

REPORT NUMBER: SPNCAP-KAR-12-045

**NEW CAR ASSESSMENT PROGRAM (NCAP)
SIDE IMPACT POLE TEST**

**KIA MOTORS CORPORATION
2012 KIA SOUL 5-DOOR MPV**

NHTSA No: MC0517

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



FEBRUARY 9, 2012

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**

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Approval Date: February 9, 2012

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

Date: _____

Date: _____

TECHNICAL REPORT DOCUMENTATION PAGE

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4. Title and Subtitle Final Report of New Car Assessment Program Side Impact Pole Testing of a 2012 Kia Soul 5-Door MPV NHTSA No. MC0517		5. Report Date February 9, 2012																												
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12. Sponsoring Agency Name and Address U. S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards (NVS-111) 1200 New Jersey Ave., SE, Room W43-410 Washington, D.C. 20590		13. Type of Report and Period Covered Final Test Report, Jan. 27 - Feb. 9, 2012																												
		14. Sponsoring Agency Code NVS-111																												
15. Supplementary Notes																														
16. Abstract A 32.2 km/h (20 mph) 75 deg. oblique impact Side NCAP Test was conducted on the subject 2012 Kia Soul 5-door MPV in accordance with the specifications of the Office of Crashworthiness Standards Side NCAP Pole Laboratory Test Procedure for the generation of consumer information on vehicle side pole crash protection. The test was conducted at the KARCO Engineering, LLC. facility in Adelanto, California on January 27, 2012. The impact velocity was 31.9 km/h and the outside ambient temperature at the struck (driver's) side of the vehicle was 17.8 deg. C. The target vehicle's maximum post-test static crush was 434 mm located at level 3. The test vehicle's occupant performance data is as follows: <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th colspan="3">Driver ATD (ES-2re)</th> </tr> <tr> <th>Units</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td></td> <td>1000</td> <td>322.2</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td>g</td> <td>82</td> <td>38.5</td> </tr> <tr> <td>Total Pelvic Force (Sum of Acetabular and Iliac Forces)</td> <td>N</td> <td>5525</td> <td>2899</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38</td> <td>23</td> </tr> <tr> <td>Maximum Abdominal Rib Deflection</td> <td>mm</td> <td>45</td> <td>22</td> </tr> </tbody> </table> The two doors on the struck side of the vehicle did not separate from the body at the hinges or latches. The opposite doors did not open during the side impact event.				Measurement Description	Driver ATD (ES-2re)			Units	Threshold	Result	Head Injury Criteria (HIC ₃₆)		1000	322.2	Resultant Lower Spine Acceleration	g	82	38.5	Total Pelvic Force (Sum of Acetabular and Iliac Forces)	N	5525	2899	Maximum Thoracic Rib Deflection	mm	38	23	Maximum Abdominal Rib Deflection	mm	45	22
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17. Key Words New Car Assessment Program (NCAP) Side Impact Pole Part 572V SID-11s		18. Distribution Statement Copies of this report are available from National Highway Traffic Safety Admin. Technical Reference Division 1200 New Jersey Ave., SE Room W43-410 Washington, DC 20590																												
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SECTION 1

TEST PURPOSE AND PROCEDURE

This side impact test is part of the MY 2012 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract number DTNH22-09-D-00122. The purpose of this test is to generate comparative side impact performance of a 2012 Kia Soul 5-door MPV. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated August 2011.

SECTION 2

SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a 2012 Kia Soul 5-door MPV. The subject vehicle was towed into the rigid pole at an angle of 75.3° and a velocity of 31.9 km/h. The test was conducted by KARCO Engineering, LLC. in Adelanto, California on January 27, 2012. Pre- and post-test photographs of the test vehicle and side impact dummy (SID-IIs) are included in Appendix A of this report.

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

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

- Head CG tri-axial accelerometers
- Thorax upper, middle and lower rib displacement potentiometers
- Abdomen upper and lower rib displacement potentiometers
- Lower spine (12) tri-axial accelerometers
- Iliac load cell
- Acetabulum load cell

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

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

Measurement Description	Units	Passenger ATD (SID-IIs)	
		IARV	Result
Head Injury Criteria (HIC ₃₆)		1000	322.2
Lower Spine (T12) Resultant Acceleration	g	82	39
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2899
Maximum Thoracic Rib Deflection	mm	38*	23
Maximum Abdominal Rib Deflection	mm	45*	22

*Proposed IARV

Supplemental restraint information is given below:

Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) 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

Both the front and rear doors on the struck side of the vehicle remained closed and latched. There was no separation at the hinges or latches. Both 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: 2012 Kia Soul 5-Door MPV NHTSA No. MC0517
Test Program: NCAP Side Pole Impact Test Test Date: 01/27/12

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 ²	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: 2012 Kia Soul 5-Door MPV NHTSA No. MC0517
 Test Program: NCAP Side Pole Impact Test Test Date: 01/27/12

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	MC0517
Model Year	2012
Make	Kia
Model	Soul
Body Style	5-Door MPV
VIN	KNDJT2A55C7381552
Body Color	Dune
Odometer Reading (km / mi)	14 / 9
Engine Displacement (L)	1.6
Type / No. of Cylinders	Inline 4
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
All Wheel Drive (AWD)	No

Traction Control System (TCS)	Yes
Auto-Leveling System	No
Automatic Door Locks	No
Power Window Auto-Reverse	Yes
Other Optional Feature	None
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	None

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

☐

DATA FROM CERTIFICATION LABEL

Manufactured By	Kia Motors Corporation
Date of Manufacture	Sep-11
Vehicle Type	MPV

GVWR (kg)	1685
GAWR Front (kg)	980
GAWR Rear (kg)	970

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

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

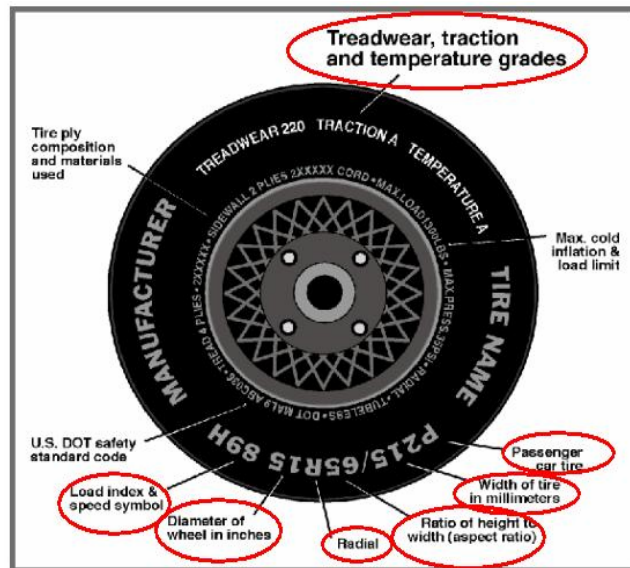
VEHICLE SEAT TYPE

Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
Front Seat	Yes					Yes	
Rear or Second Row Seat		Yes			Yes		
Third Row Seat							

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2012 Kia Soul 5-Door MPV NHTSA No. MC0517
 Test Program: NCAP Side Pole Impact Test Test Date: 01/27/12



TIRE PLACARD INFORMATION

Measured Parameter	Front	Rear
Recommended Cold Tire Pressure (kPa)	230	230
Recommended Tire Size	P195/65R15	P195/65R15

VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kpa)	300	300
Tire Size on Vehicle	P195/65R15	P195/65R15
Tire Manufacturer	Nexen	Nexen
Tire Name	Classe Premiere	Classe Premiere
Tire Type	Passenger	Passenger
Tire Width	195	195
Aspect Ratio	65	65
Radial	Yes	Yes
Wheel Diameter	15	15
Load Index/Speed Symbol	89S	89S
Treadware	440	440
Traction Grade	A	A
Temperature Grade	A	A
Tire Material	Polyester, Steel	Polyester, Steel

