

**REPORT NUMBER: SINCAP-KAR-14-028**

**NEW CAR ASSESSMENT PROGRAM (NCAP)  
MOVING DEFORMABLE BARRIER SIDE IMPACT TEST**

**KIA MOTORS CORPORATION  
2015 KIA SEDONA L 5-DOOR MPV**

**NHTSA No: M20154202**

**PREPARED BY:  
KARCO ENGINEERING, LLC.  
9270 HOLLY ROAD  
ADELANTO, CA 92301**



**MARCH 24, 2015**

**FINAL REPORT**

**PREPARED FOR:  
U.S. DEPARTMENT OF TRANSPORTATION  
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION  
OFFICE OF CRASHWORTHINESS STANDARDS  
MAIL CODE: NVS-111  
1200 NEW JERSEY AVE, SE, ROOM W43-410  
WASHINGTON, D.C. 20590**



# TECHNICAL REPORT DOCUMENTATION PAGE

|                                                                                                                                                                                                                                                            |                                    |                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|----------------------------------------------------------------------------------------|
| <b>1. Report No.</b><br>SINCAP-KAR-14-028                                                                                                                                                                                                                  | <b>2. Government Accession No.</b> | <b>3. Recipient's Catalog No.</b>                                                      |
| <b>4. Title and Subtitle</b><br>Final Report of New Car Assessment Program<br>Side Impact MDB Testing of a 2015 Kia Sedona L 5-Door MPV<br>NHTSA No. M20154202                                                                                             |                                    | <b>5. Report Date</b><br>March 24, 2015                                                |
|                                                                                                                                                                                                                                                            |                                    | <b>6. Performing Organization Code</b><br>KAR                                          |
| <b>7. Authors</b><br>Mr. Steven D. Matsusaka, Engineering Department Supervisor, KARCO<br>Mr. Frank Richardson, Program Manager, KARCO                                                                                                                     |                                    | <b>8. Performing Organization Report No.</b><br>TR-P34003-13-NC                        |
| <b>9. Performing Organization Name and Address</b><br>KARCO Engineering, LLC.<br>9270 Holly Rd.<br>Adelanto, CA 92301                                                                                                                                      |                                    | <b>10. Work Unit No.</b>                                                               |
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| <b>15. Supplementary Notes</b>                                                                                                                                                                                                                             |                                    |                                                                                        |

## **16. Abstract**

A 55/28 km/h 90 deg. Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2015 Kia Sedona L 5-door MPV 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 the KARCO Engineering, LLC. facility in Adelanto, California on March 10, 2015.

The impact velocity of the Moving Deformable Barrier was 62.07 km/h and the outside ambient temperature at the struck (driver's) side of the vehicle was 25.6° C. The target vehicle's maximum post-test static crush was 209 mm located at level 2 and 3. The test vehicle's occupant performance data is as follows:

| Measurement Description                   | Driver ATD (ES-2re) |      |        |
|-------------------------------------------|---------------------|------|--------|
|                                           | Units               | IARV | Result |
| Head Injury Criteria (HIC <sub>36</sub> ) |                     | 1000 | 29.0   |
| Maximum Thoracic Rib Deflection           | mm                  | 44   | 14     |
| Total Abdominal Force                     | N                   | 2500 | 435    |
| Pubic Symphysis Force                     | N                   | 6000 | 1126   |

| Measurement Description                                 | Passenger ATD (SID-IIs) |      |        |
|---------------------------------------------------------|-------------------------|------|--------|
|                                                         | Units                   | IARV | Result |
| Head Injury Criteria (HIC <sub>36</sub> )               |                         | 1000 | 130.7  |
| Resultant Lower Spine Acceleration                      | g                       | 82   | 46     |
| Total Pelvic Force (Sum of Acetubular and Iliac Forces) | N                       | 5525 | 2936   |
| Maximum Thoracic Rib Deflection                         | mm                      | 38*  | 22     |
| Maximum Abdominal Rib Deflection                        | mm                      | 45*  | 7      |

The two doors on the struck side of the vehicle did not separate from the body at the hinges or latches. The opposite side doors did not open during the side impact event.

\* Proposed IARV

|                                                                                                                                  |                                                                 |                                                                                                                                                                                                                                                                                                                                  |                  |
|----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>17. Key Words</b><br>New Car Assessment Program (NCAP)<br>Side Impact<br>Moving Deformable Barrier (MDB)<br>ES-2re<br>SID-IIs |                                                                 | <b>18. Distribution Statement</b><br>Copies of this report are available from:<br>National Highway Traffic Safety Administration<br>Technical Information Services Division, NPO-411<br>1200 New Jersey Ave., SE<br>Washington, DC 20590<br>e-mail: <a href="mailto:tis@nhtsa.dot.gov">tis@nhtsa.dot.gov</a><br>FAX 202-493-2833 |                  |
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## **SECTION 1**

### **TEST PURPOSE AND PROCEDURE**

This moving deformable barrier side impact test is part of the MY2015 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract number DTNH22-09-D-00122. The purpose of this test is to generate comparative side impact performance in a 2015 Kia Sedona L 5-door MPV. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated September 2013.

## **SECTION 2**

### **SUMMARY OF TEST RESULTS**

A 2015 Kia Sedona L 5-door MPV 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 62.07 km/h (38.57 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 March 10, 2015. Pre- and post-test photographs of the test vehicle, the MDB and the dummies (ES-2re and SID-IIs) are included in Appendix A of 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 September 2013. The side impact event was documented by 11 cameras. Camera locations are included in Data Sheet No. 5 of this report.

The dummy was instrumented in the following manner:

**DRIVER ATD (ES-2re)**

Primary and redundant head CG tri-axial accelerometers

Chest upper rib, middle rib and lower rib y-axis displacement potentiometers

Abdomen forward, middle, and rear y-axis load cells

Lower spine (12) tri-axial accelerometers

Pubic symphysis y-axis load cell

**PASSENGER ATD (SID-IIs)**

Primary and redundant head CG tri-axial accelerometers

Chest upper rib, middle rib and lower rib y-axis displacement potentiometers

Abdomen upper rib and lower rib y-axis displacement potentiometers

Lower spine (12) tri-axial accelerometers

Acetabulum and iliac wing y-axis load cells

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

Dummy injury readings were recorded as follows:

| Measurement Description                   | Units | Driver ATD (ES-2re) |        |
|-------------------------------------------|-------|---------------------|--------|
|                                           |       | Threshold           | Result |
| Head Injury Criteria (HIC <sub>36</sub> ) |       | 1000                | 29.0   |
| Maximum Thoracic Rib Deflection           | mm    | 44                  | 14     |
| Combined Abdominal Force                  | N     | 2500                | 435    |
| Pubic Symphysis Force                     | N     | 6000                | 1126   |

| Measurement Description                                 | Units | Passenger ATD (SID-IIs) |        |
|---------------------------------------------------------|-------|-------------------------|--------|
|                                                         |       | Threshold               | Result |
| Head Injury Criteria (HIC <sub>36</sub> )               |       | 1000                    | 130.7  |
| Lower Spine (T12) Resultant Acceleration                | g     | 82                      | 46     |
| Total Pelvic Force (sum of acetabular and iliac forces) | N     | 5525                    | 2936   |
| Maximum Thoracic Rib Deflection                         | mm    | 38*                     | 22     |
| Maximum Abdominal Rib Deflection                        | mm    | 45*                     | 7      |

\*Proposed IARV

Supplemental restraint information is given below:

| Restraint Type               | Left Front (Driver)<br>Occupant Location 1 |          | Left Rear (Passenger)<br>Occupant Location 4 |          |
|------------------------------|--------------------------------------------|----------|----------------------------------------------|----------|
|                              | Mounted                                    | Deployed | Mounted                                      | Deployed |
| Frontal Airbag               | Yes                                        | No       | No                                           |          |
| Knee Airbag                  | No                                         |          | No                                           |          |
| Side Airbag 1 (Curtain)      | Yes                                        | Yes      | Yes                                          | Yes      |
| Side Airbag 2 (Torso/Pelvis) | Yes                                        | Yes      | No                                           |          |
| Seat Belt Pretensioner       | Yes                                        | Yes      | No                                           |          |
| Seat Belt Load Limiter       | Yes                                        | Yes      | No                                           |          |
| Other                        | No                                         |          | No                                           |          |

## GENERAL COMMENTS

The two doors on the struck side of the vehicle remained closed and latched. There was no separation at the hinges or latches. The doors on the non-struck side remained closed and latched. There were no ATD values that exceeded limits.

### SECTION 3

#### OCCUPANT AND VEHICLE INFORMATION/DATA SHEETS

Test Vehicle: 2015 Kia Sedona L 5-Door MPV NHTSA No. M20154202  
Test Program: NCAP MDB Side Impact Test Test Date: 03/10/15

#### 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          | 29.574            |
| Pressure           | Tire Pressures      | lbf/in <sup>2</sup> | kPa         | 6.895             |
| Temperature        | General Use         | °F                  | °C          | $=(T_f - 32)/1.8$ |
| Force              | Dynamic Forces      | lbf                 | N           | 4.448             |
| Moment             | Torque              | lbf-ft              | N•m         | 1.355             |

# DATA SHEET NO. 1

## GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2015 Kia Sedona L 5-Door MPV NHTSA No. M20154202  
 Test Program: NCAP MDB Side Impact Test Test Date: 03/10/15

## TEST VEHICLE INFORMATION AND OPTIONS

|                            |                   |
|----------------------------|-------------------|
| NHTSA Number               | M20154202         |
| Model Year                 | 2015              |
| Make                       | Kia               |
| Model                      | Sedona L          |
| Body Style                 | 5-Door MPV        |
| VIN                        | KNDMA5C16F6024907 |
| Body Color                 | Bright Silver     |
| Odometer Reading (km / mi) | 257 / 160         |
| Engine Displacement (L)    | 3.3               |
| Type / No. of Cylinders    | V6                |
| Engine Placement           | Transverse        |
| Transmission Type          | Automatic         |
| Transmission Speeds        | 6                 |
| Overdrive                  | Yes               |
| Final Drive                | Front             |
| Roof Rack                  | No                |
| Sunroof / T-Top            | No                |
| Running Boards             | No                |
| Tilt Steering Wheel        | Yes               |
| Power Seats                | No                |
| Anti-Lock Brakes (ABS)     | Yes               |

|                                   |     |
|-----------------------------------|-----|
| Traction Control System (TCS)     | Yes |
| Auto-Leveling System              | No  |
| Automatic Door Locks              | Yes |
| Power Window Auto-Reverse         | Yes |
| Other Optional Feature            | No  |
| Driver Front Airbag               | Yes |
| Driver Curtain Airbag             | Yes |
| Driver Head/Torso Airbag          | No  |
| Driver Torso Airbag               | No  |
| Driver Torso/Pelvis Airbag        | Yes |
| Driver Pelvis Airbag              | No  |
| Driver Knee Airbag                | No  |
| Rear Pass. Curtain Airbag         | Yes |
| Rear Pass. Head/Torso Airbag      | No  |
| Rear Pass. Torso Airbag           | No  |
| Rear Pass. Torso/Pelvis Airbag    | No  |
| Rear Pass. Pelvis Airbag          | No  |
| Driver Seat Belt Pretensioner     | Yes |
| Rear Pass. Seat Belt Pretensioner | No  |
| Driver Load Limiter               | Yes |
| Rear Pass. Load Limiter           | No  |
| Other Safety Restraint            | No  |

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

No

## DATA FROM CERTIFICATION LABEL

|                     |                        |
|---------------------|------------------------|
| Manufactured By     | Kia Motors Corporation |
| Date of Manufacture | Sep-14                 |
| Vehicle Type        | MPV                    |

|                 |      |
|-----------------|------|
| GVWR (kg)       | 2760 |
| GAWR Front (kg) | 1390 |
| GAWR Rear (kg)  | 1390 |

## VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

| Measured Parameter          | Front | Rear | Third | Total |
|-----------------------------|-------|------|-------|-------|
| Designated Seating Capacity | 2     | 2    | 3     | 7     |
| Capacity Weight (VCW) (kg)  |       |      |       | 525.0 |
| DSC x 68.04 (kg)            |       |      |       | 476.3 |
| Cargo Weight (RCLW) (kg)    |       |      |       | 48.7  |

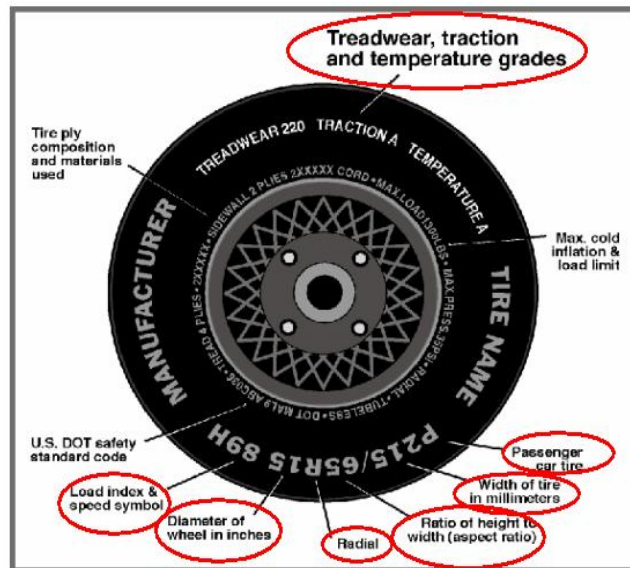
## VEHICLE SEAT TYPE

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

## DATA SHEET NO. 1 ... (CONTINUED)

### GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2015 Kia Sedona L 5-Door MPV NHTSA No. M20154202  
 Test Program: NCAP MDB Side Impact Test Test Date: 03/10/15



| Measured Parameter       | Front                         | Rear                          |
|--------------------------|-------------------------------|-------------------------------|
| Max. Tire Pressure (kpa) | 300                           | 300                           |
| Cold Pressure (kPa)      | 240                           | 240                           |
| Recommended Tire Size    | 235/65R17                     | 235/65R17                     |
| Tire Size on Vehicle     | 235/65R17                     | 235/65R17                     |
| Tire Manufacturer        | Kumho                         | Kumho                         |
| Tire Model               | Crugen                        | Crugen                        |
| Treadware                | 440                           | 440                           |
| Traction Grade           | A                             | A                             |
| Temperature Grade        | A                             | A                             |
| Tire Plies Sidewall      | 2 Polyester                   | 2 Polyester                   |
| Tire Plies Body          | 2 Steel, 2 Polyester, 1 Nylon | 2 Steel, 2 Polyester, 1 Nylon |
| Load Index/Speed Symbol  | 104H                          | 104H                          |
| Tire Material            | Steel, Polyester, Nylon       | Steel, Polyester, Nylon       |
| DOT Safety Code Left     | H25A YANH 3614                | H25A YANH 3614                |
| DOT Safety Code Right    | H25A YANH 3614                | H25A YANH 3614                |

# DATA SHEET NO. 1 ... (CONTINUED)

## GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2015 Kia Sedona L 5-Door MPV NHTSA No. M20154202  
 Test Program: NCAP MDB Side Impact Test Test Date: 03/10/15

### TIRE PRESSURES

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

### MDB TIRE SPECIFICATIONS

|               | Units | Requirement | LF         | RF         | LR         | RR         |
|---------------|-------|-------------|------------|------------|------------|------------|
| Tire Size     |       | P205/75R15  | P205/75R15 | P205/75R15 | P205/75R15 | P205/75R15 |
| Tire Pressure | kPa   | 200 ± 21    | 200        | 200        | 200        | 200        |

### TEST VEHICLE AXLE WEIGHTS

|       | Units | As Delivered (UVW) |       |        | As Tested (ATW) |       |        | Fully Loaded |       |        |
|-------|-------|--------------------|-------|--------|-----------------|-------|--------|--------------|-------|--------|
|       |       | Front              | Rear  | Total  | Front           | Rear  | Total  | Front        | Rear  | Total  |
| Left  | kg    | 595.5              | 439.0 |        | 642.5           | 512.5 |        | 642.5        | 515.5 |        |
| Right | kg    | 556.5              | 420.5 |        | 563.0           | 459.0 |        | 562.0        | 465.0 |        |
| Ratio | %     | 57.3%              | 42.7% | 100.0% | 55.4%           | 44.6% | 100.0% | 55.1%        | 44.9% | 100.0% |
| Total | kg    | 1152.0             | 859.5 | 2011.5 | 1205.5          | 971.5 | 2177.0 | 1204.5       | 980.5 | 2185.0 |

### TARGET TEST WEIGHT CALCULATION

| Measured Parameter                  | Units | Value  |       |
|-------------------------------------|-------|--------|-------|
| Total Delivered Weight (UVW)        | kg    | 2011.5 | A     |
| Actual Weight of 2 P572 ATDs Used   | kg    | 125.0  | B     |
| Rated Cargo/Luggage Wt (RCLW)       | kg    | 48.7   | C     |
| Calculated Vehicle Target Wt (TVTW) | kg    | 2185.2 | A+B+C |

Does the measured As Tested Vehicle Weight lie within the required weight range (i.e. Calculated Test Vehicle Target Weight -4.5 kg to -9.0 kg)? ☒ Yes ☐ No

### TEST VEHICLE ATTITUDE AND CG

| Measurement Description                                      | Units | Fully Loaded | As Tested | Meets Requirement*** |
|--------------------------------------------------------------|-------|--------------|-----------|----------------------|
| LF                                                           | mm    | 775          | 773       | Yes                  |
| RF                                                           | mm    | 777          | 779       | Yes                  |
| LR                                                           | mm    | 775          | 770       | Yes                  |
| RR                                                           | mm    | 778          | 777       | Yes                  |
| Vehicle CG (Aft of Front Axle)                               | mm    | 1372         | 1365      |                      |
| Vehicle CG (Left (+)/Right (-) from Longitudinal Centerline) | mm    | 52           | 53        |                      |

\*\*\*The "As Tested" vehicle attitude measurements must be equal to or within ±10 mm of the "Fully Loaded" vehicle attitude measurements at each wheel well. Indicate "Yes" or "No" for "Meets Requirement"

**DATA SHEET NO. 1 ... (CONTINUED)**

**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2015 Kia Sedona L 5-Door MPV NHTSA No. M20154202  
Test Program: NCAP MDB Side Impact Test Test Date: 03/10/15

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

| Component Description           | Weight (kg) |
|---------------------------------|-------------|
| Tail Lights                     | 3.0         |
| Spare Tire Tools                | 5.0         |
| Non-Struck Side Outboard Mirror | 2.0         |
|                                 |             |
| Ballast / Equipment Added       | 59.5        |

|                                                |  |
|------------------------------------------------|--|
| Test Height Adjustable Setting (If Applicable) |  |
|------------------------------------------------|--|

**DATA SHEET NO. 2****SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT, AND FUEL SYSTEM DATA**Test Vehicle: 2015 Kia Sedona L 5-Door MPV NHTSA No. M20154202Test Program: NCAP MDB Side Impact Test Test Date: 03/10/15**SEAT POSITIONING**

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

**SCRL ANGLE RANGE**

| Seat                      | SCRL (°) |       |       |
|---------------------------|----------|-------|-------|
|                           | Max      | Min   | Mid   |
| Driver Seat               | 2.6      | 0.0   | 1.3   |
| Front Passenger Seat      | Fixed    | Fixed | Fixed |
| Front Center Seat         |          |       |       |
| Struck Side Rear Seat     | Fixed    | Fixed | Fixed |
| Non-Struck Side Rear Seat | Fixed    | Fixed | Fixed |
| Rear Center Seat          |          |       |       |

**SEAT HEIGHT AND ANGLE**

| Seat                      | As Tested SCRL Angle | As Tested SCRP Height | SCRP Height Position | SCRP Height (mm) |              |             |
|---------------------------|----------------------|-----------------------|----------------------|------------------|--------------|-------------|
|                           |                      |                       |                      | Rearmost         | Mid Fore/Aft | Forwardmost |
| Driver Seat               | 1.3                  | 598                   | Max                  | 638              | 644          | 651         |
|                           |                      |                       | Mid                  | 615              | 621          | 628         |
|                           |                      |                       | Min                  | 591              | 598          | 604         |
| Front Passenger Seat      | Fixed                | 617                   | Max                  | 610              | 617          | 623         |
|                           |                      |                       | Mid                  | 610              | 617          | 623         |
|                           |                      |                       | Min                  | 610              | 617          | 623         |
| Front Center Seat         |                      |                       | Max                  |                  |              |             |
|                           |                      |                       | Mid                  |                  |              |             |
|                           |                      |                       | Min                  |                  |              |             |
| Struck Side Rear Seat     | Fixed                | 625                   | Max                  | 625              | 619          | 614         |
|                           |                      |                       | Mid                  | 625              | 619          | 614         |
|                           |                      |                       | Min                  | 625              | 619          | 614         |
| Non-Struck Side Rear Seat | Fixed                | 648                   | Max                  | 648              | 643          | 639         |
|                           |                      |                       | Mid                  | 648              | 643          | 639         |
|                           |                      |                       | Min                  | 648              | 643          | 639         |
| Rear Center Seat          |                      |                       | Max                  |                  |              |             |
|                           |                      |                       | Mid                  |                  |              |             |
|                           |                      |                       | Min                  |                  |              |             |

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

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

Test Vehicle: 2015 Kia Sedona L 5-Door MPV NHTSA No. M20154202  
 Test Program: NCAP MDB Side Impact Test Test Date: 03/10/15

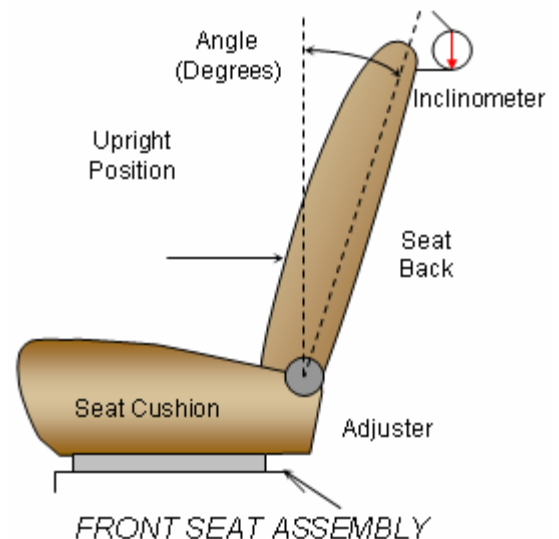
#### SEAT FORE/AFT POSITION

| Seat                      | Total Fore/Aft Travel |          | Test Position From Forwardmost Position |         |
|---------------------------|-----------------------|----------|-----------------------------------------|---------|
|                           | mm                    | Detents* | mm                                      | Detent* |
| Driver Seat               | 242                   | 61       | 121                                     | 30      |
| Front Passenger Seat      | 220                   | 56       | 110                                     | 28      |
| Front Center Seat         |                       |          |                                         |         |
| Struck Side Rear Seat     | 200                   | 10       | 100                                     | 5       |
| Non-Struck Side Rear Seat | 200                   | 10       | 100                                     | 5       |
| Rear Center Seat          |                       |          |                                         |         |

\*Detent zero (0) is the forward most detent

#### SEAT BACK ADJUSTMENT

The driver's seat back is positioned to the manufacturer's designated design angle. The right front passenger's seat back is positioned in a similar manner as the driver's seat back. The struck side rear seat back is positioned such that the dummy's head is level. The rear center and non-struck side rear outboard seat backs are positioned in a similar manner as the struck side rear seat back. Seat back angle is measured at the headrest post.



#### SEAT BACK POSITION

| Seat                                 | Total Seat Back Angle Range |          | Test Position from Most Upright |         |
|--------------------------------------|-----------------------------|----------|---------------------------------|---------|
|                                      | Degrees                     | Detents* | Degree                          | Detent* |
| Driver Seat w/Seated Dummy           | 60.5                        | 30       | 1.4                             | 10      |
| Front Passenger Seat                 | 61.7                        | 31       | 1.2                             |         |
| Front Center Seat                    |                             |          |                                 |         |
| Struck Side Rear Seat w/Seated Dummy | 29.6                        | 15       | 6.0                             | 0       |
| Non-Struck Side Rear Seat            | 30.0                        | 15       | 6.1                             | 0       |
| Rear Center Seat                     |                             |          |                                 |         |

\*Detent zero (0) is the forward most detent

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

Test Vehicle: 2015 Kia Sedona L 5-Door MPV NHTSA No. M20154202  
 Test Program: NCAP MDB Side Impact Test Test Date: 03/10/15

**SEAT BELT ANCHORAGE ADJUSTMENT**

Seat belt anchorages are adjusted in accordance with the information provided by the manufacturer on Form No. 1. The positions are marked H, M1,..., L from top to bottom.

|             | Total No. of Positions | Placed in Position |
|-------------|------------------------|--------------------|
| Driver Seat | 3                      | H                  |
| Rear Seat   | 3                      | H                  |

**HEAD RESTRAINT ADJUSTMENT**

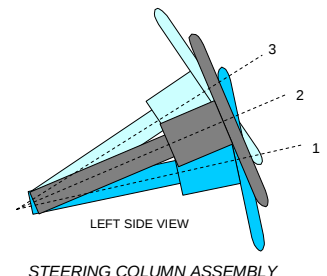
The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

|             | Total No. of Positions | Placed in Position |
|-------------|------------------------|--------------------|
| Driver Seat | 3                      | Full Up            |
| Rear Seat   | 3                      | Full Down          |

**STEERING COLUMN ADJUSTMENT**

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

|                                   | Degrees | Fore-Aft Position (mm) |
|-----------------------------------|---------|------------------------|
| Lowermost - Position 1            | 30.0    | 116                    |
| Geometric Center - Position 2     | 27.1    | 141                    |
| Uppermost - Position 3            | 24.3    | 165                    |
| Telescoping Steering Wheel Travel |         | 49                     |
| Test Position                     | 27.1    | 141                    |



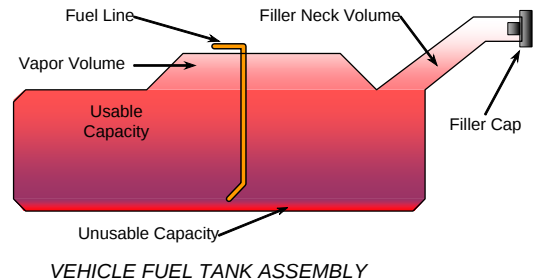
## DATA SHEET NO. 2 ... (CONTINUED)

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

Test Vehicle: 2015 Kia Sedona L 5-Door MPV NHTSA No. M20154202  
Test Program: NCAP MDB Side Impact Test Test Date: 03/10/15

#### FUEL PUMP

The vehicle is equipped with an electric fuel pump.



#### FUEL TANK CAPACITY

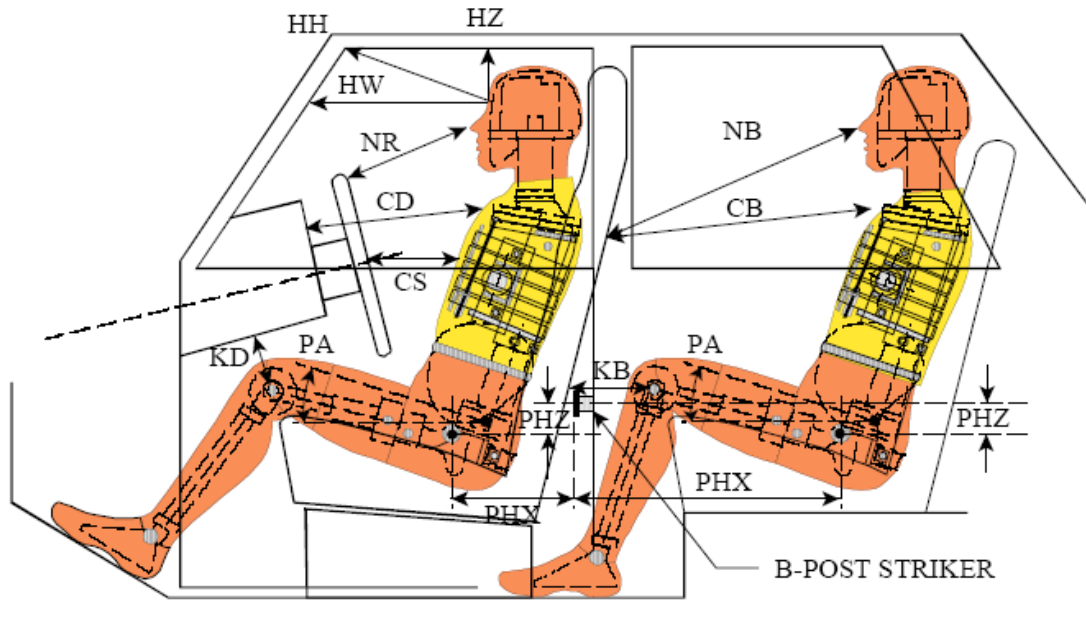
| Description                                             | Liters |
|---------------------------------------------------------|--------|
| Usable Capacity of "Standard Tank" (see Form No. 1)     | 79.98  |
| Usable Capacity of "Optional Tank" (see Form No. 1)     |        |
| Usable Capacity of "Standard Tank" (see Owner's Manual) |        |
| Usable Capacity of "Optional Tank" (see Owner's Manual) |        |
| 93% of Usable Capacity                                  | 74.38  |
| Actual amount of Solvent Used in Test                   | 74.38  |
| 1/3 of Usable Capacity                                  | 26.66  |

Is the Actual Amount of Solvent Used in the test equal to 93%  $\pm$  1% of the Usable Capacity stated in the Form No. 1? ☒ Yes ☐ No

### DATA SHEET NO. 3

#### DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2015 Kia Sedona L 5-Door MPV NHTSA No. M20154202  
 Test Program: NCAP MDB Side Impact Test Test Date: 03/10/15



**LEFT SIDE VIEW**

NOTE: 2-DOOR VEHICLE SHOWN.  
 REAR DUMMY PHX & PHZ  
 MEASUREMENTS FOR A 4-DOOR  
 VEHICLE WOULD USE THE C-POST  
 STRIKER AS A REFERENCE POINT

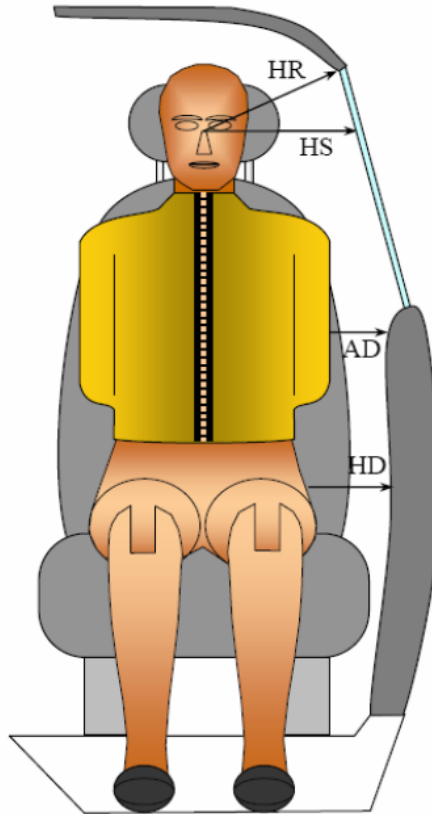
#### DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

| Driver Code   | Pass. Code    | Description                   | Driver      |           | Passenger   |           |
|---------------|---------------|-------------------------------|-------------|-----------|-------------|-----------|
|               |               |                               | Length (mm) | Angle (°) | Length (mm) | Angle (°) |
| HH            |               | Head to Header                | 405         |           |             |           |
| HW            |               | Head to Windshield            | 738         |           |             |           |
| HZ            | HZ            | Head to Roof                  | 198         |           | 309         |           |
| NR            | NB            | Nose to Rim/Seat Back         | 431         |           | 599         |           |
| CD            | CB            | Chest to Dash/Seat Back       | 582         |           | 611         |           |
| CS            |               | Chest to Steering Wheel       | 300         |           |             |           |
| KD(L)/KDA(L)° | KB(L)/KBA(L)° | Left Knee to Dash/Seat Back   | 174         | 19.7      | 371         | 14.6      |
| KD(R)/KDA(R)° | KB(R)/KBA(R)° | Right Knee to Dash/Seat Back  | 169         | 16.3      | 376         | 20.5      |
| PAX°          | PAX°          | Pelvic Tilt Angle X           |             | 13.8      |             | 21.8      |
|               | PAY°          | Pelvic Tilt Angle Y           |             | 0.2       |             | 0.2       |
| PHX           | PHX           | Hip Point to Striker (x-axis) | 198         |           | 357         |           |
| PHZ           | PHZ           | Hip Point to Striker (z-axis) | 154         |           | 151         |           |

## DATA SHEET NO. 4

### DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2015 Kia Sedona L 5-Door MPV NHTSA No. M20154202  
Test Program: NCAP MDB Side Impact Test Test Date: 03/10/15



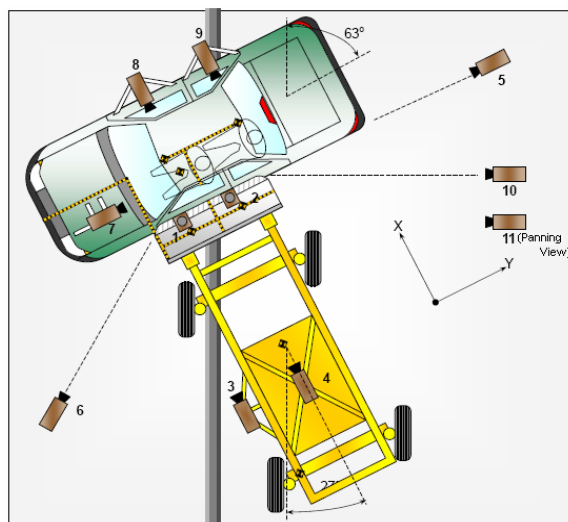
### DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

| Code | Measurement Description | Units | Driver | Passenger |
|------|-------------------------|-------|--------|-----------|
| HR   | Head to Side Header     | mm    | 211    | 257       |
| HS   | Head to Side Window     | mm    | 347    | 371       |
| AD   | Arm to Door             | mm    | 136    | 175       |
| HD   | H-Point to Door         | mm    | 175    | 250       |

## DATA SHEET NO. 5

### CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2015 Kia Sedona L 5-Door MPV NHTSA No. M20154202  
 Test Program: NCAP MDB Side Impact Test Test Date: 03/10/15



### CAMERA LOCATIONS AND DATA

| No. | View                      | Coordinates (mm) |       |       | Lens Length (mm) | Operating Frame Rate (fps) |
|-----|---------------------------|------------------|-------|-------|------------------|----------------------------|
|     |                           | X                | Y     | Z     |                  |                            |
| 1   | Overhead Overall          | 1220             | 2287  | -5486 | 14               | 1000                       |
| 2   | Overhead Close-Up         | 609              | 2287  | -5102 | 35               | 1000                       |
| 3   | Left Impact Point (MDB)   | -2134            | 0     | -1143 | 25               | 1000                       |
| 4   | Side Overall (MDB)        | -3912            | 838   | -1829 | 12.5             | 1000                       |
| 5   | Rear                      | -64              | 2485  | -1348 | 85               | 1000                       |
| 6   | Left Front                | -2266            | -3564 | -1475 | 24               | 1000                       |
| 7   | Driver Front (On-Board)   | 485              | -1000 | -745  | 24               | 1000                       |
| 8   | Driver Side (On-Board)    | 1918             | 621   | -489  | 12               | 1000                       |
| 9   | Passenger Side (On-Board) | 1870             | 1597  | -649  | 12               | 1000                       |
| 10  | Real Time Overall         |                  |       |       | Zoom             | 30                         |
| 11  | Real Time Inrun           |                  |       |       | Zoom             | 30                         |

Reference: Impact Point Projected to Ground; +X = To Front of MDB, +Y = To Right of MDB, +Z = Down

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

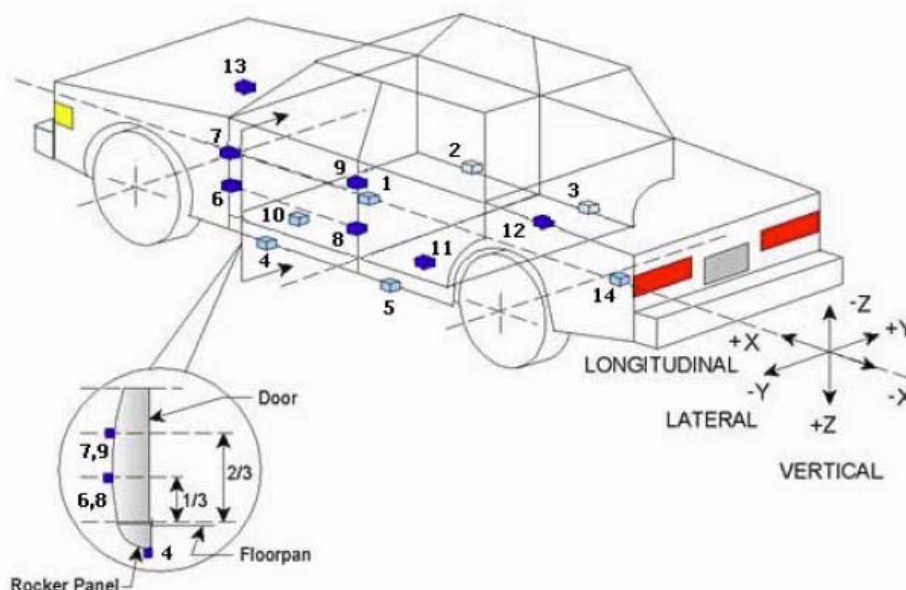
### INSTRUMENTATION

|                                  |    |
|----------------------------------|----|
| Driver Dummy Channels            | 16 |
| Passenger Dummy Channels         | 16 |
| Vehicle Structure Accelerometers | 23 |
| MDB Accelerometers               | 5  |
| Total                            | 60 |

## DATA SHEET NO. 6

### TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2015 Kia Sedona L 5-Door MPV NHTSA No. M20154202  
 Test Program: NCAP MDB Side Impact Test Test Date: 03/10/15



### VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

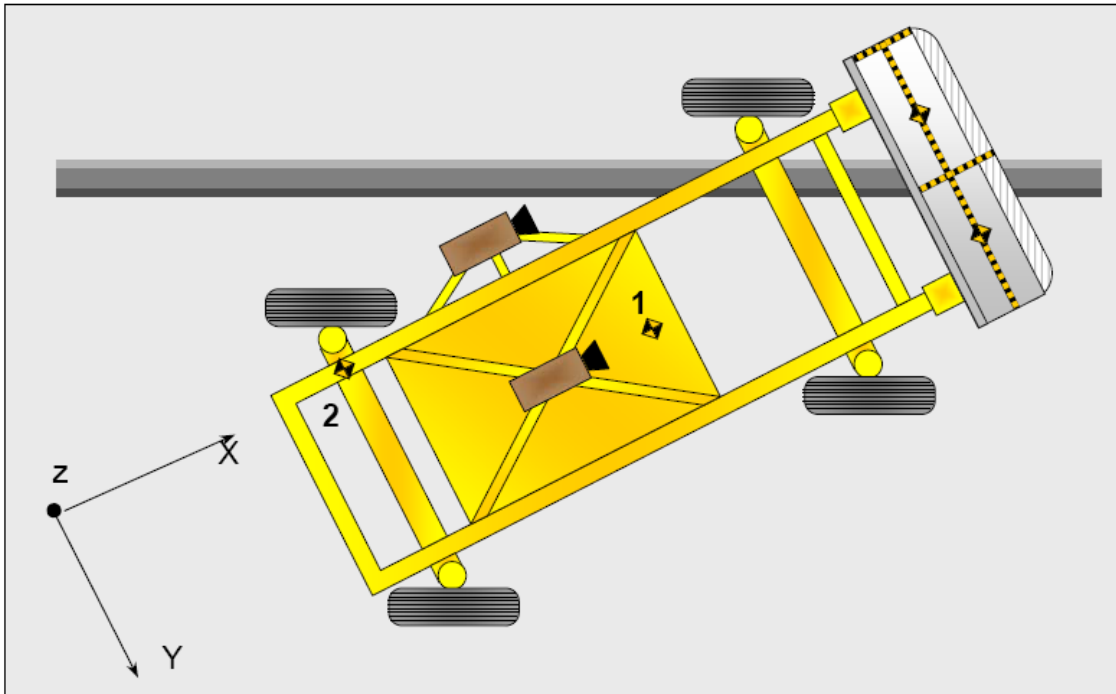
| Loc. No. | Sensor Description              | Coordinates (mm) |      |       |
|----------|---------------------------------|------------------|------|-------|
|          |                                 | X                | Y    | Z     |
| 1        | Vehicle CG                      | 2360             | 0    | -468  |
| 2        | Right Sill at Front Seat        | 3032             | 724  | -392  |
| 3        | Right Sill at Rear Seat         | 1956             | 693  | -471  |
| 4        | Left Sill at Front Door         | 2956             | -862 | -232  |
| 5        | Left Sill at Rear Door          | 1930             | -860 | -230  |
| 6        | A-Pillar Lower                  | 3472             | -834 | -422  |
| 7        | A-Pillar Middle                 | 3472             | -834 | -942  |
| 8        | B-Pillar Lower                  | 2471             | -814 | -760  |
| 9        | B-Pillar Middle                 | 2473             | -817 | -1080 |
| 10       | Front Seat Track                | 2719             | -651 | -527  |
| 11       | Rear Seat Structure             | 1941             | -694 | -667  |
| 12       | Right Rear Occupant Compartment | 2356             | 456  | -410  |
| 13       | Engine Block                    | 4096             | 212  | -870  |
| 14       | Rear Floorpan Above Axle        | 660              | 95   | -340  |

Reference: X – Rear surface of vehicle (+ forward)  
 Y – Vehicle centerline (+ to right)  
 Z – Ground plane (+ down)

## DATA SHEET NO. 7

### MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2015 Kia Sedona L 5-Door MPV NHTSA No. M20154202  
Test Program: NCAP MDB Side Impact Test Test Date: 03/10/15



### MDB ACCELEROMETER LOCATIONS

| Loc. No. | Accelerometer Location | Measurement |      |      |
|----------|------------------------|-------------|------|------|
|          |                        | X           | Y    | Z    |
| 1        | MDB CG                 | -1195       | 0    | -430 |
| 2        | MDB Rear               | -2642       | -593 | -608 |

Reference: X – Face of MDB (+ forward)  
Y – MDB centerline (+ to right)  
Z – Ground plane (+ down)

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

Test Vehicle: 2015 Kia Sedona L 5-Door MPV NHTSA No. M20154202  
 Test Program: NCAP MDB Side Impact Test Test Date: 03/10/15

**TEST DUMMY INFORMATION AND CONTACT POINTS**

| Dummy Body Part   | Front Seat Dummy (ES-2re)             | Rear Seat Dummy (SID-IIs) |
|-------------------|---------------------------------------|---------------------------|
| Face              | None                                  | Curtain Airbag            |
| Top of Head       | None                                  | Curtain Airbag            |
| Left Side of Head | Curtain Airbag, Side Header           | Curtain Airbag            |
| Back of Head      | Curtain Airbag, Side Header, Headrest | Curtain Airbag, Headrest  |
| Left Shoulder     | Curtain Airbag, Torso/Pelvis Airbag   | Door Panel                |
| Upper Torso       | Seat, Torso/Pelvis Airbag             | None                      |
| Lower Torso       | Seat, Torso/Pelvis Airbag             | None                      |
| Left Hip          | Seat, Torso/Pelvis Airbag, Door Panel | Seat, Door Panel          |
| Left Knee         | Door Panel, Knee Airbag               | Door Panel, Right Knee    |

**POST-TEST DOOR PERFORMANCE**

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

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

Test Vehicle: 2015 Kia Sedona L 5-Door MPV NHTSA No. M20154202  
Test Program: NCAP MDB Side Impact Test Test Date: 03/10/15

**POST-TEST SEAT PERFORMANCE**

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

**POST-TEST STRUCTURAL OBSERVATIONS**

| Critical Areas of Performance | Observations and Conclusions |
|-------------------------------|------------------------------|
| Pillar Performance            | No separation                |
| Sill Separation               | No separation                |
| Windshield Damage             | None                         |
| Side Window Damage            | Left rear window broken      |
| Other Notable Effects         | None                         |

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

Test Vehicle: 2015 Kia Sedona L 5-Door MPV NHTSA No. M20154202  
 Test Program: NCAP MDB Side Impact Test Test Date: 03/10/15

**SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION**

| Restraint Type               | Struck Side Driver |          | Struck Side Rear Passenger |          |
|------------------------------|--------------------|----------|----------------------------|----------|
|                              | Mounted            | Deployed | Mounted                    | Deployed |
| Frontal Airbag               | Yes                | No       | No                         |          |
| Knee Airbag                  | No                 |          | No                         |          |
| Side Airbag 1 (Curtain)      | Yes                | Yes      | Yes                        | Yes      |
| Side Airbag 2 (Torso/Pelvis) | Yes                | Yes      | No                         |          |
| Seat Belt Pretensioner       | Yes                | Yes      | No                         |          |
| Seat Belt Load Limiter       | Yes                | Yes      | No                         |          |
| Other                        | No                 |          | No                         |          |

**IMPACT POINT LOCATION DATA**

| Measured Parameter                                                        | Units | Tolerance                     | Value |
|---------------------------------------------------------------------------|-------|-------------------------------|-------|
| Vehicle Wheel Base                                                        | mm    |                               | 3058  |
| Vertical Impact Reference Line (Aft of Front Axle)(Intended Impact Point) | mm    |                               | 507   |
| Actual Impact Point (Aft of Front Axle)                                   | mm    |                               | 511   |
| Horizontal Offset (+ forward / - rearward)                                | mm    | ± 50 of Intended Impact Point | -4    |
| Vertical Offset (+ down / - up)                                           | mm    | ± 20 of Intended Impact Point | 11    |

**DATA SHEET NO. 9****MDB SUMMARY OF RESULTS**

Test Vehicle: 2015 Kia Sedona L 5-Door MPV NHTSA No. M20154202  
 Test Program: NCAP MDB Side Impact Test Test Date: 03/10/15

**MDB SPECIFICATIONS**

| Measurement Description                 | Length (mm) |
|-----------------------------------------|-------------|
| Overall Width of Framework Carriage     | 1251        |
| Overall Length including Honeycomb Face | 4023        |
| Wheel Base of Framework Carriage        | 2595        |
| CG location aft of Front Axle           | 1118        |

**MDB WEIGHTS**

|        | Units | Front Axle | Rear Axle | Total  |
|--------|-------|------------|-----------|--------|
| Left   | kg    | 401.8      | 298.0     | 699.8  |
| Right  | kg    | 376.9      | 291.6     | 668.5  |
| Ratio  | %     | 56.9%      | 43.1%     | 100.0% |
| Totals | kg    | 778.7      | 589.6     | 1368.3 |

**SPEED AND IMPACT DATA**

| Measured Parameter                              | Units   | Requirement  | Value |
|-------------------------------------------------|---------|--------------|-------|
| Trap No. 1 Velocity (Primary)                   | km/h    | 61.1 to 62.7 | 62.07 |
| Trap No. 2 Velocity (Redundant)                 | km/h    | 61.1 to 62.7 | 62.00 |
| MDB CL to Target Vehicle CL                     | degrees | 88.5 to 91.5 | 90.1  |
| MDB Forward Line of Motion to Target Vehicle CL | degrees | 62.5 to 63.5 | 62.9  |
| MDB Crabbed Angle to MDB Forward Line of Motion | degrees | 26.0 to 28.0 | 27.3  |

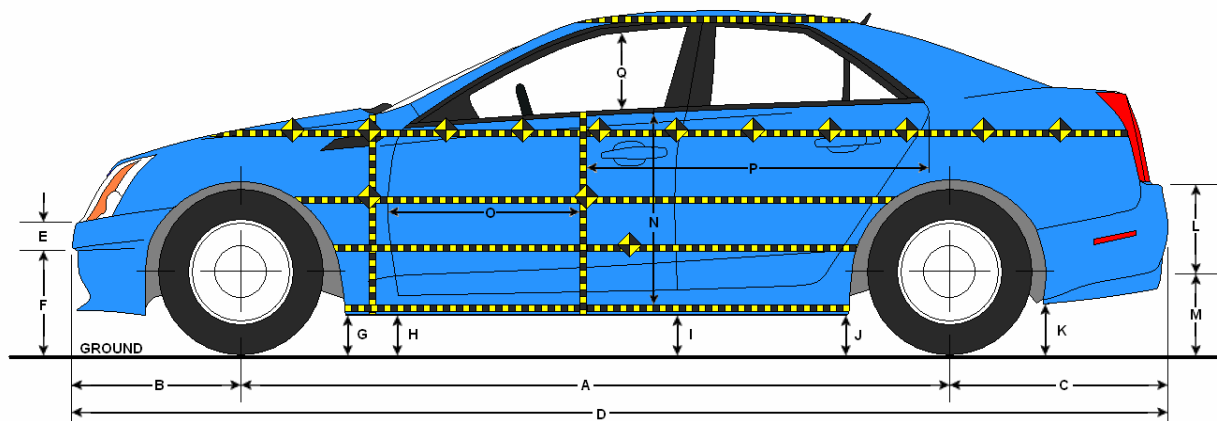
**MAXIMUM STATIC CRUSH OF HONEYCOMB FACE**

| Vertical Location |                  |             | From Centerline |           | Max. Crush (mm) |
|-------------------|------------------|-------------|-----------------|-----------|-----------------|
| Row               | Description      | Height (mm) | Distance (mm)   | Direction |                 |
| A                 | Center of Bumper | 432         | 800             | Right     | 273             |
| B                 | Top of Bumper    | 533         | 800             | Right     | 167             |
| C                 | Mid Level        | 686         | 800             | Right     | 147             |
| D                 | Top of Stack     | 813         | 800             | Left      | 153             |

