SAFETY COMPLIANCE TESTING FOR FMVSS 201
Occupant Protection In Interior Impact
Upper Interior Head Impact Protection

NISSAN MOTOR CO., LTD.
2012 Nissan NV 1500 V6 S
NHTSA No. CC5200

MGA RESEARCH CORPORATION
446 Executive Drive
Troy, Michigan 48083

Test Dates: July 28-29, 2011
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
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Prepared By: Nathaniel Newth, Project Engineer

Helen A. Kaleto, Project Manager

Approved By: _____________________________

Approval Date: _____________________________

FINAL REPORT ACCEPTANCE BY OVSC:

Accepted By: _____________________________

Acceptance Date: _____________________________
## Abstract

A compliance test series was conducted on the subject 2012 Nissan NV 1500 V6 S, NHTSA No. CC5200, in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-201U-01 for the determination of FMVSS 201 compliance. The testing was conducted at MGA Research Corporation in Troy, Michigan on July 28-29, 2011. Test failures identified were as follows:

None

The data recorded indicates that the 2012 Nissan NV 1500 V6 S tested appears to comply with the upper interior requirements of FMVSS 201.
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<td>4.4</td>
<td>Post-Test Calibration FMH #37</td>
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<td>Pre-Test Calibration FMH #38</td>
</tr>
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<td>Post-Test Calibration FMH #38</td>
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1.0 PURPOSE OF COMPLIANCE TEST

The purpose of this head impact compliance test was to determine whether the subject vehicle, a 2012 Nissan NV 1500 V6 S, meets the performance requirements of FMVSS 201, Occupant Protection in Interior Impact - Upper Interior Head Impact Protection.

Tests were conducted on July 28-29, 2011 on a 2012 Nissan NV 1500 V6 S, manufactured by Nissan Motor Co., Ltd.

All tests were conducted in accordance with the U. S. Department of Transportation, National Highway Traffic Safety Administration's Laboratory Test Procedure TP-201U-01 dated April 3, 1998 and the corresponding MGA Research Corporation's FMVSS 201U procedure number MGATP201U_FRAME#2 dated November 9, 2009.

All tests were conducted at MGA Research Corporation in Troy, Michigan and were performed by MGA engineers and technicians. The FMVSS 201U impactor test machine was used to conduct the testing. Target locations were determined by using a Coordinate Measurement Machine in conjunction with the MGA EZ-Target™ program and MGA procedure MGATP201U_Test Series dated November 9, 2009.
2.0 COMPLIANCE TEST DATA SUMMARY

The 2012 Nissan NV 1500 V6 S was equipped with A, B, O, and rear-pillars, an adjustable seat belt anchorage on each B-pillar, and assist handles located on each A-pillar.

Upon completion of targeting the test vehicle, twelve (12) targets were chosen to be impacted based upon engineering judgment and certification test data provided by the manufacturer. The twelve (12) targets chosen were:

- AP1  BP1  FH2  UR1@SR2B
- AP2  BP2  SR1  UR4@BP
- AP3  FH1  SR2B  UR5@BP

The 2012 Nissan NV 1500 V6 S tested appears to comply with the upper interior performance criteria for FMVSS 201. The HIC(d) measured using the Part 572L (Free Motion Headform) was below 1000 for each tested component.
### TABLE 2-1

#### SUMMARY TABLE OF TEST RESULTS

VEH. MOD YR/MAKE/MODEL/BODY: **2012 Nissan NV 1500 V6 S**  
VEH. NHTSA NO.: **CC5200**  
VIN: **1N6BF0KL5CN103594**  
COLOR: **Blizzard**  
VEH. BUILD DATE: **April, 2011**  
TEST DATES: **July 28-29, 2011**  
TEST LABORATORY: **MGA Research Corporation**  
OBSERVERS: **Helen Kaleto, Nathaniel Newth, Kevin McKenna, Sean Moran, Ryan Jones**

<table>
<thead>
<tr>
<th>TARGET</th>
<th>VEHICLE SIDE</th>
<th>HORIZONTAL ANGLE (deg)</th>
<th>VERTICAL ANGLE (deg)</th>
<th>VELOCITY (kph)</th>
<th>HIC(d)</th>
<th>FMH HIC</th>
<th>IMPACT ON FMH (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP1</td>
<td>Left</td>
<td>250</td>
<td>50</td>
<td>23.5</td>
<td>859</td>
<td>919</td>
<td>Above: 6 Right: 24</td>
</tr>
<tr>
<td>AP2</td>
<td>Right</td>
<td>153</td>
<td>10</td>
<td>23.6</td>
<td>493</td>
<td>433</td>
<td>Right: 36</td>
</tr>
<tr>
<td>AP3</td>
<td>Left</td>
<td>208</td>
<td>0</td>
<td>23.4</td>
<td>570</td>
<td>535</td>
<td>Right: 9</td>
</tr>
<tr>
<td>BP1</td>
<td>Left</td>
<td>270</td>
<td>3</td>
<td>23.8</td>
<td>512</td>
<td>458</td>
<td>Right: 71</td>
</tr>
<tr>
<td>BP2</td>
<td>Left</td>
<td>270</td>
<td>5</td>
<td>23.7</td>
<td>863</td>
<td>923</td>
<td>Left: 14</td>
</tr>
<tr>
<td>FH1</td>
<td>Right</td>
<td>180</td>
<td>43</td>
<td>23.7</td>
<td>718</td>
<td>732</td>
<td>Right: 6</td>
</tr>
<tr>
<td>FH2</td>
<td>Left</td>
<td>180</td>
<td>50</td>
<td>23.5</td>
<td>552</td>
<td>511</td>
<td>Left: 8</td>
</tr>
<tr>
<td>SR1</td>
<td>Right</td>
<td>90</td>
<td>5</td>
<td>23.7</td>
<td>284</td>
<td>156</td>
<td>Right: 58</td>
</tr>
<tr>
<td>SR2B</td>
<td>Right</td>
<td>90</td>
<td>24</td>
<td>23.8</td>
<td>446</td>
<td>371</td>
<td>Left: 50</td>
</tr>
<tr>
<td>UR1@SR2B</td>
<td>Left</td>
<td>270</td>
<td>50</td>
<td>23.5</td>
<td>560</td>
<td>522</td>
<td>Left: 37</td>
</tr>
<tr>
<td>UR4@BP</td>
<td>Right</td>
<td>90</td>
<td>50</td>
<td>23.6</td>
<td>578</td>
<td>546</td>
<td>Right: 40</td>
</tr>
<tr>
<td>UR5@BP</td>
<td>Right</td>
<td>50</td>
<td>50</td>
<td>23.8</td>
<td>241</td>
<td>98</td>
<td>Left: 7</td>
</tr>
</tbody>
</table>

Above and left/right refers to the position relative to reference pt. 0 where the target made contact with the Free Motion Headform. See the diagram below for details.
POST TEST COMMENTS:

The following description lists any post-test damage or other test observations for each target.

AP1 Left: Headliner deformation.
AP2 Right: Dislodged trim.
BP2 Left: Dislodged trim, D-ring compression.
FH1 Right: Sunglasses holder opened, headliner retaining fastener detached.
FH2 Left: Headliner deformation.
SR2B Right: Headliner deformation, dislodged headliner, headliner retaining fastener detached.
UR1@SR2B Left: Headliner deformation, dislodged trim, sunglasses holder opened.
UR4@BP Right: Headliner retaining fastener removed, sunglasses holder opened.
UR5@BP Right: Headliner deformation, dislodged headliner, headliner retaining fastener detached.

REMARKS:

The targets listed were impacted in the following order:

Left: AP3, AP1, FH2, UR1@SR2B, BP2, BP1
Right: SR2B, SR1, UR4@BP, UR5@BP, FH1, AP2

The 150 mm rule was observed for targets horizontal to each other and the 200 mm rule was observed for vertical components.

RECORDED BY: Nathaniel Newth
DATE: July 29, 2011
APPROVED BY: Helen A. Kaleto
### TABLE 2-2

#### GENERAL TEST AND VEHICLE PARAMETER DATA

VEH. MOD YR/MAKE/MODEL/BODY: **2012 Nissan NV 1500 V6 S**  
VEH. NHTSA NO.: **CC5200**  
VIN: **1N6BF0KL5CN103594**  
COLOR: **Blizzard**  
VEH. BUILD DATE: **April, 2011**  
TEST DATES: **July 28-29, 2011**  
TEST LABORATORY: **MGA Research Corporation**  
OBSERVERS: Helen Kaleto, Nathaniel Newth, Kevin McKenna, Sean Moran, Ryan Jones

INTERIOR TRIM INFORMATION: A, B, O, and rear-pillars, an adjustable seat belt anchorage on each B-pillar, and assist handles located on each A-pillar.

SUNROOF INFORMATION:  
- Installed: _____Yes  
  X  No  
  Operation: _____Electric  
  _____Manual

SIDE RAIL CURTAIN AIRBAG INFORMATION:  
- Installed: _____Yes  
  X  No

ROLL-BAR INFORMATION:  
- Installed: _____Yes  
  X  No  
- Padded: _____Yes  
  X  No  
- Braces: _____Yes  
  X  No

GENERAL INFORMATION:  
- Date Received: **June 10, 2011**; Odometer Reading 43 miles

DATA FROM VEHICLE’S CERTIFICATION LABEL:  
- Vehicle Manufactured By: **Nissan Motor Co., Ltd.**  
- Date of Manufacture: **April, 2011; VIN: 1N6BF0KL5CN103594**  
- GVWR: **3878 kg**; GAWR FRONT: **1735 kg**  
  GAWR REAR: **2665 kg**
DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load:
- FRONT: 350 kPa
- REAR: 550 kPa

Recommended Tire Size: **LT245/70R17E**

Recommended Cold Tire Pressure:
- FRONT: 350 kPa
- REAR: 550 kPa

Size of Tire on Test Vehicle: **LT245/70R17E**
- Type of Spare Tire: **LT245/70R17E; Space Saver:__; Standard X**

VEHICLE CAPACITY DATA:
- Type of Front Seats: **Bench__; Bucket X; Split Bench __**
- Number of Occupants: **Front 2; Rear 0; TOTAL 2**

VEHICLE CAPACITY WEIGHT:
- Vehicle Capacity Weight (VCW) = 1175 kg
- No. of Occupants x 68 kg = 136 kg
- Rated Cargo/Luggage Weight (RCLW) = 1039 kg (difference)

WEIGHT OF TEST VEHICLE AS DELIVERED AT LABORATORY: (with maximum fluids)
- Right Front = 703.0 kg
- Right Rear = 620.0 kg
- Left Front = 661.5 kg
- Left Rear = 625.0 kg
- TOTAL FRONT = 1364.5 kg
- TOTAL REAR = 1245.0 kg
- % Total Weight = 52.3 %
- % Total Weight = 47.7 %
- TOTAL DELIVERED WEIGHT = 2609.5 kg

CALCULATION OF VEHICLE’S TARGET TEST WEIGHT:
- Total Delivered Weight = 2609.5 kg
- Max. Test Cargo/Luggage Weight = 136.0 kg
- Target Test Weight = 2745.5 kg
WEIGHT OF TEST VEHICLE FULLY LOADED:

<table>
<thead>
<tr>
<th>Location</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right Front</td>
<td>688.0</td>
</tr>
<tr>
<td>Right Rear</td>
<td>692.0</td>
</tr>
<tr>
<td>Left Front</td>
<td>657.5</td>
</tr>
<tr>
<td>Left Rear</td>
<td>706.0</td>
</tr>
<tr>
<td>Total Front</td>
<td>1345.5</td>
</tr>
<tr>
<td>Total Rear</td>
<td>1398.0</td>
</tr>
</tbody>
</table>

% Total Weight:
- Front: 49.0%
- Rear: 51.0%

Total Test Weight: 2743.5 kg

Weight of ballast secured in vehicle’s cargo area: 134.0 kg

TEST VEHICLE ATTITUDE:

AS DELIVERED:
- Right Front: 909 mm; Left Front: 911 mm;
- Right Rear: 931 mm; Left Rear: 935 mm;
- Pitch Angle at Right Door Sill: 0.4° (Rear is higher)
- Pitch Angle at Left Door Sill: 0.3° (Rear is higher)
- Roll Angle at Front Bumper: 0.2° (Left is higher)
- Roll Angle at Rear Bumper: 0.3° (Right is higher)

FULLY LOADED:
- Right Front: 909 mm; Left Front: 918 mm;
- Right Rear: 918 mm; Left Rear: 925 mm;
- Pitch Angle at Right Door Sill: 0.2° (Front is higher)
- Pitch Angle at Left Door Sill: 0.1° (Front is higher)
- Roll Angle at Front Bumper: 0.4° (Left is higher)
- Roll Angle at Rear Bumper: 0.0°

