

REPORT NUMBER: TR-P29003-04-NC

**VALIDATION
MOVING DEFORMABLE BARRIER SIDE IMPACT TEST**

**FORD MOTOR CO.
2010 FORD FUSION SE
4-DOOR SEDAN**

NHTSA NUMBER: MA0213

**PREPARED BY:
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9270 HOLLY ROAD
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JUNE 10, 2009

FINAL REPORT

**U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
1200 NEW JERSEY AVE, SE
ROOM W43-410
WASHINGTON, DC 20590**

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Approval Date: June 10, 2009

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

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

Date: _____

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| 4. Title and Subtitle Final Report of Validation Testing Side Impact Testing of a 2010 Ford Fusion SE 4-Door Sedan NHTSA No. MA0213 | | 5. Report Date June 10, 2009 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 7. Authors Mr. Kelsey A. Chiu, Project Engineer, KARCO Mr. Frank Richardson, Program Manager, KARCO | | 8. Performing Organization Report No TR-P29003-04-NC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 9. Performing Organization Name and Address KARCO Engineering, LLC. 9270 Holly Rd. Adelanto, CA, 92301 | | 11. Contract or Grant No. DTNH22-03-D-32005 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | | 15. Supplementary Notes Validation Testing | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16. Abstract <p>A 55/28 km/h 90 deg. Moving Deformable Barrier Validation Side Impact Test was conducted on the subject 2010 Ford Fusion SE 4-Door Sedan in accordance with the specifications of the Office of Crash Worthiness Standards Test Procedure for the generation of consumer information on vehicle side crash protection. The test was conducted at KARCO Engineering, LLC in Adelanto, CA, on June 10, 2009.</p> <p>The impact velocity of the Moving Deformable Barrier was 61.87 km/h and the outside ambient temperature at the struck (driver's) side of the vehicle was 21.7 deg. C. The target vehicle's maximum post-test static crush was 304 mm located at level 3. The test vehicle's occupant performance data is as follows:</p> <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <thead> <tr> <th style="text-align: left;">Measurement Description</th> <th style="text-align: center;">Units</th> <th style="text-align: center;">Driver ATD (ES-2re)</th> <th style="text-align: center;">Passenger ATD (SID-IIs)</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td style="text-align: center;">N/A</td> <td style="text-align: center;">174.4</td> <td style="text-align: center;">316.6</td> </tr> <tr> <td>Maximum Chest Deflection</td> <td style="text-align: center;">mm</td> <td style="text-align: center;">39</td> <td style="background-color: #cccccc;"></td> </tr> <tr> <td>Total Abdominal Force</td> <td style="text-align: center;">N</td> <td style="text-align: center;">691</td> <td style="background-color: #cccccc;"></td> </tr> <tr> <td>Pubic Symphysis Force</td> <td style="text-align: center;">N</td> <td style="text-align: center;">2321</td> <td style="background-color: #cccccc;"></td> </tr> <tr> <td>Lower Spine Resultant Acceleration</td> <td style="text-align: center;">G</td> <td style="background-color: #cccccc;"></td> <td style="text-align: center;">71</td> </tr> <tr> <td>Total Pelvic Force (Sum of Acetubular and Iliac Forces)</td> <td style="text-align: center;">N</td> <td style="background-color: #cccccc;"></td> <td style="text-align: center;">3511</td> </tr> </tbody> </table> <p>The two doors on the struck side of the vehicle did not separate from the body at the hinges or latches, and the opposite doors did not open during the side impact event.</p> | | | | Measurement Description | Units | Driver ATD (ES-2re) | Passenger ATD (SID-IIs) | Head Injury Criteria (HIC ₃₆) | N/A | 174.4 | 316.6 | Maximum Chest Deflection | mm | 39 | | Total Abdominal Force | N | 691 | | Pubic Symphysis Force | N | 2321 | | Lower Spine Resultant Acceleration | G | | 71 | Total Pelvic Force (Sum of Acetubular and Iliac Forces) | N | | 3511 |
| Measurement Description | Units | Driver ATD (ES-2re) | Passenger ATD (SID-IIs) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Head Injury Criteria (HIC ₃₆) | N/A | 174.4 | 316.6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Chest Deflection | mm | 39 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Abdominal Force | N | 691 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pubic Symphysis Force | N | 2321 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lower Spine Resultant Acceleration | G | | 71 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Pelvic Force (Sum of Acetubular and Iliac Forces) | N | | 3511 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17. Key Words Validation Testing Side Impact Moving Deformable Barrier (MDB) ES-2re SID-IIs | | 18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Admin. Technical Reference Division 1200 New Jersey Ave., SE Room W43-410 Washington, DC 20590 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19. Security Classification of this report UNCLASSIFIED | 20. Security Classification of this page UNCLASSIFIED | 21. No. of Pages 152 | 22. Price | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Table of Contents

| <u>Section</u> | | <u>Page No.</u> |
|-----------------------|---|-----------------|
| 1 | Purpose and Summary of the 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 | 7 |
| 3 | Dummy Longitudinal Clearance Dimensions | 9 |
| 4 | Dummy Lateral Clearance Dimensions | 10 |
| 5 | Camera Locations and Data | 11 |
| 6 | Vehicle Accelerometer Locations | 12 |
| 7 | Moving Deformable Barrier (MDB) Accelerometer Locations | 13 |
| 8 | Test Vehicle Summary of Results | 14 |
| 9 | Moving Deformable Barrier (MDB) Summary of Results | 15 |
| 10 | Post-Test Observations | 16 |
| 11 | Vehicle Profile Measurements | 17 |
| 12 | Vehicle Exterior Crush Measurements | 18 |
| 13 | Vehicle Damage Profile Distances | 21 |
| 14 | Exterior Static Crush for Impactor Face | 22 |
| 15 | FMVSS 301 Fuel System Integrity Post-Impact Data | 23 |
| 16 | Dummy / Vehicle Temperature Stabilization | 24 |
| | | |
| <u>Appendix</u> | | <u>Page No.</u> |
| A | Photographs | A |
| B | Dummy Response Data | B |
| C | Dummy Calibration Data | C |

SECTION 1
PURPOSE AND SUMMARY OF TEST

PURPOSE

This moving deformable barrier side impact test is part of the FY2009 Validation Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract number DTNH22-03-D-32005. The purpose of this test is to generate comparative side impact performance in a 2010 Ford Fusion SE 4-Door Sedan. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated April 2009.

SUMMARY

A 2010 Ford Fusion SE 4-Door Sedan was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 61.87 km/h (38.45 mph). The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by KARCO Engineering, LLC in Adelanto, California, on June 10, 2009. Pre-test and post-test photographs of the test vehicle, the MDB, and the dummies (ES-2re and SID-IIs) are included in this report.

Dummies were placed in the driver and left rear designated seating positions according to instructions specified in the OCWS Side Impact Laboratory Test Procedure, dated April 2009. The side impact event was documented by ten (10) high-speed and two (2) real-time cameras. Camera locations are included in Data Sheet 5 on page 11 of this report.

The dummies were instrumented in the following manner:

Driver ATD (ES-2re)

- Head Accelerometers
- Chest Rib 1 to Rib 3 Potentiometers
- Abdomen Forward, Middle, and Rear Load Cells
- Pubic Load Cell
- Lower Spine Accelerometers

Passenger ATD (SID-IIs)

- Head Accelerometers
- Upper Neck Load Cells
- Shoulder Potentiometer
- Thorax Upper, Middle and Lower Rib Potentiometers

Abdomen Upper and Lower Rib Potentiometers

Acetabulum Load Cell

Iliac Load Cell

Lower Spine Accelerometers

Dummy injury values were recorded as follows:

| Measurement Description | Units | Driver ATD (ES-2re) | |
|---|-------|---------------------|--------|
| | | Threshold | Result |
| Head Injury Criteria (HIC ₃₆) | N/A | 1000 | 174.4 |
| Maximum Chest Deflection | mm | 44 | 39 |
| Total Abdominal Force | N | 2500 | 691 |
| Pubic Symphysis Force | N | 6000 | 2321 |

| Measurement Description | Units | Passenger ATD (SID-IIs) | |
|---|-------|-------------------------|--------|
| | | Threshold | Result |
| Head Injury Criteria (HIC ₃₆) | N/A | 1000 | 316.6 |
| Lower Spine Resultant Acceleration | G | 82 | 71 |
| Total Pelvic Force | N | 5525 | 3511 |

Supplemental restraint information is given below:

| Restraint Type | Left Front (Driver) | | Left Rear (Passenger) | |
|----------------------------|---------------------|----------|-----------------------|----------|
| | Installed | Deployed | Installed | Deployed |
| Front Airbag | Yes | No | No | |
| Knee Airbag | No | | No | |
| Side Torso Airbag | Yes | Yes | No | |
| Head / Torso Airbag | No | | No | |
| Side Curtain / Tube Airbag | Yes | Yes | Yes | Yes |
| Pretensioner | Yes | Yes | No | |
| Load Limiter | Yes | | | |

GENERAL COMMENTS

Both the driver and left rear passenger doors remained closed and latched during the impact event. No Stoddard solvent was observed to be leaking at any point after the impact or during the FMVSS 301 static rollover test. All driver and left rear passenger dummy injury values were below the established thresholds.

**SECTION 2
DATA SHEETS**

Test Vehicle: 2010 Ford Fusion SE 4-Door Sedan NHTSA No.: MA0213
 Test Program: Side Validation Testing Test Date: 06/10/09

CONVERSION FACTORS

| Quantity | Typical Application | Std Units | Metric Unit | Multiply By |
|--------------------|---------------------|---------------------|-------------|------------------|
| Mass | Vehicle Weight | lb | kg | 0.4536 |
| Linear Velocity | Impact Velocity | miles/hr | km/hr | 1.609344 |
| Length or Distance | Measurements | in | mm | 25.4 |
| Volume | Fuel Systems | gal | liter | 3.785 |
| Volume | Small Fluids | oz | mL | 29.573 |
| Pressure | Tire Pressures | lbf/in ² | kPa | 7.0 |
| Volume | Liquid | gal | liter | 3.785 |
| Temperature | General Use | °F | °C | $=(tf - 32)/1.8$ |
| Force | Dynamic Forces | lbf | N | 4.448 |
| Moment | Torque | lbf/ft | Nm | 1.355 |

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2010 Ford Fusion SE 4-Door Sedan NHTSA No.: MA0213
 Test Program: Side Validation Testing Test Date: 06/10/09

TEST VEHICLE INFORMATION AND OPTIONS

| | |
|----------------------------|-------------------|
| NHTSA Number | MA0213 |
| Model Year | 2010 |
| Make | Ford |
| Model | Fusion SE |
| Body Style | 4-Door Sedan |
| VIN | 3FAHP0HA5AR135994 |
| Body Color | Silver |
| Delivery Date | 6/3/2009 |
| Odometer Reading (km / mi) | 106 / 66 |
| Dealer | Sunrise Ford |
| Transmission | 4-Speed Automatic |
| Final Drive | Front |
| Type / No. of Cylinders | Inline 4 |
| Engine Displacement (L) | 2.5 |
| Engine Placement | Transverse |
| Roof Rack | No |
| Sunroof / T-Top | No |
| Tinted Glass | Yes |
| Traction Control | Yes |
| Power Brakes | Yes |
| Front Disc | Yes |
| Rear Disc | Yes |
| Other | Sync |

| | |
|--------------------------------|-----------|
| Anti-Lock Brakes | Yes |
| All Wheel Drive | No |
| Power Steering | Yes |
| Driver Front Airbag | Yes |
| Driver Side Torso Airbag | Yes |
| Driver Side Head Airbag | No |
| Driver Curtain Airbag | Yes |
| Driver Knee Airbag | No |
| Driver Head / Torso Airbag | No |
| Rear Pass. Front Airbag | No |
| Rear Pass. Side Torso Airbag | Yes |
| Rear Pass. Side Head Airbag | No |
| Rear Pass. Curtain Airbag | Yes |
| Rear Pass. Head / Torso Airbag | No |
| Pre-Tensioners | Yes |
| Load Limiters | Yes |
| Air Conditioning | Yes |
| AM / FM CD | Yes |
| Tilt Steering | Yes |
| Automatic Door Locks | Yes |
| Power Windows | Yes |
| Power Seats | Yes |
| Other | Bluetooth |

Does Owner's Manual provide instructions to turn off automatic door locks? Yes

DATA FROM CERTIFICATION LABEL

| | |
|---------------------|----------------|
| Manufactured By | Ford Motor Co. |
| Date of Manufacture | May-09 |

| | |
|-----------------|------|
| GVWR (kg) | 1991 |
| GAWR Front (kg) | 1063 |
| GAWR Rear (kg) | 928 |

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

| Measured Parameter | Front | Rear | Third | Total |
|-----------------------------|-------|------|-------|-------|
| Designated Seating Capacity | 2 | 3 | | 5 |
| Capacity Weight (VCW) (kg) | | | | 385.0 |
| DSC x 68.04 (kg) | | | | 340.2 |
| Cargo Weight (RCLW) (kg) | | | | 44.8 |

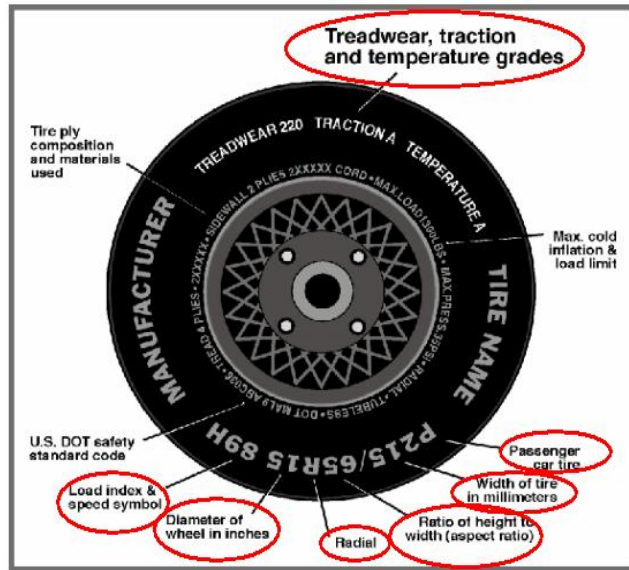
VEHICLE SEAT TYPE

| Seating Location | Type of Seat Pan | | | | Type of Seat Back | | |
|-------------------------|------------------|-------|-------------|-----------|-------------------|------------|---------|
| | | | | | Fixed | Adjustable | |
| | Bucket | Bench | Split Bench | Contoured | | w/ Lever | w/ Knob |
| Front Seat | Yes | | | | | Yes | |
| Rear or Second Row Seat | | Yes | | | Yes | | |
| Third Row Seat | | | | | | | |

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2010 Ford Fusion SE 4-Door Sedan NHTSA No.: MA0213
 Test Program: Side Validation Testing Test Date: 06/10/09



TIRE INFORMATION

| Measured Parameter | Front | Rear |
|--------------------------|-----------------------------------|-----------------------------------|
| Max. Tire Pressure (kpa) | 300 | 300 |
| Cold Pressure (kpa) | 215 | 215 |
| Recommended Tire Size | P225/50R17 | P225/50R17 |
| Tire Size on Vehicle | P225/50R17 | P225/50R17 |
| Tire Manufacturer | Michelin | Michelin |
| Tire Model | Pilot | Pilot |
| Treadwear | 300 | 300 |
| Traction | A | A |
| Temperature Grades | A | A |
| Tire Plies Sidewall | 2 Polyester | 2 Polyester |
| Tire Plies Body | 2 Polyester, 1 Polyamide, 2 Steel | 2 Polyester, 1 Polyamide, 2 Steel |
| Load Index/Speed Symbol | 93V | 93V |
| Tire Material | Polyester, Polyamide, Steel | Polyester, Polyamide, Steel |
| DOT Safety Code Right | M30A DECX 1609 | M30A DECX 1609 |
| DOT Safety Code Left | M30A DECX 1609 | M30A DECX 1609 |

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2010 Ford Fusion SE 4-Door Sedan NHTSA No.: MA0213
 Test Program: Side Validation Testing Test Date: 06/10/09

TEST VEHICLE WEIGHTS

| | Units | As Delivered Weights (UVW) | | | As Tested Weights (ATW) | | |
|-------|-------|----------------------------|-----------|--------|-------------------------|-----------|--------|
| | | Front Axle | Rear Axle | Total | Front Axle | Rear Axle | Total |
| Left | kg | 440.5 | 317.5 | | 472.0 | 391.0 | |
| Right | kg | 471.5 | 288.0 | | 464.5 | 353.0 | |
| Ratio | % | 60.1% | 39.9% | 100.0% | 55.7% | 44.3% | 100.0% |
| Total | kg | 912.0 | 605.5 | 1517.5 | 936.5 | 744.0 | 1680.5 |

TARGET TEST WEIGHT CALCULATION

| Measured Parameter | Units | Value | |
|--|-------|--------|-------|
| Total Delivered Weight (UVW) | kg | 1517.5 | A |
| Sum of Actual Weight of 2 P572 ATDs Used | kg | 125.0 | B |
| Rated Cargo/Luggage Wt (RCLW) | kg | 44.8 | C |
| Calculated Vehicle Target Wt (TVTWT) | kg | 1687.3 | A+B+C |

TEST VEHICLE ATTITUDES

| Condition | Units | LF | RF | LR | RR | CG Aft of Front Axle |
|--------------|-------|-----|-----|-----|-----|----------------------|
| Fully Loaded | mm | 702 | 715 | 699 | 702 | |
| As Tested | mm | 708 | 708 | 690 | 697 | 1206 |

GENERAL TEST VEHICLE DATA

| Measurement Description | Units | Value |
|----------------------------------|-------|-------|
| Test Vehicle Wheel Base | mm | 2725 |
| Right Side Length | mm | 3127 |
| Length at Centerline | mm | 4827 |
| Left Side Length | mm | 3127 |
| Weight of Ballast in Cargo Area | kg | 0 |
| Amount of Stoddard Solvent Added | L | 61.60 |

Vehicle components removed to make target vehicle test weight:

Right Rear Passenger Door Panel and Glass (7.0 kg), Right Rear Passenger Speaker (1.5 kg),
Right Front Passenger Door Panel and Glass (8.0 kg), Passenger Side Mirror and Speaker (1.5
kg), Rear Taillights (2.5 kg), Front Bumper Cover (8.5 kg), Trunk Carpet (1.5 kg), Spare Tire
(13.5 kg), Spare Tire Tools (3.0 kg)

TEST VEHICLE VERTICAL IMPACT LINE DATA

| Measurement Description | Units | Value |
|---------------------------------------|-------|-------|
| Target Impact Point Aft of Front Axle | mm | 418 |
| Actual Impact Point Aft of Front Axle | mm | 414 |

DATA SHEET NO. 2

SEAT ADJUSTMENT, FUEL SYSTEMS, AND STEERING WHEEL DATA

Test Vehicle: 2010 Ford Fusion SE 4-Door Sedan

NHTSA No.: MA0213

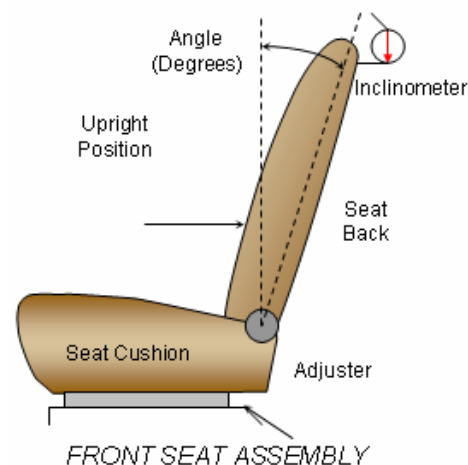
Test Program: Side Validation Testing

Test Date: 06/10/09

NOMINAL DESIGN RIDING POSITION

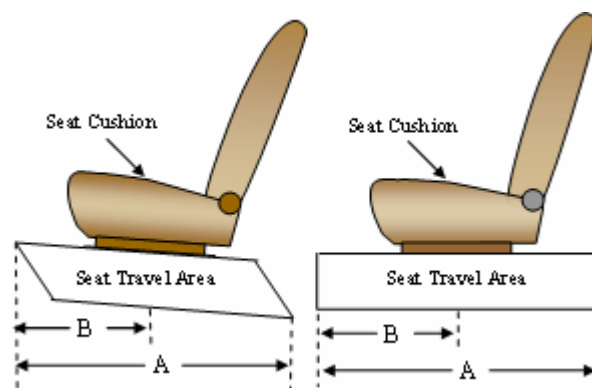
The procedure for the driver is as follows: the seat back is set to the manufacturer's designated angle; seat back angle is measured at the headrest post using a digital inclinometer. The procedure for the passenger is as follows: the seat back is fixed.

| Seating Position | Degrees |
|---------------------------|-----------------|
| Driver Seat Back Angle | 10.2 @ Headrest |
| Passenger Seat Back Angle | Fixed |



SEAT FORE / AFT POSITIONS

The total seat travel is measured from the forward most possible position to the rearmost possible position. The driver's seat is set to the mid travel longitudinal position with the seat in the full down height position. The passenger's seat is fixed.



| Seating Position | Total Fore-Aft Travel | Placed in Position | Cushion Range | Placed in Position |
|------------------|-----------------------|--------------------|----------------|--------------------|
| Driver Seat | 300 mm | 150 mm | -0.1° to -1.6° | -0.9° |
| Passenger Seat | | | | |

SEAT BELT UPPER ANCHORAGE

Position number one (1) is the uppermost position.

| Seating Position | Total No. of Positions | Placed in Position |
|------------------|------------------------|--------------------|
| Driver Seat | 4 | 1 |
| Passenger Seat | Fixed | Fixed |

DATA SHEET NO. 2 ... (CONTINUED)

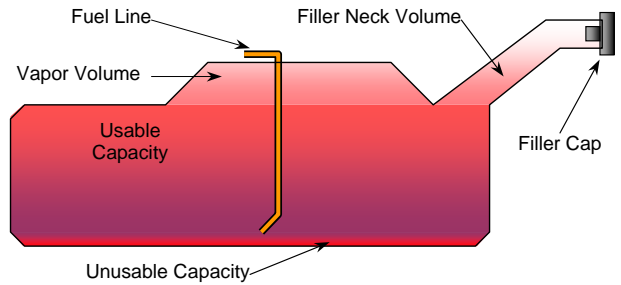
SEAT ADJUSTMENT, FUEL SYSTEMS, AND STEERING WHEEL DATA

Test Vehicle: 2010 Ford Fusion SE 4-Door Sedan NHTSA No.: MA0213
 Test Program: Side Validation Testing Test Date: 06/10/09

FUEL TANK CAPACITY

| Description | Liters |
|--|--------|
| Usable Capacity of "Standard Tank" | 66.24 |
| Usable Capacity of "Optional Tank" | |
| Usable Capacity Used for FMVSS 301 | 66.24 |
| Actual Amount of Stoddard Solvent Used | 61.60 |

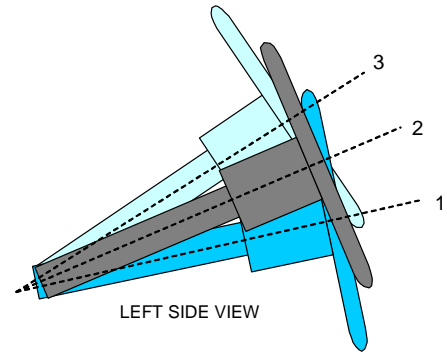
The test vehicle is equipped with an electric fuel pump. The fuel pump will operate when the vehicle is idling or running. The fuel filler door is located on the left rear fender. The standard fuel tank occupies the area under the rear seat.



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. A digital inclinometer is used to measure a plate which is placed across the rim of the steering wheel.



STEERING COLUMN ASSEMBLY

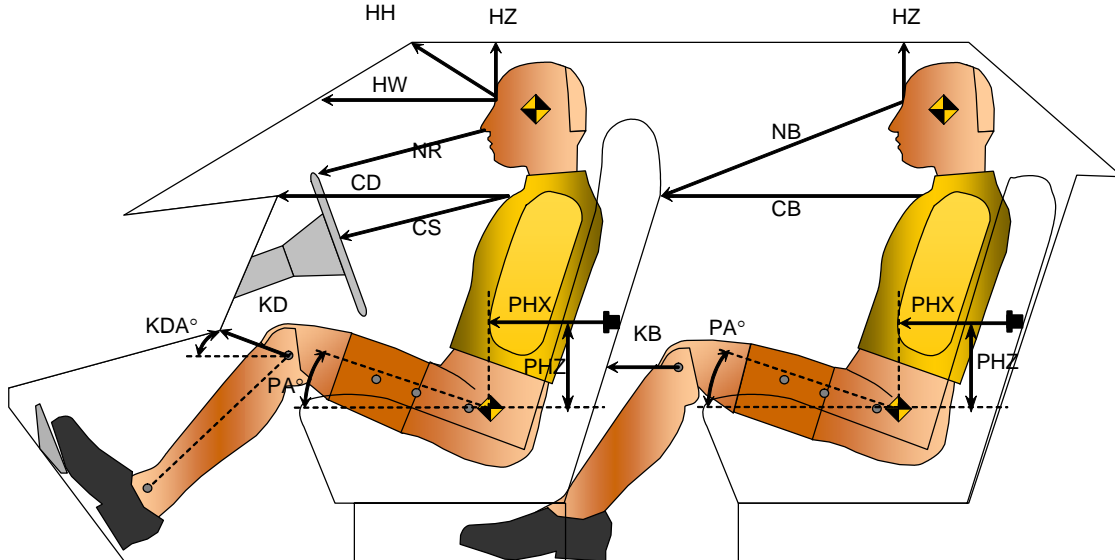
STEERING COLUMN POSITIONING

| | Degrees | Fore-Aft Position (mm) |
|-----------------------------------|---------|------------------------|
| Lowermost Position, No. 1 | 18.4 | |
| Geometric Center Position, No. 2 | 21.1 | |
| Uppermost Position, No. 3 | 23.7 | |
| Telescoping Steering Wheel Travel | | |
| Test Position | 21.6 | |

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2010 Ford Fusion SE 4-Door Sedan NHTSA No.: MA0213
 Test Program: Side Validation Testing Test Date: 06/10/09



DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

| Driver Code | Pass. Code | Description | Driver | | Passenger | |
|-------------|------------|----------------------------------|-------------|-----------|-------------|-----------|
| | | | Length (mm) | Angle (°) | Length (mm) | Angle (°) |
| HH | | Head to Header | 282 | 18.2 | | |
| HW | | Head to Windshield | 507 | 0.0 | | |
| HZ | HZ | Head to Roof | 134 | 90.0 | 261 | 90.0 |
| NR | NB | Nose to Rim / Seat Back | 366 | 16.2 | 601 | 10.0 |
| CD | CB | Chest to Dash / Seat Back | 513 | 8.5 | 625 | 2.3 |
| CS | | Steering Wheel to Chest | 292 | 13.4 | | |
| KDL | KBL | Left Knee to Dash / Seat Back | 158 | 32.6 | 330 | 19.6 |
| KDR | KBR | Right Knee to Dash / Seat Back | 121 | | 321 | 17.9 |
| PA | PA | Pelvic Angle | | 13.9 | | 19.6 |
| PHX | PHX | H-Point to Striker (x-direction) | 188 | 0.0 | 292 | 0.0 |
| PHZ | PHZ | H-Point to Striker (z-direction) | 130 | 90.0 | 336 | 90.0 |
| SA | SA | Seat Back Angle | | 10.2 | | Fixed |

DATA SHEET NO. 4

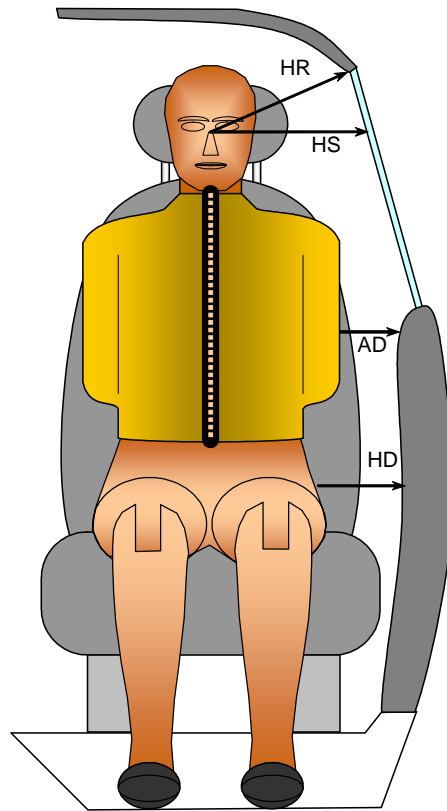
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2010 Ford Fusion SE 4-Door Sedan

NHTSA No.: MA0213

Test Program: Side Validation Testing

Test Date: 06/10/09



FRONT VIEW OF DUMMY

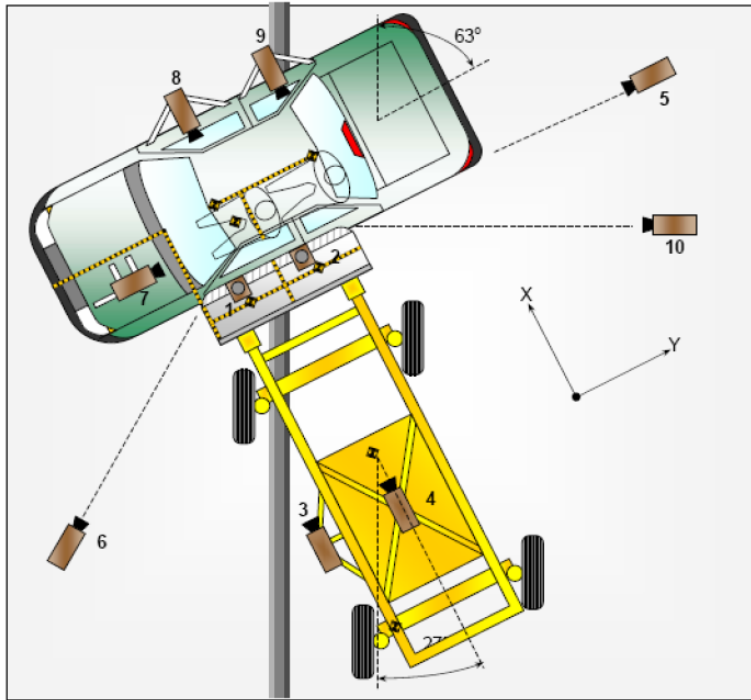
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

| Code | Measurement Description | Units | Driver | Passenger |
|------|-------------------------|-------|--------|-----------|
| HR | Head to Side Header | mm | 260 | 255 |
| HS | Head to Side Window | mm | 348 | 345 |
| AD | Arm to Door | mm | 106 | 135 |
| HD | H-Point to Door | mm | 135 | 169 |

DATA SHEET NO. 5
CAMERA LOCATIONS AND DATA

Test Vehicle: 2010 Ford Fusion SE 4-Door Sedan
Test Program: Side Validation Testing

NHTSA No.: MA0213
Test Date: 06/10/09



CAMERA LOCATIONS AND DATA

| No. | Description | Position | | | Lens (mm) | Film Speed (fps) |
|------|-------------------------|----------|-------|-------|-----------|------------------|
| | | X | Y | Z | | |
| Doc. | Real Time Inrun | -2484 | -3958 | -1506 | ZOOM | 30 |
| Doc. | Real Time Left Front | -2266 | 3549 | -1475 | ZOOM | 30 |
| 1 | Overhead Overall | 1220 | 2287 | -5486 | 14 | 1000 |
| 2 | Overhead Close-Up | 609 | 2287 | -5102 | ZOOM | 1000 |
| 3 | Left Impact Point (MDB) | -2134 | 0 | -1143 | 12 | 1000 |
| 4 | Side Overall (MDB) | -3912 | 838 | -1829 | 12 | 1000 |
| 5 | Rear | -64 | 2485 | -1348 | 105 | 1000 |
| 6 | Left Front | -2266 | -3564 | -1475 | 24 | 1000 |
| 7 | Driver Front On-Board | 652 | -769 | -1188 | 35 | 1000 |
| 8 | Driver Side On-Board | 1916 | 866 | -1036 | 20 | 1000 |
| 9 | Passenger Side On-Board | 1859 | -1777 | -1099 | 20 | 1000 |
| 10 | Left Rear | 1930 | 1600 | -1295 | 85 | N/A |

DATA SHEET NO. 6

VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2010 Ford Fusion SE 4-Door Sedan NHTSA No.: MA0213
 Test Program: Side Validation Testing Test Date: 06/10/09

VEHICLE ACCELEROMETER LOCATIONS

| Loc. No. | Accelerometer Location | Measurements (mm) | | |
|----------|---------------------------|-------------------|------|------|
| | | X | Y | Z |
| 1 | Right Sill at Front Seat | 2670 | 610 | -370 |
| 2 | Right Sill at Rear Seat | 1740 | 660 | -390 |
| 3 | Rear Floorpan Above Axle | 1000 | 50 | -400 |
| 4 | Left Sill at Rear Door | 1720 | -740 | -240 |
| 5 | Left Sill at Front Door | 2560 | -500 | -160 |
| 6 | Rt. Rear Occ. Compartment | 2100 | 350 | -200 |
| 7 | B-Post Lower | 2260 | -730 | -580 |
| 8 | B-Post Middle | 2260 | -730 | -890 |
| 9 | A-Post Lower | 3300 | -810 | -500 |
| 10 | A-Post Middle | 3300 | -810 | -670 |
| 11 | Front Seat Track | 2460 | -620 | -360 |
| 12 | Rear Seat Structure | | | |
| 13 | Vehicle CG | 1950 | 0 | -280 |

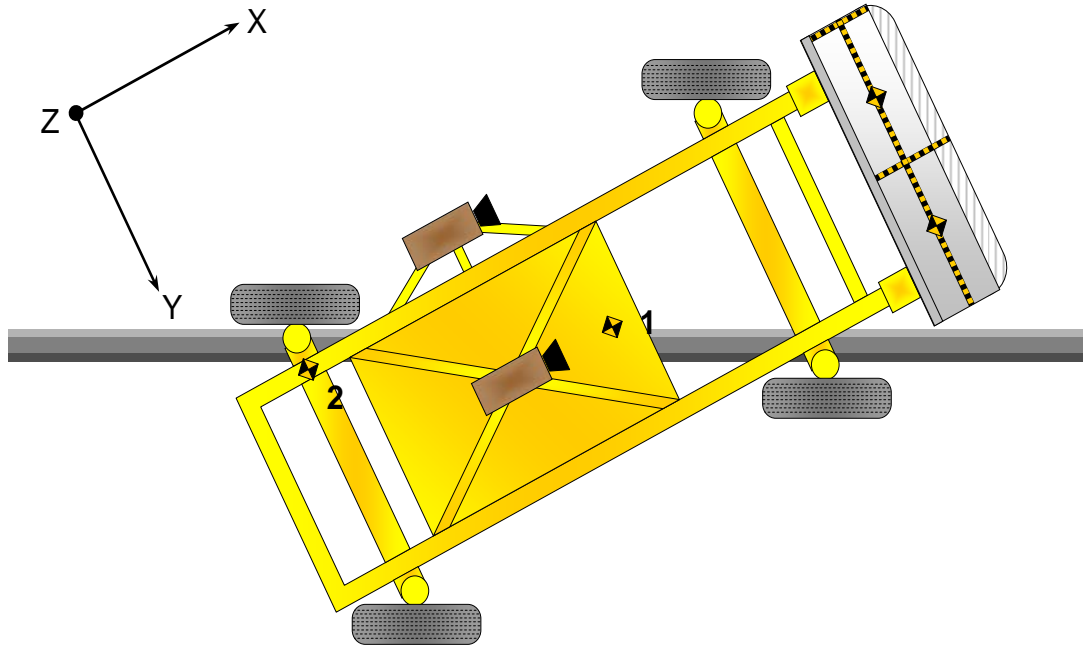
Reference Planes: X=From Rear Surface of Vehicle, Y=Vehicle Centerline, Z=Ground Plane

¹ - Not Installed

DATA SHEET NO. 7

MOVING DEFORMABLE BARRIER (MDB) ACCELEROMETER LOCATIONS

Test Vehicle: 2010 Ford Fusion SE 4-Door Sedan NHTSA No.: MA0213
 Test Program: Side Validation Testing Test Date: 06/10/09



MDB ACCELEROMETER LOCATIONS

| Loc. No. | Accelerometer Locations | Measurements (mm) | | |
|----------|-------------------------|-------------------|------|-----|
| | | X | Y | Z |
| 1 | MDB CG | -1195 | 0 | 430 |
| 2 | MDB Rear | -2642 | -593 | 608 |

All measurements in mm.

