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Prepared by: ___________________________  Date: April 9, 2007
James Hansen, Project Engineer

Reviewed by: ___________________________  Date: April 9, 2007
Michael Janovicz, Program Manager

FINAL REPORT ACCEPTED BY:

[Signature]
Date of Acceptance: April 9, 2007
NHTSA No.: C60901

Compliance tests were conducted on the subject 2006 Mid Bus Guide DW School Bus, NHTSA No. C60901, in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-222-03 for the determination of FMVSS 222 compliance.

Test Failure:
See Section 2, Test Data Summary.
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<th>Page No</th>
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<td>Bus Floor Plan</td>
</tr>
<tr>
<td>9</td>
<td>Laboratory Notice of Test Failure</td>
</tr>
</tbody>
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SECTION 1
PURPOSE OF COMPLIANCE TEST

Tests were conducted on a 2006 Mid Bus Guide DW School Bus, NHTSA No. C60901, in accordance with the specifications of the Office of Vehicle Safety Compliance (OVSC) Test Procedures TP-222-03 to determine compliance to the requirements of Federal Motor Vehicle Safety Standards (FMVSS) 222, “School Bus Passenger Seating and Crash Protection”.

This program is sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-02-D-01057.
SECTION 2
TEST DATA SUMMARY

The passenger seating and crash protection tests were conducted during January through March 2007. All tests were conducted by MGA Research Corporation at the Wisconsin Operations. The test vehicle, 2006 Mid Bus Guide DW School Bus, NHTSA No. C60901, did not appear to meet all the requirements of FMVSS 222. The test failure is listed below.

Failure 1
FMVSS Requirement: Paragraph S5.2.3(a): “The restraining barrier force/deflection curve shall fall within the zone specified in Figure 1.”

The forward deflection of the left side retraining barrier exceeded the maximum allowable force of 10,675 N before absorbing 1,356 Joules of energy. The energy absorbed was 1,239 Joules. When the force vs. deflection data was plotted, it fell out of the specified corridor listed in 49 CFR 571.222 Figure 1. The test was stopped at 295 mm to avoid equipment damage.

LINEAR AND AREA MEASUREMENTS

Seat to seat/barrier spacing was checked on all seats and found to be 610 mm or less as shown on Data Sheet 1.

The seat back height and front surface area of Seat Nos. 2 and 7 were measured in accordance with Section 12.1 of OVSC TP-222-03. As shown in Data Sheet 2 for Seat Nos. 2 and 7, the seat back area is greater than ninety percent of the seat bench width multiplied by 508.

Restraining barriers positions and projected rear surface areas of Barrier Nos. 1 and 9 were measured in accordance with OVSC TP-222-03. As shown in Data Sheet 6 for Barrier Nos. 1 and 9, the projected perimeters of the seats fall completely within the perimeters of the restraining barriers.
SECTION 2 (CONTINUED)
TEST DATA SUMMARY

SEAT CUSHION RETENTION

Seat Nos. 4 and 5 were tested in accordance with Section 12.3 of OVSC TP-222-03. Seat cushion weight was 3.4 kg for both S4 and S5. The maximum force reached for S4 and S5 was 172.0 N. For S4, the lower time limit boundary ($t_1$) was approximately 2.0 seconds with an approximate load duration of 5.5 seconds. For S5, the lower time limit boundary ($t_1$) was approximately 1.5 seconds with an approximate load duration of 6 seconds. As shown in Data Sheet 3, the seat cushions tested complied with all requirements.

SEAT BACK FORCE/DEFLECTION TEST - FORWARD

Seat Nos. 7 and 8 were tested in accordance with Section 12.4 of OVSC TP-222-03. Seat bench width was determined to be 1,005 mm for S7 and 998 mm for S8. “$W$” was calculated to be 3 for S7 and S8. The seating reference point (SRP) was 475 mm above the bus floor. The deflection of the seat back at conclusion of lower loading bar loading at 1557 W N load was 68.2 mm for S7 and 67.7 mm for S8. The allowable maximum deflection without moving the seat back to within 102 mm of another seat or restraining barrier was 356 mm. The stroke rate of the upper loading bar was determined by the test engineer to be 14.4 mm/sec. The location of the upper loading bar was 406 mm above the SRP. The tests were stopped when the maximum deflection of 356 mm was reached. The minimum required area under the force versus deflection curve of the upper loading bar was 452 W or 1,356 joules for S7 and 1,356 joules for S8. As shown on Data Sheet No. 4, Seat Nos. 7 and 8 met the force deflection forward requirements. See Plots 3, 4, 5, and 6.

SEAT BACK FORCE/DEFLECTION TEST - REARWARD

Seat Nos. 3 and 6 were tested in accordance with Section 12.4 of OVSC TP-222-03. Seat bench width was determined to be 994 mm for S3 and 1,000 mm for S6. “$W$” was calculated to be 3 for S3 and S6. The seating reference point (SRP) was 475 mm above the bus floor. The allowable maximum deflection without moving the seat back to within 102 mm of another seat or restraining barrier was 254 mm. The stroke rate of the upper loading bar was determined by the
SECTION 2 (CONTINUED)

TEST DATA SUMMARY

test engineer to be 14.0 mm/sec for S3 and 2.1 mm/sec for S6. The location of the loading bar was 343 mm above the SRP for both seats. The test was stopped when the maximum deflection of the seat back of 254 mm was achieved.

The area under the force versus deflection curve of the loading bar was 1,469 joules for S3 and 1,346 joules for S6. The minimum required area under the force versus deflection curve of the loading bar was 316 W or 948 joules for S3 and S6. As shown in Data Sheet No. 5, the tested areas under the force versus deflection curves for the loading bar comply with the requirements for both S3 and S6. See Plots 7 and 8.

RESTRAINING BARRIER FORCE/DEFLECTION TEST - FORWARD

Both front restraining barriers (B1, and B9) were tested in accordance with Section 12.4 of OVSC TP-222-03. Seat bench width of the aft seats was determined to be 1,003 mm for B1 and 1,008 for B9. “W” was calculated to be 3 for B1 and B9. The SRP was 475 mm above the bus floor. The deflection of the restraining barrier at the conclusion of the lower loading bar loading at 1557W was 84.3 mm for B1 and 96.8 mm for B9. The allowable maximum deflection without moving the restraining barriers to within interference of a seat or door was 356 mm. The stroke rate of the upper loading bar was determined by the test engineer from test data to be 14.4 mm/sec. The location of the upper loading bar was 406 mm above the SRP. The tests were stopped when the maximum load of 10675 N was exceeded for B1 and when the maximum deflection of 356 mm was reached for B9. The area under the force versus deflection curve of the upper loading bar was 1,239 joules for B1 and 1,647 joules for B9. The minimum required area under the force versus deflection curve of the upper loading bar was 452 W or 1,356 joules for B1 and 1,356 joules for B9. As shown in Data Sheet 7, the tested area under the force versus deflection curves for the upper loading bar on B1 does not comply with the requirements for the area under the force versus deflection curve. As shown in Data Sheet 7 the force vs. deflection trace for B9 does fall within the limits specified in Figure 1 of FMVSS 222.
KNEE FORM IMPACT ZONE TESTS

Seat No. S2 was tested in accordance with Section 12.7 of OVSC TP-222-03. The mass of the knee form was 4.53 kg. All knee form contact area criteria and impact energy criteria were met for the seat.

HEAD FORM IMPACT ZONE TESTS

Seat No. S2 was tested in accordance with Section 12.6 of OVSC TP-222-03. The mass of the head form was 5.21 kg. All head form contact area criteria was met for the seat. The impact energy criteria and head injury criteria for all impact locations were met.
# ADMINISTRATIVE DATA SHEET

**Test Vehicle:** 2006 MID BUS GUIDE DW SCHOOL BUS  
**NHTSA No.:** C60901  
**Test Lab:** MGA RESEARCH CORPORATION  
**Test Date:** 10/07/06

## INCOMPLETE VEHICLE (IF APPLICABLE)

<table>
<thead>
<tr>
<th>Manufacturer:</th>
<th>CHEVROLET MOTOR DIVISION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model:</td>
<td>CSD-7450-C-063336</td>
</tr>
<tr>
<td>VIN:</td>
<td>1GBJG31U461237309</td>
</tr>
<tr>
<td>Build Date:</td>
<td>4/06</td>
</tr>
<tr>
<td>Certification Date:</td>
<td></td>
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</table>

## COMPLETED VEHICLE (SCHOOL BUS)

<table>
<thead>
<tr>
<th>Manufacturer:</th>
<th>MID BUS INC.</th>
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</thead>
<tbody>
<tr>
<td>Make/Model:</td>
<td>CHEVROLET / MID BUS GUIDE</td>
</tr>
<tr>
<td>VIN:</td>
<td>1GBJG31U461237309</td>
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<tr>
<td>NHTSA No.:</td>
<td>C60901</td>
</tr>
<tr>
<td>Color:</td>
<td>Yellow</td>
</tr>
<tr>
<td>GVWR:</td>
<td>5,579 kg / 12,300 lbs</td>
</tr>
<tr>
<td>Build Date:</td>
<td>9/06</td>
</tr>
<tr>
<td>Certification Date:</td>
<td>4/06</td>
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</table>

## DATES

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<tr>
<th>Vehicle Receipt:</th>
<th>10/06/2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start of Compliance Test:</td>
<td>1/15/2007</td>
</tr>
<tr>
<td>Completion of Compliance Test:</td>
<td>3/14/2007</td>
</tr>
</tbody>
</table>

