

**REPORT NUMBER: SPNCAP-MGA-2012-016**

**NEW CAR ASSESSMENT PROGRAM (NCAP)  
Side Impact Pole Test**

**GENERAL MOTORS OF CANADA LTD.  
2012 Chevrolet Camaro 1LS 2-Dr Coupe  
NHTSA No.: MC0108**

**MGA RESEARCH CORPORATION  
5000 Warren Road  
Burlington, WI 53105**



**Test Date: October 24, 2011**

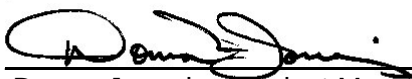
**Final Report Date: November 21, 2011**

**FINAL REPORT**

**U.S. DEPARTMENT OF TRANSPORTATION  
National Highway Traffic Safety Administration  
Office of Crashworthiness Standards  
Mail Code: NVS-111  
1200 New Jersey Ave, SE  
Room W43-410  
Washington, DC 20590**

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Prepared by:   
Donna Janovicz, Project Manager

Approved by:   
Ben Fischer, Project Engineer

Approval Date: November 21, 2011

FINAL REPORT ACCEPTANCE BY OCWS:

\_\_\_\_\_  
Division Chief, New Car Assessment Program  
NHTSA, Office of Crashworthiness Standards

Date: \_\_\_\_\_

\_\_\_\_\_  
COTR, New Car Assessment Program  
NHTSA, Office of Crashworthiness Standards

Date: \_\_\_\_\_

### Technical Report Documentation Page

| 1. Report No.<br>SPNCAP-MGA-2012-016                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2. Government Accession No.                         | 3. Recipient's Catalog No.                                                                                                                                                                                                                                                                                                          |           |                         |                      |  |  |       |           |        |                                           |     |      |     |                                    |    |    |    |                                                            |   |      |      |                                 |    |     |    |                                |    |     |    |
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| 4. Title and Subtitle<br>Final Report of New Car Assessment Program<br>Side Impact Pole Testing of a 2012 Chevrolet Camaro 1LS 2-Dr Coupe, NHTSA No.: MC0108                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                     | 5. Report Date<br>November 21, 2011                                                                                                                                                                                                                                                                                                 |           |                         |                      |  |  |       |           |        |                                           |     |      |     |                                    |    |    |    |                                                            |   |      |      |                                 |    |     |    |                                |    |     |    |
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| 7. Author(s)<br>Donna Janovicz, Project Manager<br>Ben Fischer, Project Engineer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                     | 8. Performing Organization Report No.<br>SPNCAP-MGA-2012-016                                                                                                                                                                                                                                                                        |           |                         |                      |  |  |       |           |        |                                           |     |      |     |                                    |    |    |    |                                                            |   |      |      |                                 |    |     |    |                                |    |     |    |
| 9. Performing Organization Name and Address<br>MGA Research Corporation<br>5000 Warren Road<br>Burlington, WI 53105                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                     | 10. Work Unit No.                                                                                                                                                                                                                                                                                                                   |           |                         |                      |  |  |       |           |        |                                           |     |      |     |                                    |    |    |    |                                                            |   |      |      |                                 |    |     |    |                                |    |     |    |
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| 12. Sponsoring Agency Name and Address<br>United States Department of Transportation<br>National Highway Traffic Safety Administration<br>Office of Crashworthiness Standards (NVS-111)<br>1200 New Jersey Ave, SE, Room W43-410<br>Washington, DC 20590                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                     | 13. Type of Report and Period Covered:<br>Final Test Report<br>October 24 to November 21, 2011                                                                                                                                                                                                                                      |           |                         |                      |  |  |       |           |        |                                           |     |      |     |                                    |    |    |    |                                                            |   |      |      |                                 |    |     |    |                                |    |     |    |
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| 15. Supplementary Notes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                     |                                                                                                                                                                                                                                                                                                                                     |           |                         |                      |  |  |       |           |        |                                           |     |      |     |                                    |    |    |    |                                                            |   |      |      |                                 |    |     |    |                                |    |     |    |
| <p>16. Abstract</p> <p>A 32.2 km/h (20 mph), 75° oblique impact Side NCAP Test was conducted on the subject 2012 Chevrolet Camaro 1LS 2-Dr Coupe in accordance with the specifications of the Office of Crashworthiness Standards Side NCAP Pole Laboratory Test Procedure for the generation of consumer information on vehicle side pole crash protection. The test was conducted at MGA Research Corporation, in Burlington, Wisconsin, on October 24, 2011.</p> <p>The impact velocity was 32.0 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 21.8°C. The test vehicle post-test maximum crush was 395 mm at level 3. The test vehicle's performance was as follows:</p> <table border="1" style="margin: 10px auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th colspan="3">Driver ATD (SID-IIs)</th> </tr> <tr> <th>Units</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC<sub>36</sub>)</td> <td>N/A</td> <td>1000</td> <td>317</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td>Gs</td> <td>82</td> <td>45</td> </tr> <tr> <td>Total Pelvic Force<br/>(sum of acetabular and iliac forces)</td> <td>N</td> <td>5525</td> <td>2637</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38*</td> <td>20</td> </tr> <tr> <td>Maximum Abdomen Rib Deflection</td> <td>mm</td> <td>45*</td> <td>18</td> </tr> </tbody> </table> <p style="text-align: right; margin-right: 50px;">* Proposed IARV</p> <p>The door on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite door did not open during the side impact event.</p> |                                                     |                                                                                                                                                                                                                                                                                                                                     |           | Measurement Description | Driver ATD (SID-IIs) |  |  | Units | Threshold | Result | Head Injury Criteria (HIC <sub>36</sub> ) | N/A | 1000 | 317 | Resultant Lower Spine Acceleration | Gs | 82 | 45 | Total Pelvic Force<br>(sum of acetabular and iliac forces) | N | 5525 | 2637 | Maximum Thoracic Rib Deflection | mm | 38* | 20 | Maximum Abdomen Rib Deflection | mm | 45* | 18 |
| Measurement Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Driver ATD (SID-IIs)                                |                                                                                                                                                                                                                                                                                                                                     |           |                         |                      |  |  |       |           |        |                                           |     |      |     |                                    |    |    |    |                                                            |   |      |      |                                 |    |     |    |                                |    |     |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Units                                               | Threshold                                                                                                                                                                                                                                                                                                                           | Result    |                         |                      |  |  |       |           |        |                                           |     |      |     |                                    |    |    |    |                                                            |   |      |      |                                 |    |     |    |                                |    |     |    |
| Head Injury Criteria (HIC <sub>36</sub> )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | N/A                                                 | 1000                                                                                                                                                                                                                                                                                                                                | 317       |                         |                      |  |  |       |           |        |                                           |     |      |     |                                    |    |    |    |                                                            |   |      |      |                                 |    |     |    |                                |    |     |    |
| Resultant Lower Spine Acceleration                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Gs                                                  | 82                                                                                                                                                                                                                                                                                                                                  | 45        |                         |                      |  |  |       |           |        |                                           |     |      |     |                                    |    |    |    |                                                            |   |      |      |                                 |    |     |    |                                |    |     |    |
| Total Pelvic Force<br>(sum of acetabular and iliac forces)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | N                                                   | 5525                                                                                                                                                                                                                                                                                                                                | 2637      |                         |                      |  |  |       |           |        |                                           |     |      |     |                                    |    |    |    |                                                            |   |      |      |                                 |    |     |    |                                |    |     |    |
| Maximum Thoracic Rib Deflection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | mm                                                  | 38*                                                                                                                                                                                                                                                                                                                                 | 20        |                         |                      |  |  |       |           |        |                                           |     |      |     |                                    |    |    |    |                                                            |   |      |      |                                 |    |     |    |                                |    |     |    |
| Maximum Abdomen Rib Deflection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | mm                                                  | 45*                                                                                                                                                                                                                                                                                                                                 | 18        |                         |                      |  |  |       |           |        |                                           |     |      |     |                                    |    |    |    |                                                            |   |      |      |                                 |    |     |    |                                |    |     |    |
| 17. Key Words<br>New Car Assessment Program (NCAP)<br>Side Impact<br>Pole<br>Part 572V<br>SID-IIs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                     | 18. Distribution Statement<br>Copies of this report are available from:<br>National Highway Traffic Safety Administration<br>Technical Information Services Division, NPO-411<br>1200 New Jersey Ave, SE, Room E12-100<br>Washington, DC 20590<br>Email: <a href="mailto:tis@nhtsa.dot.gov">tis@nhtsa.dot.gov</a> FAX: 202-493-2833 |           |                         |                      |  |  |       |           |        |                                           |     |      |     |                                    |    |    |    |                                                            |   |      |      |                                 |    |     |    |                                |    |     |    |
| 19. Security Classification of Report<br>Unclassified                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 20. Security Classification of Page<br>Unclassified | 21. No. of Pages<br>129                                                                                                                                                                                                                                                                                                             | 22. Price |                         |                      |  |  |       |           |        |                                           |     |      |     |                                    |    |    |    |                                                            |   |      |      |                                 |    |     |    |                                |    |     |    |

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## **SECTION 1**

### **TEST PURPOSE AND PROCEDURE**

This side impact test is part of the MY 2012 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-09-D-00124. The purpose of this test is to generate comparative side impact performance in a 2012 Chevrolet Camaro 1LS 2-Dr Coupe. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Pole Laboratory Test Procedure, dated August 2011.

## SECTION 2 SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a 2012 Chevrolet Camaro 1LS 2-Dr Coupe. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 32.0 km/h. The test was conducted by MGA Research Corporation in Burlington, Wisconsin, on October 24, 2011. Pre-test and post-test photographs of the test vehicle and side impact dummy (SID-IIs) are included in Appendix A of this report.

One Part 572V (SID-IIs) dummy was placed in the driver designated seating position according to instructions specified in the OCWS Side NCAP Pole Laboratory Test Procedure dated August 2011. Camera locations and other pertinent camera information are included in this report.

The Part 572V (SID-IIs) dummy was instrumented accordingly:

Primary and Redundant Head CG Triaxial Accelerometers  
Chest Upper Rib, Middle Rib, and Lower Rib Y-Axis Displacement Potentiometers  
Abdomen Upper Rib and Lower Rib Y-Axis Displacement Potentiometers  
Lower Spine (T12) Triaxial Accelerometers  
Acetabulum and Iliac Wing Y-Axis Load Cells

Appendix B contains the dummy response data. Dummy configuration and performance verification data can be found in Appendix C of this report. Appendix D contains the test equipment and instrumentation calibration data.

Injury readings for the SID-IIs dummy were recorded as follows:

| Measurement Description                                    | Driver ATD (SID-IIs) |           |        |
|------------------------------------------------------------|----------------------|-----------|--------|
|                                                            | Units                | Threshold | Result |
| Head Injury Criteria (HIC <sub>36</sub> )                  | N/A                  | 1000      | 317    |
| Resultant Lower Spine Acceleration                         | Gs                   | 82        | 45     |
| Total Pelvic Force<br>(sum of acetabular and iliac forces) | N                    | 5525      | 2637   |
| Maximum Thoracic Rib Deflection                            | mm                   | 38*       | 20     |
| Maximum Abdomen Rib Deflection                             | mm                   | 45*       | 18     |

\*Proposed IARV

Supplemental restraint information is given below:

### SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

| Restraint Type                   | Left Front (Driver)<br>Occupant Location 1 |          | Left Rear (Passenger)<br>Occupant Location 4 |          |
|----------------------------------|--------------------------------------------|----------|----------------------------------------------|----------|
|                                  | Mounted                                    | Deployed | Mounted                                      | Deployed |
| Frontal Airbag                   | Yes                                        | No       |                                              |          |
| Knee Airbag                      | No                                         |          |                                              |          |
| Side Curtain Airbag              | Yes                                        | Yes      | Yes                                          | Yes      |
| Side Torso/Abdomen/Pelvis Airbag | Yes                                        | Yes      | No                                           |          |
| Seat Belt Pretensioner           | Yes                                        | Yes      | No                                           |          |
| Seat Belt Load Limiter           | No                                         |          | No                                           |          |

The test data can be found on the NHTSA website at [www.nhtsa.dot.gov](http://www.nhtsa.dot.gov)

### **GENERAL COMMENTS**

There was no valid data collected for:

- Left Floor Sill Y after 74 msec.

- Left Mid B-Post Y after 10 msec.

- Driver Seat Track Y after 30 msec.

- Left Lower A-Post Y, questionable data between 10-13 msec. and 35-39 msec.

- Left Lower B-Post Y, questionable data between 15-25 msec.

The Load Cell Pole data was not recorded.

MGA does not endorse or certify products. The manufacturer's name appears solely for identification purposes.

**SECTION 3**  
**OCCUPANT AND VEHICLE INFORMATION**

**DATA SHEET NO. 1**  
**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2012 Chevrolet Camaro 1LS 2-Dr Coupe  
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MC0108  
 Test Date: 10/24/2011

**TEST VEHICLE INFORMATION AND OPTIONS**

|                                                                           |                   |                                   |     |
|---------------------------------------------------------------------------|-------------------|-----------------------------------|-----|
| NHTSA No.                                                                 | MC0108            | Traction Control System (TCS)     | Yes |
| Model Year                                                                | 2012              | Auto-Leveling System              | No  |
| Make                                                                      | Chevrolet         | Automatic Door Locks (ADL)        | Yes |
| Model                                                                     | Camaro            | Power Window Auto-Reverse         | Yes |
| Body Style                                                                | Coupe             | Other Optional Feature            | N/A |
| VIN                                                                       | 2G1FE1E35C9117533 | Driver Front Airbag               | Yes |
| Body Color                                                                | Victory Red       | Driver Curtain Airbag             | Yes |
| Odometer Reading (km/mi)                                                  | 45 / 28           | Driver Head/Torso Airbag          | No  |
| Engine Displacement (L)                                                   | 3.6               | Driver Torso Airbag               | No  |
| Type/No. Cylinders                                                        | 6                 | Driver Torso/Pelvis Airbag        | Yes |
| Engine Placement                                                          | Longitudinal      | Driver Pelvis Airbag              | No  |
| Transmission Type                                                         | Manual            | Driver Knee Airbag                | No  |
| Transmission Speeds                                                       | 6                 | Rear Pass. Curtain Airbag         | Yes |
| Overdrive                                                                 | No                | Rear Pass. Head/Torso Airbag      | No  |
| Final Drive                                                               | Rear              | Rear Pass. Torso Airbag           | No  |
| Roof Rack                                                                 | No                | Rear Pass. Torso/Pelvis Airbag    | No  |
| Sunroof/T-Top                                                             | No                | Rear Pass. Pelvis Airbag          | No  |
| Running Boards                                                            | No                | Driver Seat Belt Pretensioner     | Yes |
| Tilt Steering Wheel                                                       | Yes               | Rear Pass. Seat Belt Pretensioner | No  |
| Power Seats                                                               | No                | Driver Load Limiter               | No  |
| Anti-Lock Brakes (ABS)                                                    | Yes               | Rear Pass. Load Limiter           | No  |
| All Wheel Drive (AWD)                                                     | No                | Other Safety Restraint            | N/A |
| Does owner's manual provide instruction to turn off automatic door locks? |                   |                                   | No  |

**DATA FROM CERTIFICATION LABEL**

|                     |                               |                 |      |
|---------------------|-------------------------------|-----------------|------|
| Manufactured By     | General Motors of Canada Ltd. | GVWR (kg)       | 2072 |
| Date of Manufacture | 08/11                         | GAWR Front (kg) | 965  |
| Vehicle Type        | Passenger Car                 | GAWR Rear (kg)  | 1107 |

**VEHICLE SEATING AND WEIGHT CAPACITY DATA**

| Measured Parameter                    | Front | Rear | Third | Total |       |
|---------------------------------------|-------|------|-------|-------|-------|
| Designated Seating Capacity (DSC)     | 2     | 2    |       | 4     |       |
| Capacity Weight (VCW) (kg)            |       |      |       | 332   | (A)   |
| DSC x 68.04 kg                        |       |      |       | 272   | (B)   |
| Rated Cargo and Luggage Weight (RCLW) |       |      |       | 60    | (A-B) |

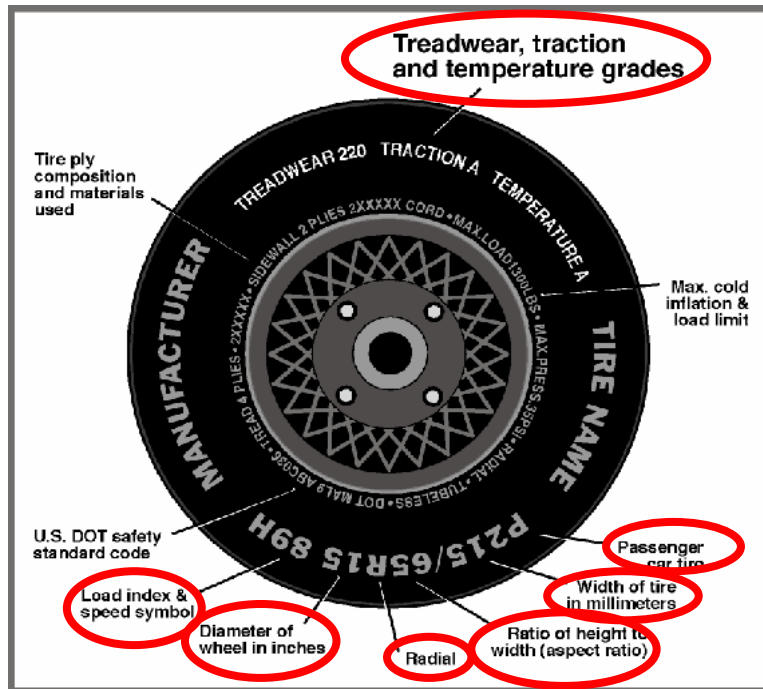
**VEHICLE SEAT TYPE**

| Seating Location   | Type of Seat Pan |       |             |           | Type of Seat Back |            |       |
|--------------------|------------------|-------|-------------|-----------|-------------------|------------|-------|
|                    | Bucket           | Bench | Split Bench | Contoured | Fixed             | Adjustable |       |
|                    |                  |       |             |           |                   | Manual     | Power |
| Front Seat         | X                |       |             |           |                   |            | X     |
| Rear or Second Row |                  | X     |             |           | X                 |            |       |
| Third Row Seat     |                  |       |             |           |                   |            |       |

**DATA SHEET NO. 1 (CONTINUED)**  
**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2012 Chevrolet Camaro 1LS 2-Dr Coupe  
Test Program: NCAP Side Pole Impact Test

NHTSA No. MC0108  
Test Date: 10/24/2011



## TIRE PLACARD INFORMATION

| Measured Parameter                   | Front     | Rear      |
|--------------------------------------|-----------|-----------|
| Recommended Cold Tire Pressure (kPa) | 240       | 240       |
| Recommended Tire Size                | 245/55R18 | 245/55R18 |

## TIRE SIDEWALL INFORMATION

| Measured Parameter       | Front           | Rear            |
|--------------------------|-----------------|-----------------|
| Max. Tire Pressure (kPa) | 300             | 300             |
| Tire Size on Vehicle     | 245/55R18       | 245/55R18       |
| Tire Manufacturer        | B.F. Goodrich   | B.F. Goodrich   |
| Tire Name                | Radial T/A Spec | Radial T/A Spec |
| Tire Type                | Passenger       | Passenger       |
| Tire Width               | 245             | 245             |
| Aspect Ratio             | 55              | 55              |
| Radial                   | Yes             | Yes             |
| Wheel Diameter           | 18              | 18              |
| Load Index/Speed Symbol  | 102T            | 102T            |
| Treadwear                | 620             | 620             |
| Traction Grade           | A               | A               |
| Temperature Grade        | B               | B               |
| Tire Material            | Rubber          | Rubber          |

**DATA SHEET NO. 1 (CONTINUED)**  
**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2012 Chevrolet Camaro 1LS 2-Dr Coupe NHTSA No. MC0108  
 Test Program: NCAP Side Pole Impact Test Test Date: 10/24/2011

**TEST PRESSURES**

|                | Units | LF  | RF  | LR  | RR  |
|----------------|-------|-----|-----|-----|-----|
| As Delivered   | kpa   | 240 | 240 | 240 | 240 |
| Tire Placard   | kpa   | 240 | 240 | 240 | 240 |
| Owner's Manual | kpa   |     |     |     |     |
| As Tested      | kpa   | 240 | 240 | 240 | 240 |

**TEST VEHICLE AXLE WEIGHTS**

|        | Units | As Delivered (UVW) |       |        | As Tested (ATW) |       |        | Fully Loaded |       |        |
|--------|-------|--------------------|-------|--------|-----------------|-------|--------|--------------|-------|--------|
|        |       | Front              | Rear  | Total  | Front           | Rear  | Total  | Front        | Rear  | Total  |
| Left   | kg    | 445.4              | 423.2 |        | 454.0           | 466.8 |        | 461.8        | 475.4 |        |
| Right  | kg    | 431.8              | 421.9 |        | 444.1           | 462.2 |        | 432.7        | 464.5 |        |
| Ratio  | %     | 50.9               | 49.1  |        | 49.2            | 50.8  |        | 48.8         | 51.2  |        |
| Totals | kg    | 877.2              | 845.1 | 1722.3 | 898.1           | 929.0 | 1827.1 | 894.5        | 939.9 | 1834.4 |

**TARGET TEST WEIGHT CALCULATION**

| Measured Parameter                              | Units | Value  |         |
|-------------------------------------------------|-------|--------|---------|
| Total Delivered Weight (UVW)                    | kg    | 1722.3 | (A)     |
| Actual Weight of 1 P572V ATD (SID-IIs) ATD Used | kg    | 52.2   | (B)     |
| Rated Cargo/Luggage Weight (RCLW)               | kg    | 60     | (C)     |
| Calculated Vehicle Target Weight (TVTW)         | kg    | 1834.5 | (A+B+C) |

Does the measured As Tested Vehicle Weight lie within the required weight range (i.e. Calculated Test Vehicle Target Weight – 4.5 kg to 9 kg)? **YES**

**WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW**

| Component Description                                                                                                                                               | Weight (kg) |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Weight of Ballast, if any                                                                                                                                           | 20.0        |
| Right tail light, jack & tools, spare tire, trunk carpet, right side mirror, rear deck plastic, c-pillar trim on right side, rear speakers, right side rear window. | 28.6        |

**TEST VEHICLE ATTITUDES AND CG**

|                                                                | Units | As Delivered | As Tested | Fully Loaded | Meets Requirement*** |
|----------------------------------------------------------------|-------|--------------|-----------|--------------|----------------------|
| Driver Door Sill Angle (front-to-rear)*                        | deg   | 0.0          | 0.1       | 0.2          | Yes                  |
| Front Pass. Sill Angle (front-to-rear)*                        | deg   | -0.2         | -0.2      | 0.0          | Yes                  |
| Front Bumper Angle (left-to-right)**                           | deg   | 0.0          | -0.1      | -0.1         | Yes                  |
| Rear Bumper Angle (left-to-right)**                            | deg   | 0.0          | 0.0       | -0.1         | Yes                  |
| Vehicle CG (Aft of Front Axle)                                 | mm    | 1401         | 1452      | 1463         |                      |
| Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline) | mm    | 7            | 6         | 18           |                      |

\*ND=Nose Down (-), NU=Nose Up (+)      \*\* LD=Left Down (-), LU=Left Up (+)

\*\*\* The "As Tested" vehicle attitude measurements must be equal to or between the "As Delivered" and "Fully Loaded" vehicle attitude measurements.

**DATA SHEET NO. 2**  
**SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEM DATA**

Test Vehicle: 2012 Chevrolet Camaro 1LS 2-Dr Coupe  
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MC0108  
 Test Date: 10/24/2011

**SEAT POSITIONING**

The driver's seat, front center seat (if applicable), and right front passenger's seat should be set to the forward-most, mid-height, mid-angle position. The struck-side rear passenger's seat, rear center seat, and non-struck side rear passenger's seats should be set to the rear-most, lowest, mid-angle position.

**SCRL ANGLE RANGE**

| Seat                      | SCRL (°) |       |       |
|---------------------------|----------|-------|-------|
|                           | Max      | Min   | Mid   |
| Driver Seat               | 21.0     | 16.0  | 18.5  |
| Front Passenger Seat      | Fixed    | Fixed | Fixed |
| Front Center Seat         |          |       |       |
| Struck Side Rear Seat     | Fixed    | Fixed | Fixed |
| Non-Struck Side Rear Seat | Fixed    | Fixed | Fixed |
| Rear Center Seat          |          |       |       |

**SEAT HEIGHT AND ANGLE**

| Seat                      | As Tested<br>SCRL Angle<br>(Mid) (°) | As Tested<br>SCR Height<br>(mm) | SCR Height<br>Position | SCR Height (mm) |              |              |
|---------------------------|--------------------------------------|---------------------------------|------------------------|-----------------|--------------|--------------|
|                           |                                      |                                 |                        | Rear-most       | Mid-Fore/Aft | Forward-Most |
| Driver Seat               | 18.5                                 | Fixed                           | Max                    | Fixed           | Fixed        | Fixed        |
|                           | 18.5                                 | Fixed                           | Mid                    | Fixed           | Fixed        | Fixed        |
|                           | 18.5                                 | Fixed                           | Min                    | Fixed           | Fixed        | Fixed        |
| Front Passenger Seat      | Fixed                                | Fixed                           | Max                    | Fixed           | Fixed        | Fixed        |
|                           | Fixed                                | Fixed                           | Mid                    | Fixed           | Fixed        | Fixed        |
|                           | Fixed                                | Fixed                           | Min                    | Fixed           | Fixed        | Fixed        |
| Front Center Seat         |                                      |                                 | Max                    |                 |              |              |
|                           |                                      |                                 | Mid                    |                 |              |              |
|                           |                                      |                                 | Min                    |                 |              |              |
| Struck Side Rear Seat     | Fixed                                | Fixed                           | Max                    | Fixed           | Fixed        | Fixed        |
|                           | Fixed                                | Fixed                           | Mid                    | Fixed           | Fixed        | Fixed        |
|                           | Fixed                                | Fixed                           | Min                    | Fixed           | Fixed        | Fixed        |
| Non-Struck Side Rear Seat | Fixed                                | Fixed                           | Max                    | Fixed           | Fixed        | Fixed        |
|                           | Fixed                                | Fixed                           | Mid                    | Fixed           | Fixed        | Fixed        |
|                           | Fixed                                | Fixed                           | Min                    | Fixed           | Fixed        | Fixed        |
| Rear Center Seat          |                                      |                                 | Max                    |                 |              |              |
|                           |                                      |                                 | Mid                    |                 |              |              |
|                           |                                      |                                 | Min                    |                 |              |              |

**DATA SHEET NO. 2 (CONTINUED)**  
**SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT, AND FUEL SYSTEM DATA**

Test Vehicle: 2012 Chevrolet Camaro 1LS 2-Dr Coupe  
 Test Program: NCAP Side Pole Impact Test

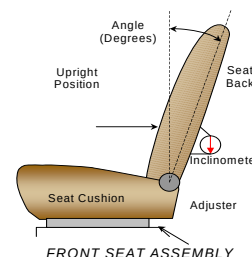
NHTSA No. MC0108  
 Test Date: 10/24/2011

**SEAT FORE/AFT POSITIONS**

| Seat                  | Total Fore/Aft Travel |                           | Test Position from Forward-most Position |                          |
|-----------------------|-----------------------|---------------------------|------------------------------------------|--------------------------|
|                       | mm                    | Detents                   | mm                                       | Detent                   |
| Driver Seat           | 216                   | 49 (1 <sup>st</sup> as 1) | 0                                        | 0 (1 <sup>st</sup> as 0) |
| Front Passenger Seat  | 211                   | 48 (1 <sup>st</sup> as 1) | 0                                        | 0 (1 <sup>st</sup> as 0) |
| Front Center Seat     |                       |                           |                                          |                          |
| Struck Side Rear Seat | Fixed                 | Fixed                     | Fixed                                    | Fixed                    |
| Non-Struck Side       | Fixed                 | Fixed                     | Fixed                                    | Fixed                    |
| Rear Center Seat      | Fixed                 | Fixed                     | Fixed                                    | Fixed                    |

**SEAT BACK ANGLE ADJUSTMENT**

The driver's seat back is positioned such that the dummy's head is level. The front center and front passenger's seat backs are positioned in a similar manner as the driver's seat back. The struck-side rear passenger seat back is positioned in accordance with the information provided by the manufacturer on Form No. 1 for the 5<sup>th</sup> percentile female dummy in a Side NCAP MDB test. The rear center and non-struck side rear passenger's seat back is set to match the struck-side rear seat back.



| Seat                       | Total Seat Back Angle Range |         | Test Position from Vertical |        |
|----------------------------|-----------------------------|---------|-----------------------------|--------|
|                            | Degrees                     | Detents | Degrees                     | Detent |
| Driver Seat w/Seated Dummy | 72.8                        |         | -4.2                        |        |
| Front Passenger Seat       | 72.9                        |         | -4.2                        |        |
| Front Center Seat          |                             |         |                             |        |
| Struck Side Rear Seat      | Fixed                       |         | Fixed                       | Fixed  |
| Non-Struck Side Rear Seat  | Fixed                       |         | Fixed                       | Fixed  |
| Rear Center Seat           | Fixed                       |         | Fixed                       | Fixed  |

**SEAT BELT ANCHORAGE ADJUSTMENT**

Seat belt anchorages are adjusted in accordance with the information provided by the manufacturer on Form No. 1.

|             | Total # of Positions | Placed in Position # |
|-------------|----------------------|----------------------|
| Driver Seat | Fixed                | Not Applicable       |

**HEAD RESTRAINT ADJUSTMENT**

Head restraints are adjusted to the lowest and most full forward in-use position.

|             | Total # of Positions | Placed in Position # |
|-------------|----------------------|----------------------|
| Driver Seat | 6                    | Lowest               |

**DATA SHEET NO. 2 (CONTINUED)**  
**SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT, AND FUEL SYSTEM DATA**

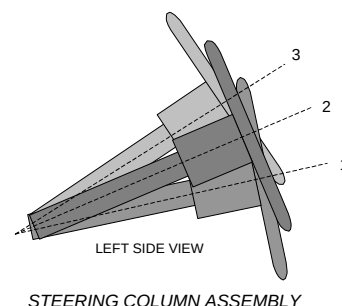
Test Vehicle: 2012 Chevrolet Camaro 1LS 2-Dr Coupe  
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MC0108  
 Test Date: 10/24/2011

**STEERING COLUMN ADJUSTMENT**

Steering wheel and column adjustments are made so that the steering wheel geometric locus is described when it moves through its full range of motion.

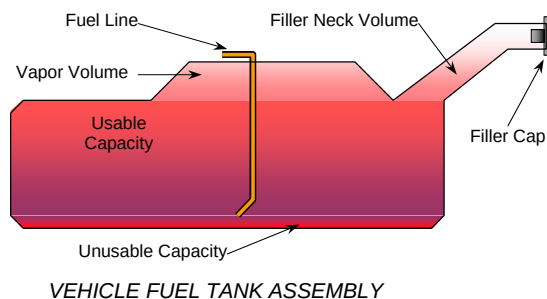
|                                   | Degrees | Fore/Aft Position (mm) |
|-----------------------------------|---------|------------------------|
| Lowermost, Position 1             | 73.5    | 183                    |
| Geometric Center, Position 2      | 71.4    | 162                    |
| Uppermost, Position 3             | 69.2    | 141                    |
| Telescoping Steering Wheel Travel |         | 42                     |
| Test Position                     | 71.4    | 162                    |



**FUEL PUMP**

Describe the fuel pump type, details about how it operates and the location of the fuel filler pipe.

The fuel pump is activated during "crank/run" for 2 seconds. If "crank/run" goes off before the 2 seconds is up, the fuel pump will turn off. At the end of 2 seconds, the fuel pump will be "on" whenever the engine is running. The fuel pipe is on the right side.



**FUEL TANK CAPACITY DATA**

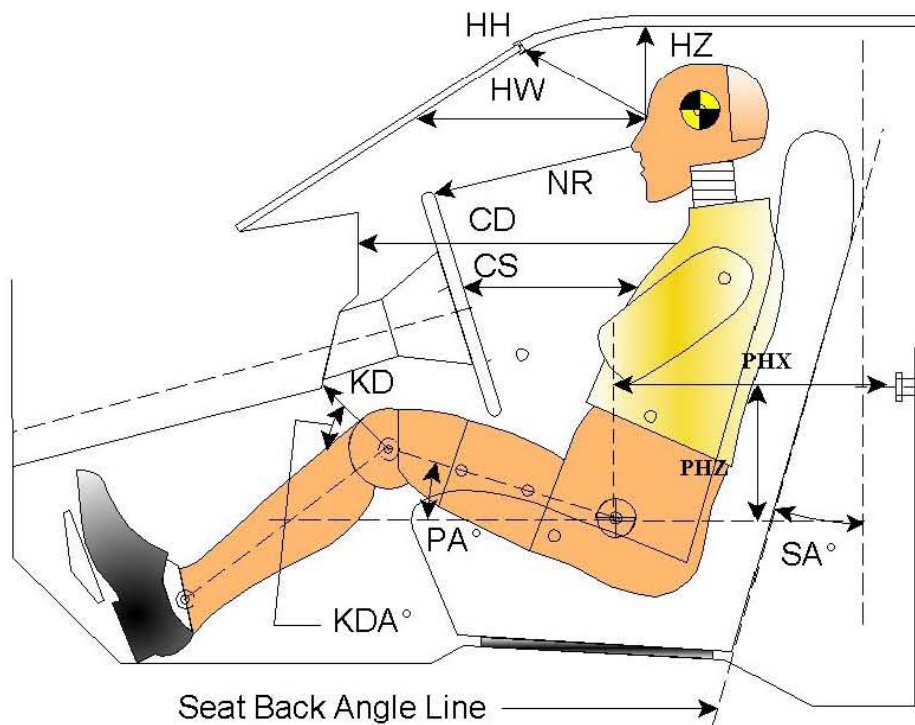
|                                                                 | Liters |
|-----------------------------------------------------------------|--------|
| Usable Capacity of "Standard Tank" (see Form No. 1)             | 71.9   |
| Usable Capacity of "Optional Tank" (see Form No. 1)             |        |
| Usable Capacity of Standard Tank as Specified in Owner's Manual | 71.0   |
| Usable Capacity of Optional Tank as Specified in Owner's Manual |        |
| 93% of Usable Capacity                                          | 66.9   |
| Actual Amount of Solvent Used                                   | 66.9   |
| 1/3 of Usable Capacity                                          | 24.0   |

Is the actual amount of solvent used in the test equal to 93%  $\pm$  1% of the Usable Capacity stated in Form No. 1? **YES**

**.DATA SHEET NO. 3**  
**DUMMY LONGITUDINAL CLEARANCE DIMENSIONS**

Test Vehicle: 2012 Chevrolet Camaro 1LS 2-Dr Coupe  
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MC0108  
 Test Date: 10/24/2011



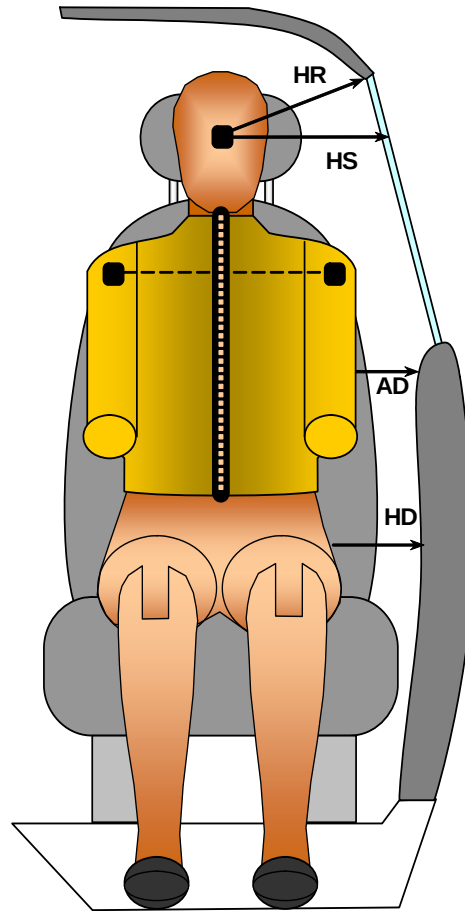
**LEFT SIDE VIEW**

| Code      | Measurement Description       | Driver S/N 296 |           |
|-----------|-------------------------------|----------------|-----------|
|           |                               | Length (mm)    | Angle (°) |
| HH        | Head to Header                | 288            |           |
| HW        | Head to Windshield            | 605            |           |
| HZ        | Head to Roof Liner            | 182            |           |
| NR        | Nose to Rim                   | 203            |           |
| CD        | Chest to Dashboard            | 440            |           |
| CS        | Chest to Steering Wheel       | 184            |           |
| KDL/KDAL° | Left Knee to Dash             | 147            | 45.2      |
| KDR/KDAR° | Right Knee to Dash            | 140            | 49.1      |
| PAX°      | Pelvic Tilt Angle (X-Axis)    |                | 21.3      |
| PAY°      | Pelvic Tilt Angle (Y-Axis)    |                | -0.2      |
| PHX       | Hip Point to Striker (X-Axis) | 641            |           |
| PHZ       | Hip Point to Striker (Z-Axis) | 186            |           |

**DATA SHEET NO. 4**  
**DUMMY LATERAL CLEARANCE DIMENSIONS**

Test Vehicle: 2012 Chevrolet Camaro 1LS 2-Dr Coupe  
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MC0108  
 Test Date: 10/24/2011



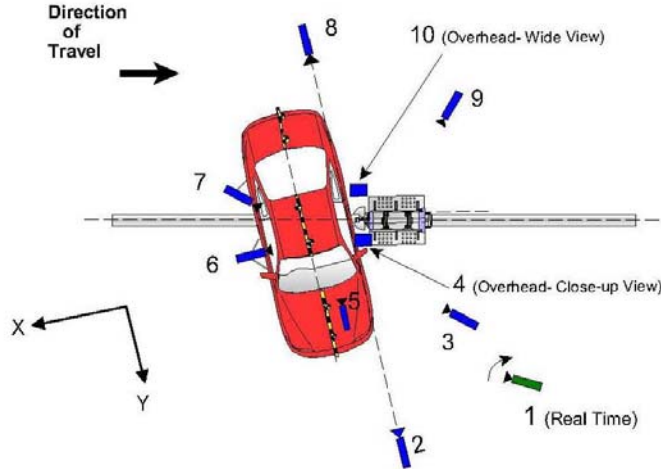
*FRONT VIEW OF DUMMY*

| Code | Measurement Description | Driver S/N 296 |
|------|-------------------------|----------------|
|      |                         | Length (mm)    |
| HR   | Head to Side Header     | 193            |
| HS   | Head to Side Window     | 343            |
| AD   | Arm to Door             | 179            |
| HD   | Hip Point to Door       | 154            |

**DATA SHEET NO. 5**  
**CAMERA AND INSTRUMENTATION DATA**

Test Vehicle: 2012 Chevrolet Camaro 1LS 2-Dr Coupe  
Test Program: NCAP Side Pole Impact Test

NHTSA No. MC0108  
Test Date: 10/24/2011



Reference: (from Point of Impact for X and Y; from Ground for Z):  
+X = Forward of Impact, + Y = Right of Impact, +Z = Down

| Camera No. | View                       | Coordinates (mm) |       |       | Lens (mm) | Film Speed (fps) |
|------------|----------------------------|------------------|-------|-------|-----------|------------------|
|            |                            | X*               | Y*    | Z*    |           |                  |
| 1          | Real-Time Pan View         |                  |       |       |           | 30               |
| 2          | Front Ground Level         | -70              | 5330  | -1730 | 24        | 1000             |
| 3          | Impact Side 45° Forward    | -2350            | 3930  | -1820 | 20        | 1000             |
| 4          | Overhead Closeup           | 150              | 0     | -4420 | 50        | 1000             |
| 5          | Onboard – Driver Front     |                  |       |       | 16        | 1000             |
| 6          | Onboard – Driver Side      |                  |       |       | 8         | 1000             |
| 7          | Onboard – Driver Rear      |                  |       |       | 8         | 1000             |
| 8          | Rear Ground Level          | -60              | -5450 | -1710 | 24        | 1000             |
| 9          | Impact Side 45° Rearward   | -3720            | -3560 | -1840 | 20        | 1000             |
| 10         | Overhead Wide View         | 310              | 0     | -4610 | 14        | 1000             |
| 11         | Real-Time Dummy Front View |                  |       |       |           | 30               |

\* All measurements accurate to  $\pm 6$  mm

Note: Vehicle was at a 15° angle to the rigid pole.

Explain why camera(s) did not operate as intended: Not Applicable

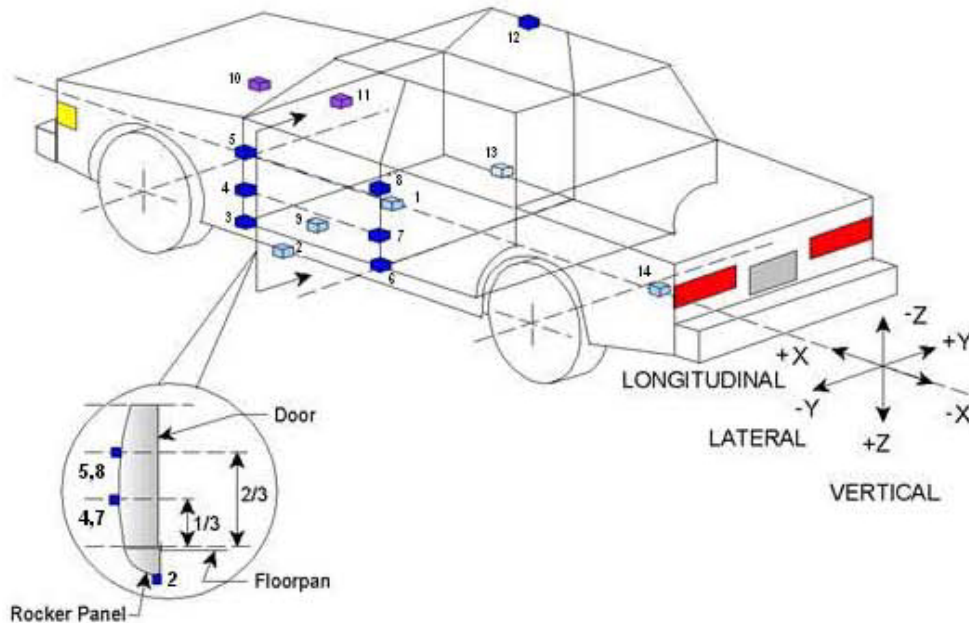
**INSTRUMENTATION**

| INSTRUMENTATION   | Number of Channels |
|-------------------|--------------------|
| Driver Dummy      | 16                 |
| Vehicle Structure | 18                 |
| Pole Load Cells   | 8                  |
| <b>TOTAL</b>      | <b>42</b>          |

**DATA SHEET NO. 6**  
**TEST VEHICLE ACCELEROMETER DATA**

Test Vehicle: 2012 Chevrolet Camaro 1LS 2-Dr Coupe  
Test Program: NCAP Side Pole Impact Test

NHTSA No. MC0108  
Test Date: 10/24/2011



|    | Accelerometer Location |                  |      |       |
|----|------------------------|------------------|------|-------|
|    | ID                     | Coordinates (mm) |      |       |
|    |                        | X                | Y    | Z     |
| 1  | Vehicle CG             | 2490             | 184  | -198  |
| 2  | Left Floor Sill        | 2740             | -750 | -170  |
| 3  | A Pillar Sill          | 3312             | -753 | -172  |
| 4  | A Pillar Low           | 3148             | -717 | -520  |
| 5  | A Pillar Mid           | 3075             | -790 | -738  |
| 6  | B Pillar Sill          | 1816             | -750 | -176  |
| 7  | B Pillar Low           | 1782             | -738 | -558  |
| 8  | B Pillar Mid           | 1782             | -736 | -720  |
| 9  | Driver Seat Track      | 2360             | -608 | -280  |
| 10 | Engine Top             | 3835             | 0    | -910  |
| 11 | Firewall               | 3530             | 0    | -912  |
| 12 | Right Roof             | 1732             | 505  | -1365 |
| 13 | Right Floor Sill       | 2760             | 750  | -175  |
| 14 | Rear Floorpan          | 250              | 0    | -430  |

Reference:

X – Test Vehicle Rear Bumper (+forward)  
Y – Test Vehicle Centerline (+ to right)  
Z – Ground Plane (+ down)

**DATA SHEET NO. 7**  
**RIGID POLE LOAD CELL DATA**

Test Vehicle: 2012 Chevrolet Camaro 1LS 2-Dr Coupe  
Test Program: NCAP Side Pole Impact Test

NHTSA No. MC0108  
Test Date: 10/24/2011



254 mm Diameter Rigid Pole

| Load Cell Locations |                                 |
|---------------------|---------------------------------|
| ID                  | Height From Impact Surface (mm) |
| 1                   | 182                             |
| 2                   | 470                             |
| 3                   | 698                             |
| 4                   | 986                             |
| 5                   | 1212                            |
| 6                   | 1641                            |
| 7                   | 1854                            |
| 8                   | 2053                            |

**DATA SHEET NO. 8**  
**POST-TEST OBSERVATIONS**

Test Vehicle: 2012 Chevrolet Camaro 1LS 2-Dr Coupe  
Test Program: NCAP Side Pole Impact Test

NHTSA No. MC0108  
Test Date: 10/24/2011

**TEST DUMMY INFORMATION AND CONTACT POINTS**

| Description       | Driver SID-IIs Dummy     |
|-------------------|--------------------------|
| Face              | Curtain Airbag           |
| Top of Head       | Curtain Airbag           |
| Left Side of Head | Curtain Airbag, Headrest |
| Back of Head      | Headrest                 |
| Left Shoulder     | Side Airbag, Seatback    |
| Upper Torso       | Side Airbag, Seatback    |
| Lower Torso       | Side Airbag, Seatback    |
| Left Hip          | Side Airbag, Seatpan     |
| Left Knee         | Door Panel               |

**POST-TEST DOOR PERFORMANCE**

| Description                                                        | Struck Side |      | Non-Struck Side |      | Rear Hatch/<br>Other Door |
|--------------------------------------------------------------------|-------------|------|-----------------|------|---------------------------|
|                                                                    | Front       | Rear | Front           | Rear |                           |
| Remained Closed and Operational                                    | No          |      | Yes             |      | Yes                       |
| Total Separation from Vehicle at Hinges or Latches                 | No          |      | No              |      | No                        |
| Latch or Hinge Systems Pulled Out of Their Anchorages              | No          |      | No              |      | No                        |
| Disengaged from Latched Position                                   | No          |      | No              |      | No                        |
| Latch Separated from Striker                                       | No          |      | No              |      | No                        |
| Jammed Shut                                                        | Yes         |      | No              |      | No                        |
| If Door Opened at Striker, Record Width of Opening at Striker (mm) |             |      |                 |      |                           |

**POST-TEST SEAT PERFORMANCE**

| Description                              | Struck Side |      | Non-Struck Side |      |
|------------------------------------------|-------------|------|-----------------|------|
|                                          | Front       | Rear | Front           | Rear |
| Seat Movement Along Seat Track           | No          | No   | No              | No   |
| Seat Disengagement from Floor Pan        | No          | No   | No              | No   |
| Seat Back Movement from Initial Position | No          | No   | No              | No   |
| Seat Back Collapse                       | No          | No   | No              | No   |

**POST-TEST STRUCTURAL OBSERVATIONS**

| Critical Areas of Performance | Observations and Conclusions |
|-------------------------------|------------------------------|
| Pillar Performance            | No Separation                |
| Sill Separation               | None                         |
| Windshield Damage             | Cracked                      |
| Side Window Damage            | Left Front Window Broke      |
| Other Notable Effects         | None                         |

**DATA SHEET NO. 8 (CONTINUED)**  
**POST-TEST OBSERVATIONS**

Test Vehicle: 2012 Chevrolet Camaro 1LS 2-Dr Coupe  
Test Program: NCAP Side Pole Impact Test

NHTSA No. MC0108  
Test Date: 10/24/2011

**SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION**

| Restraint Type                   | Left Front (Driver)<br>Occupant Location 1 |          | Left Rear (Passenger)<br>Occupant Location 4 |          |
|----------------------------------|--------------------------------------------|----------|----------------------------------------------|----------|
|                                  | Mounted                                    | Deployed | Mounted                                      | Deployed |
| Frontal Airbag                   | Yes                                        | No       |                                              |          |
| Knee Airbag                      | No                                         |          |                                              |          |
| Side Curtain Airbag              | Yes                                        | Yes      | Yes                                          | Yes      |
| Side Torso/Abdomen/Pelvis Airbag | Yes                                        | Yes      | No                                           |          |
| Seat Belt Pretensioner           | Yes                                        | Yes      | No                                           |          |
| Seat Belt Load Limiter           | No                                         |          | No                                           |          |

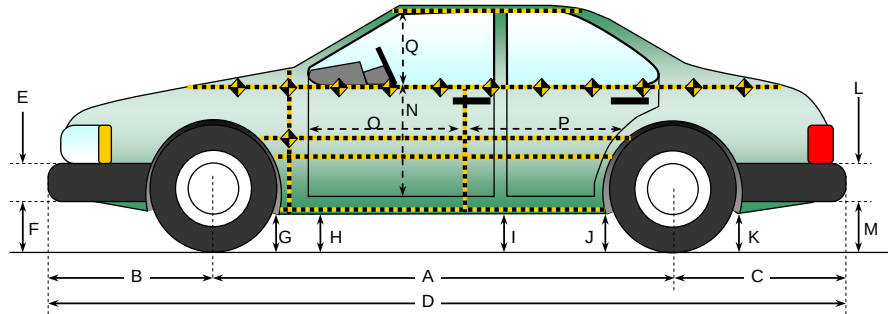
**VEHICLE SPEED, VEHICLE ANGLE AT IMPACT, AND IMPACT POINT LOCATION DATA**

| Measured Parameter                                                            | Units | Tolerance                          | Value |
|-------------------------------------------------------------------------------|-------|------------------------------------|-------|
| Vertical Impact Reference Line (Aft of Front Axle)<br>(Intended Impact Point) | mm    |                                    | 1368  |
| Actual Impact Point (Aft of Front Axle)                                       | mm    |                                    | 1363  |
| Horizontal Offset (+forward / -rearward)                                      | mm    | +/- 38 of Intended<br>Impact Point | +5    |
| Angle Between Vehicle's Longitudinal Centerline and<br>Line of Forward Motion | Deg   | 75 +/- 3                           | 75    |
| Trap No. 1 Velocity (Primary)                                                 | km/h  | 31.4 to 33.0                       | 32.0  |
| Trap No. 2 Velocity (Redundant)                                               | km/h  | 31.4 to 33.0                       | 32.1  |

**DATA SHEET NO. 9**  
**VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2012 Chevrolet Camaro 1LS 2-Dr Coupe  
Test Program: NCAP Side Pole Impact Test

NHTSA No. MC0108  
Test Date: 10/24/2011



All measurements in (mm) with tolerance of  $\pm 3$  mm

**LEFT SIDE VIEW**

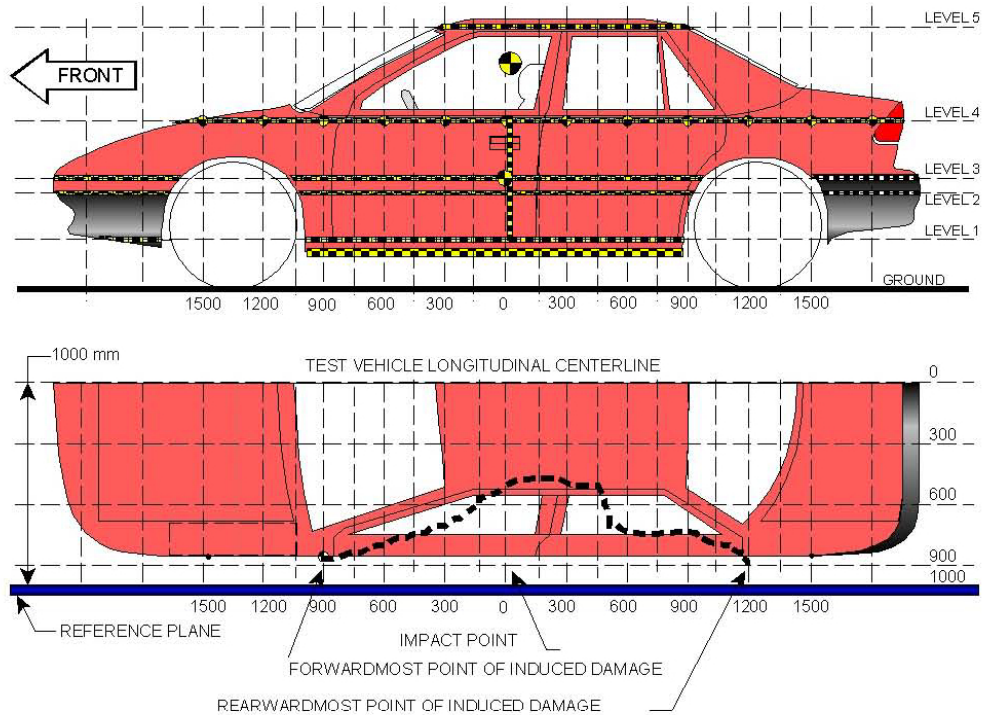
**VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION**

| Code | Measurement Description                    | Pre-Test | Post-Test | Difference |
|------|--------------------------------------------|----------|-----------|------------|
| A    | Wheelbase                                  | 2856     | 2819      | 37         |
| B    | Front Axle to FSOV                         | 922      | 912       | 10         |
| C    | Rear Axle to RSOV                          | 1060     | 1057      | 3          |
| D    | Total Vehicle Length at Centerline         | 4838     | 4788      | 50         |
| E    | Front Bumper Thickness                     | 135      | 135       | 0          |
| F    | Front Bumper Bottom to Ground              | 255      | 271       | -16        |
| G    | Sill Height at Front Wheel Well            | 158      | 147       | 11         |
| H    | Sill Height at Front Door Leading Edge     | 170      | 149       | 21         |
| I    | Sill Height at B Pillar                    | 166      | 163       | 3          |
| J1   | Sill Height at Rear Wheel Well             | 161      | 173       | -12        |
| J2   | Pinch Weld Height at Rear Wheel Well       | 163      | 189       | -26        |
| K    | Sill Height Aft of Rear Wheel Well         | 206      | 204       | 2          |
| L    | Rear Bumper Thickness                      | 120      | 120       | 0          |
| M    | Rear Bumper Bottom to Ground               | 429      | 413       | 16         |
| N    | Sill Height to Bottom of Front Window Sill | 719      | 720       | -1         |
| O    | Front Door Leading Edge to Impact CL       | 655      | 652       | 3          |
| P    | Rear Door Trailing Edge to Impact CL       | 757      | 738       | 19         |
| Q    | Front Window Opening                       | 335      | 290       | 45         |
| R    | Right Side Length                          | 4035     | 4045      | -10        |
| S    | Left Side Length                           | 4035     | 3899      | 136        |
| T    | Vehicle Width at B-Pillars                 | 1828     | 1759      | 69         |

# **DATA SHEET NO. 10** **VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2012 Chevrolet Camaro 1LS 2-Dr Coupe  
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MC0108  
 Test Date: 10/24/2011



NOTE: The measurements are taken along the vertical impact reference line.  
 Vehicle measurements forward of the vertical impact reference line are negative.