Reference: +X = Rearward
 +Y = To Right
 +Z = Up

DATA SHEET NO. 8

TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2010 Ford Fusion SE 4-Door Sedan NHTSA No.: MA0213
Test Program: Side Validation Testing Test Date: 06/10/09

MAXIMUM EXTERIOR STATIC CRUSH

| Level | Measured Parameter | Units | Maximum Crush | Above Ground |
|---------|---------------------|-------|---------------|--------------|
| Level 1 | Sill Top Height | mm | 142 | 257 |
| Level 2 | Occupant H-Point | mm | 287 | 513 |
| Level 3 | Mid Door | mm | 304 | 628 |
| Level 4 | Window Sill | mm | 266 | 900 |
| Level 5 | Window top | mm | 76 | 1395 |
| N/A | Maximum Penetration | mm | 304 | |

INSTRUMENTATION

| | |
|----------------------------------|----|
| Driver Dummy Channels | 16 |
| Passenger Dummy Channels | 23 |
| Vehicle Structure Accelerometers | 21 |
| MDB Accelerometers | 5 |
| Contact Switches | 9 |
| Airbag Timing Sensors | 4 |
| Total | 78 |

CAMERA COVERAGE

| | |
|-----------------------------|----|
| High-Speed Vehicle On-Board | 3 |
| High-Speed Offboard | 5 |
| High-Speed MDB On-Board | 2 |
| Real Time | 2 |
| Total | 12 |

DATA SHEET NO. 9

MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS

Test Vehicle: 2010 Ford Fusion SE 4-Door Sedan NHTSA No.: MA0213
 Test Program: Side Validation Testing Test Date: 06/10/09

MDB SPECIFICATIONS

| Measurement Description | Length (mm) |
|---|-------------|
| Overall Width of Framework Carriage | 1252 |
| Overall Length including Honeycomb Face | 4115 |
| Wheel Base of Framework Carriage | 2590 |
| C.G. location aft of Front Axle | 1127 |

MDB WEIGHTS

| | Units | Front Axle | Rear Axle | Total |
|--------|-------|------------|-----------|-------|
| Left | kg | 384 | 308 | |
| Right | kg | 385 | 284 | |
| Ratio | % | 56.5 | 43.5 | |
| Totals | kg | 769 | 592 | 1361 |

SPEED AND IMPACT DATA

| Measured Parameter | Units | Requirement | Value |
|---------------------------------|---------|-------------|-------|
| Trap No. 1 Velocity (Primary) | km/h | 61.1-62.7 | 61.87 |
| Trap No. 2 Velocity (Redundant) | km/h | 61.1-62.7 | |
| MDB CL to Target Vehicle CL | degrees | 88.5-91.5 | 89.3 |

MAXIMUM STATIC CRUSH OF HONEYCOMB FACE

| Vertical Location | | | From Centerline | | Max. Crush (mm) |
|-------------------|------------------|-------------|-----------------|-----------|-----------------|
| Row | Description | Height (mm) | Distance (mm) | Direction | |
| A | Center of Bumper | 432 | 800 | Left | 237 |
| B | Top of Bumper | 533 | 800 | Left | 121 |
| C | Mid Level | 686 | 800 | Right | 92 |
| D | Top of Stack | 813 | 800 | Right | 121 |

MDB INSTRUMENTATION AND CAMERAS

| | |
|--------------------|---|
| Accelerometers | 6 |
| Contact Switches | 2 |
| High Speed Cameras | 2 |

DATA SHEET NO. 10
POST-TEST OBSERVATIONS

Test Vehicle: 2010 Ford Fusion SE 4-Door Sedan NHTSA No.: MA0213
 Test Program: Side Validation Testing Test Date: 06/10/09

TEST DUMMY INFORMATION AND CONTACT POINTS

| Description | Front Seat Dummy | Rear Seat Dummy |
|-----------------------|-------------------------------------|---|
| Dummy Type/Serial No. | ES-2re, S/N F035 | SID-IIs, S/N 299 |
| Head Contact | Curtain Airbag, Headliner, Headrest | Curtain Airbag, C-Pillar, Center Rear Seat Headrest |
| Upper Torso Contact | Side Airbag | Door Panel |
| Lower Torso Contact | Door Panel | Door Panel |
| Left Knee Contact | Door Panel, Right Knee | Door Panel, Right Knee |
| Right Knee Contact | Left Knee | Left Knee |

POST-TEST DOOR OPENING AND SEAT TRACK INFORMATION

| Description | Front | Rear |
|-------------------------|---------------------------------|---------------------------------|
| Left Side Door Opening | Jammed Shut | Jammed Shut |
| Right Side Door Opening | Remained Closed and Operational | Remained Closed and Operational |
| Seat Movement | None | None |
| Seatback Failure | No | No |

POST-TEST STRUCTURAL OBSERVATIONS

| Critical Areas of Performance | Observations and Conclusions |
|-------------------------------|--|
| Pillar Performance | No separation occurred |
| Sill Separation | No separation occurred |
| Windshield Damage | Cracked |
| Window Damage | Both front and rear left side windows broken |
| Other Notable Effects | None |

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

| Restraint Type | Left Front (Driver) Occupant Location 1 | | Left Rear (Passenger) Occupant Location 2 | |
|---------------------|--|----------|--|----------|
| | Installed | Deployed | Installed | Deployed |
| Front Airbag | Yes | No | No | |
| Side Airbag | Yes | Yes | No | |
| Head / Torso Airbag | No | | No | |
| Curtain Airbag | Yes | Yes | Yes | Yes |
| Knee Airbag | No | No | No | |
| Pre-Tensioners | Yes | Yes | No | |
| Load Limiters | Yes | | | |

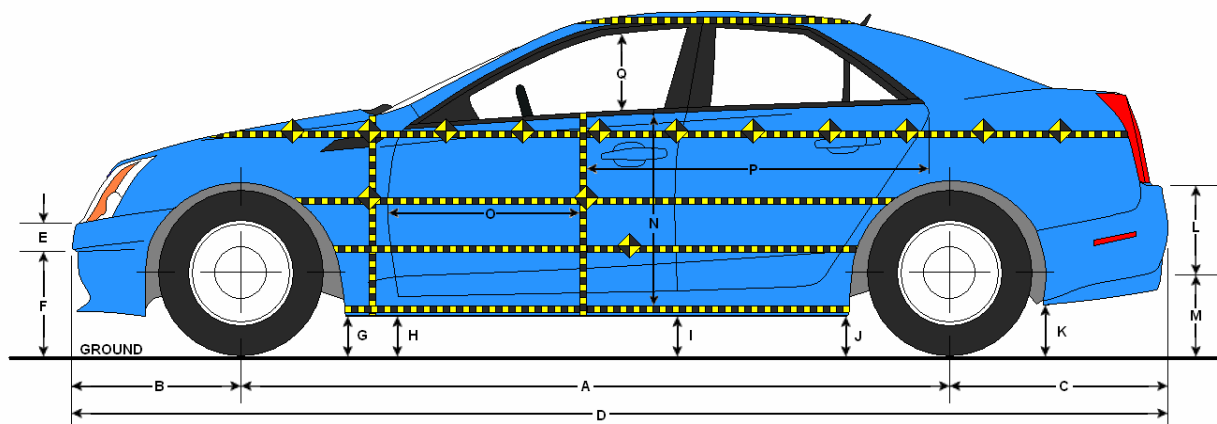
MDB LEFT EDGE IMPACT DATA

| Measured Parameter | Units | Requirement | Value |
|--------------------|-------|-------------|-----------|
| Horizontal Offset | mm | +/- 50 | -4 (Left) |
| Vertical Offset | mm | +/-20 | +5 (Up) |

DATA SHEET NO. 11

VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2010 Ford Fusion SE 4-Door Sedan NHTSA No.: MA0213
 Test Program: Side Validation Testing Test Date: 06/10/09



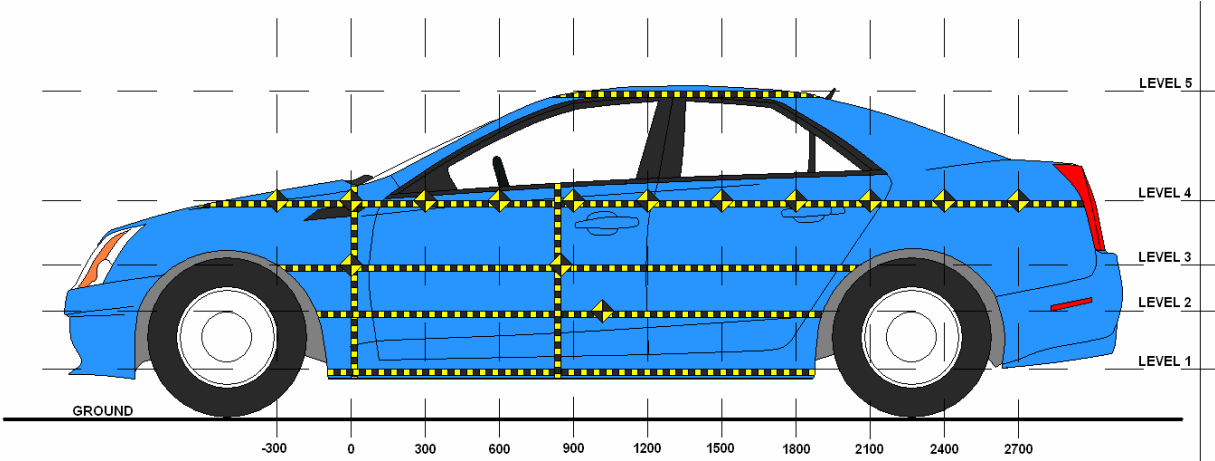
VEHICLE PRE AND POST-TEST MEASUREMENT INFORMATION

| Code | Dimension | Measurement (mm) | | |
|------|--|------------------|------|------------|
| | | Pre | Post | Difference |
| A | Wheelbase | 2725 | 2705 | -20 |
| B | Front Axle to FSOV | 994 | 1003 | 9 |
| C | Rear Axle to RSOV | 1108 | 1106 | -2 |
| D | Total Length at Centerline | 4827 | 4813 | -14 |
| E | Front Bumper Thickness | 131 | 130 | -1 |
| F | Front Bumper Bottom to Ground | 386 | 399 | 13 |
| G | Sill Height aft of Front Wheel Well | 207 | 208 | 1 |
| H | Sill Height at Front Door Leading Edge | 210 | 210 | 0 |
| I | Sill Height at B-Pillar | 225 | 294 | 69 |
| J1 | Sill Height at Rear Wheel Well | 219 | 281 | 62 |
| J2 | Pinch Weld Height at Rear Wheel Well | 182 | 211 | 29 |
| K | Sill Height Aft of Rear Wheel Well | 242 | 291 | 49 |
| L | Rear Bumper Thickness | 200 | 199 | -1 |
| M | Bottom of Rear Bumper to Ground | 450 | 511 | 61 |
| N | Sill Height to Window Bottom Sill | 638 | 645 | 7 |
| O | Front Door Leading Edge to Impact CL | 26 | 135 | 109 |
| P | Rear Door Trailing Edge to Impact CL | 2219 | 2162 | -57 |
| Q | Front Window Opening | 416 | 459 | 43 |
| R | Right Side Length | 3127 | 3136 | 9 |
| S | Left Side Length | 3127 | 3084 | -43 |
| T | Vehicle Width at B-Pillar | 1796 | 1681 | -115 |

DATA SHEET NO. 12

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2010 Ford Fusion SE 4-Door Sedan NHTSA No.: MA0213
 Test Program: Side Validation Testing Test Date: 06/10/09



LEFT SIDE VIEW

| Level | Description | Height Above Ground (mm) |
|-------|-------------------------|--------------------------|
| 1 | Sill Top Height | 257 |
| 2 | Occupant H-Point Height | 513 |
| 3 | Mid-Door Height | 628 |
| 4 | Window Sill Height | 900 |
| 5 | Window Top Height | 1395 |

DATA SHEET NO. 12 ... (CONTINUED)

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2010 Ford Fusion SE 4-Door Sedan NHTSA No.: MA0213
 Test Program: Side Validation Testing Test Date: 06/10/09

| | Pre-Test (mm) | | | | | Post-Test (mm) | | | | | Difference (mm) | | | | |
|------|---------------|-----|-----|-----|-----|----------------|-----|-----|-----|-----|-----------------|-----|-----|-----|----|
| | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| -900 | | | | | | | | | | | | | | | |
| -750 | | | | | | | | | | | | | | | |
| -600 | | | | | | | | | | | | | | | |
| -450 | | | | | | | | | | | | | | | |
| -300 | | | | 698 | | | | | 727 | | | | | 29 | |
| -150 | | | 596 | 682 | | | | 630 | 724 | | | | 34 | 42 | |
| 0 | 636 | 602 | 605 | 670 | | 659 | 643 | 649 | 710 | | 23 | 41 | 44 | 40 | |
| 150 | 636 | 610 | 605 | 662 | | 713 | 817 | 801 | 738 | | 77 | 207 | 196 | 76 | |
| 300 | 635 | 609 | 602 | 656 | | 712 | 851 | 860 | 764 | | 77 | 242 | 258 | 108 | |
| 450 | 634 | 608 | 600 | 649 | | 718 | 857 | 872 | 788 | | 84 | 249 | 272 | 139 | |
| 600 | 635 | 607 | 598 | 644 | | 729 | 866 | 856 | 809 | | 94 | 259 | 258 | 165 | |
| 750 | 633 | 606 | 597 | 639 | | 755 | 871 | 856 | 829 | | 122 | 265 | 259 | 190 | |
| 900 | 633 | 605 | 596 | 633 | 945 | 758 | 877 | 854 | 855 | 981 | 125 | 272 | 258 | 222 | 36 |
| 1050 | 635 | 604 | 595 | 631 | 928 | 765 | 886 | 852 | 840 | 976 | 130 | 282 | 257 | 209 | 48 |
| 1200 | 635 | 605 | 596 | 629 | 922 | 777 | 882 | 865 | 833 | 984 | 142 | 277 | 269 | 204 | 62 |
| 1350 | 638 | 608 | 598 | 629 | 918 | 759 | 890 | 877 | 879 | 994 | 121 | 282 | 279 | 250 | 76 |
| 1500 | 641 | 611 | 600 | 626 | 920 | 744 | 898 | 902 | 892 | 991 | 103 | 287 | 302 | 266 | 71 |
| 1650 | 644 | 614 | 603 | 628 | 926 | 734 | 887 | 907 | 859 | 975 | 90 | 273 | 304 | 231 | 49 |
| 1800 | 648 | 618 | 607 | 629 | 945 | 726 | 836 | 881 | 833 | 973 | 78 | 218 | 274 | 204 | 28 |
| 1950 | | | 607 | 632 | | | | 765 | 765 | | | | 158 | 133 | |
| 2100 | | | | 638 | | | | | 682 | | | | | 44 | |
| 2250 | | | | 645 | | | | | 679 | | | | | 34 | |
| 2400 | | | | 655 | | | | | 680 | | | | | 25 | |
| 2550 | | | | 667 | | | | | 685 | | | | | 18 | |
| 2700 | | | | | | | | | | | | | | | |
| 2850 | | | | | | | | | | | | | | | |

MAXIMUM CRUSH DATA

| | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---------------------------|---------|---------|---------|---------|---------|
| Maximum Crush (mm) | 142 | 287 | 304 | 266 | 76 |
| Distance from Impact (mm) | 1200 | 1500 | 1650 | 1500 | 1350 |

DATA SHEET NO. 12 ... (CONTINUED)

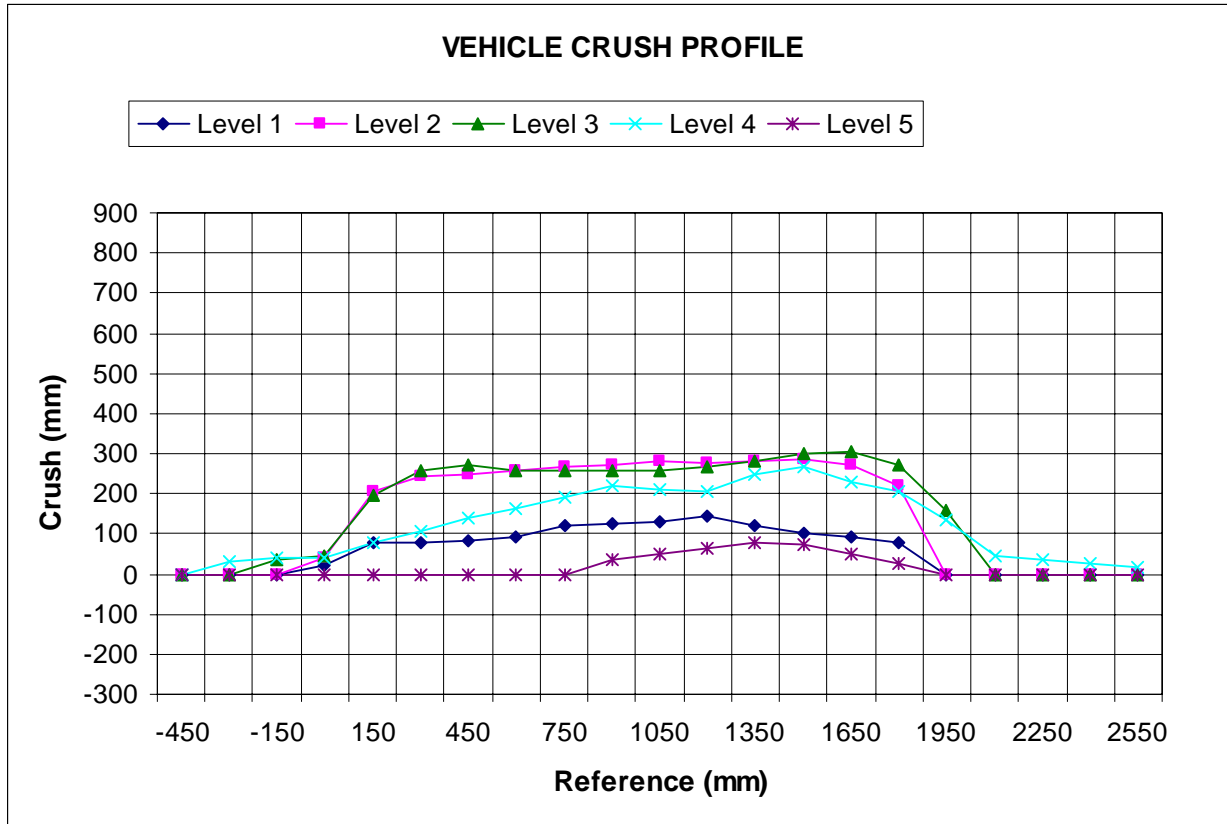
Vehicle Exterior Crush Measurements

Test Vehicle: 2010 Ford Fusion SE 4-Door Sedan

NHTSA No.: MA0213

Test Program: Side Validation Testing

Test Date: 06/10/09



DATA SHEET NO. 13

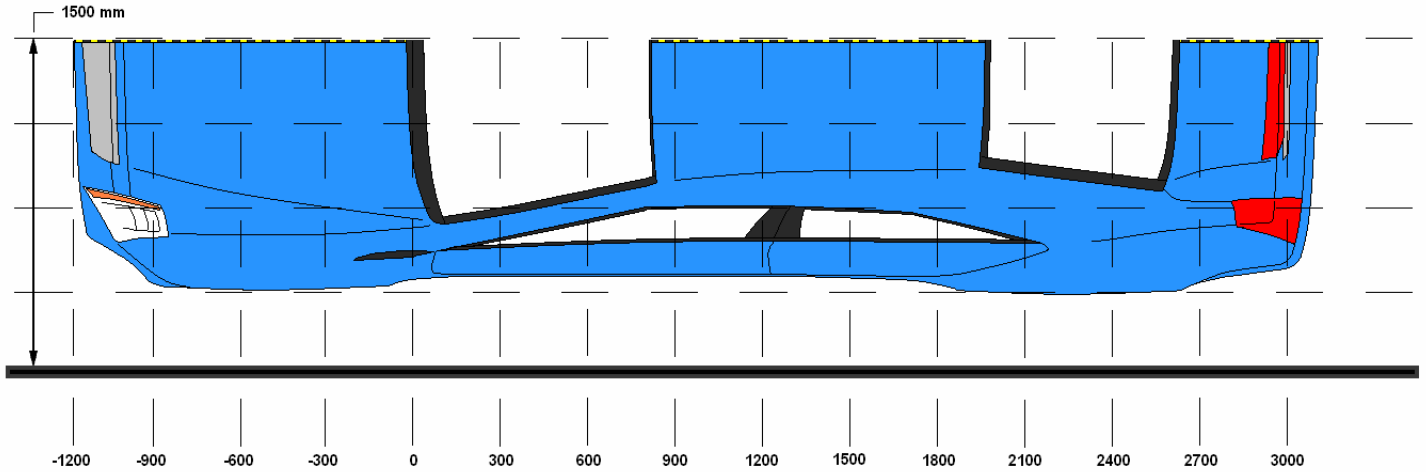
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2010 Ford Fusion SE 4-Door Sedan

NHTSA No.: MA0213

Test Program: Side Validation Testing

Test Date: 06/10/09



TOP VIEW

DAMAGE PROFILE DISTANCES

| DPD | Distance From Impact Point in mm | Level | Pre-Test (mm) | Post-Test (mm) | Max. Static Crush (mm) |
|-----|----------------------------------|-------|---------------|----------------|------------------------|
| 1 | 2100 | 4 | 682 | 638 | 44 |
| 2 | 1650 | 3 | 907 | 603 | 304 |
| 3 | 1200 | 2 | 882 | 605 | 277 |
| 4 | 750 | 2 | 871 | 606 | 265 |
| 5 | 300 | 3 | 860 | 602 | 258 |
| 6 | -150 | 4 | 724 | 682 | 42 |

DATA SHEET NO. 14

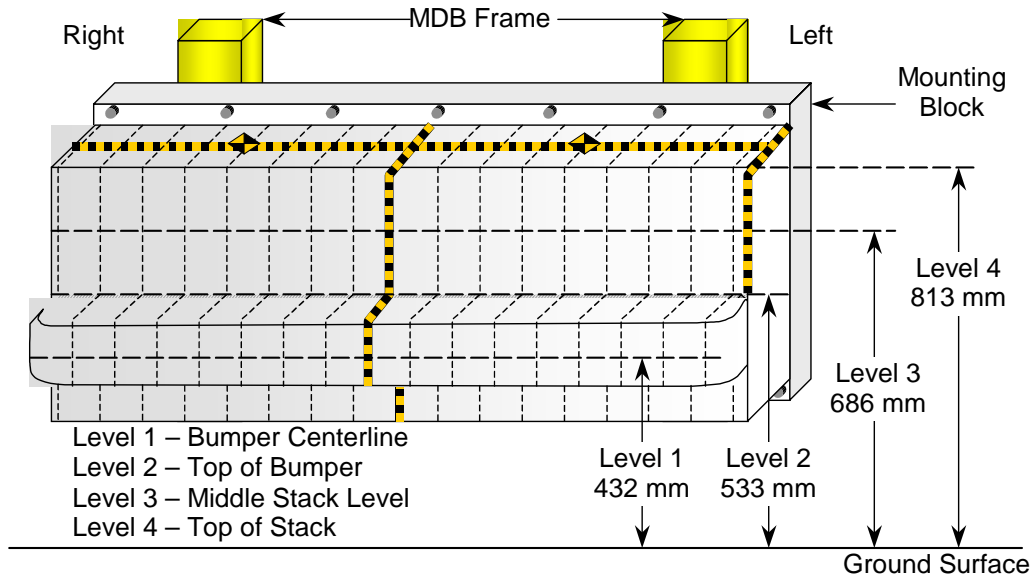
EXTERIOR STATIC CRUSH FOR IMPACTOR FACE

Test Vehicle: 2010 Ford Fusion SE 4-Door Sedan

NHTSA No.: MA0213

Test Program: Side Validation Testing

Test Date: 06/10/09



DEFORMABLE BARRIER STATIC CRUSH

| Stack Level | Distance Right of Center | | | | | | | | C/L | Distance Left of Center | | | | | | | |
|-------------|--------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-------------------------|-----|-----|-----|-----|-----|-----|-----|
| | 800 | 700 | 600 | 500 | 400 | 300 | 200 | 100 | | 0 | 100 | 200 | 300 | 400 | 500 | 600 | 700 |
| 1 | 755 | 714 | 687 | 675 | 668 | 669 | 664 | 662 | 662 | 657 | 656 | 656 | 658 | 659 | 660 | 666 | 686 |
| 2 | 741 | 734 | 718 | 700 | 684 | 681 | 680 | 684 | 681 | 681 | 685 | 691 | 698 | 700 | 705 | 714 | 727 |
| 3 | 681 | 655 | 643 | 647 | 651 | 665 | 692 | 680 | 660 | 650 | 645 | 643 | 646 | 650 | 658 | 674 | 712 |
| 4 | 698 | 665 | 639 | 635 | 650 | 683 | 709 | 693 | 681 | 667 | 648 | 651 | 662 | 679 | 697 | 719 | 741 |

All Dimensions in mm

DATA SHEET NO. 15

FMVSS 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

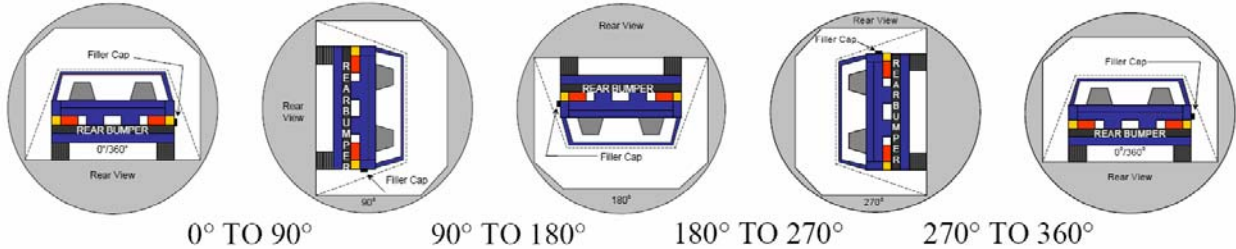
Test Vehicle: 2010 Ford Fusion SE 4-Door Sedan NHTSA No.: MA0213
 Test Program: Side Validation Testing Test Date: 06/10/09

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 20.6° Test Time: 3:18 PM

Spillage Measurements

- A. From impact until vehicle motion ceases: 0 oz.
(Maximum allowable = 1 oz.)
- B. For the 5 minute period after motion ceases: 0 oz.
(Maximum allowable = 5 oz.)
- C. For the following 25 minutes: 0 oz.
(Maximum allowable = 1 oz./minute)
- D. Spillage: No spillage occurred



SOLVENT COLLECTION TIME TABLE IN SECONDS

| Test Phase | Rotation Time | Hold Time | Total Time |
|--------------|---------------|-----------|------------|
| 0° To 90° | 86 | 300 | 386 |
| 90° To 180° | 84 | 301 | 385 |
| 180° To 270° | 76 | 303 | 379 |
| 270° To 360° | 80 | 302 | 382 |

FMVSS 301 SPILLAGE TABLE

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

SOLVENT SPILLAGE LOCATION TABLE

| Test Phase | Spillage Location |
|--------------|-------------------|
| 0° To 90° | None |
| 90° To 180° | None |
| 180° To 270° | None |
| 270° To 360° | None |

DATA SHEET NO. 16

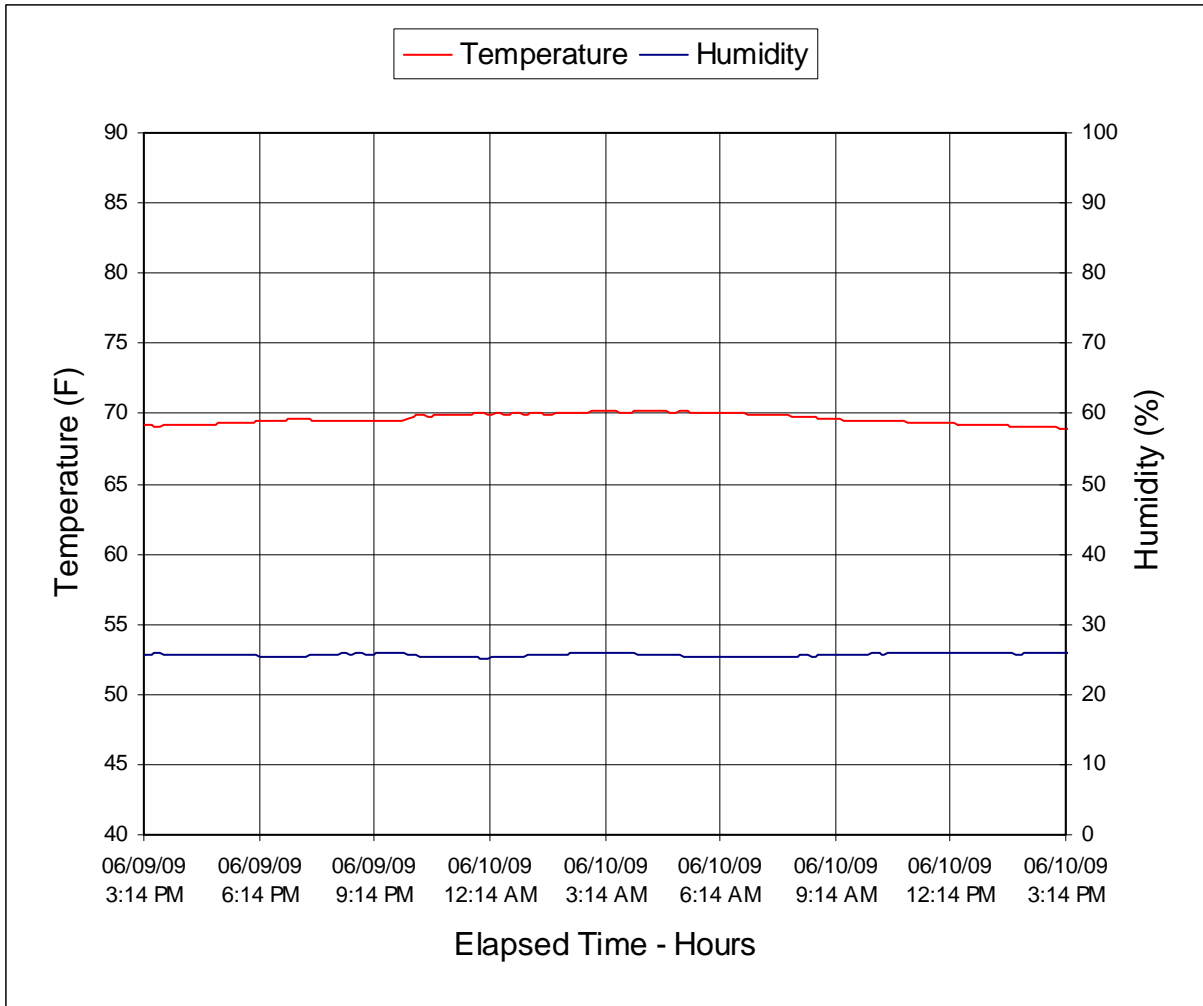
DUMMY / VEHICLE TEMPERATURE STABILIZATION

Test Vehicle: 2010 Ford Fusion SE 4-Door Sedan

NHTSA No.: MA0213

Test Program: Side Validation Testing

Test Date: 06/10/09



**APPENDIX A
PHOTOGRAPHS**

TABLE OF PHOTOGRAPHS

| <u>Number</u> | | <u>Page No.</u> |
|---------------|---|-----------------|
| 1 | As-Delivered Right Front $\frac{3}{4}$ View of Test Vehicle | A-1 |
| 2 | As-Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle | A-2 |
| 3 | Pre-Test Frontal View of the Test Vehicle | A-3 |
| 4 | Post-Test Frontal View of Test Vehicle | A-4 |
| 5 | Pre-Test Left $\frac{3}{4}$ Front View of Vehicle | A-5 |
| 6 | Post-Test Left $\frac{3}{4}$ Front View of Impact Zone | A-6 |
| 7 | Pre-Test Left Side View of Test Vehicle | A-7 |
| 8 | Post-Test Left Side View of Test Vehicle | A-8 |
| 9 | Pre-Test left $\frac{3}{4}$ Rear View of Test Vehicle | A-9 |
| 10 | Post-Test left $\frac{3}{4}$ Rear View of Impact Zone | A-10 |
| 11 | Pre-Test Rear View of Test Vehicle | A-11 |
| 12 | Post-Test Rear View of Test Vehicle | A-12 |
| 13 | Pre-Test Right Side View of Test Vehicle | A-13 |
| 14 | Post-Test Right Side View of Test Vehicle | A-14 |
| 15 | Pre-Test Overhead View of MDB Positioned Against Impact Side of Test Vehicle at Impact Location | A-15 |
| 16 | Post-Test Overhead View of the Test Vehicle and MDB | A-16 |
| 17 | Pre-Test Left Side View of MDB Positioned Against the Side of the Test Vehicle at the Ideal Impact Point | A-17 |
| 18 | Pre-Test Right Side View of MDB Positioned Against the Side of the Test Vehicle at the Ideal Impact Point | A-18 |
| 19 | Pre-Test Close-Up View of the Impact Point Target | A-19 |
| 20 | Post-Test Close-Up View of the Impact Point Target Showing Impact Point Location | A-20 |
| 21 | Pre-Test Left Front Door Latch Close-Up | A-21 |
| 22 | Post-Test Left Front Door Latch Close-Up | A-22 |
| 23 | Pre-Test Left Rear Door Latch Close-Up | A-23 |
| 24 | Post-Test Left Rear Door Latch Close-Up | A-24 |
| 25 | Pre-Test Front Close-Up View of Driver Dummy (Through Front Window) | A-25 |
| 26 | Post-Test Front Close-Up View of Driver Dummy (Through Front Window) | A-26. |
| 27 | Pre-Test Left Side View of Driver Dummy Showing Belt, Chalking, and Contact Switches | A-27 |