AS TARGETED:
- Right Front: 1062 mm; Left Front: 1063 mm;
- Right Rear: 1040 mm; Left Rear: 1039 mm;
- Pitch Angle at Right Door Sill: 0.1° (Front is higher)
- Pitch Angle at Left Door Sill: 0.1° (Front is higher)
- Roll Angle at Front Bumper: 0.2° (Left is higher)
- Roll Angle at Rear Bumper: 0.3° (Right is higher)
AS TESTED ON RIGHT SIDE:

Pitch Angle at Right Door Sill = 0.2 Front is higher
Pitch Angle at Left Door Sill = 0.1 Front is higher
Roll Angle at Front Bumper = 0.4 Left is higher
Roll Angle at Rear Bumper = 0.0

AS TESTED ON LEFT SIDE:

Pitch Angle at Right Door Sill = 0.2 Front is higher
Pitch Angle at Left Door Sill = 0.1 Front is higher
Roll Angle at Front Bumper = 0.2 Left is higher
Roll Angle at Rear Bumper = 0.3 Right is higher

VEHICLE WHEELBASE = 3720 mm

REMARKS: The seat travel distance was measured to be 240 mm for the driver front seat and 240 mm for the passenger front seat.
### TABLE 2-3

**HORIZONTAL IMPACT ANGLE RANGE FOR A AND B PILLARS**

VEH. MOD YR/MAKE/MODEL/BODY: 2012 Nissan NV 1500 V6 S  
VEH. NHTSA NO.: CC5200  
VIN: 1N6BF0KL5CN103594  
COLOR: Blizzard  
VEH. BUILD DATE: April, 2011  
TEST DATES: July 28-29, 2011  
TEST LABORATORY: MGA Research Corporation  
OBSERVERS: Helen Kaleto, Nathaniel Newth, Kevin McKenna, Sean Moran, Ryan Jones

<table>
<thead>
<tr>
<th>HORIZONTAL IMPACT ANGLE RANGE</th>
<th>MINIMUM HORIZONTAL ANGLE</th>
<th>MAXIMUM HORIZONTAL ANGLE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A-PILLAR</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L 195º-255º</td>
<td>L 207.2º</td>
<td>L 250.2º</td>
</tr>
<tr>
<td>R 105º-165º</td>
<td>R 109.7º</td>
<td>R 152.8º</td>
</tr>
<tr>
<td><strong>B-PILLAR</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L 195º-345º</td>
<td>L 270.0º</td>
<td>L 277.4º</td>
</tr>
<tr>
<td>R 15º-165º</td>
<td>R 82.4º</td>
<td>R 90.0º</td>
</tr>
</tbody>
</table>

AS DETERMINED USING THE PROCEDURES SPECIFIED IN S8.13.4.1

**REMARKS:**

RECORDED BY: Nathaniel Newth  
DATE: July 18, 2011  
APPROVED BY: Helen A. Kaleto
### TABLE 2-4

**VERTICAL IMPACT ANGLE RANGES**

**VEH. MOD YR/MAKE/MODEL/BODY:** 2012 Nissan NV 1500 V6 S  
**VEH. NHTSA NO.:** CC5200  
**VIN:** 1N6BF0KL5CN103594  
**COLOR:** Blizzard  
**VEH. BUILD DATE:** April, 2011  
**TEST DATES:** July 28-29, 2011  
**TEST LABORATORY:** MGA Research Corporation  
**OBSERVERS:** Helen Kaleto, Nathaniel Newth, Kevin McKenna, Sean Moran, Ryan Jones

<table>
<thead>
<tr>
<th>VERTICAL IMPACT ANGLE RANGES</th>
<th>VERTICAL ANGLE SPECIFIED RANGE</th>
<th>MINIMUM VERTICAL ANGLE</th>
<th>MAXIMUM VERTICAL ANGLE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FRONT HEADER</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FH1 L</td>
<td>0°-50° L</td>
<td>0°</td>
<td>43°</td>
</tr>
<tr>
<td>FH1 R</td>
<td>0°-50° R</td>
<td>0°</td>
<td>43°</td>
</tr>
<tr>
<td>FH2 L</td>
<td>0°-50° L</td>
<td>0°</td>
<td>50°</td>
</tr>
<tr>
<td>FH2 R</td>
<td>0°-50° R</td>
<td>0°</td>
<td>50°</td>
</tr>
<tr>
<td>SIDE RAIL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SR1 L</td>
<td>0°-50° L</td>
<td>0°</td>
<td>5°</td>
</tr>
<tr>
<td>SR1 R</td>
<td>0°-50° R</td>
<td>0°</td>
<td>5°</td>
</tr>
<tr>
<td>SR2A L</td>
<td>0°-50° L</td>
<td>0°</td>
<td>24°</td>
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<tr>
<td>SR2A R</td>
<td>0°-50° R</td>
<td>0°</td>
<td>24°</td>
</tr>
<tr>
<td>SR2B L</td>
<td>0°-50° L</td>
<td>0°</td>
<td>24°</td>
</tr>
<tr>
<td>SR2B R</td>
<td>0°-50° R</td>
<td>0°</td>
<td>24°</td>
</tr>
<tr>
<td><strong>A-PILLAR</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AP1 L</td>
<td>-5°-50° L</td>
<td>-5°</td>
<td>50°</td>
</tr>
<tr>
<td>AP1 R</td>
<td>-5°-50° R</td>
<td>-5°</td>
<td>50°</td>
</tr>
<tr>
<td>AP2 L</td>
<td>-5°-50° L</td>
<td>-5°</td>
<td>10°</td>
</tr>
<tr>
<td>AP2 R</td>
<td>-5°-50° R</td>
<td>-5°</td>
<td>10°</td>
</tr>
<tr>
<td>AP3 L</td>
<td>-5°-50° L</td>
<td>-5°</td>
<td>0°</td>
</tr>
<tr>
<td>AP3 R</td>
<td>-5°-50° R</td>
<td>-5°</td>
<td>0°</td>
</tr>
<tr>
<td>B-PILLAR</td>
<td>VERTICAL ANGLE SPECIFIED RANGE</td>
<td>MINIMUM VERTICAL ANGLE</td>
<td>MAXIMUM VERTICAL ANGLE</td>
</tr>
<tr>
<td>----------</td>
<td>--------------------------------</td>
<td>------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>BP1</td>
<td>L -10º-50º</td>
<td>L -10º</td>
<td>L 3º</td>
</tr>
<tr>
<td></td>
<td>R -10º-50º</td>
<td>R -10º</td>
<td>R 40º</td>
</tr>
<tr>
<td>BP2*</td>
<td>L 0º-50º</td>
<td>L 0º</td>
<td>L 5º</td>
</tr>
<tr>
<td></td>
<td>R 0º-50º</td>
<td>R 0º</td>
<td>R 5º</td>
</tr>
<tr>
<td>BP3</td>
<td>L -10º-50º</td>
<td>L -10º</td>
<td>L 5º</td>
</tr>
<tr>
<td></td>
<td>R -10º-50º</td>
<td>R -10º</td>
<td>R 5º</td>
</tr>
<tr>
<td>BP4</td>
<td>L -10º-50º</td>
<td>L N/A</td>
<td>L N/A</td>
</tr>
<tr>
<td></td>
<td>R -10º-50º</td>
<td>R N/A</td>
<td>R N/A</td>
</tr>
<tr>
<td>UPPER ROOF 1</td>
<td>0º-50º</td>
<td>0º</td>
<td>50º</td>
</tr>
<tr>
<td>UPPER ROOF 2</td>
<td>0º-50º</td>
<td>0º</td>
<td>50º</td>
</tr>
<tr>
<td>UPPER ROOF 3</td>
<td>0º-50º</td>
<td>0º</td>
<td>50º</td>
</tr>
<tr>
<td>UPPER ROOF 4</td>
<td>0º-50º</td>
<td>0º</td>
<td>50º</td>
</tr>
<tr>
<td>UPPER ROOF 5</td>
<td>0º-50º</td>
<td>0º</td>
<td>50º</td>
</tr>
</tbody>
</table>

As determined using the Procedures specified in S8.13.4.2. *Target BP2 is a seat belt anchorage location.

RECORDED BY: Nathaniel Newth

DATE: July 18, 2011

APPROVED BY: Helen A. Kaleto
TABLE 2-5

TARGET MEASUREMENTS

VEH. MOD YR/MAKE/MODEL/BODY: 2012 Nissan NV 1500 V6 S  
VEH. NHTSA NO.: CC5200  
VIN: 1N6BF0KL5CN103594  
COLOR: Blizzard  
VEH. BUILD DATE: April, 2011  
TEST DATES: July 28-29, 2011  
TEST LABORATORY: MGA Research Corporation  
OBSERVERS: Helen Kaleto, Nathaniel Newth, Kevin McKenna, Sean Moran, Ryan Jones

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Description</th>
<th>Left Side</th>
<th>Right Side</th>
</tr>
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<tbody>
<tr>
<td>M</td>
<td>Seat Fore/Aft Travel (Front seats)</td>
<td>240 mm</td>
<td>240 mm</td>
</tr>
<tr>
<td>Tº</td>
<td>Horizontal &lt; {CG-F1 (Left Seat) to (Right A-Pillar)}</td>
<td>109.8º</td>
<td>--</td>
</tr>
<tr>
<td>A1º</td>
<td>360º - Tº</td>
<td>250.2º</td>
<td>--</td>
</tr>
<tr>
<td>Wº</td>
<td>Horizontal &lt; {CG-2 (Left Seat) to (Left A-Pillar)}</td>
<td>207.2º</td>
<td>--</td>
</tr>
<tr>
<td>A2º</td>
<td>A2º = Wº</td>
<td>207.2º</td>
<td>--</td>
</tr>
<tr>
<td>Uº</td>
<td>Horizontal &lt; {CG-2 (Left Seat) to (Left B-Pillar)}</td>
<td>277.4º</td>
<td>--</td>
</tr>
<tr>
<td>B1º</td>
<td>B1º = Uº</td>
<td>277.4º</td>
<td>--</td>
</tr>
<tr>
<td>Vº</td>
<td>Horizontal &lt; {CG-R (Left Seat) to (Left B-Pillar)}</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>B2º</td>
<td>B2º = Vº</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Wº (right)</td>
<td>Horizontal &lt; {CG-F2 (Right Seat) to (Right A-Pillar)}</td>
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<tr>
<td>A1º (right)</td>
<td>A1º (right) = Wº (right)</td>
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<td>152.8º</td>
</tr>
<tr>
<td>Tº (right)</td>
<td>Horizontal &lt; {CG-F1 (Right Seat) to (Left A-Pillar)}</td>
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<td>A2º (right)</td>
<td>360º-Tº (right)</td>
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<td>109.7º</td>
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<td>Horizontal &lt; {CG-R (Right Seat) to (Right B-Pillar)}</td>
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<td>B1º (right) = Vº (right)</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Uº (right)</td>
<td>Horizontal &lt; {CG-F2 (Right Seat) to (Right B-Pillar)}</td>
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<td>82.4º</td>
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<tr>
<td>B2º (right)</td>
<td>B2º (right) = Uº (right)</td>
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<td>82.4º</td>
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<tr>
<td>J</td>
<td>A-Pillar ((Plane 3) – (Plane 5))</td>
<td>407.5 mm</td>
<td>410.1 mm</td>
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<tr>
<td>J/2</td>
<td>J ÷ 2</td>
<td>203.8 mm</td>
<td>205.1 mm</td>
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<tr>
<td>D1</td>
<td>Upper Roof ((Plane A) – (Plane B))</td>
<td>3887.0 mm</td>
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</tr>
<tr>
<td>D1/2</td>
<td>D1 ÷ 2</td>
<td>1943.5 mm</td>
<td></td>
</tr>
<tr>
<td>Measurement</td>
<td>Description</td>
<td>Left Side</td>
<td>Right Side</td>
</tr>
<tr>
<td>-------------</td>
<td>----------------------------------------------------------</td>
<td>-------------</td>
<td>-------------</td>
</tr>
<tr>
<td>D2</td>
<td>Upper Roof ((\text{Plane C}) – (\text{Plane D}))</td>
<td>1714.0 mm</td>
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</tr>
<tr>
<td>D2/2</td>
<td>( \frac{D2}{2} )</td>
<td>857.0 mm</td>
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</tr>
<tr>
<td>.35D1</td>
<td>( 0.35 \times D1 )</td>
<td>1360.5 mm</td>
<td></td>
</tr>
<tr>
<td>.35D2</td>
<td>( 0.35 \times D2 )</td>
<td>599.9 mm</td>
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</tr>
<tr>
<td>N</td>
<td>B-Pillar ((\text{BPR}) – (\text{lowest point on daylight opening forward of B-Pillar}))</td>
<td>649.1 mm</td>
<td>614.2 mm</td>
</tr>
<tr>
<td>N/2</td>
<td>B-Pillar ((\text{BP3}) – (\text{lowest point on daylight opening forward of B-Pillar}))</td>
<td>324.6 mm</td>
<td>307.1 mm</td>
</tr>
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<td>N/4</td>
<td>B-Pillar ((\text{BP4}) – (\text{lowest point on daylight opening forward of B-Pillar}))</td>
<td>162.3 mm</td>
<td>153.6 mm</td>
</tr>
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</table>

As determined using the Procedures specified in S10.1-10.13.