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2012 Kia Soul 5-Door MPV NHTSA No. MC0517
 Test Program: NCAP Side Pole Impact Test Test Date: 01/27/12

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	205	210	210	205
Tire Placard	kPa	230	230	230	230
Owner's Manual	kPa	230	230	230	230
As Tested	kPa	230	230	230	230

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	400.0	254.0		414.5	287.5		418.5	293.0	
Right	kg	374.0	240.5		380.5	271.5		377.0	271.5	
Ratio	%	61.0%	39.0%	100.0%	58.7%	41.3%	100.0%	58.5%	41.5%	100.0%
Total	kg	774.0	494.5	1268.5	795.0	559.0	1354.0	795.5	564.5	1360.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1268.5	A
Actual Weight of 1 P572 O ATD Used	kg	49.0	B
Rated Cargo/Luggage Wt (RCLW)	kg	44.8	C
Calculated Vehicle Target Wt (TVTW)	kg	1362.3	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

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Tail Lights	5.0
Rear Bumper Cover	6.0
Front Bumper Cover	7.5
Non-Struck Side Door Panels	5.0
Non-Struck Side Windows	4.0
Non-Struck Side Outboard Mirror	1.5
Spare Tire Tools	1.0
Ballast / Equipment Added	82.5

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

Test Vehicle: 2012 Kia Soul 5-Door MPV NHTSA No. MC0517
Test Program: NCAP Side Pole Impact Test Test Date: 01/27/12

TEST VEHICLE ATTITUDE AND CG

Measurement Description	Units	As Delivered	As Tested	Fully Loaded	Meets Requirement***
Driver Door Sill Angle (front-to-rear)*	°	-0.9	-0.7	-0.6	Yes
Front Passenger Sill Angle (front-to-rear)*	°	-0.7	-0.7	-0.5	Yes
Front Bumper-Line Angle (left-to-right)**	°	0.2	0.1	0.1	Yes
Rear Bumper-Line Angle (left-to-right)**	°	0.0	-0.1	-0.1	Yes
Vehicle CG (Aft of Front Axle)	mm	995	1054	1060	
Vehicle CG (Left (+)/Right (-) from Longitudinal Centerline)	mm	24	29	36	

*ND=Nose Down (-), NU=Nose Up (+)

**LD=Left Down (-), LU=Left Up (+)

***The "As Tested" vehicle attitude angle measurements must be within "As Delivered" and the "Fully Loaded" vehicle attitude measurements at each location. Indicate "Yes" or "No" for "Meets Requirement"

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

Test Vehicle: 2012 Kia Soul 5-Door MPV NHTSA No. MC0517
 Test Program: NCAP Side Pole Impact Test Test Date: 01/27/12

SEAT POSITIONING

The driver's seat is set to the forward most position where the ATD will not contact any interior panels at the mid-height and mid-angle position. The front center seat (if applicable) and right front passenger's seat should be set in a similar manner as the driver's seat. 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	5.6	0.0	2.8
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	Fixed	Fixed	Fixed

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	2.8	639	Max	623	631	639
			Mid	623	631	639
			Min	623	631	639
Front Passenger Seat	Fixed	636	Max	620	628	636
			Mid	620	628	636
			Min	620	628	636
Front Center Seat			Max			
			Mid			
			Min			
Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed

DATA SHEET NO. 2 ... (CONTINUED)

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

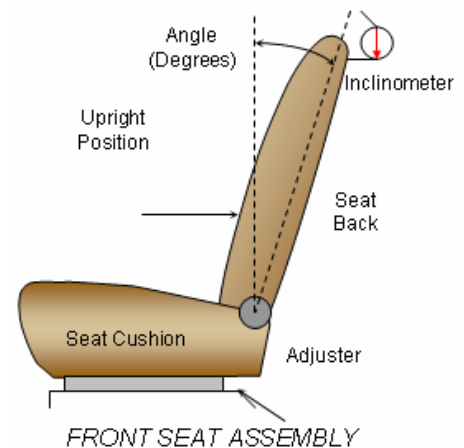
Test Vehicle: 2012 Kia Soul 5-Door MPV NHTSA No. MC0517
 Test Program: NCAP Side Pole Impact Test Test Date: 01/27/12

SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position From Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	200	21	0	0
Front Passenger Seat	200	21	0	0
Front Center Seat				
Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed	Fixed

SEAT BACK ADJUSTMENT

The driver's seat back is positioned such that the dummy's head is level. The right front passenger seat back is set to the same angle as the driver's seat.



Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degree	Detent*
Driver Seat w/Seated Dummy	80.5	40	5.1	9
Front Passenger Seat	80.2	40	5.1	9
Front Center Seat				
Struck Side Rear Seat w/Seated Dummy	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed	Fixed

SEAT BELT ANCHORAGE ADJUSTMENT

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

	Total No. of Positions	Placed in Position
Driver Seat	4	H

DATA SHEET NO. 2 ... (CONTINUED)

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

Test Vehicle: 2012 Kia Soul 5-Door MPV NHTSA No. MC0517
Test Program: NCAP Side Pole Impact Test Test Date: 01/27/12

HEAD RESTRAINT ADJUSTMENT

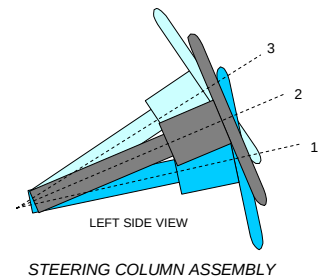
The driver's head restraint is adjusted to the lowest and most full forward in-use position.

	Total No. of Positions	Placed in Position
Driver Seat	7 Vertical, 4 Horizontal	Full Down, Full Forward

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	25.6	89
Geometric Center - Position 2	27.9	105
Uppermost - Position 3	30.2	120
Telescoping Steering Wheel Travel		31
Test Position	27.9	105



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

Test Vehicle: 2012 Kia Soul 5-Door MPV NHTSA No. MC0517
Test Program: NCAP Side Pole Impact Test Test Date: 01/27/12

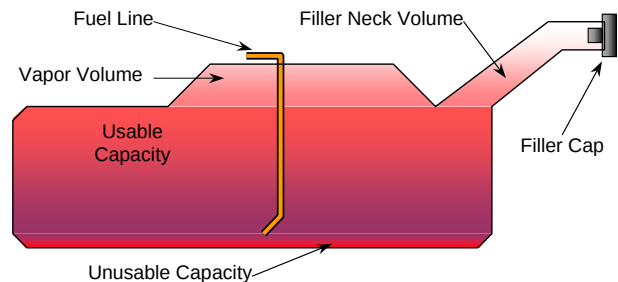
FUEL TANK CAPACITY

Description	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	47.99
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	44.63
Actual amount of Solvent Used in Test	44.63
1/3 of Usable Capacity	16.00

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**

FUEL PUMP

The vehicle is equipped with an electric fuel pump.
The fuel pump will operate when the vehicle is idling or running.