## **MAXIMUM EXTERIOR CRUSH MEASUREMENTS**

| Level | Measurement Description | Height Above Ground (mm) |
|-------|-------------------------|--------------------------|
| 1     | Sill Top                | 244                      |
| 2     | Occupant Hip Point      | 495                      |
| 3     | Mid Door                | 635                      |
| 4     | Window Sill             | 908                      |
| 5     | Window Top              | 1266                     |

**DATA SHEET NO. 10 (CONTINUED)**  
**VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2012 Chevrolet Camaro 1LS 2-Dr Coupe  
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MC0108  
 Test Date: 10/24/2011

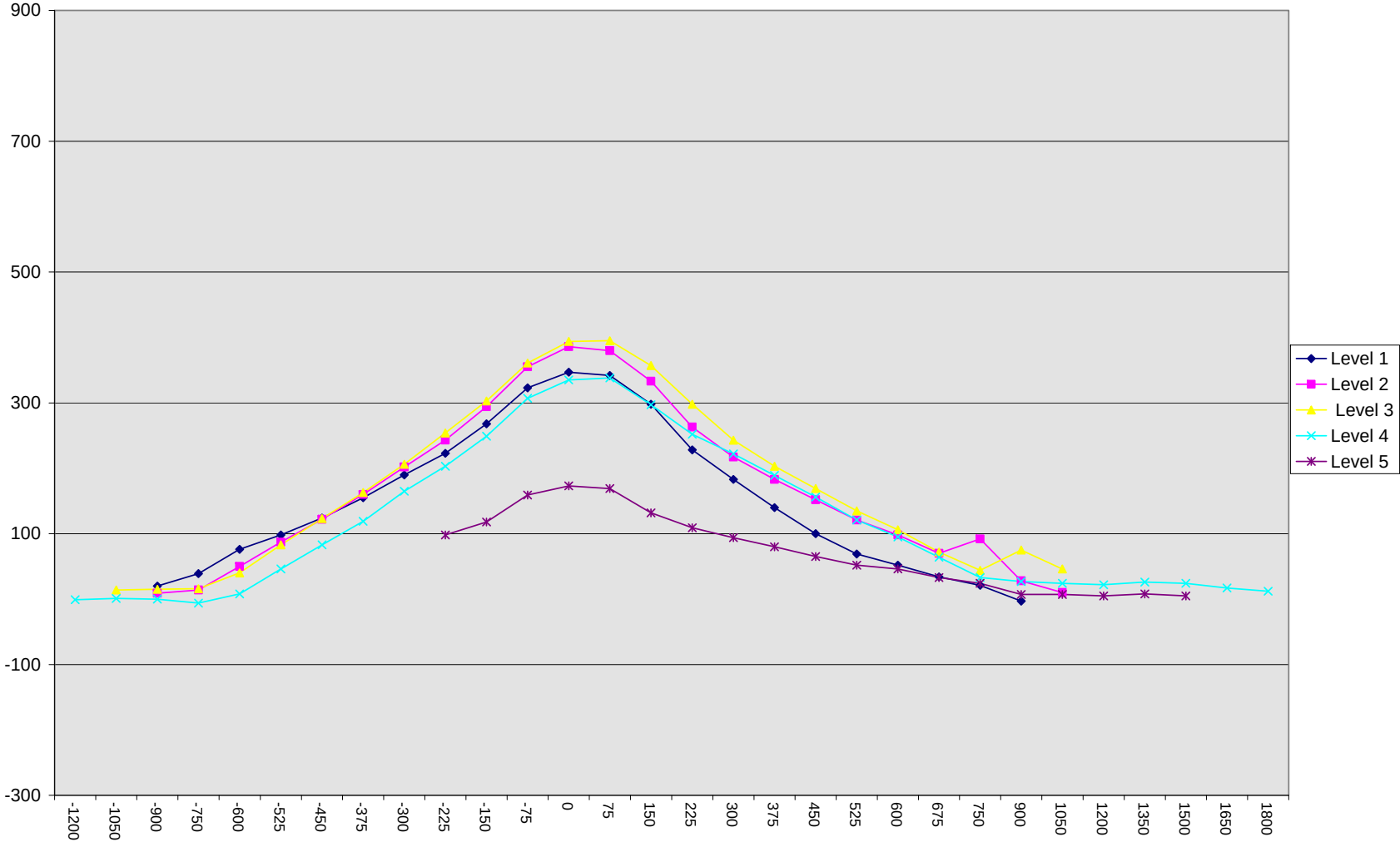
|       | Pre-Test |     |     |     |     | Post-Test |     |     |     |     | Difference |     |     |     |     |
|-------|----------|-----|-----|-----|-----|-----------|-----|-----|-----|-----|------------|-----|-----|-----|-----|
|       | 1        | 2   | 3   | 4   | 5   | 1         | 2   | 3   | 4   | 5   | 1          | 2   | 3   | 4   | 5   |
| -1200 |          |     |     | 232 |     |           |     |     | 231 |     |            |     |     | -1  |     |
| -1050 |          |     | 146 | 230 |     |           |     | 160 | 231 |     |            |     | 14  | 1   |     |
| -900  | 202      | 159 | 152 | 228 |     | 222       | 168 | 167 | 228 |     | 20         | 9   | 15  | 0   |     |
| -750  | 209      | 164 | 155 | 230 |     | 248       | 178 | 171 | 224 |     | 39         | 14  | 16  | -6  |     |
| -600  | 209      | 168 | 160 | 230 |     | 285       | 218 | 200 | 238 |     | 76         | 50  | 40  | 8   |     |
| -525  | 210      | 170 | 161 | 231 |     | 308       | 257 | 244 | 277 |     | 98         | 87  | 83  | 46  |     |
| -450  | 211      | 173 | 164 | 231 |     | 335       | 295 | 287 | 314 |     | 124        | 122 | 123 | 83  |     |
| -375  | 212      | 175 | 166 | 235 |     | 367       | 335 | 329 | 354 |     | 155        | 160 | 163 | 119 |     |
| -300  | 213      | 176 | 169 | 235 |     | 403       | 378 | 375 | 400 |     | 190        | 202 | 206 | 165 |     |
| -225  | 214      | 178 | 170 | 238 | 445 | 437       | 421 | 424 | 441 | 543 | 223        | 243 | 254 | 203 | 98  |
| -150  | 216      | 180 | 174 | 238 | 441 | 484       | 474 | 477 | 487 | 559 | 268        | 294 | 303 | 249 | 118 |
| -75   | 216      | 184 | 175 | 240 | 442 | 539       | 539 | 536 | 547 | 601 | 323        | 355 | 361 | 307 | 159 |
| 0     | 218      | 185 | 178 | 241 | 445 | 565       | 571 | 572 | 576 | 618 | 347        | 386 | 394 | 335 | 173 |
| 75    | 217      | 188 | 180 | 241 | 447 | 559       | 568 | 575 | 579 | 616 | 342        | 380 | 395 | 338 | 169 |
| 150   | 217      | 190 | 181 | 245 | 449 | 515       | 523 | 538 | 542 | 581 | 298        | 333 | 357 | 297 | 132 |
| 225   | 217      | 193 | 184 | 247 | 451 | 445       | 456 | 482 | 499 | 560 | 228        | 263 | 298 | 252 | 109 |
| 300   | 220      | 195 | 186 | 249 | 454 | 403       | 412 | 429 | 471 | 548 | 183        | 217 | 243 | 222 | 94  |
| 375   | 225      | 198 | 189 | 250 | 455 | 365       | 381 | 392 | 439 | 535 | 140        | 183 | 203 | 189 | 80  |
| 450   | 229      | 200 | 190 | 251 | 456 | 329       | 352 | 359 | 407 | 521 | 100        | 152 | 169 | 156 | 65  |
| 525   | 230      | 202 | 193 | 252 | 457 | 299       | 323 | 328 | 373 | 509 | 69         | 121 | 135 | 121 | 52  |
| 600   | 235      | 205 | 195 | 254 | 460 | 287       | 303 | 301 | 349 | 506 | 52         | 98  | 106 | 95  | 46  |
| 675   | 235      | 205 | 198 | 256 | 464 | 269       | 275 | 270 | 320 | 497 | 34         | 70  | 72  | 64  | 33  |
| 750   | 234      | 201 | 199 | 257 | 466 | 255       | 293 | 243 | 290 | 490 | 21         | 92  | 44  | 33  | 24  |
| 900   | 227      | 180 | 179 | 237 | 475 | 224       | 208 | 254 | 264 | 482 | -3         | 28  | 75  | 27  | 7   |
| 1050  |          | 156 | 154 | 220 | 493 |           | 166 | 200 | 244 | 500 |            | 10  | 46  | 24  | 7   |
| 1200  |          |     |     | 208 | 510 |           |     |     | 230 | 515 |            |     |     | 22  | 5   |
| 1350  |          |     |     | 202 | 530 |           |     |     | 228 | 538 |            |     |     | 26  | 8   |
| 1500  |          |     |     | 205 | 564 |           |     |     | 229 | 569 |            |     |     | 24  | 5   |
| 1650  |          |     |     | 215 |     |           |     |     | 232 |     |            |     |     | 17  |     |
| 1800  |          |     |     | 228 |     |           |     |     | 240 |     |            |     |     | 12  |     |

NOTE: Pre-test measurements are taken when the vehicle is in the "As Tested" weight condition. Vehicle measurements forward of the vertical impact reference line are negative. The crush profile grid is established prior to the test based on an estimated impact point. The final distance from impact is determined after the final dummy positioning and the pole is aligned with the center of gravity of the dummy's head.

**DATA SHEET NO. 10 (CONTINUED)**  
**VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2012 Chevrolet Camaro 1LS 2-Dr Coupe  
Test Program: NCAP Side Pole Impact Test

NHTSA No. MC0108  
Test Date: 10/24/2011



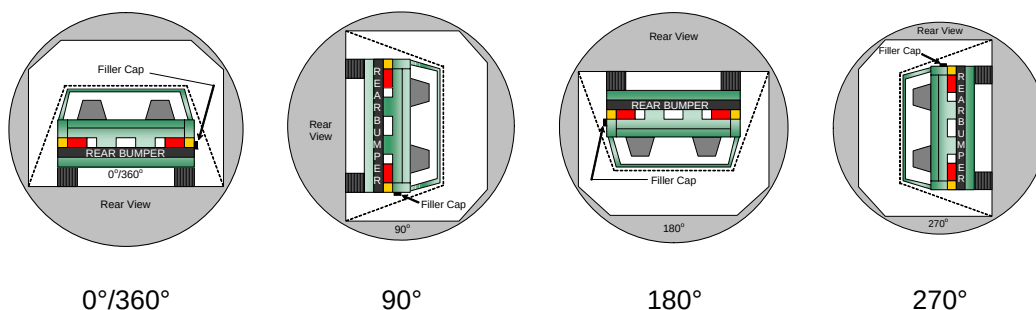
**DATA SHEET NO. 11**  
**FMVSS 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA**

Test Vehicle: 2012 Chevrolet Camaro 1LS 2-Dr Coupe NHTSA No. MC0108  
 Test Program: NCAP Side Pole Impact Test Test Date: 10/24/2011

Test Time: 10:41 am Temperature: 21.8° C

- A. From impact until vehicle motion ceases: 0 oz.  
 (Maximum Allowable = 1 ounce)  
 B. For the 5 minute period after motion ceases: None  
 (Maximum allowable = 5 ounces)  
 C. For the following 25 minutes: None  
 (Maximum allowable = 1 oz./minute)  
 D. Spillage Details: None

**FMVSS 301 STATIC ROLLOVER DATA**



**ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS**

| Test Phase   | Rotation Time | Hold Time | Total Time |
|--------------|---------------|-----------|------------|
| 0° to 90°    | 125           | 300       | 425        |
| 90° to 180°  | 114           | 300       | 414        |
| 180° to 270° | 110           | 300       | 410        |
| 270° to 360° | 116           | 300       | 416        |

**FMVSS 301 ROLLOVER SPILLAGE TABLE (units in ounces)**

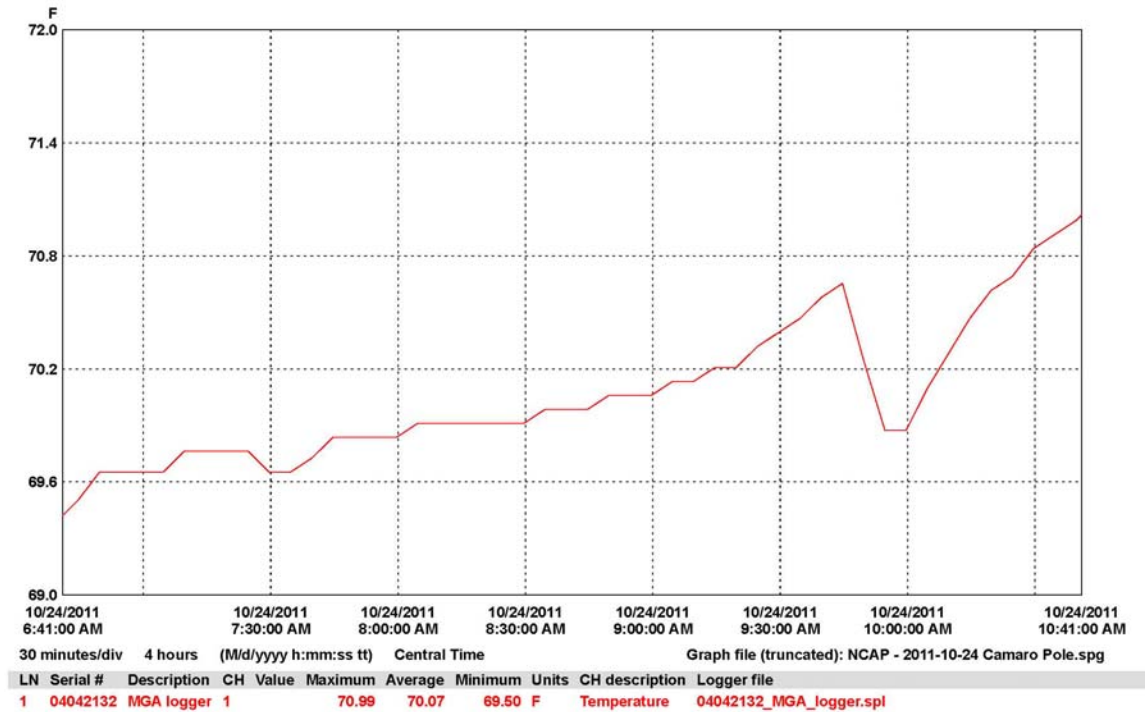
| Test Phase   | First 5 Minutes | Sixth Minute | Seventh Minute | Eight Minute |
|--------------|-----------------|--------------|----------------|--------------|
| 0° to 90°    | 0               | 0            | 0              | 0            |
| 90° to 180°  | 0               | 0            | 0              | 0            |
| 180° to 270° | 0               | 0            | 0              | 0            |
| 270° to 360° | 0               | 0            | 0              | 0            |

**ROLLOVER SOLVENT SPILLAGE LOCATION TABLE**

| Test Phase   | Spillage Location |
|--------------|-------------------|
| 0° to 90°    |                   |
| 90° to 180°  |                   |
| 180° to 270° |                   |
| 270° to 360° |                   |

# **DATA SHEET NO. 12** **DUMMY/VEHICLE TEMPERATURE STABILIZATION DATA**

Test Vehicle: 2012 Chevrolet Camaro 1LS 2-Dr Coupe      NHTSA No. MC0108  
Test Program: NCAP Side Pole Impact Test                      Test Date: 10/24/2011



**APPENDIX A**  
**PHOTOGRAPHS**

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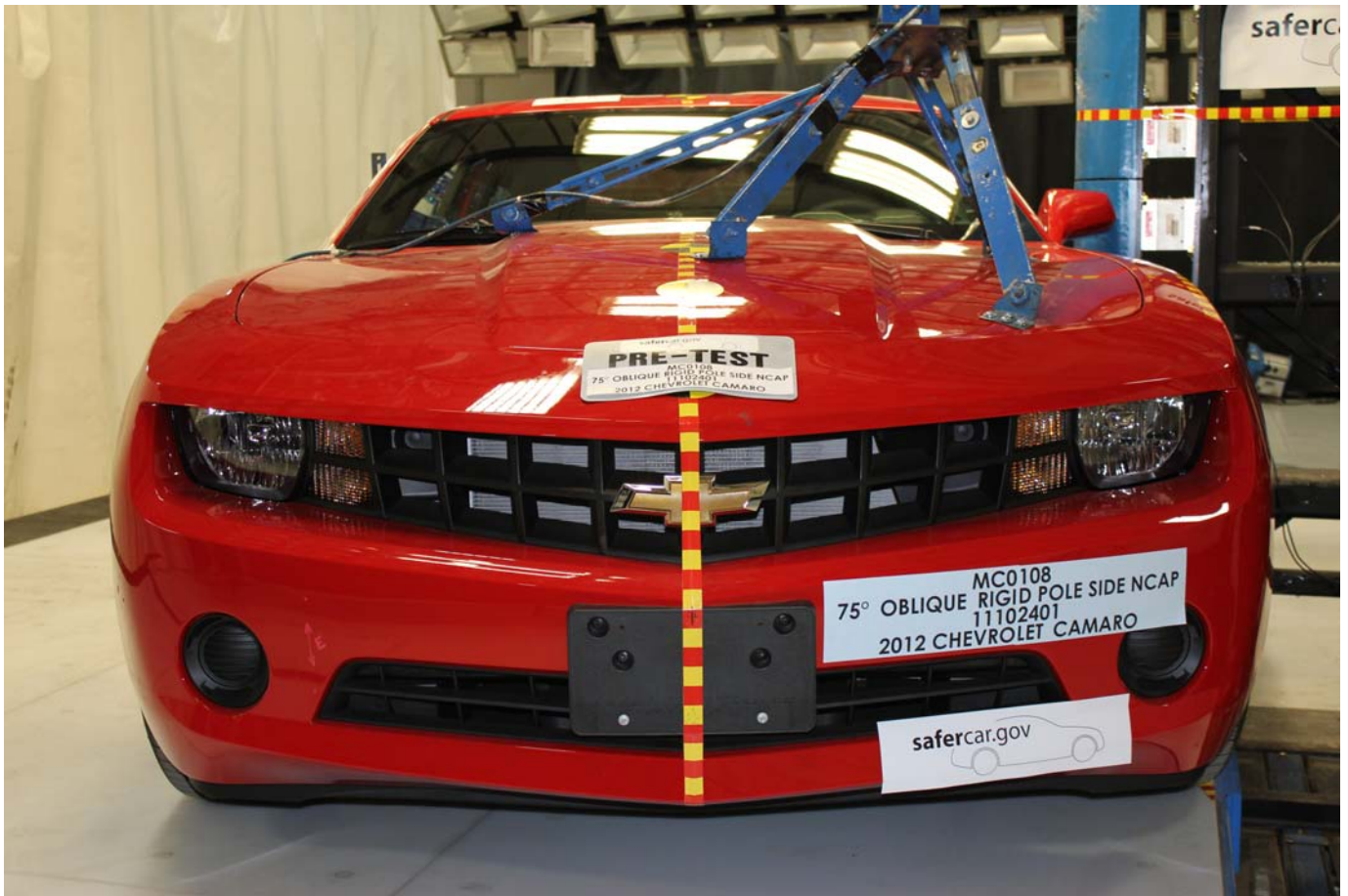
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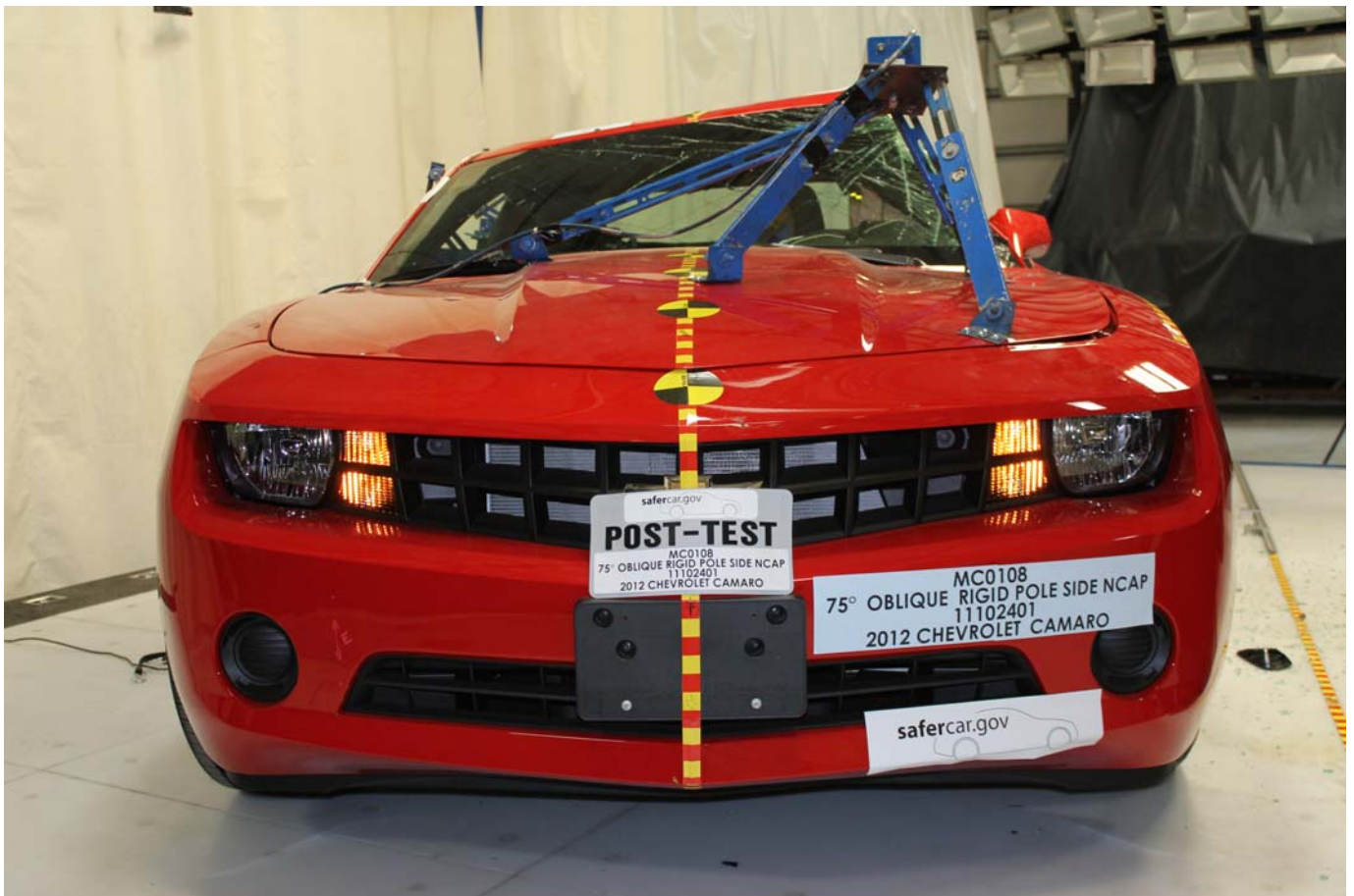
As Delivered Right Front  $\frac{3}{4}$  View of Test Vehicle



As Delivered Left Rear  $\frac{3}{4}$  View of Test Vehicle



Pre-Test Frontal View of Test Vehicle



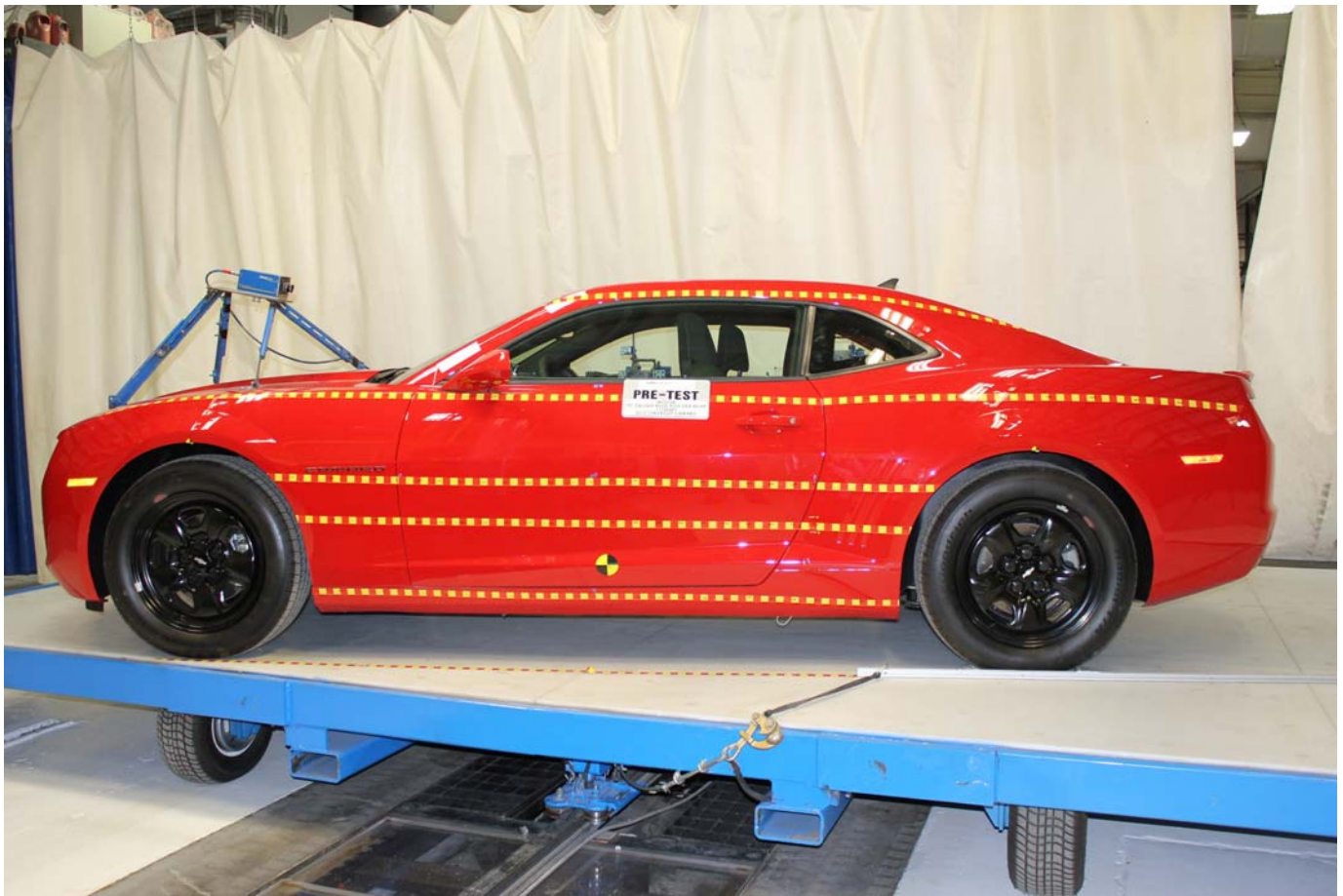
Post-Test Frontal View of Test Vehicle



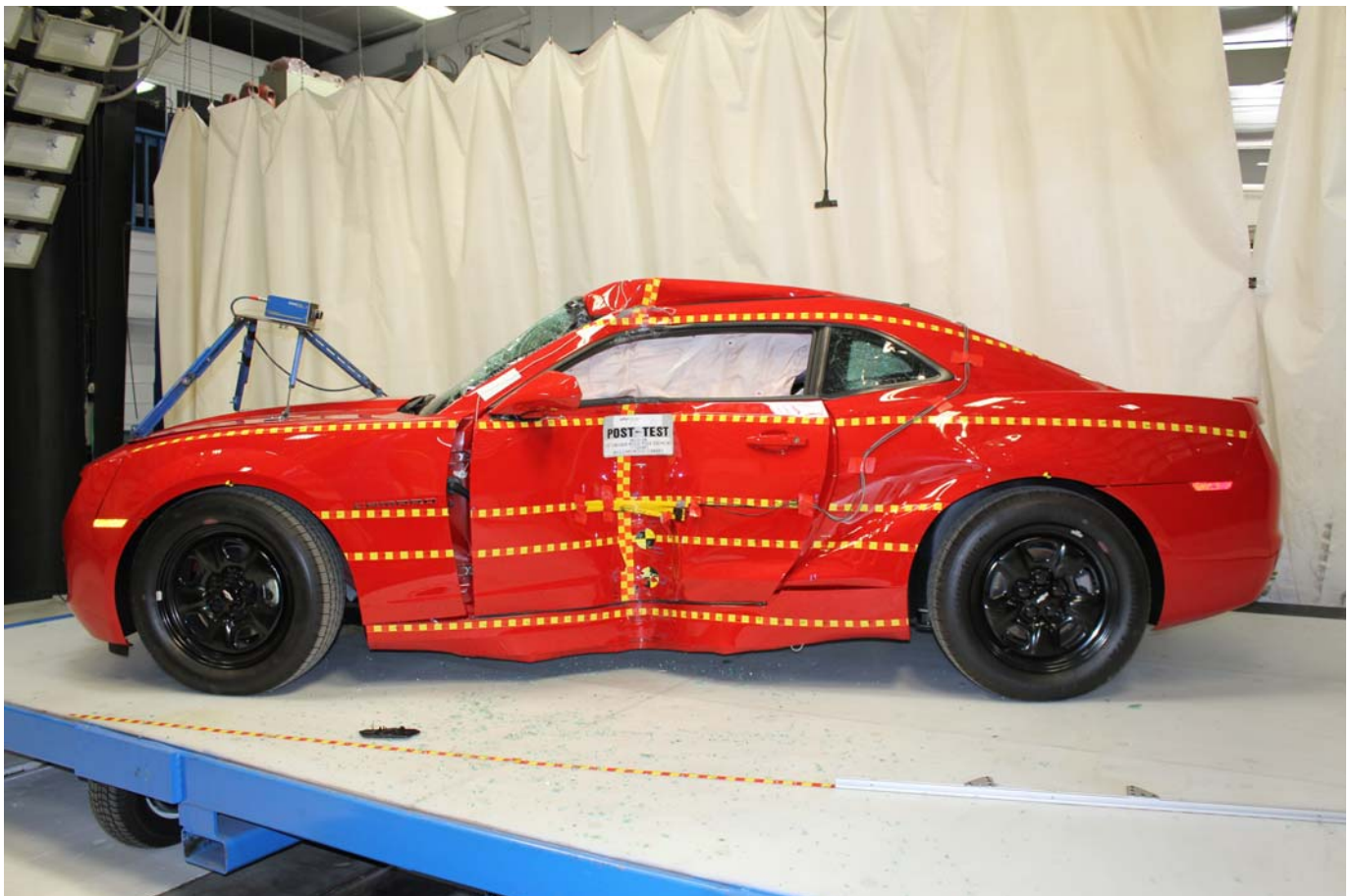
Pre-Test Left Front  $\frac{3}{4}$  View of Test Vehicle



Post-Test Left Front  $\frac{3}{4}$  View of Test Vehicle



Pre-Test Left Side View of Test Vehicle



Post-Test Left Side View of Test Vehicle



Pre-Test Left Rear  $\frac{3}{4}$  View of Test Vehicle



Post-Test Left Rear  $\frac{3}{4}$  View of Test Vehicle



Pre-Test Rear View of Test Vehicle



Post-Test Rear View of Test Vehicle



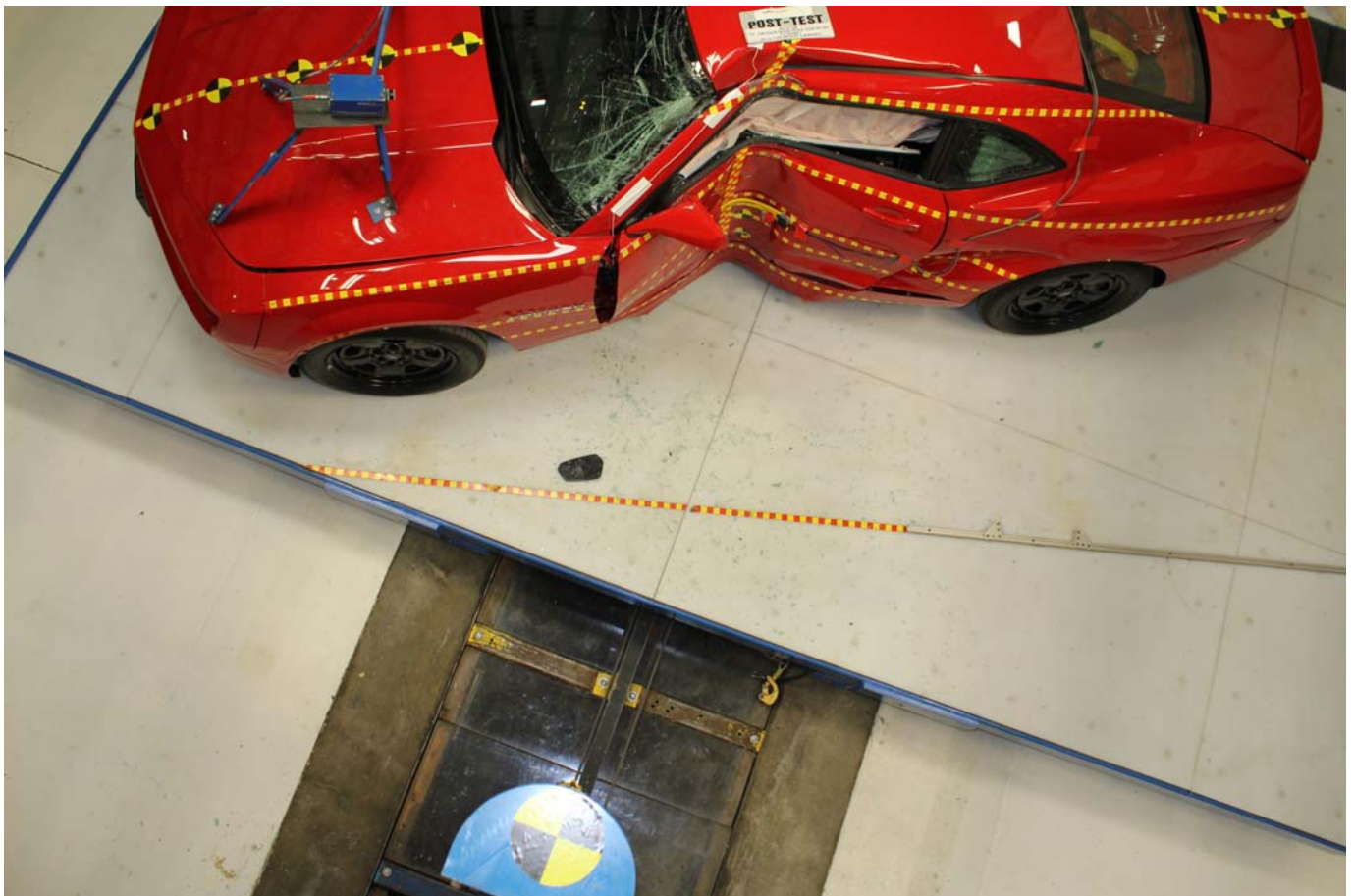
Pre-Test Right Side View of Test Vehicle



Post-Test Right Side View of Test Vehicle



Pre-Test Overhead View of Test Area



Post-Test Overhead View of Test Area



Pre-Test Left Side View of Pole Positioned Against Side of Vehicle



Pre-Test Right Side View of Pole Positioned Against Side of Vehicle



Pre-Test Close-Up View of Impact Point Target



Post-Test Close-Up View of Impact Point Target Showing Impact Location



Pre-Test Front Close-Up View of Dummy Head and Chest



Post-Test Front Close-Up View of Dummy



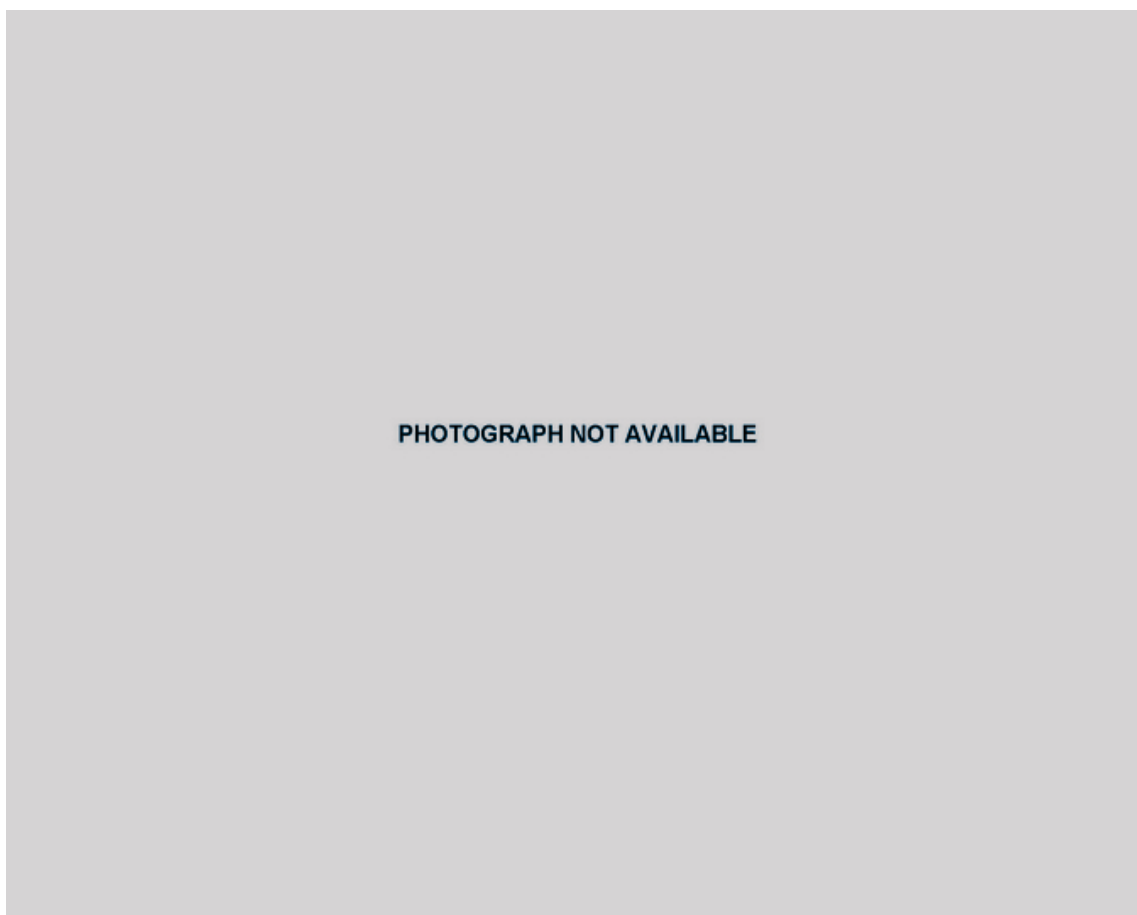
Pre-Test Left Side View of Dummy Showing Belt and Chalking



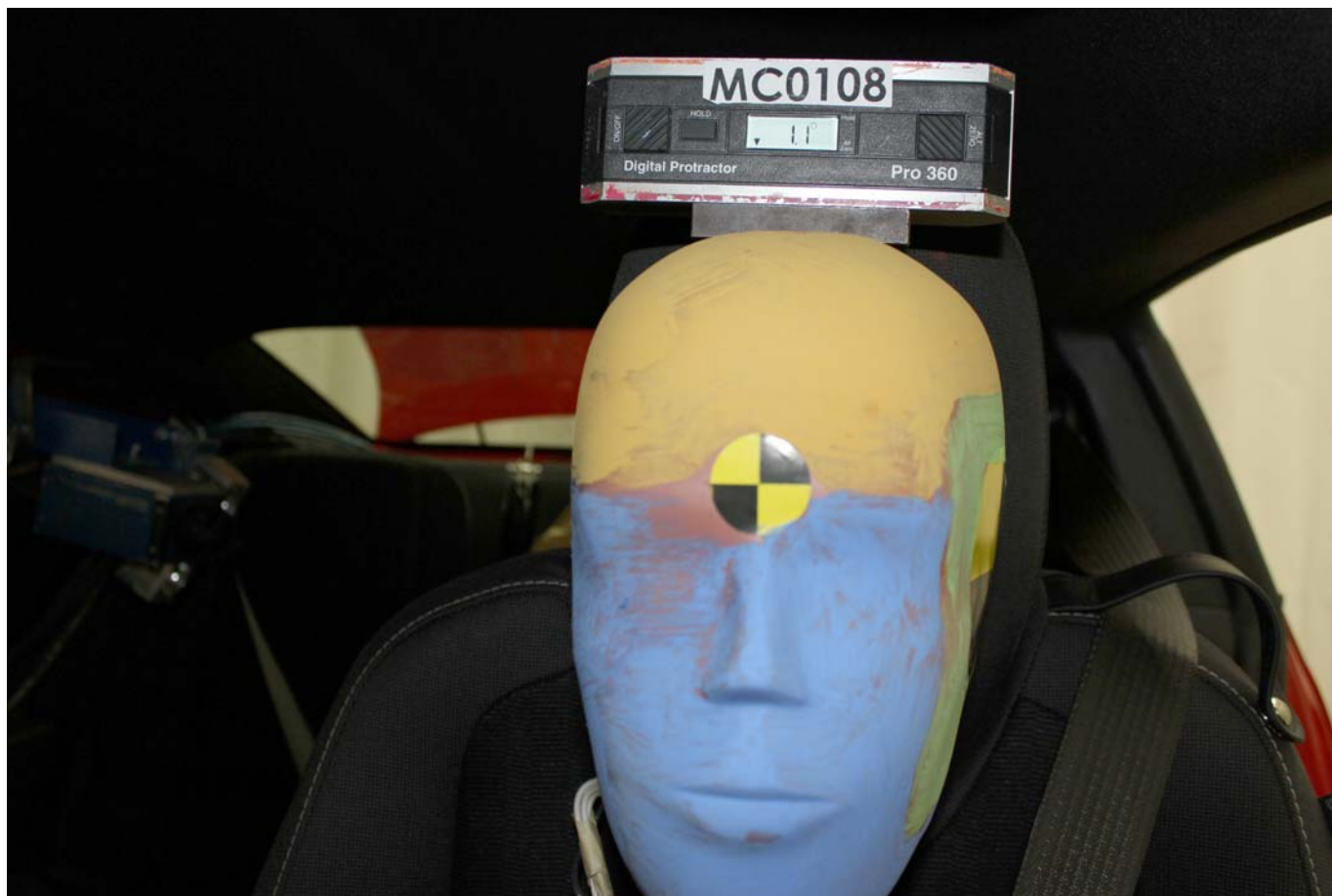
Pre-Test Left Side View of Dummy Shoulder and Door Top View



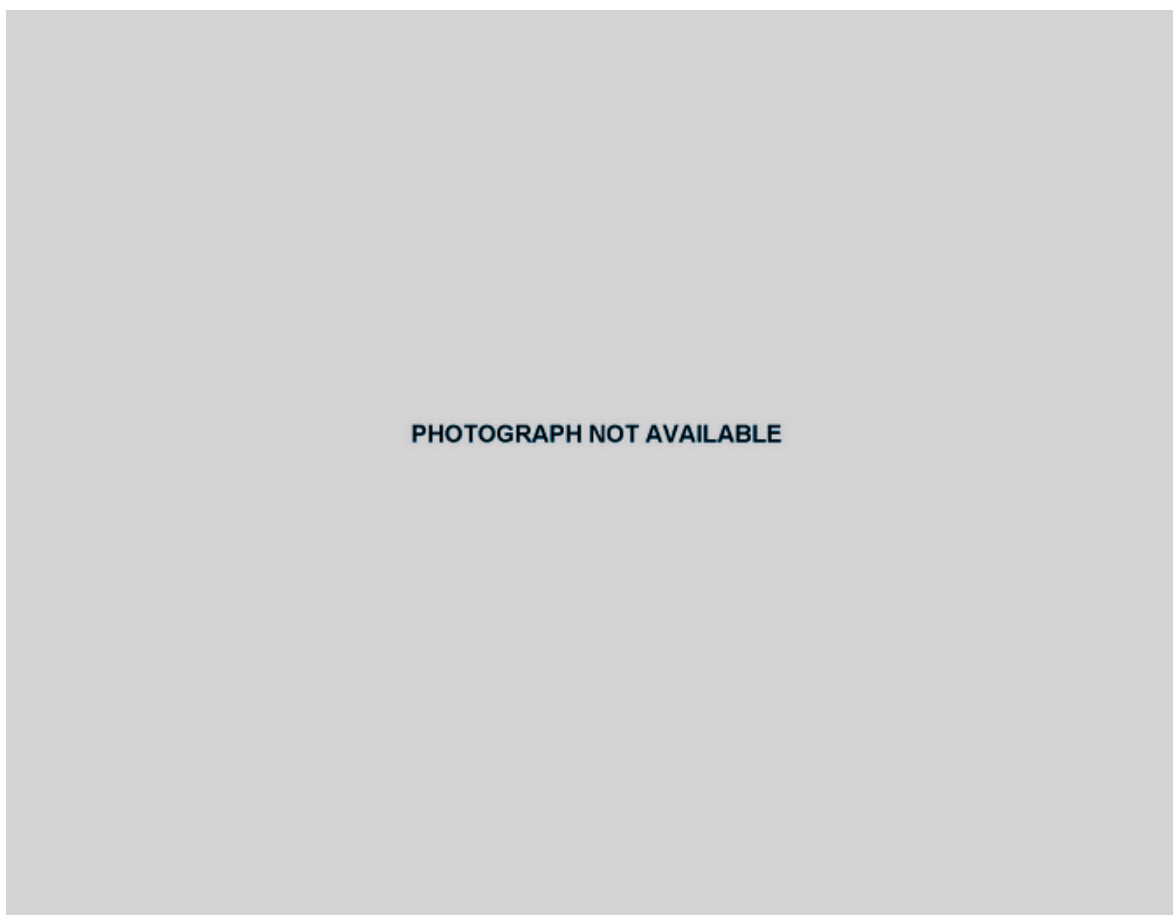
Post-Test Left Side View of Dummy Shoulder and Door Top View



