SAFETY COMPLIANCE TESTING FOR 
FMVSS NO. 222 
SCHOOL BUS PASSENGER SEATING AND CRASH PROTECTION

2011 GIRARDIN MICRO BIRD SCHOOL BUS 
NHTSA NO.: CB0903

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


FINAL REPORT DATE: AUGUST 2, 2011

FINAL REPORT

PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION 
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION 
ENFORCEMENT 
OFFICE OF VEHICLE SAFETY COMPLIANCE 
MAILCODE: NVS-220 
1200 NEW JERSEY AVENUE, S.E. 
WASHINGTON, D.C. 20590
This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers’ names or products are mentioned it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Prepared by: Eric Peschman, Project Engineer
Date: August 2, 2011

Reviewed by: Michael Janovicz, Program Manager
Date: August 2, 2011

FINAL REPORT ACCEPTED BY:

Edward E. Chan
Date of Acceptance
Compliance tests were conducted on the subject 2011 Girardin Micro Bird School Bus, NHTSA No.: CB0903, in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-222-04 for the determination of FMVSS 222 compliance.
<table>
<thead>
<tr>
<th>Section</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Purpose of Compliance Test</td>
<td>1</td>
</tr>
<tr>
<td>2 Test Data Summary</td>
<td>2</td>
</tr>
<tr>
<td>3 Compliance Test Data</td>
<td>8</td>
</tr>
<tr>
<td>Data Sheet 1 – Seat to Seat/Barrier Spacing</td>
<td>9</td>
</tr>
<tr>
<td>Data Sheet 2 – Seat Back Height and Front Surface Area Test</td>
<td>10</td>
</tr>
<tr>
<td>Data Sheet 3 – Restraining Barrier Position and Projected Rear Surface Area</td>
<td>18</td>
</tr>
<tr>
<td>Data Sheet 4 – Seat Cushion Latching and Retention Test</td>
<td>22</td>
</tr>
<tr>
<td>Data Sheet 5 – Seat Back Force Deflection Test – Forward</td>
<td>23</td>
</tr>
<tr>
<td>Data Sheet 6 – Restraining Barrier Force/Deflection Test</td>
<td>27</td>
</tr>
<tr>
<td>Data Sheet 7 – Seat Back Force Deflection Test – Rearward</td>
<td>29</td>
</tr>
<tr>
<td>Data Sheet 8 – Head Form Impact Contact Area Requirement</td>
<td>30</td>
</tr>
<tr>
<td>Data Sheet 9 – Head Form Impact Energy Requirement</td>
<td>36</td>
</tr>
<tr>
<td>Data Sheet 10 – Knee Form Impact Test</td>
<td>42</td>
</tr>
<tr>
<td>4 Instrumentation and Equipment List</td>
<td>48</td>
</tr>
<tr>
<td>5 Photographs</td>
<td>49</td>
</tr>
<tr>
<td>6 Test Plots</td>
<td>72</td>
</tr>
<tr>
<td>7 Welt Contact Points</td>
<td>152</td>
</tr>
<tr>
<td>8 Bus Floor Plan</td>
<td>186</td>
</tr>
</tbody>
</table>
SECTION 1
PURPOSE OF COMPLIANCE TEST

All tests were conducted on a 2011 Girardin Micro Bird School Bus, NHTSA No.: CB0903, in accordance with the specifications of the Office of Vehicle Safety Compliance (OVSC) Test Procedures TP-222-04 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.: DTNH22-08-D-00075.
SECTION 2
TEST DATA SUMMARY

The passenger seating and crash protection tests were conducted from April 14, 2011 through June 15, 2011. All tests were conducted by MGA Research Corporation at the Wisconsin Operations. The test vehicle, 2011 Girardin Micro Bird School Bus NHTSA No.: CB0903, appears to meet all the requirements of FMVSS 222.
LINEAR AND AREA MEASUREMENTS

Seat to seat/barrier spacing was checked on all seats and found to be 554 mm or less as shown on Data Sheet No. 1.

The seat back height and front surface area of Seat Nos. S1, S3, S7 and S8 were measured in accordance with Section 12.1 of OVSC TP-222-04. As shown in Data Sheet No. 2 for S1, S3, S7 and S8, the seat back area is greater than ninety percent of the seat bench width multiplied by 610.

The restraining barrier position and projected rear surface area of Barrier Nos. B1 and B8 were measured in accordance with OVSC TP-222-04. As shown in Data Sheet No. 3 for B1 and B8, the projected perimeters of the seats fall completely within the perimeters of the restraining barriers.

SEAT CUSHION RETENTION

Seat No. S1 was tested in accordance with Section 12.3 of OVSC TP-222-04. Seat cushion weight was 2.54 kg for S1. The maximum force reached for S1 was 134 N, and the lower time limit boundary (t1) was approximately 4 seconds with approximate load duration of 9 seconds. As shown in Data Sheet No. 4, the seat cushions tested met all requirements.

SEAT BACK FORCE DEFLECTION TEST - FORWARD

Seat Nos. S5 and S8 were tested in accordance with Section 12.4 of OVSC TP-222-04. Seat bench width was determined to be 770 mm for S5 and 1,000 mm for S8. \( W \) was calculated to be 2 for S5 and 3 for S8. The seating reference point (SRP) was 478 mm above the bus floor. The deflection of the seat back at conclusion of lower loading bar loading at 1,557 W N load was 66 mm for S5 and 75 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 for both seats. The stroke rate of the upper loading bar was determined by the test engineer to be 12.7 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 452W or 904 joules for S5. The minimum required area under the force versus deflection curve of the upper loading bar was 452W or 1,356 joules for S8. As shown on Data Sheet No. 5, S1 and S6 met the force deflection forward requirements.
SECTION 2 (CONTINUED)
TEST DATA SUMMARY

RESTRAINING BARRIER FORCE/DEFLECTION TEST - FORWARD
The right hand restraining Barrier No. B8 was tested in accordance with Section 12.4 of OVSC TP-222-04. Seat bench width of the aft seat was determined to be 1,000 mm. “W” was calculated to be 3 for B8. The SRP was 478 mm above the bus floor. The deflection of the restraining barrier at the conclusion of the lower loading bar loading at 1,557W was 104 mm. The allowable maximum deflection without moving the restraining barrier 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 12.7 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 for B8. The area under the force versus deflection curve of the upper loading bar was 1,999 joules. The minimum required area under the force versus deflection curve of the upper loading bar was 452W or 1,356 joules. As shown on Data Sheet No. 6, B8 met the force deflection forward requirements.

SEAT BACK FORCE/DEFLECTION TEST - REARWARD
Seat No. S3 was tested in accordance with Section 12.4 of OVSC TP-222-04. Seat bench width was determined to be 770 mm. “W” was calculated to be 2. The seating reference point (SRP) was 343 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 test engineer to be 8.8 mm/sec for S3. The location of the loading bar was 343 mm above the SRP. 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 829 joules for S3. The minimum required area under the force versus deflection curve of the loading bar was 316W or 632 joules. As shown in Data Sheet No. 7, S3 met the force deflection rearward requirements.

HEAD FORM IMPACT ZONE TESTS
Seat Nos. S2 and S7 and Barrier No. B1 were tested in accordance with Section 12.6 of OVSC TP-222-04. The mass of the head form was 5.21 kg. All head form contact area, impact energy, and head injury criteria were met for Seat Nos. S2 and S7 and Barrier No. B1. Data from these tests are presented in Data Sheet No. 8 and Data Sheet No.9.
KNEE FORM IMPACT ZONE TESTS

Seat Nos. S2 and S7 and Barrier No. B1 were tested in accordance with Section 12.7 of OVSC TP-222-04. The mass of the knee form was 4.53 kg. All knee form contact area criteria and impact energy criteria were met for Seat Nos. S2 and S7 and Barrier No. B1. Data from these tests are presented on Data Sheet No. 10.
ADMINISTRATIVE DATA SHEET

Test Vehicle: 2011 Girardin Micro Bird School Bus  
NHTSA No.: CB0903

Test Lab: MGA RESEARCH CORPORATION  
Test Dates: 04/14/11 – 06/15/11

INCOMPLETE VEHICLE (IF APPLICABLE)

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Ford Motor Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make/Model</td>
<td>Girardin Micro Bird</td>
</tr>
<tr>
<td>VIN</td>
<td>1FDEE3FLXBDA10617</td>
</tr>
<tr>
<td>Certification Date</td>
<td>09/10</td>
</tr>
</tbody>
</table>

COMPLETED VEHICLE (SCHOOL BUS)

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Corp. Micro Bird Inc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year/Make/Model</td>
<td>2011 Girardin Micro Bird</td>
</tr>
<tr>
<td>VIN</td>
<td>1FDEE3FLXBDA10617</td>
</tr>
<tr>
<td>NHTSA No.</td>
<td>CB0903</td>
</tr>
<tr>
<td>Color</td>
<td>Yellow</td>
</tr>
<tr>
<td>GVWR</td>
<td>5,216 kg / 11,500 lb</td>
</tr>
<tr>
<td>Manufacture Date</td>
<td>11/10</td>
</tr>
</tbody>
</table>

DATES

<table>
<thead>
<tr>
<th>Vehicle Receipt</th>
<th>12/09/10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start of Compliance Test</td>
<td>04/14/11</td>
</tr>
<tr>
<td>Completion of Compliance Test</td>
<td>06/15/11</td>
</tr>
</tbody>
</table>

TEST VEHICLE DISPOSITION


Compliance Test: All tests were performed in accordance with the references outlined in TP-222-04.

Recorded By: [Signature]  
Approved By: [Signature]  
Date: 06/15/11
### SCHOOL BUS IDENTIFICATION

<table>
<thead>
<tr>
<th>Model Year/Mfr./Make/Model:</th>
<th>2011 / Corp. Micro Bird Inc. Girardin / Micro Bird</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passenger Capacity:</td>
<td>1 Driver, 19 Passengers</td>
</tr>
<tr>
<td>NHTSA No.:</td>
<td>CB0903</td>
</tr>
<tr>
<td>VIN:</td>
<td>1FDEE3FLXBDA10617</td>
</tr>
<tr>
<td>Conventional or Forward Control:</td>
<td>Conventional</td>
</tr>
<tr>
<td>Wheel Base:</td>
<td>3,506</td>
</tr>
<tr>
<td>GAWR (Certification Label) FRONT:</td>
<td>1,837 kg / 4,050 lb</td>
</tr>
<tr>
<td>GAWR (Certification Label) REAR:</td>
<td>3,538 kg / 7,800 lb</td>
</tr>
<tr>
<td>GVWR (Certification Label) TOTAL:</td>
<td>5,216 kg / 11,500 lb</td>
</tr>
</tbody>
</table>

### TEST CONDITIONS

<table>
<thead>
<tr>
<th>Date(s) of Test:</th>
<th>04/14/11 – 06/15/11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient Temperature (°C):</td>
<td>21°C</td>
</tr>
<tr>
<td>Required Temperature Range (°C):</td>
<td>0°C to 32°C</td>
</tr>
</tbody>
</table>

### SEAT IDENTIFICATION

<table>
<thead>
<tr>
<th>Seat Manufacturer:</th>
<th>The C.E. White Co.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model Name &amp; Number:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description of Seats:</th>
<th>Seat frames are constructed of 25.4 mm square and round welded steel tubing. The seat back is a steel pan welded to the tubing. The front of the seat is covered with 60 mm of soft foam. The rear of the seat back is covered with 25 mm Styrofoam and 25 mm of thick soft foam. The seat back vertical frame members are covered in 50 mm Styrofoam. The seat cushion is constructed of 8 mm plywood; which is 100 mm tapering to 75 mm seat foam. The seats are covered in 0.6 mm of vinyl.</th>
</tr>
</thead>
</table>
SECTION 3
COMPLIANCE TEST DATA

The following data sheets document the results of testing on the 2011 Girardin Micro Bird School Bus, NHTSA No.: CB0903.
# DATA SHEET 1

## SEAT TO SEAT/BARRIER SPACING

**Test Vehicle:** 2011 Girardin Micro Bird School Bus  
**NHTSA No.:** CB0903  
**Test Lab:** MGA RESEARCH CORPORATION  
**Test Dates:** 04/14/11 – 06/15/11

<table>
<thead>
<tr>
<th>Seat Number</th>
<th>Measurement of Spacing From SRP Forward to Seat/Barrier (mm)</th>
<th>Requirement ≤ 610 mm (≤ 24”) Class 1 Buses Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>529</td>
<td>PASS</td>
</tr>
<tr>
<td>S2</td>
<td>512</td>
<td>PASS</td>
</tr>
<tr>
<td>S3</td>
<td>520</td>
<td>PASS</td>
</tr>
<tr>
<td>S4</td>
<td>540</td>
<td>PASS</td>
</tr>
<tr>
<td>S5</td>
<td>554</td>
<td>PASS</td>
</tr>
<tr>
<td>S6</td>
<td>526</td>
<td>PASS</td>
</tr>
<tr>
<td>S7</td>
<td>498</td>
<td>PASS</td>
</tr>
<tr>
<td>S8</td>
<td>550</td>
<td>PASS</td>
</tr>
</tbody>
</table>

**Comments:** None

**Recorded By:**  
**Approved By:** Michael January  
**Date:** 04/14/11
1. Maximum vertical height of the seat back above the SRP = 717 mm

2. Is item 1 > 610 mm? (S5.1.2) Yes – Pass; No – Fail
   - Pass

3. Maximum transverse width of the seat cushion (W1) = 1,000 mm

4. Calculate the following: 0.75 x W1 = 750 mm

5. Calculate the following: 0.9 x W1 x 610 mm = 549,000 mm²

6. Project the front surface of the seat back onto a vertical transverse plane. Measure the projected surface area that falls between:
   - A horizontal plane that passes through the SRP and a horizontal plane 610 mm above the SRP; and
   - A vertical longitudinal plane that passes through the inboard-most point of the seat cushion and a vertical longitudinal plane that passes through the outboard-most point of the seat cushion.

   Use the following for a typical trapezoidal shape:

6.1 Seat back width at 610 mm above the SRP height (A) = 940 mm

6.2 Seat back width at the SRP height (B) = 984 mm

6.3 Area = ½ (A+B) x 610 mm = 586,820 mm² – * 7,940 mm² = 578,880 mm²
DATA SHEET 2 (CONTINUED)
SEAT BACK HEIGHT & FRONT SURFACE AREA TEST

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.</td>
<td>Is item 6.1 &gt; item 4? (S5.1.2) Yes – Pass; No – Fail</td>
<td>PASS</td>
</tr>
<tr>
<td>8.</td>
<td>Is item 6.3 &gt; item 5? (S5.1.2) Yes – Pass; No – Fail</td>
<td>PASS</td>
</tr>
</tbody>
</table>

Note: For a seat back area that is not trapezoidal in shape or has a large radius at the corner(s), the above described measuring method (item 6.3) must be modified as required to obtain accurate area measurements.

Comments: * Denotes area of the trapezoid outside of radius.