TABLE OF PHOTOGRAPHS ... (CONTINUED)

| <u>Number</u> | | <u>Page No.</u> |
|---------------|---|-----------------|
| 28 | Pre-Test Close-Up Left Side View of Driver Dummy Shoulder and Door Top View (Door Closed) | A-28 |
| 29 | Post-Test Close-Up Left Side View of Driver Dummy Shoulder and Door Top View (Door Closed) | A-29 |
| 30 | Pre-Test Close-Up Left Side View of Driver Seat Track Showing Seat Positioning | A-30 |
| 31 | Pre-Test Close-Up Left Side View of Driver Seat Track Showing Seat Back Positioning | A-31 |
| 32 | Pre-Test Driver Dummy and Door Clearance View | A-32 |
| 33 | Post-Test Driver Dummy and Door Clearance View | A-33 |
| 34 | Pre-Test Right Side View of Front Seat of Occupant Compartment (Through Window with Dummy) | A-34 |
| 35 | Post-Test Right Side View of Front Seat of Occupant Compartment (Through Window with Dummy) | A-35 |
| 36 | Pre-Test Driver Inner Door Panel View | A-36 |
| 37 | Post-Test Driver Inner Door Panel View (with Dummy Removed) | A-37 |
| 38 | Post-Test Driver Dummy Head Contact View | A-38 |
| 39 | Post-Test Driver Dummy Door Contact View | A-39 |
| 40 | Pre-Test Left Side View of Passenger Dummy Showing Belt , Chalking, and Contact Switches | A-40 |
| 41 | Pre-Test Left Side View of Passenger Dummy Shoulder and Door Top View (Door Closed) | A-41 |
| 42 | Post-Test Left Side View of Passenger Dummy Shoulder and Door Top View (Door Closed) | A-42 |
| 43 | Pre-Test Close-Up Left Side View of Passenger Seat Track Showing Seat Positioning | A-43 |
| 44 | Pre-Test Close-Up Left Side View of Passenger Seat Back Showing Seat Back Positioning | A-44 |
| 45 | Pre-Test Passenger Dummy and Door Clearance View | A-45 |
| 46 | Post-Test Passenger Dummy and Door Clearance View | A-46 |
| 47 | Pre-Test Right Side View of Rear Seat of Occupant Compartment (Through Window with Dummy) | A-47 |
| 48 | Post-Test Right Side View of Rear Seat of Occupant Compartment (Through Window with Dummy) | A-48 |

TABLE OF PHOTOGRAPHS ... (CONTINUED)

| <u>Number</u> | | <u>Page No.</u> |
|---------------|--|-----------------|
| 49 | Pre-Test Passenger Inner Door Panel View | A-49 |
| 50 | Post-Test Passenger Inner Door Panel View (with Dummy Removed) | A-50 |
| 51 | Post-Test Passenger Dummy Head Contact View | A-51 |
| 52 | Post-Test Passenger Dummy Door Contact View | A-52 |
| 53 | Close-Up View of Vehicle's Certification Label | A-53 |
| 54 | Close-Up View of Vehicle's Tire Information Placard or Label | A-54 |
| 55 | Pre-Test Front View of MDB Impactor Face | A-55 |
| 56 | Post-Test Front View of MDB Impactor Face | A-56 |
| 57 | Pre-Test Top View of MDB Impactor Face | A-57 |
| 58 | Post-Test Top View of MDB Impactor Face | A-58 |
| 59 | Pre-Test Left Side View of MDB Impactor Face | A-59 |
| 60 | Post-Test Left Side View of MDB Impactor Face | A-60 |
| 61 | Pre-Test Right Side View of MDB Impactor Face | A-61 |
| 62 | Post-Test Right Side View of MDB Impactor Face | A-62 |
| 63 | Post-Test Primary and Redundant Speed Trap Velocity Readout | A-63 |
| 64 | FMVSS 301 / 305 Rollover 0° | A-64 |
| 65 | FMVSS 301 / 305 Rollover 90° | A-65 |
| 66 | FMVSS 301 / 305 Rollover 180° | A-66 |
| 67 | FMVSS 301 / 305 Rollover 270° | A-67 |
| 68 | FMVSS 301 / 305 Rollover 360° | A-68 |
| 69 | Impact Event | A-69 |



Figure A-1: As-Delivered Right Front $\frac{3}{4}$ View of Test Vehicle



Figure A-2: As-Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle



MA0213
55/28 km/h 90
SIDE IMPACT
06 / 10 / 09
2010 FORD
FUSION SE
(4-DR SEDAN)

Figure A-3: Pre-test Frontal View of Test Vehicle



Figure A-4: Post-test Frontal View of Test Vehicle



Figure A-5: Pre-test Left ¾ Front View of Test Vehicle



Figure A-6: Post-test Left $\frac{3}{4}$ Front View of Test Vehicle



Figure A-7: Pre-test Left Side View of Test Vehicle



Figure A-8: Post-test Left Side View of Test Vehicle



Figure A-9: Pre-test Left ¾ Rear View of Test Vehicle



Figure A-10: Post-test Left ¾ Rear View of Test Vehicle



A-11

TR-P29003-04-NC

Figure A-11: Pre-test Rear View of Test Vehicle



A-12

TR-P29003-04-NC

Figure A-12: Post-test Rear View of Test Vehicle



Figure A-13: Pre-test Right Side View of Test Vehicle



Figure A-14: Post-test Right Side View of Test Vehicle



Figure A-15: Pre-test Overhead View of the Test Vehicle with MDB Positioned Against the Side of the Test Vehicle



Figure A-16: Post-test Overhead View of the Test Vehicle and MDB



Figure A-17: Pre-test Left Side View of MDB Positioned Against the Side of the Test Vehicle at the Ideal Impact Point



Figure A-18: Pre-test Right Side View of MDB Positioned Against the Side of the Test Vehicle at the Ideal Impact Point

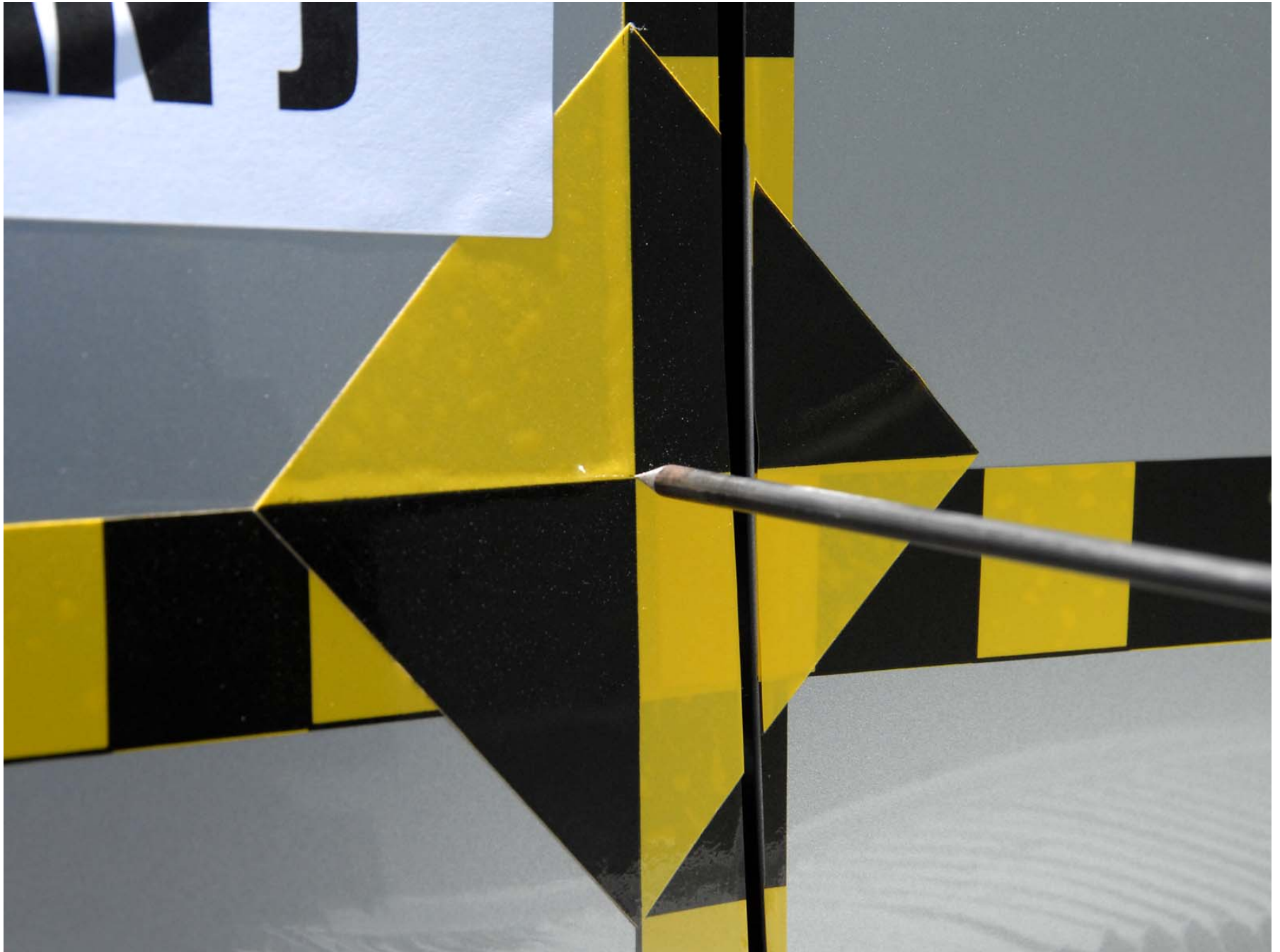


Figure A-19: Pre-test Close-Up View of Impact Point Target

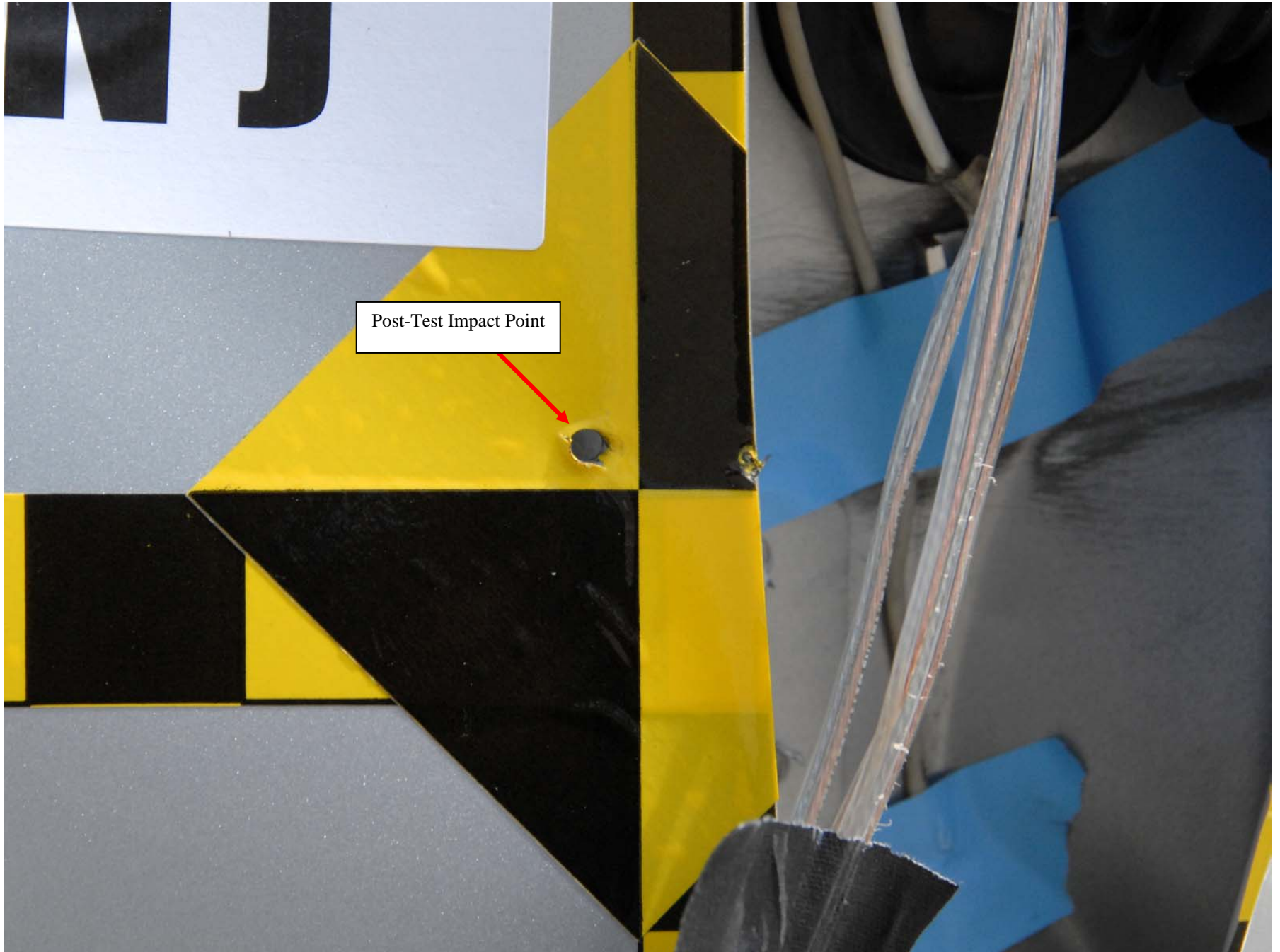


Figure A-20: Post-test Close-Up View of Impact Point Target Showing Impact Location



Figure A-21: Pre-test Left Front Door Latch Close-Up



Figure A-22: Post-test Left Front Door Latch Close-Up



Figure A-23: Pre-test Left Rear Door Latch Close-Up



Figure A-24: Post-test Left Rear Door Latch Close-Up



Figure A-25: Pre-test Front Close-Up View of Driver Dummy (Through Front Window)



Figure A-26: Post-test Front Close-Up View of Driver Dummy (Through Front Window)



Figure A-27: Pre-test Left Side View of Driver Dummy Showing Belt, Chalking, and Contact Switches (Door Open)



Figure A-28: Pre-test Left Side View of Driver Dummy Shoulder and Door Top View



Figure A-29: Post-test Left Side View of Driver Dummy Shoulder and Door Top View



Figure A-30: Pre-test Close-Up Left Side View of Driver Seat Track Showing Seat Positioning



Figure A-31: Pre-test Close-Up Left Side View of Driver Seat Back Showing Seat Back Positioning



Figure A-32: Pre-test Driver Dummy and Door Clearance View



Figure A-33: Post-test Driver Dummy and Door Clearance View



Figure A-34: Pre-test Right Side View of Front Seat of Occupant Compartment (Through Window with Dummy)



Figure A-35: Post-test Right Side View of Front Seat of Occupant Compartment (Through Window with Dummy)



Figure A-36: Pre-test Driver Inner Door Panel View



Figure A-37: Post-test Driver Inner Door Panel View (with Dummy Removed)



Figure A-38: Post-test Driver Dummy Head Contact View



A-39

TR-P29003-04-NC

Figure A-39: Post-test Driver Dummy Door Contact View



Figure A-40: Pre-test Left Side View of Passenger Dummy Showing Belt, Chalking, and Contact Switches (Door Open)



Figure A-41: Pre-test Left Side View of Passenger Dummy Shoulder and Door Top View



Figure A-42: Post-test Left Side View of Passenger Dummy Shoulder and Door Top View



Figure A-43: Pre-test Close-Up Left Side View of Passenger Seat Track Showing Seat Positioning



Figure A-44: Pre-test Close-Up Left Side View of Passenger Seat Back Showing Seat Back Positioning



Figure A-45: Pre-test Passenger Dummy and Door Clearance View



Figure A-46: Post-test Passenger Dummy and Door Clearance View



Figure A-47: Pre-test Right Side View of Rear Seat of Occupant Compartment (Through Window with Dummy)



Figure A-48: Post-test Right Side View of Rear Seat of Occupant Compartment (Through Window with Dummy)



Figure A-49: Pre-test Passenger Inner Door Panel View



Figure A-50: Post-test Passenger Inner Door Panel View (with Dummy Removed)

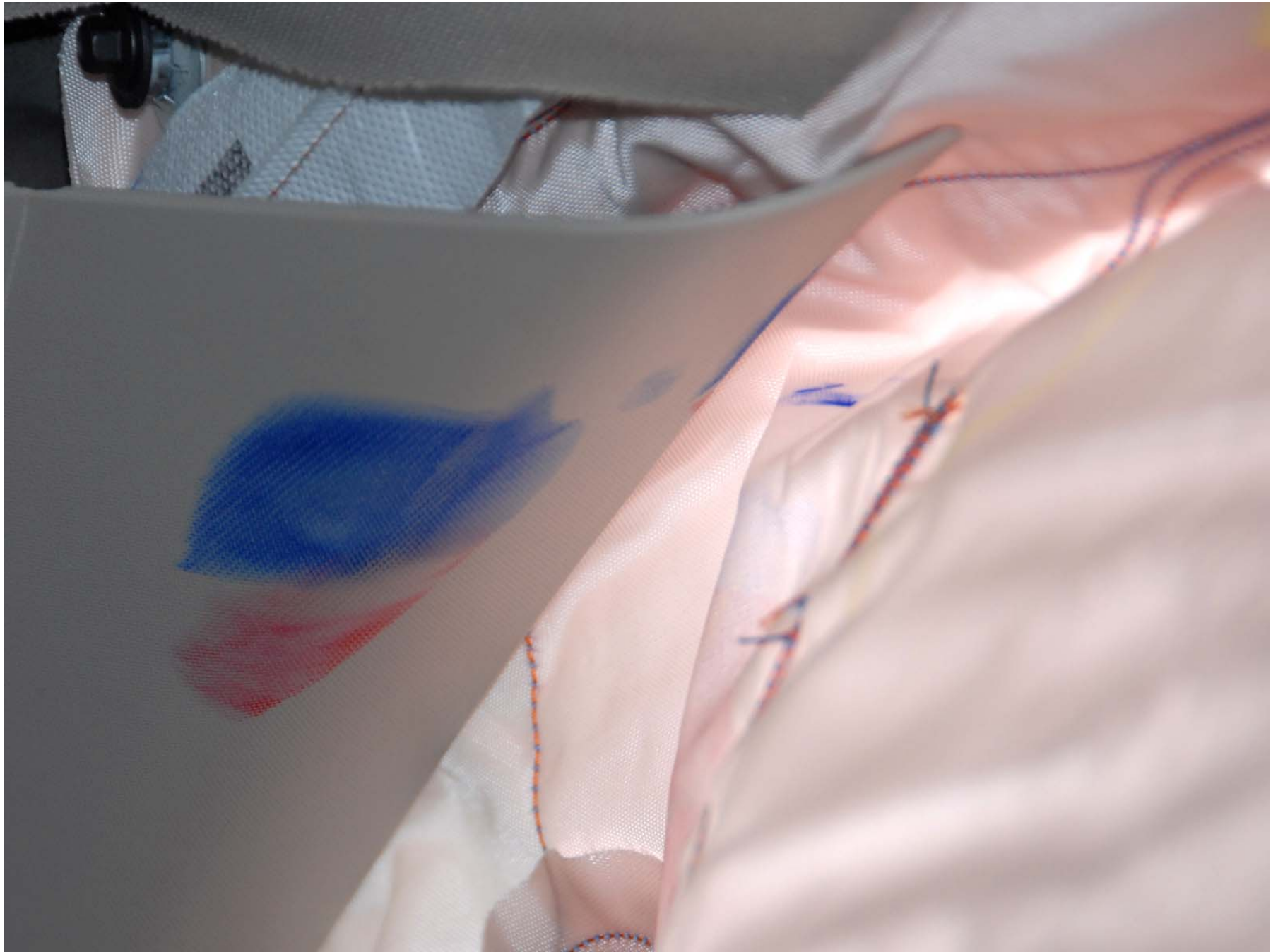


Figure A-51: Post-test Passenger Dummy Head Contact View



Figure A-52: Post-test Passenger Dummy Door Contact View



TIRE AND LOADING INFORMATION

SEATING CAPACITY TOTAL : 5 FRONT: 2 REAR: 3

The combined weight of occupants and cargo should never exceed : 385 kg or 850 lbs.

| TIRE | SIZE | COLD TIRE PRESSURE | SEE OWNERS MANUAL FOR ADDITIONAL INFORMATION |
|-------|------------|--------------------|---|
| FRONT | P225/50R17 | 215 KPA, 31 PSI | |
| REAR | P225/50R17 | 215 KPA, 31 PSI | |
| SPARE | T145/80D16 | 415 KPA, 60 PSI | |

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Figure A-54: Close-Up View of Vehicle's Tire Information Placard



A-55

TR-P29003-04-NC

Figure A-55: Pre-test Front View of MDB Impactor Face



Figure A-56: Post-test Front View of MDB Impactor Face



A-57

TR-P29003-04-NC

Figure A-57: Pre-test Top View of MDB Impactor Face

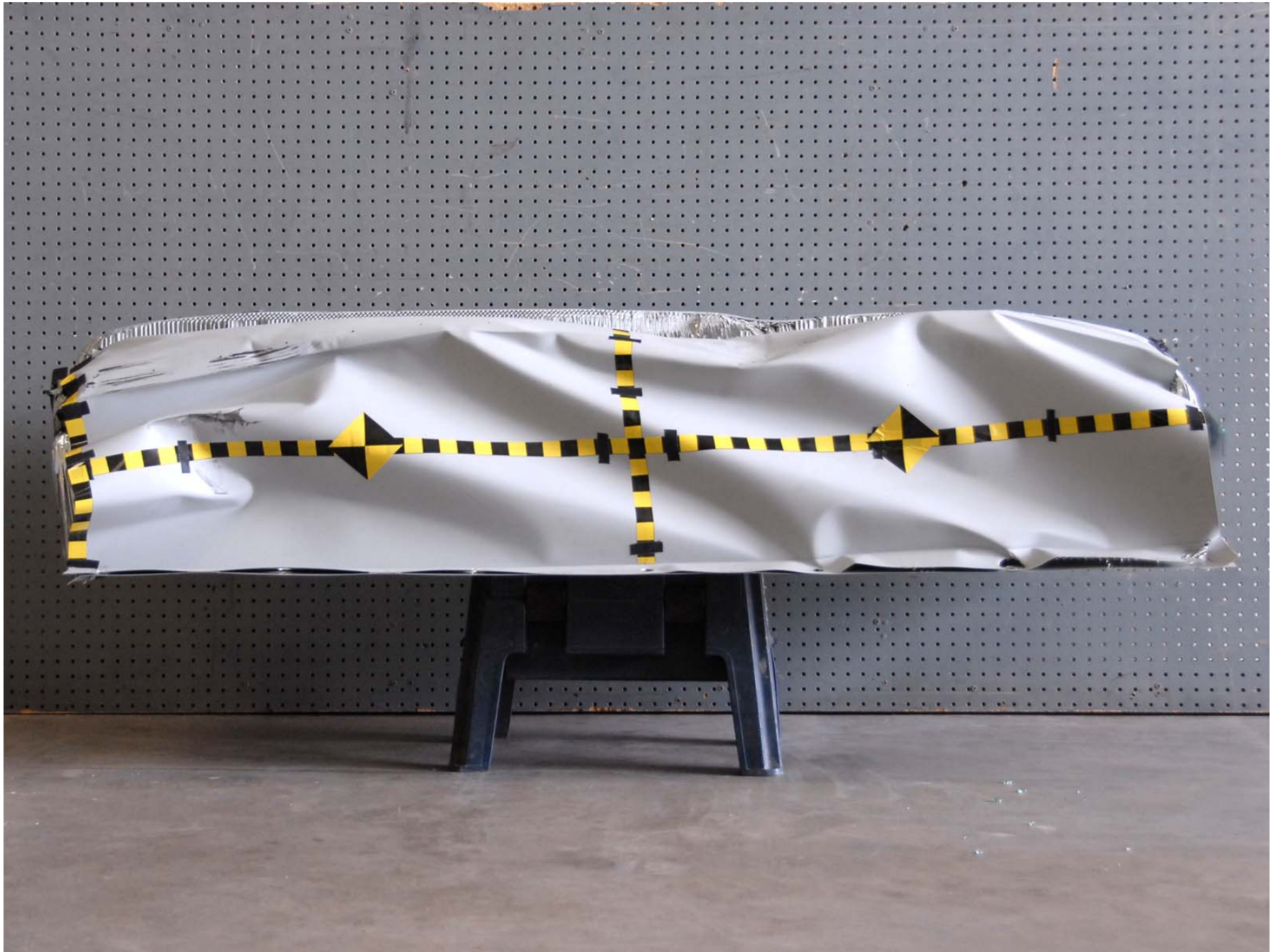


Figure A-58: Post-test Top View of MDB Impactor Face



A-59

TR-P29003-04-NC

Figure A-59: Pre-test Left Side View of MDB Impactor Face



Figure A-60: Post-test Left Side View of MDB Impactor Face



Figure A-61: Pre-test Right Side View of MDB Impactor Face



Figure A-62: Post-test Right Side View of MDB Impactor Face

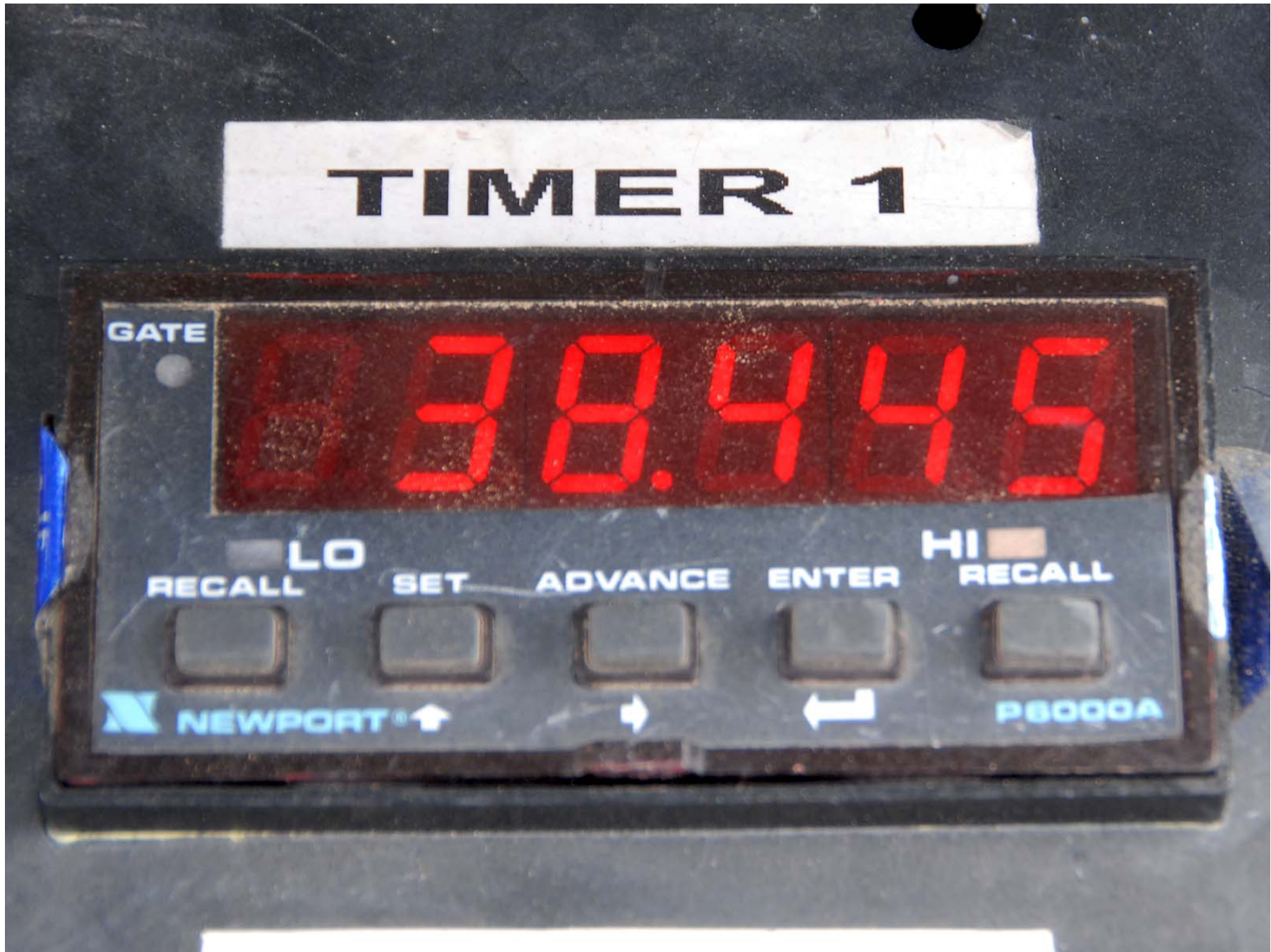


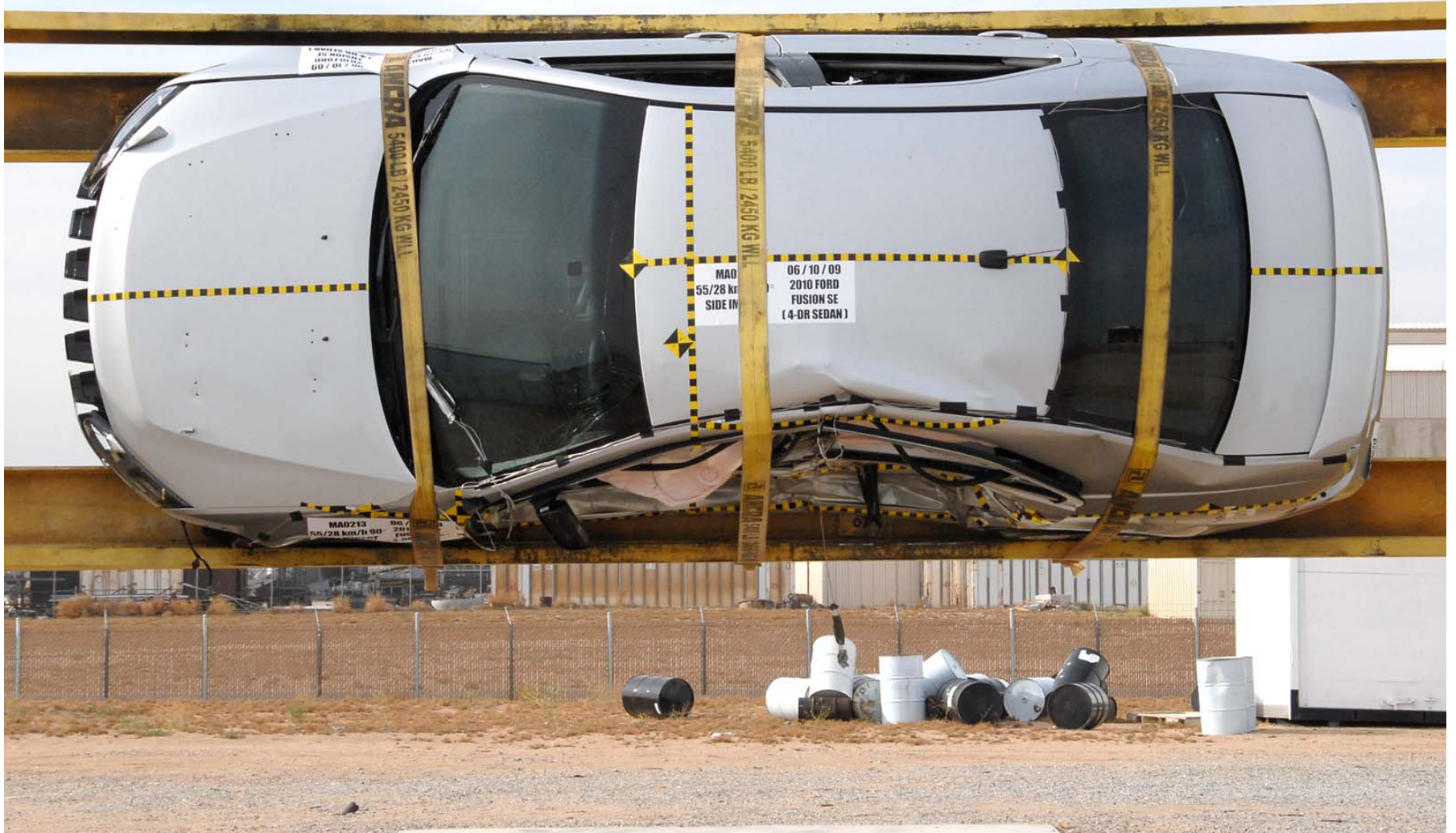
Figure A-63: Post-test Primary Speed Trap Velocity Readout with Placard Showing NHTSA No.