## DATA SHEET NO. 10

### TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2015 Kia Sedona L 5-Door MPV NHTSA No. M20154202  
 Test Program: NCAP MDB Side Impact Test Test Date: 03/10/15



**LEFT SIDE VIEW**

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

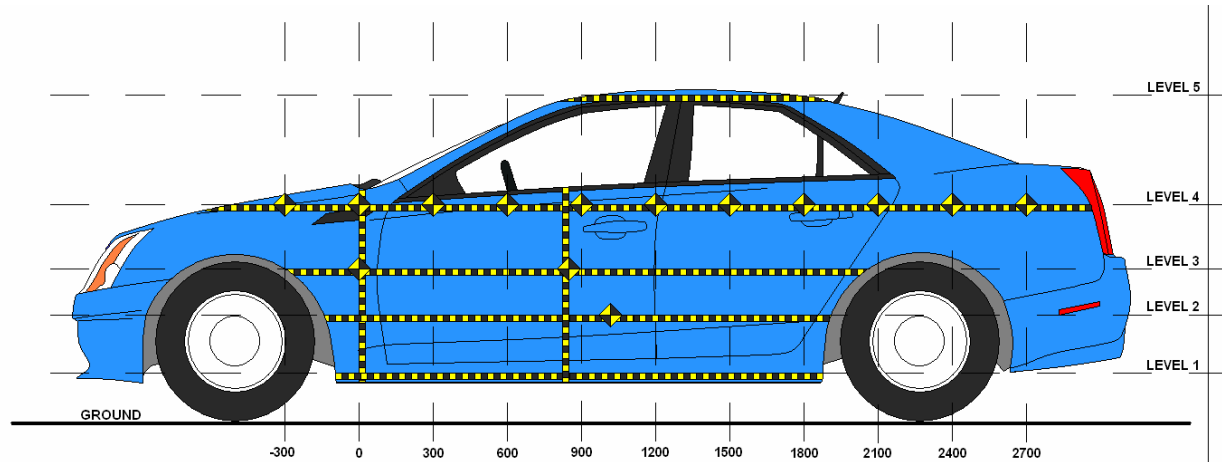
| Code | Description                                | Pre-Test | Post-Test | Difference |
|------|--------------------------------------------|----------|-----------|------------|
| A    | Wheelbase                                  | 3058     | 3060      | 2          |
| B    | Front Axle to FSOV                         | 959      | 961       | 2          |
| C    | Rear Axle to RSOV                          | 1103     | 1101      | -2         |
| D    | Total Length at Centerline                 | 5120     | 5122      | 2          |
| E    | Front Bumper Thickness                     | 134      | 134       | 0          |
| F    | Front Bumper Bottom to Ground              | 432      | 447       | 15         |
| G    | Sill Height at Front Wheel Well            | 243      | 260       | 17         |
| H    | Sill Height at Front Door Leading Edge     | 243      | 261       | 18         |
| I    | Sill Height at B-Pillar                    | 246      | 266       | 20         |
| J1   | Sill Height at Rear Wheel Well             | 265      | 281       | 16         |
| J2   | Pinch Weld Height at Rear Wheel Well       | 217      | 234       | 17         |
| K    | Sill Height Aft of Rear Wheel Well         | 311      | 334       | 23         |
| L    | Rear Bumper Thickness                      | 124      | 125       | 1          |
| M    | Rear Bumper Bottom to Ground               | 441      | 457       | 16         |
| N    | Sill Height to Bottom of Front Window Sill | 804      | 755       | -49        |
| O    | Front Door Leading Edge to Impact CL       | 865      | 814       | -51        |
| P    | Rear Door Trailing Edge to Impact CL       | 1412     | 1382      | -30        |
| Q    | Front Window Opening                       | 496      | 511       | 15         |
| R    | Right Side Length                          | 3604     | 3604      | 0          |
| S    | Left Side Length                           | 3602     | 3600      | -2         |
| T    | Vehicle Width at B-Pillar                  | 1980     | 1876      | -104       |

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

## DATA SHEET NO. 11

### TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2015 Kia Sedona L 5-Door MPV NHTSA No. M20154202  
Test Program: NCAP MDB Side Impact Test Test Date: 03/10/15



LEFT SIDE VIEW

### MAXIMUM EXTERIOR CRUSH MEASUREMENTS

| Level | Description      | Height Above Ground (mm) | Maximum Exterior Static Crush | Distance from Impact |
|-------|------------------|--------------------------|-------------------------------|----------------------|
| 1     | Sill Top         | 278                      | 49                            | 1350                 |
| 2     | Occupant H-Point | 761                      | 209                           | 1350                 |
| 3     | Mid-Door         | 729                      | 209                           | 1200                 |
| 4     | Window Sill      | 1076                     | 117                           | 1800                 |
| 5     | Window Top       | 1661                     | 17                            | 1050                 |

# DATA SHEET NO. 11 ... (CONTINUED)

## TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2015 Kia Sedona L 5-Door MPV NHTSA No. M20154202  
 Test Program: NCAP MDB Side Impact Test Test Date: 03/10/15

### EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

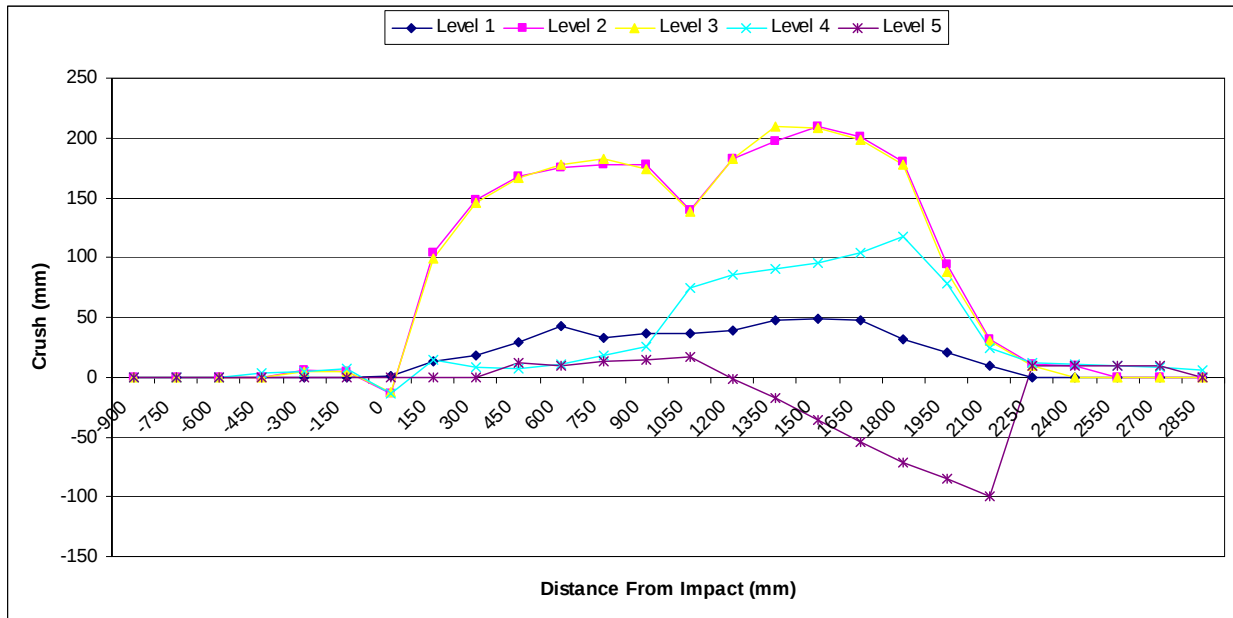
|      | Pre-Test (mm) |     |     |     |     | Post-Test (mm) |     |     |     |     | Difference (mm) |     |     |     |      |
|------|---------------|-----|-----|-----|-----|----------------|-----|-----|-----|-----|-----------------|-----|-----|-----|------|
|      | 1             | 2   | 3   | 4   | 5   | 1              | 2   | 3   | 4   | 5   | 1               | 2   | 3   | 4   | 5    |
| -900 |               |     |     |     |     |                |     |     |     |     |                 |     |     |     |      |
| -750 |               |     |     |     |     |                |     |     |     |     |                 |     |     |     |      |
| -600 |               |     |     |     |     |                |     |     |     |     |                 |     |     |     |      |
| -450 |               |     |     | 637 |     |                |     |     | 640 |     |                 |     |     | 3   |      |
| -300 |               | 504 | 503 | 617 |     |                | 510 | 507 | 622 |     |                 | 6   | 4   | 5   |      |
| -150 |               | 516 | 513 | 612 |     |                | 521 | 517 | 619 |     |                 | 5   | 4   | 7   |      |
| 0    | 555           | 526 | 525 | 603 |     | 556            | 512 | 512 | 589 |     | 1               | -14 | -13 | -14 |      |
| 150  | 576           | 526 | 525 | 596 |     | 589            | 630 | 624 | 610 |     | 13              | 104 | 99  | 14  |      |
| 300  | 579           | 524 | 524 | 586 |     | 597            | 672 | 670 | 594 |     | 18              | 148 | 146 | 8   |      |
| 450  | 577           | 522 | 522 | 580 | 784 | 606            | 690 | 688 | 587 | 796 | 29              | 168 | 166 | 7   | 12   |
| 600  | 576           | 521 | 521 | 574 | 788 | 619            | 696 | 698 | 585 | 798 | 43              | 175 | 177 | 11  | 10   |
| 750  | 577           | 520 | 520 | 569 | 791 | 610            | 697 | 703 | 587 | 804 | 33              | 177 | 183 | 18  | 13   |
| 900  | 576           | 519 | 519 | 564 | 796 | 612            | 697 | 693 | 590 | 810 | 36              | 178 | 174 | 26  | 14   |
| 1050 | 578           | 519 | 519 | 563 | 797 | 615            | 659 | 657 | 638 | 814 | 37              | 140 | 138 | 75  | 17   |
| 1200 | 579           | 519 | 520 | 560 | 798 | 618            | 702 | 702 | 645 | 796 | 39              | 183 | 182 | 85  | -2   |
| 1350 | 578           | 520 | 520 | 561 | 799 | 626            | 717 | 729 | 651 | 781 | 48              | 197 | 209 | 90  | -18  |
| 1500 | 581           | 520 | 521 | 562 | 800 | 630            | 729 | 729 | 658 | 764 | 49              | 209 | 208 | 96  | -36  |
| 1650 | 581           | 521 | 521 | 563 | 802 | 628            | 722 | 720 | 667 | 748 | 47              | 201 | 199 | 104 | -54  |
| 1800 | 583           | 522 | 522 | 564 | 803 | 614            | 702 | 700 | 681 | 732 | 31              | 180 | 178 | 117 | -71  |
| 1950 | 574           | 523 | 522 | 566 | 805 | 595            | 617 | 610 | 644 | 720 | 21              | 94  | 88  | 78  | -85  |
| 2100 | 561           | 522 | 521 | 568 | 806 | 571            | 553 | 551 | 592 | 706 | 10              | 31  | 30  | 24  | -100 |
| 2250 |               | 513 | 511 | 571 | 810 |                | 524 | 521 | 583 | 820 |                 | 11  | 10  | 12  | 10   |
| 2400 |               | 510 |     | 574 | 811 |                | 519 |     | 585 | 820 |                 | 9   |     | 11  | 9    |
| 2550 |               |     |     | 580 | 811 |                |     |     | 589 | 821 |                 |     |     | 9   | 10   |
| 2700 |               |     |     | 586 | 814 |                |     |     | 594 | 824 |                 |     |     | 8   | 10   |
| 2850 |               |     |     | 595 |     |                |     |     | 601 |     |                 |     |     | 6   |      |

# DATA SHEET NO. 11 ... (CONTINUED)

## TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2015 Kia Sedona L 5-Door MPV NHTSA No. M20154202

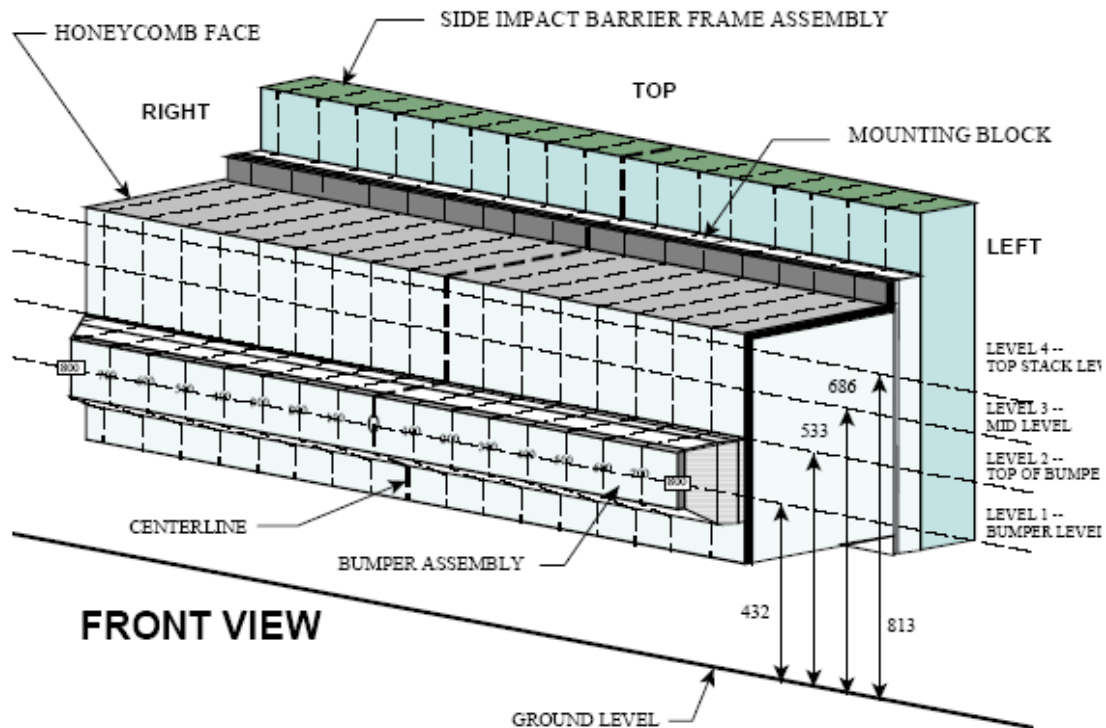
Test Program: NCAP MDB Side Impact Test Test Date: 03/10/15



## DATA SHEET NO. 12

### MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2015 Kia Sedona L 5-Door MPV      NHTSA No. M20154202  
 Test Program: NCAP MDB Side Impact Test      Test Date: 03/10/15



NOTE: Dimensions are shown in millimeters, mm

### DEFORMABLE BARRIER STATIC CRUSH

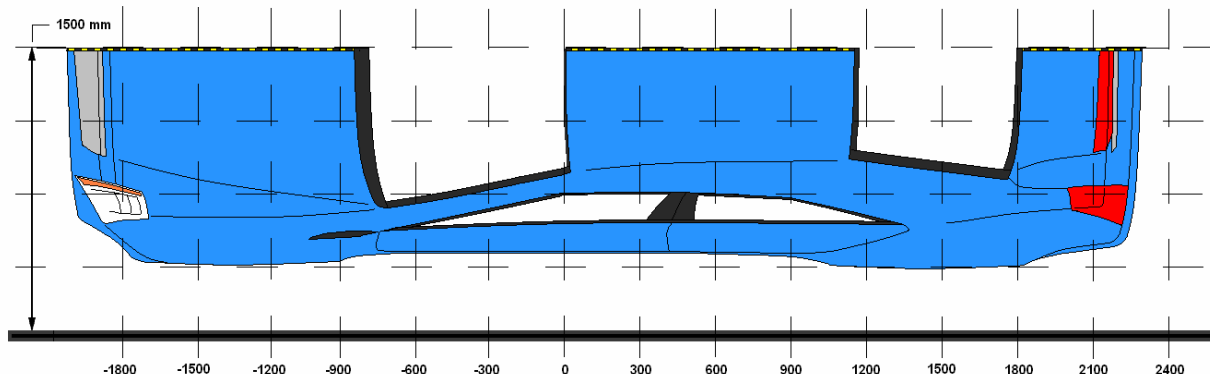
| Stack Level | Distance Right of Center |     |     |     |     |     |     |     | C/L | Distance Left of Center |     |     |     |     |     |     |     |
|-------------|--------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-------------------------|-----|-----|-----|-----|-----|-----|-----|
|             | 800                      | 700 | 600 | 500 | 400 | 300 | 200 | 100 |     | 100                     | 200 | 300 | 400 | 500 | 600 | 700 | 800 |
| 1           | 273                      | 273 | 265 | 264 | 269 | 269 | 272 | 263 | 259 | 249                     | 241 | 239 | 245 | 235 | 233 | 231 | 246 |
| 2           | 167                      | 163 | 157 | 152 | 144 | 141 | 140 | 137 | 133 | 140                     | 132 | 133 | 134 | 131 | 133 | 137 | 127 |
| 3           | 147                      | 124 | 105 | 94  | 92  | 91  | 108 | 136 | 118 | 93                      | 76  | 71  | 69  | 71  | 76  | 92  | 117 |
| 4           | 112                      | 94  | 81  | 71  | 70  | 79  | 103 | 140 | 130 | 92                      | 88  | 88  | 85  | 91  | 97  | 118 | 153 |

All dimensions in millimeters.

## DATA SHEET NO. 13

### VEHICLE AND MDB DAMAGE PROFILE DISTANCES

Test Vehicle: 2015 Kia Sedona L 5-Door MPV NHTSA No. M20154202  
 Test Program: NCAP MDB Side Impact Test Test Date: 03/10/15



### VEHICLE DAMAGE PROFILE DISTANCES

| DPD | Distance From Impact Point (mm) | Level | Pre-Test (mm) | Post-Test (mm) | Crush (mm) |
|-----|---------------------------------|-------|---------------|----------------|------------|
| 1   | 2850                            | 4     | 595           | 601            | 6          |
| 2   | 2250                            | 4     | 571           | 583            | 12         |
| 3   | 1500                            | 2     | 520           | 729            | 209        |
| 4   | 900                             | 2     | 519           | 697            | 178        |
| 5   | 150                             | 2     | 526           | 630            | 104        |
| 6   | -450                            | 4     | 637           | 640            | 3          |

### MDB DAMAGE PROFILE DISTANCES

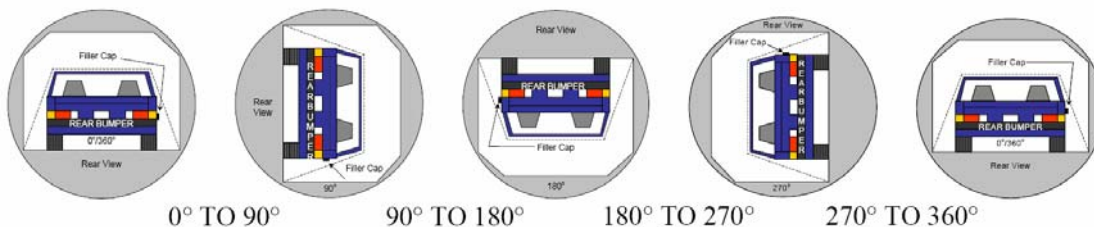
| DPD | From MDB Centerline |           | Level | Crush (mm) |
|-----|---------------------|-----------|-------|------------|
|     | Distance (mm)       | Direction |       |            |
| 1   | 800                 | Left      | 1     | 246        |
| 2   | 500                 | Left      | 1     | 235        |
| 3   | 200                 | Left      | 1     | 241        |
| 4   | 200                 | Right     | 1     | 272        |
| 5   | 500                 | Right     | 1     | 264        |
| 6   | 800                 | Right     | 1     | 273        |

## DATA SHEET NO. 14

### FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2015 Kia Sedona L 5-Door MPV NHTSA No. M20154202  
 Test Program: NCAP MDB Side Impact Test Test Date: 03/10/15  
 Temperature at Time of Impact: 25.6° C Test Time: 12:23 PM

- 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 Details: There was no Stoddard solvent spillage.



### SOLVENT COLLECTION TIME TABLE IN SECONDS

| Test Phase   | Rotation Time | Hold Time | Total Time |
|--------------|---------------|-----------|------------|
| 0° To 90°    | 81            | 300       | 381        |
| 90° To 180°  | 78            | 300       | 378        |
| 180° To 270° | 78            | 300       | 378        |
| 270° To 360° | 79            | 300       | 379        |

### FMVSS 301 SPILLAGE TABLE

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

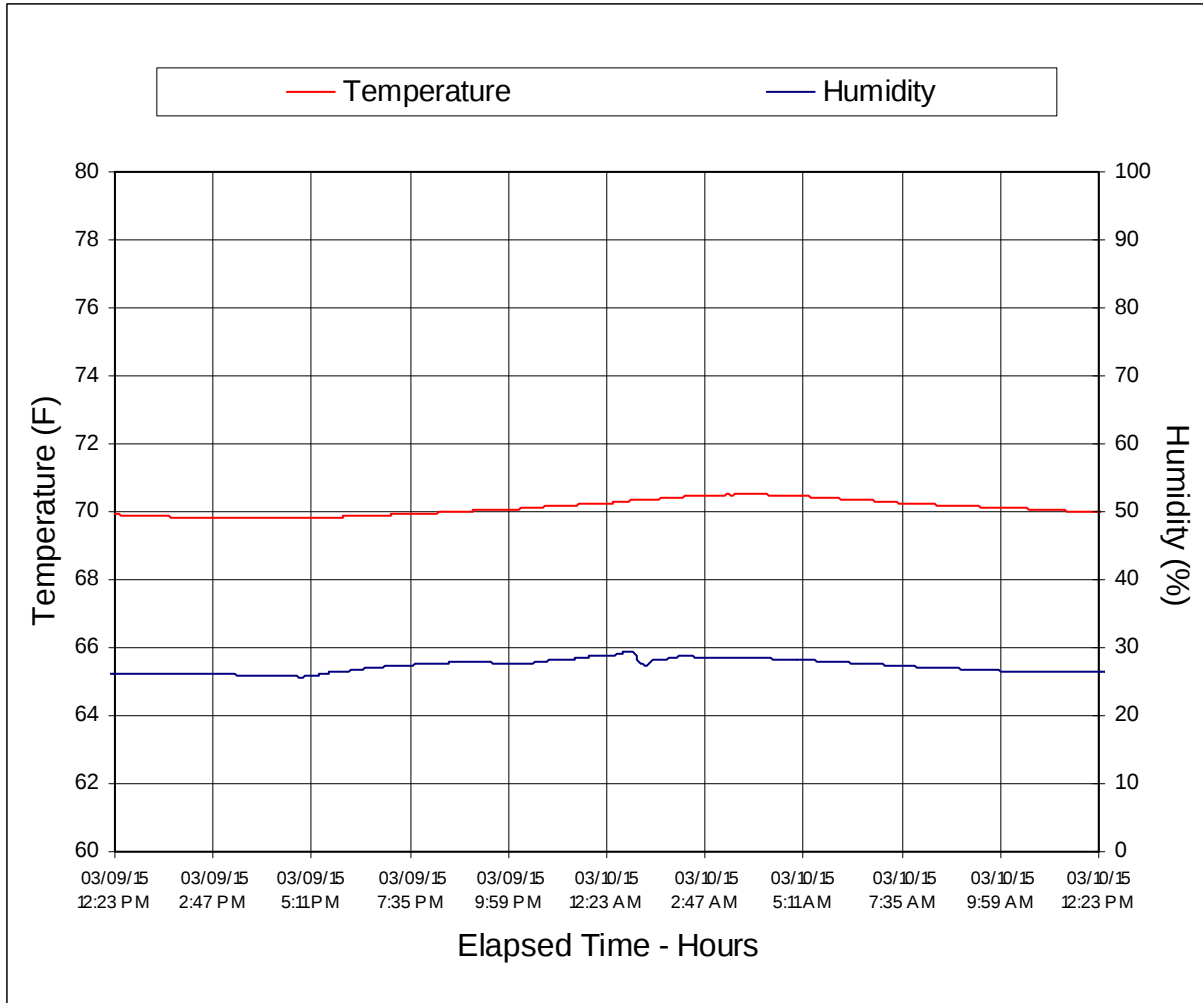
### SOLVENT SPILLAGE LOCATION TABLE

| Test Phase   | Spillage Location |
|--------------|-------------------|
| 0° To 90°    | N/A               |
| 90° To 180°  | N/A               |
| 180° To 270° | N/A               |
| 270° To 360° | N/A               |

## DATA SHEET NO. 15

### DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION

Test Vehicle: 2015 Kia Sedona L 5-Door MPV NHTSA No. M20154202  
Test Program: NCAP MDB Side Impact Test Test Date: 03/10/15



**APPENDIX A**  
**PHOTOGRAPHS**

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FIGURE 1. As-Delivered Right Front  $\frac{3}{4}$  View of Test Vehicle



FIGURE 2. As-Delivered Left Rear  $\frac{3}{4}$  View of Test Vehicle

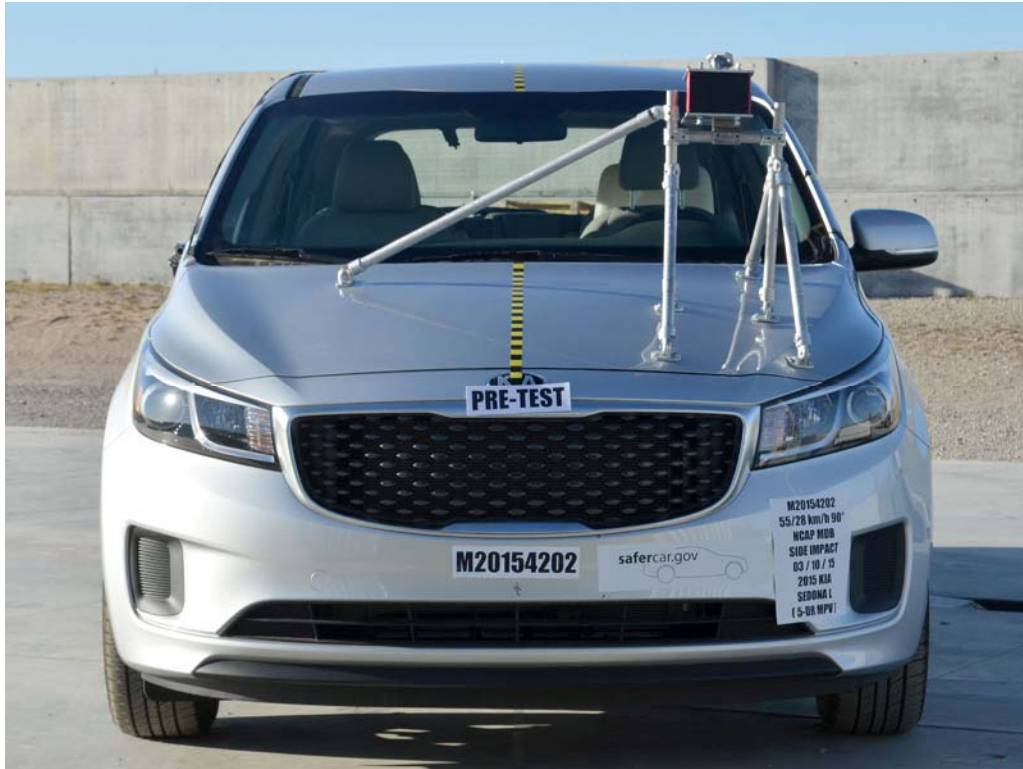


FIGURE 3. Pre-Test Frontal View of Test Vehicle



FIGURE 4. Post-Test Frontal View of Test Vehicle



FIGURE 5. Pre-Test Left Front  $\frac{3}{4}$  View of Test Vehicle



FIGURE 6. Post-Test Left Front  $\frac{3}{4}$  View of Test Vehicle



FIGURE 7. Pre-Test Left Side View of Test Vehicle



FIGURE 8. Post-Test Left Side View of Test Vehicle



FIGURE 9. Pre-Test Left Rear  $\frac{3}{4}$  View of Test Vehicle



FIGURE 10. Post-Test Left Rear  $\frac{3}{4}$  View of Test Vehicle



FIGURE 11. Pre-Test Rear View of Test Vehicle

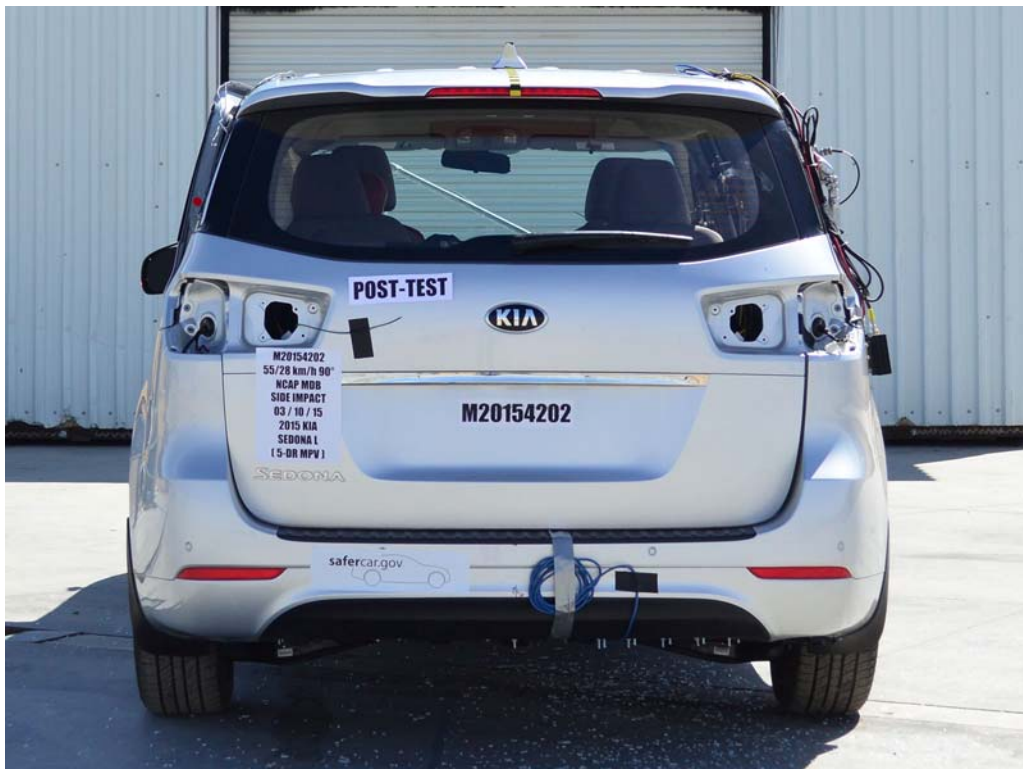


FIGURE 12. Post-Test Rear View of Test Vehicle



FIGURE 13. Pre-Test Right Side View of Test Vehicle



FIGURE 14. Post-Test Right Side View of Test Vehicle



FIGURE 15. Pre-Test Overhead View of Test Area

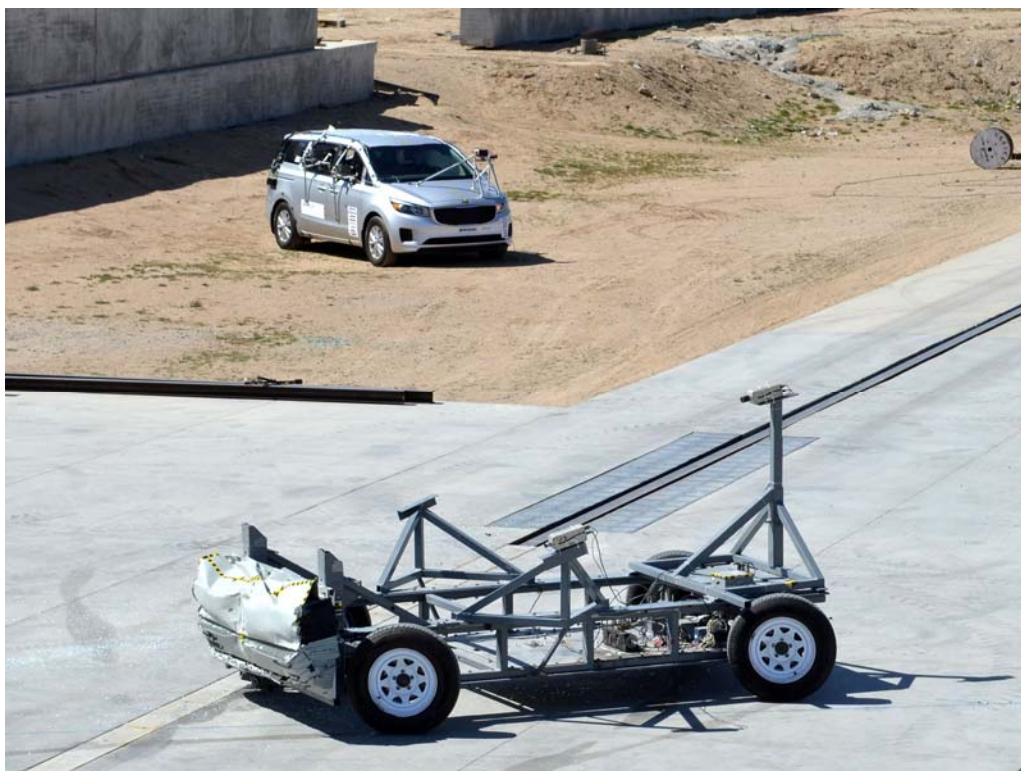


FIGURE 16. Post-Test Overhead View of Test Area



FIGURE 17. Pre-Test Left Side View of MDB Positioned  
Against Side of Test Vehicle



FIGURE 18. Pre-Test Right Side View of MDB Positioned  
Against Side of Test Vehicle



FIGURE 19. Pre-Test Close-Up View of Impact Point Target



FIGURE 20. Post-Test Close-Up View of Impact Point Target

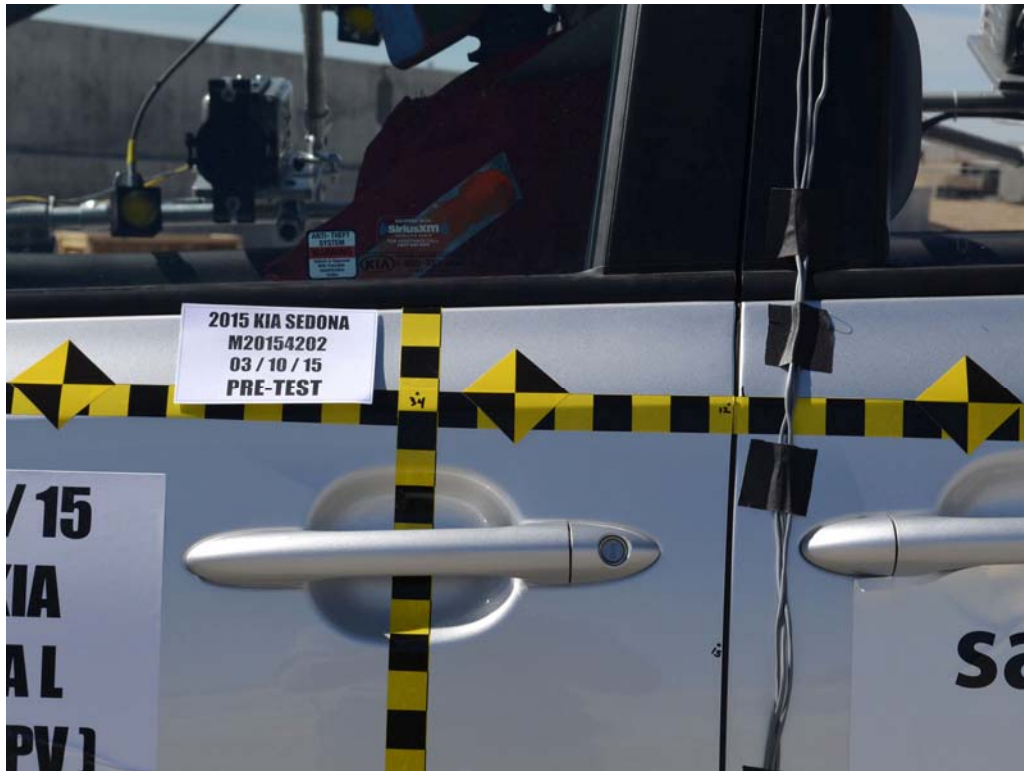


FIGURE 21. Pre-Test Left Front Door Latch Close-Up



FIGURE 22. Post-Test Left Front Door Latch Close-Up



FIGURE 23. Pre-Test Left Rear Door Latch Close-Up



FIGURE 23a. Pre-Test Left Rear Door Latch Close-Up



FIGURE 24. Post-Test Left Rear Door Latch Close-Up



FIGURE 24a. Post-Test Left Rear Door Latch Close-Up



FIGURE 25. Pre-Test Front Close-Up View of Driver Dummy



FIGURE 26. Post-Test Front Close-Up View of Driver Dummy



FIGURE 27. Pre-Test Left Side View of Driver Dummy  
Showing Belt and Chalking



FIGURE 28. Pre-Test Left Side View of Driver Dummy Shoulder and Door Top View



FIGURE 29. Post-Test Left Side View of Driver Dummy Shoulder and Door Top View



FIGURE 30. Pre-Test Frontal View of Driver Seat Back Prior to Dummy Positioning



FIGURE 31. Pre-Test Frontal View of Driver Dummy Head and Shoulders in Relation to Head Restraint



FIGURE 32. Pre-Test Overhead View of Driver Seat Pan Prior to Dummy Positioning



FIGURE 33. Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan



FIGURE 34. Pre-Test Placement of Driver Dummy's Feet



FIGURE 35. Pre-Test View of Belt Anchorage for Driver Dummy



FIGURE 36. Pre-Test Left Side View of Steering Wheel



FIGURE 37. View of Disengaged Parking Brake



FIGURE 38. Pre-Test View of Parking Brake



FIGURE 39. Pre-Test Close-Up Left Side View of Driver Seat Track



FIGURE 40. Pre-Test Close-Up Left Side View of Driver Seat Back



FIGURE 41. Pre-Test Close-Up View of Driver Seat Back or Head Restraint



FIGURE 42. Pre-Test Driver Dummy and Door Clearance View



FIGURE 43. Post-Test Driver Dummy and Door Clearance View



FIGURE 44. Pre-Test Right Side View of Driver Dummy  
and Front Seat Occupant Compartment



FIGURE 45. Post-Test Right Side View of Driver Dummy and Front Seat Occupant Compartment



FIGURE 46. Pre-Test Driver Inner Door Panel View



FIGURE 47. Post-Test Driver Inner Door Panel View  
Showing Driver Dummy Contact Locations



FIGURE 48. Post-Test Driver Dummy Close-Up Head Contact  
with Vehicle Interior View



FIGURE 49. Post-Test Driver Dummy Close-Up Head Contact with Side Airbag View



FIGURE 50. Post-Test Driver Dummy Close-Up Torso Contact with Vehicle Interior View



FIGURE 51. Post-Test Driver Dummy Close-Up Torso Contact with Side Airbag View

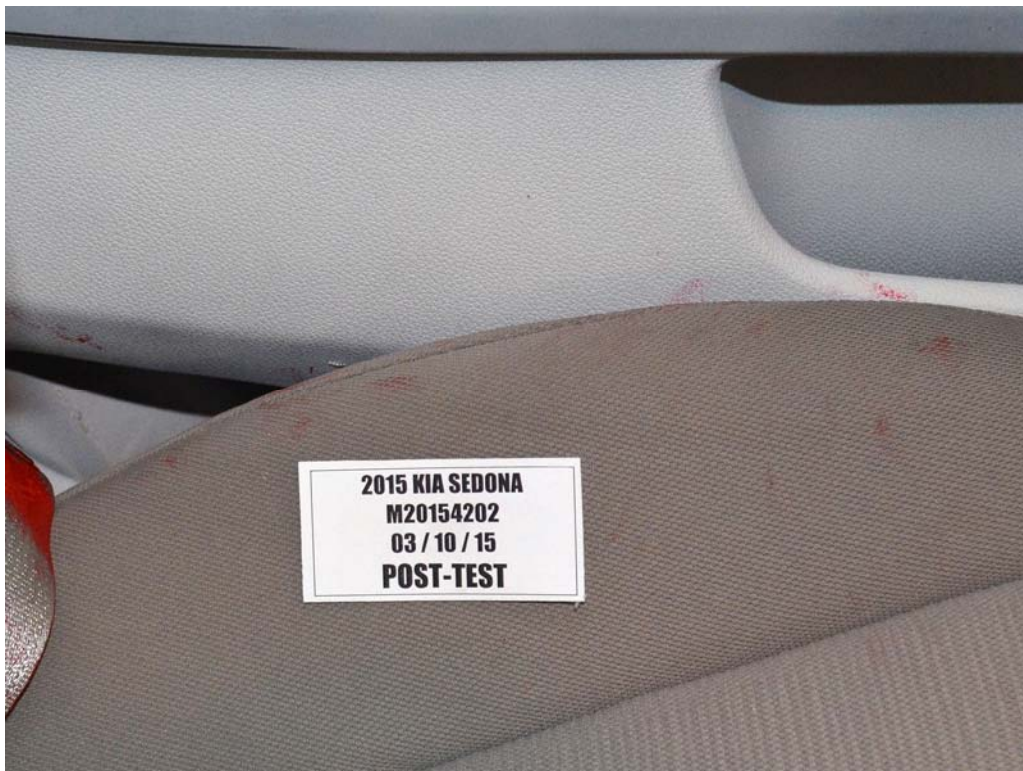


FIGURE 52. Post-Test Driver Dummy Close-Up Pelvis Contact  
with Vehicle Interior View



FIGURE 53. Post-Test Driver Dummy Close-Up Pelvis Contact with Side Airbag View



FIGURE 54. Post-Test Driver Dummy Close-Up Knee Contact View



FIGURE 55. Pre-Test Left Side View of Rear Passenger Dummy  
Showing Belt and Chalking



FIGURE 56. Pre-Test Left Side View of Rear Passenger Dummy  
Shoulder and Door Top View



FIGURE 57. Post-Test Left Side View of Rear Passenger Dummy  
Shoulder and Door Top View



FIGURE 58. Pre-Test Frontal View of Rear Passenger Seat Back  
Prior to Dummy Positioning



FIGURE 59. Pre-Test Frontal View of Rear Passenger Dummy  
Head and Shoulders in Relation to Head Restraint



FIGURE 60. Pre-Test Overhead View of Rear Passenger  
Seat Pan Prior to Dummy Positioning



FIGURE 61. Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan



FIGURE 62. Pre-Test View of Rear Passenger Dummy's Neck  
Showing Position of Adjustable Neck Bracket



FIGURE 63. Pre-Test View of Rear Passenger Dummy's Head  
Showing Dummy's Head is Level



FIGURE 64. Pre-Test Placement of Rear Passenger Dummy's Feet



FIGURE 65. Pre-Test View of Belt Anchorage for Rear Passenger Dummy



FIGURE 66. Pre-Test Close-Up Left Side View of Rear Passenger Seat Track



FIGURE 67. Pre-Test Close-Up Left Side View of Rear Passenger Seat Back



FIGURE 68. Pre-Test Close-Up View of Rear Passenger Seat Back or Head Restraint



FIGURE 69. Pre-Test Rear Passenger Dummy and Door Clearance View



FIGURE 70. Post-Test Rear Passenger Dummy and Door Clearance View



FIGURE 71. Pre-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment



FIGURE 72. Post-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment



FIGURE 73. Pre-Test Rear Passenger Inner Door Panel View



FIGURE 74. Post-Test Rear Passenger Inner Door Panel View  
Showing Rear Passenger Dummy Contact Locations

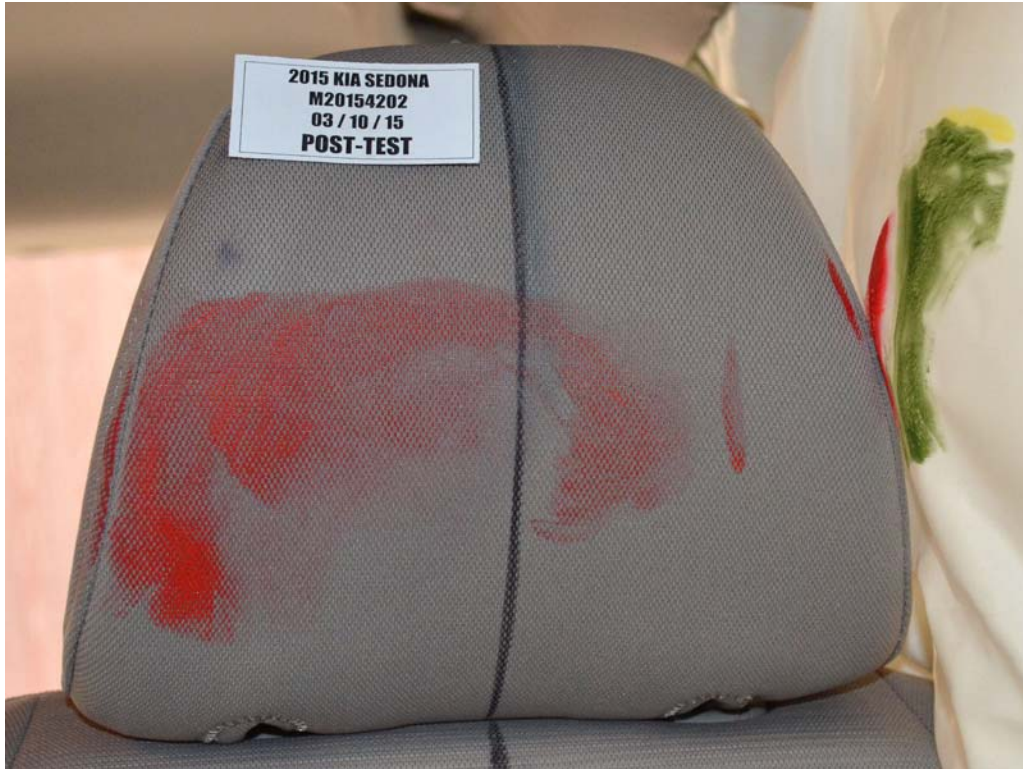


FIGURE 75. Post-Test Rear Passenger Dummy Close-Up  
Head Contact with Vehicle Interior View



FIGURE 76. Post-Test Rear Passenger Dummy Close-Up  
Head Contact with Side Airbag View

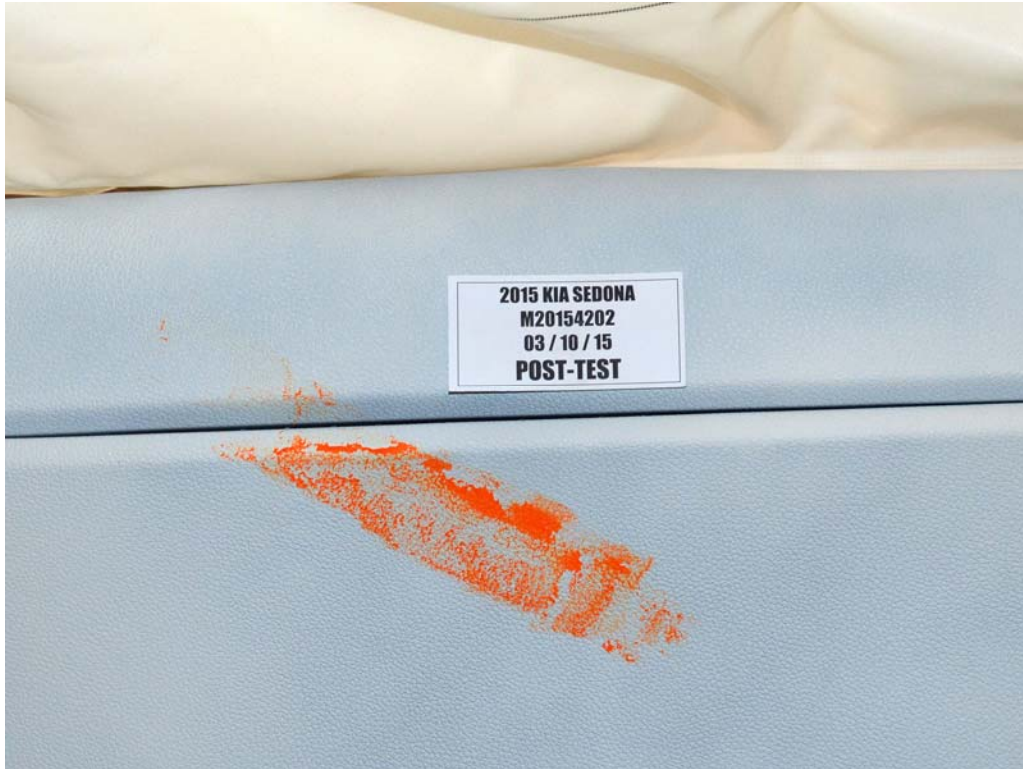


FIGURE 77. Post-Test Rear Passenger Dummy Close-Up  
Torso Contact with Vehicle Interior View

# Photograph Not Applicable

## Vehicle Not Equipped with Rear Passenger Side Airbag

FIGURE 78. Post-Test Rear Passenger Dummy Close-Up  
Torso Contact with Side Airbag View



FIGURE 79. Post-Test Rear Passenger Dummy Close-Up  
Pelvis Contact with Vehicle Interior View

Photograph Not Applicable

Vehicle Not Equipped with  
Rear Passenger Side Airbag

FIGURE 80. Post-Test Rear Passenger Dummy Close-Up  
Pelvis Contact with Side Airbag View