Pre-Test Front View of Seat Back Prior to Dummy Positioning



Pre-Test Front Close-Up View of Dummy Head and Shoulders in Relation to Head Restraint



Pre-Test Front View of Seat Pan Prior to Dummy Positioning



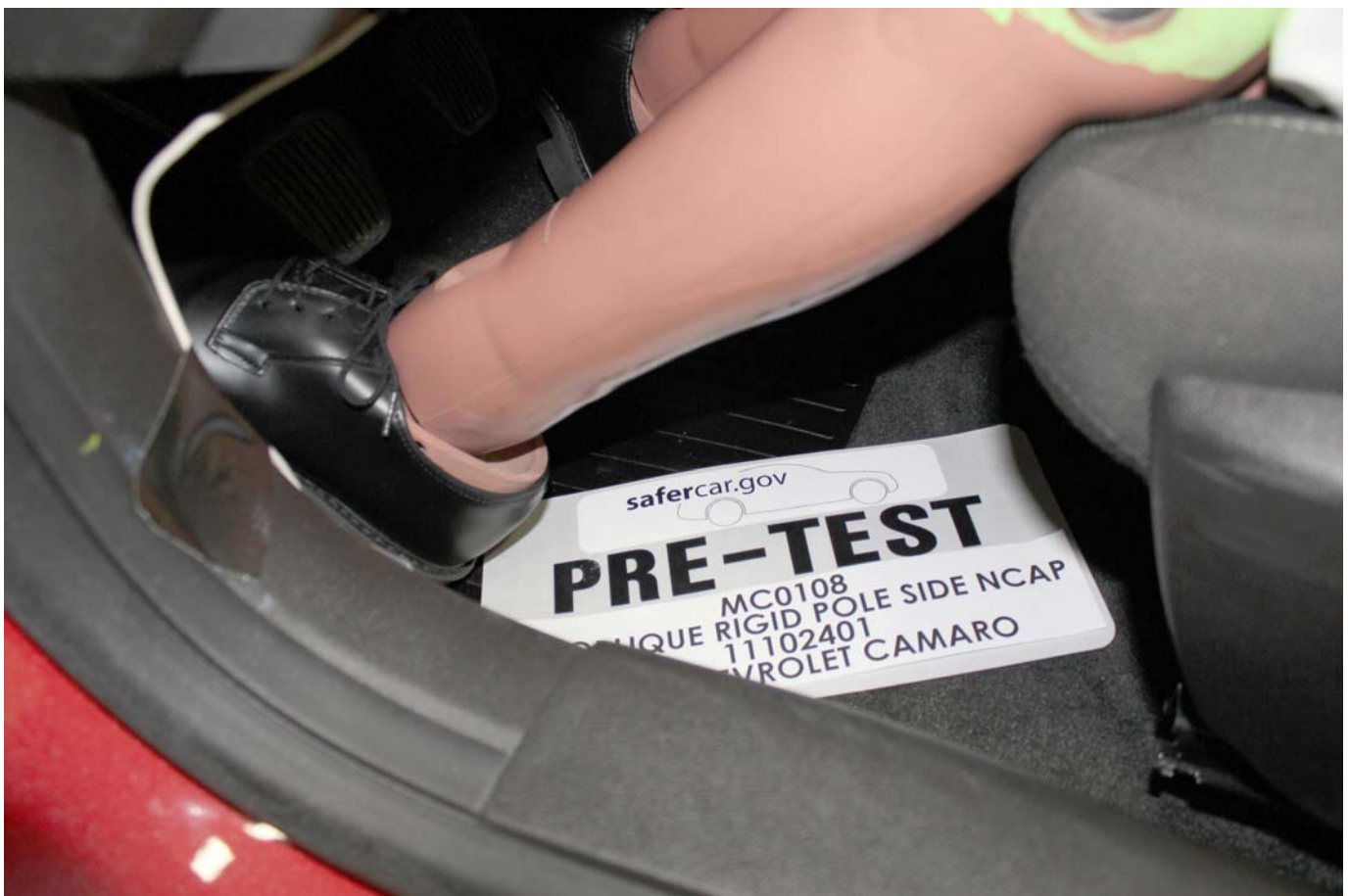
Pre-Test Overhead View of Dummy Thighs on Seat Pan



Pre-Test Left Side View of Dummy's Neck Showing Position of Adjustable Neck Bracket



Pre-Test Left Side View of Dummy's Head Showing Dummy's Head is Level



Pre-Test Placement of Dummy's Feet



Pre-Test View of Belt Anchorage for Dummy



Pre-Test Left Side View of Steering Wheel



Pre-Test View of Disengaged Parking Brake



Pre-Test View of Parking Brake



Pre-Test Close-Up Left Side View of Driver Seat Track



Pre-Test Close-Up Left Side View of Driver Seat Back

PHOTOGRAPH NOT AVAILABLE

Pre-Test Close-Up View of Driver Seat Back or Head Restraint



Pre-Test Dummy and Door Clearance View



Post-Test Dummy and Door Clearance View



Pre-Test Right Side View of Dummy and Front Seat of Occupant Compartment



Post-Test Right Side View of Dummy and Front Seat of Occupant Compartment



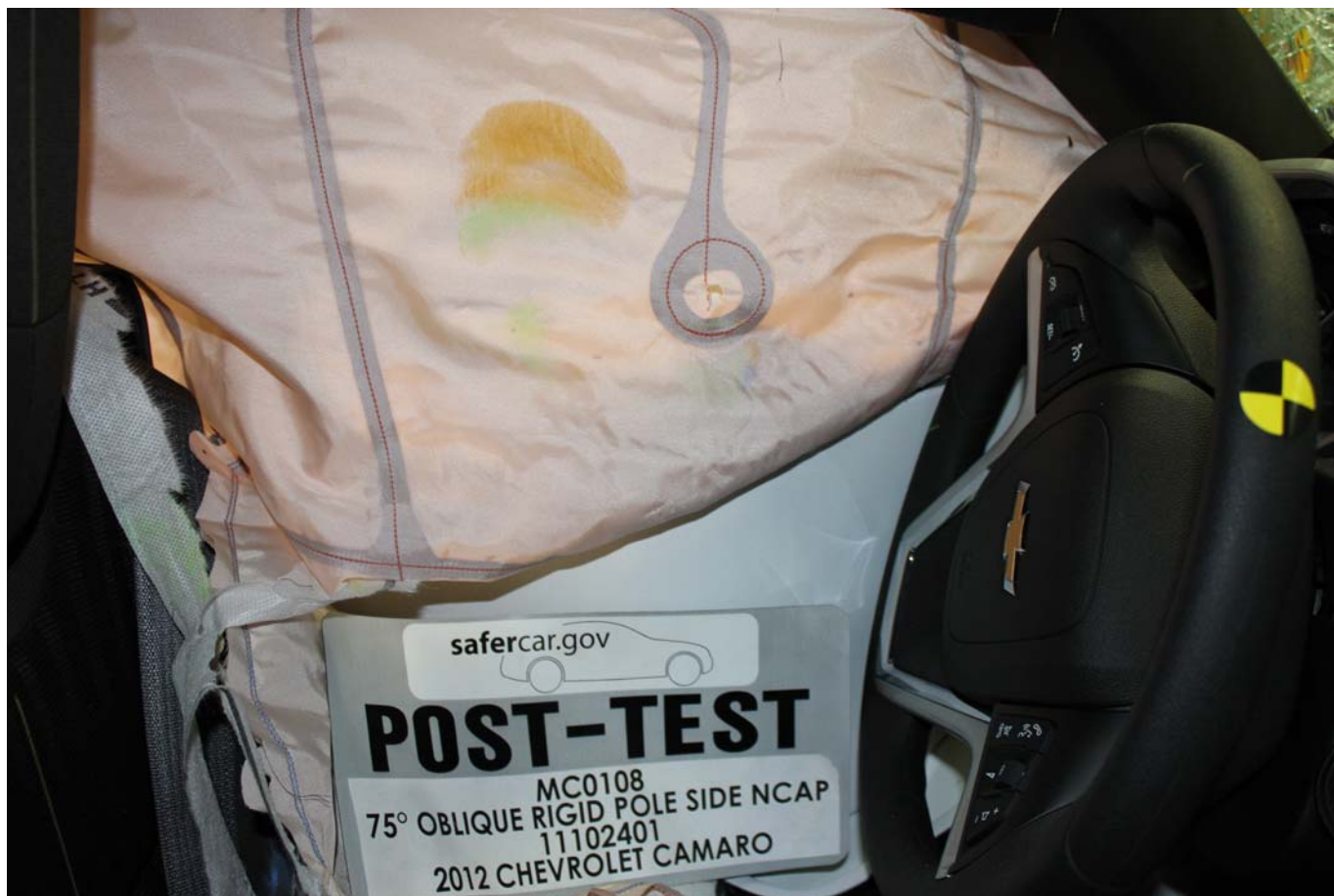
Pre-Test Inner Door Panel View



Post-Test Inner Door Panel View Showing Dummy Contact Location



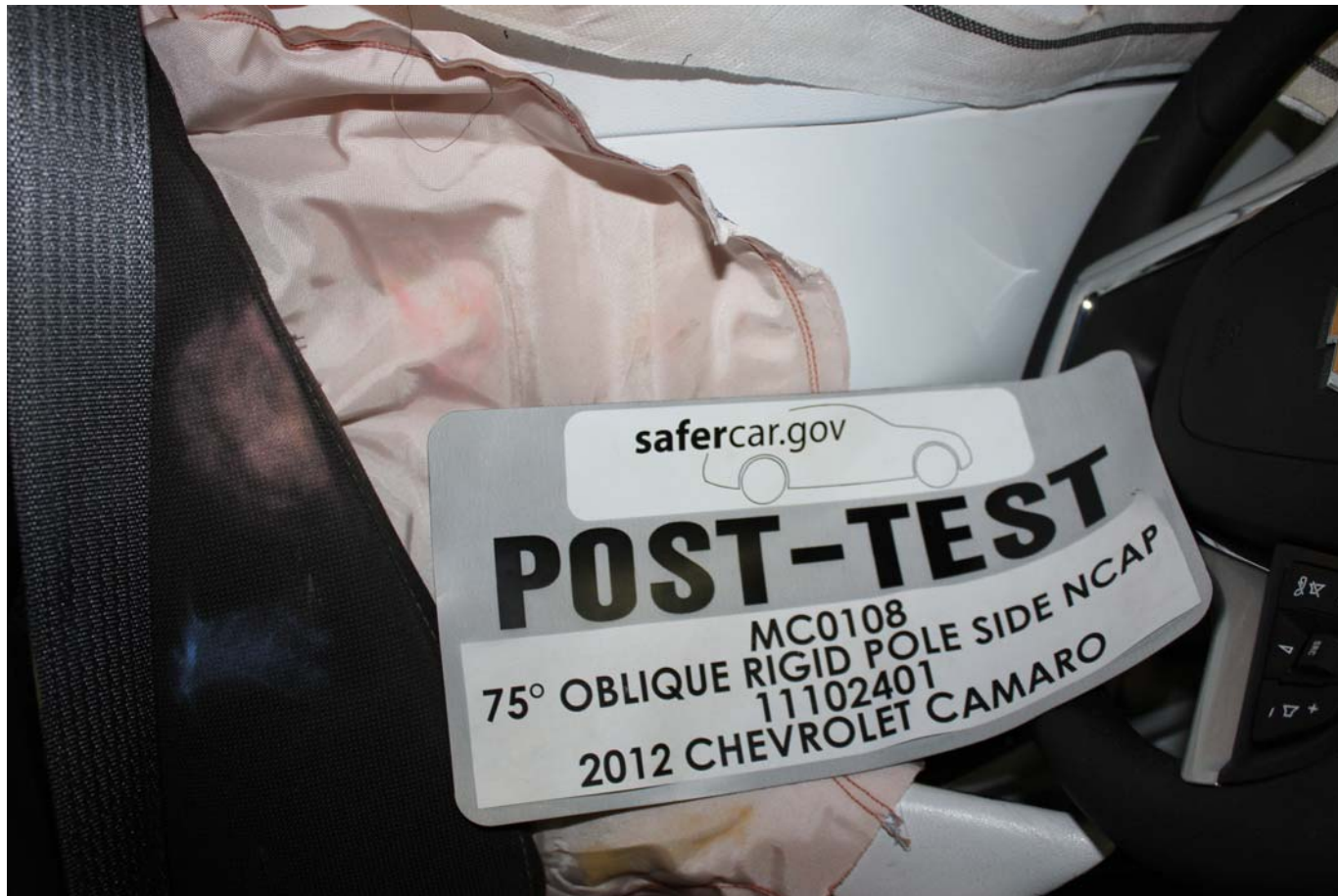
Post-Test Dummy Close-Up Head Contact with Vehicle Interior View



Post-Test Dummy Close-Up Head Contact with Side Air Bag View



Post-Test Dummy Close-Up Torso Contact with Vehicle Interior View



Post-Test Dummy Close-Up Torso Contact with Side Air Bag View



Post-Test Dummy Close-Up Pelvis Contact with Vehicle Interior View



Post-Test Dummy Close-Up Pelvis Contact with Side Air Bag View



Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



Post-Test View of Fuel Filler Cap or Fuel Filler Neck



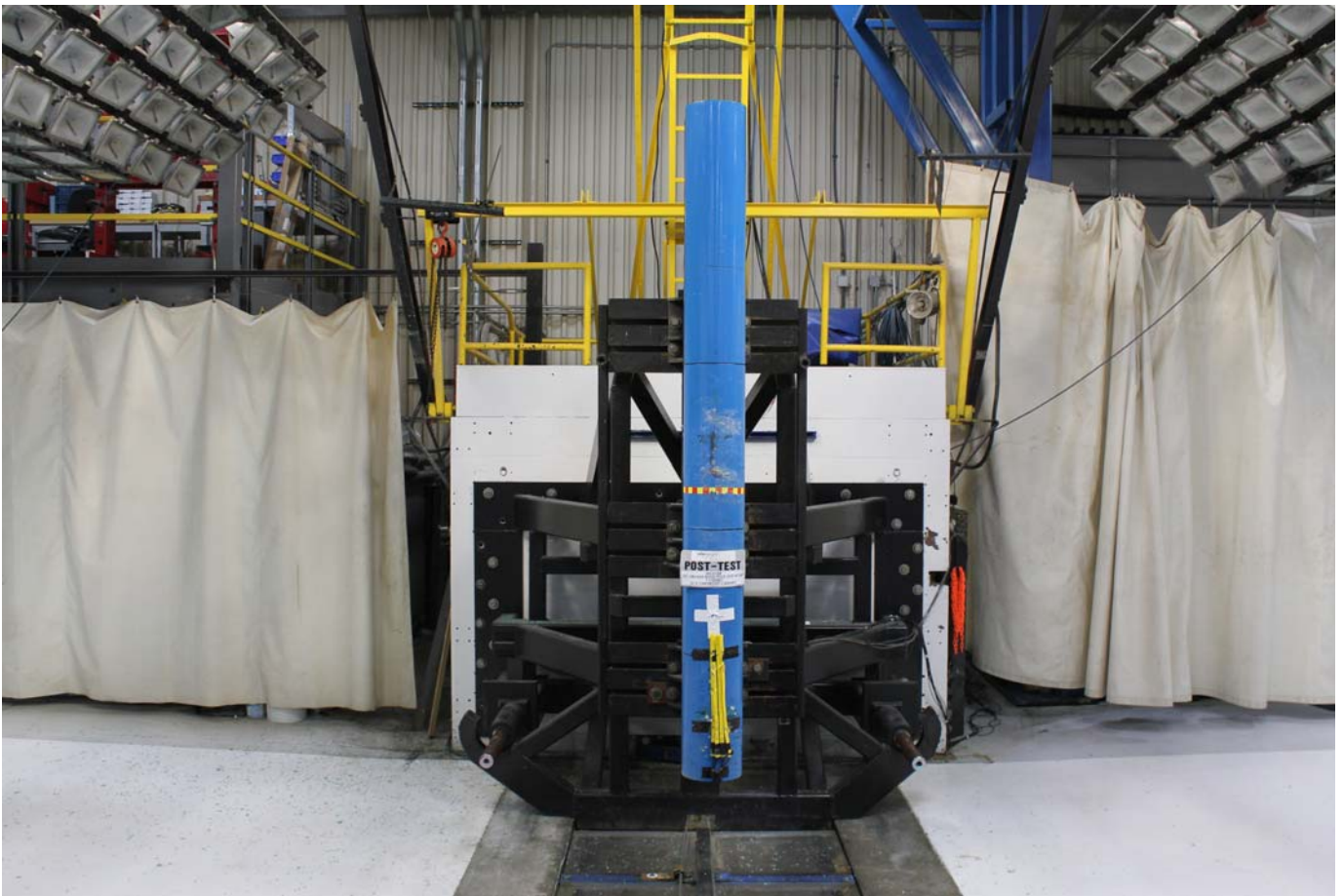
Close-Up View of Vehicle's Certification Label



Close-Up View of Vehicle's Tire Information Placard or Label



Pre-Test Pole Barrier Front View



Post-Test Pole Barrier Front View



Pre-Test Pole Barrier Side View



Post-Test Pole Barrier Side View

PHOTOGRAPH NOT AVAILABLE

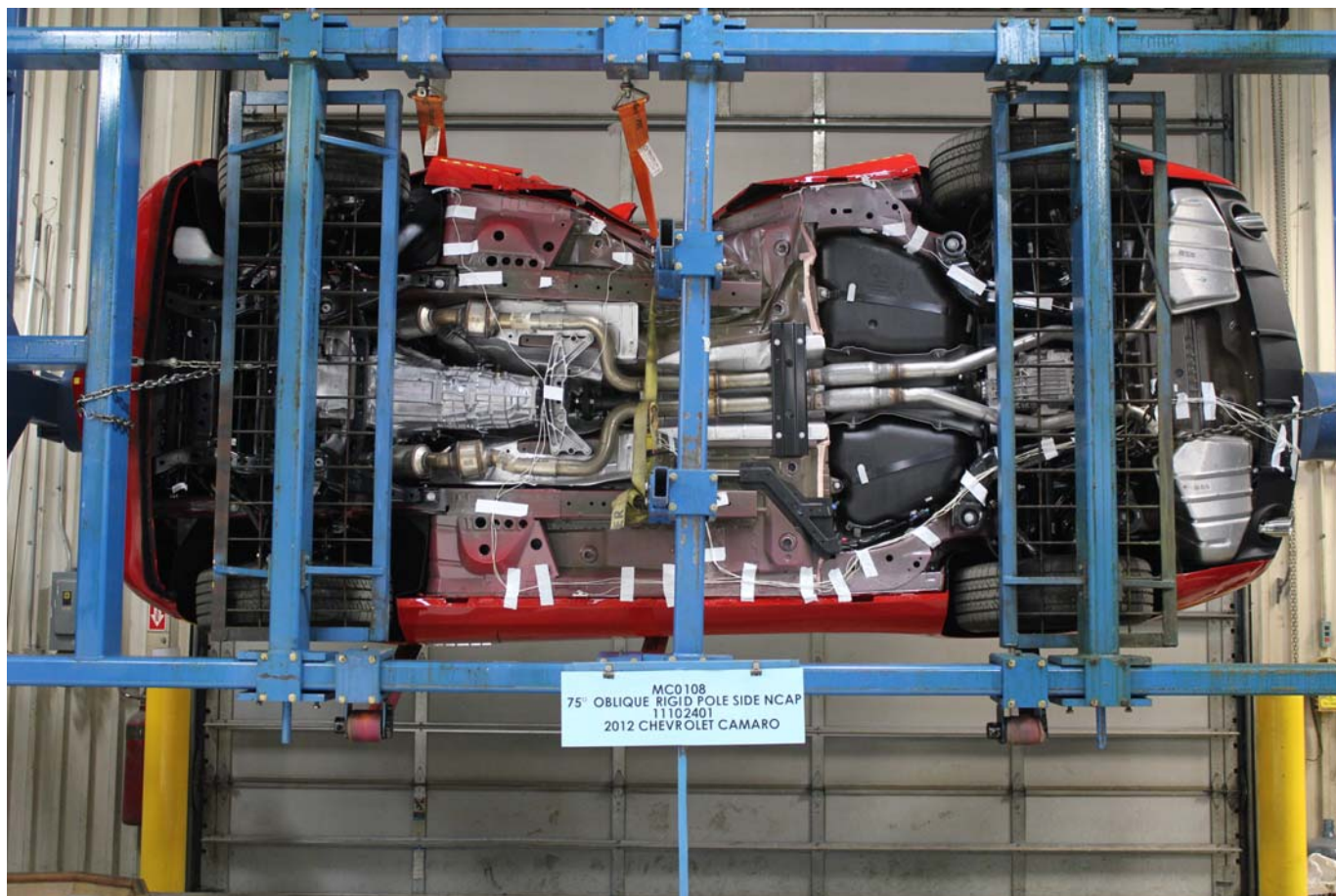
Pre-Test Ballast View



Post-Test Primary and Redundant Speed Trap Read-Out



FMVSS No. 301 Static Rollover 0 Degrees



FMVSS No. 301 Static Rollover 90 Degrees



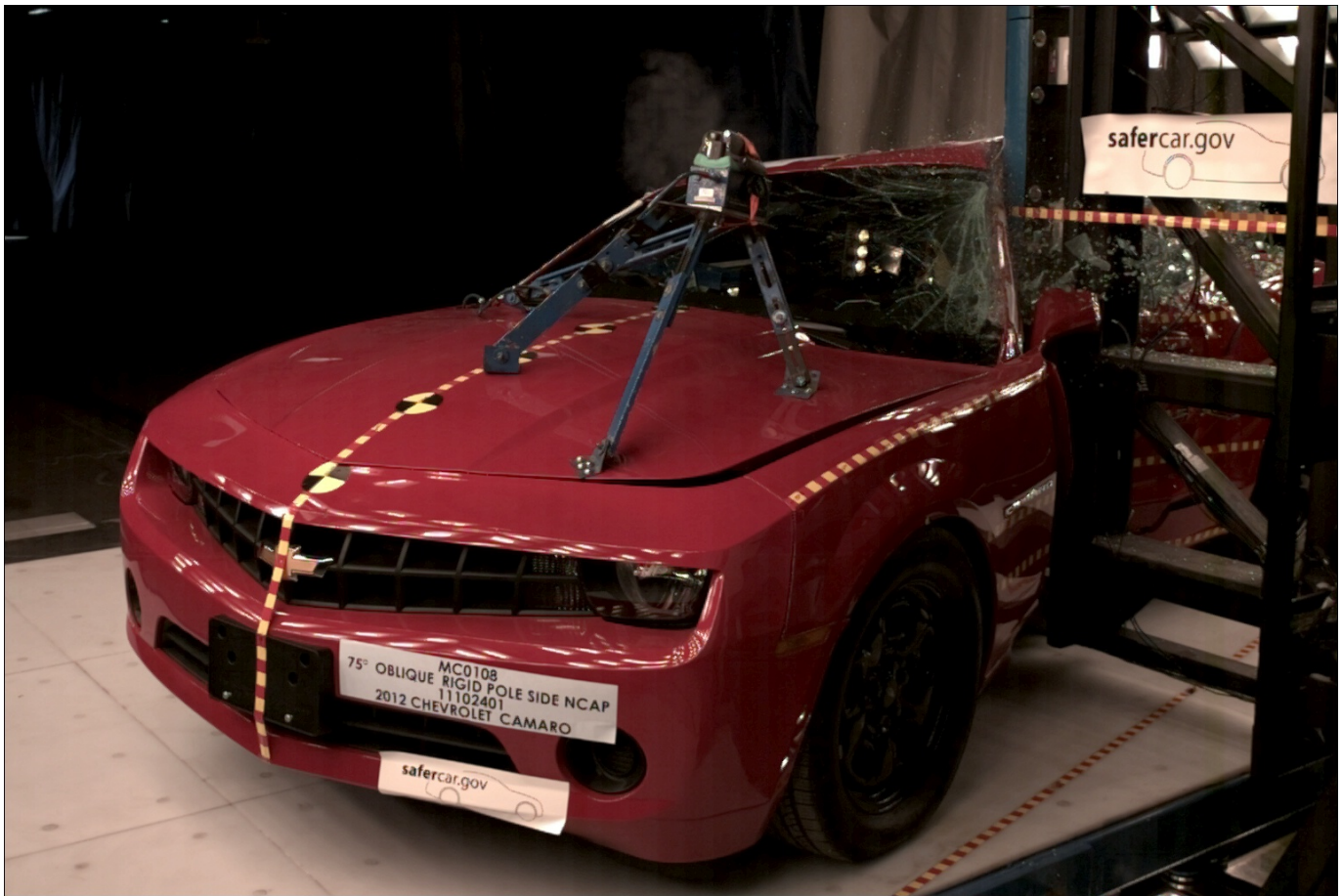
FMVSS No. 301 Static Rollover 180 Degrees



FMVSS No. 301 Static Rollover 270 Degrees



FMVSS No. 301 Static Rollover 360 Degrees



Impact Event



## 2012 CAMARO 1LS COUPE

EXTERIOR: VICTORY RED  
INTERIOR: INTERIOR TRIM JET BLACK

ENGINE 3.6L, SIDI V6  
TRANSMISSION, 6-SPEED MANUAL

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                            |                         |                      |                    |        |                             |                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|----------------------|--------------------|--------|-----------------------------|--------------------|
| <b>STANDARD EQUIPMENT</b><br><small>TIME FEATURES BELOW ARE INCLUDED AT NO EXTRA CHARGE IN THE STANDING VEHICLE PRICE SHOWN</small><br><ul style="list-style-type: none"> <li>5 YEAR / 100,000 MILE POWERTRAIN LIMITED WARRANTY SEE DEALER FOR DETAILS</li> </ul> <b>MECHANICAL</b> <ul style="list-style-type: none"> <li>TRANSMISSION, 6 SPEED MANUAL</li> <li>ENGINE 3.6L, SIDI V6</li> <li>POWER STEERING-VARIABLE RATIO</li> </ul> <b>SAFETY &amp; SECURITY</b> <ul style="list-style-type: none"> <li>ANTI LOCK BRAKE SYSTEM, 4 WHEEL DISC</li> <li>AIRBAGS, DRIVER &amp; FRONT PASS. FRONT / SIDE IMPACT</li> <li>AIRBAGS - SIDE HEAD CURTAIN FRONT AND REAR OCCUPANTS</li> <li>REAR CHILD SEAT LATCH ANCHORS</li> <li>THEFT DETERRENT SYSTEM</li> <li>STABILITRAK-STABILITY CONTROL INCLUDES TRACTION CONTROL</li> <li>6 MTHS ONSTAR DIRECTIONS AND</li> </ul> |                    | <b>CONNECTIONS WITH AUTOMATIC CRASH RESPONSE, TURN-BY-TURN NAVIGATION AND ONSTAR REMOTELINK (ASK DEALER ABOUT GEOGRAPHIC COVERAGE)</b> <ul style="list-style-type: none"> <li>TIRE PRESSURE MONITOR SYSTEM (EXCL. SPARE TIRE)</li> <li>BATTERY RUNDOWN PROTECTION</li> </ul> <b>INTERIOR</b> <ul style="list-style-type: none"> <li>POWER WINDOWS, DRIVER AND PASSENGER EXPRESS DOWN/UP</li> <li>TIRE SEALANT AND INFLATOR KIT (IN PLACE OF SPARE TIRE)</li> <li>SEAT ADJUSTER, DRIVER</li> <li>4-WAY MANUAL, W/ POWER RECLINE</li> <li>SEAT ADJUSTER, PASSENGER</li> <li>2-WAY MANUAL, W/ POWER RECLINE</li> <li>TRUNK RELEASE, POWER</li> <li>AIR FILTRATION SYSTEM</li> <li>POWER OUTLETS, 2 AUXILIARY</li> <li>STEERING WHEEL MOUNTED</li> </ul> | <b>AUDIO CONTROLS</b> <ul style="list-style-type: none"> <li>XM RADIO + SERVICE SUBSCRIPTION SOLD SEPARATELY BY SIRIUSXM AFTER 9 MTHS</li> <li>BLUETOOTH FOR PHONE</li> <li>AM/FM STEREO, CD PLAYER</li> </ul> <b>EXTERIOR</b> <ul style="list-style-type: none"> <li>REAR SPOILER</li> <li>POWER OUTSIDE MIRRORS</li> <li>DAYTIME RUNNING LAMPS</li> <li>WHEELS, 18" HERITAGE STEEL</li> </ul> | <b>Visit us at <a href="http://www.chevy.com">www.chevy.com</a></b><br><table border="1"> <tr> <td>TOTAL VEHICLE &amp; OPTIONS</td> <td>\$23,350.00</td> </tr> <tr> <td>DESTINATION CHARGE</td> <td>900.00</td> </tr> <tr> <td><b>TOTAL VEHICLE PRICE*</b></td> <td><b>\$24,250.00</b></td> </tr> </table> | TOTAL VEHICLE & OPTIONS | \$23,350.00          | DESTINATION CHARGE | 900.00 | <b>TOTAL VEHICLE PRICE*</b> | <b>\$24,250.00</b> |
| TOTAL VEHICLE & OPTIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | \$23,350.00        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                            |                         |                      |                    |        |                             |                    |
| DESTINATION CHARGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 900.00             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                            |                         |                      |                    |        |                             |                    |
| <b>TOTAL VEHICLE PRICE*</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>\$24,250.00</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                            |                         |                      |                    |        |                             |                    |
| <b>OPTIONS &amp; PRICING</b><br><small>MANUFACTURER'S SUGGESTED RETAIL PRICE</small><br><table border="1"> <tr> <td><b>STANDARD VEHICLE PRICE</b></td> <td><b>\$23,200.00</b></td> </tr> </table> <small>OPTIONS INSTALLED BY THE MANUFACTURER (MAY REPLACE STANDARD EQUIPMENT SHOWN)</small> <table border="1"> <tr> <td>WHEEL &amp; TIRE, SPARE, COMPACT (REPLACES TIRE SEALANT KIT)</td> <td>150.00</td> </tr> <tr> <td><b>TOTAL OPTIONS</b></td> <td><b>\$150.00</b></td> </tr> </table>                                                                                                                                                                                                                                                                                                                                                                           |                    | <b>STANDARD VEHICLE PRICE</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>\$23,200.00</b>                                                                                                                                                                                                                                                                                                                                                                              | WHEEL & TIRE, SPARE, COMPACT (REPLACES TIRE SEALANT KIT)                                                                                                                                                                                                                                                   | 150.00                  | <b>TOTAL OPTIONS</b> | <b>\$150.00</b>    |        |                             |                    |
| <b>STANDARD VEHICLE PRICE</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>\$23,200.00</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                            |                         |                      |                    |        |                             |                    |
| WHEEL & TIRE, SPARE, COMPACT (REPLACES TIRE SEALANT KIT)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 150.00             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                            |                         |                      |                    |        |                             |                    |
| <b>TOTAL OPTIONS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>\$150.00</b>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                            |                         |                      |                    |        |                             |                    |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |               |                  |           |            |                      |           |          |       |  |                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------|-----------|------------|----------------------|-----------|----------|-------|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>EPA Fuel Economy Estimates</b><br><div style="display: flex; justify-content: space-around;"> <div> <b>CITY MPG</b><br/> <b>17</b><br/> <small>Expected range for most drivers 14 to 20 MPG</small> </div> <div> <b>Estimated Annual Fuel Cost</b><br/> <b>\$2,775</b><br/> <small>based on 15,000 miles at \$3.70 per gallon</small> </div> <div> <b>HIGHWAY MPG</b><br/> <b>28</b><br/> <small>Expected range for most drivers 23 to 33 MPG</small> </div> </div> <div style="text-align: center;"> <b>Combined Fuel Economy</b><br/> <b>20</b><br/> <small>14 to 28 MPG</small> </div> <p><small>Your actual mileage will vary depending on how you drive and maintain your vehicle.</small></p> |                      | <b>GOVERNMENT SAFETY RATINGS</b><br><table border="1"> <tr> <td>Frontal Crash</td> <td>Driver Passenger</td> <td>Not Rated</td> </tr> <tr> <td>Side Crash</td> <td>Front seat Rear seat</td> <td>Not Rated</td> </tr> <tr> <td>Rollover</td> <td colspan="2">★★★★★</td> </tr> </table> <p><small>Star ratings based on the risk of injury in a frontal impact. Frontal ratings should ONLY be compared to other vehicles of similar size and weight.</small></p> <p><small>Star ratings based on the risk of injury in a side impact.</small></p> <p><small>Star ratings based on the risk of rollover in a single vehicle crash.</small></p> <p><small>Star rating ranges from 1 to 5 stars (★-★★★★★), with 5 being the highest. Source: National Highway Traffic Safety Administration (NHTSA).</small></p> <p><a href="http://www.safercar.gov">www.safercar.gov</a> or 1-888-327-4236</p> | Frontal Crash | Driver Passenger | Not Rated | Side Crash | Front seat Rear seat | Not Rated | Rollover | ★★★★★ |  | <b>PARTS CONTENT INFORMATION</b><br><p><b>FOR VEHICLES IN THIS CARLINE:</b><br/>U.S./CANADIAN PARTS CONTENT: 75%</p> <p><small>NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS.</small></p> <p><b>FOR THIS VEHICLE:</b><br/>FINAL ASSEMBLY POINT:<br/>OSHAWA, ON CANADA<br/>COUNTRY OF ORIGIN:<br/>ENGINE: CANADA<br/>TRANSMISSION: JAPAN</p> | <small>This label has been placed pursuant to Federal law - Do not remove prior to delivery to the ultimate purchaser. Includes Manufacturer's Recommended Pre-Delivery Service. Does not include dealer installed add-ons and accessories not listed below. Local laws or license fees.</small><br><small>© 2011 General Motors LLC. GM, CHEVROLET, and the GM logo are registered trademarks of General Motors.</small> |
| Frontal Crash                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Driver Passenger     | Not Rated                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |                  |           |            |                      |           |          |       |  |                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Side Crash                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Front seat Rear seat | Not Rated                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |                  |           |            |                      |           |          |       |  |                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Rollover                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ★★★★★                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |               |                  |           |            |                      |           |          |       |  |                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <p>See the FREE Fuel Economy Guide at dealers or <a href="http://www.fueleconomy.gov">www.fueleconomy.gov</a></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      | <p>CE 1GA0262399</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               |                  |           |            |                      |           |          |       |  |                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                           |

Monroney Label

### Head Restraints

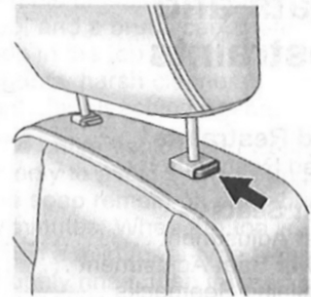
The vehicle's front seats have adjustable head restraints in the outboard seating positions.

#### WARNING

With head restraints that are not installed and adjusted properly, there is a greater chance that occupants will suffer a neck/spinal injury in a crash. Do not drive until the head restraints for all occupants are installed and adjusted properly.



Adjust the head restraint so that the top of the restraint is at the same height as the top of the occupant's head. This position reduces the chance of a neck injury in a crash.



The height of the head restraint can be adjusted. Pull the head restraint up to raise it. Try to move the head restraint to make sure that it is locked in place.

To lower the head restraint, press the button, located on the top of the seatback, and push the restraint down. Try to move the head restraint after the button is released to make sure that it is locked in place.

The front seat outboard head restraints are not designed to be removed.

Head Restraint Use and Adjustment Information from Vehicle Owner's Manual



Post-Test Dummy Close-Up Knee Contact with Vehicle Interior View

## **APPENDIX B**

### **VEHICLE AND DUMMY RESPONSE DATA PLOTS**

**TABLE OF DATA PLOTS**  
**Driver Dummy Instrumentation Plots**

|                |                                                        | <u>Page No.</u> |
|----------------|--------------------------------------------------------|-----------------|
| Figure No. 1.  | Driver Head Acceleration (X) Primary vs. Time          | B-1             |
| Figure No. 2.  | Driver Head Acceleration (Y) Primary vs. Time          | B-1             |
| Figure No. 3.  | Driver Head Acceleration (Z) Primary vs. Time          | B-1             |
| Figure No. 4.  | Driver Head Resultant Primary Acceleration vs. Time    | B-1             |
| Figure No. 5.  | Driver Lower Spine T12 Acceleration (X) vs. Time       | B-2             |
| Figure No. 6.  | Driver Lower Spine T12 Acceleration (Y) vs. Time       | B-2             |
| Figure No. 7.  | Driver Lower Spine T12 Acceleration (Z) vs. Time       | B-2             |
| Figure No. 8.  | Driver Lower Spine T12 Resultant Acceleration vs. Time | B-2             |
| Figure No. 9.  | Driver Iliac Wing Force on Impact Side (Y) vs. Time    | B-3             |
| Figure No. 10. | Driver Acetabulum Force on Impact Side (Y) vs. Time    | B-3             |
| Figure No. 11. | Driver Total Pelvis Force on Impact Side (Y) vs. Time  | B-3             |

**The following additional data for this test can be obtained from the Research and Development section of the NHTSA website. The website can be found at**  
**[www.NHTSA.dot.gov](http://www.NHTSA.dot.gov)**

**Additional Driver Dummy Instrumentation Data**

Driver Head Acceleration (X) Redundant  
Driver Head Acceleration (Y) Redundant  
Driver Head Acceleration (Z) Redundant  
Driver Upper Thorax Rib Deflection (Y)  
Driver Middle Thorax Rib Deflection (Y)  
Driver Lower Thorax Rib Deflection (Y)  
Driver Upper Abdomen Rib Deflection (Y)  
Driver Lower Abdomen Rib Deflection (Y)

### **Vehicle Instrumentation Data**

Vehicle Center of Gravity Acceleration (X)

Vehicle Center of Gravity Acceleration (Y)

Vehicle Center of Gravity Acceleration (Z)

Left Floor Sill Acceleration (Y)

Left A-Pillar Sill Acceleration (Y)

Left Lower A-Pillar Acceleration (Y)

Left Mid A-Pillar Acceleration (Y)

Left B-Pillar Sill Acceleration (Y)

Left Lower B-Pillar Acceleration (Y)

Left Mid B-Pillar Acceleration (Y)

Driver Seat Track at Dummy Hip Point Acceleration (Y)

Engine Top Acceleration (X)

Engine Top Acceleration (Y)

Firewall Center Acceleration (Y)

Right Roof at Vertical Impact Reference Line Acceleration (Y)

Right Sill at Vertical Impact Reference Line Acceleration (Y)

Rear Floorpan Behind Rear Axle at Centerline Acceleration (X)

Rear Floorpan Behind Rear Axle at Centerline Acceleration (Y)

### **Pole Instrumentation Data – Not Recorded**

Load Cell Pole Barrier #1 Force (Y)

Load Cell Pole Barrier #2 Force (Y)

Load Cell Pole Barrier #3 Force (Y)

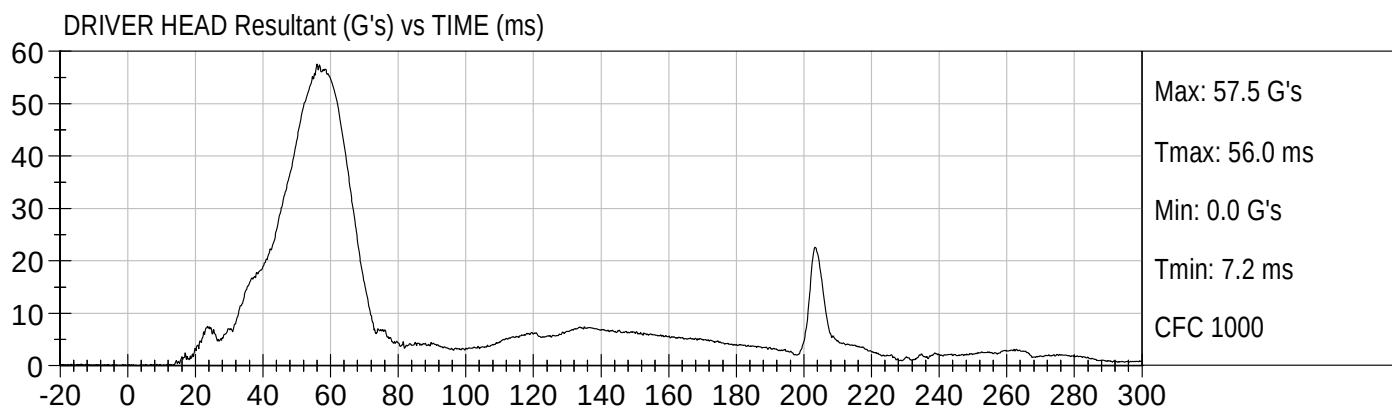
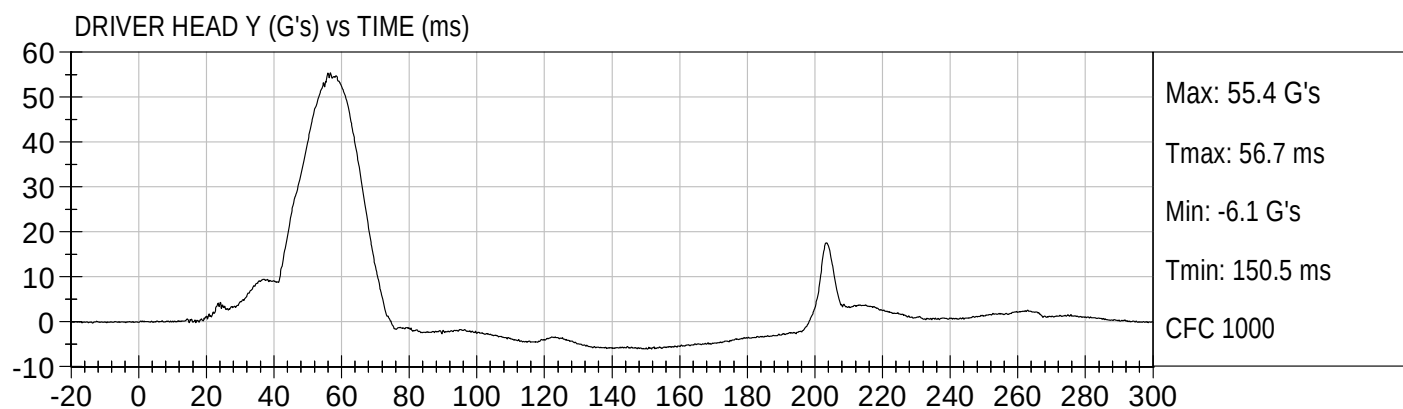
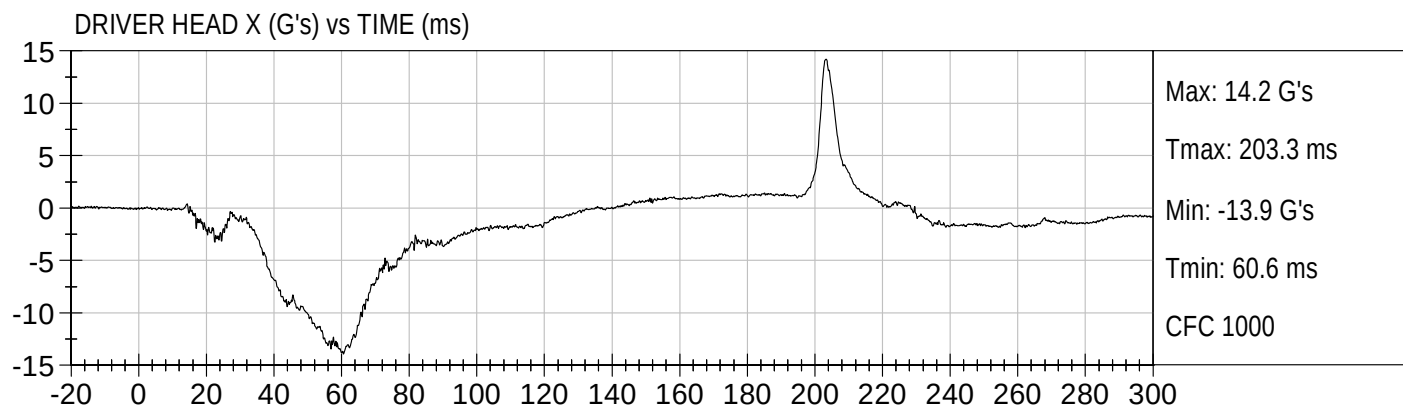
Load Cell Pole Barrier #4 Force (Y)

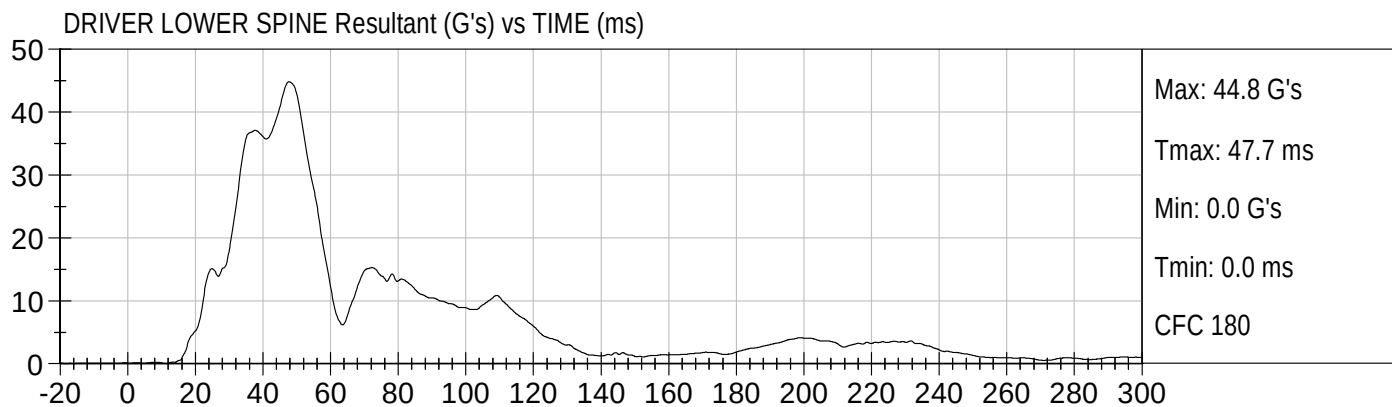
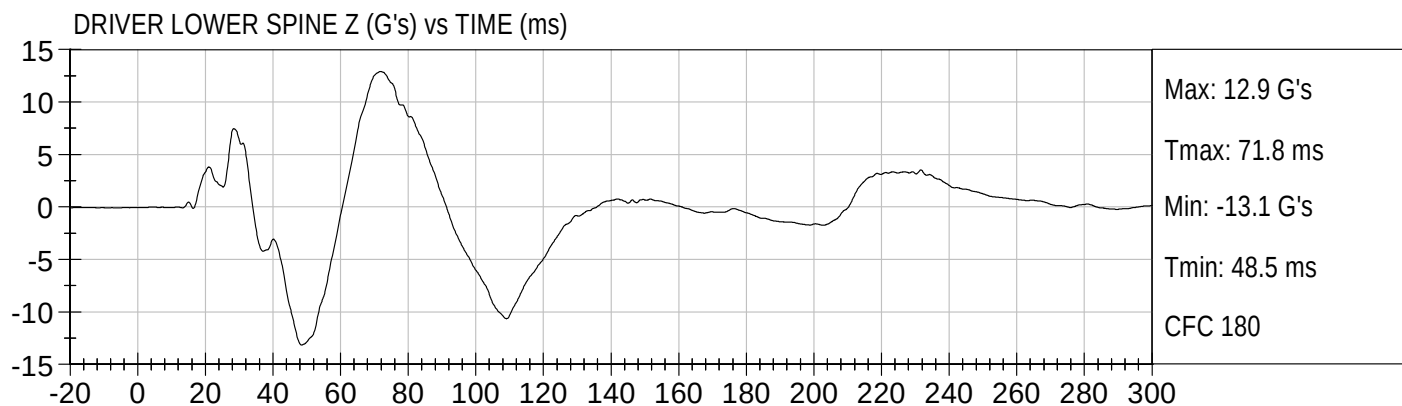
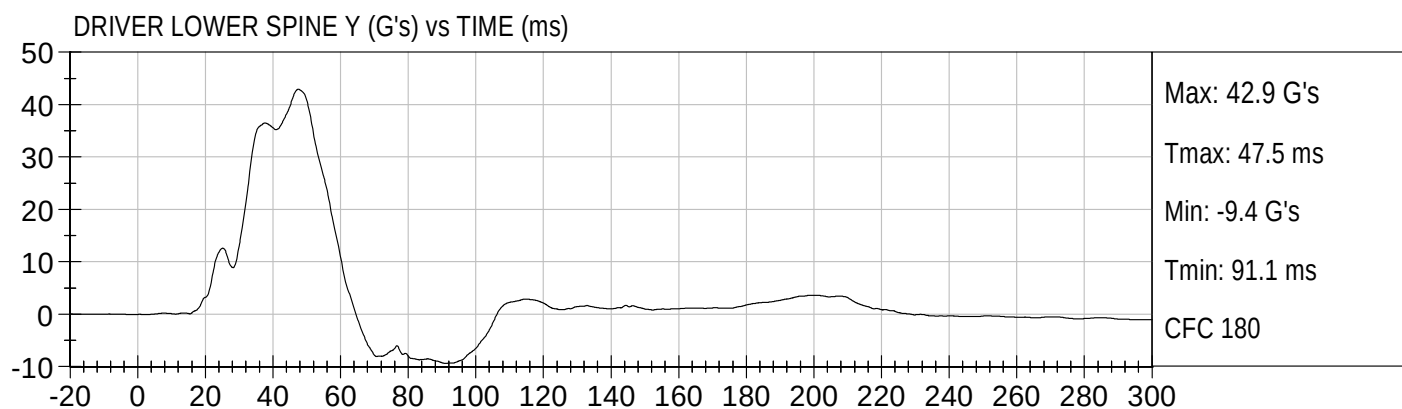
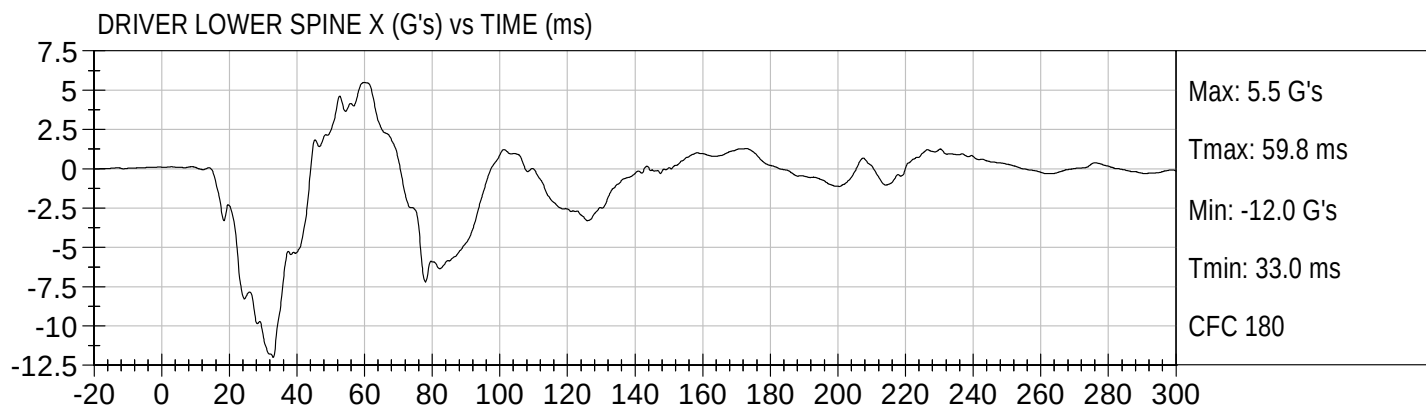
Load Cell Pole Barrier #5 Force (Y)