A-64

TR-P29003-04-NC

Figure A-64: FMVSS 301/305 Rollover 0°



A-65

TR-P29003-04-NC

Figure A-65: FMVSS 301/305 Rollover 90°



Figure A-66: FMVSS 301/305 Rollover 180°

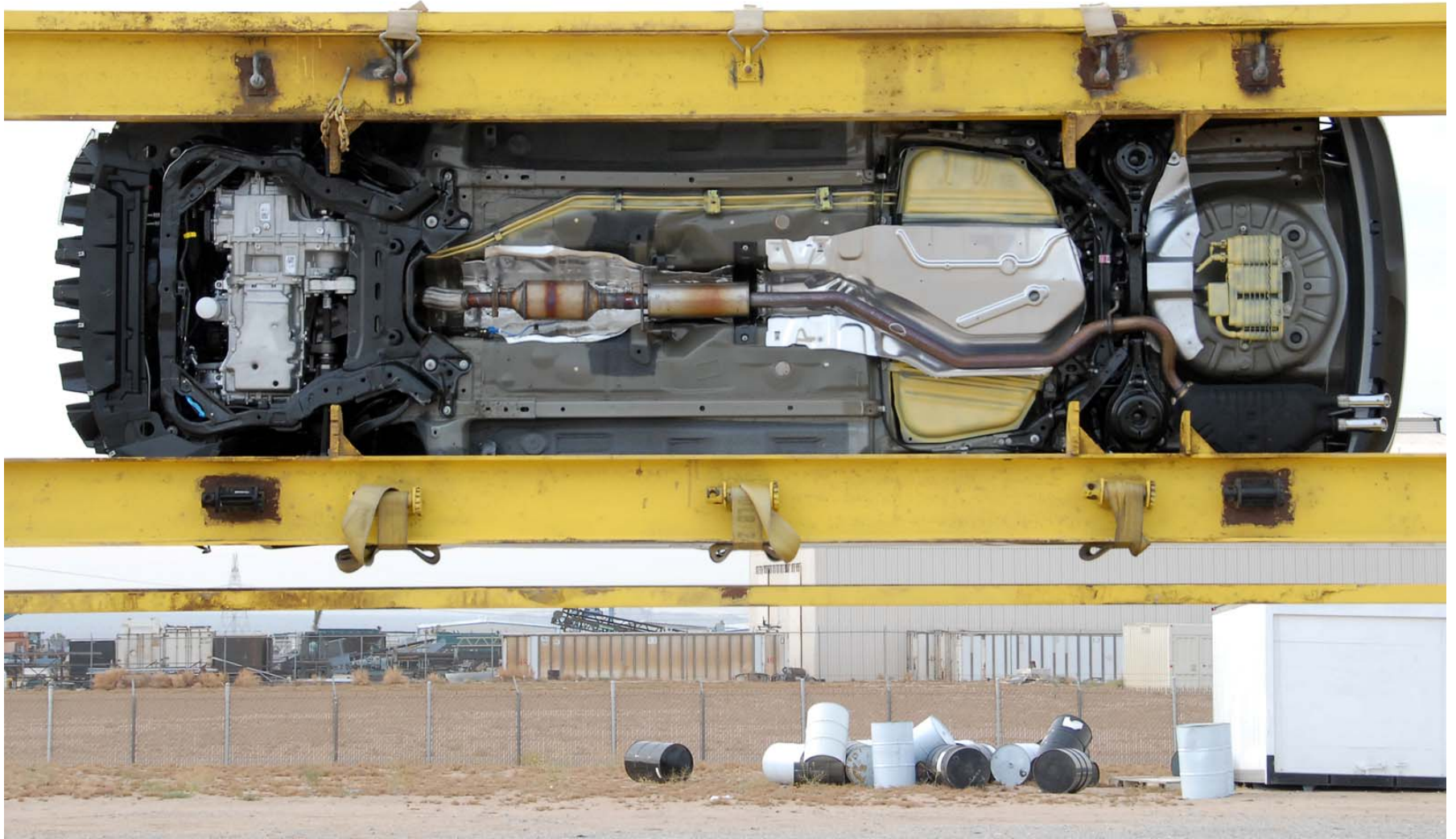


Figure A-67: FMVSS 301/305 Rollover 270°



A-68

TR-P29003-04-NC

Figure A-68: FMVSS 301/305 Rollover 360°



Figure A-69: Impact Event (Impact Side)

APPENDIX B
DUMMY RESPONSE DATA

TABLE OF DATA PLOTS

Driver and Passenger Dummy Instrumentation Plots

Filtered Data

| <u>Number</u> | | <u>Page No.</u> |
|---------------|--|-----------------|
| 1 | Driver Head X Acceleration vs. Time Primary | B-1 |
| 2 | Driver Head Y Acceleration vs. Time Primary | B-1 |
| 3 | Driver Head Z Acceleration vs. Time Primary | B-1 |
| 4 | Driver Head Resultant Acceleration vs. Time Primary | B-1 |
| 5 | Driver Chest Rib 1 Deflection vs. Time | B-2 |
| 6 | Driver Chest Rib 2 Deflection vs. Time | B-2 |
| 7 | Driver Chest Rib 3 Deflection vs. Time | B-2 |
| 8 | Driver Total Abdominal Force vs. Time | B-3 |
| 9 | Driver Pubic Symphysis Force vs. Time | B-3 |
| 10 | Passenger Head X Acceleration vs. Time Primary | B-4 |
| 11 | Passenger Head Y Acceleration vs. Time Primary | B-4 |
| 12 | Passenger Head Z Acceleration vs. Time Primary | B-4 |
| 13 | Passenger Head Resultant Acceleration vs. Time Primary | B-4 |
| 14 | Passenger Total Pelvic Force vs. Time | B-5 |
| 15 | Passenger Lower Spine X Acceleration vs. Time | B-6 |
| 16 | Passenger Lower Spine Y Acceleration vs. Time | B-6 |
| 17 | Passenger Lower Spine Z Acceleration vs. Time | B-6 |
| 18 | Passenger Lower Spine Resultant Acceleration vs. Time | B-6 |

The following additional data plots for this test can be obtained from the Research and Development section of the NHTSA website. The website can be found at:

www.NHTSA.dot.gov

Driver and Passenger Dummy Instrumentation Plots

Driver Lower Spine X Acceleration vs. Time

Driver Lower Spine Y Acceleration vs. Time

Driver Lower Spine Z Acceleration vs. Time

Driver Head Contact Switch vs. Time

Driver Shoulder Contact Switch vs. Time

Driver Torso Contact Switch vs. Time

Driver Leg Contact Switch vs. Time

Driver Head X Acceleration vs. Time Redundant

Driver Head Y Acceleration vs. Time Redundant
Driver Head Z Acceleration vs. Time Redundant
Driver Head Resultant Acceleration vs. Time Redundant
Passenger Upper Neck X Force vs. Time
Passenger Upper Neck Y Force vs. Time
Passenger Upper Neck Z Force vs. Time
Passenger Upper Neck X Moment vs. Time
Passenger Upper Neck Y Moment vs. Time
Passenger Upper Neck Z Moment vs. Time
Passenger Shoulder Y Deflection vs. Time
Passenger Chest Upper Rib Y Deflection vs. Time
Passenger Chest Middle Rib Y Deflection vs. Time
Passenger Chest Lower Rib Y Deflection vs. Time
Passenger Abdomen Upper Rib Y Deflection vs. Time
Passenger Abdomen Lower Rib Y Deflection vs. Time
Passenger Acetabulum Y Force vs. Time
Passenger Iliac Y Force vs. Time
Passenger Head X Acceleration vs. Time Redundant
Passenger Head Y Acceleration vs. Time Redundant
Passenger Head Z Acceleration vs. Time Redundant
Passenger Head Resultant Acceleration vs. Time Redundant
Passenger Head Contact Switch vs. Time
Passenger Shoulder Contact Switch vs. Time
Passenger Torso Contact Switch vs. Time
Passenger Leg Contact Switch vs. Time

Vehicle Instrumentation Plots

Right Side Sill at Front Seat X Acceleration vs. Time
Right Side Sill at Front Seat X Velocity vs. Time
Right Side Sill at Front Seat Y Acceleration vs. Time
Right Side Sill at Front Seat Y Velocity vs. Time
Right Side Sill at Front Seat Z Acceleration vs. Time
Right Side Sill at Front Seat Z Velocity vs. Time
Right Side Sill at Rear Seat X Acceleration vs. Time
Right Side Sill at Rear Seat X Velocity vs. Time
Right Side Sill at Rear Seat Y Acceleration vs. Time

Right Side Sill at Rear Seat Y Velocity vs. Time
Right Side Sill at Rear Seat Z Acceleration vs. Time
Right Side Sill at Rear Seat Z Velocity vs. Time
Rear Floorpan Above Axle X Acceleration vs. Time
Rear Floorpan Above Axle X Velocity vs. Time
Rear Floorpan Above Axle Y Acceleration vs. Time
Rear Floorpan Above Axle Y Velocity vs. Time
Rear Floorpan Above Axle Z Acceleration vs. Time
Rear Floorpan Above Axle Z Velocity vs. Time
Left Side Sill at Front Seat Y Acceleration vs. Time
Left Side Sill at Front Seat Y Velocity vs. Time
Left Side Sill at Rear Seat Y Acceleration vs. Time
Left Side Sill at Rear Seat Y Velocity vs. Time
Right Rear Occupant Compartment Y Acceleration vs. Time
Right Rear Occupant Compartment Y Velocity vs. Time
Lower A-Post Y Acceleration vs. Time
Lower A-Post Y Velocity vs. Time
Upper A-Post Y Acceleration vs. Time
Upper A-Post Y Velocity vs. Time
Lower B-Post Y Acceleration vs. Time
Lower B-Post Y Velocity vs. Time
Upper B-Post Y Acceleration vs. Time
Upper B-Post Y Velocity vs. Time
Front Seat Track Y Acceleration vs. Time
Front Seat Track Y Velocity vs. Time
Rear Seat Track Y Acceleration vs. Time
Rear Seat Track Y Velocity vs. Time
Vehicle Center of Gravity X Acceleration vs. Time
Vehicle Center of Gravity X Velocity vs. Time
Vehicle Center of Gravity Y Acceleration vs. Time
Vehicle Center of Gravity Y Velocity vs. Time
Vehicle Center of Gravity Z Acceleration vs. Time
Vehicle Center of Gravity Z Velocity vs. Time
Driver Side Airbag Timing
Driver Side Curtain Airbag Timing
Passenger Side Airbag Timing
Passenger Side Curtain Airbag Timing

MDB Instrumentation Plots

MDB Center of Gravity X Acceleration vs. Time

MDB Center of Gravity X Velocity vs. Time

MDB Center of Gravity Y Acceleration vs. Time

MDB Center of Gravity Y Velocity vs. Time

MDB Center of Gravity Z Acceleration vs. Time

MDB Center of Gravity Z Velocity vs. Time

MDB Center of Gravity Resultant Acceleration vs. Time

MDB Rear X Acceleration vs. Time

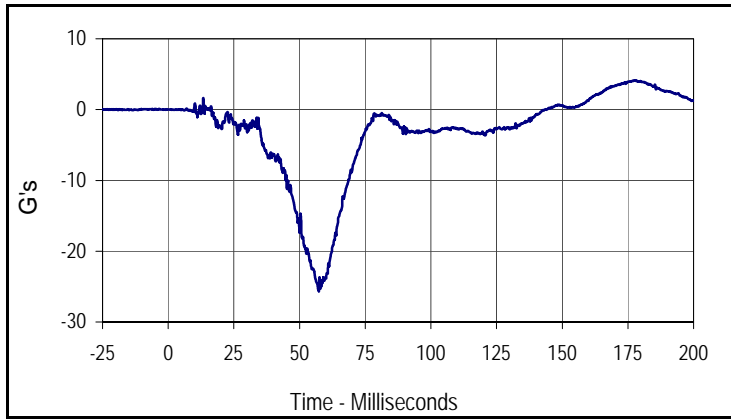
MDB Rear X Velocity vs. Time

MDB Rear Y Acceleration vs. Time

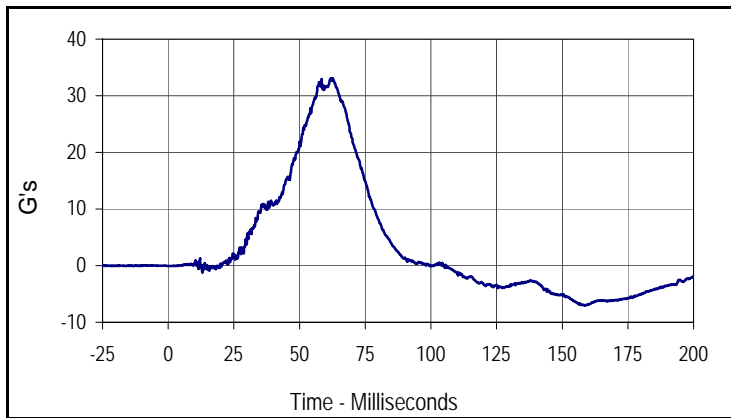
MDB Rear Y Velocity vs. Time

Test Vehicle: 2010 Ford Fusion SE 4-Door Sedan
 Test Program: Side Validation Testing

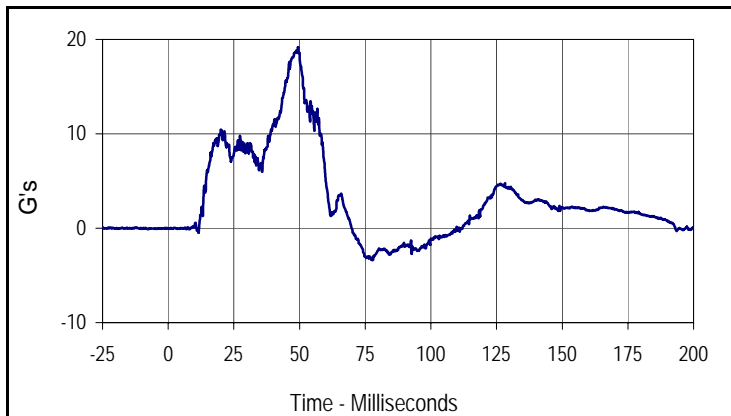
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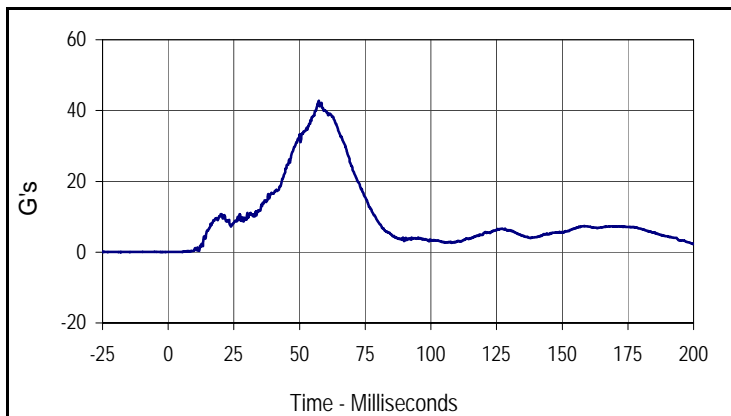
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|-----------------------|-------|-----------|-------|
| Driver Head X Primary | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 1000 | G's |
| Max | Time | Min | Time |
| 4.1 | 177.9 | -25.6 | 57.3 |



| Curve Description | | | |
|-----------------------|------|-----------|-------|
| Driver Head Y Primary | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIL | 1000 | G's |
| Max | Time | Min | Time |
| 33.1 | 62.6 | -7.1 | 158.4 |



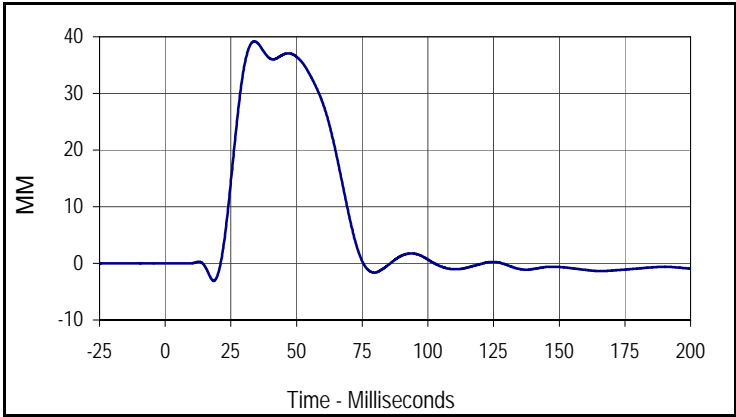
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|-----------------------|------|-----------|-------|
| Driver Head Z Primary | | | |
| CURNO | Type | SAE Class | Units |
| 003 | FIL | 1000 | G's |
| Max | Time | Min | Time |
| 19.2 | 49.4 | -3.4 | 77.8 |



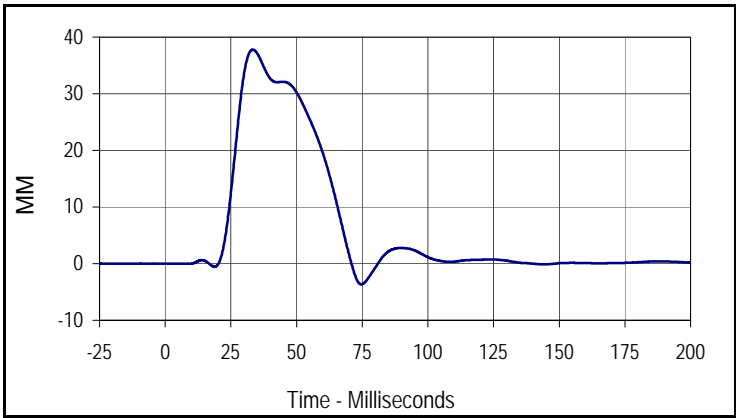
| Curve Description | | | |
|-------------------------------|------|-----------|-------|
| Driver Head Resultant Primary | | | |
| CURNO | Type | SAE Class | Units |
| 001 | RES | 1000 | G's |
| Max | Time | Min | Time |
| 42.7 | 57.4 | 0.0 | 5.4 |

Test Vehicle: 2010 Ford Fusion SE 4-Door Sedan
 Test Program: Side Validation Testing

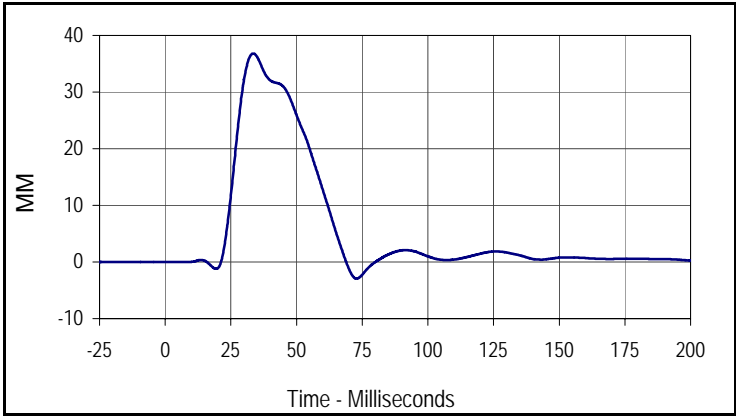
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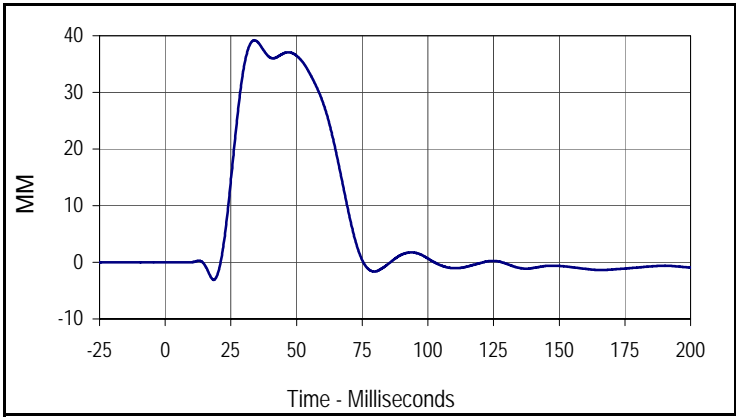
| Curve Description | | | |
|-----------------------------------|------|-----------|-------|
| Driver Chest Upper Rib Deflection | | | |
| CURNO | Type | SAE Class | Units |
| 007 | FIL | 180 | MM |
| Max | Time | Min | Time |
| 39.2 | 34.0 | -3.1 | 18.5 |



| Curve Description | | | |
|------------------------------------|------|-----------|-------|
| Driver Chest Middle Rib Deflection | | | |
| CURNO | Type | SAE Class | Units |
| 008 | FIL | 180 | MM |
| Max | Time | Min | Time |
| 37.8 | 33.3 | -3.7 | 74.6 |



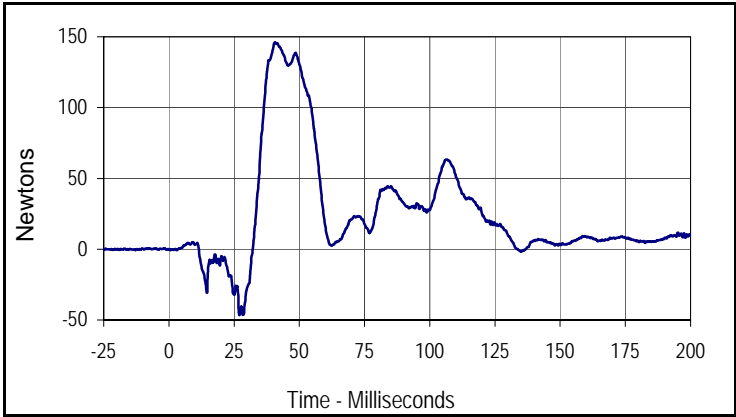
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|-----------------------------------|------|-----------|-------|
| Driver Chest Lower Rib Deflection | | | |
| CURNO | Type | SAE Class | Units |
| 009 | FIL | 180 | MM |
| Max | Time | Min | Time |
| 36.8 | 33.5 | -2.9 | 72.8 |



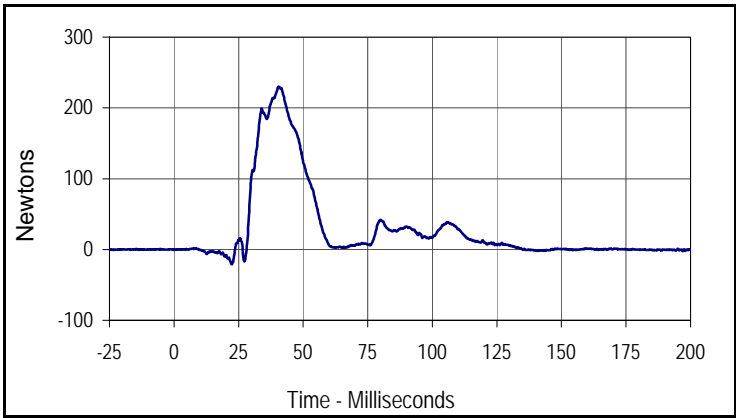
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|-------------------------------------|------|-----------|-------|
| Driver Chest Maximum Rib Deflection | | | |
| CURNO | Type | SAE Class | Units |
| 010 | FIL | 180 | MM |
| Max | Time | Min | Time |
| 39.2 | 34.0 | -3.1 | 18.5 |

Test Vehicle: 2010 Ford Fusion SE 4-Door Sedan
 Test Program: Side Validation Testing

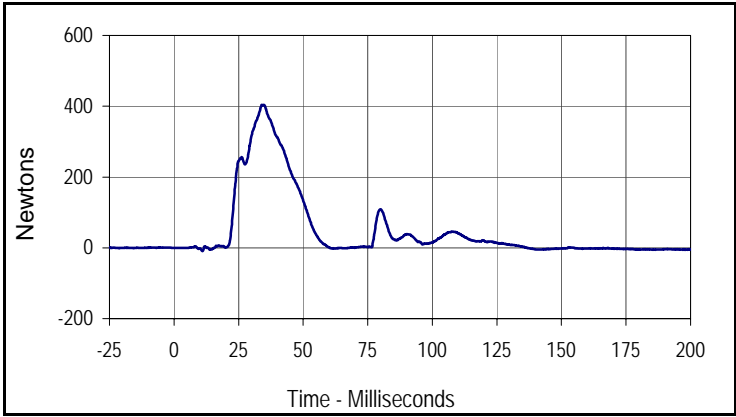
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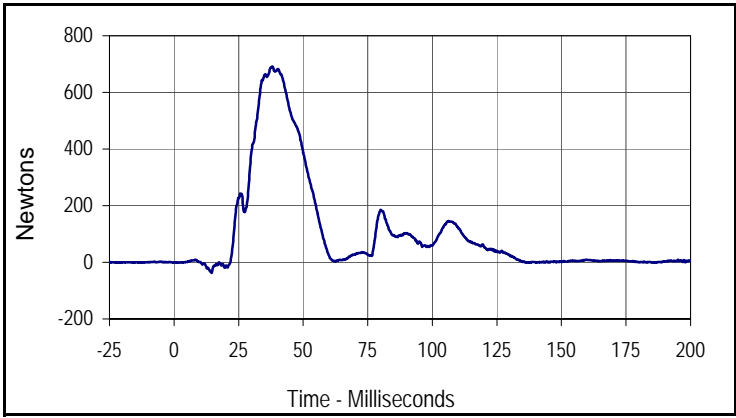
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|-------------------------|------|-----------|---------|
| Driver Front Abdomen FY | | | |
| CURNO | Type | SAE Class | Units |
| 013 | FIL | 600 | Newtons |
| Max | Time | Min | Time |
| 146.2 | 40.6 | -46.7 | 27.0 |



| Curve Description | | | |
|--------------------------|------|-----------|---------|
| Driver Middle Abdomen FY | | | |
| CURNO | Type | SAE Class | Units |
| 014 | FIL | 600 | Newtons |
| Max | Time | Min | Time |
| 230.1 | 40.6 | -20.9 | 22.3 |



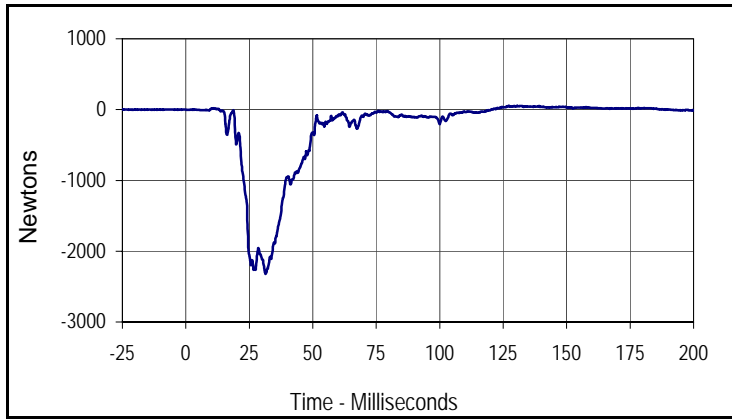
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|------------------------|------|-----------|---------|
| Driver Rear Abdomen FY | | | |
| CURNO | Type | SAE Class | Units |
| 015 | FIL | 600 | Newtons |
| Max | Time | Min | Time |
| 404.3 | 34.8 | -9.5 | 11.0 |



| Curve Description | | | |
|------------------------------|------|-----------|---------|
| Driver Total Abdominal Force | | | |
| CURNO | Type | SAE Class | Units |
| 013 | RES | 600 | Newtons |
| Max | Time | Min | Time |
| 691.4 | 38.1 | -37.4 | 14.6 |

Test Vehicle: 2010 Ford Fusion SE 4-Door Sedan
 Test Program: Side Validation Testing

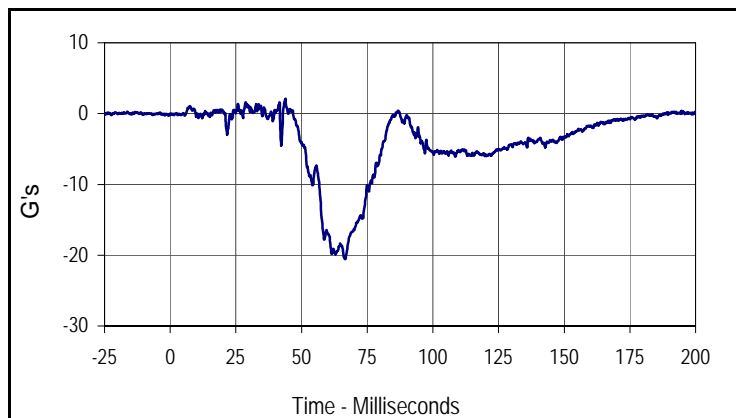
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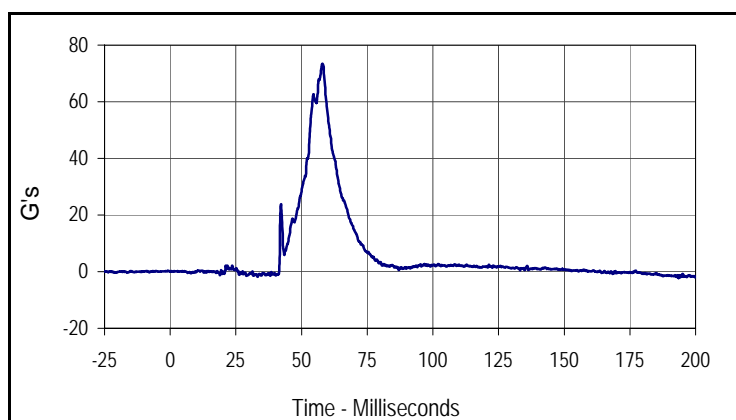
| Curve Description | | | |
|-------------------|-------|-----------|---------|
| Driver Pubic FY | | | |
| CURNO | Type | SAE Class | Units |
| 016 | FIL | 600 | Newtons |
| Max | Time | Min | Time |
| 55.0 | 127.3 | -2321.3 | 31.4 |

Test Vehicle: 2010 Ford Fusion SE 4-Door Sedan
 Test Program: Side Validation Testing

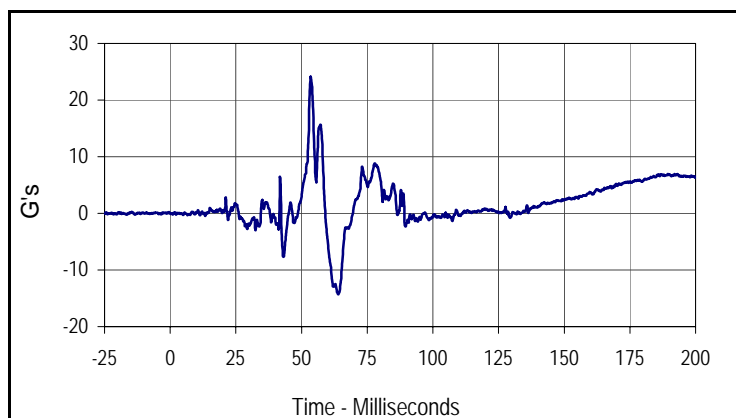
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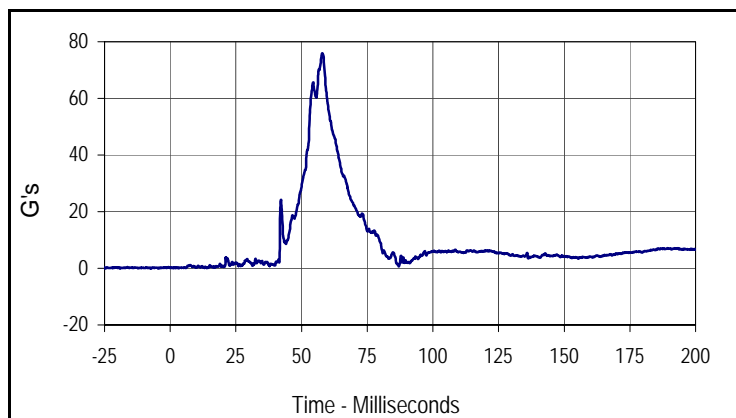
| Curve Description | | | |
|--------------------------|------|-----------|-------|
| Passenger Head X Primary | | | |
| CURNO | Type | SAE Class | Units |
| 021 | FIL | 1000 | G's |
| Max | Time | Min | Time |
| 2.1 | 43.9 | -20.5 | 66.6 |



| Curve Description | | | |
|--------------------------|------|-----------|-------|
| Passenger Head Y Primary | | | |
| CURNO | Type | SAE Class | Units |
| 022 | FIL | 1000 | G's |
| Max | Time | Min | Time |
| 73.4 | 57.9 | -2.3 | 193.5 |



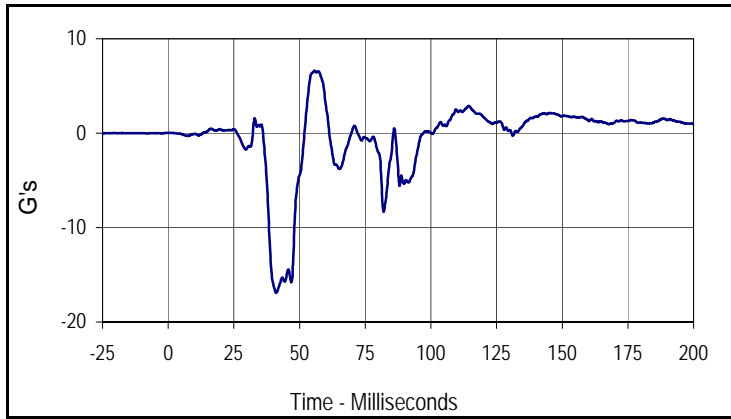
| Curve Description | | | |
|--------------------------|------|-----------|-------|
| Passenger Head Z Primary | | | |
| CURNO | Type | SAE Class | Units |
| 023 | FIL | 1000 | G's |
| Max | Time | Min | Time |
| 24.1 | 53.5 | -14.3 | 64.0 |



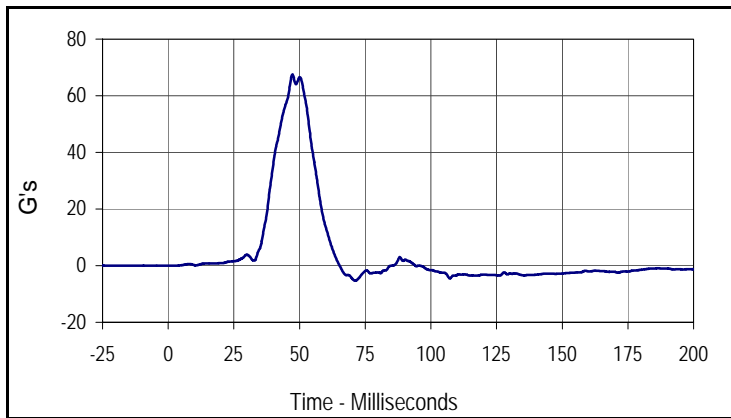
| Curve Description | | | |
|----------------------------------|------|-----------|-------|
| Passenger Head Resultant Primary | | | |
| CURNO | Type | SAE Class | Units |
| 021 | RES | 1000 | G's |
| Max | Time | Min | Time |
| 75.9 | 57.9 | 0.0 | 3.3 |

Test Vehicle: 2010 Ford Fusion SE 4-Door Sedan
 Test Program: Side Validation Testing