### SgRP Locations (world coordinates)

<table>
<thead>
<tr>
<th></th>
<th>Left (mm)</th>
<th>Right (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>y</td>
</tr>
<tr>
<td>Front</td>
<td>1517.0</td>
<td>-455.0</td>
</tr>
</tbody>
</table>

### SgRP Locations (vehicle coordinates)

<table>
<thead>
<tr>
<th></th>
<th>Left (mm)</th>
<th>Right (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>y</td>
</tr>
<tr>
<td>Front</td>
<td>1517.0</td>
<td>-455.0</td>
</tr>
<tr>
<td>CG Locations (world coordinates)</td>
<td>Left (mm)</td>
<td>Right (mm)</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-----------</td>
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</tr>
<tr>
<td></td>
<td>x</td>
<td>y</td>
</tr>
<tr>
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<tr>
<td>CGF2</td>
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<td>-455.0</td>
</tr>
</tbody>
</table>

REFERENCE FOR VEHICLE COORDINATE SYSTEM (measured in millimeters):

- Front driver front outboard seat bolt hole (x, y, z) = 1149.3, -686.5, 144.0
- Front driver door upper striker bolt (x, y, z) = 1715.9, -896.3, 562.5
- Front passenger door upper striker bolt (x, y, z) = 1715.9, 896.3, 562.5

REMARKS:

RECORDED BY: Nathaniel Newth
DATE: July 18, 2011
APPROVED BY: Helen A. Kaleto
### TABLE 2-6

**SUMMARY OF TARGETING RESULTS**

**VEH. MOD YR/MAKE/MODEL/BODY:** *2012 Nissan NV 1500 V6 S*

**VEH. NHTSA NO.:** CC5200  **VIN:** 1N6BF0KL5CN103594  **COLOR:** Blizzard

**VEH. BUILD DATE:** April, 2011  **TEST DATES:** July 28-29, 2011

**TEST LABORATORY:** MGA Research Corporation

**OBSERVERS:** Helen Kaleto, Nathaniel Newth, Kevin McKenna, Sean Moran, Ryan Jones

<table>
<thead>
<tr>
<th>Target</th>
<th>Location (mm)</th>
<th>Horizontal Angle (deg)</th>
<th>Vertical Angle (deg)</th>
<th>Relocation (Yes/No)</th>
<th>Extension (# of 25 mm Spheres)</th>
<th>Impact (Yes/No)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x     y      z</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>A-Pillar Left Side</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AP1</td>
<td>1137.3 -798.1 1340.0</td>
<td>--</td>
<td>--</td>
<td>Yes</td>
<td>--</td>
<td>--</td>
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<tr>
<td>REL</td>
<td>1164.0 -756.7 1350.7</td>
<td>250</td>
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<td>2</td>
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<tr>
<td>AP2</td>
<td>1041.7 -780.1 1252.9</td>
<td>208</td>
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<td>--</td>
<td>No</td>
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<tr>
<td>AP3</td>
<td>988.6 -802.7 1135.4</td>
<td>208</td>
<td>0</td>
<td>No</td>
<td>--</td>
<td>Yes</td>
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<tr>
<td><strong>A-Pillar Right Side</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AP1</td>
<td>1138.2 801.2 1342.4</td>
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<td>--</td>
<td>Yes</td>
<td>--</td>
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<tr>
<td>REL</td>
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<td>AP2</td>
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<td>153</td>
<td>10</td>
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<tr>
<td>AP3</td>
<td>987.4 805.2 1138.2</td>
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<td>No</td>
<td>--</td>
<td>No</td>
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<tr>
<td><strong>B-Pillar Left Side</strong></td>
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<tr>
<td>BP1</td>
<td>1800.5 -674.4 1437.2</td>
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<tr>
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<td>5</td>
<td>--</td>
<td>2</td>
<td>No</td>
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<tr>
<td><strong>B-Pillar Right Side</strong></td>
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<tr>
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<td>40</td>
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<tr>
<td>BP2</td>
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<tr>
<td>BP3</td>
<td>1709.5 767.1 1092.7</td>
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<td>--</td>
<td>Yes</td>
<td>--</td>
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</table>
### SUMMARY OF TARGETING RESULTS

<table>
<thead>
<tr>
<th>Target</th>
<th>Location (mm)</th>
<th>Horizontal Angle (deg)</th>
<th>Vertical Angle (deg)</th>
<th>Relocation (Yes/No)</th>
<th>Extension (# of 25 mm Spheres)</th>
<th>Impact (Yes/No)</th>
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<td>2</td>
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</tr>
<tr>
<td>Front Header Left Side</td>
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<td>Side Rail Left Side</td>
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<tr>
<td>Upper Roof Left Side</td>
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</tbody>
</table>

As determined using the Procedures specified in S10.1-10.13.

RECORDED BY: Nathaniel Newth  DATE: July 18, 2011
APPROVED BY: Helen A. Kaleto
3.0 TEST DATA (Including Acceleration and Velocity Plots)
SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.14  VEHICLE YR/MAKE/MODEL: 2012/DOT/NHTSA/Nissan NV 1500

GENERAL TEST PARAMETERS:
- Test Number: #2
- Target (Vehicle Side): AP1Left
- Temperature: 22.6°C
- MGA Test Reference No.: U11344
- Humidity: 63.6%
- Approach Horizontal Angles: 250°
- Time of Test: 11:55:54 AM
- Approach Vertical Angles: 50°
- FMH Serial No: [037]
- Additional Description: 2 relocations

TEST RESULTS:

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<tr>
<th>HIC(d)</th>
<th>HIC</th>
<th>Δt (msec)</th>
<th>Velocity (kph)</th>
<th>Impact location on FMH (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Above Pt. O</td>
</tr>
<tr>
<td>859</td>
<td>919</td>
<td>3.7</td>
<td>23.5</td>
<td>6</td>
</tr>
</tbody>
</table>

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

<table>
<thead>
<tr>
<th>Axis</th>
<th>Channel</th>
<th>Serial No.</th>
<th>DLR Value</th>
<th>ΔV Pre-Test</th>
<th>ΔV Post-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
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<td>J32177</td>
<td>-113.7</td>
<td>1.07</td>
<td>1.07</td>
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<td>Y</td>
<td>6</td>
<td>J14103</td>
<td>93.9</td>
<td>0.85</td>
<td>0.85</td>
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<tr>
<td>Z</td>
<td>7</td>
<td>J35800</td>
<td>97.8</td>
<td>0.94</td>
<td>0.94</td>
</tr>
</tbody>
</table>

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):
Headliner deformation

Recorded By: [Signature]  Approved By*: [Signature]  Date: 7/28/2011
*Only necessary for NHTSA (Government) Compliance testing.
The graph shows the head G-force (peak = 32.3 G) over time (msec) with a peak value of 32.3 G.

The impact velocity is 23.49 kph, as indicated by the graph showing the velocity (kph) over time (msec) with a peak value of 23.7 kph.
SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.14  VEHICLE YR/MAKE/MODEL: 2012/DOT/NHTSA/Nissan NV 1500

GENERAL TEST PARAMETERS:

- Test Number: #12
- Target (Vehicle Side): AP2Right
- Temperature: 24.2°C
- MGA Test Reference No.: U11354
- Humidity: 60.1%
- Approach Horizontal Angles: 153°
- Time of Test: 6:03:33 PM
- Approach Vertical Angles: 10°
- FMH Serial No: [038]

Additional Description:

TEST RESULTS:

<table>
<thead>
<tr>
<th>HIC(d)</th>
<th>HIC</th>
<th>Δt (msec)</th>
<th>Velocity (kph)</th>
<th>Impact location on FMH (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>493</td>
<td>433</td>
<td>7.4</td>
<td>23.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Above Pt. O: 36  Left/Right Pt. O: 2 Right</td>
</tr>
</tbody>
</table>

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

<table>
<thead>
<tr>
<th>Axis</th>
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<th>Serial No.</th>
<th>DLR Value</th>
<th>ΔV Pre-Test</th>
<th>ΔV Post-Test</th>
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<tbody>
<tr>
<td>X</td>
<td>5</td>
<td>J22700</td>
<td>-96.4</td>
<td>1.07</td>
<td>1.07</td>
</tr>
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<td>108.7</td>
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<td>0.85</td>
</tr>
<tr>
<td>Z</td>
<td>7</td>
<td>J36353</td>
<td>99.1</td>
<td>0.94</td>
<td>0.94</td>
</tr>
</tbody>
</table>

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

Dislodged trim

Recorded By: Approved By*: Date: 7/29/2011

*Only necessary for NHTSA (Government) Compliance testing.
SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.14 VEHICLE YR/MAKE/MODEL: 2012/DOT/NHTSA/Nissan NV 1500

GENERAL TEST PARAMETERS:
- Test Number: #1
- Target (Vehicle Side): AP3Left
- MGA Test Reference No.: U11343
- Approach Horizontal Angles: 208º
- Approach Vertical Angles: 0º
- Temperature: 22.2°C
- Humidity: 65.0%
- Time of Test: 10:23:35 AM
- FMH Serial No: 035

Additional Description:

TEST RESULTS:

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<thead>
<tr>
<th>HIC(d)</th>
<th>HIC</th>
<th>Δt (msec)</th>
<th>Velocity (kph)</th>
<th>Impact location on FMH (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>570</td>
<td>535</td>
<td>7.4</td>
<td>23.4</td>
<td>Above Pt. O: 9, Left/Right Pt. O: 2 Right</td>
</tr>
</tbody>
</table>

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

<table>
<thead>
<tr>
<th>Axis</th>
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<th>Serial No.</th>
<th>DLR Value</th>
<th>ΔV Pre-Test</th>
<th>ΔV Post-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
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<td>-95.8</td>
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</tr>
<tr>
<td>Y</td>
<td>6</td>
<td>J22664</td>
<td>94.2</td>
<td>0.85</td>
<td>0.85</td>
</tr>
<tr>
<td>Z</td>
<td>7</td>
<td>J35924</td>
<td>92.8</td>
<td>0.94</td>
<td>0.94</td>
</tr>
</tbody>
</table>

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):
No visible damage

Recorded By: [Signature] Approved By*: [Signature] Date: 7/28/2011

*Only necessary for NHTSA (Government) Compliance testing.
SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G1117-001.14  VEHICLE YR/MAKE/MODEL: 2012/DOT/NHTSA/Nissan NV 1500

GENERAL TEST PARAMETERS:
- Test Number: #6
- Target (Vehicle Side): BP1Left
- Temperature: 23.5°C
- MGA Test Reference No.: U11348
- Humidity: 67.1%
- Approach Horizontal Angles: 270º
- Time of Test: 5:01:15 PM
- Approach Vertical Angles: 3º
- FMH Serial No: [038]
- Additional Description:

TEST RESULTS:

<table>
<thead>
<tr>
<th>HIC(d)</th>
<th>HIC</th>
<th>Δt (msec)</th>
<th>Velocity (kph)</th>
<th>Impact location on FMH (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Above Pt. O</td>
</tr>
<tr>
<td>512</td>
<td>458</td>
<td>12.6</td>
<td>23.8</td>
<td>71</td>
</tr>
</tbody>
</table>

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

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<th>Serial No.</th>
<th>DLR Value</th>
<th>ΔV Pre-Test</th>
<th>ΔV Post-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
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<td>J22700</td>
<td>-96.4</td>
<td>1.07</td>
<td>1.07</td>
</tr>
<tr>
<td>Y</td>
<td>6</td>
<td>J36197</td>
<td>108.7</td>
<td>0.85</td>
<td>0.85</td>
</tr>
<tr>
<td>Z</td>
<td>7</td>
<td>J36353</td>
<td>99.1</td>
<td>0.94</td>
<td>0.94</td>
</tr>
</tbody>
</table>