Recorded By: [Signature]

Approved By: [Signature] Date: 04/15/11
DATA SHEET 2
SEAT BACK HEIGHT AND FRONT SURFACE AREA TEST

Test Vehicle: 2011 Girardin Micro Bird School Bus
NHTSA No.: CB0903
Test Lab: MGA RESEARCH CORPORATION
Test Dates: 04/14/11 – 06/15/11

SEAT NUMBER: S3

1. Maximum vertical height of the seat back above the SRP = 717 mm

2. Use the following for a typical trapezoidal shape:
   6.1 Seat back width at 610 mm above the SRP height (A) = 710 mm
   6.2 Seat back width at the SRP height (B) = 760 mm
   6.3 Area = \( \frac{1}{2} (A+B) \times 610 \text{ mm} = 448,350 \text{ mm}^2 - 9,360 \text{ mm}^2 = 438,990 \text{ mm}^2 \)

3. Maximum transverse width of the seat cushion (W1) = 763 mm
4. Calculate the following: 0.75 x W1 = 572.25 mm
5. Calculate the following: 0.9 x W1 x 610 mm = 418,887 mm²
6. Project the front surface of the seat back onto a vertical transverse plane. Measure the projected surface area that falls between:
   • A horizontal plane that passes through the SRP and a horizontal plane 610 mm above the SRP; and
   • A vertical longitudinal plane that passes through the inboard-most point of the seat cushion and a vertical longitudinal plane that passes through the outboard-most point of the seat cushion.

2. Is item 1 > 610 mm? (S5.1.2) Yes – Pass; No – Fail

PASS/FAIL

2. Is item 1 > 610 mm? (S5.1.2) Yes – Pass; No – Fail  PASS
### Seat Back Height & Front Surface Area Test

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.</td>
<td>Is item 6.1 &gt; item 4? (S5.1.2) Yes – Pass; No – Fail</td>
<td>PASS</td>
</tr>
<tr>
<td>8.</td>
<td>Is item 6.3 &gt; item 5? (S5.1.2) Yes – Pass; No – Fail</td>
<td>PASS</td>
</tr>
</tbody>
</table>

Note: For a seat back area that is not trapezoidal in shape or has a large radius at the corner(s), the above described measuring method (item 6.3) must be modified as required to obtain accurate area measurements.

Comments: * Denotes area of the trapezoid outside of radius.

Recorded By: [Signature]

Approved By: [Signature]  Date: 04/15/11
SEAT BACK HEIGHT AND FRONT SURFACE AREA TEST

Test Vehicle: 2011 Girardin Micro Bird School Bus  
NHTSA No.: CB0903  
Test Lab: MGA RESEARCH CORPORATION  
Test Dates: 04/14/11 – 06/15/11

SEAT NUMBER: S7

1. Maximum vertical height of the seat back above the SRP = 717 mm

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Is item 1 &gt; 610 mm? (S5.1.2) Yes – Pass; No – Fail</td>
<td>PASS</td>
</tr>
</tbody>
</table>

2. Maximum transverse width of the seat cushion (W1) = 762 mm
3. Calculate the following: 0.75 x W1 = 571.5 mm
4. Calculate the following: 0.9 x W1 x 610 mm = 418,338 mm²
5. Project the front surface of the seat back onto a vertical transverse plane. Measure the projected surface area that falls between:
   - A horizontal plane that passes through the SRP and a horizontal plane 610 mm above the SRP; and
   - A vertical longitudinal plane that passes through the inboard-most point of the seat cushion and a vertical longitudinal plane that passes through the outboard-most point of the seat cushion.
   Use the following for a typical trapezoidal shape:
6.1 Seat back width at 610 mm above the SRP height (A) = 705 mm
6.2 Seat back width at the SRP height (B) = 757 mm
6.3 Area = ½ (A+B) x 610 mm = 445,910 mm² – * 10,340 mm² = 435,570 mm²
DATA SHEET 2 (CONTINUED)
SEAT BACK HEIGHT & FRONT SURFACE AREA TEST

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. Is item 6.1 &gt; item 4? (S5.1.2) Yes – Pass; No – Fail</td>
<td></td>
<td>PASS</td>
</tr>
<tr>
<td>8. Is item 6.3 &gt; item 5? (S5.1.2) Yes – Pass; No – Fail</td>
<td></td>
<td>PASS</td>
</tr>
</tbody>
</table>

Note: For a seat back area that is not trapezoidal in shape or has a large radius at the corner(s), the above described measuring method (item 6.3) must be modified as required to obtain accurate area measurements.

Comments: * Denotes area of the trapezoid outside of radius.

Recorded By: [Signature]

Approved By: [Signature] Date: 04/15/11
1. Maximum vertical height of the seat back above the SRP = 717 mm

2. Is item 1 > 610 mm? (S5.1.2) Yes – Pass; No – Fail
   - PASS

3. Maximum transverse width of the seat cushion (W1) = 1,000 mm

4. Calculate the following: 0.75 x W1 = 750 mm

5. Calculate the following: 0.9 x W1 x 610 mm = 549,000 mm²

6. Project the front surface of the seat back onto a vertical transverse plane. Measure the projected surface area that falls between:
   - A horizontal plane that passes through the SRP and a horizontal plane 610 mm above the SRP; and
   - A vertical longitudinal plane that passes through the inboard-most point of the seat cushion and a vertical longitudinal plane that passes through the outboard-most point of the seat cushion.

   Use the following for a typical trapezoidal shape:
   - Seat back width at 610 mm above the SRP height (A) = 935 mm
   - Seat back width at the SRP height (B) = 992 mm
   - Area = \( \frac{1}{2} \) (A+B) x 610 mm = 587,735 mm² – * 8,970 mm² = 578,765 mm²
DATA SHEET 2 (CONTINUED)
SEAT BACK HEIGHT & FRONT SURFACE AREA TEST

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.</td>
<td>Is item 6.1 &gt; item 4? (S5.1.2) Yes – Pass; No – Fail</td>
<td>PASS</td>
</tr>
<tr>
<td>8.</td>
<td>Is item 6.3 &gt; item 5? (S5.1.2) Yes – Pass; No – Fail</td>
<td>PASS</td>
</tr>
</tbody>
</table>

Note: For a seat back area that is not trapezoidal in shape or has a large radius at the corner(s), the above described measuring method (item 6.3) must be modified as required to obtain accurate area measurements.

Comments: * Denotes area of the trapezoid outside of radius.

Recorded By: [Signature]

Approved By: [Signature] Date: 04/15/11
**DATA SHEET 3**

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

Test Vehicle: **2011 Girardin Micro Bird School Bus**  
NHTSA No.: **CB0903**

Test Lab: **MGA RESEARCH CORPORATION**  
Test Dates: **04/14/11 – 06/15/11**

**BARRIER NUMBER: B1/S1**

1. Measure the distance (X) from SRP of seat immediately aft of barrier in a horizontal longitudinal line forward to barrier.  
   \[ X = 529 \text{ mm} \]

2. Is distance \( X \leq 610 \text{ mm} \)? (S5.2)  
   Yes – Pass; No – Fail
   
<table>
<thead>
<tr>
<th>2. Is distance ( X \leq 610 \text{ mm} )? (S5.2) Yes – Pass; No – Fail</th>
<th><strong>PASS</strong></th>
</tr>
</thead>
</table>

3. Measure distance \( U \) at inboard (i) and outboard (o) side of barrier.  
   \[ U_i = 346 \text{ mm} \quad U_o = 358 \text{ mm} \]

4. Measure distance \( V \) at inboard (i) and outboard (o) sides of seat.  
   \[ V_i = 358 \text{ mm} \quad V_o = 359 \text{ mm} \]

5. Is \( U_i \leq V_i \)? Yes – Pass; No – Fail
   
<table>
<thead>
<tr>
<th>5. Is ( U_i \leq V_i )? Yes – Pass; No – Fail</th>
<th><strong>PASS</strong></th>
</tr>
</thead>
</table>

6. Is \( U_o \leq V_o \)? Yes – Pass; No – Fail
   
<table>
<thead>
<tr>
<th>6. Is ( U_o \leq V_o )? Yes – Pass; No – Fail</th>
<th><strong>PASS</strong></th>
</tr>
</thead>
</table>

7. Maximum vertical height of the barrier above the SRP of the seat located immediately rearward of the barrier (S) = 624 mm

8. Is item 7 > 610 mm? (S5.2 & S5.1.2) Yes – Pass; No – Fail
   
<table>
<thead>
<tr>
<th>8. Is item 7 &gt; 610 mm? (S5.2 &amp; S5.1.2) Yes – Pass; No – Fail</th>
<th><strong>PASS</strong></th>
</tr>
</thead>
</table>

9. Maximum transverse width of the seat cushion of the seat immediately rearward of the barrier (W1) = 1,000 mm

10. Calculate the following: Calculate the following: \( 0.75 \times W1 = 750 \text{ mm} \)

11. Calculate the following: \( 0.9 \times W1 \times 610 \text{ mm} = 549,000 \text{ mm}^2 \)
12. Project the front surface of the barrier onto a vertical transverse plane. Measure the projected surface area (± 2%) that falls between the following planes, which are determined relative to the seat located immediately rearward of the barrier:

- A horizontal plane that passes through the SRP and a horizontal plane 610 mm above the SRP; and
- A vertical longitudinal plane that passes through the inboard-most point of the seat cushion and a vertical longitudinal plane that passes through the outboard-most point of the seat cushion.

Use the following for a typical trapezoidal shape:

12.1 Seat back width at 610 mm above the SRP height (A) = 920 mm
12.2 Seat back width at the SRP height (B) = 975 mm
12.3 Area = ½ (A+B) x 610 mm = 577,975 mm²

Used this equation:

Area = ½ (A+B) x 610 mm = 577,975 mm² – * 10,500 mm² = 567,475 mm²

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.</td>
<td>Is item 12.1 &gt; item 10? (S5.1.2) Yes – Pass; No – Fail</td>
<td>PASS</td>
</tr>
<tr>
<td>14.</td>
<td>Is item 12.3 &gt; item 11? (S5.1.2) Yes – Pass; No – Fail</td>
<td>PASS</td>
</tr>
</tbody>
</table>

Note: For a seat back area that is not trapezoidal in shape or has a large radius at the corner(s), the above described measuring method (item 12.3) must be modified as required to obtain accurate area measurements.

Comments: * Denotes area of the trapezoid outside of radius.

Recorded By: [Signature]

Approved By: [Signature] Date: 04/18/11
DATA SHEET 3
RESTRAINING BARRIER POSITION AND PROJECTED REAR SURFACE AREA

Test Vehicle: 2011 Girardin Micro Bird School Bus  
NHTSA No.: CB0903  
Test Lab: MGA RESEARCH CORPORATION  
Test Dates: 04/14/11 – 06/15/11

BARRIER NUMBER: B8/S8

1. Measure the distance (X) from SRP of seat immediately aft of barrier in a horizontal longitudinal line forward to barrier.  X = 550 mm.  

<table>
<thead>
<tr>
<th>2.</th>
<th>Is distance X ≤ 610 mm? (S5.2) Yes – Pass; No – Fail</th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PASS</td>
<td></td>
</tr>
</tbody>
</table>

3. Measure distance U at inboard (i) and outboard (o) side of barrier.  
   Uᵢ = 352 mm  
   Uₒ = 358 mm

4. Measure distance V at inboard (i) and outboard (o) sides of seat.  
   Vᵢ = 354 mm  
   Vₒ = 358 mm

<table>
<thead>
<tr>
<th>5.</th>
<th>Is Uᵢ ≤ Vᵢ? Yes – Pass; No – Fail</th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PASS</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6.</th>
<th>Is Uₒ ≤ Vₒ? Yes – Pass; No – Fail</th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PASS</td>
<td></td>
</tr>
</tbody>
</table>

7. Maximum vertical height of the barrier above the SRP of the seat located immediately rearward of the barrier (S) = 624 mm

<table>
<thead>
<tr>
<th>8.</th>
<th>Is item 7 &gt; 610 mm? (S5.2 &amp; S5.1.2) Yes – Pass; No – Fail</th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PASS</td>
<td></td>
</tr>
</tbody>
</table>

9. Maximum transverse width of the seat cushion of the seat immediately rearward of the barrier (W₁) = 1,000 mm

10. Calculate the following:  0.75 x W₁ = 750 mm

11. Calculate the following:  0.9 x W₁ x 610 mm = 549,000 mm²
12. Project the front surface of the barrier onto a vertical transverse plane. Measure the projected surface area (± 2%) that falls between the following planes, which are determined relative to the seat located immediately rearward of the barrier:

- A horizontal plane that passes through the SRP and a horizontal plane 610 mm above the SRP; and
- A vertical longitudinal plane that passes through the inboard-most point of the seat cushion and a vertical longitudinal plane that passes through the outboard-most point of the seat cushion.

Use the following for a typical trapezoidal shape:

12.1 Seat back width at 610 mm above the SRP height (A) = 909 mm
12.2 Seat back width at the SRP height (B) = 986 mm
12.3 Area = ½ (A+B) x 610 mm = 577,975 mm²

Used this equation:

Area = ½ (A+B) x 610 mm = 577,975 mm² – * 10,830 mm² = 567,145 mm²

### Table

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.</td>
<td>Is item 12.1 &gt; item 10? (S5.1.2)</td>
<td>Yes – Pass; No – Fail</td>
</tr>
<tr>
<td>14.</td>
<td>Is item 12.3 &gt; item 11? (S5.1.2)</td>
<td>Yes – Pass; No – Fail</td>
</tr>
</tbody>
</table>

Note: For a seat back area that is not trapezoidal in shape or has a large radius at the corner(s), the above described measuring method (item 12.3) must be modified as required to obtain accurate area measurements.

Comments: * Denotes area of the trapezoid outside of radius.

Recorded By: [Signature]

Approved By: [Signature] Date: 04/18/11
SEAT CUSHION LATCHING AND RETENTION TEST

Test Vehicle: 2011 Girardin Micro Bird School Bus
Test Lab: MGA RESEARCH CORPORATION
NHTSA No.: CB0903
Test Dates: 04/14/11 – 06/15/11

SEAT NUMBER: S1

1. Cushion Weight = 24.9 N
2. Cushion Weight x 5 = F = 124.5 N (S5.1.5 (b))
3. Complete the following force/time graph:

\[
\text{F must be 5 x Cushion Weight; } t_1 \text{ and } t_2 \text{ must be according to the following expressions:}
\]

\[
1 \text{ sec.} < t_1 < 5 \text{ sec.} \pm 1.0 \text{ sec. and } -0.0 \text{ sec.}
\]
\[
t_2 = t_1 + 5\text{sec.} \pm 1.0 \text{ sec. and } -0.0 \text{ sec.}
\]

4. Did seat cushion separate from the seat structure at any attachment point? (S5.1.5 (b)) Yes – Fail; No – Pass

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

PASS

Describe Seat Cushion Attachments: The front of the seat cushion has half moon clips. The rear of the seat cushion has a sliding latch with catch bar.