FIGURE 81. Post-Test Rear Passenger Dummy Close-Up Knee Contact View



FIGURE 82. Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



FIGURE 83. Post-Test View of Fuel Filler Cap or Fuel Filler Neck



FIGURE 84. Pre-Test Front View of MDB Impactor Face



FIGURE 85. Post-Test Front View of MDB Impactor Face



FIGURE 86. Pre-Test Top View of MDB Impactor Face



FIGURE 87. Post-Test Top View of MDB Impactor Face



FIGURE 88. Pre-Test Left Side View of MDB Impactor Face



FIGURE 89. Post-Test Left Side View of MDB Impactor Face



FIGURE 90. Pre-Test Right Side View of MDB Impactor Face



FIGURE 91. Post-Test Right Side View of MDB Impactor Face



FIGURE 92. Close-Up View of Vehicle's Certification Label



FIGURE 93. Close-Up View of Vehicle's Tire Information Placard or Label



FIGURE 94. Pre-Test Ballast View



FIGURE 95. Post-Test Primary and Redundant Speed Trap Read-Out



FIGURE 96. FMVSS No. 301 Static Rollover 0 Degrees





FIGURE 99. FMVSS No. 301 Static Rollover 270 Degrees

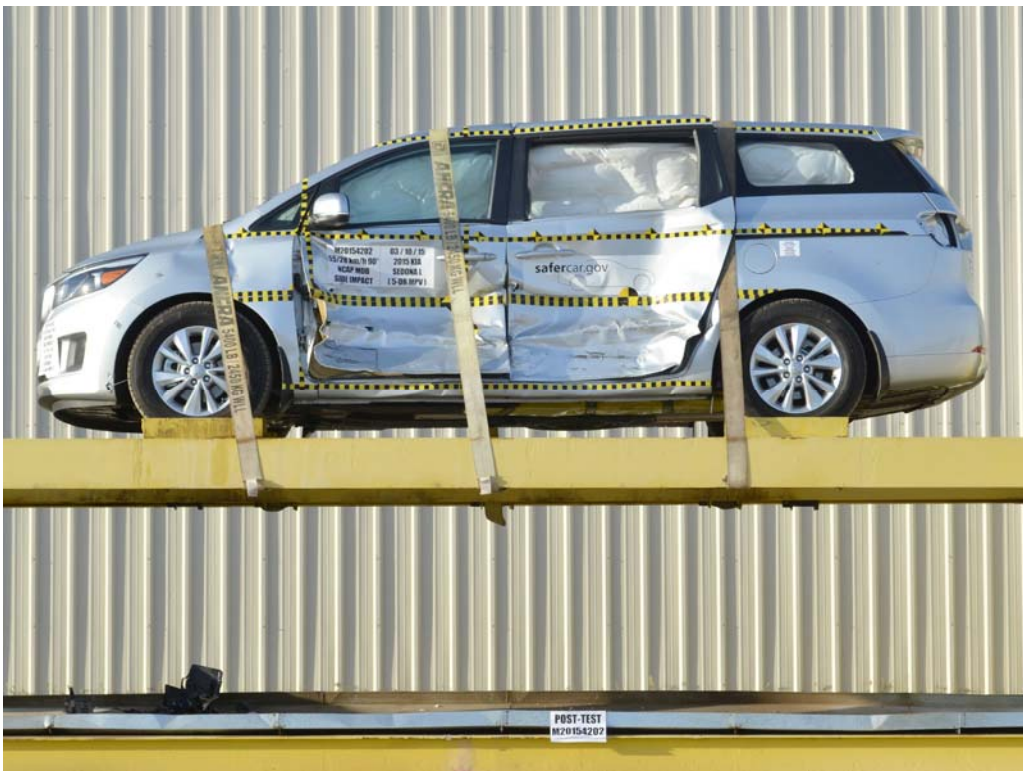


FIGURE 100. FMVSS No. 301 Static Rollover 360 Degrees



FIGURE 101. Impact Event

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>2015 KIA SEDONA L</b><br><b>MODEL / OPTION CODE:</b> 64212 / 010<br><b>EXTERIOR / INTERIOR:</b> BRIGHT SILVER/GRAY<br><b>VEHICLE ID NUMBER:</b> KNDA5AC16F6024907<br><b>ENGINE NUMBER:</b> G6DHE20<br><b>PORT OF ENTRY:</b> TACOMA<br><b>MODE OF TRANSPORT:</b> RAIL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>SOLD TO:</b> L036<br><b>SHIP TO:</b> L036<br><b>ROCK RIVER KIA</b><br><b>220 NORTH ALPINE ROAD</b><br><b>ROCKFORD IL 61107</b>                                                                                                                                                                                                                                                                                  | kia.com<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>STANDARD FEATURES</b><br><b>MECHANICAL</b><br>3.3L DOHC GDI CVT V6 Engine<br>6-Speed Automatic Transmission w/ Sportmatic<br>17" Alloy Wheels<br><b>SAFETY</b><br>Dual Front Advanced Airbags<br>Front Seat-Mounted Side Airbags<br>Full-Length Side Curtain Airbags for All 3 Rows<br>Lower Anchors and Tethers for Children (LATCH)<br>Anti-Lock Braking System (ABS)<br>Brake Assist System (BAS)<br>Traction Control System (TCS)<br>Electronic Stability Control (ESC)<br>Tire Pressure Monitoring System (TPMS)<br><b>INTERIOR, COMFORT &amp; CONVENIENCE</b><br>Front and Rear Air Conditioning<br>Power Windows and Door Locks<br>AM/FM/CD/MP3 Player<br>SIRIUSXM® Satellite Radio w/free 3-mo. subscription*<br>USB/Auxiliary Input Jacks<br>YES Essentials Anti-Soil Seat Fabric<br>2nd Row Slide-N-Stow Seats<br>Remote Keyless Entry System<br>Cruise Control<br>Steering Wheel Mounted Controls (Audio & Cruise)<br>Eco Drive Mode<br><b>EXTERIOR</b><br>Outside Mirrors w/ Turn Signal Indicators<br>Back-Up Warning System<br><b>WARRANTY</b><br>10 Year/100,000 Mile Limited Powertrain Warranty<br>5 Year/60,000 Mile Limited Basic Warranty<br>5 Year/60,000 Mile Roadside Assistance<br>*Ask dealer for details | <b>MANUFACTURER'S SUGGESTED RETAIL PRICE</b> \$25,900.00<br><b>ADDITIONAL INSTALLED EQUIPMENT:</b><br>(In addition to or in place of standard features)<br>Carpeted Floor Mats \$195.00<br>Mud Guards \$95.00<br><b>MSRP INCLUDING OPTIONS</b> \$26,190.00<br><b>INLAND FREIGHT AND HANDLING</b> \$895.00<br><b>TOTAL MANUFACTURER'S SUGGESTED RETAIL PRICE</b> \$27,085.00<br><b>TOTAL ADDITIONAL WEIGHT:</b> 8.6 | <b>EPA Fuel Economy and Environment</b><br><b>Fuel Economy</b><br><b>20</b> MPG<br>combined city/hwy<br><b>18</b> city<br><b>24</b> highway<br><b>5.0</b> gallons per 100 miles<br><b>Annual fuel cost \$2600</b><br><b>Fuel Economy &amp; Greenhouse Gas Rating</b><br><b>5</b><br><b>Smog Rating</b><br><b>5</b><br><b>GOVERNMENT 5-STAR SAFETY RATINGS</b><br><b>Overall Vehicle Score</b> Not Rated<br><b>Crash</b><br>Frontal Driver Not Rated<br>Side Front seat Not Rated<br>Rear seat Not Rated<br><b>Rollover</b> Not Rated<br><b>PARTS CONTENT INFORMATION</b><br><b>FOR VEHICLES IN THIS CAR LINE U.S./CANADIAN</b><br><b>PARTS CONTENT:</b> 3%<br><b>MAJOR SOURCES OF FOREIGN PARTS:</b><br>KOREA: 86%<br><b>NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS.</b><br><b>FOR THIS VEHICLE FINAL ASSEMBLY POINT:</b><br>KOREA<br><b>COUNTRY OF ORIGIN</b><br>KOREA<br><b>TRANSMISSION:</b> KOREA |

FIGURE 102. Monroney Label

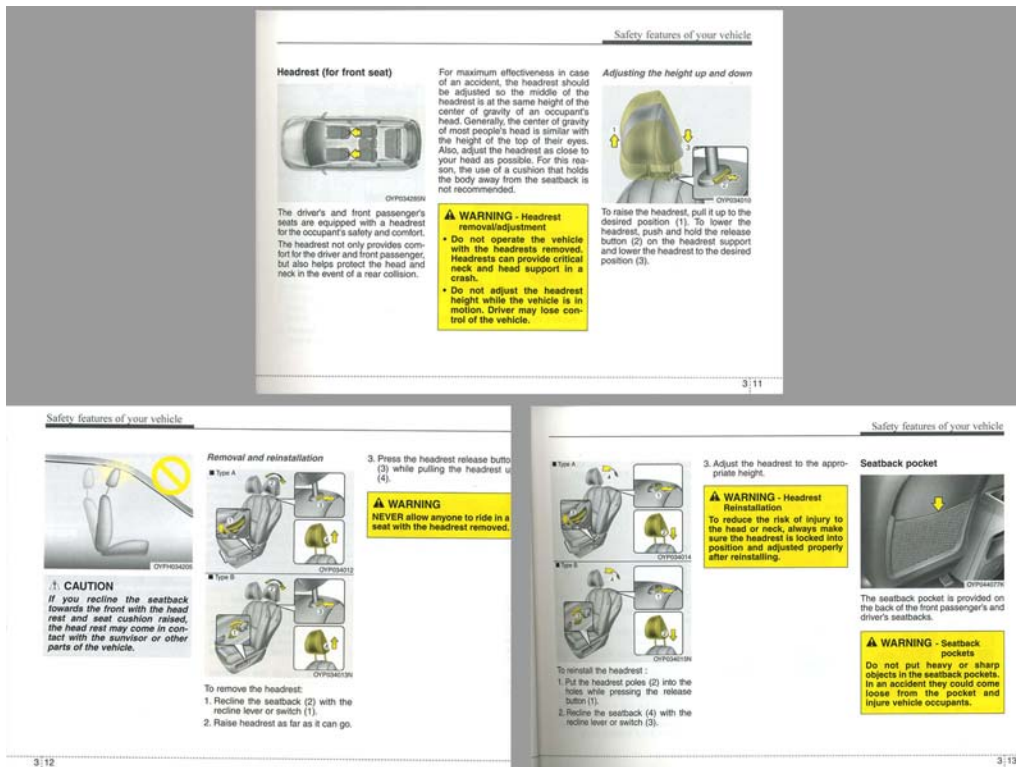


FIGURE 103. Driver Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

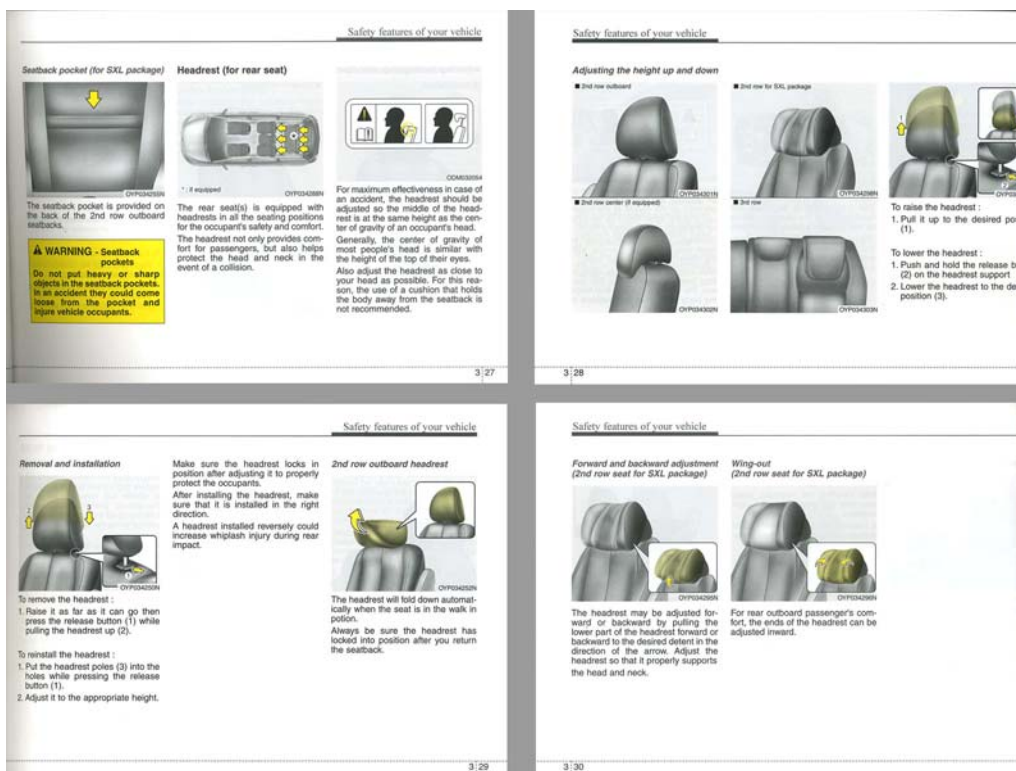


FIGURE 104. Left Rear Passenger Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

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

## TABLE OF DATA PLOTS

| Plot |                                                           | Page |
|------|-----------------------------------------------------------|------|
| 1    | Driver Head Acceleration (X) Primary vs. Time             | B-1  |
| 2    | Driver Head Acceleration (Y) Primary vs. Time             | B-1  |
| 3    | Driver Head Acceleration (Z) Primary vs. Time             | B-1  |
| 4    | Driver Head Resultant Acceleration Primary vs. Time       | B-1  |
| 5    | Driver Upper Thorax Rib Deflection (Y) vs. Time           | B-2  |
| 6    | Driver Middle Thorax Rib Deflection (Y) vs. Time          | B-2  |
| 7    | Driver Lower Thorax Rib Deflection (Y) vs. Time           | B-2  |
| 8    | Driver Thorax Rib Deflection Maximum vs. Time             | B-2  |
| 9    | Driver Anterior Abdominal Force (Y) vs. Time              | B-3  |
| 10   | Driver Middle Abdominal Force (Y) vs. Time                | B-3  |
| 11   | Driver Posterior Abdominal Force (Y) vs. Time             | B-3  |
| 12   | Driver Total Abdominal Force (Y) vs. Time                 | B-3  |
| 13   | Driver Pubic Symphysis Force (Y) vs. Time                 | B-4  |
| 14   | Passenger Head Acceleration (X) vs. Time Primary          | B-5  |
| 15   | Passenger Head Acceleration (Y) vs. Time Primary          | B-5  |
| 16   | Passenger Head Acceleration (Z) vs. Time Primary          | B-5  |
| 17   | Passenger Head Resultant Acceleration Primary vs. Time    | B-5  |
| 18   | Passenger Lower Spine T12 Acceleration (X) vs. Time       | B-6  |
| 19   | Passenger Lower Spine T12 Acceleration (Y) vs. Time       | B-6  |
| 20   | Passenger Lower Spine T12 Acceleration (Z) vs. Time       | B-6  |
| 21   | Passenger Lower Spine T12 Resultant Acceleration vs. Time | B-6  |
| 22   | Passenger Iliac Force on Impact Side (Y) vs. Time         | B-7  |
| 23   | Passenger Acetabulum Force on Impact Side (Y) vs. Time    | B-7  |
| 24   | Passenger Total Pelvic Force on Impact Side (Y) vs. Time  | B-7  |

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

### Additional Driver & Passenger Dummy Instrumentation Data

Driver Lower Spine T12 Acceleration (X)

Driver Lower Spine T12 Acceleration (Y)

Driver Lower Spine T12 Acceleration (Z)

Passenger Upper Thorax Rib Deflection (Y)

Passenger Middle Thorax Rib Deflection (Y)

Passenger Lower Thorax Rib Deflection (Y)

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

### **Vehicle Instrumentation Data**

Vehicle Center of Gravity Acceleration (X)  
Vehicle Center of Gravity Acceleration (Y)  
Vehicle Center of Gravity Acceleration (Z)  
Right Side Sill at Front Seat Acceleration (X)  
Right Side Sill at Front Seat Acceleration (Y)  
Right Side Sill at Front Seat Acceleration (Z)  
Right Side Sill at Rear Seat Acceleration (X)  
Right Side Sill at Rear Seat Acceleration (Y)  
Right Side Sill at Rear Seat Acceleration (Z)  
Left Side Sill at Front Seat Acceleration (Y)  
Left Side Sill at Rear Seat Acceleration (Y)  
Lower A-Post Acceleration (Y)  
Middle A-Post Acceleration (Y)  
Lower B-Post Acceleration (Y)  
Middle B-Post Acceleration (Y)  
Front Seat Track Acceleration (Y)  
Rear Seat Structure Acceleration (Y)  
Right Rear Occupant Compartment Acceleration (Y)  
Engine Block (X)  
Engine Block (Y)  
Rear Floorpan Above Axle Acceleration (X)  
Rear Floorpan Above Axle Acceleration (Y)  
Rear Floorpan Above Axle Acceleration (Z)

### **MDB Instrumentation Data**

MDB Center of Gravity Acceleration (X)

MDB Center of Gravity Acceleration (Y)

MDB Center of Gravity Acceleration (Z)

MDB Rear Acceleration (X)

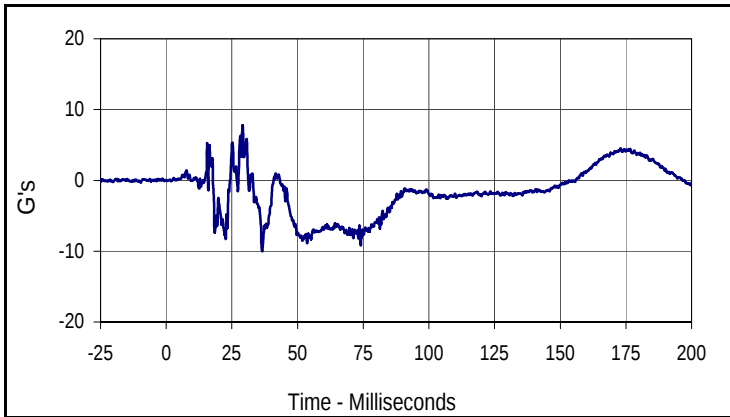
MDB Rear Acceleration (Y)

Left MDB Contact Switch

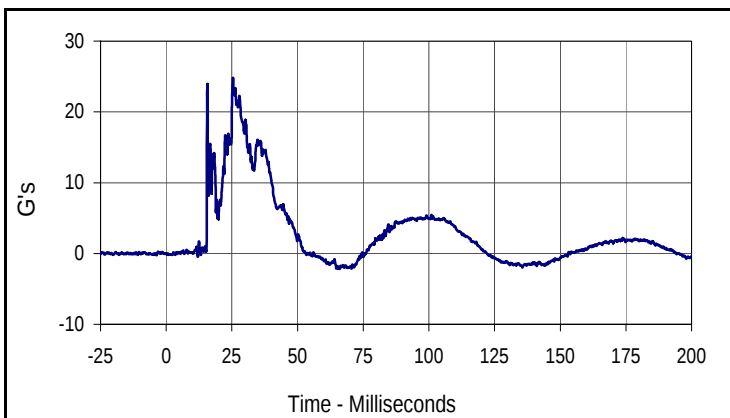
Right MDB Contact Switch

Test Vehicle: 2015 Kia Sedona L 5-Door MPV  
 Test Program: NCAP MDB Side Impact Test

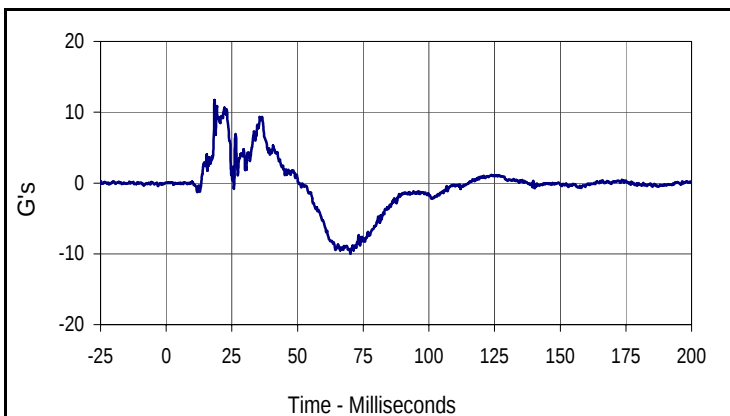
NHTSA No.: M20154202  
 Test Date: 3/10/15



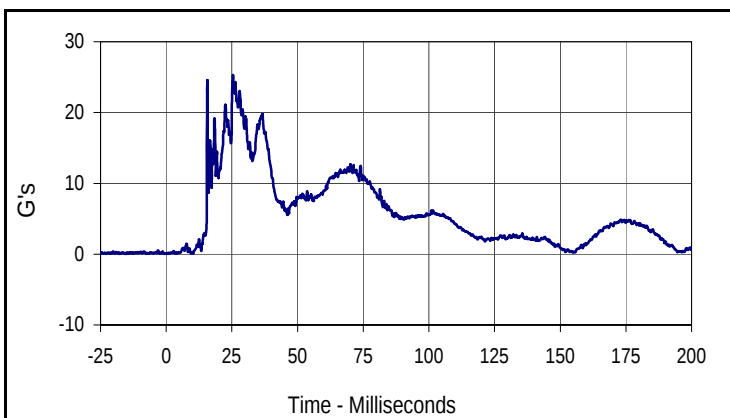
| Curve Description                  |      |           |       |
|------------------------------------|------|-----------|-------|
| Driver Head Acceleration X Primary |      |           |       |
| Plot No.                           | Type | SAE Class | Units |
| 001                                | FIL  | 1000      | G's   |
| Max                                | Time | Min       | Time  |
| 7.8                                | 29.1 | -10.0     | 36.6  |



| Curve Description                  |      |           |       |
|------------------------------------|------|-----------|-------|
| Driver Head Acceleration Y Primary |      |           |       |
| Plot No.                           | Type | SAE Class | Units |
| 002                                | FIL  | 1000      | G's   |
| Max                                | Time | Min       | Time  |
| 24.8                               | 25.4 | -2.2      | 66.0  |



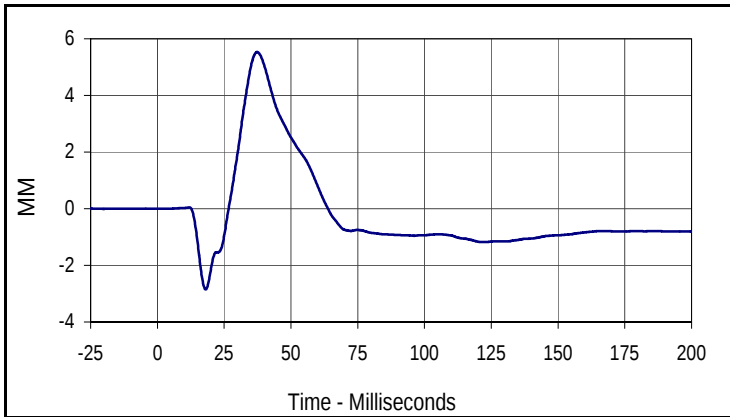
| Curve Description                  |      |           |       |
|------------------------------------|------|-----------|-------|
| Driver Head Acceleration Z Primary |      |           |       |
| Plot No.                           | Type | SAE Class | Units |
| 003                                | FIL  | 1000      | G's   |
| Max                                | Time | Min       | Time  |
| 11.7                               | 18.4 | -10.0     | 70.1  |



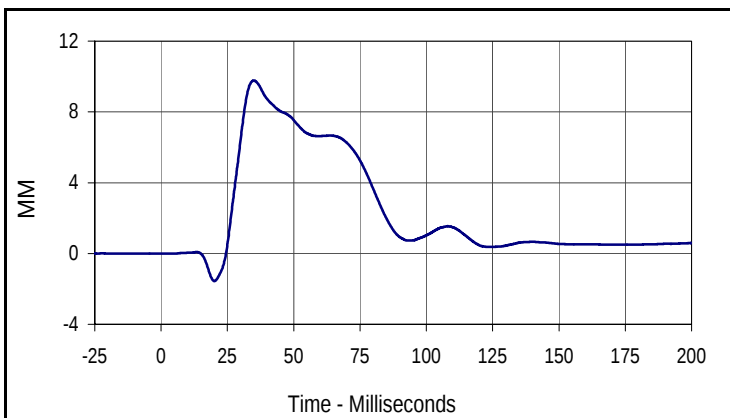
| Curve Description                          |      |           |       |
|--------------------------------------------|------|-----------|-------|
| Driver Head Resultant Acceleration Primary |      |           |       |
| Plot No.                                   | Type | SAE Class | Units |
| 004                                        | RES  | 1000      | G's   |
| Max                                        | Time | Min       | Time  |
| 25.3                                       | 25.4 | 0.0       | 0.7   |

Test Vehicle: 2015 Kia Sedona L 5-Door MPV  
 Test Program: NCAP MDB Side Impact Test

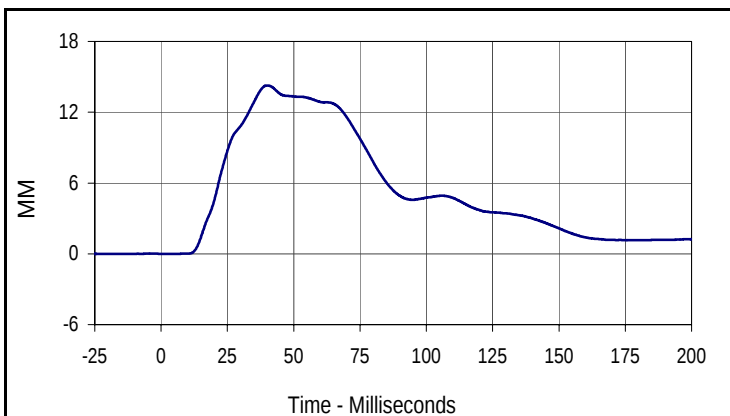
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 Test Date: 3/10/15



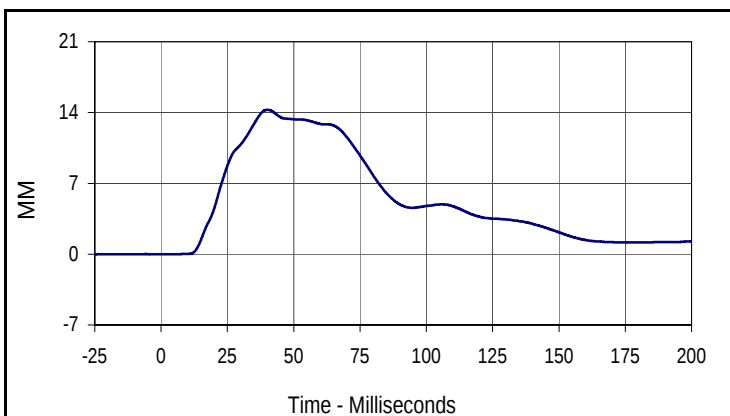
| Curve Description                    |      |           |       |
|--------------------------------------|------|-----------|-------|
| Driver Upper Thorax Rib Deflection Y |      |           |       |
| Plot No.                             | Type | SAE Class | Units |
| 005                                  | FIL  | 180       | MM    |
| Max                                  | Time | Min       | Time  |
| 5.5                                  | 37.3 | -2.8      | 18.1  |



| Curve Description                     |      |           |       |
|---------------------------------------|------|-----------|-------|
| Driver Middle Thorax Rib Deflection Y |      |           |       |
| Plot No.                              | Type | SAE Class | Units |
| 006                                   | FIL  | 180       | MM    |
| Max                                   | Time | Min       | Time  |
| 9.8                                   | 35.0 | -1.6      | 20.1  |



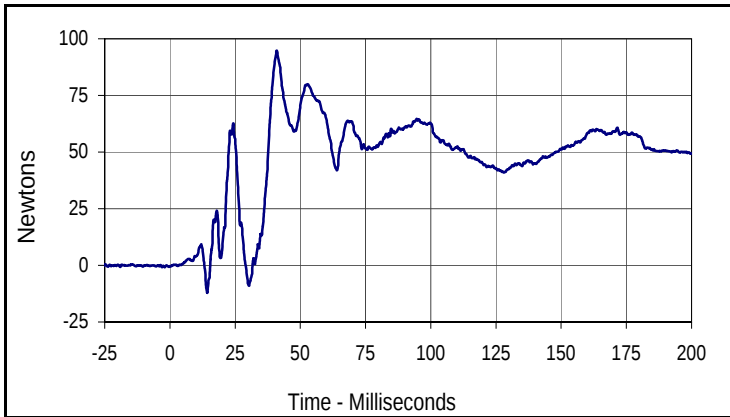
| Curve Description                    |      |           |       |
|--------------------------------------|------|-----------|-------|
| Driver Lower Thorax Rib Deflection Y |      |           |       |
| Plot No.                             | Type | SAE Class | Units |
| 007                                  | FIL  | 180       | MM    |
| Max                                  | Time | Min       | Time  |
| 14.3                                 | 40.0 | 0.0       | 5.4   |



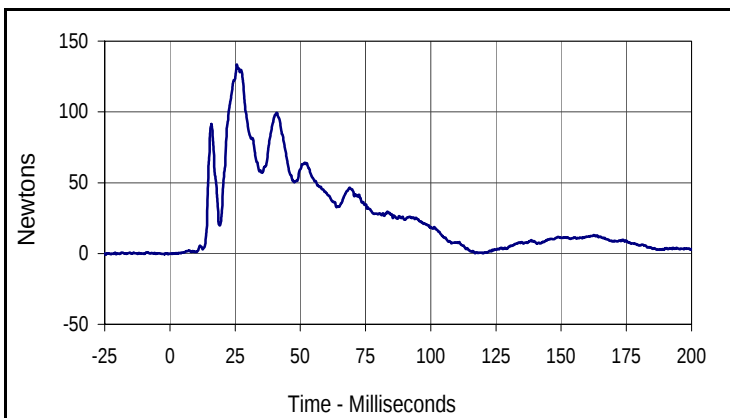
| Curve Description                    |      |           |       |
|--------------------------------------|------|-----------|-------|
| Driver Thorax Rib Deflection Maximum |      |           |       |
| Plot No.                             | Type | SAE Class | Units |
| 010                                  | FIL  | 180       | MM    |
| Max                                  | Time | Min       | Time  |
| 14.3                                 | 40.0 | 0.0       | 5.4   |

Test Vehicle: 2015 Kia Sedona L 5-Door MPV  
 Test Program: NCAP MDB Side Impact Test

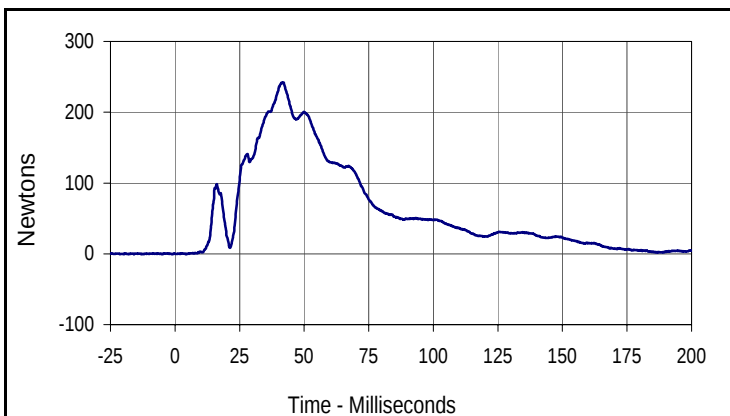
NHTSA No.: M20154202  
 Test Date: 3/10/15



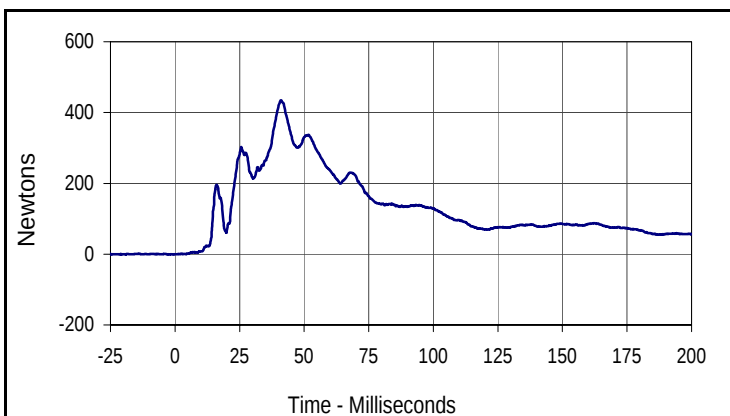
| Curve Description                 |      |           |         |
|-----------------------------------|------|-----------|---------|
| Driver Anterior Abdominal Force Y |      |           |         |
| Plot No.                          | Type | SAE Class | Units   |
| 008                               | FIL  | 600       | Newtons |
| Max                               | Time | Min       | Time    |
| 94.7                              | 41.0 | -12.2     | 14.3    |



| Curve Description               |      |           |         |
|---------------------------------|------|-----------|---------|
| Driver Middle Abdominal Force Y |      |           |         |
| Plot No.                        | Type | SAE Class | Units   |
| 009                             | FIL  | 600       | Newtons |
| Max                             | Time | Min       | Time    |
| 133.4                           | 25.7 | -0.2      | 1.1     |



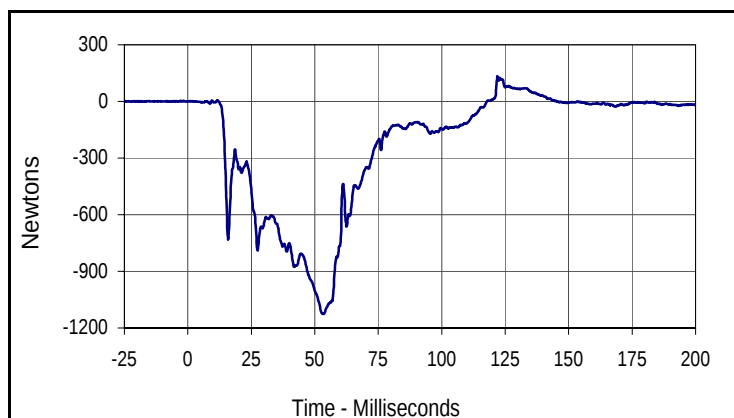
| Curve Description                  |      |           |         |
|------------------------------------|------|-----------|---------|
| Driver Posterior Abdominal Force Y |      |           |         |
| Plot No.                           | Type | SAE Class | Units   |
| 011                                | FIL  | 600       | Newtons |
| Max                                | Time | Min       | Time    |
| 241.9                              | 41.9 | -0.5      | 4.4     |



| Curve Description            |      |           |         |
|------------------------------|------|-----------|---------|
| Driver Total Abdominal Force |      |           |         |
| Plot No.                     | Type | SAE Class | Units   |
| 012                          | SUM  | 600       | Newtons |
| Max                          | Time | Min       | Time    |
| 434.7                        | 41.0 | -0.6      | 0.5     |

Test Vehicle: 2015 Kia Sedona L 5-Door MPV  
 Test Program: NCAP MDB Side Impact Test

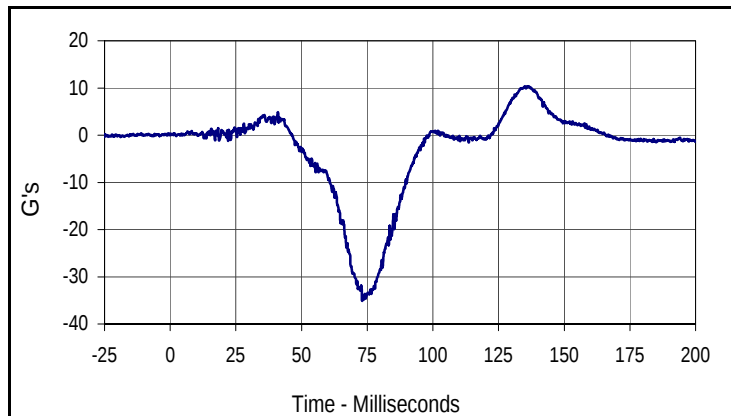
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 Test Date: 3/10/15



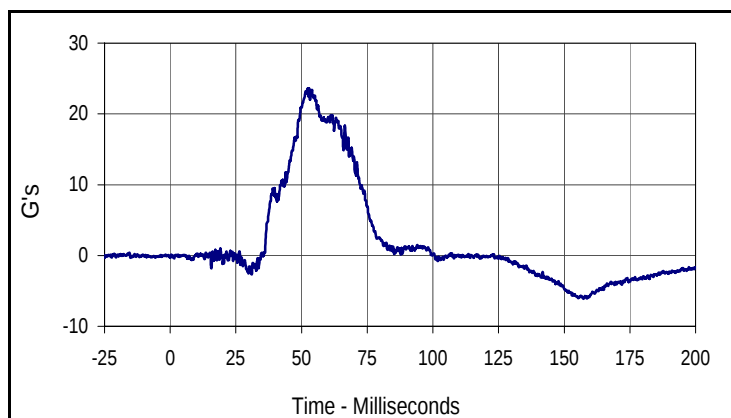
| Curve Description              |       |           |         |
|--------------------------------|-------|-----------|---------|
| Driver Pubic Symphysis Force Y |       |           |         |
| Plot No.                       | Type  | SAE Class | Units   |
| 013                            | FIL   | 600       | Newtons |
| Max                            | Time  | Min       | Time    |
| 133.5                          | 121.9 | -1125.9   | 53.4    |

Test Vehicle: 2015 Kia Sedona L 5-Door MPV  
 Test Program: NCAP MDB Side Impact Test

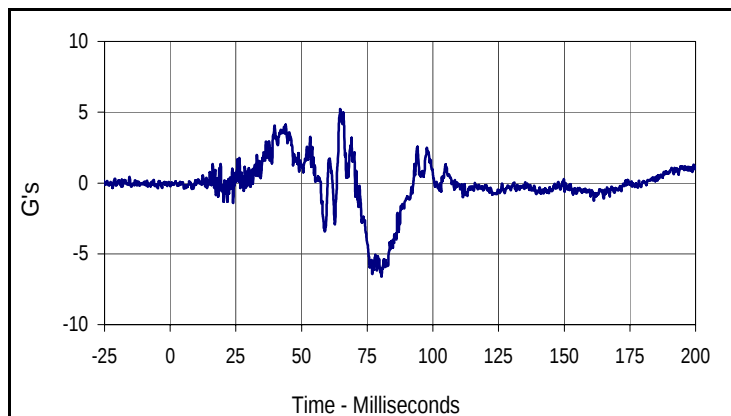
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 Test Date: 3/10/15



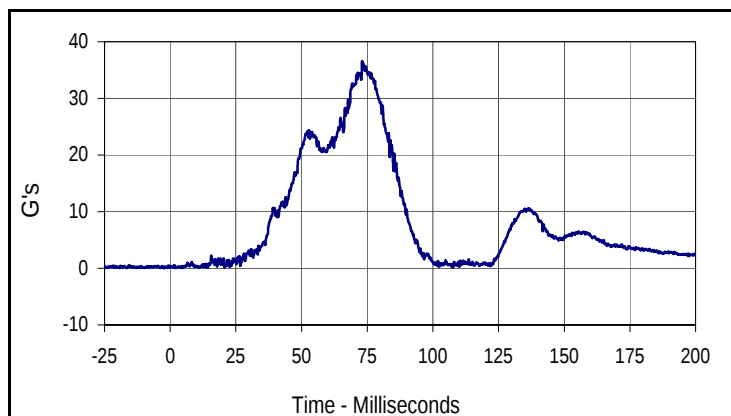
| Curve Description                     |       |           |       |
|---------------------------------------|-------|-----------|-------|
| Passenger Head Acceleration X Primary |       |           |       |
| Plot No.                              | Type  | SAE Class | Units |
| 014                                   | FIL   | 1000      | G's   |
| Max                                   | Time  | Min       | Time  |
| 10.4                                  | 135.1 | -35.2     | 73.1  |



| Curve Description                     |      |           |       |
|---------------------------------------|------|-----------|-------|
| Passenger Head Acceleration Y Primary |      |           |       |
| Plot No.                              | Type | SAE Class | Units |
| 015                                   | FIL  | 1000      | G's   |
| Max                                   | Time | Min       | Time  |
| 23.6                                  | 52.9 | -6.1      | 157.4 |



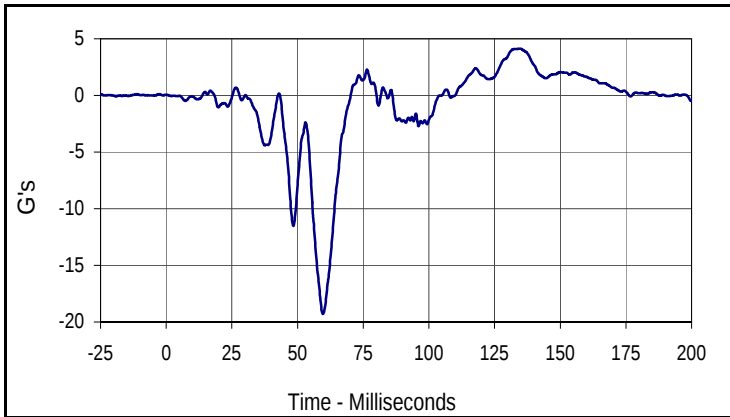
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|---------------------------------------|------|-----------|-------|
| Passenger Head Acceleration Z Primary |      |           |       |
| Plot No.                              | Type | SAE Class | Units |
| 016                                   | FIL  | 1000      | G's   |
| Max                                   | Time | Min       | Time  |
| 5.2                                   | 64.7 | -6.6      | 80.5  |



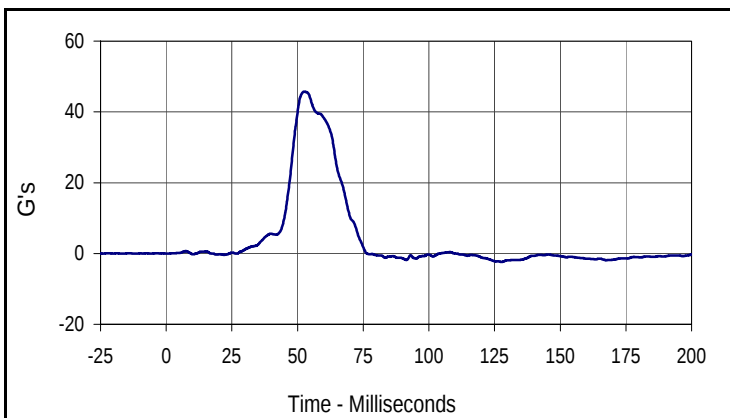
| Curve Description                             |      |           |       |
|-----------------------------------------------|------|-----------|-------|
| Passenger Head Acceleration Resultant Primary |      |           |       |
| Plot No.                                      | Type | SAE Class | Units |
| 017                                           | RES  | 1000      | G's   |
| Max                                           | Time | Min       | Time  |
| 36.5                                          | 73.1 | 0.0       | 10.9  |

Test Vehicle: 2015 Kia Sedona L 5-Door MPV  
 Test Program: NCAP MDB Side Impact Test

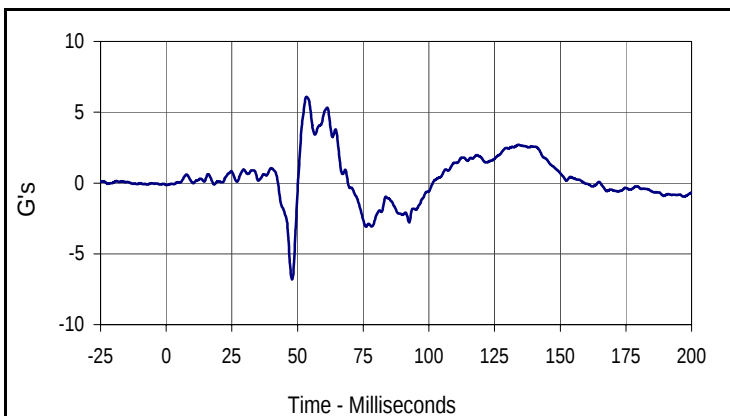
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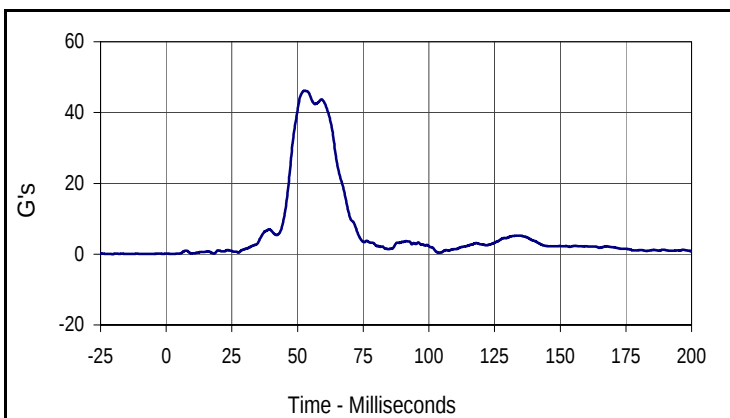
| Curve Description                        |       |           |       |
|------------------------------------------|-------|-----------|-------|
| Passenger Lower Spine T12 Acceleration X |       |           |       |
| Plot No.                                 | Type  | SAE Class | Units |
| 019                                      | FIL   | 180       | G's   |
| Max                                      | Time  | Min       | Time  |
| 4.1                                      | 134.7 | -19.3     | 59.6  |



| Curve Description                        |      |           |       |
|------------------------------------------|------|-----------|-------|
| Passenger Lower Spine T12 Acceleration Y |      |           |       |
| Plot No.                                 | Type | SAE Class | Units |
| 020                                      | FIL  | 180       | G's   |
| Max                                      | Time | Min       | Time  |
| 45.8                                     | 52.5 | -2.4      | 127.6 |



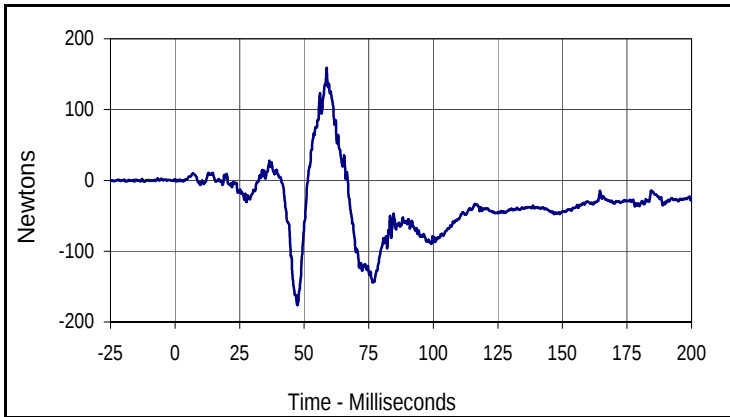
| Curve Description                        |      |           |       |
|------------------------------------------|------|-----------|-------|
| Passenger Lower Spine T12 Acceleration Z |      |           |       |
| Plot No.                                 | Type | SAE Class | Units |
| 021                                      | FIL  | 180       | G's   |
| Max                                      | Time | Min       | Time  |
| 6.1                                      | 53.4 | -6.8      | 47.9  |



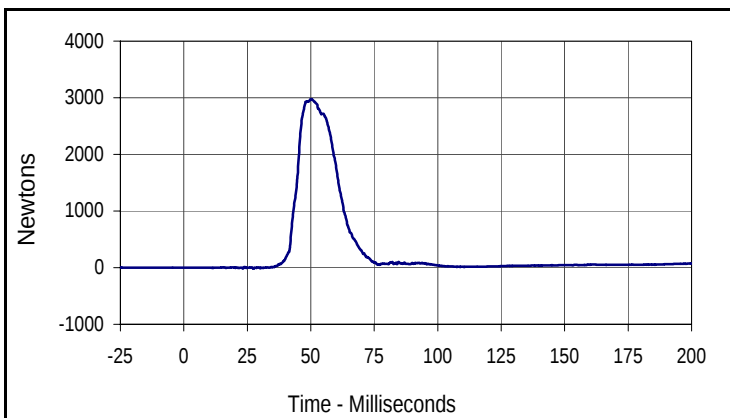
| Curve Description                           |      |           |       |
|---------------------------------------------|------|-----------|-------|
| Passenger Lower Spine T12 Acceleration Res. |      |           |       |
| Plot No.                                    | Type | SAE Class | Units |
| 022                                         | RES  | 180       | G's   |
| Max                                         | Time | Min       | Time  |
| 46.2                                        | 52.5 | 0.1       | 1.6   |

Test Vehicle: 2015 Kia Sedona L 5-Door MPV  
 Test Program: NCAP MDB Side Impact Test

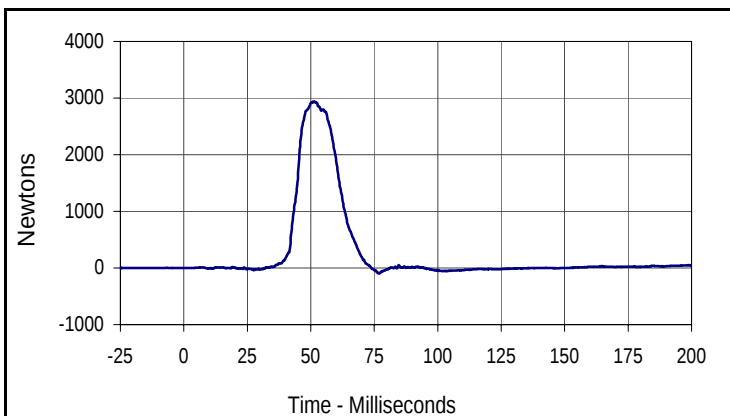
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 Test Date: 3/10/15



| Curve Description                      |      |           |         |
|----------------------------------------|------|-----------|---------|
| Passenger Iliac Force on Impact Side Y |      |           |         |
| Plot No.                               | Type | SAE Class | Units   |
| 023                                    | FIL  | 600       | Newtons |
| Max                                    | Time | Min       | Time    |
| 159.1                                  | 58.7 | -175.9    | 47.3    |



| Curve Description                           |      |           |         |
|---------------------------------------------|------|-----------|---------|
| Passenger Acetabulum Force on Impact Side Y |      |           |         |
| Plot No.                                    | Type | SAE Class | Units   |
| 024                                         | FIL  | 600       | Newtons |
| Max                                         | Time | Min       | Time    |
| 2974.7                                      | 50.2 | -15.3     | 23.3    |



| Curve Description            |      |           |         |
|------------------------------|------|-----------|---------|
| Passenger Total Pelvic Force |      |           |         |
| Plot No.                     | Type | SAE Class | Units   |
| 018                          | SUM  | 600       | Newtons |
| Max                          | Time | Min       | Time    |
| 2936.0                       | 51.1 | -94.9     | 76.9    |