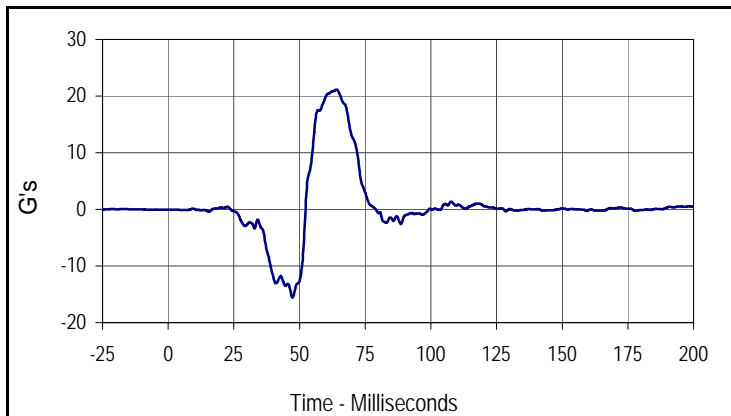
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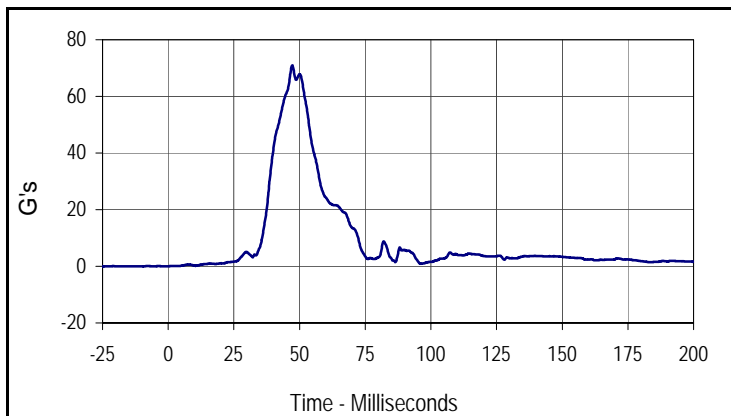
| Curve Description | | | |
|-------------------------|------|-----------|-------|
| Passenger Lower Spine X | | | |
| CURNO | Type | SAE Class | Units |
| 037 | FIL | 180 | G's |
| Max | Time | Min | Time |
| 6.6 | 55.7 | -16.9 | 41.1 |



| Curve Description | | | |
|-------------------------|------|-----------|-------|
| Passenger Lower Spine Y | | | |
| CURNO | Type | SAE Class | Units |
| 038 | FIL | 180 | G's |
| Max | Time | Min | Time |
| 67.5 | 47.3 | -5.3 | 71.2 |



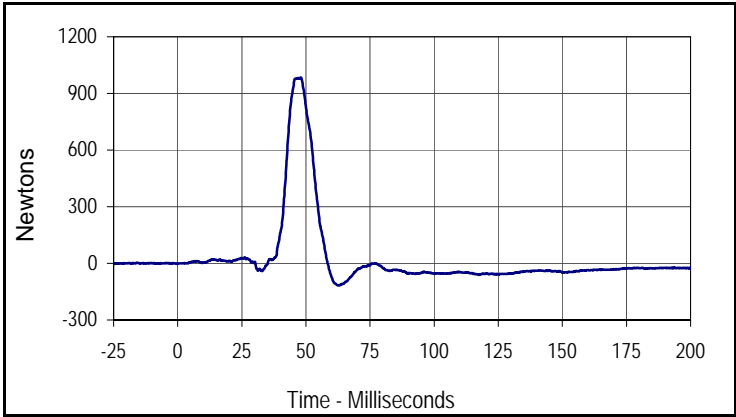
| Curve Description | | | |
|-------------------------|------|-----------|-------|
| Passenger Lower Spine Z | | | |
| CURNO | Type | SAE Class | Units |
| 039 | FIL | 180 | G's |
| Max | Time | Min | Time |
| 21.2 | 64.1 | -15.6 | 47.3 |



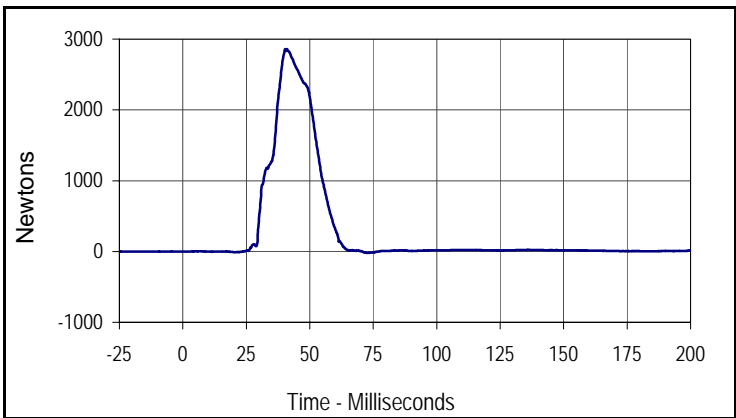
| Curve Description | | | |
|---------------------------------|------|-----------|-------|
| Passenger Lower Spine Resultant | | | |
| CURNO | Type | SAE Class | Units |
| 037 | RES | 180 | G's |
| Max | Time | Min | Time |
| 71.0 | 47.2 | 0.1 | 0.0 |

Test Vehicle: 2010 Ford Fusion SE 4-Door Sedan
 Test Program: Side Validation Testing

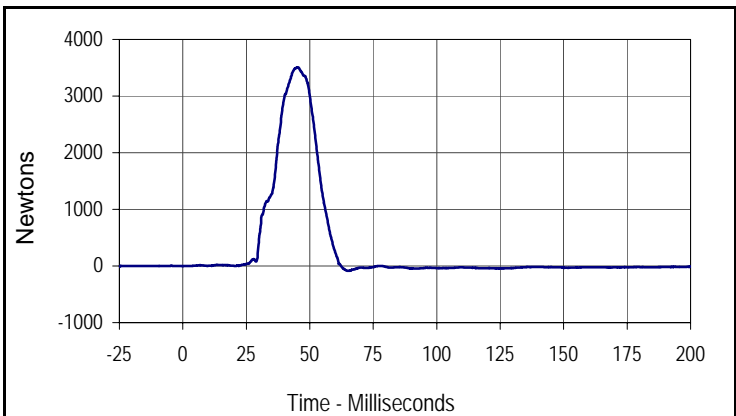
Test Date: 6/10/09
 NHTSA No.: MA0213



| Curve Description | | | |
|-----------------------------------|------|-----------|---------|
| Passenger Left Iliac Wing Force Y | | | |
| CURNO | Type | SAE Class | Units |
| 043 | FIL | 600 | Newtons |
| Max | Time | Min | Time |
| 984.0 | 48.0 | -116.4 | 62.6 |



| Curve Description | | | |
|-----------------------------------|------|-----------|---------|
| Passenger Left Acetabulum Force Y | | | |
| CURNO | Type | SAE Class | Units |
| 042 | FIL | 600 | Newtons |
| Max | Time | Min | Time |
| 2860.1 | 41.0 | -19.8 | 73.2 |



| Curve Description | | | |
|---------------------------------|------|-----------|---------|
| Passenger Combined Pelvic Force | | | |
| CURNO | Type | SAE Class | Units |
| 042 | SUM | 600 | Newtons |
| Max | Time | Min | Time |
| 3510.9 | 45.4 | -86.6 | 64.8 |

APPENDIX C
DUMMY CALIBRATION DATA

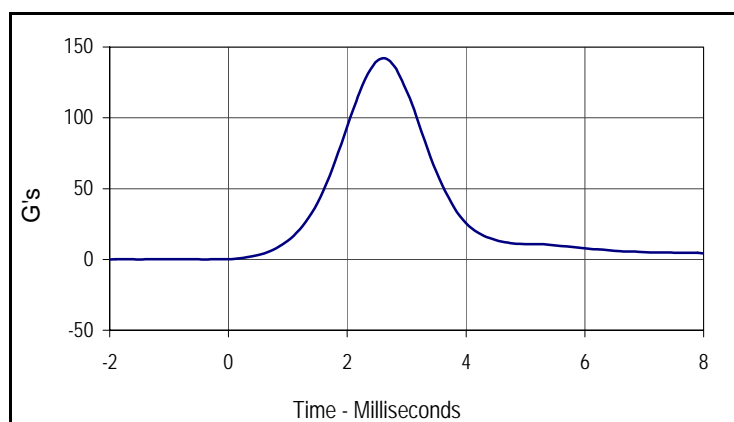
APPENDIX C
PRE-TEST CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Test Program: ES2re Lateral Head Drop Calibration
 ATD Serial No.: F035

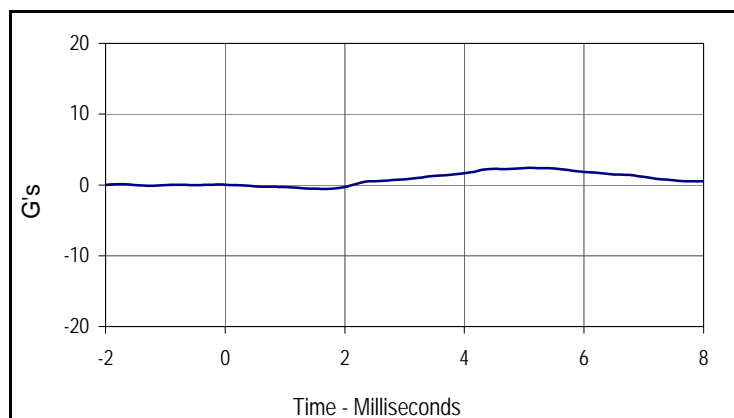
Test Date: 6/4/09
 Test I.D.: HD04G



| Tested Parameter | Units | Specification | Result | Pass/Fail |
|--------------------------------|--------|---------------|--------|-------------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Peak Resultant Acceleration | G's | 125 to 155 | 142.1 | Pass |
| Peak Longitudinal Acceleration | G's | ≤15 | 2.4 | Pass |
| Is Acceleration Unimodal? | Yes/No | Yes | Yes | Pass |
| Oscillations After Main Pulse | % | <15 | 7.6 | Pass |
| Overall Test Results | | | | Pass |



| Curve Description | | | |
|-------------------|------|-----------|-------|
| Head Resultant | | | |
| CURNO | Type | SAE Class | Units |
| 001 | RES | 1000 | G's |
| Max | Time | Min | Time |
| 142.1 | 2.6 | 0.0 | -2.0 |



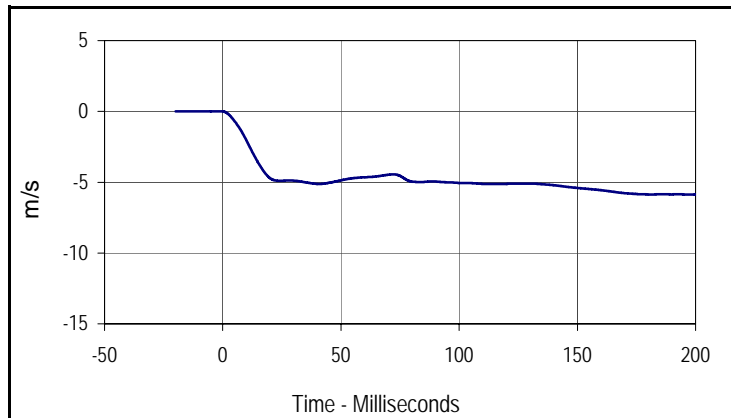
| Curve Description | | | |
|-------------------|------|-----------|-------|
| Head X | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIL | 1000 | G's |
| Max | Time | Min | Time |
| 2.4 | 5.1 | -0.5 | 1.6 |

Test Program: ES2re Neck Calibration
 ATD Serial No.: F035

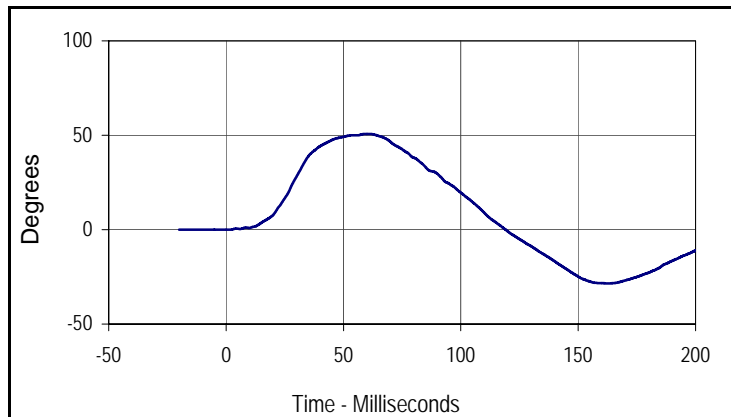
Test Date: 6/4/09
 Test I.D.: NB06A



| Tested Parameter | Units | Specification | Result | Pass/Fail | |
|--|---------|---------------|----------------|-----------|------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass | |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass | |
| Pendulum Velocity | m/s | 3.30 to 3.50 | 3.50 | Pass | |
| Pendulum Deceleration | 1 msec | m/s | 0.0 to -.050 | -0.046 | Pass |
| | 3 msec | m/s | -.250 to -.375 | -0.291 | Pass |
| | 14 msec | m/s | -3.20 to -3.70 | -3.33 | Pass |
| Headform Rotation | Max | Degrees | 49.0 to 58.0 | 50.7 | Pass |
| | Time | msec | 54.0 to 66.0 | 60.8 | Pass |
| Maximum Rotation To Time Zero Crossing | msec | 53.0 to 88.0 | 58.3 | Pass | |
| Overall Test Results | | | | Pass | |



| Curve Description | | | |
|-------------------|------|-----------|-------|
| Pendulum Velocity | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 60 | m/s |
| Max | Time | Min | Time |
| 0.0 | -1.3 | -5.9 | 200.0 |



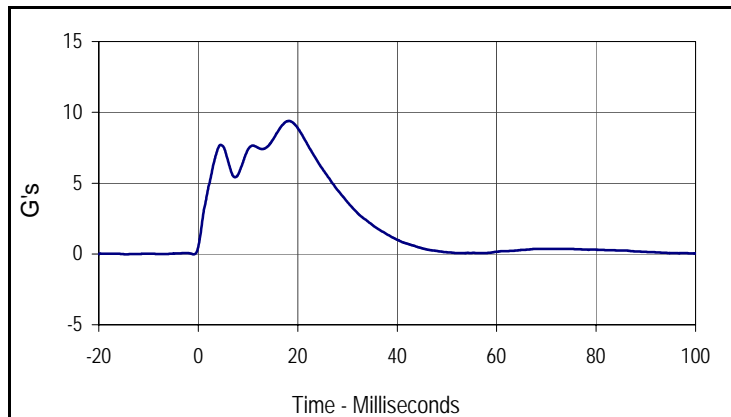
| Curve Description | | | |
|-------------------|------|-----------|---------|
| Headform Rotation | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIL | 180 | Degrees |
| Max | Time | Min | Time |
| 50.7 | 60.8 | -28.4 | 162.5 |

Test Program: ES2re Shoulder Calibration
 ATD Serial No.: F035

Test Date: 6/4/09
 Test I.D.: SH06G



| Tested Parameter | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Probe Velocity | m/s | 4.20 to 4.40 | 4.20 | Pass |
| Peak Impactor Acceleration | G's | 7.5 to 10.5 | 9.4 | Pass |
| Overall Test Results | | | | Pass |



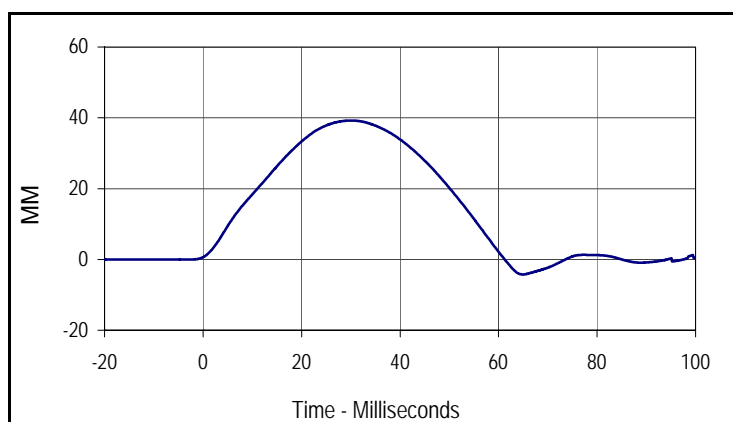
| Curve Description | | | |
|-----------------------------|------|-----------|-------|
| Probe Impactor Acceleration | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 180 | G's |
| Max | Time | Min | Time |
| 9.4 | 18.2 | 0.0 | -0.9 |

Test Program: ES2re Rib Module Calibration
 ATD Serial No.: F035 Rib #1

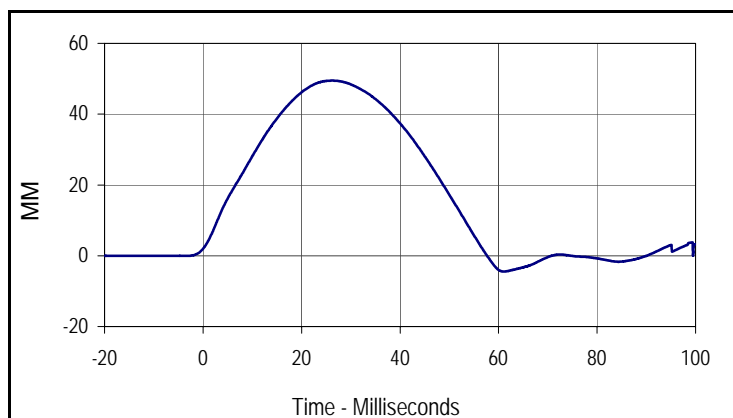
Test Date: 6/4/09
 Test I.D.: RIB06A, RIB06B



| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|-------|---------------|--------|-----------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Peak Rib Deflection at 459 MM Drop Height | MM | 36 to 40 | 39.2 | Pass |
| Peak Rib Deflection at 815 MM Drop Height | MM | 46 to 51 | 49.5 | Pass |
| Overall Test Results | | | | Pass |



| Curve Description | | | |
|---|------|-----------|-------|
| Upper Rib Deflection (459 MM Drop Height) | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 180 | MM |
| Max | Time | Min | Time |
| 39.2 | 30.3 | -4.3 | 65.1 |



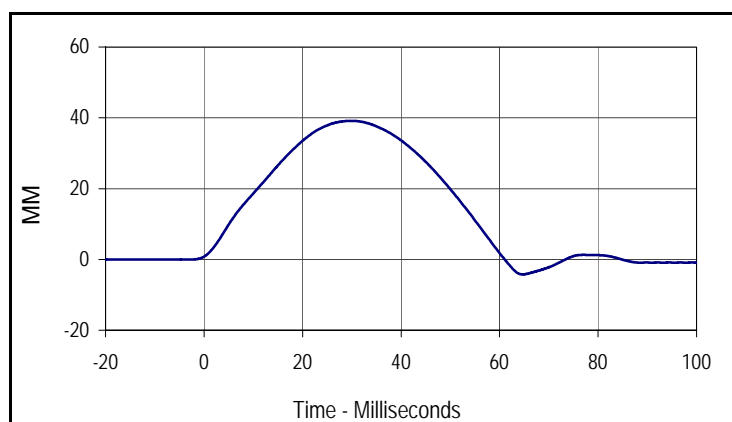
| Curve Description | | | |
|---|------|-----------|-------|
| Upper Rib Deflection (815 MM Drop Height) | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 180 | MM |
| Max | Time | Min | Time |
| 49.5 | 26.4 | -4.5 | 61.2 |

Test Program: ES2re Rib Module Calibration
 ATD Serial No.: F035 Rib #2

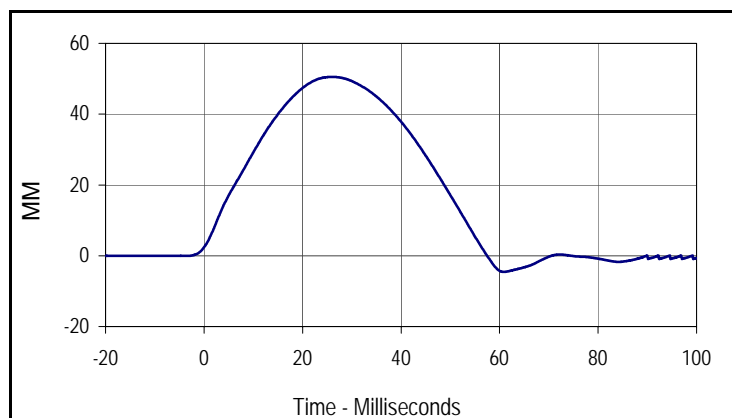
Test Date: 6/4/09
 Test I.D.: RIB06C, RIB06D



| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|-------|---------------|--------|-----------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Peak Rib Deflection at 459 MM Drop Height | MM | 36 to 40 | 39.1 | Pass |
| Peak Rib Deflection at 815 MM Drop Height | MM | 46 to 51 | 50.5 | Pass |
| Overall Test Results | | | | Pass |



| Curve Description | | | |
|---|------|-----------|-------|
| Upper Rib Deflection (459 MM Drop Height) | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 180 | MM |
| Max | Time | Min | Time |
| 39.1 | 30.1 | -4.2 | 64.9 |



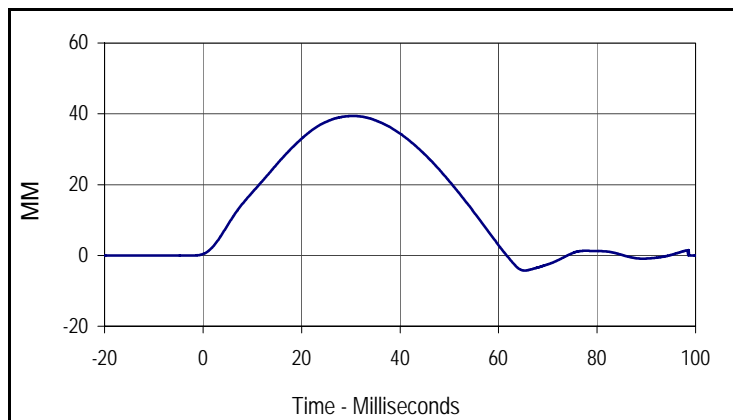
| Curve Description | | | |
|---|------|-----------|-------|
| Upper Rib Deflection (815 MM Drop Height) | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 180 | MM |
| Max | Time | Min | Time |
| 50.5 | 26.2 | -4.6 | 61.0 |

Test Program: ES2re Rib Module Calibration
 ATD Serial No.: F035 Rib #3

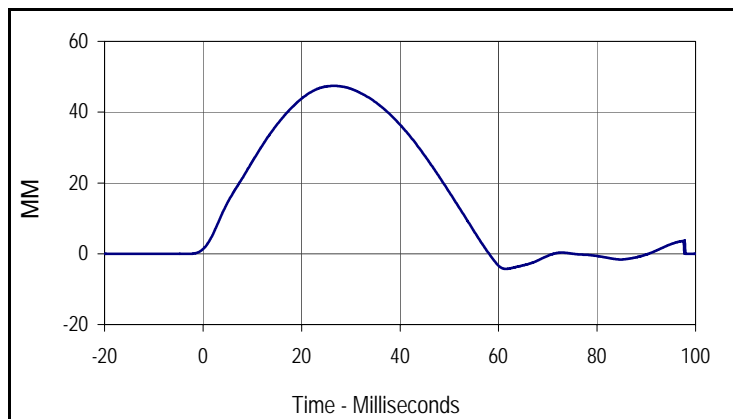
Test Date: 6/4/09
 Test I.D.: RIB06E, RIB06F



| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|-------|---------------|--------|-----------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Peak Rib Deflection at 459 MM Drop Height | MM | 36 to 40 | 39.4 | Pass |
| Peak Rib Deflection at 815 MM Drop Height | MM | 46 to 51 | 47.4 | Pass |
| Overall Test Results | | | | Pass |



| Curve Description | | | |
|---|------|-----------|-------|
| Upper Rib Deflection (459 MM Drop Height) | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 180 | MM |
| Max | Time | Min | Time |
| 39.4 | 30.7 | -4.3 | 65.5 |



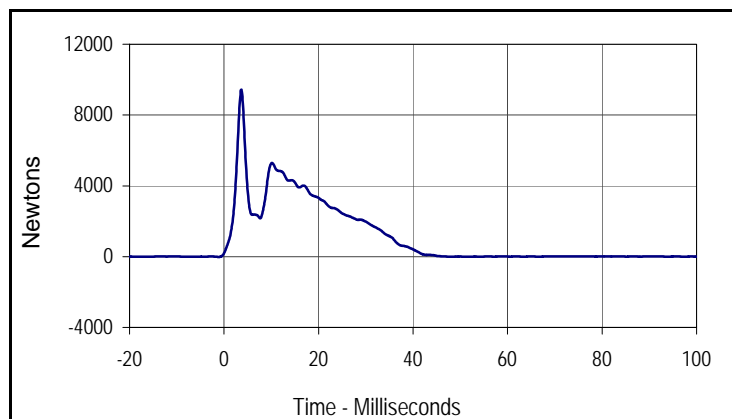
| Curve Description | | | |
|---|------|-----------|-------|
| Upper Rib Deflection (815 MM Drop Height) | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 180 | MM |
| Max | Time | Min | Time |
| 47.4 | 26.8 | -4.3 | 61.6 |

Test Program: ES2re Thorax Calibration
 ATD Serial No.: F035

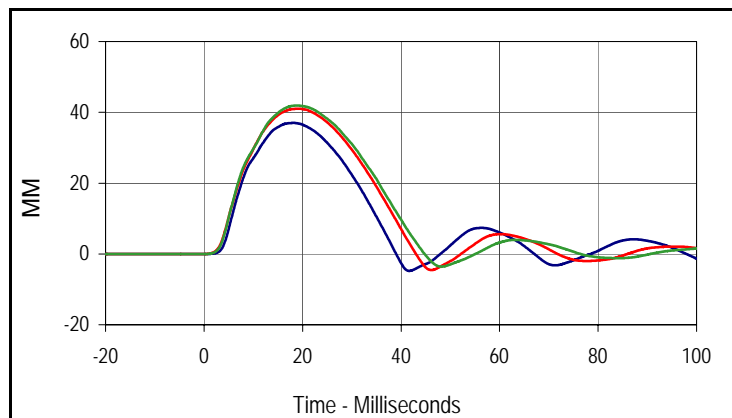
Test Date: 6/4/09
 Test I.D.: TH06A



| Tested Parameter | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Probe Velocity | m/s | 5.40 to 5.60 | 5.55 | Pass |
| Impactor Force | N | 5100 to 6200 | 5291.9 | Pass |
| | msec | > 6.0 msec | 10.2 | Pass |
| Upper Rib Deflection | MM | 34 to 41 | 37.0 | Pass |
| Middle Rib Deflection | MM | 37 to 45 | 41.0 | Pass |
| Lower Rib Deflection | MM | 37 to 44 | 41.9 | Pass |
| Overall Test Results | | | | Pass |



| Curve Description | | | |
|-------------------|------|-----------|---------|
| Impactor Force | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 180 | Newtons |
| Max | Time | Min | Time |
| 9426.3 | 3.7 | -20.0 | -1.1 |



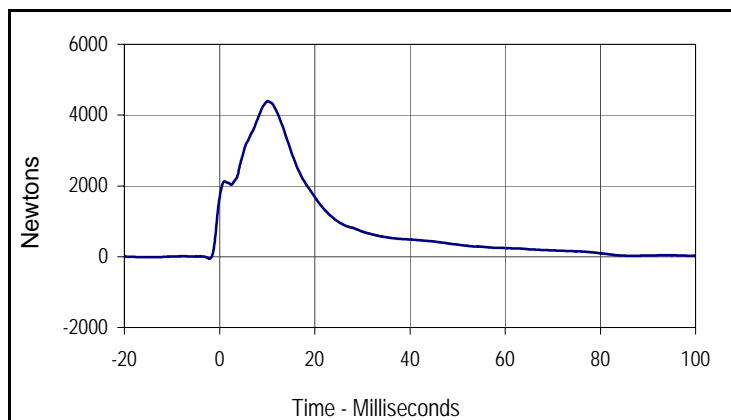
| Curve Description | | | |
|--------------------------------------|------|--------------|-------|
| Upper, Middle, Lower Rib Deflections | | | |
| CURNO(s) | Type | SAE Class | Units |
| 002-003-004 | FIL | 180 | MM |
| Max (Upper) | Time | Min (Upper) | Time |
| 37.0 | 18.2 | -4.8 | 41.7 |
| Max (Middle) | Time | Min (Middle) | Time |
| 41.0 | 19.1 | -4.6 | 46.2 |
| Max (Lower) | Time | Min (Lower) | Time |
| 41.9 | 18.8 | -3.6 | 48.2 |

Test Program: ES2re Abodomen Calibration
 ATD Serial No.: F035

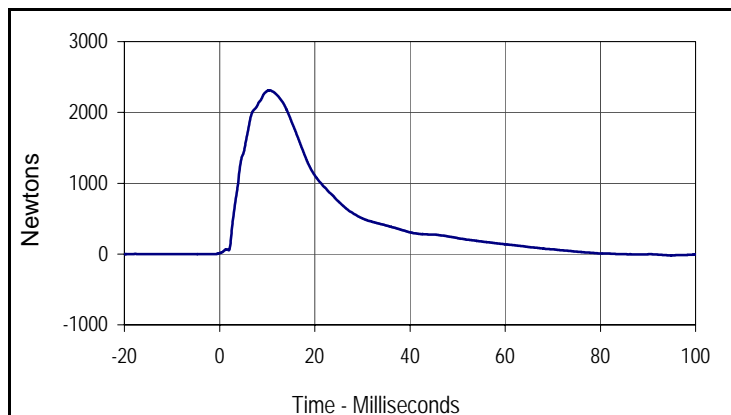
Test Date: 6/4/09
 Test I.D.: AB06A



| Tested Parameter | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Probe Velocity | m/s | 3.90 to 4.10 | 4.02 | Pass |
| Impactor Force | N | 4000 to 4800 | 4396.2 | Pass |
| | msec | 10.6 to 13.0 | 11.1 | Pass |
| Abdominal Force | N | 2200 to 2700 | 2313.0 | Pass |
| | msec | 10.0 to 12.3 | 11.7 | Pass |
| Overall Test Results | | | | Pass |



| Curve Description | | | |
|-------------------|------|-----------|---------|
| Impactor Force | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 180 | Newtons |
| Max | Time | Min | Time |
| 4396.2 | 11.1 | -52.1 | -1.1 |



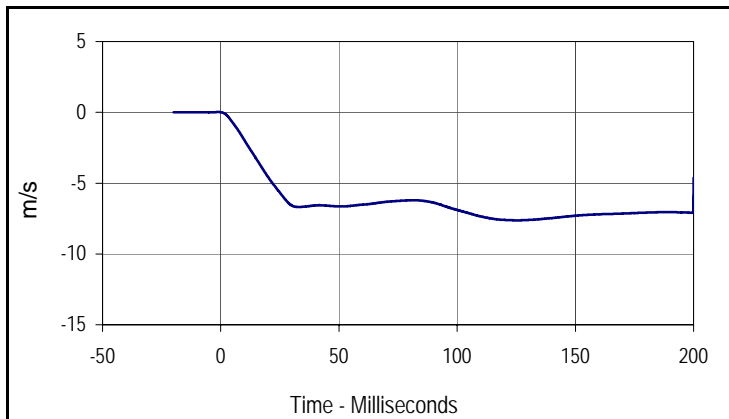
| Curve Description | | | |
|-----------------------|------|-----------|---------|
| Abdomen Sum Resultant | | | |
| CURNO | Type | SAE Class | Units |
| 002 | RES | 600 | Newtons |
| Max | Time | Min | Time |
| 2313.0 | 11.7 | -19.0 | 96.1 |

Test Program: ES2re Lumbar Spine Calibration
 ATD Serial No.: F035

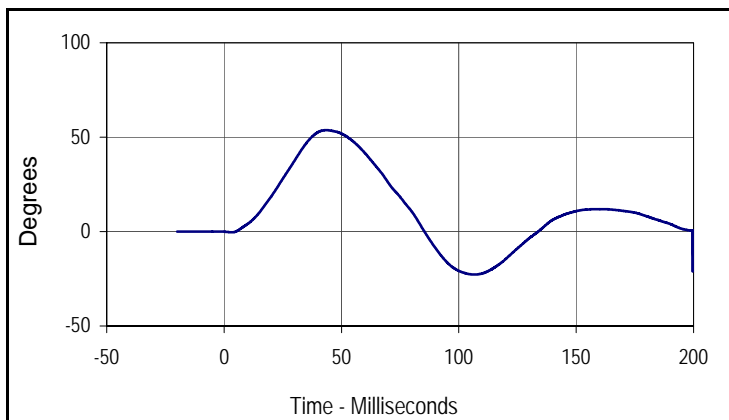
Test Date: 6/4/09
 Test I.D.: LS06A



| Tested Parameter | Units | Specification | Result | Pass/Fail | |
|--|----------|---------------|----------------|-----------|------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass | |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass | |
| Pendulum Velocity | m/s | 5.95 to 6.15 | 6.01 | Pass | |
| Pendulum Deceleration | 1 msec | m/s | 0.0 to -.050 | -0.031 | Pass |
| | 3.7 msec | m/s | -.240 to -.425 | -0.424 | Pass |
| | 27 msec | m/s | -5.80 to -6.50 | -6.09 | Pass |
| | 30 msec | m/s | < -6.50 | 6.49 | Pass |
| Headform Rotation | Max | Degrees | 45.0 to 55.0 | 53.7 | Pass |
| | Time | msec | 39.0 to 53.0 | 43.5 | Pass |
| Maximum Rotation To Time Zero Crossing | msec | 37.0 to 57.0 | 41.9 | Pass | |
| Overall Test Results | | | | Pass | |



| Curve Description | | | |
|-------------------|------|-----------|-------|
| Pendulum Velocity | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 60 | m/s |
| Max | Time | Min | Time |
| 0.0 | -1.0 | -7.6 | 125.4 |



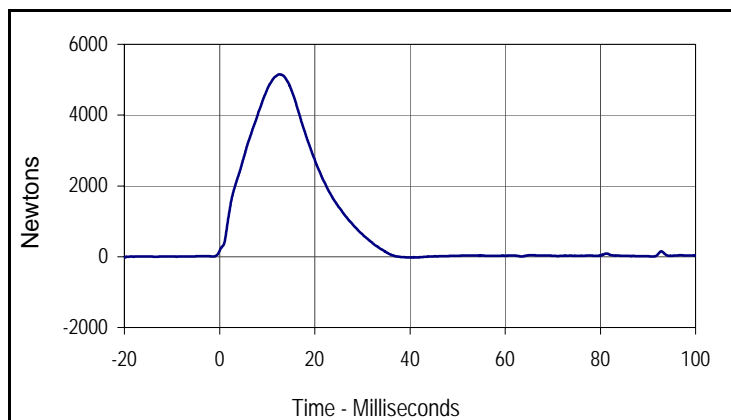
| Curve Description | | | |
|-------------------|------|-----------|---------|
| Headform Rotation | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIL | 180 | Degrees |
| Max | Time | Min | Time |
| 53.7 | 43.5 | -22.7 | 106.6 |

