

**REPORT NUMBER: NCAP-MGA-2011-054**

**NEW CAR ASSESSMENT PROGRAM (NCAP)  
Frontal Barrier Impact Test**

**VOLKSWAGEN DE MEXICO S.A. DE C.V.  
2011 Volkswagen Jetta S 4-Dr Sedan  
NHTSA No.: MB5805**

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



**Test Date: December 15, 2010**


**Final Report Date: January 13, 2011**

**FINAL REPORT**

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

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Approval Date: January 13, 2011

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NHTSA, Office of Crashworthiness Standards

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

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

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

### Technical Report Documentation Page

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| <b>4. Title and Subtitle</b><br>Final Report of New Car Assessment Program<br>Frontal Impact Testing of 2011 Volkswagen Jetta S 4-Dr Sedan<br>NHTSA No.: MB5805   |   | <b>5. Report Date</b><br>January 13, 2011   |                  |                         |       |            |               |            |               |                  |                 |   |     |     |     |     |     |                           |    |    |    |    |    |     |     |   |   |      |      |              |   |      |      |      |     |                  |   |      |      |     |     |                  |   |       |      |      |      |                   |   |       |      |      |     |
|   |   | <b>6. Performing Organization Code</b><br>MGA   |                  |                         |       |            |               |            |               |                  |                 |   |     |     |     |     |     |                           |    |    |    |    |    |     |     |   |   |      |      |              |   |      |      |      |     |                  |   |      |      |     |     |                  |   |       |      |      |      |                   |   |       |      |      |     |
| <b>7. Author(s)</b><br>Donna Janovicz, Project Manager<br>Ben Fischer, Project Engineer   |   | <b>8. Performing Organization Report No.</b><br>NCAP-MGA-2011-054   |                  |                         |       |            |               |            |               |                  |                 |   |     |     |     |     |     |                           |    |    |    |    |    |     |     |   |   |      |      |              |   |      |      |      |     |                  |   |      |      |     |     |                  |   |       |      |      |      |                   |   |       |      |      |     |
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| <b>9. Performing Organization Name and Address</b><br>MGA Research Corporation<br>5000 Warren Road<br>Burlington, WI 53105  |   | <b>11. Contract or Grant No.</b><br>DTNH22-06-D-00028   |                  |                         |       |            |               |            |               |                  |                 |   |     |     |     |     |     |                           |    |    |    |    |    |     |     |   |   |      |      |              |   |      |      |      |     |                  |   |      |      |     |     |                  |   |       |      |      |      |                   |   |       |      |      |     |
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| <b>12. Sponsoring Agency Name and Address</b><br>U.S. Department of Transportation<br>National Highway Traffic Safety Administration<br>Office of Crashworthiness Standards<br>1200 New Jersey Ave, SE, Room W43-410<br>Washington, D.C. 20590  |   | <b>14. Sponsoring Agency Code</b><br>NVS-111  |                  |                         |       |            |               |            |               |                  |                 |   |     |     |     |     |     |                           |    |    |    |    |    |     |     |   |   |      |      |              |   |      |      |      |     |                  |   |      |      |     |     |                  |   |       |      |      |      |                   |   |       |      |      |     |
|   |   | <b>15. Supplementary Notes</b>  |                  |                         |       |            |               |            |               |                  |                 |   |     |     |     |     |     |                           |    |    |    |    |    |     |     |   |   |      |      |              |   |      |      |      |     |                  |   |      |      |     |     |                  |   |       |      |      |      |                   |   |       |      |      |     |
| <b>16. Abstract</b><br>A 56.3 km/h NCAP Frontal Impact Test was conducted on the 2011 Volkswagen Jetta S 4-Dr Sedan in accordance with the specifications of the Office of Crashworthiness Standards Frontal NCAP Laboratory Test Procedure for the generation of consumer information on vehicle frontal crash protection. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and foot well intrusion performance. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on December 15, 2010.<br><br>The impact velocity was 56.3 km/h and the ambient temperature at the barrier face at the time of impact was 21°C. The target vehicle post-test maximum crush was 441 mm located at the vehicle's centerline. The test vehicle's performance was as follows:   |   |   |                  |                         |       |            |               |            |               |                  |                 |   |     |     |     |     |     |                           |    |    |    |    |    |     |     |   |   |      |      |              |   |      |      |      |     |                  |   |      |      |     |     |                  |   |       |      |      |      |                   |   |       |      |      |     |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th rowspan="2">Units</th> <th colspan="2">Threshold</th> <th rowspan="2">Driver ATD</th> <th rowspan="2">Passenger ATD</th> </tr> <tr> <th>50<sup>th</sup></th> <th>5<sup>th</sup></th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC<sub>15</sub>)</td> <td>N/A</td> <td>700</td> <td>700</td> <td>230</td> <td>325</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>52</td> <td>21</td> <td>16</td> </tr> <tr> <td>Nij</td> <td>N/A</td> <td>1</td> <td>1</td> <td>0.32</td> <td>0.41</td> </tr> <tr> <td>Neck Tension</td> <td>N</td> <td>4170</td> <td>2620</td> <td>1522</td> <td>949</td> </tr> <tr> <td>Neck Compression</td> <td>N</td> <td>4000</td> <td>2520</td> <td>388</td> <td>509</td> </tr> <tr> <td>Left Femur Force</td> <td>N</td> <td>10008</td> <td>6805</td> <td>3266</td> <td>1133</td> </tr> <tr> <td>Right Femur Force</td> <td>N</td> <td>10008</td> <td>6805</td> <td>2843</td> <td>412</td> </tr> </tbody> </table> |   |   |                  | Measurement Description | Units | Threshold  |               | Driver ATD | Passenger ATD | 50 <sup>th</sup> | 5 <sup>th</sup> | Head Injury Criteria (HIC <sub>15</sub> ) | N/A | 700 | 700 | 230 | 325 | Maximum Chest Compression | mm | 63 | 52 | 21 | 16 | Nij | N/A | 1 | 1 | 0.32 | 0.41 | Neck Tension | N | 4170 | 2620 | 1522 | 949 | Neck Compression | N | 4000 | 2520 | 388 | 509 | Left Femur Force | N | 10008 | 6805 | 3266 | 1133 | Right Femur Force | N | 10008 | 6805 | 2843 | 412 |
| Measurement Description   | Units   | Threshold   |                  |                         |       | Driver ATD | Passenger ATD |            |               |                  |                 |   |     |     |     |     |     |                           |    |    |    |    |    |     |     |   |   |      |      |              |   |      |      |      |     |                  |   |      |      |     |     |                  |   |       |      |      |      |                   |   |       |      |      |     |
|   |   | 50 <sup>th</sup>  | 5 <sup>th</sup>  |                         |       |            |               |            |               |                  |                 |   |     |     |     |     |     |                           |    |    |    |    |    |     |     |   |   |      |      |              |   |      |      |      |     |                  |   |      |      |     |     |                  |   |       |      |      |      |                   |   |       |      |      |     |
| Head Injury Criteria (HIC <sub>15</sub> )   | N/A   | 700   | 700              | 230                     | 325   |            |               |            |               |                  |                 |   |     |     |     |     |     |                           |    |    |    |    |    |     |     |   |   |      |      |              |   |      |      |      |     |                  |   |      |      |     |     |                  |   |       |      |      |      |                   |   |       |      |      |     |
| Maximum Chest Compression   | mm  | 63  | 52               | 21                      | 16    |            |               |            |               |                  |                 |   |     |     |     |     |     |                           |    |    |    |    |    |     |     |   |   |      |      |              |   |      |      |      |     |                  |   |      |      |     |     |                  |   |       |      |      |      |                   |   |       |      |      |     |
| Nij   | N/A   | 1   | 1                | 0.32                    | 0.41  |            |               |            |               |                  |                 |   |     |     |     |     |     |                           |    |    |    |    |    |     |     |   |   |      |      |              |   |      |      |      |     |                  |   |      |      |     |     |                  |   |       |      |      |      |                   |   |       |      |      |     |
| Neck Tension  | N   | 4170  | 2620             | 1522                    | 949   |            |               |            |               |                  |                 |   |     |     |     |     |     |                           |    |    |    |    |    |     |     |   |   |      |      |              |   |      |      |      |     |                  |   |      |      |     |     |                  |   |       |      |      |      |                   |   |       |      |      |     |
| Neck Compression  | N   | 4000  | 2520             | 388                     | 509   |            |               |            |               |                  |                 |   |     |     |     |     |     |                           |    |    |    |    |    |     |     |   |   |      |      |              |   |      |      |      |     |                  |   |      |      |     |     |                  |   |       |      |      |      |                   |   |       |      |      |     |
| Left Femur Force  | N   | 10008   | 6805             | 3266                    | 1133  |            |               |            |               |                  |                 |   |     |     |     |     |     |                           |    |    |    |    |    |     |     |   |   |      |      |              |   |      |      |      |     |                  |   |      |      |     |     |                  |   |       |      |      |      |                   |   |       |      |      |     |
| Right Femur Force   | N   | 10008   | 6805             | 2843                    | 412   |            |               |            |               |                  |                 |   |     |     |     |     |     |                           |    |    |    |    |    |     |     |   |   |      |      |              |   |      |      |      |     |                  |   |      |      |     |     |                  |   |       |      |      |      |                   |   |       |      |      |     |
| <b>17. Key Words</b><br><br>35 mph Frontal Barrier Impact Test<br>New Car Assessment Program (NCAP)   |   | <b>18. Distribution Statement</b><br>Copies of this report are available from:<br>National Highway Traffic Safety Adm.<br>Technical Reference Division<br>1200 New Jersey Ave, SE<br>Washington, D.C. 20590 |                  |                         |       |            |               |            |               |                  |                 |   |     |     |     |     |     |                           |    |    |    |    |    |     |     |   |   |      |      |              |   |      |      |      |     |                  |   |      |      |     |     |                  |   |       |      |      |      |                   |   |       |      |      |     |
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## TABLE OF CONTENTS

| <u>Section</u> |  | <u>Page No.</u> |
|----------------|--|-----------------|
| 1              | Purpose and Summary of Test                    | 1               |
| 2              | Occupant and Vehicle Information / Data Sheets | 3               |

| <u>Data Sheet No.</u> |   | <u>Page No.</u> |
|-----------------------|---|-----------------|
| 1                     | General Test and Vehicle Parameter Data               | 4               |
| 2                     | Seat Adjustment, Fuel System, and Steering Wheel Data | 8               |
| 3                     | Dummy Longitudinal Clearance Dimensions               | 10              |
| 4                     | Dummy Lateral Clearance Dimensions                    | 11              |
| 5                     | Seat Belt Positioning Data                            | 12              |
| 6                     | High-Speed Camera Locations and Data                  | 13              |
| 7                     | Vehicle Accelerometer Data                            | 15              |
| 8                     | Photographic Reference Target Locations               | 16              |
| 9                     | Load Cell Locations on Fixed Barrier                  | 17              |
| 10                    | Test Vehicle Summary of Results                       | 18              |
| 11                    | Post-Test Observations                                | 19              |
| 12                    | Vehicle Profile Measurements                          | 20              |
| 13                    | Accident Investigation Division Data                  | 22              |
| 14                    | Vehicle Intrusion Measurements                        | 23              |
| 15                    | Summary of FMVSS 212, 219 (Partial), and 301 Data     | 26              |
| 16                    | FMVSS 301 Static Rollover Results                     | 28              |
| 17                    | Dummy/Vehicle Temperature Stabilization Data          | 29              |

| <u>Appendix</u> |   |   |
|-----------------|---|---|
| A               | Photographs   | A |
| B               | Dummy Response Data                                 | B |
| C               | Dummy Calibration and Performance Verification Data | C |

## SECTION 1

### PURPOSE AND SUMMARY OF TEST

#### PURPOSE

This 56.3 km/h frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under contract number DTNH22-06-D-00028. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for consumer information purposes.

The 56.3 km/h frontal barrier impact was conducted in accordance with the Office of Crashworthiness Standard's NCAP Frontal Laboratory Test Procedure dated January 2010.

#### SUMMARY

A load cell barrier was impacted by a 2011 Volkswagen Jetta S 4-Dr Sedan at a velocity of 56.3 kph. The test was performed at MGA Research Corporation on December 15, 2010. Pre-and post-test photographs of the vehicle and dummies can be found in Appendix A.

Two real-time cameras and fourteen (14) high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in this report.

One Part 572E, 50<sup>th</sup> percentile male anthropomorphic test device (ATD), was placed in the driver seating position and one Part 572O 5<sup>th</sup> percentile female test device (ATD) was placed in the right-front passenger seating position according to dummy placement instructions specified in the Frontal NCAP Laboratory Test Procedure.

Both ATDs were fully instrumented with head, chest and pelvis tri-axial accelerometers, chest displacement potentiometers, upper neck transducers, right/left femur load cells, and lower leg instrumentation. Seat belt load cells were on the driver's lap and shoulder belts to measure dummy torso and pelvic section loading. No load cells were used on the passenger's belts. The driver (position 1) ATD (Serial No. 351) and the right-front passenger (position 2) ATD (Serial No. 138) were calibrated previous to this test. Certification details, along with verification data, are found in Appendix C of this report.

The 223 channels of data were recorded on an on-board data acquisition system. Appendix B contains the dummy head, chest displacement, neck, and femur response data traces.

There was 100 percent windshield retention and no intrusion into the protected zone of the windshield during the event. There was no Stoddard Solvent leakage after the event or during any phase of the static rollover.

The maximum static crush of the vehicle was 441 mm and both the driver and passenger side doors remained closed during the impact event and were operable after the impact.

The driver's head and chest contacted the airbag. The driver's head also contacted the headrest. The driver's knees contacted the knee bolster. The passenger's head and chest contacted the airbag. The passenger's head also contacted the headrest. The passenger's knees contacted the glovebox.

The occupant data is summarized below:

| ATD position                 | HIC <sub>15</sub> | T <sup>1</sup> | T <sup>2</sup> | Chest Disp. (mm) | Nij  | Neck Tension (N) | Neck Comp. (N) | Left Femur (N) | Right Femur (N) |
|------------------------------|-------------------|----------------|----------------|------------------|------|------------------|----------------|----------------|-----------------|
| Driver (50 <sup>th</sup> )   | 230               | 68.3           | 83.3           | 21               | 0.32 | 1522             | 388            | 3266           | 2843            |
| Passenger (5 <sup>th</sup> ) | 325               | 56.4           | 71.4           | 16               | 0.41 | 949              | 509            | 1133           | 412             |

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

### TEST NOTES

There was no valid data collected for:  
 Top of Engine X after 40 msec.  
 Bottom of Engine X after 20 msec.  
 Right Brake Caliper X after 40 msec.

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

**SECTION 2**  
**OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS**

**DATA SHEET NO. 1**

**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2011 Volkswagen Jetta S 4-Dr Sedan  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MB5805  
 Test Date: 12/15/2010

**TEST VEHICLE INFORMATION AND OPTIONS**

|  |                        |                            |     |
|--|------------------------|----------------------------|-----|
| NHTSA No.  | MB5805                 | Anti-Lock Brakes           | Yes |
| Model Year   | 2011                   | All Wheel Drive            | No  |
| Make   | Volkswagen             | Power Steering             | Yes |
| Model  | Jetta                  | Driver Front Airbag        | Yes |
| Body Style   | Sedan                  | Driver Curtain Airbag      | Yes |
| VIN  | 3VW2K7AJ5BM323928      | Driver Head/Torso Airbag   | No  |
| Body Color   | Platinum Gray Metallic | Driver Torso Airbag        | No  |
| Delivery Date  | 11/11/2010             | Driver Torso/Pelvis Airbag | Yes |
| Odometer (mi)  | 68                     | Driver Pelvis Airbag       | No  |
| Odometer (km)  | 109                    | Driver Knee Airbag         | No  |
| Dealer   | Fox Valley Volkswagen  | Pass. Front Airbag         | Yes |
| Transmission   | Automatic              | Pass. Curtain Airbag       | Yes |
| Final Drive  | Front                  | Pass. Head/Torso Airbag    | No  |
| Type/No. Cylinders   | 4                      | Pass. Torso Airbag         | No  |
| Engine Displacement (L)  | 2.0                    | Pass. Torso/Pelvis Airbag  | Yes |
| Engine Placement   | Lateral                | Pass. Pelvis Airbag        | No  |
| Roof Rack  | No                     | Pass. Knee Airbag          | No  |
| Sunroof/T-Top  | No                     | Pretensioners              | Yes |
| Tinted Glass   | No                     | Load Limiters              | Yes |
| Traction Control   | Yes                    | Automatic Door Locks       | Yes |
| Power Brakes   | Yes                    | Bucket Seats               | Yes |
| Front Disc   | Yes                    | Tilt Steering              | Yes |
| Rear Disc  | No                     | Other                      |     |
| Does owner's manual provide instructions to turn off automatic door locks? | No                     |                            |     |

**DATA FROM CERTIFICATION LABEL**

|                     |                                      |                 |      |
|---------------------|--------------------------------------|-----------------|------|
| Manufactured By     | Volkswagen de Mexico<br>S.A. de C.V. | GVWR (kg)       | 1850 |
| Date of Manufacture | 10.10                                | GAWR Front (kg) | 940  |
|                     |                                      | GAWR Rear (kg)  | 960  |

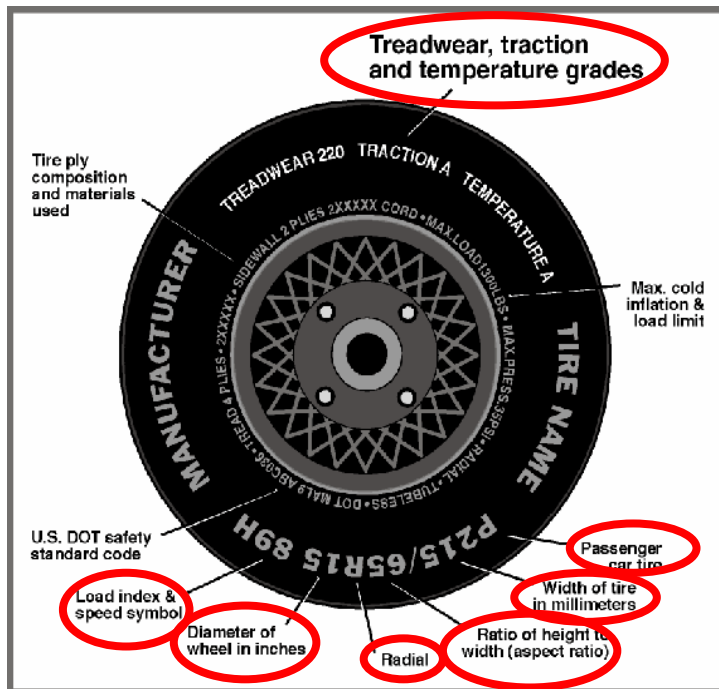
**VEHICLE SEATING AND WEIGHT CAPACITY DATA**

| Measured Parameter                | Front  | Rear        | Third | Total |
|-----------------------------------|--------|-------------|-------|-------|
| Type of Seats                     | Bucket | Split Bench |       |       |
| Designated Seating Capacity (DSC) | 2      | 3           |       | 5     |
| Capacity Weight (VCW) (kg)        |        |             |       | 495   |
| Cargo Weight (RCLW) (kg)          |        |             |       | 155   |

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

Test Vehicle: 2011 Volkswagen Jetta S 4-Dr Sedan  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MB5805  
 Test Date: 12/15/2010



| Measured Parameter          | Front            | Rear             |
|-----------------------------|------------------|------------------|
| Maximum Tire Pressure (kPa) | 350              | 350              |
| Cold Pressure (kPa)         | 220              | 220              |
| Recommended Tire Size       | 205/55R16        | 205/55R16        |
| Tire Size on Vehicle        | 205/55R16        | 205/55R16        |
| Tire Manufacturer           | Continental      | Continental      |
| Tire Model                  | Contipro Contact | Contipro Contact |
| Treadwear                   | 400              | 400              |
| Traction                    | AA               | AA               |
| Temperature Grades          | A                | A                |
| Tire Plies Sidewall         | 1                | 1                |
| Tire Plies Body             | 4                | 4                |
| Load Index & Speed Symbol   | 91H              | 91H              |
| Tire Material               | Rubber           | Rubber           |
| DOT Safety Code Right       | P50F 3Y3 4010    | P50F 3Y3 4010    |
| DOT Safety Code Left        | P50F 3Y3 4010    | P50F 3Y3 4010    |

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

Test Vehicle: 2011 Volkswagen Jetta S 4-Dr Sedan  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MB5805  
 Test Date: 12/15/2010

**TEST VEHICLE WEIGHTS**

|        | Units | As Delivered (UVW) |       |        | As Tested (ATW) |       |        |
|--------|-------|--------------------|-------|--------|-----------------|-------|--------|
|        |       | Front              | Rear  | Total  | Front           | Rear  | Total  |
| Left   | kg    | 390.5              | 285.3 |        | 418.7           | 409.6 |        |
| Right  | kg    | 398.7              | 272.2 |        | 416.8           | 390.6 |        |
| Ratio  | %     | 58.6               | 41.4  |        | 51.1            | 48.9  |        |
| Totals | kg    | 789.2              | 557.5 | 1346.7 | 835.5           | 800.2 | 1635.7 |

**TARGET TEST WEIGHT CALCULATION**

| Measured Parameter                               | Units | Value  |
|--|-------|--------|
| Total Delivered Weight (UVW)                     | kg    | 1346.7 |
| Weight of 1 P572E ATD & 1 P572O ATD              | kg    | 140.6  |
| Rated Cargo/Luggage Weight (RCLW)                | kg    | 155    |
| Calculated Target Vehicle Target Weight (TVTWTW) | kg    | 1642.3 |

**TEST VEHICLE ATTITUDES AND CG**

|              | Units | LF  | RF  | LR  | RR  | CG (aft of front axle) |
|--------------|-------|-----|-----|-----|-----|------------------------|
| As Delivered | mm    | 679 | 675 | 686 | 686 | 1100                   |
| As Tested    | mm    | 673 | 670 | 630 | 632 | 1299                   |
| Post Test    | mm    | 630 | 653 | 624 | 641 |                        |

**GENERAL TEST VEHICLE DATA**

| Measurement Description                 | Units | Value |
|---|-------|-------|
| Total Vehicle Wheel Base                | mm    | 2656  |
| Total Vehicle Length at Left Side       | mm    | 4390  |
| Total Vehicle Length at Centerline      | mm    | 4630  |
| Total Vehicle Length at Right Side      | mm    | 4390  |
| Weight of Ballast in Cargo Area         | kg    | 136.1 |
| Weight of Vehicle Components Removed    | kg    | 29.9  |
| Amount of Stoddard Solvent in Fuel Tank | L     | 51.1  |

List of components removed to meet test weight: Spare tire, right tail light, jack & tools, hub caps, trunk carpet and storage system.

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

Test Vehicle: 2011 Volkswagen Jetta S 4-Dr Sedan  
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NHTSA No.: MB5805  
 Test Date: 12/15/2010

**TARGET VEHICLE STRUCTURAL MEASUREMENT**

|    | Elements                              | Pre-Test (mm) |
|----|---------------------------------------|---------------|
| 1  | Total Length                          | 4630          |
| 2  | Total Width                           | 1786          |
| 3  | Bumper Top Height                     | 570           |
| 4  | Bumper Bottom Height                  | 450           |
| 5  | Longitudinal Member Top Height        | 479           |
| 6  | Distance between Longitudinal Members | 894           |
| 7  | Longitudinal Member Width             | 112           |
| 8  | Engine Top Height                     | 880           |
| 9  | Engine Bottom Height                  | 185           |
| 10 | Engine and Gearbox Width              | 800           |
| 11 | Front Bumper-Engine Distance          | 517           |
| 12 | Front Shock Absorber Fixing Height    | 879           |
| 13 | Bonnet Leading Edge Height            | 750           |
| 14 | Front Shock Absorber Fixing Width     | 1135          |
| 15 | Front Bumper – Front Axle Distance    | 873           |
| 16 | Front Axle – A-Pillar Distance        | 413           |
| 17 | A-Pillar – B-Pillar Distance          | 1132          |
| 18 | B-Pillar – Rear Axle Distance         | 1100          |
| 19 | B-Pillar – C-Pillar Distance          | 72            |
| 20 | Roof Sill Bottom Height               | 1275          |
| 21 | Roof Sill Top Height                  | 1384          |
| 22 | Floor Sill bottom Height              | 176           |
| 23 | Floor Sill Top Height                 | 344           |

## DATA SHEET NO. 2

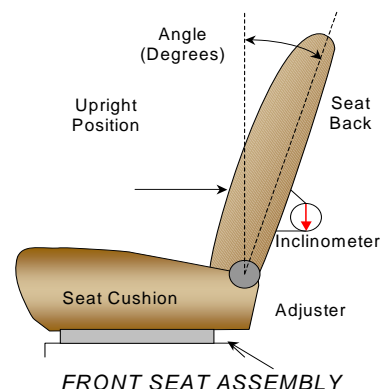
### SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

Test Vehicle: 2011 Volkswagen Jetta S 4-Dr Sedan  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MB5805  
 Test Date: 12/15/2010

#### NOMINAL DESIGN RIDING POSITION

The driver seat back is positioned as close as possible to the manufacturer's design angle. For the passenger seat back, seat back is adjusted following Appendix F, "Driver & Passenger Seating & Positioning Procedures" in the NCAP Test Procedure dated January 2010.



| SEAT BACK ANGLE           | Degrees           |
|---------------------------|-------------------|
| Driver Seat Back Angle    | 19.0° on seatback |
| Passenger Seat Back Angle | 18.5° on seatback |

#### SEAT FORE/AFT POSITIONS

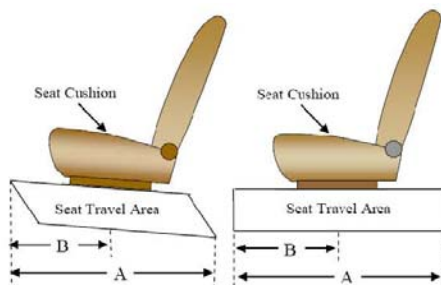
The driver and passenger seat fore/aft positions are adjusted following Appendix F, "Driver & Passenger Seating & Positioning Procedures" in the NCAP Test Procedure dated January 2010.

| SEAT FORE/AFT POSITIONS | Total Fore/Aft Travel             | Placed in Position #                        |
|-------------------------|-----------------------------------|---|
| Driver Seat             | 37 detents (1 <sup>st</sup> as 0) | 15 <sup>th</sup> detent (forward-most as 0) |
| Passenger Seat          | 25 detents (1 <sup>st</sup> as 0) | 0 detent (forward-most as 0)                |

#### SEAT BELT UPPER ANCHORAGES

The seat belt upper anchorages are positioning following the manufacturer's specified position as listed in Form 1.

| SEAT BELT UPPER ANCHORAGES | Total # of Positions | Placed in Position # |
|----------------------------|----------------------|----------------------|
| Driver Seat                | 4                    | 0 (uppermost as 0)   |
| Passenger Seat             | 4                    | 0 (uppermost as 0)   |



**DATA SHEET NO. 2 (CONTINUED)**

**SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA**

Test Vehicle: 2011 Volkswagen Jetta S 4-Dr Sedan  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MB5805  
 Test Date: 12/15/2010

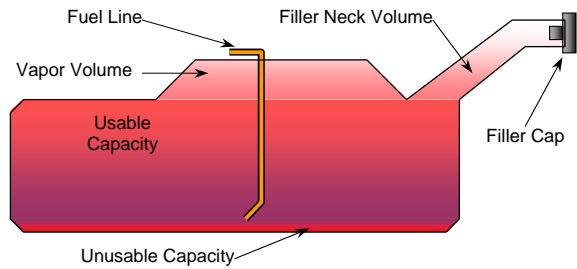
**FUEL TANK CAPACITY DATA**

|                                    | Liters       |
|------------------------------------|--------------|
| Usable Capacity of "Standard Tank" | 55.0         |
| Usable Capacity of "Optional" Tank |              |
| 92-94% of Usable Capacity          | 50.6 to 51.7 |
| Actual Amount of Solvent used      | 51.1         |
| 1/3 of Usable Capacity             | 18.3         |

**FUEL PUMP**

Describe the fuel pump type, its behavior, and the location of the fuel filler pipe.

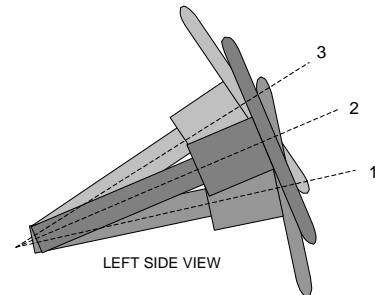
The vehicle is equipped with an electric fuel pump. The fuel pump runs for 2 seconds after ignition is switched on. If the engine doesn't run, the fuel pump stops running. If there is a crash signal, it will also stop running. The fuel pipe is on the right side.



VEHICLE FUEL TANK ASSEMBLY

**STEERING COLUMN ADJUSTMENT**

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when moved through its full range of motion. An aluminum plate is placed across the rim of the steering wheel, an inclinometer is placed on the plate and the angle is measured.



STEERING COLUMN ASSEMBLY

**STEERING COLUMN POSITION**

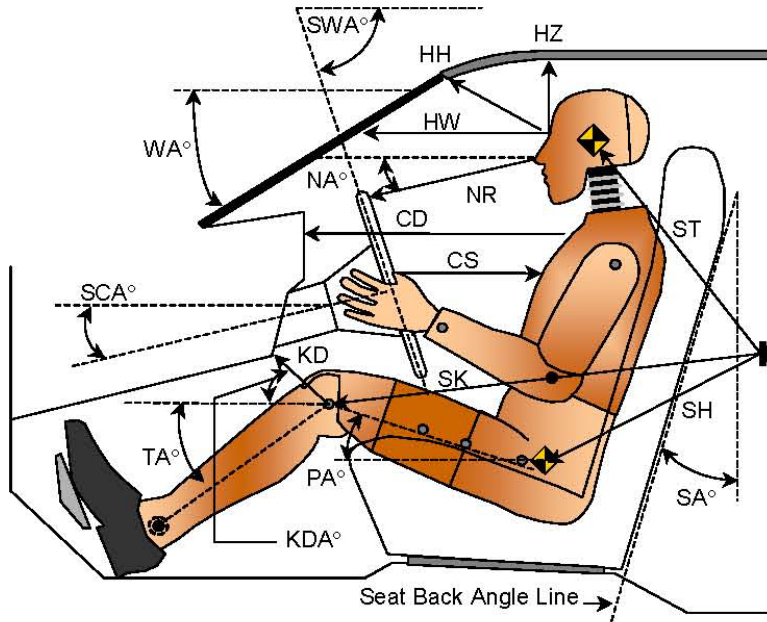
|                                   | Degrees | Fore/Aft Position (mm) |
|-----------------------------------|---------|------------------------|
| Lowermost – Position 1            | 68.0    | 210                    |
| Geometric Center – Position 2     | 65.5    | 180                    |
| Uppermost – Position 3            | 63.0    | 150                    |
| Telescoping Steering Wheel Travel |         | 60                     |
| Test Position                     | 65.5    | 180                    |

### DATA SHEET NO. 3

### DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2011 Volkswagen Jetta S 4-Dr Sedan  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MB5805  
 Test Date: 12/15/2010

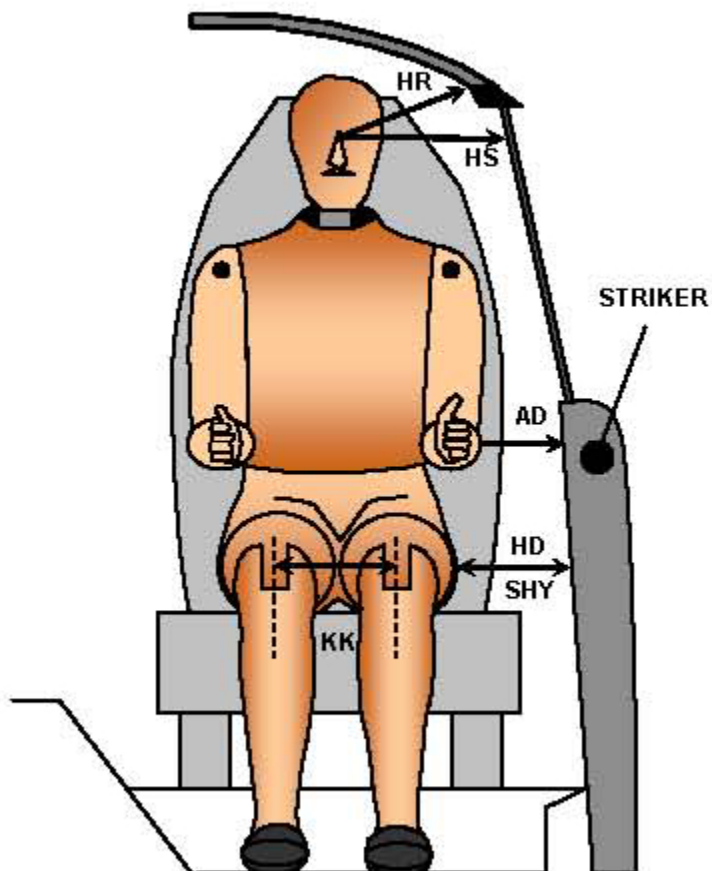


| Code | Measurement Description          | Driver S/N 351 |           | Passenger S/N 138 |           |
|------|----------------------------------|----------------|-----------|-------------------|-----------|
|      |                                  | Length (mm)    | Angle (°) | Length (mm)       | Angle (°) |
| WA   | Windshield Angle                 |                | 26.8      |                   |           |
| SWA  | Steering Wheel Angle             |                | 65.5      |                   |           |
| SCA  | Steering Column Angle            |                | 24.5      |                   |           |
| SA   | Seat Back Angle (headrest bezel) |                | 19.0      |                   | 18.5      |
| HZ   | Head to Roof (Z)                 | 184            | 90        | 237               | 90        |
| HH   | Head to Header                   | 344            | 25.3      | 331               | 39.5      |
| HW   | Head to Windshield               | 626            | 0         | 704               | 0         |
| NR   | Nose to Rim                      | 398            | 6.1       |                   |           |
| CD   | Chest to Dash                    | 528            |           | 443               |           |
| CS   | Chest to Steering Hub            | 312            | 7.3       |                   |           |
| RA   | Rim to Abdomen                   | 211            | 0         |                   |           |
| KDL  | Left Knee to Dash                | 210            | 31.4      | 177               | 43.2      |
| KDR  | Right Knee to Dash               | 204            | 30.9      | 180               | 39.0      |
| PA   | Pelvic Angle                     |                | 24.3      |                   | 22.1      |
| TA   | Tibia Angle                      |                | 43.6      |                   | 44.1      |
| SK   | Striker to Knee                  | 580            | 99.2      | 625               | 98.5      |
| ST   | Striker to Head                  | 455            | 14.3      | 391               | 26.8      |
| SH   | Striker to H-Point               | 302            | 140.3     | 355               | 120.6     |

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

Test Vehicle: 2011 Volkswagen Jetta S 4-Dr Sedan  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MB5805  
 Test Date: 12/15/2010



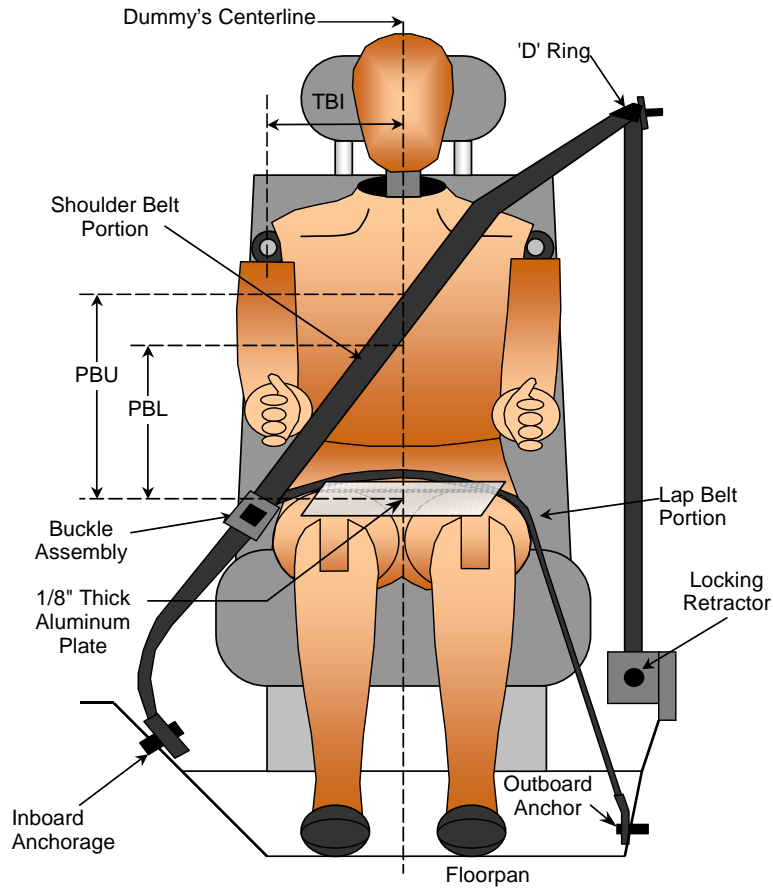
**FRONT VIEW OF DUMMY**

| Code | Measurement Description          | Driver S/N 351 | Passenger S/N 138 |
|------|----------------------------------|----------------|-------------------|
|      |                                  | Length (mm)    |                   |
| AD   | Arm to Door                      | 140            | 203               |
| HD   | H-Point to Door                  | 152            | 174               |
| HR   | Head to Side Header              | 206            | 248               |
| HS   | Head to Side Window              | 345            | 371               |
| KK   | Knee to Knee                     | 355            | 215               |
| SHY  | Striker to H-Point (Y Direction) | 265            | 306               |
| AA   | Ankle to Ankle                   | 388            | 189               |

**DATA SHEET NO. 5**  
**SEAT BELT POSITIONING DATA**

Test Vehicle: 2011 Volkswagen Jetta S 4-Dr Sedan  
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MB5805  
Test Date: 12/15/2010



**FRONT VIEW OF DUMMY**

**SEAT BELT POSITIONING MEASUREMENTS**

| Measurement Description                           | Units | Driver | Passenger |
|---|-------|--------|-----------|
| PBU - Top surface of reference to belt upper edge | mm    | 360    | 355       |
| PBL - To surface of reference to belt lower edge  | mm    | 290    | 255       |

**BELT LENGTH DATA**

| Measurement Description                          | Units | Driver | Passenger |
|--|-------|--------|-----------|
| Shoulder Belt Length as measured on ATD          | mm    | 845    | 880       |
| Lap Belt Length as measured on ATD               | mm    | 675    | 700       |
| Remainder of belt of reel                        | mm    | 1710   | 1620      |
| Total Belt Length for Continuous Webbing Systems | mm    | 3230   | 3200      |

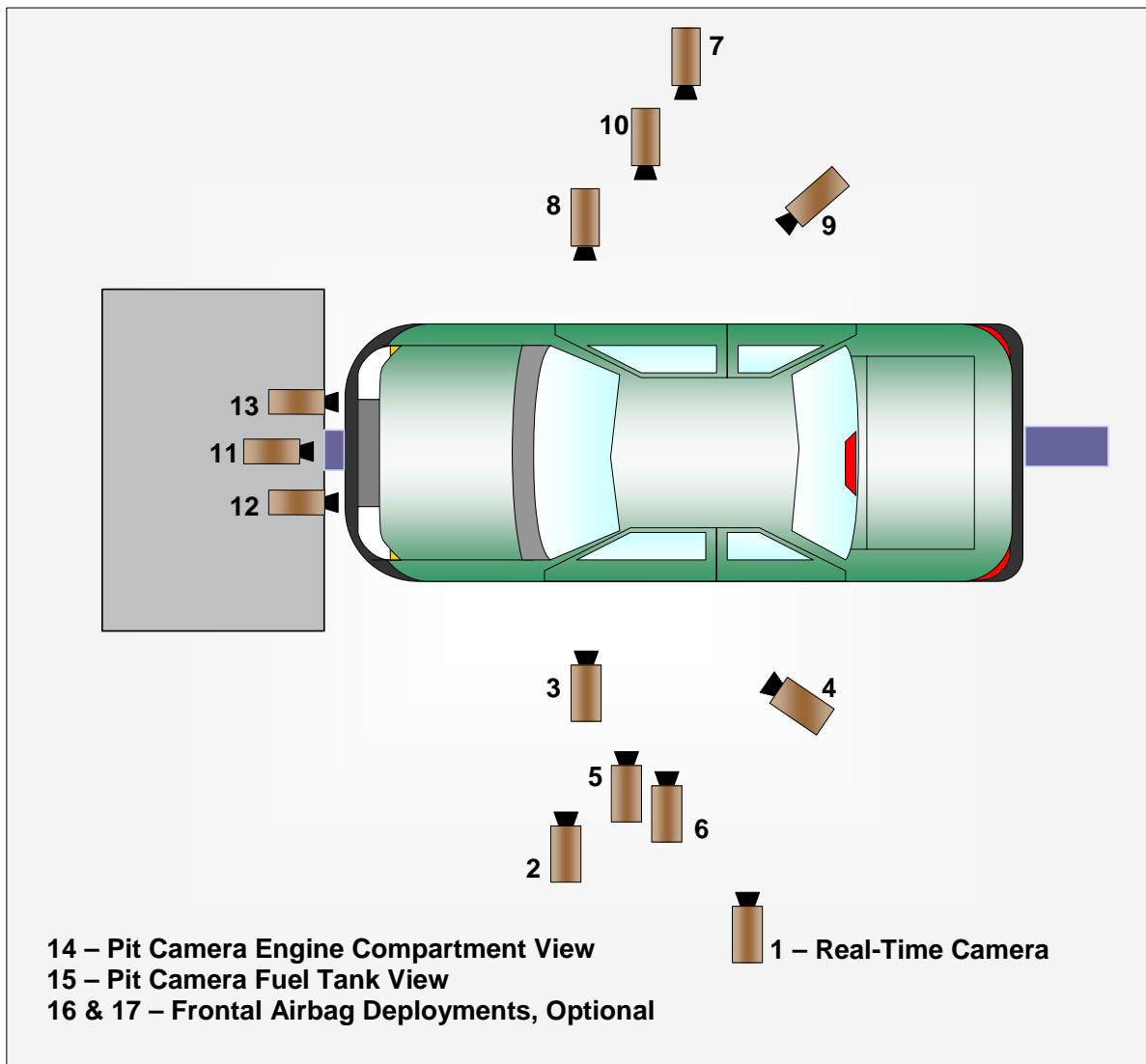
DATA SHEET NO. 6

HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2011 Volkswagen Jetta S 4-Dr Sedan  
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MB5805  
Test Date: 12/15/2010

CAMERA POSITIONS FOR FRONTAL IMPACTS



**DATA SHEET NO. 6 (CONTINUED)**

**CAMERA LOCATIONS AND DATA**

Test Vehicle: 2011 Volkswagen Jetta S 4-Dr Sedan

NHTSA No.: MB5805

Test Program: NCAP Frontal Barrier Impact Test

Test Date: 12/15/2010

**CAMERA LOCATIONS**

| No. | Camera View                       | Coordinates (mm) |       |       | Lens (mm) | Speed (fps) |
|-----|-----------------------------------|------------------|-------|-------|-----------|-------------|
|     |                                   | X*               | Y*    | Z*    |           |             |
| 1   | Real-Time Left Side View          |                  |       |       |           | 30          |
| 2   | Left Front Half                   | 1330             | -5140 | -1240 | 24        | 1000        |
| 3   | Driver Close-Up                   | 1570             | -6160 | -1530 | 35        | 1000        |
| 4   | Driver Angle                      | 5490             | -5120 | -1990 | 50        | 1000        |
| 5   | Steering Column Top               | 880              | -5160 | -1250 | 24        | 1000        |
| 6   | Steering Column Bottom            | 850              | -5190 | -870  | 24        | 1000        |
| 7   | Right Overall                     | 2170             | 6680  | -1380 | 20        | 1000        |
| 8   | Passenger Close-Up                | 1650             | 6230  | -1510 | 35        | 1000        |
| 9   | Passenger Angle                   | 5420             | 4970  | -1860 | 50        | 1000        |
| 10  | Right Front Half                  | 1340             | 5100  | -1220 | 24        | 1000        |
| 11  | Windshield                        | -260             | 0     | -2860 | 24        | 1000        |
| 12  | Top Driver                        | -20              | -310  | -2070 | 12.5      | 1000        |
| 13  | Top Passenger                     | -20              | 310   | -2070 | 12.5      | 1000        |
| 14  | Pit Front                         | 1370             | 0     | 3150  | 24        | 1000        |
| 15  | Pit Rear                          | 3130             | 0     | 3150  | 24        | 1000        |
| 16  | Onboard Driver Side (optional)    |                  |       |       |           |             |
| 17  | Onboard Passenger Side (optional) |                  |       |       |           |             |
| 18  | Real-Time Pan View                |                  |       |       |           | 30          |

**\*COORDINATES:**

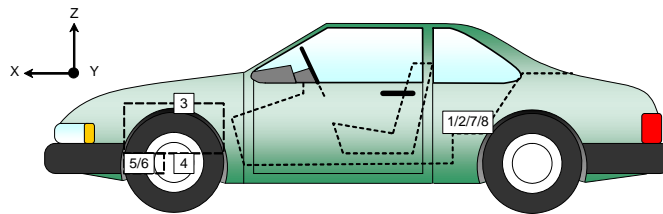
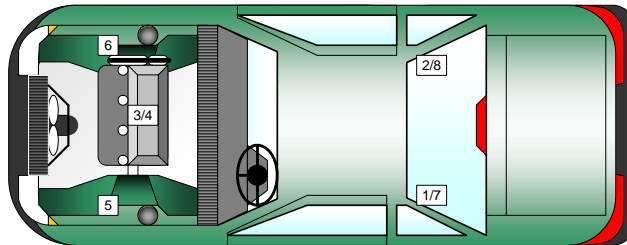
- +X = forward of impact plane
- +Y = right of monorail centerline
- +Z = below ground level

Cameras 16 & 17 were not used for this test.

**DATA SHEET NO. 7**  
**VEHICLE ACCELEROMETER DATA**

Test Vehicle: 2011 Volkswagen Jetta S 4-Dr Sedan  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MB5805  
 Test Date: 12/15/2010



**VEHICLE ACCELEROMETER PRE-TEST LOCATIONS**

| No. | Accelerometer Location | Measurements (mm) |      |      |
|-----|------------------------|-------------------|------|------|
|     |                        | X                 | Y    | Z    |
| 1   | Left Rear X-Member X   | 1964              | -408 | -190 |
| 2   | Right Rear X-Member X  | 1964              | 408  | -190 |
| 3   | Engine Top X           | 3905              | 45   | -781 |
| 4   | Engine Bottom X        | 3929              | -70  | -185 |
| 5   | Left Brake Caliper X   | 3886              | -667 | -255 |
| 6   | Right Brake Caliper X  | 3886              | 667  | -255 |
| 7   | Left Rear X-Member Z   | 1964              | -408 | -190 |
| 8   | Right Rear X-Member Z  | 1964              | 408  | -190 |

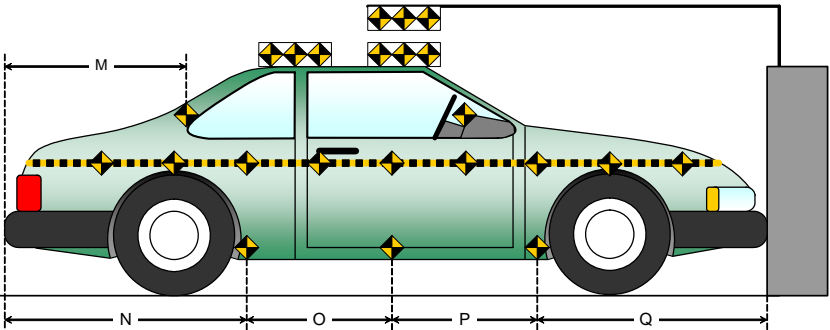
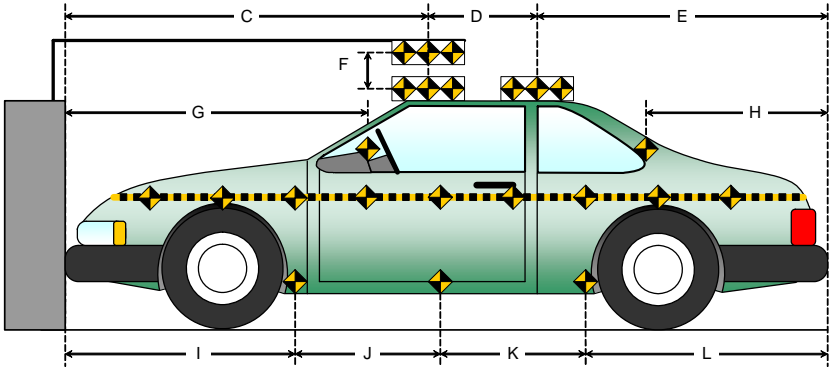
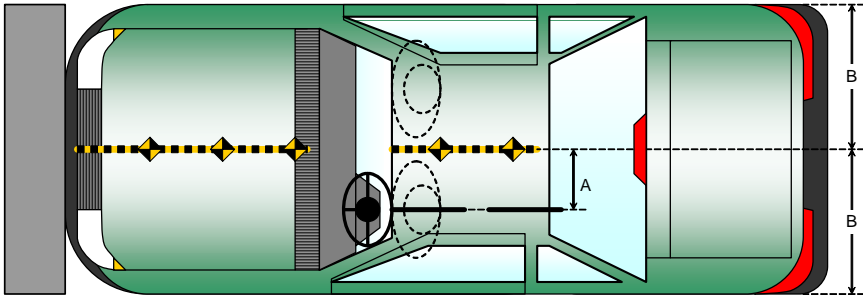
Reference Points: X - Rear Surface of Vehicle (+ forward)  
 Y - Vehicle Centerline (+ to right)  
 Z - Ground Plane (+ down)

**DATA SHEET NO. 8**  
**PHOTOGRAPHIC REFERENCE TARGET LOCATIONS**

Test Vehicle: 2011 Volkswagen Jetta S 4-Dr Sedan  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MB5805  
 Test Date: 12/15/2010

| Item | Value (mm) |
|------|------------|
| A    | 360        |
| B    | 893        |
| C    | 2280       |
| D    | 670        |
| E    | 1680       |
| F    | 137        |
| G    |            |
| H    | 1021       |
| I    | 1333       |
| J    | 915        |
| K    | 915        |
| L    | 1467       |
| M    | 1002       |
| N    | 1467       |
| O    | 915        |
| P    | 915        |
| Q    | 1333       |



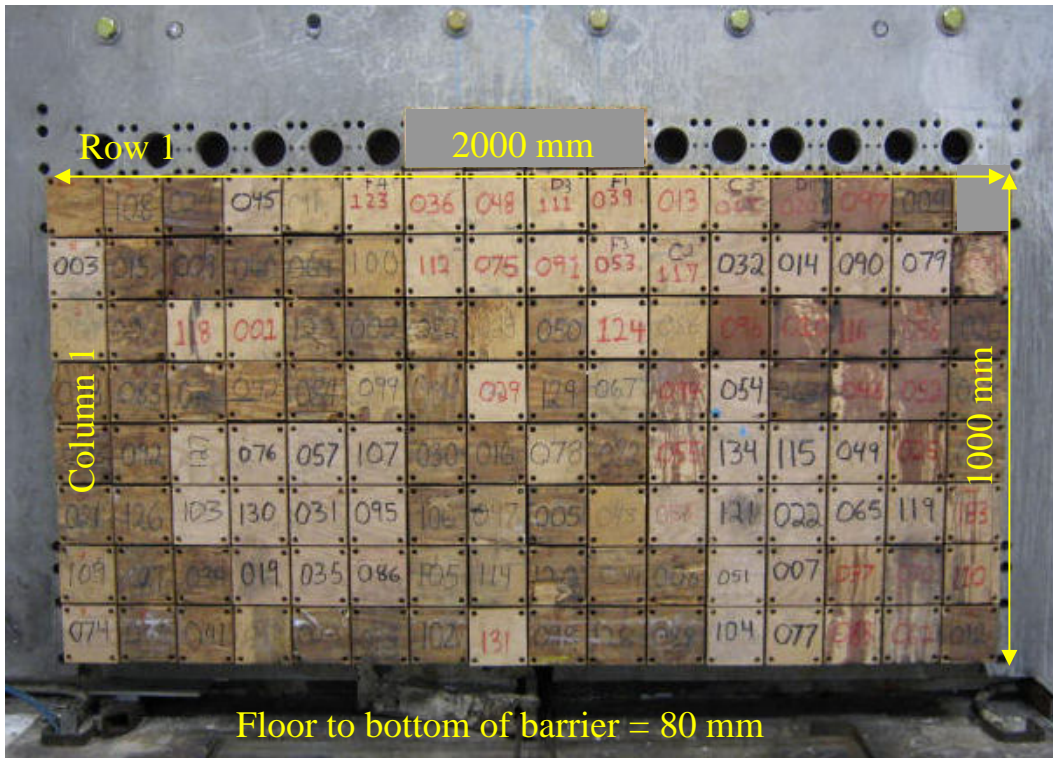
## DATA SHEET NO. 9

### LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2011 Volkswagen Jetta S 4-Dr Sedan  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MB5805  
 Test Date: 12/15/2010

#### Advanced Research Load Cell Barrier



|     |     |     |     |     |     |     |     |     |      |      |      |      |      |      |      |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|
| 1-1 | 1-2 | 1-3 | 1-4 | 1-5 | 1-6 | 1-7 | 1-8 | 1-9 | 1-10 | 1-11 | 1-12 | 1-13 | 1-14 | 1-15 | 1-16 |
| 2-1 | 2-2 | 2-3 | 2-4 | 2-5 | 2-6 | 2-7 | 2-8 | 2-9 | 2-10 | 2-11 | 2-12 | 2-13 | 2-14 | 2-15 | 2-16 |
| 3-1 | 3-2 | 3-3 | 3-4 | 3-5 | 3-6 | 3-7 | 3-8 | 3-9 | 3-10 | 3-11 | 3-12 | 3-13 | 3-14 | 3-15 | 3-16 |
| 4-1 | 4-2 | 4-3 | 4-4 | 4-5 | 4-6 | 4-7 | 4-8 | 4-9 | 4-10 | 4-11 | 4-12 | 4-13 | 4-14 | 4-15 | 4-16 |
| 5-1 | 5-2 | 5-3 | 5-4 | 5-5 | 5-6 | 5-7 | 5-8 | 5-9 | 5-10 | 5-11 | 5-12 | 5-13 | 5-14 | 5-15 | 5-16 |
| 6-1 | 6-2 | 6-3 | 6-4 | 6-5 | 6-6 | 6-7 | 6-8 | 6-9 | 6-10 | 6-11 | 6-12 | 6-13 | 6-14 | 6-15 | 6-16 |
| 7-1 | 7-2 | 7-3 | 7-4 | 7-5 | 7-6 | 7-7 | 7-8 | 7-9 | 7-10 | 7-11 | 7-12 | 7-13 | 7-14 | 7-15 | 7-16 |
| 8-1 | 8-2 | 8-3 | 8-4 | 8-5 | 8-6 | 8-7 | 8-8 | 8-9 | 8-10 | 8-11 | 8-12 | 8-13 | 8-14 | 8-15 | 8-16 |
| 9-1 | 9-2 | 9-3 | 9-4 | 9-5 | 9-6 | 9-7 | 9-8 | 9-9 | 9-10 | 9-11 | 9-12 | 9-13 | 9-14 | 9-15 | 9-16 |

Load Cells are 121 mm x 121 mm with a 7 mm gap in between each load cell.

