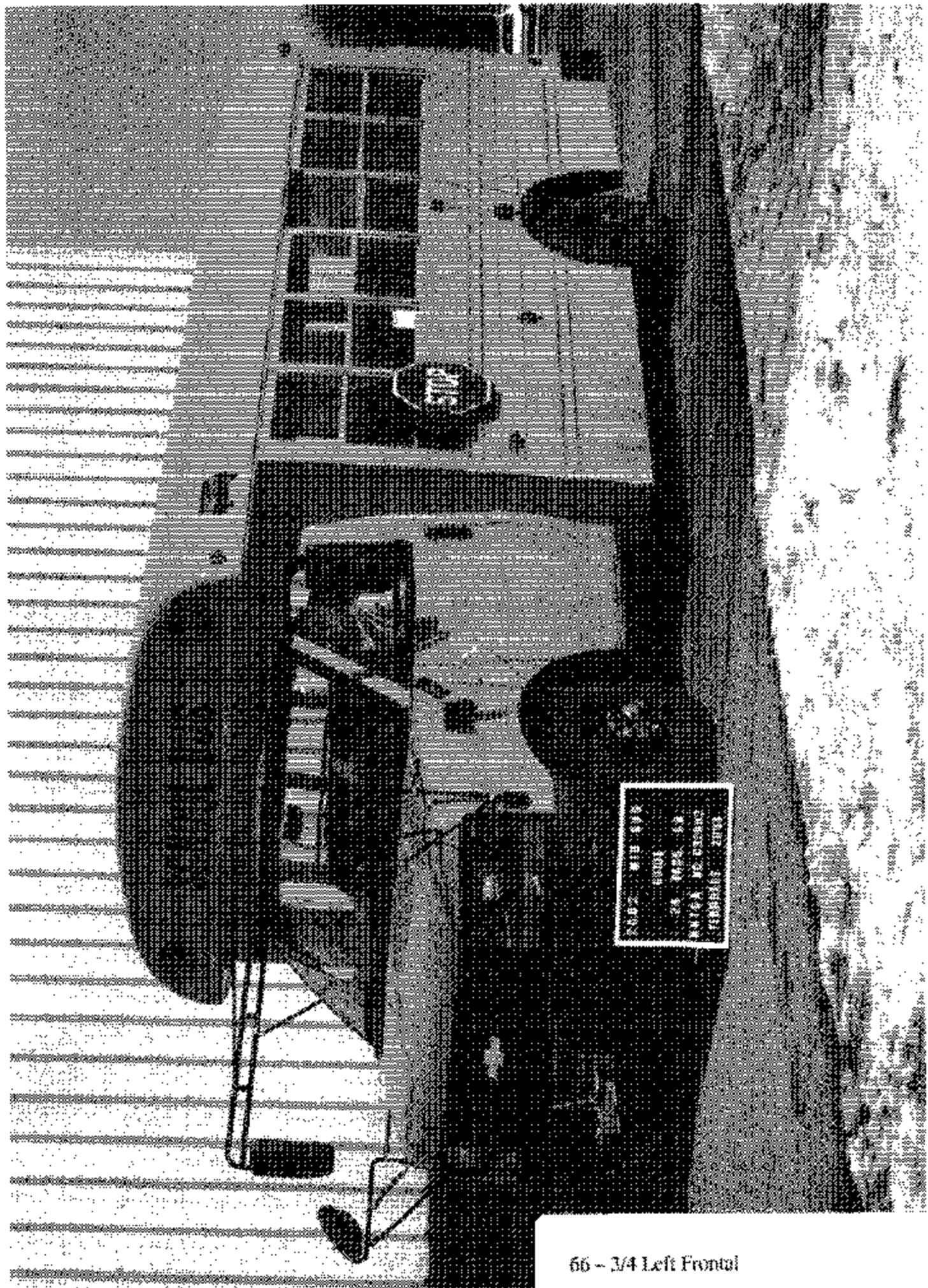
<u>  </u>	Pre-Test Calibration	Technician	<u>Karen Easterday</u>
<u>X</u>	Post-Test Calibration	Date	<u>03/14/03</u>
	Test Vehicle No. C30903	Approved By	<u>R. Landes</u>

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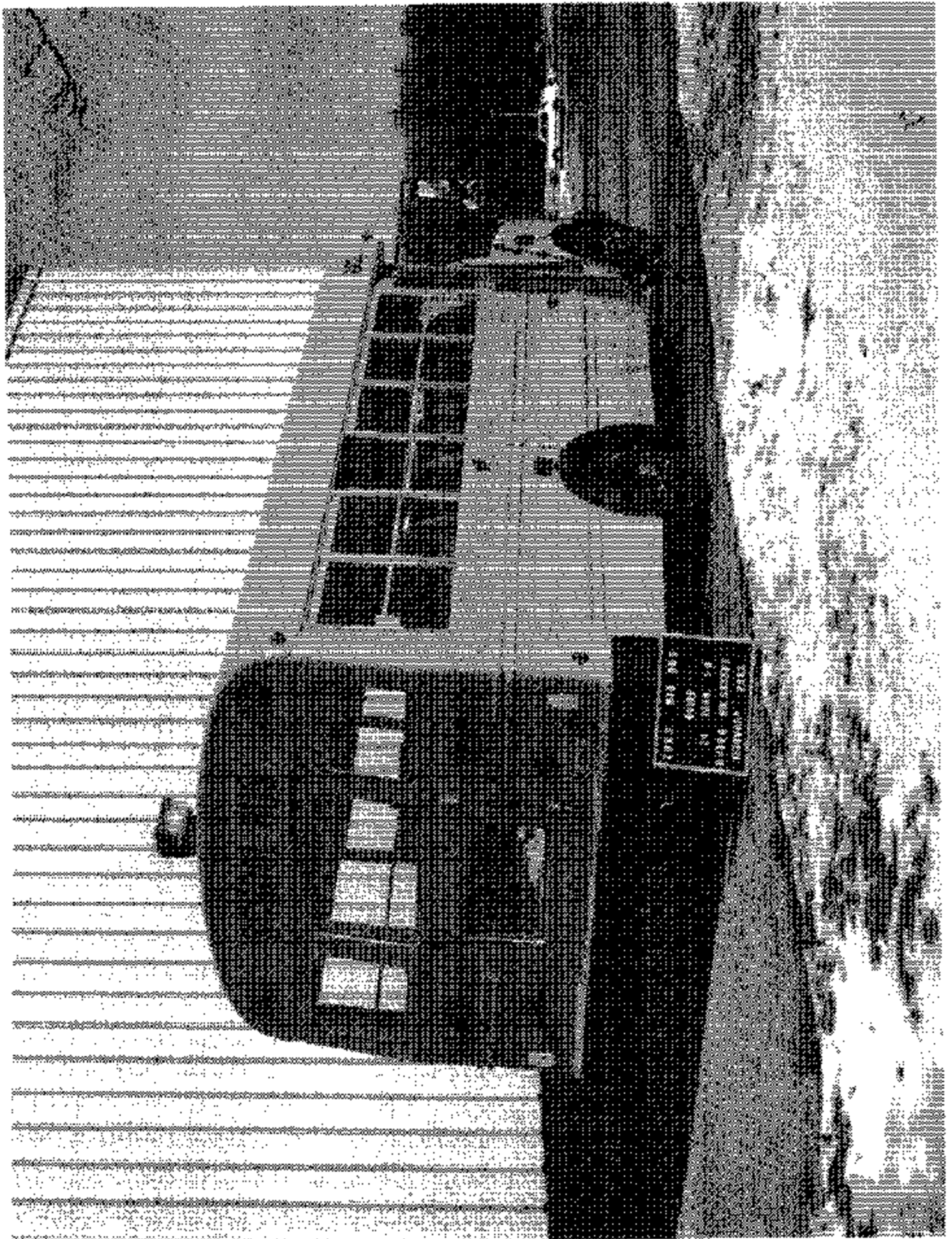
Lock-Up Detector	0 Wheel	Light "ON"		
	Speed	LFX	<u>  X  </u>	Yes
	Simulation	RFX	<u>  X  </u>	Yes
	@ over	LRX	<u>  X  </u>	Yes
	10 mph	RRX	<u>  X  </u>	Yes