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):
No visible damage

Recorded By: [Signature]  Approved By*: [Signature]  Date: 7/28/2011
*Only necessary for NHTSA (Government) Compliance testing.
SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.14  VEHICLE YR/MAKE/MODEL: 2012/DOT/NHTSA/Nissan NV 1500

GENERAL TEST PARAMETERS:
Test Number: #5
Target (Vehicle Side): BP2Left  Temperature: 23.2°C
MGA Test Reference No.: U11347  Humidity: 66.5%
Approach Horizontal Angles: 270º  Time of Test: 4:02:17 PM
Approach Vertical Angles: 5º  FMH Serial No: [037]

Additional Description:

TEST RESULTS:

<table>
<thead>
<tr>
<th>HIC(d)</th>
<th>HIC</th>
<th>Δt (msec)</th>
<th>Velocity (kph)</th>
<th>Impact location on FMH (mm)</th>
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<tr>
<td>863</td>
<td>923</td>
<td>5.3</td>
<td>23.7</td>
<td>Above Pt. O: 14  Left/Right Pt. O: 4 Left</td>
</tr>
</tbody>
</table>

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

<table>
<thead>
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<th>Axis</th>
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<th>ΔV Post-Test</th>
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<tbody>
<tr>
<td>X</td>
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<tr>
<td>Y</td>
<td>6</td>
<td>J14103</td>
<td>93.9</td>
<td>0.85</td>
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</tr>
<tr>
<td>Z</td>
<td>7</td>
<td>J35800</td>
<td>97.8</td>
<td>0.94</td>
<td>0.94</td>
</tr>
</tbody>
</table>

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):
Dislodged trim, D ring compression

Recorded By: [Signature]  Approved By*: [Signature]  Date: 7/28/2011

*Only necessary for NHTSA (Government) Compliance testing.
(peak = 23.0 G)

(peak = 238 kph)  Impact Velocity: 23.68 kph
SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.14 VEHICLE YR/MAKE/MODEL: 2012/DOT/NHTSA/Nissan NV 1500

GENERAL TEST PARAMETERS:

- Test Number: #11
- Target (Vehicle Side): FH1Right
- MGA Test Reference No.: U11353
- Approach Horizontal Angles: 180°
- Approach Vertical Angles: 43°
- Additional Description: relocation 5

TEST RESULTS:

<table>
<thead>
<tr>
<th>HIC(d)</th>
<th>HIC</th>
<th>Δt (msec)</th>
<th>Velocity (kph)</th>
<th>Impact location on FMH (mm)</th>
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</thead>
<tbody>
<tr>
<td>718</td>
<td>732</td>
<td>6.3</td>
<td>23.7</td>
<td>Above Pt. O: 6 Left/Right Pt. O: 12 Right</td>
</tr>
</tbody>
</table>

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

<table>
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<tr>
<th>Axis</th>
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<th>ΔV Post-Test</th>
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<tbody>
<tr>
<td>X</td>
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<tr>
<td>Y</td>
<td>6</td>
<td>J14103</td>
<td>93.9</td>
<td>0.85</td>
<td>0.85</td>
</tr>
<tr>
<td>Z</td>
<td>7</td>
<td>J35800</td>
<td>97.8</td>
<td>0.94</td>
<td>0.94</td>
</tr>
</tbody>
</table>

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

Sunglasses holder opened, headliner retaining fastener removed

Recorded By: [Signature]
Approved By*: [Signature] Date: 7/29/2011

*Only necessary for NHTSA (Government) Compliance testing.
Figure 1 Test #U11353

Displacement (mm)

Resultant Acceleration (G)

(peak = 143.5 G)
SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.14   VEHICLE YR/MAKE/MODEL: 2012/DOT/NHTSA/Nissan NV 1500

GENERAL TEST PARAMETERS:

- Test Number: #3
- Target (Vehicle Side): FH2Left
- Temperature: 22.7°C
- MGA Test Reference No.: U11345
- Humidity: 66.1%
- Approach Horizontal Angles: 180°
- Approach Vertical Angles: 50°
- Time of Test: 1:54:13 PM
- FMH Serial No: [038]

TEST RESULTS:

<table>
<thead>
<tr>
<th>HIC(d)</th>
<th>HIC</th>
<th>Δt (msec)</th>
<th>Velocity (kph)</th>
<th>Impact location on FMH (mm)</th>
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</thead>
<tbody>
<tr>
<td>552</td>
<td>511</td>
<td>4.5</td>
<td>23.5</td>
<td>Above Pt. O: 8 Left: 6 Left</td>
</tr>
</tbody>
</table>

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

<table>
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<tr>
<th>Axis</th>
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<th>DLR Value</th>
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<tr>
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<tr>
<td>Y</td>
<td>6</td>
<td>J36197</td>
<td>108.7</td>
<td>0.85</td>
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<tr>
<td>Z</td>
<td>7</td>
<td>J36353</td>
<td>99.1</td>
<td>0.94</td>
<td>0.94</td>
</tr>
</tbody>
</table>

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

- Headliner deformation

Recorded By: [Signature]
Approved By*: [Signature]  Date: 7/28/2011

*Only necessary for NHTSA (Government) Compliance testing.
MGA Test #: U11345  
Target Location: FH2, Left Side  
Test Date: 7/28/2011

Displacement (mm) vs. Resultant Acceleration (G):  
- (peak = 137.7 G)

TIME (msec) vs. Resultant Acceleration (G):  
- (peak = 137.7 G)
SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.14 VEHICLE YR/MAKE/MODEL: 2012/DOT/NHTSA/Nissan NV 1500

GENERAL TEST PARAMETERS:
- Test Number: #8
- Target (Vehicle Side): SR1Right
- Temperature: 22.6°C
- MGA Test Reference No.: U11350
- Humidity: 61.2%
- Approach Horizontal Angles: 90°
- Time of Test: 10:58:19 AM
- Approach Vertical Angles: 5°
- FMH Serial No: [037]
- Additional Description: 1 relocation

TEST RESULTS:

<table>
<thead>
<tr>
<th>HIC(d)</th>
<th>HIC</th>
<th>Δt (msec)</th>
<th>Velocity (kph)</th>
<th>Impact location on FMH (mm)</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
<td>Above Pt. O</td>
</tr>
<tr>
<td>284</td>
<td>156</td>
<td>8.4</td>
<td>23.7</td>
<td>58</td>
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INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

<table>
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<th>DLR Value</th>
<th>ΔV Pre-Test</th>
<th>ΔV Post-Test</th>
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<tbody>
<tr>
<td>X</td>
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<td>1.07</td>
<td>1.07</td>
</tr>
<tr>
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<td>0.85</td>
<td>0.85</td>
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<tr>
<td>Z</td>
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<td>J35800</td>
<td>97.8</td>
<td>0.94</td>
<td>0.94</td>
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</tbody>
</table>

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):
- No visible damage

Recorded By: [Signature] Approved By*: [Signature] Date: 7/29/2011

*Only necessary for NHTSA (Government) Compliance testing.
MGA Test #: U11350  Target Location: SR1, Right Side  Test Date: 7/29/2011

(peak = 71.7 G)

Displacement (mm)

TIME (msec)
SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.14 VEHICLE YR/MAKE/MODEL: 2012/DOT/NHTSA/Nissan NV 1500

GENERAL TEST PARAMETERS:
- Test Number: #7
- Target (Vehicle Side): SR2B Right
- Temperature: 22.6°C
- MGA Test Reference No.: U11349
- Humidity: 60.7%
- Approach Horizontal Angles: 90°
- Time of Test: 9:52:27 AM
- Approach Vertical Angles: 24°
- FMH Serial No: [035]
- Additional Description:

TEST RESULTS:

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<tr>
<th>HIC(d)</th>
<th>HIC</th>
<th>Δt (msec)</th>
<th>Velocity (kph)</th>
<th>Impact location on FMH (mm)</th>
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</thead>
<tbody>
<tr>
<td>446</td>
<td>371</td>
<td>7.9</td>
<td>23.8</td>
<td>Above Pt. O: 50, Left/Right Pt. O: 2 Left</td>
</tr>
</tbody>
</table>

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

<table>
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<th>Serial No.</th>
<th>DLR Value</th>
<th>ΔV Pre-Test</th>
<th>ΔV Post-Test</th>
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</thead>
<tbody>
<tr>
<td>X</td>
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<td>J35919</td>
<td>-95.8</td>
<td>1.07</td>
<td>1.07</td>
</tr>
<tr>
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<td>6</td>
<td>J22664</td>
<td>94.2</td>
<td>0.85</td>
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<td>J35924</td>
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<td>0.94</td>
<td>0.94</td>
</tr>
</tbody>
</table>

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):
Headliner deformation, dislodged headliner, headliner retaining fastener removed

Recorded By: [Signature] Approved By*: [Signature] Date: 7/29/2011
*Only necessary for NHTSA (Government) Compliance testing.
The graph shows the acceleration of a head in two dimensions: Head X (G) and Head Y (G) over time in milliseconds (msec).

- **Head X (G)**:
  - The peak acceleration is 99.6 G.
- **Head Y (G)**:
  - The peak acceleration is 7.7 G.

The x-axis represents time in milliseconds, ranging from 0 to 24 msec, while the y-axis represents acceleration in G, ranging from -100 to 10 G for Head X and from -2 to 8 G for Head Y.
SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.14 VEHICLE YR/MAKE/MODEL: 2012/DOT/NHTSA/Nissan NV 1500

GENERAL TEST PARAMETERS:
- Test Number: #4
- Target (Vehicle Side): UR1Left
- Temperature: 22.9°C
- MGA Test Reference No.: U11346
- Humidity: 64.6%
- Approach Horizontal Angles: 270°
- Time of Test: 3:06:23 PM
- Approach Vertical Angles: 50°
- FMH Serial No: [035]
- Additional Description: @ SR2B

TEST RESULTS:

<table>
<thead>
<tr>
<th>HIC(d)</th>
<th>HIC</th>
<th>Δt (msec)</th>
<th>Velocity (kph)</th>
<th>Impact location on FMH (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>560</td>
<td>522</td>
<td>7.8</td>
<td>23.5</td>
<td>Above Pt. O: 37, Left/Right Pt. O: 7 Left</td>
</tr>
</tbody>
</table>

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

<table>
<thead>
<tr>
<th>Axis</th>
<th>Channel</th>
<th>Serial No.</th>
<th>DLR Value</th>
<th>ΔV Pre-Test</th>
<th>ΔV Post-Test</th>
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</thead>
<tbody>
<tr>
<td>X</td>
<td>5</td>
<td>J35919</td>
<td>-95.8</td>
<td>1.07</td>
<td>1.07</td>
</tr>
<tr>
<td>Y</td>
<td>6</td>
<td>J22664</td>
<td>94.2</td>
<td>0.85</td>
<td>0.85</td>
</tr>
<tr>
<td>Z</td>
<td>7</td>
<td>J35924</td>
<td>92.8</td>
<td>0.94</td>
<td>0.94</td>
</tr>
</tbody>
</table>

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):
Headliner deformation, dislodged trim, sunglasses holder opened

Recorded By: [Signature] Approved By*: [Signature] Date: 7/28/2011

*Only necessary for NHTSA (Government) Compliance testing.
Impact Testing
7/29/2011
2012 DOT/NHTSA NISSAN NV 1500
FMVSS 201U - UPPER INTERIOR
TEST #9 RIGHT UR4
H/V IMPACT ANGLE= 90 / 50
U11351  PRE TEST
Safety Compliance Testing for FMVSS 201UI
“Occupant Protection In Interior Impact”

CC5200 / DTNH22-09-D-00131 / G1117-001.14
SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.14 VEHICLE YR/MAKE/MODEL: 2012/DOT/NHTSA/Nissan NV 1500

GENERAL TEST PARAMETERS:
- Test Number: #9
- Target (Vehicle Side): UR4Right
- Temperature: 22.9°C
- MGA Test Reference No.: U11351
- Humidity: 63.8%
- Approach Horizontal Angles: 90°
- Time of Test: 11:54:25 AM
- Approach Vertical Angles: 50°
- FMH Serial No: [038]
- Additional Description: @ BP

TEST RESULTS:

<table>
<thead>
<tr>
<th>HIC(d)</th>
<th>HIC</th>
<th>Δt (msec)</th>
<th>Velocity (kph)</th>
<th>Impact location on FMH (mm)</th>
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</thead>
<tbody>
<tr>
<td>578</td>
<td>546</td>
<td>7.4</td>
<td>23.6</td>
<td>Above Pt. O: 40 Left/Right Pt. O: 4 Right</td>
</tr>
</tbody>
</table>