**DATA SHEET NO. 10**  
**TEST VEHICLE SUMMARY OF RESULTS**

Test Vehicle: 2011 Volkswagen Jetta S 4-Dr Sedan  
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MB5805  
Test Date: 12/15/2010

**INSTRUMENTATION**

|                                  |     |
|----------------------------------|-----|
| Driver Dummy Data Channels       | 44  |
| Passenger Dummy Data Channels    | 44  |
| Vehicle Structure Accelerometers | 8   |
| Barrier Channels                 | 127 |
| Total                            | 223 |

**CAMERA COVERAGE**

|                            |    |
|----------------------------|----|
| High-Speed Vehicle Onboard | 0  |
| High-Speed Offboard        | 14 |
| Real-Time                  | 2  |
| Total                      | 16 |

**DATA SHEET NO. 11**

**POST-TEST OBSERVATIONS**

Test Vehicle: 2011 Volkswagen Jetta S 4-Dr Sedan  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MB5805  
 Test Date: 12/15/2010

**TEST DUMMY INFORMATION AND CONTACT**

| Description             | Driver           | Passenger        |
|-------------------------|------------------|------------------|
| Dummy Type / Serial No. | HIII 50% / 351   | HIII 5% / 138    |
| Head Contact            | Airbag, Headrest | Airbag, Headrest |
| Upper Torso Contact     | Airbag           | Airbag           |
| Lower Torso Contact     | Airbag           | Airbag           |
| Left Knee Contact       | Knee Bolster     | Glovebox         |
| Right Knee Contact      | Knee Bolster     | Glovebox         |

**DOOR OPENING AND SEAT TRACK INFORMATION**

| Description           | Driver   | Passenger  |
|-----------------------|--|--|
| Locked/Unlocked Doors | Doors were locked  | Doors were locked  |
| Front Door Opening    | Door remained closed and latched;<br>Door opened without tools | Door remained closed and latched;<br>Door opened without tools |
| Rear Door Opening     | Door remained closed and latched;<br>Door opened without tools | Door remained closed and latched;<br>Door opened without tools |
| Seat Track Shift (mm) | 0  | 0  |
| Seat Back Failure     | None   | None   |

**POST TEST STRUCTURAL OBSERVATIONS**

| Critical Areas of Performance | Observations and Conclusions |
|-------------------------------|------------------------------|
| Windshield Damage             | Cracked                      |
| Window Damage                 | None                         |
| Other Notable Effects         | None                         |

**VEHICLE REBOUND FROM BARRIER**

| Measured Parameter | Units | Value |
|--------------------|-------|-------|
| Left Side          | mm    | 1265  |
| Center             | mm    | 1224  |
| Right Side         | mm    | 1220  |
| Average            | mm    | 1236  |

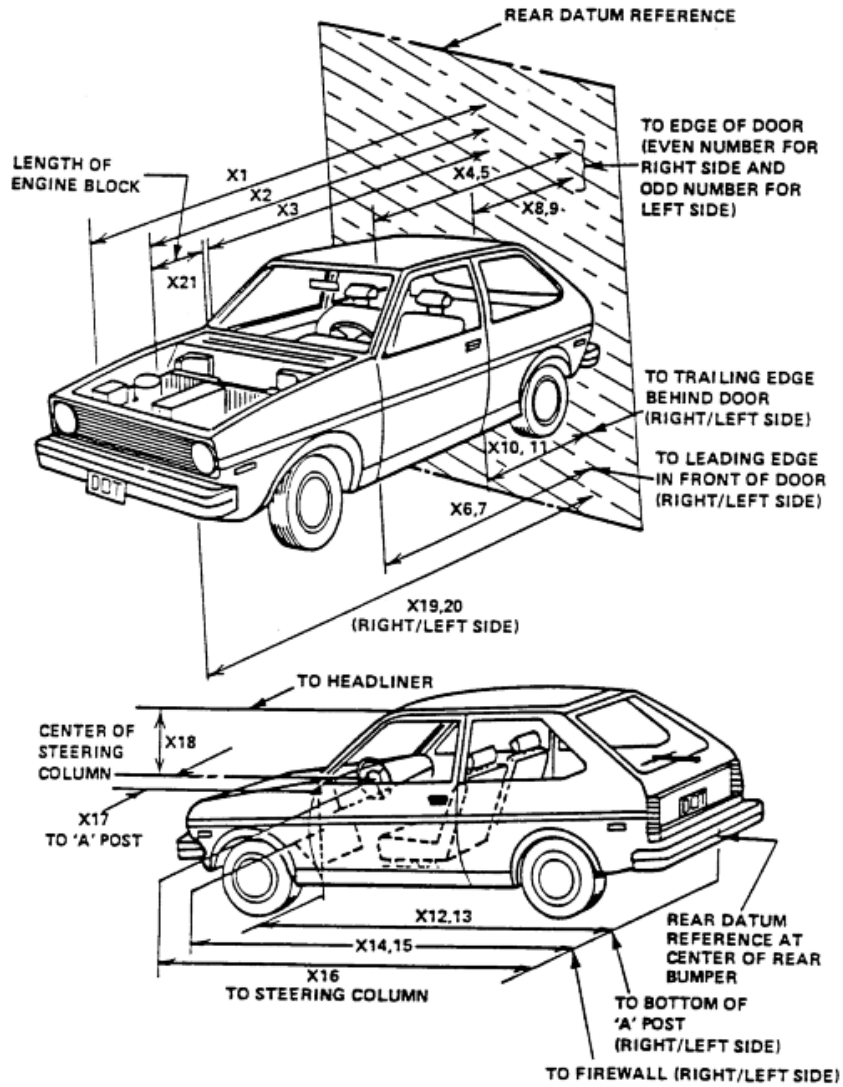
**SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION**

| Restraint Type           | Left Front (Driver) P1 |          | Left Front (Passenger) P2 |          |
|--------------------------|------------------------|----------|---------------------------|----------|
|                          | Mounted                | Deployed | Mounted                   | Deployed |
| Frontal Airbag           | Yes                    | Yes      | Yes                       | Yes      |
| Knee Airbag              | No                     |          | No                        |          |
| Curtain Side Airbag      | Yes                    | No       | Yes                       | No       |
| Torso/Pelvis Side Airbag | Yes                    | No       | Yes                       | No       |
| Seat Belt Pretensioner   | Yes                    | Yes      | Yes                       | Yes      |
| Seat Belt Load Limiter   | Yes                    |          | Yes                       |          |

**DATA SHEET NO. 12**  
**VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2011 Volkswagen Jetta S 4-Dr Sedan  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MB5805  
 Test Date: 12/15/2010



**DATA SHEET NO. 12 (CONTINUED)**  
**VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2011 Volkswagen Jetta S 4-Dr Sedan  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MB5805  
 Test Date: 12/15/2010

**RSOV (Rear Surface of Vehicle)**

| No. | Measurement Description                   | Units | Pre-Test | Post-Test | Difference |
|-----|---|-------|----------|-----------|------------|
| 1   | Total Length of Vehicle at Centerline     | mm    | 4630     | 4189      | 441        |
| 2   | RSOV to Front of Engine                   | mm    | 4120     | 3972      | 148        |
| 3   | RSOV to Firewall                          | mm    | 3630     | 3569      | 61         |
| 4   | RSOV to Upper Leading Edge of Right Door  | mm    | 3238     | 3242      | -4         |
| 5   | RSOV to Upper Leading Edge of Left Door   | mm    | 3235     | 3247      | -12        |
| 6   | RSOV to Lower Leading Edge of Right Door  | mm    | 3259     | 3238      | 21         |
| 7   | RSOV to Lower Leading Edge of Left Door   | mm    | 3259     | 3240      | 19         |
| 8   | RSOV to Upper Trailing Edge of Right Door | mm    | 2140     | 2149      | -9         |
| 9   | RSOV to Upper Trailing Edge of Left Door  | mm    | 2140     | 2132      | 8          |
| 10  | RSOV to Lower Trailing Edge of Right Door | mm    | 2190     | 2182      | 8          |
| 11  | RSOV to Lower Trailing Edge of Left Door  | mm    | 2190     | 2175      | 15         |
| 12  | RSOV to Bottom of "A" Post of Right Side  | mm    | 3259     | 3231      | 28         |
| 13  | RSOV to Bottom of "A" Post of Left Side   | mm    | 3255     | 3230      | 25         |
| 14  | RSOV to Firewall, Right Side              | mm    | 3743     | 3698      | 45         |
| 15  | RSOV to Firewall, Left Side               | mm    | 3743     | 3706      | 37         |
| 16  | RSOV to Steering Column                   | mm    | 2801     | 2834      | -33        |
| 17  | Center of Steering Column to "A" Post     | mm    | 340      | 314       | 26         |
| 18  | Center of Steering Column to Headliner    | mm    | 390      | 386       | 4          |
| 19  | RSOV to Right Side of Front Bumper        | mm    | 4390     | 4123      | 267        |
| 20  | RSOV to Left Side of Front Bumper         | mm    | 4390     | 4142      | 248        |
| 21  | Length of Engine Block                    | mm    | 459      | 459       | 0          |
| RD  | RSOV to Right Side of Dash Panel          | mm    | 2967     | 2960      | 7          |
| CD  | RSOV to Center of Dash Panel              | mm    | 2932     | 2937      | -5         |
| LD  | RSOV to Left Side of Dash Panel           | mm    | 2970     | 2970      | 0          |

**DATA SHEET NO. 13**  
**ACCIDENT INVESTIGATION DIVISION DATA**

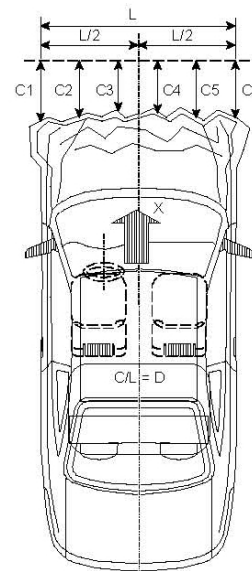
Test Vehicle: 2011 Volkswagen Jetta S 4-Dr Sedan      NHTSA No.: MB5805  
 Test Program: NCAP Frontal Barrier Impact Test      Test Date: 12/15/2010

**VEHICLE INFORMATION**

VIN: 3VW2K7AJ5BM323928      Wheelbase (mm): 2656  
 Vehicle Size Category: Sedan      Test Weight (kg): 1635.7

**ACCELEROMETER DATA**

Accelerometer Locations: As per measurements on Page 15  
 Cal. Procedure/Interval: MGA procedure / 6 month  
 Integration Algorithm: Trapezoidal      Linearity: > 99%  
 Impact Velocity (km/h): 56.3  
 Velocity Change (km/h): 62.2  
 Time of Separation (msec): 96



**CRUSH PROFILE**

Collision Deformation Classification: Frontal  
 Midpoint of Damage: Centerline  
 Damage Region Length (mm): 1522  
 Impact Mode: Frontal

| No. | Measurement Description    | Units | Pre-Test | Post-Test | Difference |
|-----|----------------------------|-------|----------|-----------|------------|
| C1  | Crush zone 1 at left side  | mm    | 4390     | 4142      | 248        |
| C2  | Crush zone 2 at left side  | mm    | 4532     | 4164      | 368        |
| C3  | Crush zone 3 at left side  | mm    | 4578     | 4170      | 408        |
| C4  | Crush zone 4 at right side | mm    | 4578     | 4138      | 440        |
| C5  | Crush zone 5 at right side | mm    | 4532     | 4118      | 414        |
| C6  | Crush zone 6 at right side | mm    | 4390     | 4123      | 267        |
| L   | C1 TO C6                   | mm    | 1522     | 1510      | 12         |

**DATA SHEET NO. 14**  
**VEHICLE INTRUSION MEASUREMENTS**

Test Vehicle: 2011 Volkswagen Jetta S 4-Dr Sedan  
 Test Program: NCAP Frontal Barrier Impact Test

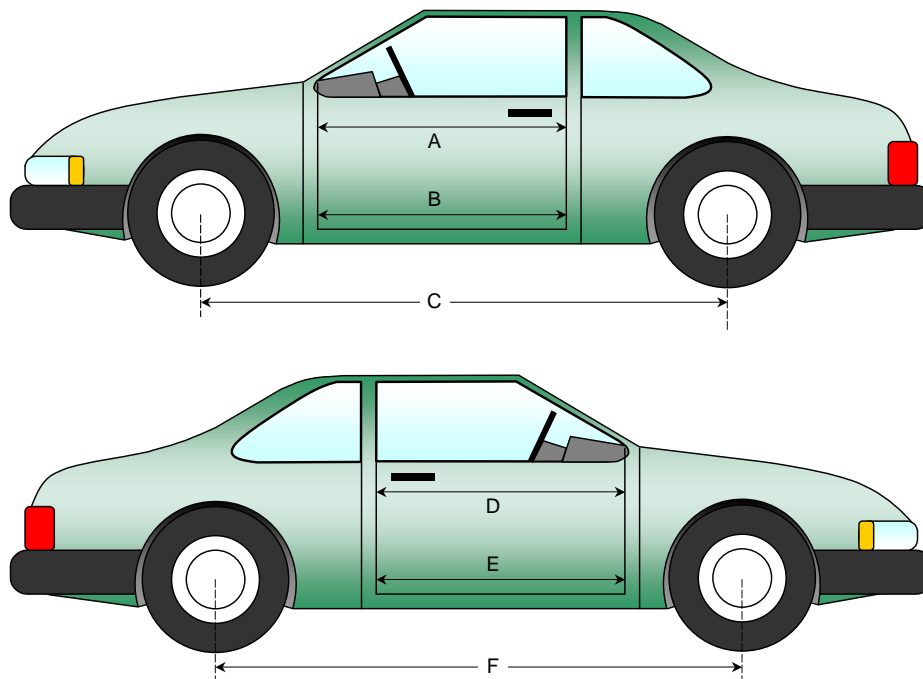
NHTSA No.: MB5805  
 Test Date: 12/15/2010

**DOOR OPENING WIDTH**

| Item | Description      | Units | Pre-Test | Post-Test | Difference |
|------|------------------|-------|----------|-----------|------------|
| A    | Left Side Upper  | mm    | 989      | 987       | 2          |
| B    | Left Side Lower  | mm    | 805      | 805       | 0          |
| D    | Right Side Upper | mm    | 989      | 990       | -1         |
| E    | Right Side Lower | mm    | 812      | 818       | -6         |

**WHEELBASE MEASUREMENTS**

| Item | Description          | Units | Pre-Test | Post-Test | Difference |
|------|----------------------|-------|----------|-----------|------------|
| C    | Left Side Wheelbase  | mm    | 2656     | 2590      | 66         |
| F    | Right Side Wheelbase | mm    | 2656     | 2630      | 26         |



**DATA SHEET NO. 14 (CONTINUED)**  
**VEHICLE INTRUSION MEASUREMENTS**

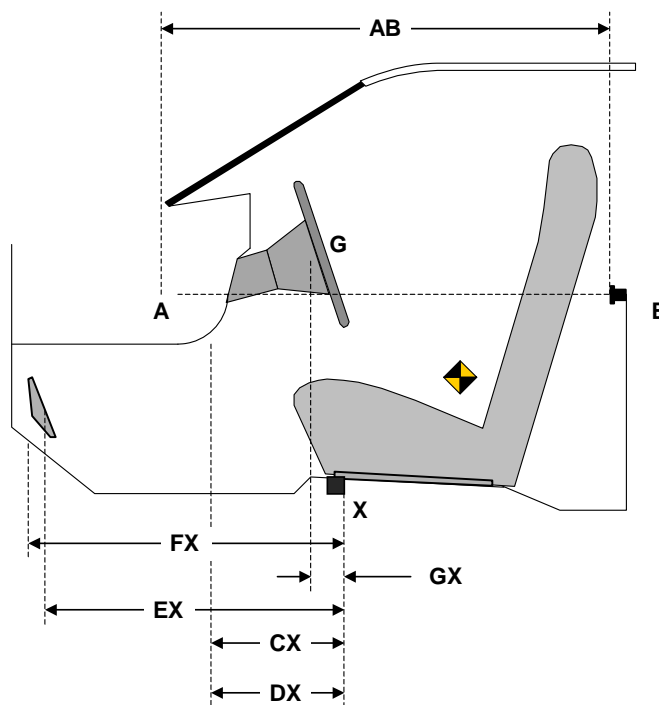
Test Vehicle: 2011 Volkswagen Jetta S 4-Dr Sedan  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MB5805  
 Test Date: 12/15/2010

**DRIVER COMPARTMENT INTRUSION**

| Item | Description                              | Units | Pre-Test | Post-Test | Difference |
|------|--|-------|----------|-----------|------------|
| AB   | Door Opening (Inside window jam)         | mm    | 841      | 840       | 1          |
| CX   | Left Knee Bolster to X                   | mm    | 259      | 268       | -9         |
| DX   | Right Knee Bolster to X                  | mm    | 270      | 286       | -16        |
| EX   | Brake Pedal to X                         | mm    | 550      | 500       | 50         |
| FX   | Foot Rest to X                           | mm    | 570      | 557       | 13         |
| GX   | Center of Steering Column Wheel Hub to X | mm    | 52       | 100       | -48        |

X = Front of Seat Track (stationary)



**DRIVER COMPARTMENT**



**DATA SHEET NO. 15**

**SUMMARY OF FMVSS 212, 219 (PARTIAL), AND 301 DATA**

Test Vehicle: 2011 Volkswagen Jetta S 4-Dr Sedan  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MB5805  
 Test Date: 12/15/2010

**Windshield Mounting Details:**

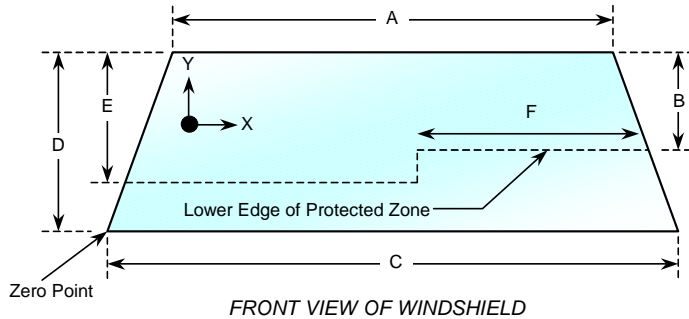
Windshield glass is secured to the vehicle frame with a rubber trim and glue.

The standard requires that the post-test retention measurement be a minimum of 75 percent of the pretest total periphery measurement for vehicles not equipped with occupant passive restraints and 50 percent for each side of the windshield for vehicles, which are equipped with occupant passive restraints.

Temperature of windshield molding during test: 21°C

**WINDSHIELD PERIPHERY MEASUREMENTS**

| Measurement | Pre-Test (mm) | Post-Test (mm) | % of Retention |
|-------------|---------------|----------------|----------------|
| Left Side   | 2076          | 2076           | 100            |
| Right Side  | 2076          | 2076           | 100            |
| Total       | 4152          | 4152           | 100            |



| Item | Units | Value |
|------|-------|-------|
| A    | mm    | 1180  |
| B    | mm    | 385   |
| C    | mm    | 1402  |
| D    | mm    | 785   |
| E    | mm    | 415   |
| F    | mm    | 521   |

**AREA OF PROTECTED ZONE FAILURES - NONE**

A. Provide coordinates of the area that the protected zone was penetrated more than 0.25 inches by a vehicle component other than one that is normally in contact with the windshield. **None**

| X | Y |
|---|---|
|   |   |
|   |   |
|   |   |
|   |   |

B. Provide coordinates of the area beneath the protected zone that the inner surface of the windshield was penetrated by a vehicle component. **None**

| X | Y |
|---|---|
|   |   |
|   |   |
|   |   |
|   |   |

**DATA SHEET NO. 15 (CONTINUED)**  
**SUMMARY OF FMVSS 212, 219 (PARTIAL), AND 301 DATA**

Test Vehicle: 2011 Volkswagen Jetta S 4-Dr Sedan                      NHTSA No.: MB5805  
Test Program: NCAP Frontal Barrier Impact Test                      Test Date: 12/15/2010

**FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA**

Test Time: 10:40 am                      Temperature: 21° C

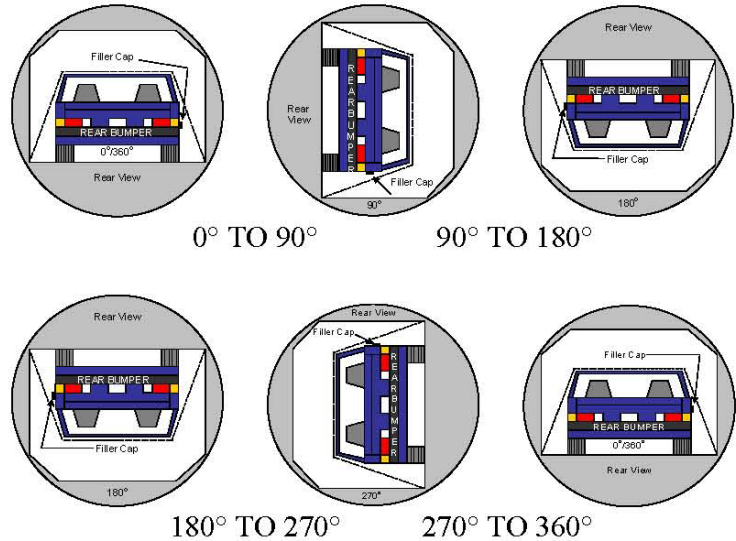
- A. From impact until vehicle motion ceases:                      0 oz.  
(Maximum Allowable = 1 ounce)
- B. For the 5 minute period after motion ceases:                      None  
(Maximum allowable = 5 ounces)
- C. For the following 25 minutes:                      None  
(Maximum allowable = 1 oz./minute)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

**DATA SHEET NO. 16**  
**FMVSS 301 STATIC ROLLOVER RESULTS**

Test Vehicle: 2011 Volkswagen Jetta S 4-Dr Sedan  
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MB5805  
 Test Date: 12/15/2010

1. The specified fixture rollover rate for each 90° of rotation is 60 to 180 seconds.
2. The position hold time at each position is 300 seconds (minimum).
3. Details of Stoddard Solvent spillage: **None**



**SOLVENT COLLECTION TIME TABLE IN SECONDS**

| Test Phase   | Rotation Time | Hold Time | Total Time |
|--------------|---------------|-----------|------------|
| 0° to 90°    | 121           | 300       | 421        |
| 90° to 180°  | 114           | 300       | 414        |
| 180° to 270° | 106           | 300       | 406        |
| 270° to 360° | 124           | 300       | 424        |

**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**

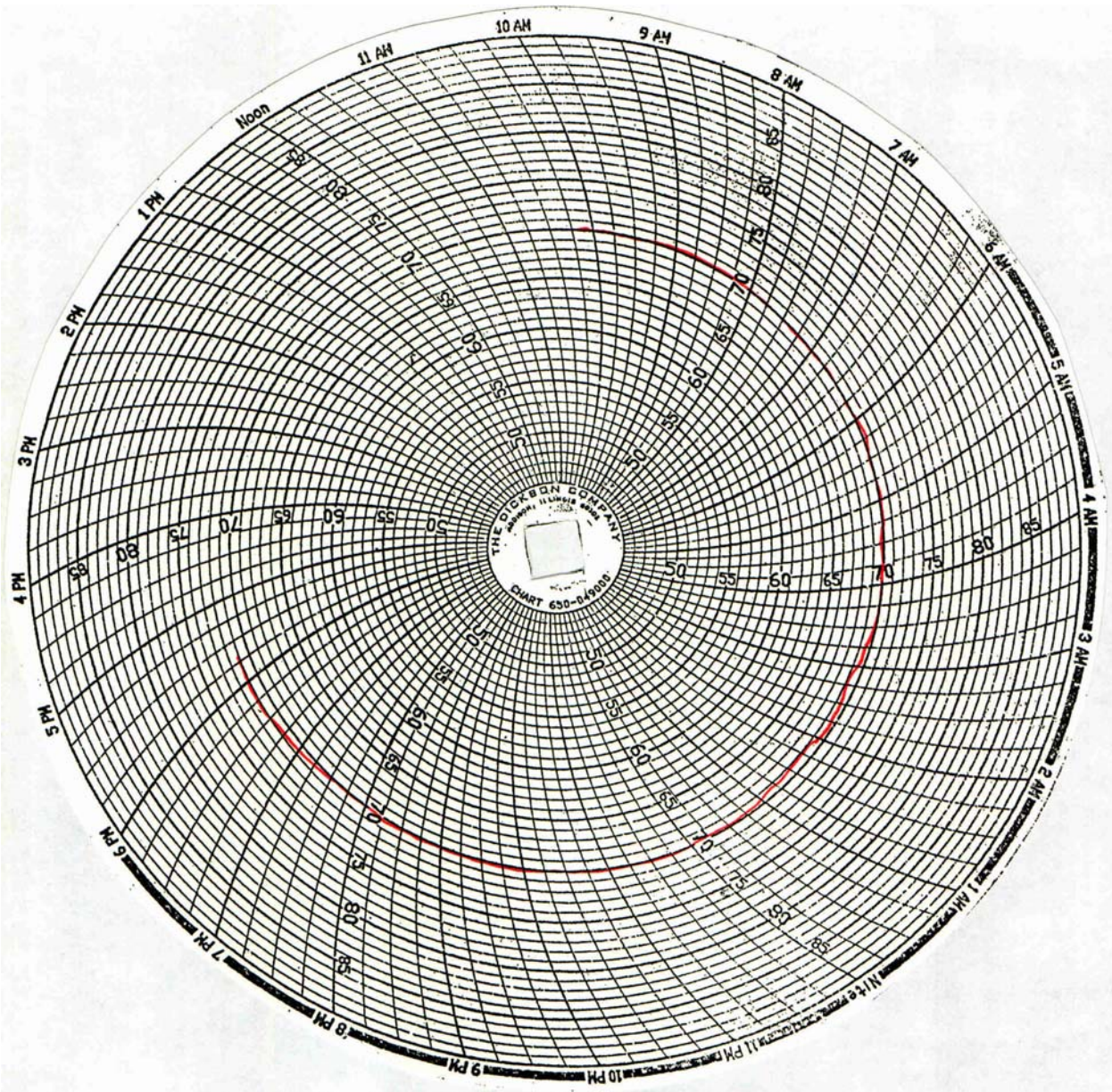
| Test Phase   | Spillage Location |
|--------------|-------------------|
| 0° to 90°    |                   |
| 90° to 180°  |                   |
| 180° to 270° |                   |
| 270° to 360° |                   |

# DATA SHEET NO. 17

## DUMMY/VEHICLE TEMPERATURE STABILIZATION DATA

Test Vehicle: 2011 Volkswagen Jetta S 4-Dr Sedan  
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MB5805  
Test Date: 12/15/2010



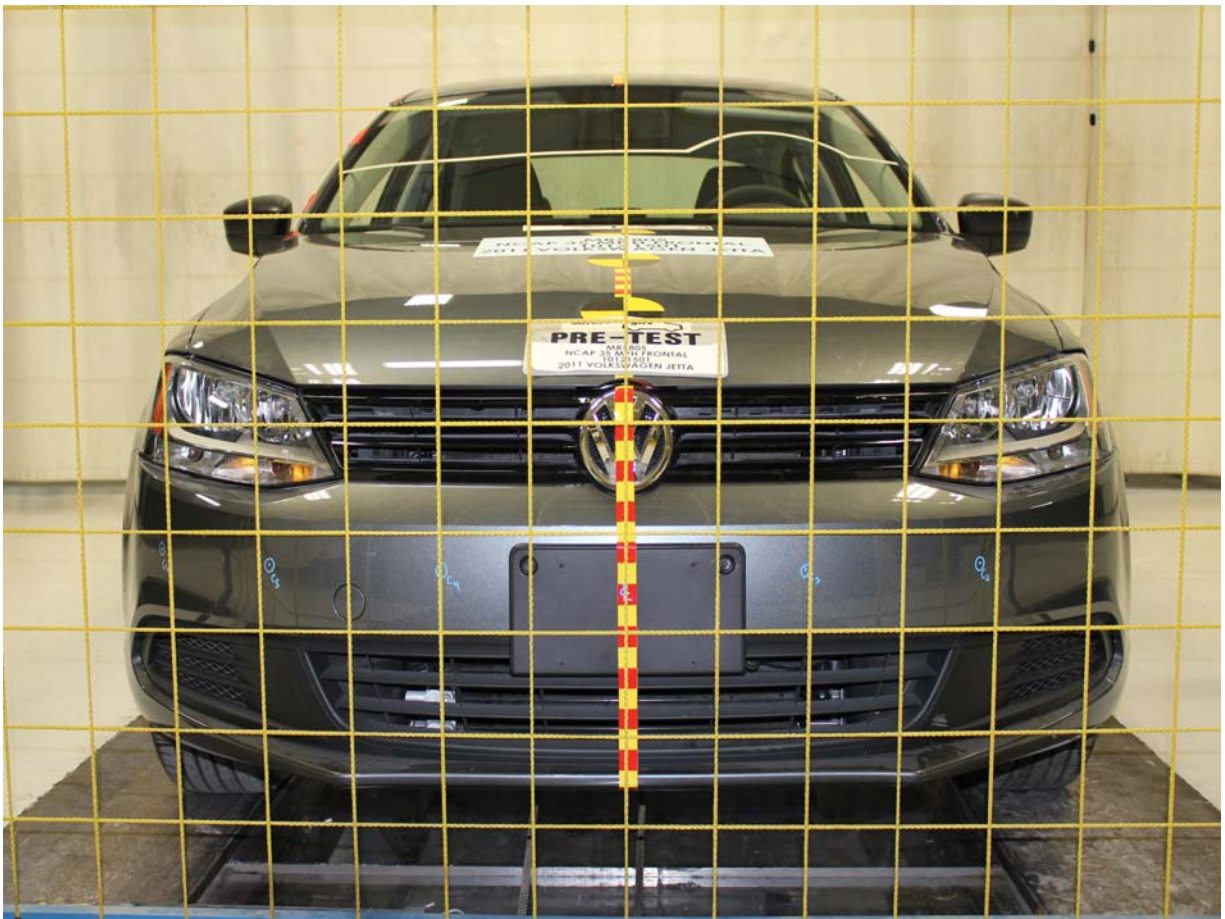
**APPENDIX A**  
**PHOTOGRAPHS**

## TABLE OF PHOTOGRAPHS

|               |   | <u>Page No.</u> |
|---------------|---|-----------------|
| Photo No. 1.  | Load Cell Location  | A-1             |
| Photo No. 2.  | Load Cell Wall  | A-1             |
| Photo No. 3.  | Manufacturer's Label  | A-2             |
| Photo No. 4.  | Tire Placard  | A-2             |
| Photo No. 5.  | Right Front Three-Quarter View, As Received                     | A-3             |
| Photo No. 6.  | Left Rear Three-Quarter View, As Received                       | A-3             |
| Photo No. 7.  | Pre-Test Front View   | A-4             |
| Photo No. 8.  | Post-Test Front View  | A-4             |
| Photo No. 9.  | Pre-Test Left Side View (with vehicle at barrier)               | A-5             |
| Photo No. 10. | Post-Test Left Side View  | A-5             |
| Photo No. 11. | Pre-Test Right Side View (with vehicle at barrier)              | A-6             |
| Photo No. 12. | Post-Test Right Side View                                       | A-6             |
| Photo No. 13. | Pre-Test Right Front Three-Quarter View                         | A-7             |
| Photo No. 14. | Post-Test Right Front Three-Quarter View                        | A-7             |
| Photo No. 15. | Pre-Test Left Rear Three-Quarter View (with vehicle at barrier) | A-8             |
| Photo No. 16. | Post-Test Left Rear Three-Quarter View                          | A-8             |
| Photo No. 17. | Pre-Test Windshield View  | A-9             |
| Photo No. 18. | Post-Test Windshield View                                       | A-9             |
| Photo No. 19. | Pre-Test Engine Compartment View                                | A-10            |
| Photo No. 20. | Post-Test Engine Compartment View                               | A-10            |
| Photo No. 21. | Pre-Test Fuel Cap View  | A-11            |
| Photo No. 22. | Post-Test Fuel Cap View   | A-11            |
| Photo No. 23. | Pre-Test Front Underbody View                                   | A-12            |
| Photo No. 24. | Post-Test Front Underbody View                                  | A-12            |
| Photo No. 25. | Pre-Test Mid Underbody View                                     | A-13            |
| Photo No. 26. | Post-Test Mid Front Underbody View                              | A-14            |
| Photo No. 27. | Post-Test Mid Rear Underbody View                               | A-14            |

|               |   | <u>Page No.</u> |
|---------------|---|-----------------|
| Photo No. 28. | Pre-Test Rear Underbody View                              | A-15            |
| Photo No. 29. | Post-Test Rear Underbody View                             | A-15            |
| Photo No. 30. | Pre-Test Dummy Cable Routing                              | A-16            |
| Photo No. 31. | Post-Test Dummy Cable Routing                             | A-16            |
| Photo No. 32. | Pre-Test Driver Dummy Front View                          | A-17            |
| Photo No. 33. | Post-Test Driver Dummy Front View                         | A-17            |
| Photo No. 34. | Pre-Test Driver Dummy Window View                         | A-18            |
| Photo No. 35. | Post-Test Driver Dummy Window View                        | A-18            |
| Photo No. 36. | Pre-Test Driver Dummy and Vehicle Interior (Door Open)    | A-19            |
| Photo No. 37. | Post-Test Driver Dummy and Vehicle Interior (Door Open)   | A-19            |
| Photo No. 38. | Pre-Test Driver's Seat Fore-Aft Markings                  | A-20            |
| Photo No. 39. | Post-Test Driver's Seat Fore-Aft Markings                 | A-20            |
| Photo No. 40. | Pre-Test Driver Dummy Feet                                | A-21            |
| Photo No. 41. | Post-Test Driver Dummy Feet                               | A-21            |
| Photo No. 42. | Pre-Test Driver's Side Knee Bolster (without dummy)       | A-22            |
| Photo No. 43. | Post-Test Driver's Side Knee Bolster (without dummy)      | A-22            |
| Photo No. 44. | Pre-Test Driver's Side Floorpan                           | A-23            |
| Photo No. 45. | Post-Test Driver's Side Floorpan                          | A-23            |
| Photo No. 46. | Post-Test Driver Dummy Contact with Airbag                | A-24            |
| Photo No. 47. | Post-Test Driver Dummy Contact with Headrest              | A-25            |
| Photo No. 48. | Post-Test Driver Dummy Contact with Knee Bolster          | A-25            |
| Photo No. 49. | Pre-Test View of Steering Column Shear Capsule            | A-26            |
| Photo No. 50. | Post-Test View of Steering Column Shear Capsule           | A-26            |
| Photo No. 51. | Pre-Test Passenger Dummy Front View                       | A-27            |
| Photo No. 52. | Post-Test Passenger Dummy Front View                      | A-27            |
| Photo No. 53. | Pre-Test Passenger Dummy Window View                      | A-28            |
| Photo No. 54. | Post-Test Passenger Dummy Window View                     | A-28            |
| Photo No. 55. | Pre-Test Passenger Dummy and Vehicle Interior (Door Open) | A-29            |

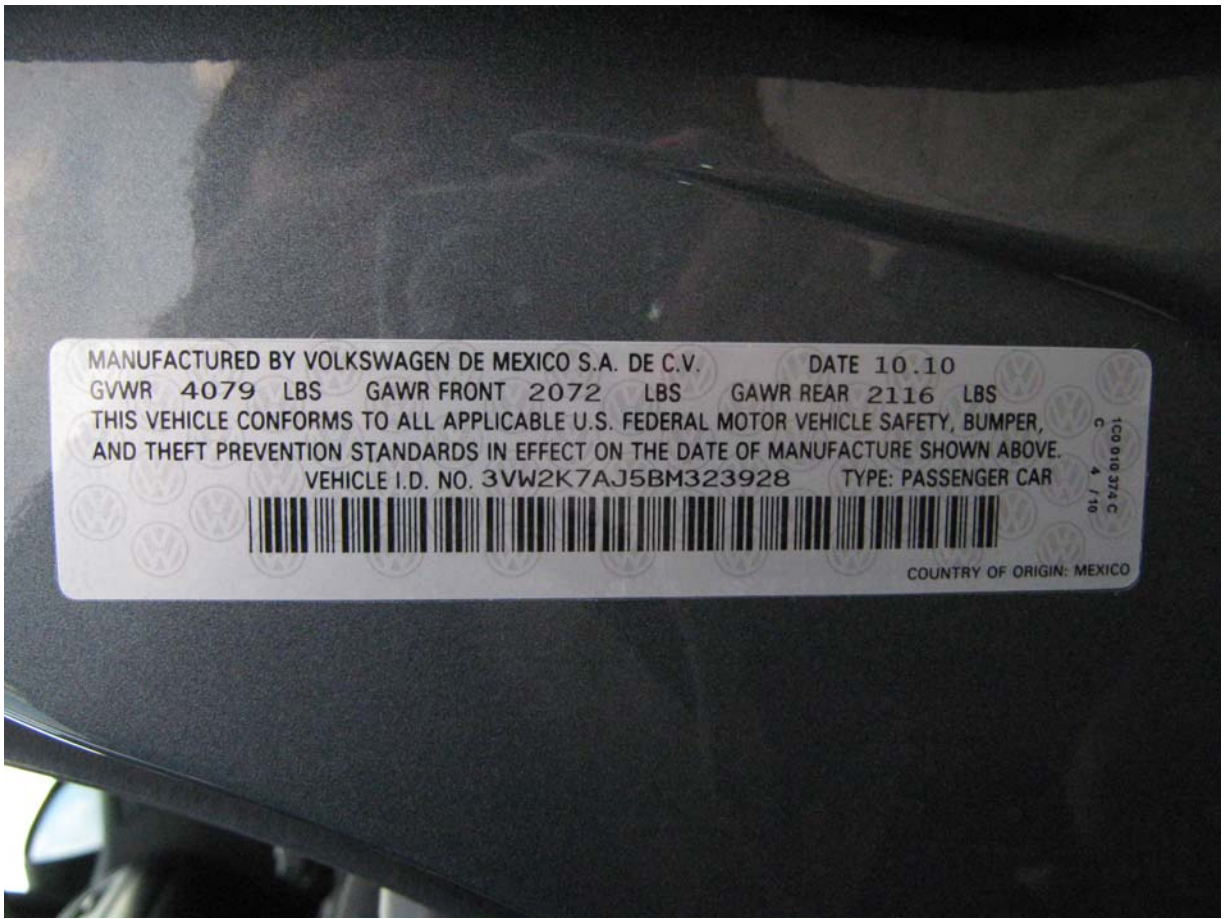
|               |  | <u>Page No.</u> |
|---------------|--|-----------------|
| Photo No. 56. | Post-Test Passenger Dummy and Vehicle Interior (Door Open) | A-29            |
| Photo No. 57. | Pre-Test Passenger's Seat Fore-Aft Markings                | A-30            |
| Photo No. 58. | Post-Test Passenger's Seat Fore-Aft Markings               | A-30            |
| Photo No. 59. | Pre-Test Passenger Dummy Feet                              | A-31            |
| Photo No. 60. | Post-Test Passenger Dummy Feet                             | A-31            |
| Photo No. 61. | Pre-Test Passenger's Side Knee Bolster (without dummy)     | A-32            |
| Photo No. 62. | Post-Test Passenger's Side Knee Bolster (without dummy)    | A-32            |
| Photo No. 63. | Pre-Test Passenger's Side Floorpan                         | A-33            |
| Photo No. 64. | Post-Test Passenger's Side Floorpan                        | A-33            |
| Photo No. 65. | Post-Test Passenger Dummy Contact with Airbag              | A-34            |
| Photo No. 66. | Post-Test Passenger Dummy Contact with Headrest            | A-35            |
| Photo No. 67. | Post-Test Passenger Dummy Contact with Glovebox            | A-35            |
| Photo No. 68. | Ballast Installed in Vehicle                               | A-36            |
| Photo No. 69. | Ballast Installed in Vehicle                               | A-36            |
| Photo No. 70. | Post-Test Stoddard Solvent Spillage Location View          | A-37            |
| Photo No. 71. | Post-Test Speed Trap Read-Out                              | A-37            |
| Photo No. 72. | Vehicle at 0 Degrees on Static Rollover Device             | A-38            |
| Photo No. 73. | Vehicle at 90 Degrees on Static Rollover Device            | A-38            |
| Photo No. 74. | Vehicle at 180 Degrees on Static Rollover Device           | A-39            |
| Photo No. 75. | Vehicle at 270 Degrees on Static Rollover Device           | A-39            |
| Photo No. 76. | Vehicle at 360 Degrees on Static Rollover Device           | A-40            |
| Photo No. 77. | Vehicle Impact   | A-40            |
| Photo No. 78. | Monroney Label   | A-41            |



Load Cell Location



Load Cell Wall



Manufacturer's Label



Tire Placard



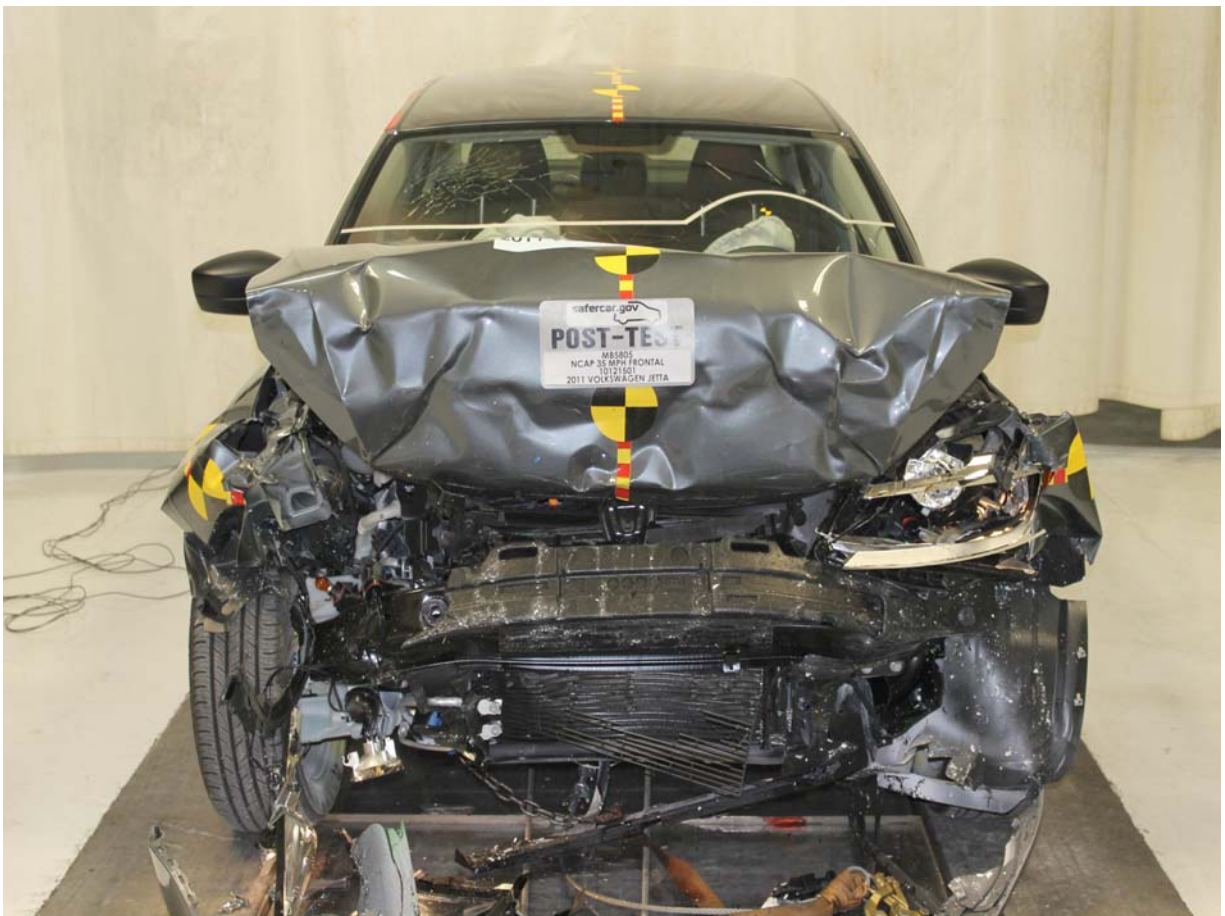
Right Front Three-Quarter View, As Received



Left Rear Three-Quarter View, As Received



Pre-Test Front View



Post-Test Front View



Pre-Test Left Side View (with vehicle at barrier)



Post-Test Left Side View



Pre-Test Right Side View (with vehicle at barrier)