APPENDIX B

Photographs



66 - 3/4 Left Frontal



67 - 3/4 Right Rear

# 2003 MID-BUS GUIDE

## 24-PASS. SCHOOL BUS

### NHTSA NO. C30903

### FEBRUARY 2003

505 EAST JEFFERSON STREET  
BLUFFTON, OHIO 45817-1398  
PH: 419-358-2500 FAX: 419-358-2400

CHASSIS VIN NO. 1GNE31162110295  
BODY NO. CSD-7460-C-033097  
MODEL NO. CSD-7460-C  
SEQUENCE NO. 2442  
MAX DESIGN CAP. 23,197C  
COMPLETION DATE 12/02  
EQUIPPED CAP. 24-19A/C

THIS BUS MEETS ALL APPLICABLE FEDERAL MOTOR VEHICLE  
SAFETY STANDARDS AND STATE STANDARDS



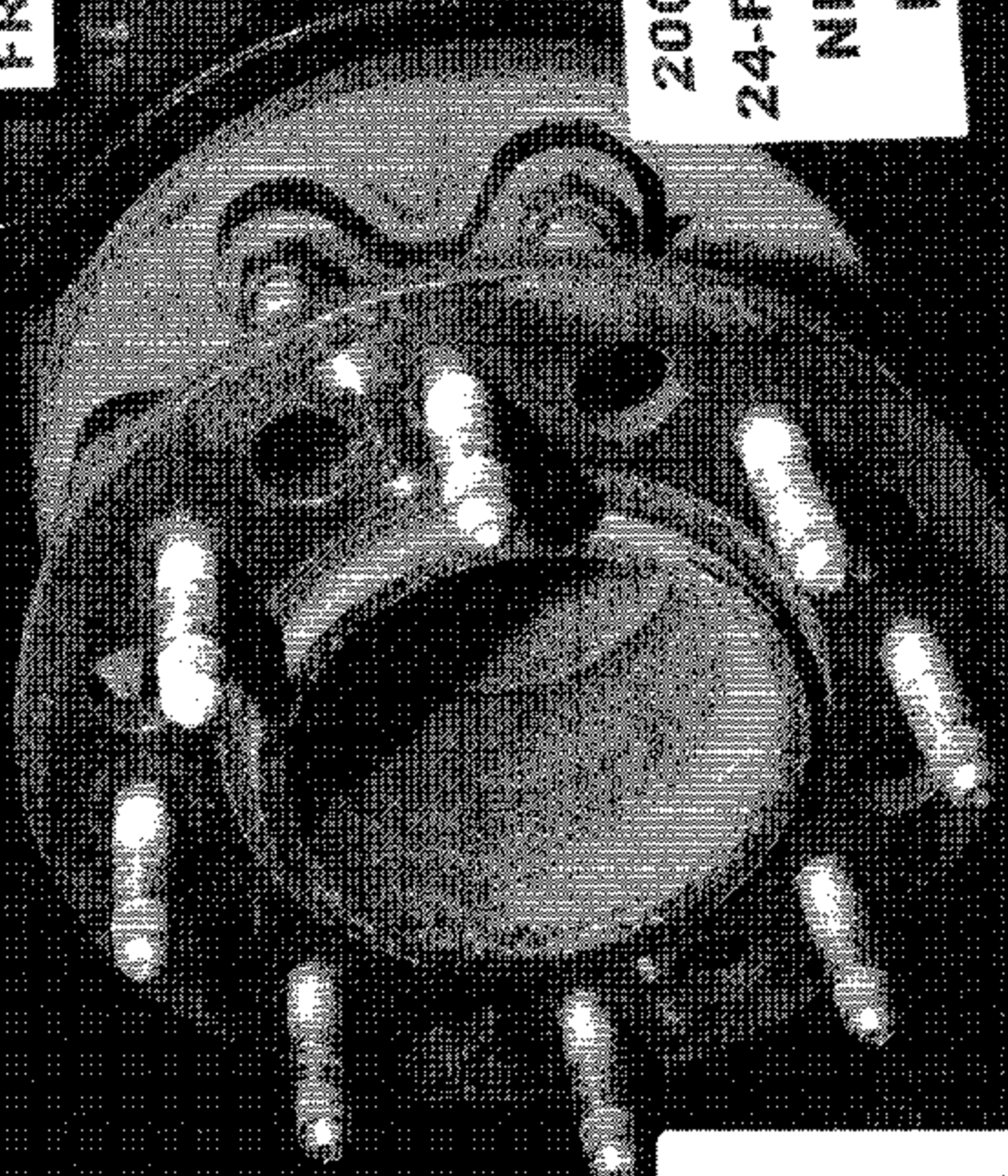
MFG BY: MID-BUS INC.  
BLUFFTON, OH 45817  
DATE OF MFR. NO. 12 YR. 02  
INC. VEH. MFG. BY:  
Chevrolet Motor Division  
DATE OF INC. VEH. MFR.  
NO. 09 YR. 02  
GVWR:  
5943 KG ( 12,000 LB)  
GAWR-FRONT:  
1951 KG ( 4,300 LB)  
GAWR INTERMEDIATE (1):  
KG ( LB)  
GAWR INTERMEDIATE (2):  
KG ( LB)  
GAWR-REAR:  
3901 KG ( 8,600 LB)  
THIS VEHICLE CONFORMS TO ALL APPLI-  
CABLE U.S.A. FEDERAL MOTOR VEHICLE  
SAFETY STANDARDS IN EFFECT IN:  
NO. 09 YR. 02  
VEHICLE IDENTIFICATION NUMBER:  
1GBJ3310431110295  
VEHICLE TYPE: School Bus  
JSD-7460-C-033097

SUITABLE TIRE-RIM CHOICE  
FRONT: L1225/75R160 TIRES,  
16x5.57, PMS, @ 450 KPA,  
( 52 PSI COLD Single  
INTERMEDIATE (1):  
TIRES,  
PMS, @ KPA,  
( PSI COLD  
INTERMEDIATE (2):  
TIRES,  
PMS, @ KPA,  
( PSI COLD  
REAR: L1225/75R160 TIRES,  
16x5.57, PMS, @ 450 KPA,  
( 52 PSI COLD Single