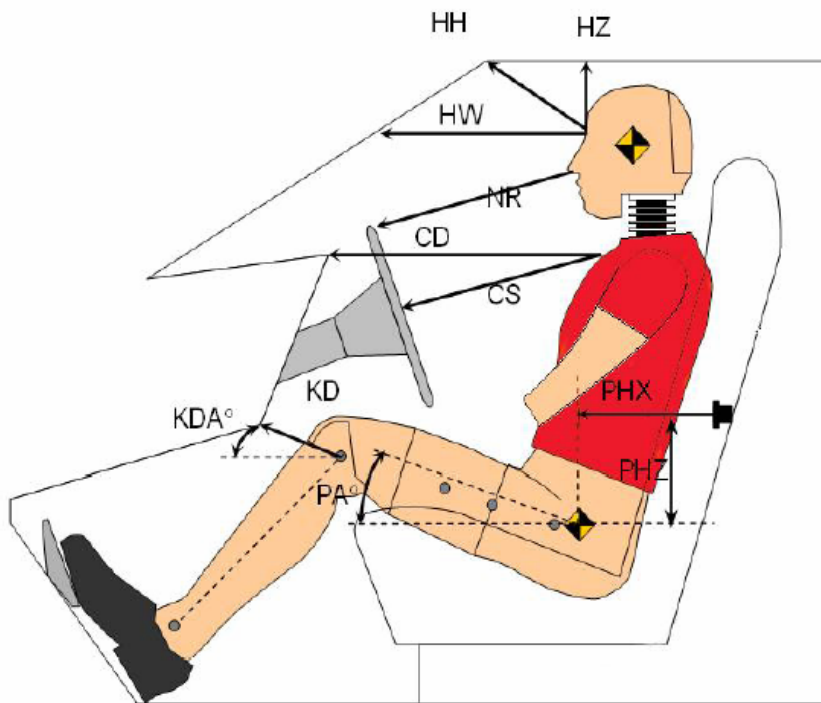


VEHICLE FUEL TANK ASSEMBLY

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2012 Kia Soul 5-Door MPV NHTSA No. MC0517
 Test Program: NCAP Side Pole Impact Test Test Date: 01/27/12



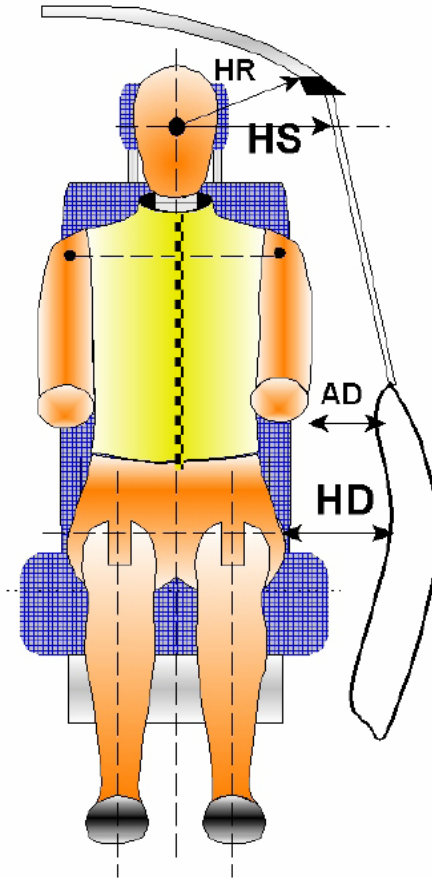
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Description	Driver	
		Length (mm)	Angle (°)
HH	Head to Header	350	
HW	Head to Windshield	628	
HZ	Head to Roof	246	
NR	Nose to Rim	278	
CD	Chest to Dash	420	
CS	Chest to Steering Wheel	197	
KD(L)/KDA(L)°	Left Knee to Dash	124	25.1
KD(R)/KDA(R)°	Right Knee to Dash	116	33.6
PAX°	Pelvic Tilt Angle (x-axis)		18.1
PAY°	Pelvic Tilt Angle (y-axis)		0.1
PHX	Hip Point to Striker (x-axis)	344	
PHZ	Hip Point to Striker (z-axis)	122	

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2012 Kia Soul 5-Door MPV NHTSA No. MC0517
Test Program: NCAP Side Pole Impact Test Test Date: 01/27/12



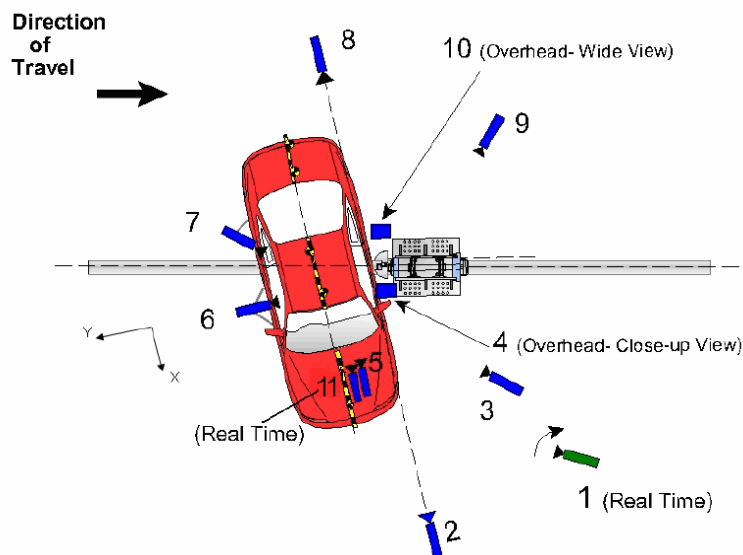
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver
HR	Head to Side Header	mm	283
HS	Head to Side Window	mm	354
AD	Arm to Door	mm	157
HD	H-Point to Door	mm	176

DATA SHEET NO. 5

CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2012 Kia Soul 5-Door MPV NHTSA No. MC0517
 Test Program: NCAP Side Pole Impact Test Test Date: 01/27/12



CAMERA LOCATIONS AND DATA

Camera No.	View	Coordinates (m)			Lens (mm)	Film Speed (fps)
		X*	Y*	Z*		
1	Real Time Pan View of Impact	8.89	46.57	-3.04		30
2	Front Ground Level - Impact View	8.34	-0.05	-0.93	24	1000
3	Impact Side 45° - Forward Pole View	4.10	-2.15	-1.15	8.5	1000
4	Overhead Close-Up View of Impact	0.00	0.00	-5.79	12.5	1000
5	On-Board - Dummy Front View	1.29	0.47	-1.42	35	1000
6	On-Board - Dummy Side View	0.13	1.51	-1.19	14	1000
7	On-Board - Dummy Rear Oblique View	-0.98	1.56	-1.28	20	1000
8	Rear Ground Level - Impact View	-6.12	-6.23	-0.96	24	1000
9	Impact Side 45° - Rearward Pole View	-8.02	0.04	-1.01	35	1000
10	Overhead Wide View of Impact	-0.06	0.22	-5.79	14	1000
11	Real Time Dummy Front View	1.37	0.52	-1.42		30

Reference from Point of Impact for X and Y; from Ground for Z):

+X = Forward of Vehicle, +Y = Right of Vehicle, +Z = Down

*All measurements accurate to ± 6 mm

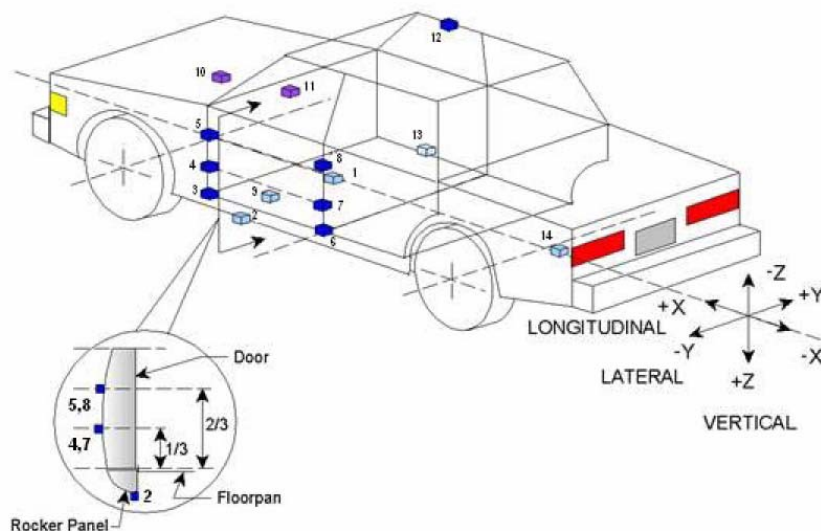
INSTRUMENTATION

Driver Dummy Channels	16
Vehicle Structure Accelerometers	18
Pole Load Cells	8
Total	42