Post-Test Right Side View



Pre-Test Right Front Three-Quarter View



Post-Test Right Front Three-Quarter View





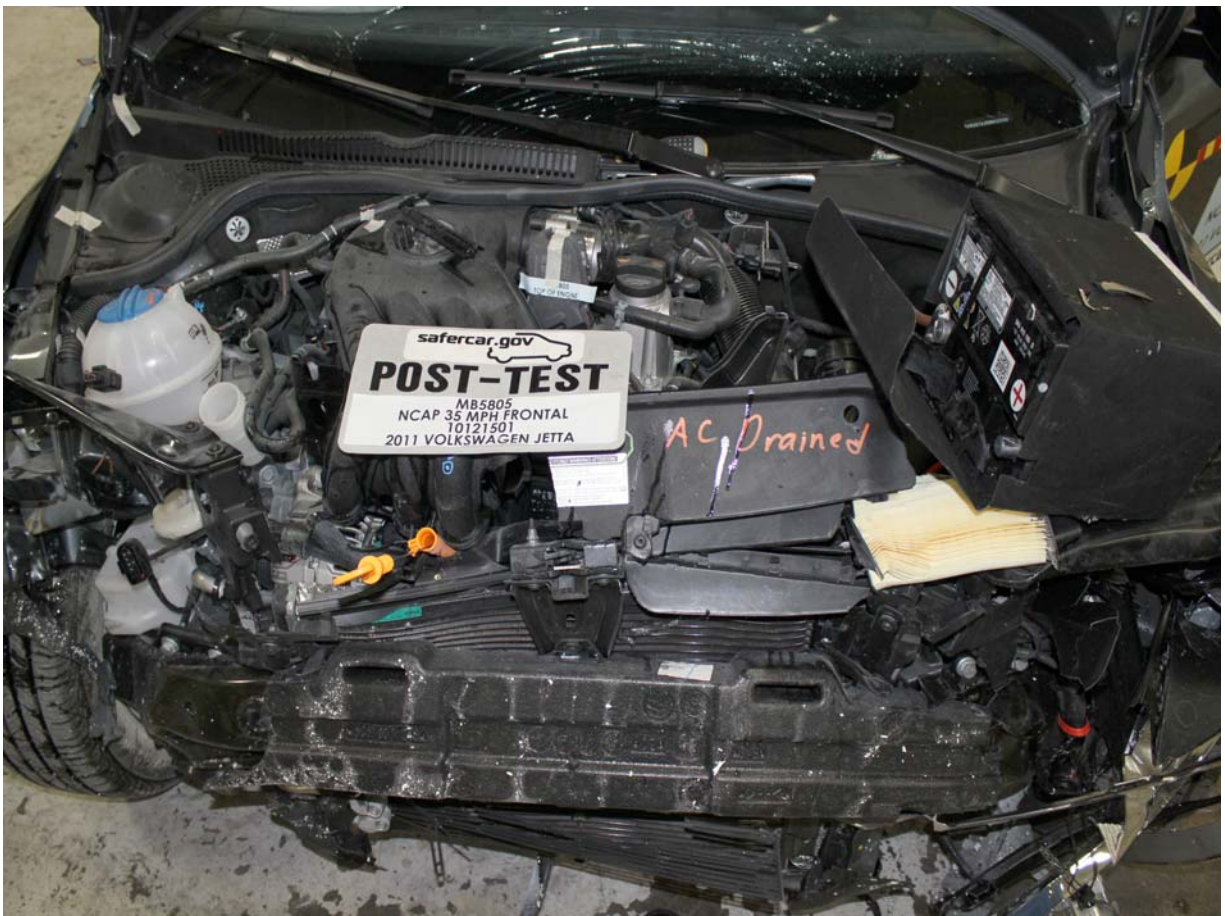
Pre-Test Windshield View



Post-Test Windshield View



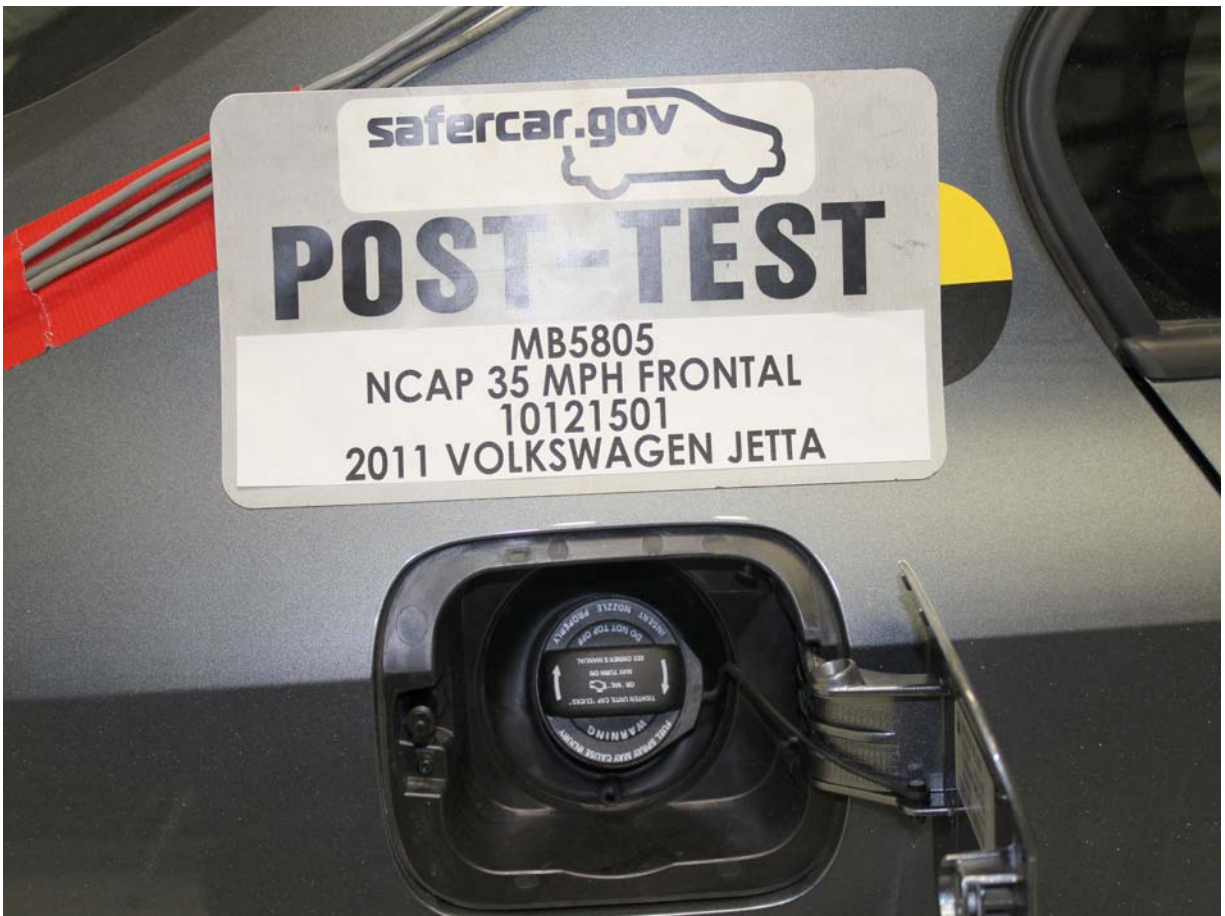
Pre-Test Engine Compartment View



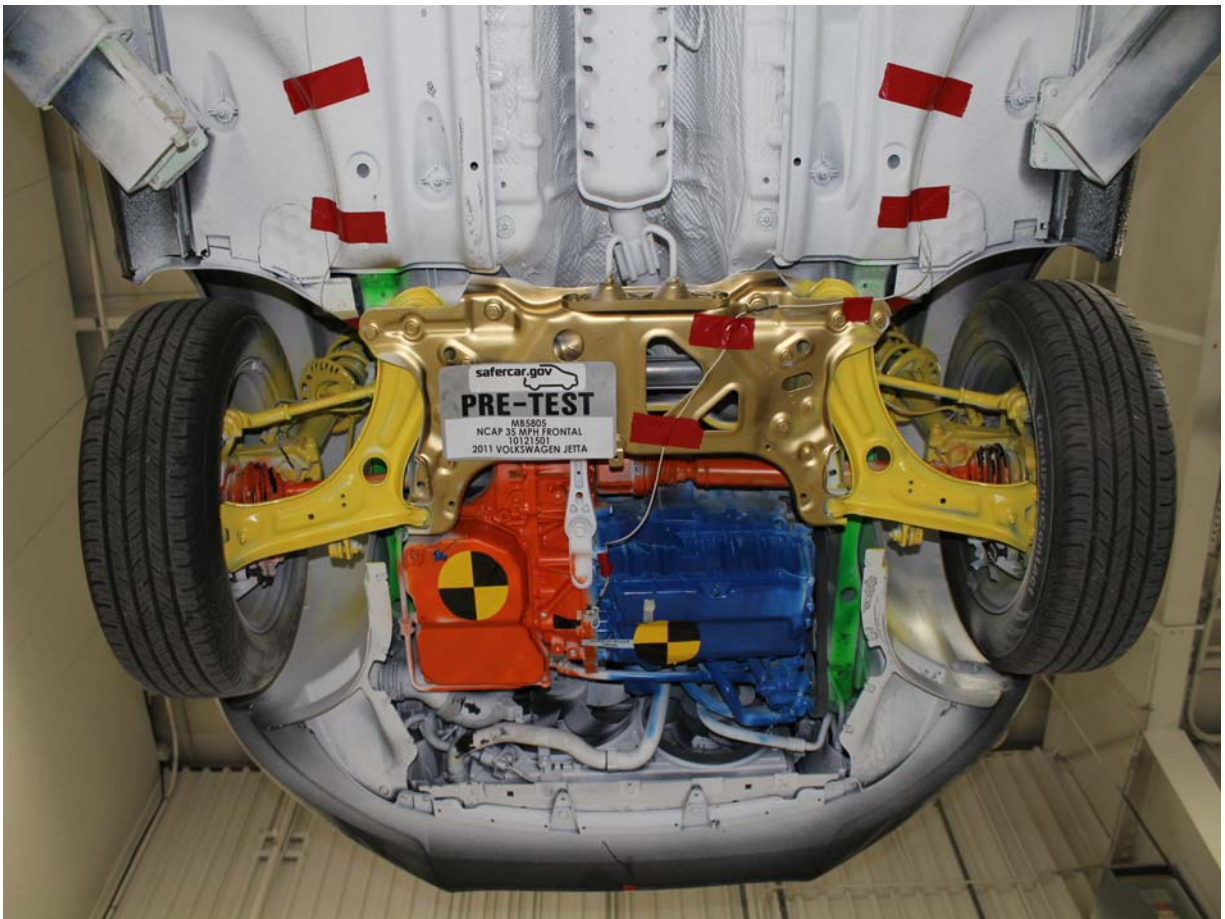
Post-Test Engine Compartment View



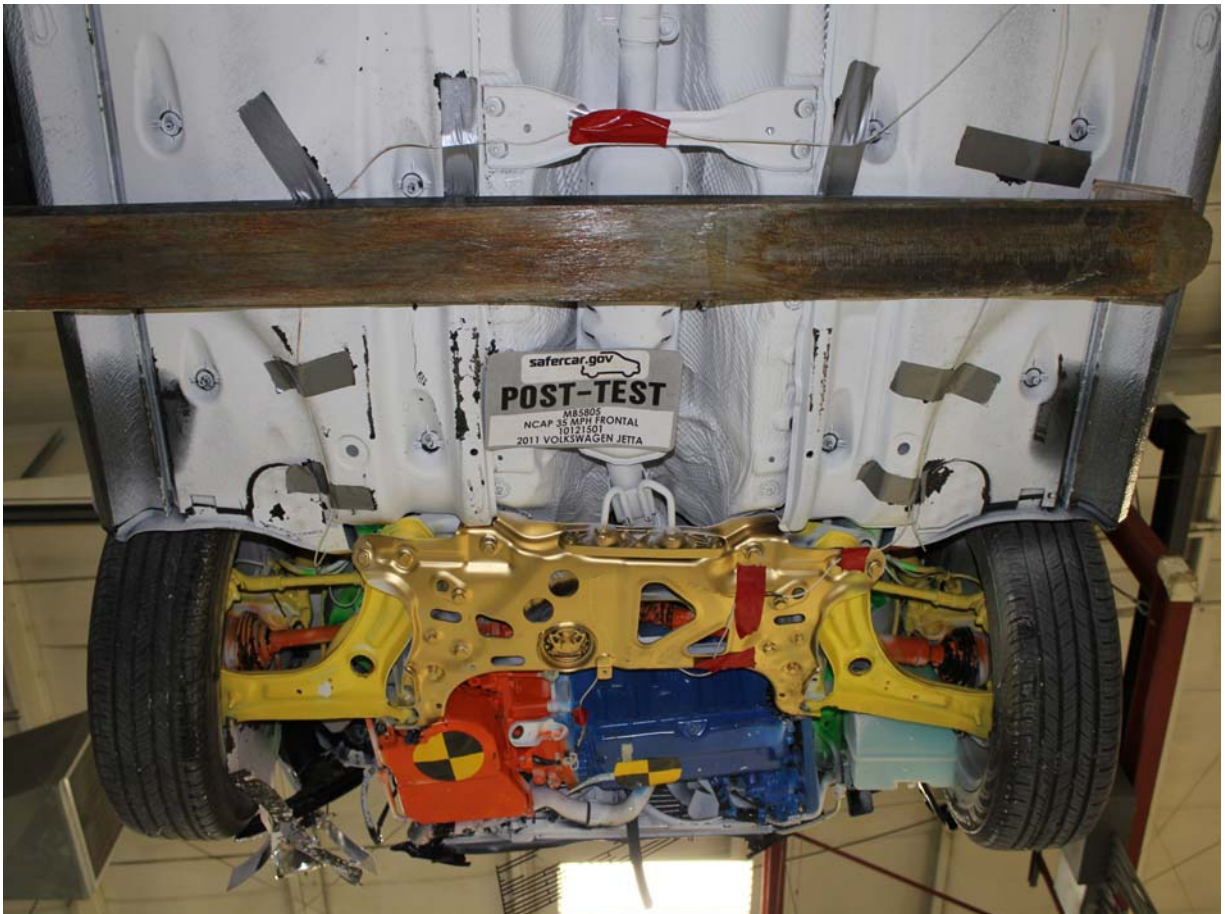
Pre-Test Fuel Cap View



Post-Test Fuel Cap View



Pre-Test Front Underbody View



Post-Test Front Underbody View

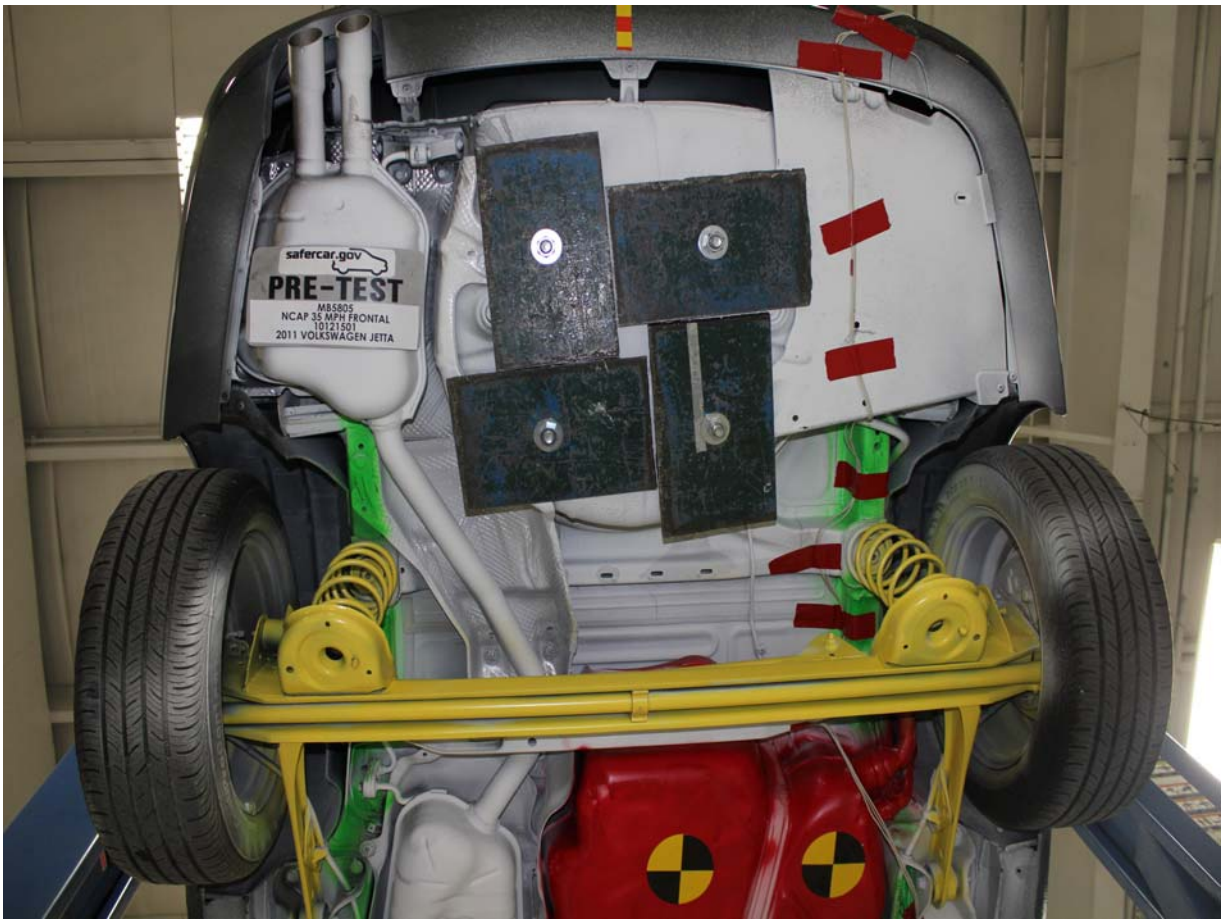




Post-Test Mid Front Underbody View



Post-Test Mid Rear Underbody View



Pre-Test Rear Underbody View



Post-Test Rear Underbody View



Pre-Test Dummy Cable Routing



Post-Test Dummy Cable Routing



Pre-Test Driver Dummy Front View



Post-Test Driver Dummy Front View



Pre-Test Driver Dummy Window View



Post-Test Driver Dummy Window View



Pre-Test Driver Dummy and Vehicle Interior (Door Open)



Post-Test Driver Dummy and Vehicle Interior (Door Open)



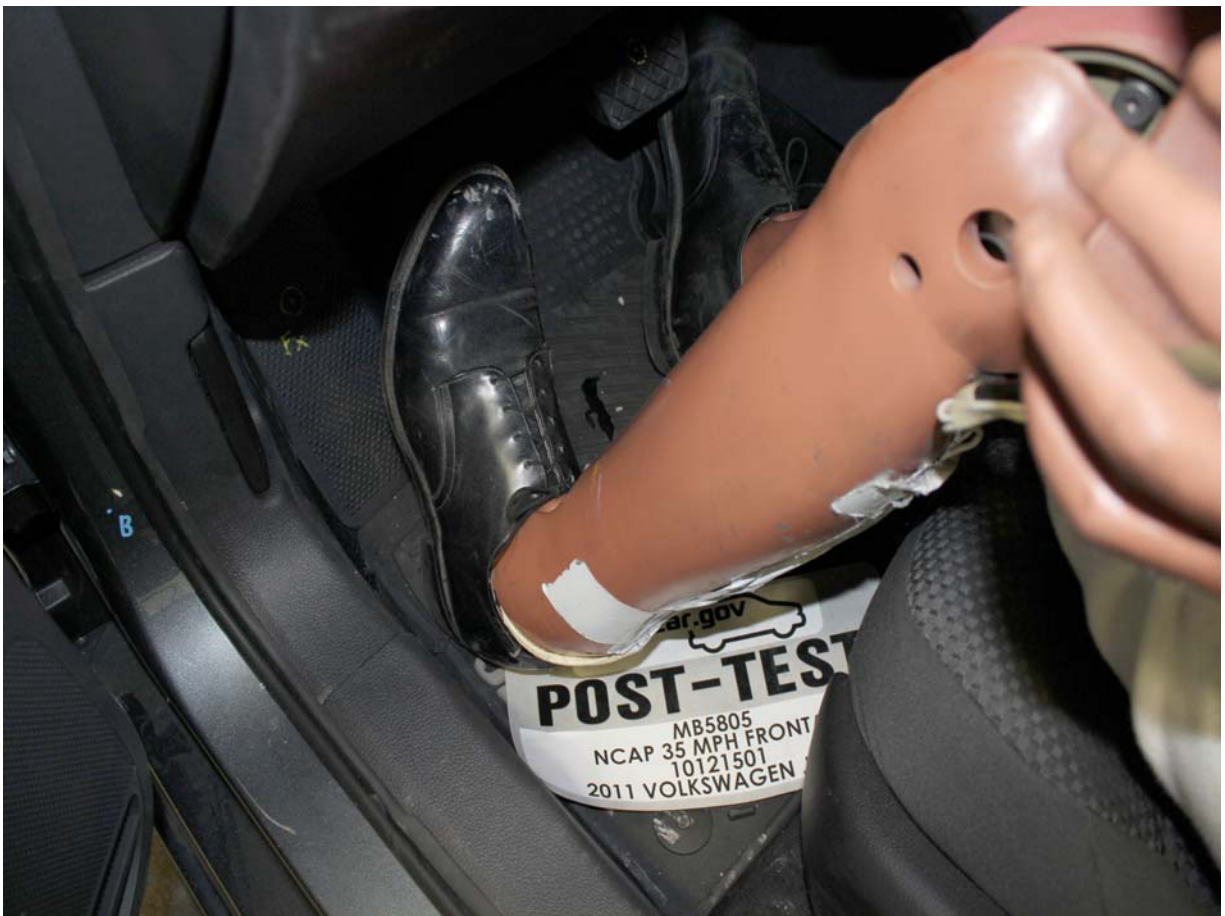
Pre-Test Driver's Seat Fore-Aft Markings



Post-Test Driver's Seat Fore-Aft Markings



Pre-Test Driver Dummy Feet



Post-Test Driver Dummy Feet



Pre-Test Driver's Side Knee Bolster (without dummy)



Post-Test Driver's Side Knee Bolster (without dummy)



Pre-Test Driver's Side Floorpan



Post-Test Driver's Side Floorpan



Post-Test Driver Dummy Contact with Airbag



Post-Test Driver Dummy Contact with Headrest



Post-Test Driver Dummy Contact with Knee Bolster



Pre-Test View of Steering Column Shear Capsule



Post-Test View of Steering Column Shear Capsule



Pre-Test Passenger Dummy Front View



Post-Test Passenger Dummy Front View



Pre-Test Passenger Dummy Window View



Post-Test Passenger Dummy Window View



Pre-Test Passenger Dummy and Vehicle Interior (Door Open)



Post-Test Passenger Dummy and Vehicle Interior (Door Open)



Pre-Test Passenger's Seat Fore-Aft Markings



Post-Test Passenger's Seat Fore-Aft Markings



Pre-Test Passenger Dummy Feet



Post-Test Passenger Dummy Feet



Pre-Test Passenger's Side Knee Bolster (without dummy)



Post-Test Passenger's Side Knee Bolster (without dummy)



Pre-Test Passenger's Side Floorpan



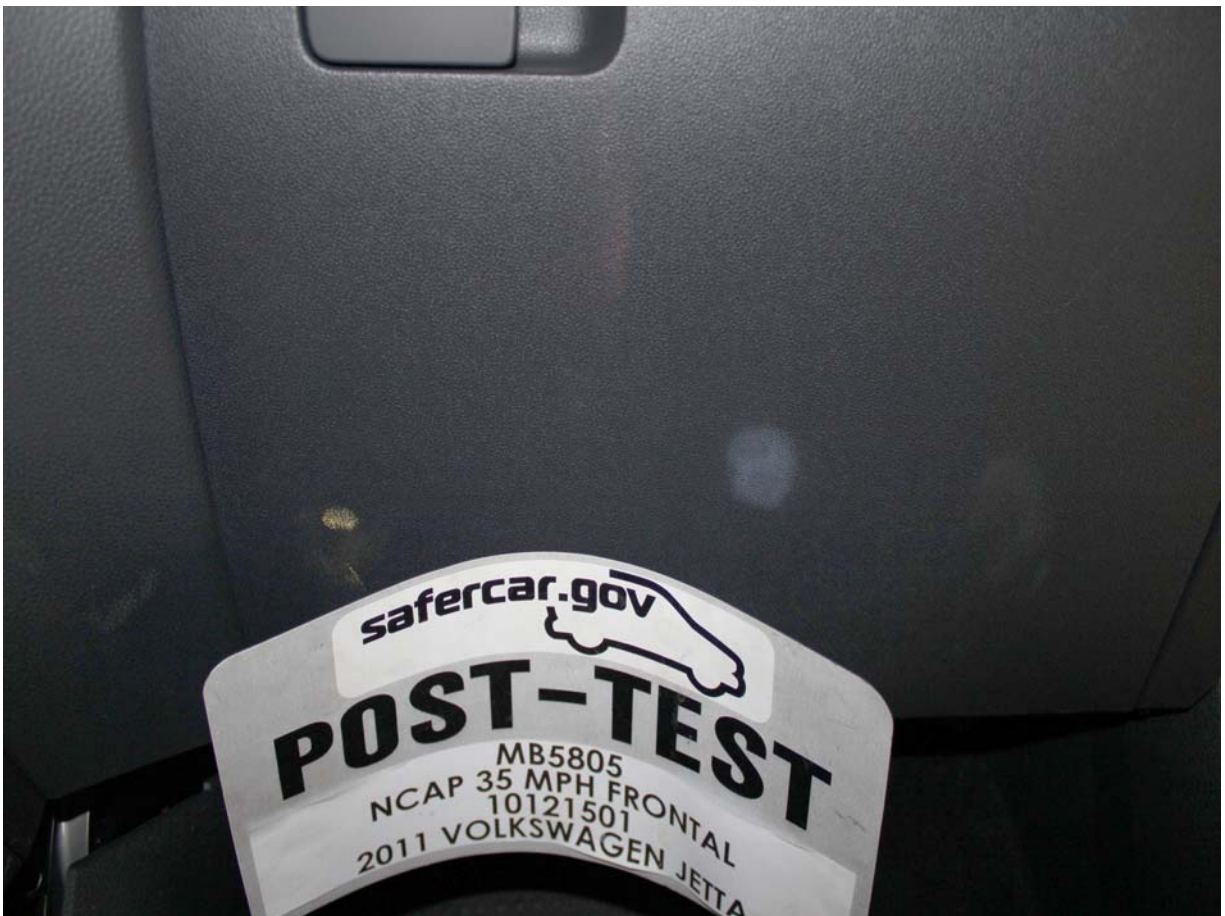
Post-Test Passenger's Side Floorpan



Post-Test Passenger Dummy Contact with Airbag



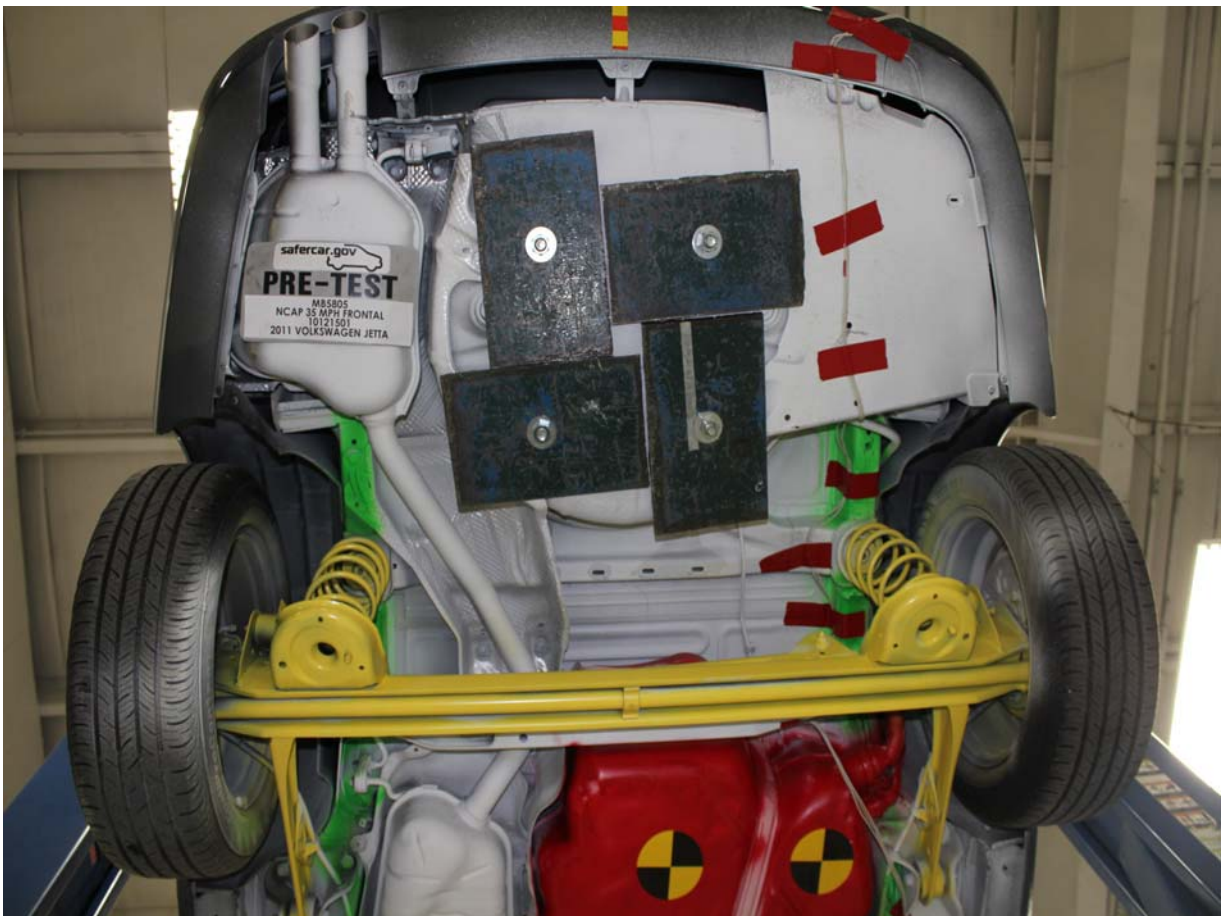
Post-Test Passenger Dummy Contact with Headrest



Post-Test Passenger Dummy Contact with Glovebox



Ballast Installed in Vehicle



Ballast Installed in Vehicle

PHOTOGRAPH NOT APPLICABLE

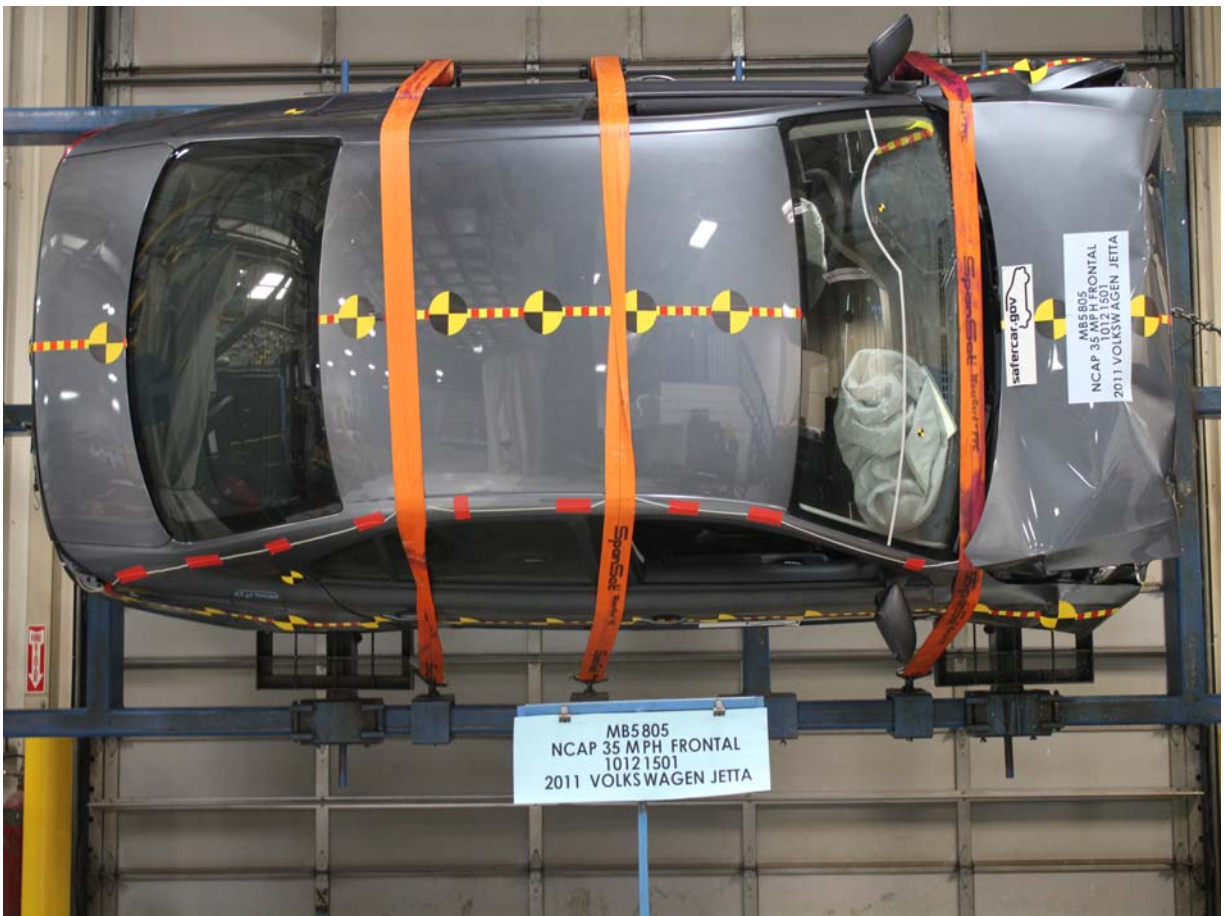
Post-Test Stoddard Solvent Spillage Location View



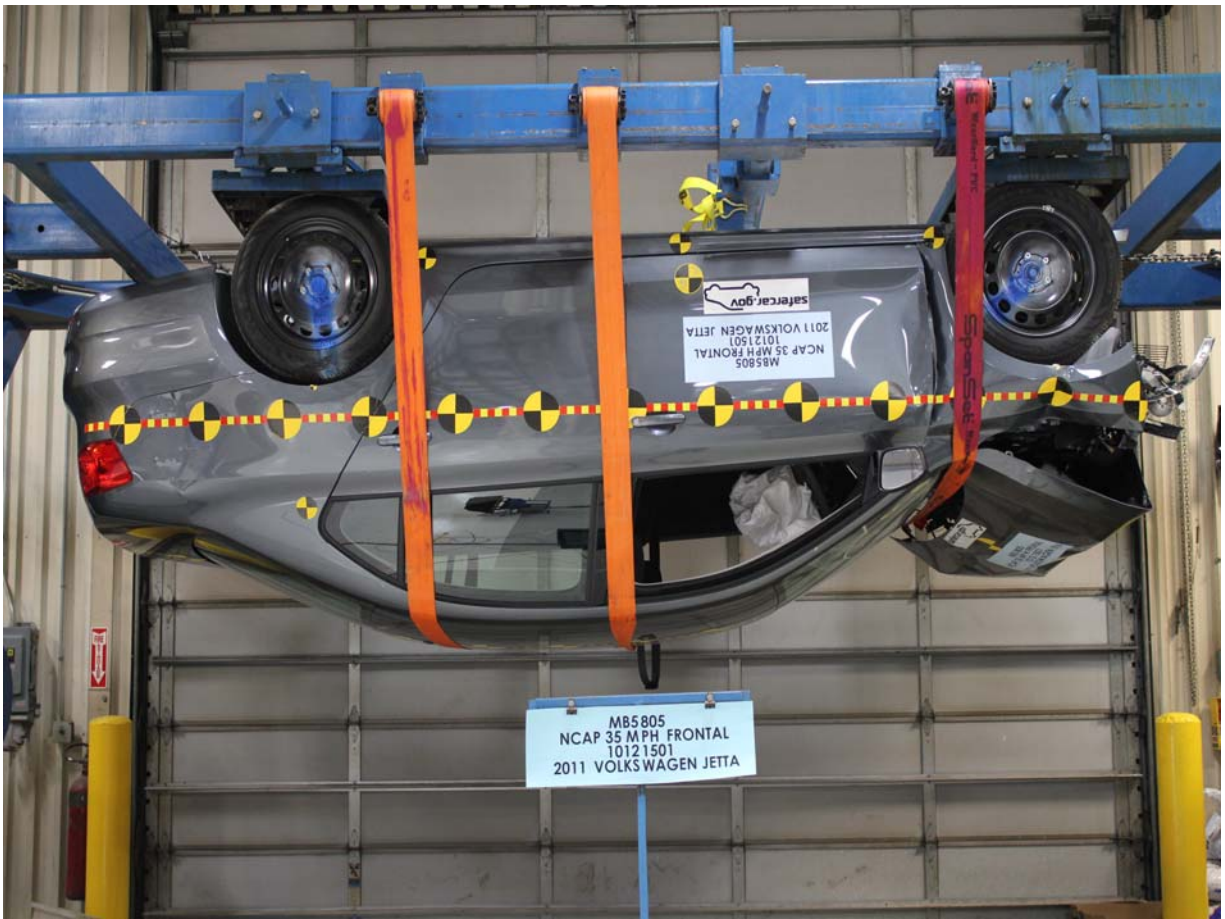
Post-Test Speed Trap Read-Out



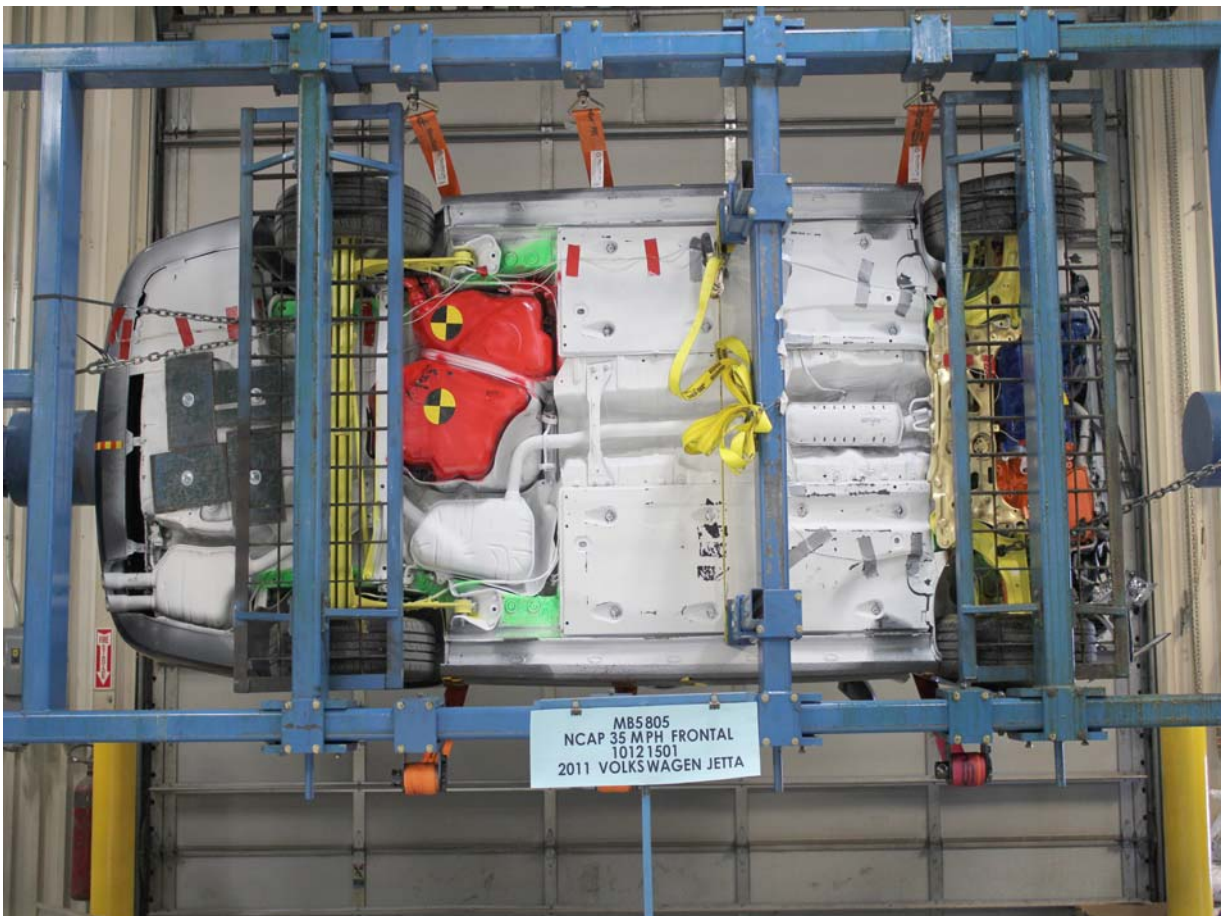
Vehicle at 0 Degrees on Static Rollover Device



Vehicle at 90 Degrees on Static Rollover Device



Vehicle at 180 Degrees on Static Rollover Device



Vehicle at 270 Degrees on Static Rollover Device



Vehicle at 360 Degrees on Static Rollover Device



Vehicle Impact



# 2011 Jetta S

Exterior: Platinum Gray Metallic Exterior

Interior: Titan Black Interior

Great. For The Price Of Good.

## EPA Fuel Economy Estimates

These estimates reflect new EPA methods beginning with 2008 models.

CITY MPG

# 23

Expected range for most drivers  
19 to 27 MPG

HIGHWAY MPG

# 29

Expected range for most drivers  
24 to 34 MPG

Estimated

## Annual Fuel Cost

**\$1,800**

based on 15,000 miles at \$3.00 per gallon

Combined Fuel Economy

This Vehicle

# 25

14 All Compact Cars

Your actual mileage will vary depending on how you drive and maintain your vehicle.



See the FREE Fuel Economy Guide at dealers or [www.fueleconomy.gov](http://www.fueleconomy.gov)

**\$17,095.00**

Manufacturer's Suggested Retail Price:

### DRIVER CARE PACKAGE

- WARRANTY INFORMATION
  - Volkswagen New Vehicle Limited Warranty
  - 3 years/50,000 miles (whichever occurs first)
  - 5 years/100,000 miles (whichever occurs first)
  - 5 years/60,000 miles (whichever occurs first)
  - Limited Warranty against Corrosion Perforation
  - 12 year/unlimited mileage
- 24-HOUR ROADSIDE ASSISTANCE
  - 3 years/50,000 miles (whichever occurs first)
  - 5 years/100,000 miles (whichever occurs first)
  - 24-hour roadside assistance for emergency repairs and battery jump starts
  - Provided by a third party supplier
- VOLKSWAGEN CAREFREE MAINTENANCE
  - Scheduled maintenance services described in the Volkswagen Maintenance booklets are covered at no charge for 3 years/36,000 miles (whichever occurs first)

- No Charge
- No Charge
- \$235.00
- \$100.00
- No Charge

### PACKAGES/OPTIONS

- Platinum Gray Metallic Exterior
- Titan Black Interior
- Rubber Mats (set of 4) and Trunk Liner
- 16" Steel Wheels w/ Full Wheel Covers & All-Season Tires
- 6-Speed Automatic Transmission

Destination Charge

\$770.00

**\$18,200.00**

Total Price:

Fuel, license, title fees, taxes and dealer-installed accessories are not included.

### PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS CARLINE: FOR THIS VEHICLE:  
 U.S./CANADIAN FINAL ASSEMBLY POINT:  
 PUEBLA, MEXICO  
 PARTS CONTENT: 9% COUNTRY OF ORIGIN:  
 MAJOR SOURCES OF FOREIGN ENGINE: MEXICO  
 PARTS CONTENT: MEXICO: 40% TRANSMISSION: JAPAN  
 GERMANY: 20%

NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION OR OTHER NON-PARTS COSTS.

Volkswagen of America, Inc.

SOLD TO: 402133  
FOX VALLEY VOLKSWAGEN SCHAUMBURG  
1000 EAST GOLF ROAD  
SCHAUMBURG, IL 60173

SHIP TO: 402133  
FOX VALLEY VOLKSWAGEN SCHAUMBURG  
1000 EAST GOLF ROAD  
SCHAUMBURG, IL 60173

VIN: 3WV2K7AJ5BM323928  
Port of Entry: HOUSTON, TX  
Trailer: TRUCK  
COMM NUM: E23883

### GOVERNMENT SAFETY RATINGS

Frontal Crash Driver Not Rated  
Passenger Not Rated

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.

Side Crash Front Seat Not Rated  
Rear Seat Not Rated

Star ratings based on the risk of injury in a side impact.

Rollover Not Rated

Star ratings based on the risk of rollover in a single vehicle crash.

Star ratings range from 1 to 5 stars (★ ★ ★ ★ ★) with 5 being the highest.

Source: National Highway Traffic Safety Administration (NHTSA).

[www.safercar.gov](http://www.safercar.gov) or 1-888-327-4236

Who better to get you into a Volkswagen than us? Volkswagen Credit



**APPENDIX B**  
**DUMMY RESPONSE DATA**

## TABLE OF DATA PLOTS

Page No.

### List of Data Plots Provided in the Test Report

|                |   |     |
|----------------|---|-----|
| Figure No. 1.  | Driver Head X Acceleration vs. Time               | B-1 |
| Figure No. 2.  | Driver Head Y Acceleration vs. Time               | B-1 |
| Figure No. 3.  | Driver Head Z Acceleration vs. Time               | B-1 |
| Figure No. 4.  | Driver Head Resultant Acceleration vs. Time       | B-1 |
| Figure No. 5.  | Driver Chest Displacement vs. Time                | B-2 |
| Figure No. 6.  | Driver Chest X Acceleration vs. Time              | B-3 |
| Figure No. 7.  | Driver Chest Y Acceleration vs. Time              | B-3 |
| Figure No. 8.  | Driver Chest Z Acceleration vs. Time              | B-3 |
| Figure No. 9.  | Driver Chest Resultant Acceleration vs. Time      | B-3 |
| Figure No. 10. | Driver Neck Force X vs. Time                      | B-4 |
| Figure No. 11. | Driver Neck Force Z vs. Time                      | B-4 |
| Figure No. 12. | Driver Neck Moment Y vs. Time                     | B-4 |
| Figure No. 13. | Driver Nij (NTF) vs. Time                         | B-5 |
| Figure No. 14. | Driver Nij (NTE) vs. Time                         | B-5 |
| Figure No. 15. | Driver Nij (NCF) vs. Time                         | B-5 |
| Figure No. 16. | Driver Nij (NCE) vs. Time                         | B-5 |
| Figure No. 17. | Driver Left Femur Force vs. Time                  | B-6 |
| Figure No. 18. | Driver Right Femur Force vs. Time                 | B-6 |
| Figure No. 19. | Passenger Head X Acceleration vs. Time            | B-7 |
| Figure No. 20. | Passenger Head Y Acceleration vs. Time            | B-7 |
| Figure No. 21. | Passenger Head Z Acceleration vs. Time            | B-7 |
| Figure No. 22. | Passenger Head Resultant Acceleration vs. Time    | B-7 |
| Figure No. 23. | Passenger Chest Displacement vs. Time             | B-8 |
| Figure No. 24. | Passenger Chest X Acceleration vs. Time           | B-9 |
| Figure No. 25. | Passenger Chest Y Acceleration vs. Time           | B-9 |
| Figure No. 26. | Passenger Chest Z Acceleration vs. Time           | B-9 |
| Figure No. 27. | Passenger Chest Resultant Z Acceleration vs. Time | B-9 |

|   | <u>Page No.</u> |
|---|-----------------|
| Figure No. 28. Passenger Neck Force X vs. Time      | B-10            |
| Figure No. 29. Passenger Neck Force Z vs. Time      | B-10            |
| Figure No. 30. Passenger Neck Moment Y vs. Time     | B-10            |
| Figure No. 31. Passenger Nij (NTF) vs. Time         | B-11            |
| Figure No. 32. Passenger Nij (NTE) vs. Time         | B-11            |
| Figure No. 33. Passenger Nij (NCF) vs. Time         | B-11            |
| Figure No. 34. Passenger Nij (NCE) vs. Time         | B-11            |
| Figure No. 35. Passenger Left Femur Force vs. Time  | B-12            |
| Figure No. 36. Passenger Right Femur Force vs. Time | B-12            |

**The following dummy and vehicle response data can be found in the R&D section of the NHTSA website at [www.nhtsa.dot.gov](http://www.nhtsa.dot.gov)**

Driver Head X Redundant

Driver Head Y Redundant

Driver Head Z Redundant

Driver Upper Neck Force Y

Driver Upper Neck Moment X

Driver Upper Neck Moment Z

Driver Chest X Redundant

Driver Chest Y Redundant

Driver Chest Z Redundant

Driver Pelvis X

Driver Pelvis Y

Driver Pelvis Z

Driver Shoulder Belt Force

Driver Lap Belt Force

Driver Left Upper Tibia Moment X

Driver Left Upper Tibia Moment Y

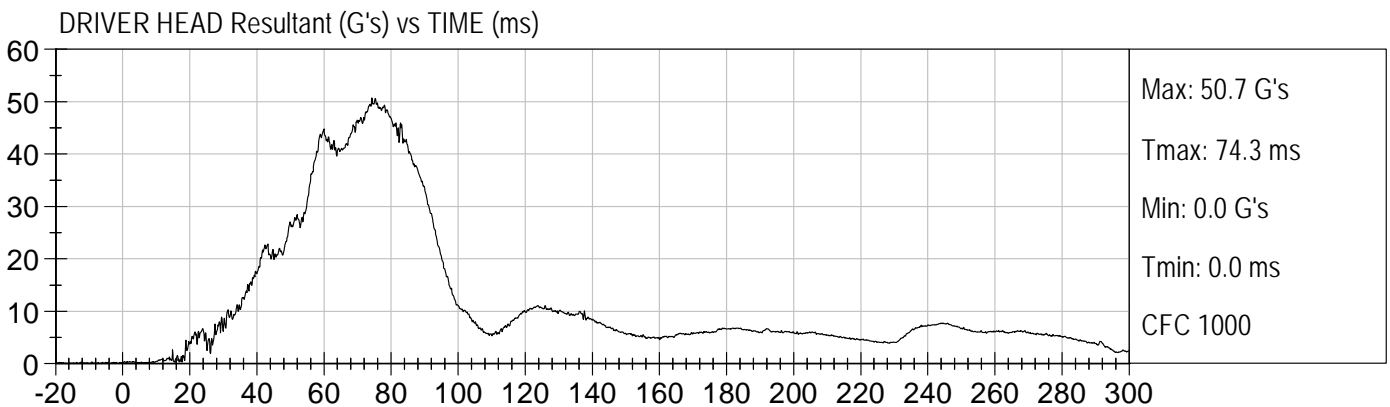
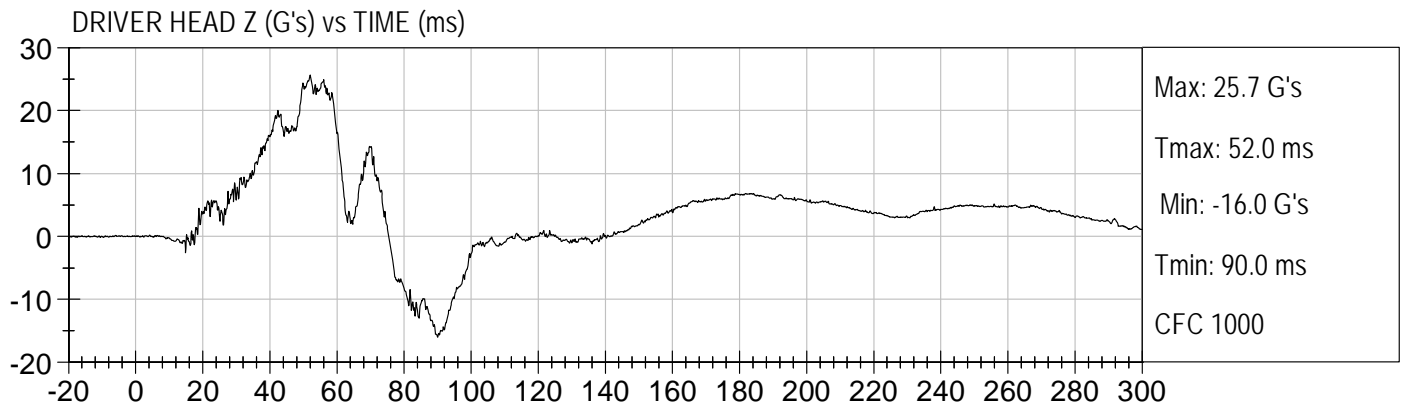
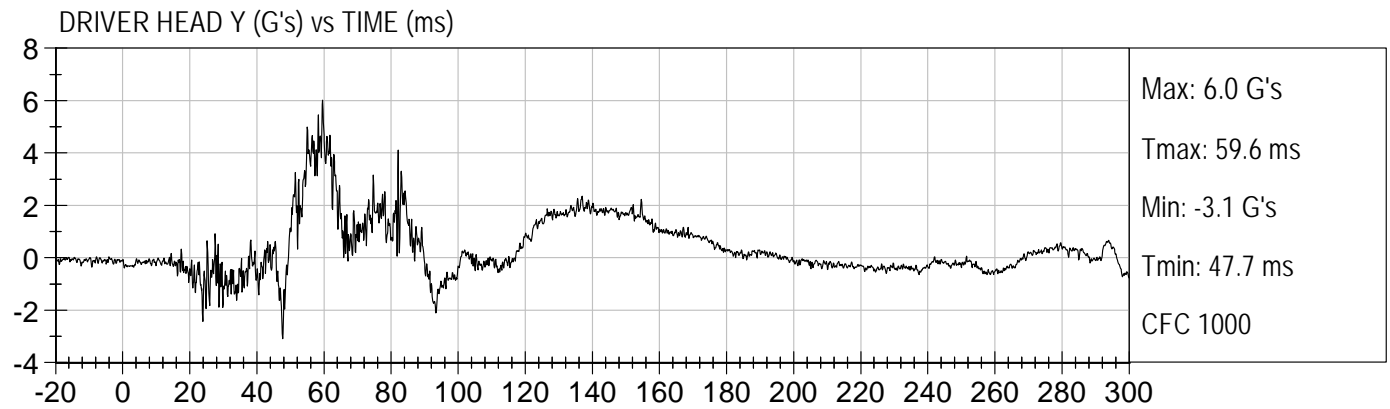
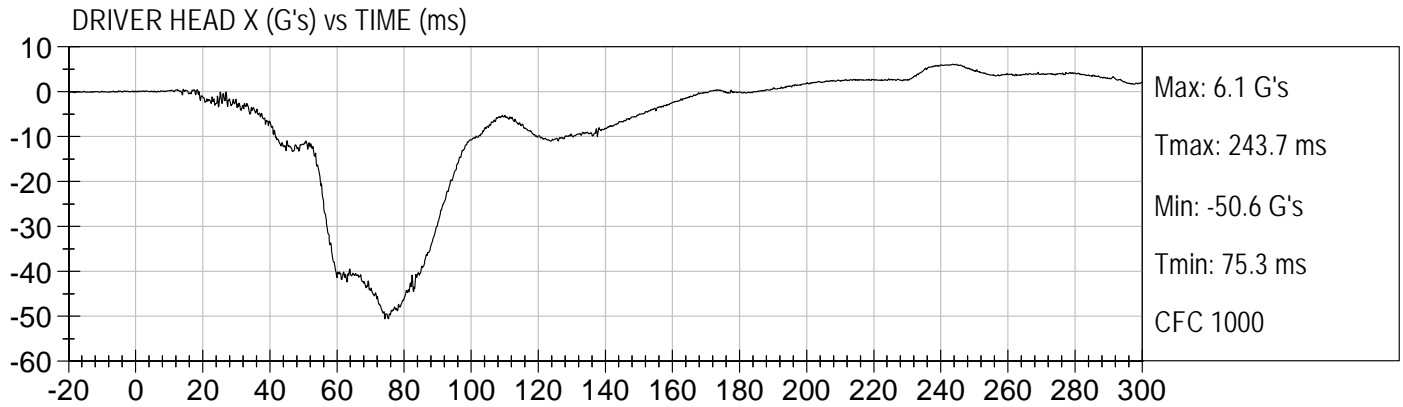
Driver Left Upper Tibia Force Z