## COMPLIANCE TEST:
All tests were performed in accordance with the references outlined in TP-222-03.

**Recorded By:**

**Approved By:** Michael Janovz  
**DATE:** 10/07/2006
### GENERAL TEST DATA SHEET

**Test Vehicle:** 2006 MID BUS GUIDE DW SCHOOL BUS  
**NHTSA No.:** C60901  
**Test Lab:** MGA RESEARCH CORPORATION  
**Test Date:** 1/15/2007

### SCHOOL BUS IDENTIFICATION

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
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</thead>
<tbody>
<tr>
<td>Model Year/Mfr./Make/Model</td>
<td>2006/MID BUS/GUIDE/DW</td>
</tr>
<tr>
<td>Passenger Capacity</td>
<td>(1 Driver, 27 Passengers)</td>
</tr>
<tr>
<td>NHTSA No.:</td>
<td>C60901</td>
</tr>
<tr>
<td>VIN:</td>
<td>1GBJG31U461237309</td>
</tr>
<tr>
<td>Conventional or Forward Control</td>
<td>Conventional</td>
</tr>
<tr>
<td>GVWR (Certification Label) FRONT</td>
<td>1,951 kg / 4,300 lbs</td>
</tr>
<tr>
<td>GVWR (Certification Label) REAR</td>
<td>3,901 kg / 8,600 lbs</td>
</tr>
<tr>
<td>GVWR (Certification Label) TOTAL</td>
<td>5,579 kg / 12,300 lbs</td>
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</table>

### TEST CONDITIONS

<table>
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<th>Feature</th>
<th>Details</th>
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<td>Date(s) of Test</td>
<td>1/15/2007 – 3/14/2007</td>
</tr>
<tr>
<td>Ambient Temperature (°C)</td>
<td>21</td>
</tr>
<tr>
<td>Required Temperature Range</td>
<td>0°C to 32°C</td>
</tr>
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</table>

### SEAT IDENTIFICATION

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seat Manufacturer</td>
<td>MID BUS INC.</td>
</tr>
<tr>
<td>Model Name &amp; Number</td>
<td></td>
</tr>
<tr>
<td>Description of Seats</td>
<td>Seat frames are constructed of 25.4 mm square welded tubing. The seat back has a 0.75 mm steel pan welded to the tubing and is covered with 20 mm foam on the front surface, 30 mm foam over 45 mm Styrofoam on the rear surface. The 45 mm Styrofoam is also covered by 10 mm foam in the knee impact areas. The seat cushion is constructed of 12mm plywood with 120 mm tapering to 75 mm poly foam pad. The seat back and seat cushion are wrapped with 0.6 mm vinyl.</td>
</tr>
</tbody>
</table>
SECTION 3
COMPLIANCE TEST DATA

The following data sheets document the results of testing on the 2006 Mid Bus Guide DW School Bus, NHTSA No. C60901.
# DATA SHEET 1

## SEAT TO SEAT/BARRIER SPACING

**Test Vehicle:** 2006 MID BUS GUIDE DW SCHOOL BUS  
**NHTSA No.:** C60901  
**Test Lab:** MGA RESEARCH CORPORATION  
**Test Date:** 1/15/2007

### Reqmt < 610 MM (< 24")  
### CLASS 1 BUSES ONLY

<table>
<thead>
<tr>
<th>SEAT NUMBER</th>
<th>MEASUREMENT OF SPACING FROM SRP FORWARD TO SEAT/BARRIER (mm)</th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>467</td>
<td>PASS</td>
</tr>
<tr>
<td>2</td>
<td>573</td>
<td>PASS</td>
</tr>
<tr>
<td>3</td>
<td>565</td>
<td>PASS</td>
</tr>
<tr>
<td>4</td>
<td>570</td>
<td>PASS</td>
</tr>
<tr>
<td>5</td>
<td>475</td>
<td>PASS</td>
</tr>
<tr>
<td>6</td>
<td>450</td>
<td>PASS</td>
</tr>
<tr>
<td>7</td>
<td>465</td>
<td>PASS</td>
</tr>
<tr>
<td>8</td>
<td>473</td>
<td>PASS</td>
</tr>
<tr>
<td>9</td>
<td>443</td>
<td>PASS</td>
</tr>
</tbody>
</table>

**Comments:** NONE

Recorded By: ____________________________  
Approved By: ____________________________  
DATE: 1/15/2007
DATA SHEET 2
SEAT BACK HEIGHT & FRONT SURFACE AREA TEST

Test Vehicle: 2006 MID BUS GUIDE DW SCHOOL BUS  NHTSA No.: C60901
Test Lab: MGA RESEARCH CORPORATION  Test Date: 1/15/2007

SEAT NUMBER: S2

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Is the seat back height at least 508 mm vertically above the SRP? (S5.1.2)</td>
<td>PASS</td>
</tr>
</tbody>
</table>

2. Measure the seat back front projected area in a vertical plane bound by horizontal planes through the SRP and 508 mm above the SRP according to the following procedure:
   
   Width, \( a = 817 \text{ mm} \); width, \( b = 985 \text{ mm} \)
   
   Height, \( c = 155 \text{ mm} \); height, \( d = 353 \text{ mm} \)
   
   \[
   \text{Area} = \frac{1}{2} (a+b) \times d + (c \times b) = 470,728 \text{ mm}^2
   \]

3. Measure the seat cushion width - \( W_1 = 1,010 \text{ mm} \)
   
   If the seat cushion is not rectangular, measure the cushion at the forward most edge and the rearward most edge, average the widths, and use the average width as \( W_1 \).

4. Calculate the following: \( 0.9 \times W_1 \times 508 \text{ mm} = 461,772 \text{ mm}^2 \)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.</td>
<td>Is item 2 greater than item 4? (S5.1.2)</td>
<td>PASS</td>
</tr>
</tbody>
</table>

NOTE: For a seat back or a seat cushion that has a nonsymmetrical shape or has a large radius at the corner, the above described measuring method must be modified as required to obtain accurate area measurements.

Comments: The measurement method was modified as shown above to accommodate the shape of this particular seat back shape.

Recorded By: ____________________________

Approved By: ____________________________  DATE: 1/15/2007
### SEAT BACK HEIGHT & FRONT SURFACE AREA TEST

**Test Vehicle:** 2006 MID BUS GUIDE DW SCHOOL BUS  
**NHTSA No.:** C60901  
**Test Lab:** MGA RESEARCH CORPORATION  
**Test Date:** 1/15/2007

#### SEAT NUMBER: S7

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Is the seat back height at least 508 mm vertically above the SRP? (S5.1.2)</td>
<td>PASS</td>
</tr>
</tbody>
</table>
| 2. | Measure the seat back front projected area in a vertical plane bound by horizontal planes through the SRP and 508 mm above the SRP according to the following procedure:  
   Width, \(a = 810 \text{ mm}\);  
   width, \(b = 995 \text{ mm}\)  
   Height, \(c = 160 \text{ mm}\);  
   height, \(d = 348 \text{ mm}\)  
   Area = \(\frac{1}{2} (a+b) \times d + (c \times b) = 473,270 \text{ mm}^2\) |   |
| 3. | Measure the seat cushion width - \(W_1 = 1,005 \text{ mm}\)  
   If the seat cushion is not rectangular, measure the cushion at the forward most edge and the rearward most edge, average the widths, and use the average width as \(W_1\). |   |
| 4. | Calculate the following: \(0.9 \times W_1 \times 508 \text{ mm} = 459,486 \text{ mm}^2\) |   |
| 5. | Is item 2 greater than item 4? (S5.1.2) | PASS |

**NOTE:** For a seat back or a seat cushion that has a nonsymmetrical shape or has a large radius at the corner, the above described measuring method must be modified as required to obtain accurate area measurements.

**Comments:** The measurement method was modified as shown above to accommodate the shape of this particular seat back shape.

**Recorded By:**   
**Approved By:** Michael Janow  
**DATE:** 1/15/2007
DATA SHEET 3
SEAT CUSHION RETENTION TEST

Test Vehicle: 2006 MID BUS GUIDE DW SCHOOL BUS
Test Lab: MGA RESEARCH CORPORATION
NHTSA No.: C60901
Test Date: 1/16/2007

SEAT NUMBER: S4

1. Cushion Weight/Mass = 3.4 kg
2. Cushion Weight x 5 = F = 167.0 N (S5.1.5)
3. Complete the following force/time graph:

F = 172.0 N

T1 = 2.0 sec.   T2 = 5.5 sec.

TIME, SECONDS

F must be 5 x Cushion Weight; t1 and t2 must be according to the following expressions:
T1 => 1 sec., <5 sec., t2 = t1 + 5 sec., + 0 sec. and -0.10 sec.

4. Did seat cushion separate from the seat structure at any attachment point? (S5.1.5)
   PASS/FAIL

   PASS

DESCRIBE SEAT CUSHION ATTACHMENTS: 2 half shell clamps on front of seat and 2 pivoting latch on rear.

Comments: None

Recorded By: ______________________________

Approved By: Michael January DATE: 1/16/2007

12
SEAT NUMBER: S5

1. Cushion Weight/Mass = 3.4 kg
2. Cushion Weight x 5 = F = 167.0 N (S5.1.5)
3. Complete the following force/time graph:

\[ F = 172.0 \text{ N} \]

\[ T1 = 1.5 \text{ sec.} \quad T2 = 6.0 \text{ sec.} \]

F must be 5 x Cushion Weight; t1 and t2 must be according to the following expressions: T1=>1 sec., <5 sec., t2 = t1 + 5 sec., + 0 sec. and -0.10 sec.