Test Program: ES2re Pelvis Calibration
 ATD Serial No.: F035

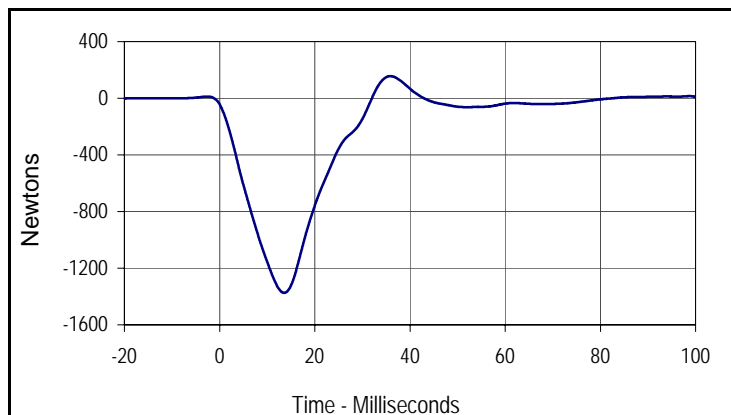
Test Date: 6/4/09
 Test I.D.: PL06A



| Tested Parameter | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|----------------|---------|-----------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Probe Velocity | m/s | 4.20 to 4.40 | 4.25 | Pass |
| Impactor Force | N | 4700 to 5400 | 5153.7 | Pass |
| | msec | 11.8 to 16.1 | 12.5 | Pass |
| Pubic Symphysis Load | N | -1230 to -1590 | -1373.9 | Pass |
| | msec | 12.2 to 17.0 | 13.6 | Pass |
| Overall Test Results | | | | Pass |



| Curve Description | | | |
|-------------------|------|-----------|---------|
| Impactor Force | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 180 | Newtons |
| Max | Time | Min | Time |
| 5153.7 | 12.5 | -22.1 | 41.4 |



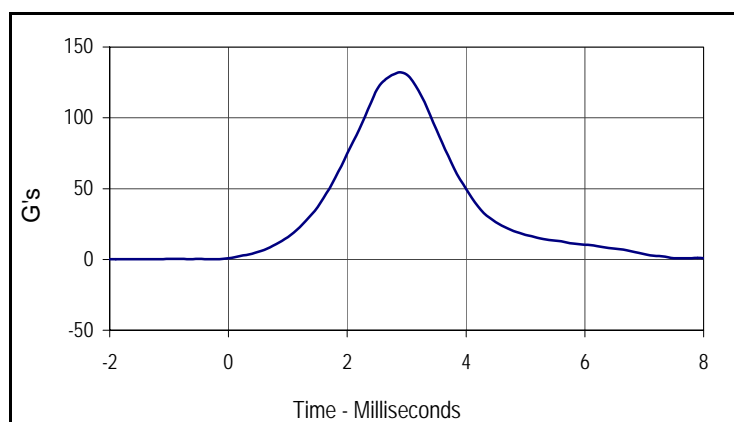
| Curve Description | | | |
|-------------------|------|-----------|---------|
| Pubic FY | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIL | 60 | Newtons |
| Max | Time | Min | Time |
| 156.2 | 35.9 | -1373.9 | 13.6 |

Test Program: SID IIs Lateral Head Drop Calibration
 ATD Serial No.: 299

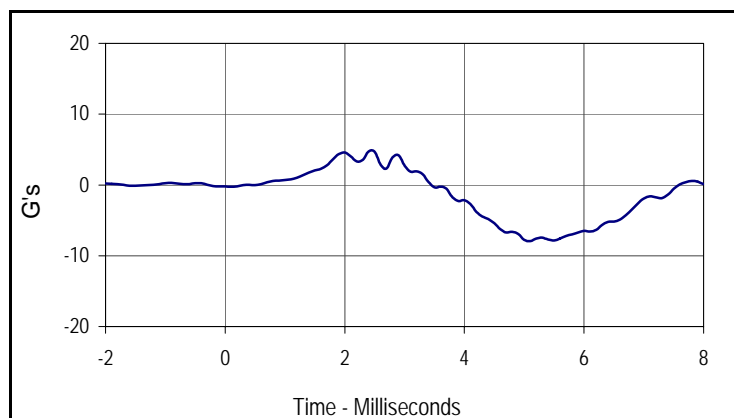
Test Date: 6/5/09
 Test I.D.: HDS06A



| Tested Parameter | Units | Specification | Result | Pass/Fail |
|--------------------------------|--------|---------------|--------|-----------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Peak Resultant Acceleration | G's | 115 to 137 | 132.3 | Pass |
| Peak Longitudinal Acceleration | G's | ≤15 | 8.0 | Pass |
| Is Acceleration Unimodal? | Yes/No | Yes | Yes | Pass |
| Oscillations After Main Pulse | % | <15 | 13.2 | Pass |
| Overall Test Results | | | | Pass |



| Curve Description | | | |
|-------------------|------|-----------|-------|
| Head Resultant | | | |
| CURNO | Type | SAE Class | Units |
| 001 | RES | 1000 | G's |
| Max | Time | Min | Time |
| 132.3 | 2.9 | 0.1 | -1.7 |



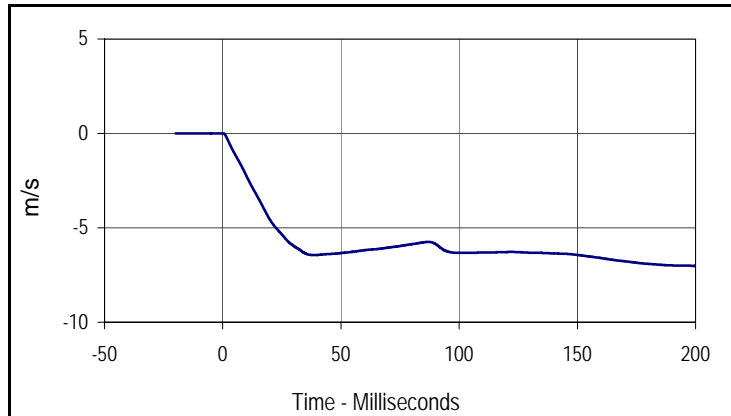
| Curve Description | | | |
|-------------------|------|-----------|-------|
| Head X | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIL | 1000 | G's |
| Max | Time | Min | Time |
| 4.7 | 2.4 | -8.0 | 5.1 |

Test Program: SID IIs Neck Calibration
 ATD Serial No.: 299

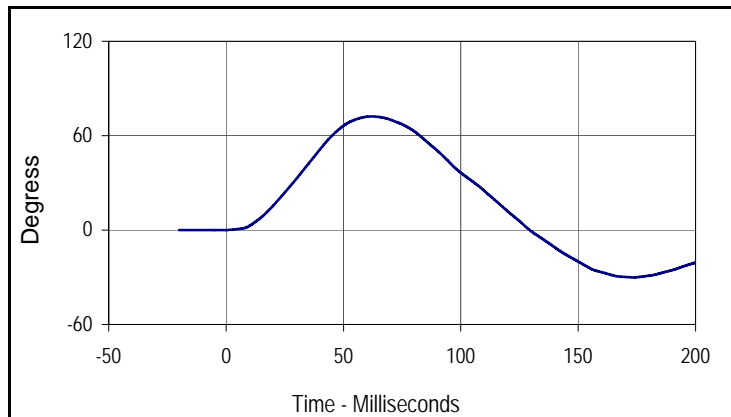
Test Date: 6/5/09
 Test I.D.: NBS06A



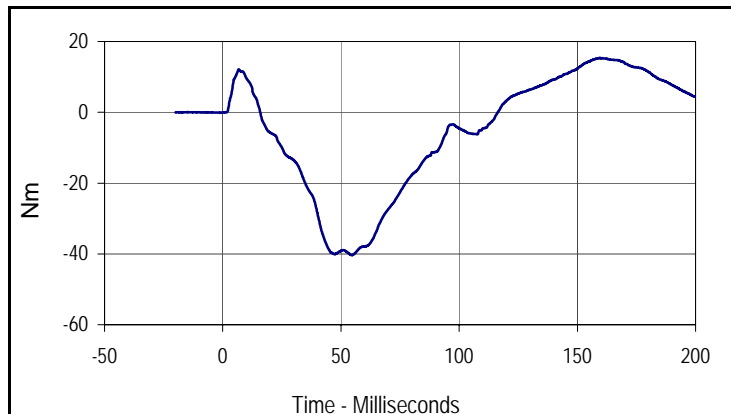
| Tested Parameter | Units | Specification | Result | Pass/Fail | |
|------------------------------------|-------------|----------------|----------------|-------------|------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass | |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass | |
| Pendulum Velocity | m/s | 5.51 to 5.63 | 5.57 | Pass | |
| Pendulum Deceleration | 10 msec | m/s | -2.20 to -2.80 | -2.2 | Pass |
| | 15 msec | m/s | -3.30 to -4.10 | -3.4 | Pass |
| | 20 msec | m/s | -4.40 to -5.40 | -4.6 | Pass |
| | 25 msec | m/s | -5.40 to -6.10 | -5.4 | Pass |
| | 25-100 msec | m/s | -5.50 to -6.20 | -6.18 | Pass |
| Translation-Rotation | Max | Degrees | 71.0 to 81.0 | 72.2 | Pass |
| | Time | msec | 50.0 to 70.0 | 61.9 | Pass |
| Peak Occipital Condyle Moment | Nm | -36.0 to -44.0 | -40.4 | Pass | |
| Decaying Moment Time to Cross 0 Nm | msec | 102.0 to 126.0 | 116.4 | Pass | |
| Overall Test Results | | | | Pass | |



| Curve Description | | | |
|-------------------|------|-----------|-------|
| Pendulum Velocity | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 180 | m/s |
| Max | Time | Min | Time |
| 0.0 | -0.3 | -7.0 | 200.0 |



| Curve Description | | | |
|------------------------------|------|-----------|--------|
| Maximum Translation Rotation | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIL | 60 | Degree |
| Max | Time | Min | Time |
| 72.2 | 61.9 | -30.0 | 173.4 |



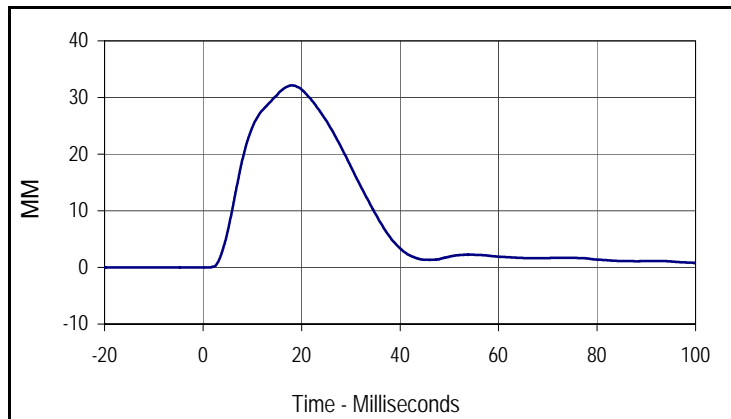
| Curve Description | | | |
|--------------------------------|-------|-----------|-------|
| Moment About Occipital Condyle | | | |
| CURNO | Type | SAE Class | Units |
| 003 | FIL | 600 | Nm |
| Max | Time | Min | Time |
| 15.4 | 159.3 | -40.4 | 54.7 |

Test Program: SID IIs Shoulder Calibration
 ATD Serial No.: 299

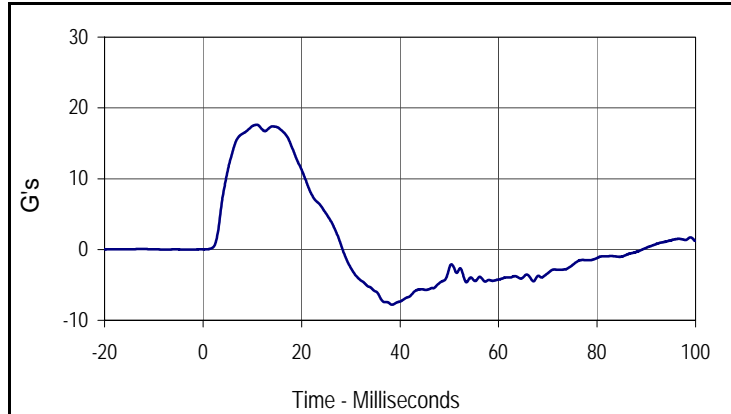
Test Date: 6/5/09
 Test I.D.: SH06A



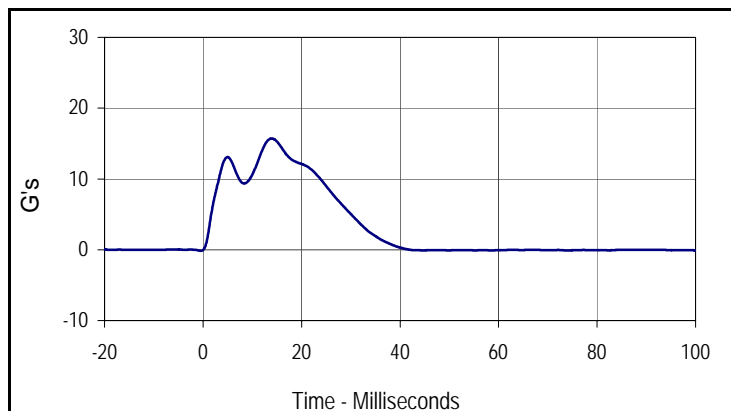
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Pendulum Velocity | m/s | 4.20 to 4.40 | 4.24 | Pass |
| Shoulder Deflection | MM | 28 to 37 | 32.1 | Pass |
| Peak Upper Spine Y Acceleration | G's | 17 to 22 | 17.6 | Pass |
| Peak Impactor Acceleration | G's | 13 to 18 | 15.7 | Pass |
| Overall Test Results | | | Pass | |



| Curve Description | | | |
|---------------------|------|-----------|-------|
| Shoulder Deflection | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 600 | MM |
| Max | Time | Min | Time |
| 32.1 | 18.0 | 0.0 | -11.1 |



| Curve Description | | | |
|----------------------------|------|-----------|-------|
| Upper Spine Y Acceleration | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIL | 180 | G's |
| Max | Time | Min | Time |
| 17.6 | 10.9 | -7.8 | 38.4 |



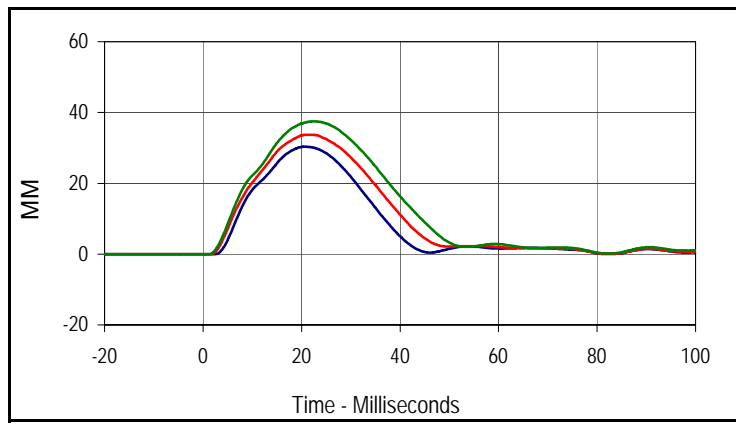
| Curve Description | | | |
|-----------------------|------|-----------|-------|
| Impactor Acceleration | | | |
| CURNO | Type | SAE Class | Units |
| 003 | FIL | 180 | G's |
| Max | Time | Min | Time |
| 15.7 | 13.9 | -0.1 | -0.4 |

Test Program: SID IIs Thorax with Arm Calibration
 ATD Serial No.: 299

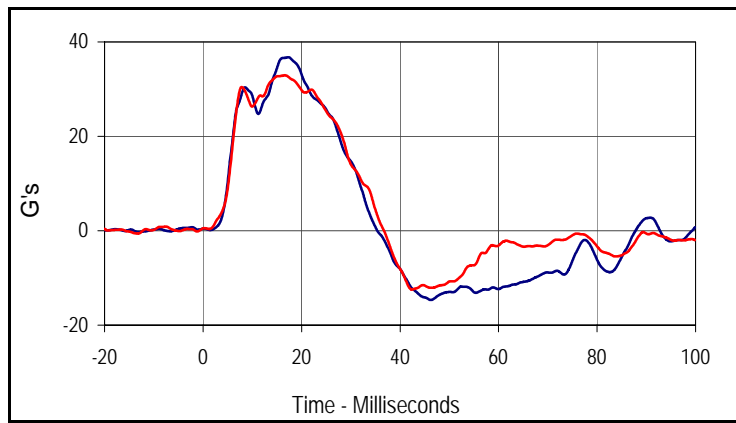
Test Date: 6/5/09
 Test I.D.: TH06A



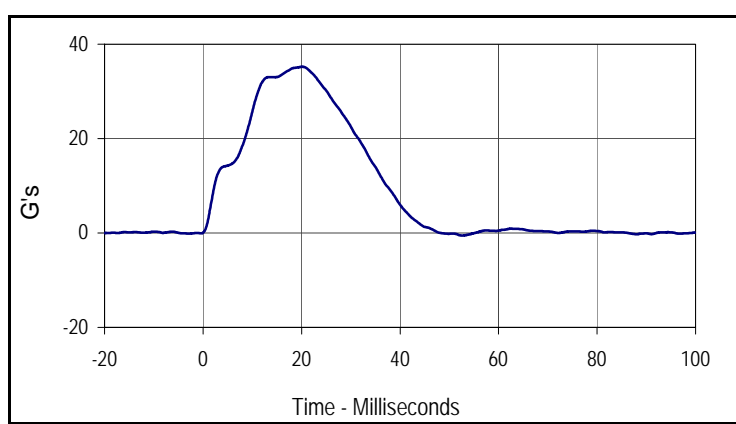
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Pendulum Velocity | m/s | 6.60 to 6.80 | 6.70 | Pass |
| Shoulder Deflection | MM | 31 to 40 | 37.5 | Pass |
| Upper Thorax Rib Deflection | MM | 26 to 32 | 30.3 | Pass |
| Middle Abdominal Rib Deflection | MM | 30 to 36 | 33.7 | Pass |
| Lower Abdominal Rib Deflection | MM | 32 to 38 | 37.5 | Pass |
| Peak Upper Spine Y Acceleration | G's | 34 to 43 | 36.8 | Pass |
| Peak Lower Spine Y Acceleration | G's | 28 to 35 | 32.9 | Pass |
| Peak Impactor Acceleration | G's | 31 to 36 | 35.2 | Pass |
| Overall Test Results | | | | Pass |



| Curve Description | | | |
|---------------------------------|------|-----------|-------|
| Upper Thorax Deflection | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 600 | MM |
| Max | Time | Min | Time |
| 30.3 | 20.7 | 0.0 | -20.0 |
| Middle Thorax Deflection | | | |
| Max | Time | Min | Time |
| 33.7 | 21.5 | 0.0 | -3.3 |
| Lower Thorax Deflection | | | |
| Max | Time | Min | Time |
| 37.5 | 22.4 | 0.0 | -19.4 |



| Curve Description | | | |
|-----------------------------------|------|-----------|-------|
| Upper Spine Y Acceleration | | | |
| CURNO | Type | SAE Class | Units |
| 004 | FIL | 180 | G's |
| Max | Time | Min | Time |
| 36.8 | 17.3 | -14.7 | 46.2 |
| Lower Spine Y Acceleration | | | |
| CURNO | Type | SAE Class | Units |
| 005 | FIL | 180 | G's |
| Max | Time | Min | Time |
| 32.9 | 16.6 | -12.4 | 42.4 |



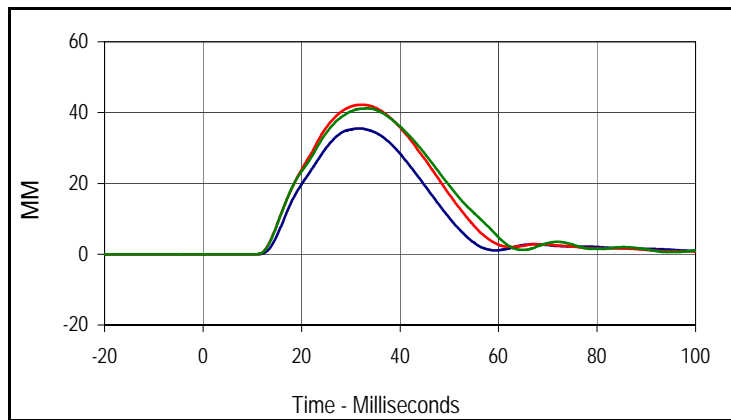
| Curve Description | | | |
|------------------------------|------|-----------|-------|
| Impactor Acceleration | | | |
| CURNO | Type | SAE Class | Units |
| 006 | FIL | 180 | G's |
| Max | Time | Min | Time |
| 35.2 | 20.2 | -0.6 | 52.6 |

Test Program: SID IIs Thorax w/o Arm Calibration
 ATD Serial No.: 299

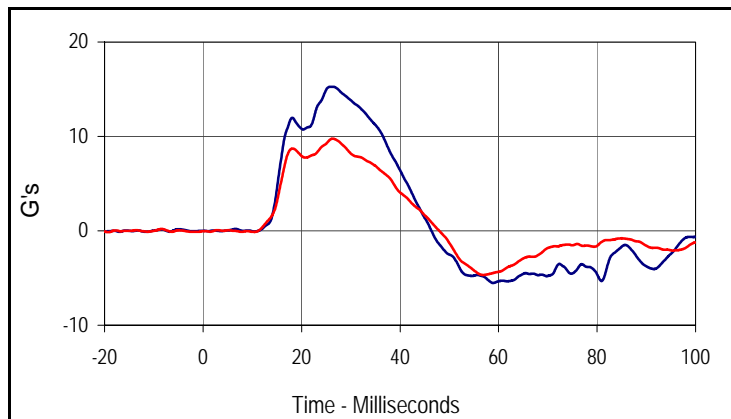
Test Date: 6/5/09
 Test I.D.: TOP6A



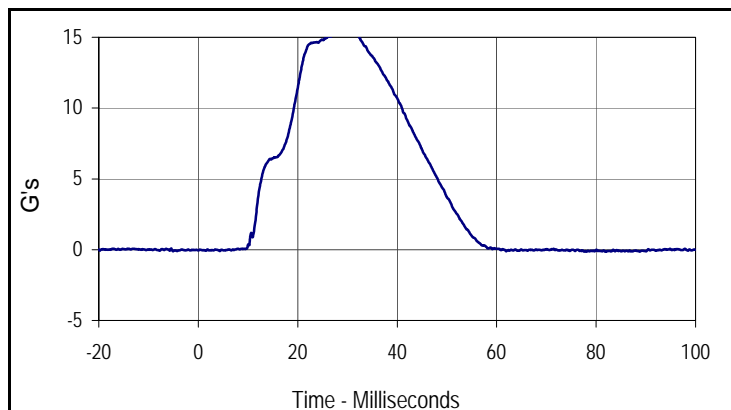
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Pendulum Velocity | m/s | 4.20 to 4.40 | 4.27 | Pass |
| Upper Thorax Rib Deflection | MM | 33 to 40 | 35.5 | Pass |
| Middle Abdominal Rib Deflection | MM | 39 to 45 | 42.2 | Pass |
| Lower Abdominal Rib Deflection | MM | 36 to 43 | 41.2 | Pass |
| Peak Upper Spine Y Acceleration | G's | 14 to 17 | 15.3 | Pass |
| Peak Lower Spine Y Acceleration | G's | 7 to 10 | 9.8 | Pass |
| Peak Impactor Acceleration | G's | 12 to 16 | 15.8 | Pass |
| Overall Test Results | | | Pass | |



| Curve Description | | | |
|---------------------------------|------|-----------|-------|
| Upper Thorax Deflection | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 600 | MM |
| Max | Time | Min | Time |
| 35.5 | 31.7 | 0.0 | -2.5 |
| Middle Thorax Deflection | | | |
| Max | Time | Min | Time |
| 42.2 | 32.3 | 0.0 | -5.6 |
| Lower Thorax Deflection | | | |
| Max | Time | Min | Time |
| 41.2 | 33.5 | 0.0 | 5.9 |



| Curve Description | | | |
|-----------------------------------|------|-----------|-------|
| Upper Spine Y Acceleration | | | |
| CURNO | Type | SAE Class | Units |
| 004 | FIL | 180 | G's |
| Max | Time | Min | Time |
| 15.3 | 25.8 | -5.5 | 58.9 |
| Lower Spine Y Acceleration | | | |
| CURNO | Type | SAE Class | Units |
| 005 | FIL | 180 | G's |
| Max | Time | Min | Time |
| 9.8 | 26.3 | -4.7 | 56.9 |



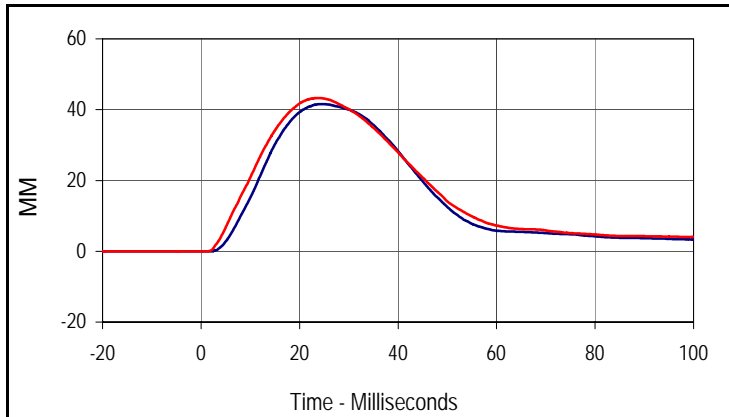
| Curve Description | | | |
|------------------------------|------|-----------|-------|
| Impactor Acceleration | | | |
| CURNO | Type | SAE Class | Units |
| 006 | FIL | 1000 | G's |
| Max | Time | Min | Time |
| 15.8 | 30.0 | -0.1 | 78.1 |

Test Program: SID IIs Abdomen Calibration
 ATD Serial No.: 299

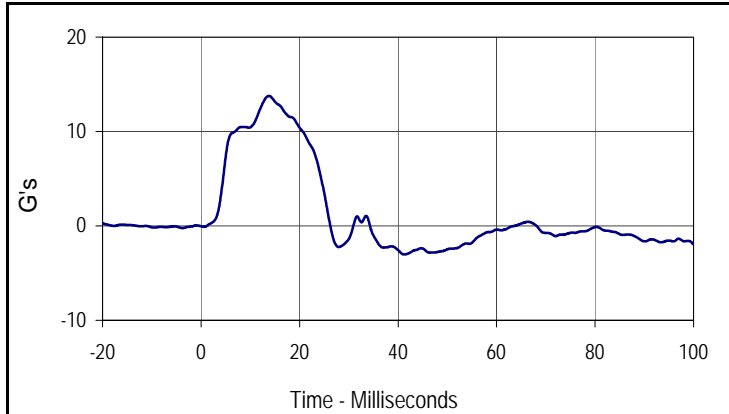
Test Date: 6/5/09
 Test I.D.: AB06A



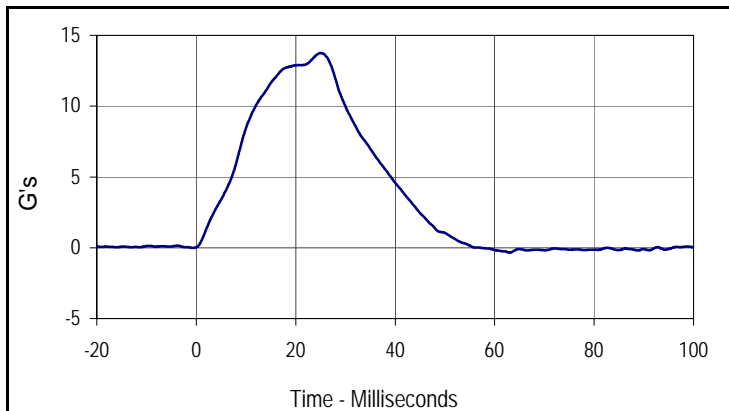
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Pendulum Velocity | m/s | 4.30 to 4.50 | 4.32 | Pass |
| Upper Abdominal Rib Deflection | MM | 39 to 47 | 41.6 | Pass |
| Lower Abdominal Rib Deflection | MM | 37 to 46 | 43.3 | Pass |
| Peak Lower Spine Y Acceleration | G's | 11 to 14 | 13.8 | Pass |
| Peak Impactor Acceleration | G's | 12 to 16 | 13.8 | Pass |
| Overall Test Results | | | Pass | |



| Curve Description | | | |
|--------------------------------|------|-----------|-------|
| Upper Abdominal Rib Deflection | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 600 | MM |
| Max | Time | Min | Time |
| 41.6 | 24.6 | 0.0 | 1.3 |
| Curve Description | | | |
| Lower Abdominal Rib Deflection | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIL | 600 | MM |
| Max | Time | Min | Time |
| 43.3 | 24.0 | 0.0 | -20.0 |



| Curve Description | | | |
|----------------------------|------|-----------|-------|
| Lower Spine Y Acceleration | | | |
| CURNO | Type | SAE Class | Units |
| 003 | FIL | 180 | G's |
| Max | Time | Min | Time |
| 13.8 | 13.8 | -3.0 | 41.3 |



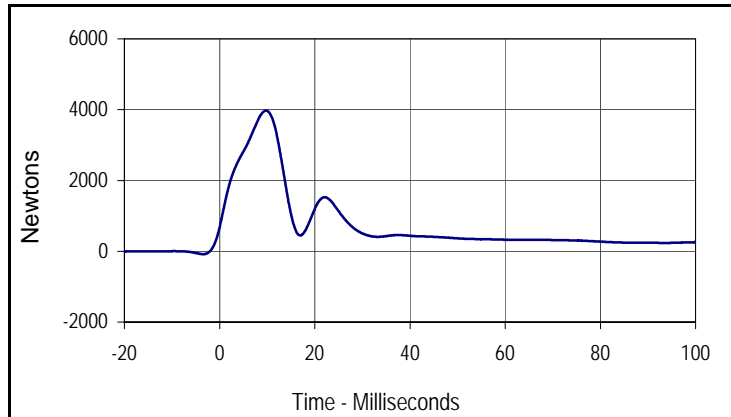
| Curve Description | | | |
|-----------------------|------|-----------|-------|
| Impactor Acceleration | | | |
| CURNO | Type | SAE Class | Units |
| 004 | FIL | 180 | G's |
| Max | Time | Min | Time |
| 13.8 | 25.0 | -0.3 | 63.0 |

Test Program: SID IIs Pelvis Acetabulum Calibration
 ATD Serial No.: 299

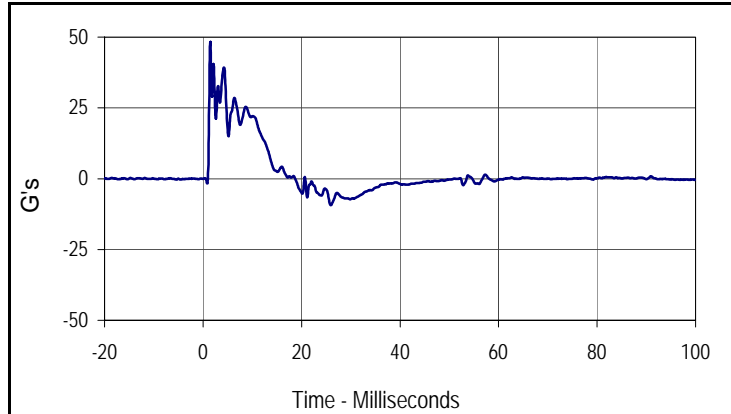
Test Date: 6/5/09
 Test I.D.: PA06A



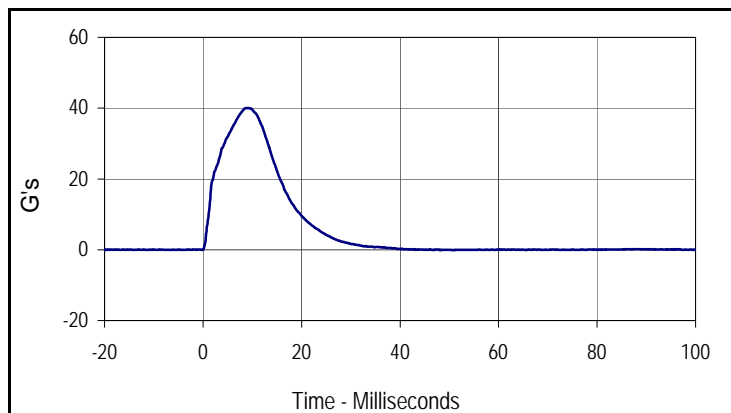
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|------------------------------|---------|---------------|--------|-----------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Pendulum Velocity | m/s | 6.60 to 6.80 | 6.74 | Pass |
| Peak Acetabulum Force | Newtons | 3800 to 4600 | 3975.5 | Pass |
| Peak Pelvis Y Acceleration | G's | 41 to 50 | 48.3 | Pass |
| Peak Impactor Acceleration | G's | 38 to 47 | 40.1 | Pass |
| Overall Test Results | | | Pass | |



| Curve Description | | | |
|-------------------------|------|-----------|---------|
| Pelvis Acetabulum Force | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 60 | Newtons |
| Max | Time | Min | Time |
| 3975.5 | 9.8 | -81.0 | -3.5 |



| Curve Description | | | |
|-----------------------|------|-----------|-------|
| Pelvis Y Acceleration | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIL | 600 | G's |
| Max | Time | Min | Time |
| 48.3 | 1.5 | -9.4 | 25.9 |



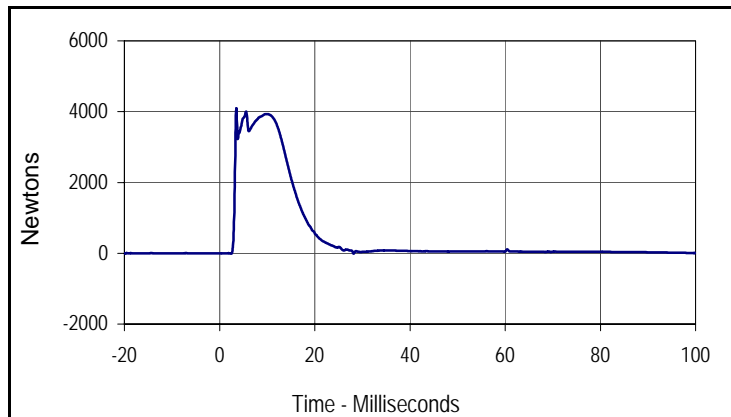
| Curve Description | | | |
|-----------------------|------|-----------|-------|
| Impactor Acceleration | | | |
| CURNO | Type | SAE Class | Units |
| 003 | FIL | 1000 | G's |
| Max | Time | Min | Time |
| 40.1 | 8.8 | -0.1 | 0.0 |