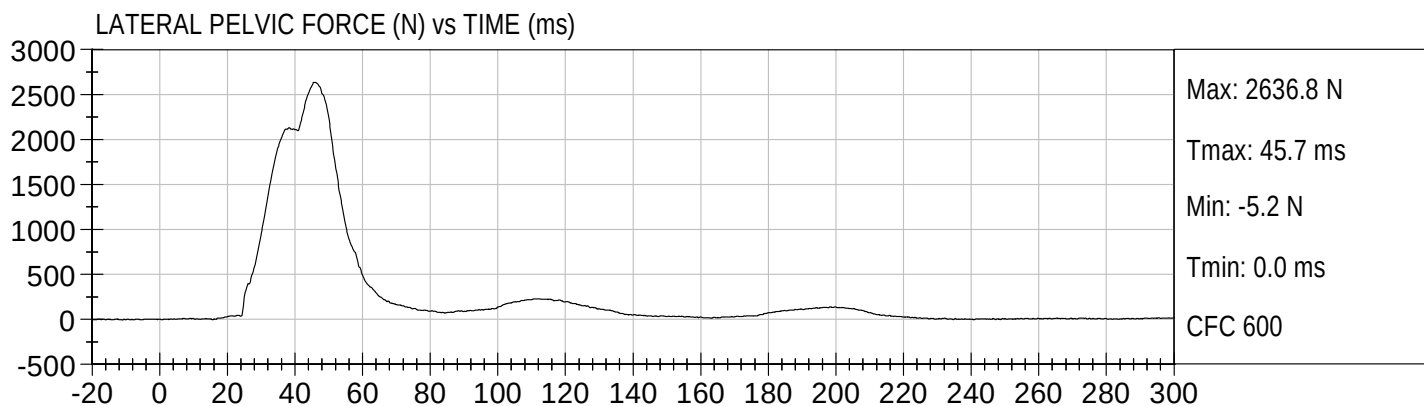
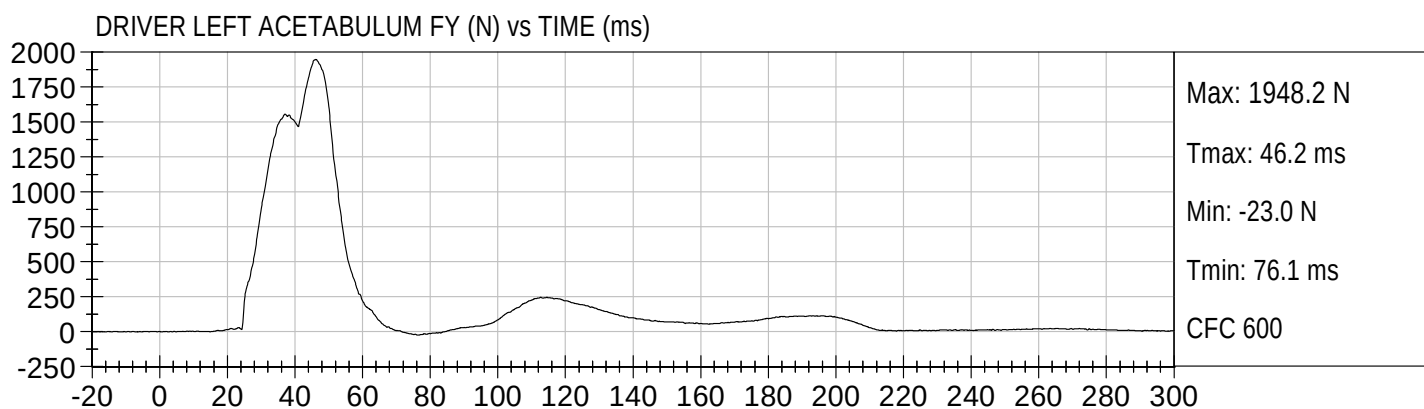
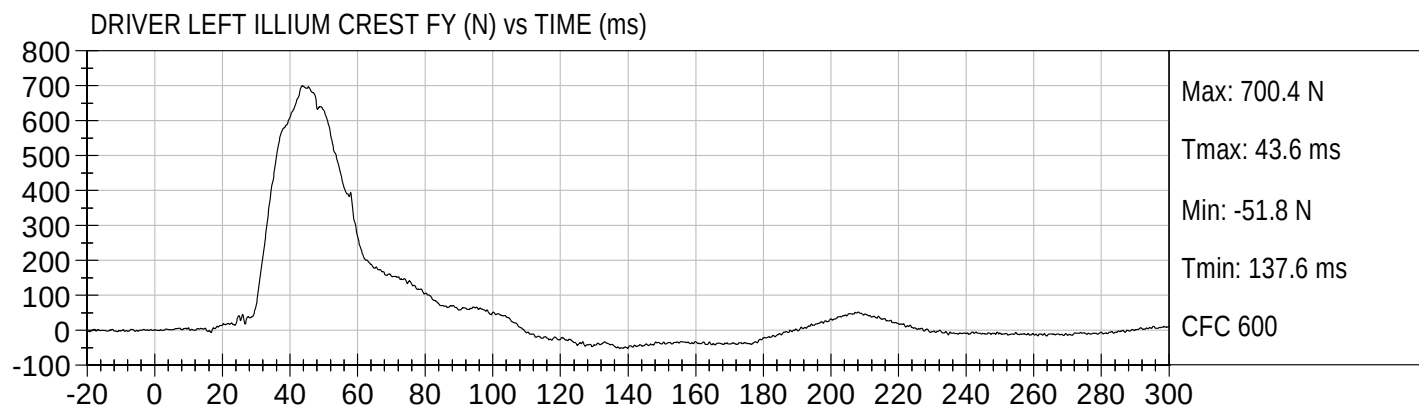
Load Cell Pole Barrier #6 Force (Y)

Load Cell Pole Barrier #7 Force (Y)

Load Cell Pole Barrier #8 Force (Y)







## **APPENDIX C**

### **DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA**

**SID-IIsD External Measurements**  
**SN: 296**

| <b>No.</b> | <b>Name</b>                   | <b>Spec. (mm)</b> | <b>Result</b> | <b>Pass/Fail</b> |
|------------|-------------------------------|-------------------|---------------|------------------|
| <b>A</b>   | Sitting Height                | 772 - 788         | 784           | Pass             |
| <b>B</b>   | Shoulder Pivot Height         | 437 - 453         | 442           | Pass             |
| <b>C</b>   | H-point Height                | 79 - 89           | 83            | Pass             |
| <b>D</b>   | H-point from Seatback         | 141 - 151         | 145           | Pass             |
| <b>E</b>   | Shoulder Pivot from Backline  | 97 - 107          | 99            | Pass             |
| <b>F</b>   | Thigh Clearance               | 119 -135          | 121           | Pass             |
| <b>G</b>   | Head Breadth                  | 140 - 148         | 142           | Pass             |
| <b>H</b>   | Head Back from Backline       | 40 - 46           | 45            | Pass             |
| <b>I</b>   | Head Depth                    | 178 - 188         | 180           | Pass             |
| <b>J</b>   | Head Circumference            | 541 - 551         | 548           | Pass             |
| <b>K</b>   | Buttock to Knee Length        | 514 - 540         | 535           | Pass             |
| <b>L</b>   | Popliteal Height              | 343 - 369         | 358           | Pass             |
| <b>M</b>   | Knee Pivot to Floor Height    | 392 - 409         | 404           | Pass             |
| <b>N</b>   | Buttock Popliteal Length      | 416 - 442         | 435           | Pass             |
| <b>O</b>   | Chest Depth w/o Jacket        | 195 - 211         | 206           | Pass             |
| <b>P</b>   | Foot Length                   | 216 - 232         | 219           | Pass             |
| <b>Q</b>   | Hip Breadth (w/ pelvic plugs) | 313 - 323         | 316           | Pass             |
| <b>R</b>   | Arm Length                    | 249 - 259         | 250           | Pass             |
| <b>S</b>   | Knee Joint to Seatback        | 477 - 493         | 481           | Pass             |
| <b>V</b>   | Shoulder Width                | 341 - 357         | 346           | Pass             |
| <b>W</b>   | Foot Width                    | 78 - 94           | 85            | Pass             |
| <b>Y</b>   | Chest Circumference w/ jacket | 851 - 881         | 870           | Pass             |
| <b>Z</b>   | Waist Circumference           | 761 - 791         | 772           | Pass             |

**MGA RESEARCH CORPORATION**  
**HEAD DROP TEST**  
**SID-Its BUILD LEVEL D DUMMY**

**ATD Serial No:** 296

**Test ID:** D113411

| Tested Parameter             | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature       | deg C | 20.6 to 22.2  | 21.8   | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70      | 42     | Pass      |
| Peak Resultant Acceleration  | G's   | 115 to 137    | 127    | Pass      |
| Peak Lateral Acceleration    | G's   | +/- 15        | 4.8    | Pass      |
| Unimodal                     | N/A   | <15%          | Yes    | Pass      |
| Overall Test Results         |       |               |        | Pass      |

Jessica Hall  
Laboratory Technician

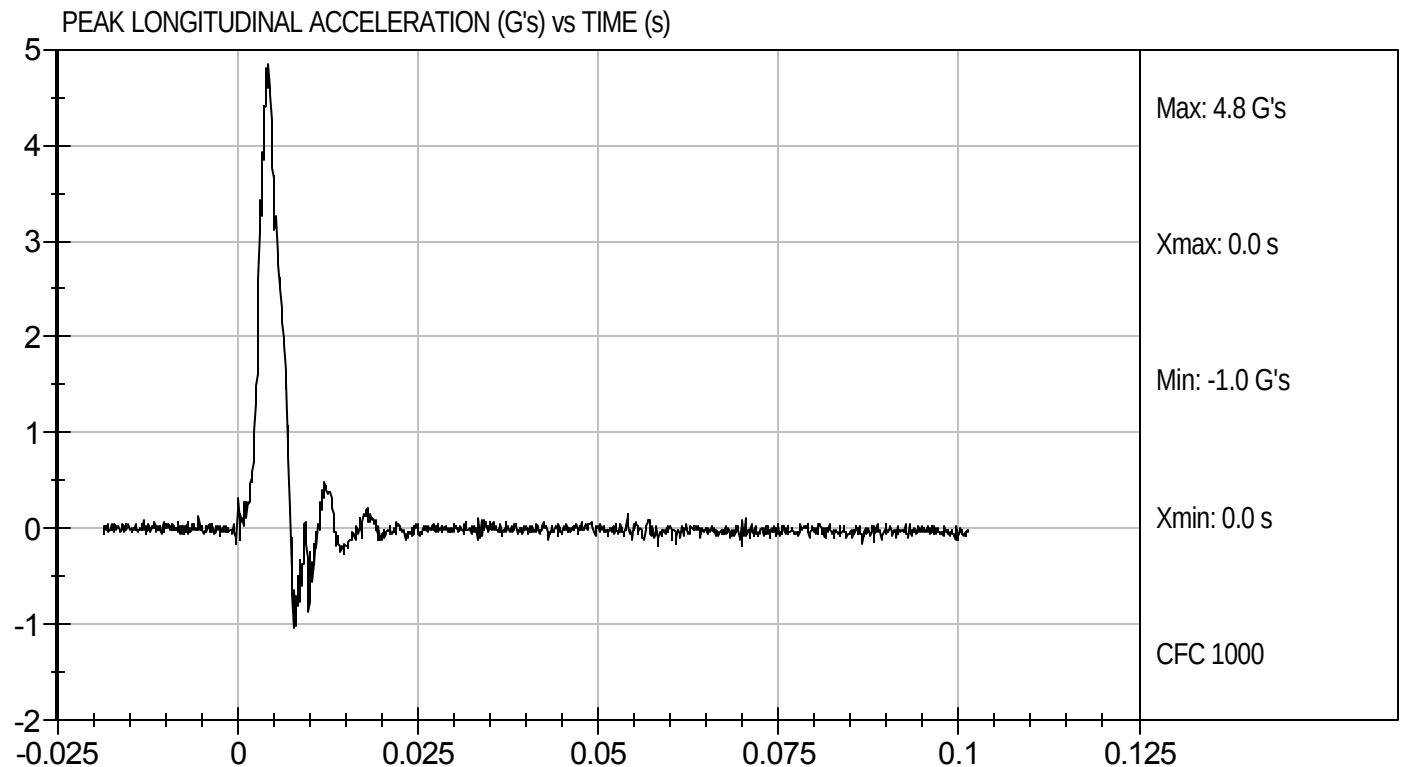
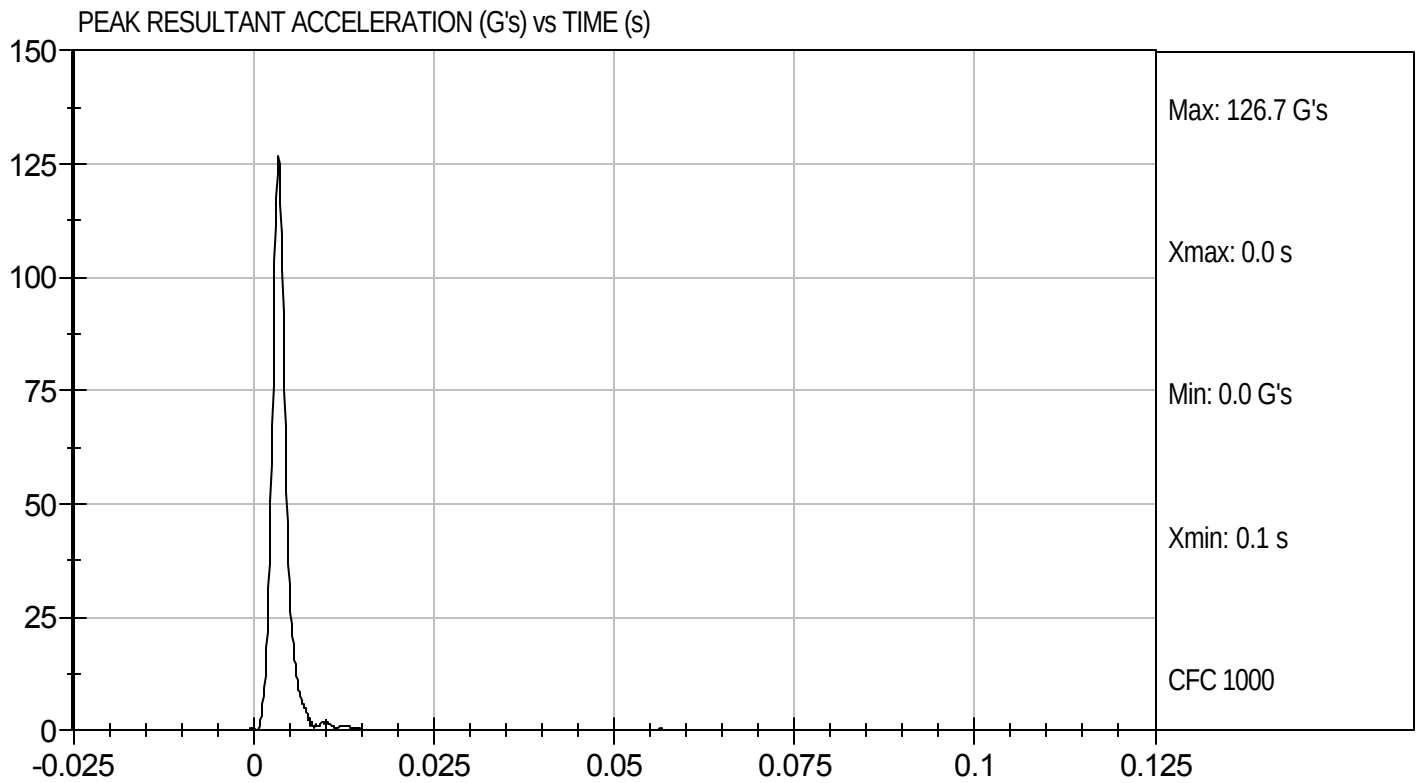
10/10/11  
Test Date

David Winkelbauer  
Approved By



Test Desc: Head Drop  
Component ID: D113411

Test Date: 10/10/11  
Velocity: 0 ft/s, 0 m/s

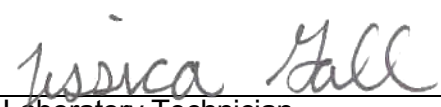


**MGA RESEARCH CORPORATION**  
**LATERAL NECK PENDULUM TEST**  
**SID-IIs BUILD LEVEL D DUMMY**

**ATD Serial No:** 296

**Test I.D:** D113412

| Tested Parameter                                             |           | Units | Specification | Result | Pass/Fail |
|--------------------------------------------------------------|-----------|-------|---------------|--------|-----------|
| Temperature                                                  |           | deg C | 20.6 to 22.2  | 21.7   | Pass      |
| Humidity                                                     |           | %     | 10 to 70      | 42     | Pass      |
| Impact Velocity                                              |           | m/s   | 5.51 to 5.63  | 5.52   | Pass      |
| Delta Velocity                                               | 10 ms     | m/s   | 2.20 to 2.80  | 2.52   | Pass      |
|                                                              | 15 ms     | m/s   | 3.30 to 4.10  | 3.47   | Pass      |
|                                                              | 20 ms     | m/s   | 4.40 to 5.40  | 4.59   | Pass      |
|                                                              | 25 ms     | m/s   | 5.40 to 6.10  | 5.49   | Pass      |
|                                                              | 25-100 ms | m/s   | 5.50 to 6.20  | 5.65   | Pass      |
| Maximum D-Plane Rotation                                     |           | deg   | 71 to 81      | 71     | Pass      |
| Time of Maximum D-Plane Rotation                             |           | ms    | 50 to 70      | 60     | Pass      |
| Maximum Occipital Condyle Moment during Rotation Interval Nm |           |       | -44 to -36    | -40    | Pass      |
| Time of Moment Decay to 0 Nm                                 |           | ms    | 102 to 126    | 113    | Pass      |
| Overall Test Results                                         |           |       |               | Pass   |           |

  
 Laboratory Technician

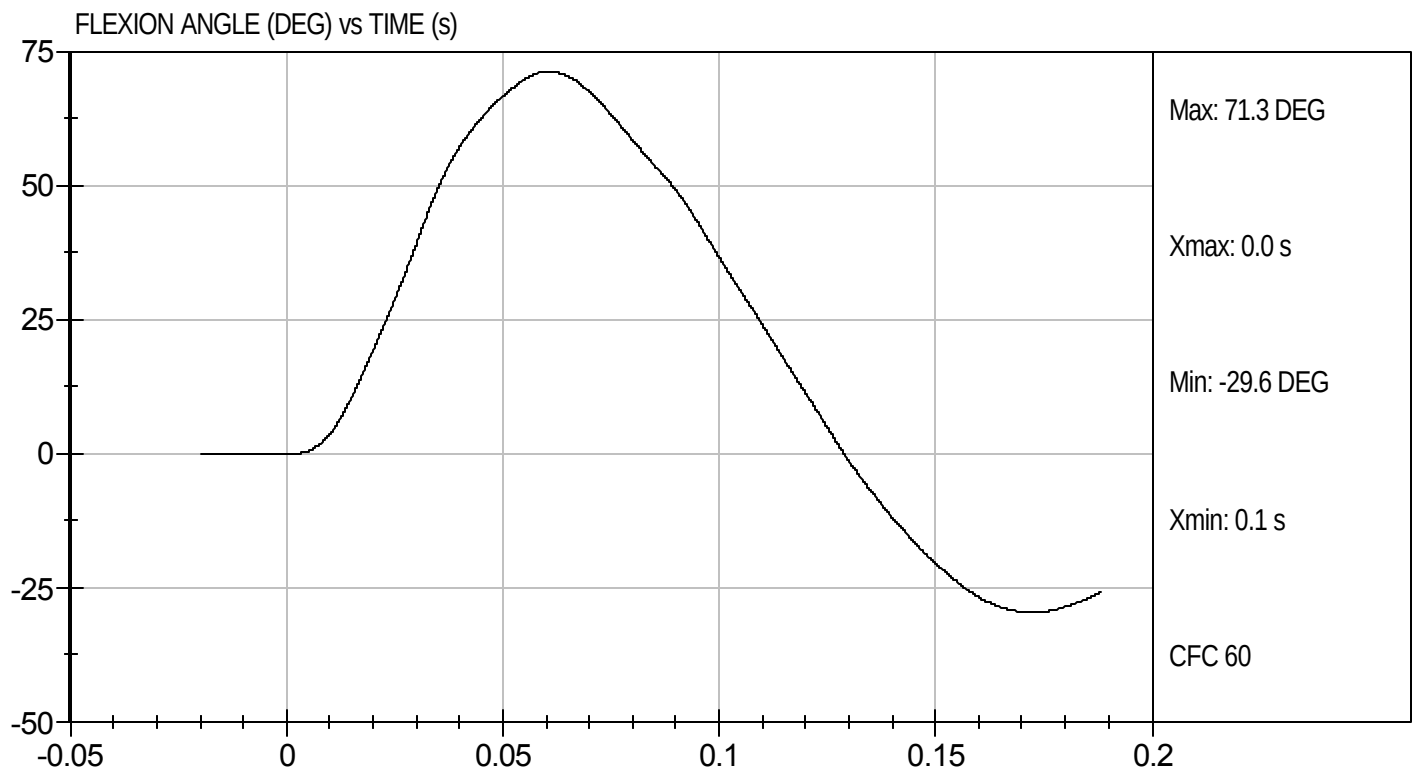
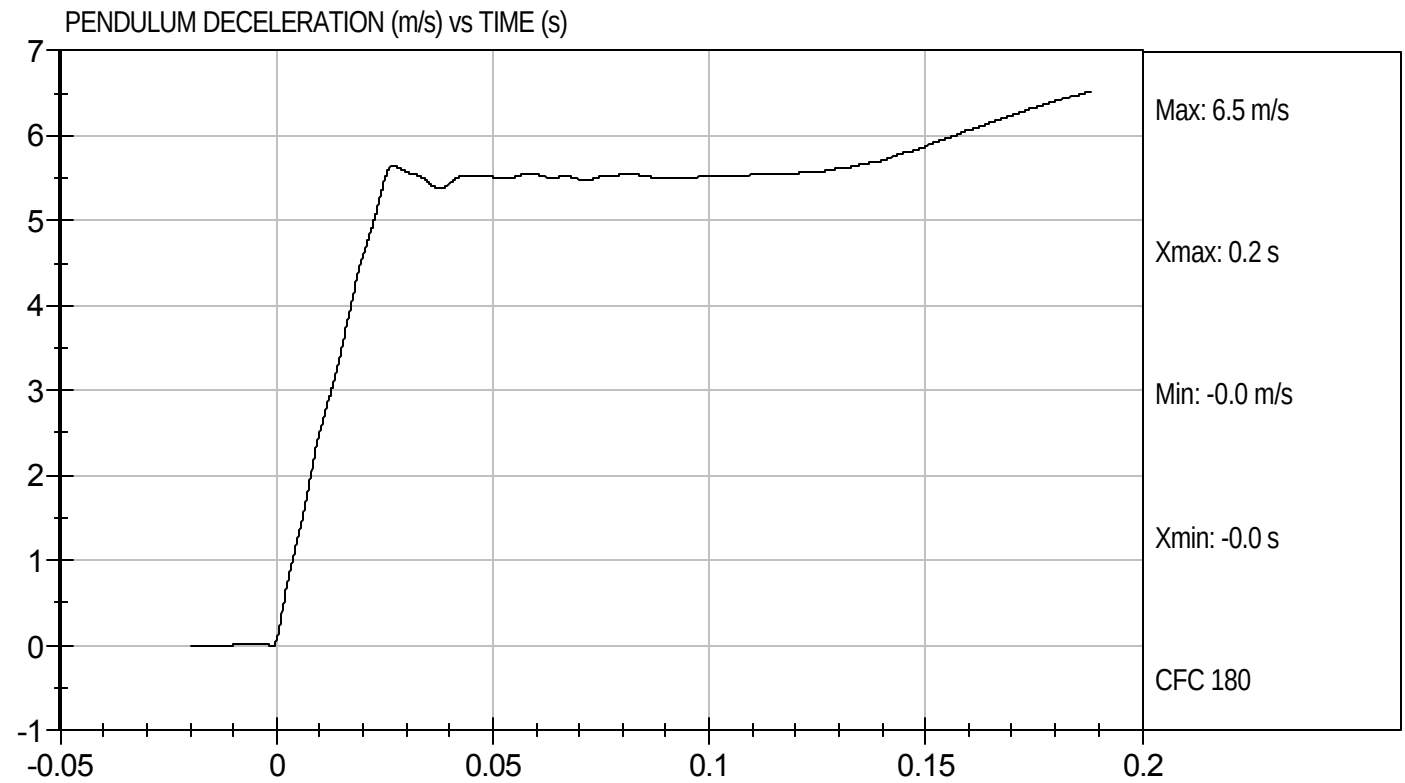
10/10/11  
 Test Date

  
 Approved By



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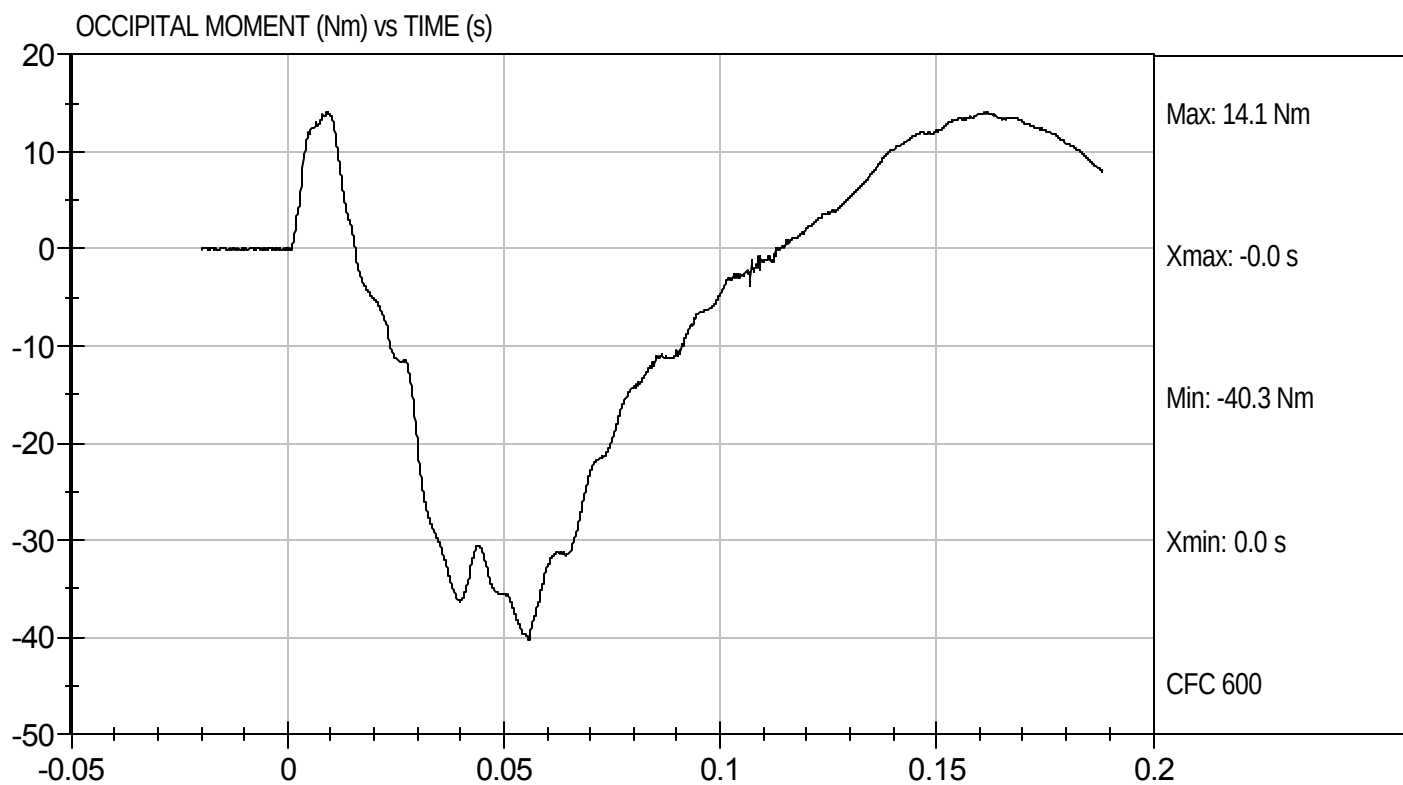
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Velocity: 18.11 ft/s, 5.52 m/s





Test Desc: Neck Bending  
Component ID: D113412

Test Date: 10/10/11  
Velocity: 18.11 ft/s, 5.52 m/s



**MGA RESEARCH CORPORATION**  
**SHOULDER IMPACT TEST**  
**SID-11s BUILD LEVEL D DUMMY**

**ATD Serial No:** 296

**Test ID:** D113413

| Tested Parameter                | Units | Specification | Result | Pass/Fail |
|---------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature          | deg C | 20.6 to 22.2  | 21.5   | Pass      |
| Laboratory Relative Humidity    | %     | 10 to 70      | 43     | Pass      |
| Impact Velocity                 | m/s   | 4.20 to 4.40  | 4.38   | Pass      |
| Maximum Probe Acceleration      | G's   | 13 to 18      | 15     | Pass      |
| Shoulder Displacement           | mm    | 28 to 37      | 31     | Pass      |
| Upper Spine (T1) Y Acceleration | G's   | 17 to 22      | 18     | Pass      |
| Overall Test Results            |       |               | Pass   |           |

*Jessica Hall*  
Laboratory Technician

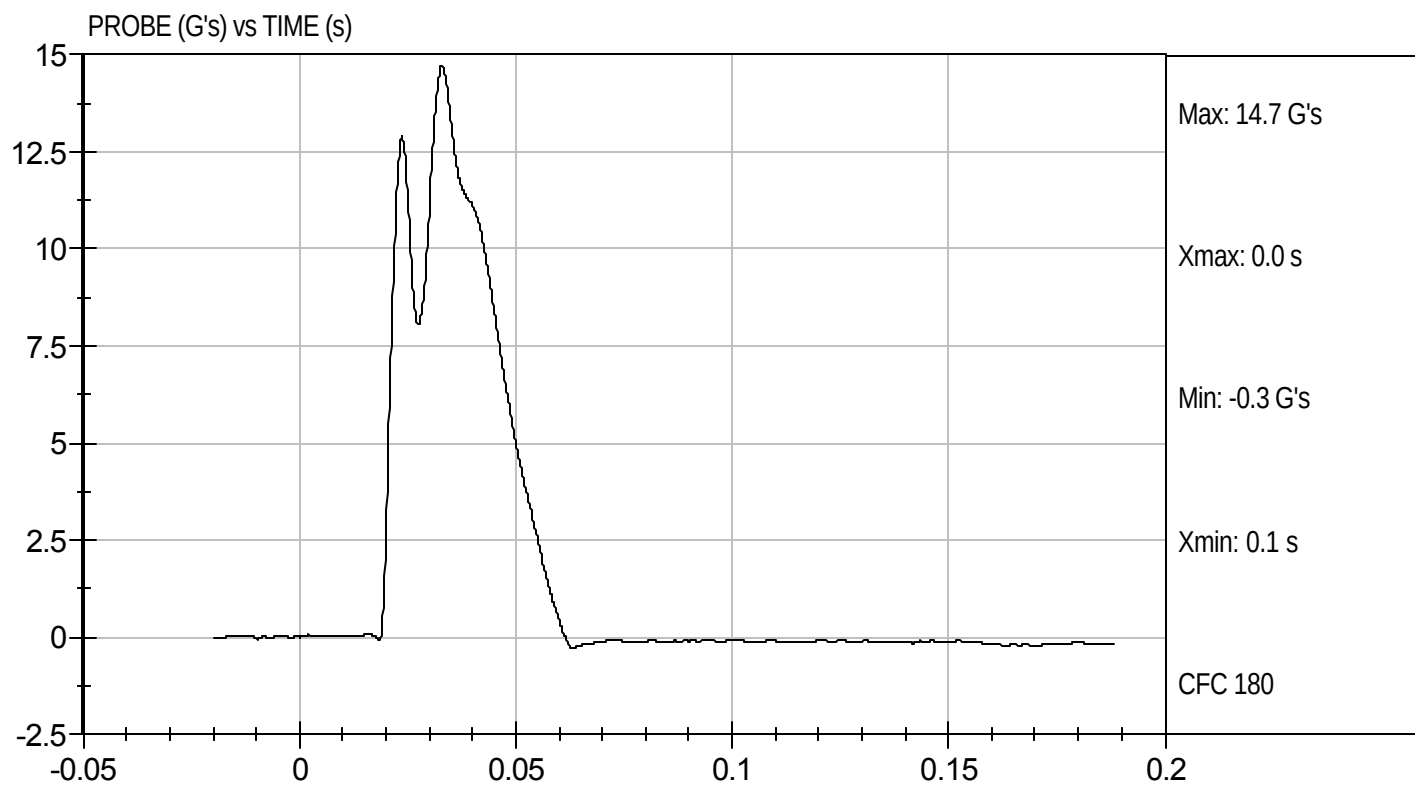
10/10/11  
Test Date

*David Winkelbauer*  
Approved By



Test Desc: Shoulder Impact  
Component ID: D113413

Test Date: 10/10/11  
Velocity: 14.36 ft/s, 4.38 m/s

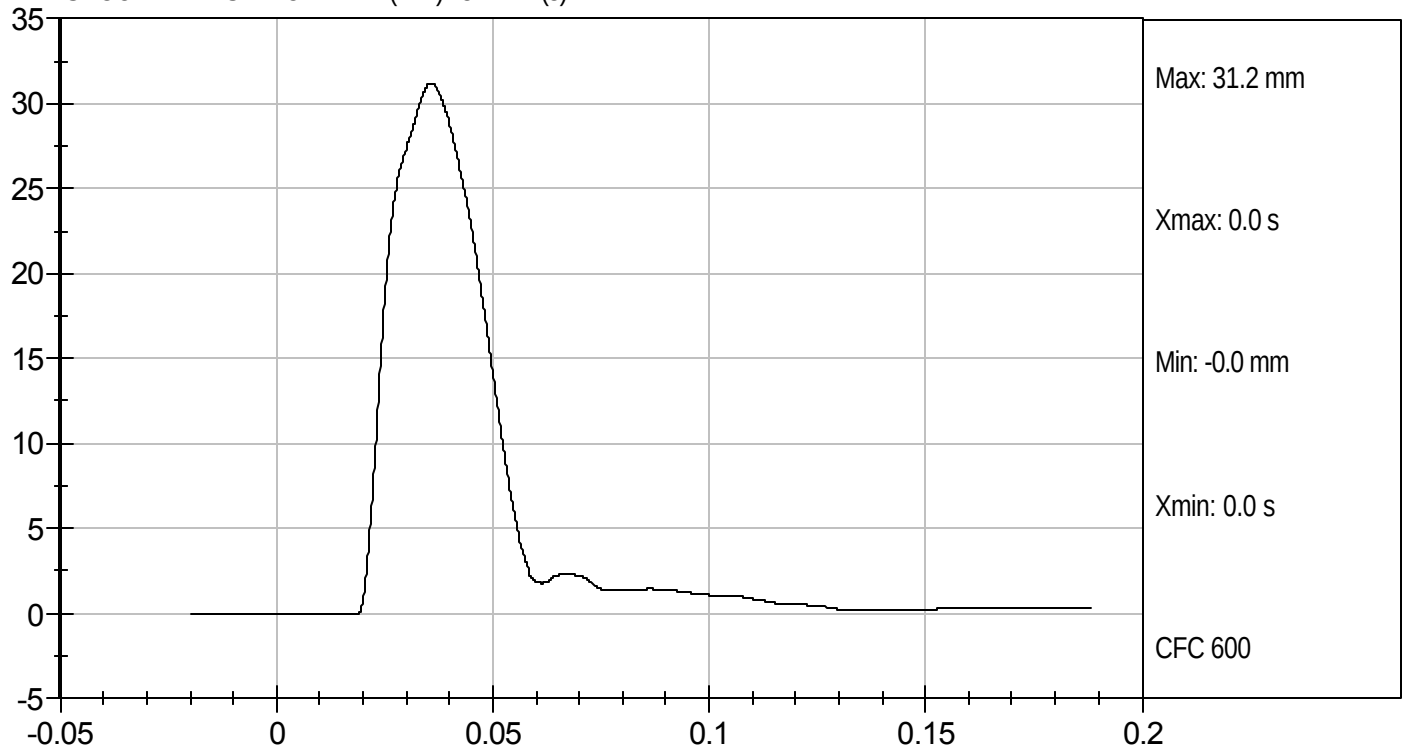




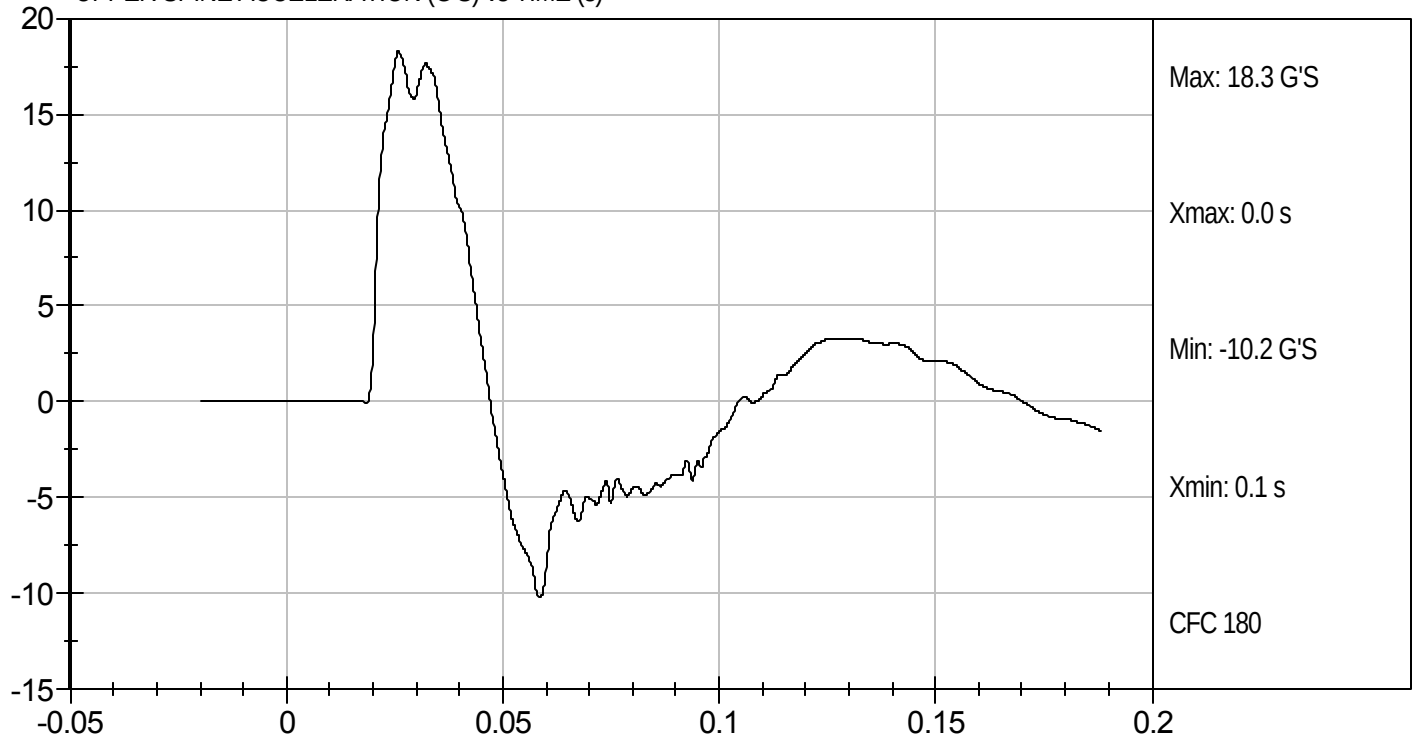
Test Desc: Shoulder Impact  
Component ID: D113413

Test Date: 10/10/11  
Velocity: 14.36 ft/s, 4.38 m/s

SHOULDER DISPLACEMENT (mm) vs TIME (s)



UPPER SPINE ACCELERATION (G'S) vs TIME (s)



**MGA RESEARCH CORPORATION**  
**THORAX (WITH ARM) IMPACT TEST**  
**SID-IIs BUILD LEVEL D DUMMY**

**ATD Serial No:** 296

**Test I.D:** D113414

| Tested Parameter                 | Units | Specification | Result | Pass/Fail |
|----------------------------------|-------|---------------|--------|-----------|
| Temperature                      | deg C | 20.6 to 22.2  | 21.5   | Pass      |
| Humidity                         | %     | 10 to 70      | 43     | Pass      |
| Impact Velocity                  | m/s   | 6.60 to 6.80  | 6.77   | Pass      |
| Peak Impactor Acceleration       | G's   | 30 to 36      | 32     | Pass      |
| Shoulder Displacement            | mm    | 31 to 40      | 35     | Pass      |
| Upper Rib Displacement           | mm    | 25 to 32      | 28     | Pass      |
| Middle Rib Displacement          | mm    | 30 to 36      | 32     | Pass      |
| Lower Rib Displacement           | mm    | 32 to 38      | 34     | Pass      |
| Upper Spine (T1) Y Acceleration  | G's   | 34 to 43      | 37     | Pass      |
| Lower Spine (T12) Y Acceleration | G's   | 29 to 37      | 32     | Pass      |
| Overall Test Results             |       |               | Pass   |           |

  
Laboratory Technician

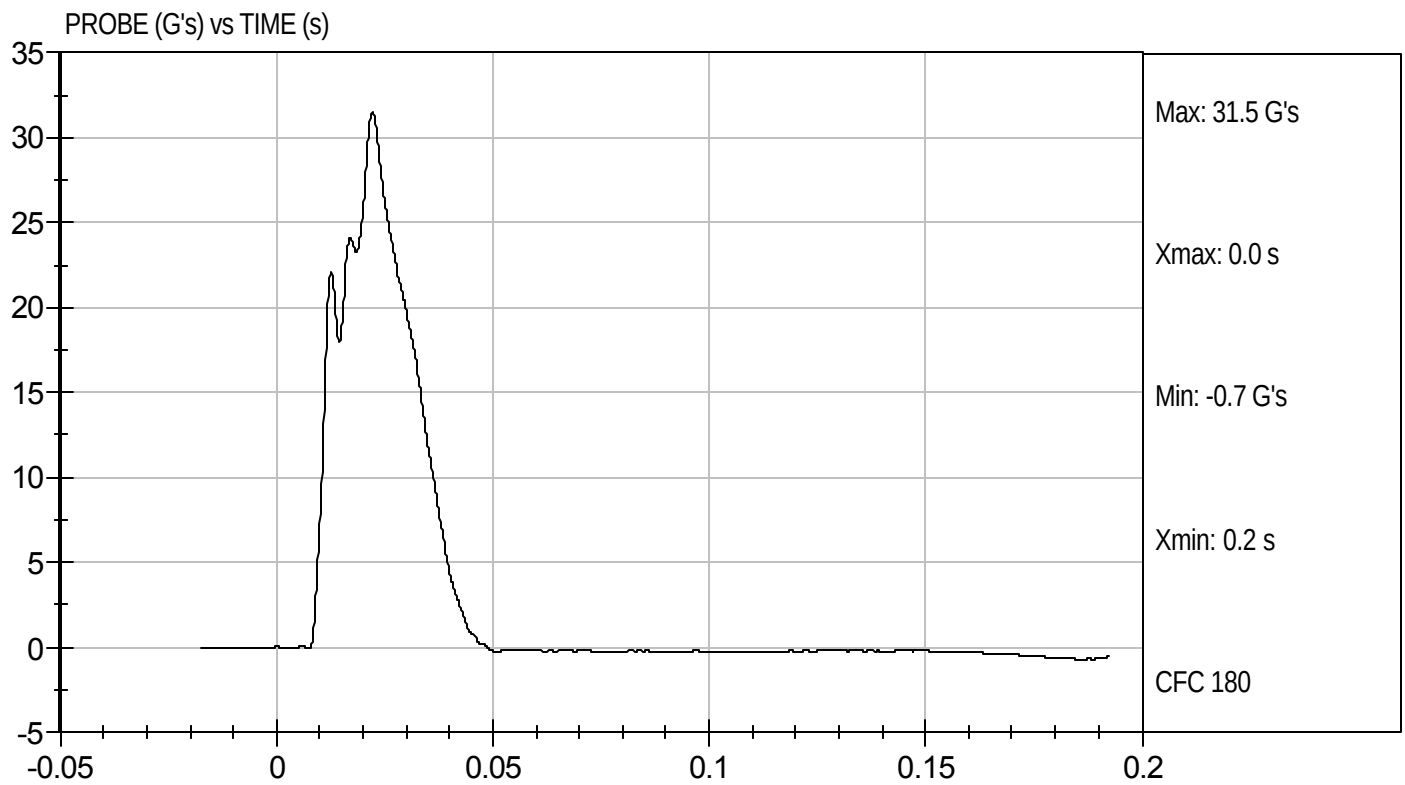
10/10/11  
Test Date

  
Approved By



Test Desc: Thorax With Arm  
Component ID: D113414

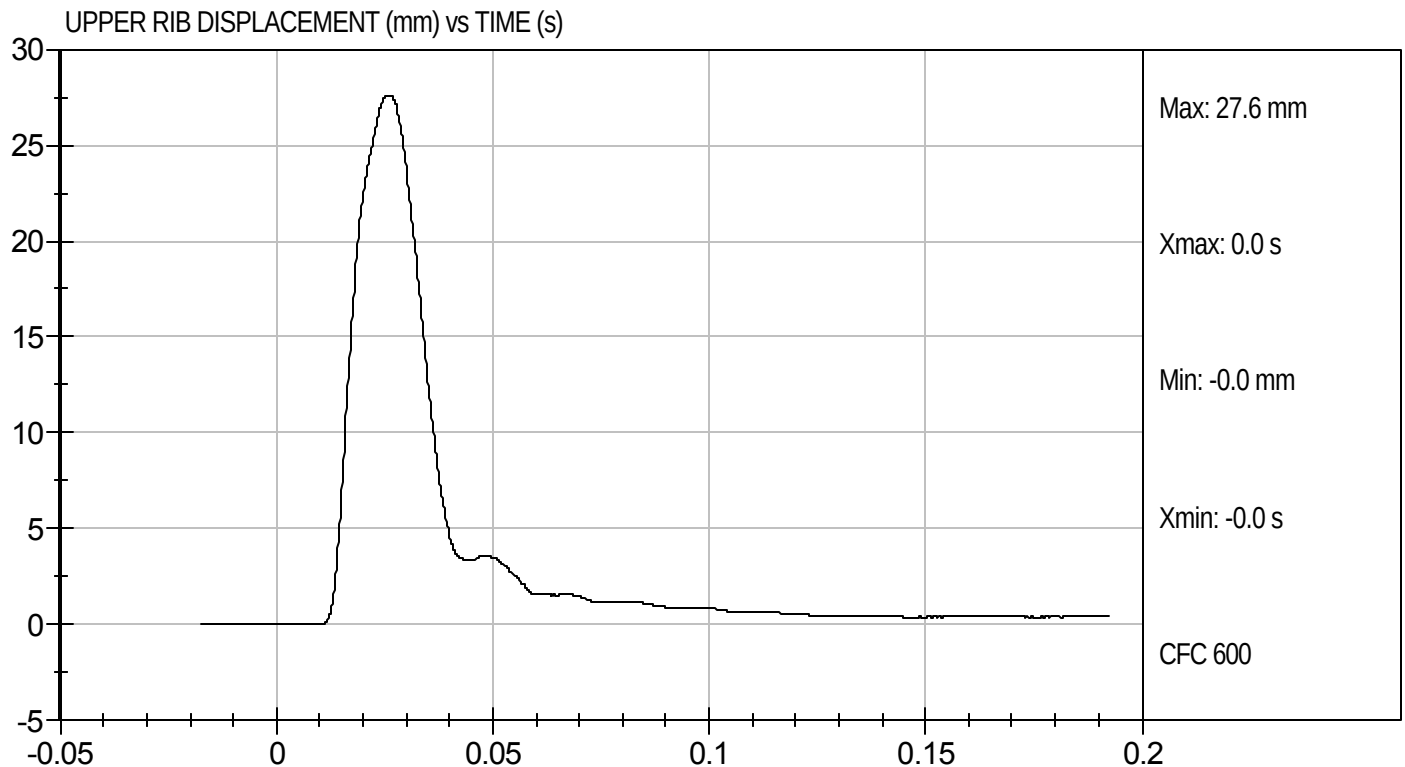
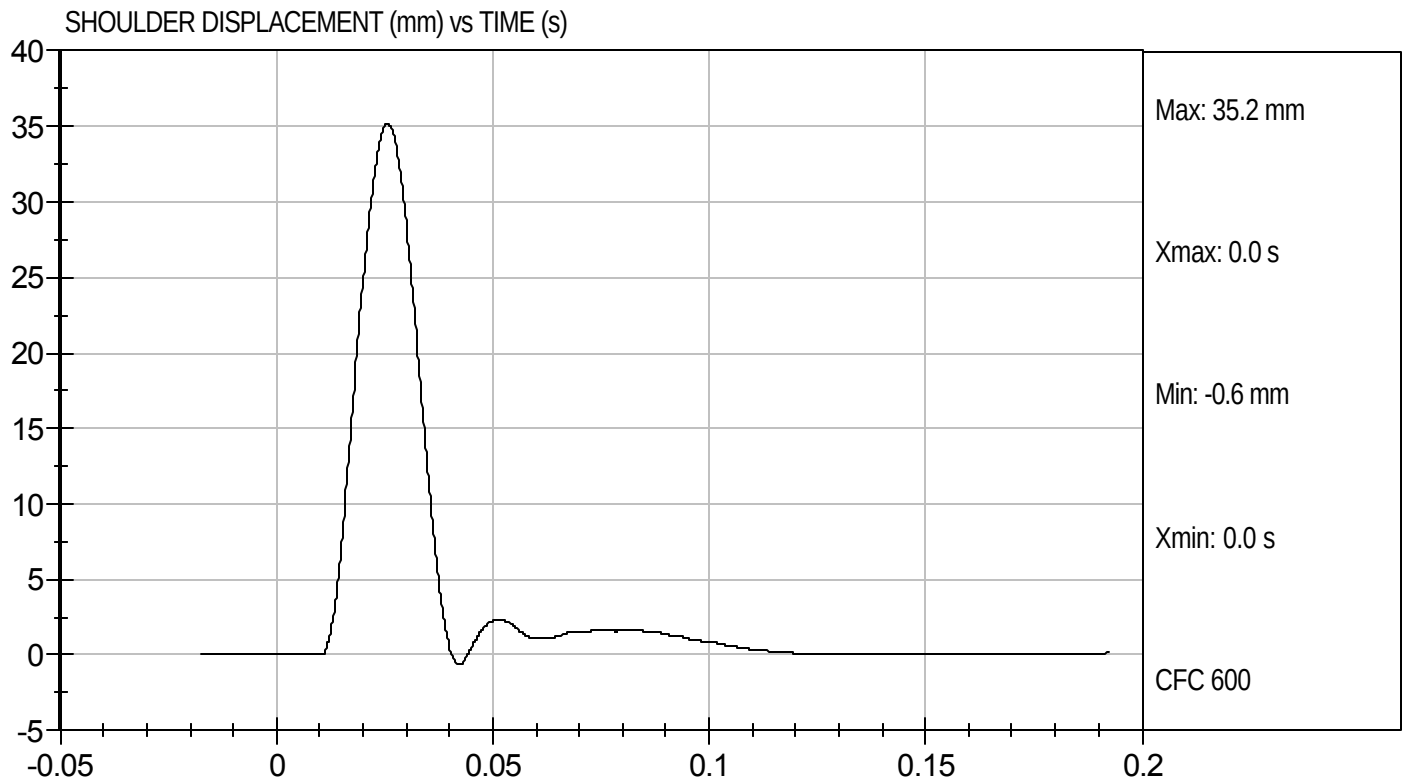
Test Date: 10/10/11  
Velocity: 22.2 ft/s, 6.77 m/s