2003 MID-BUS GUIDE  
24-PASS, SCHOOL BUS  
NHTSA NO. C30903  
FEBRUARY 2003

**LEFT  
FRONT**

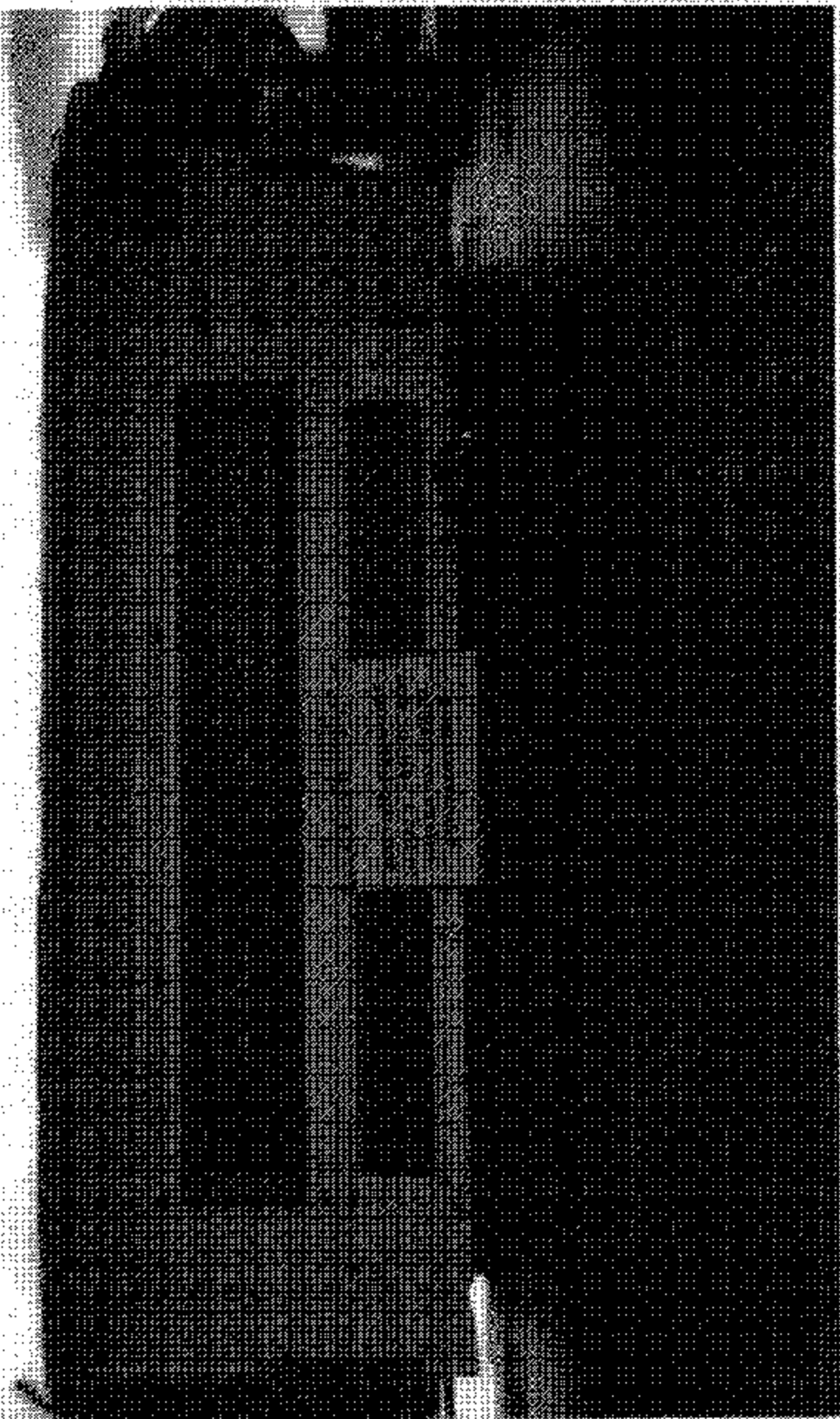
**2003 MID-BUS GUIDE  
24-PASS. SCHOOL BUS  
NHTSA NO. C30903  
FEBRUARY 2003**



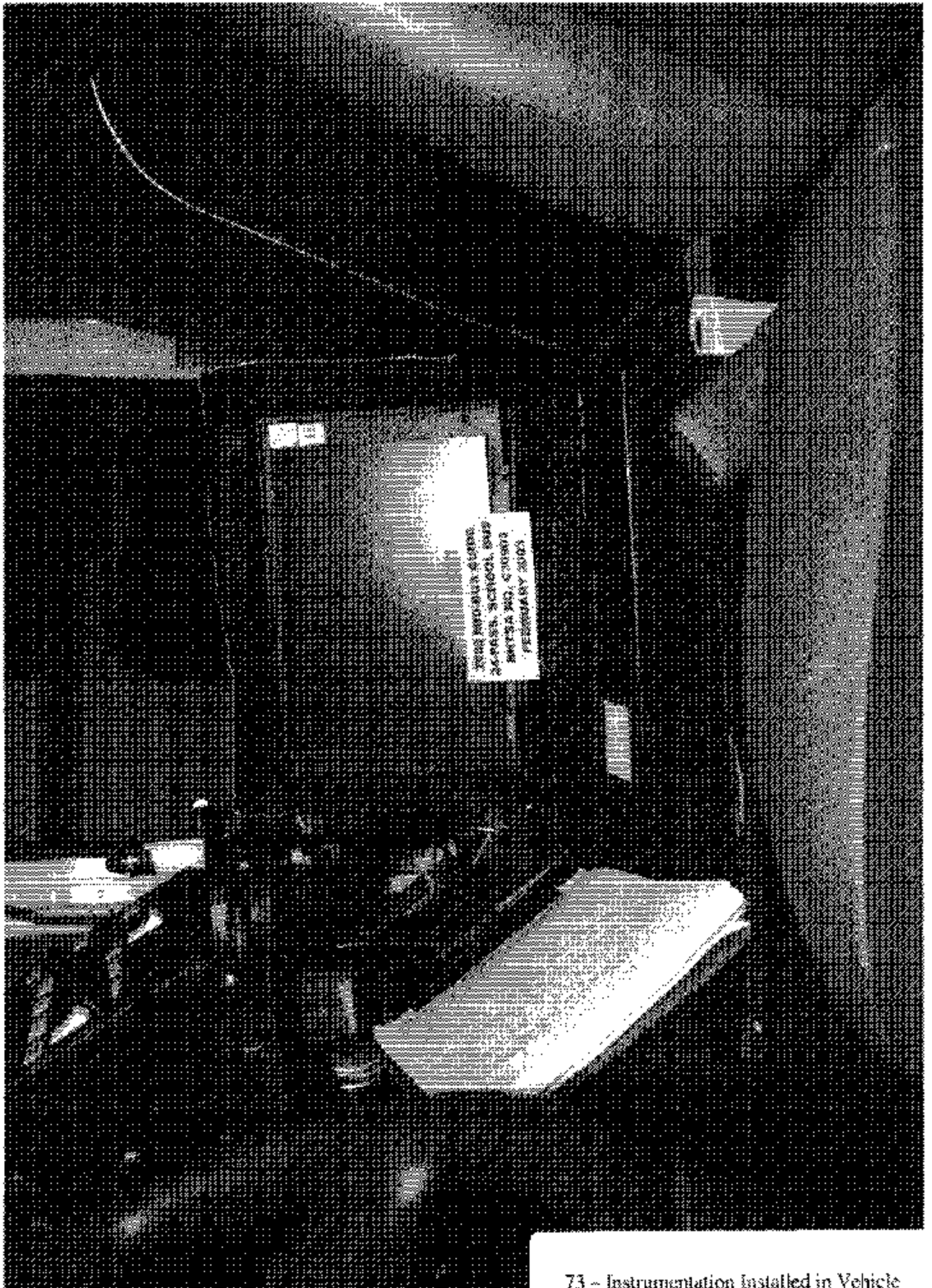
70 - Thermocouple Installation  
Left Front