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

<table>
<thead>
<tr>
<th>Axis</th>
<th>Channel</th>
<th>Serial No.</th>
<th>DLR Value</th>
<th>ΔV Pre-Test</th>
<th>ΔV Post-Test</th>
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<tr>
<td>X</td>
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<td>-96.4</td>
<td>1.07</td>
<td>1.07</td>
</tr>
<tr>
<td>Y</td>
<td>6</td>
<td>J36197</td>
<td>108.7</td>
<td>0.85</td>
<td>0.85</td>
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<td>Z</td>
<td>7</td>
<td>J36353</td>
<td>99.1</td>
<td>0.94</td>
<td>0.94</td>
</tr>
</tbody>
</table>

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

Headliner retaining fastener removed, sunglasses holder opened

Recorded By: [Signature] Approved By*: [Signature] Date: 7/29/2011

*Only necessary for NHTSA (Government) Compliance testing.
SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G11I7-001.14    VEHICLE YR/MAKE/MODEL: 2012/DOT/NHTSA/Nissan NV 1500

GENERAL TEST PARAMETERS:
Test Number: #10
Target (Vehicle Side): UR5Right
MGA Test Reference No.: U11352
Approach Horizontal Angles: 50°
Approach Vertical Angles: 50°
Additional Description: @ BP

TEST RESULTS:

<table>
<thead>
<tr>
<th>HIC(d)</th>
<th>HIC</th>
<th>Δt (msec)</th>
<th>Velocity (kph)</th>
<th>Impact location on FMH (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>241</td>
<td>98</td>
<td>35.5</td>
<td>23.8</td>
<td>Above Pt. O: 7 Left: 5 Left</td>
</tr>
</tbody>
</table>

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

<table>
<thead>
<tr>
<th>Axis</th>
<th>Channel</th>
<th>Serial No.</th>
<th>DLR Value</th>
<th>ΔV Pre-Test</th>
<th>ΔV Post-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>5</td>
<td>J35919</td>
<td>-95.8</td>
<td>1.07</td>
<td>1.07</td>
</tr>
<tr>
<td>Y</td>
<td>6</td>
<td>J22664</td>
<td>94.2</td>
<td>0.85</td>
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<tr>
<td>Z</td>
<td>7</td>
<td>J35924</td>
<td>92.8</td>
<td>0.94</td>
<td>0.94</td>
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</tbody>
</table>

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):
Headliner deformation, dislodged headliner, headliner retaining fastener removed

Recorded By: [Signature]
Approved By*: [Signature]
Date: 7/29/2011

*Only necessary for NHTSA (Government) Compliance testing.
MGA Test #: U11352  Target Location: UR5, Right Side  Test Date: 7/29/2011

Displacement (mm)

Resultant Acceleration (G)

(peak = 40.5 G)

TIME (msec)
4.0 TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

The following section lists the test equipment for the compliance test series. Items marked with an asterisk are calibrated by an external lab. An additional summary table is given for the pre and post-test calibration data for the Free Motion Headforms. The temperature trace to confirm testing was conducted between 66ºF and 78ºF (19ºC – 26ºC) is included in Appendix A. Calibration certificates can be found in Appendix B.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>MANUFACTURER NAME</th>
<th>MODEL #</th>
<th>FUNCTION OF ITEM</th>
<th>ACCURACY</th>
<th>CAL. INTERNAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head Drop Tower (includes test frame and DAS)</td>
<td>MGA Research Corp.</td>
<td>MGA-100-DC</td>
<td>FMH Calibration</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Accelerometers</td>
<td>Endevco</td>
<td>7264-2000</td>
<td>Acceleration Data</td>
<td>±0.5%</td>
<td>6 months</td>
</tr>
<tr>
<td>FMVSS 201U Test Frame (includes the propulsion control system, actuator, test frame, and DAS)</td>
<td>MGA Research Corp.</td>
<td>MGA-100-FMH</td>
<td>Test System</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Free Motion Headforms</td>
<td>UTAMA</td>
<td>035</td>
<td>Test Device</td>
<td>N/A</td>
<td>Pre and Post-Test Series</td>
</tr>
<tr>
<td></td>
<td>UTAMA</td>
<td>037</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>UTAMA</td>
<td>038</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Speed Video</td>
<td>Vision Research</td>
<td>Miro Ex4</td>
<td>Record Event</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Measuring Devices:</td>
<td>Stanley</td>
<td>TPM121</td>
<td>Measurement Targeting</td>
<td>1 mm N/A 0.5°</td>
<td>Annual</td>
</tr>
<tr>
<td>- Tape Measure</td>
<td>- Plumb Bobs</td>
<td>--</td>
<td>Horizontal Measurement</td>
<td></td>
<td></td>
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<tr>
<td>- Digital Protractor</td>
<td>Mitutoyo</td>
<td>MGA00712</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>*FARO™</td>
<td>Faro Technologies</td>
<td>G10020001619</td>
<td>Targeting</td>
<td>0.1 mm</td>
<td>Annual</td>
</tr>
<tr>
<td>*FARO™</td>
<td>Faro Technologies</td>
<td>S08059801273</td>
<td>Targeting</td>
<td>0.1 mm</td>
<td>Annual</td>
</tr>
<tr>
<td>Measuring Devices:</td>
<td>Dickson</td>
<td>MGA00894</td>
<td>Record Temperature and Humidity</td>
<td>± 1°C ± 1% RH</td>
<td>Annual</td>
</tr>
<tr>
<td>- Tape Measure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Plumb Bobs</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>*Temperature Recorder</td>
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<tr>
<td>Digital Protractor</td>
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<tr>
<td>Measuring Devices:</td>
<td>Detecto</td>
<td>MGA00783</td>
<td>Weigh FMH Head</td>
<td>± 0.01 lb</td>
<td>Annual</td>
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<td>- Tape Measure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>* Scale</td>
<td></td>
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<tr>
<td>Measuring Devices:</td>
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<td>26032389</td>
<td>Weighing Vehicle</td>
<td>± .5 kg</td>
<td>Annual</td>
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<tr>
<td>- Tape Measure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>*Vehicle Scale</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Each headform was calibrated by an engineer after the headform had soaked in an environment of 66°F to 78°F (19°C to 26°C) for a period of at least four hours.

Each headform was found to comply with the performance criteria under Part 572L for pre and post-test calibrations. That is, the peak resultant acceleration was between 225 and 275 G’s, the peak lateral acceleration was less than 15 G’s, the headform weighed between 9.9 and 10.1 lbs., the pulse was determined to be unimodal, and there was no major damage to the headform.

<table>
<thead>
<tr>
<th>FMH Serial #</th>
<th>Headform Calibration Date</th>
<th>Weight (lbs)</th>
<th>Temp (°C)</th>
<th>% Humidity</th>
<th>Peak Resultant Acceleration (G’s)</th>
<th>Peak Lateral Acceleration (G’s)</th>
<th>Unimodal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre #035</td>
<td>7/26/2011</td>
<td>9.90</td>
<td>22.8</td>
<td>49.0</td>
<td>246.4</td>
<td>5.5</td>
<td>Yes</td>
</tr>
<tr>
<td>Post #035</td>
<td>8/1/2011</td>
<td>9.90</td>
<td>23.3</td>
<td>58.9</td>
<td>252.9</td>
<td>3.2</td>
<td>Yes</td>
</tr>
<tr>
<td>Pre #037</td>
<td>7/26/2011</td>
<td>9.96</td>
<td>22.8</td>
<td>48.5</td>
<td>254.4</td>
<td>8.0</td>
<td>Yes</td>
</tr>
<tr>
<td>Post #037</td>
<td>8/1/2011</td>
<td>9.96</td>
<td>23.3</td>
<td>57.9</td>
<td>259.5</td>
<td>7.3</td>
<td>Yes</td>
</tr>
<tr>
<td>Pre #038</td>
<td>7/26/2011</td>
<td>9.90</td>
<td>22.9</td>
<td>48.0</td>
<td>257.7</td>
<td>12.0</td>
<td>Yes</td>
</tr>
<tr>
<td>Post #038</td>
<td>8/1/2011</td>
<td>9.90</td>
<td>23.3</td>
<td>58.7</td>
<td>260.4</td>
<td>13.7</td>
<td>Yes</td>
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</table>
4-1 Pre-Test Calibration

HEAD DROP TEST SUMMARY
PART 572L

HEADFORM SERIAL NUMBER: 035  CALIBRATION DATE: 7/26/2011

CALIBRATION TIME: 2:33:51 PM

<table>
<thead>
<tr>
<th>TEST PARAMETER</th>
<th>SPECIFICATION</th>
<th>TEST RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>9.90 to 10.10 lbs.</td>
<td>9.90</td>
</tr>
<tr>
<td>Temperature</td>
<td>19° C to 26° C</td>
<td>22.8</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>10% to 70%</td>
<td>49.0</td>
</tr>
<tr>
<td>Peak Resultant Acceleration</td>
<td>225 G’s to 275 G’s</td>
<td>246.4</td>
</tr>
<tr>
<td>Peak Lateral Acceleration</td>
<td>15 G’s Maximum</td>
<td>5.5</td>
</tr>
<tr>
<td>Unimodal Acceleration Curve</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

FMH INSTRUMENTATION

HEAD ACCELEROMETERS

<table>
<thead>
<tr>
<th>Channel Number</th>
<th>Manufacturer</th>
<th>Model Number</th>
<th>Serial Number</th>
<th>Date of Last Calibration</th>
<th>Date of Next Calibration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ENDEVCO</td>
<td>7264-2000</td>
<td>J35919</td>
<td>02/04/11</td>
<td>08/04/11</td>
</tr>
<tr>
<td>2</td>
<td>ENDEVCO</td>
<td>7264-2000</td>
<td>J22664</td>
<td>02/04/11</td>
<td>08/04/11</td>
</tr>
<tr>
<td>3</td>
<td>ENDEVCO</td>
<td>7264-2000</td>
<td>J35924</td>
<td>02/04/11</td>
<td>08/04/11</td>
</tr>
</tbody>
</table>

REMARKS:

RECORDED BY: __DATE: _7/26/2011_

APPROVED BY: __________________
Head 035 (Pre) Calibration #H35045

(peak = 243.7 G)

TIME (msec)

Head 035 (Pre) Calibration #H35045

(peak = 37.3 G)

TIME (msec)

Head 035 (Pre) Calibration #H35045
## 4-2 Post-Test Calibration

### HEAD DROP TEST SUMMARY

**PART 572L**

<table>
<thead>
<tr>
<th>HEADFORM SERIAL NUMBER:</th>
<th>035</th>
<th>CALIBRATION DATE:</th>
<th>8/1/2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>CALIBRATION TIME:</td>
<td>1:09:53 PM</td>
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</table>

### TEST PARAMETER SPECIFICATION AND TEST RESULTS

<table>
<thead>
<tr>
<th>TEST PARAMETER</th>
<th>SPECIFICATION</th>
<th>TEST RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>9.90 to 10.10 lbs.</td>
<td>9.90</td>
</tr>
<tr>
<td>Temperature</td>
<td>19°C to 26°C</td>
<td>23.3</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>10% to 70%</td>
<td>58.9</td>
</tr>
<tr>
<td>Peak Resultant Acceleration</td>
<td>225 G’s to 275 G’s</td>
<td>252.9</td>
</tr>
<tr>
<td>Peak Lateral Acceleration</td>
<td>15 G’s Maximum</td>
<td>3.2</td>
</tr>
<tr>
<td>Unimodal Acceleration Curve</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

### FMH INSTRUMENTATION

**HEAD ACCELEROMETERS**

<table>
<thead>
<tr>
<th>Channel Number</th>
<th>Manufacturer</th>
<th>Model Number</th>
<th>Serial Number</th>
<th>Date of Last Calibration</th>
<th>Date of Next Calibration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ENDEVCO</td>
<td>7264-2000</td>
<td>J35919</td>
<td>02/04/11</td>
<td>08/04/11</td>
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<td>2</td>
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<td>7264-2000</td>
<td>J22664</td>
<td>02/04/11</td>
<td>08/04/11</td>
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<tr>
<td>3</td>
<td>ENDEVCO</td>
<td>7264-2000</td>
<td>J35924</td>
<td>02/04/11</td>
<td>08/04/11</td>
</tr>
</tbody>
</table>

**REMARKS:**

**RECORDED BY:** [Signatures] **DATE:** 8/1/2011

**APPROVED BY:** [Signatures]
Head 035 (Post) Calibration #H35046

(peak = 234.3 G)

TIME (msec)

Head X (G)