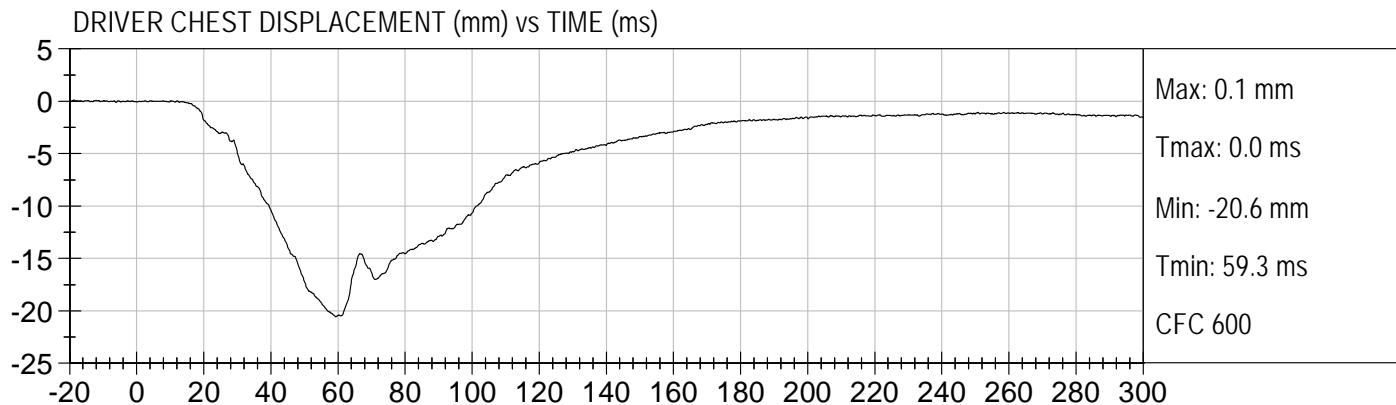
Driver Left Lower Tibia Moment X

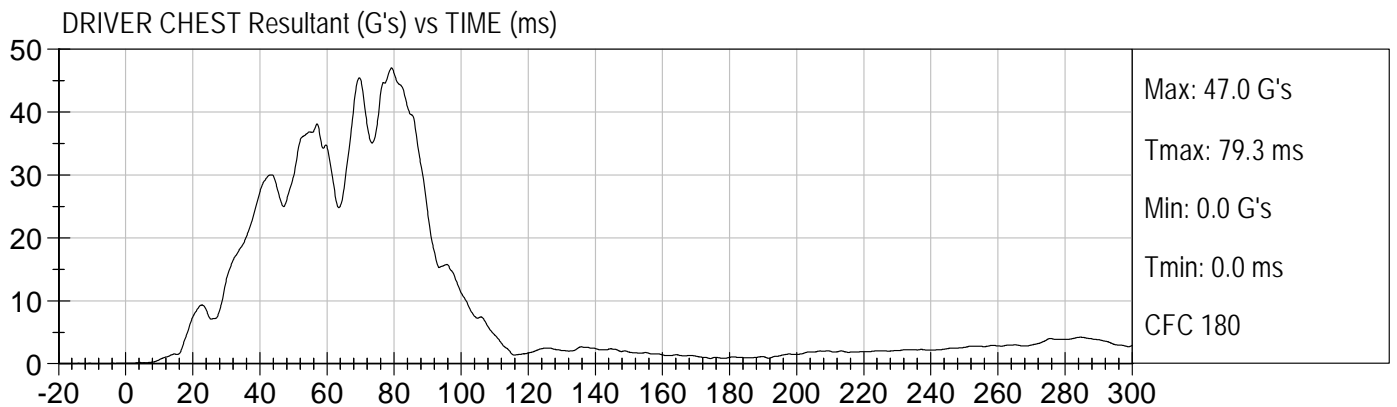
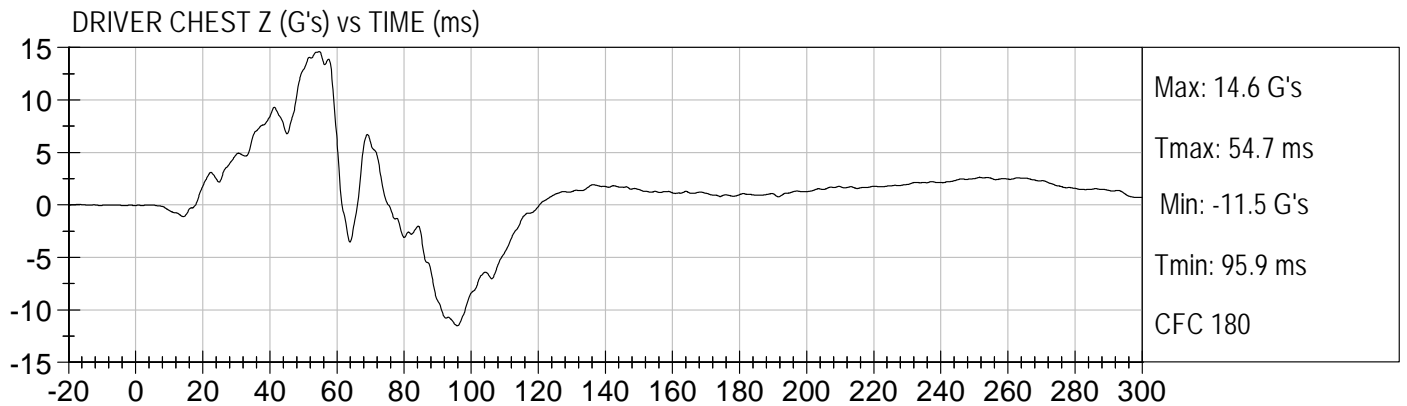
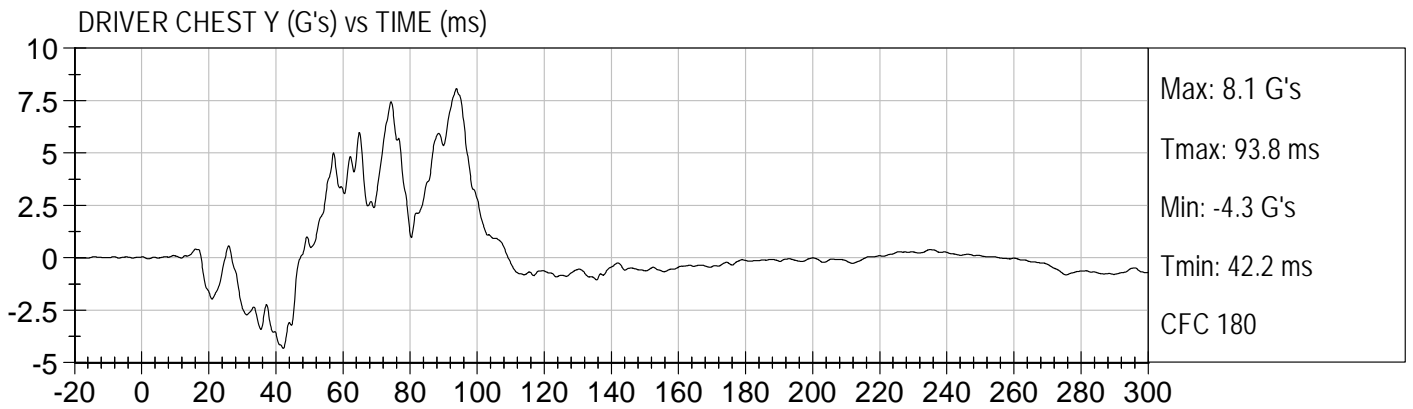
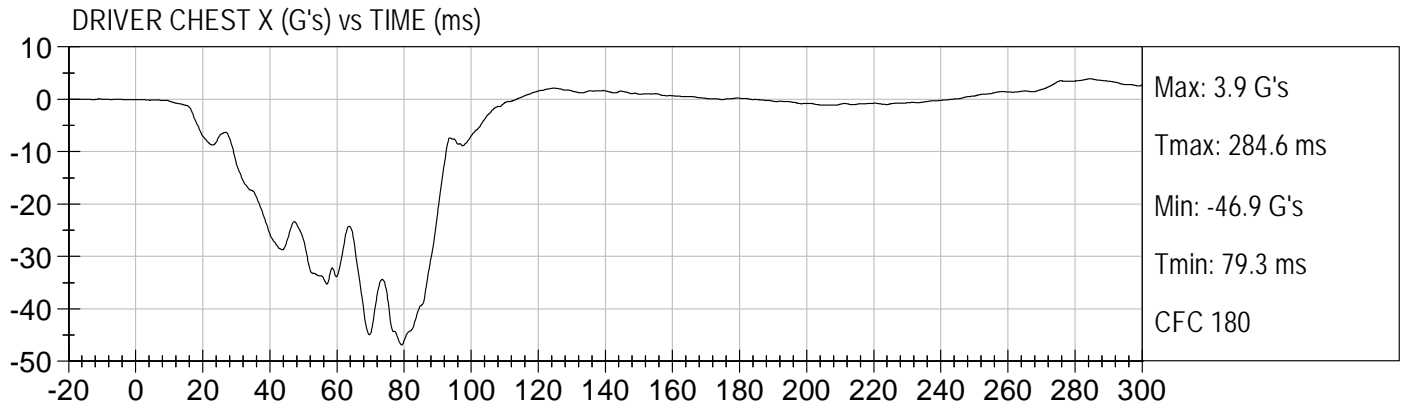
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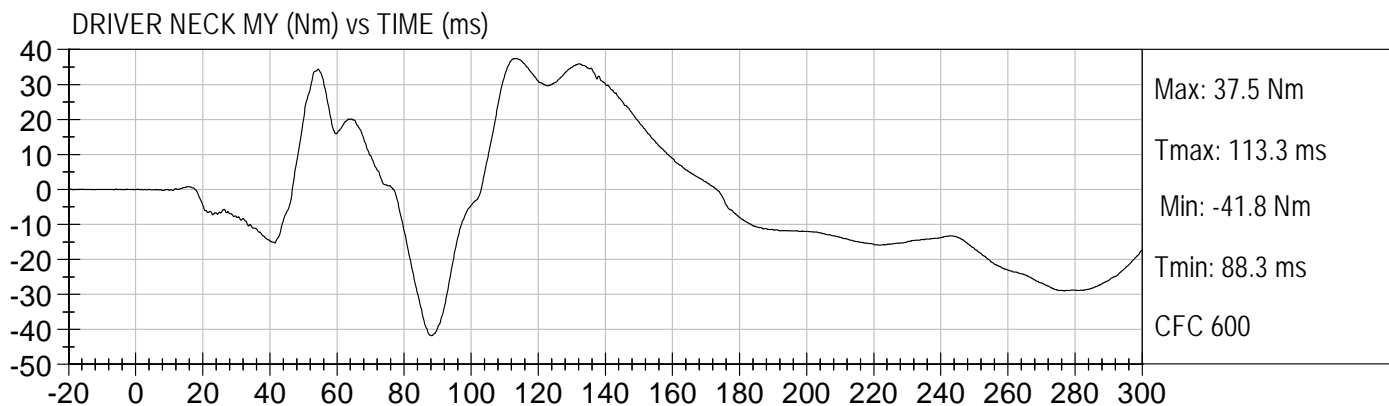
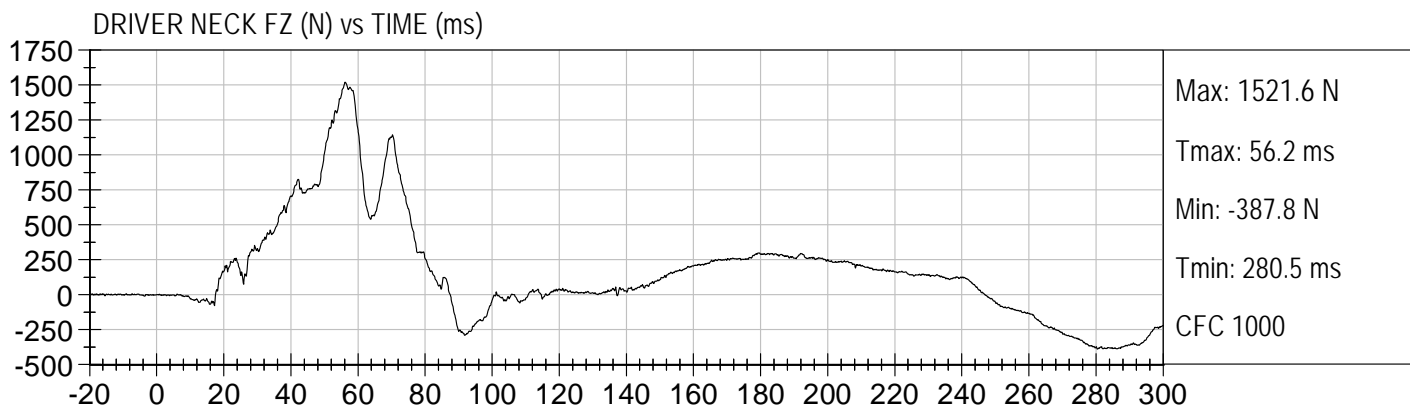
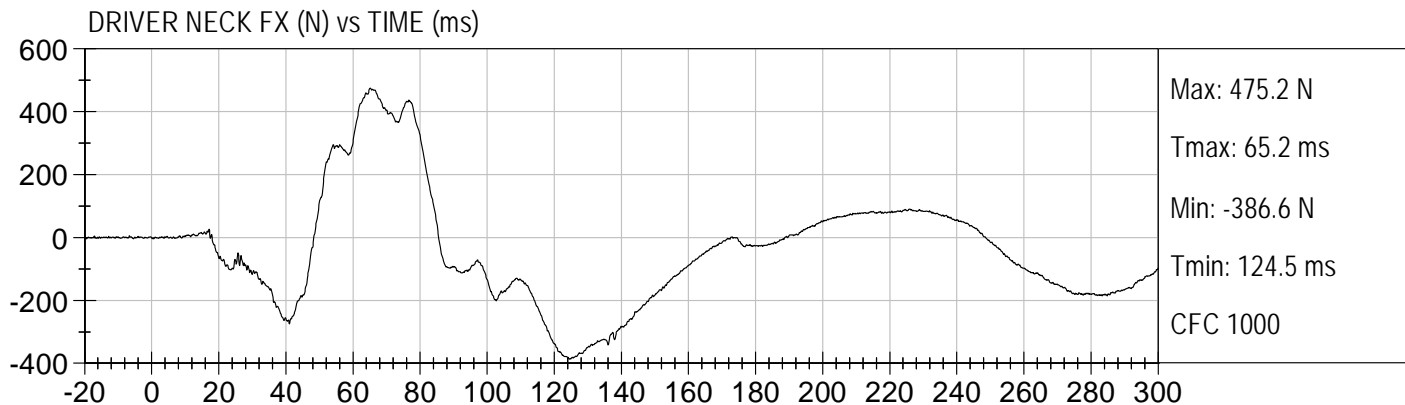
Driver Left Lower Tibia Force Z  
Driver Right Upper Tibia Moment X  
Driver Right Upper Tibia Moment Y  
Driver Right Upper Tibia Force Z  
Driver Right Lower Tibia Moment X  
Driver Right Lower Tibia Moment Y  
Driver Right Lower Tibia Force Z  
Driver Left Foot Fore Z  
Driver Left Foot Aft X  
Driver Left Foot Aft Z  
Driver Right Foot Fore Z  
Driver Right Foot Aft X  
Driver Right Foot Aft Z  
Passenger Head X Redundant  
Passenger Head Y Redundant  
Passenger Head Z Redundant  
Passenger Upper Neck Force Y  
Passenger Upper Neck Moment X  
Passenger Upper Neck Moment Z  
Passenger Chest X Redundant  
Passenger Chest Y Redundant  
Passenger Chest Z Redundant  
Passenger Pelvis X  
Passenger Pelvis Y  
Passenger Pelvis Z  
Passenger Lap Belt Force – not installed  
Passenger Shoulder Belt Force – not installed  
Passenger Left Upper Tibia Moment X  
Passenger Left Upper Tibia Moment Y  
Passenger Left Upper Tibia Force Z  
Passenger Left Lower Tibia Moment X

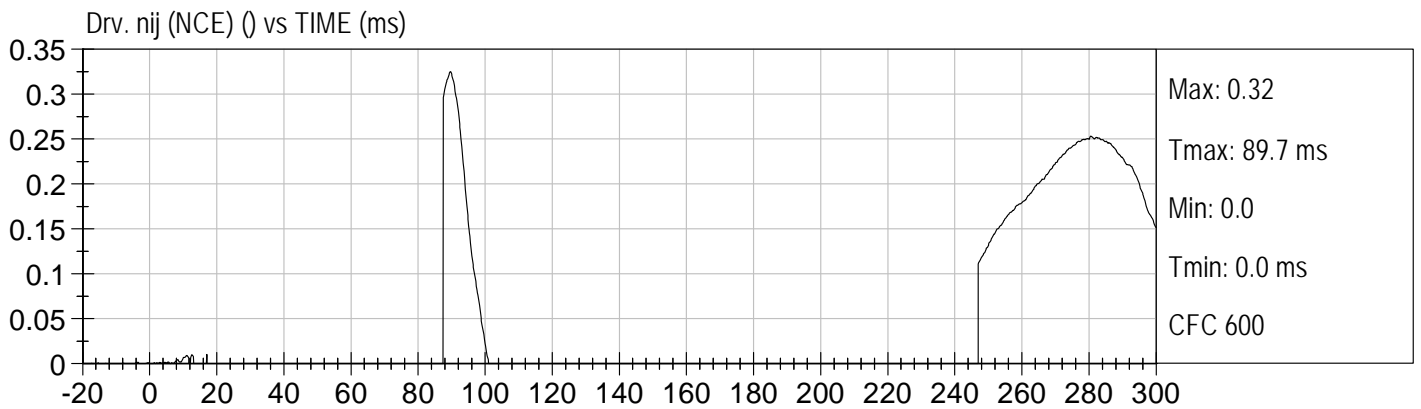
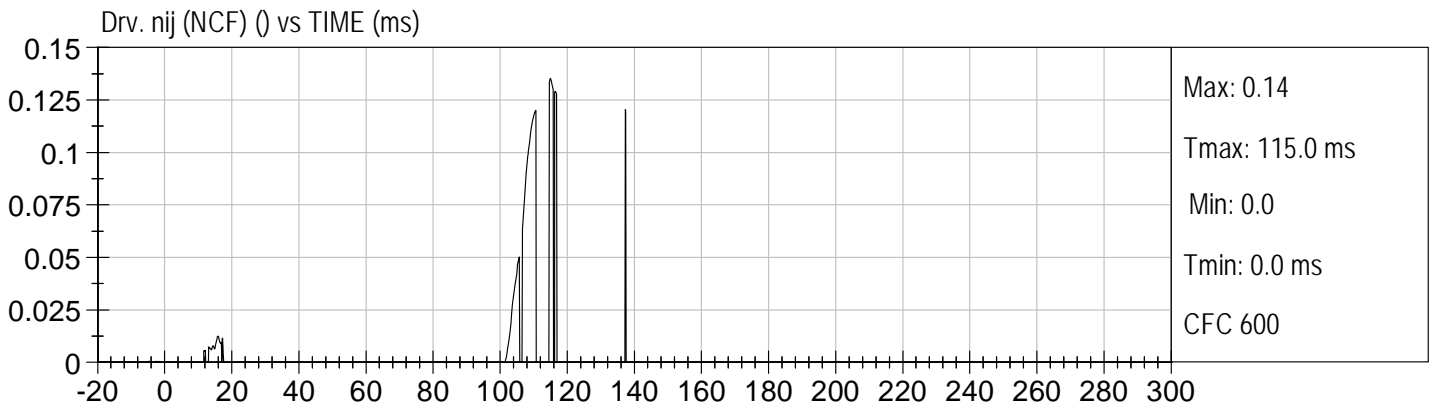
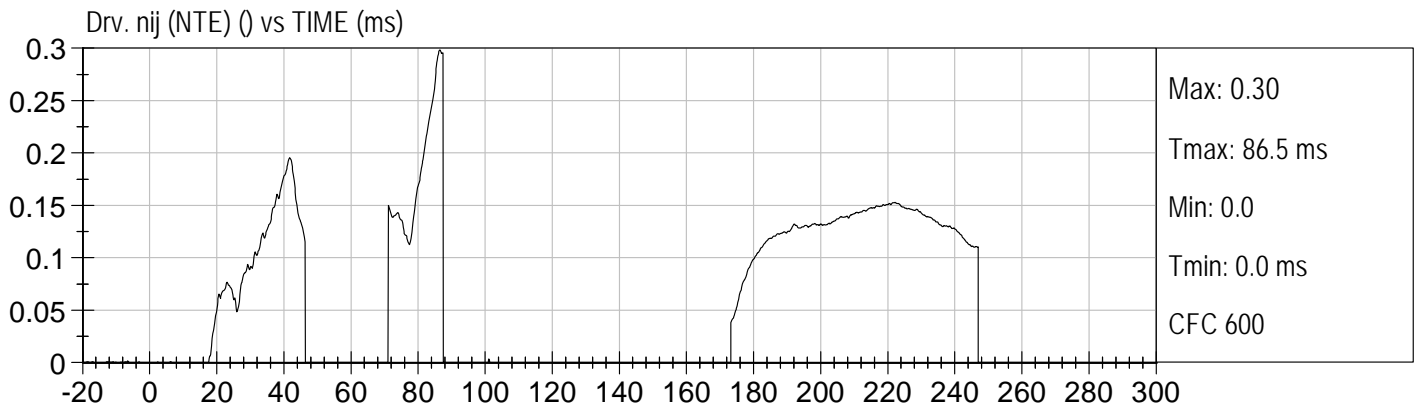
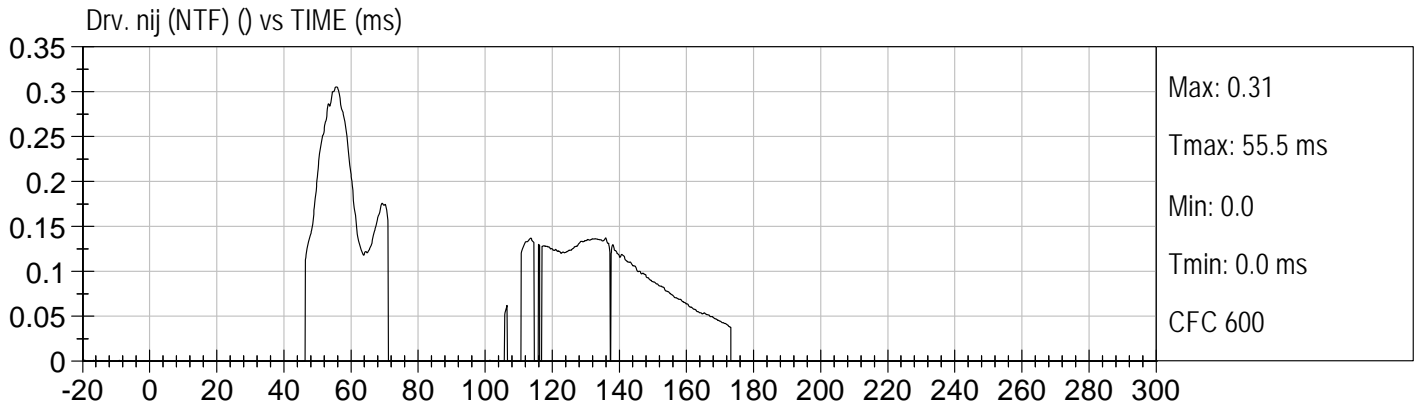
Passenger Left Lower Tibia Moment Y  
Passenger Left Lower Tibia Force Z  
Passenger Right Upper Tibia Moment X  
Passenger Right Upper Tibia Moment Y  
Passenger Right Upper Tibia Force Z  
Passenger Right Lower Tibia Moment X  
Passenger Right Lower Tibia Moment Y  
Passenger Right Lower Tibia Force Z  
Passenger Left Foot Fore Z  
Passenger Left Foot Aft X  
Passenger Left Foot Aft Z  
Passenger Right Foot Fore Z  
Passenger Right Foot Aft X  
Passenger Right Foot Aft Z  
Left Rear Seat Crossmember X  
Left Rear Seat Crossmember Z  
Right Rear Seat Crossmember X  
Right Rear Seat Crossmember Z  
Vehicle Engine Top X  
Vehicle Engine Bottom X  
Vehicle Left Brake Caliper X  
Vehicle Right Brake Caliper X  
Advanced Research Load Cell Barrier – 127 channels

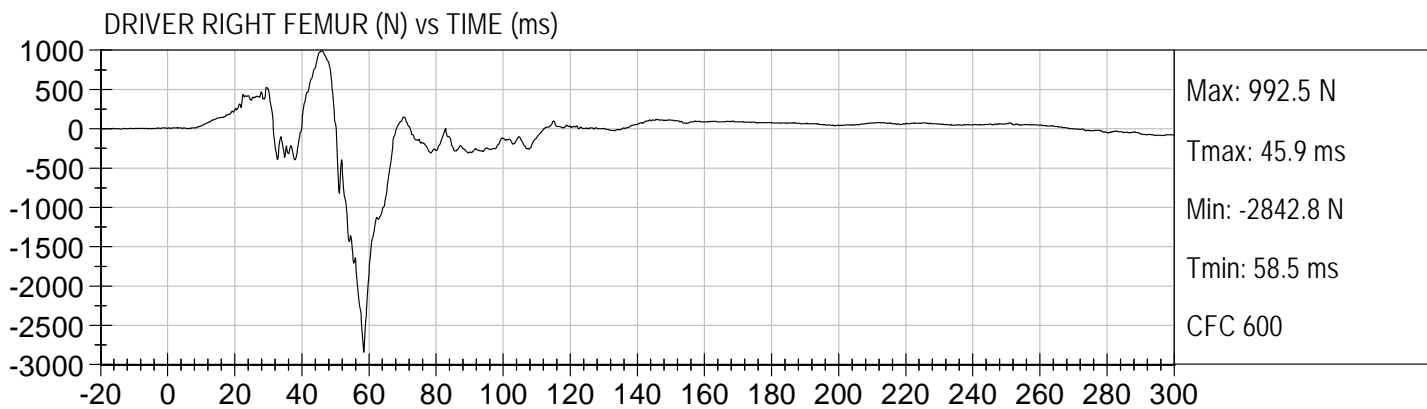
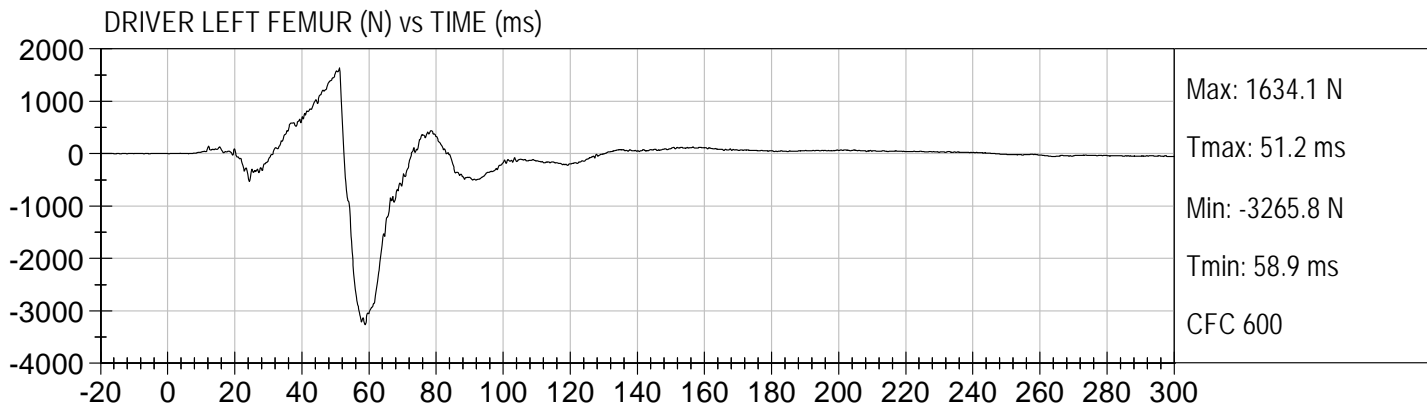






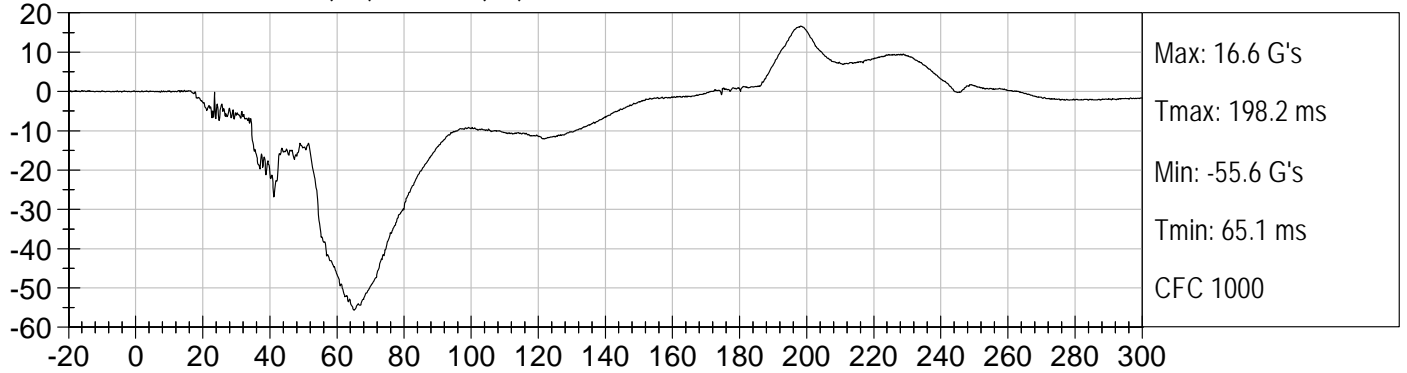




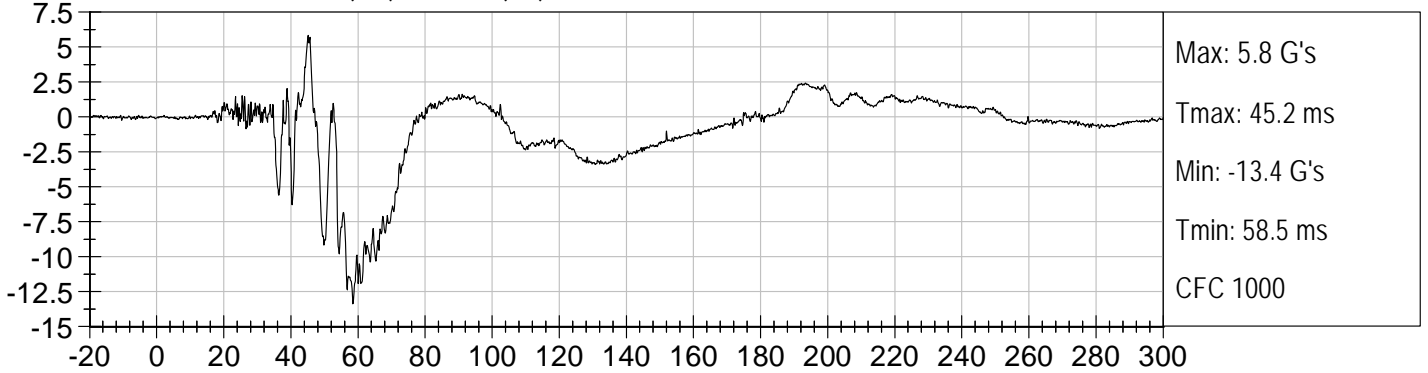




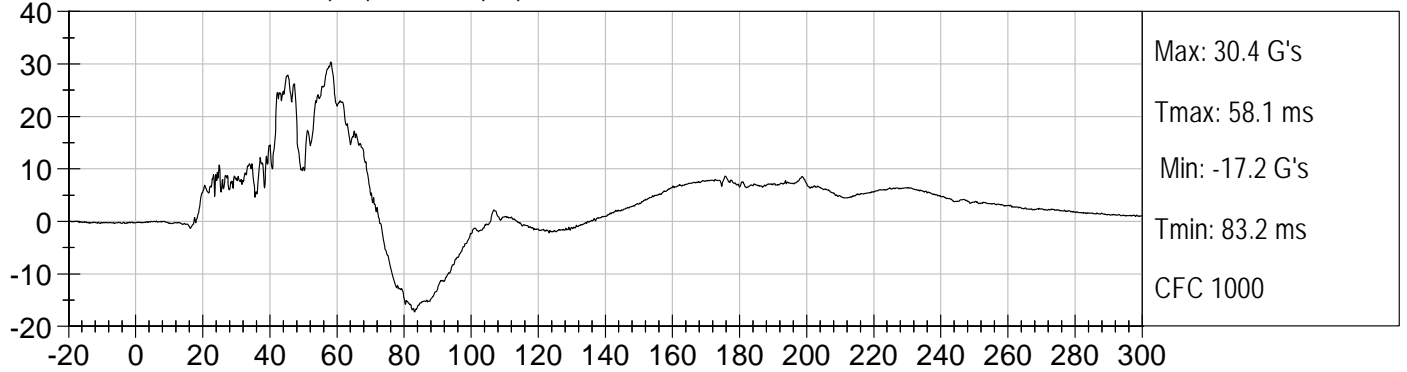
PASSENGER HEAD X (G's) vs TIME (ms)



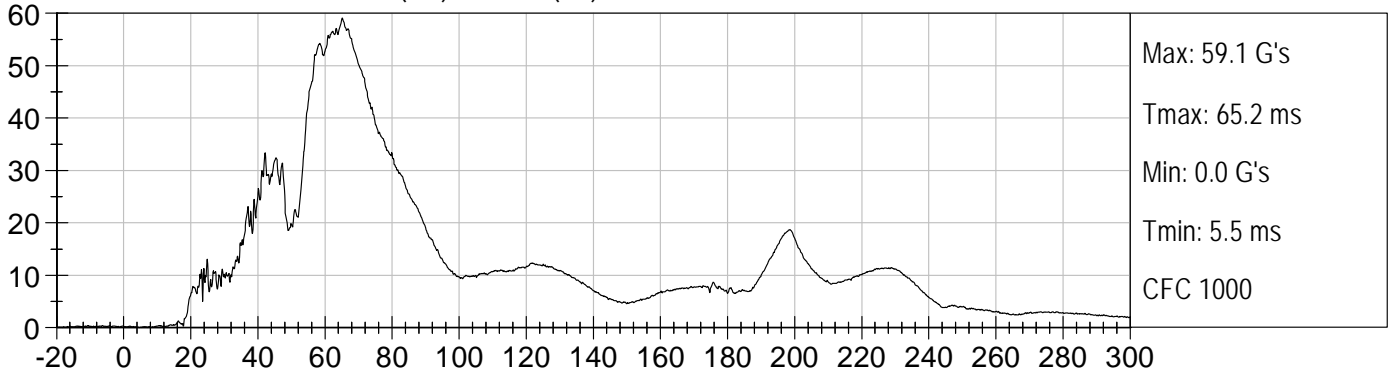
PASSENGER HEAD Y (G's) vs TIME (ms)

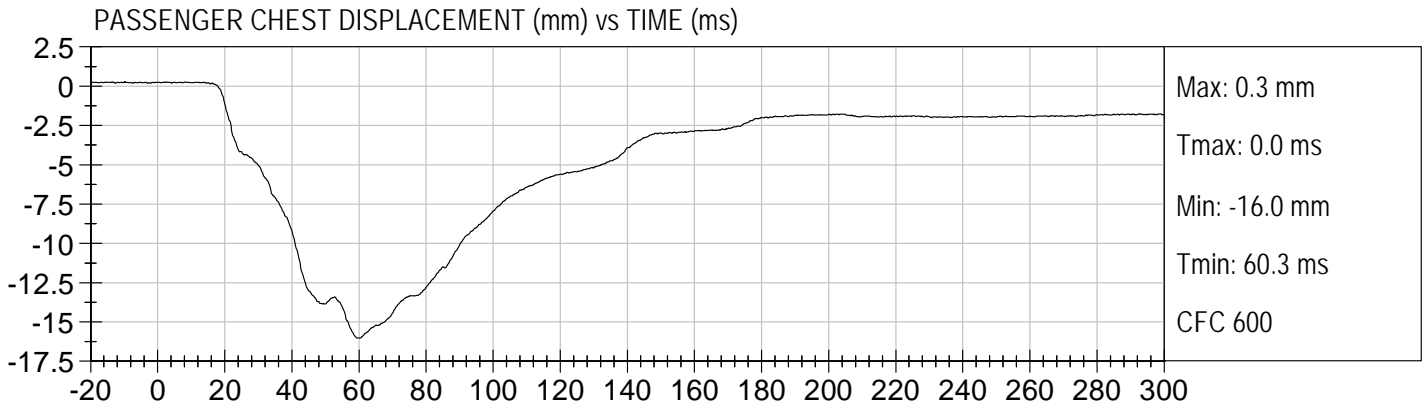


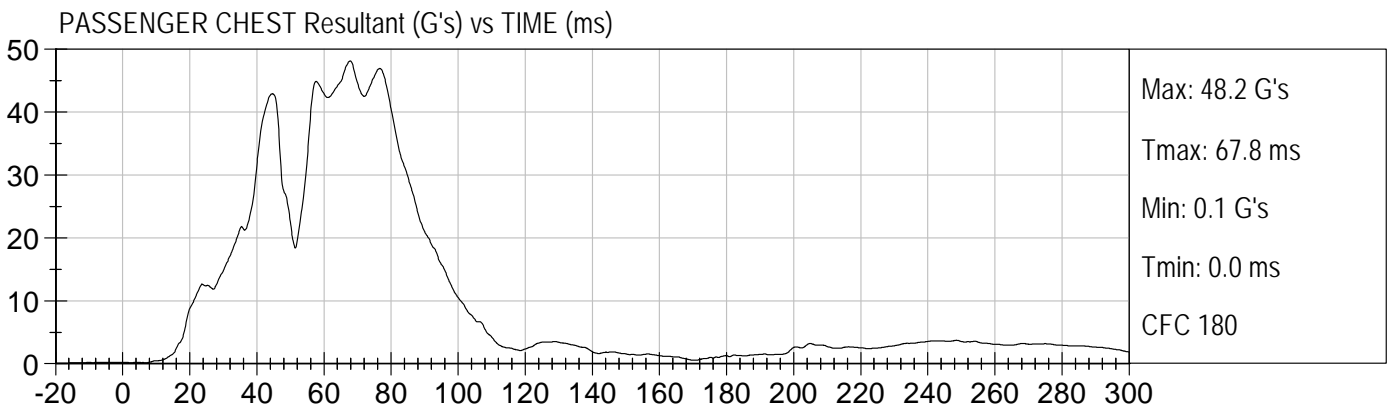
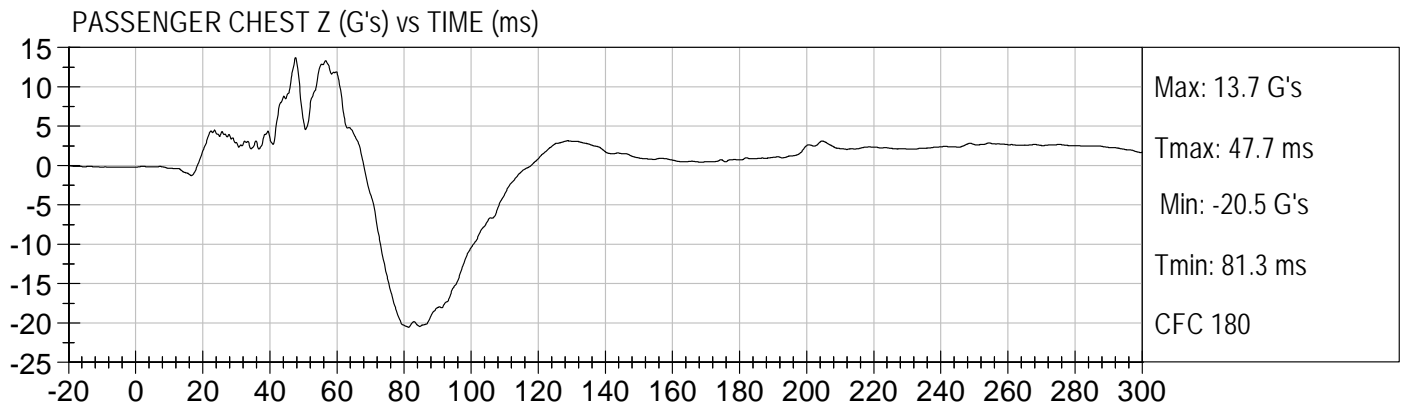
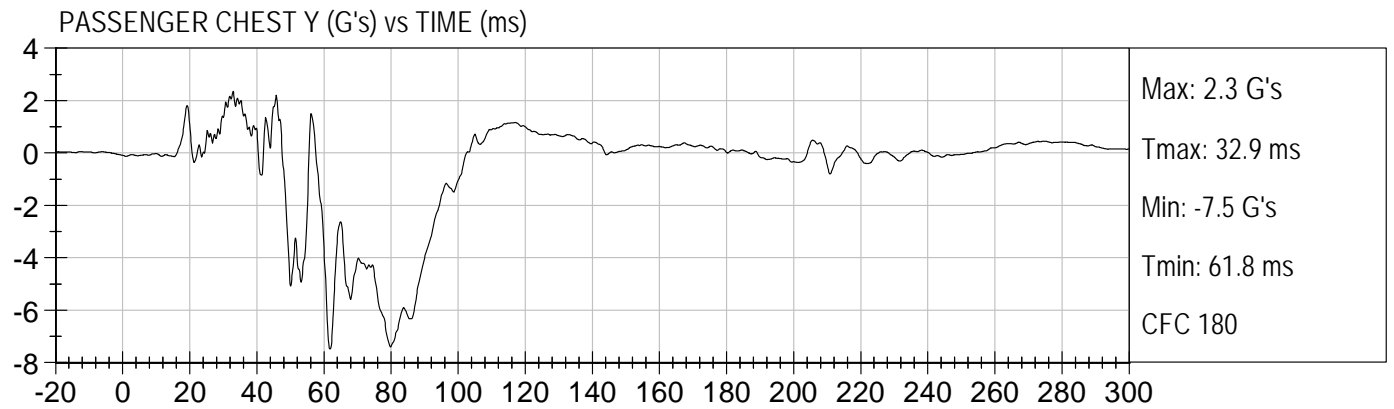
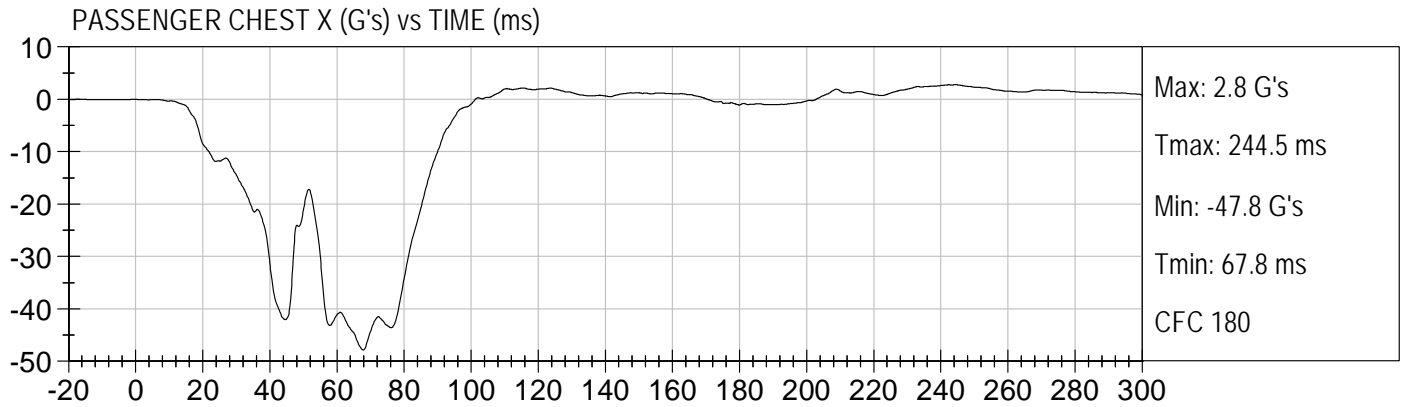
PASSENGER HEAD Z (G's) vs TIME (ms)

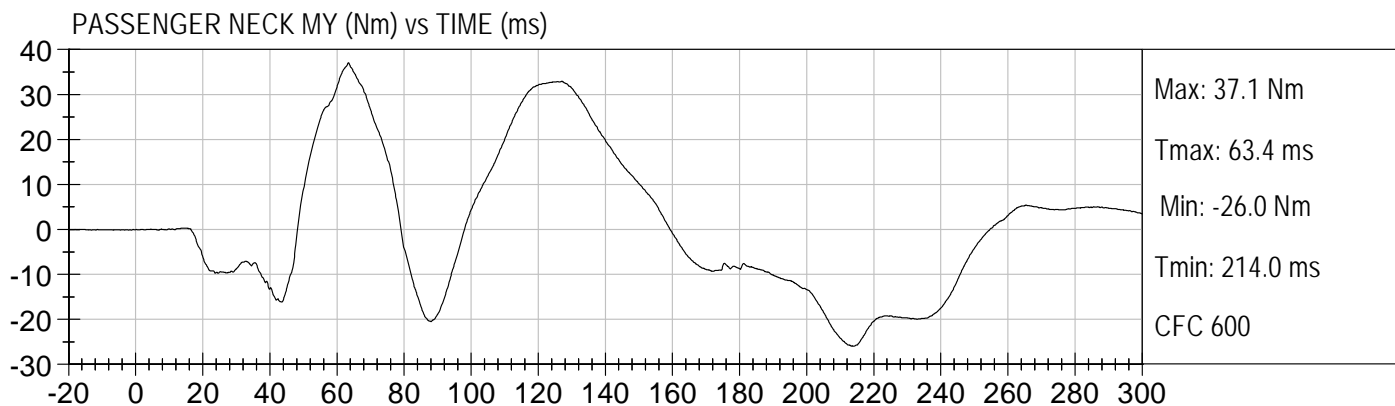
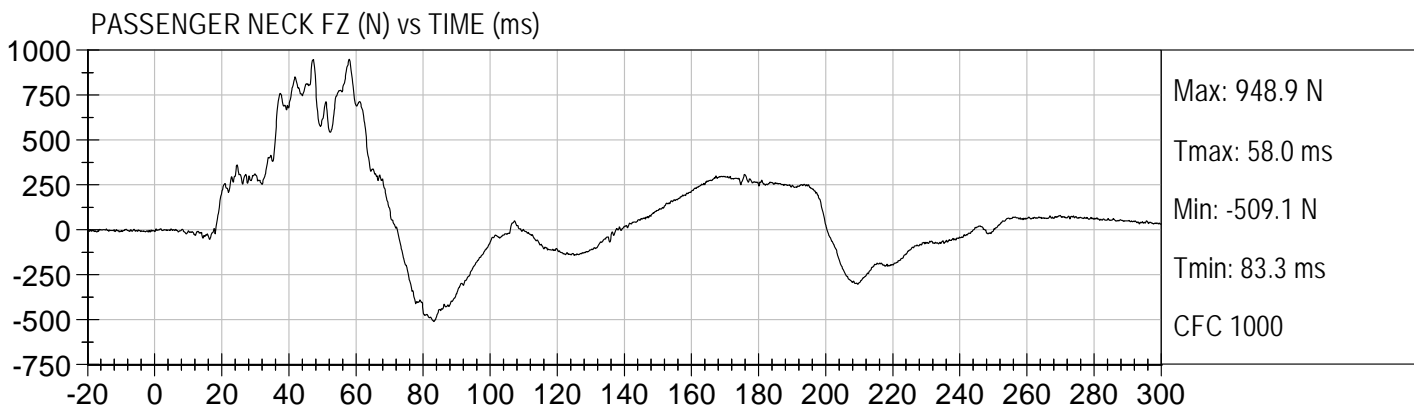
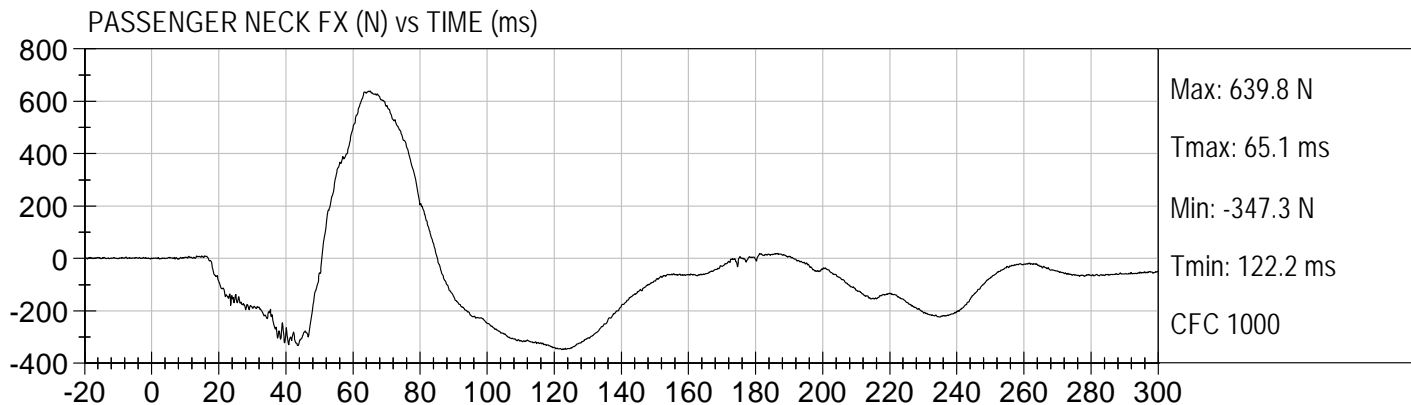