**RIGHT  
REAR**

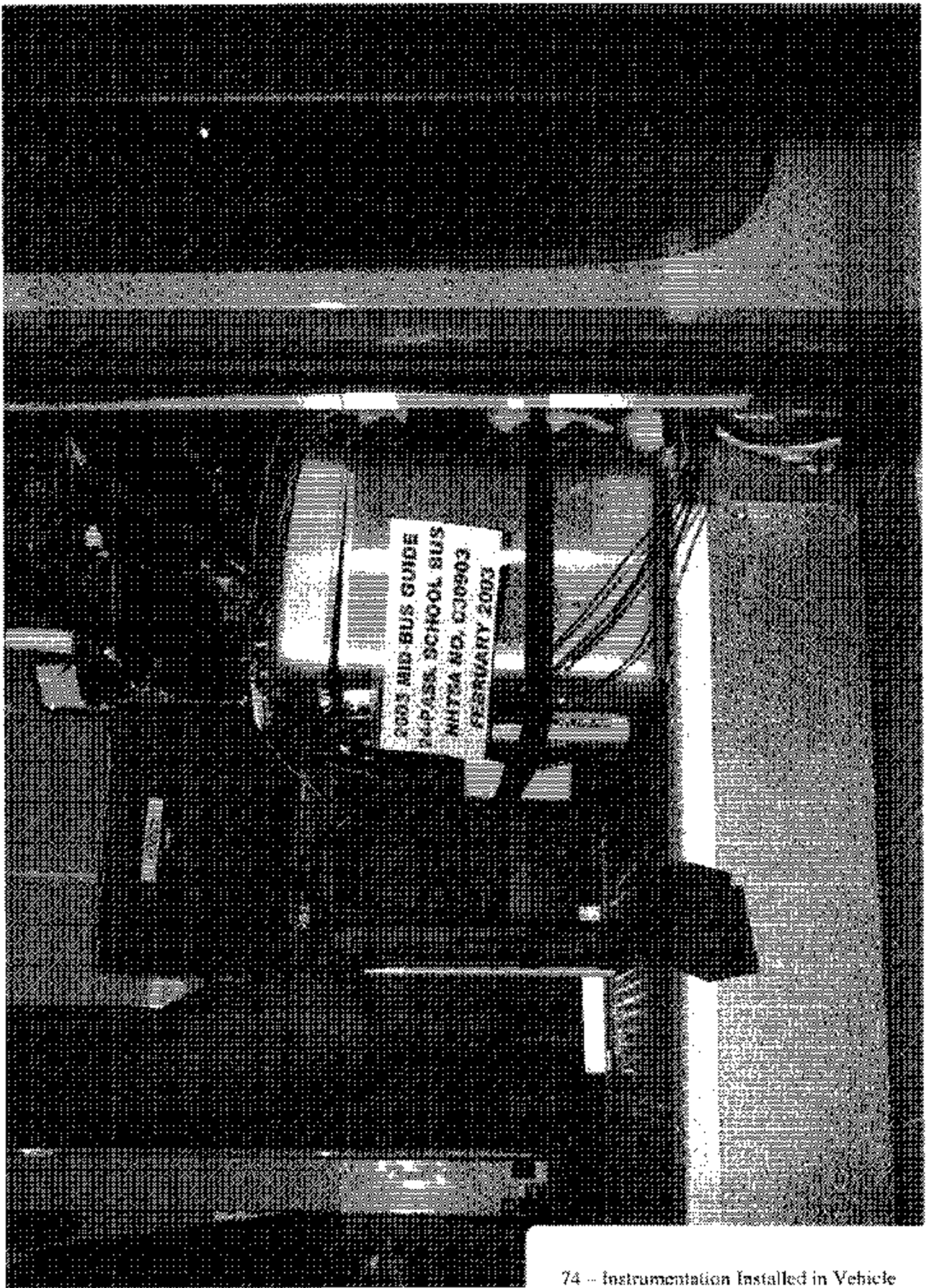
**2003 MID-BUS GUIDE  
24-PASS. SCHOOL BUS  
NHTSA NO. C30903  
FEBRUARY 2003**



72 - Instrumentation Installed in Vehicle



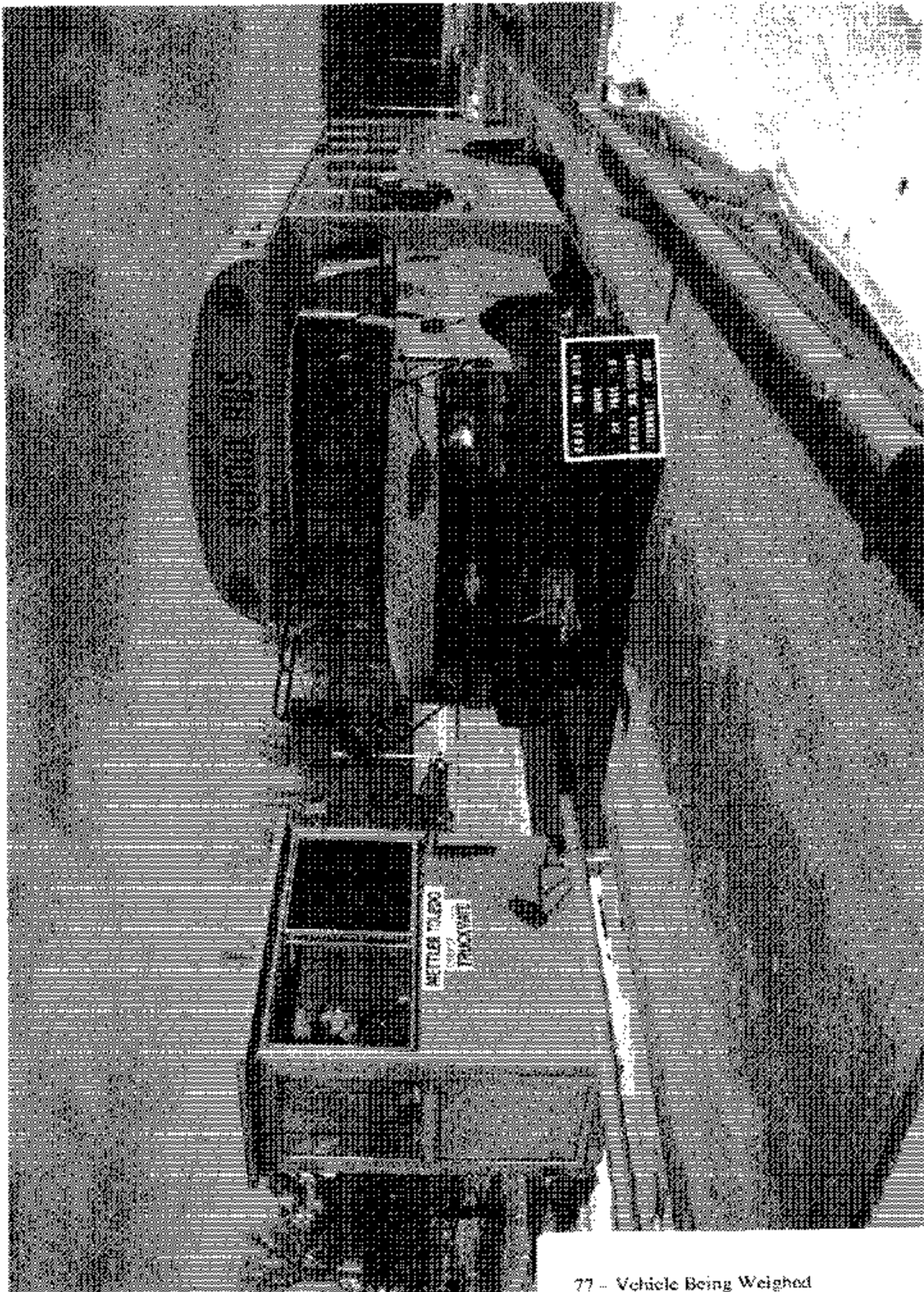
73 - Instrumentation Installed in Vehicle





2003 MID-BUS GUIDE  
24-PASS. SCHOOL BUS  
NHTSA NO. C30903  
FEBRUARY 2003





77 - Vehicle Being Weighed



2003 MID-BUS

GUIDE

24-PASS. S.B.

NHTSA NO. C30903

FEBRUARY 2003



79 - Ballast in Vehicle

**2003 MID-BUS GUIDE  
24-PASS, SCHOOL BUS  
NHTSA NO. C30903  
FEBRUARY 2003**

The image shows a close-up of a vehicle's instrument cluster, which is partially obscured by a white rectangular label. The cluster includes a speedometer with markings for 50, 100, and 150, and a tachometer with markings for 1000 and 1500. The needle of the speedometer is positioned near the 50 mark. The white label is placed over the right side of the instrument cluster, containing text that identifies the document as a 2003 Mid-Bus Guide for a 24-pass school bus, with NHTSA number C30903, dated February 2003.

2003 MID-BUS GUIDE  
24-PASS. SCHOOL BUS  
NHTSA NO. C30903  
FEBRUARY 2003



2003 MID-BUS GUIDE  
24-PASS. SCHOOL BUS  
NHTSA NO. C30903  
FEBRUARY 2003

APPENDIX C

Copy of Manufacturer's Sticker

Note for C30903:

There was no manufacturer's sticker available for the final stage manufacturer. The sticker that follows is from the incomplete vehicle manufacturer.