DATA SHEET NO. 6

TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2012 Kia Soul 5-Door MPV NHTSA No. MC0517
 Test Program: NCAP Side Pole Impact Test Test Date: 01/27/12



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

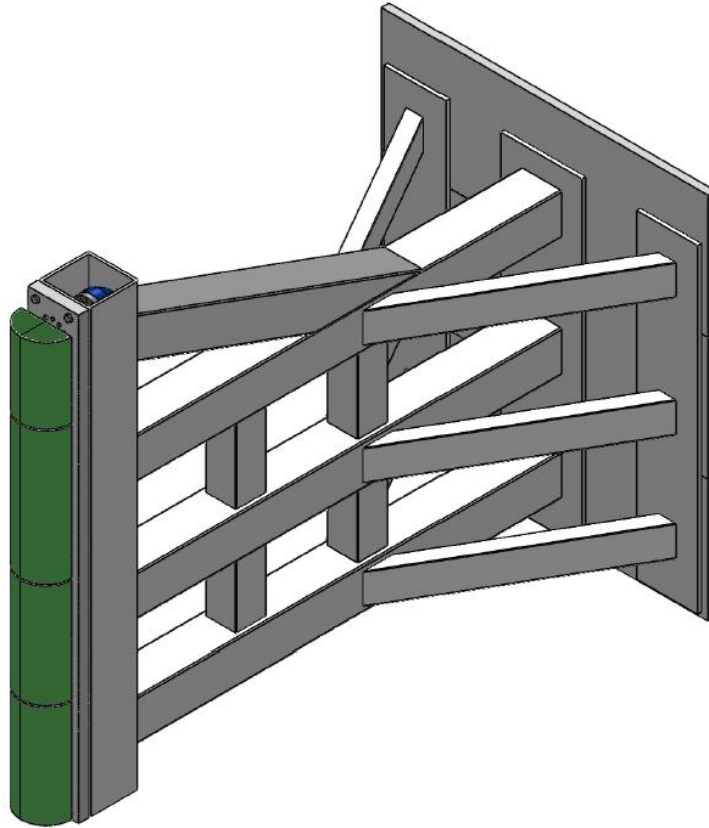
Loc. No.	Sensor Description	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	1590	25	-276
2	Left Floor Sill	2474	-662	-220
3	A-Pillar Sill	2792	-715	-420
4	A-Pillar Low	2792	-715	-590
5	A-Pillar Mid	2792	-715	-860
6	B-Pillar Sill	1813	-710	-425
7	B-Pillar Low	1813	-710	-630
8	B-Pillar Mid	1813	-710	-805
9	Driver Seat Track	2185	-550	-455
10	Engine Top	3410	143	-840
11	Firewall	306	30	-955
12	Right Roof	1911	470	-1602
13	Right Floor Sill	1640	620	-280
14	Rear Floorpan	720	310	-475

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

DATA SHEET NO. 7

RIGID POLE LOAD CELL DATA

Test Vehicle: 2012 Kia Soul 5-Door MPV NHTSA No. MC0517
Test Program: NCAP Side Pole Impact Test Test Date: 01/27/12



RIGID POLE LOAD CELL LOCATIONS

ID	Units	Height From Ground
1	mm	87
2	mm	468
3	mm	648
4	mm	978
5	mm	1168
6	mm	1651
7	mm	1816
8	mm	2057

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

Test Vehicle: 2012 Kia Soul 5-Door MPV NHTSA No. MC0517
 Test Program: NCAP Side Pole Impact Test Test Date: 01/27/12

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Driver SID-IIs Dummy
Face	Curtain Airbag, Torso/Pelvis Airbag
Top of Head	Curtain Airbag, Head Restraint
Left Side of Head	Curtain Airbag, Torso/Pelvis Airbag
Back of Head	Curtain Airbag, Head Restraint, Seat Back
Left Shoulder	Torso/Pelvis Airbag
Upper Torso	Seat, Torso/Pelvis Airbag
Lower Torso	Seat, Torso/Pelvis Airbag
Left Hip	Seat, Torso/Pelvis Airbag
Left Knee	Door Panel, Right Knee

POST-TEST DOOR PERFORMANCE

Description	Struck Side		Non-Struck Side		Rear Hatch/Other Door
	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

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	Broken
Side Window Damage	Left Front Window Broken
Other Notable Effects	None

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

Test Vehicle: 2012 Kia Soul 5-Door MPV NHTSA No. MC0517
 Test Program: NCAP Side Pole Impact Test Test Date: 01/27/12

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	

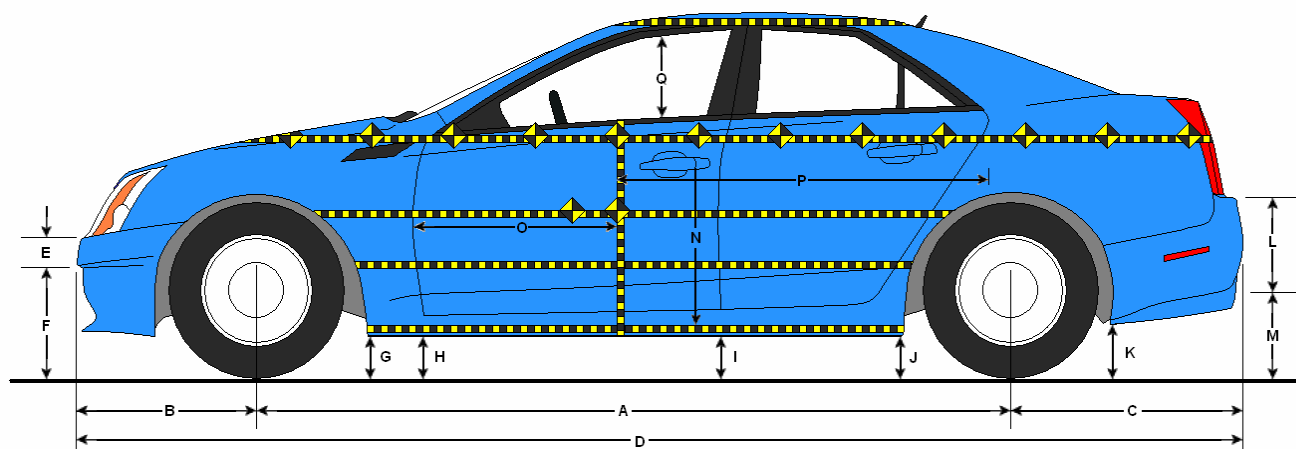
IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vertical Impact Reference Line (Aft of Front Axle)(Intended Impact Point)	mm		1032
Actual Impact Point (Aft of Front Axle)	mm		1031
Horizontal Offset (+ forward / - rearward)	mm	± 38 of Intended Impact Point	1
Angle Between Vehicle's Longitudinal Centerline and Line of Forward Motion	°	75 ± 3	75.3
Trap No. 1 Velocity (Primary)	km/h	31.4 to 33.0	31.9
Trap No. 2 Velocity (Redundant)	km/h	31.4 to 33.0	31.9

DATA SHEET NO. 9

TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2012 Kia Soul 5-Door MPV NHTSA No. MC0517
 Test Program: NCAP Side Pole Impact Test Test Date: 01/27/12