Comments: None

Recorded By: [Signature]

Approved By: [Signature]  Date: 06/15/11
SEAT BACK FORCE DEFLECTION TEST - FORWARD

SEAT NUMBER: S5

1. Seat Bench Width = 770 mm
   \[ W = \frac{\text{Seat Bench Width}}{381}\text{ mm (round to nearest whole number)} = (2) \]

2. Seat Reference Point (SRP) location is: (Description of location as supplied by the COTR): 478 mm Above Floor, 0 mm from center

3. 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 = 660 mm
   Seat Back width at SRP = 760 mm
   (Loading Bar Length = Seat Back Width – 102 mm, +13, -6.3)

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

5. Deflection of the seat back at conclusion of lower bar loading (1,557W position) = 66 mm.

6. 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)

7. Seat back movement rate selected by the test engineer = 12.7 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).
   Upper Loading Bar Length = 622 mm
   Seat back width at 406 mm above the SRP height = 720 mm
   (Loading Bar Length = Seat Back Width – 102 mm, +13, -6.3)

9. Reason for stopping seat back deflection:
   \[ \_\_\_\_ \text{Reached deflection determined in Item 5 above (if less than 356 mm)} \]
   \[ \_\_\_\_ \text{Reached 356 mm maximum allowed deflection (Actual deflection was 357 mm)} \]
   \[ \_\_\_\_ \text{Force exceeded 10676 N} \]
   \[ \_\_\_\_ \text{Separation was about to occur} \]

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

<table>
<thead>
<tr>
<th></th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. Is the seat in its final deflected position within 102 mm of the next seat or barrier? Yes – Fail; No – Pass</td>
<td>PASS</td>
</tr>
</tbody>
</table>
## SEAT BACK FORCE DEFLECTION TEST – FORWARD

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.</td>
<td>Does the forward force vs. deflection trace of the seat back lie within the unshaded area? (S5.1.3) Yes – Pass; No – Fail</td>
<td>PASS</td>
</tr>
<tr>
<td>13.</td>
<td>Include a deflection vs. time plot for the upper loading bar.</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>The area within the force vs. deflection curve = 1,432 Joules (N-m)</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>452W = 904 Joules (N-m) (S5.1.3.4)</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>Is item 14 &gt; item 15? (S5.1.3.4) Yes – Pass; No – Fail</td>
<td>PASS</td>
</tr>
</tbody>
</table>

Comments: None

Recorded By: [Signature]

Approved By: [Signature] Date: 05/12/11
**DATA SHEET 5**  
**SEAT BACK FORCE DEFLECTION TEST - FORWARD**

**Test Vehicle:** 2011 Girardin Micro Bird School Bus  
**NHTSA No.:** CB0903  
**Test Lab:** MGA RESEARCH CORPORATION  
**Test Dates:** 04/14/11 – 06/15/11

**SEAT NUMBER: S8**

1. Seat Bench Width = 1,000 mm  
   \[ W = \frac{\text{Seat Bench Width}}{381} \text{ mm (round to nearest whole number)} = (3) \]
2. Seat Reference Point (SRP) location is: (Description of location as supplied by the COTR): 478 mm Above Floor, 0 mm from center
3. 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 = 895 mm  
   Seat Back width at SRP = 995 mm  
   (Loading Bar Length = Seat Back Width – 102 mm, +13, -6.3)
4. Include x-y plot of Force vs. Time for the lower loading bar.
5. Deflection of the seat back at conclusion of lower bar loading (1,557W position) = 75 mm.
6. 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)
7. Seat back movement rate selected by the test engineer = 12.7 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).  
   Upper Loading Bar Length = 850 mm  
   Seat back width at 406 mm above the SRP height = 950 mm  
   (Loading Bar Length = Seat Back Width – 102 mm, +13, -6.3)
9. Reason for stopping seat back deflection:  
   - [ ] Reached deflection determined in Item 5 above (if less than 356 mm)  
   - [x] Reached 356 mm maximum allowed deflection (Actual deflection was 357 mm)  
   - [ ] Force exceeded 10,676 N  
   - [ ] Separation was about to occur
10. Include the x-y plot of force vs. deflection for the upper loading bar with boundaries of Figure 14 (OVSC TP-222) superimposed.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.</td>
<td>Is the seat in its final deflected position within 102 mm of the next seat or barrier? Yes – Fail; No – Pass</td>
<td><strong>PASS</strong></td>
</tr>
</tbody>
</table>
## SEAT BACK FORCE DEFLECTION TEST – FORWARD

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>12.</strong></td>
<td>Does the forward force vs. deflection trace of the seat back lie within the unshaded area? (S5.1.3) Yes – Pass; No – Fail</td>
<td><strong>PASS</strong></td>
</tr>
<tr>
<td><strong>13.</strong></td>
<td>Include a deflection vs. time plot for the upper loading bar.</td>
<td></td>
</tr>
<tr>
<td><strong>14.</strong></td>
<td>The area within the force vs. deflection curve = 1,749 Joules (N-m)</td>
<td></td>
</tr>
<tr>
<td><strong>15.</strong></td>
<td>$452W = 1,356$ Joules (N-m) (S5.1.3.4)</td>
<td></td>
</tr>
<tr>
<td><strong>16.</strong></td>
<td>Is item 14 &gt; item 15? (S5.1.3.4) Yes – Pass; No – Fail</td>
<td><strong>PASS</strong></td>
</tr>
</tbody>
</table>

**Comments:** None

**Recorded By:**

**Approved By:** Michael January  
**Date:** 05/13/11
DATA SHEET 6
RESTRAINING BARRIER FORCE/DEFLECTION TEST

Test Vehicle: 2011 Girardin Micro Bird School Bus
NHTSA No.: CB0903
Test Lab: MGA RESEARCH CORPORATION
Test Dates: 04/14/11 – 06/15/11

BARRIER NUMBER: B8

1. Seat cushion width of seat immediately rearward of restraining barrier = 1,000 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): 478 mm Above Floor.

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 = 889 mm
   Width of barrier at SRP = 980 mm
   (Loading Bar Length = Seat Back Width – 102 mm, +13, -6.3)

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 (1,557W position) = 104 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 = 12.7 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)
   Upper loading bar length = 838 mm
   Barrier width at 406 mm above the SRP height = 939 mm
   (Loading Bar Length = Seat Back Width – 102 mm, +13, -6.3)

9. Reason for stopping restraining barrier deflection:
   \_X_ Reached 356 mm maximum
   ____ Force exceeded 10,676 N
   ____ Separation was about to occur
   ____ Interference with door operation

10. Maximum deflection of barrier 356 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)) Yes – Fail; No – Pass
    \[ \text{PASS} \]
## RESTRAINING BARRIER FORCE/DEFLECTION TEST

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>12. Did any separation of barrier component or the separation of the barrier from the vehicle occur?</strong>&lt;br&gt;(S5.1.3 (d) &amp; (e)) Yes – Fail; No – Pass</td>
<td><strong>PASS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>13. Include the x-y plot of force vs. deflection for the upper loading bar with boundaries of Figure 14 (OVSC TP-222) superimposed.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>14. Does the forward force vs. deflection trace of the barrier back lie within the unshaded area?</strong>&lt;br&gt;(S5.2.3(a)) Yes – Pass; No – Fail</td>
<td><strong>PASS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>15. Include a deflection vs. time plot for the upper loading bar.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>16. The area within the force vs. deflection curve = 1,999 Joules (N-m)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>17. 452W = 1,356 Joules (N-m)</strong>&lt;br&gt;(S5.2.3) (S5.1.3.4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>18. Is item 16 &gt; item 17?</strong> Yes – Pass; No – Fail</td>
<td><strong>PASS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments: None.

Recoded By: [Signature]

Approved By: [Signature] Date: 05/13/11
DATA SHEET 7
SEAT BACK FORCE DEFORMATION TEST – REARWARD

Test Vehicle: 2011 Girardin Micro Bird School Bus
NHTSA No.: CB0903
Test Lab: MGA RESEARCH CORPORATION
Test Dates: 04/14/11 – 06/15/11

SEAT NUMBER: S3

1. Seat bench width = 770 mm
   W = (Seat Cushion Width)/381 mm (round to nearest whole number) = (2)

2. Location of the loading bar is in a horizontal plane 343 mm above the SRP of the test seat. (Requirement: 343 mm above SRP) (S5.1.4.1)
   Loading bar length = 622 mm
   Seat back width at 343 mm above the SRP height = 726 mm
   (Loading Bar Length = Seat Back Width – 102 mm, +13, -6.3)

3. Deflection of the seat back at 222 N preload = not recorded

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 = 8.8 mm/sec

6. Reason for stopping deflection:
   ___ Reached deflection determined in item 3 above
   X   Reached 254 mm maximum allowed deflection
   ___ Force exceeded 9,786 N
   ___ Separation was about to occur

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

8. Does the force vs. deflection plot lie within the boundaries of Figure 18 (OVSC TP-222) Yes – Pass; No – Fail
   **PASS**

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

10. 316W = 632 Joules (N-m)

11. The area within the force vs. deflection curve = 829 Joules (N-m)

12. Is item 11 > item 10? (S5.1.4.2) Yes – Pass; No – Fail
   **PASS**

Comments: None.

Recorded By: [Signature]
Approved By: [Signature] Date: 05/20/11
DATA SHEET 8
HEAD FORM IMPACT CONTACT AREA REQUIREMENT

Test Vehicle: 2011 Girardin Micro Bird School Bus  
NHTSA No.: CB0903
Test Lab: MGA RESEARCH CORPORATION  
Test Dates: 04/14/11 – 06/15/11

SEAT NUMBER: S2

REAR 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 the plane of reference for head form impact angle:
   - $0^\circ$ = 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 REQUIREMENT**

4. Complete the following table:

<table>
<thead>
<tr>
<th>Head Impact &amp; Test #</th>
<th>(1) Location</th>
<th>(2) Speed Trap Impact Velocity** mps</th>
<th>(3) Derived Velocity mps</th>
<th>(4)* Contact Area (CA) mm²</th>
<th>(5) CA ≥ 1935 mm²</th>
<th>(6) Yes-PASS</th>
<th>(7) No-FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>Y</td>
<td>Angle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H1</td>
<td>-708</td>
<td>604</td>
<td>0º</td>
<td>1.56</td>
<td>1.80</td>
<td>5,730</td>
<td>PASS</td>
</tr>
<tr>
<td>H2</td>
<td>-594</td>
<td>603</td>
<td>0º</td>
<td>1.58</td>
<td>1.91</td>
<td>5,600</td>
<td>PASS</td>
</tr>
<tr>
<td>H3</td>
<td>-479</td>
<td>605</td>
<td>0º</td>
<td>1.60</td>
<td>1.75</td>
<td>5,480</td>
<td>PASS</td>
</tr>
<tr>
<td>H4</td>
<td>-697</td>
<td>490</td>
<td>0º</td>
<td>1.59</td>
<td>1.47</td>
<td>5,900</td>
<td>PASS</td>
</tr>
<tr>
<td>H5</td>
<td>-581</td>
<td>490</td>
<td>0º</td>
<td>1.59</td>
<td>1.94</td>
<td>5,450</td>
<td>PASS</td>
</tr>
<tr>
<td>H6</td>
<td>-466</td>
<td>490</td>
<td>0º</td>
<td>1.59</td>
<td>1.49</td>
<td>5,390</td>
<td>PASS</td>
</tr>
<tr>
<td>H7</td>
<td>-787</td>
<td>354</td>
<td>0º</td>
<td>1.60</td>
<td>1.85</td>
<td>5,910</td>
<td>PASS</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: 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. In the case of Seat No. S2, the inboard edge of the seat is on the right hand side of the seat as viewed from the rear.

Recorded By: 

Approved By: Michael January Date: 05/11/11
DATA SHEET 8
HEAD FORM IMPACT CONTACT AREA REQUIREMENT

Test Vehicle: 2011 Girardin Micro Bird School Bus
Test Lab: MGA RESEARCH CORPORATION
NHTSA No.: CB0903
Test Dates: 04/14/11 – 06/15/11

SEAT NUMBER: S7

REAR 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 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
### HEAD FORM IMPACT CONTACT AREA REQUIREMENT

4. Complete the following table:

<table>
<thead>
<tr>
<th>Head Impact &amp; Test #</th>
<th>Location</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</td>
<td>Y</td>
<td>Angle</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H1</td>
<td>372</td>
<td>586</td>
<td>0°</td>
<td>1.56</td>
<td>2.04</td>
<td>5,850</td>
<td>PASS</td>
</tr>
<tr>
<td>H2</td>
<td>485</td>
<td>586</td>
<td>0°</td>
<td>1.53</td>
<td>1.92</td>
<td>6,520</td>
<td>PASS</td>
</tr>
<tr>
<td>H3</td>
<td>355</td>
<td>484</td>
<td>0°</td>
<td>1.56</td>
<td>1.64</td>
<td>5,240</td>
<td>PASS</td>
</tr>
<tr>
<td>H4</td>
<td>469</td>
<td>481</td>
<td>0°</td>
<td>1.55</td>
<td>1.73</td>
<td>5,950</td>
<td>PASS</td>
</tr>
<tr>
<td>H5</td>
<td>584</td>
<td>481</td>
<td>0°</td>
<td>1.55</td>
<td>1.83</td>
<td>5,200</td>
<td>PASS</td>
</tr>
<tr>
<td>H6</td>
<td>475</td>
<td>330</td>
<td>0°</td>
<td>1.56</td>
<td>1.81</td>
<td>4,350</td>
<td>PASS</td>
</tr>
<tr>
<td>H7</td>
<td>587</td>
<td>331</td>
<td>0°</td>
<td>1.55</td>
<td>1.79</td>
<td>5,810</td>
<td>PASS</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: 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: [Signature]

Approved By: [Signature] Date: 05/6/11
REAR 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 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 REQUIREMENT

4. Complete the following table:

<table>
<thead>
<tr>
<th>Head Impact &amp; Test #</th>
<th>Location</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</td>
<td>Y</td>
<td>Angle</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H1</td>
<td>-801</td>
<td>509</td>
<td>0°</td>
<td>1.60</td>
<td>1.07</td>
<td>4,440</td>
<td>PASS</td>
</tr>
<tr>
<td>H2</td>
<td>-684</td>
<td>511</td>
<td>0°</td>
<td>1.56</td>
<td>1.27</td>
<td>4,000</td>
<td>PASS</td>
</tr>
<tr>
<td>H3</td>
<td>-571</td>
<td>510</td>
<td>0°</td>
<td>1.56</td>
<td>1.63</td>
<td>4,010</td>
<td>PASS</td>
</tr>
<tr>
<td>H4</td>
<td>-456</td>
<td>510</td>
<td>0°</td>
<td>1.54</td>
<td>1.18</td>
<td>3,580</td>
<td>PASS</td>
</tr>
<tr>
<td>H5</td>
<td>-796</td>
<td>336</td>
<td>0°</td>
<td>1.58</td>
<td>1.53</td>
<td>4,730</td>
<td>PASS</td>
</tr>
<tr>
<td>H6</td>
<td>-684</td>
<td>336</td>
<td>0°</td>
<td>1.56</td>
<td>1.50</td>
<td>3,120</td>
<td>PASS</td>
</tr>
<tr>
<td>H7</td>
<td>-570</td>
<td>339</td>
<td>0°</td>
<td>1.58</td>
<td>1.73</td>
<td>3,010</td>
<td>PASS</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: 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: Michael Janczor Date: 06/06/11
REAR 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 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</th>
<th>Speed Trap Impact Velocity ** mps</th>
<th>Derived Velocity ** mps</th>
<th>Max HIC</th>
<th>Energy Req’d joules</th>
<th>Column 5 &lt; 1000</th>
<th>Column 6 &gt; 4.5 joules</th>
<th>Yes- PASS</th>
<th>No- FAIL</th>
<th>Yes- PASS</th>
<th>No- FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>H8</td>
<td>X: -365</td>
<td>Y: 604</td>
<td>Angle: 0º</td>
<td>6.62</td>
<td>6.79</td>
<td>176</td>
<td>7.92</td>
<td>PASS</td>
<td>PASS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H9</td>
<td>X: -249</td>
<td>Y: 603</td>
<td>Angle: 0º</td>
<td>6.66</td>
<td>6.82</td>
<td>139</td>
<td>7.20</td>
<td>PASS</td>
<td>PASS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H11</td>
<td>X: -239</td>
<td>Y: 486</td>
<td>Angle: 0º</td>
<td>6.67</td>
<td>7.01</td>
<td>101</td>
<td>9.52</td>
<td>PASS</td>
<td>PASS</td>
<td>PASS</td>
<td>PASS</td>
</tr>
</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: 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. In the case of Seat No. S2, the inboard edge of the seat is on the right hand side of the seat as viewed from the rear.