**APPENDIX C**  
**DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA**

**APPENDIX C**  
**PRE-TEST / ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA**

Test Program: ES2re External Measurements  
 ATD Serial No.: F037

Test Date: 1/16/15  
 Test I.D.: N/A



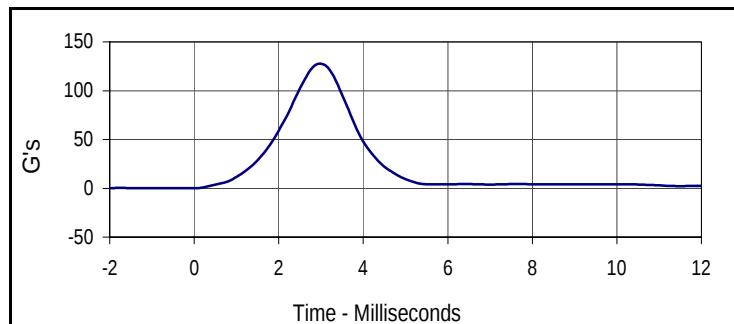
| Tested Parameter             |                                                | Units | Specification | Result | Pass/Fail |
|------------------------------|------------------------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature       |                                                | °C    | 20.6 to 22.2  | 21.2   | Pass      |
| Laboratory Relative Humidity |                                                | %     | 10 to 70      | 30.0   | Pass      |
| 1                            | Sitting Height                                 | mm    | 900 - 918     | 909    | Pass      |
| 2                            | Seat to Shoulder Joint                         | mm    | 558 - 572     | 564    | Pass      |
| 3                            | Seat to Lower Face of Thoracic Spine Box       | mm    | 346 - 356     | 350    | Pass      |
| 4                            | Seat to Hip Joint (Center of Bolt)             | mm    | 97 - 103      | 99     | Pass      |
| 5                            | Sole to Seat, Sitting                          | mm    | 333 - 451     | 395    | Pass      |
| 6                            | Head Width                                     | mm    | 152 - 158     | 156    | Pass      |
| 7                            | Shoulder / Arm Width                           | mm    | 461 - 479     | 470    | Pass      |
| 8                            | Thorax Width                                   | mm    | 322 - 332     | 326    | Pass      |
| 9                            | Abdomen Width                                  | mm    | 273 - 287     | 280    | Pass      |
| 10                           | Pelvis Lap Width                               | mm    | 359 - 373     | 363    | Pass      |
| 11                           | Head Depth                                     | mm    | 196 - 206     | 201    | Pass      |
| 12                           | Thorax Depth                                   | mm    | 262 - 272     | 270    | Pass      |
| 13                           | Abdomen Width                                  | mm    | 194 - 204     | 199    | Pass      |
| 14                           | Pelvis Depth                                   | mm    | 235 - 245     | 240    | Pass      |
| 15                           | Back of Buttocks to Hip Joint (Center of Bolt) | mm    | 150 - 160     | 155    | Pass      |
| 16                           | Back of Buttocks to Front Knee                 | mm    | 597 - 615     | 608    | Pass      |
| Overall Test Results         |                                                |       |               |        | Pass      |

Test Program: ES2re Head Drop Test  
 ATD Serial No.: F037

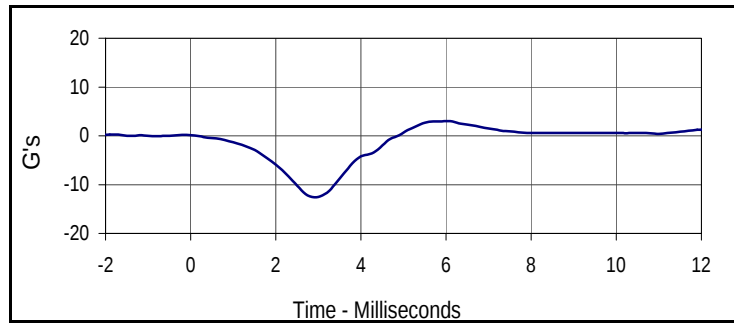
Test Date: 1/16/15  
 Test I.D.: F037HD070



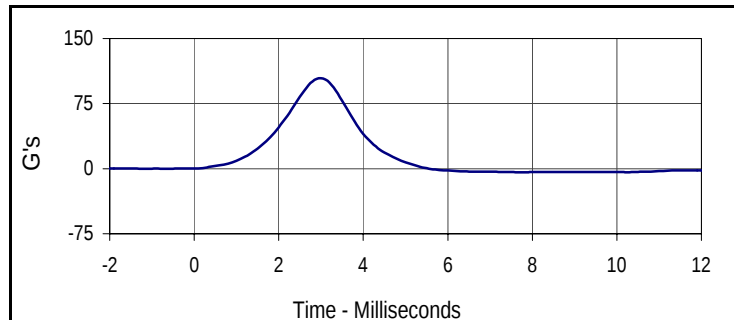
| Tested Parameter                   | Units   | Specification | Result | Pass/Fail |
|------------------------------------|---------|---------------|--------|-----------|
| Head Assembly Soak Time            | Minutes | ≥240          | 312    | Pass      |
| Temperature During Soak            | Max     | 20.6 to 22.2  | 21.6   | Pass      |
|                                    | Min     |               | 21.1   | Pass      |
| Humidity During Soak               | Max     | 10.0 to 70.0  | 34.0   | Pass      |
|                                    | Min     |               | 33.4   | Pass      |
| Laboratory Temperature During Test | °C      | 20.6 to 22.2  | 21.2   | Pass      |
| Laboratory Humidity During Test    | %       | 10.0 to 70.0  | 34.0   | Pass      |
| Peak Head Resultant Acceleration   | G's     | 125 to 155    | 127.8  | Pass      |
| Peak Head X Acceleration           | G's     | ≤15           | 12.6   | Pass      |
| Is Acceleration Unimodal?          | Yes/No  | Yes           | Yes    | Pass      |
| Oscillations After Main Pulse      | %       | <15           | 0.2    | Pass      |
| Overall Test Results               |         |               |        | Pass      |



| Curve Description |      |           |       |
|-------------------|------|-----------|-------|
| Head Resultant    |      |           |       |
| Plot No.          | Type | SAE Class | Units |
| 001               | RES  | 1000      | G's   |
| Max               | Time | Min       | Time  |
| 127.8             | 3.0  | 0.0       | -8.0  |



| Curve Description |      |           |       |
|-------------------|------|-----------|-------|
| Head X            |      |           |       |
| Plot No.          | Type | SAE Class | Units |
| 002               | FIL  | 1000      | G's   |
| Max               | Time | Min       | Time  |
| 3.0               | 6.0  | -12.6     | 2.9   |



| Curve Description |      |           |       |
|-------------------|------|-----------|-------|
| Head Y            |      |           |       |
| Plot No.          | Type | SAE Class | Units |
| 003               | FIL  | 1000      | G's   |
| Max               | Time | Min       | Time  |
| 104.3             | 3.0  | -4.1      | 7.7   |



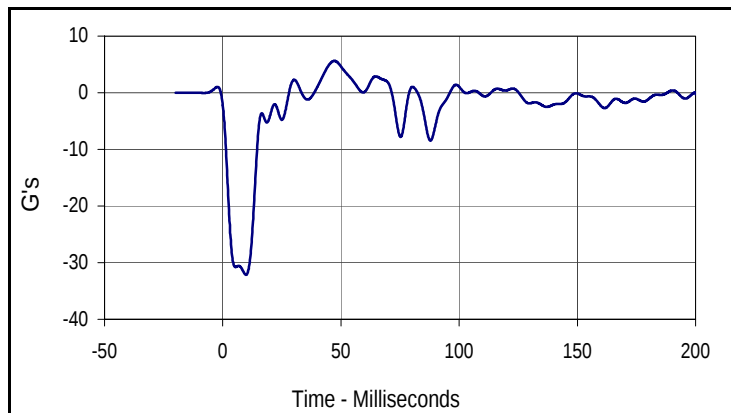
| Curve Description |      |           |       |
|-------------------|------|-----------|-------|
| Head Z            |      |           |       |
| Plot No.          | Type | SAE Class | Units |
| 004               | FIL  | 1000      | G's   |
| Max               | Time | Min       | Time  |
| 72.9              | 3.0  | -0.3      | -15.3 |

Test Program: ES2re Neck Flexion Test  
 ATD Serial No.: F037

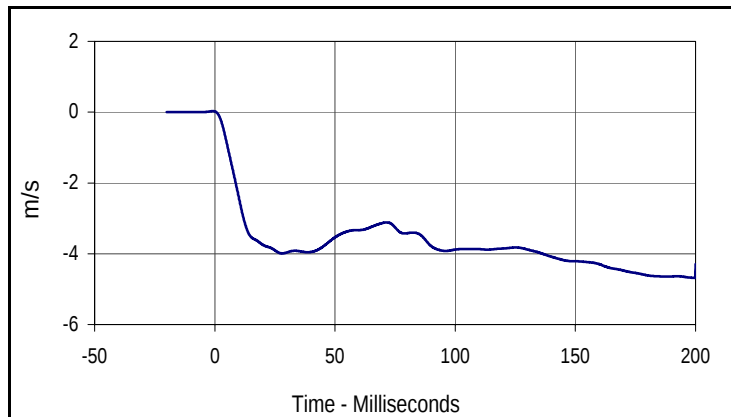
Test Date: 1/16/15  
 Test I.D.: F037NB070



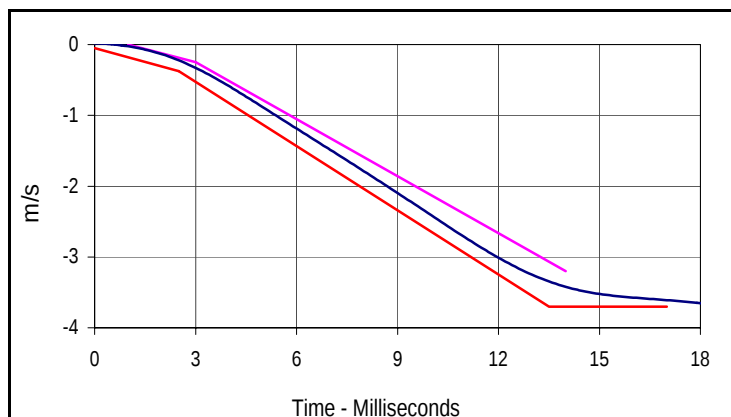
| Tested Parameter                      | Units   | Specification | Result | Pass/Fail |
|---------------------------------------|---------|---------------|--------|-----------|
| Neck Assembly Soak Time               | Minutes | ≥240          | 347    | Pass      |
| Temperature During Soak               | Max     | 20.6 to 22.2  | 21.6   | Pass      |
|                                       | Min     |               | 21.1   | Pass      |
| Humidity During Soak                  | Max     | 10.0 to 70.0  | 34.0   | Pass      |
|                                       | Min     |               | 33.4   | Pass      |
| Laboratory Temperature During Test    | °C      | 20.6 to 22.2  | 21.2   | Pass      |
| Laboratory Humidity During Test       | %       | 10.0 to 70.0  | 33.9   | Pass      |
| Pendulum Velocity                     | m/s     | 3.3 to 3.5    | 3.37   | Pass      |
| Headform Flexion                      | Max     | 49 to 59      | 53.9   | Pass      |
|                                       | Time    | 54 to 66      | 55.6   | Pass      |
| Headform Flexion Decay (Peak to Zero) | msec    | 53 to 88      | 63.0   | Pass      |
| Overall Test Results                  |         |               |        | Pass      |



| Curve Description     |      |           |       |
|-----------------------|------|-----------|-------|
| Pendulum Deceleration |      |           |       |
| Plot No.              | Type | SAE Class | Units |
| 001                   | FIL  | 60        | G's   |
| Max                   | Time | Min       | Time  |
| 5.6                   | 47.2 | -32.1     | 9.8   |



| Curve Description |      |           |       |
|-------------------|------|-----------|-------|
| Pendulum Velocity |      |           |       |
| Plot No.          | Type | SAE Class | Units |
| 002               | FIL  | 60        | m/s   |
| Max               | Time | Min       | Time  |
| 0.0               | -0.8 | -4.7      | 199.4 |



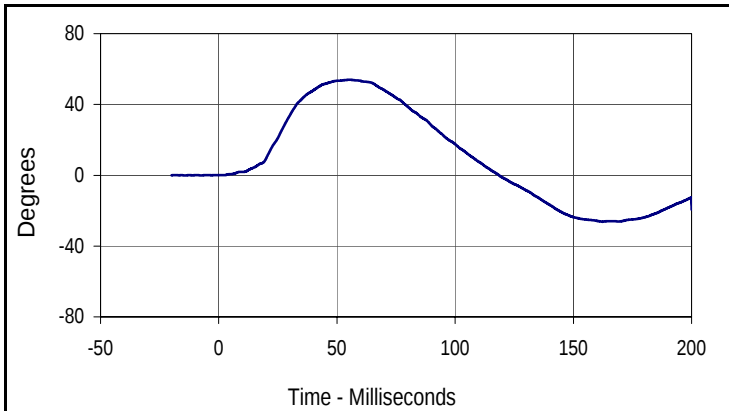
| Curve Description |      |           |       |
|-------------------|------|-----------|-------|
| Pendulum Velocity |      |           |       |
| Plot No.          | Type | SAE Class | Units |
| 002               | FIL  | 60        | m/s   |
| Max               | Time | Min       | Time  |
| 0.0               | -0.8 | -4.7      | 199.4 |

#### Velocity Corridors

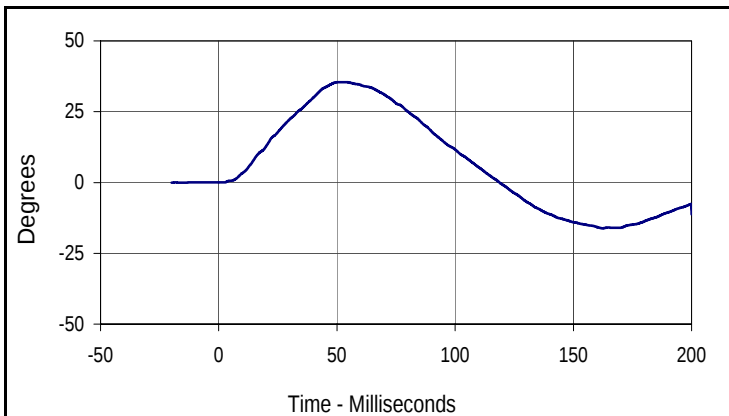
| Upper Boundary |                | Lower Boundary |                |
|----------------|----------------|----------------|----------------|
| Time (msec)    | Velocity (m/s) | Time (msec)    | Velocity (m/s) |
| 1.0            | 0.00           | 0.0            | -0.05          |
| 3.0            | -0.03          | 2.5            | -0.375         |
| 14.0           | -3.20          | 13.5           | -3.70          |
|                |                | 17.0           | -3.70          |

Test Program: ES2re Neck Flexion Test  
 ATD Serial No.: F037

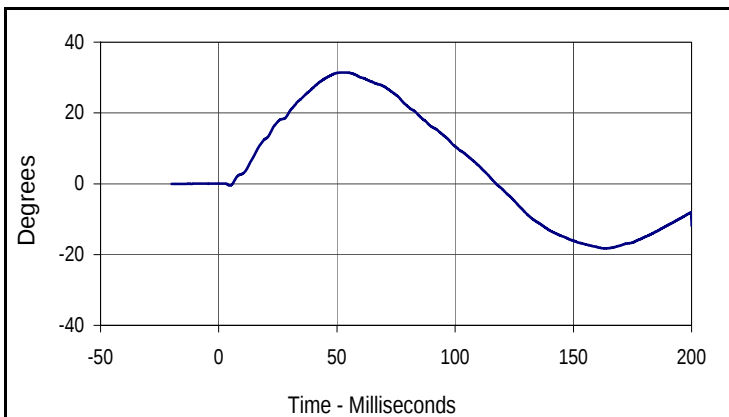
Test Date: 1/16/15  
 Test I.D.: F037NB070



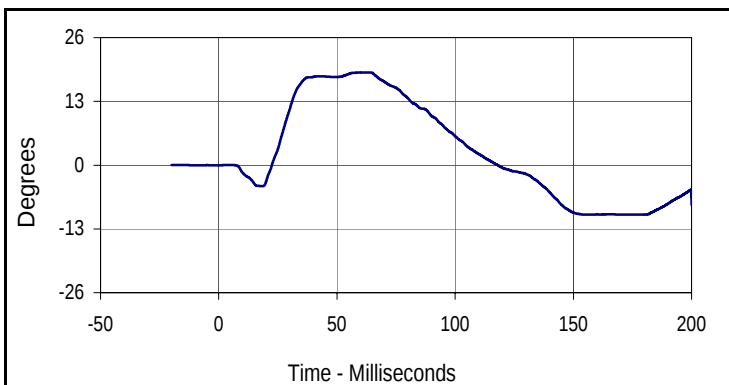
| Curve Description |      |           |         |
|-------------------|------|-----------|---------|
| Headform Rotation |      |           |         |
| Plot No.          | Type | SAE Class | Units   |
| 003               | FIL  | 180       | Degrees |
| Max               | Time | Min       | Time    |
| 53.9              | 55.6 | -26.2     | 162.3   |



| Curve Description |      |           |         |
|-------------------|------|-----------|---------|
| Potentiometer A   |      |           |         |
| Plot No.          | Type | SAE Class | Units   |
| 004               | FIL  | 180       | Degrees |
| Max               | Time | Min       | Time    |
| 35.5              | 52.6 | -16.2     | 162.3   |



| Curve Description |      |           |         |
|-------------------|------|-----------|---------|
| Potentiometer B   |      |           |         |
| Plot No.          | Type | SAE Class | Units   |
| 005               | FIL  | 180       | Degrees |
| Max               | Time | Min       | Time    |
| 31.4              | 52.5 | -18.3     | 163.4   |



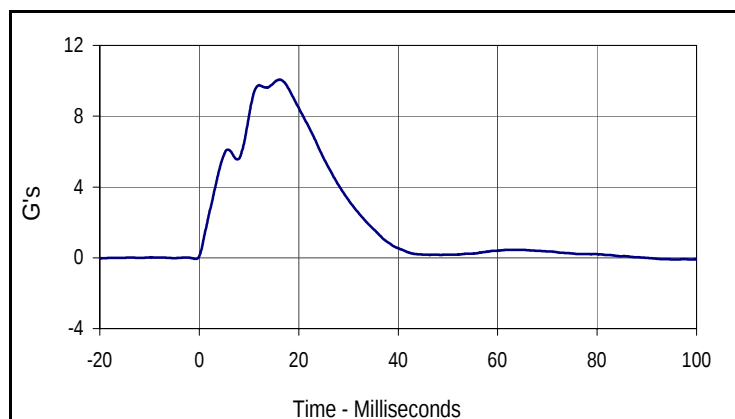
| Curve Description |      |           |         |
|-------------------|------|-----------|---------|
| Potentiometer C   |      |           |         |
| Plot No.          | Type | SAE Class | Units   |
| 006               | FIL  | 180       | Degrees |
| Max               | Time | Min       | Time    |
| 18.9              | 64.0 | -10.1     | 174.8   |

Test Program: ES2re Shoulder Impact Test  
 ATD Serial No.: F037

Test Date: 1/16/15  
 Test I.D.: F037SH070



| Tested Parameter                   | Units   | Specification | Result | Pass/Fail |
|------------------------------------|---------|---------------|--------|-----------|
| Dummy Soak Time                    | Minutes | ≥240          | 412    | Pass      |
| Temperature During Soak            | Max     | 20.6 to 22.2  | 21.6   | Pass      |
|                                    | Min     |               | 21.1   | Pass      |
| Humidity During Soak               | Max     | 10.0 to 70.0  | 34.0   | Pass      |
|                                    | Min     |               | 33.4   | Pass      |
| Laboratory Temperature During Test | °C      | 20.6 to 22.2  | 21.3   | Pass      |
| Laboratory Humidity During Test    | %       | 10.0 to 70.0  | 33.8   | Pass      |
| Pendulum Speed                     | m/s     | 4.2 to 4.4    | 4.32   | Pass      |
| Peak Impactor Acceleration         | G's     | 7.5 to 10.5   | 10.1   | Pass      |
| Overall Test Results               |         |               |        | Pass      |



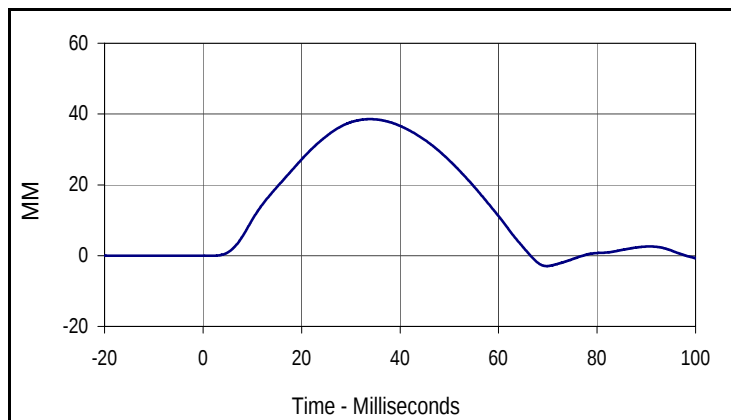
| Curve Description     |      |           |       |
|-----------------------|------|-----------|-------|
| Impactor Acceleration |      |           |       |
| Plot No.              | Type | SAE Class | Units |
| 001                   | FIL  | 180       | G's   |
| Max                   | Time | Min       | Time  |
| 10.1                  | 16.2 | -0.1      | 98.7  |

Test Program: ES2re Thorax - Rib Drop Test  
 ATD Serial No.: F037 Rib # 1

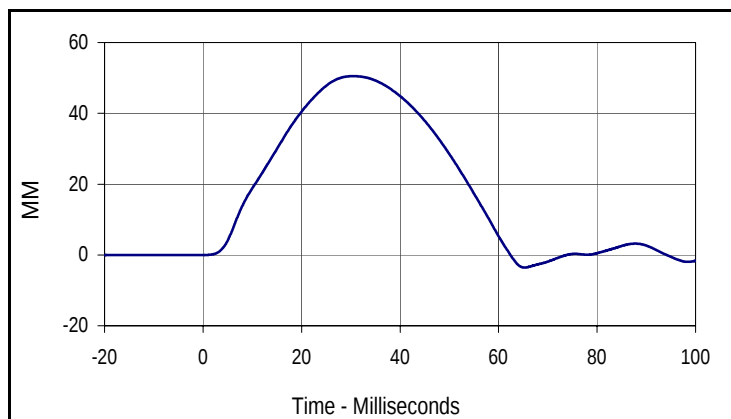
Test Date: 1/16/15  
 Test I.D.: F037RB1070



| Tested Parameter                                | Units   | Specification | Result | Pass/Fail |
|-------------------------------------------------|---------|---------------|--------|-----------|
| Rib Module Soak Time                            | Minutes | ≥240          | 467    | Pass      |
| Temperature During Soak                         | Max     | 20.6 to 22.2  | 21.6   | Pass      |
|                                                 | Min     |               | 21.1   | Pass      |
| Humidity During Soak                            | Max     | 10.0 to 70.0  | 34.0   | Pass      |
|                                                 | Min     |               | 33.4   | Pass      |
| Laboratory Temperature During Test              | °C      | 20.6 to 22.2  | 21.4   | Pass      |
| Laboratory Humidity During Test                 | %       | 10.0 to 70.0  | 33.6   | Pass      |
| Peak Rib Deflection at 459 +/- 5 mm Drop Height | mm      | 36 to 40      | 38.6   | Pass      |
| Peak Rib Deflection at 815 +/- 8 mm Drop Height | mm      | 46 to 51      | 50.5   | Pass      |
| Overall Test Results                            |         |               |        | Pass      |



| Curve Description                         |      |           |       |
|-------------------------------------------|------|-----------|-------|
| Upper Rib Deflection (459 mm Drop Height) |      |           |       |
| Plot No.                                  | Type | SAE Class | Units |
| 001                                       | FIL  | 180       | MM    |
| Max                                       | Time | Min       | Time  |
| 38.6                                      | 33.9 | -3.0      | 69.8  |



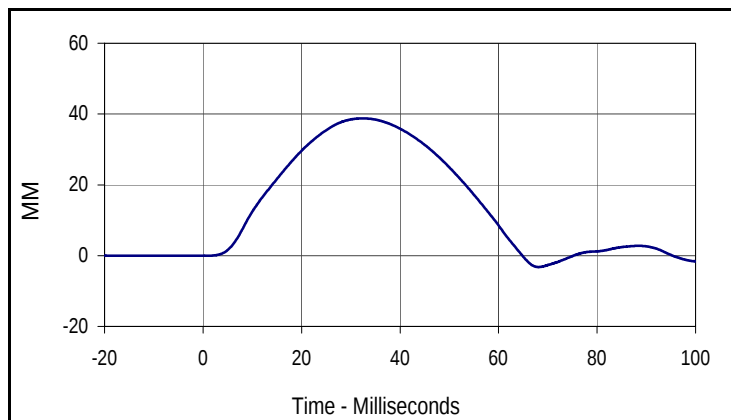
| Curve Description                         |      |           |       |
|-------------------------------------------|------|-----------|-------|
| Upper Rib Deflection (815 mm Drop Height) |      |           |       |
| Plot No.                                  | Type | SAE Class | Units |
| 002                                       | FIL  | 180       | MM    |
| Max                                       | Time | Min       | Time  |
| 50.5                                      | 30.5 | -3.6      | 65.3  |

Test Program: ES2re Thorax - Rib Drop Test  
 ATD Serial No.: F037 Rib # 2

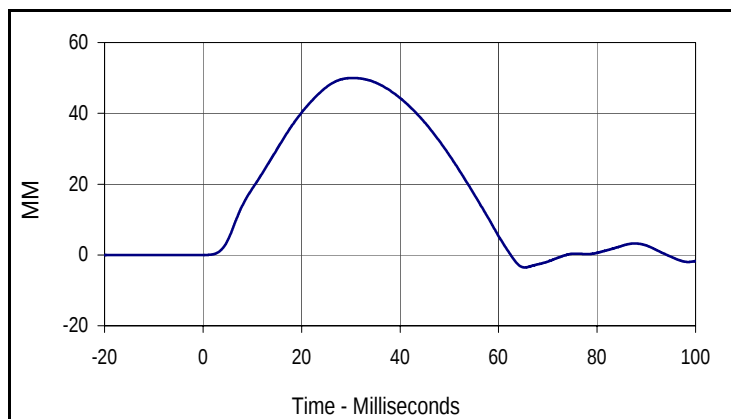
Test Date: 1/16/15  
 Test I.D.: F037RB2070



| Tested Parameter                                | Units   | Specification | Result | Pass/Fail |
|-------------------------------------------------|---------|---------------|--------|-----------|
| Rib Module Soak Time                            | Minutes | ≥240          | 512    | Pass      |
| Temperature During Soak                         | Max     | 20.6 to 22.2  | 21.6   | Pass      |
|                                                 | Min     |               | 21.1   | Pass      |
| Humidity During Soak                            | Max     | 10.0 to 70.0  | 34.0   | Pass      |
|                                                 | Min     |               | 33.4   | Pass      |
| Laboratory Temperature During Test              | °C      | 20.6 to 22.2  | 21.4   | Pass      |
| Laboratory Humidity During Test                 | %       | 10.0 to 70.0  | 33.6   | Pass      |
| Peak Rib Deflection at 459 +/- 5 mm Drop Height | mm      | 36 to 40      | 38.8   | Pass      |
| Peak Rib Deflection at 815 +/- 8 mm Drop Height | mm      | 46 to 51      | 50.0   | Pass      |
| Overall Test Results                            |         |               |        | Pass      |



| Curve Description                          |      |           |       |
|--------------------------------------------|------|-----------|-------|
| Middle Rib Deflection (459 mm Drop Height) |      |           |       |
| Plot No.                                   | Type | SAE Class | Units |
| 001                                        | FIL  | 180       | MM    |
| Max                                        | Time | Min       | Time  |
| 38.8                                       | 32.4 | -3.2      | 68.1  |



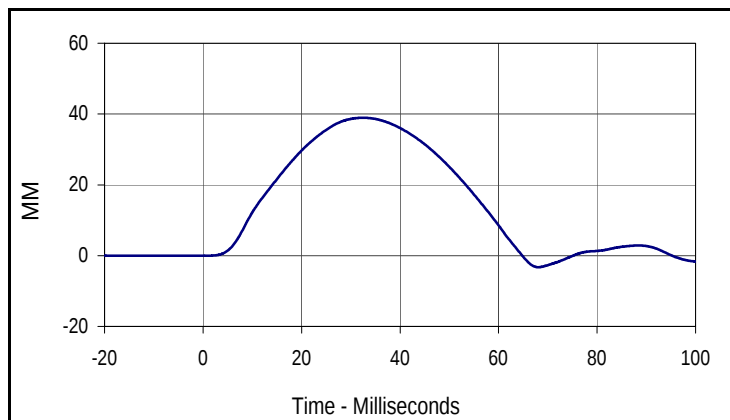
| Curve Description                          |      |           |       |
|--------------------------------------------|------|-----------|-------|
| Middle Rib Deflection (815 mm Drop Height) |      |           |       |
| Plot No.                                   | Type | SAE Class | Units |
| 002                                        | FIL  | 180       | MM    |
| Max                                        | Time | Min       | Time  |
| 50.0                                       | 30.3 | -3.5      | 65.3  |

Test Program: ES2re Thorax - Rib Drop Test  
 ATD Serial No.: F037 Rib # 3

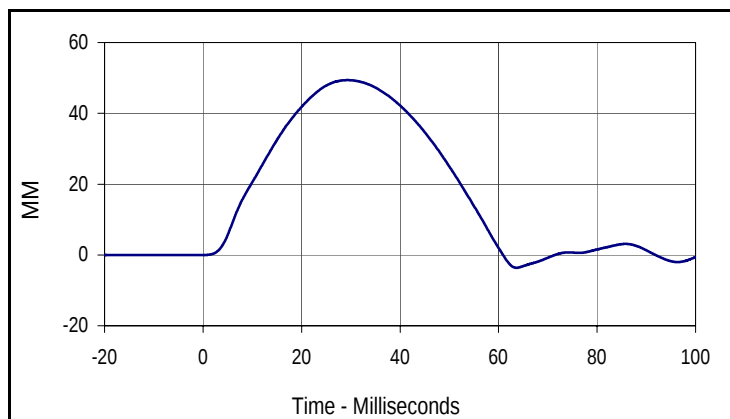
Test Date: 1/16/15  
 Test I.D.: F037RB3070



| Tested Parameter                                | Units   | Specification | Result | Pass/Fail |
|-------------------------------------------------|---------|---------------|--------|-----------|
| Rib Module Soak Time                            | Minutes | ≥240          | 557    | Pass      |
| Temperature During Soak                         | Max     | 20.6 to 22.2  | 21.6   | Pass      |
|                                                 | Min     |               | 21.1   | Pass      |
| Humidity During Soak                            | Max     | 10.0 to 70.0  | 34.0   | Pass      |
|                                                 | Min     |               | 33.4   | Pass      |
| Laboratory Temperature During Test              | °C      | 20.6 to 22.2  | 21.5   | Pass      |
| Laboratory Humidity During Test                 | %       | 10.0 to 70.0  | 33.7   | Pass      |
| Peak Rib Deflection at 459 +/- 5 mm Drop Height | mm      | 36 to 40      | 38.9   | Pass      |
| Peak Rib Deflection at 815 +/- 8 mm Drop Height | mm      | 46 to 51      | 49.4   | Pass      |
| Overall Test Results                            |         |               |        | Pass      |



| Curve Description                         |      |           |       |
|-------------------------------------------|------|-----------|-------|
| Lower Rib Deflection (459 mm Drop Height) |      |           |       |
| Plot No.                                  | Type | SAE Class | Units |
| 001                                       | FIL  | 180       | MM    |
| Max                                       | Time | Min       | Time  |
| 38.9                                      | 32.5 | -3.3      | 68.1  |



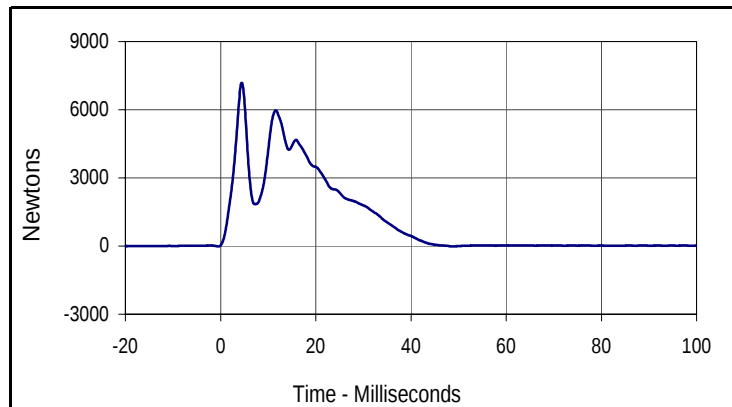
| Curve Description                         |      |           |       |
|-------------------------------------------|------|-----------|-------|
| Lower Rib Deflection (815 mm Drop Height) |      |           |       |
| Plot No.                                  | Type | SAE Class | Units |
| 002                                       | FIL  | 180       | MM    |
| Max                                       | Time | Min       | Time  |
| 49.4                                      | 29.3 | -3.6      | 63.7  |

Test Program: ES2re Thorax - Full Body Impact Test  
 ATD Serial No.: F037

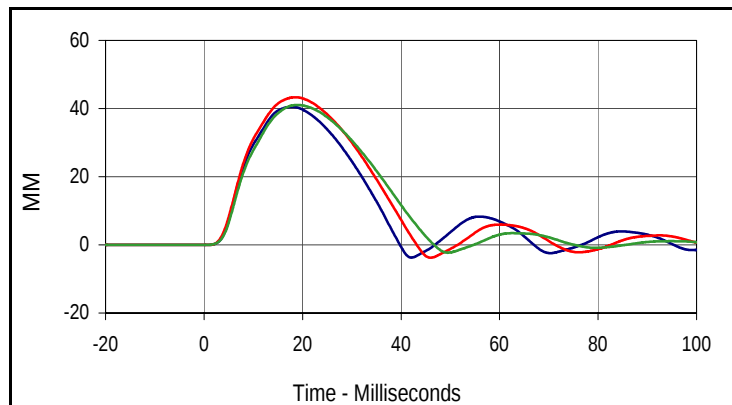
Test Date: 1/16/15  
 Test I.D.: F037TH070



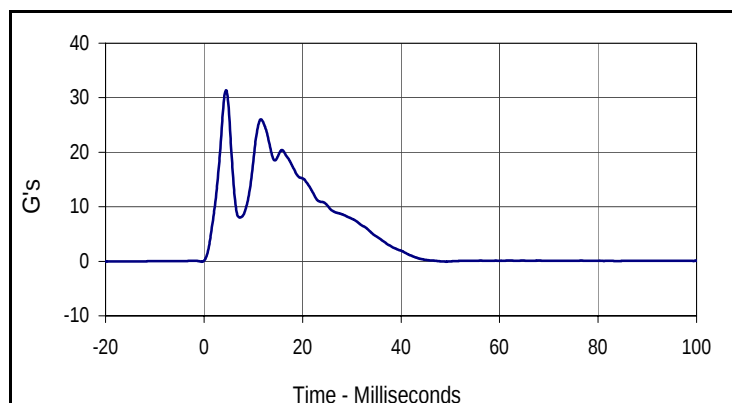
| Tested Parameter                   | Units   | Specification | Result | Pass/Fail |
|------------------------------------|---------|---------------|--------|-----------|
| Dummy Soak Time                    | Minutes | ≥240          | 602    | Pass      |
| Temperature During Soak            | Max     | 20.6 to 22.2  | 21.6   | Pass      |
|                                    | Min     |               | 21.1   | Pass      |
| Humidity During Soak               | Max     | 10.0 to 70.0  | 34.0   | Pass      |
|                                    | Min     |               | 33.4   | Pass      |
| Laboratory Temperature During Test | °C      | 20.6 to 22.2  | 21.5   | Pass      |
| Laboratory Humidity During Test    | %       | 10.0 to 70.0  | 33.6   | Pass      |
| Peak Impactor Velocity             | m/s     | 5.4 to 5.6    | 5.56   | Pass      |
| Peak Impactor Force                | N       | 5100 to 6200  | 5967.1 | Pass      |
|                                    | msec    | > 6.0 msec    | 11.6   | Pass      |
| Peak Upper Rib Deflection          | mm      | 34 to 41      | 40.5   | Pass      |
| Peak Middle Rib Deflection         | mm      | 37 to 45      | 43.3   | Pass      |
| Peak Lower Rib Deflection          | mm      | 37 to 44      | 41.1   | Pass      |
| Overall Test Results               |         |               |        | Pass      |



| Curve Description |      |           |         |
|-------------------|------|-----------|---------|
| Impactor Force    |      |           |         |
| Plot No.          | Type | SAE Class | Units   |
| 001               | FIL  | 180       | Newtons |
| Max               | Time | Min       | Time    |
| 7186.3            | 4.5  | -13.9     | 49.1    |



| Curve Description                    |      |              |       |
|--------------------------------------|------|--------------|-------|
| Upper, Middle, Lower Rib Deflections |      |              |       |
| Plot No.                             | Type | SAE Class    | Units |
| 002                                  | FIL  | 180          | MM    |
| Max (Upper)                          | Time | Min (Upper)  | Time  |
| 40.5                                 | 17.8 | -3.7         | 42.1  |
| Max (Middle)                         | Time | Min (Middle) | Time  |
| 43.3                                 | 18.5 | -3.8         | 46.0  |
| Max (Lower)                          | Time | Min (Lower)  | Time  |
| 41.1                                 | 18.9 | -2.3         | 49.5  |



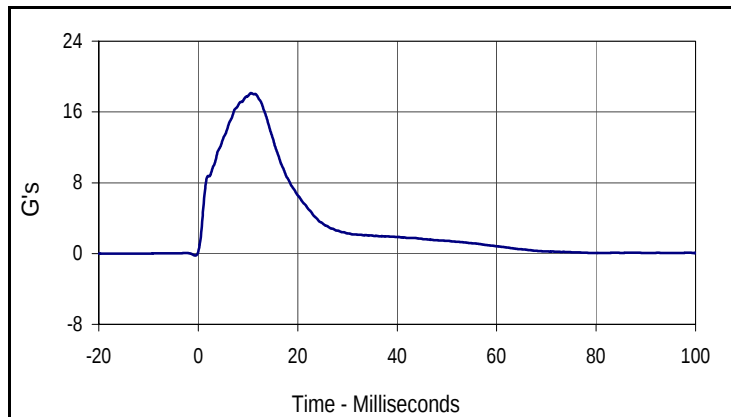
| Curve Description     |      |           |       |
|-----------------------|------|-----------|-------|
| Impactor Acceleration |      |           |       |
| Plot No.              | Type | SAE Class | Units |
| 003                   | FIL  | 180       | G's   |
| Max                   | Time | Min       | Time  |
| 31.4                  | 4.5  | -0.1      | 49.1  |

Test Program: ES2re Abdomen Impact Test  
 ATD Serial No.: F037

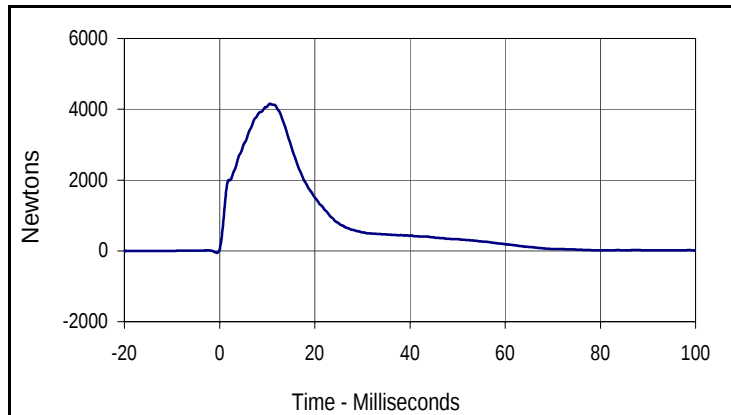
Test Date: 1/16/15  
 Test I.D.: F037ABD070



| Tested Parameter                   |      | Units   | Specification | Result | Pass/Fail |
|------------------------------------|------|---------|---------------|--------|-----------|
| Dummy Soak Time                    |      | Minutes | ≥240          | 672    | Pass      |
| Temperature During Soak            | Max  | °C      | 20.6 to 22.2  | 21.6   | Pass      |
|                                    | Min  | °C      |               | 21.1   | Pass      |
| Humidity During Soak               | Max  | %       | 10.0 to 70.0  | 34.0   | Pass      |
|                                    | Min  | %       |               | 33.4   | Pass      |
| Laboratory Temperature During Test |      | °C      | 20.6 to 22.2  | 21.5   | Pass      |
| Laboratory Humidity During Test    |      | %       | 10.0 to 70.0  | 33.4   | Pass      |
| Probe Velocity                     |      | m/s     | 3.9 to 4.1    | 4.01   | Pass      |
| Peak Impactor Force                | N    |         | 4000 to 4800  | 4153.4 | Pass      |
|                                    | msec |         | 10.6 to 13.0  | 10.6   | Pass      |
| Sum of Abdominal Forces            | N    |         | 2200 to 2700  | 2370.6 | Pass      |
|                                    | msec |         | 10.0 to 12.3  | 10.5   | Pass      |
| Overall Test Results               |      |         |               |        | Pass      |



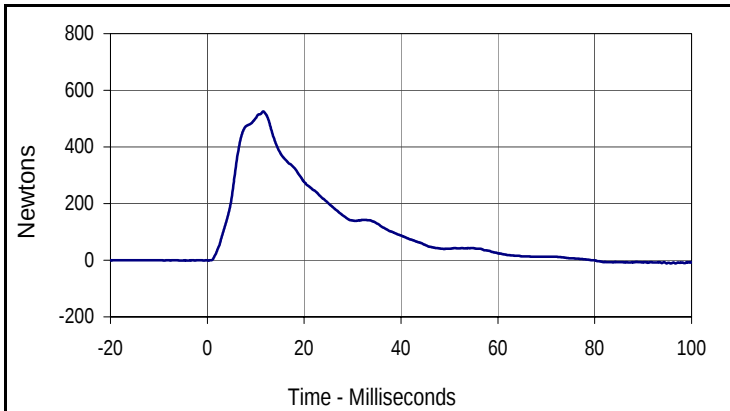
| Curve Description     |      |           |       |
|-----------------------|------|-----------|-------|
| Impactor Acceleration |      |           |       |
| Plot No.              | Type | SAE Class | Units |
| 001                   | FIL  | 180       | G's   |
| Max                   | Time | Min       | Time  |
| 18.1                  | 10.6 | -0.2      | -0.6  |



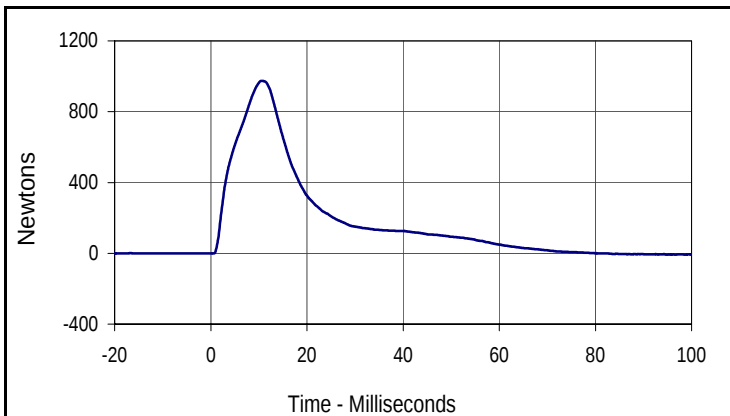
| Curve Description |      |           |         |
|-------------------|------|-----------|---------|
| Impactor Force    |      |           |         |
| Plot No.          | Type | SAE Class | Units   |
| 002               | FIL  | 180       | Newtons |
| Max               | Time | Min       | Time    |
| 4153.4            | 10.6 | -52.9     | -0.6    |

Test Program: ES2re Abdomen Impact Test  
 ATD Serial No.: F037

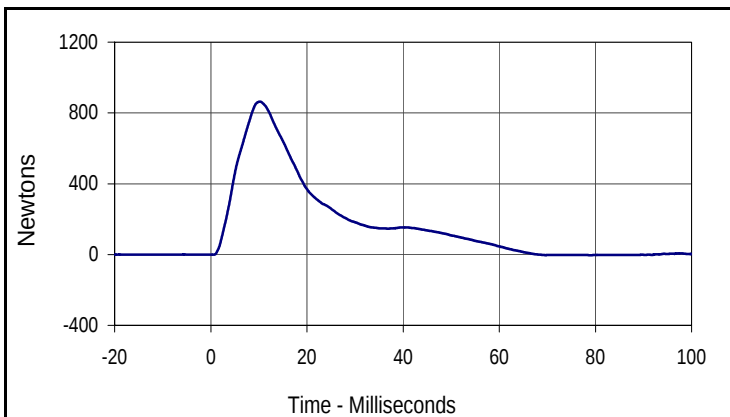
Test Date: 1/16/15  
 Test I.D.: F037ABD070



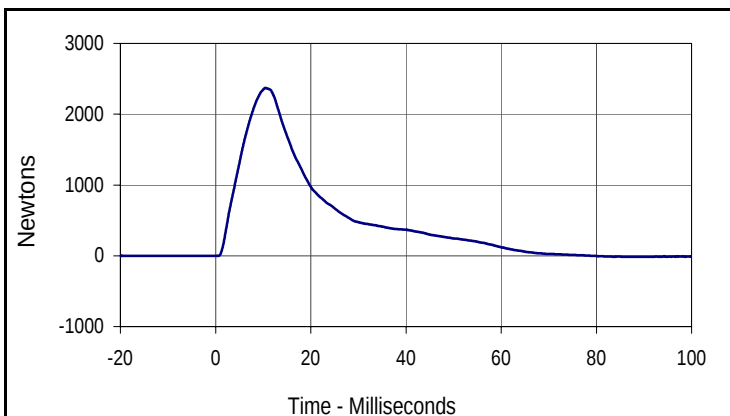
| Curve Description   |      |           |         |
|---------------------|------|-----------|---------|
| Front Abdomen Force |      |           |         |
| Plot No.            | Type | SAE Class | Units   |
| 003                 | FIL  | 600       | Newtons |
| Max                 | Time | Min       | Time    |
| 525.5               | 11.5 | -11.4     | 95.7    |



| Curve Description    |      |           |         |
|----------------------|------|-----------|---------|
| Middle Abdomen Force |      |           |         |
| Plot No.             | Type | SAE Class | Units   |
| 004                  | FIL  | 600       | Newtons |
| Max                  | Time | Min       | Time    |
| 974.6                | 10.6 | -8.0      | 94.8    |



| Curve Description  |      |           |         |
|--------------------|------|-----------|---------|
| Rear Abdomen Force |      |           |         |
| Plot No.           | Type | SAE Class | Units   |
| 005                | FIL  | 600       | Newtons |
| Max                | Time | Min       | Time    |
| 864.6              | 10.2 | -3.9      | 111.1   |



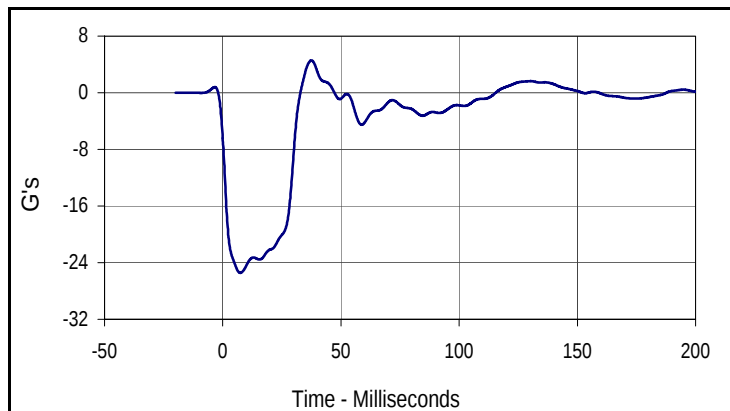
| Curve Description     |      |           |         |
|-----------------------|------|-----------|---------|
| Abdomen Sum Resultant |      |           |         |
| Plot No.              | Type | SAE Class | Units   |
| 006                   | RES  | 600       | Newtons |
| Max                   | Time | Min       | Time    |
| 2370.6                | 10.5 | -15.8     | 92.0    |