LEFT SIDE VIEW

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

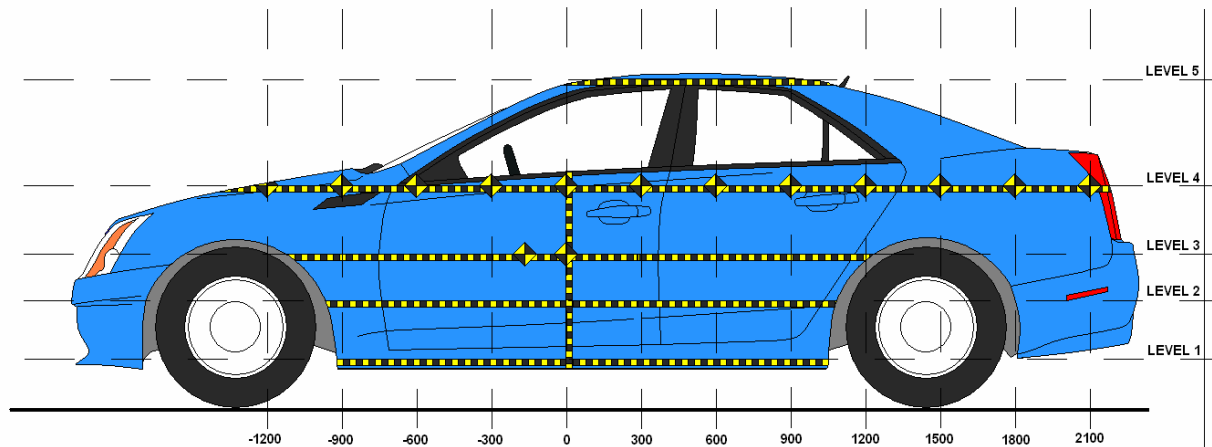
Code	Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2553	2486	-67
B	Front Axle to FSOV	794	810	16
C	Rear Axle to RSOV	660	687	27
D	Total Length at Centerline	4006	3984	-22
E	Front Bumper Thickness	117	117	0
F	Front Bumper Bottom to Ground	397	429	32
G	Sill Height at Front Wheel Well	256	253	-3
H	Sill Height at Front Door Leading Edge	264	266	2
I	Sill Height at B-Pillar	285	306	21
J1	Sill Height at Rear Wheel Well	292	325	33
J2	Pinch Weld Height at Rear Wheel Well	242	261	19
K	Sill Height Aft of Rear Wheel Well	500	528	28
L	Rear Bumper Thickness	108	108	0
M	Rear Bumper Bottom to Ground	458	511	53
N	Sill Height to Bottom of Front Window Sill	663	697	34
O	Front Door Leading Edge to Impact CL	598	490	-108
P	Rear Door Trailing Edge to Impact CL	1418	1297	-121
Q	Front Window Opening	433	467	34
R	Right Side Length	2864	2877	13
S	Left Side Length	2864	2734	-130
T	Vehicle Width at B-Pillar	1776	1630	-146

All measurements in mm with tolerance of ± 3 mm

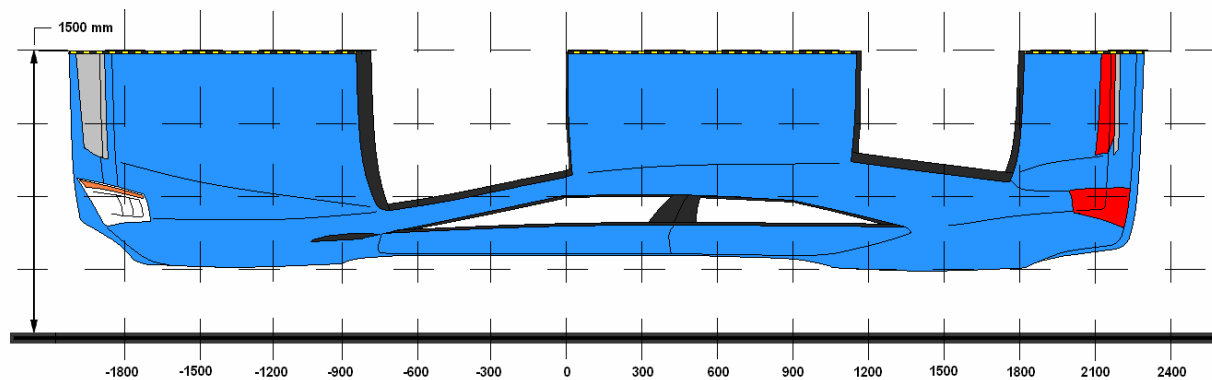
DATA SHEET NO. 10

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2012 Kia Soul 5-Door MPV NHTSA No. MC0517
 Test Program: NCAP Side Pole Impact Test Test Date: 01/27/12



LEFT SIDE VIEW



OVERHEAD VIEW

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Description	Height Above Ground (mm)	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	316	373	0
2	Occupant H-Point	661	428	0
3	Mid-Door	726	434	0
4	Window Sill	1026	398	0
5	Window Top	1557	238	150

DATA SHEET NO. 10 ... (CONTINUED)

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2012 Kia Soul 5-Door MPV NHTSA No. MC0517
 Test Program: NCAP Side Pole Impact Test Test Date: 01/27/12

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			607	764				668	814				61	50	
-750		608	618	731			684	690	794			76	72	63	
-600	671	645	650	715		752	730	735	792		81	85	85	77	
-450	688	649	647	705		841	813	811	817		153	164	164	112	
-300	681	647	644	696		904	878	877	894		223	231	233	198	
-150	678	645	641	689		971	977	977	985		293	332	336	296	
0	679	642	640	680	890	1052	1070	1074	1078	1122	373	428	434	398	232
150	677	641	637	674	881	1029	1033	1038	1056	1119	352	392	401	382	238
300	677	640	637	669	879	929	927	926	943	1059	252	287	289	274	180
450	675	641	637	666	877	866	820	814	847	1014	191	179	177	181	137
600	680	640	637	663	875	821	789	786	806	978	141	149	149	143	103
750	683	639	637	664	874	783	758	756	779	956	100	119	119	115	82
900	684	640	639	662	873	747	728	728	753	945	63	88	89	91	72
1050	676	637	640	665	875	707	693	701	728	938	31	56	61	63	63
1200		607	612	669	877		632	642	705	932		25	30	36	55
1350		601	601	673	879		644	598	682	928		43	-3	9	49
1500			599	680	882			636	717	927			37	37	45
1650			601	692	889			632	726	927			31	34	38
1800				714	907				741	936				27	29
1950															
2100															
2250															
2400															
2550															
2700															
2850															

DATA SHEET NO. 10 ... (CONTINUED)

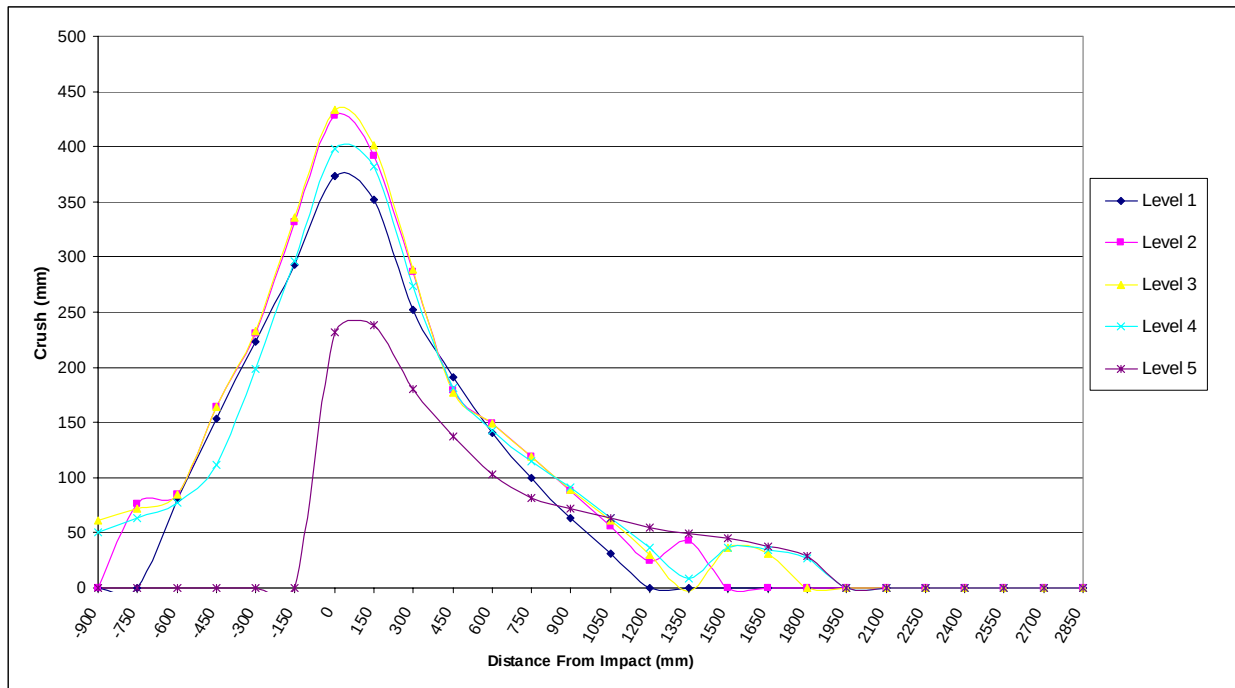
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2012 Kia Soul 5-Door MPV