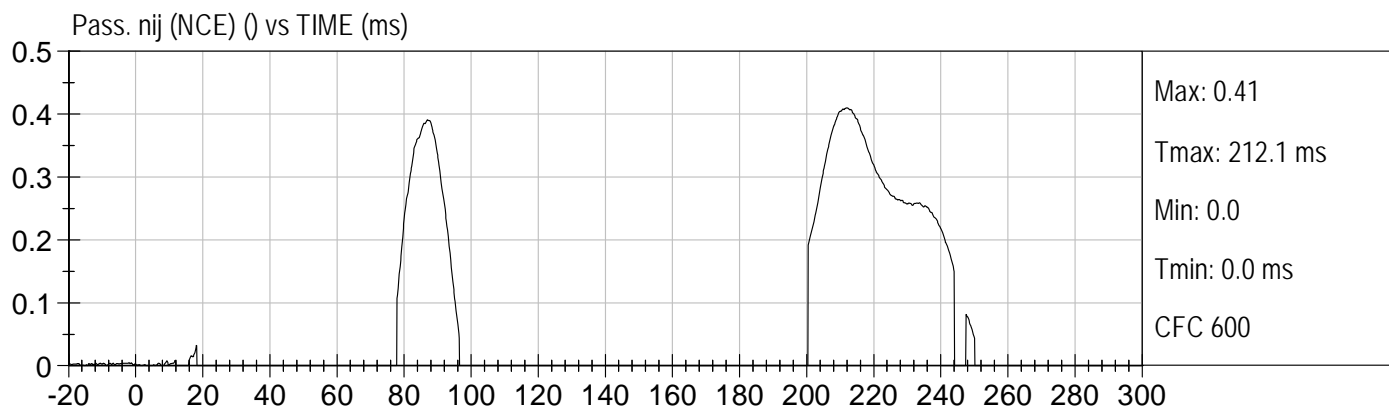
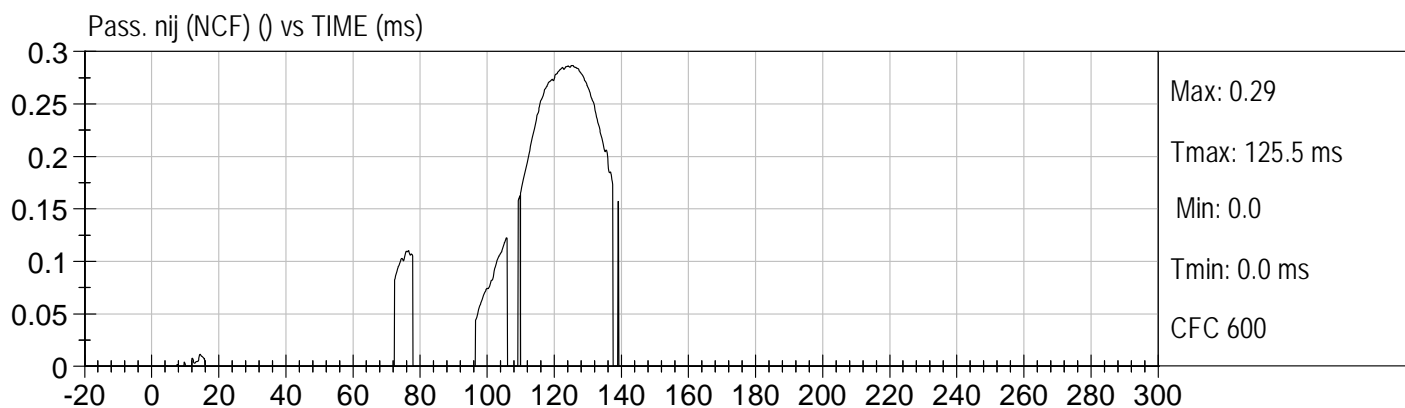
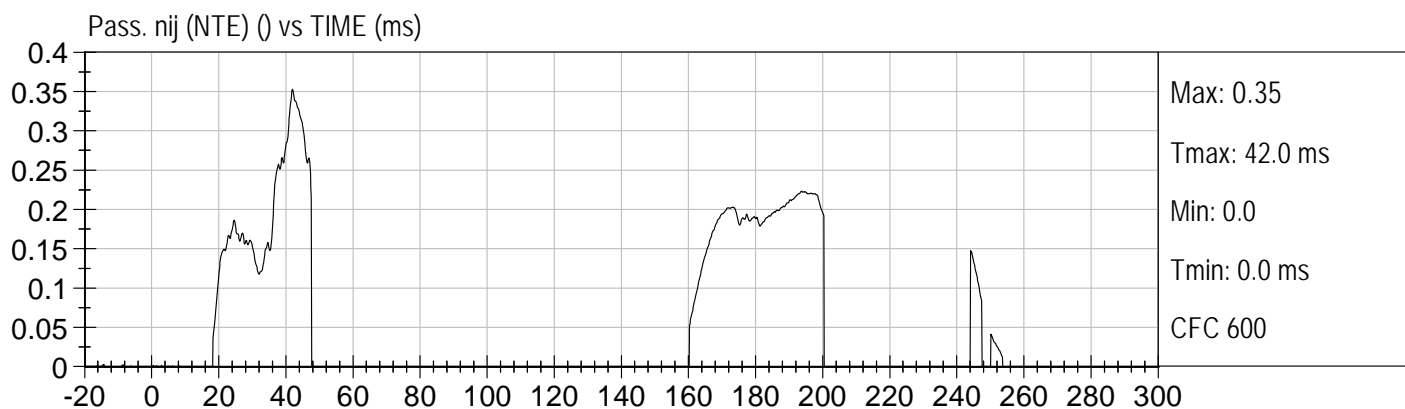
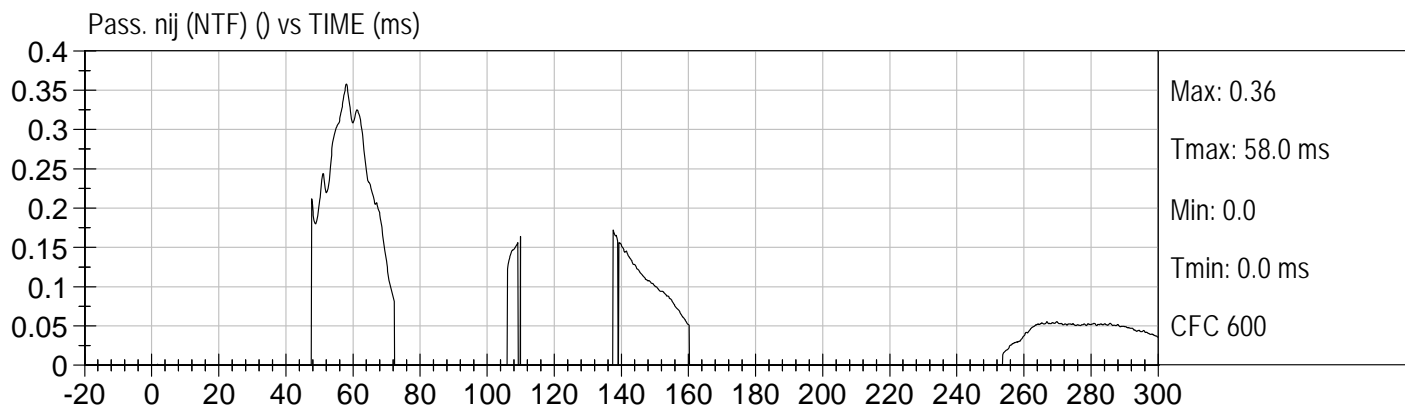
PASSENGER HEAD Resultant (G's) vs TIME (ms)

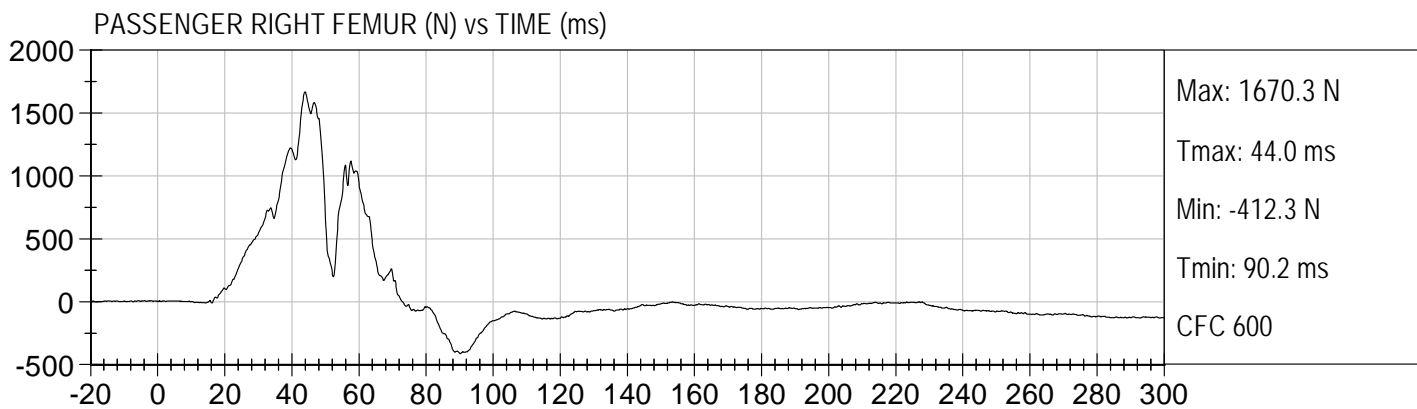
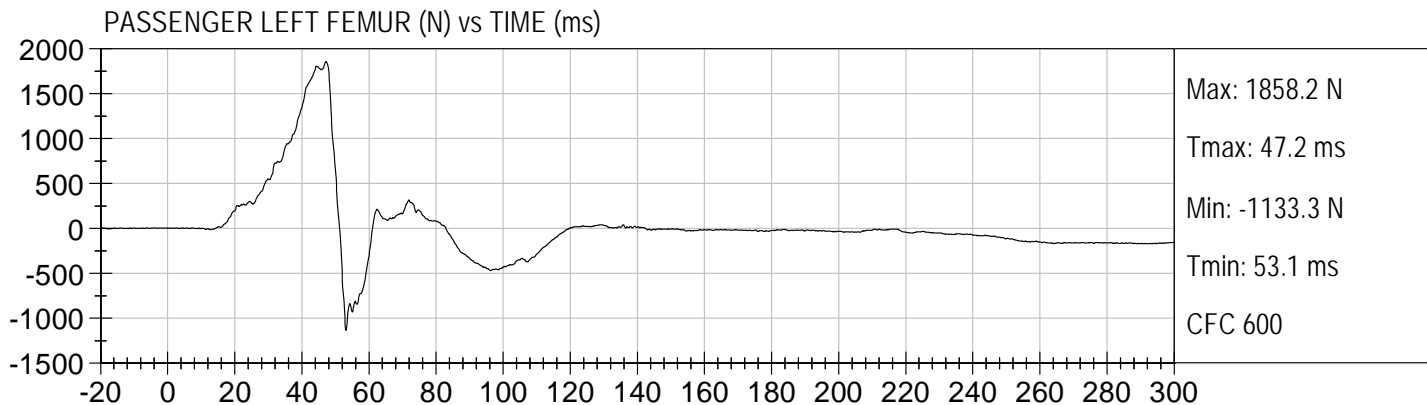












**APPENDIX C**  
**DUMMY CALIBRATION DATA**

**MGA RESEARCH CORPORATION**  
**HEAD DROP TEST**  
**HYBRID III 50TH PERCENTILE MALE**

ATD Serial No: 351

Test ID: D104381

| Tested Parameter             | Units | Specification      | Result | Pass/Fail |
|------------------------------|-------|--------------------|--------|-----------|
| Laboratory Temperature       | deg C | 18.9 - 25.6        | 21.8   | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70           | 12     | Pass      |
| Peak Resultant Acceleration  | G's   | 225 - 275          | 266    | Pass      |
| Peak Lateral Acceleration    | G's   | <= +/- 15.0        | -8.0   | Pass      |
| Unimodal                     | N/A   | Yes                | Yes    | Pass      |
| Oscillations                 | N/A   | within 10% of peak | Yes    | Pass      |
| Overall Test Results         |       |                    |        | Pass      |

Jessica Hall  
Laboratory Technician

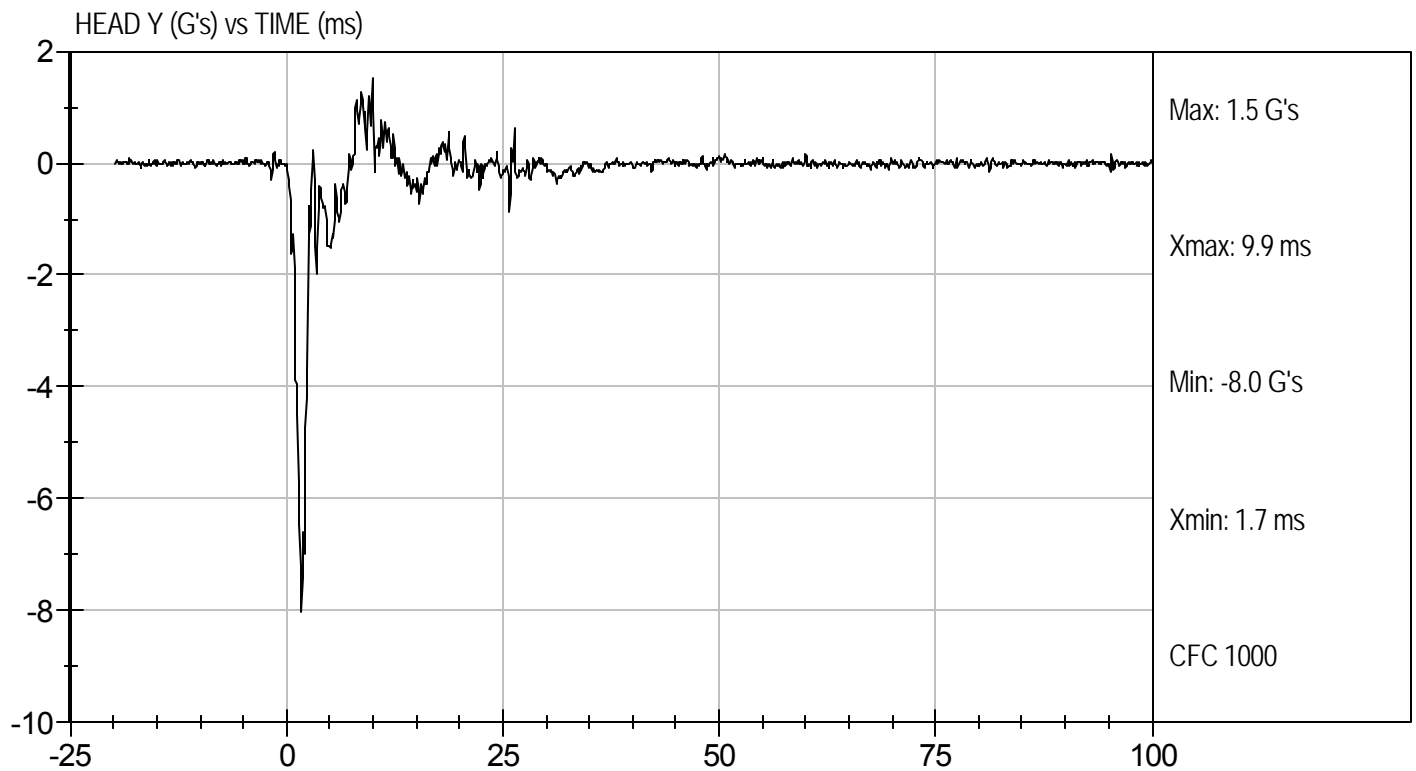
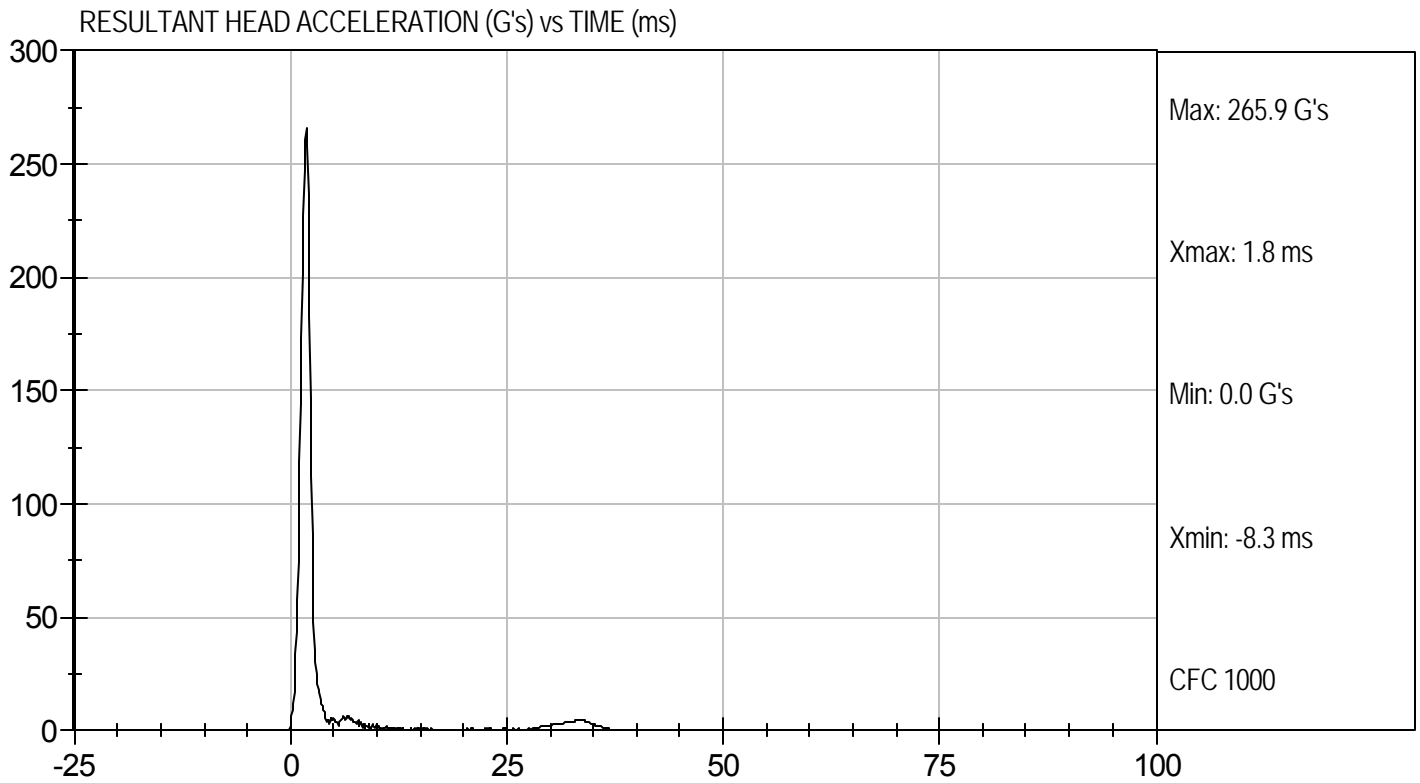
12/13/10  
Test Date

David Winkelbauer  
Approved By



Test Desc: Head Drop  
Component ID: D104381

Test Date: 12/13/10  
Velocity: 0 ft/s, 0.00 m/s



**MGA RESEARCH CORPORATION**  
**NECK FLEXION TEST**  
**HYBRID III 50TH PERCENTILE MALE**

ATD Serial No: 351

Test I.D.: D104382

| Tested Parameter                               |         | Units   | Specification  | Result | Pass/Fail |
|--|---------|---------|----------------|--------|-----------|
| Laboratory Temperature                         |         | deg C   | 20.6 to 22.2   | 21.7   | Pass      |
| Laboratory Relative Humidity                   |         | %       | 10 to 70       | 12     | Pass      |
| Pendulum Velocity                              |         | m/s     | 6.89 to 7.13   | 6.96   | Pass      |
| Pendulum Deceleration                          | 10 ms   | G's     | 22.50 to 27.50 | 23.05  | Pass      |
|  | 20 ms   | G's     | 17.60 to 22.60 | 18.43  | Pass      |
|  | 30 ms   | G's     | 12.50 to 18.50 | 13.47  | Pass      |
| Peak Pendulum Deceleration After 30 ms         |         | G's     | <= 29.0        | 13.4   | Pass      |
| Deceleration Decay Time to Cross 5 G's         |         | ms      | 34.0 to 42.0   | 35.7   | Pass      |
| Maximum "D" Plane Rotation                     | Maximum | Degrees | 64.0 to 78.0   | 68.9   | Pass      |
|  | Time    | ms      | 57.0 to 64.0   | 58.3   | Pass      |
| "D" Plane Rotation Decay Time To Zero Crossing |         | ms      | 113.0 to 128.0 | 113.1  | Pass      |
| Moment About Occipital Condyle                 | Maximum | N m     | 88.1 to 108.5  | 91.7   | Pass      |
|  | Time    | ms      | 47.0 to 58.0   | 49.3   | Pass      |
| Positive Moment Decay Time To Zero Crossing    |         | ms      | 97.0 to 107.0  | 100.6  | Pass      |
| Overall Test Results                           |         |         |                |        | Pass      |

Jessica Hall  
Laboratory Technician

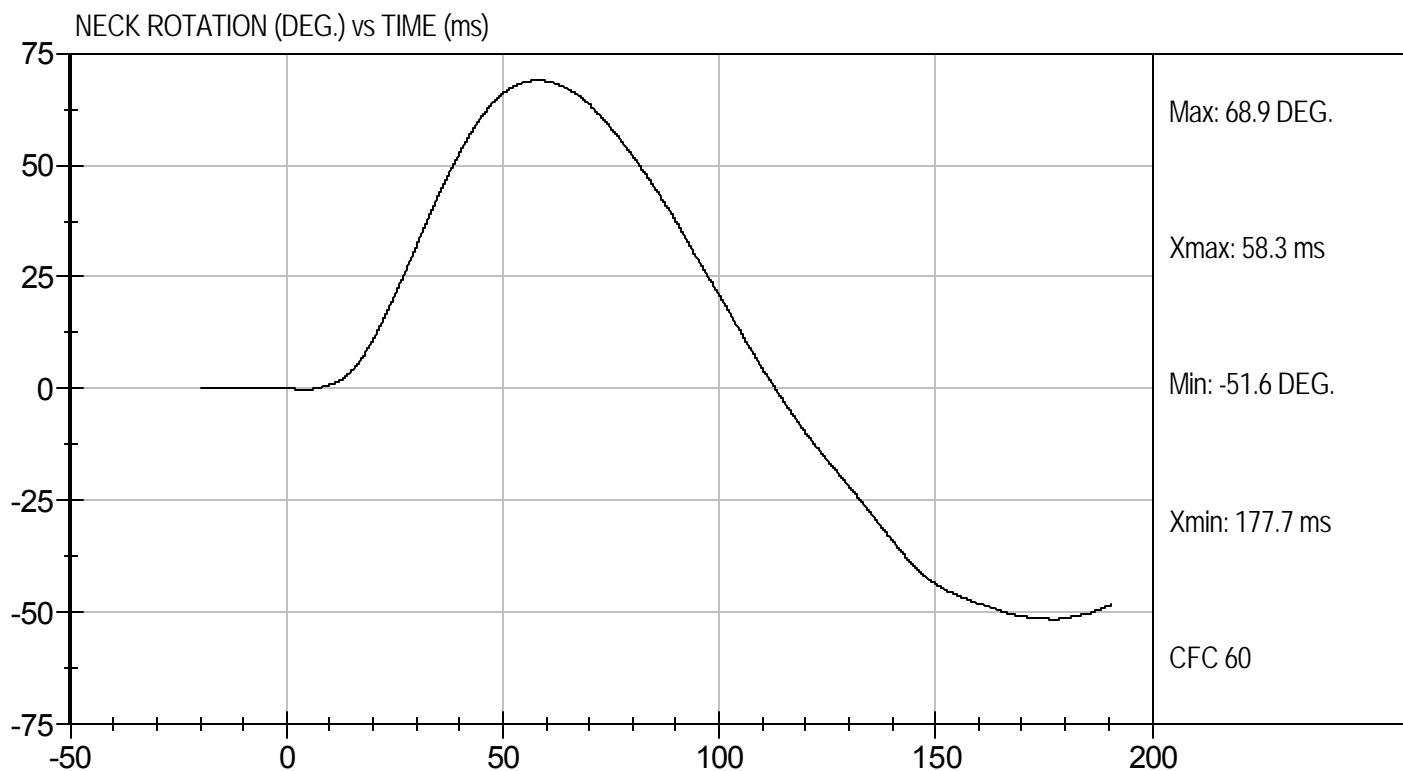
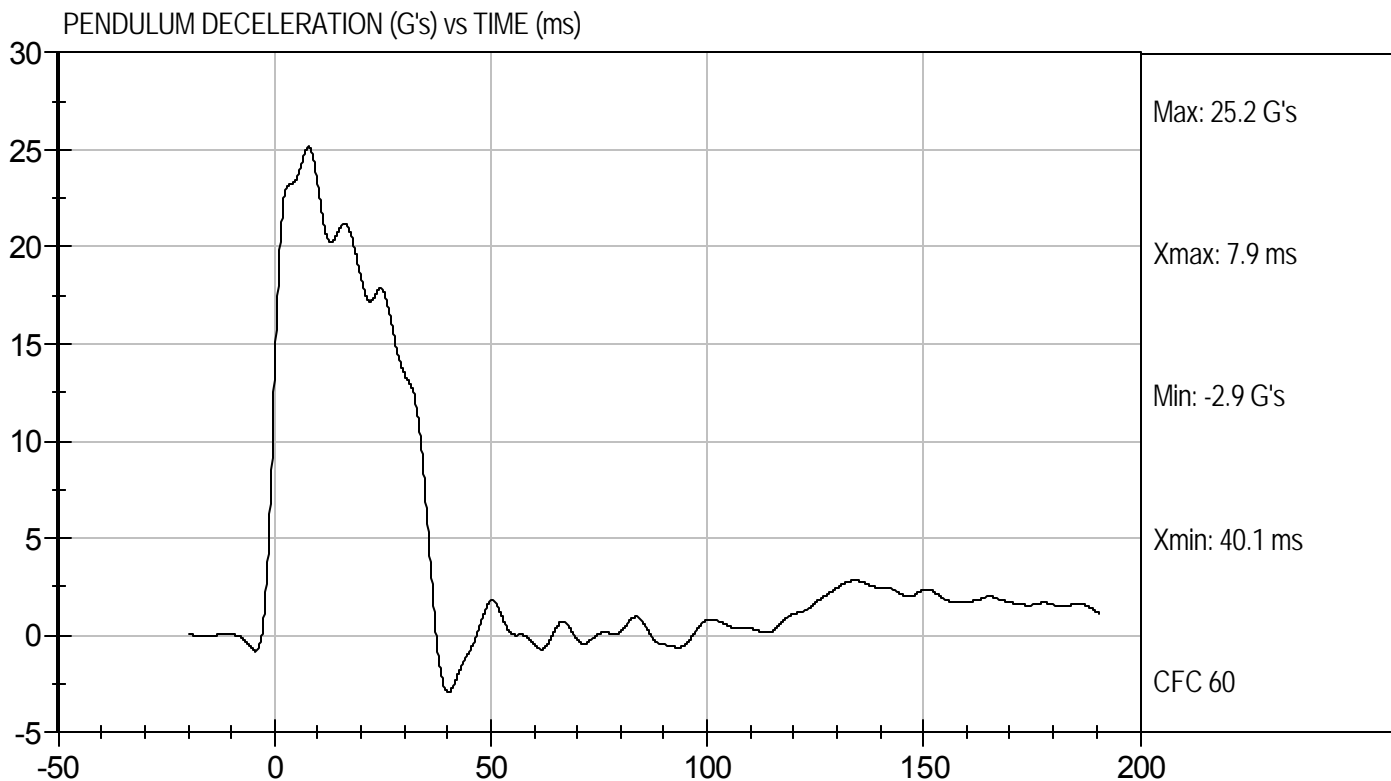
12/13/10  
Test Date

David Winkelbauer  
Approved By



Test Desc: Neck Flexion  
Component ID: D104382

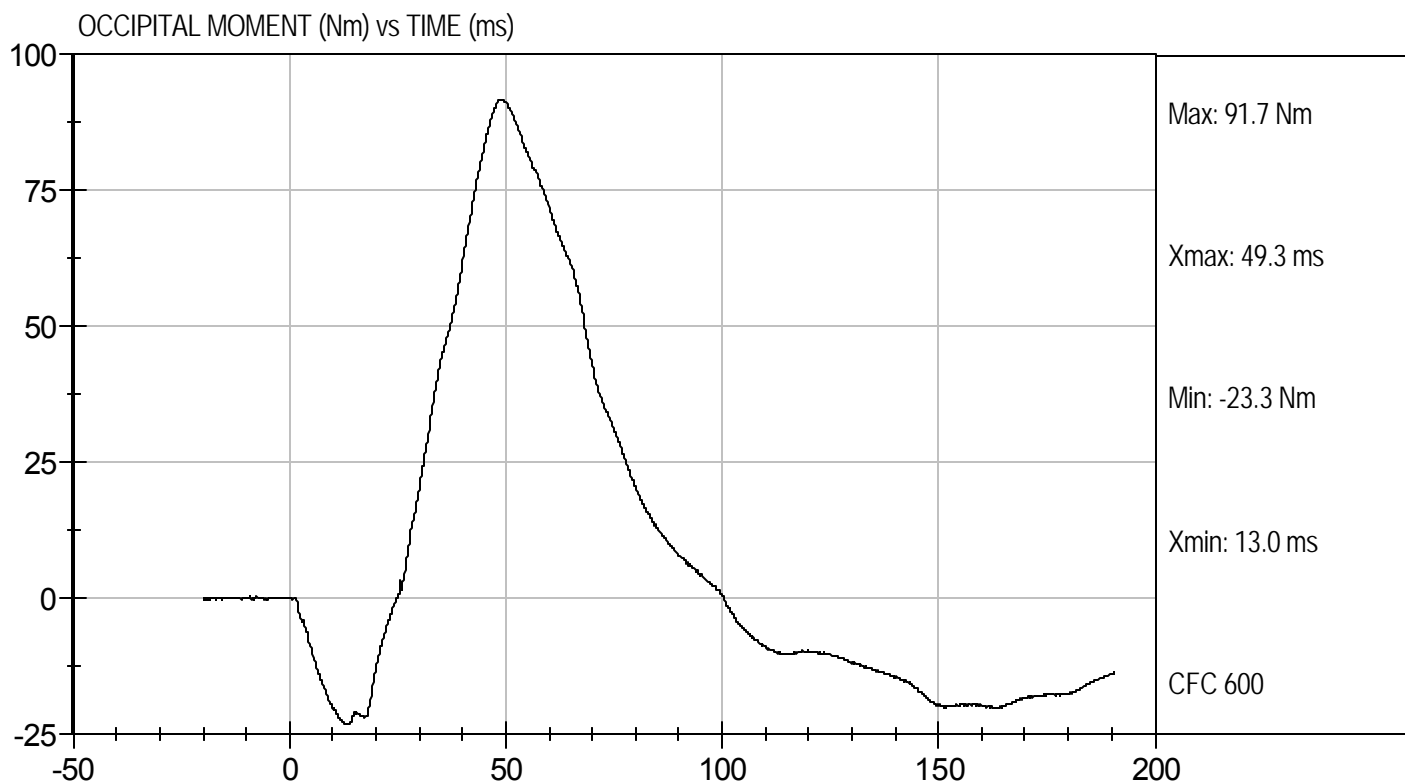
Test Date: 12/13/10  
Velocity: 22.83 ft/s, 6.96 m/s





Test Desc: Neck Flexion  
Component ID: D104382

Test Date: 12/13/10  
Velocity: 22.83 ft/s, 6.96 m/s



**MGA RESEARCH CORPORATION  
NECK EXTENSION TEST  
HYBRID III 50TH PERCENTILE MALE**

ATD Serial No: 351

Test I.D.: D104383

| Tested Parameter                               |         | Units   | Specification  | Result | Pass/Fail |
|--|---------|---------|----------------|--------|-----------|
| Laboratory Temperature                         |         | deg C   | 20.6 to 22.2   | 21.6   | Pass      |
| Laboratory Relative Humidity                   |         | %       | 10 to 70       | 12     | Pass      |
| Pendulum Velocity                              |         | m/s     | 5.95 to 6.19   | 6.13   | Pass      |
| Pendulum Deceleration                          | 10 ms   | G's     | 17.20 to 21.20 | 18.45  | Pass      |
|  | 20 ms   | G's     | 14.00 to 19.00 | 16.00  | Pass      |
|  | 30 ms   | G's     | 11.00 to 16.00 | 11.72  | Pass      |
| Peak Pendulum Deceleration After 30 ms         |         | G's     | <= 22.0        | 12.1   | Pass      |
| Deceleration Decay Time to Cross 5 G's         |         | ms      | 38.0 to 46.0   | 38.6   | Pass      |
| Maximum "D" Plane Rotation                     | Maximum | Degrees | 81.0 to 106.0  | 97.5   | Pass      |
|  | Time    | ms      | 72.0 to 82.0   | 77.3   | Pass      |
| "D" Plane Rotation Decay Time To Zero Crossing |         | ms      | 147.0 to 174.0 | 157.9  | Pass      |
| Moment About Occipital Condyle                 | Maximum | Nm      | -52.9 to -79.9 | -60.6  | Pass      |
|  | Time    | ms      | 65.0 to 79.0   | 72.9   | Pass      |
| Negative Moment Decay Time To Zero Crossing    |         | ms      | 120.0 to 148.0 | 145.8  | Pass      |
| Overall Test Results                           |         |         |                |        | Pass      |

*Jessica Hall*  
Laboratory Technician

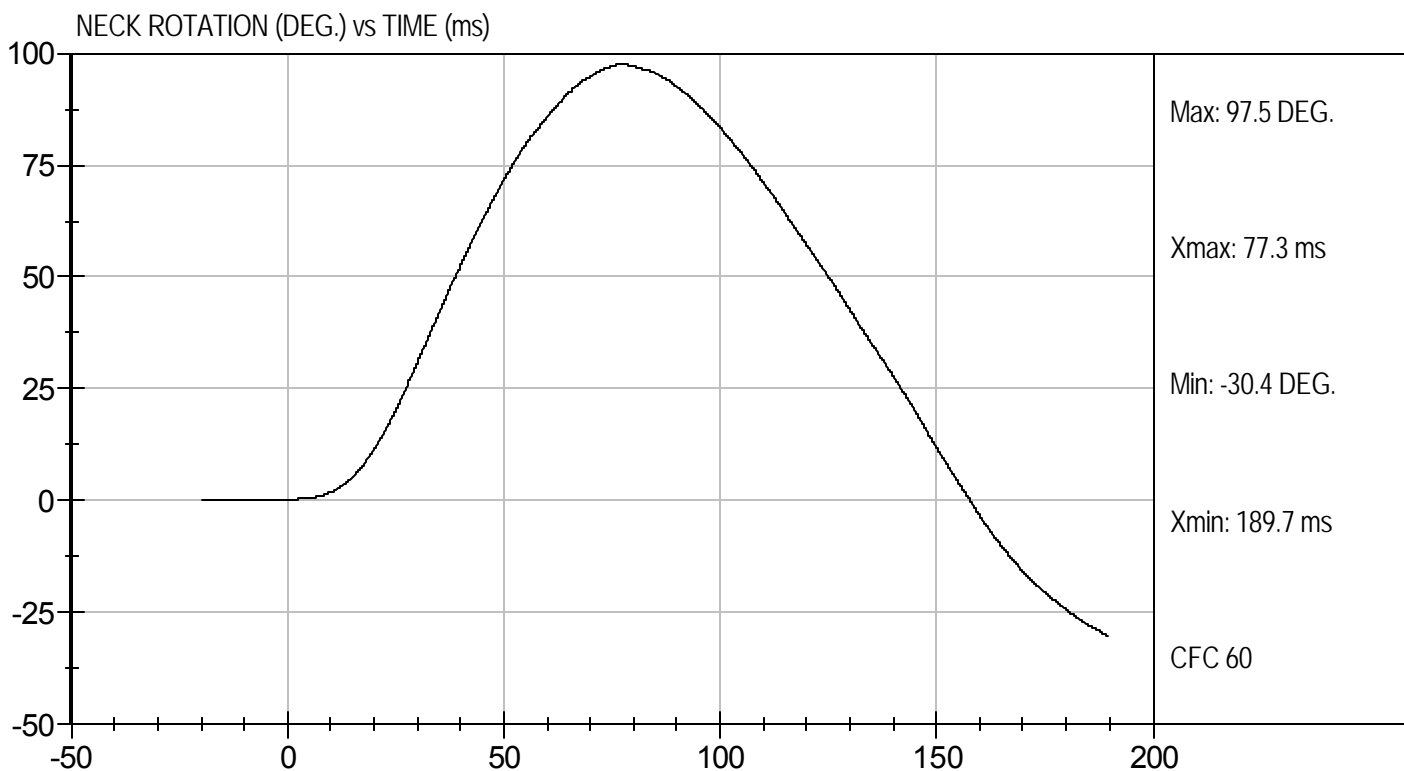
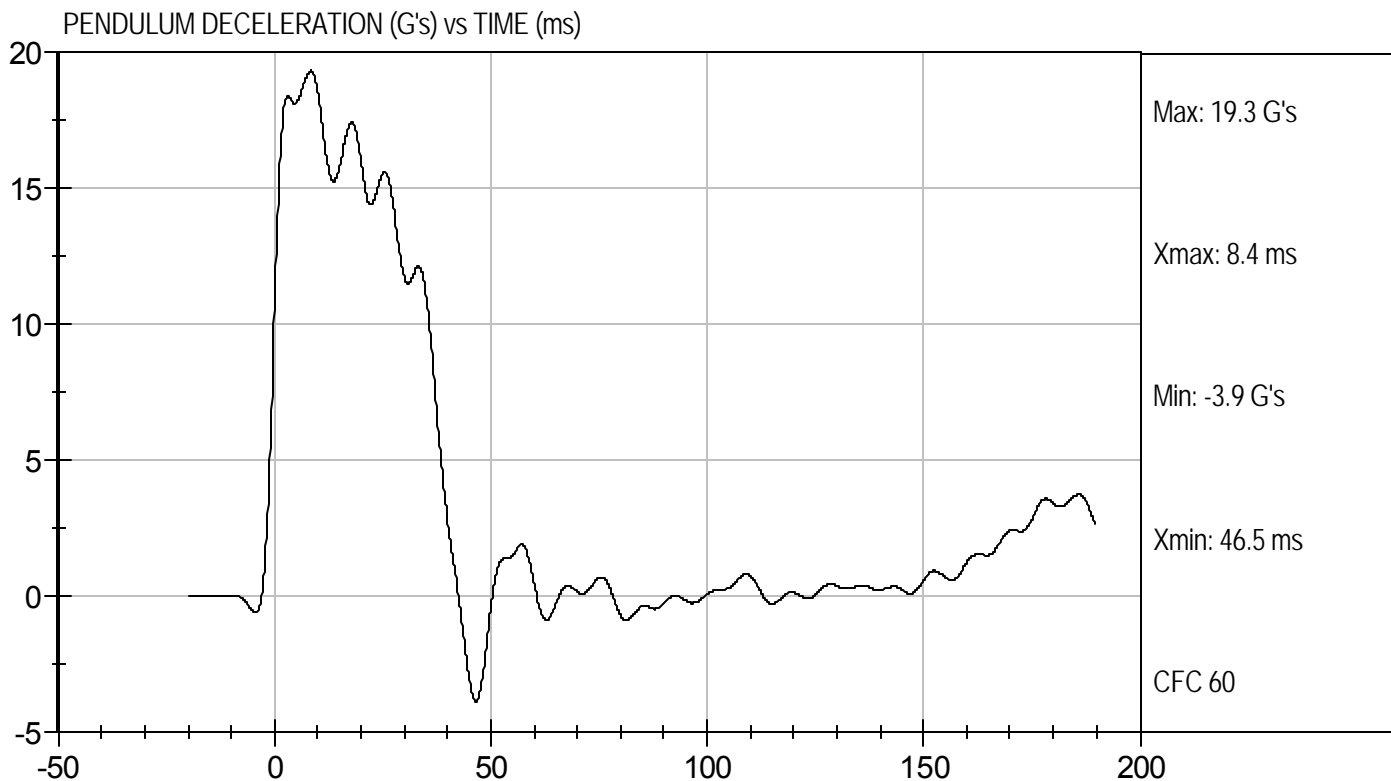
12/13/10  
Test Date

*David Winkelbauer*  
Approved By



Test Desc: Neck Extension  
Component ID: D104383

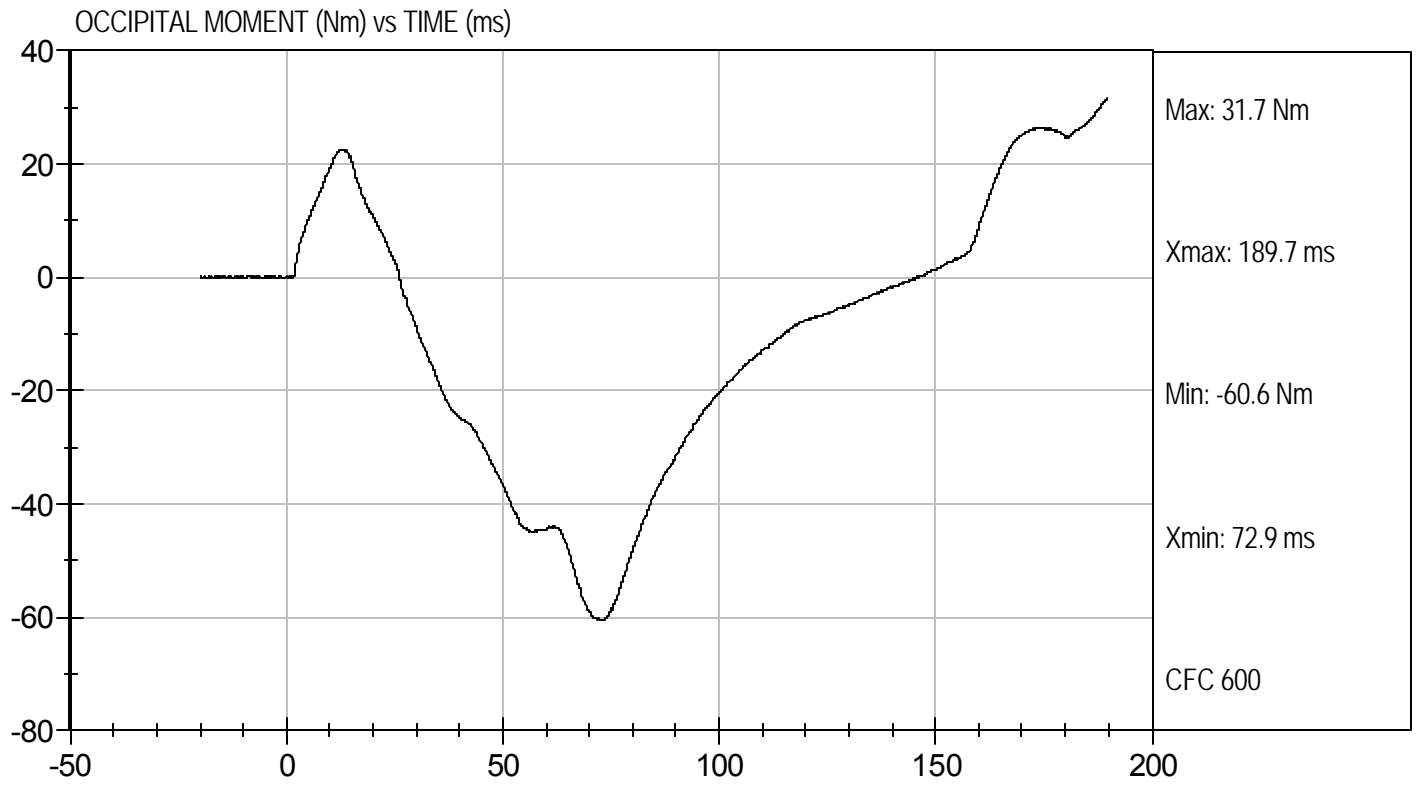
Test Date: 12/13/10  
Velocity: 20.10 ft/s, 6.13 m/s





Test Desc: Neck Extension  
Component ID: D104383

Test Date: 12/13/10  
Velocity: 20.10 ft/s, 6.13 m/s



**MGA RESEARCH CORPORATION  
THORAX IMPACT  
HYBRID III 50TH PERCENTILE MALE**

ATD Serial No: 351

Test I.D.: D104384

| Tested Parameter             | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature       | deg C | 20.6 to 22.2  | 21.3   | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70      | 14     | Pass      |
| Probe Velocity               | m/s   | 6.58 to 6.82  | 6.77   | Pass      |
| Peak Probe Force             | N     | 5159 to 5893  | 5,215  | Pass      |
| Peak Sternum Displacement    | cm    | 6.35 to 7.26  | 6.79   | Pass      |
| Internal Hysteresis          | %     | 69 to 85      | 69     | Pass      |
| Overall Test Results         |       |               |        | Pass      |

Jessica Hall  
Laboratory Technician

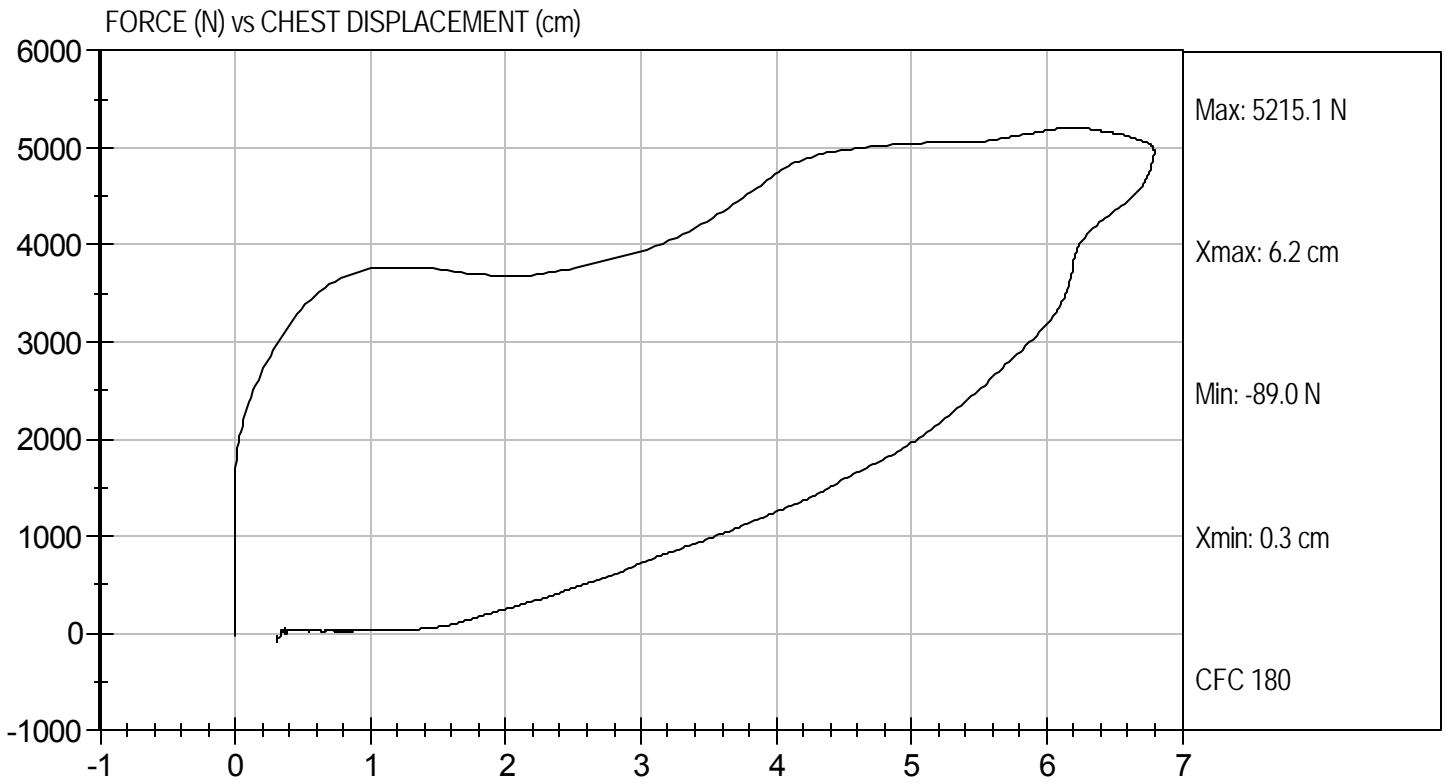
12/13/10  
Test Date

David Winkelbauer  
Approved By



Test Desc: Thorax Impact  
Component ID: D104384

Test Date: 12/13/10  
Velocity: 22.22 ft/s, 6.77 m/s



**MGA RESEARCH CORPORATION  
RIGHT KNEE IMPACT TEST  
HYBRID III 50TH PERCENTILE MALE**

ATD Serial No: 351

Test I.D: D104385

| Tested Parameter             | Units   | Specification | Result | Pass/Fail |
|------------------------------|---------|---------------|--------|-----------|
| Laboratory Temperature       | deg C   | 18.9 to 25.5  | 21.9   | Pass      |
| Laboratory Relative Humidity | %       | 10 to 70      | 15     | Pass      |
| Probe Velocity               | m/s     | 2.07 to 2.13  | 2.09   | Pass      |
| Peak Probe Force             | Newtons | 4715 to 5782  | 5,019  | Pass      |
| Overall Test Results         |         |               |        | Pass      |

Jessica Gall  
Laboratory Technician

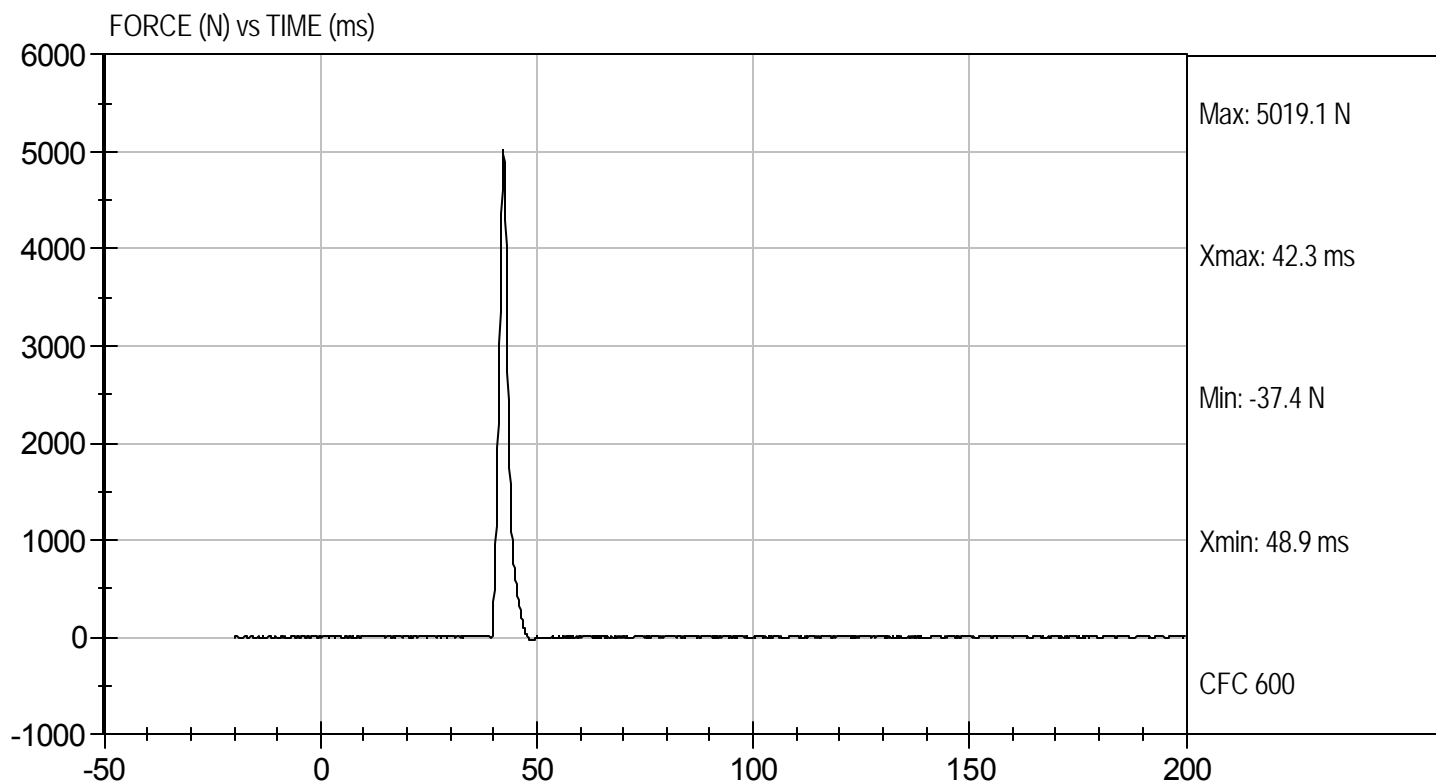
12/13/10  
Test Date

David Winkelbauer  
Approved By



Test Desc: Right Knee  
Component ID: D104385

Test Date: 12/13/10  
Velocity: 6.86 ft/s, 2.09 m/s



**MGA RESEARCH CORPORATION**  
**LEFT KNEE IMPACT TEST**  
**HYBRID III 50TH PERCENTILE MALE**

ATD Serial No: 351

Test I.D: D104386

| Tested Parameter             | Units   | Specification | Result | Pass/Fail |
|------------------------------|---------|---------------|--------|-----------|
| Laboratory Temperature       | deg C   | 18.9 to 25.5  | 21.9   | Pass      |
| Laboratory Relative Humidity | %       | 10 to 70      | 15     | Pass      |
| Probe Velocity               | m/s     | 2.07 to 2.13  | 2.09   | Pass      |
| Peak Probe Force             | Newtons | 4715 to 5782  | 5,244  | Pass      |
| Overall Test Results         |         |               |        | Pass      |