2006 Chevrolet Colorado LTZ

VORTEC 6000 V8 SFI GAS ENGINE

4 SPEED AUTO TRANS W/OVERDRIVE

EXTERIOR WHEATLAND YELLOW

INTERIOR MEDIUM DARK PEWTER - VINYL



Most dependable, longest-lasting trucks. CHEVY TRUCKS

Division of General Motors Corporation

STANDARD EQUIPMENT

Items Featured Below are included at NO EXTRA CHARGE in the Standard Vehicle Price Shown at Right

- OPERATION/DURABILITY FEATURES:
POWER STEERING
FRONT DISCREAR DISC BRAKES
W/FRONT DISC BRAKE WEAR SENSORS
INDEPENDENT FRONT SUSPENSION
2 STAGE MULTI-LEAF RR SPRINGS
FRONT STABILIZER BAR
BATTERY
APPROX 35 GALLON FUEL TANK
SAFETY & SECURITY FEATURES:
DRIVER & FRONT PASS AIR BAGS
BRAKE/TRANS SHIFT INTERLOCK
DAYTIME RUNNING LAMPS
FOUR WHEEL ANTI-LOCK BRAKES
STEEL SIDE DOOR BEAMS
ENERGY ABSORBING STRG COLUMN
PASSLOCK THEFT DETERRANT
CONVENIENCE FEATURES:
AM/FM STEREO, SK&SC, AND CLOCK

- SOLAR-RAY TINTED GLASS
FRONT AIR CONDITIONING
FRONT/SIDE WINDOW DEFOGGERS
INTERMITTENT WIPER SYSTEM
GAGES AND TRIP ODOMETER
HIGH BACK BUCKET SEATS
DRIVER AND PASSENGER
2 POWER OUTLETS, 3 CUPHOLDERS
HALOGEN HEADLAMPS
FRONT VINYL FLOOR COVERING
OTHER ADDED FEATURES:
BASE COAT CLEAR COAT PAINT
CORROSION PREVENTION PACKAGE
FRONT PAINTED BUMPERS, GRILLE
INTERIOR DOME LAMP
3 YEAR/36,000 MILE LIMITED WARRANTY-SEE DLR FOR DETAILS
24 HOUR ROADSIDE ASSISTANCE

Compare this vehicle to others in the FREE FUEL ECONOMY GUIDE available at the dealer.

CITY MPG

HIGHWAY MPG



Actual mileage will vary with options, driving conditions, driving habits and vehicle condition. Results reported to EPA indicate that the majority of vehicles with these estimates will achieve between

and mpg in the city and between and mpg on the highway.

\* NOT APPLICABLE \*

ZZZ

2006 CHEVROLET COLORADO LTZ
MID BUB INC
55 E JEFFERSON ST
BLUFFTON SC 29910
DM 4487

FINAL ASSEMBLY WENTZVILLE MO USA
PART NO 100122800
PEWTER COLOR C
DEALER NO 06-193

VIN 1GBJG31U431110295

STANDARD VEHICLE PRICE
Options Installed by Manufacturer

\$23,755.00

- SCHOOL BUS CHASSIS EQUIPMENT 430.00
PAINTED WHEEL - BLACK 30.00
AIR CONDITIONING NOT DESIRED -795.00
DRIVER ONLY, HIGH BACK BUCKET -185.00
DELETE- RH DOOR -140.00
RADIO DELETE -100.00
GVW RATING - 12,000 LBS NO CHARGE
INTERIOR REARVIEW MIRROR NO CHARGE
HVAC PROV. AUX HEATER WIRING NO CHARGE
FEDERAL EMISSIONS - CLEAN FUEL NO CHARGE
FLEET VEHICLE NO CHARGE
FRONT LICENSE PLATE MOUNT NO CHARGE
LT225/75R16ID ALS BW TIRES-FRNT NO CHARGE
LT225/75R16ID ALS BW TIRES-REAR NO CHARGE
PREFERRED EQUIPMENT GROUP 1SA NO CHARGE
CONSISTS OF:
STANDARD BODY NO CHARGE
WHEATLAND YELLOW NO CHARGE

TOTAL OPTIONS -760.00

TOTAL VEHICLE & OPTIONS \$22,995.00

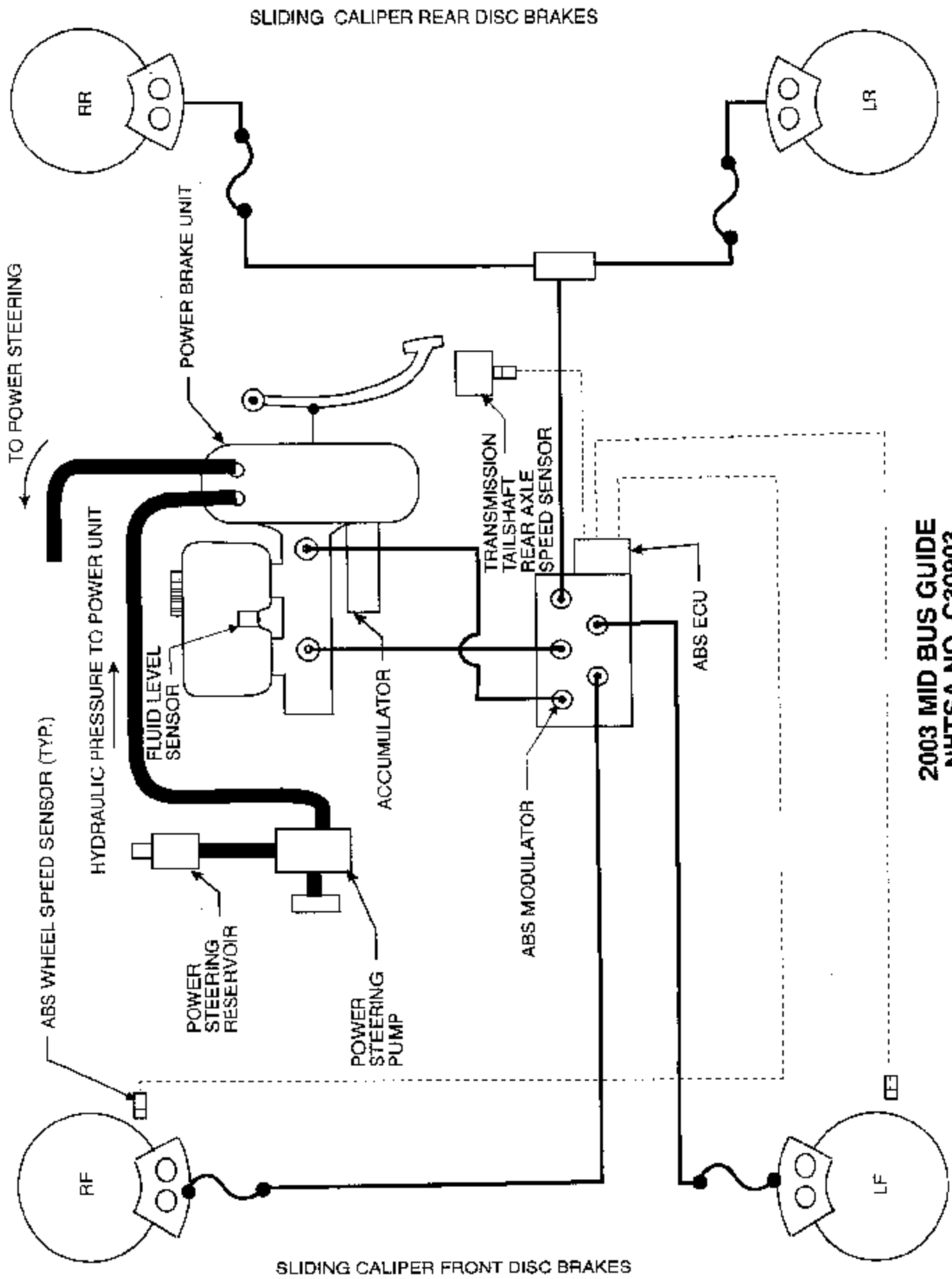
DESTINATION CHARGE 715.00

TOTAL VEHICLE PRICE\* \$23,710.00

This new vehicle is subject to recall. Do not operate this vehicle until you have received notice from the manufacturer. For more information, contact the manufacturer's representative or the dealer. For a full copy of the recall notice, visit the manufacturer's website at www.gm.com. © 2005 General Motors Corporation. PART NO. 1228475

3W

1GA9922697



2003 MID BUS GUIDE  
 NHTSA NO. C30903

## APPENDIX D

### Discussion on Data

## DISCUSSION ON DATA

Any discrepancies in brake temperature from visual to recorded data are probably due to the fact that the visual temperatures were taken prior to accelerating to speed, and the recorder was not turned on until just before starting the stop.