NHTSA No. MC0517

Test Program: NCAP Side Pole Impact Test

Test Date: 01/27/12

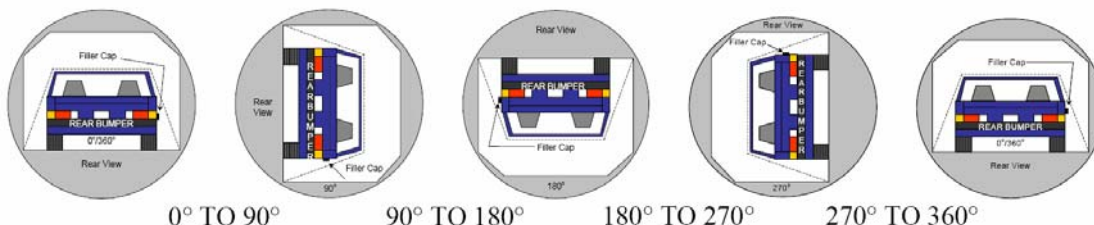


DATA SHEET NO. 11

FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2012 Kia Soul 5-Door MPV NHTSA No. MC0517
 Test Program: NCAP Side Pole Impact Test Test Date: 01/27/12
 Temperature at Time of Impact: 17.8° C Test Time: 3:02 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: No spillage occurred



SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° To 90°	83	300	383
90° To 180°	82	300	382
180° To 270°	79	300	379
270° To 360°	81	300	381

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			

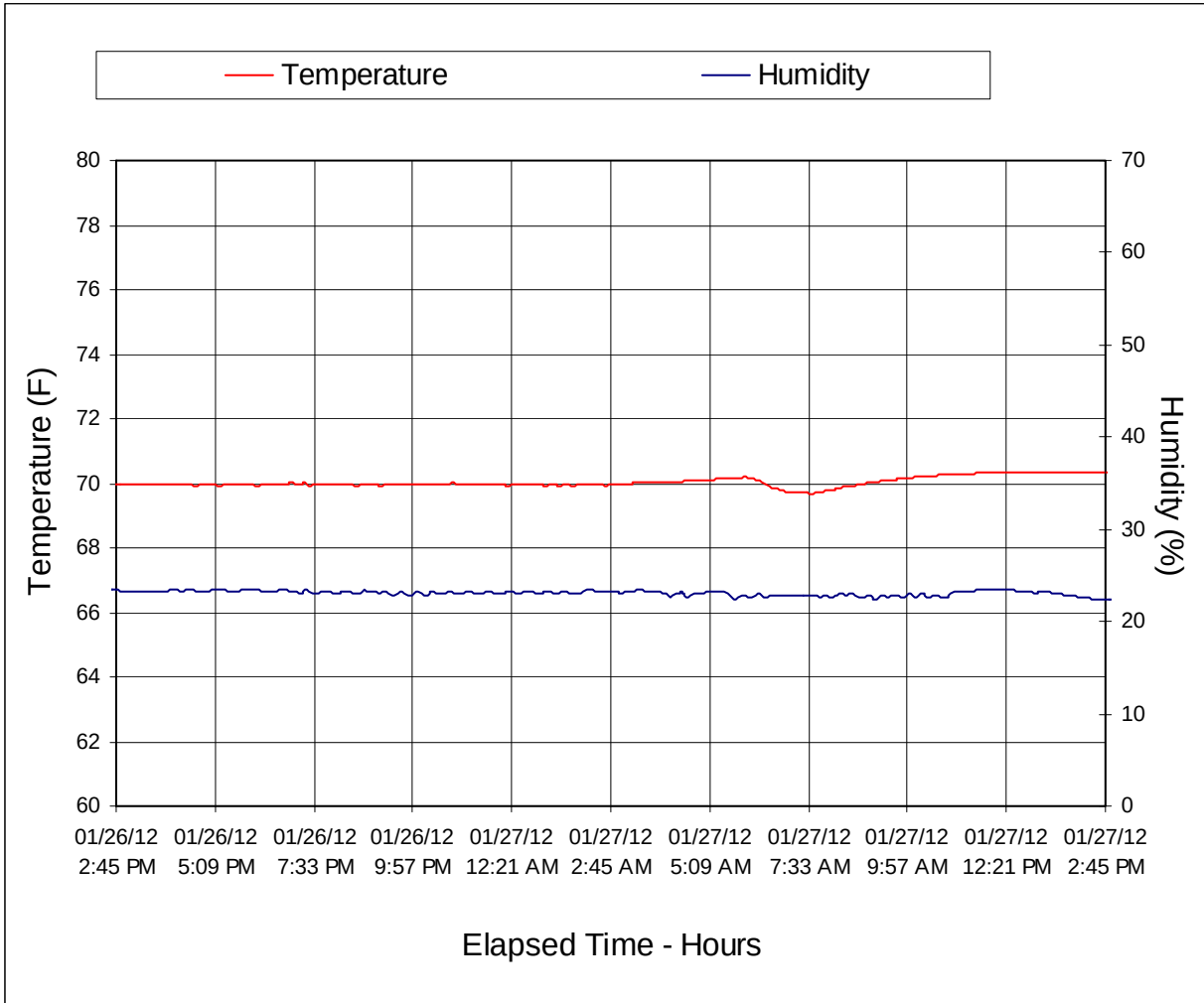
SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0° To 90°	No Spillage Occurred
90° To 180°	No Spillage Occurred
180° To 270°	No Spillage Occurred
270° To 360°	No Spillage Occurred

DATA SHEET NO. 14

DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION

Test Vehicle: 2012 Kia Soul 5-Door MPV NHTSA No. MC0517
Test Program: NCAP Side Pole Impact Test Test Date: 01/27/12



APPENDIX A
PHOTOGRAPHS

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FIGURE 1. As-Delivered Right Front Three-Quarter View of Test Vehicle



FIGURE 2. As-Delivered Left Rear Three-Quarter 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 Three-Quarter View of Test Vehicle



FIGURE 6. Post-Test Left Front Three-Quarter 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 Three-Quarter View of Test Vehicle



FIGURE 10. Post-Test Left Rear Three-Quarter 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 Vehicle and Pole