*Jessica Gall*  
 Laboratory Technician

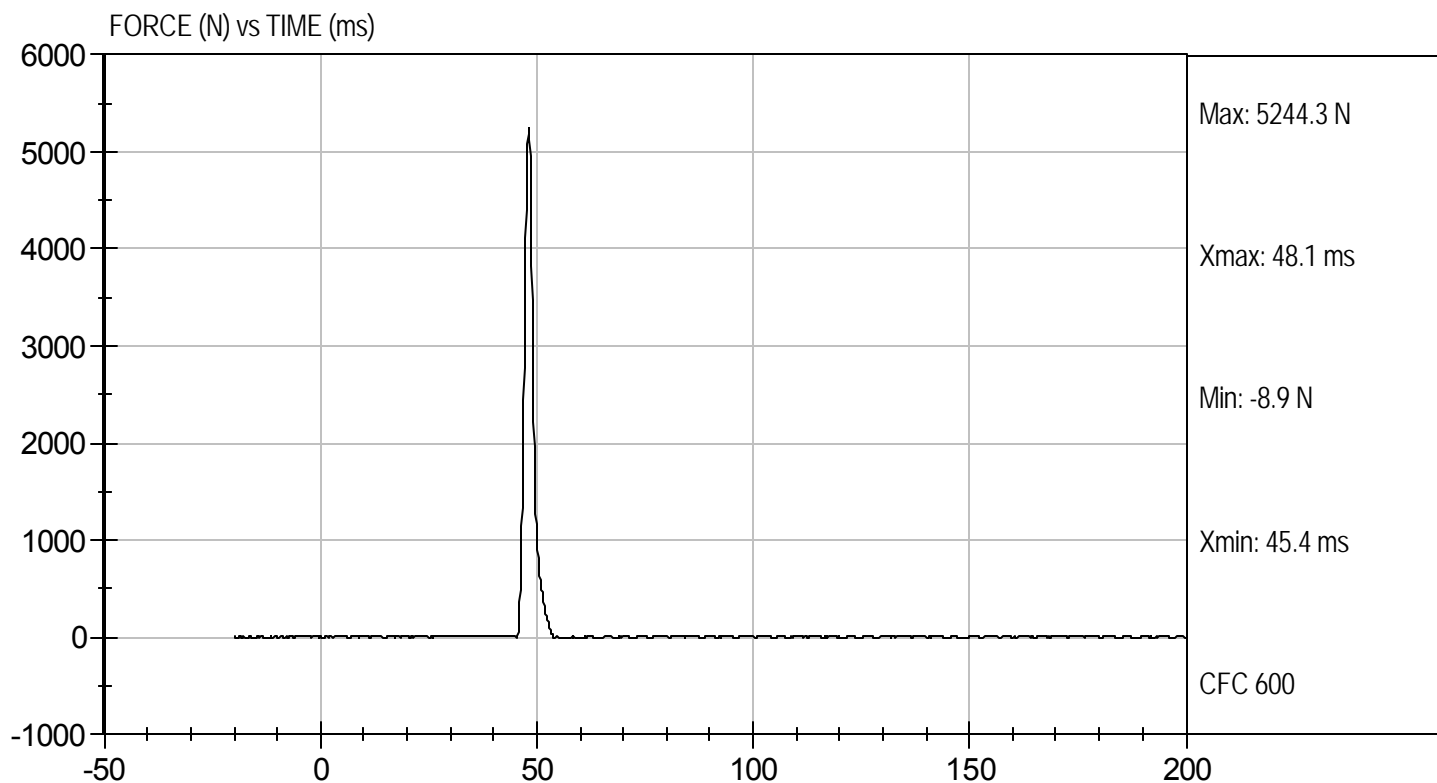
12/13/10  
 Test Date

*David Winkelbauer*  
 Approved By



Test Desc: Left Knee  
Component ID: D104386

Test Date: 12/13/10  
Velocity: 6.86 ft/s, 2.09 m/s



**MGA RESEARCH CORPORATION**  
**HIP-FEMUR FLEXION TEST**  
**HYBRID III 50TH PERCENTILE MALE**

ATD Serial No: 351

Test I.D: D104380

| Tested Parameter             | Units | Specification              | Result |      | Pass/Fail |
|------------------------------|-------|----------------------------|--------|------|-----------|
|                              |       |                            | Right  | Left |           |
| Laboratory Temperature       | deg C | 18.9 to 25.6               | 21.8   | 21.8 | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70                   | 14     | 14   | Pass      |
| Rotation Rate                | deg/s | 5 -10                      | 8      | 8    | Pass      |
| 30 Degrees                   | Nm    | 94.9 Nm Max                | 51.0   | 39.0 | Pass      |
| 150 ft-lbf / 203.4 Nm        | Deg   | 40- 50 Degree Max Rotation | 47     | 50   | Pass      |
| Overall Test Results         |       |                            |        |      | Pass      |

Jessica Gall  
 Laboratory Technician

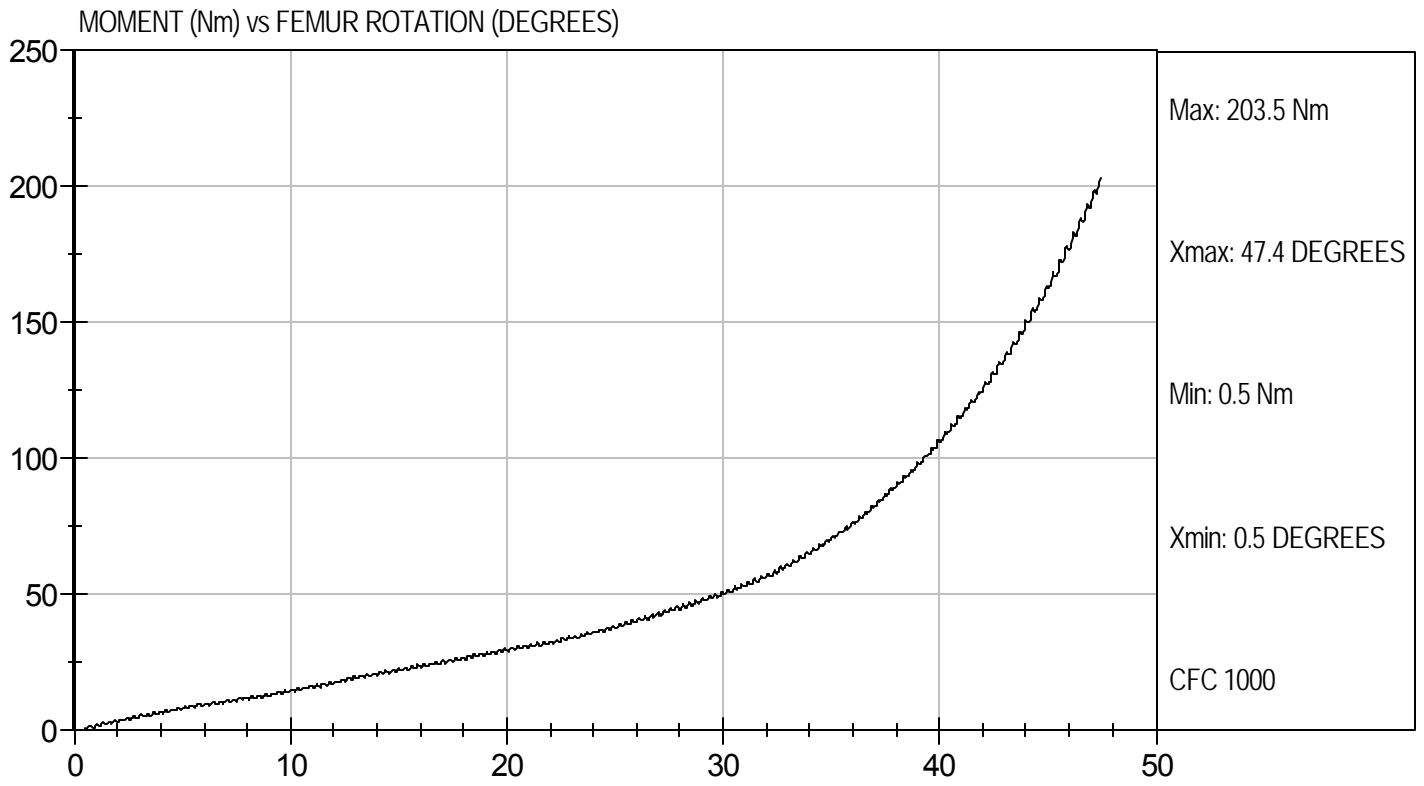
12/13/10  
 Test Date

David Winkelbauer  
 Approved By



Test Desc: Hip Femur Flexion  
Component ID: D104389

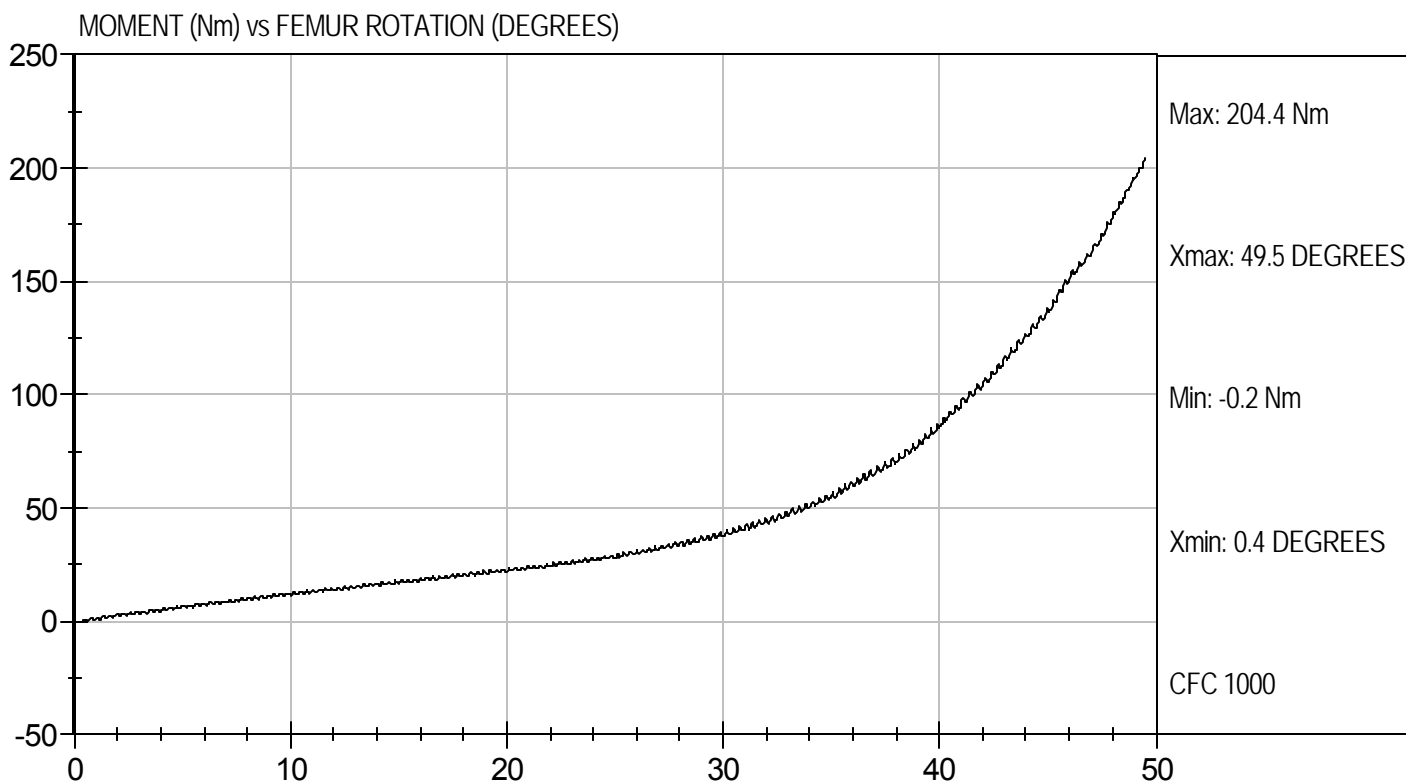
Test Date: 12/13/10  
Velocity: 0 ft/s, 0.00 m/s





Test Desc: Hip Femur Flexion  
Component ID: D104380

Test Date: 12/13/10  
Velocity: 0 ft/s, 0.00 m/s



**MGA RESEARCH CORPORATION**  
**HEAD DROP TEST**  
**HYBRID III 50TH PERCENTILE MALE**

ATD Serial No: 351

Test ID: D104441

| Tested Parameter             | Units | Specification      | Result | Pass/Fail |
|------------------------------|-------|--------------------|--------|-----------|
| Laboratory Temperature       | deg C | 18.9 - 25.6        | 20.6   | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70           | 13     | Pass      |
| Peak Resultant Acceleration  | G's   | 225 - 275          | 253    | Pass      |
| Peak Lateral Acceleration    | G's   | <= +/- 15.0        | -5.5   | Pass      |
| Unimodal                     | N/A   | Yes                | Yes    | Pass      |
| Oscillations                 | N/A   | within 10% of peak | Yes    | Pass      |
| Overall Test Results         |       |                    |        | Pass      |

Jessica Hall  
Laboratory Technician

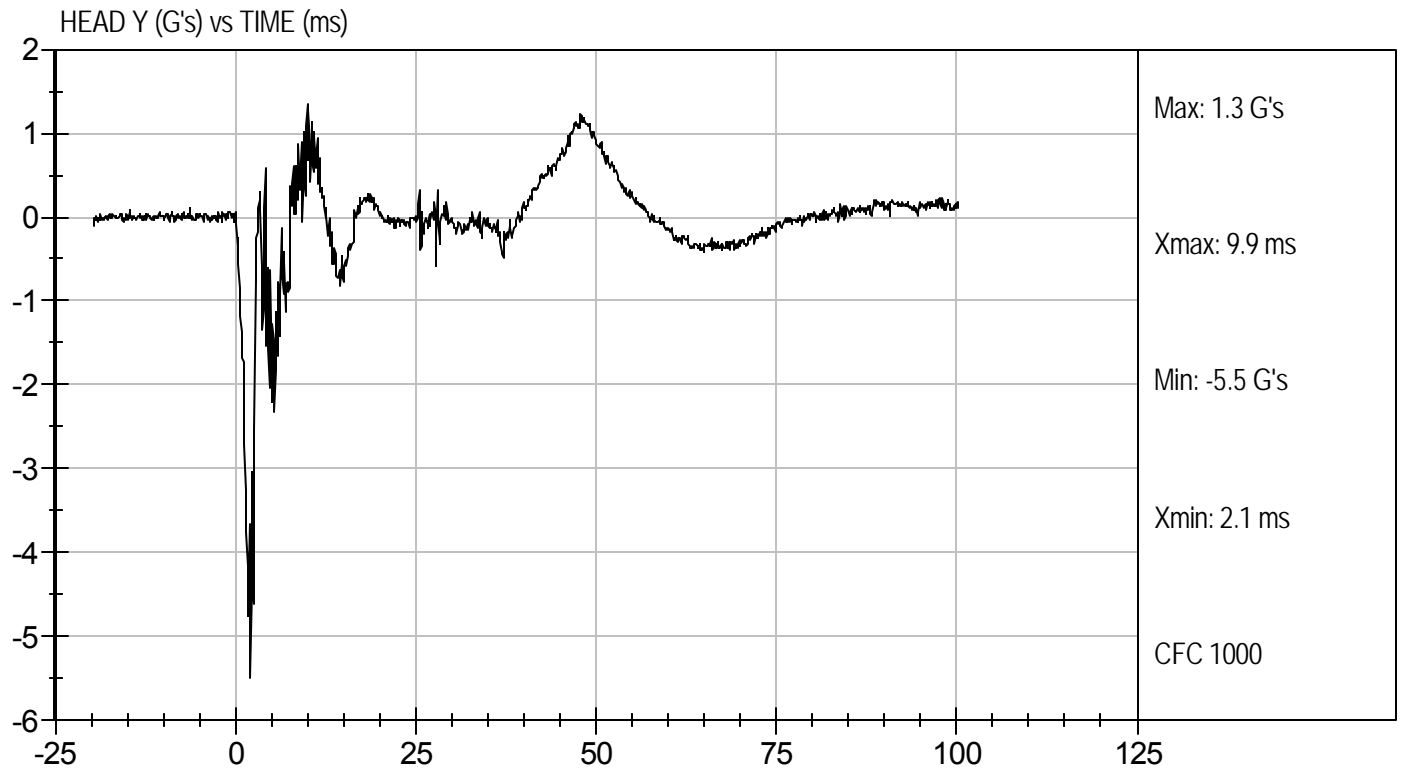
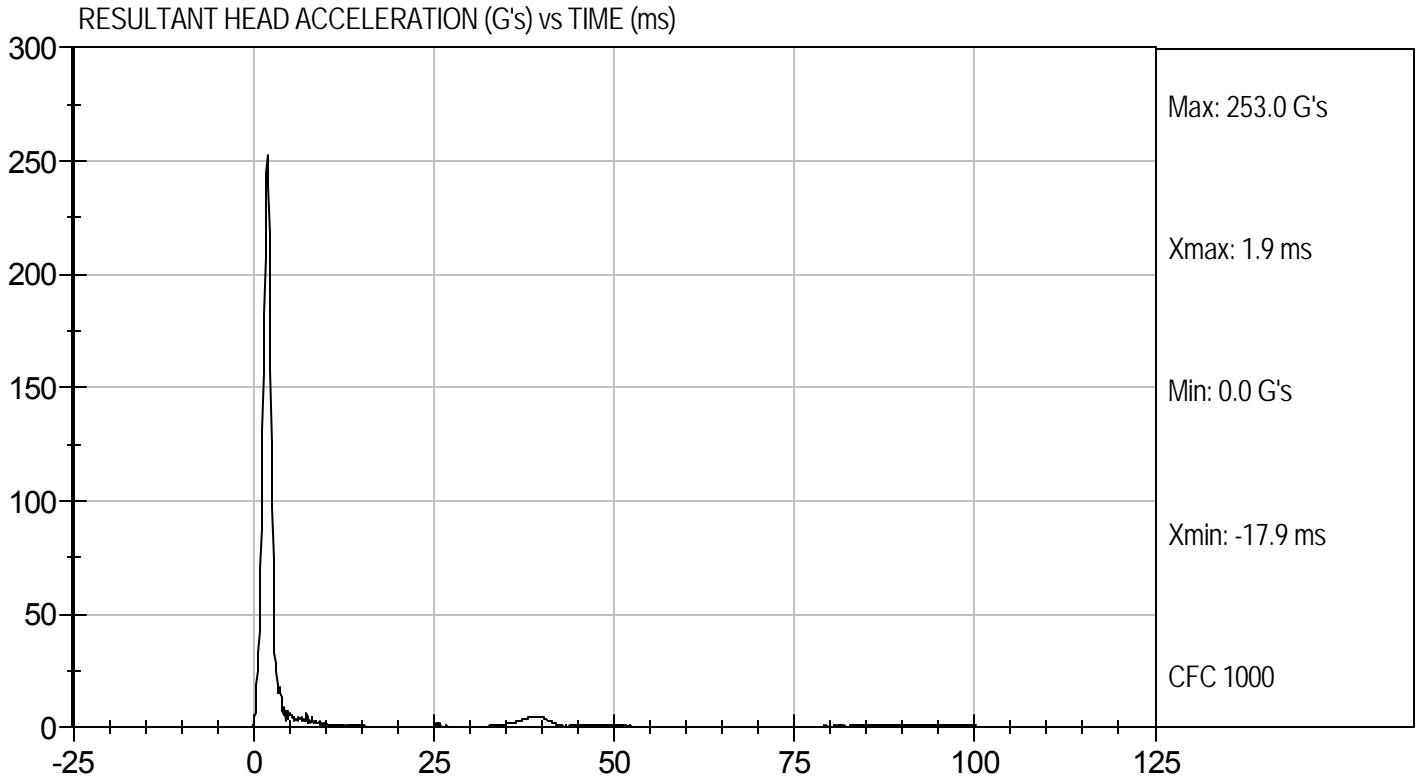
12/15/10  
Test Date

David Winkelbauer  
Approved By



Test Desc: Head Drop  
Component ID: D104441

Test Date: 12/15/10  
Velocity: 0 ft/s, 0.00 m/s



**MGA RESEARCH CORPORATION  
NECK FLEXION TEST  
HYBRID III 50TH PERCENTILE MALE**

ATD Serial No: 351

Test I.D.: D104442

| Tested Parameter                               |         | Units   | Specification  | Result | Pass/Fail |
|--|---------|---------|----------------|--------|-----------|
| Laboratory Temperature                         |         | deg C   | 20.6 to 22.2   | 20.8   | Pass      |
| Laboratory Relative Humidity                   |         | %       | 10 to 70       | 13     | Pass      |
| Pendulum Velocity                              |         | m/s     | 6.89 to 7.13   | 7.06   | Pass      |
| Pendulum Deceleration                          | 10 ms   | G's     | 22.50 to 27.50 | 23.85  | Pass      |
|  | 20 ms   | G's     | 17.60 to 22.60 | 19.71  | Pass      |
|  | 30 ms   | G's     | 12.50 to 18.50 | 15.18  | Pass      |
| Peak Pendulum Deceleration After 30 ms         |         | G's     | <= 29.0        | 15.1   | Pass      |
| Deceleration Decay Time to Cross 5 G's         |         | ms      | 34.0 to 42.0   | 35.2   | Pass      |
| Maximum "D" Plane Rotation                     | Maximum | Degrees | 64.0 to 78.0   | 71.3   | Pass      |
|  | Time    | ms      | 57.0 to 64.0   | 58.0   | Pass      |
| "D" Plane Rotation Decay Time To Zero Crossing |         | ms      | 113.0 to 128.0 | 113.3  | Pass      |
| Moment About Occipital Condyle                 | Maximum | N m     | 88.1 to 108.5  | 94.8   | Pass      |
|  | Time    | ms      | 47.0 to 58.0   | 47.5   | Pass      |
| Positive Moment Decay Time To Zero Crossing    |         | ms      | 97.0 to 107.0  | 98.9   | Pass      |
| Overall Test Results                           |         |         |                |        | Pass      |

*Jessica Hall*  
Laboratory Technician

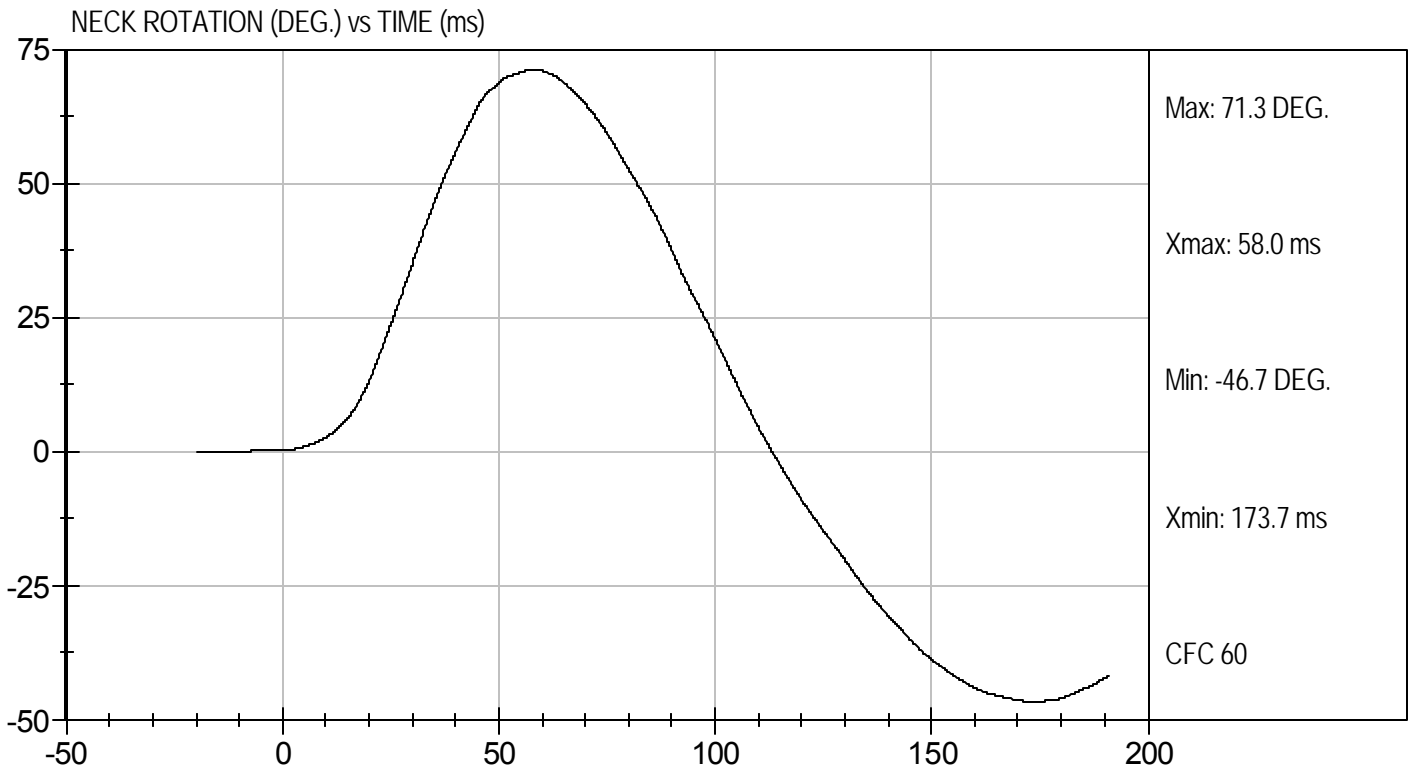
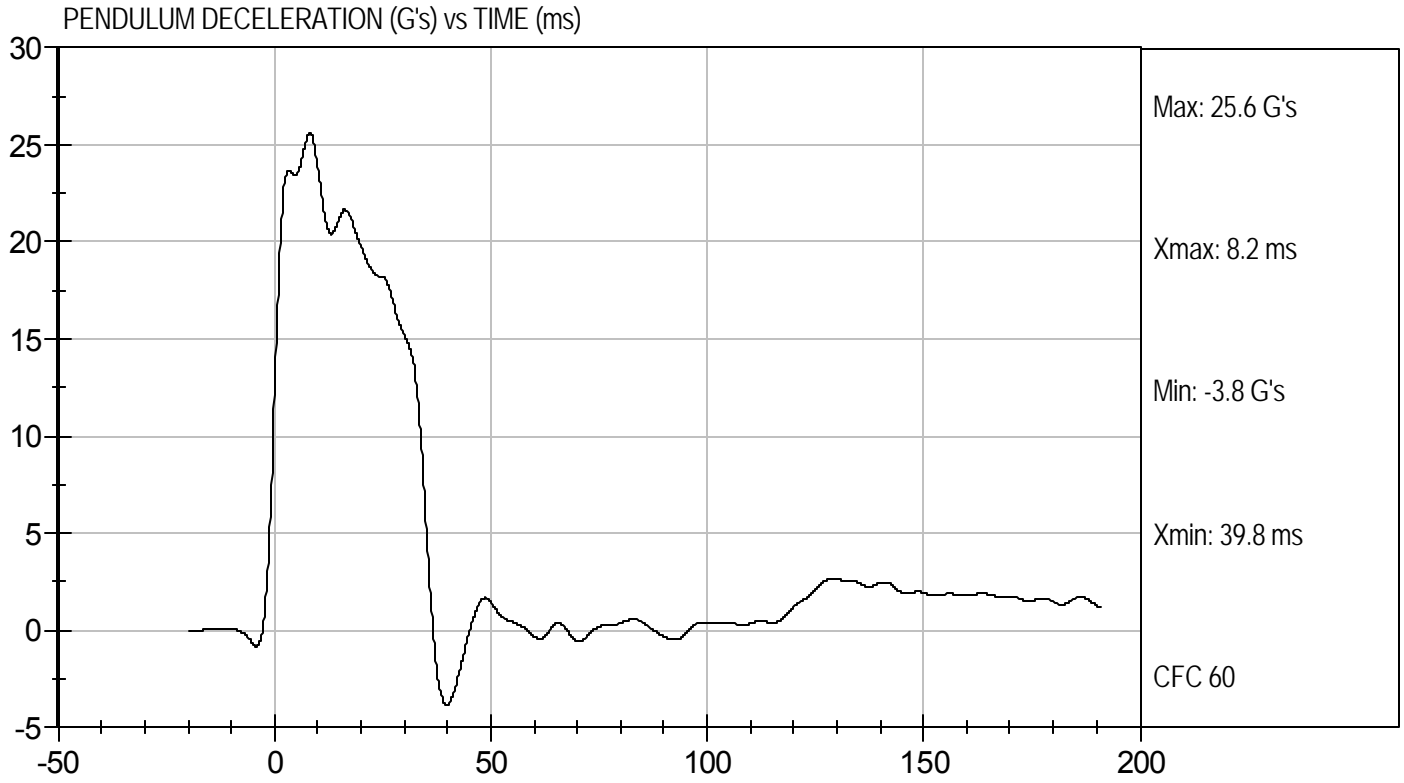
12/15/10  
Test Date

*David Winkelbauer*  
Approved By



Test Desc: Neck Flexion  
Component ID: D104442

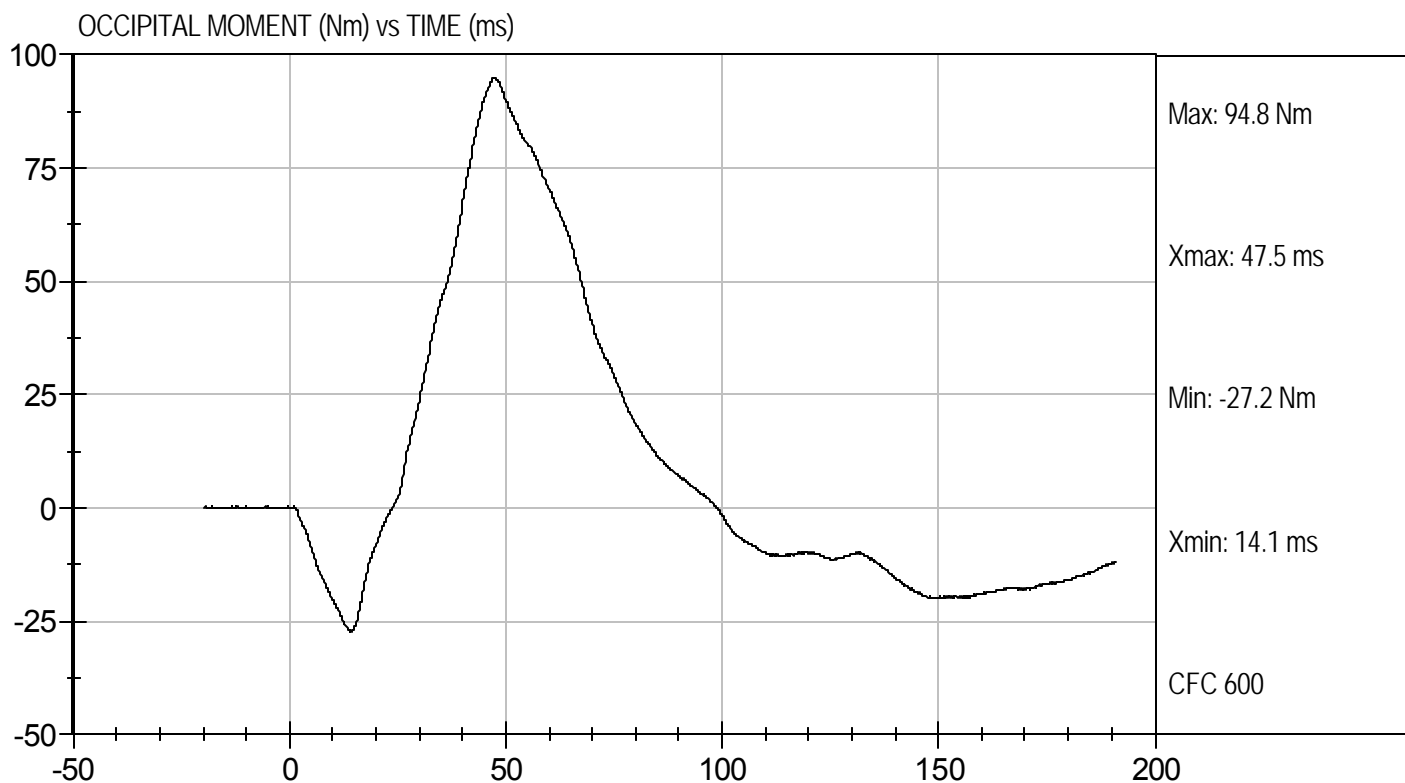
Test Date: 12/15/10  
Velocity: 23.15 ft/s, 7.06 m/s





Test Desc: Neck Flexion  
Component ID: D104442

Test Date: 12/15/10  
Velocity: 23.15 ft/s, 7.06 m/s



**MGA RESEARCH CORPORATION  
NECK EXTENSION TEST  
HYBRID III 50TH PERCENTILE MALE**

ATD Serial No: 351

Test I.D.: D104443

| Tested Parameter                               |         | Units   | Specification  | Result | Pass/Fail |
|--|---------|---------|----------------|--------|-----------|
| Laboratory Temperature                         |         | deg C   | 20.6 to 22.2   | 21.6   | Pass      |
| Laboratory Relative Humidity                   |         | %       | 10 to 70       | 15     | Pass      |
| Pendulum Velocity                              |         | m/s     | 5.95 to 6.19   | 6.16   | Pass      |
| Pendulum Deceleration                          | 10 ms   | G's     | 17.20 to 21.20 | 19.44  | Pass      |
|  | 20 ms   | G's     | 14.00 to 19.00 | 17.47  | Pass      |
|  | 30 ms   | G's     | 11.00 to 16.00 | 14.03  | Pass      |
| Peak Pendulum Deceleration After 30 ms         |         | G's     | <= 22.0        | 13.9   | Pass      |
| Deceleration Decay Time to Cross 5 G's         |         | ms      | 38.0 to 46.0   | 38.2   | Pass      |
| Maximum "D" Plane Rotation                     | Maximum | Degrees | 81.0 to 106.0  | 92.5   | Pass      |
|  | Time    | ms      | 72.0 to 82.0   | 75.2   | Pass      |
| "D" Plane Rotation Decay Time To Zero Crossing |         | ms      | 147.0 to 174.0 | 154.5  | Pass      |
| Moment About Occipital Condyle                 | Maximum | Nm      | -52.9 to -79.9 | -63.4  | Pass      |
|  | Time    | ms      | 65.0 to 79.0   | 69.8   | Pass      |
| Negative Moment Decay Time To Zero Crossing    |         | ms      | 120.0 to 148.0 | 143.3  | Pass      |
| Overall Test Results                           |         |         |                |        | Pass      |

Jessica Gall  
Laboratory Technician

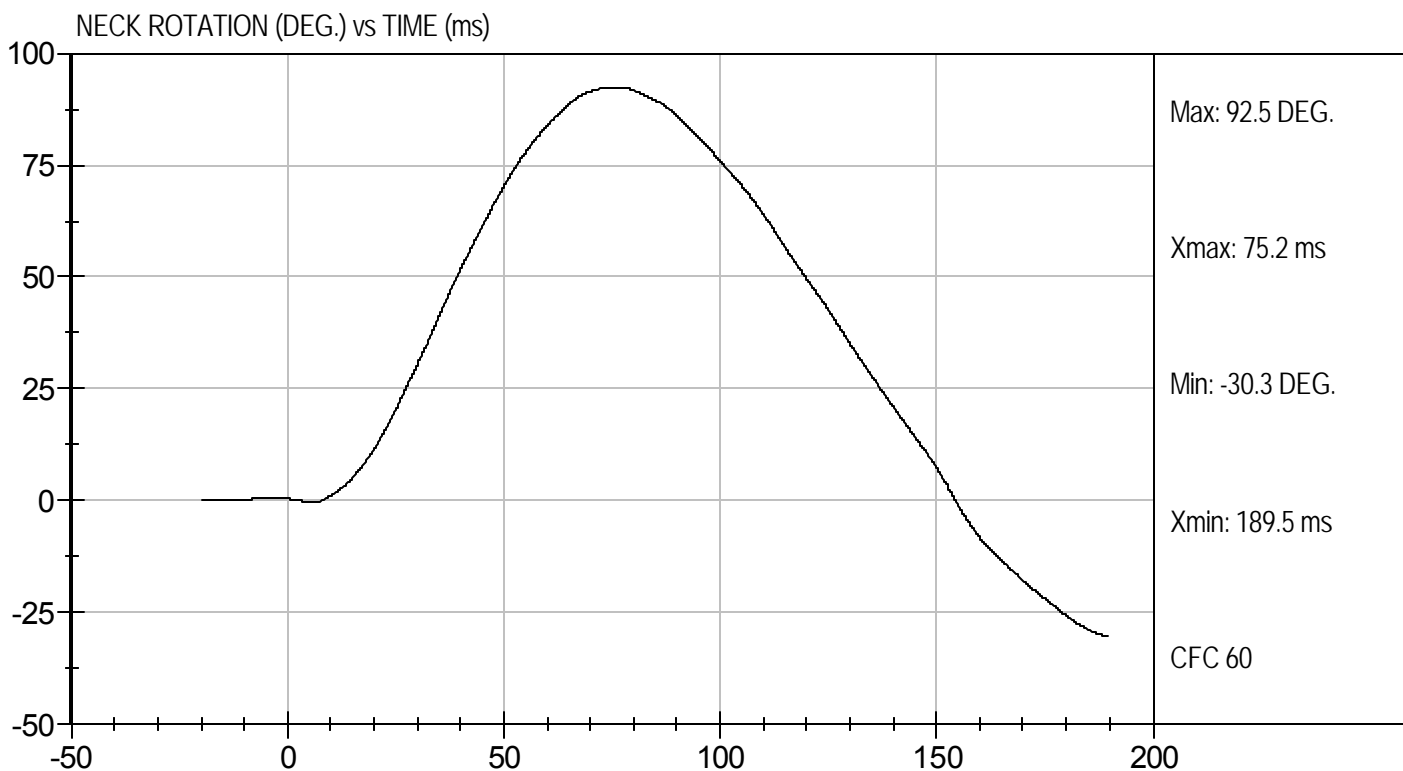
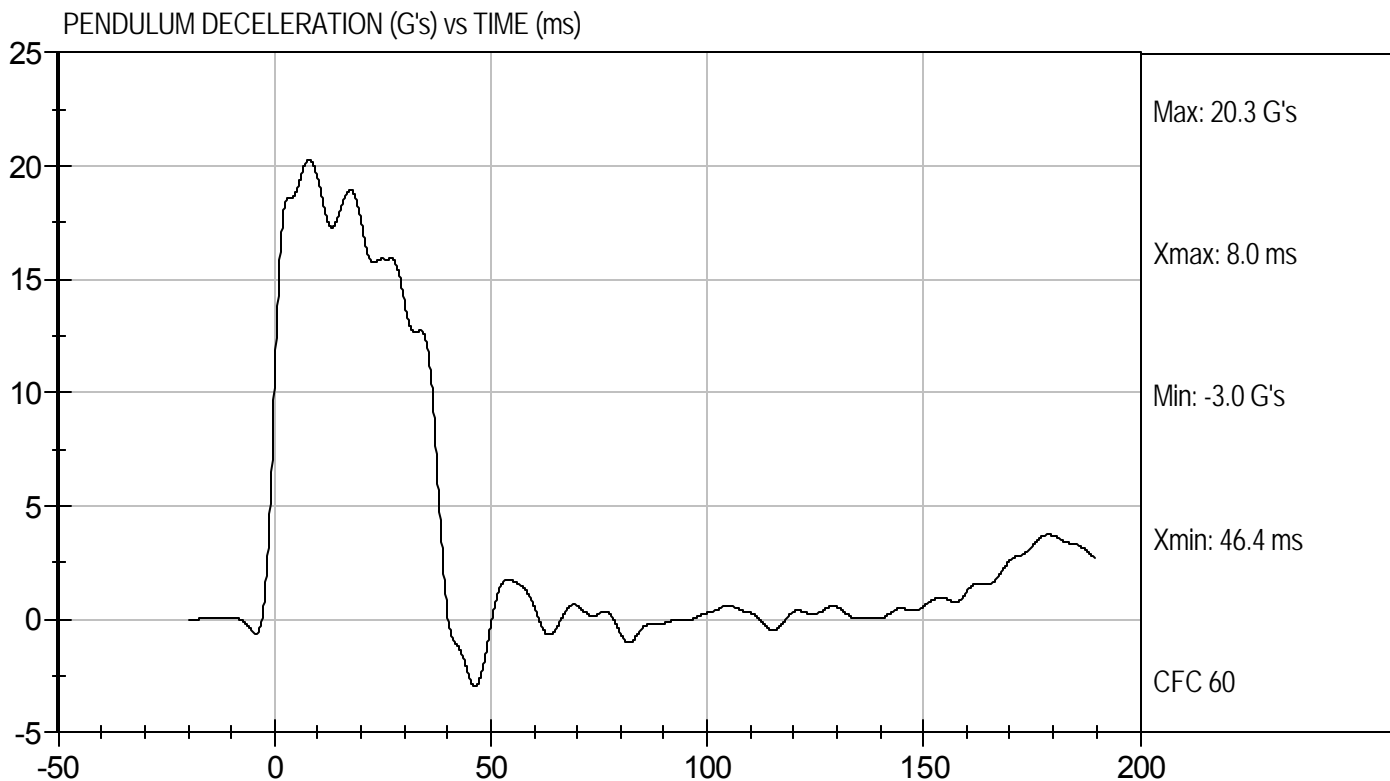
12/16/10  
Test Date

David Winkelbauer  
Approved By



Test Desc: Neck Extension  
Component ID: D104443

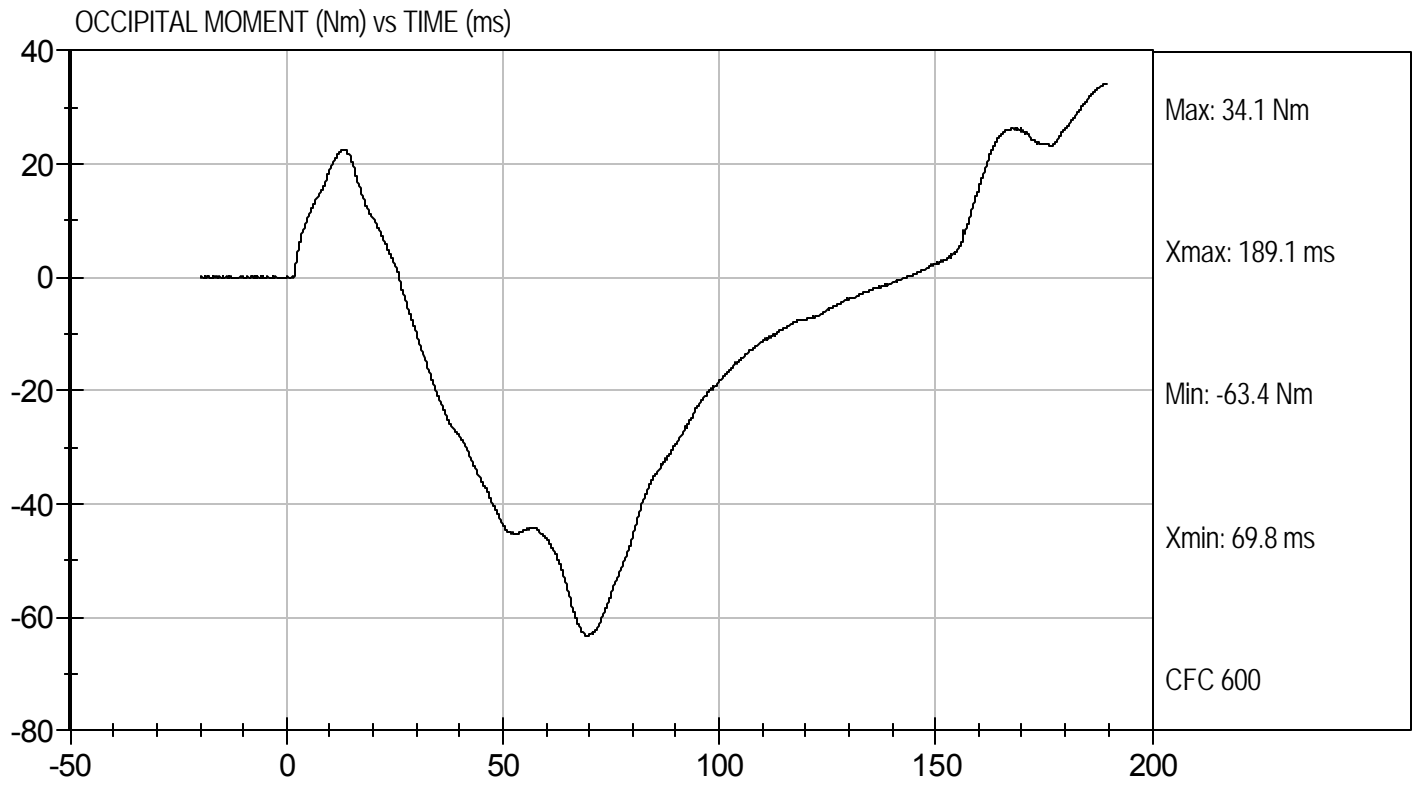
Test Date: 12/16/10  
Velocity: 20.20 ft/s, 6.16 m/s





Test Desc: Neck Extension  
Component ID: D104443

Test Date: 12/16/10  
Velocity: 20.20 ft/s, 6.16 m/s



**MGA RESEARCH CORPORATION  
THORAX IMPACT  
HYBRID III 50TH PERCENTILE MALE**

ATD Serial No: 351

Test I.D: D104444

| 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      | 14     | Pass      |
| Probe Velocity               | m/s   | 6.58 to 6.82  | 6.60   | Pass      |
| Peak Probe Force             | N     | 5159 to 5893  | 5,274  | Pass      |
| Peak Sternum Displacement    | cm    | 6.35 to 7.26  | 6.49   | Pass      |
| Internal Hysteresis          | %     | 69 to 85      | 72     | Pass      |
| Overall Test Results         |       |               |        | Pass      |

Jessica Hall  
Laboratory Technician

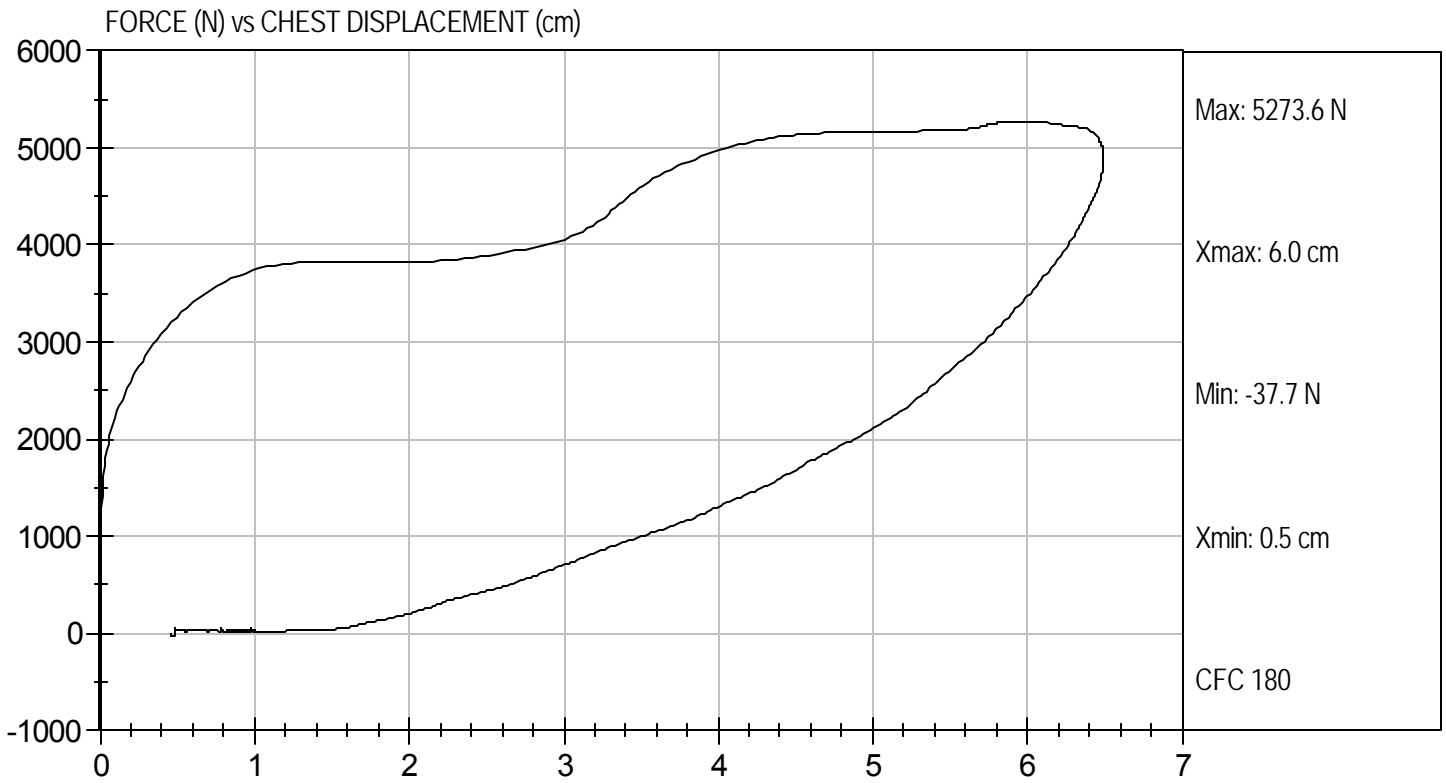
12/16/10  
Test Date

David Winkelbauer  
Approved By



Test Desc: Thorax Impact  
Component ID: D104444

Test Date: 12/16/10  
Velocity: 21.64 ft/s, 6.60 m/s



**MGA RESEARCH CORPORATION  
RIGHT KNEE IMPACT TEST  
HYBRID III 50TH PERCENTILE MALE**


ATD Serial No: 351

Test I.D: D104445

| Tested Parameter             | Units   | Specification | Result | Pass/Fail |
|------------------------------|---------|---------------|--------|-----------|
| Laboratory Temperature       | deg C   | 18.9 to 25.5  | 20.6   | Pass      |
| Laboratory Relative Humidity | %       | 10 to 70      | 13     | Pass      |
| Probe Velocity               | m/s     | 2.07 to 2.13  | 2.12   | Pass      |
| Peak Probe Force             | Newtons | 4715 to 5782  | 5,282  | Pass      |
| Overall Test Results         |         |               |        | Pass      |

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

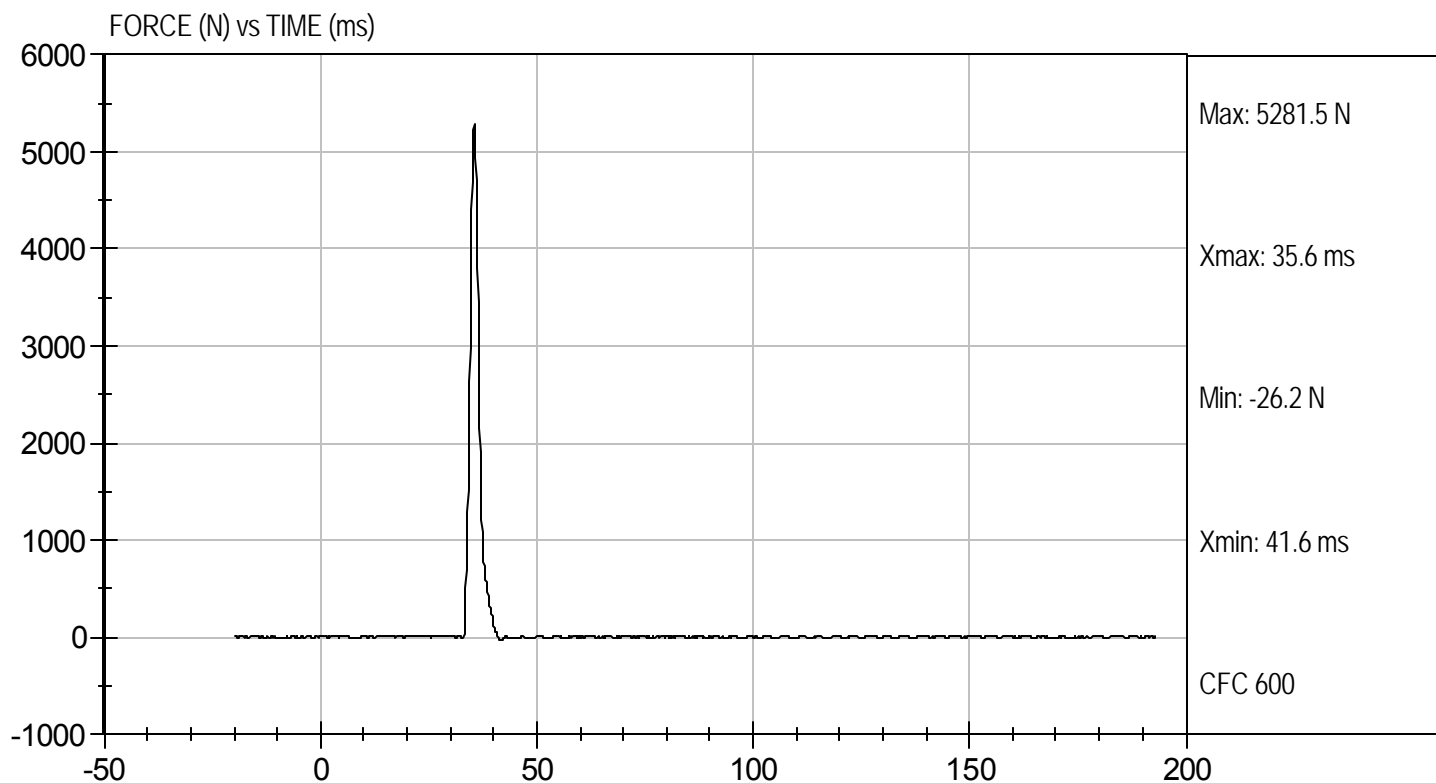
12/15/10  
\_\_\_\_\_  
Test Date

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



Test Desc: Right Knee  
Component ID: D104445

Test Date: 12/15/10  
Velocity: 6.94 ft/s, 2.12 m/s



**MGA RESEARCH CORPORATION**  
**LEFT KNEE IMPACT TEST**  
**HYBRID III 50TH PERCENTILE MALE**

ATD Serial No: 351

Test I.D: D104446

| Tested Parameter             | Units   | Specification | Result | Pass/Fail |
|------------------------------|---------|---------------|--------|-----------|
| Laboratory Temperature       | deg C   | 18.9 to 25.5  | 20.6   | Pass      |
| Laboratory Relative Humidity | %       | 10 to 70      | 13     | Pass      |
| Probe Velocity               | m/s     | 2.07 to 2.13  | 2.09   | Pass      |
| Peak Probe Force             | Newtons | 4715 to 5782  | 4,954  | Pass      |
| Overall Test Results         |         |               |        | Pass      |