### Symbols for Brake Components

4	-	4 Wheel	G	-	Groan	DL	-	Deceleration (State FPSPS)
X	-	Skid	SQ	-	Squcal	PF	-	Pedal on Floor
L	-	Left	SQK	-	Squeak	SCP	-	Shoe Scrape
R	-	Right	PO	-	Pinchout	RB	-	Rubber Banding
R	-	Rear	P	-	Pull	O	-	Odor
F	-	Front	R	-	Shudder	NOX	-	No Skid
B	-	Both	M	-	Momentary			

INT or INTT	-	Initial Part of Stop
MID	-	Middle of Stop
END	-	End of Stop

All stops were performed manually.

APPENDIX E

Contractor's Comments  
Procedure Modifications  
and  
Test Facility

Comments for vehicle C30903.

For all recorded decelerations:

The recorded average deceleration values for the tests are slightly lower than that which is required or targeted for certain test sections. However, in all cases and in reality, the driver maintained the correct required/target deceleration values for the majority of time for each of those stops. The recorded deceleration is acquired from the moment the service brake pedal is moved until the vehicle reaches zero speed. Therefore, the time needed to achieve the target deceleration (rise time) and the time the vehicle goes from the target deceleration to zero (fall time) is included in the average deceleration calculation. The rise and fall times were added to the entire length of the stops. Hence the recorded average deceleration values were always less than the required/target deceleration values.

## 7.5-MILE TEST TRACK

The 7.5-mile test track encloses a 1,600 acre area, one mile wide and 3.5 miles long.

The track has a downward grade, north to south, of 0.228 percent and a cross slope in the straight aways of 3/16 inch per foot. The 1.88 mile long straight-aways flow into transition areas 2,300 feet in length and then into 5,275 foot long curves with a constant radius of 2,400 feet. The 36-foot wide straight-aways and the 42-foot wide curves provide three test lanes. Paved berms, 16 feet in width, border the straight-aways and the inside of the curves.

As a vehicle moves toward the outside of the track in the curves, it encounters a progressively steeper bank. The inside lane (or "slow" lane) has a bank of 10 degrees allowing a neutral speed of 80 mph with no side forces. In the center lane, the slope increases to 19 degrees resulting in a neutral speed of 110 mph. The outside lane's 28-degree bank allows a 140 mph neutral speed. Rimming the outer lane is a seven-foot safety lane culminating in a 36-degree slope at the guardrail.

The facility is paved with Portland cement concrete. It carries a maximum single axle load of 36,000 pounds and a maximum tandem axle load weight of 48,000 pounds. Special provisions can be made for heavier weight loads.

With 22.5 lane miles, our track will accommodate many vehicles simultaneously. Research which utilizes the track includes component performance and durability studies, brake tests, aerodynamic studies, fuel economy studies, drive line efficiency tests, and the determination of vehicular acceleration and cruise characteristics. In addition, it supports maximum speed determination, road load power, noise and emission measurements and tire durability test programs.

The 7.5-mile test track can be used in conjunction with other facilities at TRC. It provides an excellent area for pre-test conditioning of equipment such as brake burnishing, tire break-in, and vehicle warm-up.

### TRC SKID PAD

The Skid Pad is a test facility which is utilized primarily for the evaluation of tire and brake systems.

The overall dimensions of the pad are 9,000 feet by 84 feet with loops on the north and south ends. Both turnaround loops have a 309-foot radius and are 16 feet wide with a 25 percent super elevation. They will accommodate speeds of 45 mph with zero side force and 60 mph with .5 g's lateral acceleration. The acceleration/deceleration lanes at each end are 3,280 feet in length.

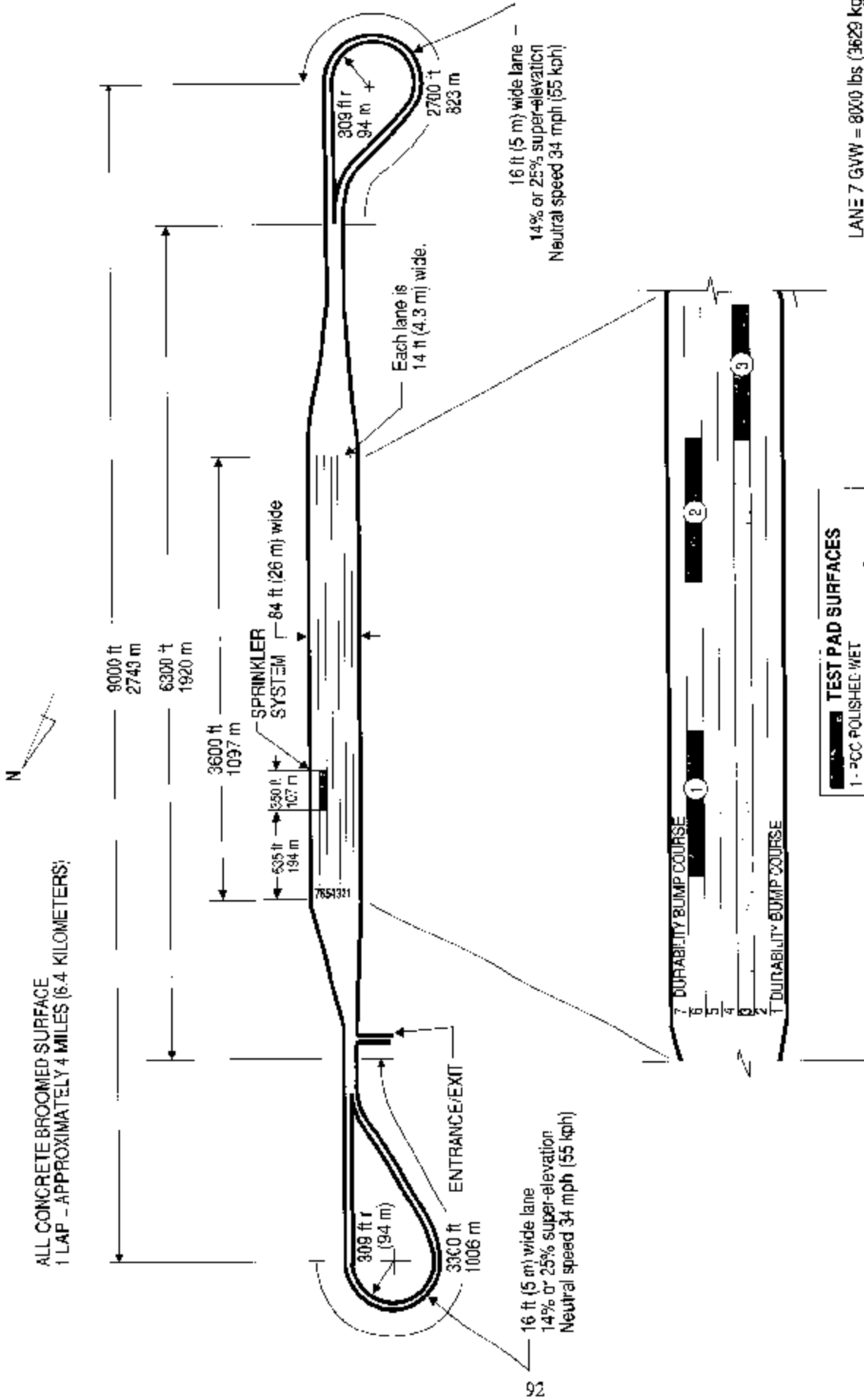
A test area of 210,000 square feet is situated in the center of the skid pad containing several test pads with varying surface textures. Skid numbers in this area range from 30 (wet) to 80 (dry).

The skid pad is paved with Portland cement. The load capacity of the skid pad is 36,000 pounds maximum single axle weight and 48,000 pounds maximum tandem axle weight.

Varying surface textures in the main test area are ideal for testing tire and/or brake system performance on different surfaces as characterized by "skid numbers." The skid pad is also used for acceleration studies, aerodynamics, rolling resistance, noise testing, and vehicle top-speed determination.