Test Program: ES2re Lumbar Flexion Test  
 ATD Serial No.: F037

Test Date: 1/16/15  
 Test I.D.: F037LB070



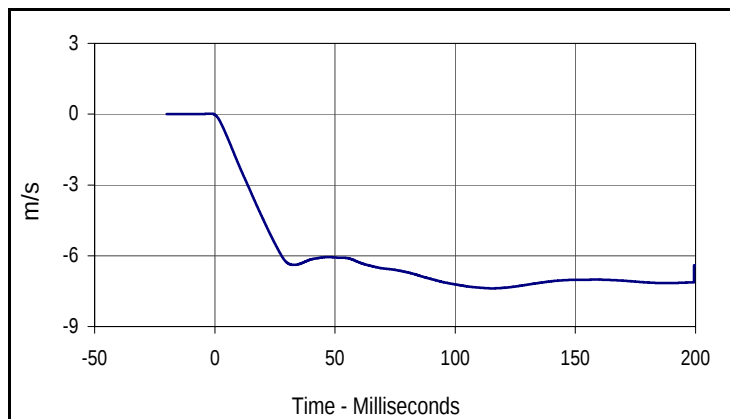
| Tested Parameter                      | Units   | Specification | Result | Pass/Fail |
|---------------------------------------|---------|---------------|--------|-----------|
| Lumbar Spine Assembly Soak Time       | Minutes | ≥240          | 747    | Pass      |
| Temperature During Soak               | Max     | 20.6 to 22.2  | 21.6   | Pass      |
|                                       | Min     |               | 21.1   | Pass      |
| Humidity During Soak                  | Max     | 10.0 to 70.0  | 34.0   | Pass      |
|                                       | Min     |               | 33.4   | Pass      |
| Laboratory Temperature During Test    | °C      | 20.6 to 22.2  | 21.5   | Pass      |
| Laboratory Humidity During Test       | %       | 10.0 to 70.0  | 33.6   | Pass      |
| Pendulum Velocity                     | m/s     | 5.95 to 6.15  | 5.96   | Pass      |
| Headform Rotation                     | Max     | 45 to 55      | 48.8   | Pass      |
|                                       | Time    | 39 to 53      | 42.3   | Pass      |
| Time of Decay to Zero Angle from Peak | msec    | 37 to 57      | 44.0   | Pass      |
| Overall Test Results                  |         |               |        | Pass      |



#### Curve Description

##### Pendulum Deceleration

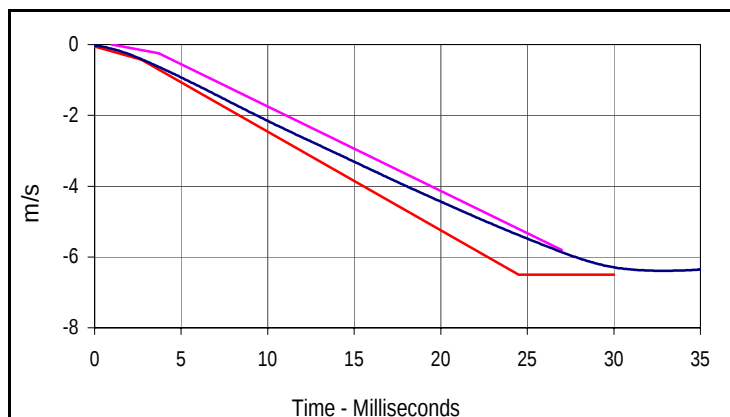
| Plot No. | Type | SAE Class | Units |
|----------|------|-----------|-------|
| 001      | FIL  | 60        | G's   |
| Max      | Time | Min       | Time  |
| 4.6      | 38.1 | -25.4     | 8.0   |



#### Curve Description

##### Pendulum Velocity

| Plot No. | Type | SAE Class | Units |
|----------|------|-----------|-------|
| 002      | FIL  | 60        | m/s   |
| Max      | Time | Min       | Time  |
| 0.0      | -1.3 | -7.4      | 116.1 |



#### Curve Description

##### Pendulum Velocity

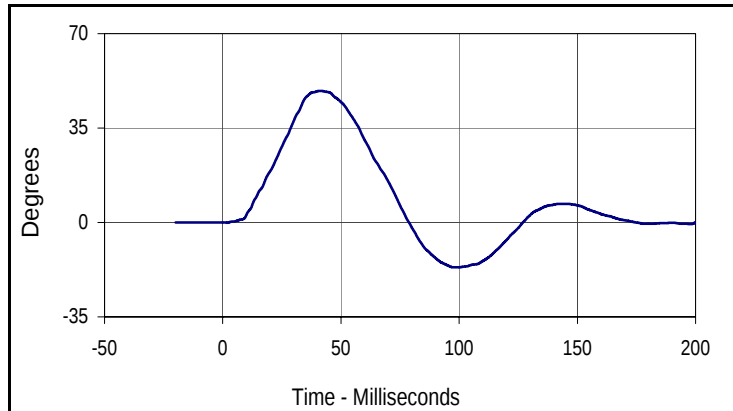
| Plot No. | Type | SAE Class | Units |
|----------|------|-----------|-------|
| 002      | FIL  | 60        | m/s   |
| Max      | Time | Min       | Time  |
| 0.0      | -1.3 | -7.4      | 116.1 |

#### Velocity Corridors

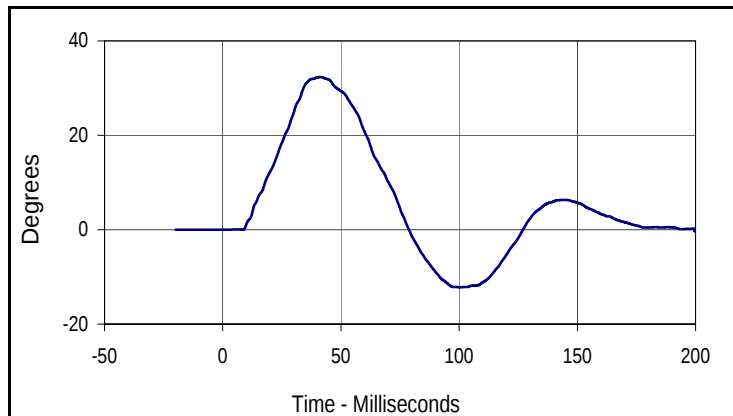
| Upper Boundary |                | Lower Boundary |                |
|----------------|----------------|----------------|----------------|
| Time (msec)    | Velocity (m/s) | Time (msec)    | Velocity (m/s) |
| 1.0            | 0.00           | 0.0            | -0.05          |
| 3.7            | -0.24          | 2.7            | -0.425         |
| 27.0           | -5.80          | 24.5           | -6.50          |
|                |                | 30.0           | -6.50          |

Test Program: ES2re Lumbar Flexion Test  
 ATD Serial No.: F037

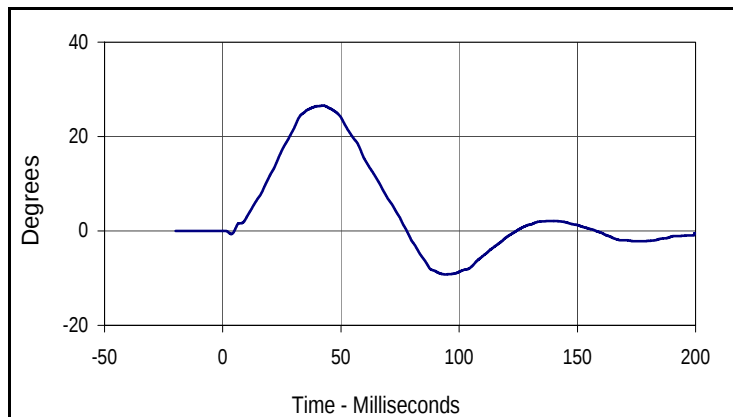
Test Date: 1/16/15  
 Test I.D.: F037LB070



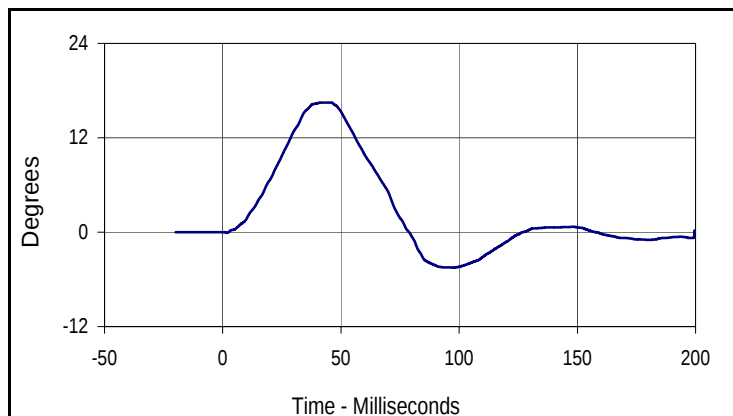
| Curve Description |      |           |         |
|-------------------|------|-----------|---------|
| Headform Rotation |      |           |         |
| Plot No.          | Type | SAE Class | Units   |
| 003               | FIL  | 180       | Degrees |
| Max               | Time | Min       | Time    |
| 48.8              | 42.3 | -16.6     | 98.5    |



| Curve Description |      |           |         |
|-------------------|------|-----------|---------|
| Potentiometer A   |      |           |         |
| Plot No.          | Type | SAE Class | Units   |
| 004               | FIL  | 180       | Degrees |
| Max               | Time | Min       | Time    |
| 32.3              | 42.3 | -12.2     | 101.2   |



| Curve Description |      |           |         |
|-------------------|------|-----------|---------|
| Potentiometer B   |      |           |         |
| Plot No.          | Type | SAE Class | Units   |
| 005               | FIL  | 180       | Degrees |
| Max               | Time | Min       | Time    |
| 26.6              | 43.1 | -9.2      | 94.7    |



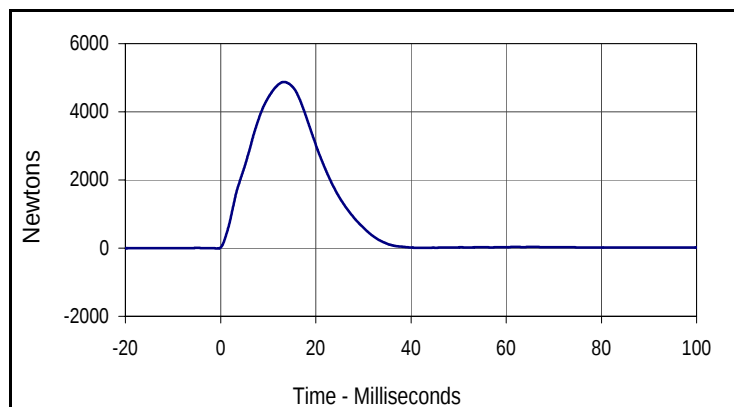
| Curve Description |      |           |         |
|-------------------|------|-----------|---------|
| Potentiometer C   |      |           |         |
| Plot No.          | Type | SAE Class | Units   |
| 006               | FIL  | 180       | Degrees |
| Max               | Time | Min       | Time    |
| 16.5              | 46.2 | -4.5      | 98.1    |

Test Program: ES2re Pelvis Impact Test  
 ATD Serial No.: F037

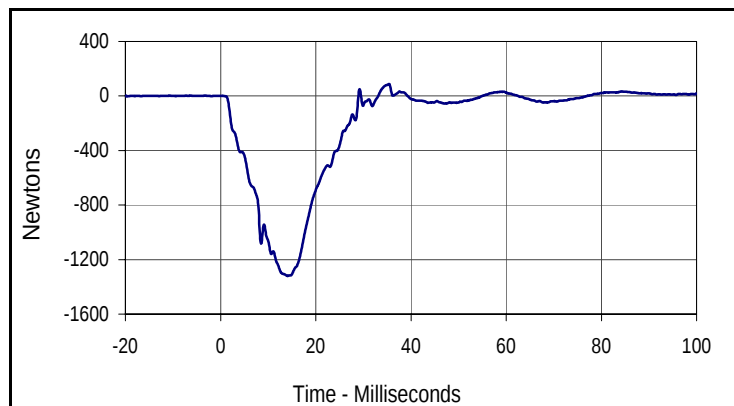
Test Date: 1/16/15  
 Test I.D.: F037PL070



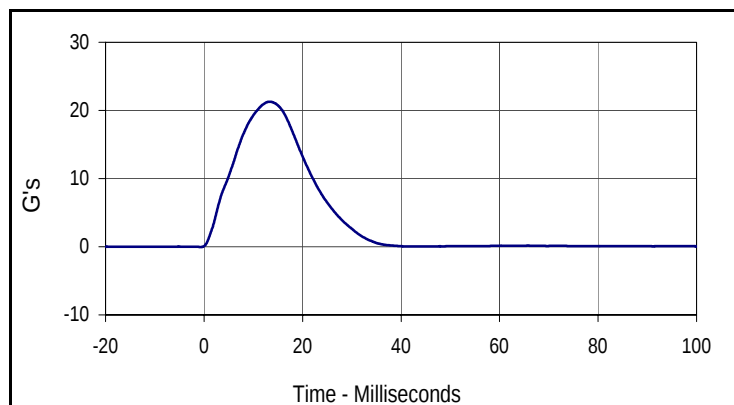
| Tested Parameter                   | Units   | Specification  | Result  | Pass/Fail |
|------------------------------------|---------|----------------|---------|-----------|
| Dummy Soak Time                    | Minutes | ≥240           | 802     | Pass      |
| Temperature During Soak            | Max     | 20.6 to 22.2   | 21.6    | Pass      |
|                                    | Min     |                | 21.1    | Pass      |
| Humidity During Soak               | Max     | 10.0 to 70.0   | 34.0    | Pass      |
|                                    | Min     |                | 33.4    | Pass      |
| Laboratory Temperature During Test | °C      | 20.6 to 22.2   | 21.6    | Pass      |
| Laboratory Humidity During Test    | %       | 10.0 to 70.0   | 33.5    | Pass      |
| Pendulum Velocity                  | m/s     | 4.2 to 4.4     | 4.32    | Pass      |
| Peak Impactor Force                | N       | 4700 to 5400   | 4876.8  | Pass      |
|                                    | msec    | 11.8 to 16.1   | 13.4    | Pass      |
| Peak Pubic Symphysis Load          | N       | -1230 to -1590 | -1319.6 | Pass      |
|                                    | msec    | 12.2 to 17.0   | 14.1    | Pass      |
| Overall Test Results               |         |                |         | Pass      |



| Curve Description |      |           |         |
|-------------------|------|-----------|---------|
| Impactor Force    |      |           |         |
| Plot No.          | Type | SAE Class | Units   |
| 001               | FIL  | 180       | Newtons |
| Max               | Time | Min       | Time    |
| 4876.8            | 13.4 | -9.6      | -0.6    |



| Curve Description       |      |           |         |
|-------------------------|------|-----------|---------|
| Pubic Symphysis Force Y |      |           |         |
| Plot No.                | Type | SAE Class | Units   |
| 002                     | FIL  | 600       | Newtons |
| Max                     | Time | Min       | Time    |
| 87.9                    | 35.4 | -1319.6   | 14.1    |



| Curve Description     |      |           |       |
|-----------------------|------|-----------|-------|
| Impactor Acceleration |      |           |       |
| Plot No.              | Type | SAE Class | Units |
| 003                   | FIL  | 180       | G's   |
| Max                   | Time | Min       | Time  |
| 21.3                  | 13.4 | 0.0       | -0.6  |

Test Program: SID IIs External Measurements  
 ATD Serial No.: 307

Test Date: 1/19/15  
 Test I.D.: N/A



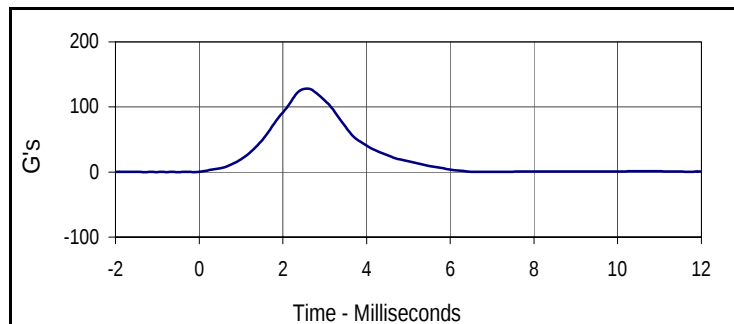
| Tested Parameter             |                                 | Units | Specification | Result | Pass/Fail |
|------------------------------|---------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature       |                                 | °C    | 20.6 to 22.2  | 21.6   | Pass      |
| Laboratory Relative Humidity |                                 | %     | 10 to 70      | 32     | Pass      |
| A                            | Sitting Height                  | mm    | 772 - 788     | 778    | Pass      |
| B                            | Shoulder Pivot Height           | mm    | 437 - 453     | 443    | Pass      |
| C                            | H-Point Height                  | mm    | 79 - 89       | 85     | Pass      |
| D                            | H-Point from Seatback           | mm    | 141 - 151     | 144    | Pass      |
| E                            | Shoulder Pivot from Backline    | mm    | 97 - 107      | 102    | Pass      |
| F                            | Thigh Clearance                 | mm    | 119 - 135     | 128    | Pass      |
| G                            | Head Breadth                    | mm    | 140 - 148     | 145    | Pass      |
| H                            | Head Back from Backline         | mm    | 40 - 46       | 43     | Pass      |
| I                            | Head Depth                      | mm    | 178 - 188     | 185    | Pass      |
| J                            | Head Circumference              | mm    | 541 - 551     | 546    | Pass      |
| K                            | Buttock to Knee Length          | mm    | 514 - 540     | 525    | Pass      |
| L                            | Popliteal Height                | mm    | 343 - 369     | 351    | Pass      |
| M                            | Knee Pivot to Floor Height      | mm    | 392 - 409     | 400    | Pass      |
| N                            | Buttock Popliteal Length        | mm    | 416 - 442     | 432    | Pass      |
| O                            | Chest Depth w/o Jacket          | mm    | 195 - 211     | 205    | Pass      |
| P                            | Foot Length                     | mm    | 216 - 232     | 223    | Pass      |
| Q                            | Hip Breadth with Pelvic Plug    | mm    | 313 - 323     | 319    | Pass      |
| R                            | Arm Length                      | mm    | 249 - 259     | 254    | Pass      |
| S                            | Knee Joint to Seatback          | mm    | 477 - 493     | 483    | Pass      |
| V                            | Shoulder Width                  | mm    | 341 - 357     | 351    | Pass      |
| W                            | Foot Width                      | mm    | 78 - 94       | 89     | Pass      |
| Y                            | Chest Circumference with Jacket | mm    | 851 - 881     | 872    | Pass      |
| Z                            | Waist Circumference             | mm    | 760 - 791     | 774    | Pass      |
| Overall Test Results         |                                 |       |               |        | Pass      |

Test Program: SID IIs Head Drop Test  
 ATD Serial No.: 307

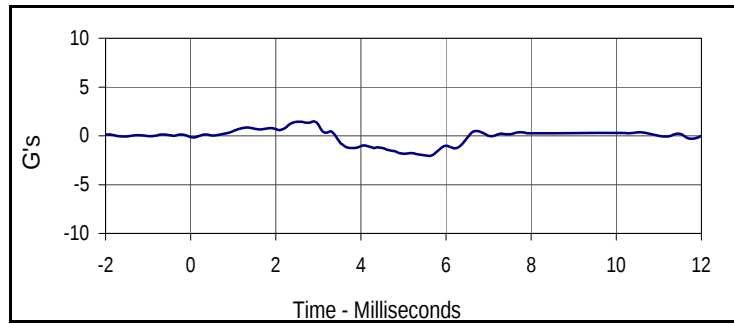
Test Date: 1/19/15  
 Test I.D.: 307HD079



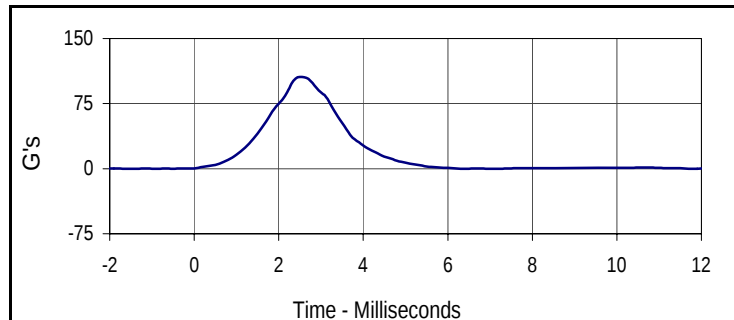
| Tested Parameter                   |     | Units   | Specification | Result | Pass/Fail |
|------------------------------------|-----|---------|---------------|--------|-----------|
| Head Assembly Soak Time            |     | Minutes | ≥240          | 322    | Pass      |
| Temperature During Soak            | Max | °C      | 18.9 to 25.6  | 21.6   | Pass      |
|                                    | Min | °C      |               | 21.3   | Pass      |
| Humidity During Soak               | Max | %       | 10.0 to 70.0  | 31.9   | Pass      |
|                                    | Min | %       |               | 31.7   | Pass      |
| Laboratory Temperature During Test |     | °C      | 18.9 to 25.6  | 21.6   | Pass      |
| Laboratory Humidity During Test    |     | %       | 10.0 to 70.0  | 31.9   | Pass      |
| Peak Head Resultant Acceleration   |     | G's     | 115 to 137    | 128.0  | Pass      |
| Peak Head X Acceleration           |     | G's     | <15           | 2.1    | Pass      |
| Is Acceleration Unimodal?          |     | Yes/No  | Yes           | Yes    | Pass      |
| Oscillations After Main Pulse      |     | %       | <15           | 0.6    | Pass      |
| Overall Test Results               |     |         |               | Pass   |           |



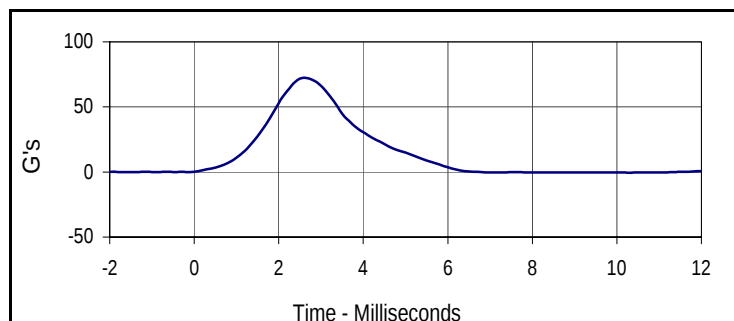
| Curve Description |      |           |       |
|-------------------|------|-----------|-------|
| Head Resultant    |      |           |       |
| Plot No.          | Type | SAE Class | Units |
| 001               | RES  | 1000      | G's   |
| Max               | Time | Min       | Time  |
| 128.0             | 2.6  | 0.0       | -1.0  |



| Curve Description |      |           |       |
|-------------------|------|-----------|-------|
| Head X            |      |           |       |
| Plot No.          | Type | SAE Class | Units |
| 002               | FIL  | 1000      | G's   |
| Max               | Time | Min       | Time  |
| 1.5               | 2.9  | -2.1      | 5.6   |



| Curve Description |      |           |       |
|-------------------|------|-----------|-------|
| Head Y            |      |           |       |
| Plot No.          | Type | SAE Class | Units |
| 003               | FIL  | 1000      | G's   |
| Max               | Time | Min       | Time  |
| 105.6             | 2.5  | -0.4      | -7.3  |



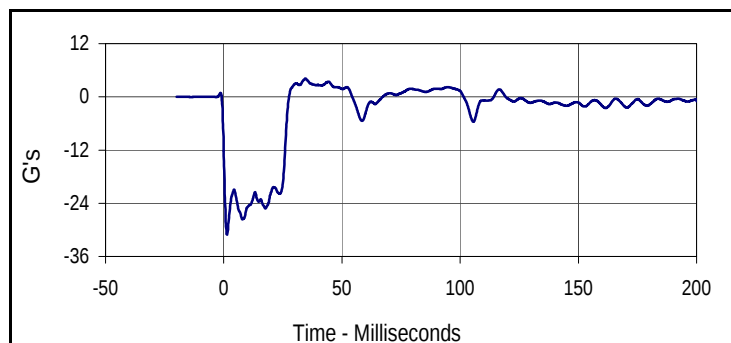
| Curve Description |      |           |       |
|-------------------|------|-----------|-------|
| Head Z            |      |           |       |
| Plot No.          | Type | SAE Class | Units |
| 004               | FIL  | 1000      | G's   |
| Max               | Time | Min       | Time  |
| 72.5              | 2.6  | -0.5      | 10.3  |

Test Program: SID IIs Neck Flexion Test  
 ATD Serial No.: 307

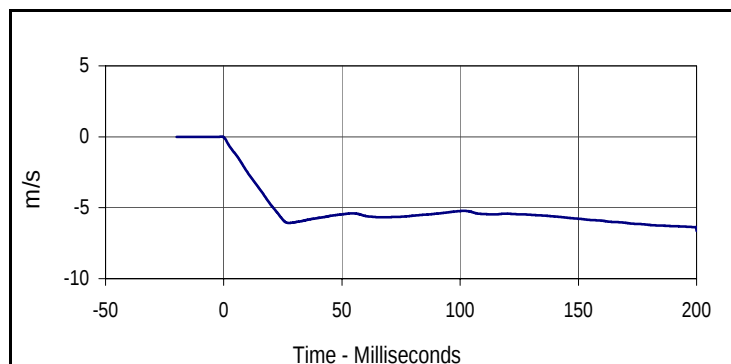
Test Date: 1/19/15  
 Test I.D.: 307NB079



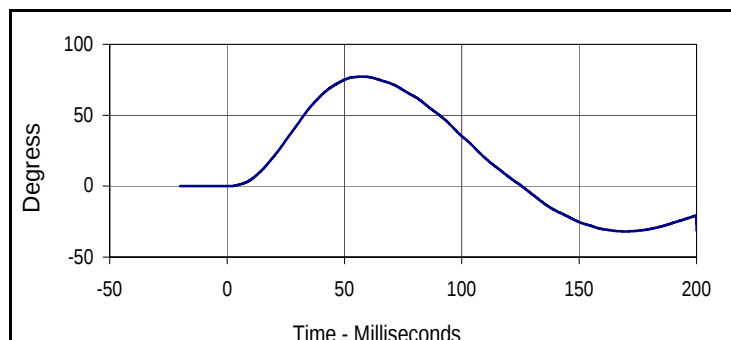
| Tested Parameter                   | Units       | Specification  | Result | Pass/Fail |
|------------------------------------|-------------|----------------|--------|-----------|
| Neck Assembly Soak Time            | Minutes     | ≥240           | 367    | Pass      |
| Temperature During Soak            | Max         | 20.6 to 22.2   | 21.6   | Pass      |
|                                    | Min         |                | 21.3   | Pass      |
| Humidity During Soak               | Max         | 10.0 to 70.0   | 31.9   | Pass      |
|                                    | Min         |                | 31.7   | Pass      |
| Laboratory Temperature During Test | °C          | 20.6 to 22.2   | 21.6   | Pass      |
| Laboratory Humidity During Test    | %           | 10.0 to 70.0   | 31.9   | Pass      |
| Pendulum Velocity                  | m/s         | 5.51 to 5.63   | 5.54   | Pass      |
| Pendulum Deceleration              | 10 msec     | -2.20 to -2.80 | -2.49  | Pass      |
|                                    | 15 msec     | -3.30 to -4.10 | -3.64  | Pass      |
|                                    | 20 msec     | -4.40 to -5.40 | -4.81  | Pass      |
|                                    | 25 msec     | -5.40 to -6.10 | -5.84  | Pass      |
|                                    | 25-100 msec | -5.50 to -6.20 | -6.07  | Pass      |
| D-Plane Rotation                   | Max         | 71 to 81       | 77.2   | Pass      |
|                                    | Time        | 50 to 70       | 57.7   | Pass      |
| Peak Occipital Condyle Moment      | Nm          | -36 to -44     | -38.4  | Pass      |
| Decaying Moment Time to Cross 0 Nm | msec        | 102 to 126     | 104.8  | Pass      |
| Overall Test Results               |             |                | Pass   |           |



| Curve Description     |      |           |       |
|-----------------------|------|-----------|-------|
| Pendulum Deceleration |      |           |       |
| Plot No.              | Type | SAE Class | Units |
| 001                   | FIL  | 180       | G's   |
| Max                   | Time | Min       | Time  |
| 4.1                   | 0.0  | -31.1     | 0.0   |



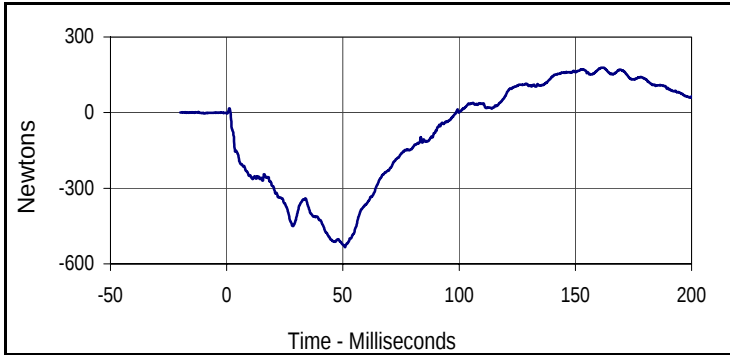
| Curve Description |      |           |       |
|-------------------|------|-----------|-------|
| Pendulum Velocity |      |           |       |
| Plot No.          | Type | SAE Class | Units |
| 002               | FIL  | 180       | m/s   |
| Max               | Time | Min       | Time  |
| 0.0               | -0.9 | -6.6      | 200.0 |



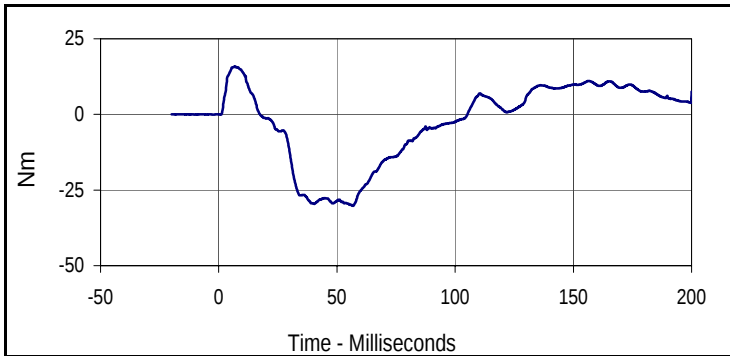
| Curve Description |      |           |         |
|-------------------|------|-----------|---------|
| D-Plane Rotation  |      |           |         |
| Plot No.          | Type | SAE Class | Units   |
| 003               | FIL  | 60        | Degress |
| Max               | Time | Min       | Time    |
| 77.2              | 57.7 | -31.9     | 169.9   |

Test Program: SID IIs Neck Flexion Test  
 ATD Serial No.: 307

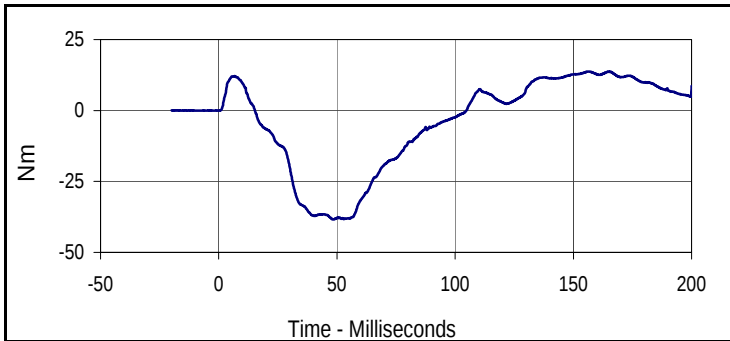
Test Date: 1/19/15  
 Test I.D.: 307NB079



| Curve Description |       |           |         |
|-------------------|-------|-----------|---------|
| Neck Force Y      |       |           |         |
| Plot No.          | Type  | SAE Class | Units   |
| 004               | FIL   | 600       | Newtons |
| Max               | Time  | Min       | Time    |
| 178.7             | 161.8 | -533.5    | 50.9    |



| Curve Description |      |           |       |
|-------------------|------|-----------|-------|
| Neck Moment X     |      |           |       |
| Plot No.          | Type | SAE Class | Units |
| 005               | FIL  | 600       | Nm    |
| Max               | Time | Min       | Time  |
| 15.9              | 6.9  | -30.2     | 56.8  |



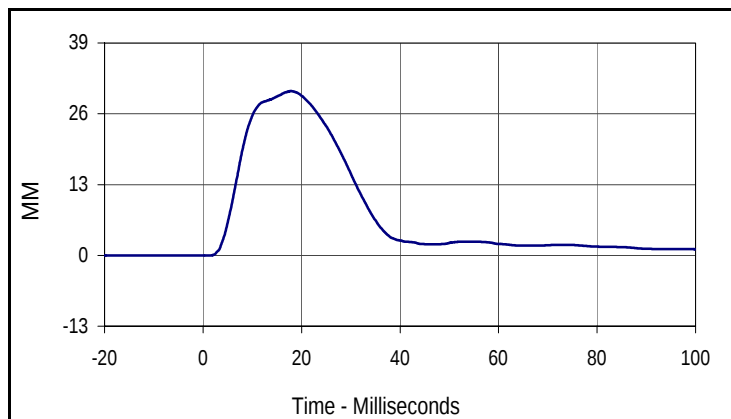
| Curve Description              |       |           |       |
|--------------------------------|-------|-----------|-------|
| Moment About Occipital Condyle |       |           |       |
| Plot No.                       | Type  | SAE Class | Units |
| 006                            | FIL   | 600       | Nm    |
| Max                            | Time  | Min       | Time  |
| 13.7                           | 156.5 | -38.4     | 48.4  |

Test Program: SID IIs Shoulder Impact Test  
 ATD Serial No.: 307

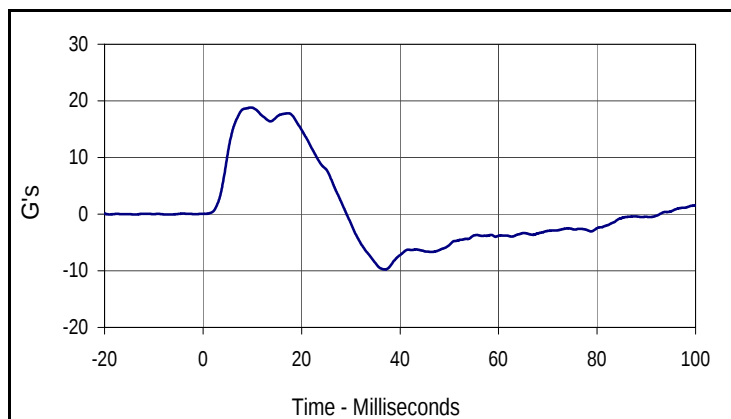
Test Date: 1/19/15  
 Test I.D.: 307SH079



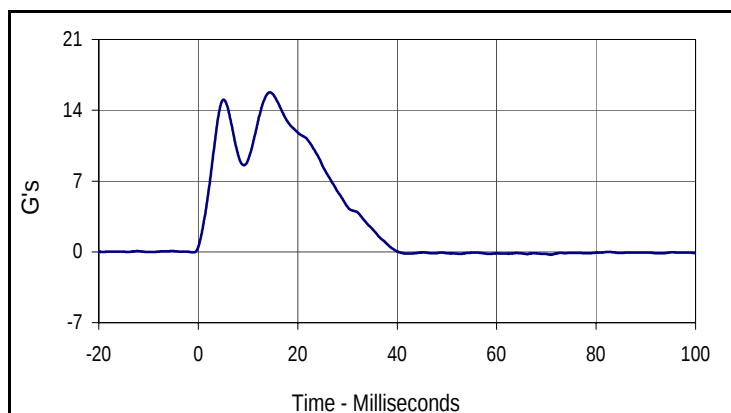
| Tested Parameter                   |     | Units   | Specification | Result | Pass/Fail |
|------------------------------------|-----|---------|---------------|--------|-----------|
| Dummy Soak Time                    |     | Minutes | ≥180          | 422    | Pass      |
| Temperature During Soak            | Max | °C      | 20.6 to 22.2  | 21.6   | Pass      |
|                                    | Min | °C      |               | 21.3   | Pass      |
| Humidity During Soak               | Max | %       | 10.0 to 70.0  | 31.9   | Pass      |
|                                    | Min | %       |               | 31.7   | Pass      |
| Laboratory Temperature During Test |     | °C      | 20.6 to 22.2  | 21.5   | Pass      |
| Laboratory Humidity During Test    |     | %       | 10.0 to 70.0  | 31.8   | Pass      |
| Impactor Velocity                  |     | m/s     | 4.20 to 4.40  | 4.31   | Pass      |
| Peak Shoulder Deflection           |     | mm      | 28 to 37      | 30.2   | Pass      |
| Peak Lateral Spine Acceleration Y  |     | G's     | 17 to 22      | 18.8   | Pass      |
| Peak Impactor Acceleration         |     | G's     | 13 to 18      | 15.8   | Pass      |
| Overall Test Results               |     |         |               | Pass   |           |



| Curve Description   |      |           |       |
|---------------------|------|-----------|-------|
| Shoulder Deflection |      |           |       |
| Plot No.            | Type | SAE Class | Units |
| 001                 | FIL  | 600       | MM    |
| Max                 | Time | Min       | Time  |
| 30.2                | 17.9 | 0.0       | -17.3 |



| Curve Description          |      |           |       |
|----------------------------|------|-----------|-------|
| Upper Spine Y Acceleration |      |           |       |
| Plot No.                   | Type | SAE Class | Units |
| 002                        | FIL  | 180       | G's   |
| Max                        | Time | Min       | Time  |
| 18.8                       | 9.7  | -9.8      | 36.9  |



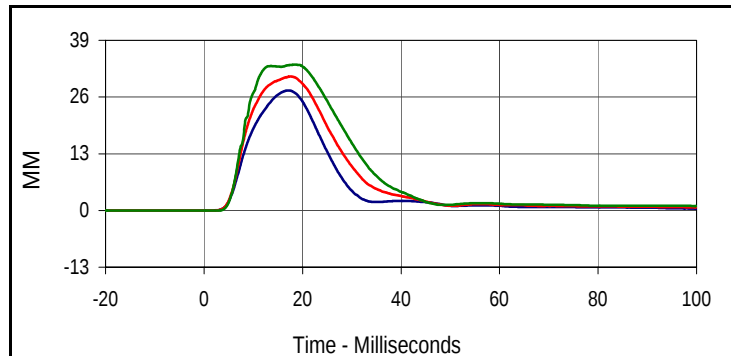
| Curve Description     |      |           |       |
|-----------------------|------|-----------|-------|
| Impactor Acceleration |      |           |       |
| Plot No.              | Type | SAE Class | Units |
| 003                   | FIL  | 180       | G's   |
| Max                   | Time | Min       | Time  |
| 15.8                  | 14.4 | -0.3      | 70.9  |

Test Program: SID IIs Thorax with Arm Impact Test  
 ATD Serial No.: 307

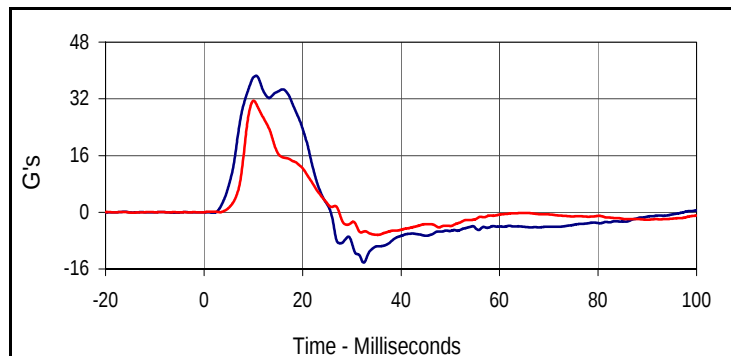
Test Date: 1/19/15  
 Test I.D.: 307TWA079



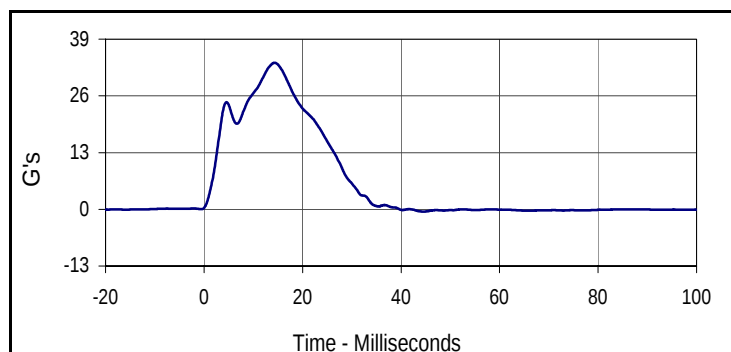
| Tested Parameter                   | Units   | Specification | Result | Pass/Fail |
|------------------------------------|---------|---------------|--------|-----------|
| Dummy Soak Time                    | Minutes | ≥180          | 467    | Pass      |
| Temperature During Soak            | Max     | 20.6 to 22.2  | 21.6   | Pass      |
|                                    | Min     |               | 21.3   | Pass      |
| Humidity During Soak               | Max     | 10.0 to 70.0  | 31.9   | Pass      |
|                                    | Min     |               | 31.7   | Pass      |
| Laboratory Temperature During Test | °C      | 18.9 to 25.6  | 21.5   | Pass      |
| Laboratory Humidity During Test    | %       | 10.0 to 70.0  | 31.7   | Pass      |
| Impactor Velocity                  | m/s     | 6.6 to 6.8    | 6.72   | Pass      |
| Peak Shoulder Deflection           | mm      | 31 to 40      | 34.4   | Pass      |
| Peak Upper Thorax Rib Deflection   | mm      | 25 to 32      | 27.5   | Pass      |
| Peak Middle Thorax Rib Deflection  | mm      | 30 to 36      | 30.7   | Pass      |
| Peak Lower Thorax Rib Deflection   | mm      | 32 to 38      | 33.4   | Pass      |
| Peak Upper Spine Y Acceleration    | G's     | 34 to 43      | 38.5   | Pass      |
| Peak Lower Spine Y Acceleration    | G's     | 29 to 37      | 31.5   | Pass      |
| Peak Impactor Acceleration         | G's     | 30 to 36      | 33.6   | Pass      |
| Overall Test Results               |         |               | Pass   |           |



| Curve Description        |      |           |       |
|--------------------------|------|-----------|-------|
| Upper Thorax Deflection  |      |           |       |
| Plot No.                 | Type | SAE Class | Units |
| 001                      | FIL  | 600       | MM    |
| Max                      | Time | Min       | Time  |
| 27.5                     | 17.2 | 0.0       | -11.6 |
| Middle Thorax Deflection |      |           |       |
| Max                      | Time | Min       | Time  |
| 30.7                     | 17.6 | 0.0       | -17.9 |
| Lower Thorax Deflection  |      |           |       |
| Max                      | Time | Min       | Time  |
| 33.4                     | 18.4 | 0.0       | -17.4 |



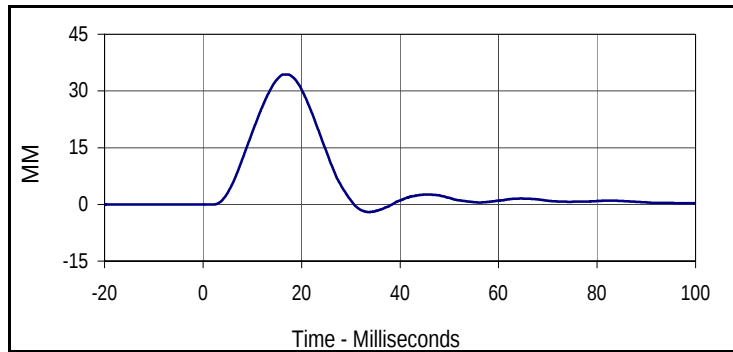
| Curve Description          |      |           |       |
|----------------------------|------|-----------|-------|
| Upper Spine Y Acceleration |      |           |       |
| Plot No.                   | Type | SAE Class | Units |
| 004                        | FIL  | 180       | G's   |
| Max                        | Time | Min       | Time  |
| 38.5                       | 10.6 | -14.2     | 32.4  |
| Lower Spine Y Acceleration |      |           |       |
| Plot No.                   | Type | SAE Class | Units |
| 005                        | FIL  | 180       | G's   |
| Max                        | Time | Min       | Time  |
| 31.5                       | 10.1 | -6.4      | 35.3  |



| Curve Description     |      |           |       |
|-----------------------|------|-----------|-------|
| Impactor Acceleration |      |           |       |
| Plot No.              | Type | SAE Class | Units |
| 006                   | FIL  | 180       | G's   |
| Max                   | Time | Min       | Time  |
| 33.6                  | 14.3 | -0.5      | 44.6  |

Test Program: SID IIs Thorax with Arm Impact Test  
 ATD Serial No.: 307

Test Date: 1/19/15  
 Test I.D.: 307TWA079



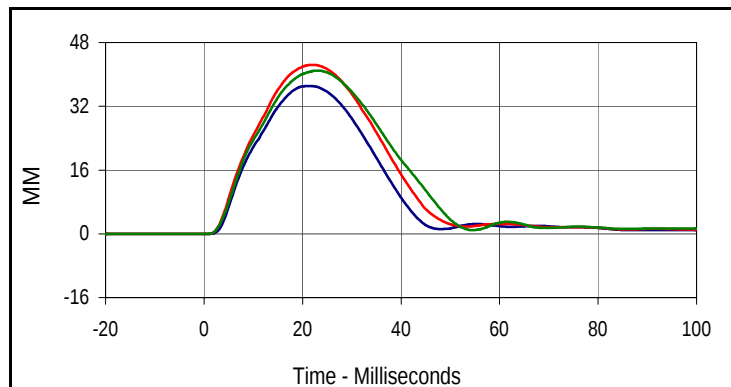
| Curve Description   |      |           |       |
|---------------------|------|-----------|-------|
| Shoulder Deflection |      |           |       |
| Plot No.            | Type | SAE Class | Units |
| 007                 | FIL  | 600       | MM    |
| Max                 | Time | Min       | Time  |
| 34.4                | 16.8 | -2.0      | 33.7  |

Test Program: SID IIs Thorax without Arm Impact Test  
 ATD Serial No.: 307

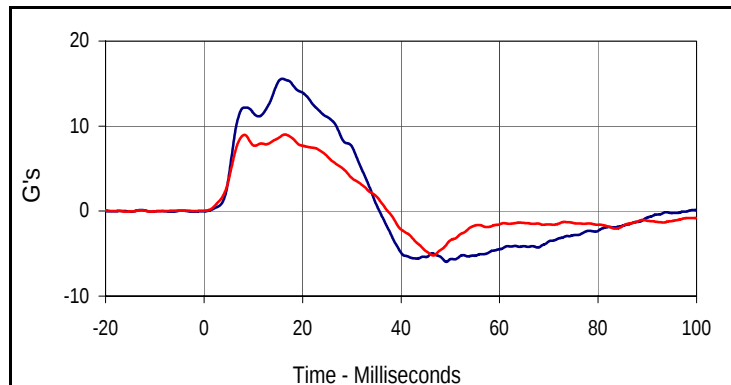
Test Date: 1/19/15  
 Test I.D.: 307TWOA079



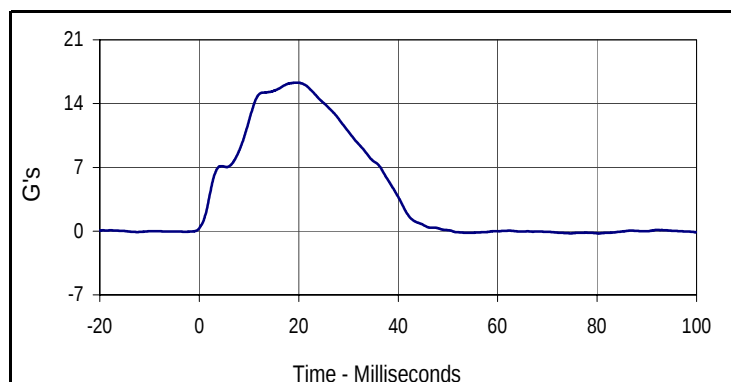
| Tested Parameter                   | Units   | Specification | Result | Pass/Fail |
|------------------------------------|---------|---------------|--------|-----------|
| Dummy Soak Time                    | Minutes | ≥180          | 522    | Pass      |
| Temperature During Soak            | Max     | 18.9 to 25.6  | 21.6   | Pass      |
|                                    | Min     |               | 21.3   | Pass      |
| Humidity During Soak               | Max     | 10.0 to 70.0  | 31.9   | Pass      |
|                                    | Min     |               | 31.7   | Pass      |
| Laboratory Temperature During Test | °C      | 18.9 to 25.6  | 21.5   | Pass      |
| Laboratory Humidity During Test    | %       | 10.0 to 70.0  | 31.7   | Pass      |
| Impactor Velocity                  | m/s     | 4.2 to 4.4    | 4.37   | Pass      |
| Peak Upper Thorax Rib Deflection   | mm      | 32 to 40      | 37.1   | Pass      |
| Peak Middle Thorax Rib Deflection  | mm      | 39 to 45      | 42.4   | Pass      |
| Peak Lower Thorax Rib Deflection   | mm      | 35 to 43      | 41.0   | Pass      |
| Peak Upper Spine Y Acceleration    | G's     | 13 to 17      | 15.6   | Pass      |
| Peak Lower Spine Y Acceleration    | G's     | 7 to 11       | 9.0    | Pass      |
| Peak Impactor Acceleration         | G's     | 14 to 18      | 16.3   | Pass      |
| Overall Test Results               |         |               | Pass   |           |



| Curve Description        |      |           |       |
|--------------------------|------|-----------|-------|
| Upper Thorax Deflection  |      |           |       |
| Plot No.                 | Type | SAE Class | Units |
| 001                      | FIL  | 600       | MM    |
| Max                      | Time | Min       | Time  |
| 37.1                     | 21.2 | 0.0       | -12.5 |
| Middle Thorax Deflection |      |           |       |
| Max                      | Time | Min       | Time  |
| 42.4                     | 21.9 | 0.0       | -11.1 |
| Lower Thorax Deflection  |      |           |       |
| Max                      | Time | Min       | Time  |
| 41.0                     | 23.1 | 0.0       | -7.2  |



| Curve Description          |      |           |       |
|----------------------------|------|-----------|-------|
| Upper Spine Y Acceleration |      |           |       |
| Plot No.                   | Type | SAE Class | Units |
| 004                        | FIL  | 180       | G's   |
| Max                        | Time | Min       | Time  |
| 15.6                       | 15.9 | -6.0      | 49.2  |
| Lower Spine Y Acceleration |      |           |       |
| Plot No.                   | Type | SAE Class | Units |
| 005                        | FIL  | 180       | G's   |
| Max                        | Time | Min       | Time  |
| 9.0                        | 16.4 | -5.2      | 46.6  |