Jessica Gall  
 Laboratory Technician

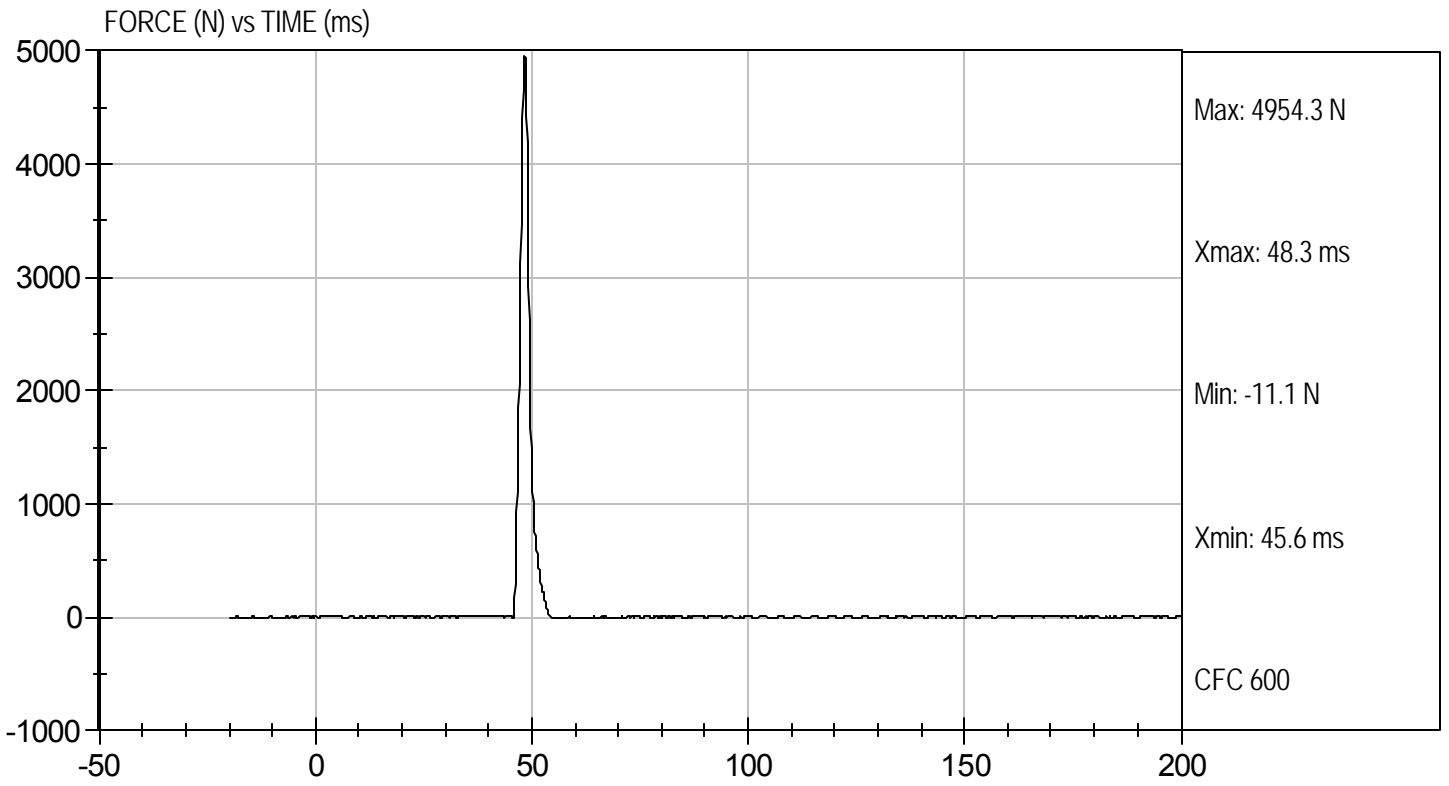
12/15/10  
 Test Date

David Winkelbauer  
 Approved By



Test Desc: Left Knee  
Component ID: D104446

Test Date: 12/15/10  
Velocity: 6.86 ft/s, 2.09 m/s



**MGA RESEARCH CORPORATION**  
**HIP-FEMUR FLEXION TEST**  
**HYBRID III 50TH PERCENTILE MALE**

ATD Serial No: 351

Test I.D: D104440

| Tested Parameter             | Units | Specification                 | Result |      | Pass/Fail |
|------------------------------|-------|-------------------------------|--------|------|-----------|
|                              |       |                               | Right  | Left |           |
| Laboratory Temperature       | deg C | 18.9 to 25.6                  | 20.9   | 20.9 | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70                      | 14     | 14   | Pass      |
| Rotation Rate                | deg/s | 5 -10                         | 8      | 8    | Pass      |
| 30 Degrees                   | Nm    | 94.9 Nm Max                   | 54.8   | 45.2 | Pass      |
| 150 ft-lbf / 203.4 Nm        | Deg   | 40- 50 Degree<br>Max Rotation | 46     | 48   | Pass      |
| Overall Test Results         |       |                               |        |      | Pass      |

Jessica Hall  
Laboratory Technician

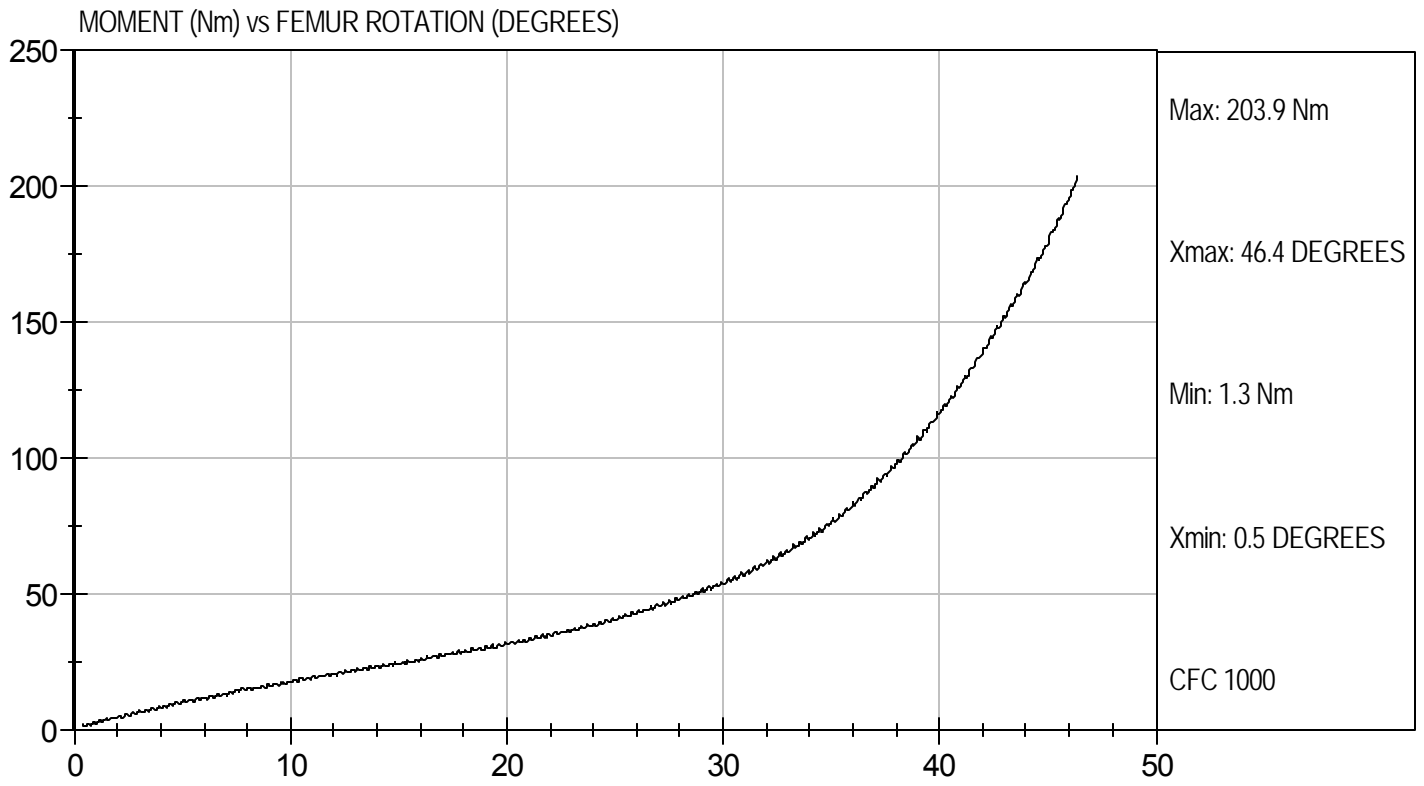
12/15/10  
Test Date

David Winkelbauer  
Approved By



Test Desc: Hip Femur Flexion  
Component ID: D104449

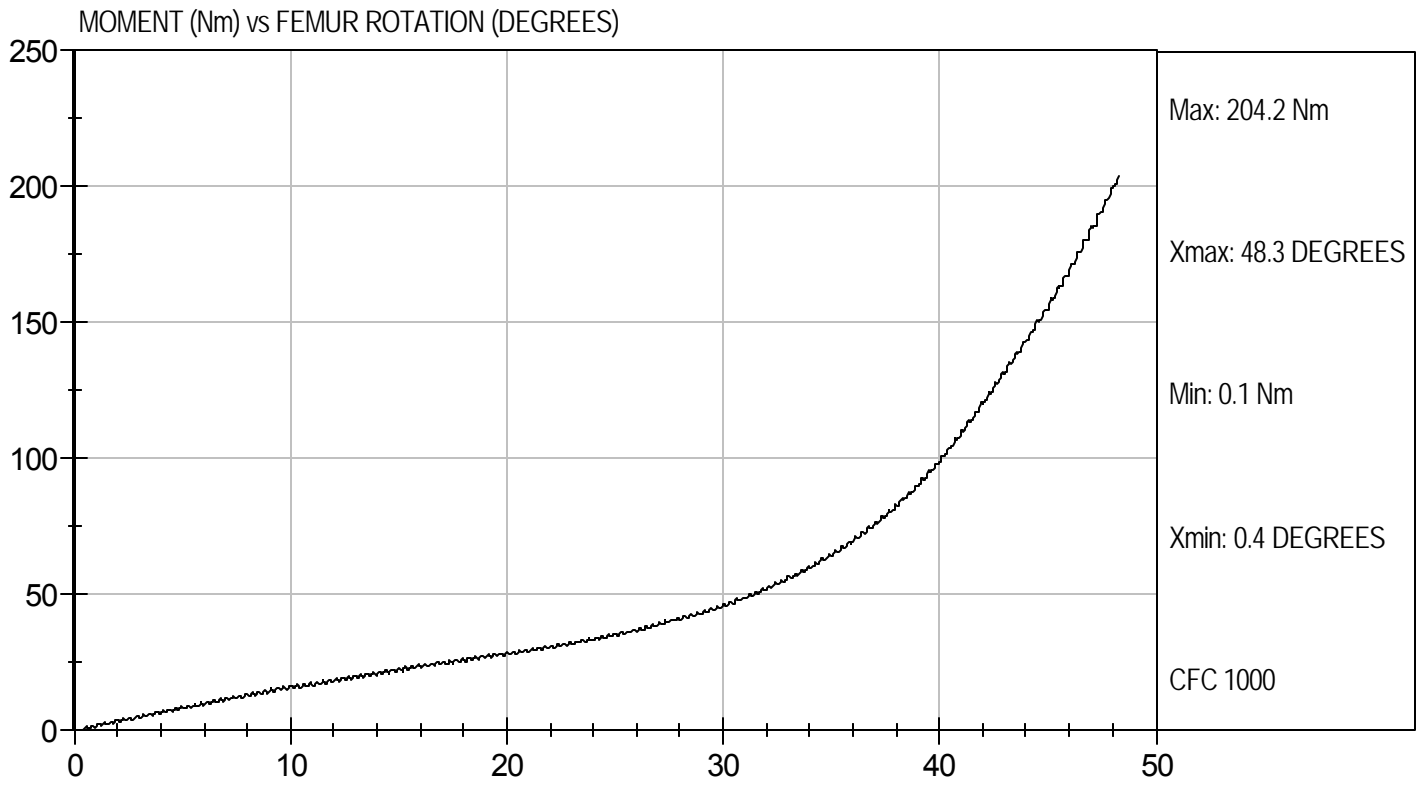
Test Date: 12/15/10  
Velocity: 0 ft/s, 0.00 m/s





Test Desc: Hip Femur Flexion  
Component ID: D104440

Test Date: 12/15/10  
Velocity: 0 ft/s, 0.00 m/s



**MGA RESEARCH CORPORATION**  
**HEAD DROP TEST**  
**HYBRID III 5TH PERCENTILE**

ATD Serial No: 138

Test ID: D103611

| Tested Parameter             | Units | Specification      | Result | Pass/Fail |
|------------------------------|-------|--------------------|--------|-----------|
| Laboratory Temperature       | deg C | 18.9 to 25.6       | 22.0   | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70           | 31     | Pass      |
| Peak Resultant Acceleration  | G's   | 250 to 300         | 295    | Pass      |
| Peak Lateral Acceleration    | G's   | +/- 15             | -6.1   | Pass      |
| Unimodal                     | N/A   | Yes                | Yes    | Pass      |
| Oscillations                 | N/A   | within 10% of peak | Yes    | Pass      |
| Overall Test Results         |       |                    |        | Pass      |

*Jessica Hall*  
 Laboratory Technician

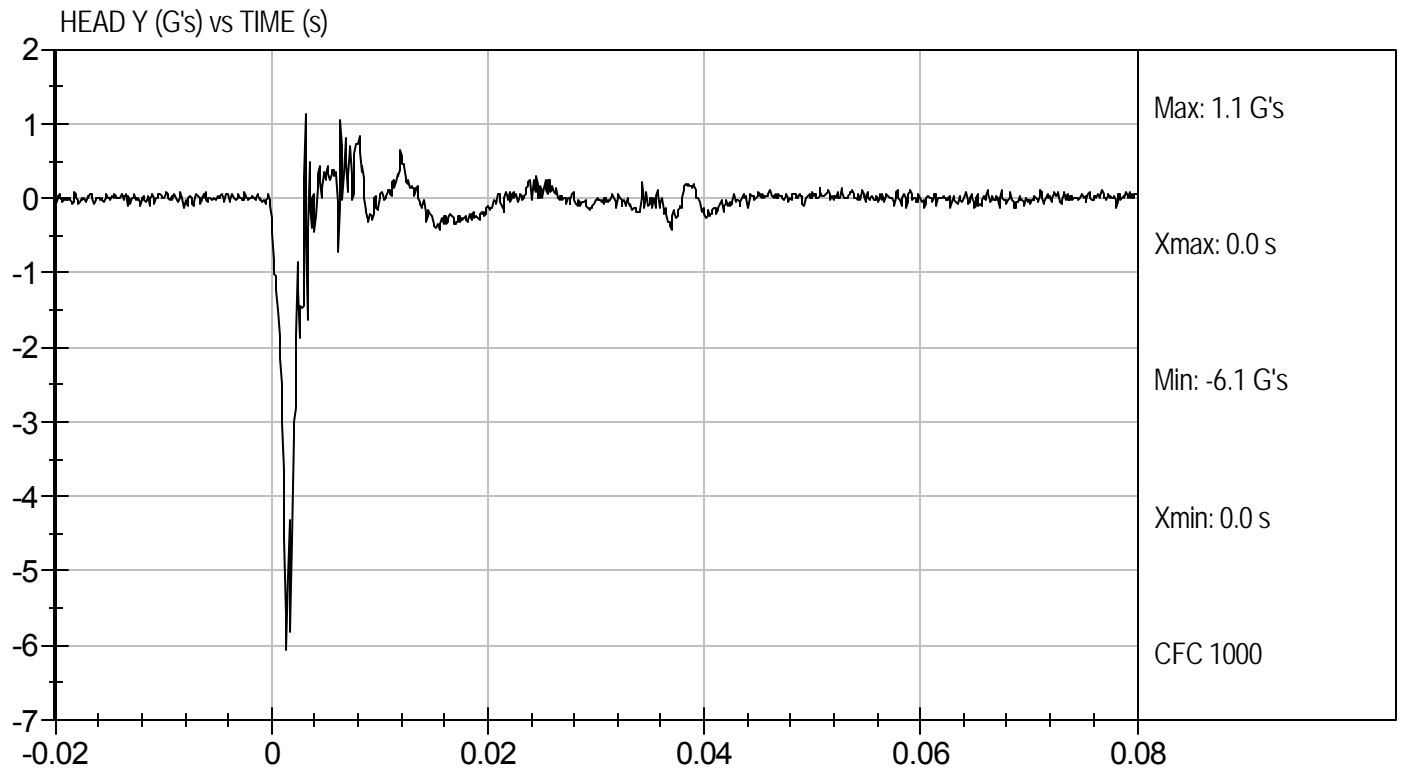
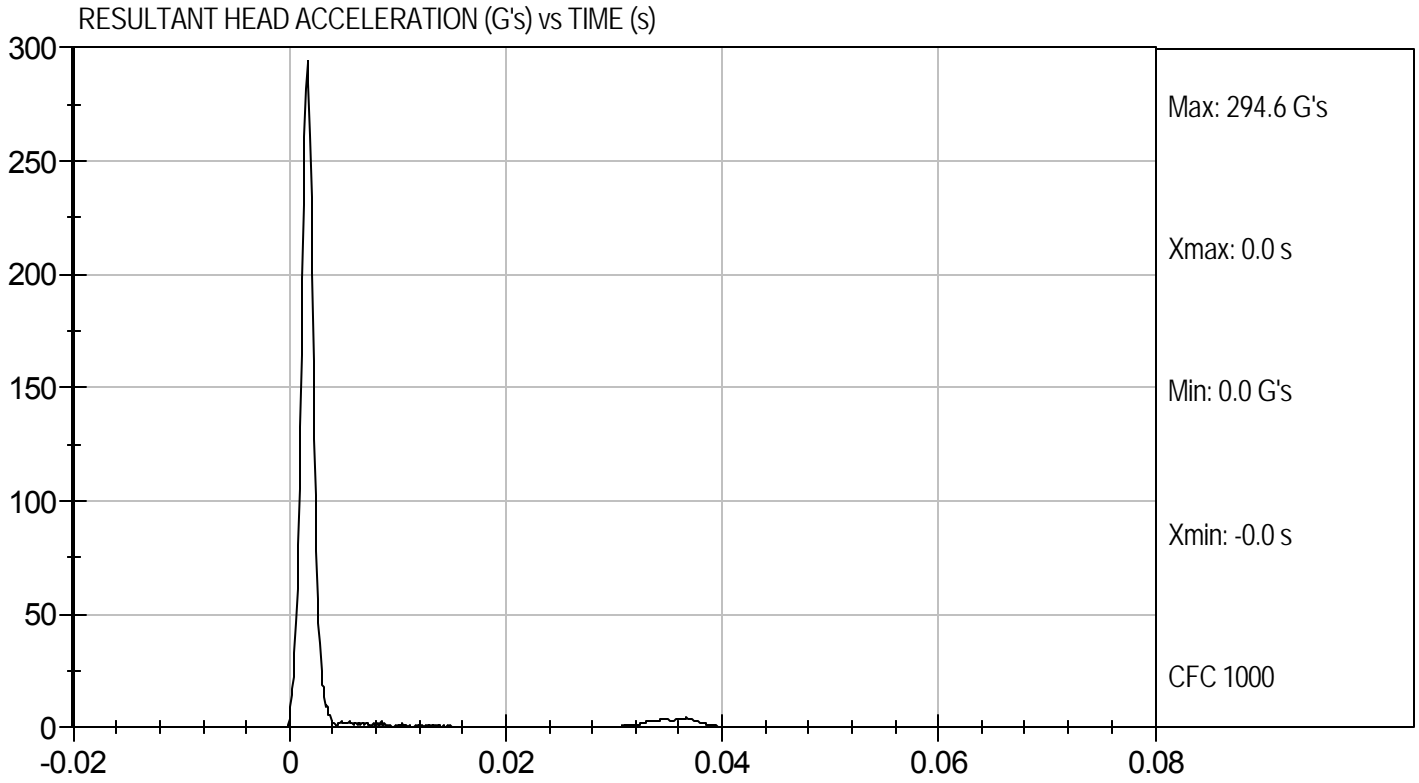
10/21/10  
 Test Date

*David Winkelbauer*  
 Approved By



Test Desc: Head Drop  
Component ID: D103611

Test Date: 10/21/10  
Velocity: 0 ft/s, 0.00 m/s



**MGA RESEARCH CORPORATION**  
**NECK FLEXION TEST**  
**HYBRID III 5TH PERCENTILE**

ATD Serial No: 138

Test I.D.: D103612

| 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      | 33     | Pass      |
| Pendulum Speed                                      |       | m/s   | 6.89 to 7.13  | 7.06   | Pass      |
| Pendulum Deceleration                               | 10 ms | m/s   | 2.1 to 2.5    | 2.4    | Pass      |
|   | 20 ms | m/s   | 4.0 to 5.0    | 4.7    | Pass      |
|   | 30 ms | m/s   | 5.8 to 7.0    | 6.6    | Pass      |
| D Plane Rotation                                    | Max   | deg   | 77 to 91      | 78     | Pass      |
| Occipital Condyle Moment within Deflection Corridor |       | Nm    | 69 to 83      | 77     | Pass      |
| Positive Moment Time Curve Decay to 10 Nm           |       | ms    | 80 to 100     | 83     | Pass      |
| Overall Results                                     |       |       |               |        | Pass      |

Jessica Gall  
Laboratory Technician

10/21/10  
Test Date

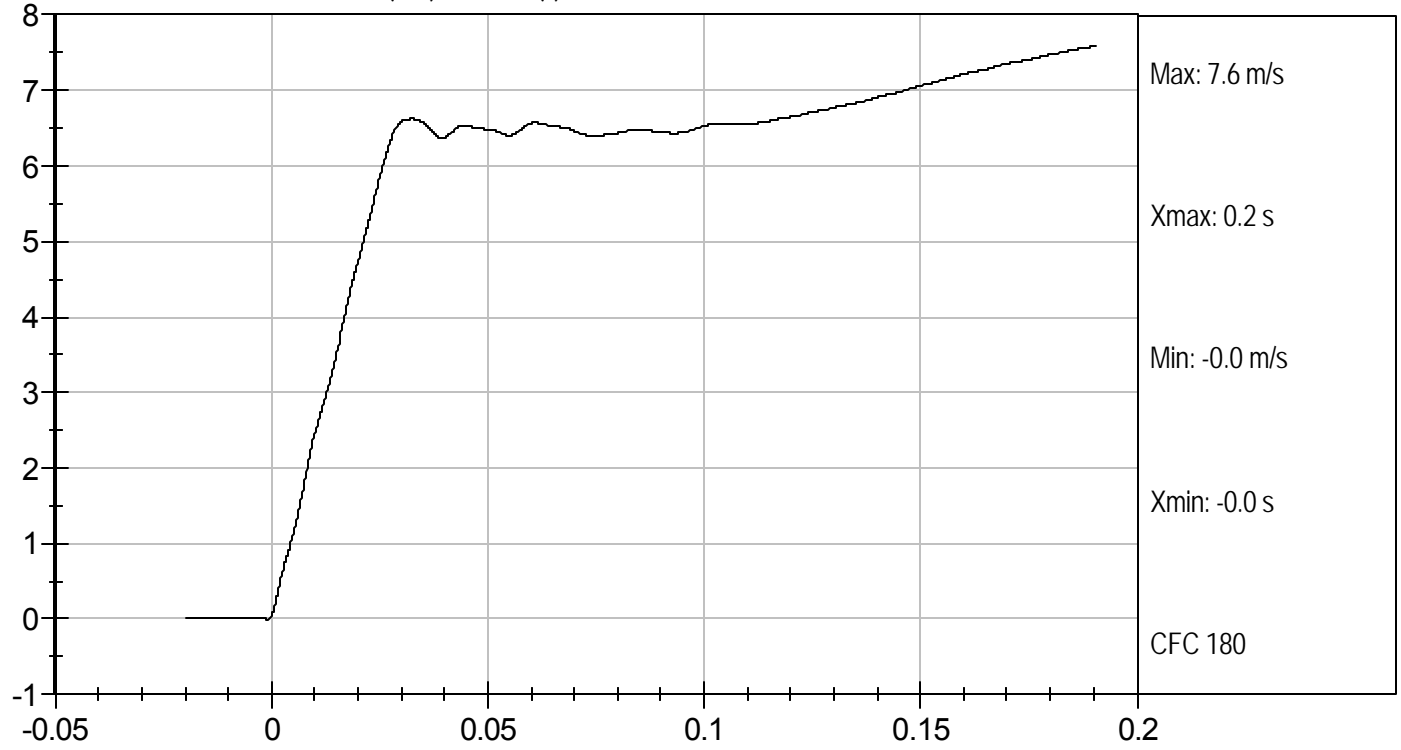
David Winkelbauer  
Approved By



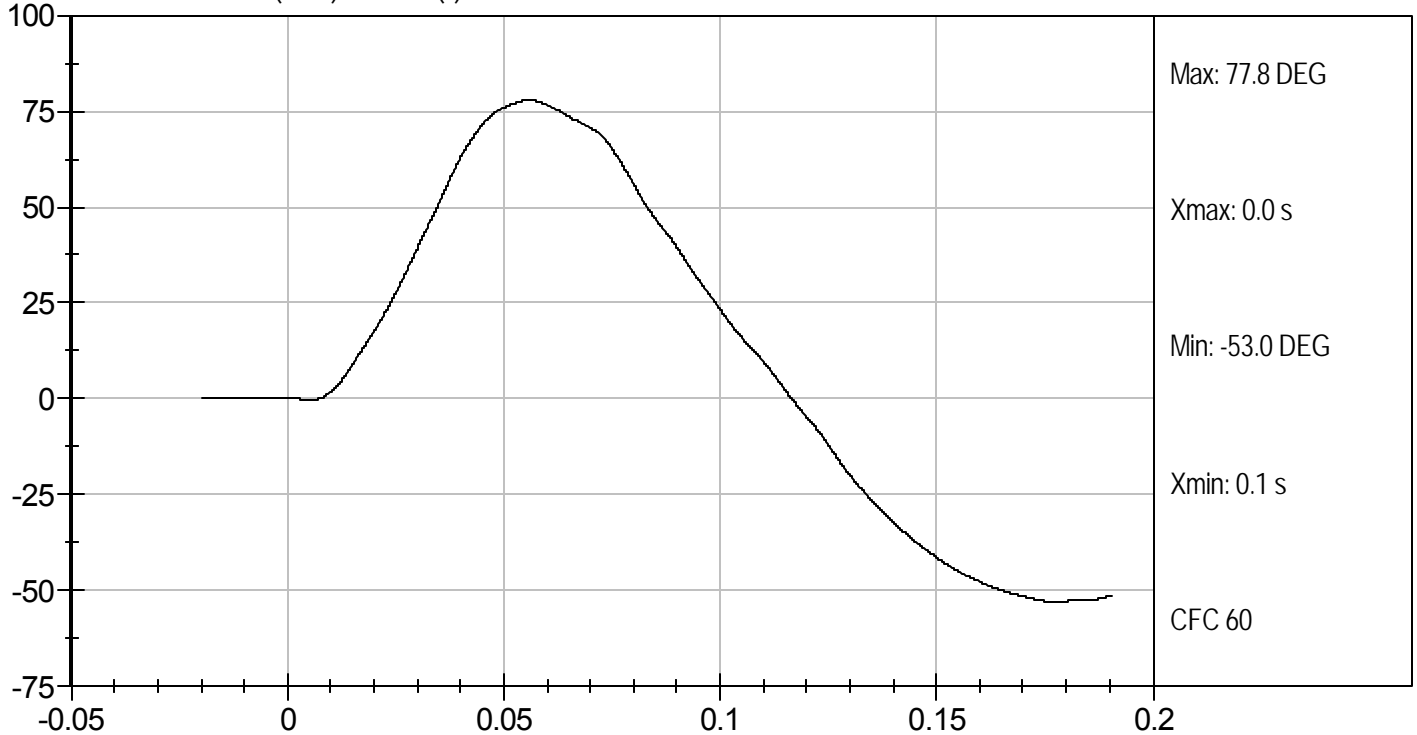
Test Desc: Neck Flexion  
Component ID: D103612

Test Date: 10/21/10  
Velocity: 23.15 ft/s, 7.06 m/s

PENDULUM DECELERATION (m/s) vs TIME (s)



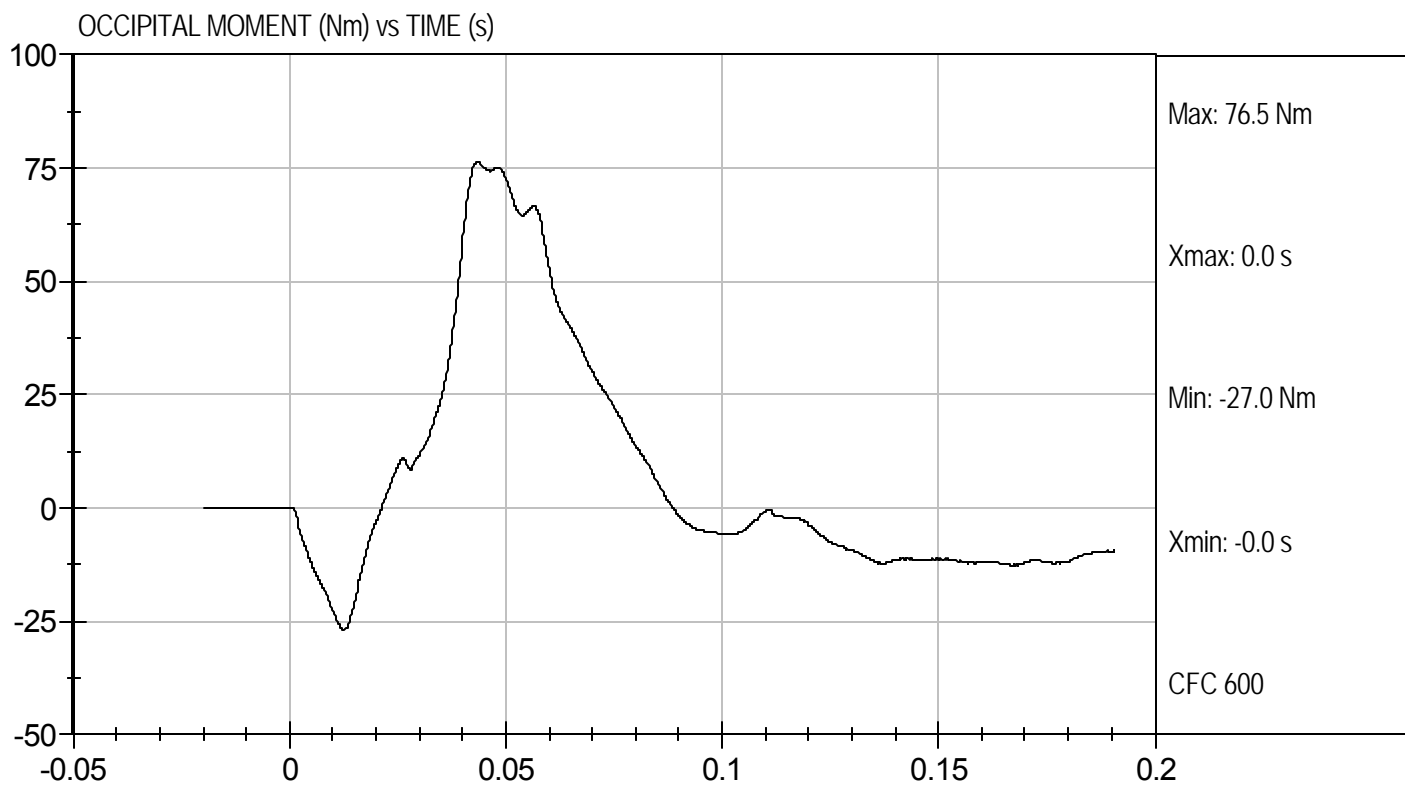
NECK ROTATION (DEG) vs TIME (s)





Test Desc: Neck Flexion  
Component ID: D103612

Test Date: 10/21/10  
Velocity: 23.15 ft/s, 7.06 m/s



**MGA RESEARCH CORPORATION**  
**NECK EXTENSION TEST**  
**HYBRID III 5TH PERCENTILE**

ATD Serial No: 138

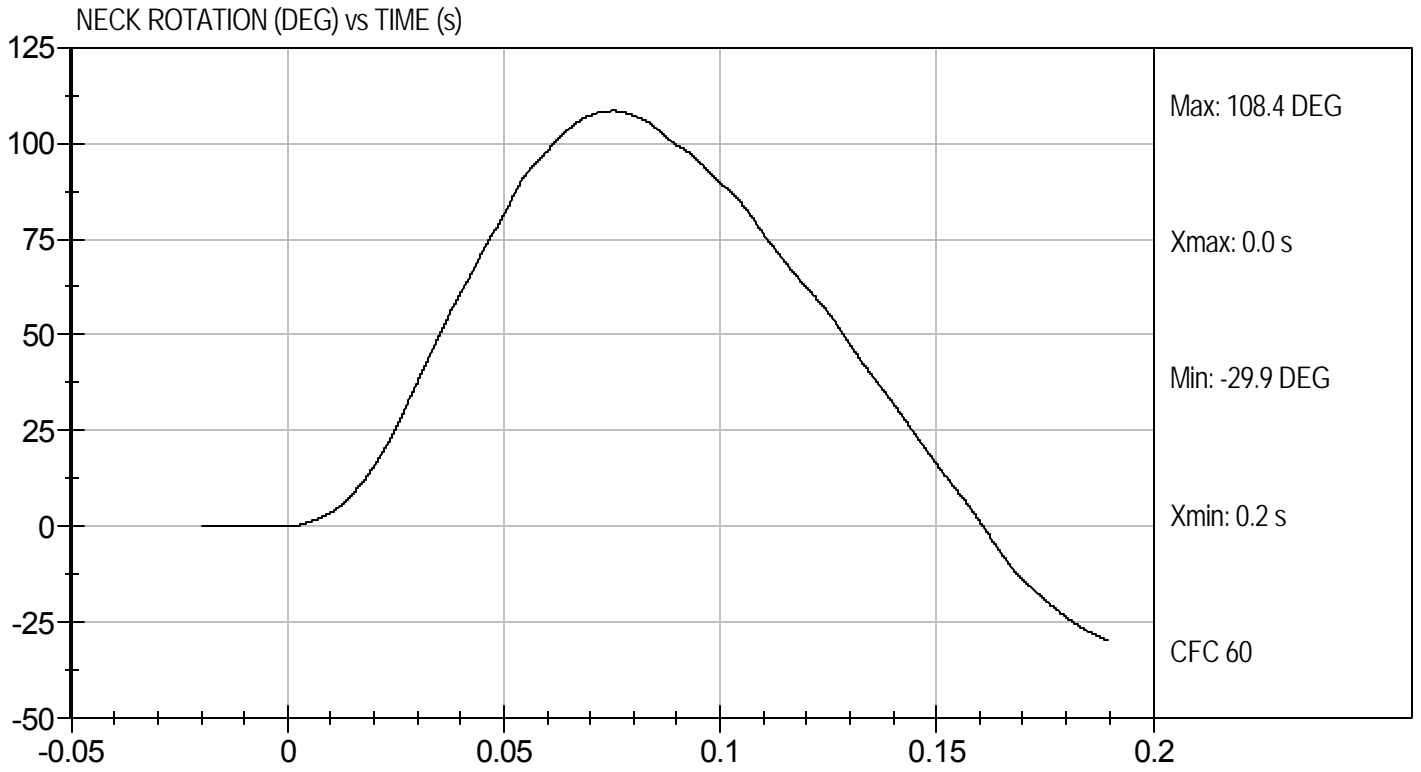
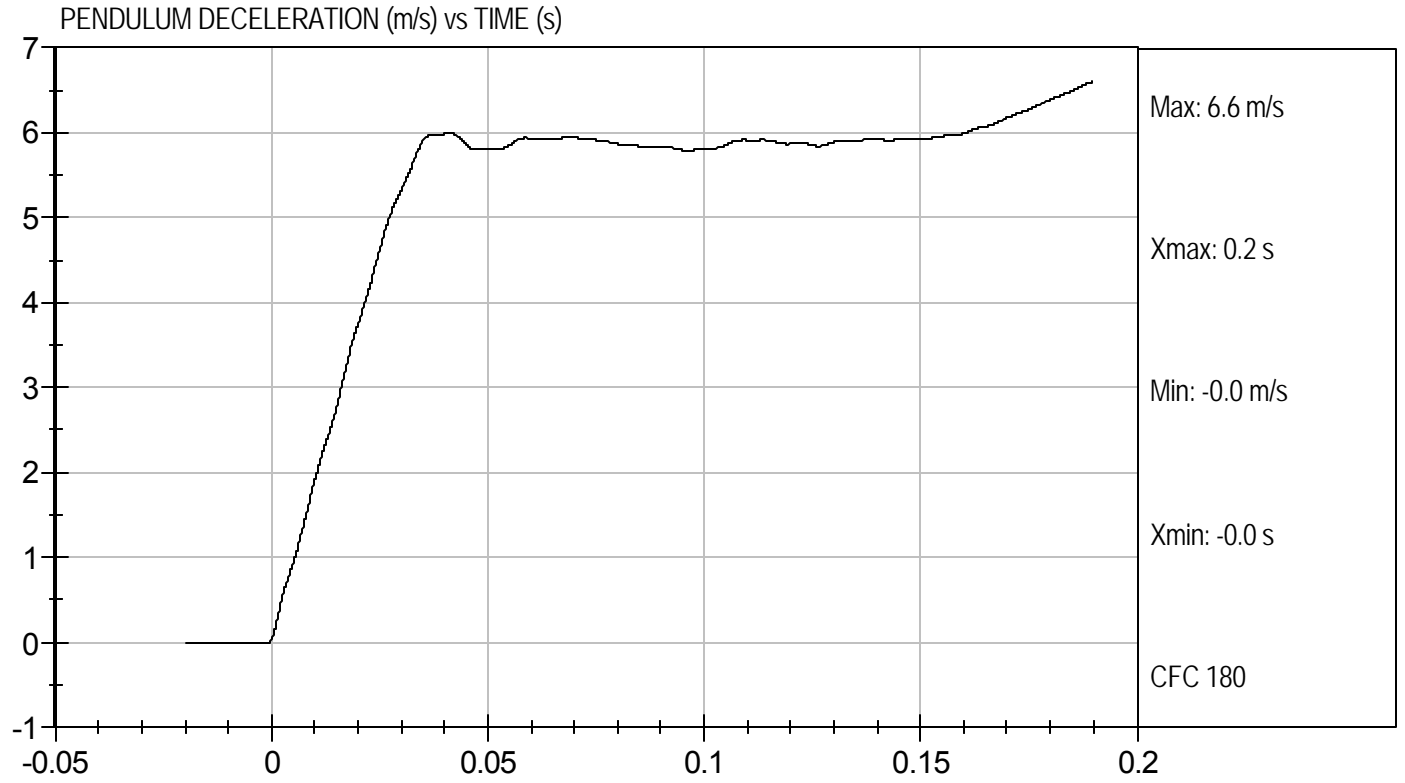
Test I.D.: D103613

| 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      | 31              | Pass      |
| Pendulum Speed                                      |       | m/s   | 5.95 to 6.19  | 6.12            | Pass      |
| Pendulum Deceleration                               | 10 ms | m/s   | 1.5 to 1.9    | 1.9             | Pass      |
|   | 20 ms | m/s   | 3.1 to 3.9    | 3.8             | Pass      |
|   | 30 ms | m/s   | 4.6 to 5.6    | 5.3             | Pass      |
| D Plane Rotation                                    | Max   | deg   | 99 to 114     | 108             | Pass      |
| Occipital Condyle Moment within Deflection Corridor |       | Nm    | -65 to -53    | -54             | Pass      |
| Negative Moment Time Curve Decay to -10 Nm          |       | ms    | 94 to 114     | 102             | Pass      |
|   |       |       |               | Overall Results | Pass      |

*Jessica Hall*  
 Laboratory Technician

10/21/10  
 Test Date

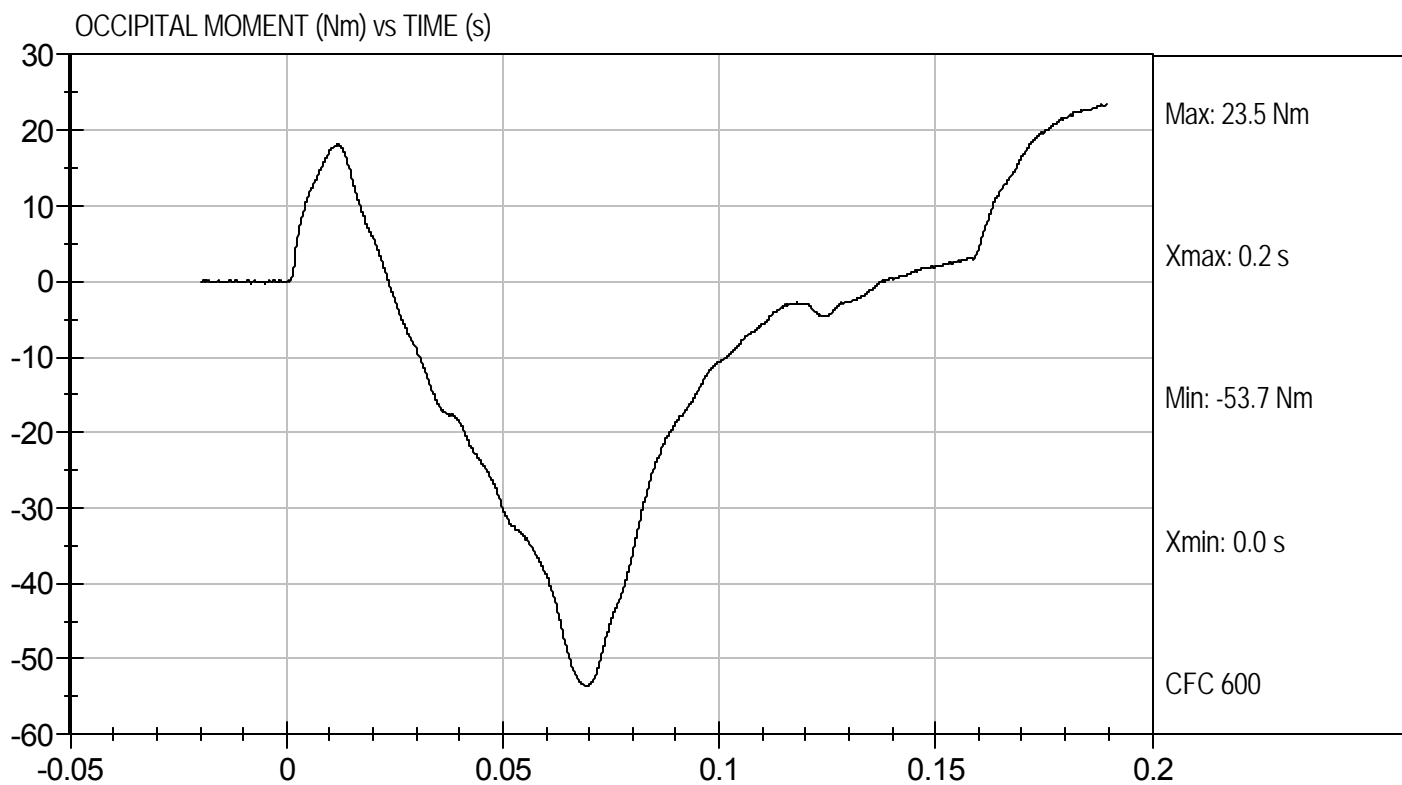
*David Winkelbauer*  
 Approved By





Test Desc: Neck Extension  
Component ID: D103613

Test Date: 10/21/10  
Velocity: 20.08 ft/s, 6.12 m/s



**MGA RESEARCH CORPORATION**  
**THORAX IMPACT**  
**HYBRID III 5TH PERCENTILE**

ATD Serial No: 138

Test I.D: D103614

| Tested Parameter                              | Units | Specification | Result | Pass/Fail |
|---|-------|---------------|--------|-----------|
| Temperature                                   | deg C | 20.6 to 22.2  | 21.5   | Pass      |
| Relative Humidity                             | %     | 10 to 70      | 32     | Pass      |
| Probe Speed                                   | m/s   | 6.59 to 6.83  | 6.77   | Pass      |
| Peak Deflection                               | mm    | 50 to 58      | 54     | Pass      |
| Peak Resistive Force w/in Deflection Corridor | kN    | 3.9 to 4.4    | 4.05   | Pass      |
| Internal Hysteresis                           | %     | 69 to 85      | 70     | Pass      |
| Peak Force 18 mm - 50 mm                      | N     | <= 4,600 N    | 4011   | Pass      |
| Overall Test Results                          |       |               |        | Pass      |

*Jessica Hall*  
Laboratory Technician

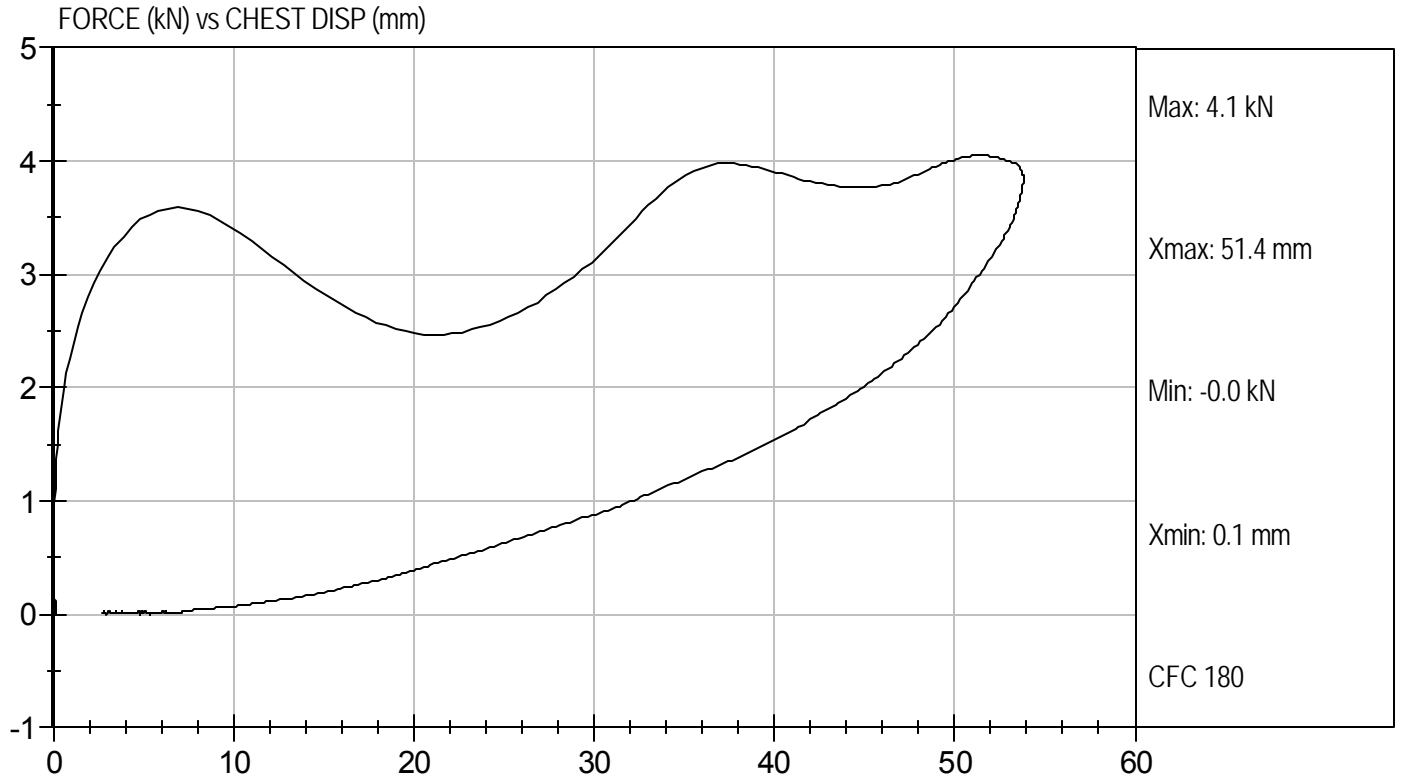
10/20/10  
Test Date

*David Winkelbauer*  
Approved By



Test Desc: Thorax Impact  
Component ID: D103614

Test Date: 10/20/10  
Velocity: 22.22 ft/s, 6.77 m/s



**MGA RESEARCH CORPORATION**  
**LEFT KNEE IMPACT TEST**  
**HYBRID III 5TH PERCENTILE**

ATD Serial No: 138

Test I.D: D103615

| Tested Parameter             | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature       | deg C | 18.9 to 25.5  | 21.6   | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70      | 33     | Pass      |
| Probe Speed                  | m/s   | 2.07 to 2.13  | 2.13   | Pass      |
| Maximum Force                | kN    | 3.45 to 4.06  | 3.55   | Pass      |
| Overall Test Results         |       |               |        | Pass      |

Jessica Gall  
 Laboratory Technician

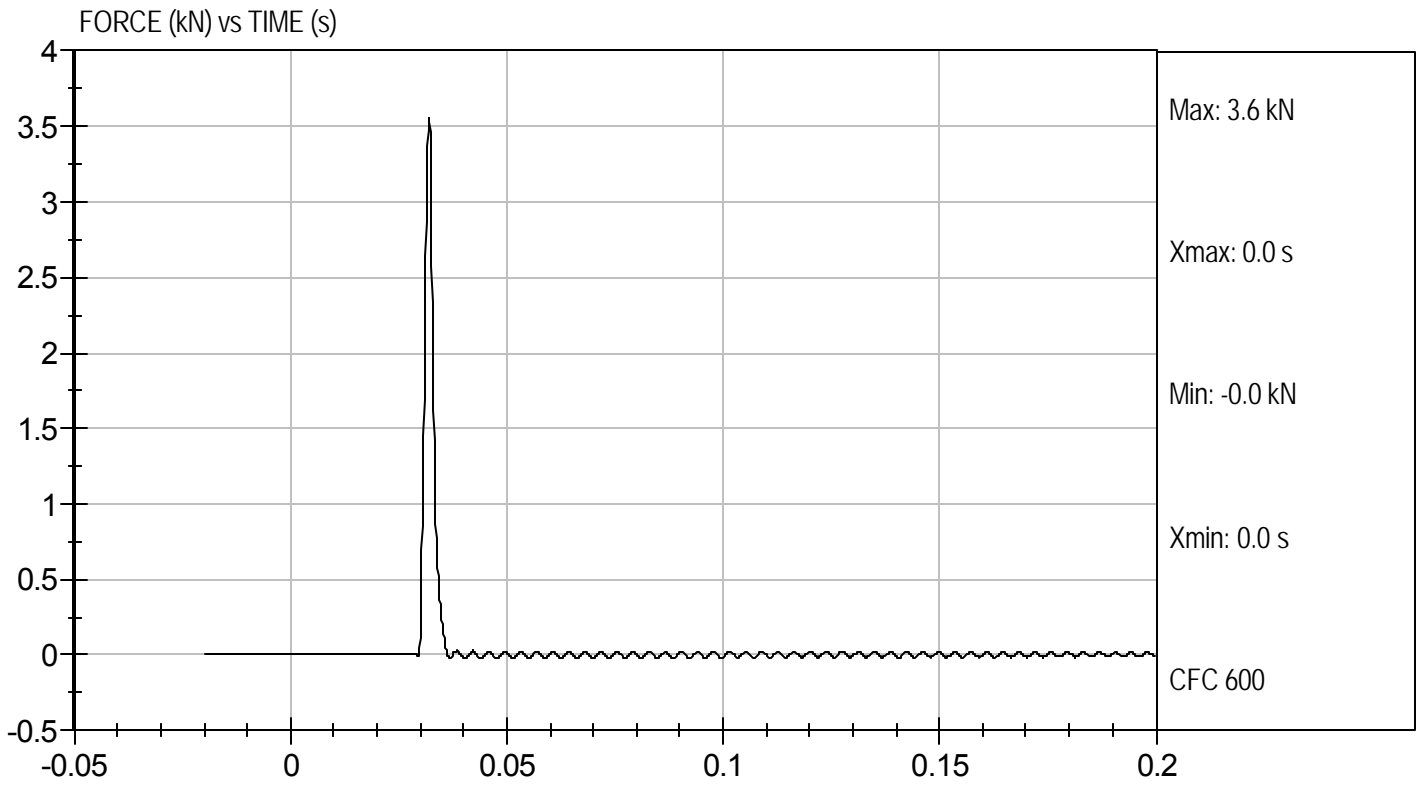
10/21/10  
 Test Date

David Winkelbauer  
 Approved By



Test Desc: Left Knee  
Component ID: D103615

Test Date: 10/21/10  
Velocity: 6.98 ft/s, 2.13 m/s



**MGA RESEARCH CORPORATION**  
**LEFT KNEE IMPACT TEST**  
**HYBRID III 5TH PERCENTILE**

ATD Serial No: 138

Test I.D: D103616

| Tested Parameter             | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature       | deg C | 18.9 to 25.5  | 21.6   | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70      | 33     | Pass      |
| Probe Speed                  | m/s   | 2.07 to 2.13  | 2.13   | Pass      |
| Maximum Force                | kN    | 3.45 to 4.06  | 3.90   | Pass      |
| Overall Test Results         |       |               |        | Pass      |