<table>
<thead>
<tr>
<th>4. Did seat cushion separate from the seat structure at any attachment point? (S5.1.5)</th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>PASS</td>
<td></td>
</tr>
</tbody>
</table>

DESCRIBE SEAT CUSHION ATTACHMENTS: 2 half shell clamps on front of seat and 2 pivoting latch on rear.

Comments: None

Recorded By: __________________________

Approved By: __________________________ DATE: 1/16/2007
DATA SHEET 4
SEAT BACK FORCE DEFLECTION TEST - FORWARD

Test Vehicle: 2006 MID BUS GUIDE DW SCHOOL BUS  NHTSA No.: C60901
Test Lab: MGA RESEARCH CORPORATION  Test Date: 2/19/2007

SEAT NUMBER: S7

1. Seat Bench Width = 1,005 mm
   \[ W = \frac{\text{Seat Bench Width}}{381} \text{ mm} \] (round to nearest whole number) = (3)
   Seat Reference Point (SRP) location is: (Description of location as supplied by the COTR): 475 mm Above Floor, 135 mm forward from the front of seat back.

2. Location of lower loading bar is 0 mm above the SRP.
   (Requirement: Between 102 mm above and 102 mm below the SRP) (S5.1.3.1)
   Length of lower loading bar = 900 mm
   Seat Back width at SRP = 1,000 mm

3. Include x-y plot of Force vs. Time for the lower loading bar.

4. Deflection of the seat back at conclusion of lower bar loading (1557 W Newtons position) = 68.2 mm, at start of upper bar loading 68.2 mm, at end of upper bar loading 68.2 mm.

5. Maximum deflection allowed without moving the seat back to within 102 mm of another seat or restraining barrier = 356 mm (must be 356 mm of less) (S5.1.3)

6. Seat back movement rate selected by the test engineer = 14.4 mm/sec

7. Location of upper loading bar is in a horizontal plane 406 mm above the SRP.
   (Requirement: 406 mm) (S5.1.3.3). Length of upper loading bar = 800 mm. Width of seat back at 406 mm above SRP = 900 mm.

8. Reason for stopping seat back deflection:
   ___ Reached deflection determined in Item 6 above (if less than 356 mm)
   \[ \times \] Reached 356 mm maximum allowed deflection (Actual deflection was 361 mm)
   ___ Separation was about to occur

9. Include the x-y plot of force vs. deflection for the upper loading bar with boundaries of Figure 14 (OVSC TP-222-3) superimposed.
### DATA SHEET 4 (CONTINUED)
#### SEAT BACK FORCE DEFLECTION TEST - FORWARD

<table>
<thead>
<tr>
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<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.</td>
<td>Is the seat in its final deflected position within 102 mm of the next seat or barrier?</td>
<td>PASS</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
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<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.</td>
<td>Does the forward force vs. deflection trace of the seat back lie within the corridor? (S5.1.3)</td>
<td>PASS</td>
</tr>
</tbody>
</table>

12. Include a deflection vs. time plot for the upper loading bar.
13. The area within the force vs. deflection curve = 1,810 joules
14. 452W = 1,356 joules (S5.1.3.4)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.</td>
<td>Is item 13 greater than or equal to item 14? (S5.1.3.4)</td>
<td>PASS</td>
</tr>
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</table>

Comments: None

Recorded By: ____________________________  
Approved By: ____________________________  DATE: 2/19/2007
SEAT NUMBER: S8

1. Seat Bench Width = 998 mm
   \[ W = \frac{\text{Seat Bench Width}}{381} \text{ mm (round to nearest whole number)} = (3) \]
   Seat Reference Point (SRP) location is: (Description of location as supplied by the COTR: 475 mm Above Floor, 135 mm forward from the front of seat back.

2. Location of lower loading bar is 0 mm above the SRP.
   (Requirement: Between 102 mm above and 102 mm below the SRP) (S5.1.3.1)
   Length of lower loading bar = 900 mm
   Seat Back width at SRP = 1,000 mm

3. Include x-y plot of Force vs. Time for the lower loading bar.

4. Deflection of the seat back at conclusion of lower bar loading (1557 W Newtons position) = 67.7 mm, at start of upper bar loading 67.7 mm, at end of upper bar loading 67.7 mm.

5. Maximum deflection allowed without moving the seat back to within 102 mm of another seat or restraining barrier = 356 mm (must be 356 mm of less) (S5.1.3)

6. Seat back movement rate selected by the test engineer = 14.4 mm/sec

7. Location of upper loading bar is in a horizontal plane 406 mm above the SRP.
   (Requirement: 406 mm) (S5.1.3.3). Length of upper loading bar = 800 mm. Width of seat back at 406 mm above SRP = 904 mm.

8. Reason for stopping seat back deflection:
   ___ Reached deflection determined in Item 6 above (if less than 356 mm)
   _X_ Reached 356 mm maximum allowed deflection (Actual deflection was 361 mm)
   ___ Separation was about to occur

9. Include the x-y plot of force vs. deflection for the upper loading bar with boundaries of Figure 14 (OVSC TP-222-3) superimposed.
DATA SHEET 4 (CONTINUED)
SEAT BACK FORCE DEFLECTION TEST – FORWARD

<table>
<thead>
<tr>
<th>Test Vehicle: 2006 MID BUS GUIDE DW SCHOOL BUS</th>
<th>NHTSA No.: C60901</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Lab: MGA RESEARCH CORPORATION</td>
<td>Test Date: 2/19/2007</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>10. Is the seat in its final deflected position within 102 mm of the next seat or barrier?</td>
<td>PASS</td>
</tr>
<tr>
<td>11. Does the forward force vs. deflection trace of the seat back lie within the corridor? (S5.1.3)</td>
<td>PASS</td>
</tr>
</tbody>
</table>

12. Include a deflection vs. time plot for the upper loading bar.
13. The area within the force vs. deflection curve = 2,270 joules
14. 452W = 1,356 joules (S5.1.3.4)

<table>
<thead>
<tr>
<th></th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>15. Is item 13 greater than or equal to item 14? (S5.1.3.4)</td>
<td>PASS</td>
</tr>
</tbody>
</table>

Comments: None

Recorded By: ________________________________
Approved By: ________________________________  DATE: 2/19/2007
DATA SHEET 5
SEAT BACK FORCE DEFLECTION TEST – REARWARD

Test Vehicle: 2006 MID BUS GUIDE DW SCHOOL BUS
Test Lab: MGA RESEARCH CORPORATION
NHTSA No.: C60901
Test Date: 2/22/2007

SEAT NUMBER: S3

1. Seat Bench Width = 994 mm
   \[ W = \frac{\text{Seat Bench Width}}{381 \text{ mm}} \] (round to nearest whole number) = (3)

2. Location of the loading bar is in a horizontal plane 343 mm above the SRP of the test seat. (Requirement: 343 mm above the SRP) (S5.1.4.1)
   Length of loading bar = 835 mm
   Width of seat back at 343 mm above SRP = 935 mm

3. Deflection of seat back at 222 N preload = 15 mm

4. Maximum deflection allowed without moving the seat back to within 102 mm of another seat = 254 mm (maximum allowed = 254 mm) (S5.1.4)

5. Seat back movement rate selected by the test engineer = 14.0 mm/sec

6. Reason for stopping deflection:
   ___ Reached deflection determined in Item 4 above (if less than 254 mm)
   ___ Reached 254 mm maximum allowed deflection (Actual deflection was 257 mm)
   ___ Separation was about to occur

7. Include the x-y plot of force vs. deflection for the loading bar with boundaries of Figure 18 (OVSC TP-222-3) superimposed.

8. Does the force vs. deflection plot lie within the boundaries of Figure 18 (OVSC TP-222-03)?
   **PASS**

9. Include a deflection vs. time plot for the upper loading bar.

10. 316W = 948 joules

11. The area within the force vs. deflection curve = 1,469 joules
DATA SHEET 5 (CONTINUED)
SEAT BACK FORCE DEFLECTION TEST – REARWARD

Test Vehicle: 2006 MID BUS GUIDE DW SCHOOL BUS  NHTSA No.: C60901
Test Lab: MGA RESEARCH CORPORATION  Test Date: 2/22/2007

| 12. Is item 11 greater than or equal to item 10? (S5.1.4.2) | PASS/Fail | PASS |

Comments: None

Recorded By: _______________________________

Approved By: __________________ Date: 2/22/07
DATA SHEET 5 (CONTINUED)
SEAT BACK FORCE DEFLECTION TEST – REARWARD

Test Vehicle: 2006 MID BUS GUIDE DW SCHOOL BUS  NHTSA No.: C60901
Test Lab: MGA RESEARCH CORPORATION  Test Date: 2/20/2007

SEAT NUMBER: S6

1. Seat Bench Width = 1,000 mm
   \[ W = \frac{\text{Seat Bench Width}}{381 \text{ mm}} \text{ (round to nearest whole number)} = (3) \]
2. Location of the loading bar is in a horizontal plane 343 mm above the SRP of the test seat. (Requirement: 343 mm above the SRP) (S5.1.4.1)
   Length of loading bar = 830 mm
   Width of seat back at 343 mm above SRP = 930 mm
3. Deflection of seat back at 222 N preload = 12 mm
4. Maximum deflection allowed without moving the seat back to within 102 mm of another seat = 254 mm (maximum allowed = 254 mm) (S5.1.4)
5. Seat back movement rate selected by the test engineer = 2.1 mm/sec
6. Reason for stopping deflection:
   ___ Reached deflection determined in Item 4 above (if less than 254 mm)
   \textbf{X} Reached 254 mm maximum allowed deflection (Actual deflection was 257 mm)
   ___ Separation was about to occur
7. Include the x-y plot of force vs. deflection for the loading bar with boundaries of Figure 18 (OVSC TP-222-3) superimposed.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.</td>
<td>Does the force vs. deflection plot lie within the boundaries of Figure 18 (OVSC TP-222-03)?</td>
<td>PASS</td>
</tr>
</tbody>
</table>