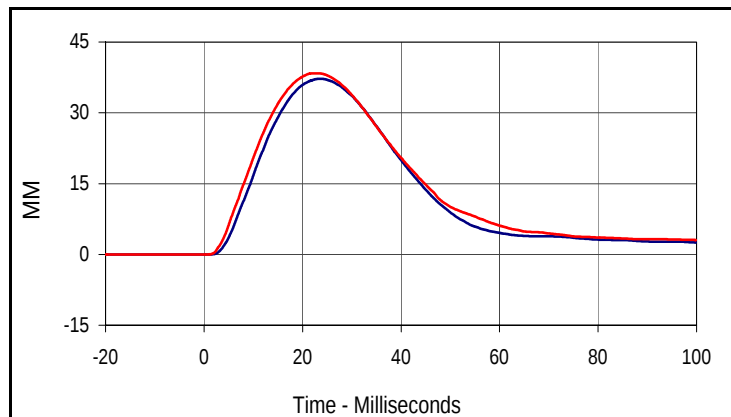
| Curve Description     |      |           |       |
|-----------------------|------|-----------|-------|
| Impactor Acceleration |      |           |       |
| Plot No.              | Type | SAE Class | Units |
| 006                   | FIL  | 180       | G's   |
| Max                   | Time | Min       | Time  |
| 16.3                  | 19.7 | -0.2      | 74.7  |

Test Program: SID IIs Abdomen Impact Test  
 ATD Serial No.: 307

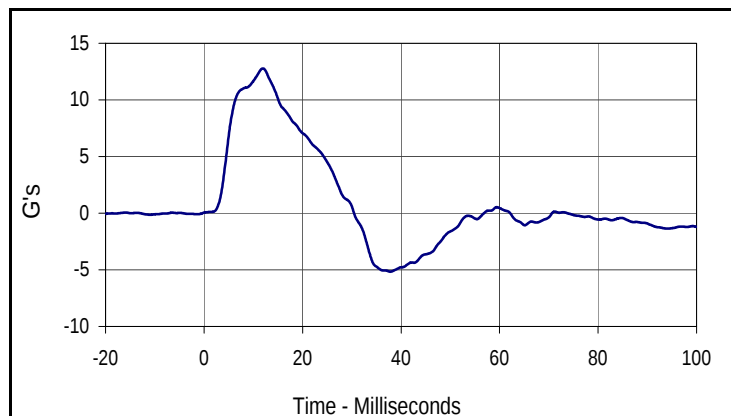
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 Test I.D.: 307ABD079



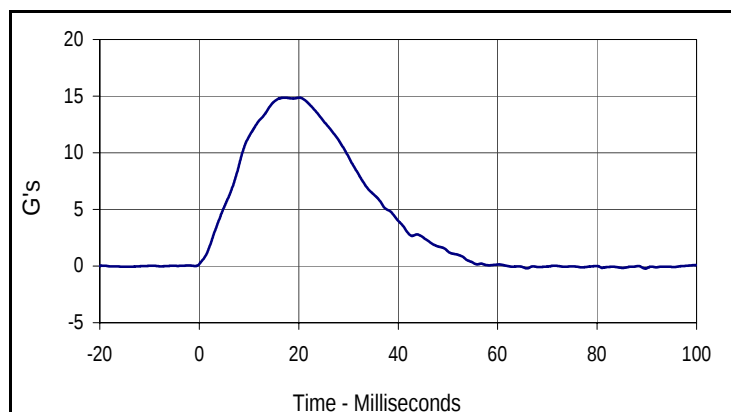
| Tested Parameter                    | Units   | Specification | Result | Pass/Fail |
|-------------------------------------|---------|---------------|--------|-----------|
| Dummy Soak Time                     | Minutes | ≥180          | 577    | Pass      |
| Temperature During Soak             | Max     | 20.6 to 22.2  | 21.6   | Pass      |
|                                     | Min     |               | 21.3   | Pass      |
| Humidity During Soak                | Max     | 10.0 to 70.0  | 31.9   | Pass      |
|                                     | Min     |               | 31.7   | Pass      |
| Laboratory Temperature During Test  | °C      | 18.9 to 25.6  | 21.4   | Pass      |
| Laboratory Humidity During Test     | %       | 10.0 to 70.0  | 31.7   | Pass      |
| Impactor Velocity                   | m/s     | 4.2 to 4.4    | 4.34   | Pass      |
| Peak Upper Abdominal Rib Deflection | mm      | 36 to 47      | 37.2   | Pass      |
| Peak Lower Abdominal Rib Deflection | mm      | 33 to 44      | 38.4   | Pass      |
| Peak Lower Spine Y Acceleration     | G's     | 9 to 14       | 12.8   | Pass      |
| Peak Impactor Acceleration          | G's     | 12 to 16      | 14.9   | Pass      |
| Overall Test Results                |         |               | Pass   |           |



| Curve Description              |      |           |       |
|--------------------------------|------|-----------|-------|
| Upper Abdominal Rib Deflection |      |           |       |
| Plot No.                       | Type | SAE Class | Units |
| 001                            | FIL  | 600       | MM    |
| Max                            | Time | Min       | Time  |
| 37.2                           | 23.5 | 0.0       | -13.6 |
| Curve Description              |      |           |       |
| Lower Abdominal Rib Deflection |      |           |       |
| Plot No.                       | Type | SAE Class | Units |
| 002                            | FIL  | 600       | MM    |
| Max                            | Time | Min       | Time  |
| 38.4                           | 22.5 | 0.0       | -16.4 |

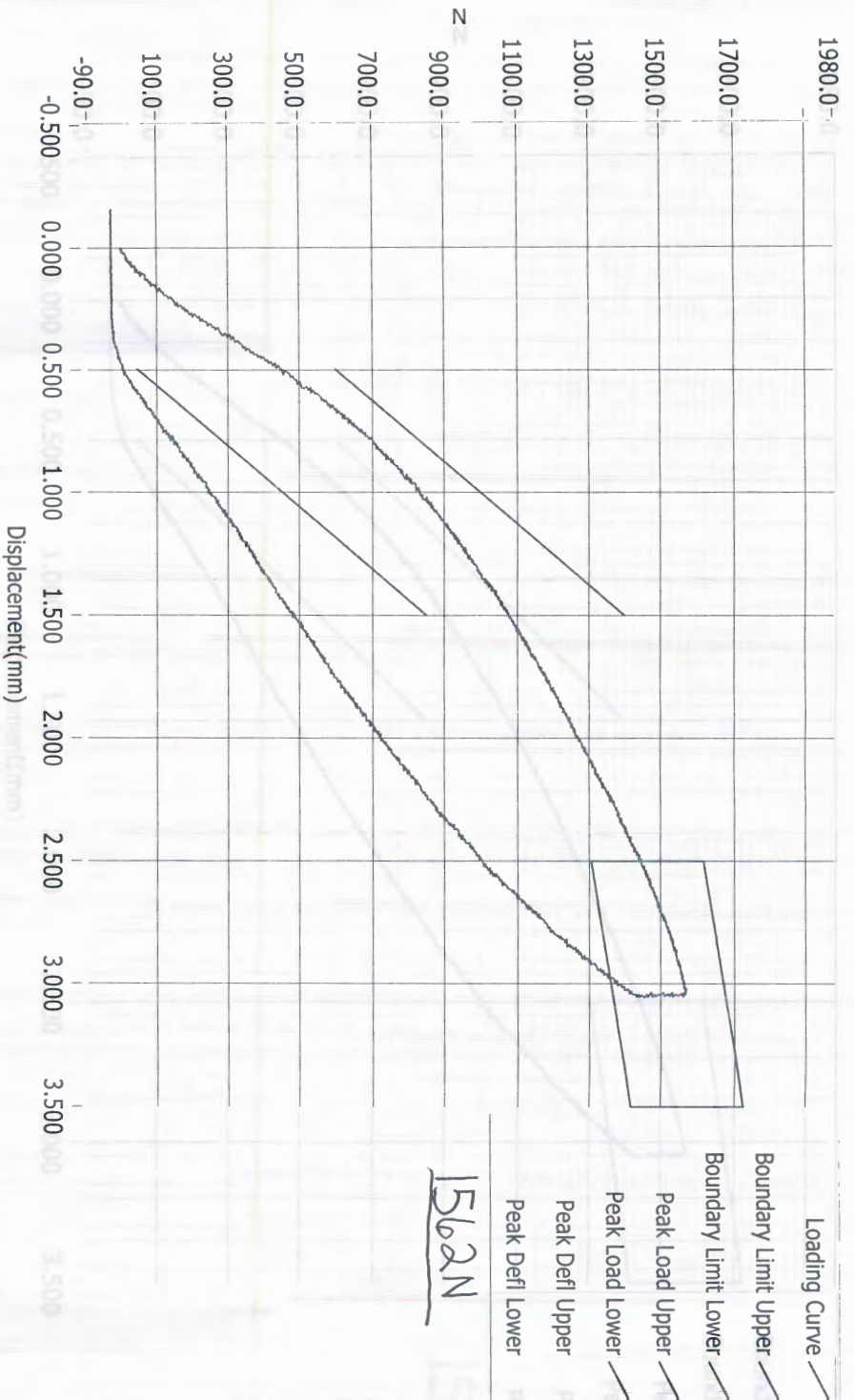


| Curve Description          |      |           |       |
|----------------------------|------|-----------|-------|
| Lower Spine Y Acceleration |      |           |       |
| Plot No.                   | Type | SAE Class | Units |
| 003                        | FIL  | 180       | G's   |
| Max                        | Time | Min       | Time  |
| 12.8                       | 12.0 | -5.2      | 37.8  |



| Curve Description     |      |           |       |
|-----------------------|------|-----------|-------|
| Impactor Acceleration |      |           |       |
| Plot No.              | Type | SAE Class | Units |
| 004                   | FIL  | 180       | G's   |
| Max                   | Time | Min       | Time  |
| 14.9                  | 20.2 | -0.2      | 89.7  |

# Resultant Data - SIDIIs Plug Compression



## ATD Calibration Lab

| Test ID | Part Serial Number | Test Date  | Test Time |
|---------|--------------------|------------|-----------|
| 70981   | 70981              | 12/13/2013 | 10:48 PM  |
| Cert ID | ATD Serial Number  | ATD Type   | ATD Type  |
| N/A     | N/A                | SIDIIs     | SIDIIs    |

Current Date : 12/13/2013

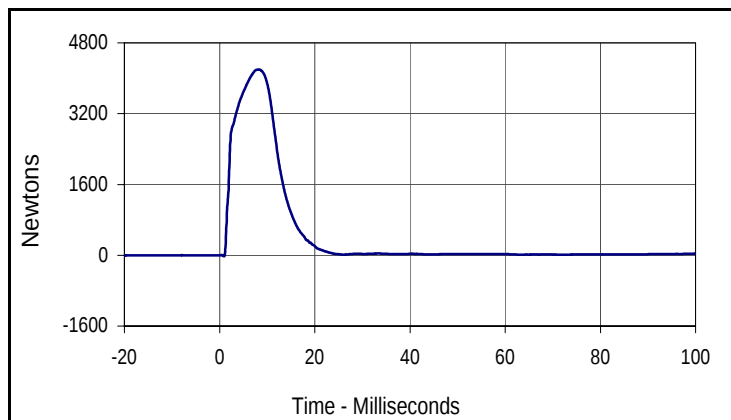
Current Time : 22:48:58

Test Program: SID IIs Pelvis Acetabulum Impact Test  
 ATD Serial No.: 307

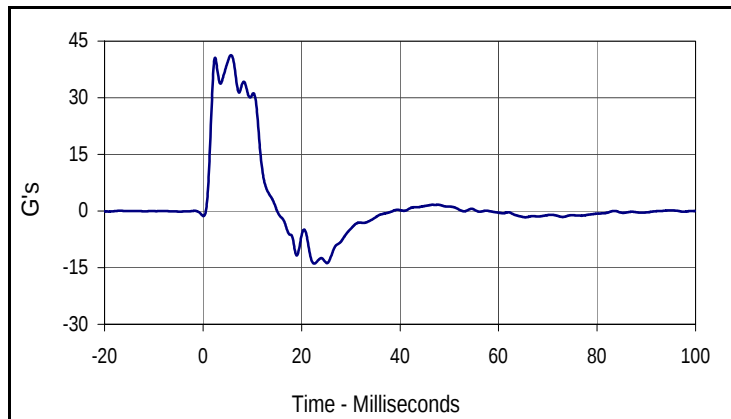
Test Date: 1/19/15  
 Test I.D.: 307ACET079



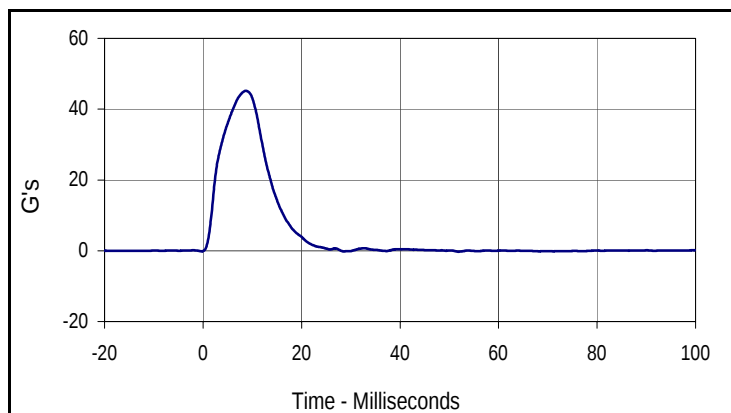
| Tested Parameter                         |     | Units   | Specification | Result | Pass/Fail |
|------------------------------------------|-----|---------|---------------|--------|-----------|
| Dummy Soak Time                          |     | Minutes | ≥180          | 627    | Pass      |
| Temperature During Soak                  | Max | °C      | 20.6 to 22.2  | 21.6   | Pass      |
|                                          | Min | °C      |               | 21.3   | Pass      |
| Humidity During Soak                     | Max | %       | 10.0 to 70.0  | 31.9   | Pass      |
|                                          | Min | %       |               | 31.7   | Pass      |
| Laboratory Temperature During Test       |     | °C      | 18.9 to 25.6  | 21.4   | Pass      |
| Laboratory Humidity During Test          |     | %       | 10.0 to 70.0  | 31.7   | Pass      |
| Impactor Velocity                        |     | m/s     | 6.6 to 6.8    | 6.68   | Pass      |
| Peak Acetabulum Force Y                  |     | Newtons | 3600 to 4300  | 4197.0 | Pass      |
| Peak Pelvis Y Acceleration After 6 msec. |     | G's     | 34 to 42      | 40.7   | Pass      |
| Peak Impactor Acceleration               |     | G's     | 38 to 47      | 45.2   | Pass      |
| Overall Test Results                     |     |         |               | Pass   |           |



| Curve Description       |      |           |         |
|-------------------------|------|-----------|---------|
| Pelvis Acetabulum Force |      |           |         |
| Plot No.                | Type | SAE Class | Units   |
| 001                     | FIL  | 600       | Newtons |
| Max                     | Time | Min       | Time    |
| 4197.0                  | 8.3  | -26.5     | 1.0     |



| Curve Description     |      |           |       |
|-----------------------|------|-----------|-------|
| Pelvis Y Acceleration |      |           |       |
| Plot No.              | Type | SAE Class | Units |
| 002                   | FIL  | 180       | G's   |
| Max                   | Time | Min       | Time  |
| 41.3                  | 5.7  | -13.9     | 22.6  |



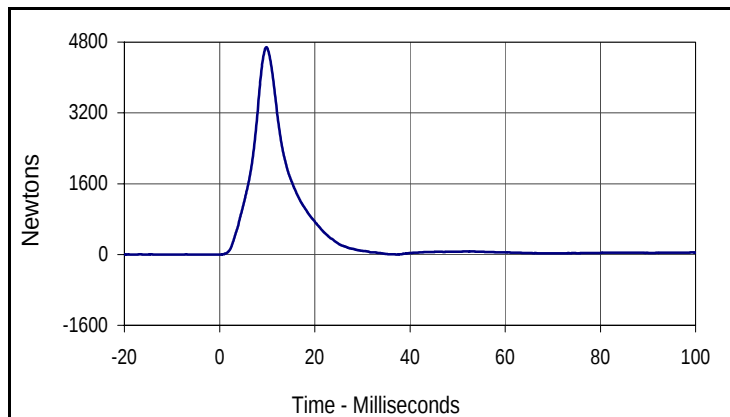
| Curve Description     |      |           |       |
|-----------------------|------|-----------|-------|
| Impactor Acceleration |      |           |       |
| Plot No.              | Type | SAE Class | Units |
| 003                   | FIL  | 180       | G's   |
| Max                   | Time | Min       | Time  |
| 45.2                  | 8.6  | -0.3      | 51.8  |

Test Program: SID IIs Pelvis Iliac Calibration  
 ATD Serial No.: 307

Test Date: 1/19/15  
 Test I.D.: 307PL079



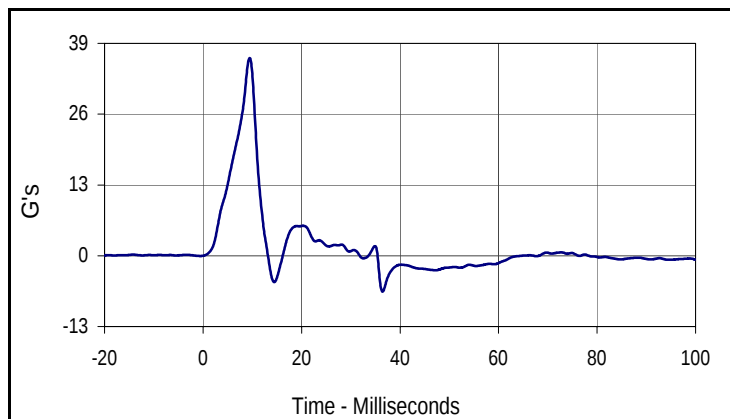
| Tested Parameter                   |     | Units   | Specification | Result | Pass/Fail |
|------------------------------------|-----|---------|---------------|--------|-----------|
| Dummy Soak Time                    |     | Minutes | ≥180          | 682    | Pass      |
| Temperature During Soak            | Max | °C      | 20.6 to 22.2  | 21.6   | Pass      |
|                                    | Min | °C      |               | 21.3   | Pass      |
| Humidity During Soak               | Max | %       | 10.0 to 70.0  | 31.9   | Pass      |
|                                    | Min | %       |               | 31.7   | Pass      |
| Laboratory Temperature During Test |     | °C      | 18.9 to 25.6  | 21.3   | Pass      |
| Laboratory Humidity During Test    |     | %       | 10.0 to 70.0  | 31.7   | Pass      |
| Impactor Velocity                  |     | m/s     | 4.2 to 4.4    | 4.35   | Pass      |
| Peak Iliac Force                   |     | Newtons | 4100 to 5100  | 4685.5 | Pass      |
| Peak Pelvis Y Acceleration         |     | G's     | 28 to 39      | 36.3   | Pass      |
| Peak Impactor Acceleration         |     | G's     | 36 to 45      | 42.9   | Pass      |
| Overall Test Results               |     |         |               | Pass   |           |



#### Curve Description

##### Pelvis Iliac Force

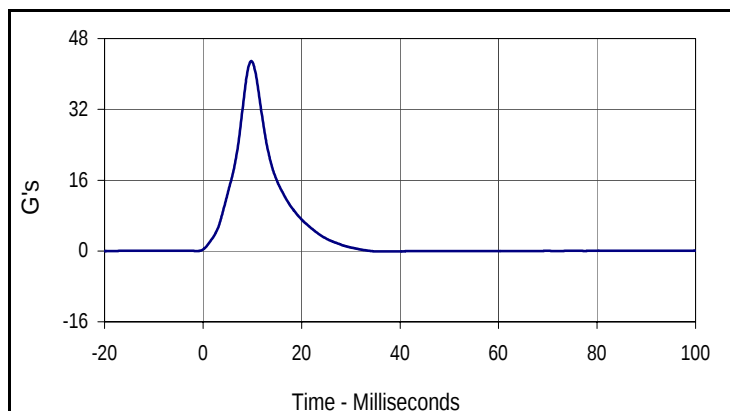
| Plot No. | Type | SAE Class | Units   |
|----------|------|-----------|---------|
| 001      | FIL  | 600       | Newtons |
| Max      | Time | Min       | Time    |
| 4685.5   | 9.8  | -2.7      | 37.3    |



#### Curve Description

##### Pelvis Y Acceleration

| Plot No. | Type | SAE Class | Units |
|----------|------|-----------|-------|
| 002      | FIL  | 180       | G's   |
| Max      | Time | Min       | Time  |
| 36.3     | 9.5  | -6.6      | 36.4  |



#### Curve Description

##### Impactor Acceleration

| Plot No. | Type | SAE Class | Units |
|----------|------|-----------|-------|
| 003      | FIL  | 180       | G's   |
| Max      | Time | Min       | Time  |
| 42.9     | 9.8  | -0.1      | 35.7  |

**APPENDIX C**  
**POST-TEST / ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA**

Test Program: ES2re External Measurements  
 ATD Serial No.: F037

Test Date: 3/13/15  
 Test I.D.: N/A



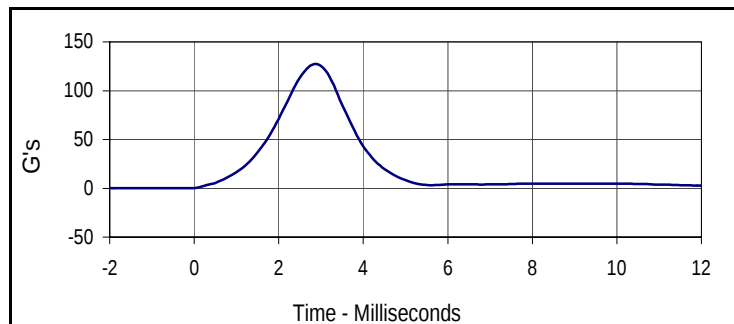
| Tested Parameter             |                                                | Units | Specification | Result | Pass/Fail |
|------------------------------|------------------------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature       |                                                | °C    | 20.6 to 22.2  | 21.2   | Pass      |
| Laboratory Relative Humidity |                                                | %     | 10 to 70      | 30.0   | Pass      |
| 1                            | Sitting Height                                 | mm    | 900 - 918     | 909    | Pass      |
| 2                            | Seat to Shoulder Joint                         | mm    | 558 - 572     | 564    | Pass      |
| 3                            | Seat to Lower Face of Thoracic Spine Box       | mm    | 346 - 356     | 350    | Pass      |
| 4                            | Seat to Hip Joint (Center of Bolt)             | mm    | 97 - 103      | 99     | Pass      |
| 5                            | Sole to Seat, Sitting                          | mm    | 333 - 451     | 395    | Pass      |
| 6                            | Head Width                                     | mm    | 152 - 158     | 156    | Pass      |
| 7                            | Shoulder / Arm Width                           | mm    | 461 - 479     | 470    | Pass      |
| 8                            | Thorax Width                                   | mm    | 322 - 332     | 326    | Pass      |
| 9                            | Abdomen Width                                  | mm    | 273 - 287     | 280    | Pass      |
| 10                           | Pelvis Lap Width                               | mm    | 359 - 373     | 363    | Pass      |
| 11                           | Head Depth                                     | mm    | 196 - 206     | 201    | Pass      |
| 12                           | Thorax Depth                                   | mm    | 262 - 272     | 270    | Pass      |
| 13                           | Abdomen Width                                  | mm    | 194 - 204     | 199    | Pass      |
| 14                           | Pelvis Depth                                   | mm    | 235 - 245     | 240    | Pass      |
| 15                           | Back of Buttocks to Hip Joint (Center of Bolt) | mm    | 150 - 160     | 155    | Pass      |
| 16                           | Back of Buttocks to Front Knee                 | mm    | 597 - 615     | 608    | Pass      |
| Overall Test Results         |                                                |       |               |        | Pass      |

Test Program: ES2re Head Drop Test  
 ATD Serial No.: F037

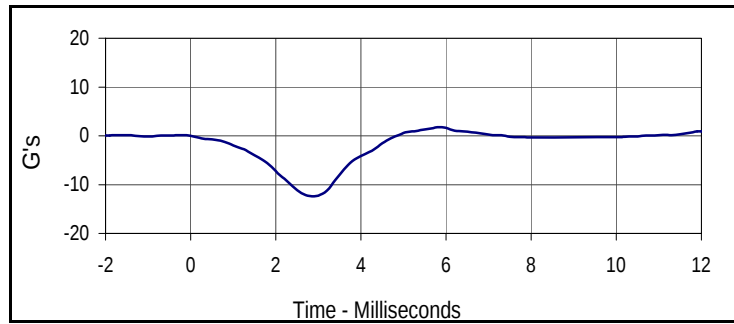
Test Date: 3/13/15  
 Test I.D.: F037HD071



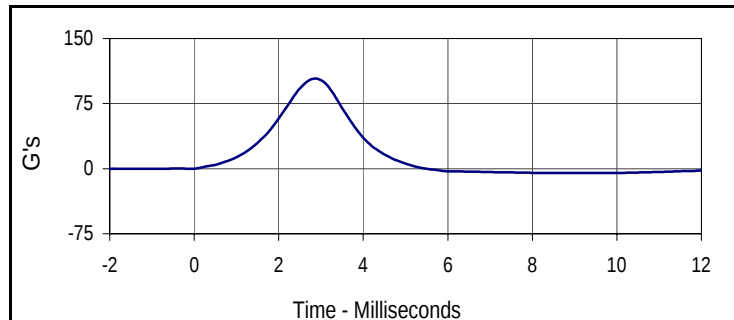
| Tested Parameter                   | Units   | Specification | Result | Pass/Fail |
|------------------------------------|---------|---------------|--------|-----------|
| Head Assembly Soak Time            | Minutes | ≥240          | 352    | Pass      |
| Temperature During Soak            | Max     | 20.6 to 22.2  | 21.7   | Pass      |
|                                    | Min     |               | 21.1   | Pass      |
| Humidity During Soak               | Max     | 10.0 to 70.0  | 24.1   | Pass      |
|                                    | Min     |               | 22.5   | Pass      |
| Laboratory Temperature During Test | °C      | 20.6 to 22.2  | 21.1   | Pass      |
| Laboratory Humidity During Test    | %       | 10.0 to 70.0  | 22.7   | Pass      |
| Peak Head Resultant Acceleration   | G's     | 125 to 155    | 127.3  | Pass      |
| Peak Head X Acceleration           | G's     | ≤15           | 12.4   | Pass      |
| Is Acceleration Unimodal?          | Yes/No  | Yes           | Yes    | Pass      |
| Oscillations After Main Pulse      | %       | <15           | 0.3    | Pass      |
| Overall Test Results               |         |               |        | Pass      |



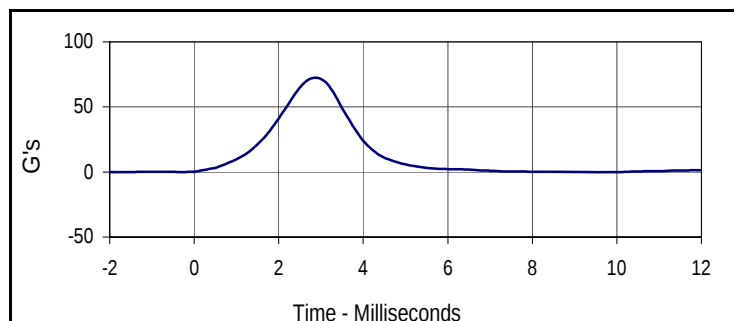
| Curve Description |      |           |       |
|-------------------|------|-----------|-------|
| Head Resultant    |      |           |       |
| Plot No.          | Type | SAE Class | Units |
| 001               | RES  | 1000      | G's   |
| Max               | Time | Min       | Time  |
| 127.3             | 2.9  | 0.0       | -7.7  |



| Curve Description |      |           |       |
|-------------------|------|-----------|-------|
| Head X            |      |           |       |
| Plot No.          | Type | SAE Class | Units |
| 002               | FIL  | 1000      | G's   |
| Max               | Time | Min       | Time  |
| 1.8               | 5.9  | -12.4     | 2.9   |



| Curve Description |      |           |       |
|-------------------|------|-----------|-------|
| Head Y            |      |           |       |
| Plot No.          | Type | SAE Class | Units |
| 003               | FIL  | 1000      | G's   |
| Max               | Time | Min       | Time  |
| 103.9             | 2.9  | -4.9      | 10.1  |



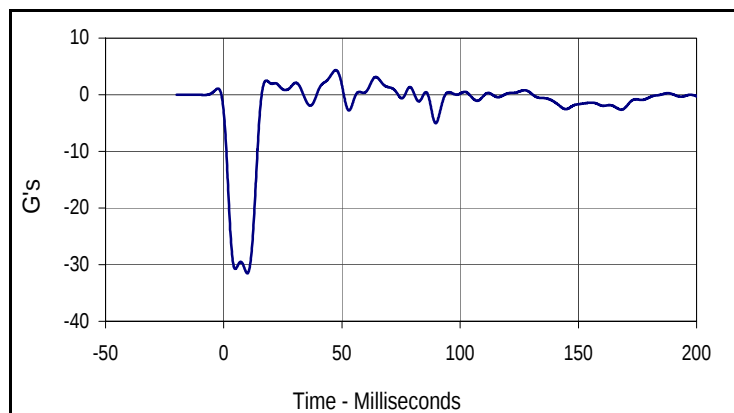
| Curve Description |      |           |       |
|-------------------|------|-----------|-------|
| Head Z            |      |           |       |
| Plot No.          | Type | SAE Class | Units |
| 004               | FIL  | 1000      | G's   |
| Max               | Time | Min       | Time  |
| 72.5              | 2.9  | -0.2      | -9.6  |

Test Program: ES2re Neck Flexion Test  
 ATD Serial No.: F037

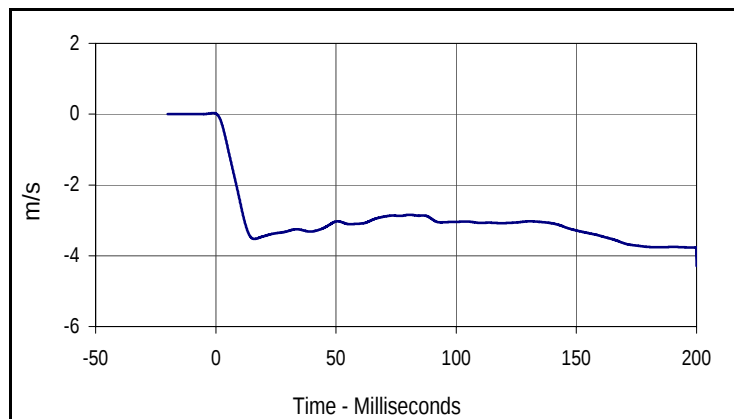
Test Date: 3/13/15  
 Test I.D.: F037NB071



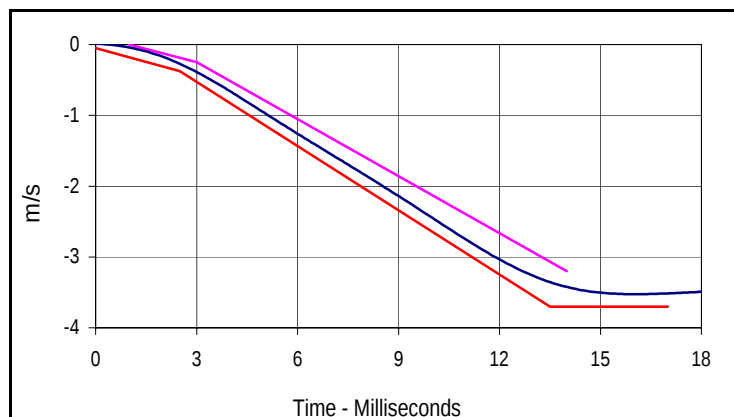
| Tested Parameter                      | Units   | Specification | Result | Pass/Fail |
|---------------------------------------|---------|---------------|--------|-----------|
| Neck Assembly Soak Time               | Minutes | ≥240          | 387    | Pass      |
| Temperature During Soak               | Max     | 20.6 to 22.2  | 21.7   | Pass      |
|                                       | Min     |               | 21.1   | Pass      |
| Humidity During Soak                  | Max     | 10.0 to 70.0  | 24.1   | Pass      |
|                                       | Min     |               | 22.5   | Pass      |
| Laboratory Temperature During Test    | °C      | 20.6 to 22.2  | 21.7   | Pass      |
| Laboratory Humidity During Test       | %       | 10.0 to 70.0  | 22.7   | Pass      |
| Pendulum Velocity                     | m/s     | 3.3 to 3.5    | 3.42   | Pass      |
| Headform Flexion                      | Max     | 49 to 59      | 54.3   | Pass      |
|                                       | Time    | 54 to 66      | 59.9   | Pass      |
| Headform Flexion Decay (Peak to Zero) | msec    | 53 to 88      | 61.1   | Pass      |
| Overall Test Results                  |         |               |        | Pass      |



| Curve Description     |      |           |       |
|-----------------------|------|-----------|-------|
| Pendulum Deceleration |      |           |       |
| Plot No.              | Type | SAE Class | Units |
| 001                   | FIL  | 60        | G's   |
| Max                   | Time | Min       | Time  |
| 4.3                   | 47.4 | -31.5     | 10.0  |



| Curve Description |      |           |       |
|-------------------|------|-----------|-------|
| Pendulum Velocity |      |           |       |
| Plot No.          | Type | SAE Class | Units |
| 002               | FIL  | 60        | m/s   |
| Max               | Time | Min       | Time  |
| 0.0               | -1.0 | -4.3      | 200.0 |



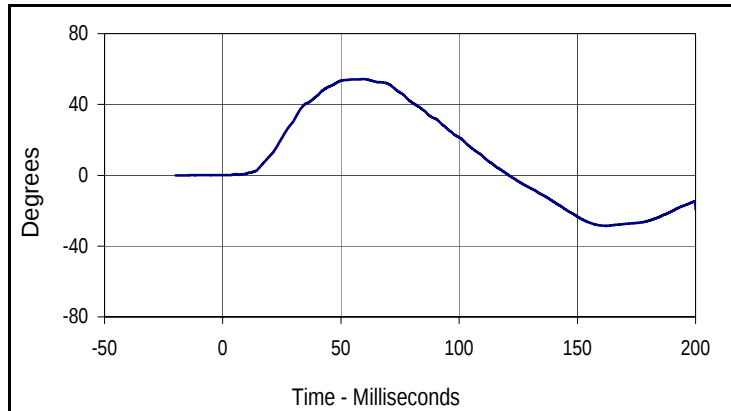
| Curve Description |      |           |       |
|-------------------|------|-----------|-------|
| Pendulum Velocity |      |           |       |
| Plot No.          | Type | SAE Class | Units |
| 002               | FIL  | 60        | m/s   |
| Max               | Time | Min       | Time  |
| 0.0               | -1.0 | -4.3      | 200.0 |

Velocity Corridors

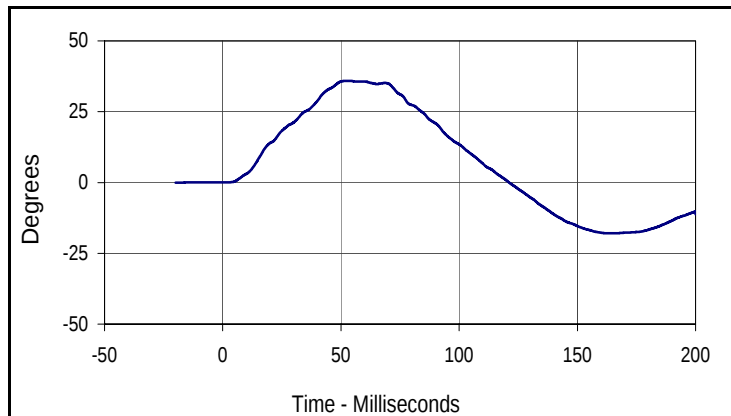
| Upper Boundary |                | Lower Boundary |                |
|----------------|----------------|----------------|----------------|
| Time (msec)    | Velocity (m/s) | Time (msec)    | Velocity (m/s) |
| 1.0            | 0.00           | 0.0            | -0.05          |
| 3.0            | -0.03          | 2.5            | -0.375         |
| 14.0           | -3.20          | 13.5           | -3.70          |
|                |                | 17.0           | -3.70          |

Test Program: ES2re Neck Flexion Test  
 ATD Serial No.: F037

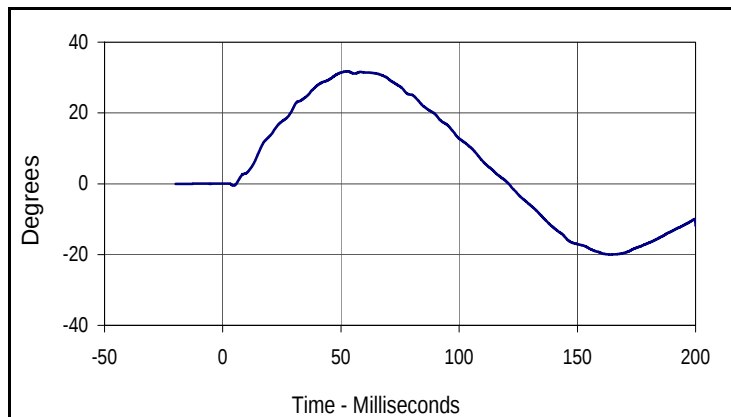
Test Date: 3/13/15  
 Test I.D.: F037NB071



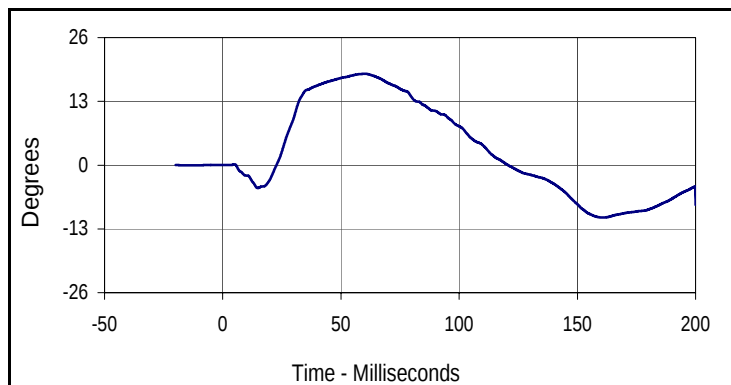
| Curve Description |      |           |         |
|-------------------|------|-----------|---------|
| Headform Rotation |      |           |         |
| Plot No.          | Type | SAE Class | Units   |
| 003               | FIL  | 180       | Degrees |
| Max               | Time | Min       | Time    |
| 54.3              | 59.9 | -28.6     | 162.2   |



| Curve Description |      |           |         |
|-------------------|------|-----------|---------|
| Potentiometer A   |      |           |         |
| Plot No.          | Type | SAE Class | Units   |
| 004               | FIL  | 180       | Degrees |
| Max               | Time | Min       | Time    |
| 35.9              | 54.0 | -17.9     | 162.7   |



| Curve Description |      |           |         |
|-------------------|------|-----------|---------|
| Potentiometer B   |      |           |         |
| Plot No.          | Type | SAE Class | Units   |
| 005               | FIL  | 180       | Degrees |
| Max               | Time | Min       | Time    |
| 31.8              | 52.7 | -20.0     | 164.1   |



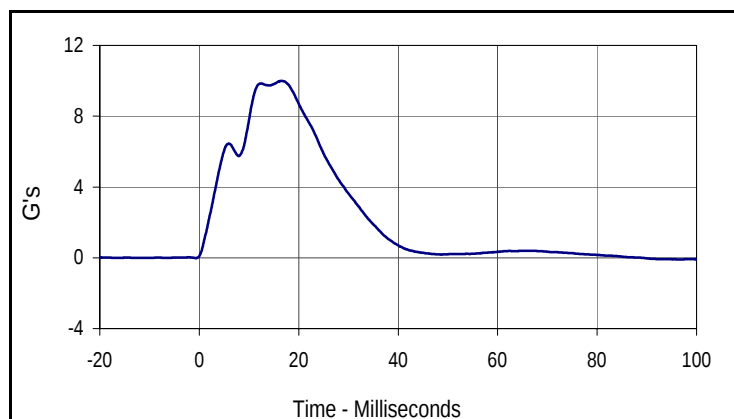
| Curve Description |      |           |         |
|-------------------|------|-----------|---------|
| Potentiometer C   |      |           |         |
| Plot No.          | Type | SAE Class | Units   |
| 006               | FIL  | 180       | Degrees |
| Max               | Time | Min       | Time    |
| 18.6              | 60.1 | -10.7     | 160.0   |

Test Program: ES2re Shoulder Impact Test  
 ATD Serial No.: F037

Test Date: 3/13/15  
 Test I.D.: F037SH071



| Tested Parameter                   | Units   | Specification | Result | Pass/Fail |
|------------------------------------|---------|---------------|--------|-----------|
| Dummy Soak Time                    | Minutes | ≥240          | 452    | Pass      |
| Temperature During Soak            | Max     | 20.6 to 22.2  | 21.7   | Pass      |
|                                    | Min     |               | 21.1   | Pass      |
| Humidity During Soak               | Max     | 10.0 to 70.0  | 24.1   | Pass      |
|                                    | Min     |               | 22.5   | Pass      |
| Laboratory Temperature During Test | °C      | 20.6 to 22.2  | 21.7   | Pass      |
| Laboratory Humidity During Test    | %       | 10.0 to 70.0  | 22.5   | Pass      |
| Pendulum Speed                     | m/s     | 4.2 to 4.4    | 4.36   | Pass      |
| Peak Impactor Acceleration         | G's     | 7.5 to 10.5   | 10.0   | Pass      |
| Overall Test Results               |         |               |        | Pass      |



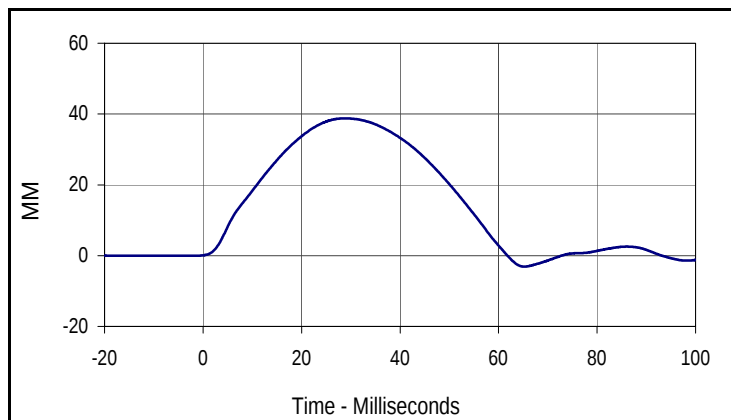
| Curve Description     |      |           |       |
|-----------------------|------|-----------|-------|
| Impactor Acceleration |      |           |       |
| Plot No.              | Type | SAE Class | Units |
| 001                   | FIL  | 180       | G's   |
| Max                   | Time | Min       | Time  |
| 10.0                  | 16.6 | -0.1      | 96.2  |

Test Program: ES2re Thorax - Rib Drop Test  
 ATD Serial No.: F037 Rib # 1

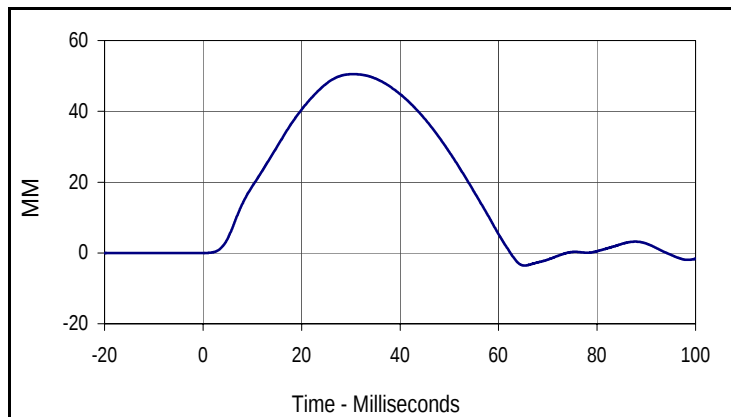
Test Date: 3/13/15  
 Test I.D.: F037RB1071



| Tested Parameter                                | Units   | Specification | Result | Pass/Fail |
|-------------------------------------------------|---------|---------------|--------|-----------|
| Rib Module Soak Time                            | Minutes | ≥240          | 507    | Pass      |
| Temperature During Soak                         | Max     | 20.6 to 22.2  | 21.7   | Pass      |
|                                                 | Min     |               | 21.1   | Pass      |
| Humidity During Soak                            | Max     | 10.0 to 70.0  | 24.1   | Pass      |
|                                                 | Min     |               | 22.5   | Pass      |
| Laboratory Temperature During Test              | °C      | 20.6 to 22.2  | 21.7   | Pass      |
| Laboratory Humidity During Test                 | %       | 10.0 to 70.0  | 22.6   | Pass      |
| Peak Rib Deflection at 459 +/- 5 mm Drop Height | mm      | 36 to 40      | 38.8   | Pass      |
| Peak Rib Deflection at 815 +/- 8 mm Drop Height | mm      | 46 to 51      | 50.5   | Pass      |
| Overall Test Results                            |         |               |        | Pass      |



| Curve Description                         |      |           |       |
|-------------------------------------------|------|-----------|-------|
| Upper Rib Deflection (459 mm Drop Height) |      |           |       |
| Plot No.                                  | Type | SAE Class | Units |
| 001                                       | FIL  | 180       | MM    |
| Max                                       | Time | Min       | Time  |
| 38.8                                      | 28.9 | -3.1      | 65.2  |



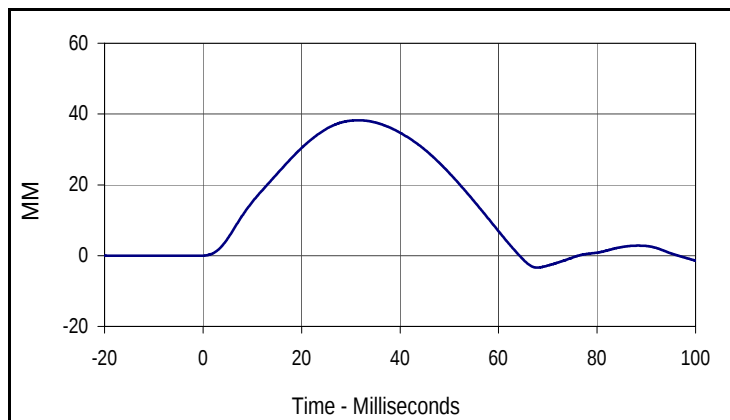
| Curve Description                         |      |           |       |
|-------------------------------------------|------|-----------|-------|
| Upper Rib Deflection (815 mm Drop Height) |      |           |       |
| Plot No.                                  | Type | SAE Class | Units |
| 002                                       | FIL  | 180       | MM    |
| Max                                       | Time | Min       | Time  |
| 50.5                                      | 30.5 | -3.6      | 65.3  |

Test Program: ES2re Thorax - Rib Drop Test  
 ATD Serial No.: F037 Rib # 2

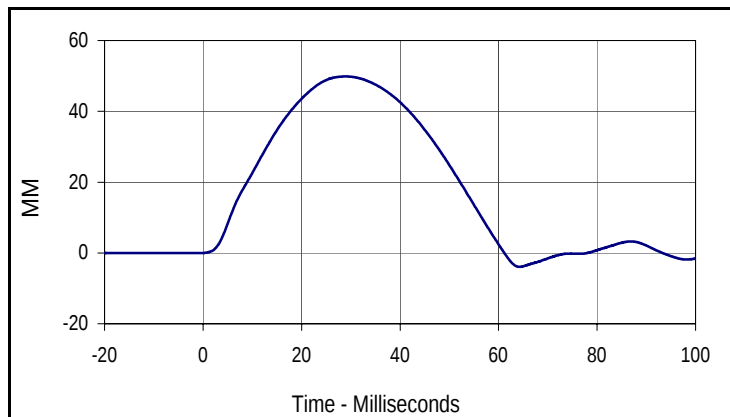
Test Date: 3/13/15  
 Test I.D.: F037RB2071



| Tested Parameter                                | Units   | Specification | Result | Pass/Fail |
|-------------------------------------------------|---------|---------------|--------|-----------|
| Rib Module Soak Time                            | Minutes | ≥240          | 552    | Pass      |
| Temperature During Soak                         | Max     | 20.6 to 22.2  | 21.7   | Pass      |
|                                                 | Min     |               | 21.1   | Pass      |
| Humidity During Soak                            | Max     | 10.0 to 70.0  | 24.1   | Pass      |
|                                                 | Min     |               | 22.5   | Pass      |
| Laboratory Temperature During Test              | °C      | 20.6 to 22.2  | 21.7   | Pass      |
| Laboratory Humidity During Test                 | %       | 10.0 to 70.0  | 22.5   | Pass      |
| Peak Rib Deflection at 459 +/- 5 mm Drop Height | mm      | 36 to 40      | 38.2   | Pass      |
| Peak Rib Deflection at 815 +/- 8 mm Drop Height | mm      | 46 to 51      | 49.9   | Pass      |
| Overall Test Results                            |         |               |        | Pass      |



| Curve Description                          |      |           |       |
|--------------------------------------------|------|-----------|-------|
| Middle Rib Deflection (459 mm Drop Height) |      |           |       |
| Plot No.                                   | Type | SAE Class | Units |
| 001                                        | FIL  | 180       | MM    |
| Max                                        | Time | Min       | Time  |
| 38.2                                       | 31.6 | -3.4      | 67.9  |