Test Program: SID IIs Pelvis Iliac Calibration
 ATD Serial No.: 299

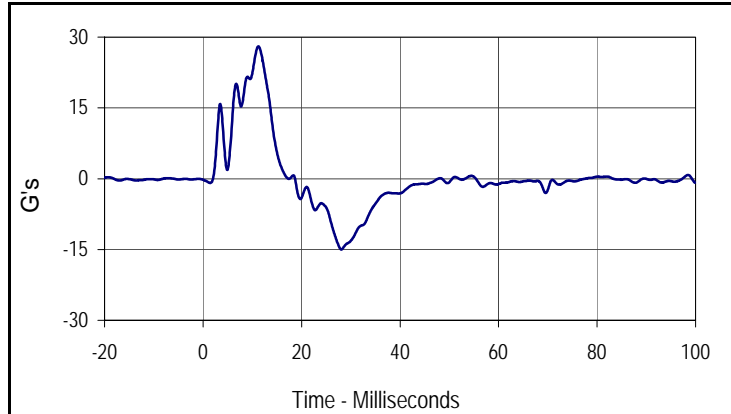
Test Date: 6/5/09
 Test I.D.: PL06A



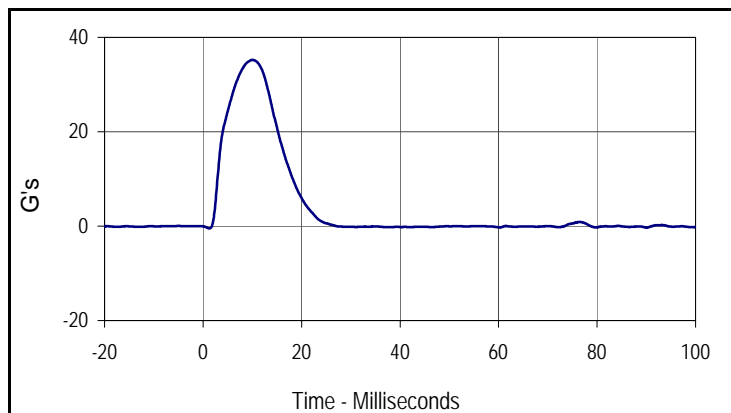
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|------------------------------|---------|---------------|--------|-----------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Pendulum Velocity | m/s | 4.2 to 4.4 | 4.39 | Pass |
| Peak Iliac Force | Newtons | 3700 to 4500 | 4096.7 | Pass |
| Peak Pelvis Y Acceleration | G's | 27 to 33 | 28.0 | Pass |
| Peak Impactor Acceleration | G's | 34 to 40 | 35.2 | Pass |
| Overall Test Results | | | Pass | Pass |



| Curve Description | | | |
|--------------------|------|-----------|---------|
| Pelvis Iliac Force | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 600 | Newtons |
| Max | Time | Min | Time |
| 4096.7 | 3.5 | -15.3 | 2.4 |



| Curve Description | | | |
|-----------------------|------|-----------|-------|
| Pelvis Y Acceleration | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIL | 180 | G's |
| Max | Time | Min | Time |
| 28.0 | 11.2 | -15.0 | 28.1 |



| Curve Description | | | |
|-----------------------|------|-----------|-------|
| Impactor Acceleration | | | |
| CURNO | Type | SAE Class | Units |
| 003 | FIL | 180 | G's |
| Max | Time | Min | Time |
| 35.2 | 10.0 | -0.5 | 1.3 |

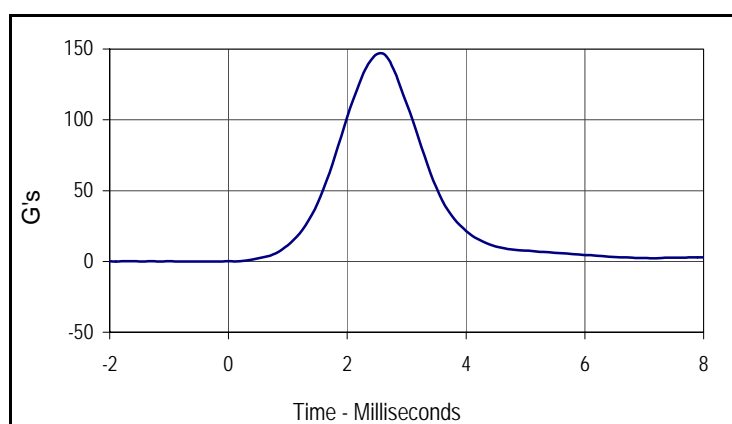
APPENDIX C
POST-TEST CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Test Program: ES2re Lateral Head Drop Calibration
 ATD Serial No.: F035

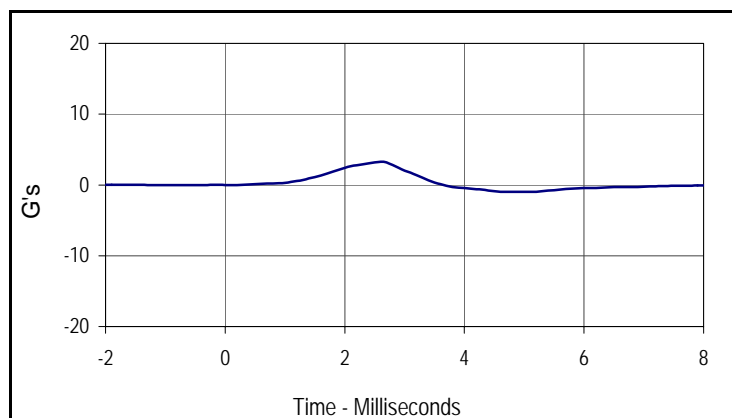
Test Date: 6/12/09
 Test I.D.: HD06B



| Tested Parameter | Units | Specification | Result | Pass/Fail |
|--------------------------------|--------|---------------|--------|-------------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Peak Resultant Acceleration | G's | 125 to 155 | 146.8 | Pass |
| Peak Longitudinal Acceleration | G's | ≤15 | 3.3 | Pass |
| Is Acceleration Unimodal? | Yes/No | Yes | Yes | Pass |
| Oscillations After Main Pulse | % | <15 | 5.2 | Pass |
| Overall Test Results | | | | Pass |



| Curve Description | | | |
|-------------------|------|-----------|-------|
| Head Resultant | | | |
| CURNO | Type | SAE Class | Units |
| 001 | RES | 1000 | G's |
| Max | Time | Min | Time |
| 146.8 | 2.6 | 0.0 | -0.2 |



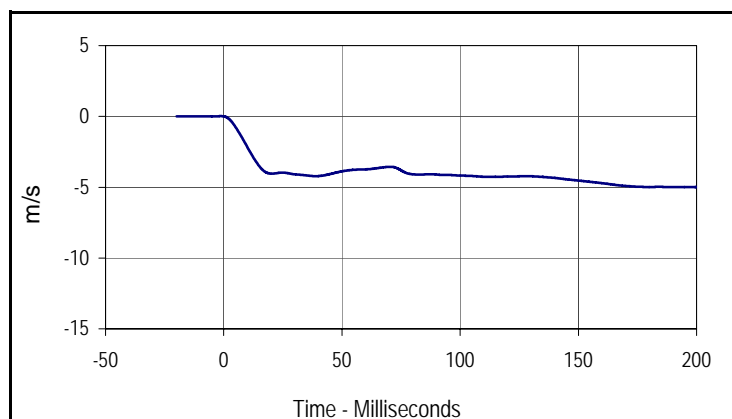
| Curve Description | | | |
|-------------------|------|-----------|-------|
| Head X | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIL | 1000 | G's |
| Max | Time | Min | Time |
| 3.3 | 2.6 | -1.0 | 5.1 |

Test Program: ES2re Neck Calibration
 ATD Serial No.: F035

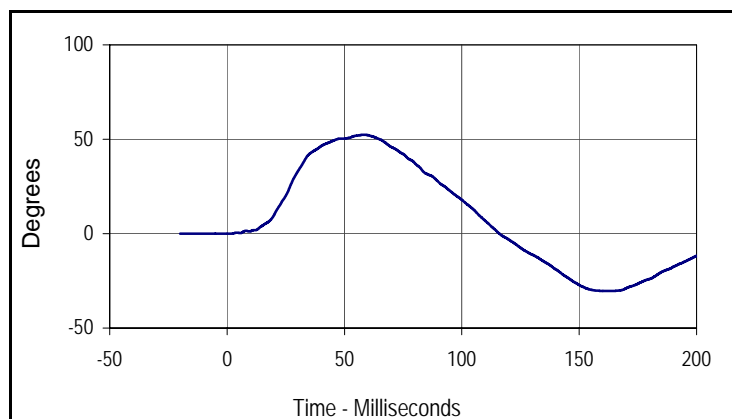
Test Date: 6/12/09
 Test I.D.: NB06B



| Tested Parameter | Units | Specification | Result | Pass/Fail | |
|--|---------|---------------|----------------|-----------|------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass | |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass | |
| Pendulum Velocity | m/s | 3.30 to 3.50 | 3.47 | Pass | |
| Pendulum Deceleration | 1 msec | m/s | 0.0 to -.050 | -0.044 | Pass |
| | 3 msec | m/s | -.250 to -.375 | -0.309 | Pass |
| | 14 msec | m/s | -3.20 to -3.70 | -3.28 | Pass |
| Headform Rotation | Max | Degrees | 49.0 to 58.0 | 52.4 | Pass |
| | Time | msec | 54.0 to 66.0 | 58.4 | Pass |
| Maximum Rotation To Time Zero Crossing | msec | 53.0 to 88.0 | 57.6 | Pass | |
| Overall Test Results | | | | Pass | |



| Curve Description | | | |
|-------------------|------|-----------|-------|
| Pendulum Velocity | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 60 | m/s |
| Max | Time | Min | Time |
| 0.0 | -1.2 | -5.0 | 200.0 |



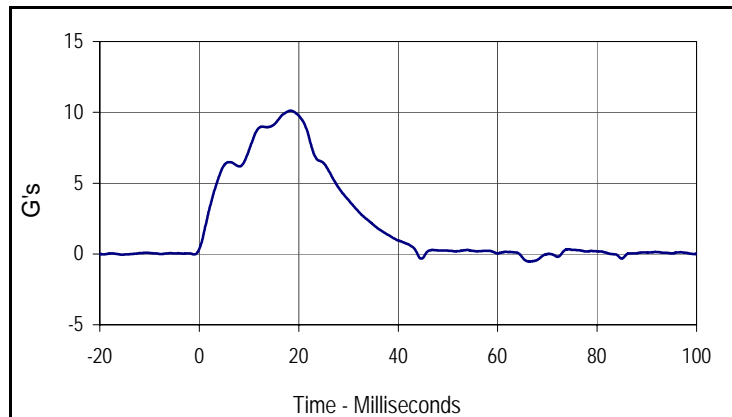
| Curve Description | | | |
|-------------------|------|-----------|---------|
| Headform Rotation | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIL | 180 | Degrees |
| Max | Time | Min | Time |
| 52.4 | 58.4 | -30.4 | 161.9 |

Test Program: ES2re Shoulder Calibration
 ATD Serial No.: F035

Test Date: 6/12/09
 Test I.D.: SH06B



| Tested Parameter | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Probe Velocity | m/s | 4.20 to 4.40 | 4.39 | Pass |
| Peak Impactor Acceleration | G's | 7.5 to 10.5 | 10.1 | Pass |
| Overall Test Results | | | | Pass |



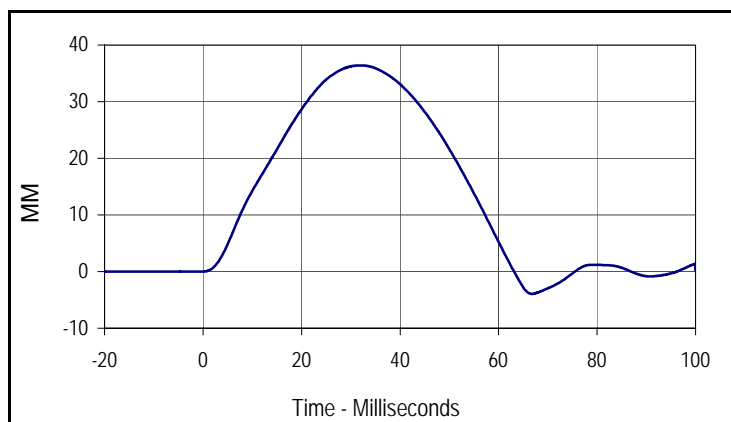
| Curve Description | | | |
|-----------------------------|------|-----------|-------|
| Probe Impactor Acceleration | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 180 | G's |
| Max | Time | Min | Time |
| 10.1 | 18.4 | -0.5 | 66.3 |

Test Program: ES2re Rib Module Calibration
 ATD Serial No.: F035 Rib #1

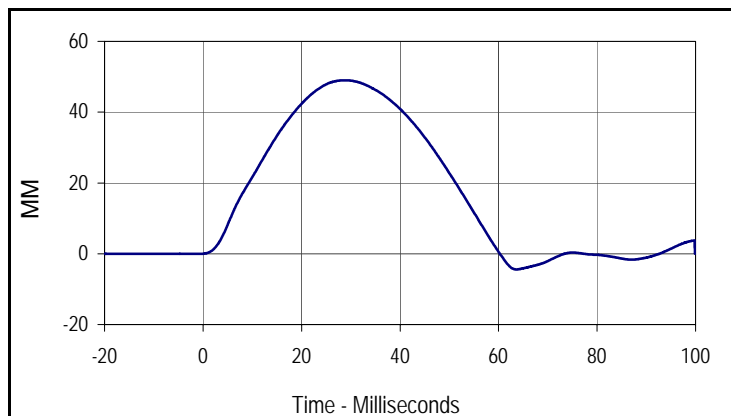
Test Date: 6/12/09
 Test I.D.: RIB06G,RIB06H



| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|-------|---------------|--------|-----------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Peak Rib Deflection at 459 MM Drop Height | MM | 36 to 40 | 36.4 | Pass |
| Peak Rib Deflection at 815 MM Drop Height | MM | 46 to 51 | 49.0 | Pass |
| Overall Test Results | | | | Pass |



| Curve Description | | | |
|---|------|-----------|-------|
| Upper Rib Deflection (459 MM Drop Height) | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 180 | MM |
| Max | Time | Min | Time |
| 36.4 | 32.0 | -3.9 | 66.8 |



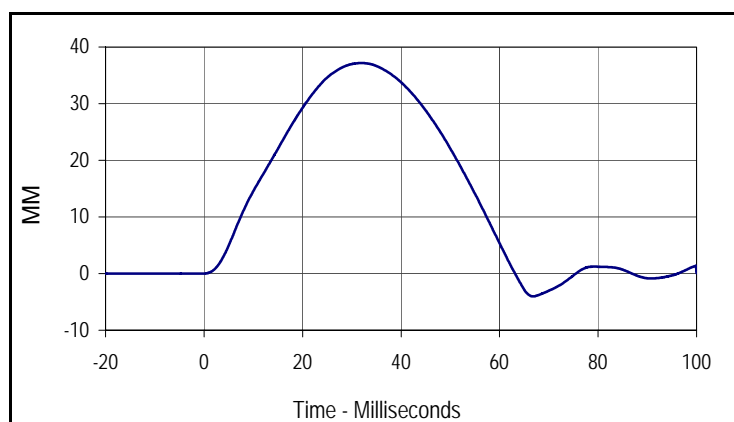
| Curve Description | | | |
|---|------|-----------|-------|
| Upper Rib Deflection (815 MM Drop Height) | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 180 | MM |
| Max | Time | Min | Time |
| 49.0 | 28.8 | -4.4 | 63.6 |

Test Program: ES2re Rib Module Calibration
 ATD Serial No.: F035 Rib #2

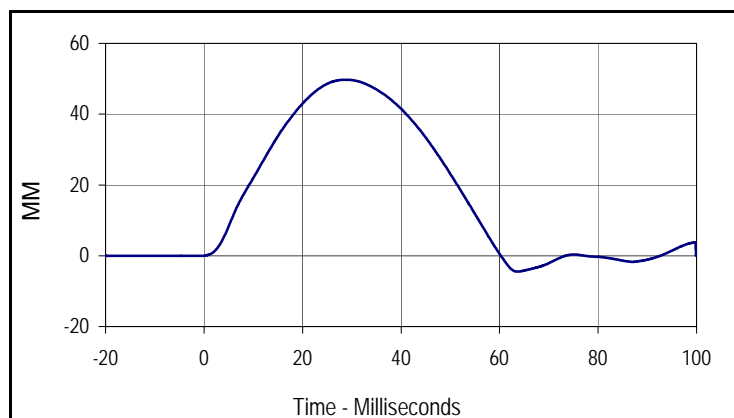
Test Date: 6/12/09
 Test I.D.: RIB06M,RIB06N



| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|-------|---------------|--------|-----------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Peak Rib Deflection at 459 MM Drop Height | MM | 36 to 40 | 37.2 | Pass |
| Peak Rib Deflection at 815 MM Drop Height | MM | 46 to 51 | 49.7 | Pass |
| Overall Test Results | | | | Pass |



| Curve Description | | | |
|---|------|-----------|-------|
| Upper Rib Deflection (459 MM Drop Height) | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 180 | MM |
| Max | Time | Min | Time |
| 37.2 | 32.0 | -4.0 | 66.8 |



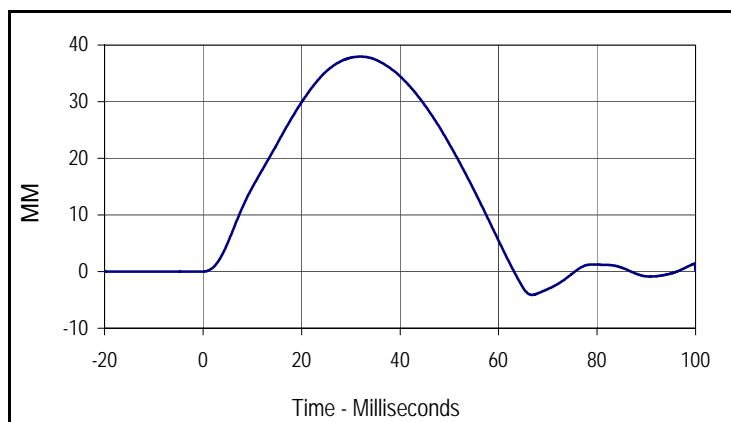
| Curve Description | | | |
|---|------|-----------|-------|
| Upper Rib Deflection (815 MM Drop Height) | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 180 | MM |
| Max | Time | Min | Time |
| 49.7 | 28.8 | -4.5 | 63.6 |

Test Program: ES2re Rib Module Calibration
 ATD Serial No.: F035 Rib #3

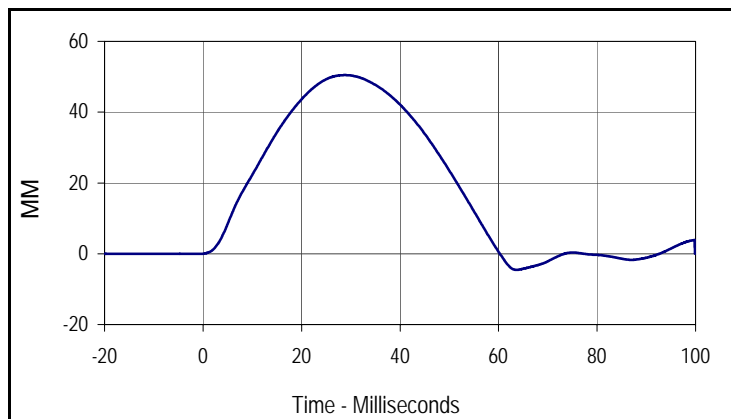
Test Date: 6/12/09
 Test I.D.: RIB06O,RIB06P



| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|-------|---------------|--------|-----------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Peak Rib Deflection at 459 MM Drop Height | MM | 36 to 40 | 37.9 | Pass |
| Peak Rib Deflection at 815 MM Drop Height | MM | 46 to 51 | 50.5 | Pass |
| Overall Test Results | | | | Pass |



| Curve Description | | | |
|---|------|-----------|-------|
| Upper Rib Deflection (459 MM Drop Height) | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 180 | MM |
| Max | Time | Min | Time |
| 37.9 | 32.0 | -4.1 | 66.8 |



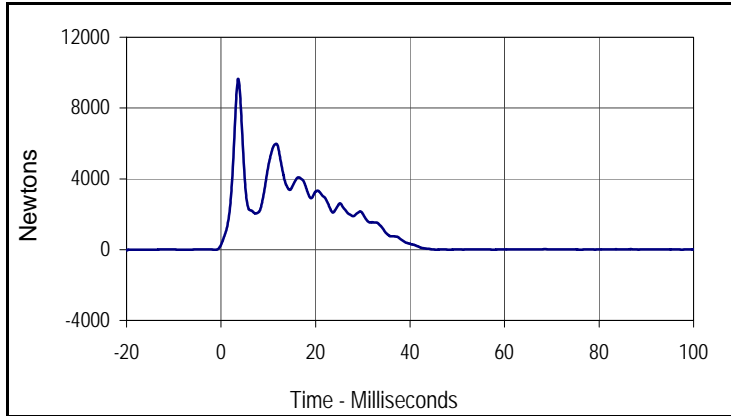
| Curve Description | | | |
|---|------|-----------|-------|
| Upper Rib Deflection (815 MM Drop Height) | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 180 | MM |
| Max | Time | Min | Time |
| 50.5 | 28.8 | -4.6 | 63.6 |

Test Program: ES2re Thorax Calibration
 ATD Serial No.: F035

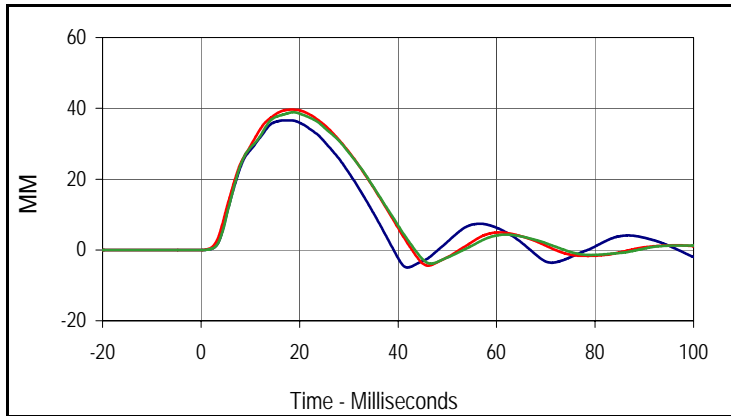
Test Date: 6/12/09
 Test I.D.: ES001



| Tested Parameter | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Probe Velocity | m/s | 5.40 to 5.60 | 5.52 | Pass |
| Impactor Force | N | 5100 to 6200 | 5980.2 | Pass |
| | msec | > 6.0 msec | 11.6 | Pass |
| Upper Rib Deflection | MM | 34 to 41 | 36.6 | Pass |
| Middle Rib Deflection | MM | 37 to 45 | 39.6 | Pass |
| Lower Rib Deflection | MM | 37 to 44 | 38.9 | Pass |
| Overall Test Results | | | | Pass |



| Curve Description | | | |
|-------------------|------|-----------|---------|
| Impactor Force | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 180 | Newtons |
| Max | Time | Min | Time |
| 9641.1 | 3.6 | -15.7 | -20.0 |



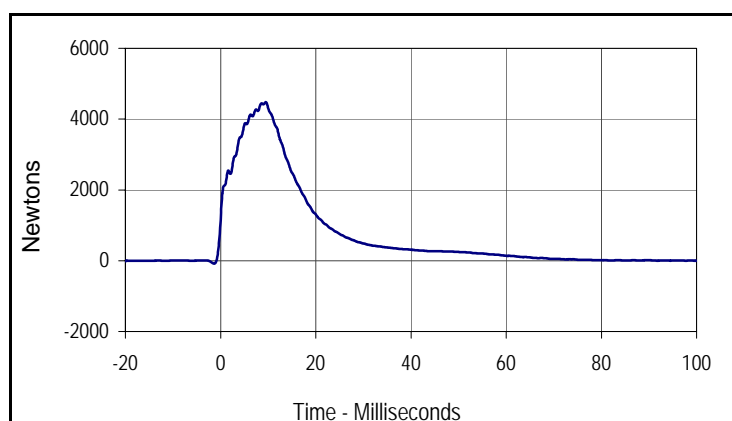
| Curve Description | | | |
|--------------------------------------|------|--------------|-------|
| Upper, Middle, Lower Rib Deflections | | | |
| CURNO(s) | Type | SAE Class | Units |
| 002-003-004 | FIL | 180 | MM |
| Max (Upper) | Time | Min (Upper) | Time |
| 36.6 | 17.1 | -5.0 | 41.9 |
| Max (Middle) | Time | Min (Middle) | Time |
| 39.6 | 18.5 | -4.4 | 46.1 |
| Max (Lower) | Time | Min (Lower) | Time |
| 38.9 | 18.8 | -3.9 | 46.7 |

Test Program: ES2re Abodomen Calibration
 ATD Serial No.: F035

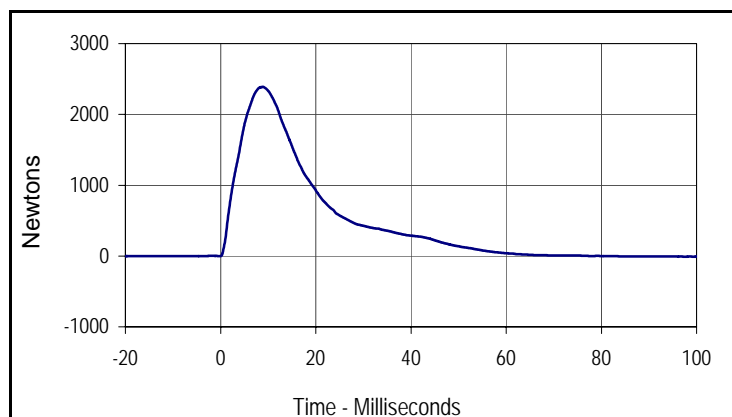
Test Date: 6/12/09
 Test I.D.: AB06C



| Tested Parameter | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Probe Velocity | m/s | 3.90 to 4.10 | 3.95 | Pass |
| Impactor Force | N | 4000 to 4800 | 4477.2 | Pass |
| | msec | 10.6 to 13.0 | 10.6 | Pass |
| Abdominal Force | N | 2200 to 2700 | 2389.7 | Pass |
| | msec | 10.0 to 12.3 | 10.3 | Pass |
| Overall Test Results | | | | Pass |



| Curve Description | | | |
|-------------------|------|-----------|---------|
| Impactor Force | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 180 | Newtons |
| Max | Time | Min | Time |
| 4477.2 | 10.5 | -82.5 | -0.3 |



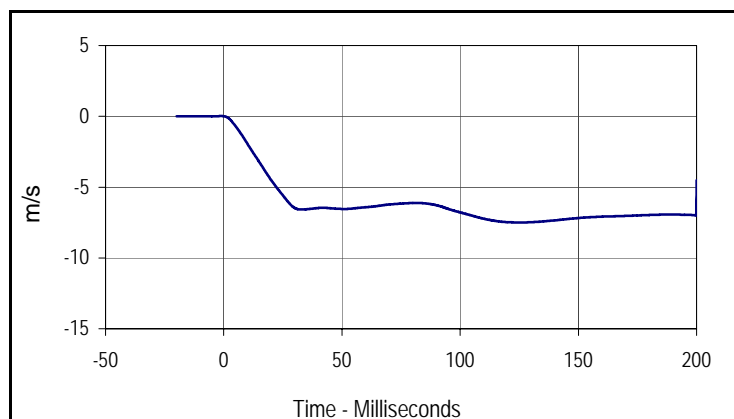
| Curve Description | | | |
|-------------------|------|-----------|---------|
| Abdominal Force | | | |
| CURNO | Type | SAE Class | Units |
| 002 | RES | 600 | Newtons |
| Max | Time | Min | Time |
| 2389.7 | 8.9 | -8.7 | 97.9 |

Test Program: ES2re Lumbar Spine Calibration
 ATD Serial No.: F035

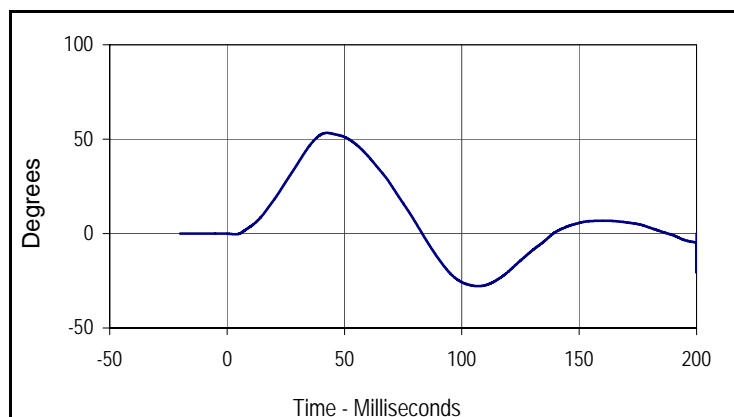
Test Date: 6/12/09
 Test I.D.: LS06C



| Tested Parameter | Units | Specification | Result | Pass/Fail | |
|--|----------|---------------|----------------|-----------|------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass | |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass | |
| Pendulum Velocity | m/s | 5.95 to 6.15 | 6.02 | Pass | |
| Pendulum Deceleration | 1 msec | m/s | 0.0 to -.050 | -0.035 | Pass |
| | 3.7 msec | m/s | -.240 to -.425 | -0.421 | Pass |
| | 27 msec | m/s | -5.80 to -6.50 | -6.10 | Pass |
| | 30 msec | m/s | < -6.50 | -6.48 | Pass |
| Headform Rotation | Max | Degrees | 45.0 to 55.0 | 53.3 | Pass |
| | Time | msec | 39.0 to 53.0 | 42.5 | Pass |
| Maximum Rotation To Time Zero Crossing | msec | 37.0 to 57.0 | 40.4 | Pass | |
| Overall Test Results | | | | Pass | |



| Curve Description | | | |
|-------------------|------|-----------|-------|
| Pendulum Velocity | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 180 | m/s |
| Max | Time | Min | Time |
| 0.0 | -1.0 | -7.5 | 125.4 |



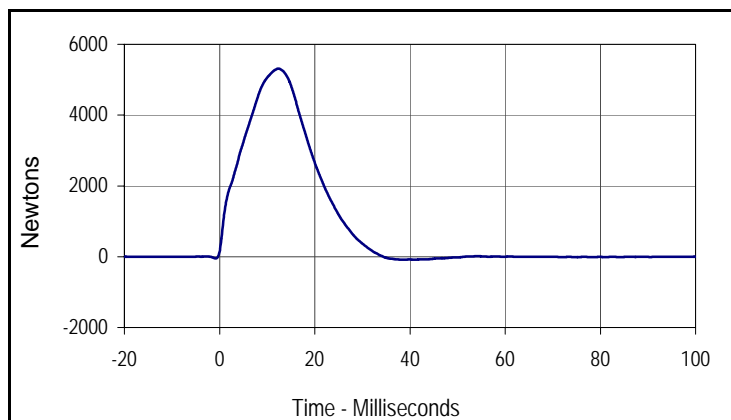
| Curve Description | | | |
|-------------------|------|-----------|---------|
| Headform Rotation | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIL | 180 | Degrees |
| Max | Time | Min | Time |
| 53.3 | 42.5 | -27.8 | 106.9 |

Test Program: ES2re Pelvis Calibration
 ATD Serial No.: F035

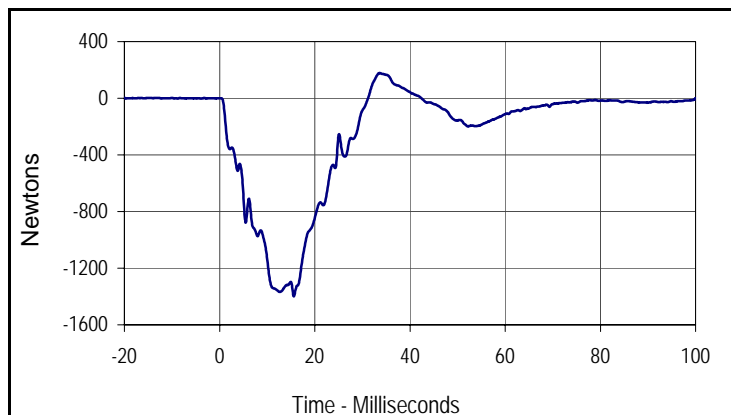
Test Date: 6/12/09
 Test I.D.: PL06C



| Tested Parameter | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|----------------|---------|-----------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Probe Velocity | m/s | 4.20 to 4.40 | 4.23 | Pass |
| Impactor Force | N | 4700 to 5400 | 5310.3 | Pass |
| | msec | 11.8 to 16.1 | 12.4 | Pass |
| Pubic Symphysis Load | N | -1230 to -1590 | -1399.5 | Pass |
| | msec | 12.2 to 17.0 | 15.6 | Pass |
| Overall Test Results | | | | Pass |



| Curve Description | | | |
|-------------------|------|-----------|---------|
| Impactor Force | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 180 | Newtons |
| Max | Time | Min | Time |
| 5310.3 | 12.4 | -86.9 | 38.2 |



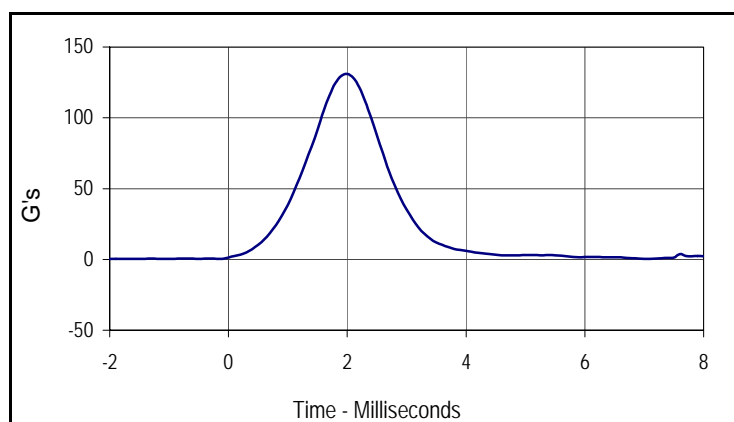
| Curve Description | | | |
|----------------------|------|-----------|---------|
| Pubic Symphysis Load | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIL | 600 | Newtons |
| Max | Time | Min | Time |
| 178.0 | 33.6 | -1399.5 | 15.6 |