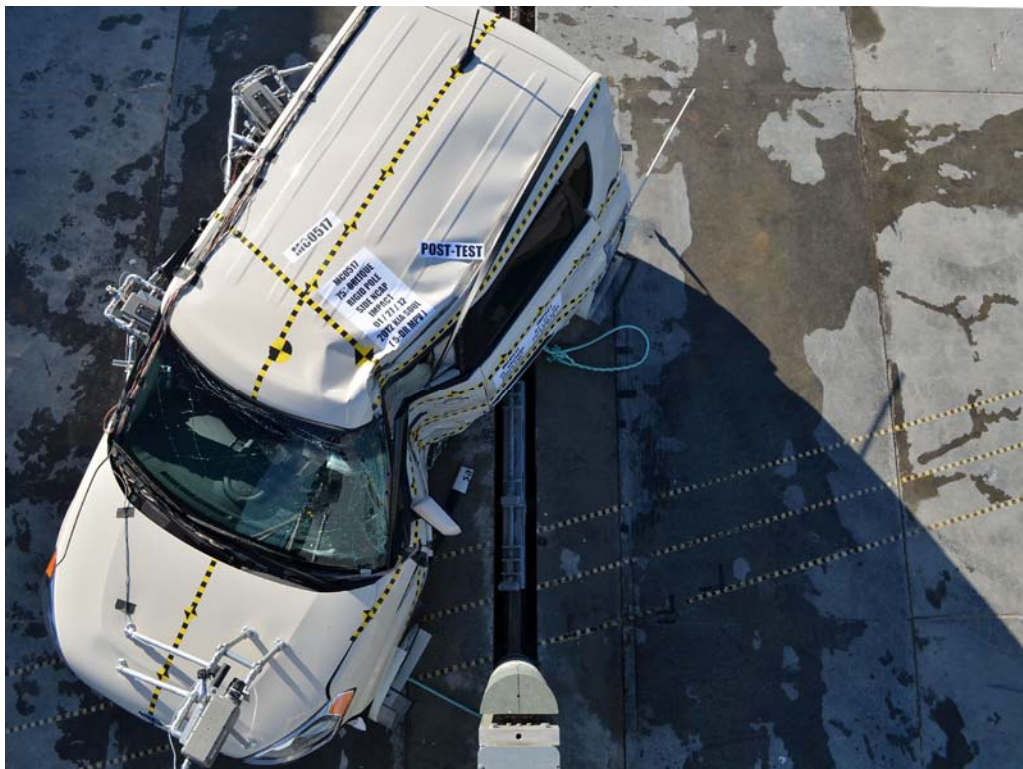


FIGURE 16. Post-Test Overhead View of Test Vehicle and Pole



FIGURE 17. Pre-Test Left Side View of Pole
Positioned Against Side of Vehicle at Impact Point



FIGURE 18. Pre-Test Right Side View of Pole
Positioned Against Side of Vehicle at Ideal Impact Point



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



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



FIGURE 21. Pre-Test Front Close-Up View of Dummy



FIGURE 22. Post-Test Front Close-Up View of Dummy



FIGURE 23. Pre-Test Left Side View of Dummy Showing Belt, Chalking, and Contact Switches



FIGURE 24. Pre-Test Left Side View of Dummy Shoulder and Driver Door Top View



FIGURE 25. Post-Test Left Side View of Dummy Shoulder and Door Top View



FIGURE 26. Pre-Test Frontal View of Seat Back Prior to Dummy Positioning



FIGURE 27. Pre-Test Frontal View of Dummy Head and Shoulders
in Relation to Head Restraint



FIGURE 28. Pre-Test Frontal View of Seat Pan Prior to Dummy Positioning



FIGURE 29. Pre-Test Overhead View of Dummy Thighs on Seat Pan



FIGURE 30. Pre-Test View of Dummy's Neck Showing Position of Adjustable Neck Bracket



FIGURE 31. Pre-Test View of Dummy's Head Showing Dummy's Head Is Level



FIGURE 32. Pre-Test Placement of Dummy's Feet



FIGURE 33. Pre-Test View of Belt Anchorage for Dummy



FIGURE 34. Pre-Test Left Side View of Steering Wheel

Photograph Not Available

FIGURE 35. View of Disengaged Parking Brake



FIGURE 36. Pre-Test View of Parking Brake



FIGURE 39. Pre-Test Close-Up View of Driver Seat Back or Head Restraint



FIGURE 40. Pre-Test Driver Dummy and Door Clearance

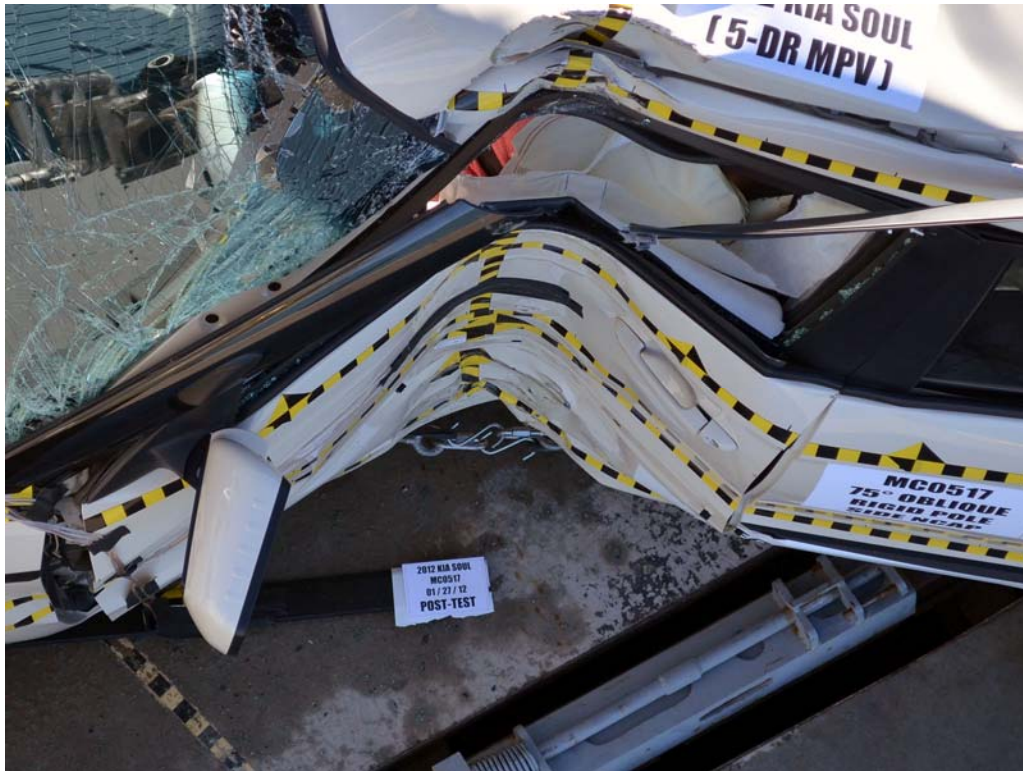


FIGURE 41. Post-Test Driver Dummy and Door Clearance



FIGURE 42. Pre-Test Right Side View of Dummy and Front Seat Occupant Compartment



FIGURE 43. Post-Test Right Side View of Dummy and Front Seat Occupant Compartment



FIGURE 44. Pre-Test Inner Driver Door Panel View



FIGURE 45. Post-Test Inner Driver Door Panel View
Showing Dummy Contact Locations