Test Desc: Thorax With Arm  
Component ID: D113414

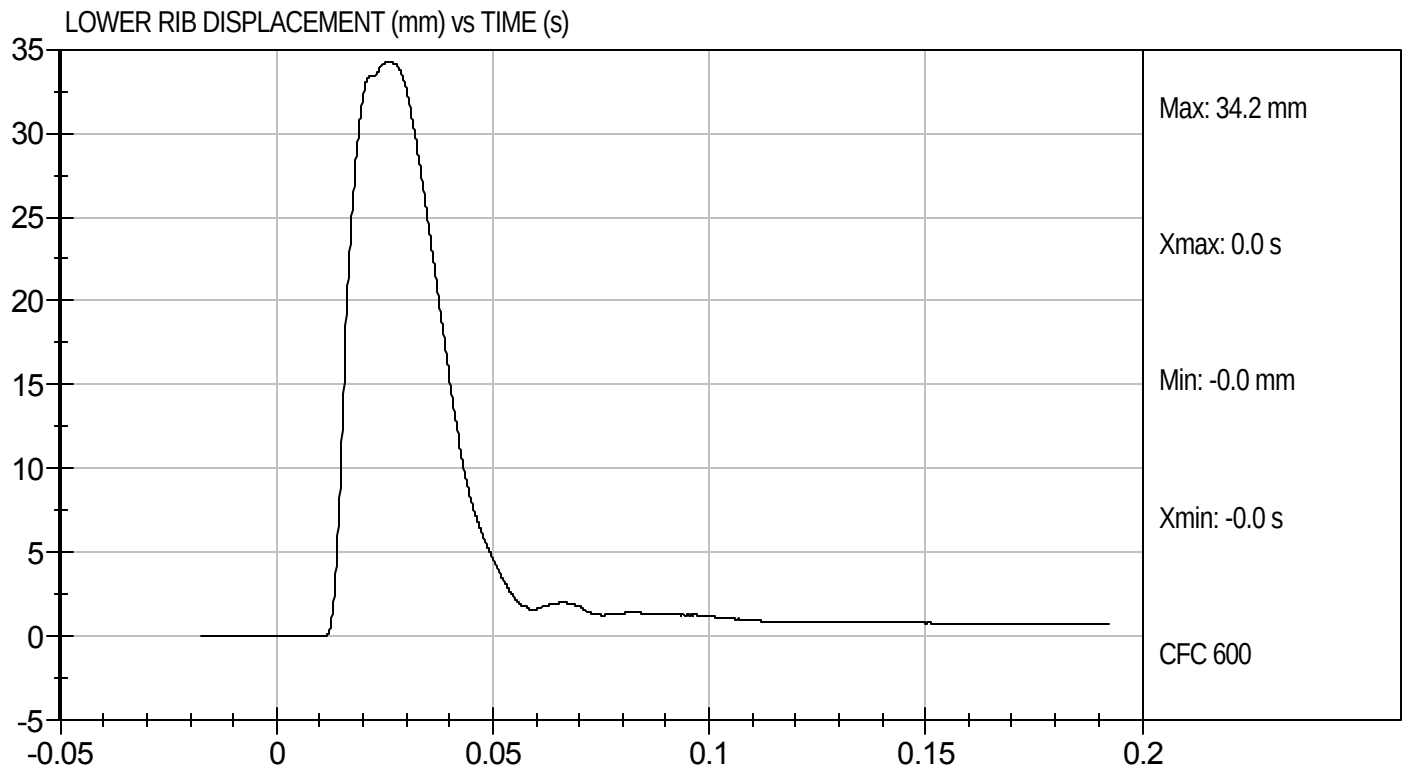
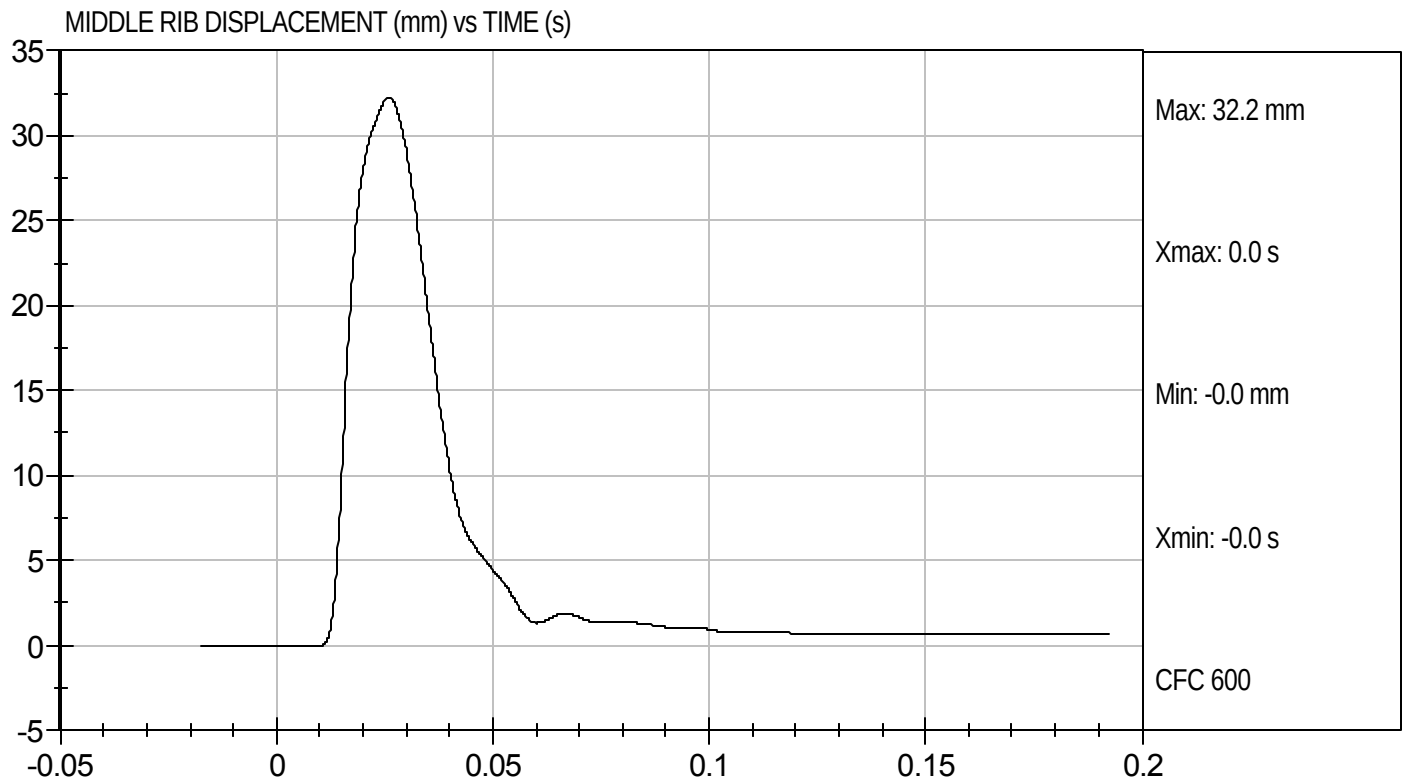
Test Date: 10/10/11  
Velocity: 22.2 ft/s, 6.77 m/s





Test Desc: Thorax With Arm  
Component ID: D113414

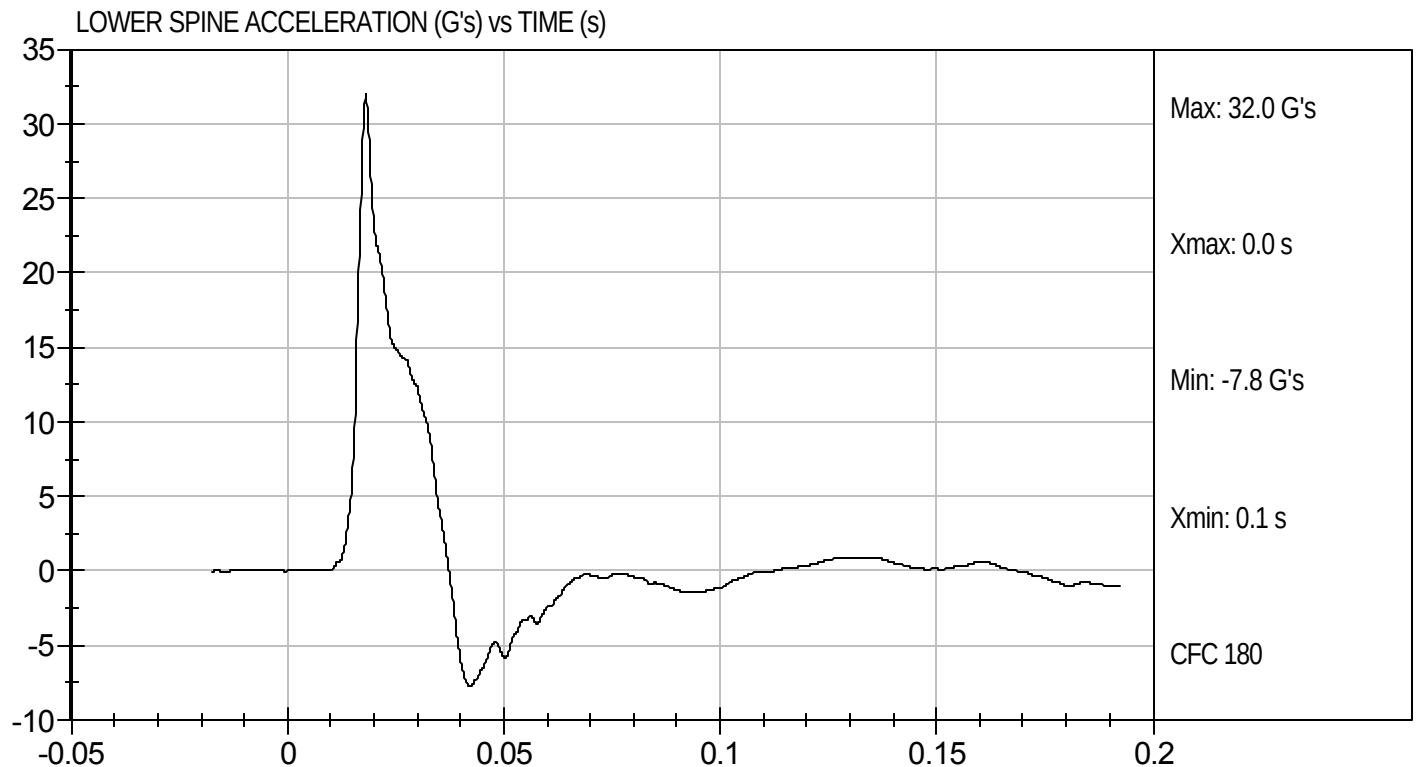
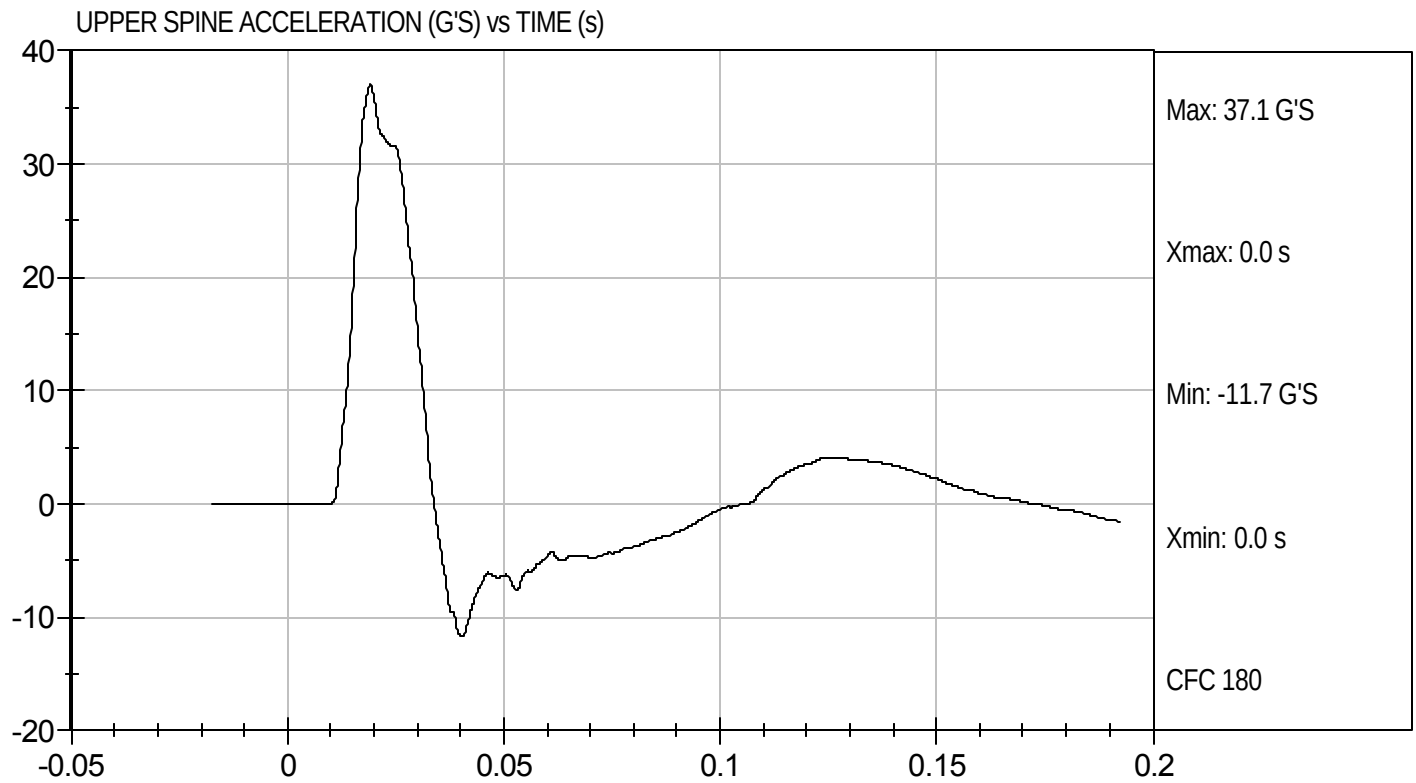
Test Date: 10/10/11  
Velocity: 22.2 ft/s, 6.77 m/s





Test Desc: Thorax With Arm  
Component ID: D113414

Test Date: 10/10/11  
Velocity: 22.2 ft/s, 6.77 m/s



**MGA RESEARCH CORPORATION**  
**THORAX (WITHOUT ARM) IMPACT TEST**  
**SID-IIs BUILD LEVEL D DUMMY**

**ATD Serial No:** 296

**Test I.D:** D113415

| Tested Parameter                 | Units | Specification | Result | Pass/Fail |
|----------------------------------|-------|---------------|--------|-----------|
| Temperature                      | deg C | 20.6 to 22.2  | 21.5   | Pass      |
| Humidity                         | %     | 10 to 70      | 43     | Pass      |
| Impact Velocity                  | m/s   | 4.20 to 4.40  | 4.34   | Pass      |
| Peak Impactor Force              | G's   | 14 to 18      | 14     | Pass      |
| Upper Rib Displacement           | mm    | 32 to 40      | 36     | Pass      |
| Middle Rib Displacement          | mm    | 39 to 45      | 42     | Pass      |
| Lower Rib Displacement           | mm    | 35 to 43      | 39     | Pass      |
| Upper Spine (T1) Y Acceleration  | G's   | 13 to 17      | 13     | Pass      |
| Lower Spine (T12) Y Acceleration | G's   | 7 to 11       | 8      | Pass      |
| Overall Test Results             |       |               | Pass   |           |

Jessica Hall  
Laboratory Technician

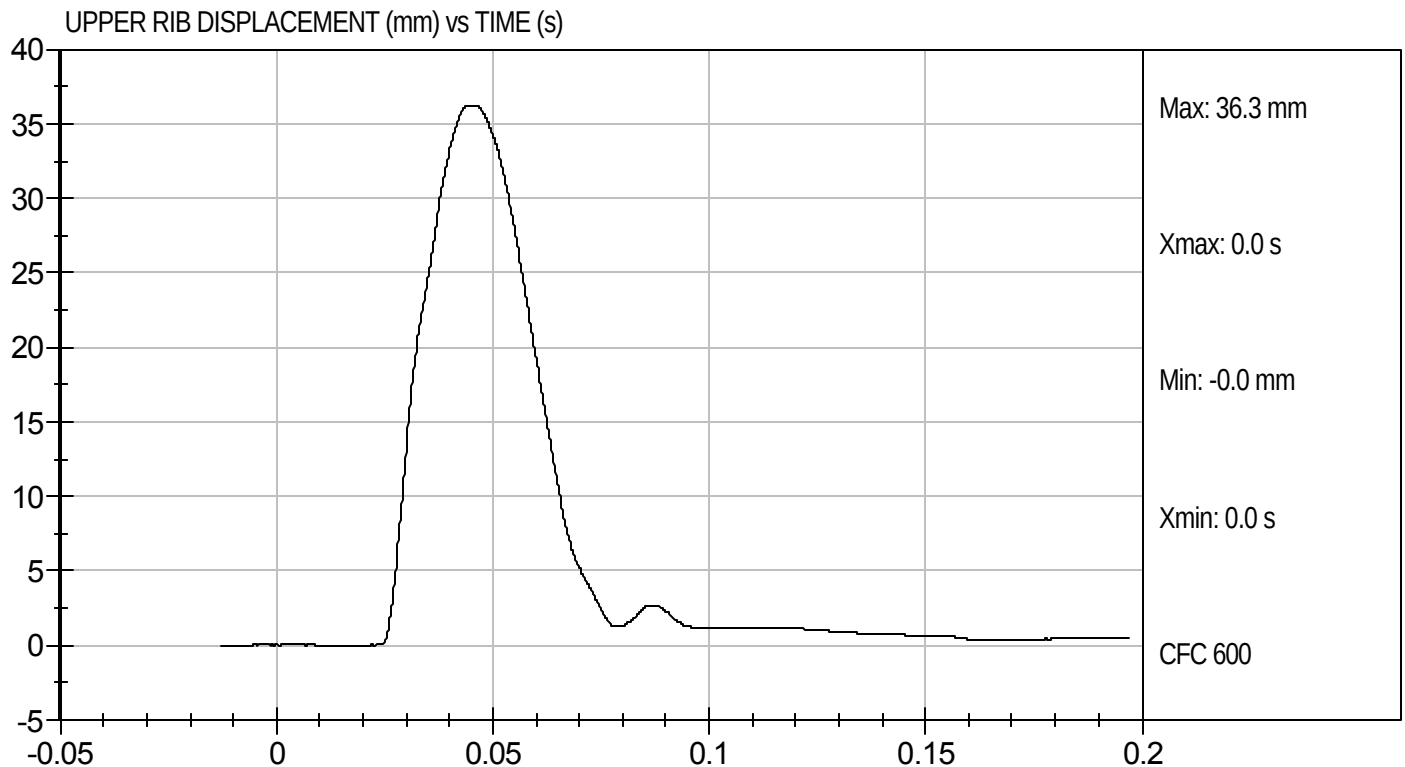
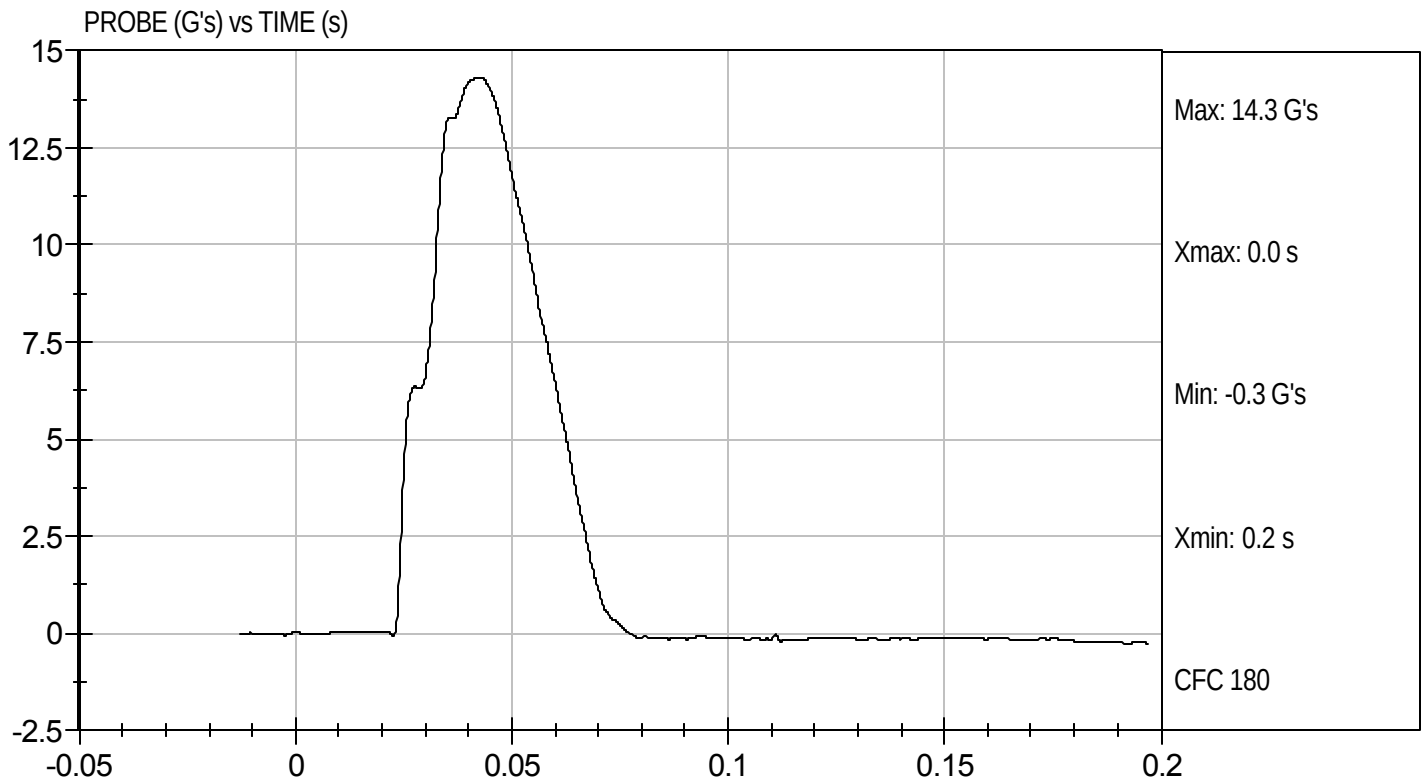
10/10/11  
Test Date

David Winkelbauer  
Approved By



Test Desc: Thorax Without Arm  
Component ID: D113415

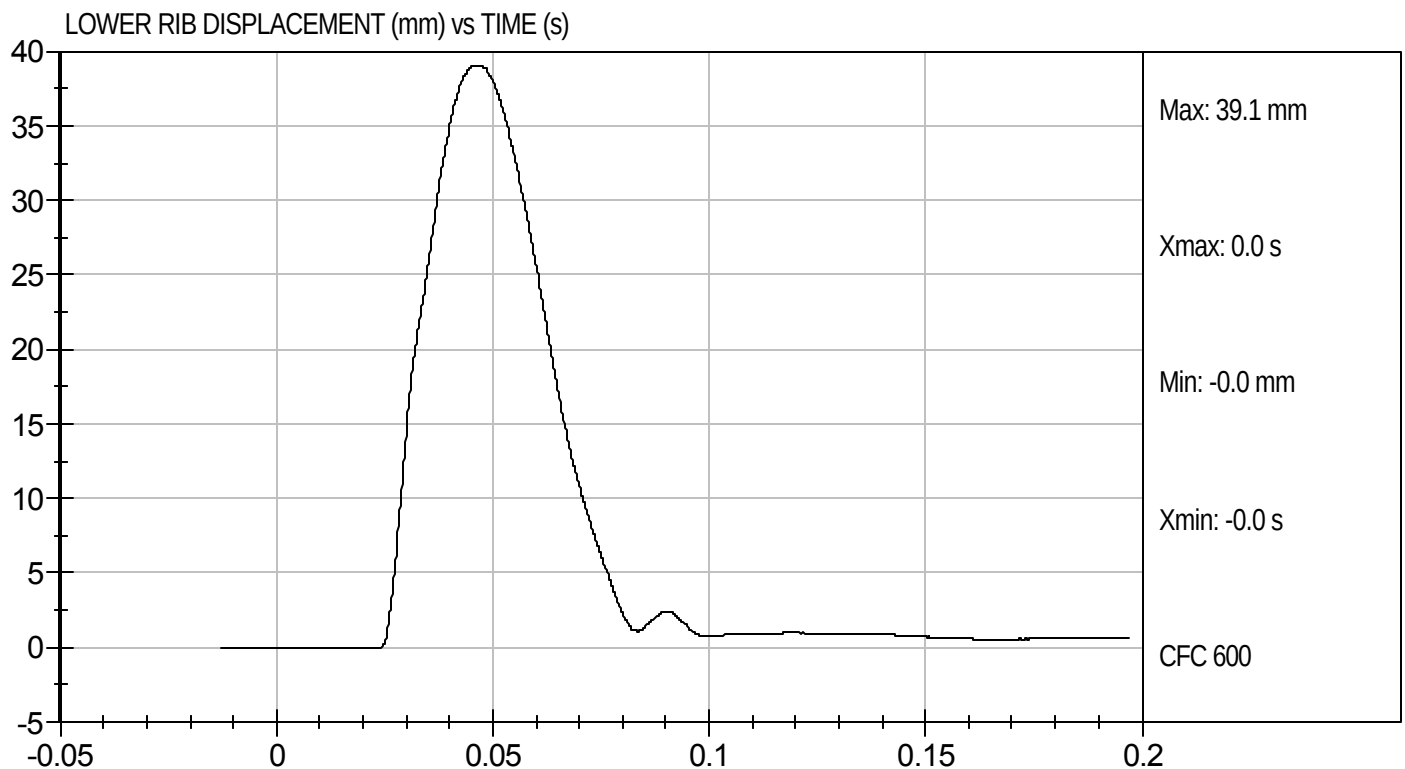
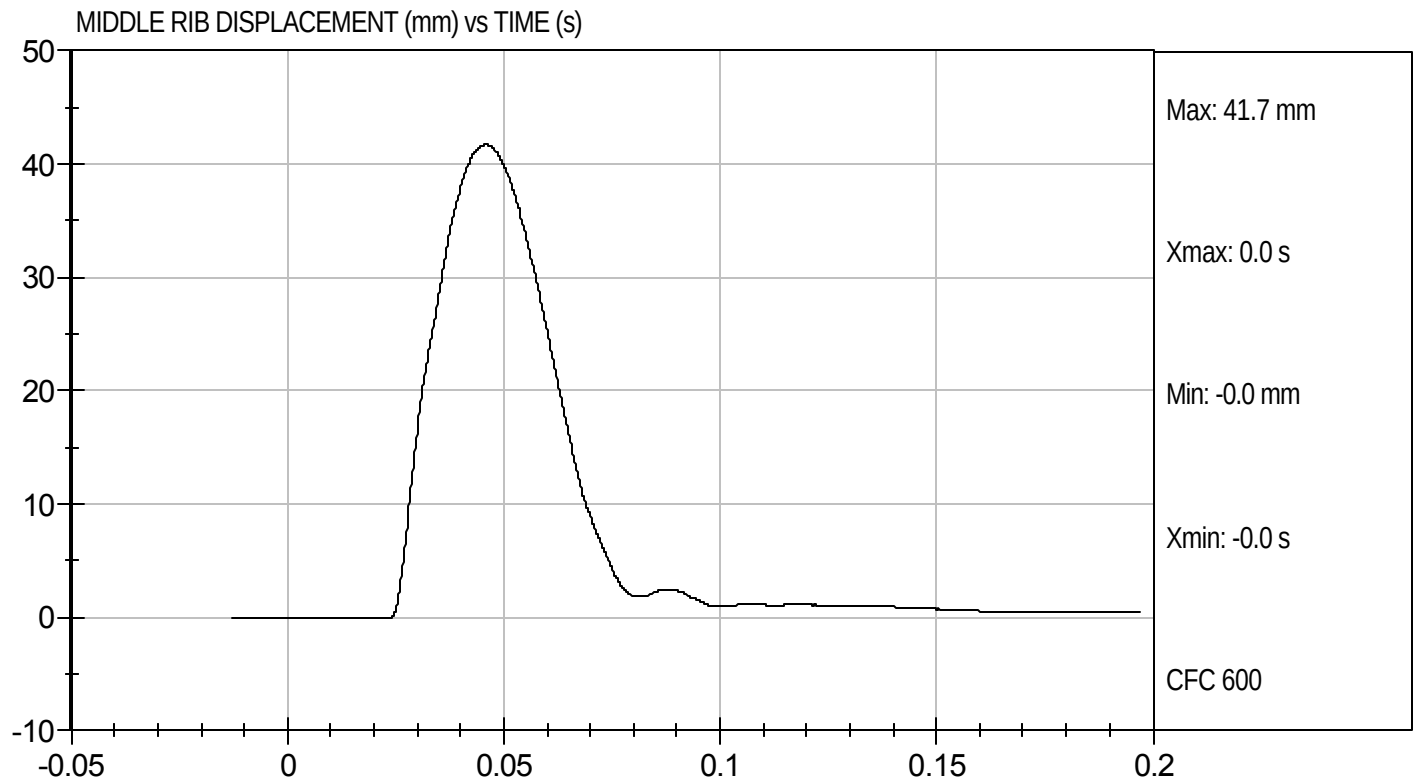
Test Date: 10/10/11  
Velocity: 14.24 ft/s, 4.34 m/s





Test Desc: Thorax Without Arm  
Component ID: D113415

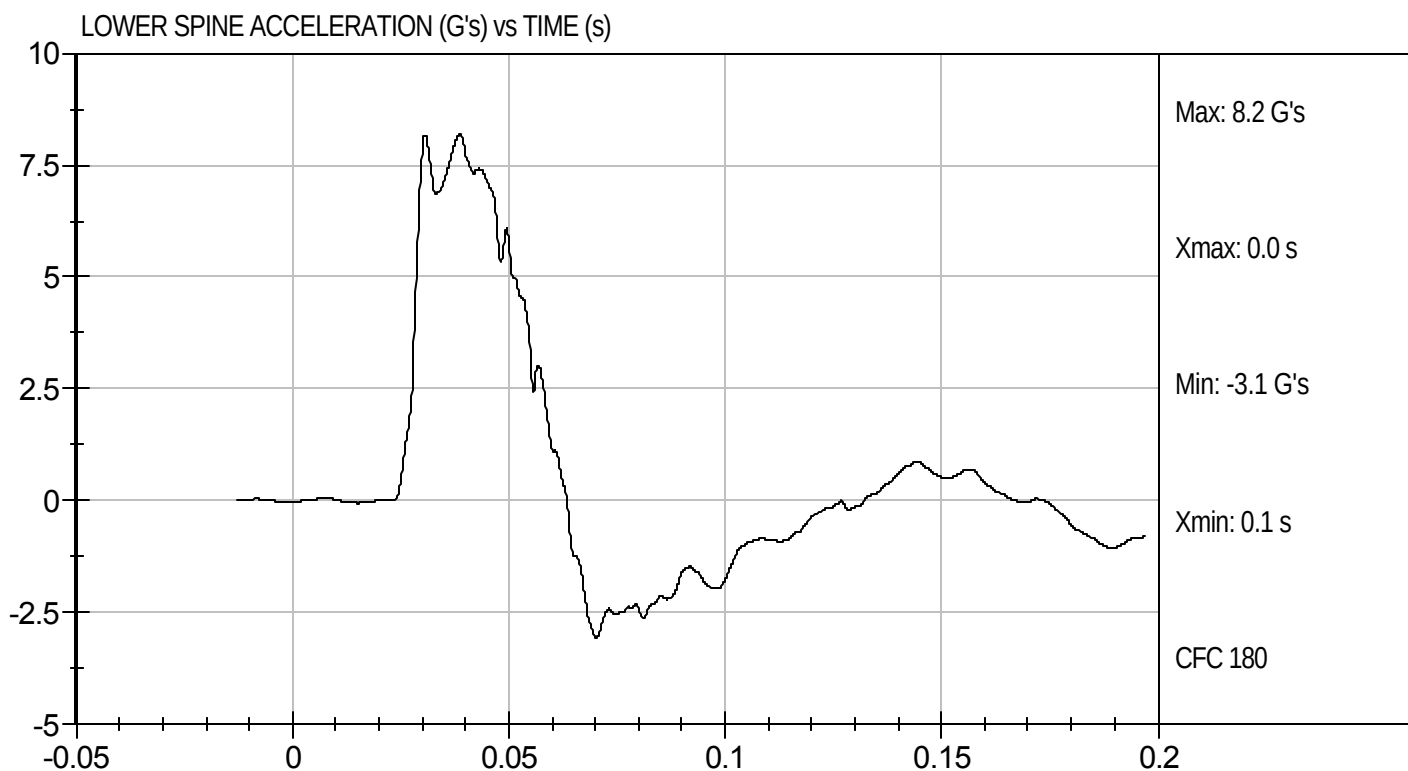
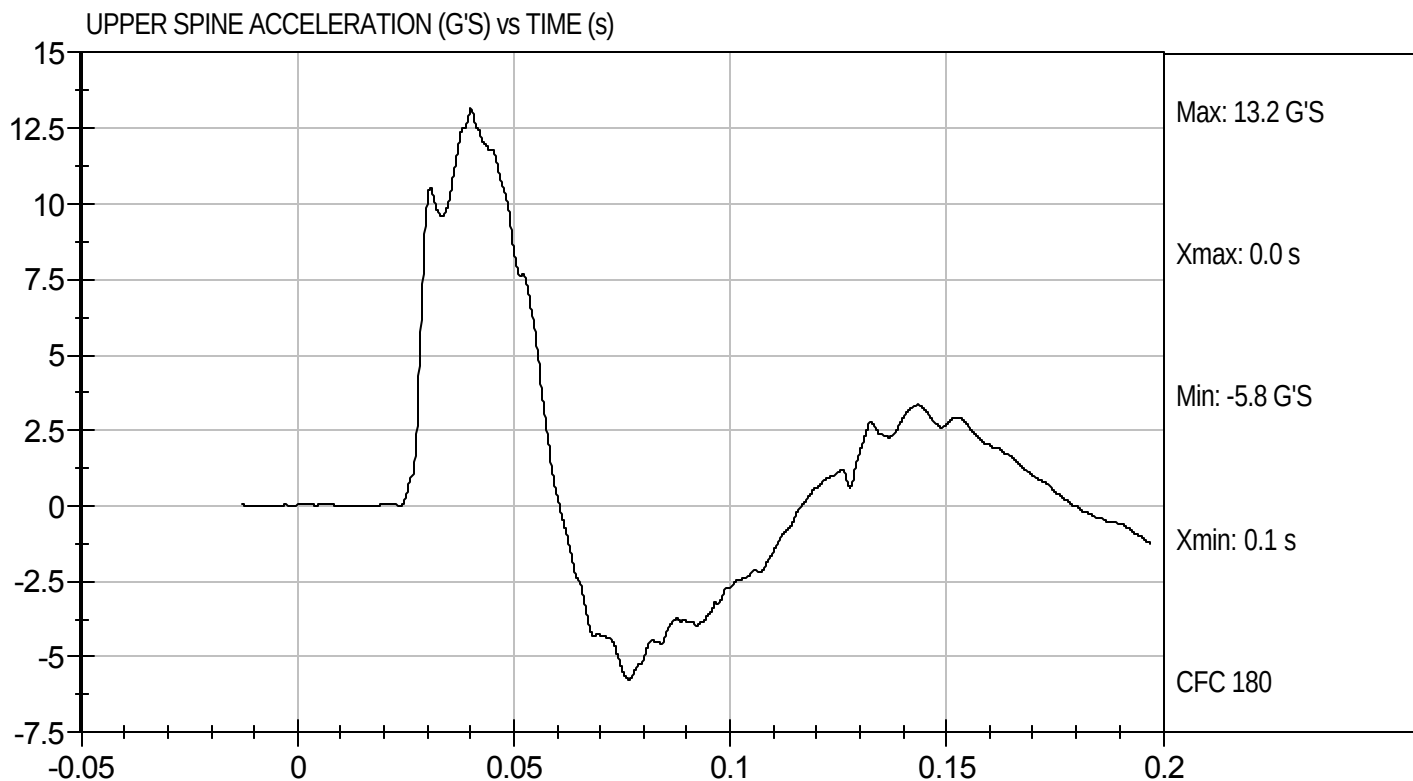
Test Date: 10/10/11  
Velocity: 14.24 ft/s, 4.34 m/s





Test Desc: Thorax Without Arm  
Component ID: D113415

Test Date: 10/10/11  
Velocity: 14.24 ft/s, 4.34 m/s



**MGA RESEARCH CORPORATION**  
**ABDOMINAL IMPACT TEST**  
**SID-IIs BUILD LEVEL D DUMMY**

**ATD Serial No:** 296

**Test I.D:** D113416

| Tested Parameter                 | Units | Specification | Result | Pass/Fail |
|----------------------------------|-------|---------------|--------|-----------|
| Temperature                      | deg C | 20.6 to 22.2  | 21.5   | Pass      |
| Humidity                         | %     | 10 to 70      | 43     | Pass      |
| Impact Velocity                  | m/s   | 4.20 to 4.40  | 4.34   | Pass      |
| Peak Impactor Acceleration       | G's   | 12 to 16      | 13     | Pass      |
| Upper Rib Displacement           | mm    | 36 to 47      | 42     | Pass      |
| Lower Rib Displacement           | mm    | 33 to 44      | 38     | Pass      |
| Lower Spine (T12) Y Acceleration | G's   | 9 to 14       | 11     | Pass      |
| Overall Test Results             |       |               | Pass   |           |

  
Laboratory Technician

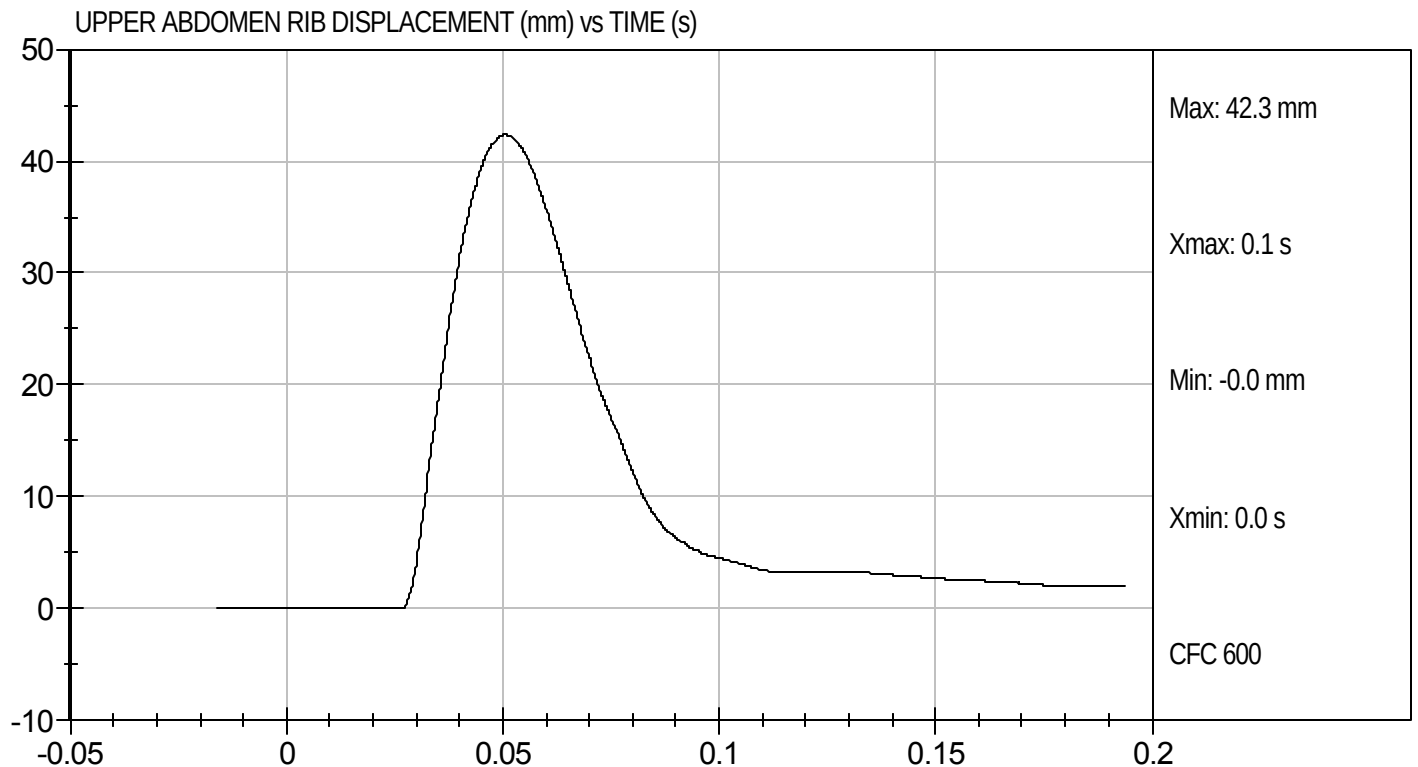
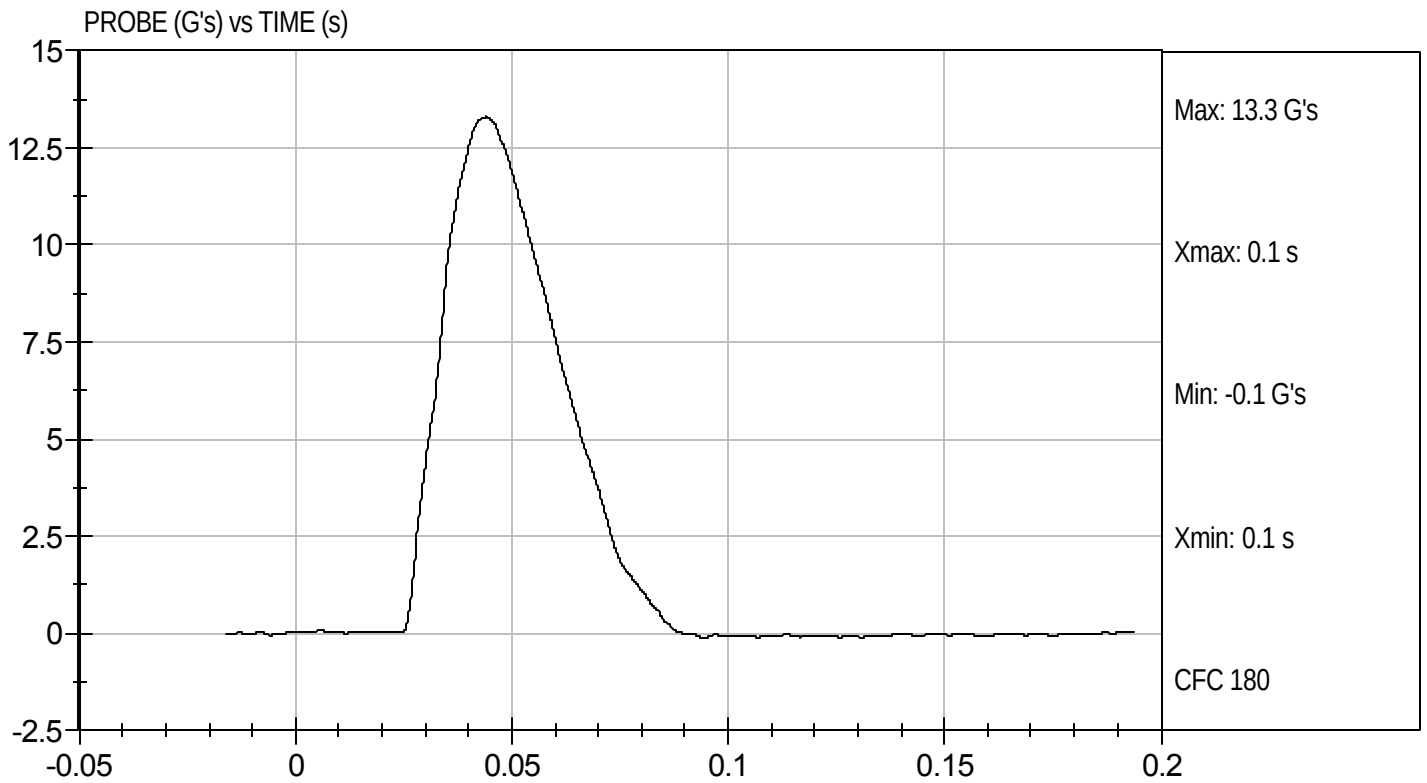
10/10/11  
Test Date