ALL CONCRETE BROOMED SURFACE  
1 LAP - APPROXIMATELY 4 MILES (6.4 KILOMETERS)



LANE 7 GVW = 8000 lbs (3629 kgs)  
GVW = 80,000 LBS (36,298 kgs)

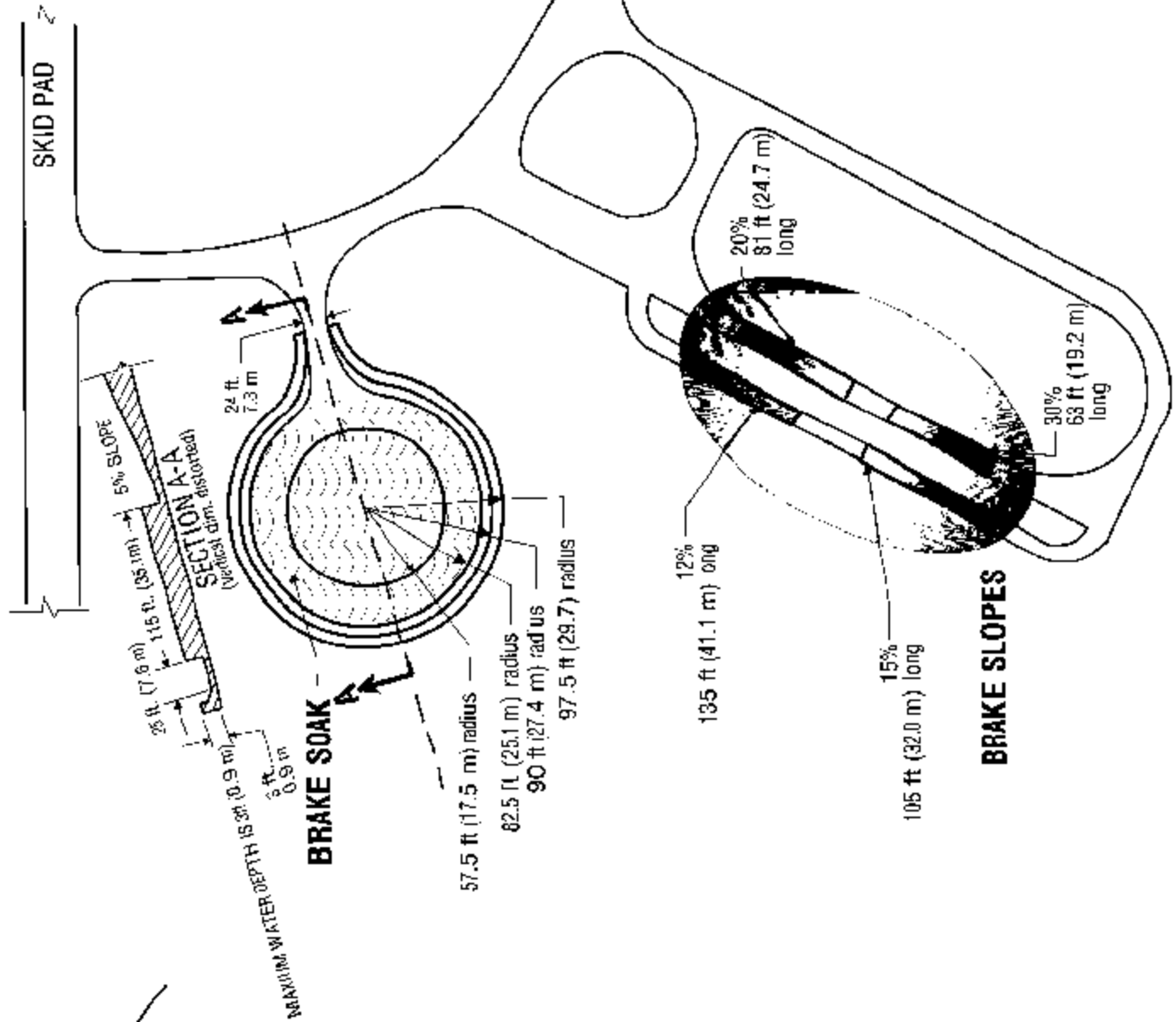
NOTE: BUMP COURSES PARALLEL THE PERIMETERS OF LANES 1 AND 7.

Not to scale  
All dimensions are approximate



SKID PAD

TRANSPORTATION RESEARCH CENTER INC.  
EAST LIBERTY, OHIO 43319-0367



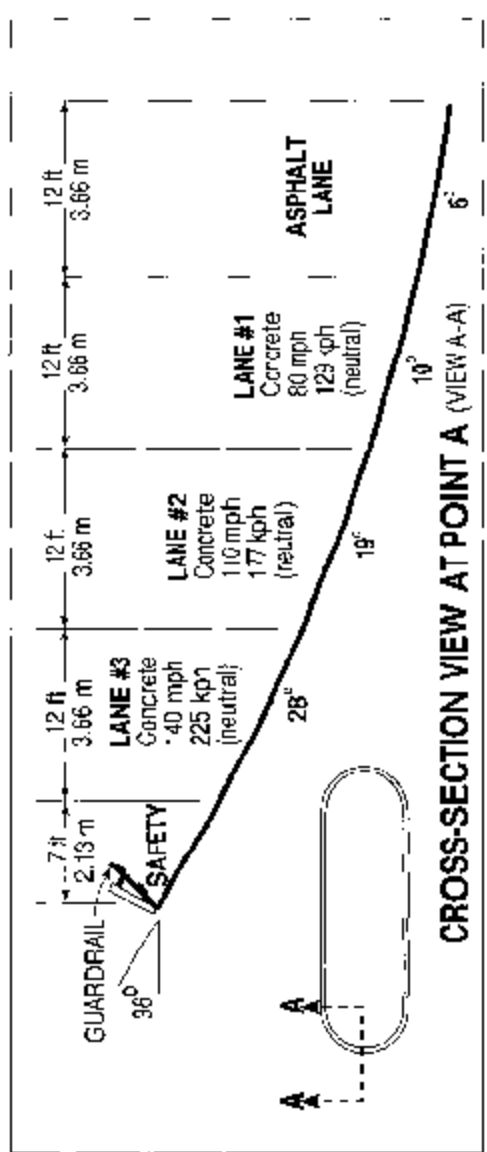
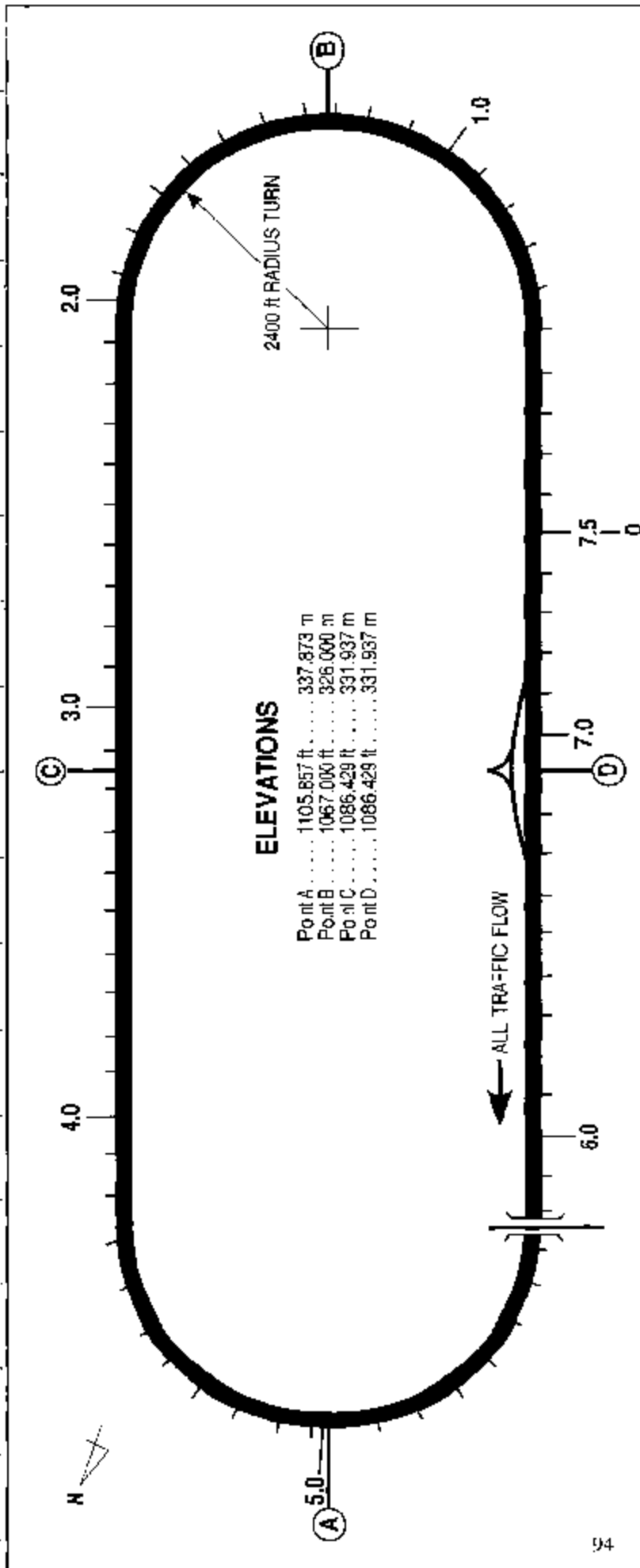
GVW FOR 12 & 15% SLOPE = 4000 lbs (1814 kgs)  
OTHER GVW = 80,000 lbs (36,296 kg)