8. 316W = 948 joules
9. The area within the force vs. deflection curve = 1,346 joules
### DATA SHEET 5 (CONTINUED)

#### SEAT BACK FORCE DEFLECTION TEST – REARWARD

<table>
<thead>
<tr>
<th>Test Vehicle:</th>
<th>2006 MID BUS GUIDE DW SCHOOL BUS</th>
<th>NHTSA No.:</th>
<th>C60901</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Lab:</td>
<td>MGA RESEARCH CORPORATION</td>
<td>Test Date:</td>
<td>2/20/2007</td>
</tr>
</tbody>
</table>

| 12. | Is item 11 greater than or equal to item 10? (S5.1.4.2) | PASS/FAIL | PASS |

Comments: None

Recorded By: ____________________________

Approved By: ____________________________ DATE: 2/20/2007
DATA SHEET 6
RESTRAINING BARRIER POSITION AND PROJECTED REAR SURFACE AREA

Test Vehicle: **2006 MID BUS GUIDE DW SCHOOL BUS**
Test Lab: **MGA RESEARCH CORPORATION**
NHTSA No.: **C60901**
Test Date: **2/20/2007**

SEAT NUMBER: **B1**

1. Measure distance T from SRP of seat immediately aft of barrier in a horizontal longitudinal line forward to barrier. \( T = 467 \text{ mm} \).

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Is distance T equal to or less than 610 mm? (S5.2)</td>
<td>PASS</td>
</tr>
</tbody>
</table>

3. Measure distance D at top (t) and bottom (b) of barrier.
   \( D_t = 78 \text{ mm} \quad D_b = 0 \text{ mm} \)

4. Measure distance C at top (t) and bottom (b) of barrier.
   \( C_t = 84 \text{ mm} \quad C_b = 0 \text{ mm} \)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.</td>
<td>Is ( D_t ) equal to or less than ( C_t )?</td>
<td>PASS</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.</td>
<td>Is ( D_b ) equal to or less than ( C_b )?</td>
<td>PASS</td>
</tr>
</tbody>
</table>

7. Measure distance E at top of barrier and bottom of barrier.
   \( E_t = 768 \text{ mm} \quad E_b = 969 \text{ mm} \)

8. Measure distance A at top of seat back and bottom of seat.
   \( A_t = 751 \text{ mm} \quad A_b = 969 \text{ mm} \)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.</td>
<td>Is distance ( E_t + D_t ) equal to or greater than distance ( A_t + C_t )?</td>
<td>PASS</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.</td>
<td>Is distance ( E_b + D_b ) equal to or greater than distance ( A_b + C_b )</td>
<td>PASS</td>
</tr>
</tbody>
</table>

11. Measure distance U at inboard (i) and outboard (o) side of barrier.
    \( U_i = 350 \text{ mm} \quad U_o = 330 \text{ mm} \)

12. Measure distance V at inboard (i) and outboard (o) sides of seat.
    \( V_i = 440 \text{ mm} \quad V_o = 440 \text{ mm} \)
### DATA SHEET 6 (CONTINUED)

**RESTRAINING BARRIER POSITION AND PROJECTED REAR SURFACE AREA**

| 13. Is $U_i$ equal to or less than $V_i$? | PASS/FAIL | PASS |
| 14. Is $U_o$ equal to or less than $V_o$? | PASS/FAIL | PASS |

15. Measure distance $S$ at inboard (I) and outboard (o) side of barrier.
- $S_i = 770$ mm
- $S_o = 790$ mm

16. Measure distance $W$ at inboard (i) and outboard (o) sides of seat.
- $W_i = 630$ mm
- $W_o = 630$ mm

17. Is $S_i + U_i$ equal to or greater than $W_i + V_i$? | PASS/FAIL | PASS |

18. Is $S_o + U_o$ equal to or greater than $W_o + V_o$? | PASS/FAIL | PASS |

19. Compute area $(W \times A) = 565,740 \text{ mm}^2$
20. Compute area $(E \times S) = 700,050 \text{ mm}^2$

21. Is $(W \times A)$ equal to or less than $(E \times S)$? | PASS/FAIL | PASS |

**Comments:** None

**Recorded By:**

**Approved By:** Michael Janosy  DATE: 2/20/2007
DATA SHEET 6 (CONTINUED)
RESTRAINING BARRIER POSITION AND PROJECTED REAR SURFACE AREA

Test Vehicle: 2006 MID BUS GUIDE DW SCHOOL BUS  NHTSA No.: C60901
Test Lab: MGA RESEARCH CORPORATION  Test Date: 2/20/2007

SEAT NUMBER: B9

1. Measure distance T from SRP of seat immediately aft of barrier in a horizontal longitudinal line forward to barrier.  T= 443 mm.

<table>
<thead>
<tr>
<th>2. Is distance T equal to or less than 610 mm? (S5.2)</th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>PASS</td>
<td></td>
</tr>
</tbody>
</table>

3. Measure distance D at top (t) and bottom (b) of barrier.
   \[ D_t = 92 \text{ mm} \quad D_b = 0 \text{ mm} \]

4. Measure distance C at top (t) and bottom (b) of barrier.
   \[ C_t = 92 \text{ mm} \quad C_b = 0 \text{ mm} \]

<table>
<thead>
<tr>
<th>5. Is ( D_t ) equal to or less than ( C_t )?</th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>PASS</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6. Is ( D_b ) equal to or less than ( C_b )?</th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>PASS</td>
<td></td>
</tr>
</tbody>
</table>

7. Measure distance E at top of barrier and bottom of barrier.
   \[ E_t = 810 \text{ mm} \quad E_b = 1,005 \text{ mm} \]

8. Measure distance A at top of seat back and bottom of seat.
   \[ A_t = 805 \text{ mm} \quad A_b = 998 \text{ mm} \]

<table>
<thead>
<tr>
<th>9. Is distance ( E_t + D_t ) equal to or greater than distance ( A_t + C_t )?</th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>PASS</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>10. Is distance ( E_b + D_b ) equal to or greater than distance ( A_b + C_b )</th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>PASS</td>
<td></td>
</tr>
</tbody>
</table>

11. Measure distance U at inboard (i) and outboard (o) side of barrier.
    \[ U_i = 355 \text{ mm} \quad U_o = 360 \text{ mm} \]

12. Measure distance V at inboard (i) and outboard (o) sides of seat.
    \[ V_i = 425 \text{ mm} \quad V_o = 425 \text{ mm} \]
<table>
<thead>
<tr>
<th></th>
<th></th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.</td>
<td>Is $U_i$ equal to or less than $V_i$?</td>
<td>PASS</td>
</tr>
<tr>
<td>14.</td>
<td>Is $U_o$ equal to or less than $V_o$?</td>
<td>PASS</td>
</tr>
<tr>
<td>15.</td>
<td>Measure distance $S$ at inboard ($I$) and outboard ($O$) side of barrier.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$S_i = 780$ mm</td>
<td>$S_o = 775$ mm</td>
</tr>
<tr>
<td>16.</td>
<td>Measure distance $W$ at inboard ($I$) and outboard ($O$) sides of seat.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$W_i = 628$ mm</td>
<td>$W_o = 626$ mm</td>
</tr>
<tr>
<td>17.</td>
<td>Is $S_i + U_i$ equal to or greater than $W_i + V_i$?</td>
<td>PASS</td>
</tr>
<tr>
<td>18.</td>
<td>Is $S_o + U_o$ equal to or greater than $W_o + V_o$?</td>
<td>PASS</td>
</tr>
<tr>
<td>19.</td>
<td>Compute area $(W \times A) = 565,241$ mm$^2$</td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>Compute area $(E \times S) = 705,581$ mm$^2$</td>
<td></td>
</tr>
<tr>
<td>21.</td>
<td>Is $(W \times A)$ equal to or less than $(E \times S)$?</td>
<td>PASS</td>
</tr>
</tbody>
</table>

Comments: None

Recorded By: ________________________________

Approved By: ________________________________  DATE: 2/20/2007
BARRIER IDENTIFICATION: B1

1. Seat cushion width of seat immediately rearward of restraining barrier = 1,003 mm
   \[ W = \frac{\text{Seat Cushion Width}}{381 \text{ mm}} \] (round to nearest whole number) = (3)

2. Location of SRP of seat rearward of restraining barrier is: (Description of location as supplied by the manufacturer): 475 mm Above Floor, 135 mm forward from the front of seat back.

3. Location of lower loading bar is 0 mm above/below the SRP.
   (Requirement: between 102 mm above and 102 mm below the SRP) (S5.1.3.1)
   Length of loading bar = 900 mm
   Width of barrier at SRP = 1,000 mm

4. Include the x-y plot of force vs. time for the lower loading bar.

5. Deflection of the barrier at the conclusion of lower bar loading (1557W position) = 84.3 mm.

6. Maximum deflection allowed without moving the restraining barrier to within interference of door operation = 356 mm (must be 356 mm or less).