  
Approved By



Test Desc: Abdomen Impact  
Component ID: D113416

Test Date: 10/10/11  
Velocity: 14.24 ft/s, 4.34 m/s

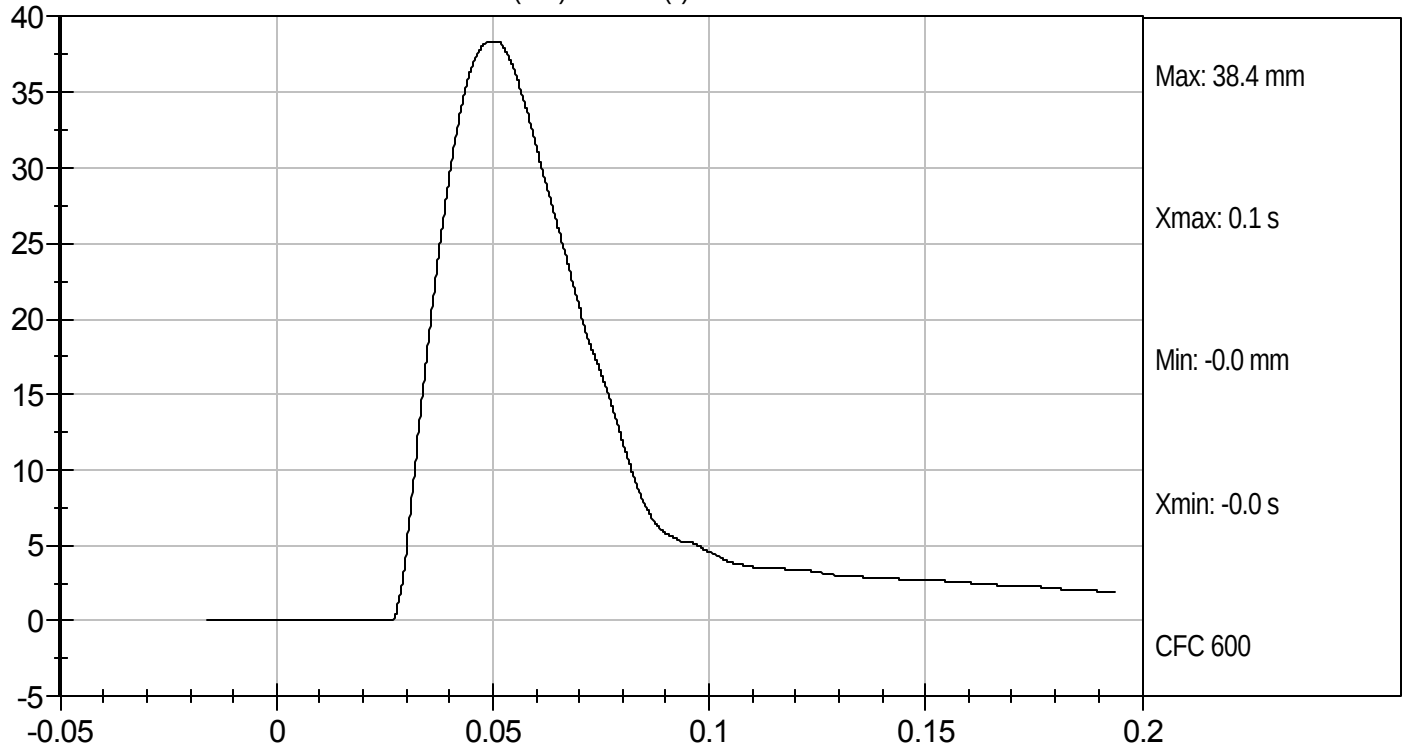




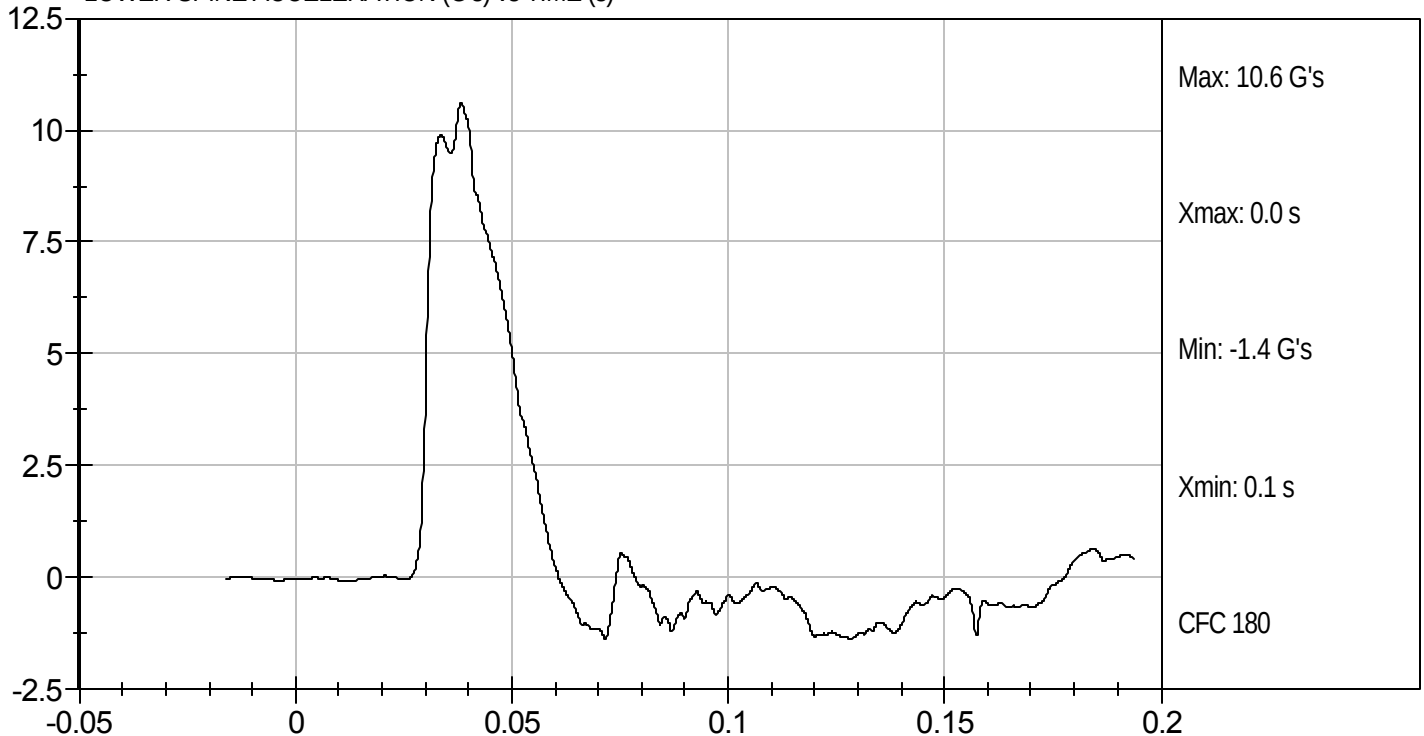
Test Desc: Abdomen Impact  
Component ID: D113416

Test Date: 10/10/11  
Velocity: 14.24 ft/s, 4.34 m/s

LOWER ABDOMEN RIB DISPLACEMENT (mm) vs TIME (s)



LOWER SPINE ACCELERATION (G's) vs TIME (s)



**MGA RESEARCH CORPORATION**  
**PELVIS IMPACT TEST**  
**SID-IIs BUILD LEVEL D DUMMY**

**ATD Serial No:** 296

**Test I.D:** D113417

| Tested Parameter                 | Units | Specification | Result | Pass/Fail |
|----------------------------------|-------|---------------|--------|-----------|
| Temperature                      | deg C | 20.6 to 22.2  | 21.5   | Pass      |
| Humidity                         | %     | 10 to 70      | 43     | Pass      |
| Impact Velocity                  | m/s   | 6.60 to 6.80  | 6.77   | Pass      |
| Peak Impactor Acceleration       | G's   | 38 to 47      | 43     | Pass      |
| Pelvis Y Acceleration after 6 ms | G's   | 34 to 42      | 40     | Pass      |
| Peak Acetabulum Force            | N     | 3600 to 4300  | 3870   | Pass      |
| Overall Test Results             |       |               |        | Pass      |

  
Laboratory Technician

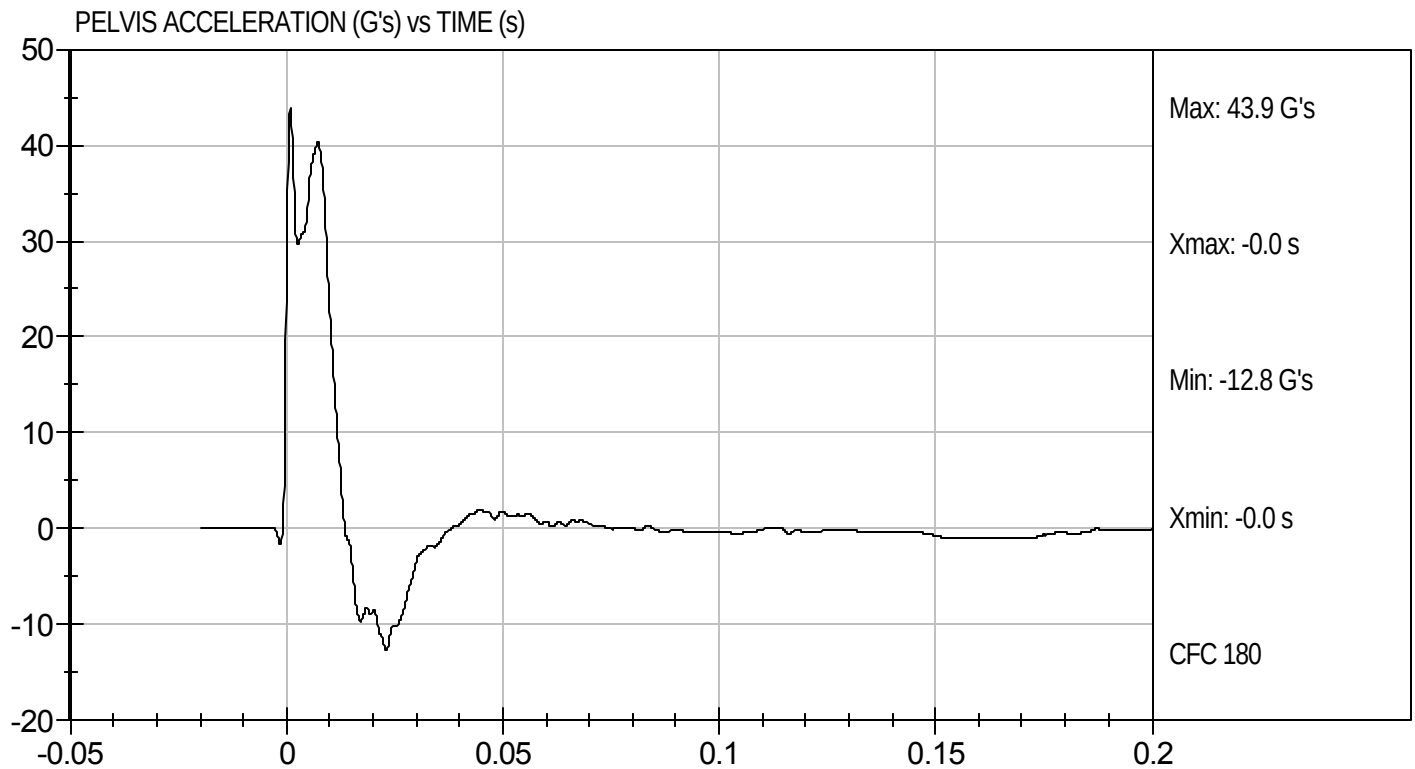
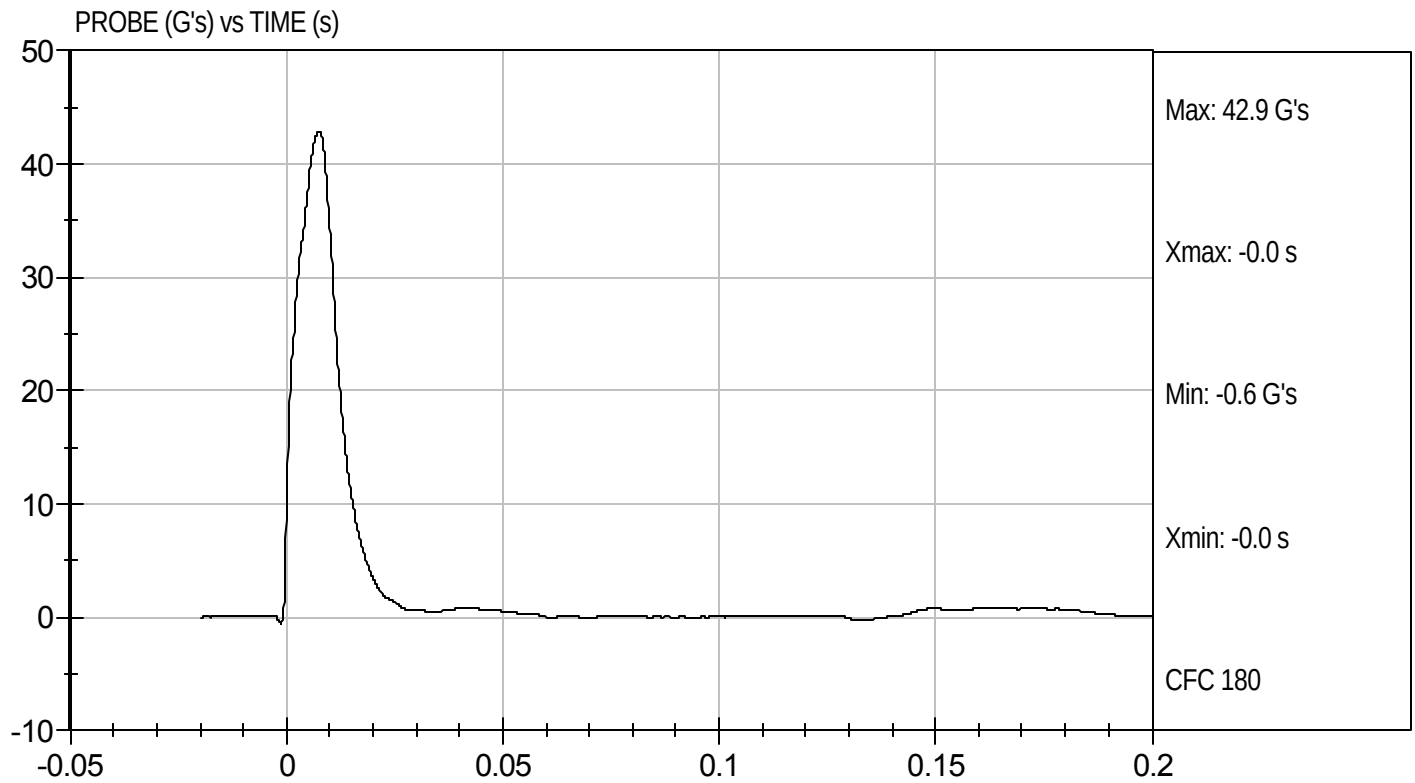
10/10/11  
Test Date

  
Approved By



Test Desc: Pelvis Impact  
Component ID: D113417

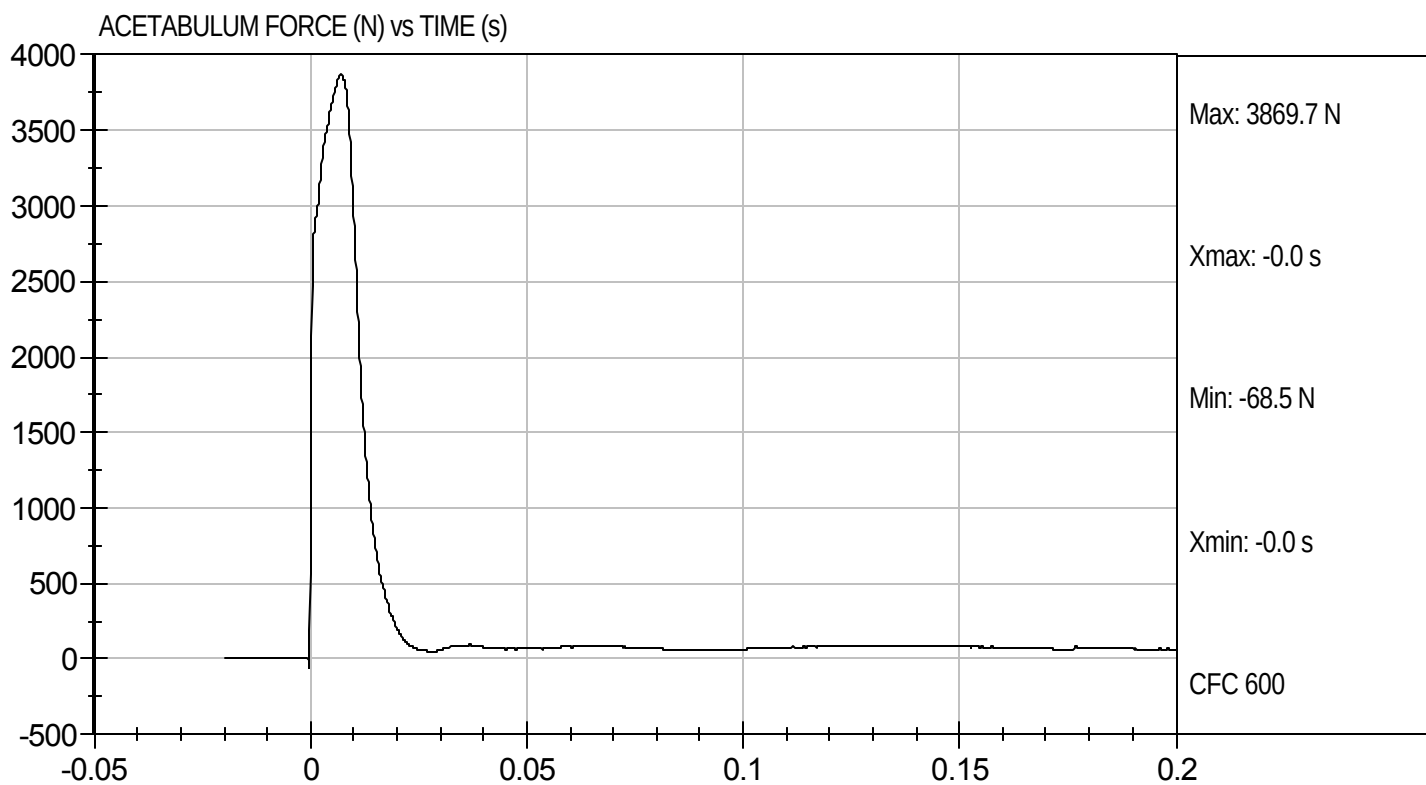
Test Date: 10/10/11  
Velocity: 22.2 ft/s, 6.77 m/s





Test Desc: Pelvis Impact  
Component ID: D113417

Test Date: 10/10/11  
Velocity: 22.2 ft/s, 6.77 m/s



**MGA RESEARCH CORPORATION**  
**ILIAC IMPACT TEST**  
**SID-IIs BUILD LEVEL D DUMMY**

**ATD Serial No:** 296

**Test I.D:** D113418

| Tested Parameter           | Units | Specification | Result | Pass/Fail |
|----------------------------|-------|---------------|--------|-----------|
| Temperature                | deg C | 20.6 to 22.2  | 21.5   | Pass      |
| Humidity                   | %     | 10 to 70      | 43     | Pass      |
| Impact Velocity            | m/s   | 4.20 to 4.40  | 4.30   | Pass      |
| Peak Impactor Acceleration | G's   | 36 to 45      | 36     | Pass      |
| Pelvis Y Acceleration      | G's   | 28 to 39      | 29     | Pass      |
| Peak Pelvis Iliac Force    | N     | 4100 to 5100  | 4431   | Pass      |
| Overall Test Results       |       |               | Pass   |           |

  
Laboratory Technician

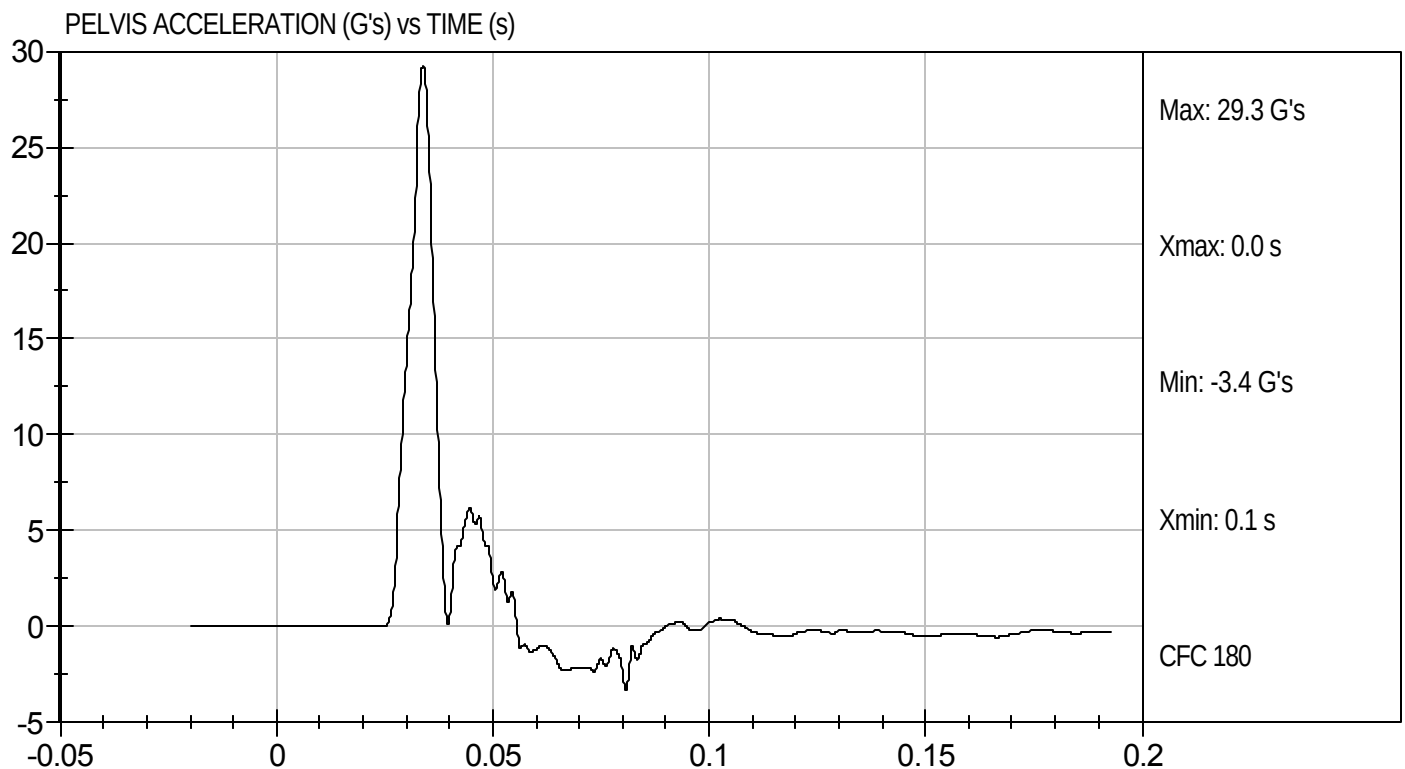
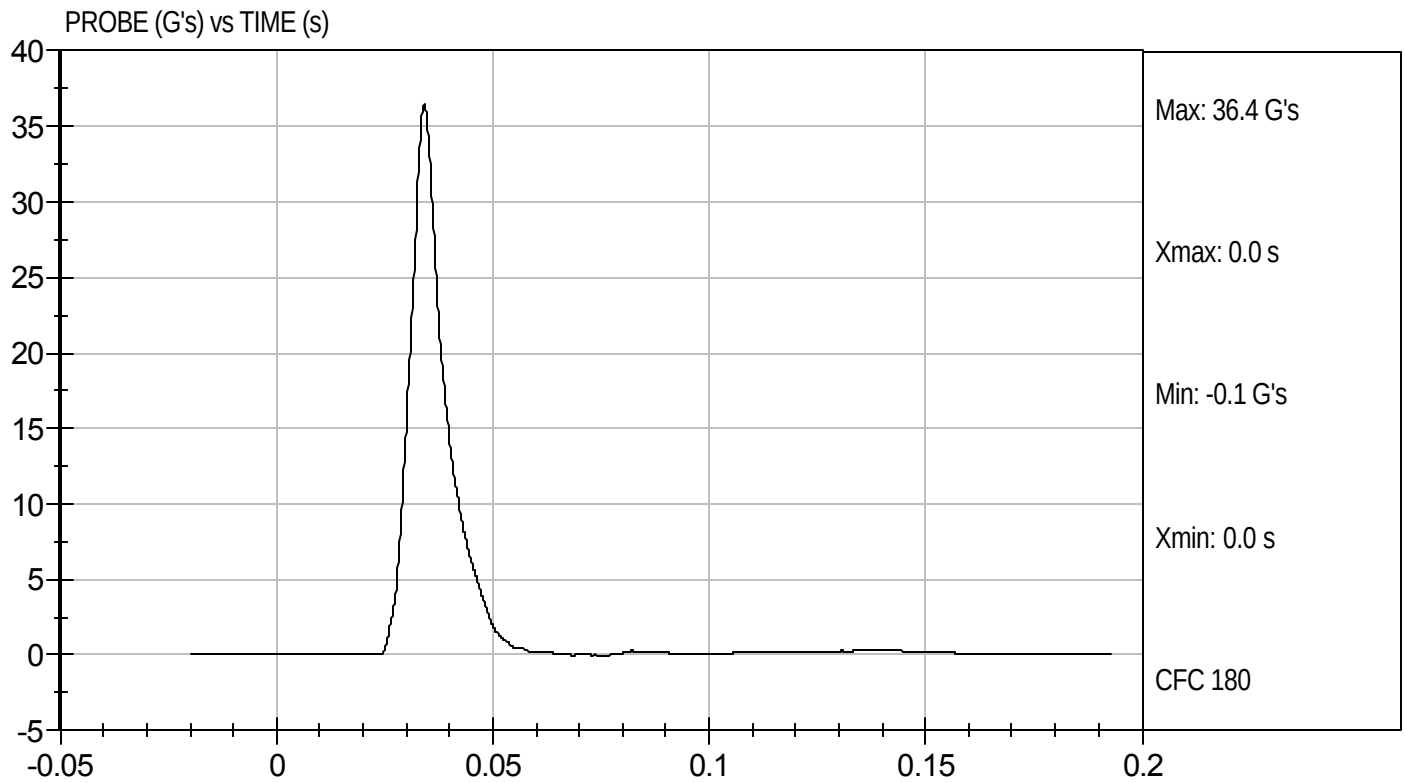
10/10/11  
Test Date

  
Approved By



Test Desc: Iliac Impact  
Component ID: D113418

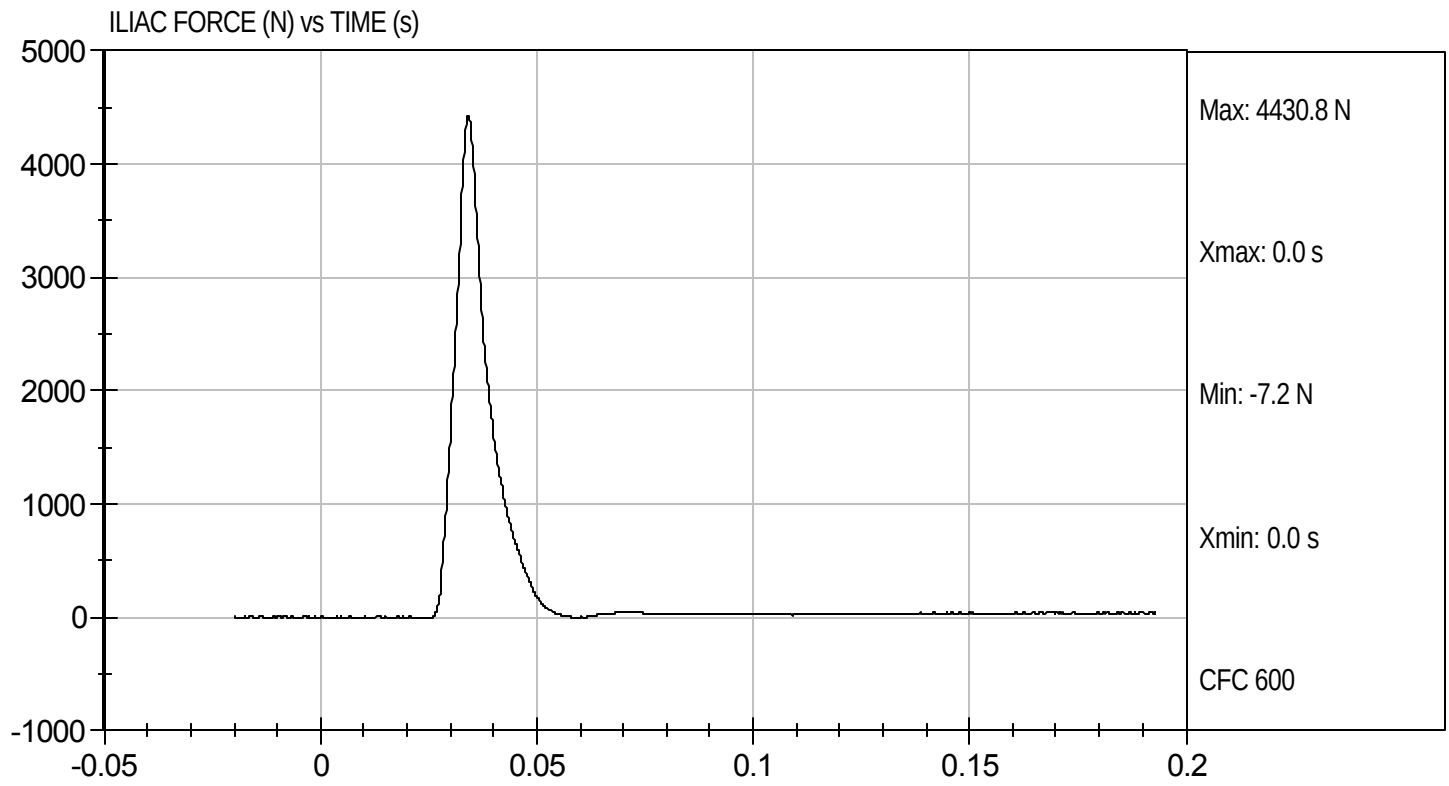
Test Date: 10/10/11  
Velocity: 14.12 ft/s, 4.30 m/s





Test Desc: Iliac Impact  
Component ID: D113418

Test Date: 10/10/11  
Velocity: 14.12 ft/s, 4.30 m/s



**MGA RESEARCH CORPORATION**  
**HEAD DROP TEST**  
**SID-Its BUILD LEVEL D DUMMY**

**ATD Serial No:** 296

**Test ID:** D113531

| Tested Parameter             | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature       | deg C | 20.6 to 22.2  | 21.8   | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70      | 35     | Pass      |
| Peak Resultant Acceleration  | G's   | 115 to 137    | 124    | Pass      |
| Peak Lateral Acceleration    | G's   | +/- 15        | -5     | Pass      |
| Unimodal                     | N/A   | <15%          | Yes    | Pass      |
| Overall Test Results         |       |               |        | Pass      |

  
\_\_\_\_\_  
Laboratory Technician

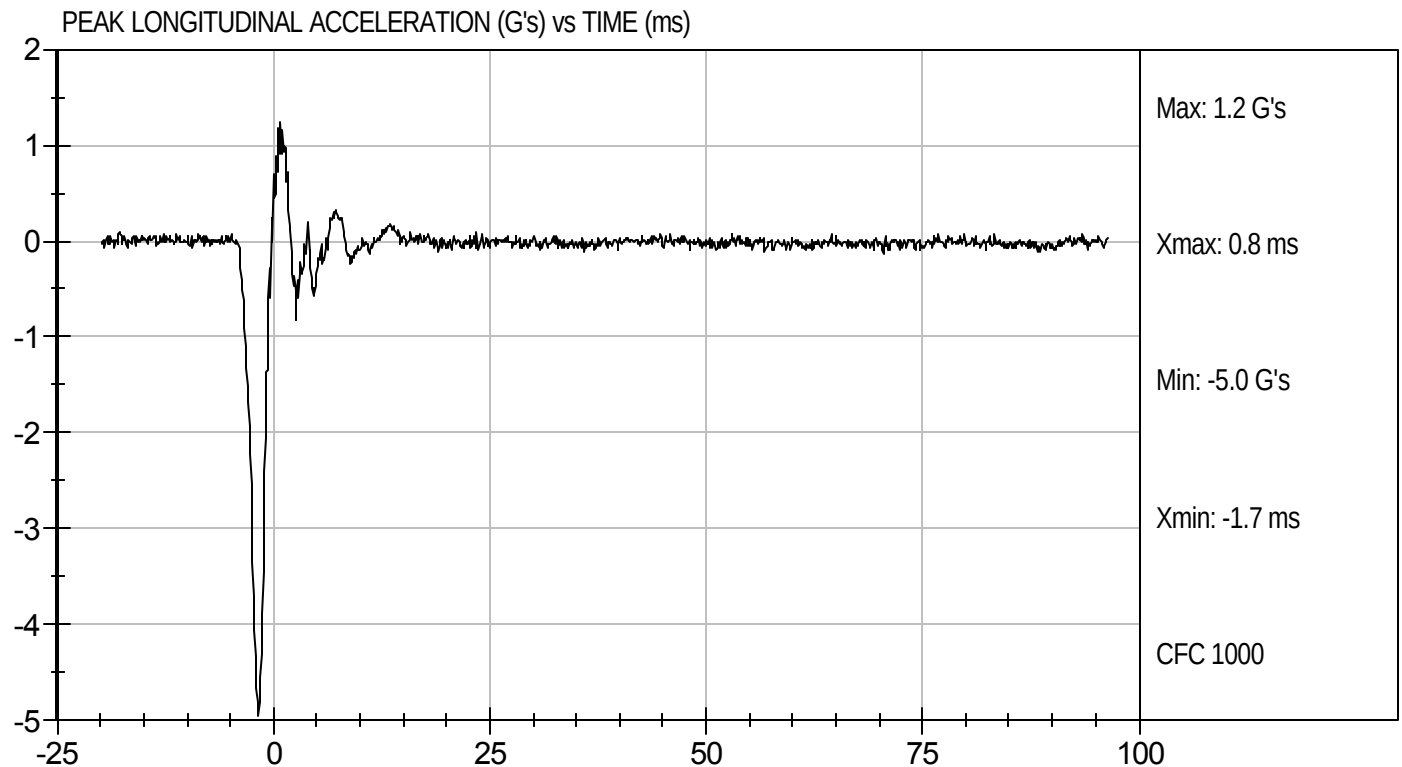
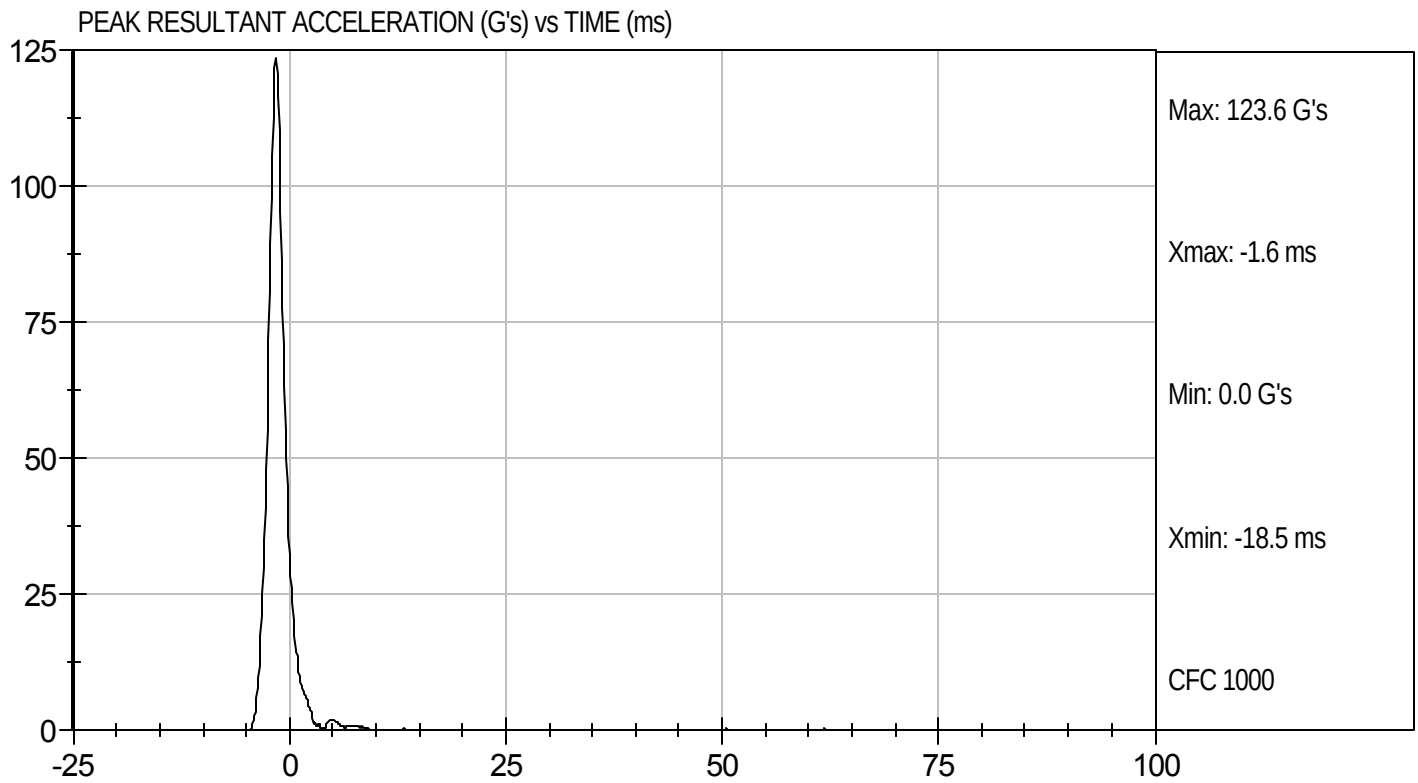
10/24/11  
Test Date

  
\_\_\_\_\_  
Approved By



Test Desc: Head Drop  
Component ID: D113531

Test Date: 10/24/11  
Velocity: 0 ft/s, 0 m/s



**MGA RESEARCH CORPORATION**  
**LATERAL NECK PENDULUM TEST**  
**SID-IIs BUILD LEVEL D DUMMY**

**ATD Serial No:** 296

**Test I.D:** D113532

| Tested Parameter                                             |           | Units | Specification | Result | Pass/Fail |
|--------------------------------------------------------------|-----------|-------|---------------|--------|-----------|
| Temperature                                                  |           | deg C | 20.6 to 22.2  | 21.7   | Pass      |
| Humidity                                                     |           | %     | 10 to 70      | 35     | Pass      |
| Impact Velocity                                              |           | m/s   | 5.51 to 5.63  | 5.58   | Pass      |
| Delta Velocity                                               | 10 ms     | m/s   | 2.20 to 2.80  | 2.26   | Pass      |
|                                                              | 15 ms     | m/s   | 3.30 to 4.10  | 3.32   | Pass      |
|                                                              | 20 ms     | m/s   | 4.40 to 5.40  | 4.48   | Pass      |
|                                                              | 25 ms     | m/s   | 5.40 to 6.10  | 5.42   | Pass      |
|                                                              | 25-100 ms | m/s   | 5.50 to 6.20  | 5.64   | Pass      |
| Maximum D-Plane Rotation                                     |           | deg   | 71 to 81      | 72     | Pass      |
| Time of Maximum D-Plane Rotation                             |           | ms    | 50 to 70      | 59     | Pass      |
| Maximum Occipital Condyle Moment during Rotation Interval Nm |           |       | -44 to -36    | -41    | Pass      |
| Time of Moment Decay to 0 Nm                                 |           | ms    | 102 to 126    | 117    | Pass      |
| Overall Test Results                                         |           |       |               | Pass   |           |

  
 Laboratory Technician

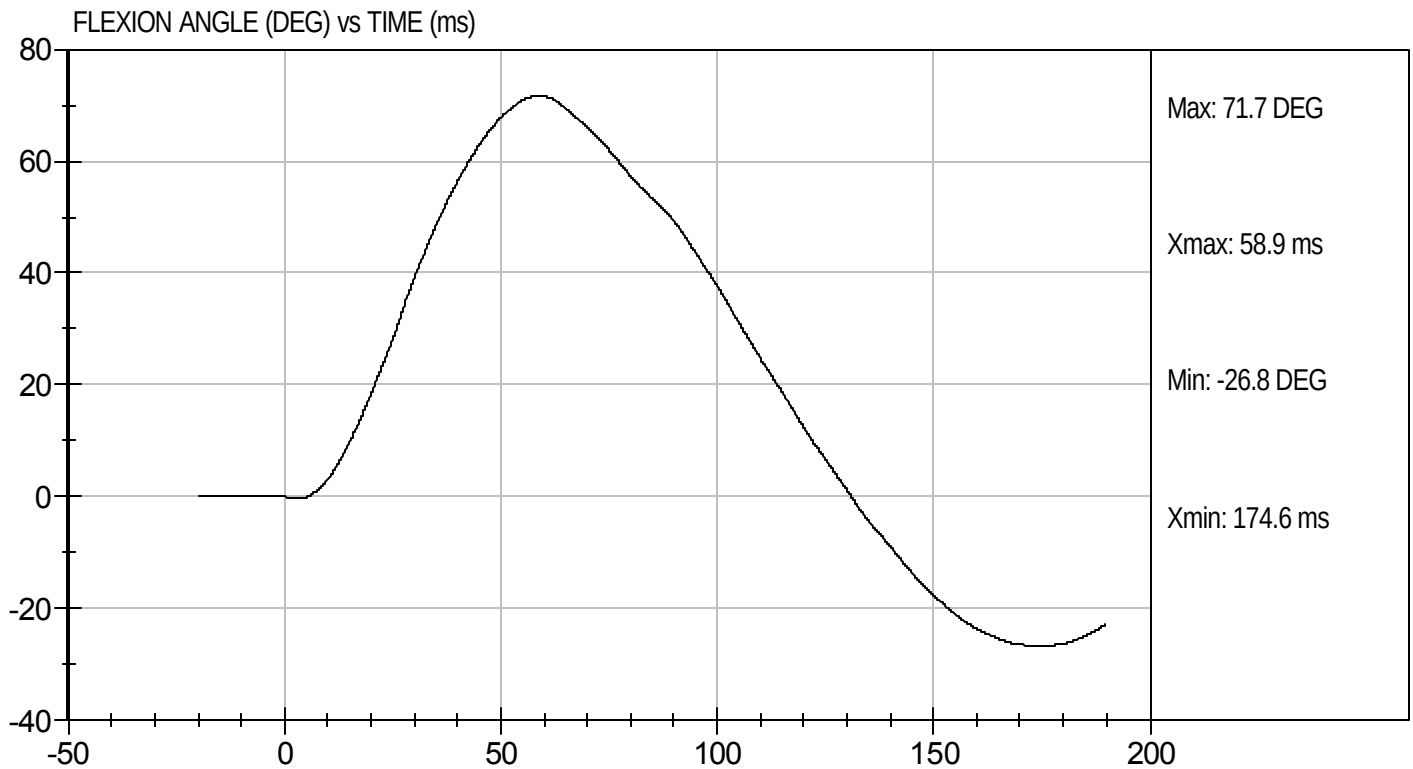
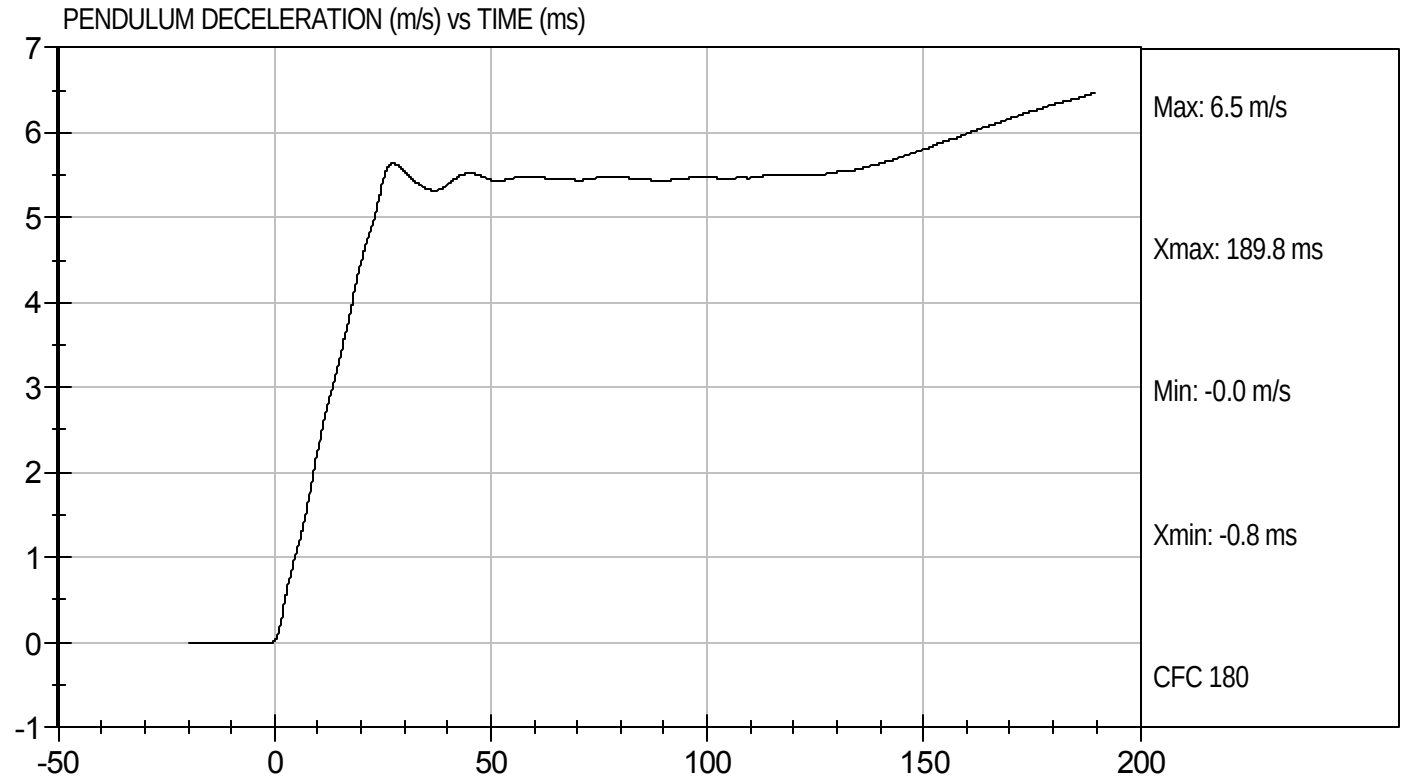
10/24/11  
 Test Date

  
 Approved By



Test Desc: Neck Bending  
Component ID: D113532

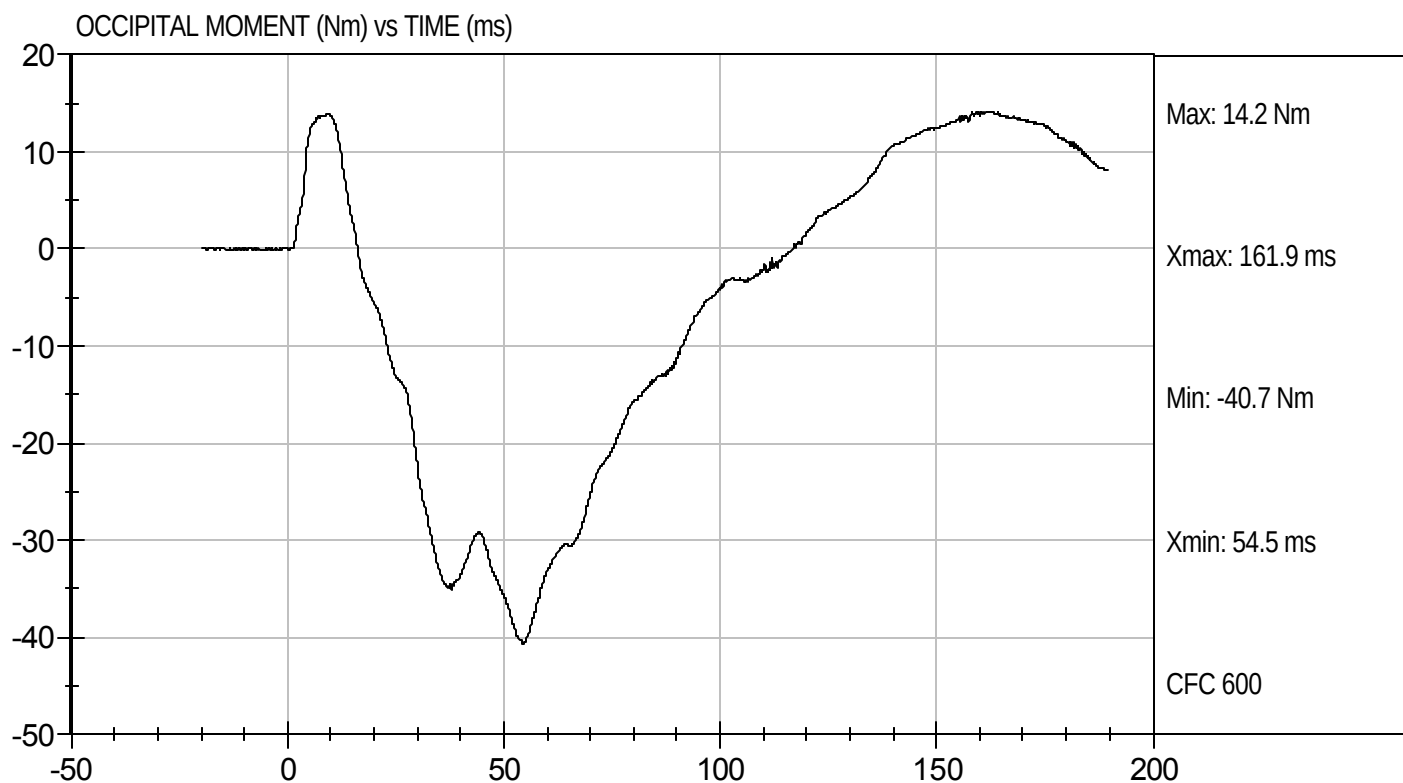
Test Date: 10/24/11  
Velocity: 18.32 ft/s, 5.58 m/s





Test Desc: Neck Bending  
Component ID: D113532

Test Date: 10/24/11  
Velocity: 18.32 ft/s, 5.58 m/s



**MGA RESEARCH CORPORATION**  
**SHOULDER IMPACT TEST**  
**SID-11s BUILD LEVEL D DUMMY**

**ATD Serial No:** 296

**Test ID:** D113533

| Tested Parameter                | Units | Specification | Result               | Pass/Fail |
|---------------------------------|-------|---------------|----------------------|-----------|
| Laboratory Temperature          | deg C | 20.6 to 22.2  | 22.0                 | Pass      |
| Laboratory Relative Humidity    | %     | 10 to 70      | 35                   | Pass      |
| Impact Velocity                 | m/s   | 4.20 to 4.40  | 4.38                 | Pass      |
| Maximum Probe Acceleration      | G's   | 13 to 18      | 15                   | Pass      |
| Shoulder Displacement           | mm    | 28 to 37      | 31                   | Pass      |
| Upper Spine (T1) Y Acceleration | G's   | 17 to 22      | 18                   | Pass      |
|                                 |       |               | Overall Test Results | Pass      |