Recorded By: [Signature]

Approved By: [Signature] Date: 05/11/11
DATA SHEET 9
HEAD FORM IMPACT ENERGY REQUIREMENT

Test Vehicle: 2011 Girardin Micro Bird School Bus
NHTSA No.: CB0903
Test Lab: MGA RESEARCH CORPORATION
Test Dates: 04/14/11 – 06/15/11

SEAT NUMBER: S7

REAR 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 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>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)*</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head impact &amp; Test #</td>
<td>Location</td>
<td>Speed Trap Impact Velocity ** mps</td>
<td>Derived Velocity ** mps</td>
<td>Max HIC</td>
<td>Energy Req’d joules</td>
<td>Column 5 &lt; 1000</td>
<td>Column 6 &gt; 4.5 joules</td>
</tr>
<tr>
<td>H8</td>
<td>144</td>
<td>588</td>
<td>0°</td>
<td>6.68</td>
<td>6.90</td>
<td>107</td>
<td>8.63</td>
</tr>
<tr>
<td>H9</td>
<td>260</td>
<td>584</td>
<td>0°</td>
<td>6.65</td>
<td>6.83</td>
<td>126</td>
<td>8.81</td>
</tr>
<tr>
<td>H10</td>
<td>130</td>
<td>484</td>
<td>0°</td>
<td>6.67</td>
<td>6.83</td>
<td>122</td>
<td>11.17</td>
</tr>
<tr>
<td>H11</td>
<td>243</td>
<td>484</td>
<td>0°</td>
<td>6.68</td>
<td>6.75</td>
<td>81</td>
<td>16.19</td>
</tr>
<tr>
<td>H12</td>
<td>130</td>
<td>330</td>
<td>0°</td>
<td>6.69</td>
<td>6.94</td>
<td>156</td>
<td>11.42</td>
</tr>
<tr>
<td>H13</td>
<td>246</td>
<td>330</td>
<td>0°</td>
<td>6.67</td>
<td>6.77</td>
<td>102</td>
<td>16.48</td>
</tr>
<tr>
<td>H14</td>
<td>360</td>
<td>330</td>
<td>0°</td>
<td>6.66</td>
<td>6.78</td>
<td>125</td>
<td>8.91</td>
</tr>
</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: 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: [Signature]

Approved By: [Signature] Date: 05/11/11
REAR 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 the plane of reference for head form impact angle:
   - $0^\circ$ = 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</th>
<th>Speed Trap Impact Velocity** mps</th>
<th>Derived Velocity** mps</th>
<th>Max HIC</th>
<th>Energy Req’d joules</th>
<th>Column 5 &lt; 1000</th>
<th>Column 6 &gt; 4.5 joules</th>
<th>Yes-PASS</th>
<th>No-FAIL</th>
<th>Yes-PASS</th>
<th>No-FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>H8</td>
<td>-342</td>
<td>510</td>
<td>6.62</td>
<td>6.81</td>
<td>132</td>
<td>6.96</td>
<td>PASS</td>
<td>PASS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H9</td>
<td>-229</td>
<td>507</td>
<td>6.61</td>
<td>6.75</td>
<td>106</td>
<td>5.90</td>
<td>PASS</td>
<td>PASS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H10</td>
<td>-113</td>
<td>505</td>
<td>6.62</td>
<td>6.79</td>
<td>87</td>
<td>7.05</td>
<td>PASS</td>
<td>PASS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H11</td>
<td>-454</td>
<td>341</td>
<td>6.67</td>
<td>6.89</td>
<td>127</td>
<td>13.11</td>
<td>PASS</td>
<td>PASS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H12</td>
<td>-341</td>
<td>340</td>
<td>6.65</td>
<td>6.77</td>
<td>110</td>
<td>13.34</td>
<td>PASS</td>
<td>PASS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H13</td>
<td>-226</td>
<td>342</td>
<td>6.65</td>
<td>6.79</td>
<td>83</td>
<td>17.78</td>
<td>PASS</td>
<td>PASS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H14</td>
<td>-110</td>
<td>342</td>
<td>6.63</td>
<td>6.75</td>
<td>150</td>
<td>7.62</td>
<td>PASS</td>
<td>PASS</td>
<td></td>
<td></td>
<td></td>
</tr>
</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: 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: [Signature]
Approved By: [Signature] Date: 06/07/11
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:
   - $0^\circ = \text{Parallel with Floor, (+) is Up, (-) is Down}$
   - $X = \text{From Inboard Edge of the Seat}$
   - $Y = \text{Measured Vertically from the SRP}$
4. Complete the following table:

<table>
<thead>
<tr>
<th>Knee impact &amp; Test #</th>
<th>Location</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>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>Y</td>
<td>Angle</td>
<td></td>
<td></td>
<td></td>
<td>Yes- PASS</td>
<td>No- FAIL</td>
</tr>
<tr>
<td>K1</td>
<td>-415</td>
<td>219</td>
<td>0º</td>
<td>4.91</td>
<td>4.98</td>
<td>3,590</td>
<td>1,229 PASS</td>
</tr>
<tr>
<td>K2</td>
<td>-300</td>
<td>217</td>
<td>0º</td>
<td>4.89</td>
<td>4.87</td>
<td>3,450</td>
<td>1,276 PASS</td>
</tr>
<tr>
<td>K3</td>
<td>-186</td>
<td>215</td>
<td>0º</td>
<td>4.88</td>
<td>4.59</td>
<td>3,440</td>
<td>1,128 PASS</td>
</tr>
<tr>
<td>K4</td>
<td>-72</td>
<td>214</td>
<td>0º</td>
<td>4.93</td>
<td>5.14</td>
<td>4,250</td>
<td>2,410 PASS</td>
</tr>
<tr>
<td>K5</td>
<td>-400</td>
<td>21</td>
<td>0º</td>
<td>4.83</td>
<td>4.90</td>
<td>1,422</td>
<td>PASS</td>
</tr>
<tr>
<td>K6</td>
<td>-285</td>
<td>20</td>
<td>0º</td>
<td>4.85</td>
<td>4.82</td>
<td>1,718</td>
<td>PASS</td>
</tr>
<tr>
<td>K7</td>
<td>-172</td>
<td>18</td>
<td>0º</td>
<td>4.86</td>
<td>4.92</td>
<td>1,690</td>
<td>PASS</td>
</tr>
<tr>
<td>K8</td>
<td>-57</td>
<td>13</td>
<td>0º</td>
<td>4.82</td>
<td>4.82</td>
<td>2,394</td>
<td>PASS</td>
</tr>
</tbody>
</table>

* Impact velocity from item No. 7 below

** Impact velocity range = 4.86 mps, +0.076, -0 mps for contact area (K1 through K4)

** Impact velocity range = 4.86 mps, +0, -0.076 mps for contact area (K5 through K8)

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 plot K1 through K8.

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

Comments: 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. In the case of Seat No. S2, the inboard edge of the seat is on the right hand side of the seat as viewed from the rear.

Recorded By: [Signature]

Approved By: [Signature] Date: 04/19/11
DATA SHEET 10
KNEE FORM IMPACT TEST

Test Vehicle: 2011 Girardin Micro Bird School Bus NHTSA No.: CB0903
Test Lab: MGA RESEARCH CORPORATION Test Dates: 04/14/11 – 06/15/11

SEAT NUMBER: S7

REAR SURFACE

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° = Parallel with Floor, (+) is Up, (-) is Down
   X = From Inboard Edge of the Seat
   Y = Measured Vertically from the SRP
### KNEE FORM IMPACT TEST

4. Complete the following table:

<table>
<thead>
<tr>
<th>Knee impact &amp; Test #</th>
<th>Location</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>
</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>K1</td>
<td>110</td>
<td>140</td>
<td>0º</td>
<td>4.86</td>
<td>5.04</td>
<td>3,790</td>
<td>2,007</td>
</tr>
<tr>
<td>K2</td>
<td>214</td>
<td>140</td>
<td>0º</td>
<td>4.88</td>
<td>5.01</td>
<td>3,620</td>
<td>1,409</td>
</tr>
<tr>
<td>K3</td>
<td>493</td>
<td>140</td>
<td>0º</td>
<td>4.90</td>
<td>4.97</td>
<td>3,330</td>
<td>1,527</td>
</tr>
<tr>
<td>K4</td>
<td>594</td>
<td>141</td>
<td>0º</td>
<td>4.89</td>
<td>5.02</td>
<td>3,910</td>
<td>1,369</td>
</tr>
<tr>
<td>K5</td>
<td>65</td>
<td>0</td>
<td>0º</td>
<td>4.82</td>
<td>5.02</td>
<td>2,529</td>
<td></td>
</tr>
<tr>
<td>K6</td>
<td>167</td>
<td>0</td>
<td>0º</td>
<td>4.84</td>
<td>4.88</td>
<td>1,376</td>
<td></td>
</tr>
<tr>
<td>K7</td>
<td>499</td>
<td>0</td>
<td>0º</td>
<td>4.84</td>
<td>4.76</td>
<td>1,782</td>
<td></td>
</tr>
<tr>
<td>K8</td>
<td>601</td>
<td>0</td>
<td>0º</td>
<td>4.85</td>
<td>4.75</td>
<td>1,626</td>
<td></td>
</tr>
</tbody>
</table>

* Impact velocity from item No. 7 below

** Impact velocity range = 4.86 mps, +0.076, -0 mps for contact area (K1 through K4)

** Impact velocity range = 4.86 mps, +0, -0.076 mps for contact area (K5 through K8)

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 plot K1 through K8.

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

Comments: 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: 05/06/11
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° = 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:

<table>
<thead>
<tr>
<th>Knee impact &amp; Test #</th>
<th>Location</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>
</tr>
</thead>
<tbody>
<tr>
<td>K1</td>
<td>-430</td>
<td>241</td>
<td>4.94</td>
<td>5.07</td>
<td>2,530</td>
<td>1,296</td>
<td>PASS</td>
</tr>
<tr>
<td>K2</td>
<td>-312</td>
<td>241</td>
<td>4.94</td>
<td>4.88</td>
<td>2,320</td>
<td>1,536</td>
<td>PASS</td>
</tr>
<tr>
<td>K3</td>
<td>-416</td>
<td>132</td>
<td>4.89</td>
<td>4.87</td>
<td>2,430</td>
<td>1,598</td>
<td>PASS</td>
</tr>
<tr>
<td>K4</td>
<td>-182</td>
<td>135</td>
<td>4.90</td>
<td>4.83</td>
<td>3,470</td>
<td>1,143</td>
<td>PASS</td>
</tr>
<tr>
<td>K5</td>
<td>-198</td>
<td>241</td>
<td>4.86</td>
<td>4.93</td>
<td></td>
<td>1,644</td>
<td>PASS</td>
</tr>
<tr>
<td>K6</td>
<td>-81</td>
<td>241</td>
<td>4.84</td>
<td>4.76</td>
<td></td>
<td>1,728</td>
<td>PASS</td>
</tr>
<tr>
<td>K7</td>
<td>-69</td>
<td>133</td>
<td>4.81</td>
<td>4.81</td>
<td></td>
<td>1,475</td>
<td>PASS</td>
</tr>
<tr>
<td>K8</td>
<td>-72</td>
<td>10</td>
<td>4.82</td>
<td>4.81</td>
<td></td>
<td>1,764</td>
<td>PASS</td>
</tr>
</tbody>
</table>

* Impact velocity from item No. 7 below
** Impact velocity range = 4.86 mps, +0.076, -0 mps for contact area (K1 through K4)
** Impact velocity range = 4.86 mps, +0, -0.076 mps for contact area (K5 through K8)

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 plot K1 through K8.
8. Attach force vs. time plots for K5, K6, K7 and K8.

Comments: 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: 06/02/11
# SECTION 4
## INSTRUMENTATION AND EQUIPMENT LIST

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Description</th>
<th>Model / Serial No.</th>
<th>Cal. Date</th>
<th>Cal. Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load Cell</td>
<td>Interface</td>
<td>1210AF-300 / 184552</td>
<td>06/14/11</td>
<td>12/14/11</td>
</tr>
<tr>
<td>Load Cell</td>
<td>PCB</td>
<td>1315-101-01A / 634-10k</td>
<td>04/07/11</td>
<td>10/07/11</td>
</tr>
<tr>
<td>Load Cell</td>
<td>PCB</td>
<td>1315-101-01A / 671</td>
<td>02/10/11</td>
<td>08/10/11</td>
</tr>
<tr>
<td>Load Cell</td>
<td>Key Transducer</td>
<td>1315-101-01 / 260</td>
<td>02/11/11</td>
<td>08/11/11</td>
</tr>
<tr>
<td>Load Cell</td>
<td>Key Transducer</td>
<td>1315-101-01 / 271</td>
<td>02/11/11</td>
<td>08/11/11</td>
</tr>
<tr>
<td>Load Cell</td>
<td>Interface</td>
<td>1210AF-25K-B / 137781</td>
<td>12/16/10</td>
<td>06/16/11</td>
</tr>
<tr>
<td>String Pot.</td>
<td>Ametek</td>
<td>P-40A / 0108-27165</td>
<td>02/11/11</td>
<td>08/11/11</td>
</tr>
<tr>
<td>String Pot.</td>
<td>Ametek</td>
<td>P-40A / 0504-21782</td>
<td>02/11/11</td>
<td>08/11/11</td>
</tr>
<tr>
<td>Inclinometer</td>
<td>Digital Protractor</td>
<td>Pro 360 / 001</td>
<td>Daily</td>
<td>Daily</td>
</tr>
<tr>
<td>Steel Tape</td>
<td>Stanley</td>
<td>Powerlock / 173</td>
<td>02/28/11</td>
<td>08/28/11</td>
</tr>
<tr>
<td>Impact Fixture</td>
<td>MGA</td>
<td>IF2003A</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Camera</td>
<td>Sony</td>
<td>DSC-575</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Planimeter</td>
<td>Sokkia Corp.</td>
<td>Planix5 / 007319</td>
<td>Daily</td>
<td>Daily</td>
</tr>
</tbody>
</table>
# SECTION 5
## PHOTOGRAPHS