NJ 1 TO SCALE  
ALL DIMENSIONS ARE APPROXIMATE



**BRAKE SOAK and BRAKE SLOPES**

**TRANSPORTATION RESEARCH CENTER INC.**  
EAST LEBESQUE, OHIO 43319-0827  
F-3-0010



**DISTANCES**

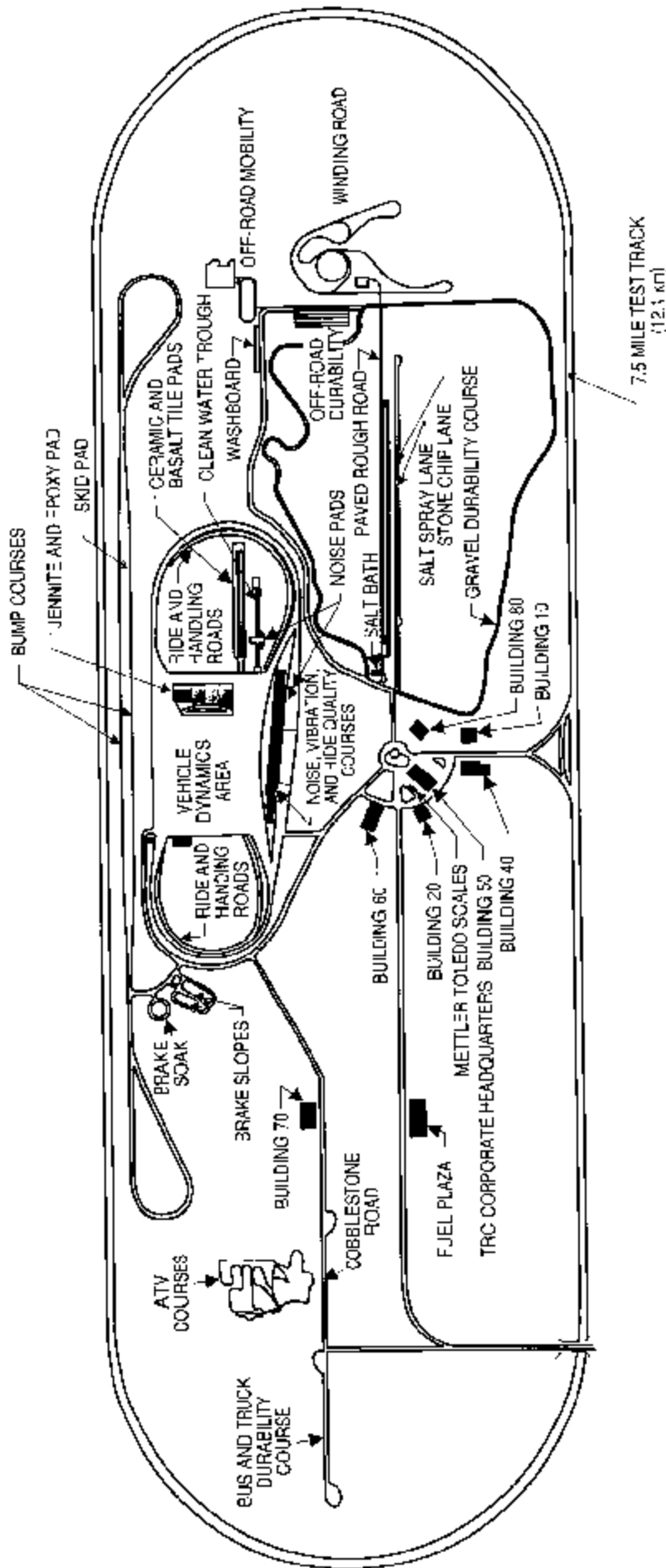
Lane 3	7.539 mi	12.133 km
Lane 2	7.521 mi	12.104 km
Lane 1	7.507 mi	12.081 km
Point A to Point B	3.333 mi	5.364 km
Point C to Point D	.947 mi	1.524 km

NCT TO SCALE



**TRANSPORTATION RESEARCH CENTER INC.**  
EAST LEBERTON, OHIO 43024-9037  
F-10 0436

**7.5-MILE TEST TRACK**



NOT TO SCALE



# TEST FACILITY DETAIL

TRANSPORTATION RESEARCH CENTER INC.  
EAST LIBERTY, OHIO 43003-9067  
1-10-0001

**APPENDIX F**  
**Notice of Possible Non-Compliance**

This vehicle (C30903) met all the requirements.

APPENDIX G  
Conversion Sheet

## METRIC CONVERSION FACTORS

### Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
<b>LENGTH</b>				
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
<b>AREA</b>				
sq ft	square inches	6.5	square centimeters	cm <sup>2</sup>
sq ft	square feet	0.09	square meters	m <sup>2</sup>
sq yd	square yards	0.8	square meters	m <sup>2</sup>
sq mi	square miles	2.6	square kilometers	km <sup>2</sup>
acres	acres	0.4	hectares	ha
<b>MASS (weight)</b>				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
<b>VOLUME</b>				
cup	cup	5	centiliters	cl
tblsp	tablespoon	15	milliliters	ml
fl oz	fluid ounce	30	milliliters	ml
g	gallon	3.8	liters	l
qt	quart	0.95	liters	l
gal	gallon	3.8	liters	l
cu ft	cubic foot	0.03	cubic meters	m <sup>3</sup>
cu yd	cubic yard	0.76	cubic meters	m <sup>3</sup>
<b>TEMPERATURE (exact)</b>				
°F	Fahrenheit temperature	5/9 (then subtracting 32)	Celsius temperature	°C

### Approximate Conversions from Metric Measures

When You Know	Multiply by	To Find	Symbol	
<b>LENGTH</b>				
millimeters	0.04	inches	in	
centimeters	0.4	inches	in	
meters	3.3	feet	ft	
kilometers	1.1	yards	yd	
	0.6	miles	mi	
<b>AREA</b>				
square centimeters	0.16	square inches	sq in	
square meters	1.2	square yards	sq yd	
square kilometers	0.4	square miles	sq mi	
hectares (10,000 m <sup>2</sup> )	2.5	acres	acres	
<b>MASS (weight)</b>				
grams	0.036	ounces	oz	
kilograms	2.2	pounds	lb	
tonnes (1000 kg)	1.1	short tons	short tons	
<b>VOLUME</b>				
milliliters	0.03	fluid ounces	fl oz	
liters	2.7	pints	pt	
liters	1.06	quarts	qt	
liters	0.76	gallons	gal	
cubic meters	35	cubic feet	cu ft	
cubic meters	1.3	cubic yards	cu yd	
<b>TEMPERATURE (exact)</b>				
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F

1 in = 2.54 exactly. For millimeter conversions that need greater accuracy, see NBS Mon. Publ. 298, *Units of Length and Force*, Page 2-73, U.S. Catalog No. C7-110799.