  
\_\_\_\_\_  
Laboratory Technician

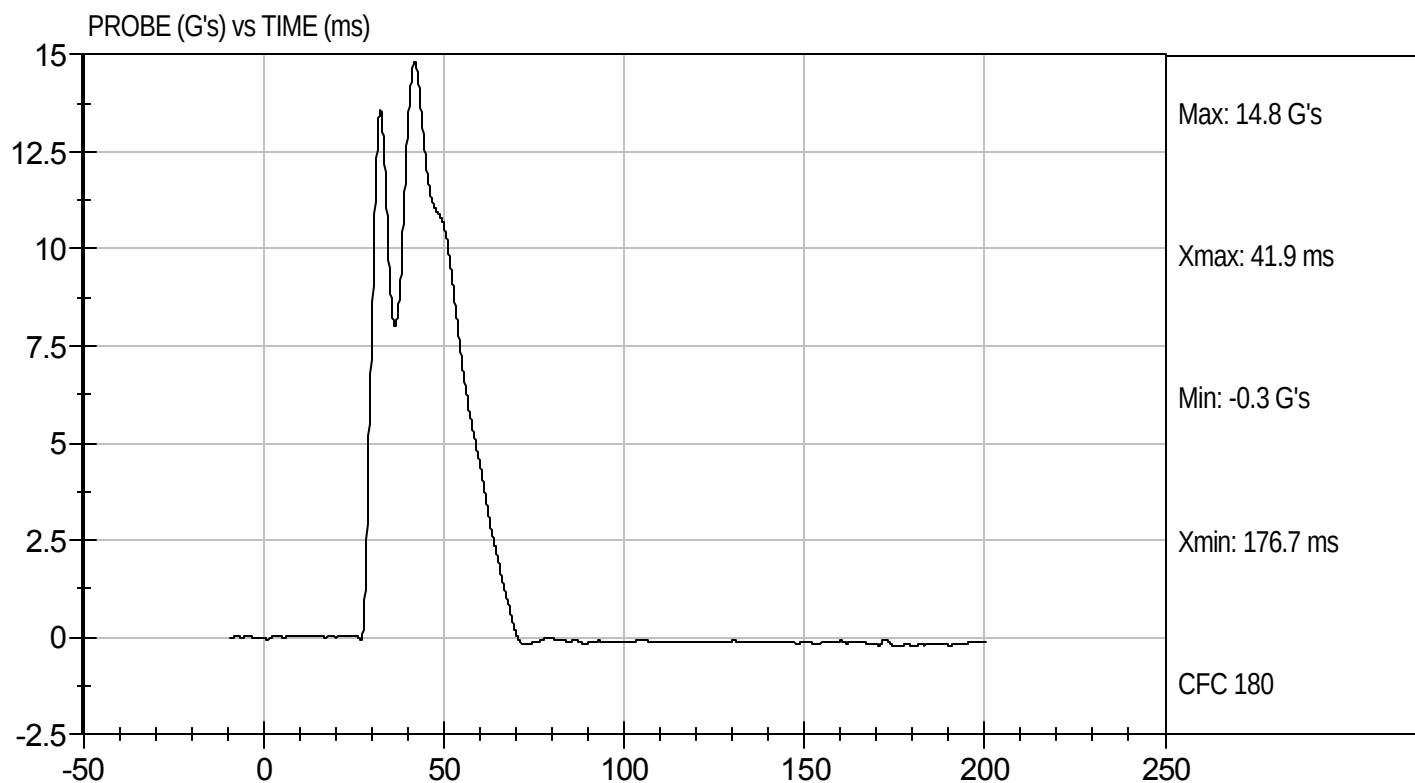
10/24/11  
Test Date

  
\_\_\_\_\_  
Approved By



Test Desc: Shoulder Impact  
Component ID: D113533

Test Date: 10/24/11  
Velocity: 14.36 ft/s, 4.38 m/s

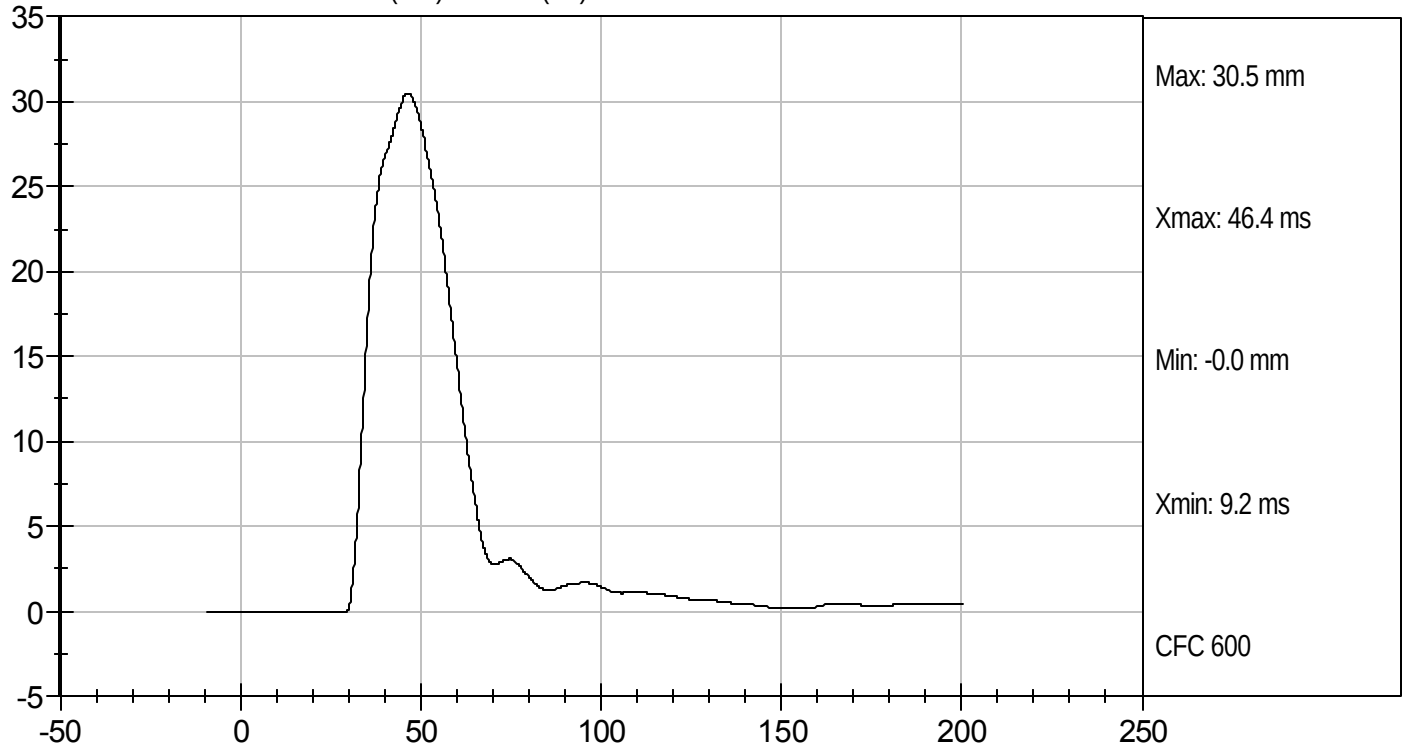




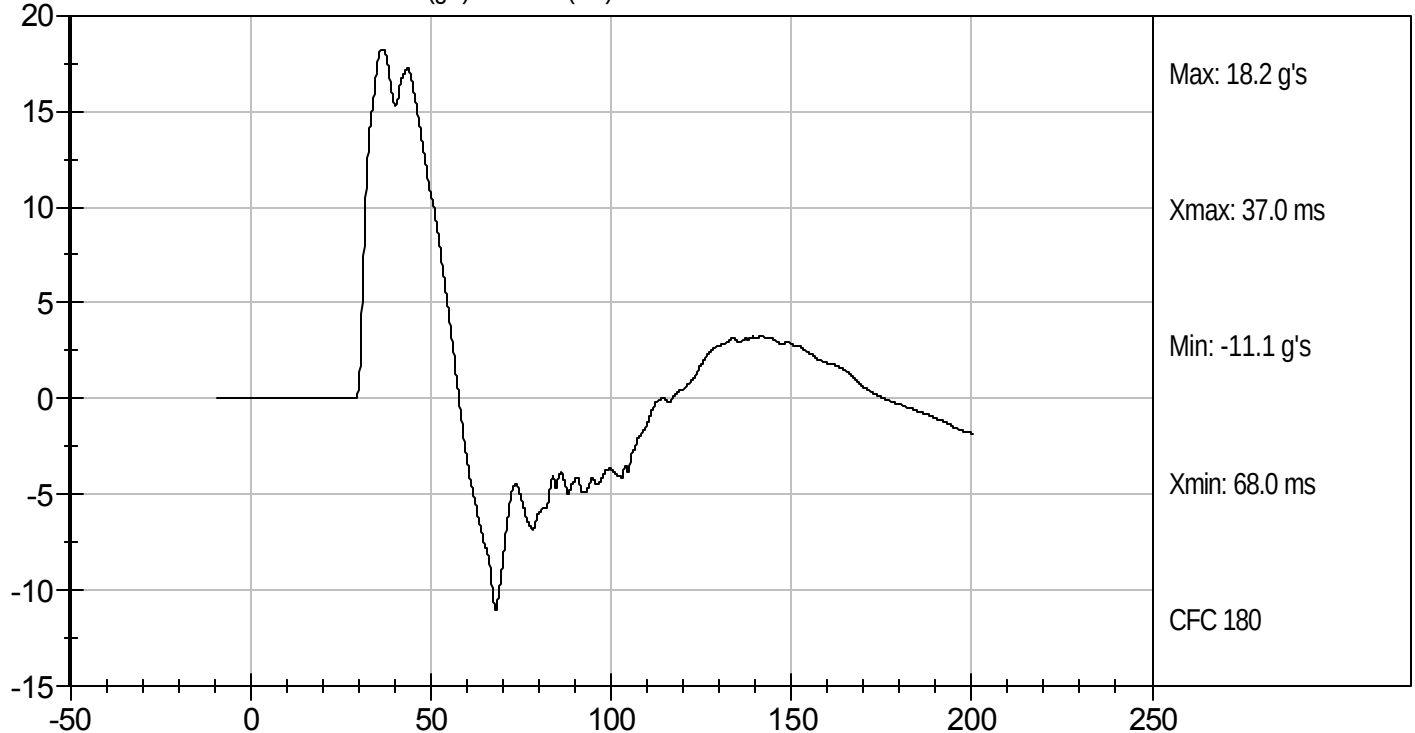
Test Desc: Shoulder Impact  
Component ID: D113533

Test Date: 10/24/11  
Velocity: 14.36 ft/s, 4.38 m/s

SHOULDER DISPLACEMENT (mm) vs TIME (ms)



UPPER SPINE ACCELERATION (g's) vs TIME (ms)

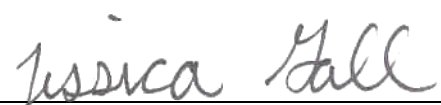


**MGA RESEARCH CORPORATION**  
**THORAX (WITH ARM) IMPACT TEST**  
**SID-IIs BUILD LEVEL D DUMMY**

**ATD Serial No:** 296

**Test I.D:** D113534

| Tested Parameter                 | Units | Specification | Result | Pass/Fail |
|----------------------------------|-------|---------------|--------|-----------|
| Temperature                      | deg C | 20.6 to 22.2  | 21.9   | Pass      |
| Humidity                         | %     | 10 to 70      | 35     | Pass      |
| Impact Velocity                  | m/s   | 6.60 to 6.80  | 6.77   | Pass      |
| Peak Impactor Acceleration       | G's   | 30 to 36      | 32     | Pass      |
| Shoulder Displacement            | mm    | 31 to 40      | 35     | Pass      |
| Upper Rib Displacement           | mm    | 25 to 32      | 28     | Pass      |
| Middle Rib Displacement          | mm    | 30 to 36      | 32     | Pass      |
| Lower Rib Displacement           | mm    | 32 to 38      | 35     | Pass      |
| Upper Spine (T1) Y Acceleration  | G's   | 34 to 43      | 38     | Pass      |
| Lower Spine (T12) Y Acceleration | G's   | 29 to 37      | 33     | Pass      |
| Overall Test Results             |       |               | Pass   |           |

  
Laboratory Technician

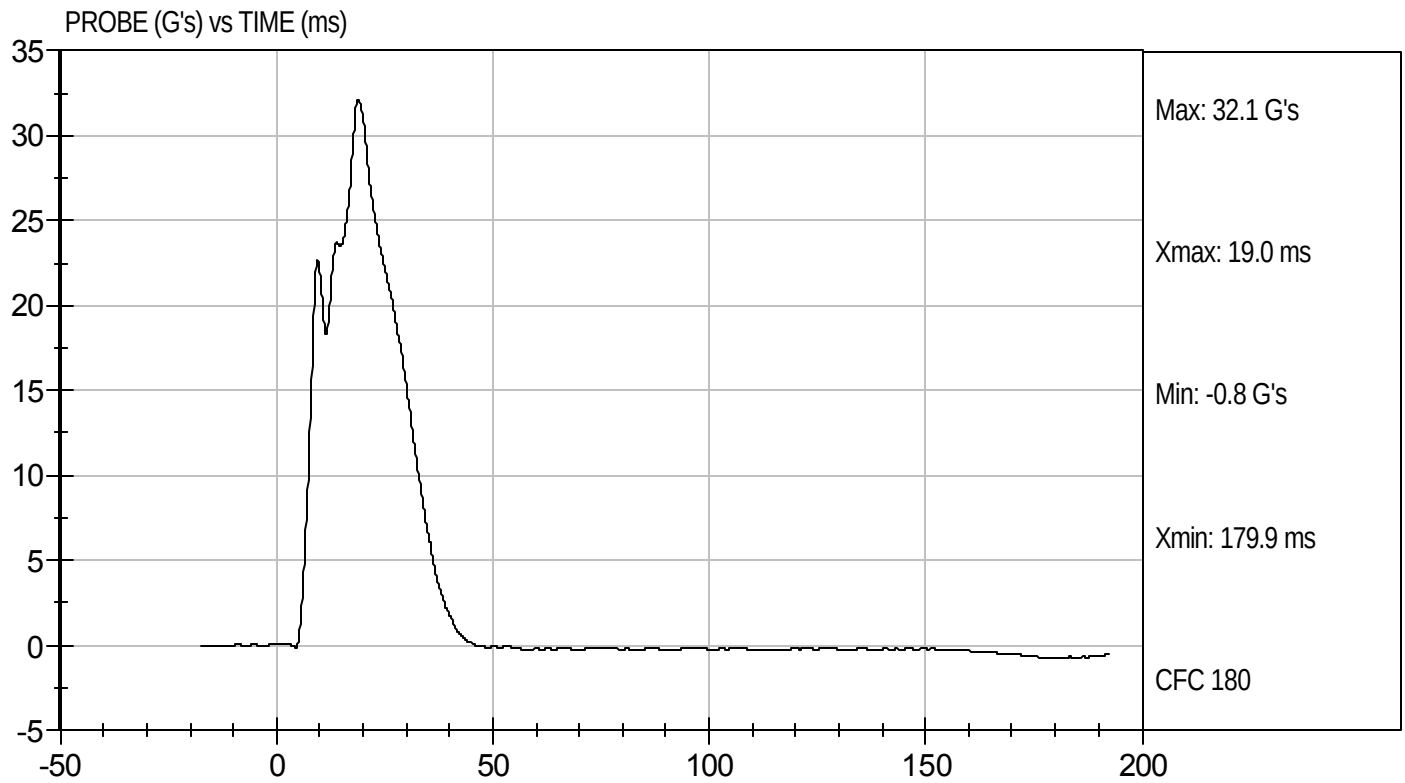
10/24/11  
Test Date

  
Approved By



Test Desc: Thorax With Arm  
Component ID: D113534

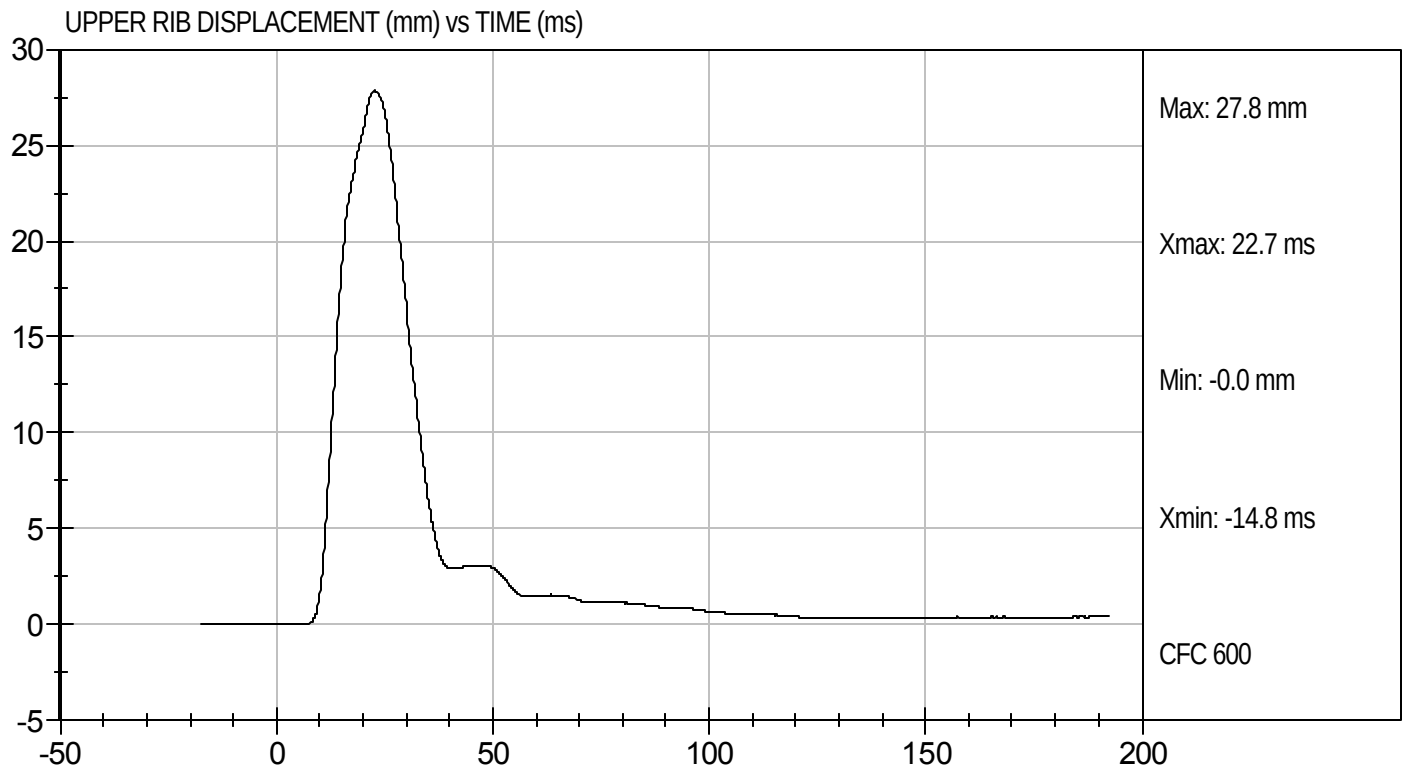
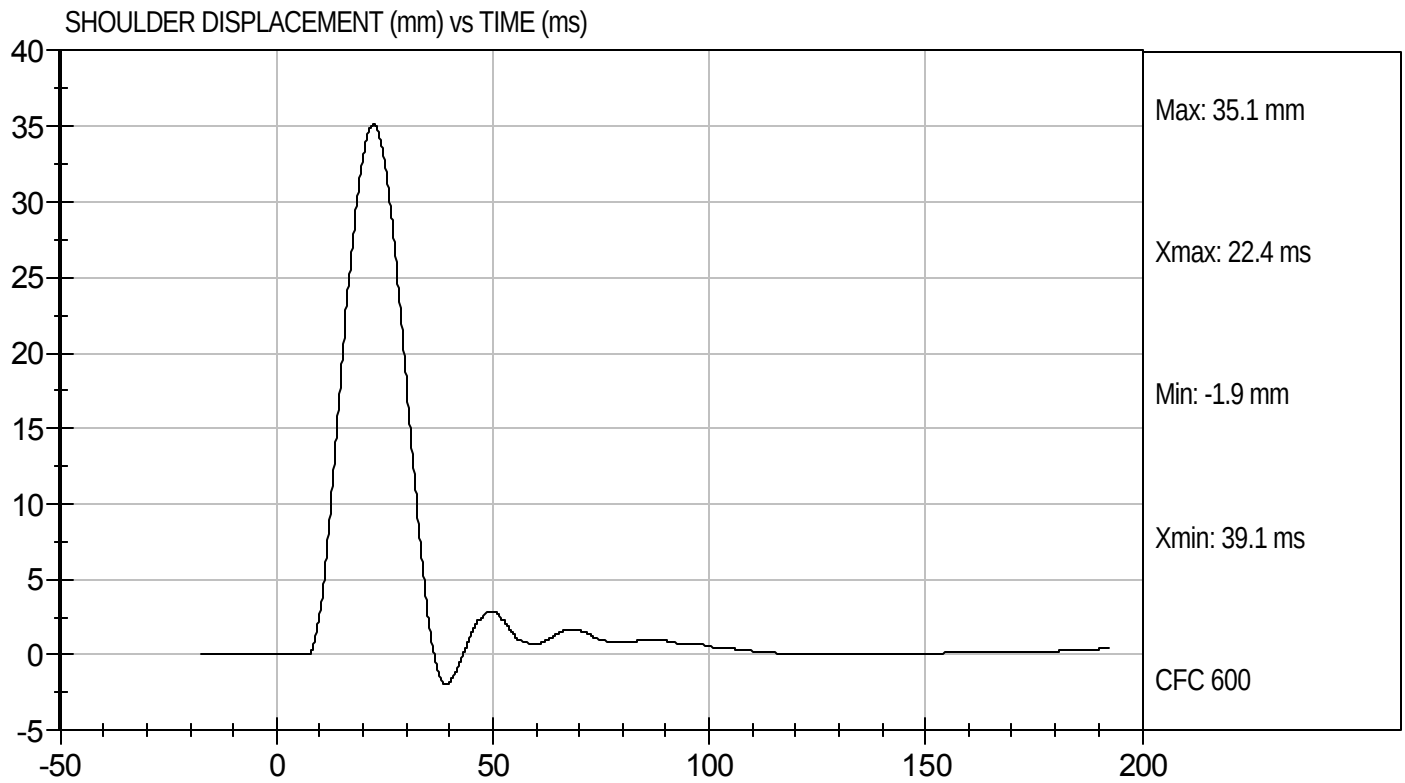
Test Date: 10/24/11  
Velocity: 22.22 ft/s, 6.77 m/s





Test Desc: Thorax With Arm  
Component ID: D113534

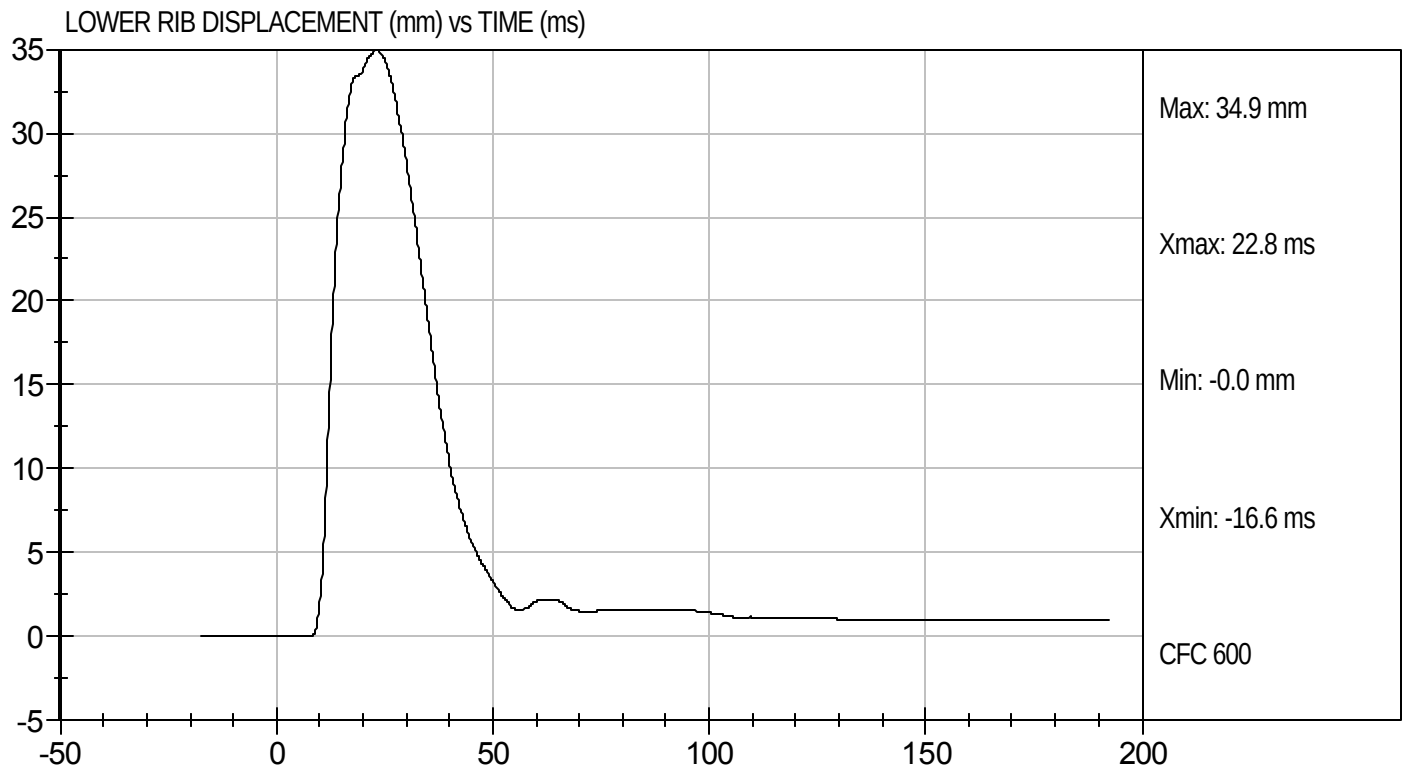
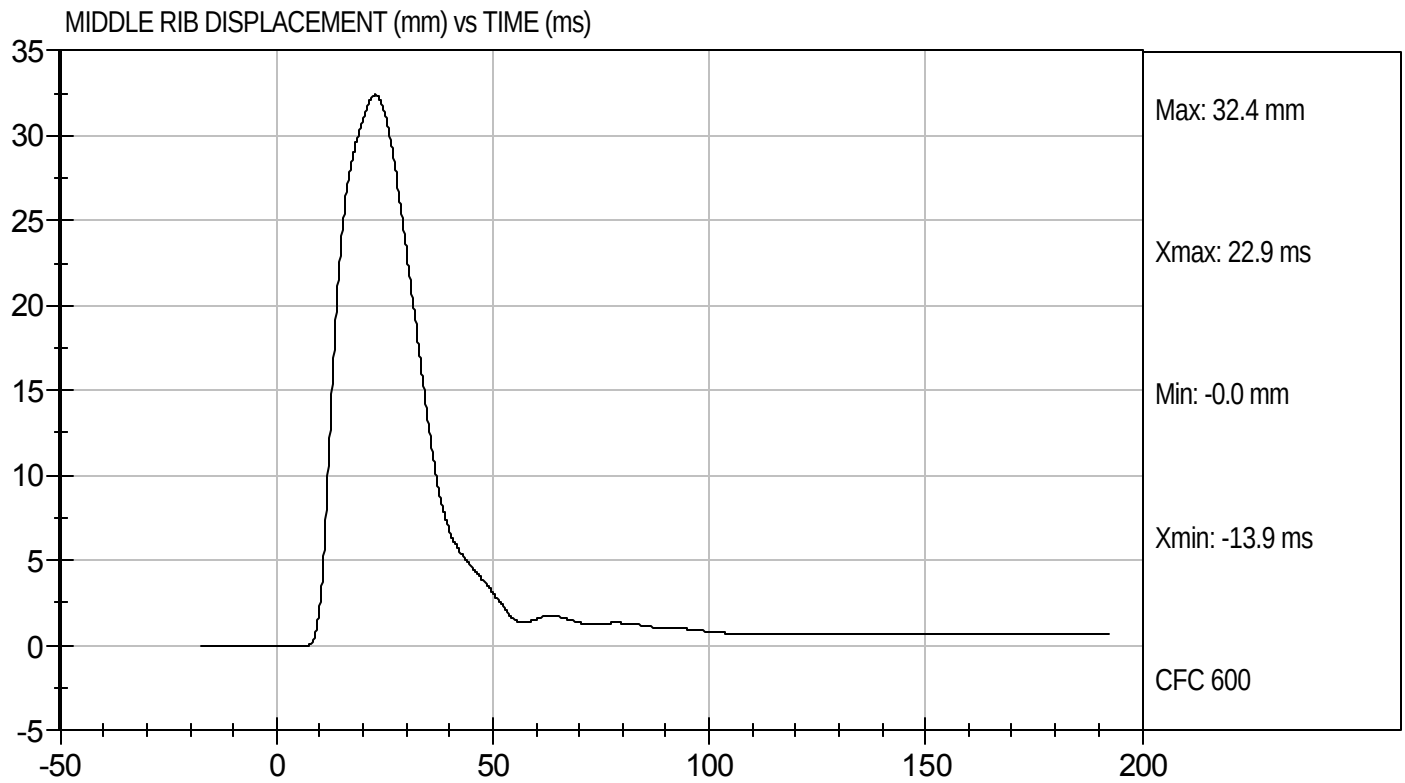
Test Date: 10/24/11  
Velocity: 22.22 ft/s, 6.77 m/s





Test Desc: Thorax With Arm  
Component ID: D113534

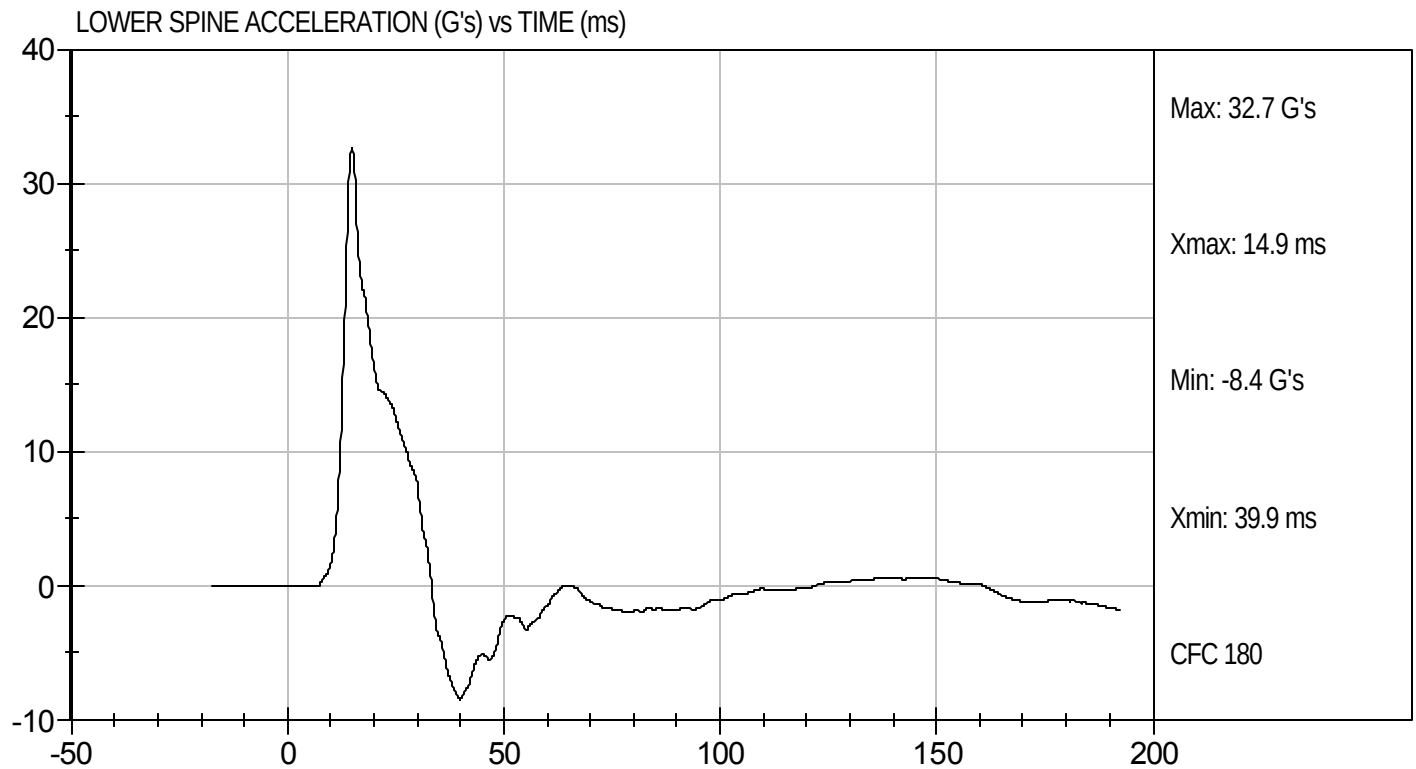
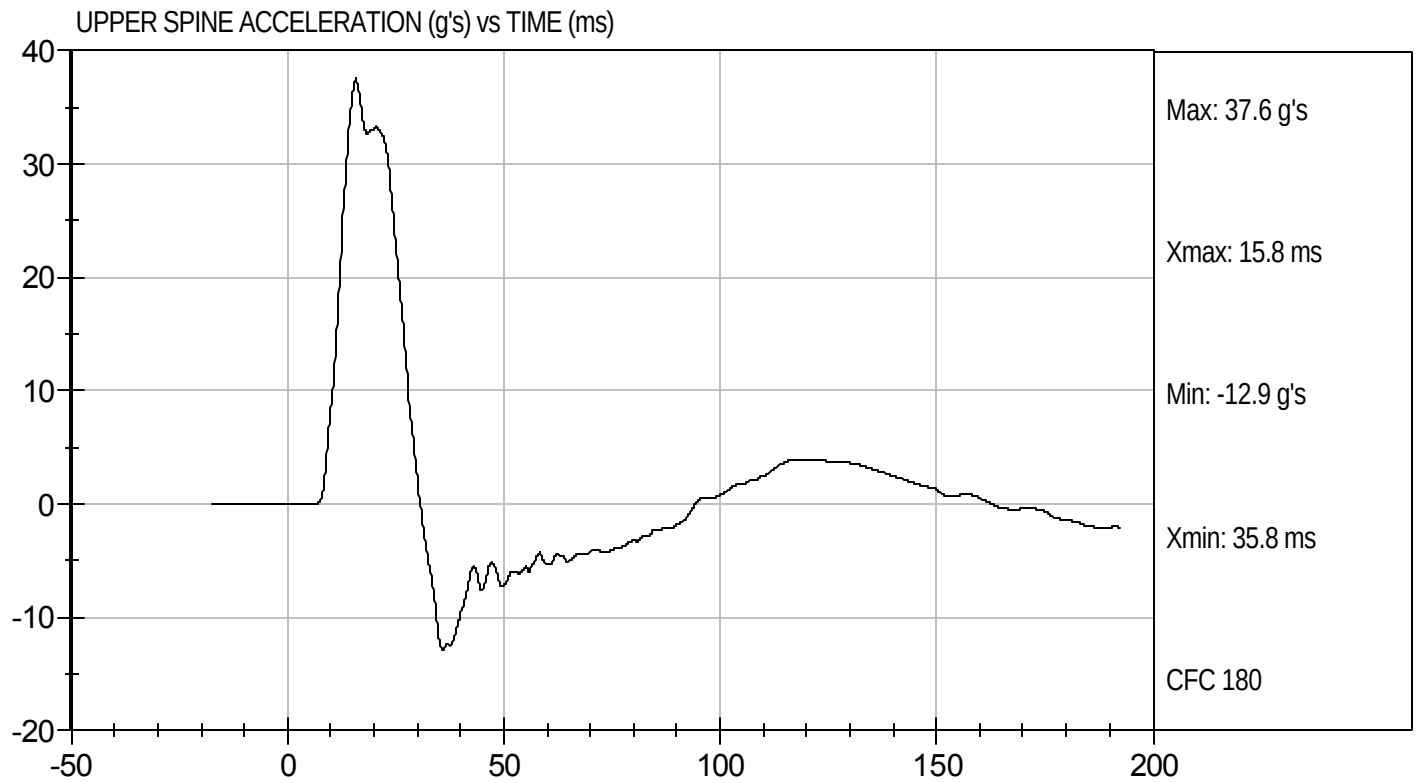
Test Date: 10/24/11  
Velocity: 22.22 ft/s, 6.77 m/s





Test Desc: Thorax With Arm  
Component ID: D113534

Test Date: 10/24/11  
Velocity: 22.22 ft/s, 6.77 m/s



**MGA RESEARCH CORPORATION**  
**THORAX (WITHOUT ARM) IMPACT TEST**  
**SID-IIs BUILD LEVEL D DUMMY**

**ATD Serial No:** 296

**Test I.D:** D113535

| Tested Parameter                 | Units | Specification | Result | Pass/Fail |
|----------------------------------|-------|---------------|--------|-----------|
| Temperature                      | deg C | 20.6 to 22.2  | 22.0   | Pass      |
| Humidity                         | %     | 10 to 70      | 34     | Pass      |
| Impact Velocity                  | m/s   | 4.20 to 4.40  | 4.38   | Pass      |
| Peak Impactor Force              | G's   | 14 to 18      | 15     | Pass      |
| Upper Rib Displacement           | mm    | 32 to 40      | 39     | Pass      |
| Middle Rib Displacement          | mm    | 39 to 45      | 43     | Pass      |
| Lower Rib Displacement           | mm    | 35 to 43      | 38     | Pass      |
| Upper Spine (T1) Y Acceleration  | G's   | 13 to 17      | 14     | Pass      |
| Lower Spine (T12) Y Acceleration | G's   | 7 to 11       | 9      | Pass      |
| Overall Test Results             |       |               | Pass   |           |

  
Laboratory Technician

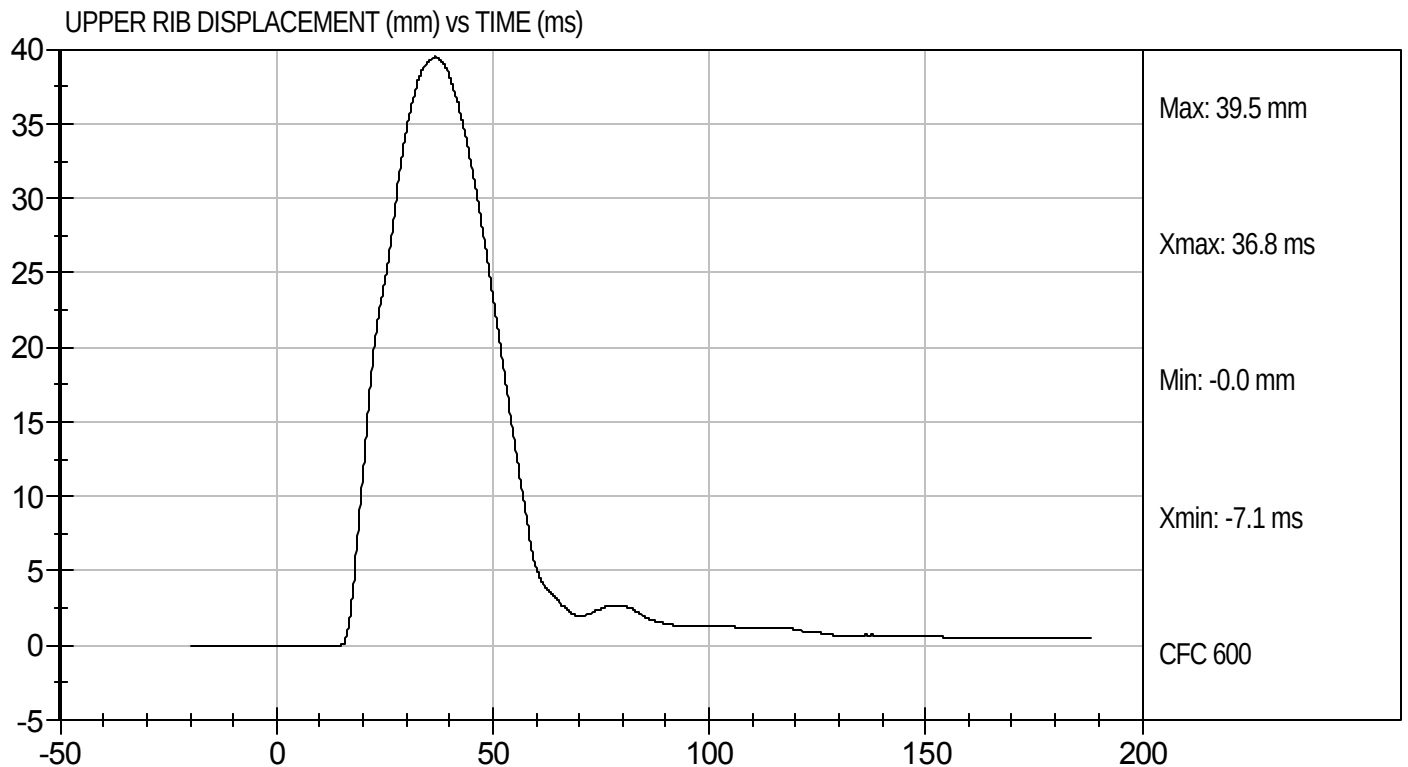
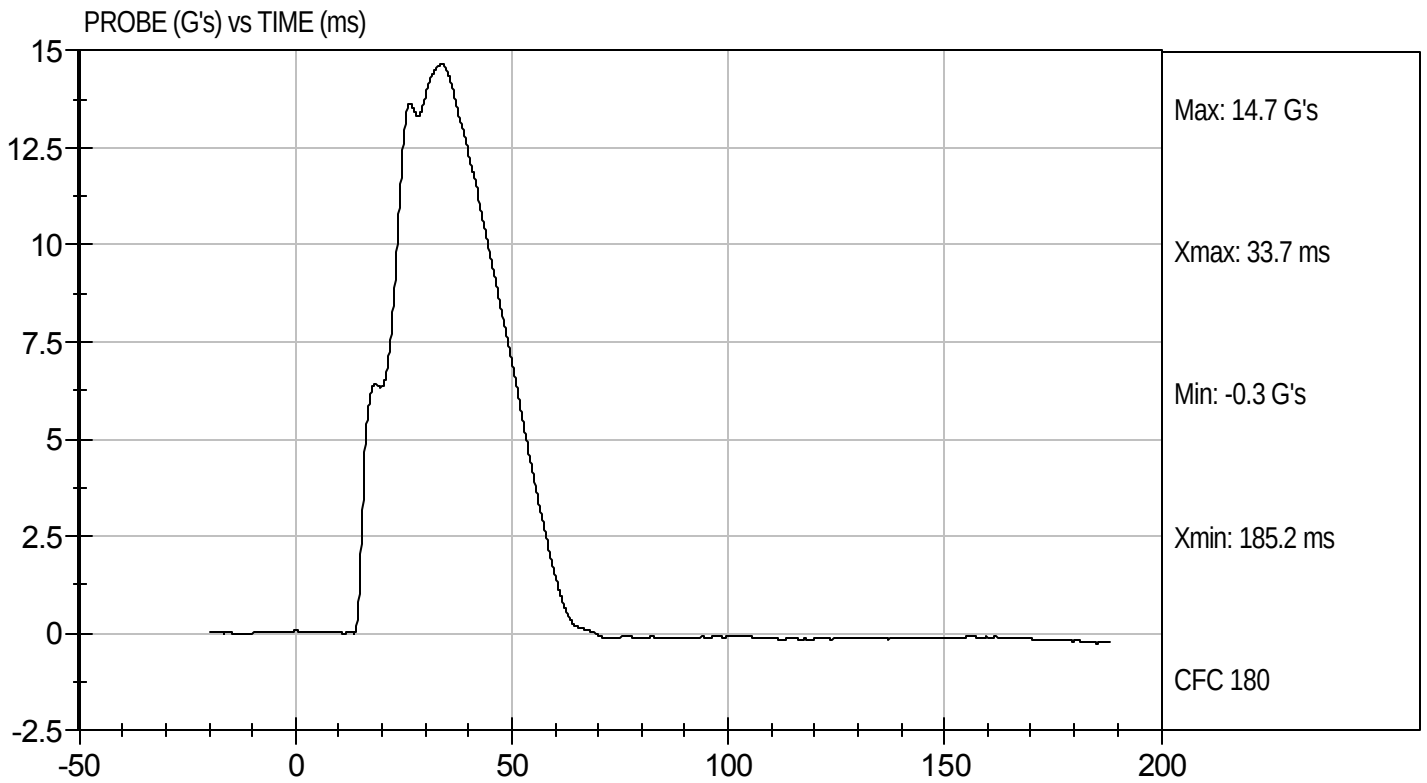
10/24/11  
Test Date

  
Approved By



Test Desc: Thorax Without Arm  
Component ID: D113535

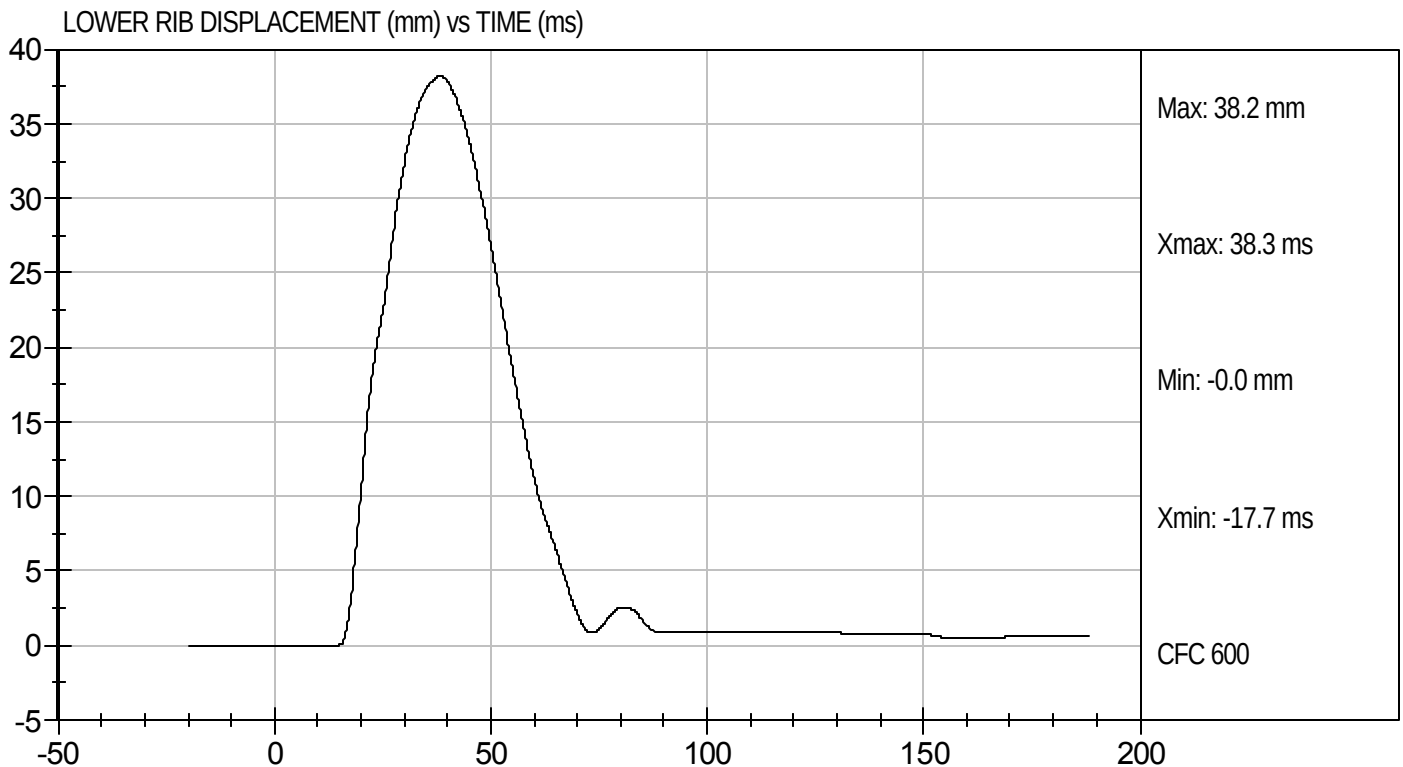
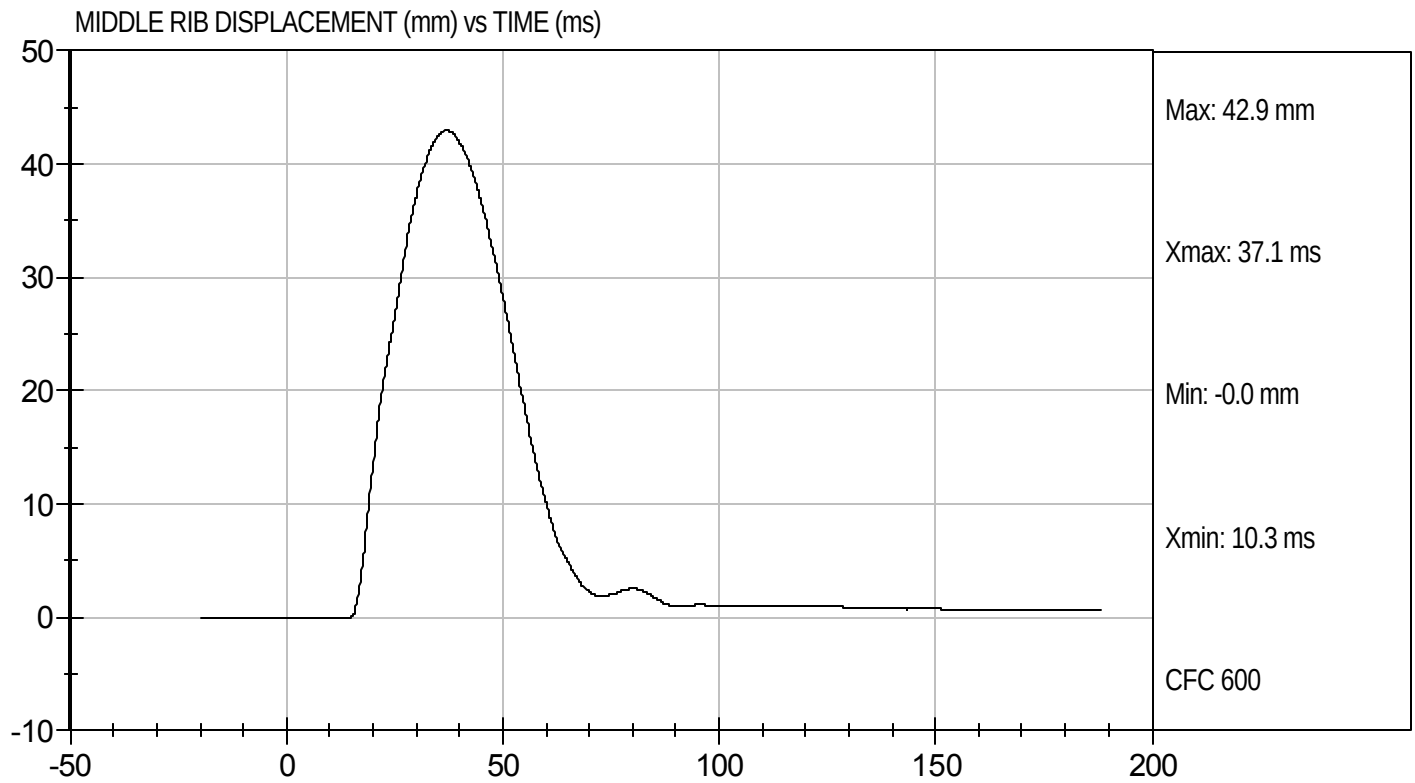
Test Date: 10/24/11  
Velocity: 14.36 ft/s, 4.38 m/s