### TABLE OF PHOTOGRAPHS

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Left Side View of School Bus</td>
<td>50</td>
</tr>
<tr>
<td>2</td>
<td>Right Side View of School Bus</td>
<td>51</td>
</tr>
<tr>
<td>3</td>
<td>¾ Front View From Left Side of School Bus</td>
<td>52</td>
</tr>
<tr>
<td>4</td>
<td>¾ Front View From Right Side of School Bus</td>
<td>53</td>
</tr>
<tr>
<td>5</td>
<td>¾ Rear View From Left Side of School Bus</td>
<td>54</td>
</tr>
<tr>
<td>6</td>
<td>¾ Rear View From Right Side of School Bus</td>
<td>55</td>
</tr>
<tr>
<td>7</td>
<td>Certification Label &amp; Tire Placard</td>
<td>56</td>
</tr>
<tr>
<td>8</td>
<td>Incomplete Vehicle Label</td>
<td>57</td>
</tr>
<tr>
<td>9</td>
<td>Vehicle Interior View From Front to Rear</td>
<td>58</td>
</tr>
<tr>
<td>10</td>
<td>Vehicle Interior View From Rear to Front</td>
<td>59</td>
</tr>
<tr>
<td>11</td>
<td>Pre-Test of Seat Cushion Retention Set Up on Seat S1</td>
<td>60</td>
</tr>
<tr>
<td>12</td>
<td>Pre-Test of Seat S5 Force Deflection Forward Test</td>
<td>61</td>
</tr>
<tr>
<td>13</td>
<td>Post-Test of Seat S5 Force Deflection Forward Test</td>
<td>62</td>
</tr>
<tr>
<td>14</td>
<td>Pre-Test of Seat S8 Force Deflection Forward Test</td>
<td>63</td>
</tr>
<tr>
<td>15</td>
<td>Post-Test of Seat S8 Force Deflection Forward Test</td>
<td>64</td>
</tr>
<tr>
<td>16</td>
<td>Pre-Test of Barrier B8 Force Deflection Forward Test</td>
<td>65</td>
</tr>
<tr>
<td>17</td>
<td>Post-Test of Barrier B8 Force Deflection Forward Test</td>
<td>66</td>
</tr>
<tr>
<td>18</td>
<td>Pre-Test of Seat S3 Force Deflection Rearward Test</td>
<td>67</td>
</tr>
<tr>
<td>19</td>
<td>Post-Test of Seat S3 Force Deflection Rearward Test</td>
<td>68</td>
</tr>
<tr>
<td>20</td>
<td>Post-Test of Head and Knee Impact Locations on Seat S2</td>
<td>69</td>
</tr>
<tr>
<td>21</td>
<td>Post-Test of Head and Knee Impact Locations on Seat S7</td>
<td>70</td>
</tr>
<tr>
<td>22</td>
<td>Post-Test of Head and Knee Impact Locations on Barrier B1</td>
<td>71</td>
</tr>
</tbody>
</table>
Test Vehicle: 2011 Girardin Micro Bird School Bus
Test Lab: MGA Research Corporation
NHTSA No.: CB0903
Test Dates: 04/14/11 – 06/15/11
Test Vehicle: 2011 Girardin Micro Bird School Bus

NHTSA No.: CB0903

Test Lab: MGA Research Corporation

Test Dates: 04/14/11 – 06/15/11

¾ Front View From Left Side of School Bus
Test Vehicle: 2011 Girardin Micro Bird School Bus
Test Lab: MGA Research Corporation
NHTSA No.: CB0903
Test Dates: 04/14/11 – 06/15/11

¾ Front View From Right Side of School Bus
Test Vehicle: 2011 Girardin Micro Bird School Bus
Test Lab: MGA Research Corporation
NHTSA No.: CB0903
Test Dates: 04/14/11 – 06/15/11

¾ Rear View From Right Side of School Bus
Test Vehicle: 2011 Girardin Micro Bird School Bus
Test Lab: MGA Research Corporation
NHTSA No.: CB0903
Test Dates: 04/14/11 – 06/15/11
Test Vehicle: 2011 Girardin Micro Bird School Bus
Test Lab: MGA Research Corporation
NHTSA No.: CB0903
Test Dates: 04/14/11 – 06/15/11

Incomplete Vehicle Label

DATE: 09/10
FRONT GAWR: 4050LB 1837KG
WITH LT225/75R16E 115/112R 16x6.0K
AT 450 kPa/ 65 PSI COLD
VIN: 1FDEE3FLXBD1A0617

REAR GAWR: 7800LB 3538KG
WITH LT225/75R16E 115/112R 16x6.0K
AT 415 kPa/ 60 PSI COLD

Equipped with the Ford School Bus Prep Pkg
EXT PNT: BY RC: 86 DSO: 2233
WB | INT TR | TP/PS | R | AXLE TR | SPR | BE414
138 | CE | 7 | 52 | T | RRVV | R05
MADE IN U.S.A.
ULN ▽5U5A-3520472-AA
Test Vehicle: 2011 Girardin Micro Bird School Bus
Test Lab: MGA Research Corporation
NHTSA No.: CB0903
Test Dates: 04/14/11 – 06/15/11

Vehicle Interior View From Front to Rear
Test Vehicle: 2011 Girardin Micro Bird School Bus
Test Lab: MGA Research Corporation
NHTSA No.: CB0903
Test Dates: 04/14/11 – 06/15/11

Vehicle Interior View From Rear to Front
Pre-Test of Seat Cushion Retention Set Up on Seat S1
Pre-Test of Seat S5 Force Deflection Forward Test
Test Vehicle: 2011 Girardin Micro Bird School Bus
Test Lab: MGA Research Corporation
NHTSA No.: CB0903
Test Dates: 04/14/11 – 06/15/11

Post-Test of Seat S5 Force Deflection Forward Test
Test Vehicle: 2011 Girardin Micro Bird School Bus
Test Lab: MGA Research Corporation
NHTSA No.: CB0903
Test Dates: 04/14/11 – 06/15/11

Pre-Test of Seat S8 Force Deflection Forward Test
Test Vehicle: 2011 Girardin Micro Bird School Bus
Test Lab: MGA Research Corporation
NHTSA No.: CB0903
Test Dates: 04/14/11 – 06/15/11

Post-Test of Seat S8 Force Deflection Forward Test
Pre-Test of Barrier B8 Force Deflection Forward Test
Test Vehicle: 2011 Girardin Micro Bird School Bus
NHTSA No.: CB0903
Test Lab: MGA Research Corporation
Test Dates: 04/14/11 – 06/15/11

Post-Test of Barrier B8 Force Deflection Forward Test
Test Vehicle: 2011 Girardin Micro Bird School Bus
Test Lab: MGA Research Corporation
NHTSA No.: CB0903
Test Dates: 04/14/11 – 06/15/11

Pre-Test of Seat S3 Force Deflection Rearward Test
Post-Test of Seat S3 Force Deflection Rearward Test
Post-Test of Head and Knee Impact Locations on Seat S2
Post-Test of Head and Knee Impact Locations on Seat S7
Test Vehicle: 2011 Girardin Micro Bird School Bus
Test Lab: MGA Research Corporation
NHTSA No.: CB0903
Test Dates: 04/14/11 – 06/15/11

Post-Test of Head and Knee Impact Locations on Barrier B1
# TABLE OF TEST PLOTS

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Seat Cushion Retention Seat S1 Force vs. Time</td>
<td>74</td>
</tr>
<tr>
<td>2</td>
<td>Seat Back Forward Deflection Seat S5 (Lower) Force vs. Time</td>
<td>75</td>
</tr>
<tr>
<td>3</td>
<td>Seat Back Forward Deflection Seat S5 (Lower) Displacement vs. Time</td>
<td>75</td>
</tr>
<tr>
<td>4</td>
<td>Seat Back Forward Deflection Seat S5 (Upper) Force vs. Time</td>
<td>76</td>
</tr>
<tr>
<td>5</td>
<td>Seat Back Forward Deflection Seat S5 (Upper) Displacement vs. Time</td>
<td>76</td>
</tr>
<tr>
<td>6</td>
<td>Seat Back Forward Deflection Seat S5 (Upper) Force vs. Displacement</td>
<td>77</td>
</tr>
<tr>
<td>7</td>
<td>Seat Back Forward Deflection Seat S8 (Lower) Force vs. Time</td>
<td>78</td>
</tr>
<tr>
<td>8</td>
<td>Seat Back Forward Deflection Seat S8 (Lower) Displacement vs. Time</td>
<td>78</td>
</tr>
<tr>
<td>9</td>
<td>Seat Back Forward Deflection Seat S8 (Upper) Force vs. Time</td>
<td>79</td>
</tr>
<tr>
<td>10</td>
<td>Seat Back Forward Deflection Seat S8 (Upper) Displacement vs. Time</td>
<td>79</td>
</tr>
<tr>
<td>11</td>
<td>Seat Back Forward Deflection Seat S8 (Upper) Force vs. Displacement</td>
<td>80</td>
</tr>
<tr>
<td>12</td>
<td>Barrier Forward Deflection Barrier B8 (Lower) Force vs. Time</td>
<td>81</td>
</tr>
<tr>
<td>13</td>
<td>Barrier Forward Deflection Barrier B8 (Lower) Displacement vs. Time</td>
<td>81</td>
</tr>
<tr>
<td>14</td>
<td>Barrier Forward Deflection Barrier B8 (Upper) Force vs. Time</td>
<td>82</td>
</tr>
<tr>
<td>15</td>
<td>Barrier Forward Deflection Barrier B8 (Upper) Displacement vs. Time</td>
<td>82</td>
</tr>
<tr>
<td>16</td>
<td>Barrier Forward Deflection Barrier B8 (Upper) Force vs. Displacement</td>
<td>83</td>
</tr>
<tr>
<td>17</td>
<td>Seat Back Rearward Deflection Seat S3 (Lower) Force vs. Time</td>
<td>84</td>
</tr>
<tr>
<td>18</td>
<td>Seat Back Rearward Deflection Seat S3 (Lower) Displacement vs. Time</td>
<td>84</td>
</tr>
<tr>
<td>19</td>
<td>Seat Back Rearward Deflection Seat S3 (Lower) Force vs. Displacement</td>
<td>85</td>
</tr>
<tr>
<td>20</td>
<td>H1 Head Form Impact (1.5 m/s) Seat S2</td>
<td>86</td>
</tr>
<tr>
<td>21</td>
<td>H2 Head Form Impact (1.5 m/s) Seat S2</td>
<td>87</td>
</tr>
<tr>
<td>22</td>
<td>H3 Head Form Impact (1.5 m/s) Seat S2</td>
<td>88</td>
</tr>
<tr>
<td>23</td>
<td>H4 Head Form Impact (1.5 m/s) Seat S2</td>
<td>89</td>
</tr>
<tr>
<td>24</td>
<td>H5 Head Form Impact (1.5 m/s) Seat S2</td>
<td>90</td>
</tr>
<tr>
<td>25</td>
<td>H6 Head Form Impact (1.5 m/s) Seat S2</td>
<td>91</td>
</tr>
<tr>
<td>26</td>
<td>H7 Head Form Impact (1.5 m/s) Seat S2</td>
<td>92</td>
</tr>
<tr>
<td>27</td>
<td>H1 Head Form Impact (1.5 m/s) Seat S7</td>
<td>93</td>
</tr>
<tr>
<td>28</td>
<td>H2 Head Form Impact (1.5 m/s) Seat S7</td>
<td>94</td>
</tr>
<tr>
<td>29</td>
<td>H3 Head Form Impact (1.5 m/s) Seat S7</td>
<td>95</td>
</tr>
<tr>
<td>30</td>
<td>H4 Head Form Impact (1.5 m/s) Seat S7</td>
<td>96</td>
</tr>
<tr>
<td>31</td>
<td>H5 Head Form Impact (1.5 m/s) Seat S7</td>
<td>97</td>
</tr>
<tr>
<td>32</td>
<td>H6 Head Form Impact (1.5 m/s) Seat S7</td>
<td>98</td>
</tr>
<tr>
<td>33</td>
<td>H7 Head Form Impact (1.5 m/s) Seat S7</td>
<td>99</td>
</tr>
<tr>
<td>34</td>
<td>H1 Head Form Impact (1.5 m/s) Barrier B1</td>
<td>100</td>
</tr>
<tr>
<td>35</td>
<td>H2 Head Form Impact (1.5 m/s) Barrier B1</td>
<td>101</td>
</tr>
<tr>
<td>36</td>
<td>H3 Head Form Impact (1.5 m/s) Barrier B1</td>
<td>102</td>
</tr>
<tr>
<td>37</td>
<td>H4 Head Form Impact (1.5 m/s) Barrier B1</td>
<td>103</td>
</tr>
<tr>
<td>38</td>
<td>H5 Head Form Impact (1.5 m/s) Barrier B1</td>
<td>104</td>
</tr>
<tr>
<td>39</td>
<td>H6 Head Form Impact (1.5 m/s) Barrier B1</td>
<td>105</td>
</tr>
<tr>
<td>40</td>
<td>H7 Head Form Impact (1.5 m/s) Barrier B1</td>
<td>106</td>
</tr>
<tr>
<td>41</td>
<td>H8 Head Form Impact (6.69 m/s) Seat S2</td>
<td>107</td>
</tr>
<tr>
<td>42</td>
<td>H9 Head Form Impact (6.69 m/s) Seat S2</td>
<td>108</td>
</tr>
<tr>
<td>43</td>
<td>H10 Head Form Impact (6.69 m/s) Seat S2</td>
<td>109</td>
</tr>
<tr>
<td>44</td>
<td>H11 Head Form Impact (6.69 m/s) Seat S2</td>
<td>110</td>
</tr>
</tbody>
</table>
### TABLE OF TEST PLOTS