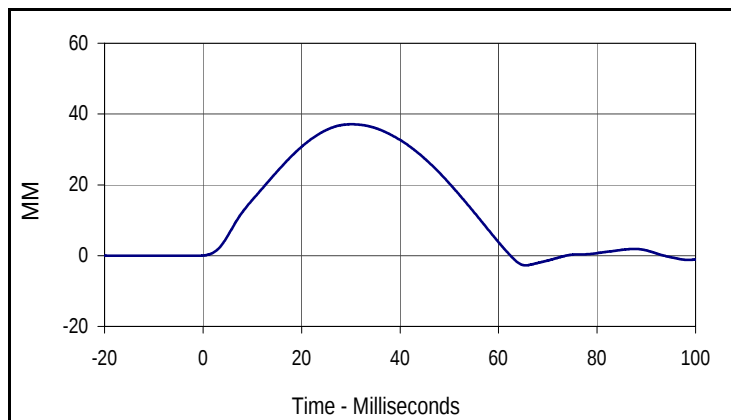
| Curve Description                          |      |           |       |
|--------------------------------------------|------|-----------|-------|
| Middle Rib Deflection (815 mm Drop Height) |      |           |       |
| Plot No.                                   | Type | SAE Class | Units |
| 002                                        | FIL  | 180       | MM    |
| Max                                        | Time | Min       | Time  |
| 49.9                                       | 28.9 | -3.9      | 64.3  |

Test Program: ES2re Thorax - Rib Drop Test  
 ATD Serial No.: F037 Rib # 3

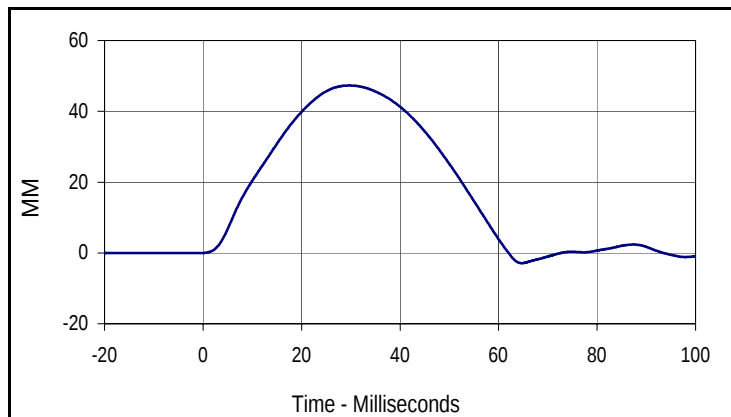
Test Date: 3/13/15  
 Test I.D.: F037RB3071



| Tested Parameter                                | Units   | Specification | Result | Pass/Fail |
|-------------------------------------------------|---------|---------------|--------|-----------|
| Rib Module Soak Time                            | Minutes | ≥240          | 597    | Pass      |
| Temperature During Soak                         | Max     | 20.6 to 22.2  | 21.7   | Pass      |
|                                                 | Min     |               | 21.1   | Pass      |
| Humidity During Soak                            | Max     | 10.0 to 70.0  | 24.1   | Pass      |
|                                                 | Min     |               | 22.5   | Pass      |
| Laboratory Temperature During Test              | °C      | 20.6 to 22.2  | 21.7   | Pass      |
| Laboratory Humidity During Test                 | %       | 10.0 to 70.0  | 22.5   | Pass      |
| Peak Rib Deflection at 459 +/- 5 mm Drop Height | mm      | 36 to 40      | 37.1   | Pass      |
| Peak Rib Deflection at 815 +/- 8 mm Drop Height | mm      | 46 to 51      | 47.3   | Pass      |
| Overall Test Results                            |         |               |        | Pass      |



| Curve Description                         |      |           |       |
|-------------------------------------------|------|-----------|-------|
| Lower Rib Deflection (459 mm Drop Height) |      |           |       |
| Plot No.                                  | Type | SAE Class | Units |
| 001                                       | FIL  | 180       | MM    |
| Max                                       | Time | Min       | Time  |
| 37.1                                      | 30.2 | -2.8      | 65.5  |



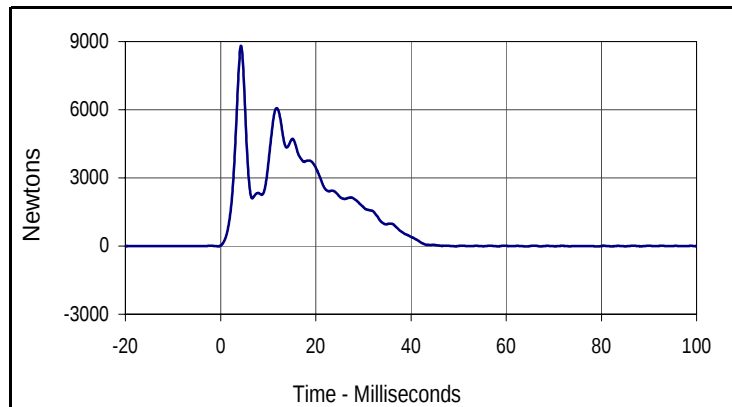
| Curve Description                         |      |           |       |
|-------------------------------------------|------|-----------|-------|
| Lower Rib Deflection (815 mm Drop Height) |      |           |       |
| Plot No.                                  | Type | SAE Class | Units |
| 002                                       | FIL  | 180       | MM    |
| Max                                       | Time | Min       | Time  |
| 47.3                                      | 29.7 | -2.9      | 64.7  |

Test Program: ES2re Thorax - Full Body Impact Test  
 ATD Serial No.: F037

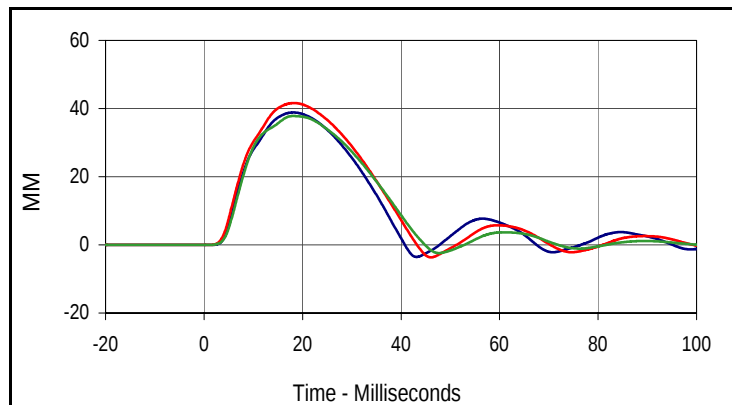
Test Date: 3/13/15  
 Test I.D.: F037TH071



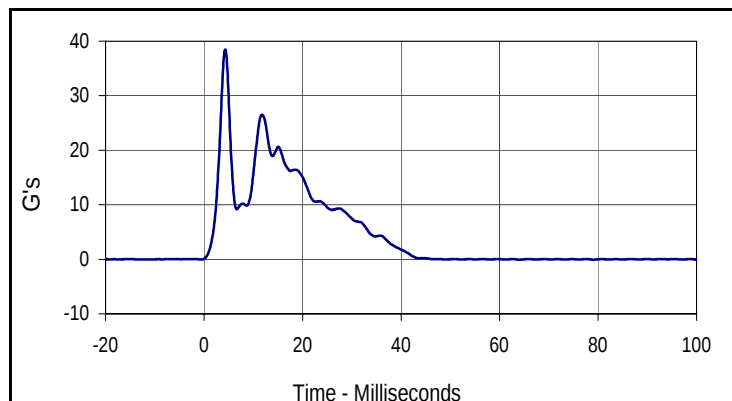
| Tested Parameter                   |      | Units   | Specification | Result | Pass/Fail |
|------------------------------------|------|---------|---------------|--------|-----------|
| Dummy Soak Time                    |      | Minutes | ≥240          | 642    | Pass      |
| Temperature During Soak            | Max  | °C      | 20.6 to 22.2  | 21.7   | Pass      |
|                                    | Min  | °C      |               | 21.1   | Pass      |
| Humidity During Soak               | Max  | %       | 10.0 to 70.0  | 24.1   | Pass      |
|                                    | Min  | %       |               | 22.5   | Pass      |
| Laboratory Temperature During Test |      | °C      | 20.6 to 22.2  | 21.7   | Pass      |
| Laboratory Humidity During Test    |      | %       | 10.0 to 70.0  | 22.5   | Pass      |
| Peak Impactor Velocity             |      | m/s     | 5.4 to 5.6    | 5.56   | Pass      |
| Peak Impactor Force                | N    |         | 5100 to 6200  | 6069.1 | Pass      |
|                                    | msec |         | > 6.0 msec    | 11.8   | Pass      |
| Peak Upper Rib Deflection          |      | mm      | 34 to 41      | 38.8   | Pass      |
| Peak Middle Rib Deflection         |      | mm      | 37 to 45      | 41.6   | Pass      |
| Peak Lower Rib Deflection          |      | mm      | 37 to 44      | 37.8   | Pass      |
| Overall Test Results               |      |         |               |        | Pass      |



| Curve Description |      |           |         |
|-------------------|------|-----------|---------|
| Impactor Force    |      |           |         |
| Plot No.          | Type | SAE Class | Units   |
| 001               | FIL  | 180       | Newtons |
| Max               | Time | Min       | Time    |
| 8815.9            | 4.3  | -16.8     | 64.0    |



| Curve Description                    |      |              |       |
|--------------------------------------|------|--------------|-------|
| Upper, Middle, Lower Rib Deflections |      |              |       |
| Plot No.                             | Type | SAE Class    | Units |
| 002                                  | FIL  | 180          | MM    |
| Max (Upper)                          | Time | Min (Upper)  | Time  |
| 38.8                                 | 18.1 | -3.5         | 43.1  |
| Max (Middle)                         | Time | Min (Middle) | Time  |
| 41.6                                 | 18.3 | -3.7         | 46.1  |
| Max (Lower)                          | Time | Min (Lower)  | Time  |
| 37.8                                 | 18.1 | -2.4         | 47.7  |



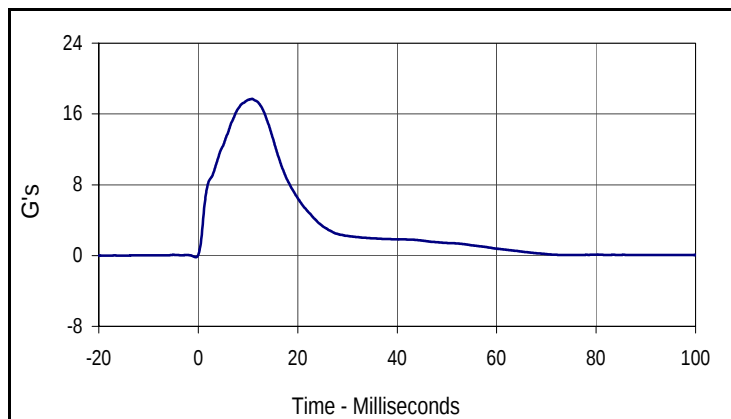
| Curve Description     |      |           |       |
|-----------------------|------|-----------|-------|
| Impactor Acceleration |      |           |       |
| Plot No.              | Type | SAE Class | Units |
| 003                   | FIL  | 180       | G's   |
| Max                   | Time | Min       | Time  |
| 38.5                  | 4.3  | -0.1      | 64.0  |

Test Program: ES2re Abdomen Impact Test  
 ATD Serial No.: F037

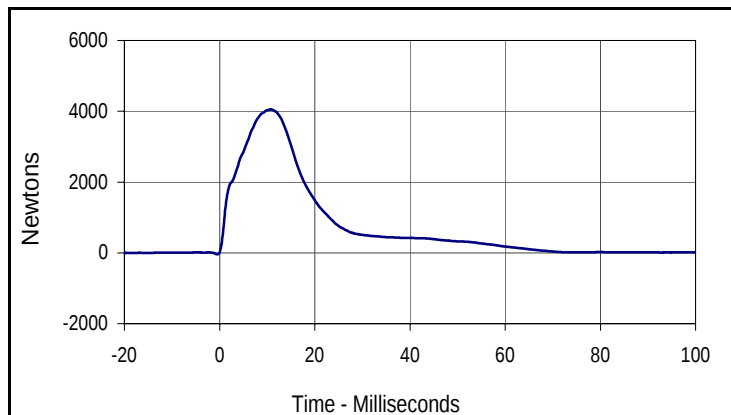
Test Date: 3/13/15  
 Test I.D.: F037ABD071



| Tested Parameter                   | Units   | Specification | Result | Pass/Fail |
|------------------------------------|---------|---------------|--------|-----------|
| Dummy Soak Time                    | Minutes | ≥240          | 712    | Pass      |
| Temperature During Soak            | Max     | 20.6 to 22.2  | 21.7   | Pass      |
|                                    | Min     |               | 21.1   | Pass      |
| Humidity During Soak               | Max     | 10.0 to 70.0  | 24.1   | Pass      |
|                                    | Min     |               | 22.5   | Pass      |
| Laboratory Temperature During Test | °C      | 20.6 to 22.2  | 21.7   | Pass      |
| Laboratory Humidity During Test    | %       | 10.0 to 70.0  | 22.5   | Pass      |
| Probe Velocity                     | m/s     | 3.9 to 4.1    | 4.03   | Pass      |
| Peak Impactor Force                | N       | 4000 to 4800  | 4053.7 | Pass      |
|                                    | msec    | 10.6 to 13.0  | 10.8   | Pass      |
| Sum of Abdominal Forces            | N       | 2200 to 2700  | 2387.8 | Pass      |
|                                    | msec    | 10.0 to 12.3  | 11.0   | Pass      |
| Overall Test Results               |         |               |        | Pass      |



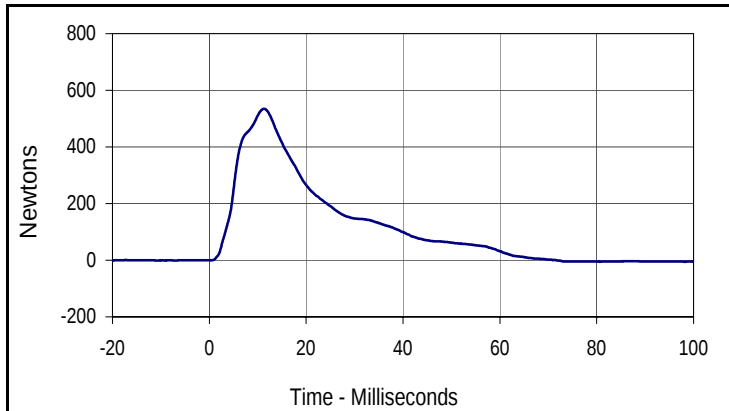
| Curve Description     |      |           |       |
|-----------------------|------|-----------|-------|
| Impactor Acceleration |      |           |       |
| Plot No.              | Type | SAE Class | Units |
| 001                   | FIL  | 180       | G's   |
| Max                   | Time | Min       | Time  |
| 17.7                  | 10.8 | -0.2      | -0.5  |



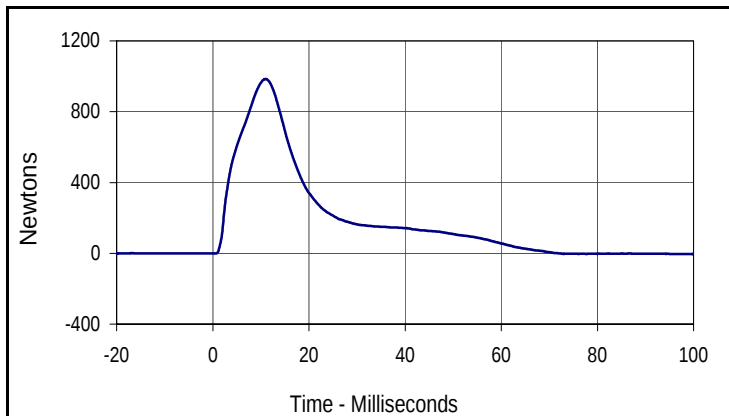
| Curve Description |      |           |         |
|-------------------|------|-----------|---------|
| Impactor Force    |      |           |         |
| Plot No.          | Type | SAE Class | Units   |
| 002               | FIL  | 180       | Newtons |
| Max               | Time | Min       | Time    |
| 4053.7            | 10.8 | -40.9     | -0.5    |

Test Program: ES2re Abdomen Impact Test  
 ATD Serial No.: F037

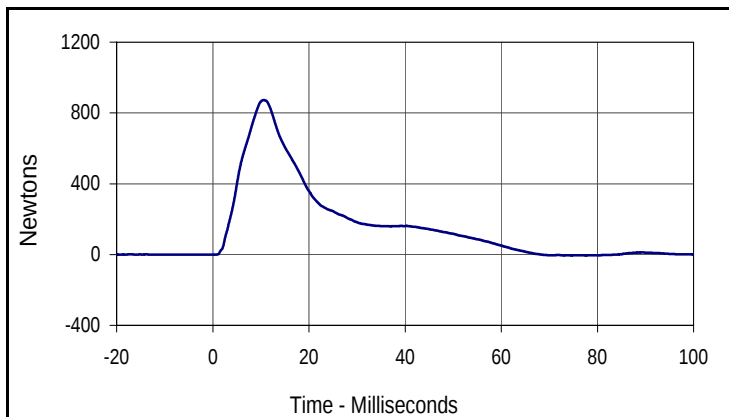
Test Date: 3/13/15  
 Test I.D.: F037ABD071



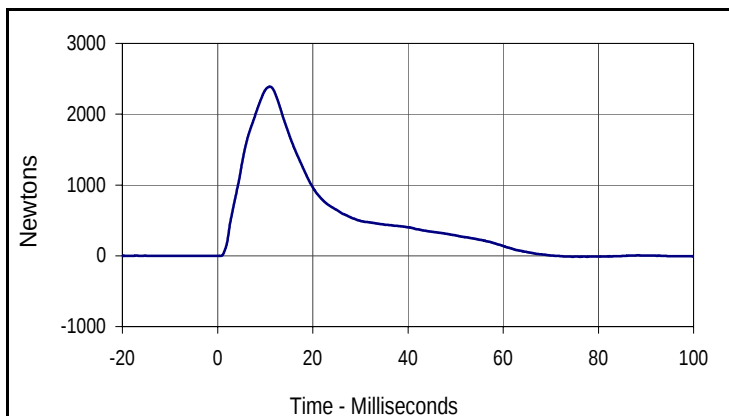
| Curve Description   |      |           |         |
|---------------------|------|-----------|---------|
| Front Abdomen Force |      |           |         |
| Plot No.            | Type | SAE Class | Units   |
| 003                 | FIL  | 600       | Newtons |
| Max                 | Time | Min       | Time    |
| 534.9               | 11.3 | -5.1      | 98.2    |



| Curve Description    |      |           |         |
|----------------------|------|-----------|---------|
| Middle Abdomen Force |      |           |         |
| Plot No.             | Type | SAE Class | Units   |
| 004                  | FIL  | 600       | Newtons |
| Max                  | Time | Min       | Time    |
| 984.6                | 11.0 | -4.3      | 97.5    |



| Curve Description  |      |           |         |
|--------------------|------|-----------|---------|
| Rear Abdomen Force |      |           |         |
| Plot No.           | Type | SAE Class | Units   |
| 005                | FIL  | 600       | Newtons |
| Max                | Time | Min       | Time    |
| 872.7              | 10.5 | -5.5      | 74.6    |



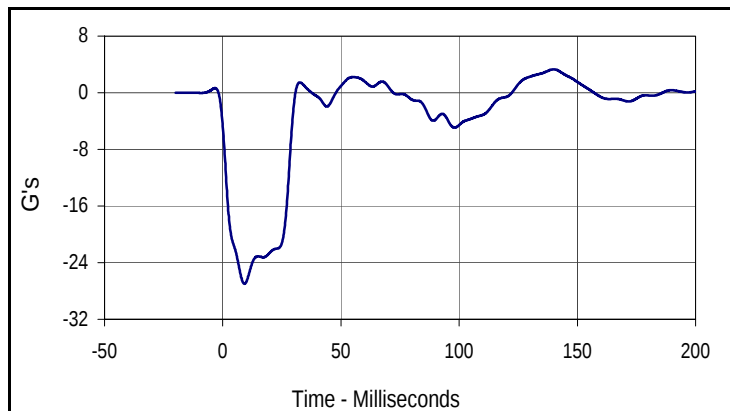
| Curve Description     |      |           |         |
|-----------------------|------|-----------|---------|
| Abdomen Sum Resultant |      |           |         |
| Plot No.              | Type | SAE Class | Units   |
| 006                   | RES  | 600       | Newtons |
| Max                   | Time | Min       | Time    |
| 2387.8                | 11.0 | -13.6     | 77.6    |

Test Program: ES2re Lumbar Flexion Test  
 ATD Serial No.: F037

Test Date: 3/13/15  
 Test I.D.: F037LB071



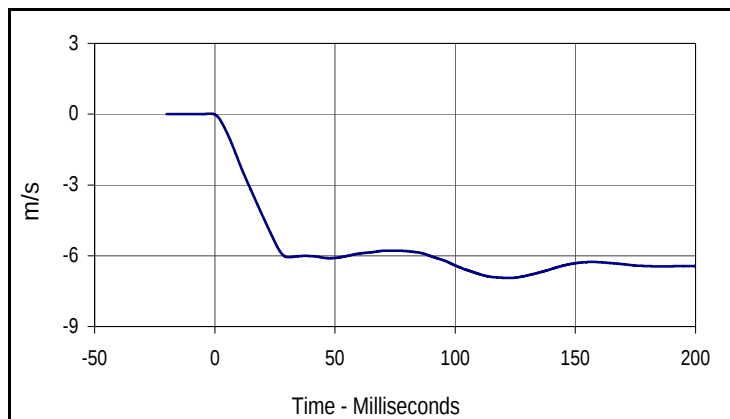
| Tested Parameter                      | Units   | Specification | Result | Pass/Fail |
|---------------------------------------|---------|---------------|--------|-----------|
| Lumbar Spine Assembly Soak Time       | Minutes | ≥240          | 787    | Pass      |
| Temperature During Soak               | Max     | 20.6 to 22.2  | 21.7   | Pass      |
|                                       | Min     |               | 21.1   | Pass      |
| Humidity During Soak                  | Max     | 10.0 to 70.0  | 24.1   | Pass      |
|                                       | Min     |               | 22.5   | Pass      |
| Laboratory Temperature During Test    | °C      | 20.6 to 22.2  | 21.7   | Pass      |
| Laboratory Humidity During Test       | %       | 10.0 to 70.0  | 22.5   | Pass      |
| Pendulum Velocity                     | m/s     | 5.95 to 6.15  | 6.04   | Pass      |
| Headform Rotation                     | Max     | 45 to 55      | 49.5   | Pass      |
|                                       | Time    | 39 to 53      | 44.7   | Pass      |
| Time of Decay to Zero Angle from Peak | msec    | 37 to 57      | 41.6   | Pass      |
| Overall Test Results                  |         |               |        | Pass      |



#### Curve Description

##### Pendulum Deceleration

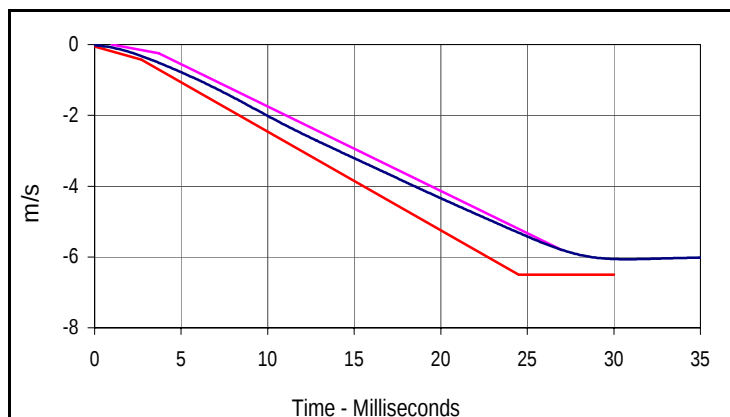
| Plot No. | Type  | SAE Class | Units |
|----------|-------|-----------|-------|
| 001      | FIL   | 60        | G's   |
| Max      | Time  | Min       | Time  |
| 3.3      | 140.5 | -27.0     | 9.8   |



#### Curve Description

##### Pendulum Velocity

| Plot No. | Type | SAE Class | Units |
|----------|------|-----------|-------|
| 002      | FIL  | 60        | m/s   |
| Max      | Time | Min       | Time  |
| 0.0      | -1.2 | -6.9      | 122.9 |



#### Curve Description

##### Pendulum Velocity

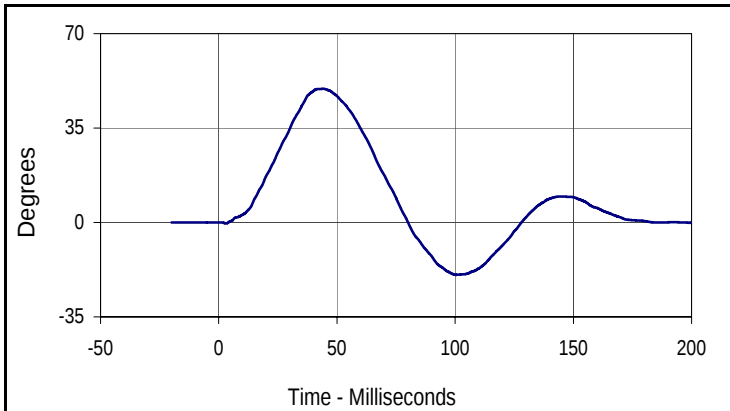
| Plot No. | Type | SAE Class | Units |
|----------|------|-----------|-------|
| 002      | FIL  | 60        | m/s   |
| Max      | Time | Min       | Time  |
| 0.0      | -1.2 | -6.9      | 122.9 |

#### Velocity Corridors

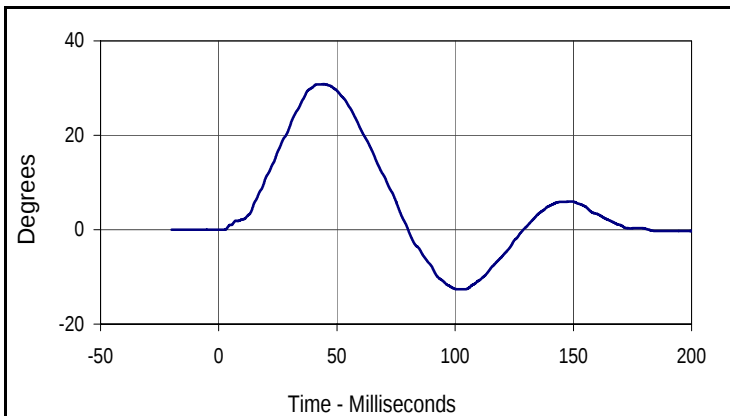
| Upper Boundary |                | Lower Boundary |                |
|----------------|----------------|----------------|----------------|
| Time (msec)    | Velocity (m/s) | Time (msec)    | Velocity (m/s) |
| 1.0            | 0.00           | 0.0            | -0.05          |
| 3.7            | -0.24          | 2.7            | -0.425         |
| 27.0           | -5.80          | 24.5           | -6.50          |
|                |                | 30.0           | -6.50          |

Test Program: ES2re Lumbar Flexion Test  
 ATD Serial No.: F037

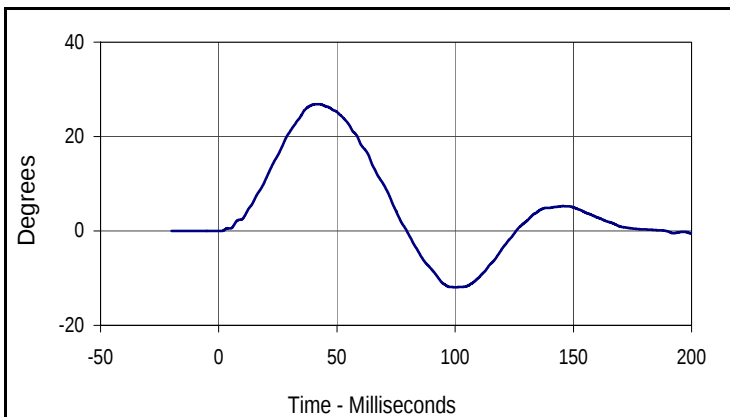
Test Date: 3/13/15  
 Test I.D.: F037LB071



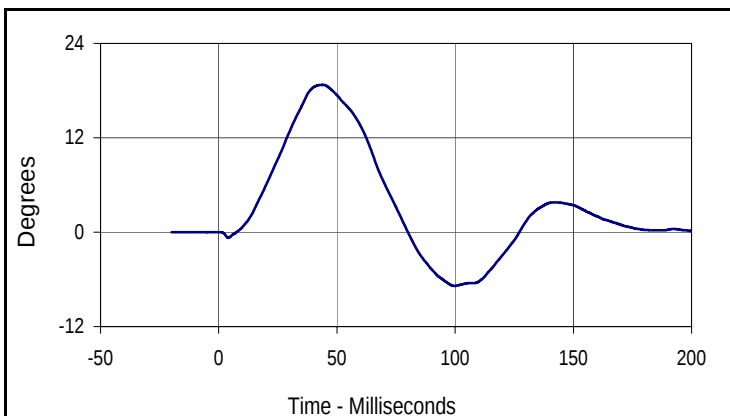
| Curve Description |      |           |         |
|-------------------|------|-----------|---------|
| Headform Rotation |      |           |         |
| Plot No.          | Type | SAE Class | Units   |
| 003               | FIL  | 180       | Degrees |
| Max               | Time | Min       | Time    |
| 49.5              | 44.7 | -19.4     | 101.0   |



| Curve Description |      |           |         |
|-------------------|------|-----------|---------|
| Potentiometer A   |      |           |         |
| Plot No.          | Type | SAE Class | Units   |
| 004               | FIL  | 180       | Degrees |
| Max               | Time | Min       | Time    |
| 30.8              | 45.0 | -12.6     | 104.3   |



| Curve Description |      |           |         |
|-------------------|------|-----------|---------|
| Potentiometer B   |      |           |         |
| Plot No.          | Type | SAE Class | Units   |
| 005               | FIL  | 180       | Degrees |
| Max               | Time | Min       | Time    |
| 26.9              | 42.9 | -12.0     | 100.6   |



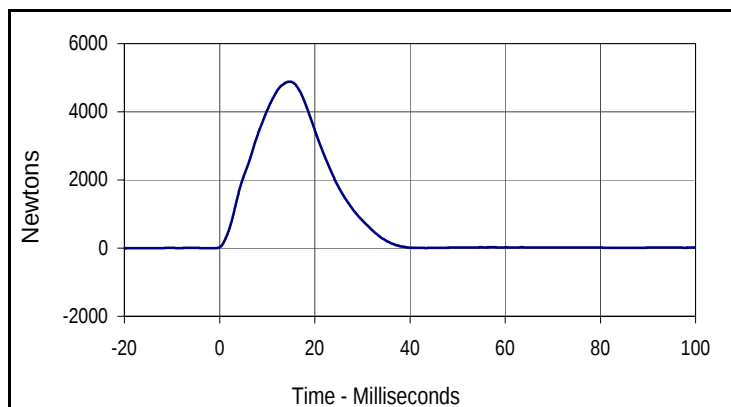
| Curve Description |      |           |         |
|-------------------|------|-----------|---------|
| Potentiometer C   |      |           |         |
| Plot No.          | Type | SAE Class | Units   |
| 006               | FIL  | 180       | Degrees |
| Max               | Time | Min       | Time    |
| 18.7              | 44.4 | -6.8      | 100.4   |

Test Program: ES2re Pelvis Impact Test  
 ATD Serial No.: F037

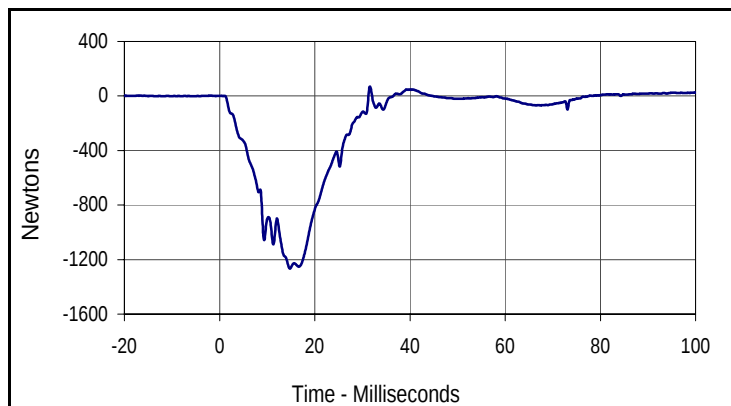
Test Date: 3/13/15  
 Test I.D.: F037PL071



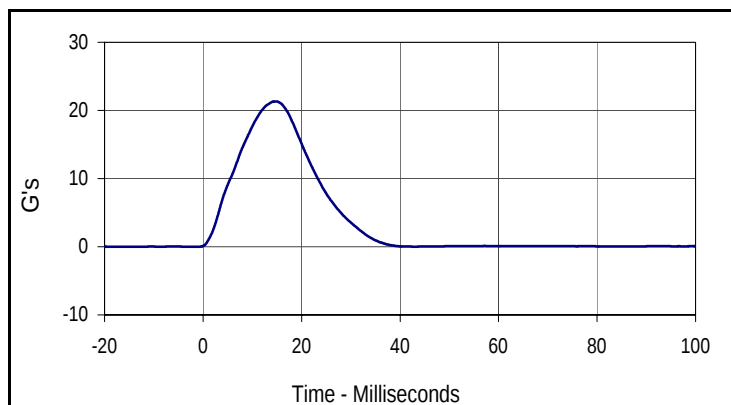
| Tested Parameter                   | Units   | Specification  | Result  | Pass/Fail |
|------------------------------------|---------|----------------|---------|-----------|
| Dummy Soak Time                    | Minutes | ≥240           | 842     | Pass      |
| Temperature During Soak            | Max     | 20.6 to 22.2   | 21.7    | Pass      |
|                                    | Min     |                | 21.1    | Pass      |
| Humidity During Soak               | Max     | 10.0 to 70.0   | 24.1    | Pass      |
|                                    | Min     |                | 22.5    | Pass      |
| Laboratory Temperature During Test | °C      | 20.6 to 22.2   | 21.7    | Pass      |
| Laboratory Humidity During Test    | %       | 10.0 to 70.0   | 22.6    | Pass      |
| Pendulum Velocity                  | m/s     | 4.2 to 4.4     | 4.32    | Pass      |
| Peak Impactor Force                | N       | 4700 to 5400   | 4884.9  | Pass      |
|                                    | msec    | 11.8 to 16.1   | 14.8    | Pass      |
| Peak Pubic Symphysis Load          | N       | -1230 to -1590 | -1265.7 | Pass      |
|                                    | msec    | 12.2 to 17.0   | 14.8    | Pass      |
| Overall Test Results               |         |                |         | Pass      |



| Curve Description |      |           |         |
|-------------------|------|-----------|---------|
| Impactor Force    |      |           |         |
| Plot No.          | Type | SAE Class | Units   |
| 001               | FIL  | 180       | Newtons |
| Max               | Time | Min       | Time    |
| 4884.9            | 14.8 | -3.9      | -14.3   |



| Curve Description       |      |           |         |
|-------------------------|------|-----------|---------|
| Pubic Symphysis Force Y |      |           |         |
| Plot No.                | Type | SAE Class | Units   |
| 002                     | FIL  | 600       | Newtons |
| Max                     | Time | Min       | Time    |
| 69.9                    | 31.6 | -1265.7   | 14.8    |



| Curve Description     |      |           |       |
|-----------------------|------|-----------|-------|
| Impactor Acceleration |      |           |       |
| Plot No.              | Type | SAE Class | Units |
| 003                   | FIL  | 180       | G's   |
| Max                   | Time | Min       | Time  |
| 21.3                  | 14.8 | 0.0       | -14.3 |

Test Program: SID IIs External Measurements  
 ATD Serial No.: 307

Test Date: 3/14/15  
 Test I.D.: N/A



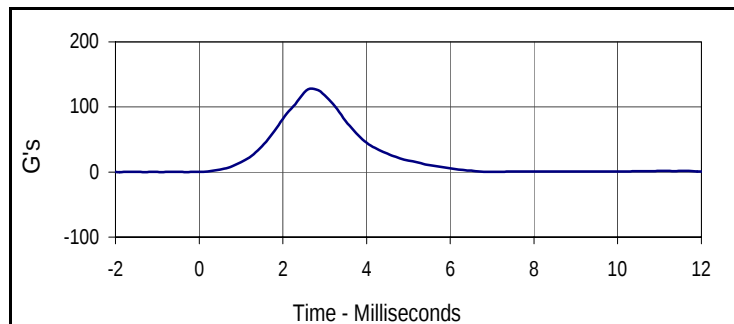
| Tested Parameter             |                                 | Units | Specification | Result | Pass/Fail |
|------------------------------|---------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature       |                                 | °C    | 20.6 to 22.2  | 21.6   | Pass      |
| Laboratory Relative Humidity |                                 | %     | 10 to 70      | 25     | Pass      |
| A                            | Sitting Height                  | mm    | 772 - 788     | 778    | Pass      |
| B                            | Shoulder Pivot Height           | mm    | 437 - 453     | 443    | Pass      |
| C                            | H-Point Height                  | mm    | 79 - 89       | 85     | Pass      |
| D                            | H-Point from Seatback           | mm    | 141 - 151     | 144    | Pass      |
| E                            | Shoulder Pivot from Backline    | mm    | 97 - 107      | 102    | Pass      |
| F                            | Thigh Clearance                 | mm    | 119 - 135     | 128    | Pass      |
| G                            | Head Breadth                    | mm    | 140 - 148     | 145    | Pass      |
| H                            | Head Back from Backline         | mm    | 40 - 46       | 43     | Pass      |
| I                            | Head Depth                      | mm    | 178 - 188     | 185    | Pass      |
| J                            | Head Circumference              | mm    | 541 - 551     | 546    | Pass      |
| K                            | Buttock to Knee Length          | mm    | 514 - 540     | 525    | Pass      |
| L                            | Popliteal Height                | mm    | 343 - 369     | 351    | Pass      |
| M                            | Knee Pivot to Floor Height      | mm    | 392 - 409     | 400    | Pass      |
| N                            | Buttock Popliteal Length        | mm    | 416 - 442     | 432    | Pass      |
| O                            | Chest Depth w/o Jacket          | mm    | 195 - 211     | 205    | Pass      |
| P                            | Foot Length                     | mm    | 216 - 232     | 223    | Pass      |
| Q                            | Hip Breadth with Pelvic Plug    | mm    | 313 - 323     | 319    | Pass      |
| R                            | Arm Length                      | mm    | 249 - 259     | 254    | Pass      |
| S                            | Knee Joint to Seatback          | mm    | 477 - 493     | 483    | Pass      |
| V                            | Shoulder Width                  | mm    | 341 - 357     | 351    | Pass      |
| W                            | Foot Width                      | mm    | 78 - 94       | 89     | Pass      |
| Y                            | Chest Circumference with Jacket | mm    | 851 - 881     | 872    | Pass      |
| Z                            | Waist Circumference             | mm    | 760 - 791     | 774    | Pass      |
| Overall Test Results         |                                 |       |               |        | Pass      |

Test Program: SID IIs Head Drop Test  
 ATD Serial No.: 307

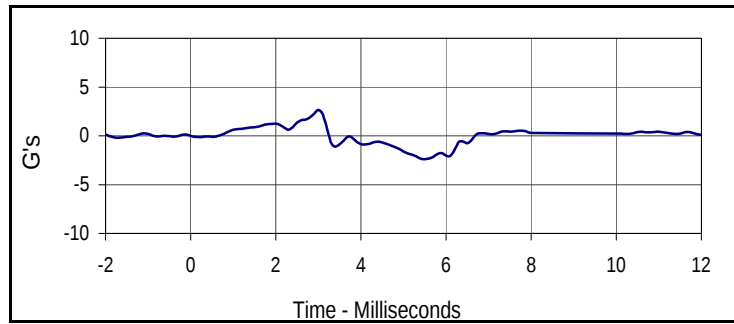
Test Date: 3/14/15  
 Test I.D.: 307HD080



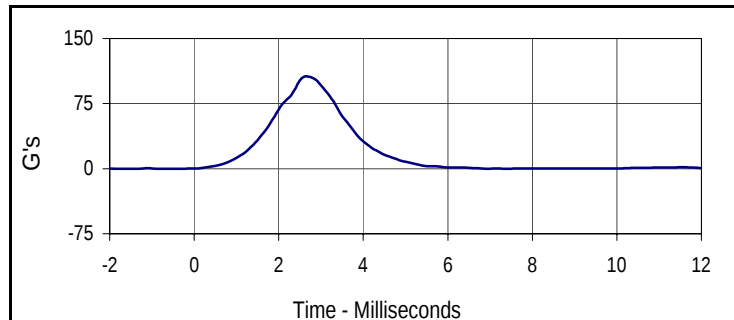
| Tested Parameter                   |     | Units   | Specification | Result | Pass/Fail |
|------------------------------------|-----|---------|---------------|--------|-----------|
| Head Assembly Soak Time            |     | Minutes | ≥240          | 366    | Pass      |
| Temperature During Soak            | Max | °C      | 18.9 to 25.6  | 21.8   | Pass      |
|                                    | Min | °C      |               | 21.6   | Pass      |
| Humidity During Soak               | Max | %       | 10.0 to 70.0  | 25.8   | Pass      |
|                                    | Min | %       |               | 24.9   | Pass      |
| Laboratory Temperature During Test |     | °C      | 18.9 to 25.6  | 21.6   | Pass      |
| Laboratory Humidity During Test    |     | %       | 10.0 to 70.0  | 24.9   | Pass      |
| Peak Head Resultant Acceleration   |     | G's     | 115 to 137    | 128.0  | Pass      |
| Peak Head X Acceleration           |     | G's     | <15           | 2.6    | Pass      |
| Is Acceleration Unimodal?          |     | Yes/No  | Yes           | Yes    | Pass      |
| Oscillations After Main Pulse      |     | %       | <15           | 0.4    | Pass      |
| Overall Test Results               |     |         |               |        | Pass      |



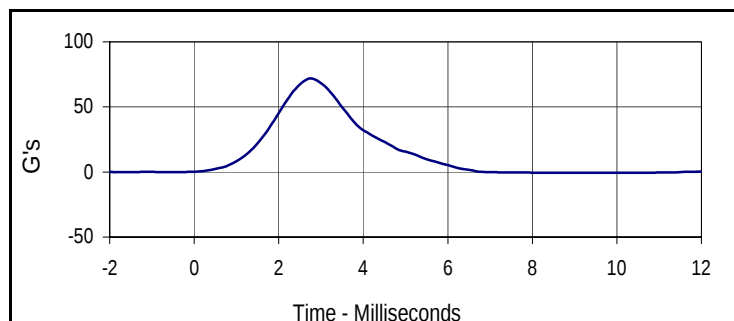
| Curve Description |      |           |       |
|-------------------|------|-----------|-------|
| Head Resultant    |      |           |       |
| Plot No.          | Type | SAE Class | Units |
| 001               | RES  | 1000      | G's   |
| Max               | Time | Min       | Time  |
| 128.0             | 2.7  | 0.0       | -5.5  |



| Curve Description |      |           |       |
|-------------------|------|-----------|-------|
| Head X            |      |           |       |
| Plot No.          | Type | SAE Class | Units |
| 002               | FIL  | 1000      | G's   |
| Max               | Time | Min       | Time  |
| 2.6               | 3.0  | -2.4      | 5.5   |



| Curve Description |      |           |       |
|-------------------|------|-----------|-------|
| Head Y            |      |           |       |
| Plot No.          | Type | SAE Class | Units |
| 003               | FIL  | 1000      | G's   |
| Max               | Time | Min       | Time  |
| 106.1             | 2.7  | -0.5      | -17.0 |



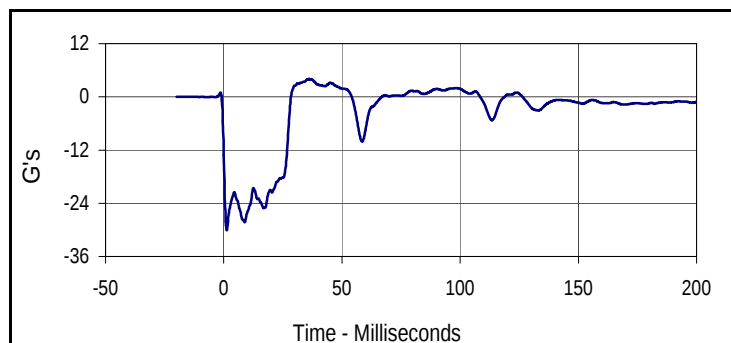
| Curve Description |      |           |       |
|-------------------|------|-----------|-------|
| Head Z            |      |           |       |
| Plot No.          | Type | SAE Class | Units |
| 004               | FIL  | 1000      | G's   |
| Max               | Time | Min       | Time  |
| 71.8              | 2.8  | -0.7      | 10.3  |

Test Program: SID IIs Neck Flexion Test  
 ATD Serial No.: 307

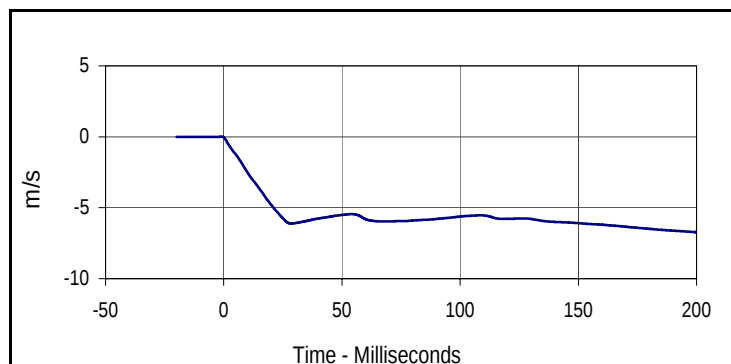
Test Date: 3/14/15  
 Test I.D.: 307NB080



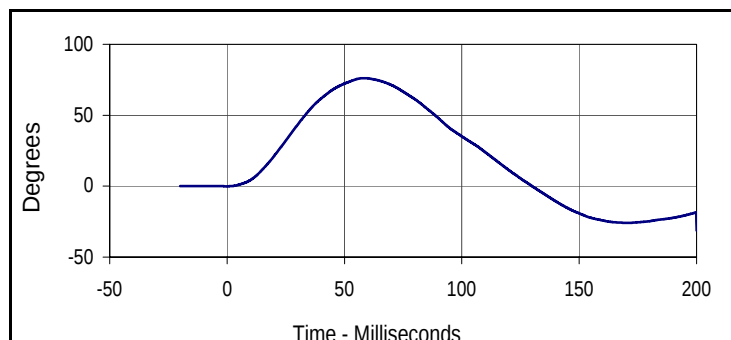
| Tested Parameter                   | Units       | Specification  | Result | Pass/Fail |
|------------------------------------|-------------|----------------|--------|-----------|
| Neck Assembly Soak Time            | Minutes     | ≥240           | 411    | Pass      |
| Temperature During Soak            | Max         | 20.6 to 22.2   | 21.8   | Pass      |
|                                    | Min         |                | 21.6   | Pass      |
| Humidity During Soak               | Max         | 10.0 to 70.0   | 25.8   | Pass      |
|                                    | Min         |                | 24.9   | Pass      |
| Laboratory Temperature During Test | °C          | 20.6 to 22.2   | 21.7   | Pass      |
| Laboratory Humidity During Test    | %           | 10.0 to 70.0   | 25.1   | Pass      |
| Pendulum Velocity                  | m/s         | 5.51 to 5.63   | 5.55   | Pass      |
| Pendulum Deceleration              | 10 msec     | -2.20 to -2.80 | -2.51  | Pass      |
|                                    | 15 msec     | -3.30 to -4.10 | -3.63  | Pass      |
|                                    | 20 msec     | -4.40 to -5.40 | -4.78  | Pass      |
|                                    | 25 msec     | -5.40 to -6.10 | -5.74  | Pass      |
|                                    | 25-100 msec | -5.50 to -6.20 | -6.12  | Pass      |
| D-Plane Rotation                   | Max         | 71 to 81       | 76.2   | Pass      |
|                                    | Time        | 50 to 70       | 58.3   | Pass      |
| Peak Occipital Condyle Moment      | Nm          | -36 to -44     | -36.9  | Pass      |
| Decaying Moment Time to Cross 0 Nm | msec        | 102 to 126     | 115.0  | Pass      |
| Overall Test Results               |             |                | Pass   |           |



| Curve Description     |      |           |       |
|-----------------------|------|-----------|-------|
| Pendulum Deceleration |      |           |       |
| Plot No.              | Type | SAE Class | Units |
| 001                   | FIL  | 180       | G's   |
| Max                   | Time | Min       | Time  |
| 4.0                   | 0.0  | -30.1     | 0.0   |