Head 035 (Post) Calibration #H35046

(peak = 104.3 G)

TIME (msec)

Head Z (G)
4-3 Pre-Test Calibration

HEAD DROP TEST SUMMARY
PART 572L

<table>
<thead>
<tr>
<th>HEADFORM SERIAL NUMBER: 037</th>
<th>CALIBRATION DATE: 7/26/2011</th>
</tr>
</thead>
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<tr>
<td>CALIBRATION TIME: 2:47:58 PM</td>
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<th>SPECIFICATION</th>
<th>TEST RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>9.90 to 10.10 lbs.</td>
<td>9.96</td>
</tr>
<tr>
<td>Temperature</td>
<td>19°C to 26°C</td>
<td>22.8</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>10% to 70%</td>
<td>48.5</td>
</tr>
<tr>
<td>Peak Resultant Acceleration</td>
<td>225 G’s to 275 G’s</td>
<td>254.4</td>
</tr>
<tr>
<td>Peak Lateral Acceleration</td>
<td>15 G’s Maximum</td>
<td>8.0</td>
</tr>
<tr>
<td>Unimodal Acceleration Curve</td>
<td>YES</td>
<td>YES</td>
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FMH INSTRUMENTATION

<table>
<thead>
<tr>
<th>HEAD ACCELEROMETERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel Number</td>
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<tr>
<td>----------------</td>
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<td>1</td>
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<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
</tbody>
</table>

REMARKS:

RECORDED BY: ___________ DATE: 7/26/2011

APPROVED BY: ____________
(peak = 254.4 G)

TIME (msec)

Head 037 (Pre) Calibration #H37045

(peak = 8.0 G)

TIME (msec)

Head 037 (Pre) Calibration #H37045
### 4-4 Post-Test Calibration

**HEAD DROP TEST SUMMARY**

**PART 572L**

<table>
<thead>
<tr>
<th>HEADFORM SERIAL NUMBER: 037</th>
<th>CALIBRATION DATE: 8/1/2011</th>
</tr>
</thead>
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<table>
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<th>TEST PARAMETER</th>
<th>SPECIFICATION</th>
<th>TEST RESULTS</th>
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<tbody>
<tr>
<td>Weight</td>
<td>9.90 to 10.10 lbs.</td>
<td>9.96</td>
</tr>
<tr>
<td>Temperature</td>
<td>19°C to 26°C</td>
<td>23.3</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>10% to 70%</td>
<td>57.9</td>
</tr>
<tr>
<td>Peak Resultant Acceleration</td>
<td>225 G’s to 275 G’s</td>
<td>259.5</td>
</tr>
<tr>
<td>Peak Lateral Acceleration</td>
<td>15 G’s Maximum</td>
<td>7.3</td>
</tr>
<tr>
<td>Unimodal Acceleration Curve</td>
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**FMH INSTRUMENTATION**

**HEAD ACCELEROMETERS**

<table>
<thead>
<tr>
<th>Channel Number</th>
<th>Manufacturer</th>
<th>Model Number</th>
<th>Serial Number</th>
<th>Date of Last Calibration</th>
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</tr>
</tbody>
</table>

REMARKS:

RECORDED BY: [Signature] DATE: 8/1/2011

APPROVED BY: [Signature]
Head 037 (Post) Calibration #H37046

Resultant Acceleration (G)

TIME (msec)

Head Y (G)

TIME (msec)
Head 037 (Post) Calibration #H37046

(peak = 253.6 G)

Time (msec)

Head X (G)

(peak = 613 G)

Time (msec)

Head Z (G)
4-5 Pre-Test Calibration

HEAD DROP TEST SUMMARY
PART 572L

HEADFORM SERIAL NUMBER: 038  CALIBRATION DATE: 7/26/2011
CALIBRATION TIME: 3:04:08 PM

<table>
<thead>
<tr>
<th>TEST PARAMETER</th>
<th>SPECIFICATION</th>
<th>TEST RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>9.90 to 10.10 lbs.</td>
<td>9.90</td>
</tr>
<tr>
<td>Temperature</td>
<td>19° C to 26° C</td>
<td>22.9</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>10% to 70%</td>
<td>48.0</td>
</tr>
<tr>
<td>Peak Resultant Acceleration</td>
<td>225 G’s to 275 G’s</td>
<td>257.7</td>
</tr>
<tr>
<td>Peak Lateral Acceleration</td>
<td>15 G’s Maximum</td>
<td>12.0</td>
</tr>
<tr>
<td>Unimodal Acceleration Curve</td>
<td>YES</td>
<td>YES</td>
</tr>
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</table>

FMH INSTRUMENTATION

HEAD ACCELEROMETERS

<table>
<thead>
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<th>Channel Number</th>
<th>Manufacturer</th>
<th>Model Number</th>
<th>Serial Number</th>
<th>Date of Last Calibration</th>
<th>Date of Next Calibration</th>
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<tbody>
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<td>7264-2000</td>
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</tr>
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</table>

REMARKS:

RECORDED BY: [Signature]  DATE: 7/26/2011

APPROVED BY: [Signature]
Head 038 (Pre) Calibration #H38045

- Peak acceleration: 257.7 G

- Peak acceleration: 12.0 G

TIME (msec)

Head 038 (Pre) Calibration #H38045
Head 038 (Pre) Calibration #H38045

(peak = 243.3 G)

TIME (msec)

Head 038 (Pre) Calibration #H38045

(peak = 95.5 G)

TIME (msec)
## 4-6 Post-Test Calibration

### HEAD DROP TEST SUMMARY

**PART 572L**

<table>
<thead>
<tr>
<th>HEADFORM SERIAL NUMBER: 038</th>
<th>CALIBRATION DATE: 8/1/2011</th>
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<td>CALIBRATION TIME: 1:37:24 PM</td>
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<th>TEST PARAMETER</th>
<th>SPECIFICATION</th>
<th>TEST RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>9.90 to 10.10 lbs.</td>
<td>9.90</td>
</tr>
<tr>
<td>Temperature</td>
<td>19°C to 26°C</td>
<td>23.3</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>10% to 70%</td>
<td>58.7</td>
</tr>
<tr>
<td>Peak Resultant Acceleration</td>
<td>225 G’s to 275 G’s</td>
<td>260.4</td>
</tr>
<tr>
<td>Peak Lateral Acceleration</td>
<td>15 G’s Maximum</td>
<td>13.7</td>
</tr>
<tr>
<td>Unimodal Acceleration Curve</td>
<td>YES</td>
<td>YES</td>
</tr>
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</table>

### FMH INSTRUMENTATION

#### HEAD ACCELEROMETERS

<table>
<thead>
<tr>
<th>Channel Number</th>
<th>Manufacturer</th>
<th>Model Number</th>
<th>Serial Number</th>
<th>Date of Last Calibration</th>
<th>Date of Next Calibration</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>ENDEVCO</td>
<td>7264-2000</td>
<td>J22700</td>
<td>02/07/11</td>
<td>08/07/11</td>
</tr>
<tr>
<td>2</td>
<td>ENDEVCO</td>
<td>7264-2000</td>
<td>J36197</td>
<td>02/07/11</td>
<td>08/07/11</td>
</tr>
<tr>
<td>3</td>
<td>ENDEVCO</td>
<td>7264-2000</td>
<td>J36353</td>
<td>02/07/11</td>
<td>08/07/11</td>
</tr>
</tbody>
</table>

**REMARKS:**

**RECORDED BY:** [Signature]  **DATE:** 8/1/2011

**APPROVED BY:** [Signature]
Head 038 (Post) Calibration #H38046

Resultant Acceleration (G)

TIME (msec)

(peak = 260.4 G)

Head 038 (Post) Calibration #H38046

Head Y (G)

TIME (msec)

(peak = 13.7 G)
5.0 PHOTOGRAPHS

As Delivered – Left Side View

As Delivered – Right Side View
Post-Test Component Photographs
08/01/11
DOT/NHTSA
2012 Nissan NV1500
FMVSS 201U
DTNH22-09-D-00131
Post-Test Components
G11I7-001.14

08/01/11
DOT/NHTSA
2012 Nissan NV1500
FMVSS 201U
DTNH22-09-D-00131
Post-Test Components
G11I7-001.14
Appendix A – Temperature Trace

CC5200 - 2012 Nissan NV 1500 - FMVSS 201U

Temperature Trace Graph

Time and Date:
- 07/25/11
- 07/26/11
- 07/27/11
- 07/28/11
- 07/29/11
- 07/30/11
- 07/31/11
- 08/01/11
- 08/02/11

Temperature (°C) / Humidity (%RH)

- Temperature (°C)
- Humidity (%RH)
Appendix B – Calibration Certificates

MGA Research Corporation-Calibration Certificate
ACCELEROMETER

<table>
<thead>
<tr>
<th>Reference</th>
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<tbody>
<tr>
<td>Name: Accel Standard</td>
<td>Name: MGA MI</td>
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<tr>
<td>Model #: 352003</td>
<td>Manufacturer: Redvoo</td>
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<tr>
<td>Serial #: 95980</td>
<td>Model #: 7264-2000</td>
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<tr>
<td>Capacity: Gs:250</td>
<td>Serial #: 339519</td>
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<td>Capacity/Range: 2,000</td>
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<tr>
<td>Calibrated By: Modal Shop</td>
<td>(Gs)</td>
</tr>
</tbody>
</table>

Calibration Date: 2/4/2011

New DLR(Units/Gs)\(^1\) 95.8

100K SHUNT

Linearity: \(^2\) 0.99951

New vs Old Sensitivity (% Difference) 0.7

Temperature: 72 \(^\circ\)F

Humidity: 20 %

Sensitivity (\(\mu\)V/G): 0.025975

Calibrated By: Ryan Jones

Signature: ___________

Approved by: ___________

1. Actual data of reference and sensor instruments is found in calibration files
2. Linearity is defined as \(1 - (\text{Standard Deviation/ Mean})\).

All calibrations are traceable to the National Institute of Standards and Technology
Calibration uncertainty no greater than 4.0 % at the 95% confidence level.
# MGA Research Corporation—Calibration Certificate

**ACCELEROMETER**

<table>
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<tbody>
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<td>Name: Accel Standard</td>
<td>Name: MGA MI</td>
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<td>Manufacturer Endevo</td>
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<td>Serial #: 95980</td>
<td>Model #: 7264-2000</td>
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<td>Capacity: Gx250</td>
<td>Serial #: 222664</td>
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<td>Capacity/Range: 2,000 Gx'</td>
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<table>
<thead>
<tr>
<th>Calibration Date: 2/4/2011</th>
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</thead>
<tbody>
<tr>
<td>New DLR (Units/G/S) 100K SHUNT</td>
</tr>
<tr>
<td>Linearity: 0.9993%</td>
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<tr>
<td>New vs Old Sensitivity (% Difference)</td>
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<tr>
<td>Temperature: 72 °F</td>
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<tr>
<td>Humidity: 20%</td>
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<tr>
<td>Sensitivity (μV/G): 0.026447</td>
</tr>
<tr>
<td>Calibrated By: Ryan Jones</td>
</tr>
</tbody>
</table>

Signature: [Signature]

Approved by: [Signature]

---

1. Actual data of reference and sensor instruments is found in calibration files.
2. Linearity is defined as 1 - (Standard Deviation/Mean).