<table>
<thead>
<tr>
<th>No.</th>
<th>Test Description</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>H12 Head Form Impact (6.69 m/s) Seat S2</td>
<td>111</td>
</tr>
<tr>
<td>46</td>
<td>H13 Head Form Impact (6.69 m/s) Seat S2</td>
<td>112</td>
</tr>
<tr>
<td>47</td>
<td>H14 Head Form Impact (6.69 m/s) Seat S2</td>
<td>113</td>
</tr>
<tr>
<td>48</td>
<td>H8 Head Form Impact (6.69 m/s) Seat S7</td>
<td>114</td>
</tr>
<tr>
<td>49</td>
<td>H9 Head Form Impact (6.69 m/s) Seat S7</td>
<td>115</td>
</tr>
<tr>
<td>50</td>
<td>H10 Head Form Impact (6.69 m/s) Seat S7</td>
<td>116</td>
</tr>
<tr>
<td>51</td>
<td>H11 Head Form Impact (6.69 m/s) Seat S7</td>
<td>117</td>
</tr>
<tr>
<td>52</td>
<td>H12 Head Form Impact (6.69 m/s) Seat S7</td>
<td>118</td>
</tr>
<tr>
<td>53</td>
<td>H13 Head Form Impact (6.69 m/s) Seat S7</td>
<td>119</td>
</tr>
<tr>
<td>54</td>
<td>H14 Head Form Impact (6.69 m/s) Seat S7</td>
<td>120</td>
</tr>
<tr>
<td>55</td>
<td>H8 Head Form Impact (6.69 m/s) Barrier B1</td>
<td>121</td>
</tr>
<tr>
<td>56</td>
<td>H9 Head Form Impact (6.69 m/s) Barrier B1</td>
<td>122</td>
</tr>
<tr>
<td>57</td>
<td>H10 Head Form Impact (6.69 m/s) Barrier B1</td>
<td>123</td>
</tr>
<tr>
<td>58</td>
<td>H11 Head Form Impact (6.69 m/s) Barrier B1</td>
<td>124</td>
</tr>
<tr>
<td>59</td>
<td>H12 Head Form Impact (6.69 m/s) Barrier B1</td>
<td>125</td>
</tr>
<tr>
<td>60</td>
<td>H13 Head Form Impact (6.69 m/s) Barrier B1</td>
<td>126</td>
</tr>
<tr>
<td>61</td>
<td>H13 Head Form Impact (6.69 m/s) Barrier B1</td>
<td>127</td>
</tr>
<tr>
<td>62</td>
<td>K1 Knee Form Impact Seat S2</td>
<td>128</td>
</tr>
<tr>
<td>63</td>
<td>K2 Knee Form Impact Seat S2</td>
<td>129</td>
</tr>
<tr>
<td>64</td>
<td>K3 Knee Form Impact Seat S2</td>
<td>130</td>
</tr>
<tr>
<td>65</td>
<td>K4 Knee Form Impact Seat S2</td>
<td>131</td>
</tr>
<tr>
<td>66</td>
<td>K5 Knee Form Impact Seat S2</td>
<td>132</td>
</tr>
<tr>
<td>67</td>
<td>K6 Knee Form Impact Seat S2</td>
<td>133</td>
</tr>
<tr>
<td>68</td>
<td>K7 Knee Form Impact Seat S2</td>
<td>134</td>
</tr>
<tr>
<td>69</td>
<td>K8 Knee Form Impact Seat S2</td>
<td>135</td>
</tr>
<tr>
<td>70</td>
<td>K1 Knee Form Impact Seat S7</td>
<td>136</td>
</tr>
<tr>
<td>71</td>
<td>K2 Knee Form Impact Seat S7</td>
<td>137</td>
</tr>
<tr>
<td>72</td>
<td>K3 Knee Form Impact Seat S7</td>
<td>138</td>
</tr>
<tr>
<td>73</td>
<td>K4 Knee Form Impact Seat S7</td>
<td>139</td>
</tr>
<tr>
<td>74</td>
<td>K5 Knee Form Impact Seat S7</td>
<td>140</td>
</tr>
<tr>
<td>75</td>
<td>K6 Knee Form Impact Seat S7</td>
<td>141</td>
</tr>
<tr>
<td>76</td>
<td>K7 Knee Form Impact Seat S7</td>
<td>142</td>
</tr>
<tr>
<td>77</td>
<td>K8 Knee Form Impact Seat S7</td>
<td>143</td>
</tr>
<tr>
<td>78</td>
<td>K1 Knee Form Impact Barrier B1</td>
<td>144</td>
</tr>
<tr>
<td>79</td>
<td>K2 Knee Form Impact Barrier B1</td>
<td>145</td>
</tr>
<tr>
<td>80</td>
<td>K3 Knee Form Impact Barrier B1</td>
<td>146</td>
</tr>
<tr>
<td>81</td>
<td>K4 Knee Form Impact Barrier B1</td>
<td>147</td>
</tr>
<tr>
<td>82</td>
<td>K5 Knee Form Impact Barrier B1</td>
<td>148</td>
</tr>
<tr>
<td>83</td>
<td>K6 Knee Form Impact Barrier B1</td>
<td>149</td>
</tr>
<tr>
<td>84</td>
<td>K7 Knee Form Impact Barrier B1</td>
<td>150</td>
</tr>
<tr>
<td>85</td>
<td>K8 Knee Form Impact Barrier B1</td>
<td>151</td>
</tr>
</tbody>
</table>
Seat Cushion Retention Seat S1 Force vs. Time
SECTION 6 (CONTINUED)

TEST PLOTS

Seat Back Forward Deflection Seat S5 (Lower) Force vs. Time

Seat Back Forward Deflection Seat S5 (Lower) Displacement vs. Time
SECTION 6 (CONTINUED)

TEST PLOTS

Seat Back Forward Deflection Seat S5 (Upper) Force vs. Time

Seat Back Forward Deflection Seat S5 (Upper) Displacement vs. Time
SECTION 6 (CONTINUED)
TEST PLOTS

Seat Back Forward Deflection Seat S5 (Upper) Force vs. Displacement
SECTION 6 (CONTINUED)

TEST PLOTS

Seat Back Forward Deflection Seat S8 (Lower) Force vs. Time

Seat Back Forward Deflection Seat S8 (Lower) Displacement vs. Time
SECTION 6 (CONTINUED)

TEST PLOTS

Seat Back Forward Deflection Seat S8 (Upper) Force vs. Time

Seat Back Forward Deflection Seat S8 (Upper) Displacement vs. Time
SECTION 6 (CONTINUED)
TEST PLOTS

Seat Back Forward Deflection Seat S8 (Upper) Force vs. Displacement
SECTION 6 (CONTINUED)
TEST PLOTS

Barrier Forward Deflection Barrier B8 (Lower) Force vs. Time

Barrier Forward Deflection Barrier B8 (Lower) Displacement vs. Time
SECTION 6 (CONTINUED)

TEST PLOTS

Barrier Forward Deflection Barrier B8 (Upper) Force vs. Time

Barrier Forward Deflection Barrier B8 (Upper) Displacement vs. Time
SECTION 6 (CONTINUED)

TEST PLOTS

Barrier Forward Deflection Barrier B8 (Upper) Force vs. Displacement
SECTION 6 (CONTINUED)

TEST PLOTS

**Seat Back Rearward Deflection Seat S3 (Lower) Force vs. Time**

![Force (N) vs Time (sec)](chart1)

**Seat Back Rearward Deflection Seat S3 (Lower) Displacement vs. Time**

![Displacement (mm) vs Time (sec)](chart2)
Seat Back Rearward Deflection Seat S3 (Lower) Force vs. Displacement
FMVSS 222 HEAD FORM IMPACTS (1.5 m/s)
Test Date: 5-10-2011
Component ID: 2011 Girardin Micro Bird
Location: S2 H1
NHTSA #: CB0903
speed trap: 1.563 m/s

Head X Acceleration (G's) VS TIME (S)

Max: 1.98 G's
TMax: 0.18 S
Min: -7.64 G's
TMin: 0.03 S

HIC 36: 2.03
T1: 17.10 S
T2: 40.30 S

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

Max: 1.82 m/s
TMax: -0.01 S
Min: -0.32 m/s
TMin: 0.10 S
VEL@IMP: 1.803 m/s

VEL@IMP: 1.803 m/s
FMVSS 222 HEAD FORM IMPACTS (1.5 m/s) Test Date: 5-10-2011
Component ID: 2011 Girardin Micro Bird Location: S2 H2
NHTSA #: CB0903 speed trap: 1.580 m/s

Head X Acceleration (G's) VS TIME (S)
HIC 36: 2.15 T1: 16.10 S T2: 38.20 S
Max: 1.93 G's Tmax: 0.18 S
Min: -7.88 G's Tmin: 0.03 S

VELOCITY X (m/s) VS TIME (S)
Max: 1.92 m/s Tmax: -0.01 S
Min: -0.19 m/s Tmin: 0.10 S
VEL@IMP: 1.907m/s
FMVSS 222 HEAD FORM IMPACTS (1.5 m/s)  
Test Date: 5-10-2011  
Component ID: 2011 Girardin Micro Bird  
Location: S2 H3

Component ID: 2011 Girardin Micro Bird  
Location: S2 H3  
NHTSA #: CB0903  
speed trap: 1.595 m/s

Head X Acceleration (G's) VS TIME (S)  
HIC 36: 2.26  
T1: 15.40 S  
T2: 37.00 S

Max: 1.88 G's  
TMax: 0.18 S  
Min: -8.31 G's  
TMin: 0.03 S

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

Max: 1.76 m/s  
TMax: -0.01 S  
Min: -0.41 m/s  
TMin: 0.10 S  
VEL@IMP: 1.746 m/s
FMVSS 222 HEAD FORM IMPACTS (1.5 m/s)

Test Date: 5-11-2011
Component ID: 2011 Girardin Micro Bird
Location: S2 H4
NHTSA #: CB0903
speed trap: 1.593 m/s

Head X Acceleration (G's) VS TIME (S)
Max: 1.87 G's
TMax: 0.21 S
Min: -6.60 G's
TMin: 0.04 S
HIC 36: 1.78
T1: 15.70 S
T2: 47.50 S

VELocity X (m/s) VS TIME (S)
Max: 1.50 m/s
TMax: -0.01 S
Min: -0.82 m/s
TMin: 0.12 S
VEL@IMP: 1.473m/s
FMVSS 222 HEAD FORM IMPACTS (1.5 m/s)  
Test Date: 5-11-2011  
Component ID: 2011 Girardin Micro Bird  
Location: S2 H6

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

HIC 36: 1.86  
T1: 21.20 S  
T2: 51.00 S

Max: 1.80 G's  
TMax: 0.21 S  
Min: -6.82 G's  
TMin: 0.04 S

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

Max: 1.51 m/s  
TMax: -0.01 S  
Min: -0.78 m/s  
TMin: 0.11 S  
VEL@IMP: 1.486 m/s
FMVSS 222 HEAD FORM IMPACTS (1.5 m/s)  Test Date: 5-11-2011
Component ID: 2011 Girardin Micro Bird  NHTSA #: CB0903
Location: S2 H7  speed trap: 1.598 m/s

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

- Max: 2.01 G's
- Tmax: 0.22 S
- Min: -5.78 G's
- Tmin: 0.04 S

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

- Max: 1.86 m/s
- Tmax: -0.01 S
- Min: -0.30 m/s
- Tmin: 0.10 S
- Vel@Imp: 1.845 m/s
FMVSS 222 HEAD FORM IMPACTS (1.5 m/s)
Test Date: 5-6-2011
Component ID: 2011 Girardin Micro Bird
Location: S7 H1
NHTSA #: CB0903
speed trap: 1.561 m/s

Head X Acceleration (G's) VS TIME (S)
HIC 36: 1.86  T1: 18.20 S  T2: 43.20 S
Max: 0.68 G's  Tmax: 0.10 S
Min: -7.12 G's  Tmin: 0.03 S

VELOCITY X (m/s) VS TIME (S)
Max: 2.05 m/s  Tmax: -0.01 S
Min: -0.21 m/s  Tmin: 0.08 S
VEL@IMP: 2.038 m/s
FMVSS 222 HEAD FORM IMPACTS (1.5 m/s)  
Test Date: 5-6-2011  
Component ID: 2011 Girardin Micro Bird  
Location: S7 H2  
NHTSA #: CB0903  
speed trap: 1.527 m/s

Head X Acceleration (G's) VS TIME (S)  
HIC 36: 1.77  
T1: 16.10 S  
T2: 42.00 S

Max: 2.56 G's  
TMax: 0.15 S  
Min: -7.04 G's  
TMin: 0.03 S

VELOCITY X (m/s) VS TIME (S)  
Max: 1.94 m/s  
TMax: -0.01 S  
Min: -0.28 m/s  
TMin: 0.08 S  
VEL@IMP: 1.923 m/s
FMVSS 222 HEAD FORM IMPACTS (1.5 m/s)  
Component ID: 2011 Girardin Micro Bird  
Location: S7 H3  
Test Date: 5-9-2011  
NHTSA #: CB0903  
speed trap: 1.559 m/s

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

- Max: 1.55 G's
- Tmax: 0.20 S
- Min: -5.55 G's
- Tmin: 0.03 S

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

- Max: 1.66 m/s
- Tmax: -0.01 S
- Min: -0.50 m/s
- Tmin: 0.10 S
- VEL@IMP: 1.636 m/s
FMVSS 222 HEAD FORM IMPACTS (1.5 m/s)  
Test Date: 5-9-2011  
Location: S7 H4  
Component ID: 2011 Girardin Micro Bird  
NHTSA #: CB0903  
speed trap: 1.550 m/s

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

- Max: 2.40 G's  
- Tmax: 0.18 S  
- Min: -5.06 G's  
- Tmin: 0.04 S  

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

- Max: 1.75 m/s  
- Tmax: -0.01 S  
- Min: -0.55 m/s  
- Tmin: 0.10 S  

VEL@IMP: 1.731 m/s
FMVSS 222 HEAD FORM IMPACTS (1.5 m/s)
Test Date: 5-6-2011
Component ID: 2011 Girardin Micro Bird
Location: S7 H5
NHTSA #: CB0903
speed trap: 1.553 m/s

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

- Max: 2.66 G's
- Tmax: 0.16 S
- Min: -5.91 G's
- Tmin: 0.04 S

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

- Max: 1.85 m/s
- Tmax: -0.01 S
- Min: -0.48 m/s
- Tmin: 0.09 S
- VEL@IMP: 1.829 m/s
FMVSS 222 HEAD FORM IMPACTS (1.5 m/s)  
Component ID: 2011 Girardin Micro Bird  
Location: S7 H6  
Test Date: 5-9-2011  
NHTSA #: CB0903  
speed trap: 1.559 m/s

- Head X Acceleration (G's) VS TIME (S)  
  HIC 36: 0.53  
  T1: 15.80 S  
  T2: 51.80 S  
  Max: 1.09 G's  
  Tmax: 0.26 S  
  Min: -3.74 G's  
  Tmin: 0.03 S

- VELOCITY X (m/s) VS TIME (S)  
  Max: 1.83 m/s  
  Tmax: -0.01 S  
  Min: -0.21 m/s  
  Tmin: 0.12 S  
  VEL@IMP: 1.806m/s
FMVSS 222 HEAD FORM IMPACTS (1.5 m/s)
Test Date: 5-9-2011
Component ID: 2011 Girardin Micro Bird
Location: S7 H7
NHTSA #: CB0903
speed trap: 1.553 m/s

Head X Acceleration (G's) VS TIME (S)  
HIC 36: 1.19  T1: 25.50 S  T2: 61.50 S

Max: 2.43 G's  
TMax: 0.20 S
Min: -5.02 G's  
TMin: 0.05 S

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

Max: 1.81 m/s  
TMax: -0.01 S
Min: -0.42 m/s  
TMin: 0.10 S
VEL@IMP: 1.793 m/s
FMVSS 222 HEAD FORM IMPACTS (1.5 m/s)
Test Date: 6-2-2011
Component ID: 2011 Girardin Micro Bird
Location: B1 H1
NHTSA #: CB0903
speed trap: 1.598 m/s

Head X Acceleration (G's) VS TIME (S)
HIC 36: 2.21
T1: 19.60 S
T2: 54.60 S

Max: 0.25 G's
TMax: 0.10 S
Min: -6.86 G's
TMin: 0.04 S

VELOCITY X (m/s) VS TIME (S)
Max: 1.12 m/s
TMax: -0.01 S
Min: -1.32 m/s
TMin: 0.10 S
VEL@IMP: 1.068 m/s
FMVSS 222 HEAD FORM IMPACTS (1.5 m/s)
Component ID: 2011 Girardin Micro Bird
Location: B1 H2
Test Date: 6-6-2011
NHTSA #: CB0903
speed trap: 1.559 m/s

Head X Acceleration (G's) VS TIME (S)
HIC 36: 1.75
T1: 20.90 S
T2: 50.80 S
Max: 0.31 G's
TMax: 0.11 S
Min: -6.65 G's
TMin: 0.04 S