7. Barrier movement rate selected by the test engineer = 14.4 mm/sec

8. Location of upper loading bar is in a horizontal plane 406 mm above the SRP.
   (Requirement: 406 mm) (S5.1.3.3)
   Length of loading bar = 800 mm
   Width of Barrier at 406 mm above the SRP = 898 mm

9. Reason for stopping restraining barrier deflection:
   ____ Reached 356 mm maximum
   ____ Separation was about to occur
   ____ Interference with door operation
   __X__ Exceeded maximum load of 10675

10. Maximum deflection of barrier back 295 mm.
    (Requirement: maximum allowed is 356 mm) (S5.2.3(b))
### DATA SHEET 7 (CONTINUED)

#### RESTRAINING BARRIER FORCE/DEFLECTION TEST

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.</td>
<td>Does the restraining barrier interfere with the normal operation of the door. (S5.2.3 (c))</td>
<td>PASS</td>
</tr>
<tr>
<td>12.</td>
<td>Did any separation of barrier component or the separation of the barrier from the vehicle occur? (S5.1.3 (d) &amp; (e))</td>
<td>PASS</td>
</tr>
<tr>
<td>13.</td>
<td>Include the x-y plot of force vs. deflection for the upper loading bar with boundaries of Figure 14 (OVSC TP-222-3) superimposed.</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Does the forward force vs. deflection trace of the barrier back lie within the unshaded area? (S5.2.3(a))</td>
<td>FAIL</td>
</tr>
<tr>
<td>15.</td>
<td>Include a deflection vs. time plot for the upper loading bar.</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>The area within the force vs. deflection curve = 1,239 joules</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>$452W = 1,356$ joules (S5.2.3) (S5.1.3.4)</td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>Is item 16 greater than item 17?</td>
<td>FAIL</td>
</tr>
</tbody>
</table>

Comments: None

Recorded By: ________________________________

Approved By: ________________________________  DATE: 2/22/2007
BARRIER IDENTIFICATION: B9

1. Seat cushion width of seat immediately rearward of restraining barrier = 1,008 mm
   \[ W = \frac{(\text{Seat Cushion Width})}{381} \text{ mm} \] (round to nearest whole number) = (3)

2. Location of SRP of seat rearward of restraining barrier is: (Description of location as supplied by the manufacturer): 475 mm Above Floor, 135 mm forward from the front of seat back.

3. Location of lower loading bar is 0 mm above/below the SRP.
   (Requirement: between 102 mm above and 102 mm below the SRP) (S5.1.3.1)
   Length of lower loading bar = 900 mm
   Width of barrier at SRP = 1,000 mm

4. Include the x-y plot of force vs. time for the lower loading bar.

5. Deflection of the barrier at the conclusion of lower bar loading (1557W position) = 96.8 mm.

6. Maximum deflection allowed without moving the restraining barrier to within interference of door operation = 356 mm (must be 356 mm or less).

7. Barrier movement rate selected by the test engineer = 14.4 mm/sec

8. Location of upper loading bar is in a horizontal plane 406 mm above the SRP.
   (Requirement: 406 mm) (S5.1.3.3)
   Length of loading bar = 800 mm
   Width of Barrier at 406 mm above the SRP = 900 mm

9. Reason for stopping restraining barrier deflection:
   \[ X \] Reached 356 mm maximum
   ____ Separation was about to occur
   ____ Interference with door operation
   ____ Exceeded maximum load of 10675

10. Maximum deflection of barrier back 361 mm.
    (Requirement: maximum allowed is 356 mm) (S5.2.3(b))
11. Does the restraining barrier interfere with the normal operation of the door. (S5.2.3 (c))  PASS

12. Did any separation of barrier component or the separation of the barrier from the vehicle occur? (S5.1.3 (d) & (e))  PASS

13. Include the x-y plot of force vs. deflection for the upper loading bar with boundaries of Figure 14 (OVSC TP-222-3) superimposed.

14. Does the forward force vs. deflection trace of the barrier back lie within the unshaded area? (S5.2.3(a))  PASS

15. Include a deflection vs. time plot for the upper loading bar.

16. The area within the force vs. deflection curve = 1,647 joules

17. 452W = 1,356 joules (S5.2.3) (S5.1.3.4)

18. Is item 16 greater than item 17?  PASS

Comments:  None

Recorded By:______________________________

Approved By:______________________________  DATE: 2/21/2007
DATA SHEET 8
HEAD FORM IMPACT CONTACT AREA AND ENERGY REQUIREMENTS

Test Vehicle: 2006 MID BUS GUIDE DW SCHOOL BUS
NHTSA No.: C60901
Test Lab: MGA RESEARCH CORPORATION
Test Date: 2/27/2007

SEAT NUMBER: S2

NOTE: SHADED AREA IS NONCONTACTABLE SURFACE

1. Locate x-y reference point on sketch above for head form impact locations. (Label the positive and negative directions, if applicable)
2. Identify head form impact location on sketch by placing H1, H2, H3, H4, H5, H6, and H7 in the appropriate location.
3. Define and mark on graphic above, the plane of reference for head form impact angle:
   0° = Parallel With Floor, (+) is Up, (-) is Down
   X = From Inboard Edge of Seat
   Y = Measured Vertically from the SRP
DATA SHEET 8 (CONTINUED)
HEAD FORM IMPACT CONTACT AREA AND ENERGY REQUIREMENTS

4. Complete the following table:

<table>
<thead>
<tr>
<th>Head Impact &amp; Test #</th>
<th>Location (a)</th>
<th>Speed Trap Impact Velocity** mps</th>
<th>Derived Velocity mps</th>
<th>Contact Area (CA) mm²</th>
<th>CA ≥ 1935 mm²</th>
<th>Yes-Pass</th>
<th>No-Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X, Y, Angle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H1</td>
<td>810, 450, 0</td>
<td>1.56</td>
<td>1.39</td>
<td>4,340</td>
<td>PASS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H2</td>
<td>700, 450, 0</td>
<td>1.56</td>
<td>2.00</td>
<td>4,510</td>
<td>PASS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H3</td>
<td>590, 450, 0</td>
<td>1.55</td>
<td>1.85</td>
<td>4,340</td>
<td>PASS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H4</td>
<td>810, 320, 0</td>
<td>1.57</td>
<td>1.56</td>
<td>3,580</td>
<td>PASS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H5</td>
<td>700, 320, 0</td>
<td>1.56</td>
<td>1.56</td>
<td>3,230</td>
<td>PASS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H6</td>
<td>590, 320, 0</td>
<td>1.58</td>
<td>1.69</td>
<td>3,270</td>
<td>PASS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H7</td>
<td>480, 320, 0</td>
<td>1.57</td>
<td>1.51</td>
<td>2,810</td>
<td>PASS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Contact Velocity from Item 7 below
** Velocity Range = 1.52 mps, +0.08, -0 mps

5. Attach Contact Area Prints.
6. Attach acceleration versus time plots for each impact.
7. Integrate the acceleration versus time plots and attach plots of the results that show velocity versus time.

Comments: (a) All measurements are referenced to the point where the horizontal plane through the SRP intersects the vertical line tangent to the inboard edge at the seat.

Recorded By:______________________________
Approved By:______________________________ DATE: 2/27/2007
SEAT NUMBER: S2

NOTE: SHADED AREA IS NONCONTACTABLE SURFACE

1. Locate x-y reference point on sketch above for head form impact locations. (Label the positive and negative directions, if applicable)
2. Identify head form impact location on sketch by placing H8, H9, H10, H11, H12, H13, and H14 in the appropriate location.
3. Define and mark on graphic above, the plane of reference for head form impact angle:
   0° = Parallel With Floor, (+) is Up, (-) is Down
   X = From Inboard Edge of Seat
   Y = Measured Vertically from the SRP
4. Complete the following table:

<table>
<thead>
<tr>
<th>Head impact &amp; Test #</th>
<th>Location (a)</th>
<th>Speed Trap Impact Velocity ** mps</th>
<th>Derived Velocity ** mps</th>
<th>Max HIC</th>
<th>Engy Reqd Joules</th>
<th>Column 5 &lt; 1000</th>
<th>Column 6 &gt; 4.5 joules</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X</td>
<td>Y</td>
<td>Angle</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H8</td>
<td>480</td>
<td>450</td>
<td>0</td>
<td>6.65</td>
<td>6.46</td>
<td>119</td>
<td>5.36</td>
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<td>H9</td>
<td>370</td>
<td>450</td>
<td>0</td>
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<td>6.61</td>
<td>113</td>
<td>5.62</td>
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<td>H10</td>
<td>260</td>
<td>450</td>
<td>0</td>
<td>6.64</td>
<td>6.41</td>
<td>106</td>
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<tr>
<td>H11</td>
<td>150</td>
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<td>0</td>
<td>6.62</td>
<td>6.80</td>
<td>127</td>
<td>6.31</td>
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<tr>
<td>H12</td>
<td>370</td>
<td>320</td>
<td>0</td>
<td>6.62</td>
<td>6.56</td>
<td>125</td>
<td>13.03</td>
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<tr>
<td>H13</td>
<td>260</td>
<td>320</td>
<td>0</td>
<td>6.62</td>
<td>6.64</td>
<td>129</td>
<td>14.52</td>
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<td>320</td>
<td>0</td>
<td>6.63</td>
<td>6.58</td>
<td>125</td>
<td>10.53</td>
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</tbody>
</table>

* Impact velocity from item No. 6 below

** Impact velocity range = 6.69 mps, +0, -0.08 mps

5. Attach acceleration versus time plots for each impact.

6. Integrate the acceleration versus time plots and attach plots of the results that show velocity versus time.

Comments: (a) All measurements are referenced to the point where the horizontal plane through the SRP intersects the vertical line tangent to the inboard edge at the seat.