Test Desc: Thorax Without Arm  
Component ID: D113535

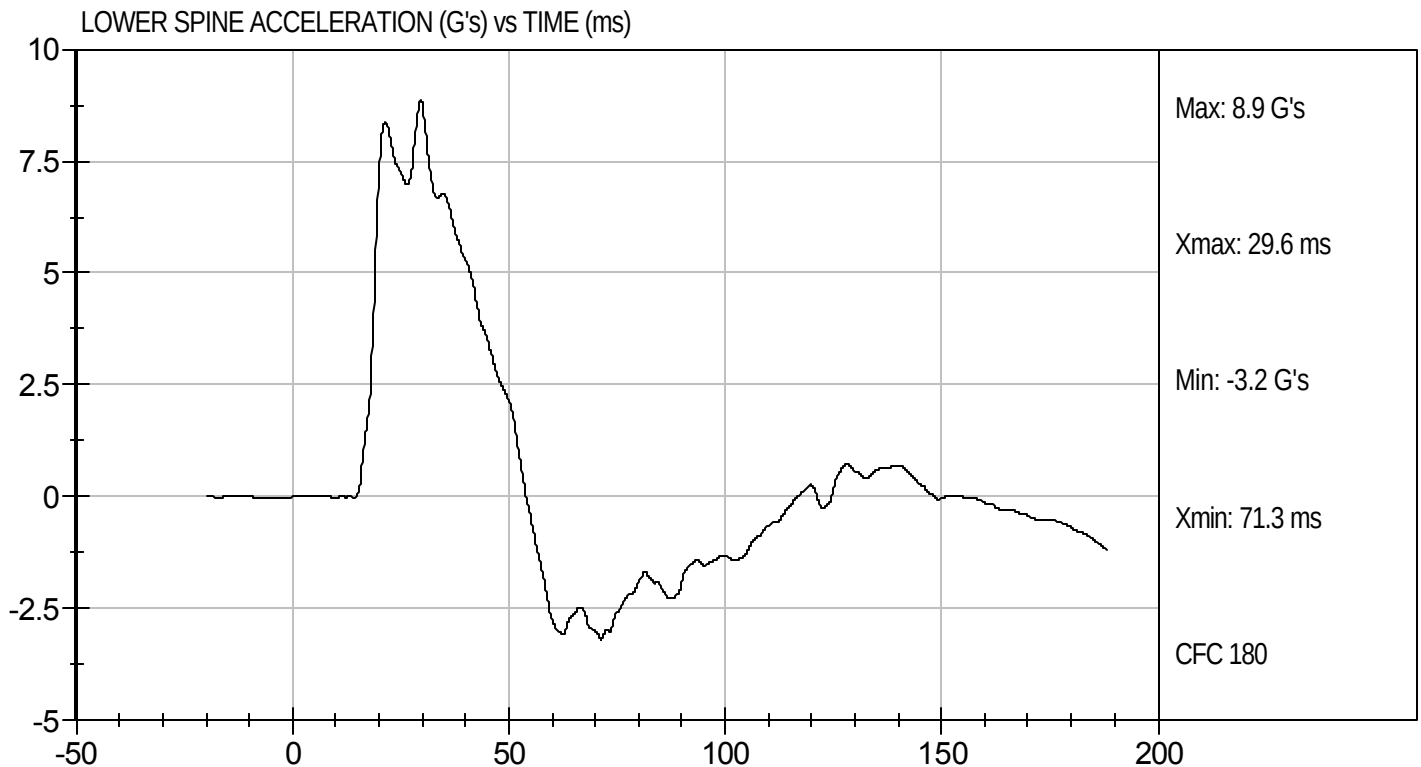
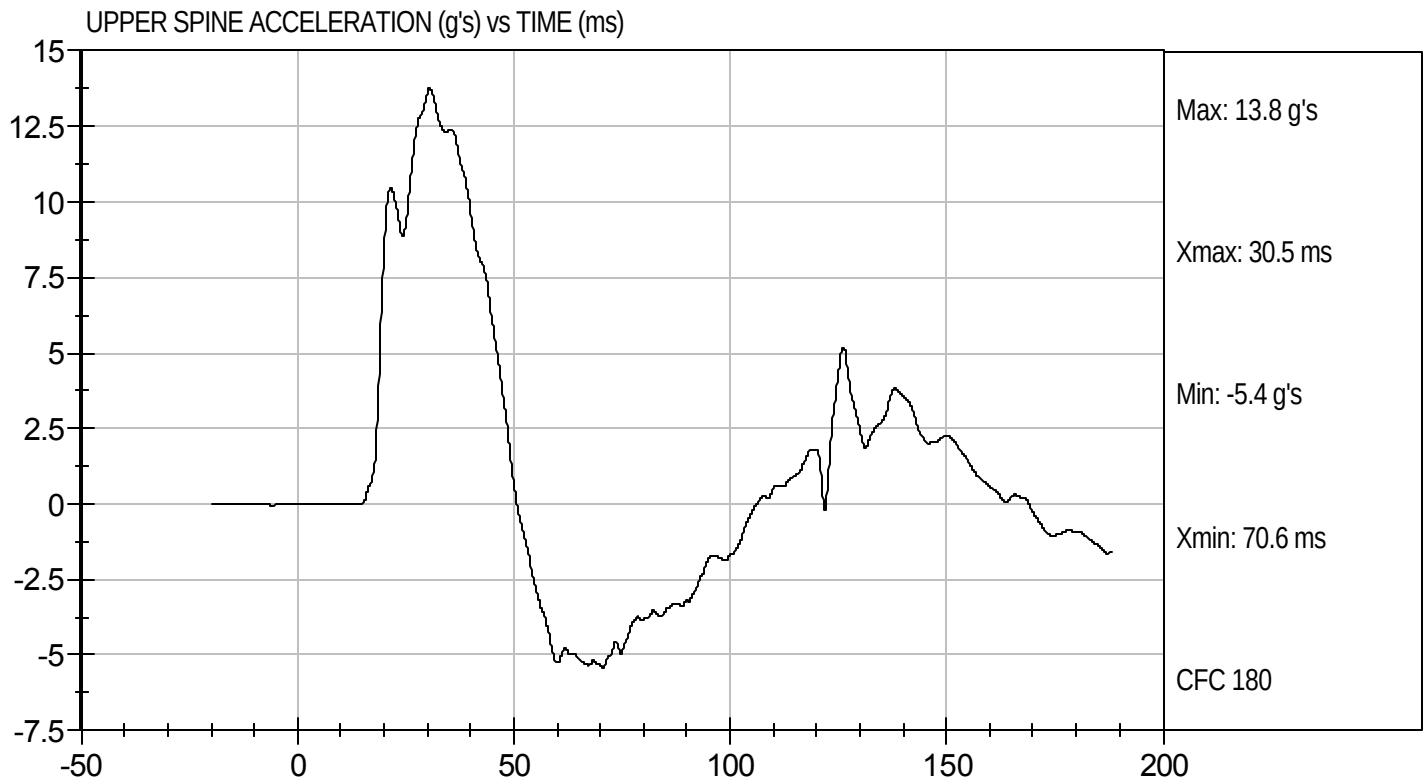
Test Date: 10/24/11  
Velocity: 14.36 ft/s, 4.38 m/s





Test Desc: Thorax Without Arm  
Component ID: D113535

Test Date: 10/24/11  
Velocity: 14.36 ft/s, 4.38 m/s



**MGA RESEARCH CORPORATION**  
**ABDOMINAL IMPACT TEST**  
**SID-IIs BUILD LEVEL D DUMMY**

**ATD Serial No:** 296

**Test I.D:** D113536

| Tested Parameter                 | Units | Specification | Result               | Pass/Fail |
|----------------------------------|-------|---------------|----------------------|-----------|
| Temperature                      | deg C | 20.6 to 22.2  | 21.8                 | Pass      |
| Humidity                         | %     | 10 to 70      | 34                   | Pass      |
| Impact Velocity                  | m/s   | 4.20 to 4.40  | 4.34                 | Pass      |
| Peak Impactor Acceleration       | G's   | 12 to 16      | 13                   | Pass      |
| Upper Rib Displacement           | mm    | 36 to 47      | 42                   | Pass      |
| Lower Rib Displacement           | mm    | 33 to 44      | 42                   | Pass      |
| Lower Spine (T12) Y Acceleration | G's   | 9 to 14       | 10                   | Pass      |
|                                  |       |               | Overall Test Results | Pass      |

Jessica Hall  
Laboratory Technician

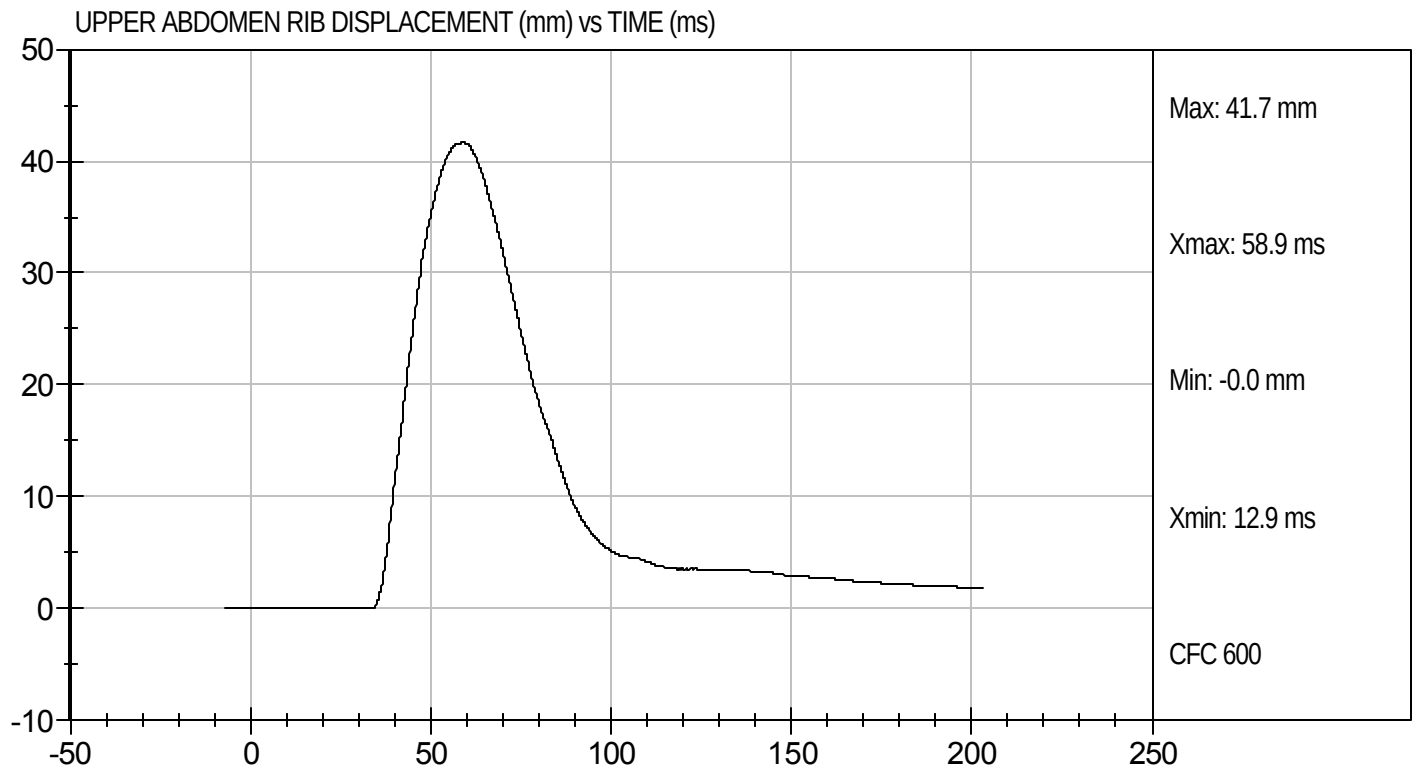
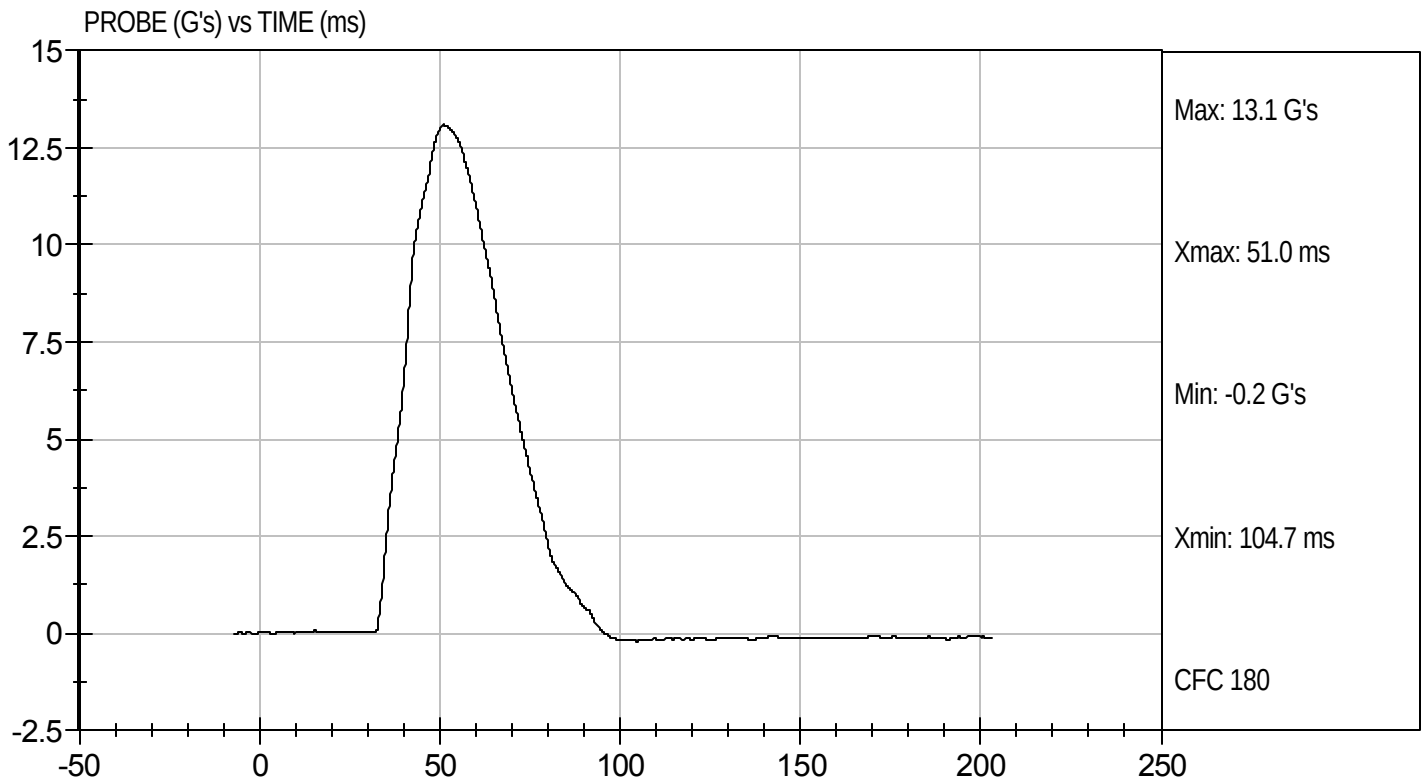
10/24/11  
Test Date

David Winkelbauer  
Approved By



Test Desc: Abdomen Impact  
Component ID: D113536

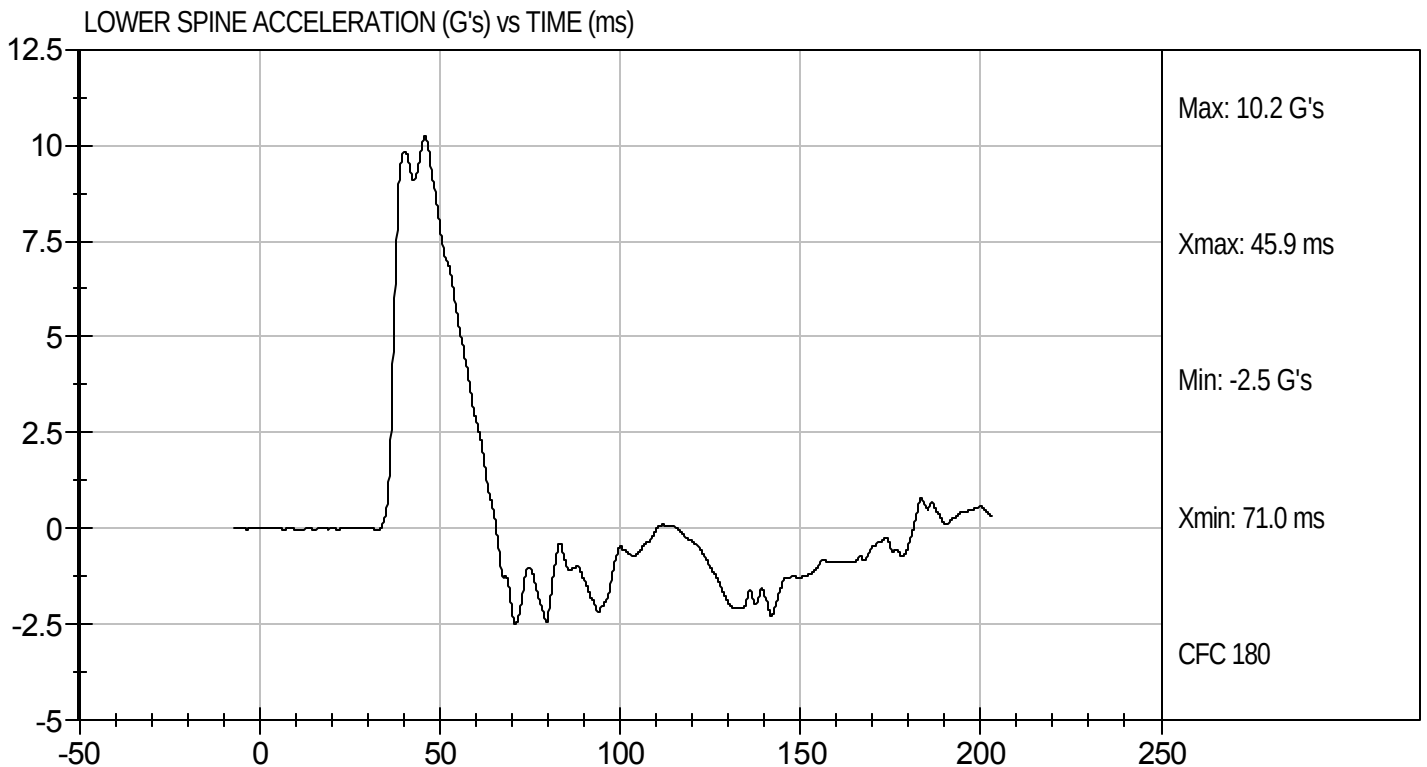
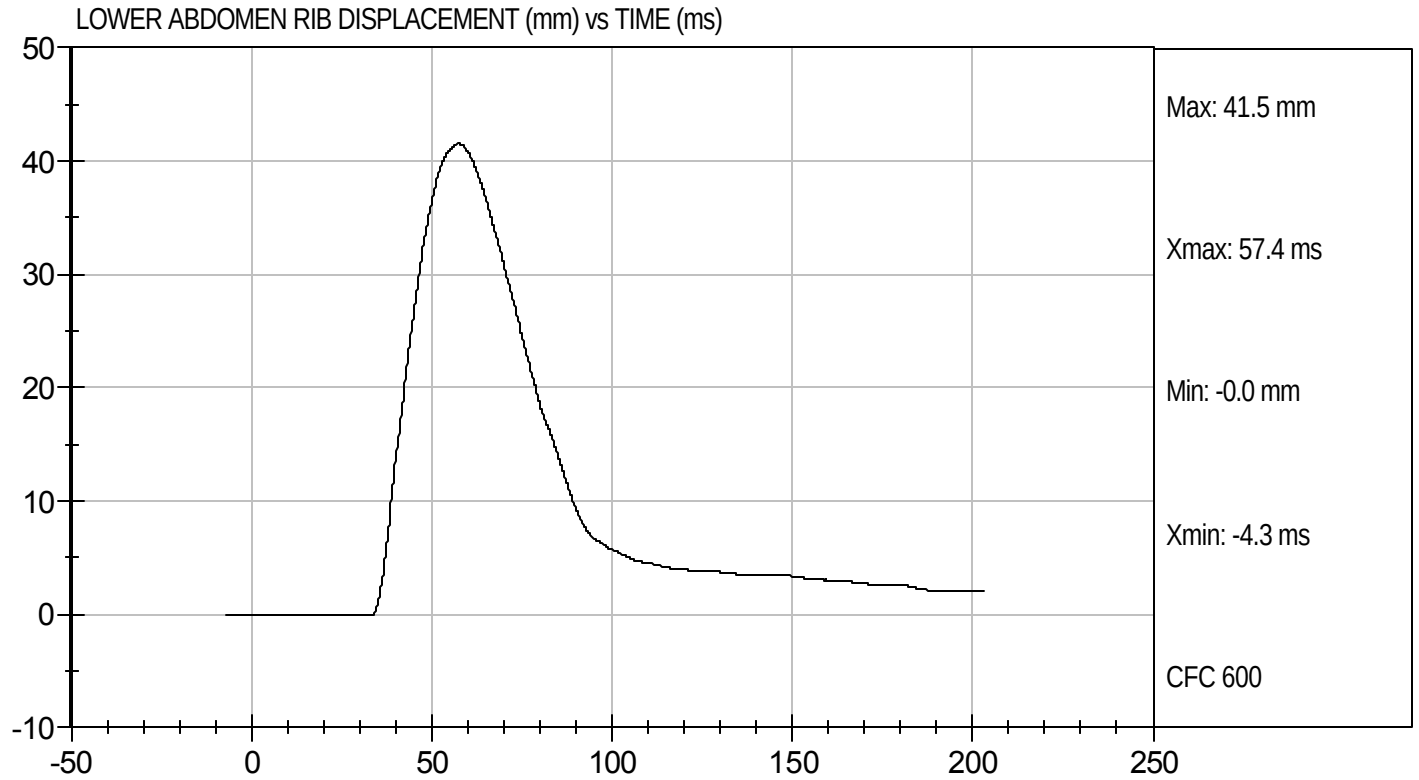
Test Date: 10/24/11  
Velocity: 14.25 ft/s, 4.34 m/s





Test Desc: Abdomen Impact  
Component ID: D113536

Test Date: 10/24/11  
Velocity: 14.25 ft/s, 4.34 m/s



**MGA RESEARCH CORPORATION**  
**PELVIS IMPACT TEST**  
**SID-IIs BUILD LEVEL D DUMMY**

**ATD Serial No:** 296

**Test I.D:** D113537

| Tested Parameter                 | Units | Specification | Result | Pass/Fail |
|----------------------------------|-------|---------------|--------|-----------|
| Temperature                      | deg C | 20.6 to 22.2  | 21.9   | Pass      |
| Humidity                         | %     | 10 to 70      | 34     | Pass      |
| Impact Velocity                  | m/s   | 6.60 to 6.80  | 6.77   | Pass      |
| Peak Impactor Acceleration       | G's   | 38 to 47      | 43     | Pass      |
| Pelvis Y Acceleration after 6 ms | G's   | 34 to 42      | 42     | Pass      |
| Peak Acetabulum Force            | N     | 3600 to 4300  | 3723   | Pass      |
| Overall Test Results             |       |               |        | Pass      |

  
Laboratory Technician

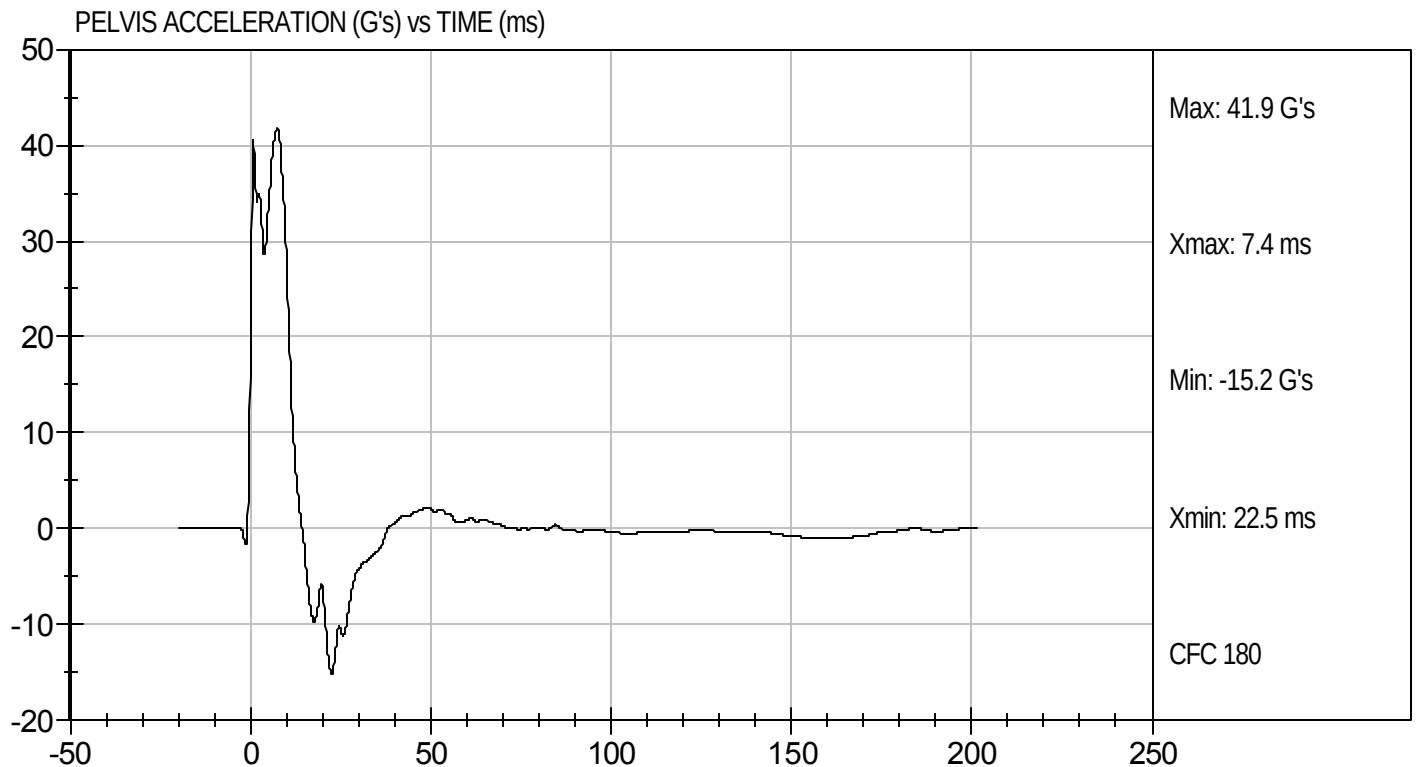
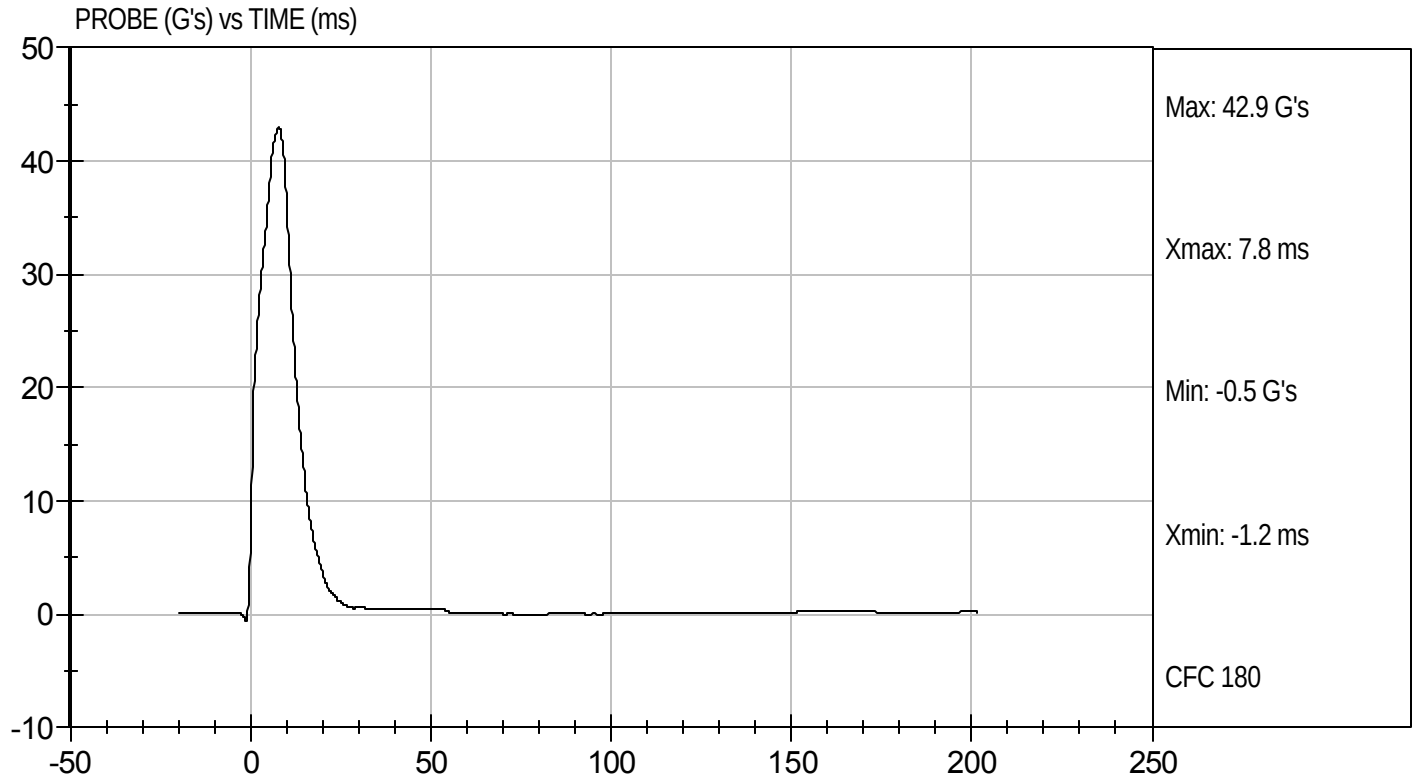
10/24/11  
Test Date

  
Approved By



Test Desc: Pelvis Impact  
Component ID: D113537

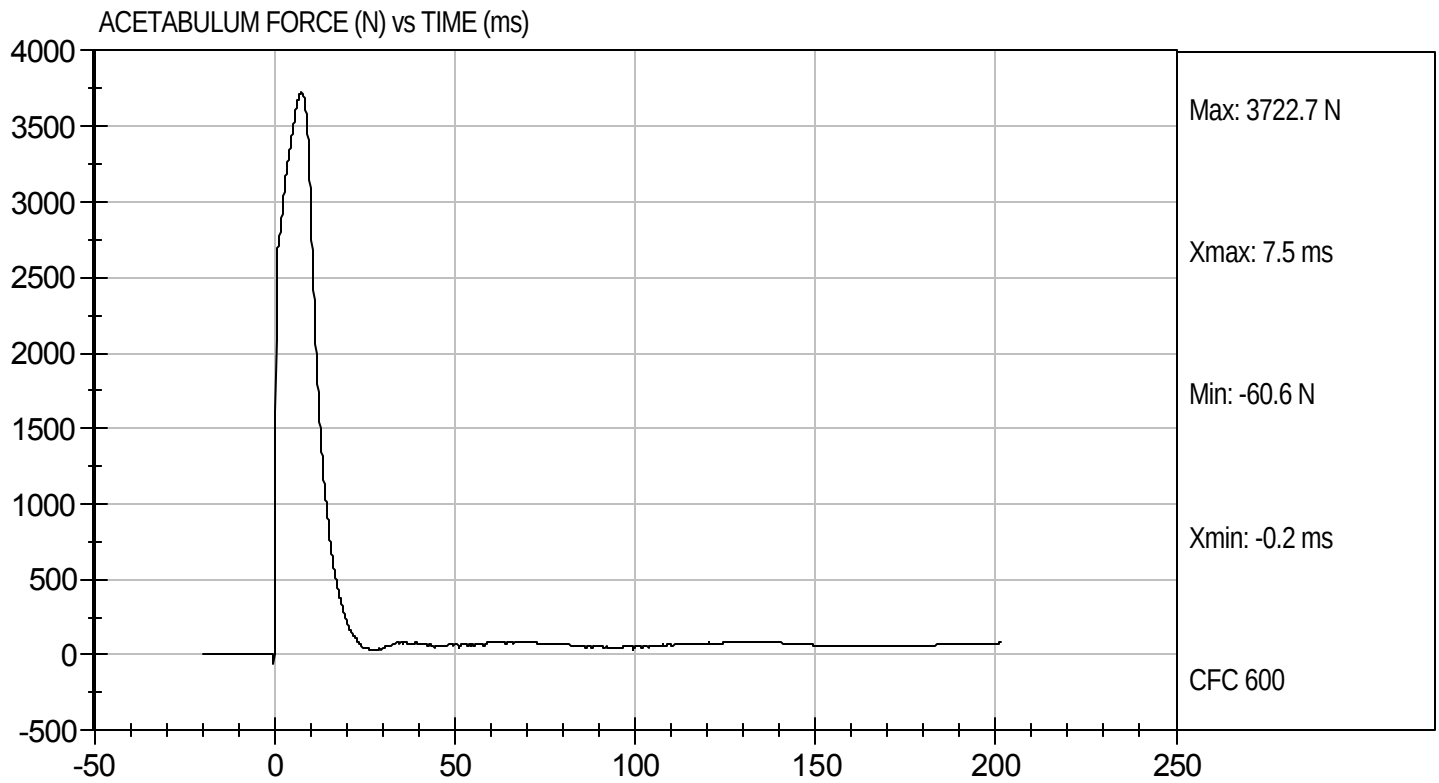
Test Date: 10/24/11  
Velocity: 22.22 ft/s, 6.77 m/s





Test Desc: Pelvis Impact  
Component ID: D113537

Test Date: 10/24/11  
Velocity: 22.22 ft/s, 6.77 m/s



**MGA RESEARCH CORPORATION**  
**ILIAC IMPACT TEST**  
**SID-IIs BUILD LEVEL D DUMMY**

**ATD Serial No:** 296

**Test I.D:** D113538

| Tested Parameter           | Units | Specification | Result | Pass/Fail |
|----------------------------|-------|---------------|--------|-----------|
| Temperature                | deg C | 20.6 to 22.2  | 21.8   | Pass      |
| Humidity                   | %     | 10 to 70      | 35     | Pass      |
| Impact Velocity            | m/s   | 4.20 to 4.40  | 4.38   | Pass      |
| Peak Impactor Acceleration | G's   | 36 to 45      | 37     | Pass      |
| Pelvis Y Acceleration      | G's   | 28 to 39      | 30     | Pass      |
| Peak Pelvis Iliac Force    | N     | 4100 to 5100  | 4572   | Pass      |
| Overall Test Results       |       |               | Pass   |           |

  
Laboratory Technician

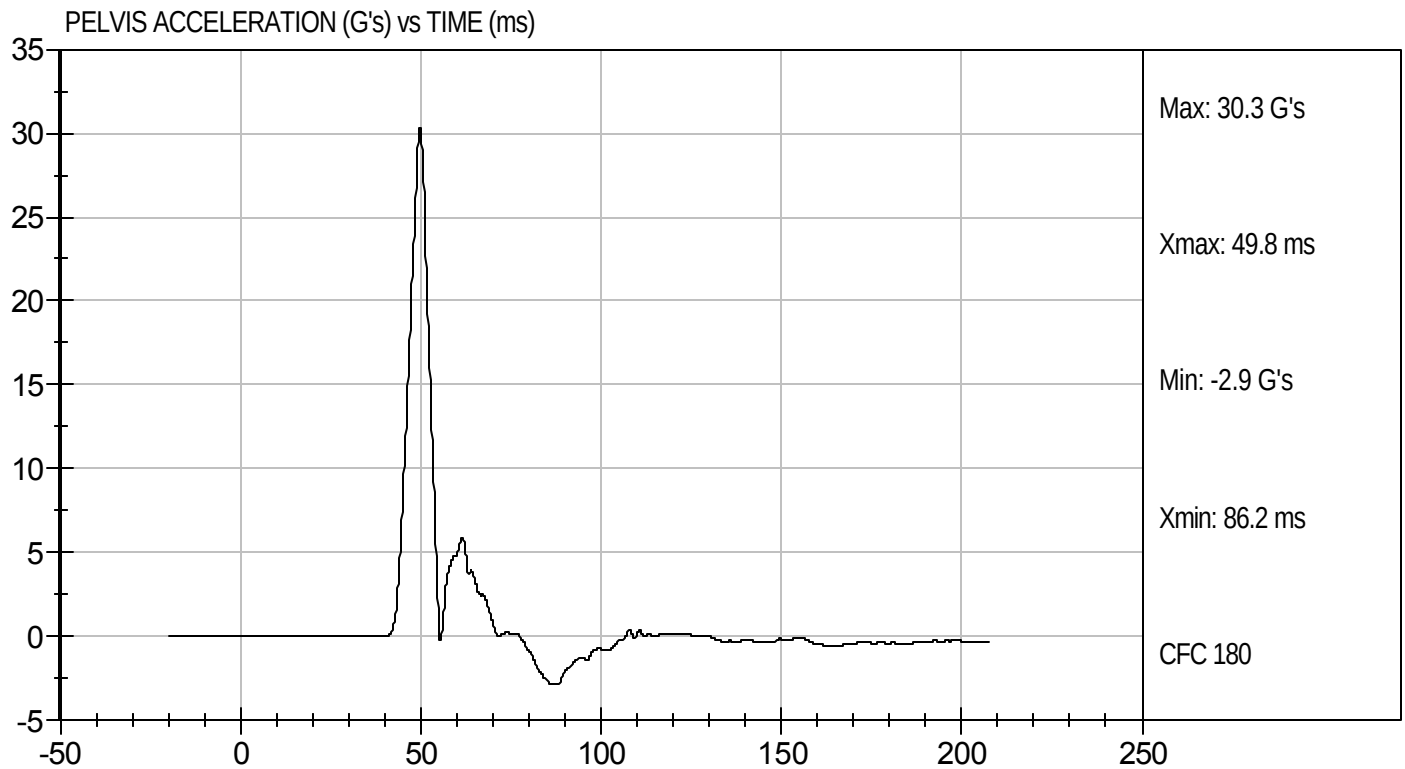
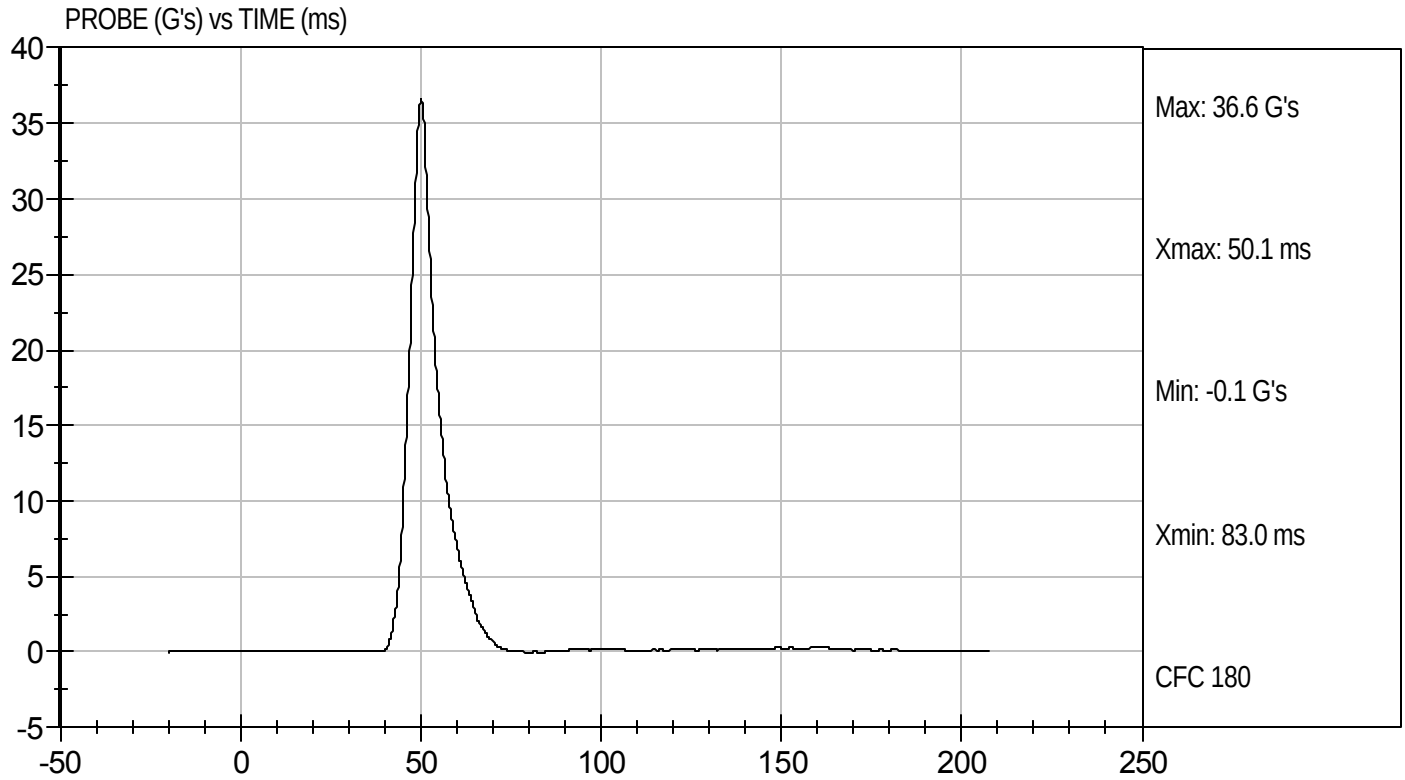
10/24/11  
Test Date

  
Approved By



Test Desc: Iliac Impact  
Component ID: D113538

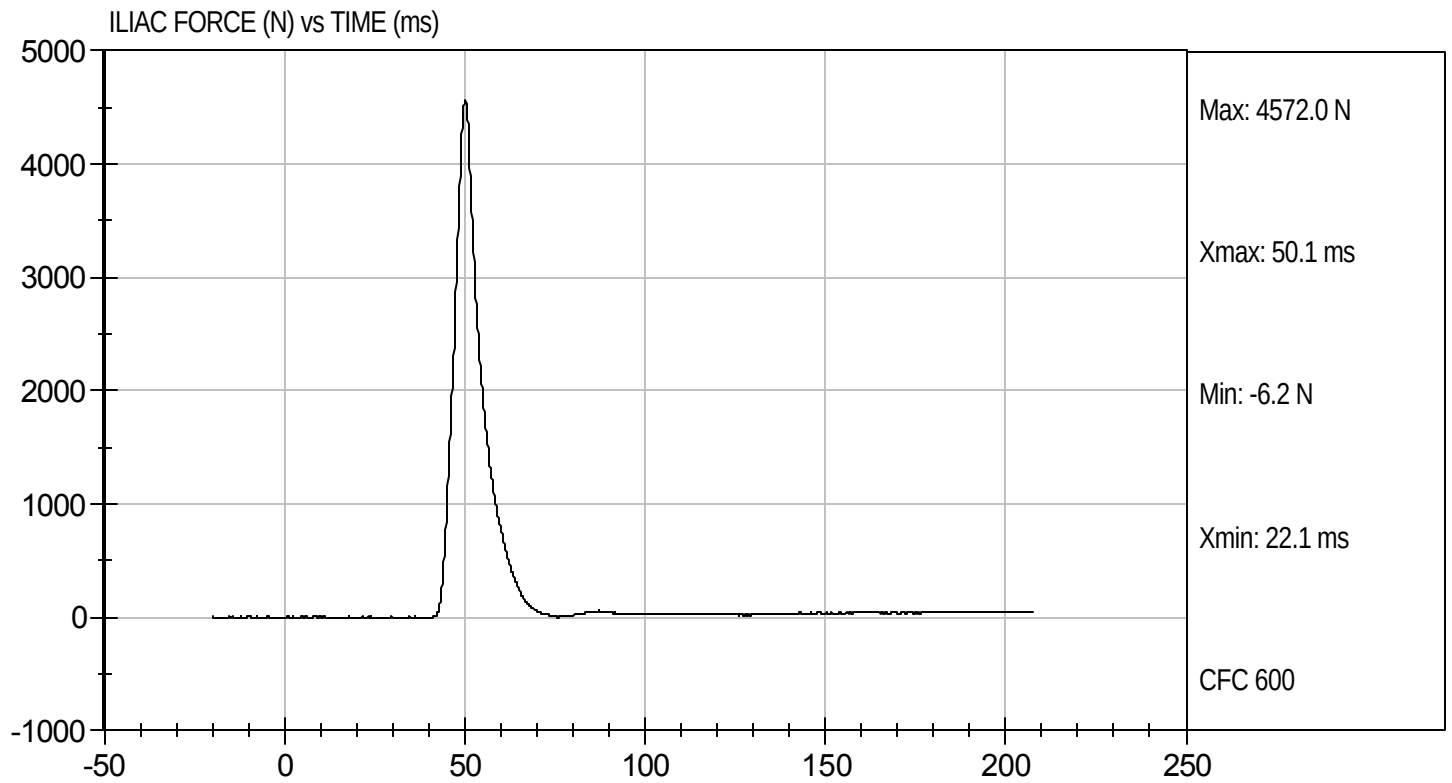
Test Date: 10/24/11  
Velocity: 14.36 ft/s, 4.38 m/s





Test Desc: Iliac Impact  
Component ID: D113538

Test Date: 10/24/11  
Velocity: 14.36 ft/s, 4.38 m/s



## **APPENDIX D**

### **TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA**

**Table 1 – Dummy Instrumentation**

|                                  |               |        | SID-IIs S/N 296 |              |                  |          |
|----------------------------------|---------------|--------|-----------------|--------------|------------------|----------|
|                                  |               |        | Serial Number   | Manufacturer | Calibration Date |          |
| Head Accelerometers              |               |        | X               | P67363       | Endevco          | 10/13/11 |
|                                  |               |        | Y               | P67364       | Endevco          | 10/13/11 |
|                                  |               |        | Z               | P67365       | Endevco          | 10/13/11 |
| Head Accelerometers              |               |        | Xr              | P64023       | Endevco          | 10/13/11 |
|                                  |               |        | Yr              | P66672       | Endevco          | 10/13/11 |
|                                  |               |        | Zr              | P66762       | Endevco          | 10/13/11 |
| Displacement Potentiometers      | Thoracic Rib  | Upper  | Y               | G1214        | FTSS             | 10/18/11 |
|                                  |               | Middle | Y               | G1163        | FTSS             | 10/18/11 |
|                                  |               | Lower  | Y               | G1158        | FTSS             | 10/18/11 |
|                                  | Abdominal Rib | Upper  | Y               | G1146        | FTSS             | 10/18/11 |
|                                  |               | Lower  | Y               | G1126        | FTSS             | 10/18/11 |
| Lower Spine Accelerometers (T12) |               |        | X               | P67286       | Endevco          | 09/22/11 |
|                                  |               |        | Y               | P67289       | Endevco          | 09/22/11 |
|                                  |               |        | Z               | P67291       | Endevco          | 09/22/11 |
| Acetabulum Load Cell             |               |        | Y               | ACG269       | Denton           | 01/06/11 |
| Iliac Wing Load Cell             |               |        | Y               | IWG282       | Denton           | 01/06/11 |
| Pelvis Plug (struck side)        |               |        |                 | 37205        | FTSS             | 10/12/10 |
| Pelvis Plug (non-struck side)    |               |        |                 | 37203        | FTSS             | 10/12/10 |

**Table 2 – Vehicle Instrumentation**

|                           |   | Serial Number | Manufacturer | Calibration Date |
|---------------------------|---|---------------|--------------|------------------|
| Vehicle Center of Gravity | X | P63256        | Endevco      | 08/22/11         |
| Vehicle Center of Gravity | Y | P63258        | Endevco      | 08/22/11         |
| Vehicle Center of Gravity | Z | P63257        | Endevco      | 08/22/11         |
| Left Floor Sill           | Y | P55687        | Endevco      | 04/27/11         |
| A-Pillar Sill             | Y | P59247        | Endevco      | 05/20/11         |
| A-Pillar Low              | Y | P55684        | Endevco      | 04/27/11         |
| A-Pillar Mid              | Y | P47894        | Endevco      | 09/12/11         |
| B-Pillar Sill             | Y | P59639        | Endevco      | 05/20/11         |
| B-Pillar Low              | Y | P55674        | Endevco      | 07/07/11         |
| B-Pillar Mid              | V | P47837        | Endevco      | 08/22/11         |
| Driver Seat               | Y | P47108        | Endevco      | 07/08/11         |
| Engine Top                | X | P63255        | Endevco      | 09/13/11         |
| Engine Top                | Y | P63254        | Endevco      | 09/13/11         |
| Firewall                  | Y | P59283        | Endevco      | 07/07/11         |
| Right Roof                | Y | P59362        | Endevco      | 07/07/11         |
| Right Floor Sill          | Y | P59383        | Endevco      | 09/12/11         |
| Rear Floorpan             | X | P59310        | Endevco      | 06/15/11         |
| Rear Floorpan             | Y | P59309        | Endevco      | 06/15/11         |

**Table 3 – Pole Instrumentation**

|             | Serial Number | Manufacturer | Calibration Date |
|-------------|---------------|--------------|------------------|
| Load Cell 1 |               |              |                  |
| Load Cell 2 |               |              |                  |
| Load Cell 3 |               |              |                  |
| Load Cell 4 |               |              |                  |
| Load Cell 5 |               |              |                  |
| Load Cell 6 |               |              |                  |
| Load Cell 7 |               |              |                  |
| Load Cell 8 |               |              |                  |