Test Program: SID IIs Lateral Head Drop Calibration
 ATD Serial No.: 299

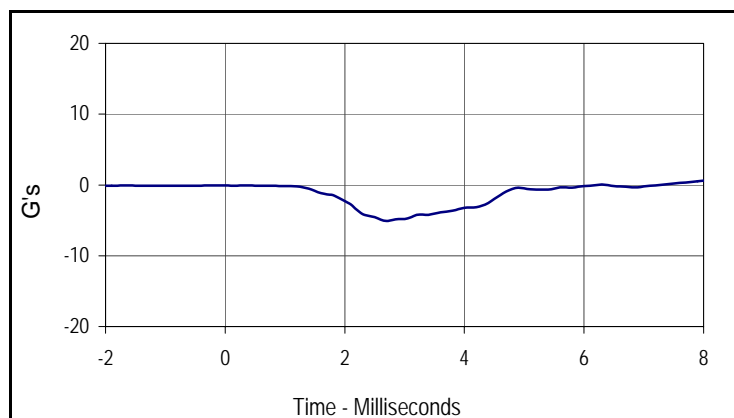
Test Date: 6/15/09
 Test I.D.: HD06C



| Tested Parameter | Units | Specification | Result | Pass/Fail |
|--------------------------------|--------|---------------|--------|-------------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Peak Resultant Acceleration | G's | 115 to 137 | 131.1 | Pass |
| Peak Longitudinal Acceleration | G's | ≤15 | 5.1 | Pass |
| Is Acceleration Unimodal? | Yes/No | Yes | Yes | Pass |
| Oscillations After Main Pulse | % | <15 | 2.4 | Pass |
| Overall Test Results | | | | Pass |



| Curve Description | | | |
|-------------------|------|-----------|-------|
| Head Resultant | | | |
| CURNO | Type | SAE Class | Units |
| 001 | RES | 1000 | G's |
| Max | Time | Min | Time |
| 131.1 | 2.0 | 0.4 | -0.2 |



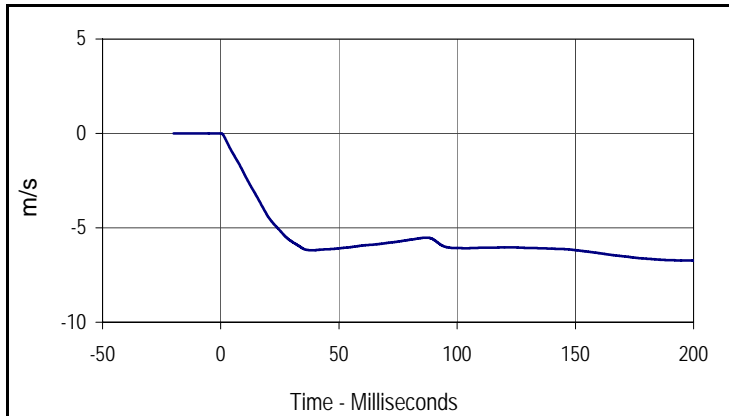
| Curve Description | | | |
|-------------------|------|-----------|-------|
| Head X | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIL | 1000 | G's |
| Max | Time | Min | Time |
| -0.1 | 0.4 | -5.1 | 2.7 |

Test Program: SID IIs Neck Calibration
 ATD Serial No.: 299

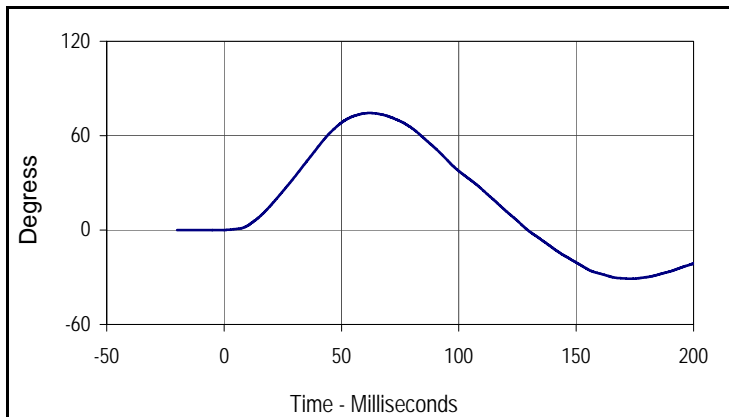
Test Date: 6/15/09
 Test I.D.: NB06C



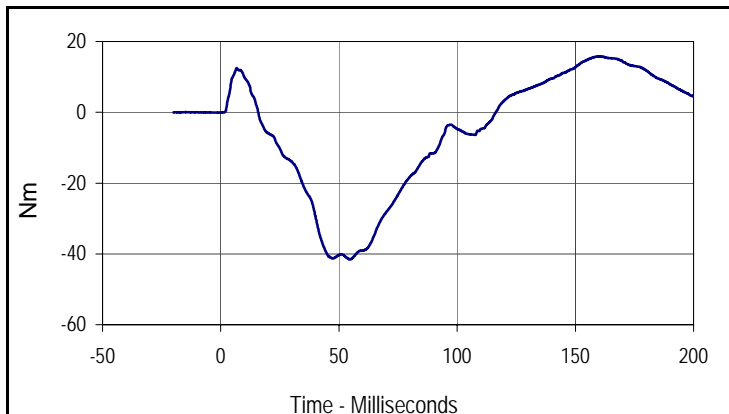
| Tested Parameter | Units | Specification | Result | Pass/Fail | |
|------------------------------------|-------------|----------------|----------------|-------------|------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass | |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass | |
| Pendulum Velocity | m/s | 5.51 to 5.63 | 5.58 | Pass | |
| Pendulum Deceleration | 10 msec | m/s | -2.20 to -2.80 | -2.3 | Pass |
| | 15 msec | m/s | -3.30 to -4.10 | -3.4 | Pass |
| | 20 msec | m/s | -4.40 to -5.40 | -4.5 | Pass |
| | 25 msec | m/s | -5.40 to -6.10 | -5.4 | Pass |
| | 25-100 msec | m/s | -5.50 to -6.20 | -6.18 | Pass |
| Translation-Rotation | Max | Degrees | 71.0 to 81.0 | 74.4 | Pass |
| | Time | msec | 50.0 to 70.0 | 61.7 | Pass |
| Peak Occipital Condyle Moment | Nm | -36.0 to -44.0 | -41.6 | Pass | |
| Decaying Moment Time to Cross 0 Nm | msec | 102.0 to 126.0 | 116.2 | Pass | |
| Overall Test Results | | | | Pass | |



| Curve Description | | | |
|-------------------|------|-----------|-------|
| Pendulum Velocity | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 180 | m/s |
| Max | Time | Min | Time |
| 0.0 | -0.5 | -6.7 | 199.8 |



| Curve Description | | | |
|------------------------------|------|-----------|--------|
| Maximum Translation Rotation | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIL | 60 | Degree |
| Max | Time | Min | Time |
| 74.4 | 61.7 | -31.0 | 173.2 |



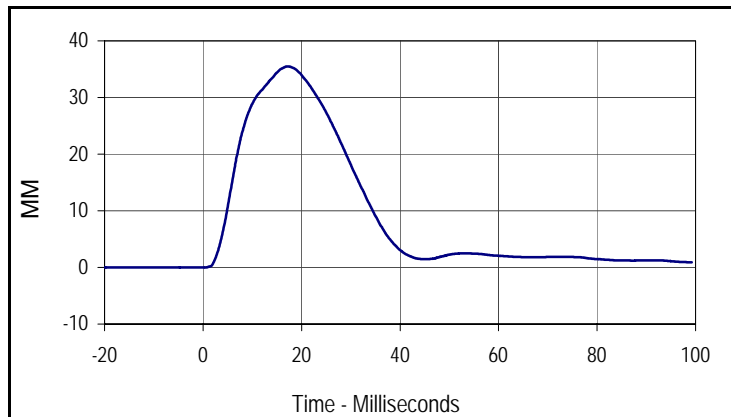
| Curve Description | | | |
|--------------------------------|-------|-----------|-------|
| Moment About Occipital Condyle | | | |
| CURNO | Type | SAE Class | Units |
| 003 | FIL | 600 | Nm |
| Max | Time | Min | Time |
| 15.8 | 159.1 | -41.6 | 54.5 |

Test Program: SID IIs Shoulder Calibration
 ATD Serial No.: 299

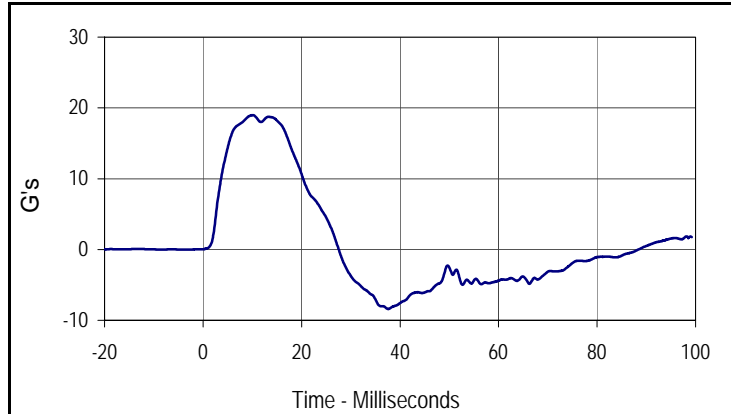
Test Date: 6/15/09
 Test I.D.: SH06D



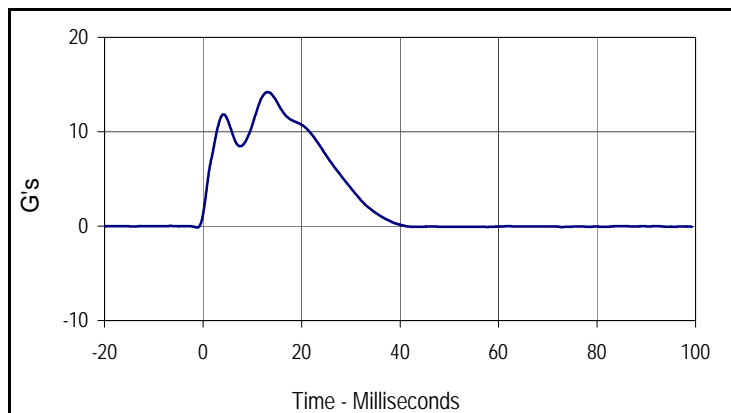
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Pendulum Velocity | m/s | 4.20 to 4.40 | 4.29 | Pass |
| Shoulder Deflection | MM | 28 to 37 | 35.5 | Pass |
| Peak Upper Spine Y Acceleration | G's | 17 to 22 | 19.0 | Pass |
| Peak Impactor Acceleration | G's | 13 to 18 | 14.2 | Pass |
| Overall Test Results | | | Pass | |



| Curve Description | | | |
|---------------------|------|-----------|-------|
| Shoulder Deflection | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 600 | MM |
| Max | Time | Min | Time |
| 35.5 | 17.2 | 0.0 | -11.9 |



| Curve Description | | | |
|----------------------------|------|-----------|-------|
| Upper Spine Y Acceleration | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIL | 180 | G's |
| Max | Time | Min | Time |
| 19.0 | 10.1 | -8.4 | 37.6 |



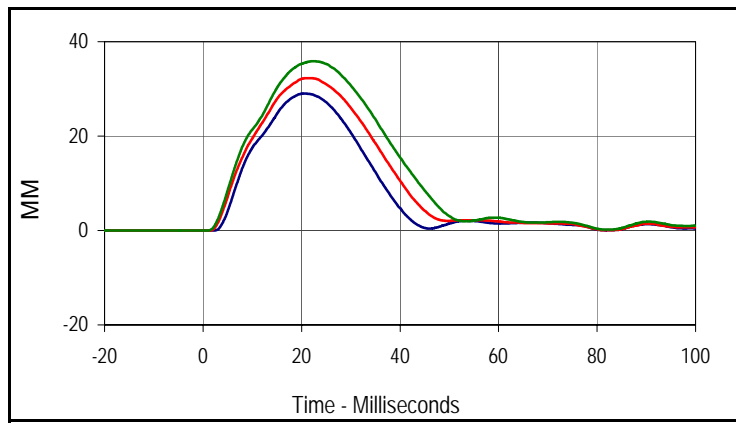
| Curve Description | | | |
|-----------------------|------|-----------|-------|
| Impactor Acceleration | | | |
| CURNO | Type | SAE Class | Units |
| 003 | FIL | 180 | G's |
| Max | Time | Min | Time |
| 14.2 | 13.1 | -0.1 | -1.2 |

Test Program: SID IIs Thorax with Arm Calibration
 ATD Serial No.: 299

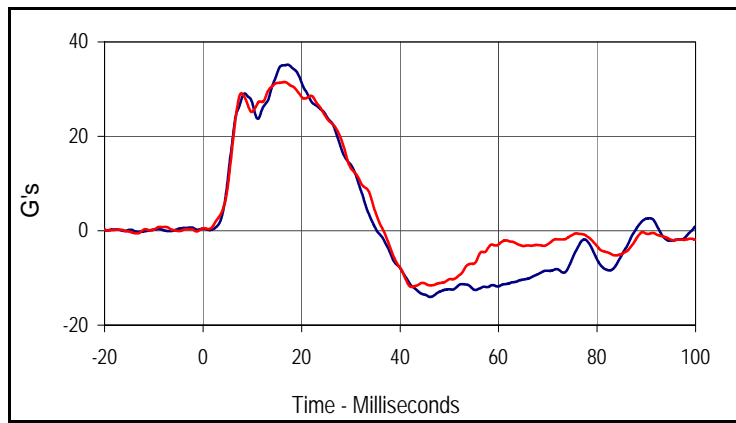
Test Date: 6/15/09
 Test I.D.: TH06C



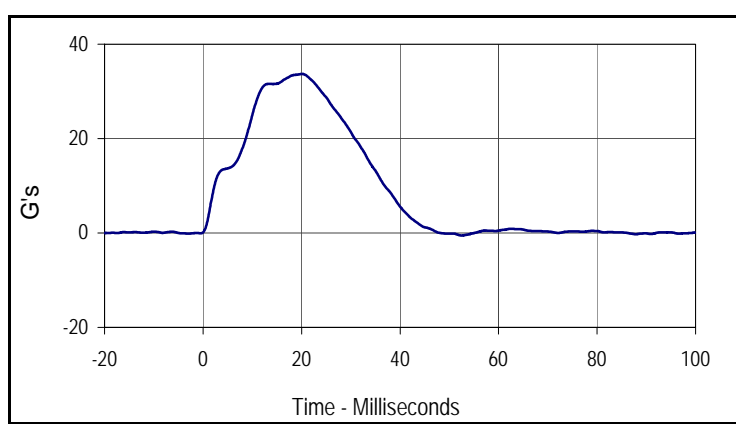
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Pendulum Velocity | m/s | 6.60 to 6.80 | 6.75 | Pass |
| Shoulder Deflection | MM | 31 to 40 | 36.3 | Pass |
| Upper Thorax Rib Deflection | MM | 26 to 32 | 29.0 | Pass |
| Middle Abdominal Rib Deflection | MM | 30 to 36 | 32.3 | Pass |
| Lower Abdominal Rib Deflection | MM | 32 to 38 | 35.9 | Pass |
| Peak Upper Spine Y Acceleration | G's | 34 to 43 | 35.2 | Pass |
| Peak Lower Spine Y Acceleration | G's | 28 to 35 | 31.5 | Pass |
| Peak Impactor Acceleration | G's | 31 to 36 | 33.7 | Pass |
| Overall Test Results | | | Pass | |



| Curve Description | | | |
|---------------------------------|------|-----------|-------|
| Upper Thorax Deflection | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 600 | MM |
| Max | Time | Min | Time |
| 29.0 | 20.6 | 0.0 | -18.4 |
| Middle Thorax Deflection | | | |
| Max | Time | Min | Time |
| 32.3 | 21.4 | 0.0 | -3.4 |
| Lower Thorax Deflection | | | |
| Max | Time | Min | Time |
| 35.9 | 22.3 | 0.0 | -19.5 |



| Curve Description | | | |
|-----------------------------------|------|-----------|-------|
| Upper Spine Y Acceleration | | | |
| CURNO | Type | SAE Class | Units |
| 004 | FIL | 180 | G's |
| Max | Time | Min | Time |
| 35.2 | 17.2 | -14.0 | 46.1 |
| Lower Spine Y Acceleration | | | |
| CURNO | Type | SAE Class | Units |
| 005 | FIL | 180 | G's |
| Max | Time | Min | Time |
| 31.5 | 16.5 | -11.9 | 42.3 |



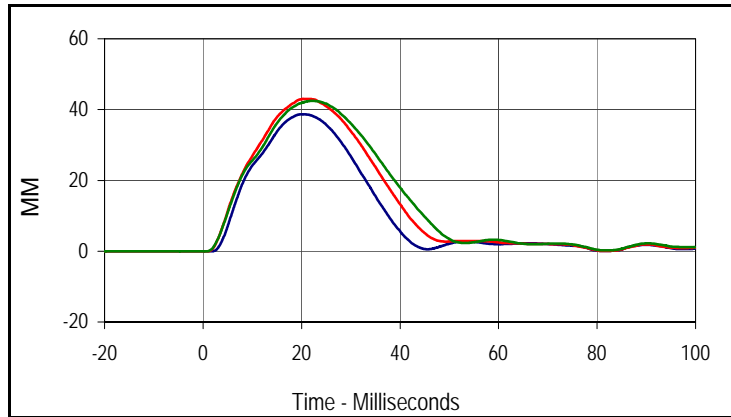
| Curve Description | | | |
|------------------------------|------|-----------|-------|
| Impactor Acceleration | | | |
| CURNO | Type | SAE Class | Units |
| 006 | FIL | 180 | G's |
| Max | Time | Min | Time |
| 33.7 | 20.1 | -0.5 | 52.5 |

Test Program: SID IIs Thorax w/o Arm Calibration
 ATD Serial No.: 299

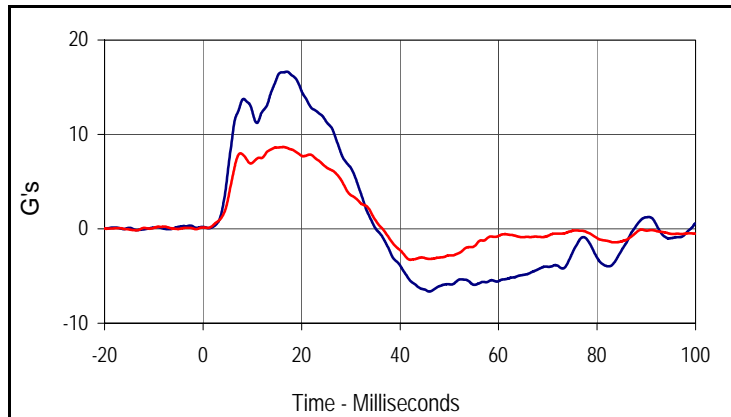
Test Date: 6/15/09
 Test I.D.: TA06C



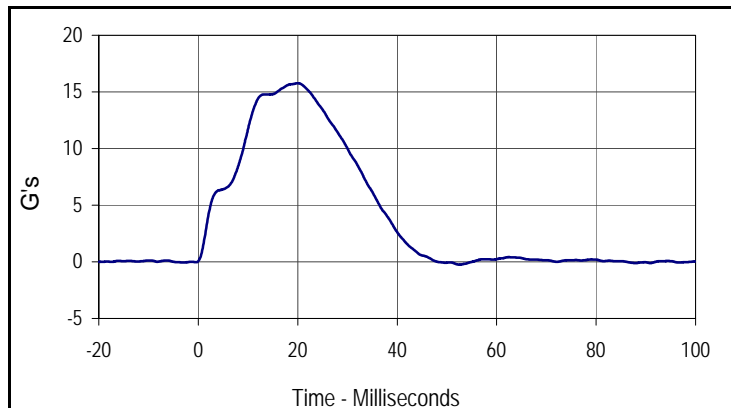
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Pendulum Velocity | m/s | 4.20 to 4.40 | 4.27 | Pass |
| Upper Thorax Rib Deflection | MM | 33 to 40 | 38.7 | Pass |
| Middle Abdominal Rib Deflection | MM | 39 to 45 | 43.0 | Pass |
| Lower Abdominal Rib Deflection | MM | 36 to 43 | 42.4 | Pass |
| Peak Upper Spine Y Acceleration | G's | 14 to 17 | 16.6 | Pass |
| Peak Lower Spine Y Acceleration | G's | 7 to 10 | 8.7 | Pass |
| Peak Impactor Acceleration | G's | 12 to 16 | 15.8 | Pass |
| Overall Test Results | | | Pass | |



| Curve Description | | | |
|---------------------------------|------|-----------|-------|
| Upper Thorax Deflection | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 600 | MM |
| Max | Time | Min | Time |
| 38.7 | 20.2 | 0.0 | -18.8 |
| Middle Thorax Deflection | | | |
| Max | Time | Min | Time |
| 43.0 | 21.0 | 0.0 | -3.8 |
| Lower Thorax Deflection | | | |
| Max | Time | Min | Time |
| 42.4 | 22.1 | 0.0 | -19.7 |



| Curve Description | | | |
|-----------------------------------|------|-----------|-------|
| Upper Spine Y Acceleration | | | |
| CURNO | Type | SAE Class | Units |
| 004 | FIL | 180 | G's |
| Max | Time | Min | Time |
| 16.6 | 17.0 | -6.6 | 45.9 |
| Lower Spine Y Acceleration | | | |
| CURNO | Type | SAE Class | Units |
| 005 | FIL | 180 | G's |
| Max | Time | Min | Time |
| 8.7 | 16.3 | -3.3 | 42.1 |



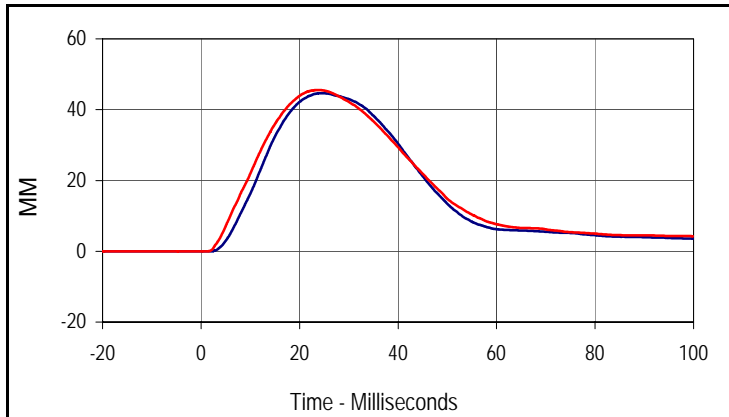
| Curve Description | | | |
|------------------------------|------|-----------|-------|
| Impactor Acceleration | | | |
| CURNO | Type | SAE Class | Units |
| 006 | FIL | 180 | G's |
| Max | Time | Min | Time |
| 15.8 | 20.1 | -0.2 | 52.5 |

Test Program: SID IIs Abdomen Calibration
 ATD Serial No.: 299

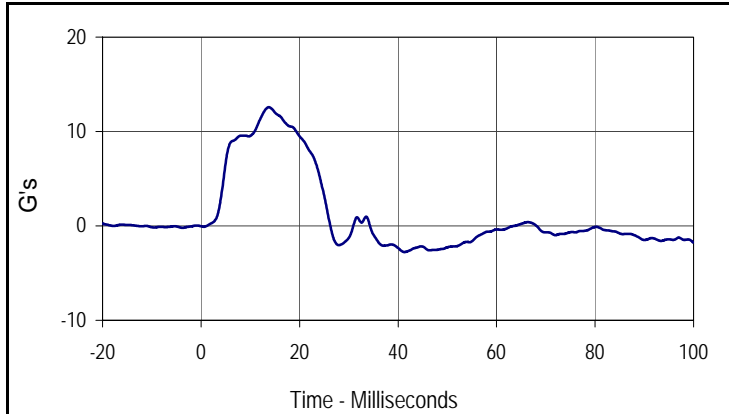
Test Date: 6/15/09
 Test I.D.: AB06C



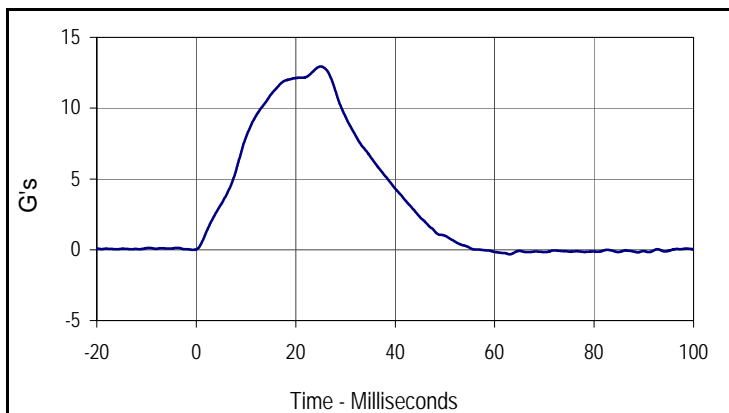
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Pendulum Velocity | m/s | 4.30 to 4.50 | 4.37 | Pass |
| Upper Abdominal Rib Deflection | MM | 39 to 47 | 44.7 | Pass |
| Lower Abdominal Rib Deflection | MM | 37 to 46 | 45.5 | Pass |
| Peak Lower Spine Y Acceleration | G's | 11 to 14 | 12.6 | Pass |
| Peak Impactor Acceleration | G's | 12 to 16 | 12.9 | Pass |
| Overall Test Results | | | Pass | |



| Curve Description | | | |
|--------------------------------|------|-----------|-------|
| Upper Abdominal Rib Deflection | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 600 | MM |
| Max | Time | Min | Time |
| 44.7 | 24.6 | 0.0 | 1.3 |
| Curve Description | | | |
| Lower Abdominal Rib Deflection | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIL | 600 | MM |
| Max | Time | Min | Time |
| 45.5 | 24.0 | 0.0 | -20.0 |



| Curve Description | | | |
|----------------------------|------|-----------|-------|
| Lower Spine Y Acceleration | | | |
| CURNO | Type | SAE Class | Units |
| 003 | FIL | 180 | G's |
| Max | Time | Min | Time |
| 12.6 | 13.8 | -2.8 | 41.3 |



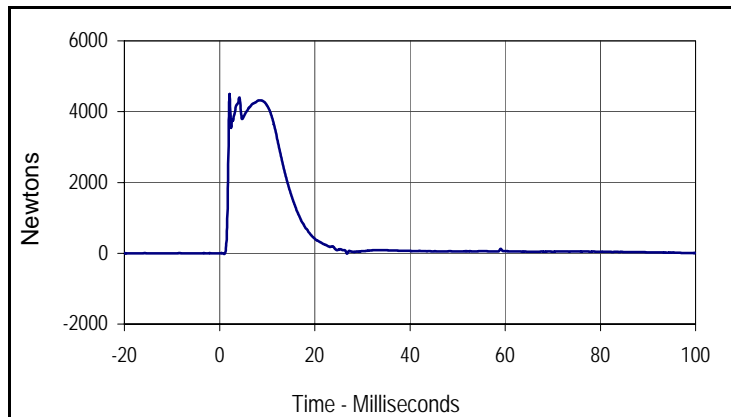
| Curve Description | | | |
|-----------------------|------|-----------|-------|
| Impactor Acceleration | | | |
| CURNO | Type | SAE Class | Units |
| 004 | FIL | 180 | G's |
| Max | Time | Min | Time |
| 12.9 | 25.0 | -0.3 | 63.0 |

Test Program: SID IIs Pelvis Acetabulum Calibration
 ATD Serial No.: 299

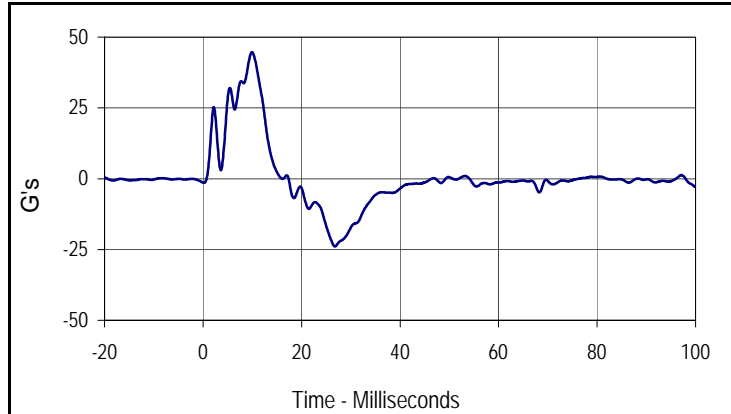
Test Date: 6/15/09
 Test I.D.: PA06C



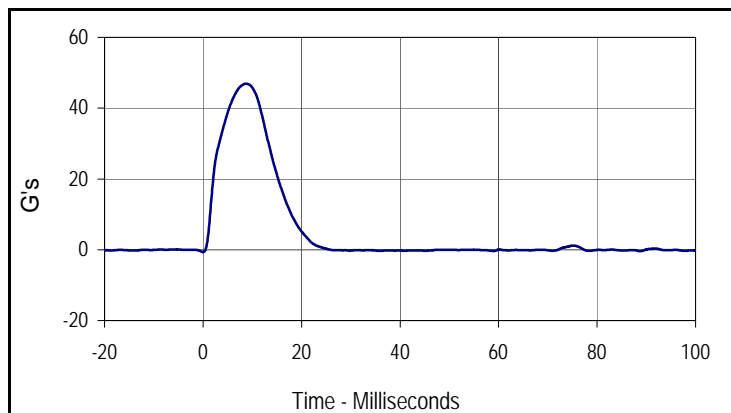
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|------------------------------|---------|---------------|--------|-----------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Pendulum Velocity | m/s | 6.60 to 6.80 | 6.63 | Pass |
| Peak Acetabulum Force | Newtons | 3800 to 4600 | 4502.3 | Pass |
| Peak Pelvis Y Acceleration | G's | 41 to 50 | 44.7 | Pass |
| Peak Impactor Acceleration | G's | 38 to 47 | 46.9 | Pass |
| Overall Test Results | | | Pass | |



| Curve Description | | | |
|-------------------------|------|-----------|---------|
| Pelvis Acetabulum Force | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 600 | Newtons |
| Max | Time | Min | Time |
| 4502.3 | 2.1 | -16.9 | 1.0 |



| Curve Description | | | |
|-----------------------|------|-----------|-------|
| Pelvis Y Acceleration | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIL | 180 | G's |
| Max | Time | Min | Time |
| 44.7 | 9.9 | -23.9 | 26.8 |



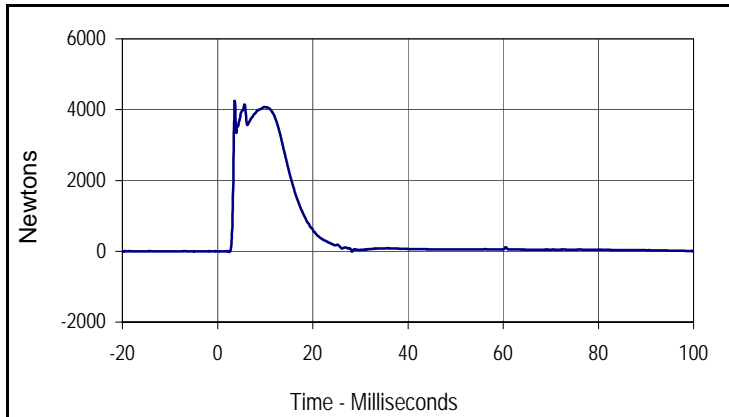
| Curve Description | | | |
|-----------------------|------|-----------|-------|
| Impactor Acceleration | | | |
| CURNO | Type | SAE Class | Units |
| 003 | FIL | 180 | G's |
| Max | Time | Min | Time |
| 46.9 | 8.7 | -0.7 | 0.0 |

Test Program: SID IIs Pelvis Iliac Calibration
 ATD Serial No.: 299

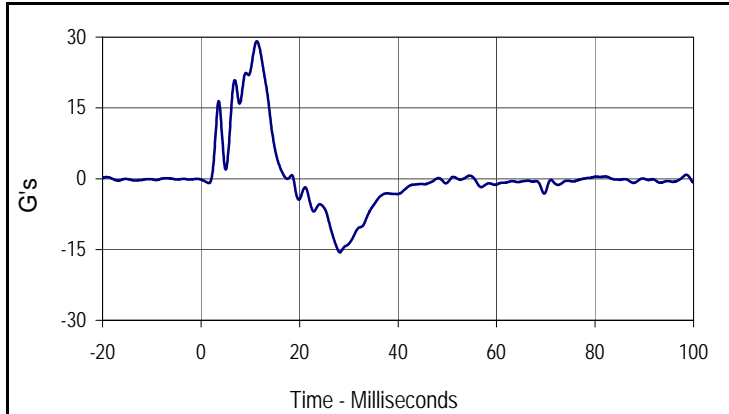
Test Date: 6/15/09
 Test I.D.: PI06C



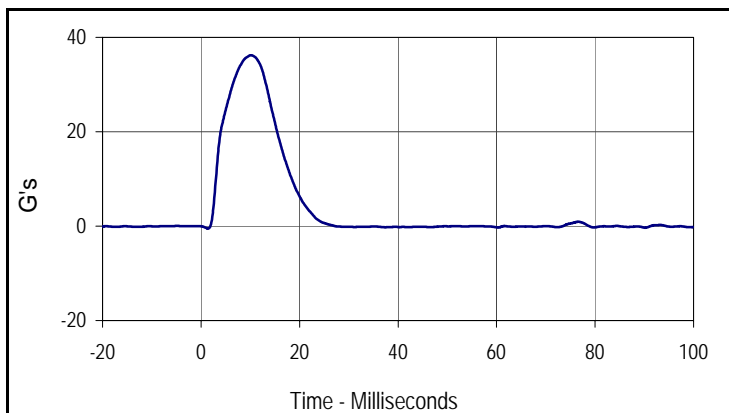
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|------------------------------|---------|---------------|--------|-----------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Pendulum Velocity | m/s | 4.2 to 4.4 | 4.23 | Pass |
| Peak Iliac Force | Newtons | 3700 to 4500 | 4242.0 | Pass |
| Peak Pelvis Y Acceleration | G's | 27 to 33 | 29.1 | Pass |
| Peak Impactor Acceleration | G's | 34 to 40 | 36.2 | Pass |
| Overall Test Results | | | Pass | |



| Curve Description | | | |
|--------------------|------|-----------|---------|
| Pelvis Iliac Force | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 600 | Newtons |
| Max | Time | Min | Time |
| 4242.0 | 3.6 | -15.9 | 2.5 |



| Curve Description | | | |
|-----------------------|------|-----------|-------|
| Pelvis Y Acceleration | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIL | 180 | G's |
| Max | Time | Min | Time |
| 29.1 | 11.3 | -15.6 | 28.2 |



| Curve Description | | | |
|-----------------------|------|-----------|-------|
| Impactor Acceleration | | | |
| CURNO | Type | SAE Class | Units |
| 003 | FIL | 180 | G's |
| Max | Time | Min | Time |
| 36.2 | 10.1 | -0.5 | 1.4 |