Recorded By: ____________________________

Approved By: ____________________________ DATE: 2/26/2007
DATA SHEET 9
KNEE FORM IMPACT TEST

Test Vehicle: 2006 MID BUS GUIDE DW SCHOOL BUS
Test Lab: MGA RESEARCH CORPORATION
NHTSA No.: C60901
Test Date: 2/26/2007

SEAT NUMBER: S2

1. Locate x-y reference point on sketch above for knee form impact locations. (Label the positive and negative directions, if applicable)
2. Identify knee form impact location on sketch by placing K1, K2, K3, K4, K5, K6, K7, and K8 in the appropriate location.
3. Define the plane of reference for knee form impact angle:
   
   - $0^\circ$ = Parallel With Floor, (+) is Up, (-) is Down
   - X = From Inboard Edge of the Seat
   - Y = Measured Vertically from the SRP
4. Complete the following table:

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<tr>
<th>Knee impact &amp; Test #</th>
<th>Location (a)</th>
<th>Speed Trap Impact Velocity ** mps</th>
<th>Derived Velocity ** mps</th>
<th>Cont. Area mm²</th>
<th>Resist Force (N)</th>
<th>Column 5 &gt; 1935 mm²</th>
<th>Column 6 &lt; 2669N</th>
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<tr>
<td></td>
<td>X  Y  Angle</td>
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<td></td>
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<tr>
<td>K1</td>
<td>380 250 0</td>
<td>4.80</td>
<td>4.35</td>
<td>3,070</td>
<td>1,453</td>
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<td>PASS</td>
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<tr>
<td>K2</td>
<td>230 250 0</td>
<td>4.82</td>
<td>4.81</td>
<td>3,270</td>
<td>1,717</td>
<td>PASS</td>
<td>PASS</td>
</tr>
<tr>
<td>K3</td>
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<td>4.76</td>
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<td>2,158</td>
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<td>PASS</td>
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<td>380 100 0</td>
<td>4.86</td>
<td>4.83</td>
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<td>1,506</td>
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<td>K5</td>
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<td>4.82</td>
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<td>80 100 0</td>
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* Impact velocity from item No. 7 below
** Impact velocity range = 4.86 mps, +0.08, -0 mps for contact area, +0, -0.08 mps for force

5. Attach Contact Area Prints for K1, K2, K3 and K4.

6. Attach acceleration versus time plots for each impact.

7. Integrate the acceleration versus time plots and attach plots of the results that show velocity versus time for each impact K1 through K8.

8. Attach force vs. time plots for K5, K6, K7 and K8.

Comments: (a) All measurements are referenced to the point where the horizontal plane through the SRP intersects the vertical line tangent to the inboard edge at the seat.

Recorded By: ____________________________

Approved By: ____________________________ DATE: 2/26/2007
### SECTION 4
#### INSTRUMENTATION AND EQUIPMENT LIST

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<th>Next Cal. Date</th>
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<td>TF2003</td>
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<td>A/D Interface</td>
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<td>Powerlock / 278</td>
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<td>Sony</td>
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## TABLE OF PHOTOGRAPHS

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<td>21</td>
<td>Post-Test of Head and Knee Impact Locations on Seat S2</td>
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<td>Pre-Test of Barrier B1 Force Deflection Forward Test</td>
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<td>Pre-Test of Barrier B9 Force Deflection Forward Test</td>
<td>62</td>
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<td>26</td>
<td>Post-Test of Barrier B9 Force Deflection Forward Test</td>
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Test Vehicle: 2006 MID BUS GUIDE DW SCHOOL BUS
Procedure: FMVSS 222
NHTSA No.: C60901
Test Date: 1/15/2007

Left Side View of School Bus
Test Vehicle: 2006 MID BUS GUIDE DW SCHOOL BUS
Procedure: FMVSS 222
NHTSA No.: C60901
Test Date: 1/15/2007

Right Side View of School Bus
Test Vehicle: 2006 MID BUS GUIDE DW SCHOOL BUS
Procedure: FMVSS 222
NHTSA No.: C60901
Test Date: 1/15/2007
Test Vehicle: 2006 MID BUS GUIDE DW SCHOOL BUS
Procedure: FMVSS 222
NHTSA No.: C60901
Test Date: 1/15/2007

MFD. BY: MID BUS INC.
BLUFFTON, OH 45817

DATE OF MFR: MO. 9 YR. 06
INC. VEH. MFD. BY: Chevrolet Motor Div.

DATE OF INC. VEH. MFR:
MO. 4 YR. 06

GVWR: 5579 KG (12300LB)

GAWR-FRONT: 1951 KG (4300LB)

GAWR INTERMEDIATE (1):

GAWR INTERMEDIATE (2):

GAWR-REAR: 3901 KG (8600LB)

THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S.A. FEDERAL MOTOR VEHICLE SAFETY STANDARDS IN EFFECT IN:
MO. 4 YR. 06

VEHICLE IDENTIFICATION NUMBER:
1GBJG31U461237309

VEHICLE TYPE: School Bus
CSD-7450-C-063336

Certification Label
Test Vehicle: 2006 MID BUS GUIDE DW SCHOOL BUS
Procedure: FMVSS 222
NHTSA No.: C60901
Test Date: 1/15/2007

Vehicle Interior View From Front to Rear
Test Vehicle: 2006 MID BUS GUIDE DW SCHOOL BUS
Procedure: FMVSS 222
NHTSA No.: C60901
Test Date: 1/15/2007

Vehicle Interior View From Rear to Front
Test Vehicle: 2006 MID BUS GUIDE DW SCHOOL BUS
Procedure: FMVSS 222
NHTSA No.: C60901
Test Date: 1/15/2007

Pre-Test of Seat Cushion S4
Test Vehicle: 2006 MID BUS GUIDE DW SCHOOL BUS
Procedure: FMVSS 222
NHTSA No.: C60901
Test Date: 1/15/2007

Post-Test of Seat Cushion S4
Test Vehicle: 2006 MID BUS GUIDE DW SCHOOL BUS
Procedure: FMVSS 222
NHTSA No.: C60901
Test Date: 1/15/2007

Pre-Test of Seat Cushion S5
Test Vehicle: 2006 MID BUS GUIDE DW SCHOOL BUS
Procedure: FMVSS 222
NHTSA No.: C60901
Test Date: 1/15/2007

Post-Test of Seat Cushion S5
Test Vehicle: 2006 MID BUS GUIDE DW SCHOOL BUS
Procedure: FMVSS 222
NHTSA No.: C60901
Test Date: 1/15/2007

Pre-Test of Seat Back S7 Force Deflection Forward Test
Post-Test of Seat Back S7 Force Deflection Forward Test
Pre-Test of Seat Back S8 Force Deflection Forward Test
Test Vehicle: 2006 MID BUS GUIDE DW SCHOOL BUS
Procedure: FMVSS 222
NHTSA No.: C60901
Test Date: 1/15/2007

Post-Test of Seat Back S8 Force Deflection Forward Test
Pre-Test of Seat Back S3 Force Deflection Rearward Test
Post-Test of Seat Back S3 Force Deflection Rearward Test
Test Vehicle: 2006 MID BUS GUIDE DW SCHOOL BUS
Procedure: FMVSS 222
NHTSA No.: C60901
Test Date: 1/15/2007

Pre-Test of Seat Back S6 Force Deflection Rearward Test
Test Vehicle: 2006 MID BUS GUIDE DW SCHOOL BUS
Procedure: FMVSS 222
NHTSA No.: C60901
Test Date: 1/15/2007

Post-Test of Seat Back S6 Force Deflection Rearward Test
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<th>NHTSA No.:</th>
<th>C60901</th>
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<tr>
<td>Procedure:</td>
<td>FMVSS 222</td>
<td>Test Date:</td>
<td>1/15/2007</td>
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Post-Test of Head and Knee Impact Locations on Seat S2
Pre-Test of Barrier B1 Force Deflection Forward Test
Post-Test of Barrier B1 Force Deflection Forward Test
Test Vehicle: 2006 MID BUS GUIDE DW SCHOOL BUS
Procedure: FMVSS 222
NHTSA No.: C60901
Test Date: 1/15/2007

Post-Test of Barrier B1 Force Deflection Forward Test View 2
Test Vehicle: 2006 MID BUS GUIDE DW SCHOOL BUS
Procedure: FMVSS 222
NHTSA No.: C60901
Test Date: 1/15/2007

Pre-Test of Barrier B9 Force Deflection Forward Test
Test Vehicle: 2006 MID BUS GUIDE DW SCHOOL BUS
Procedure: FMVSS 222
NHTSA No.: C60901
Test Date: 1/15/2007

Post-Test of Barrier B9 Force Deflection Forward Test
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Test Desc: Seat Back Forward Deflection (Upper)  
Component ID: MID BUS S7  
NHTSA #: C60901

Test Date: 2/19/2007

Total Energy: 1,810 J

Disp Max : 361.0 mm
Time Max : 28.4

Force Max : 8,114.8 N
Time Max : 24.9
Test Desc: Seat Back Forward Deflection (Lower)  Test Date: 2/19/2007  Component ID: MID BUS S7  NHTSA #: C60901

FORCE (N) VS DISPLACEMENT (mm)

DISPLACEMENT (mm) VS TIME (SEC)

DISP. Max : 74.7 mm  DISP. End : 68.2 mm

FORCE (N) VS TIME (SEC)