Jessica Gall  
Laboratory Technician

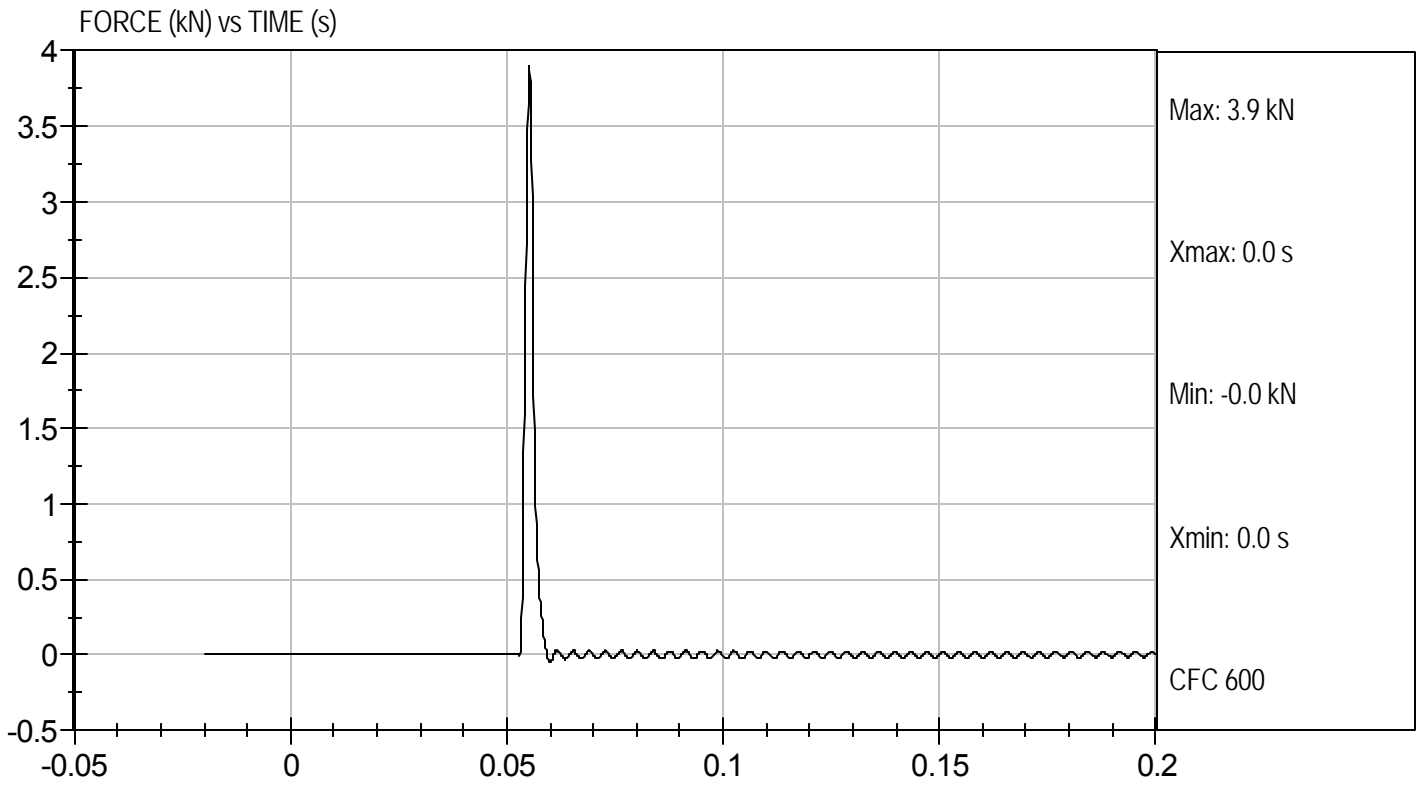
10/21/10  
Test Date

David Winkelbauer  
Approved By



Test Desc: Left Knee  
Component ID: D103616

Test Date: 10/21/10  
Velocity: 6.98 ft/s, 2.13 m/s



**MGA RESEARCH CORPORATION**  
**TORSO FLEXION TEST**  
**HYBRID III 5TH PERCENTILE**

ATD Serial No: 138

Test I.D: D103617

| Tested Parameter             | Units   | Specification | Result | Pass/Fail |
|------------------------------|---------|---------------|--------|-----------|
| Laboratory Temperature       | deg C   | 18.9 to 25.6  | 21.5   | Pass      |
| Laboratory Relative Humidity | %       | 10 to 70      | 32     | Pass      |
| Initial Angle                | deg     | 0 to 20       | 18     | Pass      |
| Return Angle                 | deg     | +/- 8         | 4      | Pass      |
| Force at 45 deg              | N       | 320 to 390    | 334    | Pass      |
| Upper Torso Deflection Rate  | Deg/sec | 0.5 to 1.5    | 1.0    | Pass      |
| Overall Result               |         |               |        | Pass      |

Jessica Gall  
 Laboratory Technician

10/21/10  
 Test Date

David Winkelbauer  
 Approved By

**MGA RESEARCH CORPORATION**  
**HEAD DROP TEST**  
**HYBRID III 5TH PERCENTILE**

ATD Serial No: 138

Test ID: D104431

| Tested Parameter             | Units | Specification      | Result | Pass/Fail |
|------------------------------|-------|--------------------|--------|-----------|
| Laboratory Temperature       | deg C | 18.9 to 25.6       | 20.8   | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70           | 13     | Pass      |
| Peak Resultant Acceleration  | G's   | 250 to 300         | 277    | Pass      |
| Peak Lateral Acceleration    | G's   | +/- 15             | -11.3  | Pass      |
| Unimodal                     | N/A   | Yes                | Yes    | Pass      |
| Oscillations                 | N/A   | within 10% of peak | Yes    | Pass      |
| Overall Test Results         |       |                    |        | Pass      |

Jessica Hall  
Laboratory Technician

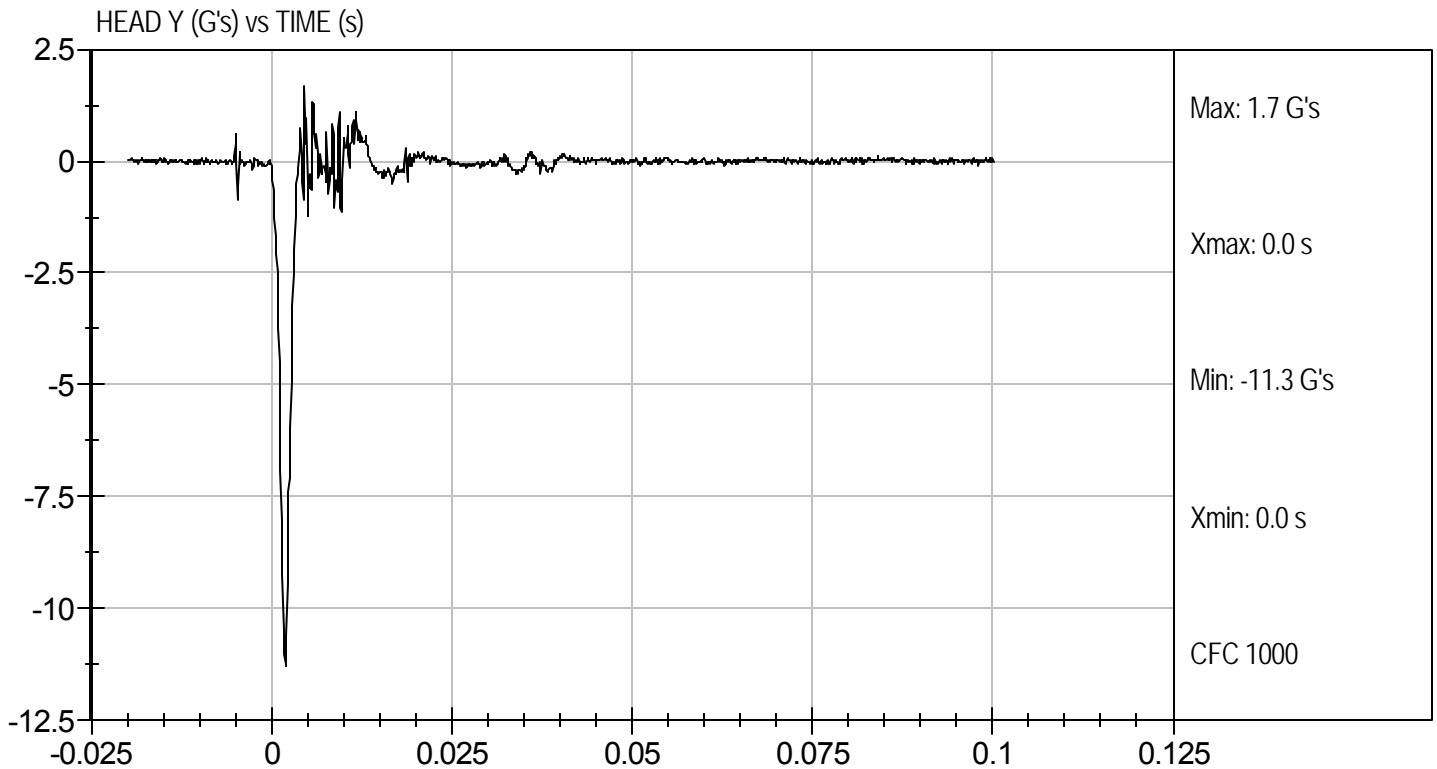
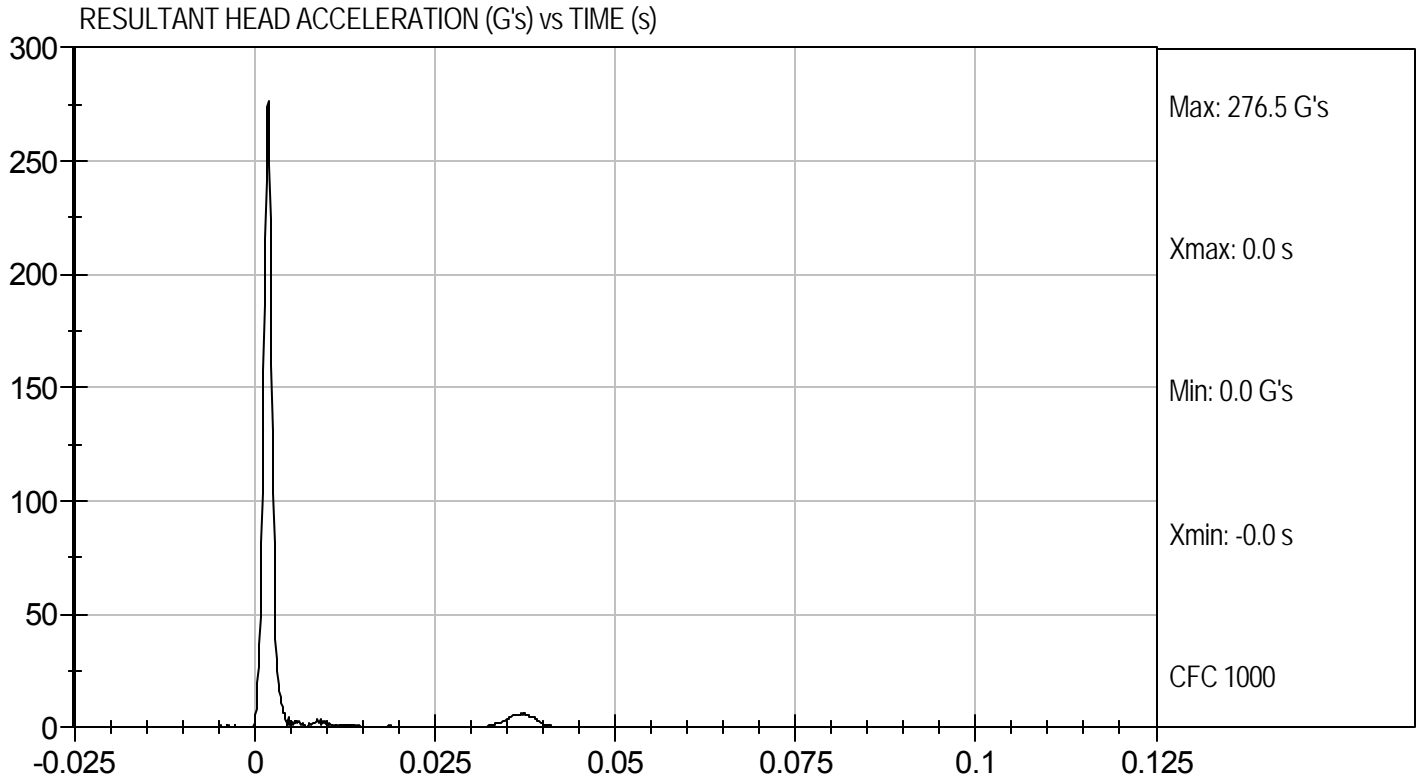
12/15/10  
Test Date

David Winkelbauer  
Approved By



Test Desc: Head Drop  
Component ID: D104431

Test Date: 12/15/10  
Velocity: 0 ft/s, 0 m/s



**MGA RESEARCH CORPORATION**  
**NECK FLEXION TEST**  
**HYBRID III 5TH PERCENTILE**

ATD Serial No: 138

Test I.D.: D104432

| Tested Parameter                                    |       | Units | Specification | Result          | Pass/Fail |
|---|-------|-------|---------------|-----------------|-----------|
| Laboratory Temperature                              |       | deg C | 20.6 to 22.2  | 20.8            | Pass      |
| Laboratory Relative Humidity                        |       | %     | 10 to 70      | 13              | Pass      |
| Pendulum Speed                                      |       | m/s   | 6.89 to 7.13  | 7.06            | Pass      |
| Pendulum Deceleration                               | 10 ms | m/s   | 2.1 to 2.5    | 2.4             | Pass      |
|   | 20 ms | m/s   | 4.0 to 5.0    | 4.5             | Pass      |
|   | 30 ms | m/s   | 5.8 to 7.0    | 6.4             | Pass      |
| D Plane Rotation                                    | Max   | deg   | 77 to 91      | 77              | Pass      |
| Occipital Condyle Moment within Deflection Corridor |       | Nm    | 69 to 83      | 79              | Pass      |
| Positive Moment Time Curve Decay to 10 Nm           |       | ms    | 80 to 100     | 82              | Pass      |
|   |       |       |               | Overall Results | Pass      |

Jessica Hall  
Laboratory Technician

12/15/10  
Test Date

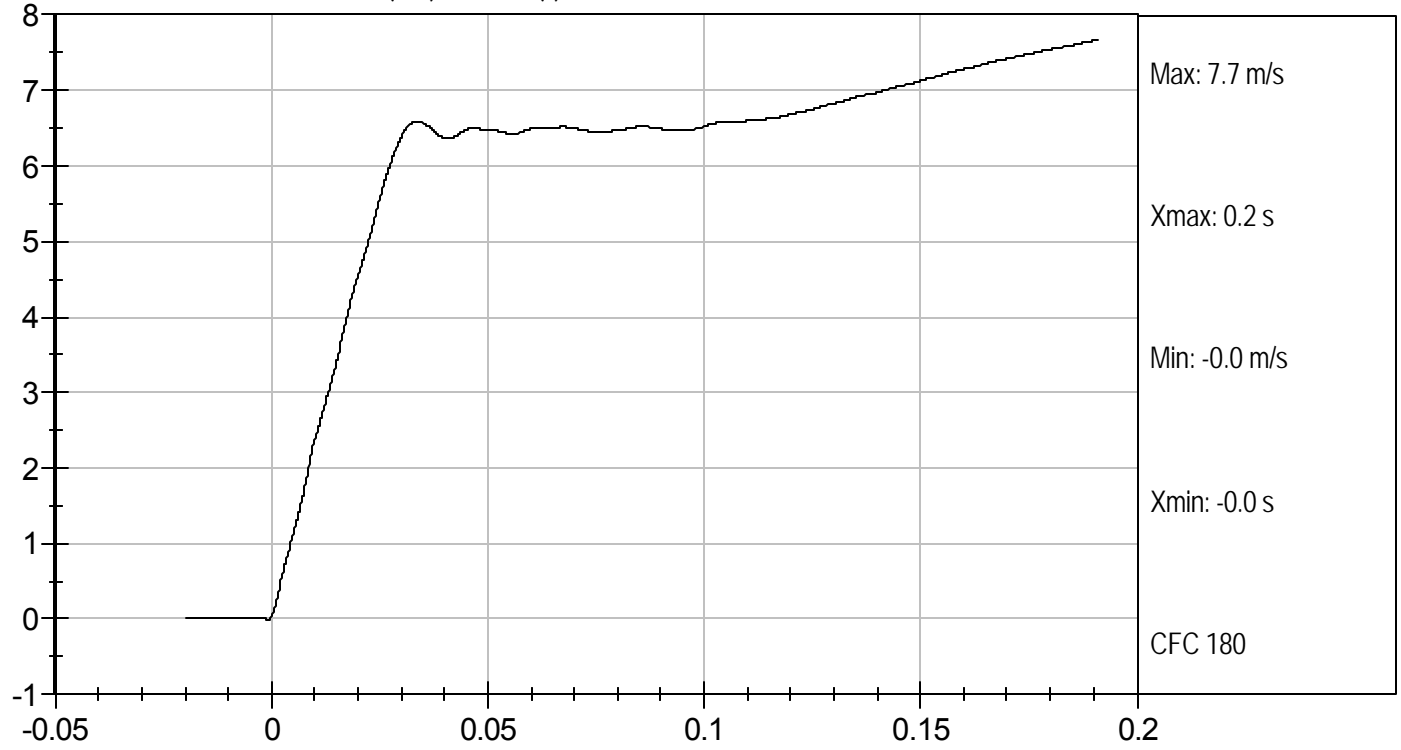
David Winkelbauer  
Approved By



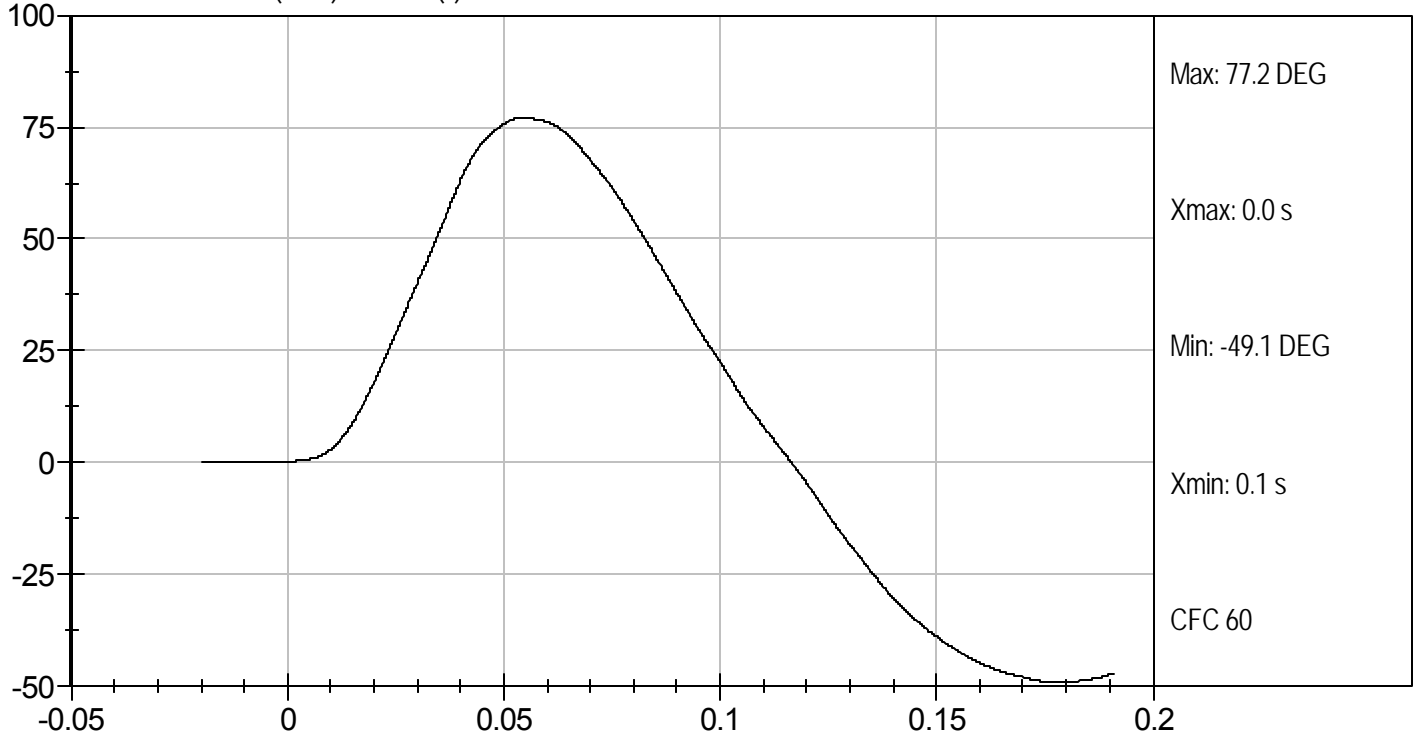
Test Desc: Neck Flexion  
Component ID: D104432

Test Date: 12/15/10  
Velocity: 23.15 ft/s, 7.06 m/s

PENDULUM DECELERATION (m/s) vs TIME (s)



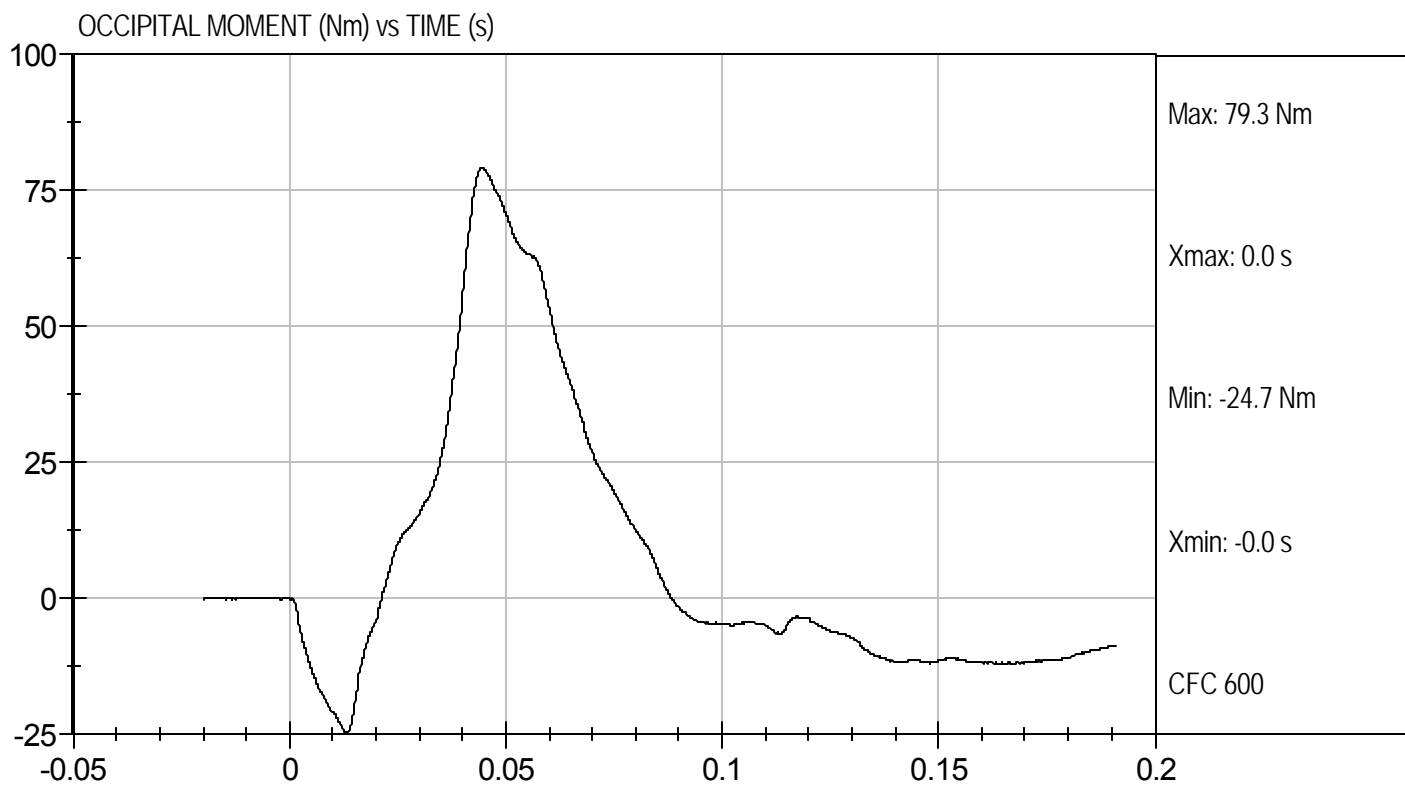
NECK ROTATION (DEG) vs TIME (s)





Test Desc: Neck Flexion  
Component ID: D104432

Test Date: 12/15/10  
Velocity: 23.15 ft/s, 7.06 m/s



**MGA RESEARCH CORPORATION**  
**NECK EXTENSION TEST**  
**HYBRID III 5TH PERCENTILE**

ATD Serial No: 138

Test I.D.: D104433

| Tested Parameter                                    |       | Units | Specification | Result | Pass/Fail |
|---|-------|-------|---------------|--------|-----------|
| Laboratory Temperature                              |       | deg C | 20.6 to 22.2  | 20.8   | Pass      |
| Laboratory Relative Humidity                        |       | %     | 10 to 70      | 13     | Pass      |
| Pendulum Speed                                      |       | m/s   | 5.95 to 6.19  | 6.16   | Pass      |
| Pendulum Deceleration                               | 10 ms | m/s   | 1.5 to 1.9    | 1.9    | Pass      |
|   | 20 ms | m/s   | 3.1 to 3.9    | 3.7    | Pass      |
|   | 30 ms | m/s   | 4.6 to 5.6    | 5.1    | Pass      |
| D Plane Rotation                                    | Max   | deg   | 99 to 114     | 102    | Pass      |
| Occipital Condyle Moment within Deflection Corridor |       | Nm    | -65 to -53    | -56    | Pass      |
| Negative Moment Time Curve Decay to -10 Nm          |       | ms    | 94 to 114     | 100    | Pass      |
| Overall Results                                     |       |       |               |        | Pass      |

Jessica Hall  
Laboratory Technician

12/15/10  
Test Date

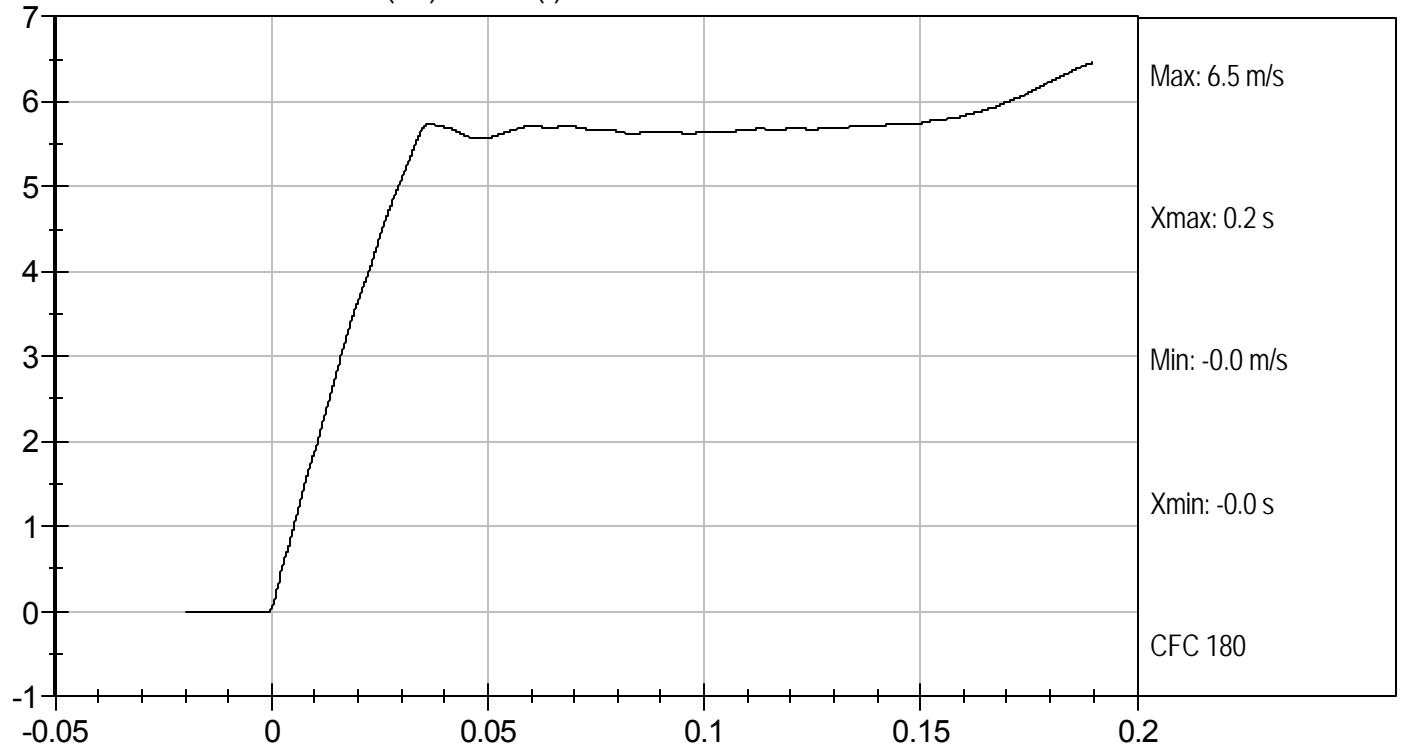
David Winkelbauer  
Approved By



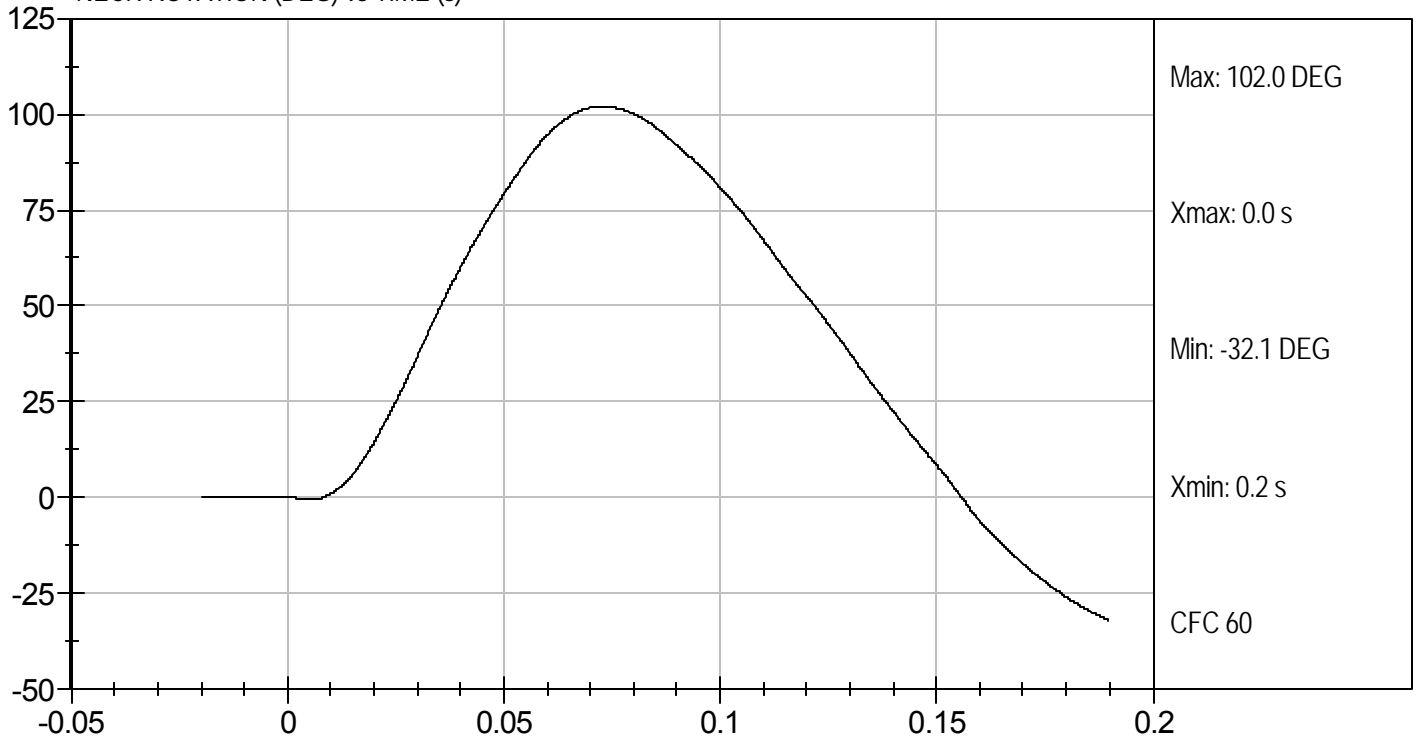
Test Desc: Neck Extension  
Component ID: D104433

Test Date: 12/15/10  
Velocity: 20.20 ft/s, 6.16 m/s

PENDULUM DECELERATION (m/s) vs TIME (s)



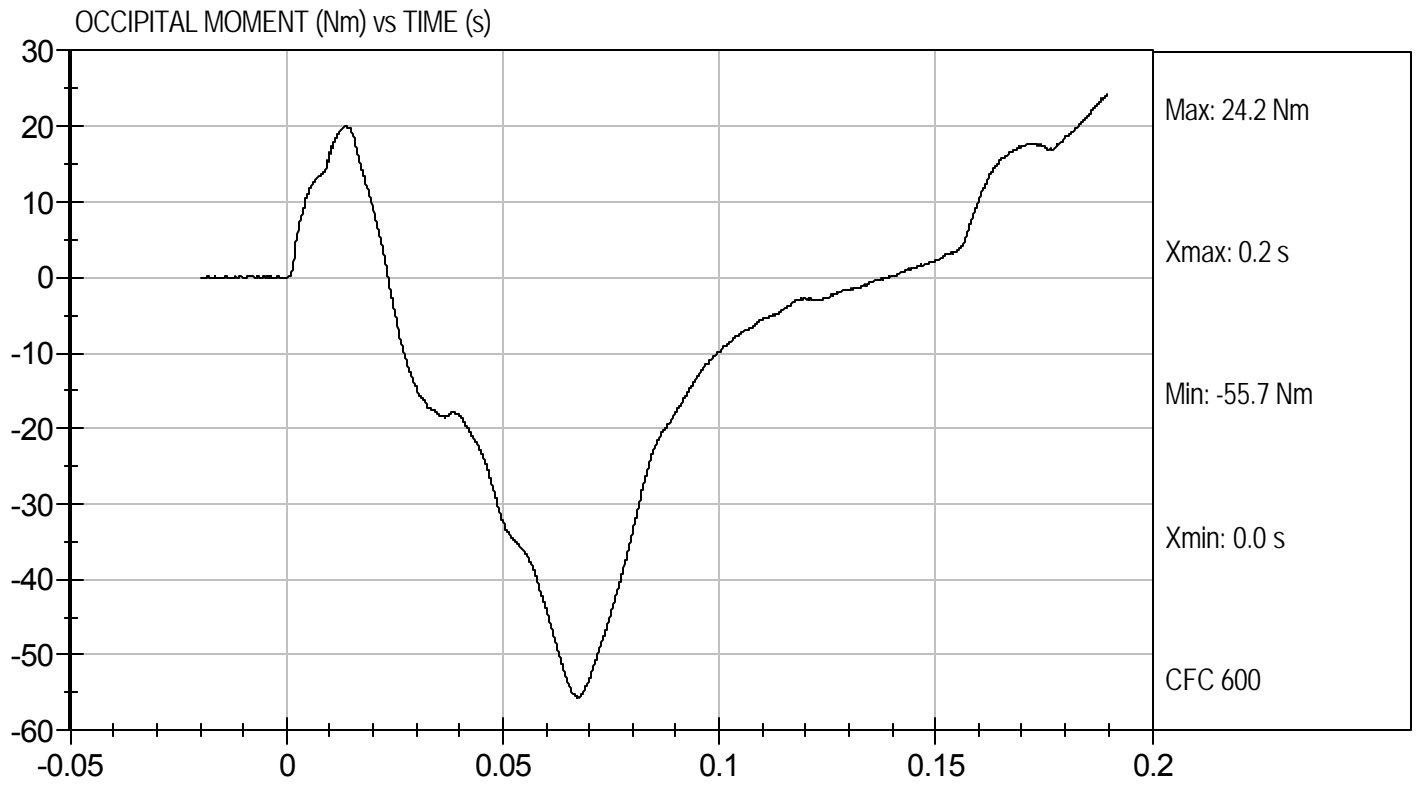
NECK ROTATION (DEG) vs TIME (s)





Test Desc: Neck Extension  
Component ID: D104433

Test Date: 12/15/10  
Velocity: 20.20 ft/s, 6.16 m/s



**MGA RESEARCH CORPORATION**  
**THORAX IMPACT**  
**HYBRID III 5TH PERCENTILE**

ATD Serial No: 138

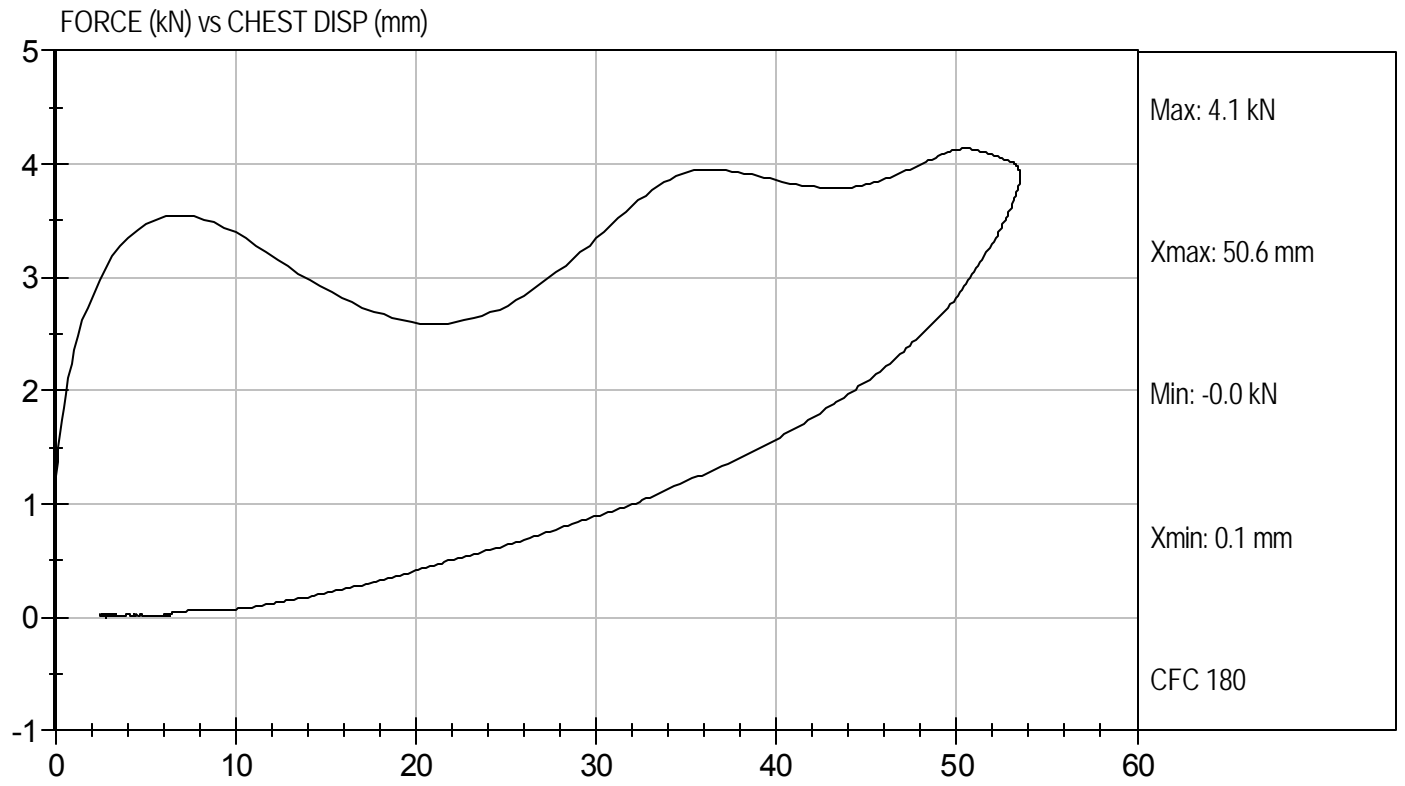
Test I.D.: D104434

| Tested Parameter                              | Units | Specification | Result | Pass/Fail |
|---|-------|---------------|--------|-----------|
| Temperature                                   | deg C | 20.6 to 22.2  | 21.8   | Pass      |
| Relative Humidity                             | %     | 10 to 70      | 14     | Pass      |
| Probe Speed                                   | m/s   | 6.59 to 6.83  | 6.60   | Pass      |
| Peak Deflection                               | mm    | 50 to 58      | 54     | Pass      |
| Peak Resistive Force w/in Deflection Corridor | kN    | 3.9 to 4.4    | 4.14   | Pass      |
| Internal Hysteresis                           | %     | 69 to 85      | 70     | Pass      |
| Peak Force 18 mm - 50 mm                      | N     | <= 4,600 N    | 4123   | Pass      |
| Overall Test Results                          |       |               |        | Pass      |

*Jessica Gall*  
 Laboratory Technician

12/16/10  
 Test Date

*David Winkelbauer*  
 Approved By



**MGA RESEARCH CORPORATION**  
**RIGHT KNEE IMPACT TEST**  
**HYBRID III 5TH PERCENTILE**

ATD Serial No: 138

Test I.D: D104435

| Tested Parameter             | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature       | deg C | 18.9 to 25.5  | 20.8   | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70      | 13     | Pass      |
| Probe Speed                  | m/s   | 2.07 to 2.13  | 2.12   | Pass      |
| Maximum Force                | kN    | 3.45 to 4.06  | 3.57   | Pass      |
| Overall Test Results         |       |               |        | Pass      |

*Jessica Gall*  
 \_\_\_\_\_  
 Laboratory Technician

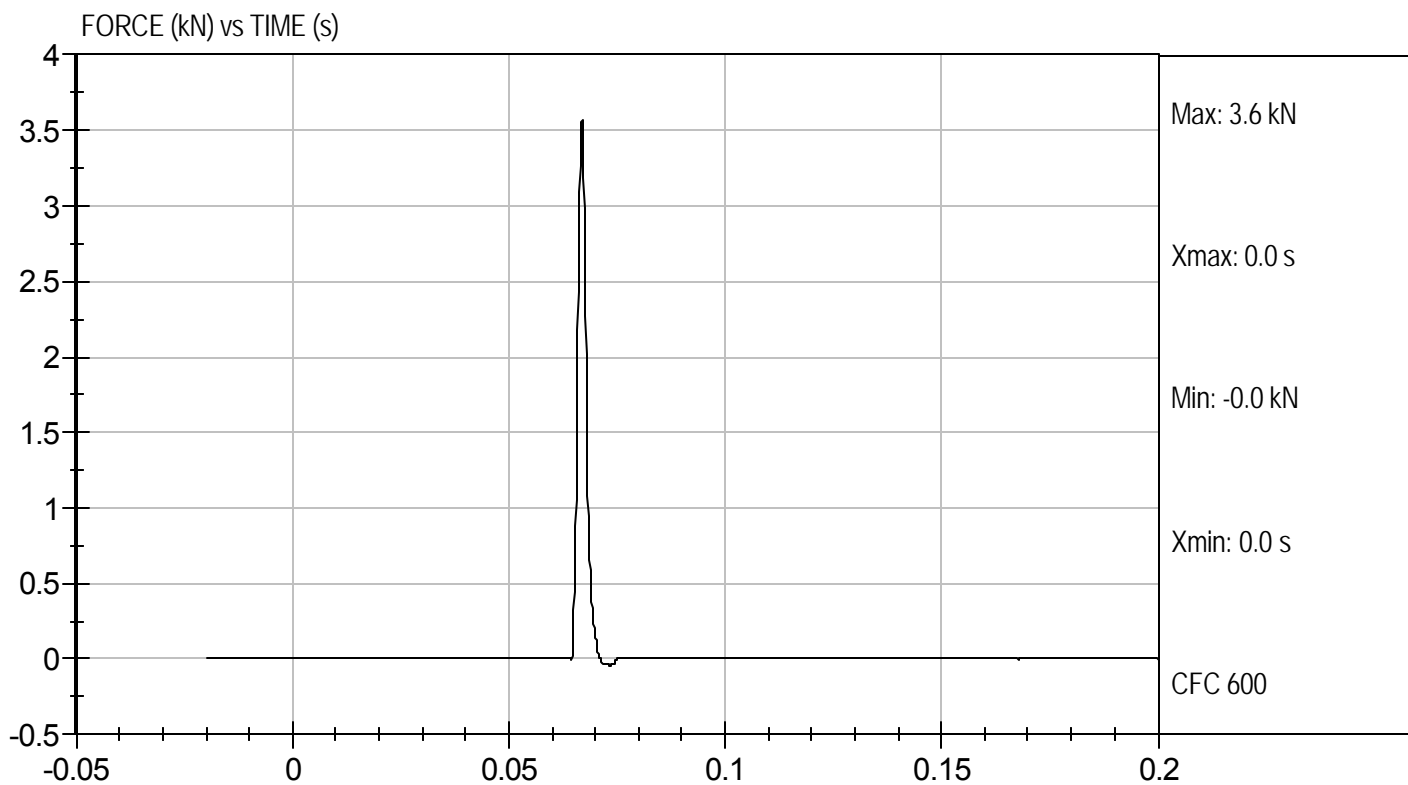
12/15/10  
 \_\_\_\_\_  
 Test Date

*David Winkelbauer*  
 \_\_\_\_\_  
 Approved By



Test Desc: Right Knee  
Component ID: D104435

Test Date: 12/15/10  
Velocity: 6.97 ft/s, 2.12 m/s




**MGA RESEARCH CORPORATION**  
**LEFT KNEE IMPACT TEST**  
**HYBRID III 5TH PERCENTILE**

ATD Serial No: 138

Test I.D: D104436

| Tested Parameter             | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature       | deg C | 18.9 to 25.5  | 20.8   | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70      | 13     | Pass      |
| Probe Speed                  | m/s   | 2.07 to 2.13  | 2.12   | Pass      |
| Maximum Force                | kN    | 3.45 to 4.06  | 3.47   | Pass      |
| Overall Test Results         |       |               |        | Pass      |

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

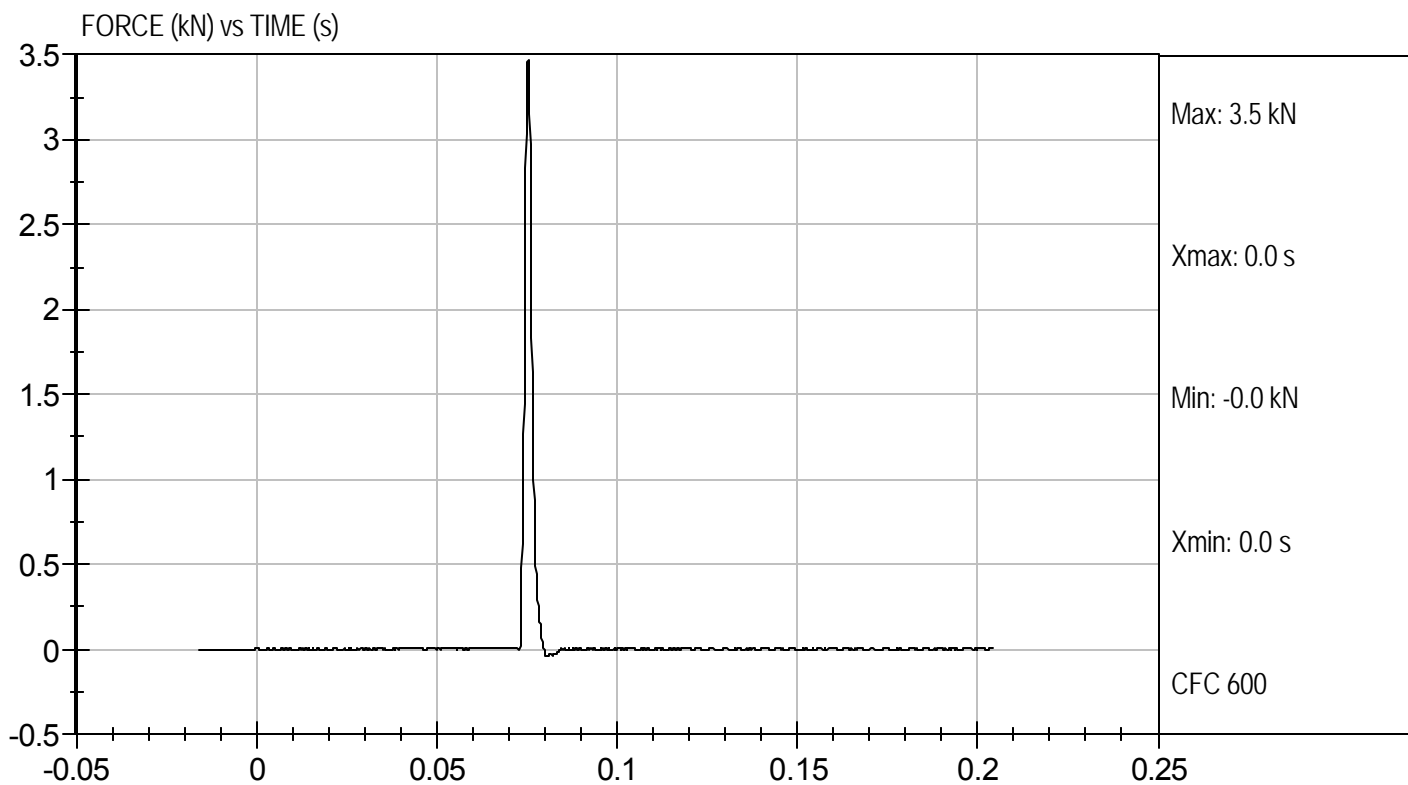
12/15/10  
 \_\_\_\_\_  
 Test Date

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



Test Desc: Left Knee  
Component ID: D104436

Test Date: 12/15/10  
Velocity: 6.97 ft/s, 2.12 m/s



**MGA RESEARCH CORPORATION**  
**TORSO FLEXION TEST**  
**HYBRID III 5TH PERCENTILE**

ATD Serial No: 138

Test I.D: D104437

| Tested Parameter             | Units   | Specification | Result | Pass/Fail |
|------------------------------|---------|---------------|--------|-----------|
| Laboratory Temperature       | deg C   | 18.9 to 25.6  | 21.5   | Pass      |
| Laboratory Relative Humidity | %       | 10 to 70      | 13     | Pass      |
| Initial Angle                | deg     | 0 to 20       | 17     | Pass      |
| Return Angle                 | deg     | +/- 8         | 5      | Pass      |
| Force at 45 deg              | N       | 320 to 390    | 379    | Pass      |
| Upper Torso Deflection Rate  | Deg/sec | 0.5 to 1.5    | 1.0    | Pass      |
| Overall Result               |         |               |        | Pass      |

Jessica Hall  
 Laboratory Technician

12/16/10  
 Test Date

David Winkelbauer  
 Approved By