All calibrations are traceable to the National Institute of Standards and Technology.
Calibration uncertainty no greater than 4.9% at the 95% confidence level.
MGA Research Corporation-Calibration Certificate

ACCELEROMETER

Reference

Name:  Accel Standard
Model #:  332C03
Serial #:  003980
Capacity:  0g-250
Calibration Date:  8/14/2010
Calibrated By:  Model Shop

Sensor

Name:  M3A.Mf
Manufacturer:  Redvco
Model #:  7264-2000
Serial #:  335924
Capacity/Range:  2,000 (G's)

Calibration Date:  2/4/2011
New DLR (Units:G's) 1 92.8
1000  SITUN1
Linearity 2 0.99947
New vs Old Sensitivity (% Difference) 1.2
Temperature:  72 °F
Humidity:  20 %
Sensitivity (uV/G):  0.026624
Calibrated By:  Ryan Jones

Signature:  ____________________________

Approved by:  ____________________________

1. Actual data of reference and sensor instruments is found in calibration files
2. Linearity is defined as 1-(Standard Deviation/ Mean)  
All calibrations are traceable to the National Institute of Standards and Technology
Calibration uncertainty no greater than 4.0 % at the 95% confidence level.
MGA Research Corporation-Calibration Certificate

ACCELEROMETER

Reference

Name: Accel Standard
Model #: 332C03
Serial #: 95980
Calibration Date: 9/14/2010
Calibrated By: Modal Shop

Sensor

Name: MGA.M1
Manufacturer: Endevco
Model #: 7264-2000
Serial #: J32177
Capacity/Range: 2,000 (G's)

Calibration Date: 2/4/2011
New DLR (Units: G/S) 1
100X SHUNT 113.7
Linearity 2 0.9997
New vs Old Sensitivity (% Difference) -0.2
Temperature: 72 °F
Humidity: 20 %
Sensitivity (uV/V/G): 0.021883
Calibrated By: Ryan Jones

Signature: ____________________________
Approved by: ____________________________

1. Actual data of reference and sensor instruments is found in calibration files
2. Linearity is defined as 1 - (Standard Deviation/ Mean)
All calibrations are traceable to the National Institute of Standards and Technology
Calibration uncertainty no greater than 4.0 % at the 95% confidence level.
**MGA Research Corporation-Calibration Certificate**

**Accelerometer**

<table>
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<td><strong>Model #:</strong> 352C03</td>
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<td><strong>Serial #:</strong> 95980</td>
<td><strong>Model #:</strong> 7264-2000</td>
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<td><strong>Capacity:</strong> G/s250</td>
<td><strong>Serial #:</strong> J14103</td>
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<td><strong>Capacity/Range:</strong> 2,000 G/s</td>
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<td><strong>Calibrated By:</strong> Model Shop</td>
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- **Calibration Date:** 2/4/2011
- **New DLR (Units: m/s/s):** 1 93.9
- **100K SHUNT**
- **Linearity:** 0.9995
- **New vs Old Sensitivity (% Difference):** -0.1
- **Temperature:** 72 °F
- **Humidity:** 20%
- **Sensitivity (mV/V/G):** 0.026479
- **Calibrated By:** Ryan Jones

Signature: [Signature]

Approved by: [Signature]

1. Actual data of reference and sensor instruments is found in calibration files.
2. Linearity is defined as 1 - (Standard Deviation/ Mean).

All calibrations are traceable to the National Institute of Standards and Technology.

Calibration uncertainty no greater than 4.0 % at the 95% confidence level.
# MGA Research Corporation-Calibration Certificate

## ACCELEROMETER

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<td><strong>Capacity/Range:</strong> 2,000 G (G's)</td>
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<tr>
<td>New DNL(G/0.01G)</td>
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<tr>
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<td>Sensitivity (mV/V/G)</td>
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<td>Ryan Jones</td>
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**Signature:**

<table>
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1. Actual data of reference and sensor instruments is found in calibration files.

2. Linearity is defined as $1 - \frac{\text{Standard Deviation}}{\text{Mean}}$.

All calibrations are traceable to the National Institute of Standards and Technology. Calibration uncertainty no greater than 4.0 % at the 95% confidence level.
# MGA Research Corporation-Calibration Certificate

## ACCELEROMETER

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<tr>
<td><strong>Name:</strong> Accel Standard</td>
<td><strong>Name:</strong> MGAM1</td>
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<tr>
<td><strong>Model #:</strong> 352003</td>
<td><strong>Manufacturer:</strong> Endevco</td>
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<td><strong>Serial #:</strong> 95940</td>
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<td><strong>Capacity:</strong> 0%:250</td>
<td><strong>Serial #:</strong> J22700</td>
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<td><strong>Calibration Date:</strong> 9/14/2010</td>
<td><strong>Capacity/Range:</strong> 2,000 (G's)</td>
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<td><strong>Calibrated By:</strong> Modal Shop</td>
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**Calibration Date:** 2/7/2011

- **New DLR (Unit: G/S):** 95.4
- **Linearity:** 0.99966
- **New vs Old Sensitivity (%) Difference:** 0.5
- **Temperature:** 70 °F
- **Humidity:** 20 %
- **Sensitivity (uV/G/C):** 0.025819
- **Calibrated By:** Chris Collins

---

**Signature:**

Chris Collins

---

**Approved by:**

Kunel Kaleto

---

1. Actual data of reference and sensor instruments is found in calibration files
2. Linearity is defined as \[ \frac{\text{Standard Deviation}}{\text{Mean}} \]

All calibrations are traceable to the National Institute of Standards and Technology. Calibration uncertainty no greater than 4.0 % at the 95% confidence level.
MGA Research Corporation-Calibration Certificate

ACCELEROMETER

<table>
<thead>
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<tr>
<td>Name: Accel Standard</td>
<td>Name: MGA MI</td>
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<td>Model #: 352C03</td>
<td>Manufacturer: Endevo</td>
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<td>Serial #: 95980</td>
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Calibration Date: 2/7/2011

New DLR(Unit=G's) 1
108.7
100K SHUNT

Linearity: 0.99976

New vs Old Sensitivity (% Difference): 0.9

Temperature: 70 °F

Humidity: 20 %

Sensitivity (nV/V/G): 0.022869

Calibrated By: Chris Collins

Signature: Chris Collins

Approved by: Steven A. Keates

1. Actual data of reference and sensor instruments is found in calibration files
2. Linearity is defined as \(1 - \frac{\text{Standard Deviation}}{\text{Mean}}\)

All calibrations are traceable to the National Institute of Standards and Technology

Calibration uncertainty no greater than 4.0 % at the 95% confidence level.
### MGA Research Corporation - Calibration Certificate

**ACCELEROMETER**

<table>
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<td><strong>Name</strong>: MOA M1</td>
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<td><strong>Model #</strong>: 352003</td>
<td><strong>Manufacturer</strong>: Endeco</td>
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<tr>
<td><strong>Serial #</strong>: 95980</td>
<td><strong>Model #</strong>: 7264-2000</td>
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<tr>
<td><strong>Capacity</strong>: $0\times 250$</td>
<td><strong>Serial #</strong>: 36353</td>
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<tr>
<td><strong>Calibration Date</strong>: 9/14/2010</td>
<td><strong>Capacity/Range</strong>: 2,000 $^{(\text{g})}$</td>
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<tr>
<td><strong>Calibrated By</strong>: Modal Shop</td>
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</tbody>
</table>

**Calibration Data**

- **Calibration Date**: 2/7/2011
- **New DLR (Digital Gain)**: 99.1
- **Linear Hysteresis**: 0.99988
- **New vs Old Sensitivity (%) Difference**: 0.9
- **Temperature**: 70 °F
- **Humidity**: 20.1%
- **Sensitivity (mV/G):** 0.025114
- **Calibrated By**: Chris Collins

**Signature**: [Signature]

**Approved by**: [Signature]

---

1. Actual data of reference and sensor instruments is found in calibration files.
2. Linearity is defined as $1 - \text{Standard Deviation/Mean}$.

All calibrations are traceable to the National Institute of Standards and Technology. Calibration uncertainty no greater than 4.0 % at the 95% confidence level.
~ Calibration Certificate ~

Sensor Information
Model Number: 352003
Serial Number: 95880
Manufacturer: ""I""C4O
ID Number: ICP® Accelerometer

Calibration Data
Sensitivity @ 100 Hz: 0.94 mV/g
Phase @ 100 Hz: -0.87 deg.
Test Level: 10.00 g

Transducer Specifications
Amp. Range: ± 500 g
Resolution: 0.0005 g
Repeatability: ± 5000 Hz
Temp. Range: -54 to 121 °C

Axis: Uniaxial

Phase Response

Amplitude Response

Notes
Results relate only to the items calibrated.
This certificate may not be reproduced except in full, without written permission.
Method: Calibration is performed in compliance with ISO 9001 and ISO 17025.
This calibration was performed with TMS B1S5O Calibration Validation version 4.6.1.
Calibration traceable to primary methods which have been proficiency validated through
interlaboratory comparison to NIST (project number 622071198).
Back-to-Back Comparison Calibration per (ISO 10003-21).

Procedure Used: TMS-H220
Measurement uncertainty (95% confidence level with coverage factor 2) for frequency ranges
tested during calibration are as follows: 0.5-4.59 Hz: ± 3.005%, 5-9.99 Hz: ± 2.505, 10-69 Hz:
± 1.705, 100 Hz: ± 1.250, 101-300 Hz: ± 1.405, 301-600 Hz: ± 1.705, 601-1000 Hz: ± 2.055, 1001-16000 Hz:
± 3.050, 16001-20000 Hz; ± 4.050.

Customer
MGA Research Corp.

User Notes

Unit Condition
As Found: In Tolerance

Lab Conditions
Temperature: 73 (23) °F (°C)

As Left: In Tolerance
Humidity: 32 %

Approval Information
Technician: Ed Davlin
Cal Date: 09/14/2010
Approval: 

Dil ID: 15820239018101

Page 1 of 2
~Calibration Certificate~

Sensor Information

<table>
<thead>
<tr>
<th>Model Number</th>
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<tr>
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Note

This certificate may not be reproduced except in full, without written permission.

Standards and/or Equipment Used During Calibration

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<th>Manufacturer</th>
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<th>Serial</th>
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<td>Data Acquision Card</td>
<td>NI</td>
<td>4401</td>
<td>1004324</td>
<td>6/28/2011</td>
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<td>Std Accelerometer</td>
<td>PCB</td>
<td>060A200</td>
<td>110553</td>
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<td>Air Bearing Shaker</td>
<td>PCB</td>
<td>399C11</td>
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<td>Std Sig Conditioner</td>
<td>PCB</td>
<td>442A102</td>
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<td>PCB</td>
<td>443B101</td>
<td>379</td>
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<td>TMS</td>
<td>2100E21-C</td>
<td>1002</td>
<td>n/a</td>
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Technician: Ed Devlin

Cal Date: 3/14/2010

Customer: MGA Research Corp.

Cal ID: 55606  366331
Calibration Certificate

Part Description: Gold  Certification Date: 5/28/2011  Serial#: G10-02-00-01619
Single Point - (Max-Min)/2 Specification: 0.084 mm (0.0033")
Volumetric (Max Deviation) Specification: 0.119 mm (+/-0.047")

Measurement Standards Traceability

- Ball Bar Kit  Asset Number: 1041  Calibration Due: 9/28/2011  *SI Traceability: L3011940353
- Thermometer  Asset Number: 668  Calibration Due: 2/19/2012  *SI Traceability: ASLA-1001877661
- Reference Sphere  Asset Number: TQ223  Calibration Due: 10/9/2012  *SI Traceability: NIST 821/26560-08

The artifacts above have been calibrated with a traceable system in the National Institute of Metrology (NIM) through an Accredited Laboratory.

Calibration Results

1. Single Point Accuracy Test: +/-0.01, 0.20%-0.80% and >0.80% range."  PASSED
2. Effective diagram sphere test.  PASSED
3. Volumetric ball bar test in 4 quadrants and 2 orientations.  PASSED

Instrument condition as received: Within Specifications

Instrument condition outgoing: Within Specifications

Technician: [Signature]  Date: 6/28/11

FARO Technologies, Inc.
Michigan Regional Office
Phone: 248-669-8820
Fax: 248-669-8856
L-A-B Cert Number: L1147.01-1

46998 Megellen Drive
Wixom, MI 48393
USA

Laboratory Accreditation Bureau Accredited
Calibration Certificate

Post Description: Silver
Certification Date: 10/19/2013

Single Point - (Max-0.5%) Specification: 0.0% ± 0.5% mm (±0.05%)
Volume (Min Deviation) Specification: 0.0% ± 1.0% mm (±0.05%)

Measurement Standards Traceability

Ball Bar Kit
Assist Number: 1639
Calibration Date: 10/22/2010
*SI Traceability: NIST-2010020451

Thermocouple
Assist Number: 1Q003
Calibration Date: 11/06/2010
*SI Traceability: ASLA-061059862

Reference Sphere
Assist Number: 5241
Calibration Date: 11/21/2011
*SI Traceability: NIST-2012/236660-38

The certificates have been issued with a check mark on the Calibration Certificate of Traceability to the International System of Units (SI) through a National Institute for Standards (NIST). All measurements have been conducted with a calibrated instrument that has been traceable to the National Institute of Standards and Technology (NIST).