Force Max : 9,228.4 N  Time Max : 28.7  Force @ 60 sec : 4,612.7 N
Test Desc: Seat Back Forward Deflection (Upper)  
Test Date: 2/19/2007  
Component ID: MID BUS S8  
NHTSA #: C60901

Total Energy: 2,270 J

force (N) vs displacement (mm)

- Force Max : 10,606.5 N  
  Time Max : 24.6

displacement (mm) vs time (sec)

- Disp Max : 361.2 mm  
  Time Max : 31.5

force (N) vs time (sec)
Test Desc: Seat Back Forward Deflection (Lower)  
Component ID: MID BUS S8  
NHTSA #: C60901  

Test Date: 2/19/2007  

Force @ 60 sec: 4,605.7 N  

Component ID: MID BUS S8  
NHTSA #: C60901  

Test Date: 2/19/2007  

Force Max: 9,238.2 N  
Time Max: 28.6 sec  
Force @ 60 sec: 4,605.7 N
Test Desc: Seat Back Rearward Deflection  
Component ID: MID BUS S3
Test Date: 2/22/2007
NHTSA #: C60901

Total Energy: 1,469.1 J

FORCE (N) VS DISPLACEMENT (mm)
Disp Max : 256.6 mm
Force Max : 9,210.6 N

DISPLACEMENT (mm) VS TIME (SEC)
Disp Max : 256.6 mm
Time Max : 20.5

FORCE (N) VS TIME (SEC)
Force Max : 9,210.6 N
Time Max : 9.8
Test Desc: Seat Back Rearward Deflection
Component ID: MD BUS S6
NHTSA #: C60901

Total Energy: 1,345.9 J

Force Max: 9,570.6 N
Time Max: 17.3

Disp Max: 257.4 mm
Time Max: 22.4
Test Description: Barrier Forward Deflection (Upper)
Component ID: MID BUS B1
NHTSA #: C60901

Total Energy: 1,239 J

Disp Max: 294.8 mm
Time Max: 21.1

Force Max: 13,088.1 N
Time Max: 21.0
Test Desc: Barrier Forward Deflection (Lower)  
Component ID: MID BUS B1  
NHTSA #: C60901  

Test Date: 2/22/2007

Force @ 60 sec: 4,617.1 N

Disp. Max: 93.7 mm
Disp. End: 1,062.0 mm

Force Max: 9,283.0 N
Time Max: 27.5
Force @ 60 sec: 4,617.1 N

FORCE (N) VS DISPLACEMENT (mm)

DISPLACEMENT (mm) VS TIME (SEC)

FORCE (N) VS TIME (SEC)
Test Desc: Barrier Forward Deflection (Upper)  
Component ID: MID BUS B9  
NHTSA #: C60901  

Test Date: 2/21/2007  

FORCE (N) VS DISPLACEMENT (mm)

- Force Max: 8,587.0 N  
- Time Max: 25.4

DISPLACEMENT (mm) VS TIME (SEC)

- Disp Max: 361.0 mm  
- Time Max: 31.4

FORCE (N) VS TIME (SEC)

- Total Energy: 1,647 J
Test Desc: Barrier Forward Deflection (Lower)  
Component ID: MID BUS B9  
NHTSA #: C60901  

Test Date: 2/21/2007

**FORCE (N) VS DISPLACEMENT (mm)**

- Force Max: 9,256.6 N  
- Time Max: 29.1 sec

**DISPLACEMENT (mm) VS TIME (SEC)**

- Disp. Max: 102.7 mm  
- Disp. End: 96.8 mm

**FORCE (N) VS TIME (SEC)**

- Force Max: 9,256.6 N  
- Time Max: 29.1 sec  
- Force @ 60 sec: 4,621.6 N
Test Desc: Head Form Impact (1.5 m/s)  
Component ID: MID BUS S2; Location H2  
NHTSA #: C60901  

**HEAD X Acceleration (G's) VS TIME (S)**

- Max: 3.54 G's
- Tmax: 0.25 S
- Min: -5.43 G's
- Tmin: 0.04 S

**VELOCITY X (m/s) VS TIME (S)**

- Max: 2.75 m/s
- Tmax: 0.50 S
- Min: 0.00 m/s
- Tmin: 0.07 S
- Vel@IMP: 1.995 m/s
Test Desc: Head Form Impact (1.5 m/s)  
Component ID: MID BUS S2; Location H3  
NHTSA #: C60901  

**HEAD X Acceleration (G's) VS TIME (S)**

- Max: 3.38 G's  
- Tmax: 0.25 S  
- Min: -5.32 G's  
- Tmin: 0.04 S

**VELOCITY X (m/s) VS TIME (S)**

- Max: 2.09 m/s  
- Tmax: 0.49 S  
- Min: -0.21 m/s  
- Tmin: 0.08 S  
- Vel@Imp: 1.845 m/s
Test Desc: Head Form Impact (1.5 m/s)
Component ID: MID BUS S2, Location H4
NHTSA #: C60901

**HEAD X Acceleration (G's) VS TIME (S)**

- Max: 4.48 G's
- Tmax: 0.29 S
- Min: -5.64 G's
- Tmin: 0.04 S

**VELOCITY X (m/s) VS TIME (S)**

- Max: 1.57 m/s
- Tmax: -0.01 S
- Min: -0.81 m/s
- Tmin: 0.09 S
- Vel@Imp: 1.563 m/s
Test Desc: Head Form Impact (1.5 m/s)  
Component ID: MID BUS S2, Location H5  
Test Date: 2/27/2007  
NHTSA #: C60901
Test Desc: Head Form Impact (1.5 m/s)
Test Date: 2/27/2007
Component ID: MID BUS S2; Location H6
NHTSA #: C60901

**HEAD X Acceleration (G's) VS TIME (S)**

Max: 3.48 G's  
TMax: 0.33 S  
Min: -5.53 G's  
TMin: 0.05 S

**VELOCITY X (m/s) VS TIME (S)**

Max: 1.70 m/s  
TMax: 0.00 S  
Min: -0.45 m/s  
TMin: 0.11 S  
VEL@IMP: 1.692 m/s
Test Desc: Head Form Impact (6.69 m/s)
Component ID: MID BUS S2; Location H8
NHTSA#: C60901

Max: 24.98 G's
TMax: 0.08 S
Min: -52.06 G's
TMin: 0.01 S

Max: 6.50 m/s
TMax: -0.01 S
Min: -3.11 m/s
TMin: 0.06 S
VEL@IMP: 6.464 m/s

Max: 1,276.73 N
TMax: 0.08 S
Min: -2,660.73 N
TMin: 0.01 S

Energy: 5.36 J
Test Desc: Head Form Impact (6.69 m/s)  
Component ID: MID BUS S2; Location H9  
NHTSA#: C60901

**HEAD X ACCELERATION (G's) VS TIME (S)**  
Hic: 113.18  
T1: 5.10 ms  
T2: 32.80 ms  
Max: 26.41 G's  
TMax: 0.08 S  
Min: -48.14 G's  
TMin: 0.01 S

**VELOCITY X (m/s) VS TIME (S)**  
Max: 6.64 m/s  
TMax: -0.00 S  
Min: -2.87 m/s  
TMin: 0.06 S  
VEL@IMP: 6.607 m/s

**FORCE X (N) VS TIME (S)**  
Max: 1,349.76 N  
TMax: 0.08 S  
Min: -2,460.54 N  
TMin: 0.01 S

**FORCE (N) VS TIME (SEC)**  
Energy: 5.62 J
Test Desc: Head Form Impact (6.69 m/s)  Test Date: 2/26/2007
Component ID: MID BUS S2; Location H10  NHTSA#: C60901

HEAD X ACCELERATION (G's) VS TIME (S)

Max: 25.01 G's  Tmax: 0.09 S  Min: -36.80 G's  Tmin: 0.01 S
Hic: 105.69  T1: 7.10 ms  T2: 36.30 ms

VELOCITY X (m/s) VS TIME (S)

Max: 6.47 m/s  Tmax: -0.01 S  Min: -3.00 m/s  Tmin: 0.06 S
Vel@Imp: 6.412 m/s

FORCE X (N) VS TIME (S)

Max: 1,278.04 N  Tmax: 0.09 S  Min: -1,880.97 N  Tmin: 0.01 S

Energy: 8.34 J
Test Desc: Head Form Impact (6.69 m/s)  
Test Date: 2/26/2007  
Component ID: MID BUS S2; Location H11  
NHTSA#: C60901

HEAD X ACCELERATION (G's) VS TIME (S)

Max: 35.79 G's  
TMax: 0.08 S  
Min: -42.73 G's  
TMin: 0.01 S

VELOCITY X (m/s) VS TIME (S)

Max: 6.82 m/s  
TMax: -0.00 S  
Min: -2.80 m/s  
TMin: 0.06 S  
VEL@IMP: 6.795 m/s

FORCE X (N) VS TIME (S)

Max: 1,829.07 N  
TMax: 0.08 S  
Min: -2,184.01 N  
TMin: 0.01 S

ENERGY (J) VS TIME (SEC)

Energy: 6.31 J
Test Desc: Head Form Impact (6.69 m/s)  
Test Date: 2/26/2007  
Component ID: MID BUS S2; Location H12  
NHTSA#: C60901

HEAD X ACCELERATION (G’s) VS TIME (S)

Max: 28.64 G’s  
TMax: 0.09 S  
Min: -52.49 G’s  
TMin: 0.02 S

VELOCITY X (m/s) VS TIME (S)