VELOCITY X (m/s) VS TIME (S)
Max: 1.31 m/s
TMax: -0.01 S
Min: -0.86 m/s
TMin: 0.10 S
VEL@IMP: 1.27 m/s
FMVSS 222 HEAD FORM IMPACTS (1.5 m/s)
Test Date: 6-6-2011
Component ID: 2011 Girardin Micro Bird
Location: B1 H3
NHTSA #: CB0903
speed trap: 1.559 m/s

Head X Acceleration (G's) VS TIME (S)
Max: 0.45 G's
TMax: 0.13 S
Min: -6.67 G's
TMin: 0.03 S

VELOCITY X (m/s) VS TIME (S)
Max: 1.65 m/s
TMax: -0.01 S
Min: -0.39 m/s
TMin: 0.10 S
VEL@IMP: 1.628 m/s
Head X Acceleration (G's) VS TIME (S)

Max: 0.31 G's
TMax: 0.15 S
Min: -6.75 G's
TMin: 0.03 S

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

Max: 1.22 m/s
TMax: -0.01 S
Min: -1.03 m/s
TMin: 0.10 S
VEL@IMP: 1.177m/s

FMVSS 222 HEAD FORM IMPACTS (1.5 m/s)
Test Date: 6-6-2011
Component ID: 2011 Girardin Micro Bird
Location: B1 H4
NHTSA #: CB0903
speed trap: 1.535 m/s
FMVSS 222 HEAD FORM IMPACTS (1.5 m/s)
Component ID: 2011 Girardin Micro Bird
Location: B1 H5
Test Date: 6-6-2011
NHTSA #: CB0903
speed trap: 1.575 m/s

Head X Acceleration (G's) VS TIME (S)

HIC 36: 1.20  T1: 32.00 S  T2: 68.00 S

Max: 0.62 G's
TMax: 0.12 S
Min: -4.91 G's
TMin: 0.05 S

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

Max: 1.56 m/s
TMax: -0.01 S
Min: -0.60 m/s
TMin: 0.10 S
VEL@IMP: 1.533m/s
FMVSS 222 HEAD FORM IMPACTS (1.5 m/s)  
Component ID: 2011 Girardin Micro Bird  
Location: B1 H6  
Test Date: 6-6-2011  
NHTSA #: CB0903  
speed trap: 1.561 m/s

Head X Acceleration (G's) VS TIME (S)  
HIC 36: 0.97  
T1: 39.60 S  
T2: 75.60 S

Max: 0.31 G's  
TMax: 0.13 S  
Min: -4.49 G's  
TMin: 0.06 S

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

Max: 1.52 m/s  
TMax: -0.01 S  
Min: -0.68 m/s  
TMin: 0.12 S  
VEL@IMP: 1.495m/s
HEAD FORM IMPACT (6.69 m/s)  
Component ID: 2011 Girardin Micro Bird  
Location:  S2 H8  
NHTSA#:  CB0903  
speed trap:  6.620 m/s  
Test Date: 5-11-2011  
Component ID: 2011 Girardin Micro Bird  
max: 0.35 G's  
Tmax: 0.09 S  
min: -73.66 G's  
Tmin: 0.01 S  
Max: 6.82 m/s  
Tmax: -0.01 S  
Min: -2.08 m/s  
Tmin: 0.08 S  
VEL@IMP: 6.792 m/s  
Max: 18.13 N  
Tmax: 0.09 S  
Min: -3,764.95 N  
Tmin: 0.01 S  
Energy: 7.92 J  
Hic: 176.01  
T1: 6.90 ms  
T2: 14.30 ms  
Max: 0.35 G's  
Tmax: 0.09 S  
Min: -73.66 G's  
Tmin: 0.01 S  
Max: 6.82 m/s  
Tmax: -0.01 S  
Min: -2.08 m/s  
Tmin: 0.08 S  
VEL@IMP: 6.792 m/s  
Max: 18.13 N  
Tmax: 0.09 S  
Min: -3,764.95 N  
Tmin: 0.01 S  
Energy: 7.92 J
**HEAD FORM IMPACT (6.69 m/s)**

Test Date: 5-11-2011  
Component ID: 2011 Girardin Micro Bird  
Location: S2 H9  
NHTSA#: CB0903  
speed trap: 6.655 m/s

**HEAD X ACCELERATION (G's) VS TIME (S)**  
Max: 12.16 G's  
TMax: 0.13 S  
Min: -66.77 G's  
TMin: 0.01 S  
Hic: 139.08  
T1: 6.30 ms  
T2: 13.60 ms

**VELOCITY X (m/s) VS TIME (S)**  
Max: 6.85 m/s  
TMax: -0.01 S  
Min: -1.98 m/s  
TMin: 0.08 S  
VEL@IMP: 6.823 m/s

**FORCE X (N) VS TIME (S)**  
Max: 621.31 N  
TMax: 0.13 S  
Min: -3,412.76 N  
TMin: 0.01 S

**ENERGY (J)**  
Energy: 7.20 J
HEAD FORM IMPACT (6.69 m/s)  Test Date: 5-11-2011
Component ID: 2011 Girardin Micro Bird
Location: S2 H10
NHTSA#: CB0903
speed trap: 6.617 m/s

**HEAD X ACCELERATION (G’s) VS TIME (S)**
- Max: 8.11 G’s
- Tmax: 0.12 S
- Min: -62.64 G’s
- Tmin: 0.01 S

**VELOCITY X (m/s) VS TIME (S)**
- Max: 6.88 m/s
- Tmax: -0.01 S
- Min: -1.86 m/s
- Tmin: 0.08 S
- VEL@IMP: 6.852 m/s

**FORCE X (N) VS TIME (S)**
- Max: 414.42 N
- Tmax: 0.12 S
- Min: -3,201.31 N
- Tmin: 0.01 S

**FORCE (N) VS TIME (SEC)**
- Energy: 6.75 J
HEAD FORM IMPACT (6.69 m/s)  Test Date: 5-11-2011
Component ID: 2011 Girardin Micro Bird  NHTSA#: CB0903
Location: S2 H11  speed trap: 6.666 m/s

HEAD X ACCELERATION (G's) VS TIME (S)
Max: 0.83 G's  TMax: 0.10 S
Min: -53.57 G's  TMin: 0.01 S
Hic: 101.01  T1: 7.30 ms  T2: 15.80 ms

VELOCITY X (m/s) VS TIME (S)
Max: 7.02 m/s  TMax: -0.01 S
Min: -1.58 m/s  TMin: 0.09 S
VEL@IMP: 7.007 m/s

FORCE X (N) VS TIME (S)
Max: 42.60 N  TMax: 0.10 S
Min: -2,738.14 N  TMin: 0.01 S
Energy: 9.52 J
Component ID: 2011 Girardin Micro Bird
Location: S2 H12
NHTSA#: CB0903
speed trap: 6.661 m/s

HEAD FORM IMPACT (6.69 m/s) Test Date: 5-11-2011

HEAD X ACCELERATION (G's) VS TIME (S) Hic: 118.18  T1: 5.90 ms  T2: 25.80 ms
Max: 1.13 G's  
TMax: 0.08 S  
Min: -57.72 G's  
TMin: 0.01 S

VELOCITY X (m/s) VS TIME (S)
Max: 6.82 m/s  
TMax: -0.01 S  
Min: -1.79 m/s  
TMin: 0.07 S  
VEL@IMP: 6.788 m/s

FORCE X (N) VS TIME (S)
Max: 57.87 N 
TMax: 0.08 S  
Min: -2,949.92 N  
TMin: 0.01 S

FORCE (N) VS TIME (SEC)
Energy: 7.99 J
HEAD FORM IMPACT (6.69 m/s)  Test Date: 5-11-2011
Component ID: 2011 Girardin Micro Bird
Location: S2 H13
NHTSA#: CB0903
speed trap: 6.654 m/s

HEAD X ACCELERATION (G's) VS TIME (S)
Hic: 110.80  T1: 12.00 ms  T2: 29.90 ms
Max: 1.42 G's
TMax: 0.10 S
Min: -42.14 G's
TMin: 0.02 S

VELOCITY X (m/s) VS TIME (S)
Max: 6.78 m/s
TMax: -0.01 S
Min: -2.02 m/s
TMin: 0.06 S
VEL@IMP: 6.756 m/s

FORCE X (N) VS TIME (S)
Max: 72.70 N
TMax: 0.10 S
Min: -2,153.64 N
TMin: 0.02 S

Energy: 13.24 J
HEAD FORM IMPACT (6.69 m/s)  
Test Date: 5-11-2011
Component ID: 2011 Girardin Micro Bird
Location: S2 H14
NHTSA#: CB0903
speed trap: 6.672 m/s

HEAD X ACCELERATION (G's) VS TIME (S)
- Hic: 232.48
- T1: 9.70 ms
- T2: 15.10 ms
- Max: 1.73 G's
- Tmax: 0.08 S
- Min: -106.66 G's
- Tmin: 0.01 S

VELOCITY X (m/s) VS TIME (S)
- Max: 6.86 m/s
- Tmax: -0.01 S
- Min: -1.34 m/s
- Tmin: 0.06 S
- VEL@IMP: 6.842 m/s

FORCE X (N) VS TIME (S)
- Max: 88.52 N
- Tmax: 0.08 S
- Min: -5,451.54 N
- Tmin: 0.01 S

Energy: 10.04 J
HEAD FORM IMPACT (6.69 m/s)  Test Date: 5-9-2011
Component ID: 2011 Girardin Micro Bird  NHTSA#: CB0903
Location: S7 H8  speed trap: 6.676 m/s

Max: 1.16 G's  TMax: 0.08 S  Min: -52.43 G's  Tmin: 0.01 S

Max: 6.94 m/s  TMax: -0.01 S  Min: -2.68 m/s  Tmin: 0.07 S  VEL@IMP: 6.902 m/s

Max: 59.21 N  Tmax: 0.08 S  Min: -2,679.75 N  Tmin: 0.01 S

Energy: 8.63 J
HEAD FORM IMPACT (6.69 m/s)  Test Date: 5-9-2011
Component ID: 2011 Girardin Micro Bird
Location: S7 H9          speed trap: 6.647 m/s
NHTSA#:  CB0903

<table>
<thead>
<tr>
<th></th>
<th>Max:</th>
<th>Tmax:</th>
<th>Min:</th>
<th>Tmin:</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEAD X ACCELERATION</td>
<td>1.13 G's</td>
<td>0.08 S</td>
<td>-64.25 G's</td>
<td>0.01 S</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VELOCITY X (m/s)</td>
<td>6.88 m/s</td>
<td>-0.01 S</td>
<td>-2.65 m/s</td>
<td>0.07 S</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FORCE X (N)</td>
<td>57.89 N</td>
<td>0.08 S</td>
<td>-3,283.84 N</td>
<td>0.01 S</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENERGY</td>
<td>8.81 J</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
HEAD FORM IMPACT (6.69 m/s)  Test Date: 5-9-2011
Component ID: 2011 Girardin Micro Bird  NHTSA#: CB0903
Location: S7 H11  speed trap: 6.676 m/s

HEAD X ACCELERATION (G's) VS TIME (S)
Max: 0.61 G's  
TMax: 0.09 S  
Min: -36.65 G's  
TMin: 0.01 S

VELOCITY X (m/s) VS TIME (S)
Max: 6.79 m/s  
TMax: -0.01 S  
Min: -2.82 m/s  
TMin: 0.08 S  
VEL@IMP: 6.749 m/s

FORCE X (N) VS TIME (S)
Max: 31.42 N  
TMax: 0.09 S  
Min: -1,873.25 N  
TMin: 0.01 S

Energy: 16.19 J
HEAD FORM IMPACT (6.69 m/s)  
Test Date: 5-9-2011  
Component ID: 2011 Girardin Micro Bird  
Location: S7 H12  
speed trap: 6.690 m/s  
NHTSA#: CB0903

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

- Max: 1.04 G's  
- Tmax: 0.09 S  
- Min: -65.97 G's  
- Tmin: 0.01 S

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

- Max: 6.96 m/s  
- Tmax: -0.01 S  
- Min: -1.59 m/s  
- Tmin: 0.08 S  
VEL@IMP: 6.936 m/s

**FORCE X (N) VS TIME (S)**

- Max: 53.02 N  
- Tmax: 0.09 S  
- Min: -3,371.65 N  
- Tmin: 0.01 S

**ENERGY**

- Energy: 11.42 J
HEAD FORM IMPACT (6.69 m/s)
Component ID: 2011 Girardin Micro Bird
Location: S7 H13  speed trap: 6.671 m/s
NHTSA#:  CB0903

Max: 0.48 G's
TMax: 0.10 S
Min: -39.90 G's
TMin: 0.02 S

Max: 6.80 m/s
TMax: -0.01 S
Min: -2.23 m/s
TMin: 0.09 S
VEL@IMP: 6.765 m/s

Max: 24.42 N
TMax: 0.10 S
Min: -2,039.54 N
TMin: 0.02 S

Energy: 16.48 J
HEAD FORM IMPACT (6.69 m/s)  Test Date: 6-7-2011
Component ID: 2011 Girardin Micro Bird Location: B1 H10 speed trap: 6.620 m/s NHTSA#: CB0903

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

Max: 5.23 G's
TMax: 0.10 S
Min: -65.10 G's
TMin: 0.01 S

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

Max: 6.83 m/s
TMax: -0.01 S
Min: -2.92 m/s
TMin: 0.07 S
VEL@IMP: 6.793 m/s

**FORFORCE X (N) VS TIME (S)**

Max: 267.40 N
TMax: 0.10 S
Min: -3,327.39 N
TMin: 0.01 S

**ENERGY (J)**

Energy: 7.05 J
HEAD FORM IMPACT (6.69 m/s)  
Component ID: 2011 Girardin Micro Bird  
Location: B1 H12  
NHTSA#: CB0903  
speed trap: 6.649 m/s  

Test Date: 6-6-2011

**HEAD X ACCELERATION (G's) VS TIME (S)**  
Hic: 110.20  T1: 10.90 ms  T2: 25.80 ms

- Max: 2.51 G's
- Tmax: 0.11 S
- Min: -47.82 G's
- Tmin: 0.02 S

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

- Max: 6.80 m/s
- Tmax: 0.01 S
- Min: -3.16 m/s
- Tmin: 0.08 S

**VELOCITY@IMP: 6.767 m/s**

**FORCE X (N) VS TIME (S)**

- Max: 128.24 N
- Tmax: 0.11 S
- Min: -2,444.22 N
- Tmin: 0.02 S

Energy: 13.34 J

**FORCE (N) VS TIME (SEC)**
HEAD FORM IMPACT (6.69 m/s)  Test Date: 6-7-2011
Component ID: 2011 Girardin Micro Bird
Location: B1 H13
NHTSA#: CB0903
speed trap: 6.653 m/s

HEAD X ACCELERATION (G's) VS TIME (S)
Max: 2.65 G's
TMax: 0.11 S
Min: -41.78 G's
TMin: 0.02 S
Hic: 83.27 T1: 12.10 ms T2: 27.40 ms

VELOCITY X (m/s) VS TIME (S)
Max: 6.84 m/s
TMax: -0.01 S
Min: -3.20 m/s
TMin: 0.09 S
VEL@IMP: 6.792 m/s