Calibration Results

- Single Point Accuracy Test at ±5%, ±12%, and ±20% range: PASSED
- Single Sphere Shadow Test: PASSED
- Volumetric Ball Bar Test in 4 quadrants and 2 directions: PASSED

Instrument condition - operator:

Technician: [Signature]
Date: 10/19/13

FARO Technologies, Inc.
Phone: 1-800-779-2771
Fax: 407-332-8056
Web: www.faro.com

LABORATORY ACCREDITATION BUREAU
ISO/IEC 17025 Accredited

Page 1 of 6
### Tape Measure Calibration Certificate

**Reference Steel Rule**
- **Brand:** """"Whitney""
- **SN:** """"72-00744"
- **Calibration Date:** 11/25/11

**Subject Tape Measure**
- **Brand:** """"Stanley""
- **SN:** """"72-01513"
- **Calibration Date:** 3/18/11

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<tr>
<td>2 (50)</td>
<td>2</td>
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<tr>
<td>3 (75)</td>
<td>3</td>
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</tr>
<tr>
<td>4 (100)</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5 (125)</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>6 (150)</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>7 (175)</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>8 (200)</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>9 (225)</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>10 (250)</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>11 (275)</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>12 (300)</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>13 (325)</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>14 (350)</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>15 (375)</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>16 (400)</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>17 (425)</td>
<td>17</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reference in (mm)</th>
<th>Subject Tape Measure</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 (450)</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>19 (475)</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>20 (500)</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>21 (525)</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>22 (550)</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>23 (575)</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>24 (600)</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>25 (625)</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>26 (650)</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>27 (675)</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>28 (700)</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>29 (725)</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>30 (750)</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>31 (775)</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>32 (800)</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>33 (825)</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>34 (850)</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>35 (875)</td>
<td>35</td>
<td></td>
</tr>
</tbody>
</table>

If all differences are ± 1/32 of an inch (1 mm), then the tape measure is acceptable.

**Pass**

**Maximum Difference = 0**

**Date:** 3/18/11

**Performed By:** [Signature]

---

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is ± 0.35%. All certification data and equipment are on file for inspection at your request, but uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor k=2.
Certificate of Calibration

4700 Sardon Court SE, Kentwood MI 49512, Telephone: 816-458-3134, Fax: 616-888-2384, www.metricalcal.com

Order Number: 603109
Certificate Number: 1000039071
Page: 1 of 1

Customer ID: N/A
Last Calibration: N/A
Calibration Due: 9/27/10
Next Calibration: 9/27/11

As Found Condition: In Tolerance
As Left Condition: In Tolerance

MetroCal, Inc. maintains reference standards of measurement which are traceable to the National Institute of Standards and Technology, or other authorized National Standards. Calibration was performed in accordance with MetroCal Procedures CP045 and complies with the ANAB/ASL 2540-1 and ISO/IEC 17025 Standards. Results shall not be reproduced, except in full, without the written approval of MetroCal, Inc. Results relate only to the item(s) calibrated. Any number of factors may cause the calibration item to drift out of calibration before the recommended interval has expired. Statements of compliance made using simple acceptance rules.

Calibration Procedure
Uncertainty Expressed at 95% confidence level

<table>
<thead>
<tr>
<th>Standard Used</th>
<th>Cal Date</th>
<th>Run Date</th>
<th>Traceable No.</th>
<th>95% confidence (RUL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GoA Scale Bar</td>
<td>8/27/10</td>
<td>6/27/11</td>
<td>ID# 100</td>
<td>0.0015±</td>
</tr>
</tbody>
</table>

Results:

<table>
<thead>
<tr>
<th>Units</th>
<th>Nominal</th>
<th>Actual</th>
<th>Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decimal Deg.</td>
<td>16.00</td>
<td>16.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>50.00</td>
<td>50.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>30.00</td>
<td>30.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>40.00</td>
<td>40.0</td>
<td>-0.10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tolerance ± 0.1&quot; Level</th>
<th>Reference Level Check: Within ± 0.1 degrees</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Nominal</th>
<th>Actual</th>
<th>Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.00</td>
<td>5.0</td>
<td>0.0</td>
</tr>
<tr>
<td>10.00</td>
<td>10.1</td>
<td>0.10</td>
</tr>
<tr>
<td>25.00</td>
<td>25.0</td>
<td>0.00</td>
</tr>
<tr>
<td>50.00</td>
<td>50.0</td>
<td>0.00</td>
</tr>
<tr>
<td>40.00</td>
<td>39.9</td>
<td>-0.10</td>
</tr>
</tbody>
</table>

Comments: Environmental conditions during calibration: 69°F, 44% RH.
No adjustment required.

Shannon Kibbeck
Calibration Technician

Issued: 9/27/10

* Checked box indicate this calibration was performed at the customer facility.

l 9/27/10
## Calibration Certificate

**NovaStar S**

**SOLUTIONS**

35200 Plymouth Rd.
Livonia, MI 48150

**CALIBRATION #1237.B**

**Calibration Certificate #:**

Z52549:1300715528

---

**DICKSON TM325 TEMP/HUMID DISP**

**WORK ORDER:** 1300715528

**SERIAL NUMBER:** N/A

**ASSET NUMBER:** Z52549

**CUST. ASSET NUM:** MGA00894

**PROCEDURE NAME:** 1012

**PROCEDURE REV:** A

**CALIBRATED BY:** JOE McCONNAUGHAHY

**CUSTOMER:** MGA RESEARCH

**ADDRESS:** 446 Executive Drive

**Troy, MI 48083**

**PRIMARY CONTACT:** BOB MILLER

---

This Instrument has been processed and calibrated in accordance with the NovaStar Solutions Quality System Manual and is traceable to the National Institute of Standards and Technology (NIST), or to NIST accepted intrinsic standards of measurement, or derived by the ratio type of self-calibration techniques. The NovaStar Solutions quality system is accredited to ISO/IEC 17025:2003 and ANSI/NCSL Z540-1-1994.

The results reported herein apply only to the calibration of the item described above. No sampling plan was used for this calibration.

The ratio of the tolerance of the instrument or parameter being calibrated to the expanded uncertainty of the standard (K-R) is greater than 4:1 unless otherwise specified. Expanded uncertainties are expressed at the approximate 95% level of confidence using a K-R. Due to any number of factors, the recommended due date on the item does not imply continuing conformance to specifications during the recommended interval. Unless otherwise stated the unit under test meets or exceeds manufacturer specifications.

For range and best measurement capability specifications for the standards used to perform this calibration, see the most recent calibration report maintained by this calibration laboratory (available upon request).

This report may not be reproduced, except in full, without written approval from NovaStar Solutions.

---

**As Received Condition:** IN TOLERANCE

**As Returned Condition:** IN TOLERANCE

**Action Taken:** FULL CALIBRATION

**REMARKS:**

---

**Standards Used**

<table>
<thead>
<tr>
<th>Asset #</th>
<th>Cert #</th>
<th>Description</th>
<th>Cal Date</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1594</td>
<td>1504:1298548177</td>
<td>HART SCIENTIFIC 1502A THERMOMETER READOUT</td>
<td>2/7/2011</td>
<td>2/7/2012</td>
</tr>
<tr>
<td>1717</td>
<td>1717:1297150241</td>
<td>HART SCIENTIFIC 5614 PRT</td>
<td>2/7/2011</td>
<td>2/7/2012</td>
</tr>
</tbody>
</table>

***** End of Certificate *****

QA approved: [Signature]

QA Date: 3-30-11

Asset Barcode: [Barcode]

---

P-1602-021B Rev. 0.0 Page 1 of 1 Generated: 3/21/11 Revision Date: 12/4/08
Certificate of Calibration

MGA Research
448 Executive Drive
Troy, MI 48083

Order Number: E0370
Certificate No.: 100628894
Page: 1 of 1

Gauge Number: MGA00763
Gauge Desc: 0 to 264 x 0.01lb Digital Scale
Manufacturer: Daleco
Model Number: AP-20
Serial Number: E16907-0107

As Found Condition: See Results
As Left Condition: See Results

MetroCal Inc., maintains reference standards of measurement which are traceable to the National Institute of Standards and Technology, or other authorized National Standards. Calibration was performed in accordance with MetroCal Procedure CP040 and relevant sections of the manufacturer's manual. This calibration complied with ISO17025 and ANSI/NCSL Z540-1 Standards. Results shall not be reproduced except in full without the written approval of MetroCal Inc. Results relate only to the item(s) calibrated. Any number of factors may cause the calibration then to drift out of calibration before the recommended interval has elapsed. Statements of compliance made using simple acceptance rules.

Calibration Procedure
Uncertainty Expressed at
95% confidence, (K=2)

Results:
Tolerance used: Class III

<table>
<thead>
<tr>
<th>Units: lb</th>
<th>As Found</th>
<th>TI Division/Increment: 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight Test</td>
<td>Nominal</td>
<td>Indication</td>
</tr>
<tr>
<td>Zero</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>0-25%fs</td>
<td>0.00</td>
<td>0.01</td>
</tr>
<tr>
<td>25-50%fs</td>
<td>10.00</td>
<td>10.02</td>
</tr>
<tr>
<td>50-75%fs</td>
<td>15.00</td>
<td>15.02</td>
</tr>
<tr>
<td>75-100%fs</td>
<td>20.00</td>
<td>20.03</td>
</tr>
<tr>
<td>1/2 load test</td>
<td>10.00</td>
<td>10.02</td>
</tr>
<tr>
<td>return to zero</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>4 quad/Shift Test</td>
<td>Pass</td>
<td></td>
</tr>
</tbody>
</table>

Comments: Environmental conditions during calibration: 75 °F, 39 % RH.
The adapter that was sent in with the scale has loose components, be careful when using.
No adjustments required.

Issued: 8/28/10

Shannon R. Stabler
Calibration Technician

☑ Checked box indicate this calibration was performed at the customer's facility.

@ 7/18/10
Test report for commercial device

<table>
<thead>
<tr>
<th>Customer: MGA</th>
<th>Cert#: 11-8007</th>
<th>Temp/Humidity: OK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location of Calibration: 2839 Elliott Troy, MI 48038</td>
<td>Calibration Date: 7/18/2011</td>
<td>Cal Due: Jul-12</td>
</tr>
<tr>
<td>Equipment Make: Intercomp</td>
<td>Model: SW Deluxe</td>
<td>Serial: 26032389</td>
</tr>
<tr>
<td>NTEP:</td>
<td>Class:</td>
<td>COC #:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Applied Test Wt</th>
<th>Before Adjustment</th>
<th>Tolerance</th>
<th>In-Tolerance Y/N</th>
<th>After Adjustment</th>
<th>In-Tolerance Y/N</th>
<th>Unc</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000lb</td>
<td>1000lb</td>
<td>2lb</td>
<td>y</td>
<td>1000lb</td>
<td>y</td>
<td>.5lb</td>
</tr>
<tr>
<td>200lb</td>
<td>200lb</td>
<td>1lb</td>
<td>y</td>
<td>200lb</td>
<td>y</td>
<td>.11lb</td>
</tr>
<tr>
<td>1000lb</td>
<td>1000lb</td>
<td>2lb</td>
<td>y</td>
<td>1000lb</td>
<td>y</td>
<td>.5lb</td>
</tr>
<tr>
<td>200lb</td>
<td>200lb</td>
<td>1lb</td>
<td>y</td>
<td>200lb</td>
<td>y</td>
<td>.11lb</td>
</tr>
<tr>
<td>1000lb</td>
<td>1000lb</td>
<td>2lb</td>
<td>y</td>
<td>1000lb</td>
<td>y</td>
<td>.5lb</td>
</tr>
<tr>
<td>200lb</td>
<td>200lb</td>
<td>1lb</td>
<td>y</td>
<td>200lb</td>
<td>y</td>
<td>.11lb</td>
</tr>
<tr>
<td>1000lb</td>
<td>1000lb</td>
<td>2lb</td>
<td>y</td>
<td>1000lb</td>
<td>y</td>
<td>.5lb</td>
</tr>
<tr>
<td>200lb</td>
<td>200lb</td>
<td>1lb</td>
<td>y</td>
<td>200lb</td>
<td>y</td>
<td>.11lb</td>
</tr>
</tbody>
</table>

**shift test**

n/a

Platform #1: Pass
Platform #2: Pass
Platform #3: Pass

Tests performed: ✔ Repeatability ✔ Linearity ✔ Sensitivity ✔ Discrimination

Technician comments: Scale passed all tests performed

Traceable certificate for weights used: A1190, 1163, 20650, 5003, 10002

✔ Scale Certified ✔ Scale Rejected

Sterling Scale Service Rep: Dan W
Date: 7/19/2011

The above item has been calibrated using the relevant EPO or OEM procedures utilizing test weights Traceable to International Systems of Units (SI), through the Michigan Department of Agriculture. Expanded uncertainty (k=2) confidence level of 95% as reported. Results relate only to items tested. The reported uncertainty is valid only for the environment in which it is determined. Any number of factors may cause the item to drift out of calibration before recommended interval has expired for this reason Sterling Scale does not warranty calibration. This report shall not be reproduced, except in full without approval of the laboratory Tolerances followed are maintenance/acceptance per MB 44 or customer specific.