Max: 6.59 m/s  
TMax: -0.00 S  
Min: -3.12 m/s  
TMin: 0.06 S  
VEL@IMP: 6.556 m/s

FORCE X (N) VS TIME (S)

Max: 1,463.77 N  
TMax: 0.09 S  
Min: -2,682.91 N  
TMin: 0.02 S

ENERGY (J) VS TIME (SEC)

Energy: 13.03 J
Test Desc: Head Form Impact (6.69 m/s)  
Test Date: 2/26/2007  
Component ID: MID BUS S2; Location H13  
NHTSA#: C60901  

**HEAD X ACCELERATION (G's) VS TIME (S)**  
Max: 31.43 G's  
TMax: 0.09 S  
Min: -56.90 G's  
TMin: 0.02 S  

Hic: 129.42  
T1: 13.10 ms  
T2: 22.80 ms  

**VELOCITY X (m/s) VS TIME (S)**  
Max: 6.67 m/s  
TMax: -0.00 S  
Min: -2.77 m/s  
TMin: 0.06 S  
VEL@IMP: 6.644 m/s  

**FORCE X (N) VS TIME (S)**  
Max: 1,606.29 N  
TMax: 0.09 S  
Min: -2,908.28 N  
TMin: 0.02 S  

**FORCE (N) VS TIME (SEC)**  
Energy: 14.52 J
Test Desc: Knee Form Impact
Component ID: MID BUS S2; Location K1
NHTSA #: C60901

Test Date: 2/27/2007

KNEE X Acceleration (G's) VS TIME (S)
Max: 21.89 G's
TMax: 0.20 s
Min: -32.69 G's
TMin: 0.10 s

VELOCITY X (m/s) VS TIME (S)
Max: 4.45 m/s
TMax: 0.06 s
Min: -3.26 m/s
TMin: 0.57 s
VEL@IMP: 4.35 m/s

FORCE X (N) VS TIME (S)
Max: 972.91 N
TMax: 0.20 s
Min: -1,452.59 N
TMin: 0.10 s
Test Desc: Knee Form Impact
Component ID: MID BUS S2; Location K2
NHTSA #: C60901

Test Date: 2/27/2007

KNEE X Acceleration (G's) VS TIME (S)
Max: 21.89 G's
TMax: 0.04 s
Min: -38.64 G's
TMin: 0.10 s

VELOCITY X (m/s) VS TIME (S)
Max: 4.83 m/s
TMax: 0.07 s
Min: -2.01 m/s
TMin: 0.15 s
VEL@IMP: 4.81 m/s

FORCE X (N) VS TIME (S)
Max: 972.83 N
TMax: 0.04 s
Min: -1,717.12 N
TMin: 0.10 s
Test Desc: Knee Form Impact
Component ID: MID BUS S2; Location K3
Test Date: 2/27/2007
NHTSA #: C60901

KNEE X Acceleration (G's) VS TIME (S)
Max: 22.06 G's
TMax: 0.04 s
Min: -48.56 G's
TMin: 0.09 s

VELOCITY X (m/s) VS TIME (S)
Max: 4.79 m/s
TMax: 0.07 s
Min: -2.01 m/s
TMin: 0.12 s
VEL@IMP: 4.76 m/s

FORCE X (N) VS TIME (S)
Max: 980.40 N
TMax: 0.04 s
Min: -2,157.91 N
TMin: 0.09 s
Test Desc: Knee Form Impact
Component ID: MID BUS S2; Location K4
NHTSA #: C60901

Test Date: 2/27/2007

KNEE X Acceleration (G's) VS TIME (S)
Max: 21.77 G's
TMax: 0.04 s
Min: -33.89 G's
TMin: 0.10 s

VELOCITY X (m/s) VS TIME (S)
Max: 4.86 m/s
TMax: 0.07 s
Min: -1.87 m/s
TMin: 0.13 s
VEL@IMP: 4.83 m/s

FORCE X (N) VS TIME (S)
Max: 967.63 N
TMax: 0.04 s
Min: -1,505.87 N
TMin: 0.10 s
Test Desc: Knee Form Impact
Component ID: MID BUS S2; Location K5
Test Date: 2/27/2007
NHTSA #: C60901

KNEE X Acceleration (G's) VS TIME (S)
Max: 24.24 G's
TMax: 0.21 s
Min: -35.64 G's
TMin: 0.10 s

VELOCITY X (m/s) VS TIME (S)
Max: 4.64 m/s
TMax: 0.07 s
Min: -2.30 m/s
TMin: 0.21 s
VEL@IMP: 4.6 m/s

FORCE X (N) VS TIME (S)
Max: 1,077.03 N
TMax: 0.21 s
Min: -1,583.62 N
TMin: 0.10 s
Test Desc: Knee Form Impact
Component ID: MID BUS S2; Location K6
NHTSA #: C60901
Test Date: 2/27/2007

Maximum Acceleration (G's):
- Max: 31.69 G's
- Tmax: 0.14 s
- Min: -51.46 G's
- Tmin: 0.09 s

Maximum Velocitity (m/s):
- Max: 4.82 m/s
- Tmax: 0.06 s
- Min: -2.05 m/s
- Tmin: 0.11 s

Maximum Force (N):
- Max: 1,408.11 N
- Tmax: 0.14 s
- Min: -2,286.63 N
- Tmin: 0.09 s

VELOCITY X (m/s) VS TIME (S)
Max: 4.82 m/s
TMax: 0.06 s
Min: -2.05 m/s
TMin: 0.11 s
VEL@IMP: 4.8 m/s

FORCE X (N) VS TIME (S)
Max: 1,408.11 N
TMax: 0.14 s
Min: -2,286.63 N
TMin: 0.09 s
Test Desc: Knee Form Impact  
Component ID: MID BUS S2; Location K8  
NHTSA #: C60901  
Test Date: 2/27/2007

KNEE X Acceleration (G's) VS TIME (S)
Max: 30.73 G's  
TMax: 0.15 s  
Min: -50.34 G's  
TMin: 0.09 s

VELOCITY X (m/s) VS TIME (S)
Max: 5.00 m/s  
TMax: 0.07 s  
Min: -1.98 m/s  
TMin: 0.11 s  
VEL@IMP: 4.98 m/s

FORCE X (N) VS TIME (S)
Max: 1,365.49 N  
TMax: 0.15 s  
Min: -2,236.94 N  
TMin: 0.09 s
SECTION 7
WELT CONTACT POINTS

Test Vehicle: 2006 MID BUS GUIDE DW SCHOOL BUS
Test Lab: MGA RESEARCH CORPORATION
NHTSA No.: C60901
Test Date: 2/27/2007

H1 / SEAT S2

H1   MID BUS   43.4 cm²
H2 / SEAT S2

H2  MID BUS  45.1 cm²
H3 / SEAT S2

H3 MID BUS 43.4 cm²
SECTION 7 (CONTINUED)
WELT CONTACT POINTS

Test Vehicle: 2006 MID BUS GUIDE DW SCHOOL BUS
Test Lab: MGA RESEARCH CORPORATION
NHTSA No.: C60901
Test Date: 2/27/2007

H4 / SEAT S2

H4 MID BUS 35.8 cm²
H5 / SEAT S2

H5   MID BUS   32.3 cm²
H7 / SEAT S2

H7  MID BUS  28.1 cm$^2$
SECTION 7 (CONTINUED)
WELT CONTACT POINTS

Test Vehicle: 2006 MID BUS GUIDE DW SCHOOL BUS
Test Lab: MGA RESEARCH CORPORATION
NHTSA No.: C60901
Test Date: 2/27/2007

K1 / SEAT S2

K1 MID BUS 30.7 cm²
SECTION 7 (CONTINUED)
WELT CONTACT POINTS

Test Vehicle: 2006 MID BUS GUIDE DW SCHOOL BUS
Test Lab: MGA RESEARCH CORPORATION
NHTSA No.: C60901
Test Date: 2/27/2007

K2 / SEAT S2

K2 MID BUS 32.7 cm²
K3 / SEAT S2

K3 MID BUS 31.4 cm$^2$
SECTION 7 (CONTINUED)
WELT CONTACT POINTS

Test Vehicle: 2006 MID BUS GUIDE DW SCHOOL BUS  
Test Lab: MGA RESEARCH CORPORATION  
NHTSA No.: C60901  
Test Date: 2/27/2007

K4 / SEAT S2

K4 MID BUS  32.6 cm²
LABORATORY NOTICE OF TEST FAILURE TO OVSC

Test Procedure: FMVSS 222  
Test Date: February 23, 2007

Test Vehicle: 2006 MID BUS GUIDE  
Test Lab: MGA Research Corp.

NHTSA No.: C60901  
Project Engineer: Eric Peschman

Contract No.: DTNH22-02-D-01057  
Delivery Order No.: 005

MFR.: MID BUS INC.  
VIN: 1GBJG31U4612373309

Build Date: 9/06

TEST FAILURE DESCRIPTION

The forward deflection of the left side retraining barrier exceeded the maximum allowable force of 10,675 N before absorbing 1,356 Joules of energy. The energy absorbed was 1,239 Joules. When the force vs. deflection data was plotted, it fell out of the specified corridor listed in 49 CFR 571.222 Figure 1. The test was stopped at 295 mm to avoid equipment damage.

FMVSS REQUIREMENTS DESCRIPTION

Paragraph S5.2.3 (a): "The restraining barrier force/deflection curve shall fall within the zone specified in figure 1."

Remarks: No remarks.

Notification to NHTSA (COTR): Brian Smith

Date: February 23, 2007

By: ______________________________