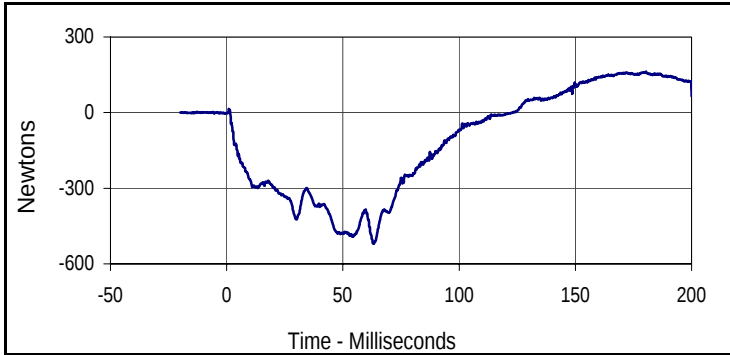
| Curve Description |      |           |       |
|-------------------|------|-----------|-------|
| Pendulum Velocity |      |           |       |
| Plot No.          | Type | SAE Class | Units |
| 002               | FIL  | 180       | m/s   |
| Max               | Time | Min       | Time  |
| 0.0               | -0.9 | -6.7      | 199.9 |



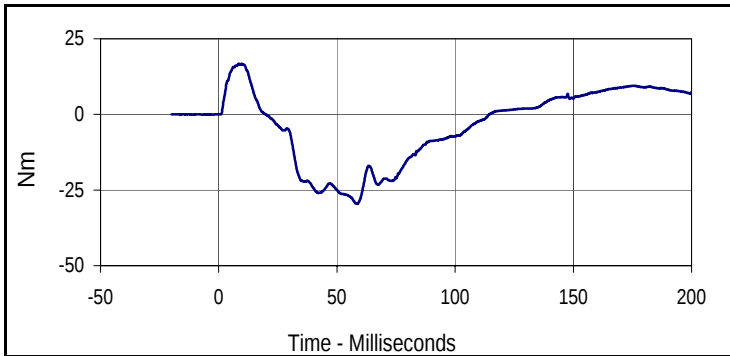
| Curve Description |      |           |         |
|-------------------|------|-----------|---------|
| D-Plane Rotation  |      |           |         |
| Plot No.          | Type | SAE Class | Units   |
| 003               | FIL  | 60        | Degrees |
| Max               | Time | Min       | Time    |
| 76.2              | 58.3 | -31.2     | 200.0   |

Test Program: SID IIs Neck Flexion Test  
 ATD Serial No.: 307

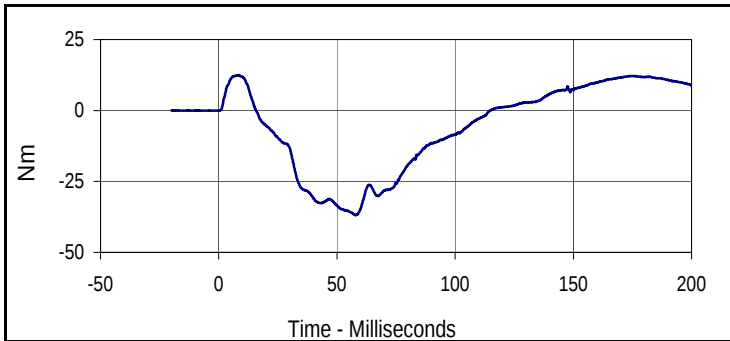
Test Date: 3/14/15  
 Test I.D.: 307NB080



| Curve Description |       |           |         |
|-------------------|-------|-----------|---------|
| Neck Force Y      |       |           |         |
| Plot No.          | Type  | SAE Class | Units   |
| 004               | FIL   | 1000      | Newtons |
| Max               | Time  | Min       | Time    |
| 162.5             | 180.4 | -519.5    | 63.0    |



| Curve Description |      |           |       |
|-------------------|------|-----------|-------|
| Neck Moment X     |      |           |       |
| Plot No.          | Type | SAE Class | Units |
| 005               | FIL  | 600       | Nm    |
| Max               | Time | Min       | Time  |
| 16.7              | 9.7  | -29.5     | 58.6  |



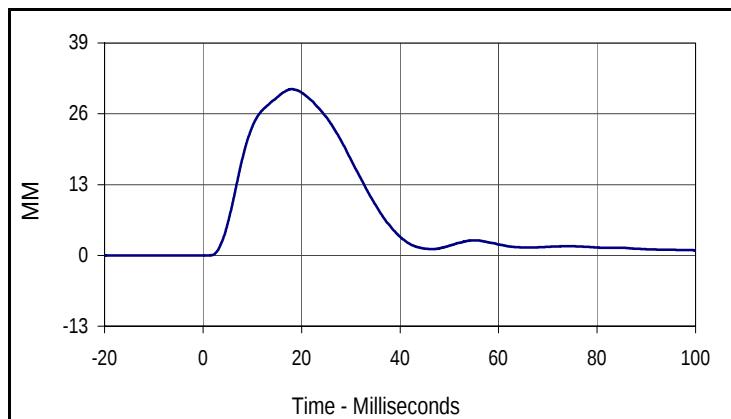
| Curve Description              |      |           |       |
|--------------------------------|------|-----------|-------|
| Moment About Occipital Condyle |      |           |       |
| Plot No.                       | Type | SAE Class | Units |
| 006                            | FIL  | 600       | Nm    |
| Max                            | Time | Min       | Time  |
| 12.5                           | 8.7  | -36.9     | 57.8  |

Test Program: SID IIs Shoulder Impact Test  
 ATD Serial No.: 307

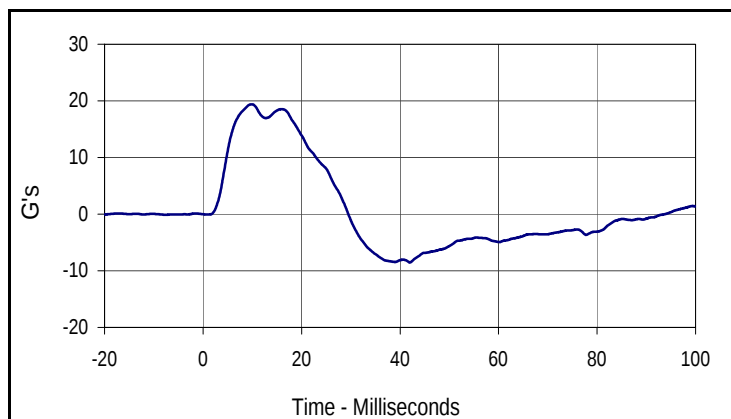
Test Date: 3/14/15  
 Test I.D.: 307SH080



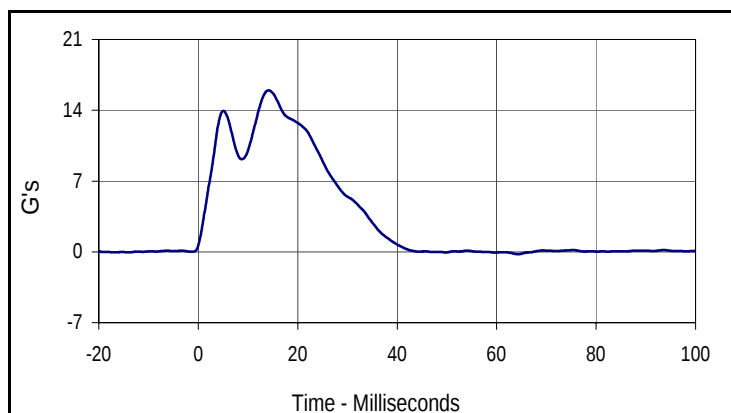
| Tested Parameter                   |     | Units   | Specification | Result | Pass/Fail |
|------------------------------------|-----|---------|---------------|--------|-----------|
| Dummy Soak Time                    |     | Minutes | ≥180          | 466    | Pass      |
| Temperature During Soak            | Max | °C      | 20.6 to 22.2  | 21.8   | Pass      |
|                                    | Min | °C      |               | 21.6   | Pass      |
| Humidity During Soak               | Max | %       | 10.0 to 70.0  | 25.8   | Pass      |
|                                    | Min | %       |               | 24.9   | Pass      |
| Laboratory Temperature During Test |     | °C      | 20.6 to 22.2  | 21.7   | Pass      |
| Laboratory Humidity During Test    |     | %       | 10.0 to 70.0  | 25.4   | Pass      |
| Impactor Velocity                  |     | m/s     | 4.20 to 4.40  | 4.32   | Pass      |
| Peak Shoulder Deflection           |     | mm      | 28 to 37      | 30.5   | Pass      |
| Peak Lateral Spine Acceleration Y  |     | G's     | 17 to 22      | 19.4   | Pass      |
| Peak Impactor Acceleration         |     | G's     | 13 to 18      | 16.0   | Pass      |
| Overall Test Results               |     |         |               | Pass   |           |



| Curve Description   |      |           |       |
|---------------------|------|-----------|-------|
| Shoulder Deflection |      |           |       |
| Plot No.            | Type | SAE Class | Units |
| 001                 | FIL  | 600       | MM    |
| Max                 | Time | Min       | Time  |
| 30.5                | 18.0 | 0.0       | -20.0 |



| Curve Description          |      |           |       |
|----------------------------|------|-----------|-------|
| Upper Spine Y Acceleration |      |           |       |
| Plot No.                   | Type | SAE Class | Units |
| 002                        | FIL  | 180       | G's   |
| Max                        | Time | Min       | Time  |
| 19.4                       | 9.8  | -8.5      | 42.0  |



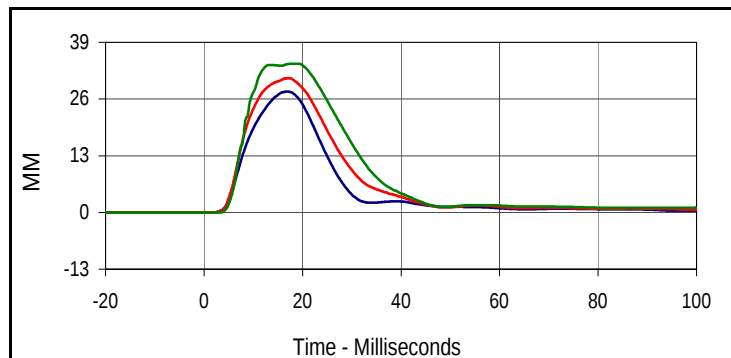
| Curve Description     |      |           |       |
|-----------------------|------|-----------|-------|
| Impactor Acceleration |      |           |       |
| Plot No.              | Type | SAE Class | Units |
| 003                   | FIL  | 180       | G's   |
| Max                   | Time | Min       | Time  |
| 16.0                  | 14.1 | -0.2      | 64.4  |

Test Program: SID IIs Thorax with Arm Impact Test  
 ATD Serial No.: 307

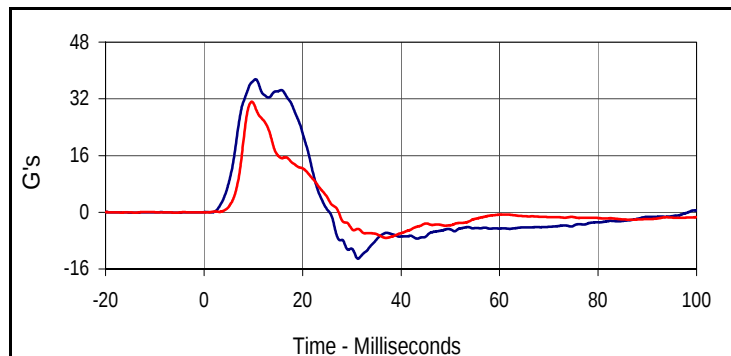
Test Date: 3/14/15  
 Test I.D.: 307TWA080



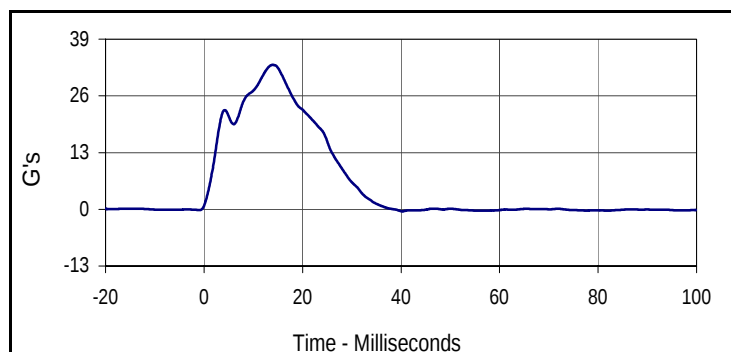
| Tested Parameter                   | Units   | Specification | Result | Pass/Fail |
|------------------------------------|---------|---------------|--------|-----------|
| Dummy Soak Time                    | Minutes | ≥180          | 511    | Pass      |
| Temperature During Soak            | Max     | 20.6 to 22.2  | 21.8   | Pass      |
|                                    | Min     |               | 21.6   | Pass      |
| Humidity During Soak               | Max     | 10.0 to 70.0  | 25.8   | Pass      |
|                                    | Min     |               | 24.9   | Pass      |
| Laboratory Temperature During Test | °C      | 18.9 to 25.6  | 21.7   | Pass      |
| Laboratory Humidity During Test    | %       | 10.0 to 70.0  | 25.3   | Pass      |
| Impactor Velocity                  | m/s     | 6.6 to 6.8    | 6.68   | Pass      |
| Peak Shoulder Deflection           | mm      | 31 to 40      | 34.9   | Pass      |
| Peak Upper Thorax Rib Deflection   | mm      | 25 to 32      | 27.7   | Pass      |
| Peak Middle Thorax Rib Deflection  | mm      | 30 to 36      | 30.8   | Pass      |
| Peak Lower Thorax Rib Deflection   | mm      | 32 to 38      | 34.1   | Pass      |
| Peak Upper Spine Y Acceleration    | G's     | 34 to 43      | 37.5   | Pass      |
| Peak Lower Spine Y Acceleration    | G's     | 29 to 37      | 31.2   | Pass      |
| Peak Impactor Acceleration         | G's     | 30 to 36      | 33.1   | Pass      |
| Overall Test Results               |         |               | Pass   |           |



| Curve Description        |      |           |       |
|--------------------------|------|-----------|-------|
| Upper Thorax Deflection  |      |           |       |
| Plot No.                 | Type | SAE Class | Units |
| 001                      | FIL  | 600       | MM    |
| Max                      | Time | Min       | Time  |
| 27.7                     | 16.8 | 0.0       | -1.6  |
| Middle Thorax Deflection |      |           |       |
| Max                      | Time | Min       | Time  |
| 30.8                     | 17.1 | 0.0       | -4.8  |
| Lower Thorax Deflection  |      |           |       |
| Max                      | Time | Min       | Time  |
| 34.1                     | 18.4 | 0.0       | -17.4 |



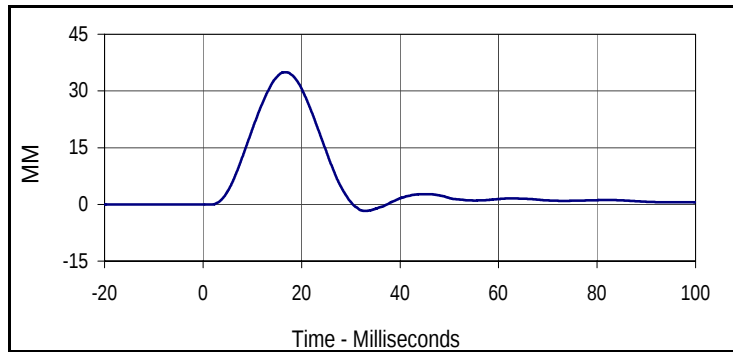
| Curve Description          |      |           |       |
|----------------------------|------|-----------|-------|
| Upper Spine Y Acceleration |      |           |       |
| Plot No.                   | Type | SAE Class | Units |
| 004                        | FIL  | 180       | G's   |
| Max                        | Time | Min       | Time  |
| 37.5                       | 10.5 | -13.1     | 31.2  |
| Lower Spine Y Acceleration |      |           |       |
| Plot No.                   | Type | SAE Class | Units |
| 005                        | FIL  | 180       | G's   |
| Max                        | Time | Min       | Time  |
| 31.2                       | 9.7  | -7.3      | 36.9  |



| Curve Description     |      |           |       |
|-----------------------|------|-----------|-------|
| Impactor Acceleration |      |           |       |
| Plot No.              | Type | SAE Class | Units |
| 006                   | FIL  | 180       | G's   |
| Max                   | Time | Min       | Time  |
| 33.1                  | 14.0 | -0.4      | 40.2  |

Test Program: SID IIs Thorax with Arm Impact Test  
 ATD Serial No.: 307

Test Date: 3/14/15  
 Test I.D.: 307TWA080



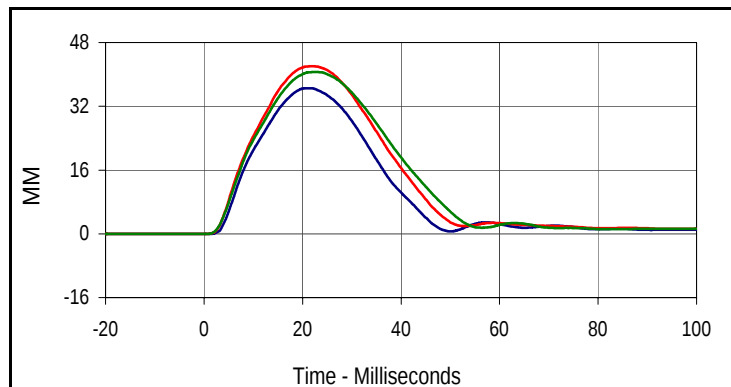
| Curve Description   |      |           |       |
|---------------------|------|-----------|-------|
| Shoulder Deflection |      |           |       |
| Plot No.            | Type | SAE Class | Units |
| 007                 | FIL  | 600       | MM    |
| Max                 | Time | Min       | Time  |
| 34.9                | 16.4 | -1.8      | 32.9  |

Test Program: SID IIs Thorax without Arm Impact Test  
 ATD Serial No.: 307

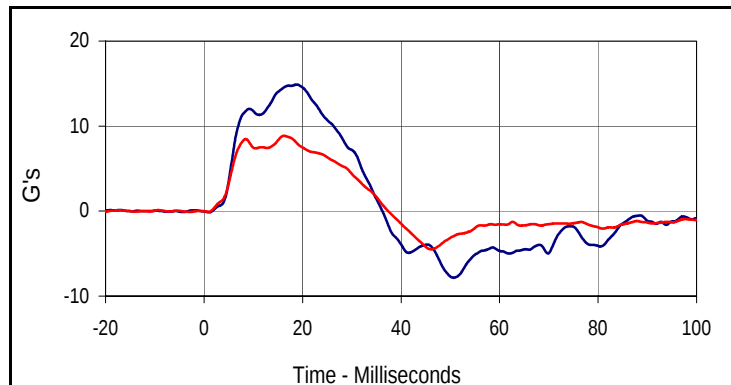
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 Test I.D.: 307TWOA080



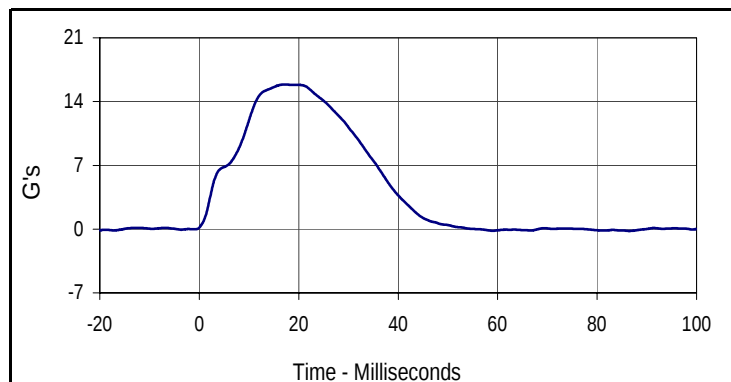
| Tested Parameter                   |     | Units   | Specification | Result | Pass/Fail |
|------------------------------------|-----|---------|---------------|--------|-----------|
| Dummy Soak Time                    |     | Minutes | ≥180          | 566    | Pass      |
| Temperature During Soak            | Max | °C      | 18.9 to 25.6  | 21.8   | Pass      |
|                                    | Min | °C      |               | 21.6   | Pass      |
| Humidity During Soak               | Max | %       | 10.0 to 70.0  | 25.8   | Pass      |
|                                    | Min | %       |               | 24.9   | Pass      |
| Laboratory Temperature During Test |     | °C      | 18.9 to 25.6  | 21.8   | Pass      |
| Laboratory Humidity During Test    |     | %       | 10.0 to 70.0  | 25.3   | Pass      |
| Impactor Velocity                  |     | m/s     | 4.2 to 4.4    | 4.34   | Pass      |
| Peak Upper Thorax Rib Deflection   |     | mm      | 32 to 40      | 36.6   | Pass      |
| Peak Middle Thorax Rib Deflection  |     | mm      | 39 to 45      | 42.1   | Pass      |
| Peak Lower Thorax Rib Deflection   |     | mm      | 35 to 43      | 40.6   | Pass      |
| Peak Upper Spine Y Acceleration    |     | G's     | 13 to 17      | 14.9   | Pass      |
| Peak Lower Spine Y Acceleration    |     | G's     | 7 to 11       | 8.9    | Pass      |
| Peak Impactor Acceleration         |     | G's     | 14 to 18      | 15.9   | Pass      |
| Overall Test Results               |     |         |               | Pass   |           |



| Curve Description        |      |           |       |
|--------------------------|------|-----------|-------|
| Upper Thorax Deflection  |      |           |       |
| Plot No.                 | Type | SAE Class | Units |
| 001                      | FIL  | 600       | MM    |
| Max                      | Time | Min       | Time  |
| 36.6                     | 20.9 | 0.0       | 0.8   |
| Middle Thorax Deflection |      |           |       |
| Max                      | Time | Min       | Time  |
| 42.1                     | 22.0 | 0.0       | -0.6  |
| Lower Thorax Deflection  |      |           |       |
| Max                      | Time | Min       | Time  |
| 40.6                     | 22.7 | 0.0       | -17.4 |



| Curve Description          |      |           |       |
|----------------------------|------|-----------|-------|
| Upper Spine Y Acceleration |      |           |       |
| Plot No.                   | Type | SAE Class | Units |
| 004                        | FIL  | 180       | G's   |
| Max                        | Time | Min       | Time  |
| 14.9                       | 18.9 | -7.8      | 50.7  |
| Lower Spine Y Acceleration |      |           |       |
| Plot No.                   | Type | SAE Class | Units |
| 005                        | FIL  | 180       | G's   |
| Max                        | Time | Min       | Time  |
| 8.9                        | 16.2 | -4.5      | 46.1  |



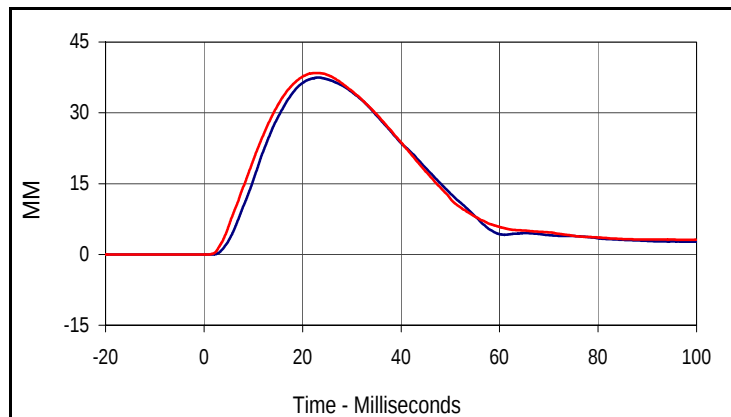
| Curve Description     |      |           |       |
|-----------------------|------|-----------|-------|
| Impactor Acceleration |      |           |       |
| Plot No.              | Type | SAE Class | Units |
| 006                   | FIL  | 180       | G's   |
| Max                   | Time | Min       | Time  |
| 15.9                  | 17.1 | -0.2      | 0.0   |

Test Program: SID IIs Abdomen Impact Test  
 ATD Serial No.: 307

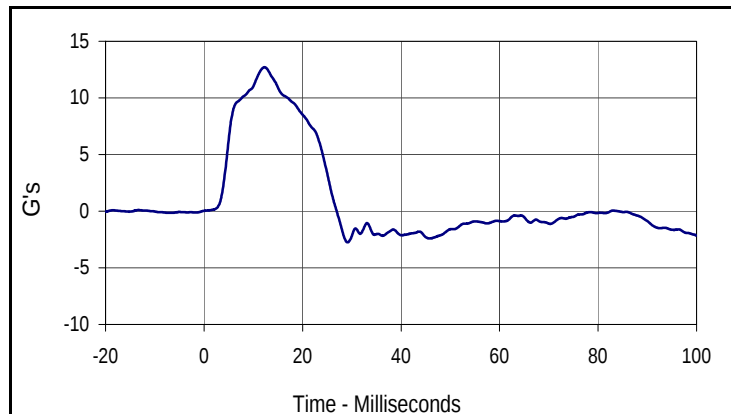
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 Test I.D.: 307ABD080



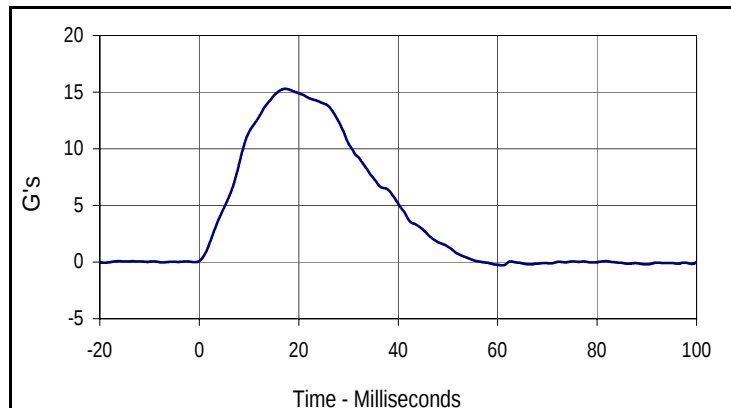
| Tested Parameter                    | Units   | Specification | Result | Pass/Fail |
|-------------------------------------|---------|---------------|--------|-----------|
| Dummy Soak Time                     | Minutes | ≥180          | 621    | Pass      |
| Temperature During Soak             | Max     | 20.6 to 22.2  | 21.8   | Pass      |
|                                     | Min     |               | 21.6   | Pass      |
| Humidity During Soak                | Max     | 10.0 to 70.0  | 25.8   | Pass      |
|                                     | Min     |               | 24.9   | Pass      |
| Laboratory Temperature During Test  | °C      | 18.9 to 25.6  | 21.8   | Pass      |
| Laboratory Humidity During Test     | %       | 10.0 to 70.0  | 25.8   | Pass      |
| Impactor Velocity                   | m/s     | 4.2 to 4.4    | 4.32   | Pass      |
| Peak Upper Abdominal Rib Deflection | mm      | 36 to 47      | 37.5   | Pass      |
| Peak Lower Abdominal Rib Deflection | mm      | 33 to 44      | 38.4   | Pass      |
| Peak Lower Spine Y Acceleration     | G's     | 9 to 14       | 12.7   | Pass      |
| Peak Impactor Acceleration          | G's     | 12 to 16      | 15.3   | Pass      |
| Overall Test Results                |         |               | Pass   |           |



| Curve Description              |      |           |       |
|--------------------------------|------|-----------|-------|
| Upper Abdominal Rib Deflection |      |           |       |
| Plot No.                       | Type | SAE Class | Units |
| 001                            | FIL  | 600       | MM    |
| Max                            | Time | Min       | Time  |
| 37.5                           | 23.2 | 0.0       | -20.0 |
| Curve Description              |      |           |       |
| Lower Abdominal Rib Deflection |      |           |       |
| Plot No.                       | Type | SAE Class | Units |
| 002                            | FIL  | 600       | MM    |
| Max                            | Time | Min       | Time  |
| 38.4                           | 22.8 | 0.0       | 0.9   |

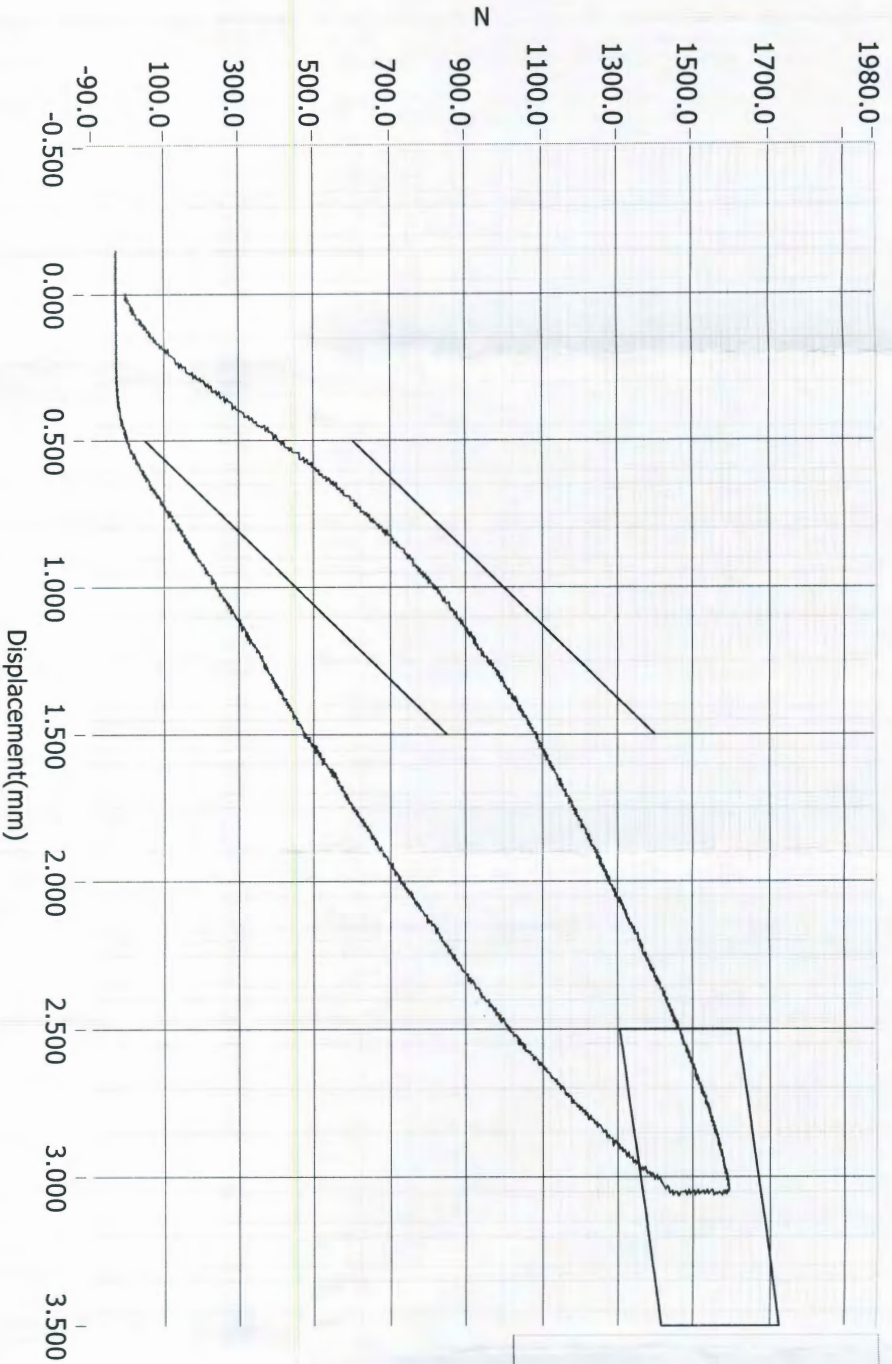


| Curve Description          |      |           |       |
|----------------------------|------|-----------|-------|
| Lower Spine Y Acceleration |      |           |       |
| Plot No.                   | Type | SAE Class | Units |
| 003                        | FIL  | 180       | G's   |
| Max                        | Time | Min       | Time  |
| 12.7                       | 12.3 | -2.8      | 29.1  |



| Curve Description     |      |           |       |
|-----------------------|------|-----------|-------|
| Impactor Acceleration |      |           |       |
| Plot No.              | Type | SAE Class | Units |
| 004                   | FIL  | 180       | G's   |
| Max                   | Time | Min       | Time  |
| 15.3                  | 17.3 | -0.3      | 61.0  |

# Resultant Data - SIDIIs Plug Compression



- Loading Curve
- Boundary Limit Upper
- Boundary Limit Lower
- Peak Load Upper
- Peak Load Lower
- Peak Defl Upper
- Peak Defl Lower

1590 N

## ATD Calibration Lab

M20154202 Post Test

Current Date : 12/13/2013

Current Time : 21:00:18

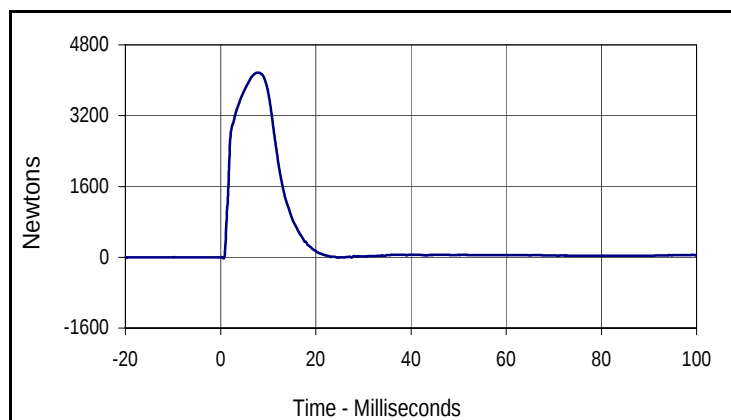
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|---------|--------------------|------------|-----------|
|         | 70957              | 12/13/2013 | 8:59 PM   |
| Cert ID | ATD Serial Number  | ATD Type   |           |
|         | N/A                | SIDIIs     |           |

Test Program: SID IIs Pelvis Acetabulum Impact Test  
 ATD Serial No.: 307

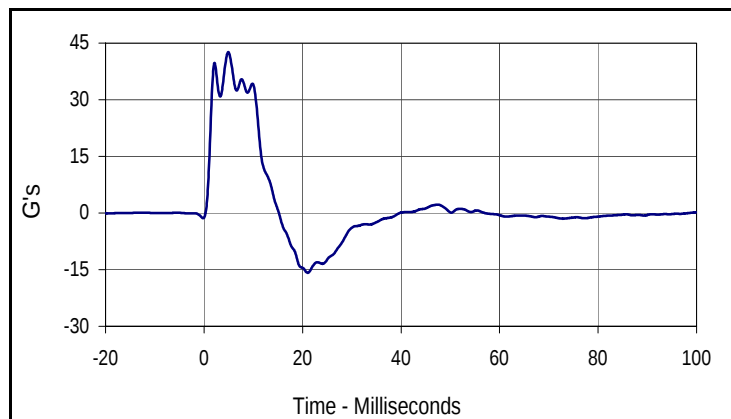
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 Test I.D.: 307ACET080



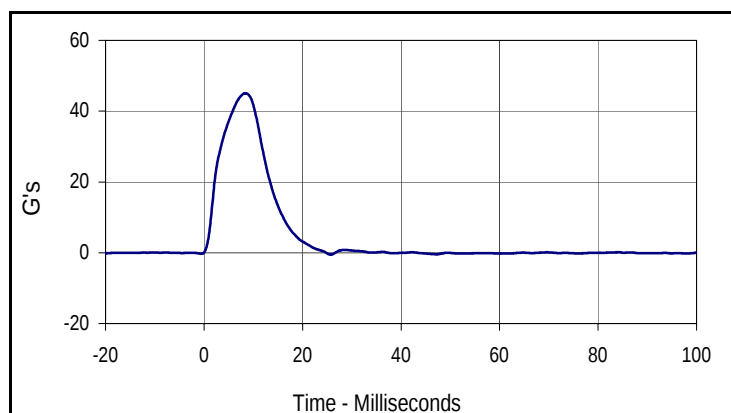
| Tested Parameter                         | Units   | Specification | Result | Pass/Fail |
|------------------------------------------|---------|---------------|--------|-----------|
| Dummy Soak Time                          | Minutes | ≥180          | 671    | Pass      |
| Temperature During Soak                  | Max     | 20.6 to 22.2  | 21.8   | Pass      |
|                                          | Min     |               | 21.6   | Pass      |
| Humidity During Soak                     | Max     | 10.0 to 70.0  | 25.8   | Pass      |
|                                          | Min     |               | 24.9   | Pass      |
| Laboratory Temperature During Test       | °C      | 18.9 to 25.6  | 21.8   | Pass      |
| Laboratory Humidity During Test          | %       | 10.0 to 70.0  | 25.6   | Pass      |
| Impactor Velocity                        | m/s     | 6.6 to 6.8    | 6.65   | Pass      |
| Peak Acetabulum Force Y                  | Newtons | 3600 to 4300  | 4171.0 | Pass      |
| Peak Pelvis Y Acceleration After 6 msec. | G's     | 34 to 42      | 35.5   | Pass      |
| Peak Impactor Acceleration               | G's     | 38 to 47      | 45.1   | Pass      |
| Overall Test Results                     |         |               | Pass   |           |



| Curve Description       |      |           |         |
|-------------------------|------|-----------|---------|
| Pelvis Acetabulum Force |      |           |         |
| Plot No.                | Type | SAE Class | Units   |
| 001                     | FIL  | 600       | Newtons |
| Max                     | Time | Min       | Time    |
| 4171.0                  | 8.1  | -24.7     | 0.7     |



| Curve Description     |      |           |       |
|-----------------------|------|-----------|-------|
| Pelvis Y Acceleration |      |           |       |
| Plot No.              | Type | SAE Class | Units |
| 002                   | FIL  | 180       | G's   |
| Max                   | Time | Min       | Time  |
| 42.6                  | 4.9  | -15.8     | 21.0  |



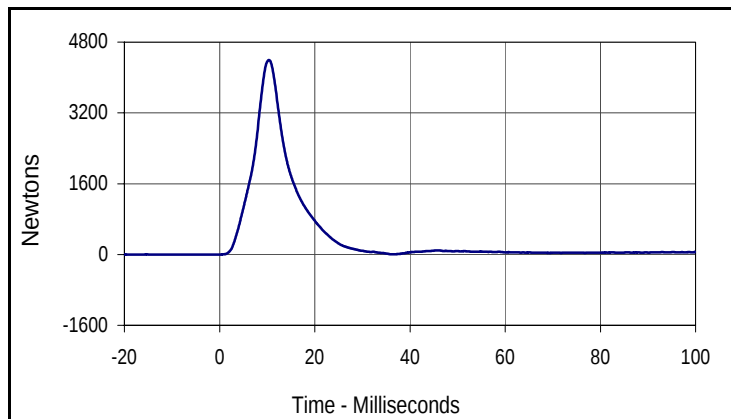
| Curve Description     |      |           |       |
|-----------------------|------|-----------|-------|
| Impactor Acceleration |      |           |       |
| Plot No.              | Type | SAE Class | Units |
| 003                   | FIL  | 180       | G's   |
| Max                   | Time | Min       | Time  |
| 45.1                  | 8.4  | -0.5      | 25.7  |

Test Program: SID IIs Pelvis Iliac Calibration  
 ATD Serial No.: 307

Test Date: 3/14/15  
 Test I.D.: 307PL080



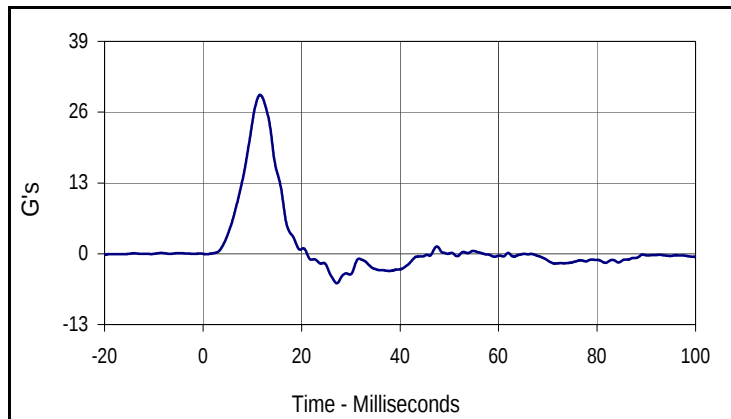
| Tested Parameter                   |     | Units   | Specification | Result | Pass/Fail |
|------------------------------------|-----|---------|---------------|--------|-----------|
| Dummy Soak Time                    |     | Minutes | ≥180          | 726    | Pass      |
| Temperature During Soak            | Max | °C      | 20.6 to 22.2  | 21.8   | Pass      |
|                                    | Min | °C      |               | 21.6   | Pass      |
| Humidity During Soak               | Max | %       | 10.0 to 70.0  | 25.8   | Pass      |
|                                    | Min | %       |               | 24.9   | Pass      |
| Laboratory Temperature During Test |     | °C      | 18.9 to 25.6  | 21.7   | Pass      |
| Laboratory Humidity During Test    |     | %       | 10.0 to 70.0  | 25.8   | Pass      |
| Impactor Velocity                  |     | m/s     | 4.2 to 4.4    | 4.32   | Pass      |
| Peak Iliac Force                   |     | Newtons | 4100 to 5100  | 4395.4 | Pass      |
| Peak Pelvis Y Acceleration         |     | G's     | 28 to 39      | 29.2   | Pass      |
| Peak Impactor Acceleration         |     | G's     | 36 to 45      | 40.6   | Pass      |
| Overall Test Results               |     |         |               | Pass   |           |



#### Curve Description

##### Pelvis Iliac Force

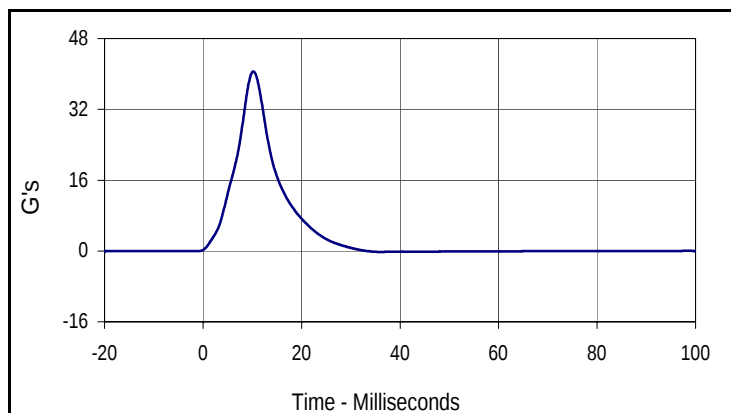
| Plot No. | Type | SAE Class | Units   |
|----------|------|-----------|---------|
| 001      | FIL  | 600       | Newtons |
| Max      | Time | Min       | Time    |
| 4395.4   | 10.4 | -2.1      | -5.3    |



#### Curve Description

##### Pelvis Y Acceleration

| Plot No. | Type | SAE Class | Units |
|----------|------|-----------|-------|
| 002      | FIL  | 180       | G's   |
| Max      | Time | Min       | Time  |
| 29.2     | 11.6 | -5.4      | 27.2  |



#### Curve Description

##### Impactor Acceleration

| Plot No. | Type | SAE Class | Units |
|----------|------|-----------|-------|
| 003      | FIL  | 180       | G's   |
| Max      | Time | Min       | Time  |
| 40.6     | 10.2 | -0.2      | 35.8  |

**APPENDIX D**  
**TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA**

**TABLE 1 – Dummy Instrumentation (ES-2re)**

|                                        |           |   | ES-2re S/N F037 |              |             |
|----------------------------------------|-----------|---|-----------------|--------------|-------------|
|                                        |           |   | Serial Number   | Manufacturer | Calibration |
| Head Accelerometers                    | Primary   | X | P58858          | Endevco      | 10/11/14    |
|                                        |           | Y | P58865          | Endevco      | 10/11/14    |
|                                        |           | Z | P58867          | Endevco      | 10/11/14    |
|                                        | Redundant | X | P58859          | Endevco      | 10/11/14    |
|                                        |           | Y | P58866          | Endevco      | 10/11/14    |
|                                        |           | Z | P58873          | Endevco      | 10/11/14    |
| Thorax Rib Displacement Potentiometers | Upper     | Y | 209             | FTSS         | 10/12/14    |
|                                        | Middle    | Y | 210             | FTSS         | 10/12/14    |
|                                        | Lower     | Y | 207             | FTSS         | 10/12/14    |
| Abdomen Load Cells                     | Forward   | Y | 1504            | Denton       | 5/1/14      |
|                                        | Middle    | Y | 1505            | Denton       | 5/1/14      |
|                                        | Rear      | Y | 1506            | Denton       | 5/1/14      |
| Lower Spine Accelerometers (T12)       |           | X | P16336          | Endevco      | 10/11/14    |
|                                        |           | Y | P52027          | Endevco      | 10/11/14    |
|                                        |           | Z | P58877          | Endevco      | 10/11/14    |
| Pubic Symphysis Load Cell              |           | Y | DG6784          | Denton       | 5/15/14     |

**TABLE 2 – Dummy Instrumentation (SID-IIs)**

|                                  |               |           |   | SID-IIs S/N 307 |              |             |
|----------------------------------|---------------|-----------|---|-----------------|--------------|-------------|
|                                  |               |           |   | Serial Number   | Manufacturer | Calibration |
| Head Accelerometers              |               | Primary   | X | P58900          | Endevco      | 9/29/14     |
|                                  |               |           | Y | P58902          | Endevco      | 9/29/14     |
|                                  |               |           | Z | P58983          | Endevco      | 9/29/14     |
|                                  |               | Redundant | X | P58901          | Endevco      | 9/29/14     |
|                                  |               |           | Y | P58906          | Endevco      | 9/29/14     |
|                                  |               |           | Z | P58989          | Endevco      | 9/29/14     |
| Displacement Potentiometers      | Thoracic Rib  | Upper     | Y | 1249            | FTSS         | 9/30/14     |
|                                  |               | Middle    | Y | 1265            | FTSS         | 9/30/14     |
|                                  |               | Lower     | Y | 1277            | FTSS         | 9/30/14     |
|                                  | Abdominal Rib | Upper     | Y | 1286            | FTSS         | 9/30/14     |
|                                  |               | Lower     | Y | 1290            | FTSS         | 9/30/14     |
| Lower Spine Accelerometers (T12) |               |           | X | P59007          | Endevco      | 9/30/14     |
|                                  |               |           | Y | P59015          | Endevco      | 9/30/14     |
|                                  |               |           | Z | P58995          | Endevco      | 9/30/14     |
| Acetabulum Load Cell             |               |           | Y | 260             | Denton       | 5/8/14      |
| Iliac Wing Load Cell             |               |           | Y | 272             | Denton       | 4/4/14      |
| Pelvis Plug (Struck Side)        |               |           |   | 70700           | FTSS         | 12/12/13    |
| Pelvis Plug (Non-Struck Side)    |               |           |   | 70698           | FTSS         | 12/12/13    |

**TABLE 3 – Vehicle Instrumentation**

| Vehicle Instrumentation |                             |   | Serial Number | Manufacturer | Calibration Date |
|-------------------------|-----------------------------|---|---------------|--------------|------------------|
| 1                       | Vehicle Center of Gravity   | X | A147439       | MSI          | 9/11/14          |
|                         | Vehicle Center of Gravity   | Y | A148280       | MSI          | 9/23/14          |
|                         | Vehicle Center of Gravity   | Z | A147448       | MSI          | 9/11/14          |
| 2                       | Right Sill at Front Seat    | X | A145474       | MSI          | 9/18/14          |
|                         | Right Sill at Front Seat    | Y | A147442       | MSI          | 9/11/14          |
|                         | Right Sill at Front Seat    | Z | A148267       | MSI          | 9/23/14          |
| 3                       | Right Sill at Rear Seat     | X | A146000       | MSI          | 9/16/14          |
|                         | Right Sill at Rear Seat     | Y | A148232       | MSI          | 9/23/14          |
|                         | Right Sill at Rear Seat     | Z | A147387       | MSI          | 9/12/14          |
| 4                       | Left Sill at Front Door     | Y | A145472       | MSI          | 8/11/14          |
| 5                       | Left Sill at Rear Door      | Y | A145499       | MSI          | 9/11/14          |
| 6                       | Left A-Post Lower           | Y | A147475       | MSI          | 9/11/14          |
| 7                       | Left A-Post Middle          | Y | A147442       | MSI          | 9/11/14          |
| 8                       | Left B-Post Lower           | Y | A147415       | MSI          | 9/12/14          |
| 9                       | Left B-Post Middle          | Y | A147461       | MSI          | 9/11/14          |
| 10                      | Front Seat Track            | Y | A147381       | MSI          | 9/12/14          |
| 11                      | Rear Seat Structure         | Y | A148214       | MSI          | 9/18/14          |
| 12                      | Right Rear Occ. Compartment | Y | A148212       | MSI          | 9/18/14          |
| 13                      | Engine Block                | X | A145478       | MSI          | 9/16/14          |
|                         | Engine Block                | Y | A147409       | MSI          | 9/12/14          |
| 14                      | Rear Floorpan Above Axle    | X | A148217       | MSI          | 9/18/14          |
|                         | Rear Floorpan Above Axle    | Y | A145494       | MSI          | 9/14/14          |
|                         | Rear Floorpan Above Axle    | Z | A145442       | MSI          | 9/16/14          |

**TABLE 4 – MDB Instrumentation**

|                                    |   | Serial Number | Manufacturer | Calibration Date |
|------------------------------------|---|---------------|--------------|------------------|
| MDB Center of Gravity              | X | A128040       | MSI          | 10/3/14          |
| MDB Center of Gravity              | Y | A124105       | MSI          | 10/3/14          |
| MDB Center of Gravity              | Z | A104832       | MSI          | 10/3/14          |
| Left Frame at Rear Axle Centerline | X | A148320       | MSI          | 2/24/15          |
| Left Frame at Rear Axle Centerline | Y | A148316       | MSI          | 2/24/15          |