FORCE X (N) VS TIME (S)
Max: 135.56 N
TMax: 0.11 S
Min: -2,135.26 N
TMin: 0.02 S

Energy: 17.78 J
HEAD FORM IMPACT (6.69 m/s) Test Date: 6-7-2011
Component ID: 2011 Girardin Micro Bird
Location: B1 H14
NHTSA#: CB0903
speed trap: 6.631 m/s

**HEAD X ACCELERATION (G's) VS TIME (S)**
- Max: 3.51 G's
- Tmax: 0.09 S
- Min: -109.80 G's
- Tmin: 0.01 S

** VELOCITY X (m/s) VS TIME (S)**
- Max: 6.80 m/s
- Tmax: -0.01 S
- Min: -2.54 m/s
- Tmin: 0.08 S

**FORCE X (N) VS TIME (S)**
- Max: 179.51 N
- Tmax: 0.09 S
- Min: -5,611.77 N
- Tmin: 0.01 S

**ENERGY**
- Energy: 7.62 J

**FORCE (N) VS TIME (SEC)**
- Energy: 7.62 J
FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Girardin Micro Bird
Location: S2 K1  speed trap: 4.909 m/s

Test Date: 5-11-2011
NHTSA #: CB0903

Knee X Acceleration (G's) VS TIME (S)
Max: 21.70 G's
TMax: 0.02 s
Min: -27.67 G's
TMin: 0.17 s

VELOCITY X (m/s) VS TIME (S)
Max: 5.06 m/s
TMax: 0.12 s
Min: -1.74 m/s
TMin: 0.20 s
VEL@IMP: 4.98 m/s

FORCE X (N) VS TIME (S)
Max: 964.45 N
TMax: 0.02 s
Min: -1,229.42 N
TMin: 0.17 s
FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Girardin Micro Bird
Location: S2 K2 speed trap: 4.894 m/s
NHTSA #: CB0903
Test Date: 5-11-2011

Knee X Acceleration (G's) VS TIME (S)
Max: 20.72 G's
TMax: 0.02 s
Min: -28.70 G's
TMin: 0.17 s

VELOCITY X (m/s) VS TIME (S)
Max: 4.95 m/s
TMax: 0.12 s
Min: -1.84 m/s
TMin: 0.21 s
VEL@IMP: 4.87 m/s

FORCE X (N) VS TIME (S)
Max: 920.73 N
TMax: 0.02 s
Min: -1,275.62 N
TMin: 0.17 s
FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Girardin Micro Bird
Location: S2 K3  speed trap: 4.879 m/s
Test Date: 5-11-2011
NHTSA #: CB0903

Knee X Acceleration (G's) VS TIME (S)
Max: 21.63 G's
TMax: 0.02 s
Min: -25.37 G's
TMin: 0.16 s

VELOCITY X (m/s) VS TIME (S)
Max: 4.68 m/s
TMax: 0.11 s
Min: -2.09 m/s
TMin: 0.19 s
VEL@IMP: 4.59 m/s

FORCE X (N) VS TIME (S)
Max: 961.35 N
TMax: 0.02 s
Min: -1,127.55 N
TMin: 0.16 s
FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Girardin Micro Bird
Location: S2 K4 speed trap: 4.925 m/s
NHTSA #: CB0903

Knee X Acceleration (G's) VS TIME (S)
Max: 21.10 G's
TMax: 0.02 s
Min: -54.23 G's
TMin: 0.17 s

VELOCITY X (m/s) VS TIME (S)
Max: 5.19 m/s
TMax: 0.12 s
Min: -0.96 m/s
TMin: 0.19 s
VEL@IMP: 5.14 m/s

FORCE X (N) VS TIME (S)
Max: 937.77 N
TMax: 0.02 s
Min: -2,409.77 N
TMin: 0.17 s
FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Girardin Micro Bird
Location: S2 K5    speed trap: 4.827 m/s

Test Date: 5-11-2011
NHTSA #: CB0903

Knee X Acceleration (G's) VS TIME (S)
Max: 21.75 G's
TMax: 0.02 s
Min: -32.00 G's
TMin: 0.16 s

VELOCITY X (m/s) VS TIME (S)
Max: 4.97 m/s
TMax: 0.12 s
Min: -1.95 m/s
TMin: 0.20 s
VEL@IMP: 4.9 m/s

FORCE X (N) VS TIME (S)
Max: 966.63 N
TMax: 0.02 s
Min: -1,422.15 N
TMin: 0.16 s
FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Girardin Micro Bird
Location: S2 K6  speed trap: 4.854 m/s

Test Date: 5-11-2011
NHTSA #: CB0903

Knee X Acceleration (G's) VS TIME (S)
Max: 23.36 G's
TMax: 0.02 s
Min: -38.66 G's
TMin: 0.17 s

VELOCITY X (m/s) VS TIME (S)
Max: 4.90 m/s
TMax: 0.12 s
Min: -2.29 m/s
TMin: 0.19 s
VEL@IMP: 4.82 m/s

FORCE X (N) VS TIME (S)
Max: 1,037.98 N
TMax: 0.02 s
Min: -1,717.89 N
TMin: 0.17 s
Component ID: 2011 Girardin Micro Bird
Location: S2 K7 speed trap: 4.856 m/s

Knee X Acceleration (G's) VS TIME (S)
Max: 22.65 G's
TMax: 0.02 s
Min: -38.04 G's
TMin: 0.17 s

VELOCITY X (m/s) VS TIME (S)
Max: 4.98 m/s
TMax: 0.12 s
Min: -2.16 m/s
TMin: 0.20 s
VEL@IMP: 4.92 m/s

FORCE X (N) VS TIME (S)
Max: 1,006.57 N
TMax: 0.02 s
Min: -1,690.28 N
TMin: 0.17 s
FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Girardin Micro Bird
Location: S2 K8    speed trap: 4.822 m/s
NHTSA #: CB0903
Test Date: 5-11-2011

Knee X Acceleration (G's) VS TIME (S)
Max: 21.55 G's
TMax: 0.02 s
Min: -53.87 G's
TMin: 0.16 s

VELOCITY X (m/s) VS TIME (S)
Max: 4.89 m/s
TMax: 0.12 s
Min: -1.82 m/s
TMin: 0.18 s
VEL@IMP: 4.82 m/s

FORCE X (N) VS TIME (S)
Max: 957.68 N
TMax: 0.02 s
Min: -2,394.04 N
TMin: 0.16 s
FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Girardin Micro Bird
Location: S7 K1 speed trap: 4.863 m/s

Test Date: 5-6-2011
NHTSA #: CB0903

Knee X Acceleration (G's) VS TIME (S)
Max: 20.63 G's
TMax: 0.02 s
Min: -45.16 G's
TMin: 0.16 s

VELOCITY X (m/s) VS TIME (S)
Max: 5.07 m/s
TMax: 0.12 s
Min: -1.44 m/s
TMin: 0.18 s
VEL@IMP: 5.04 m/s

FORCE X (N) VS TIME (S)
Max: 916.72 N
TMax: 0.02 s
Min: -2,007.08 N
TMin: 0.16 s
FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Girardin Micro Bird
Location: S7 K2 speed trap: 4.884 m/s
Test Date: 5-6-2011
NHTSA #: CB0903

Knee X Acceleration (G’s) VS TIME (S)
Max: 20.75 G’s
TMax: 0.02 s
Min: -31.70 G’s
TMin: 0.17 s

VELOCITY X (m/s) VS TIME (S)
Max: 5.05 m/s
TMax: 0.12 s
Min: -1.96 m/s
TMin: 0.20 s
VEL@IMP: 5.01 m/s

FORCE X (N) VS TIME (S)
Max: 922.30 N
TMax: 0.02 s
Min: -1,408.84 N
TMin: 0.17 s
FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Girardin Micro Bird
Location: S7 K3 speed trap: 4.898 m/s

Knee X Acceleration (G’s) VS TIME (S)
Max: 21.58 G’s
TMax: 0.02 s
Min: -34.36 G’s
TMin: 0.17 s

VELOCITY X (m/s) VS TIME (S)
Max: 5.02 m/s
TMax: 0.12 s
Min: -1.83 m/s
TMin: 0.20 s
VEL@IMP: 4.97 m/s

FORCE X (N) VS TIME (S)
Max: 959.05 N
TMax: 0.02 s
Min: -1,526.85 N
TMin: 0.17 s
FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Girardin Micro Bird
Location: S7 K4 speed trap: 4.888 m/s

Test Date: 5-6-2011
NHTSA #: CB0903

Knee X Acceleration (G's) VS TIME (S)
Max: 21.94 G's
TMax: 0.02 s
Min: -30.80 G's
TMin: 0.17 s

VELOCITY X (m/s) VS TIME (S)
Max: 5.09 m/s
TMax: 0.12 s
Min: -1.88 m/s
TMin: 0.20 s
VEL@IMP: 5.02 m/s

FORCE X (N) VS TIME (S)
Max: 975.04 N
TMax: 0.02 s
Min: -1,368.55 N
TMin: 0.17 s
FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Girardin Micro Bird
Location: S7 K5 speed trap: 4.823 m/s
NHTSA #: CB0903

Test Date: 5-6-2011

Knee X Acceleration (G's) VS TIME (S)
Max: 21.87 G's
TMax: 0.02 s
Min: -56.90 G's
TMin: 0.17 s

VELOCITY X (m/s) VS TIME (S)
Max: 5.07 m/s
TMax: 0.12 s
Min: -1.58 m/s
TMin: 0.18 s
VEL@IMP: 5.02 m/s

FORCE X (N) VS TIME (S)
Max: 972.00 N
TMax: 0.02 s
Min: -2,528.71 N
TMin: 0.17 s
FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Girardin Micro Bird
Location: S7 K6 speed trap: 4.837 m/s

Test Date: 5-6-2011
NHTSA #: CB0903

Knee X Acceleration (G's) VS TIME (S)
Max: 21.88 G's
TMax: 0.02 s
Min: -30.95 G's
TMin: 0.17 s

VELOCITY X (m/s) VS TIME (S)
Max: 4.94 m/s
TMax: 0.12 s
Min: -1.97 m/s
TMin: 0.21 s
VEL@IMP: 4.88 m/s

FORCE X (N) VS TIME (S)
Max: 972.32 N
TMax: 0.02 s
Min: -1,375.54 N
TMin: 0.17 s
FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Girardin Micro Bird
Location: S7 K7 speed trap: 4.836 m/s

Knee X Acceleration (G's) VS TIME (S)
- Max: 22.75 G's
- Tmax: 0.02 s
- Min: -40.10 G's
- Tmin: 0.16 s

VELOCITY X (m/s) VS TIME (S)
- Max: 4.83 m/s
- Tmax: 0.12 s
- Min: -2.13 m/s
- Tmin: 0.19 s
- Vel@Imp: 4.76 m/s

FORCE X (N) VS TIME (S)
- Max: 1,010.93 N
- Tmax: 0.02 s
- Min: -1,781.90 N
- Tmin: 0.16 s
FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Girardin Micro Bird
Location: B1 K1 speed trap: 4.940 m/s
Test Date: 6-1-2011
NHTSA #: CB0903

Knee X Acceleration (G's) VS TIME (S)
Max: 23.16 G's
TMax: 0.02 s
Min: -29.16 G's
TMin: 0.16 s

VELOCITY X (m/s) VS TIME (S)
Max: 5.12 m/s
TMax: 0.12 s
Min: -1.74 m/s
TMin: 0.23 s
VEL@IMP: 5.07 m/s

FORCE X (N) VS TIME (S)
Max: 1,029.38 N
TMax: 0.02 s
Min: -1,295.98 N
TMin: 0.16 s
FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Girardin Micro Bird
Location: B1 K3 speed trap: 4.885 m/s

Test Date: 6-2-2011
NHTSA #: CB0903

Knee X Acceleration (G's) VS TIME (S)
Max: 22.89 G's
TMax: 0.02 s
Min: -35.96 G's
TMin: 0.17 s

VELOCITY X (m/s) VS TIME (S)
Max: 4.96 m/s
TMax: 0.12 s
Min: -1.72 m/s
TMin: 0.23 s
VEL@IMP: 4.87 m/s

FORCE X (N) VS TIME (S)
Max: 1,017.06 N
TMax: 0.02 s
Min: -1,598.10 N
TMin: 0.17 s
FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Girardin Micro Bird
Location: B1 K4 speed trap: 4.903 m/s

Test Date: 6-2-2011
NHTSA #: CB0903

Knee X Acceleration (G's) VS TIME (S)
Max: 23.11 G's
TMax: 0.02 s
Min: -25.72 G's
TMin: 0.18 s

 VELOCITY X (m/s) VS TIME (S)
Max: 4.94 m/s
TMax: 0.12 s
Min: -1.93 m/s
TMin: 0.24 s
VEL@IMP: 4.83 m/s

FORCE X (N) VS TIME (S)
Max: 1,026.95 N
TMax: 0.02 s
Min: -1,143.20 N
TMin: 0.18 s
FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Girardin Micro Bird
Location: B1 K5 speed trap: 4.860 m/s
Test Date: 6-2-2011
NHTSA #: CB0903

Knee X Acceleration (G's) VS TIME (S)
Max: 25.63 G's
TMax: 0.02 s
Min: -37.00 G's
TMin: 0.16 s

VELOCITY X (m/s) VS TIME (S)
Max: 5.00 m/s
TMax: 0.12 s
Min: -1.52 m/s
TMin: 0.21 s
VEL@IMP: 4.93 m/s

FORCE X (N) VS TIME (S)
Max: 1,139.17 N
TMax: 0.02 s
Min: -1,644.30 N
TMin: 0.16 s
FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Girardin Micro Bird
Location: B1 K6 speed trap: 4.842 m/s

Test Date: 6-2-2011
NHTSA #: CB0903

Knee X Acceleration (G's) VS TIME (S)
Max: 27.55 G's
TMax: 0.02 s
Min: -38.89 G's
TMin: 0.16 s

VELOCITY X (m/s) VS TIME (S)
Max: 4.86 m/s
TMax: 0.12 s
Min: -1.47 m/s
TMin: 0.21 s
VEL@IMP: 4.76 m/s

FORCE X (N) VS TIME (S)
Max: 1,224.35 N
TMax: 0.02 s
Min: -1,728.15 N
TMin: 0.16 s
Knee X Acceleration (G's) VS TIME (S)

Max: 24.28 G's
TMax: 0.02 s
Min: -33.18 G's
TMin: 0.17 s

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

Max: 4.88 m/s
TMax: 0.12 s
Min: -1.66 m/s
TMin: 0.21 s
VEL@IMP: 4.81 m/s

FORCE X (N) VS TIME (S)

Max: 1,079.19 N
TMax: 0.02 s
Min: -1,474.56 N
TMin: 0.17 s
FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Girardin Micro Bird
Location: B1 K8 speed trap: 4.818 m/s

Test Date: 6-2-2011
NHTSA #: CB0903

Knee X Acceleration (G's) VS TIME (S)
Max: 23.58 G's
TMax: 0.02 s
Min: -39.71 G's
TMin: 0.16 s

VELOCITY X (m/s) VS TIME (S)
Max: 4.90 m/s
TMax: 0.12 s
Min: -1.29 m/s
TMin: 0.20 s
VEL@IMP: 4.81 m/s

FORCE X (N) VS TIME (S)
Max: 1,047.99 N
TMax: 0.02 s
Min: -1,764.49 N
TMin: 0.16 s
SECTION 7
WELT CONTACT POINTS