FIGURE 46. Post-Test Dummy Close-Up Head Contact with Vehicle Interior View



FIGURE 47. Post-Test Dummy Close-Up Head Contact with Side Airbag View



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



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

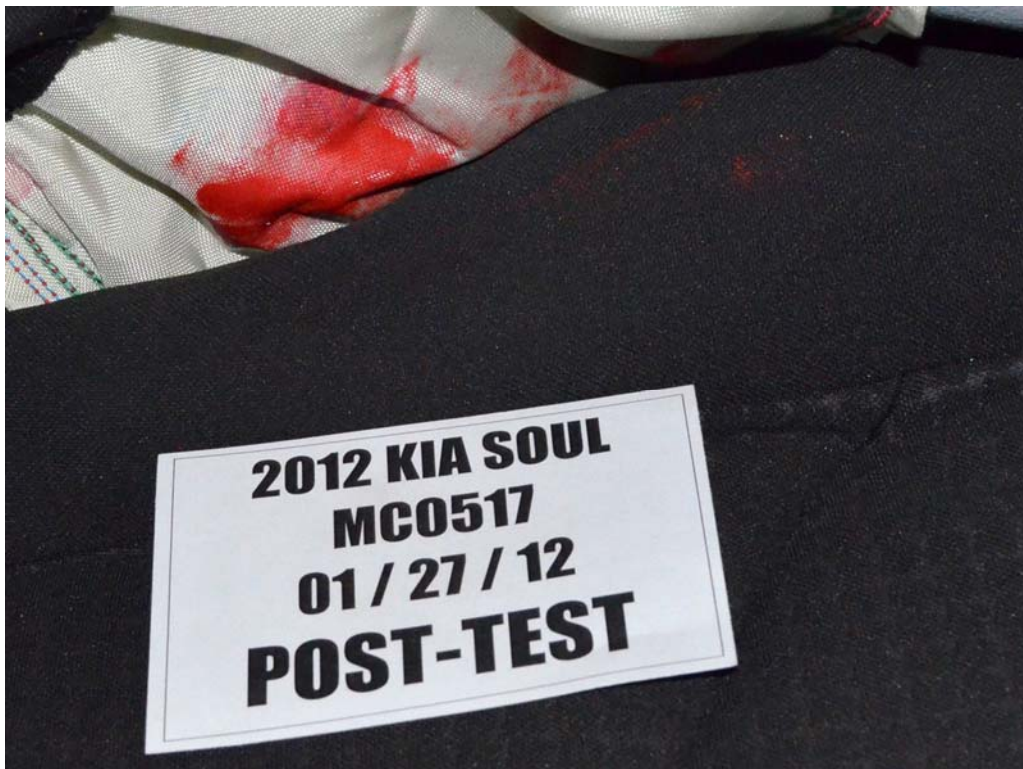


FIGURE 50. Post-Test Dummy Close-Up Pelvis Contact with Vehicle Interior View



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



FIGURE 52. Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



FIGURE 53. Post-Test View of Fuel Filler Cap or Fuel Filler Neck



FIGURE 54. Close-Up View of Vehicle's Certification Label



FIGURE 55. Close-Up View of Vehicle's Tire Information Placard



FIGURE 56. Pre-Test Pole Barrier Front View



FIGURE 57. Post-Test Pole Barrier Front View



FIGURE 58. Pre-Test Pole Barrier Side View



FIGURE 59. Post-Test Pole Barrier Side View

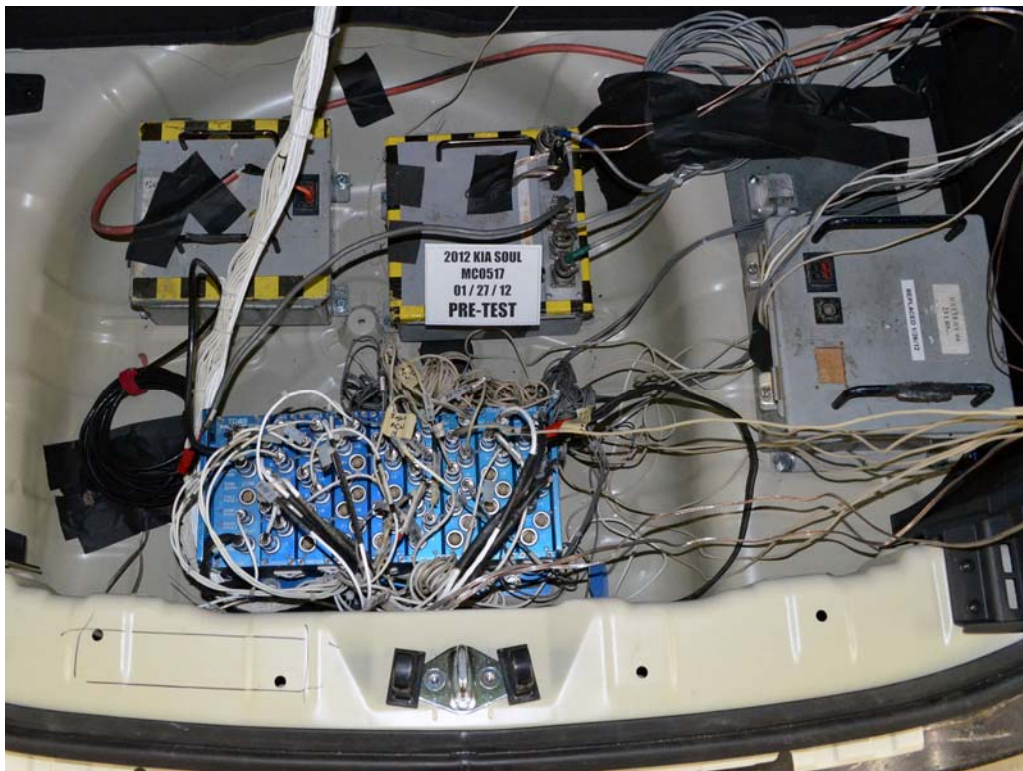


FIGURE 60. Pre-Test Ballast View



FIGURE 61. Post-Test Primary and Redundant Speed Trap Read-Out



FIGURE 62. FMVSS No. 301-305 Rollover 0 Degrees



FIGURE 63. FMVSS No. 301-305 Rollover 90 Degrees

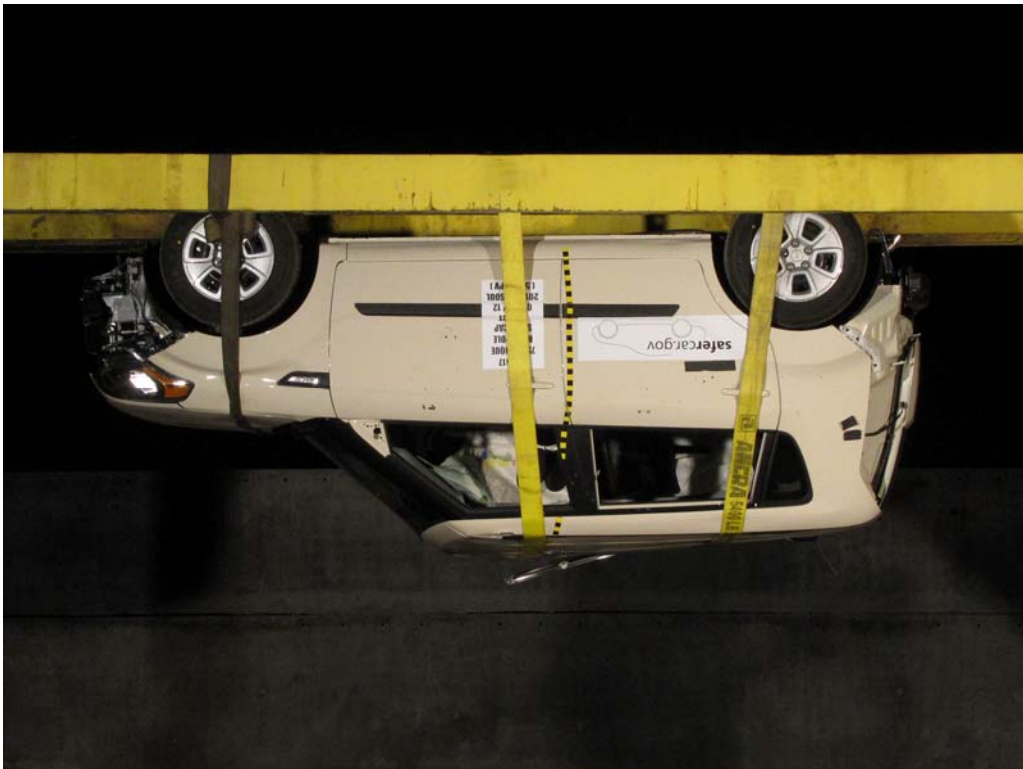


FIGURE 64. FMVSS No. 301-305 Rollover 180 Degrees

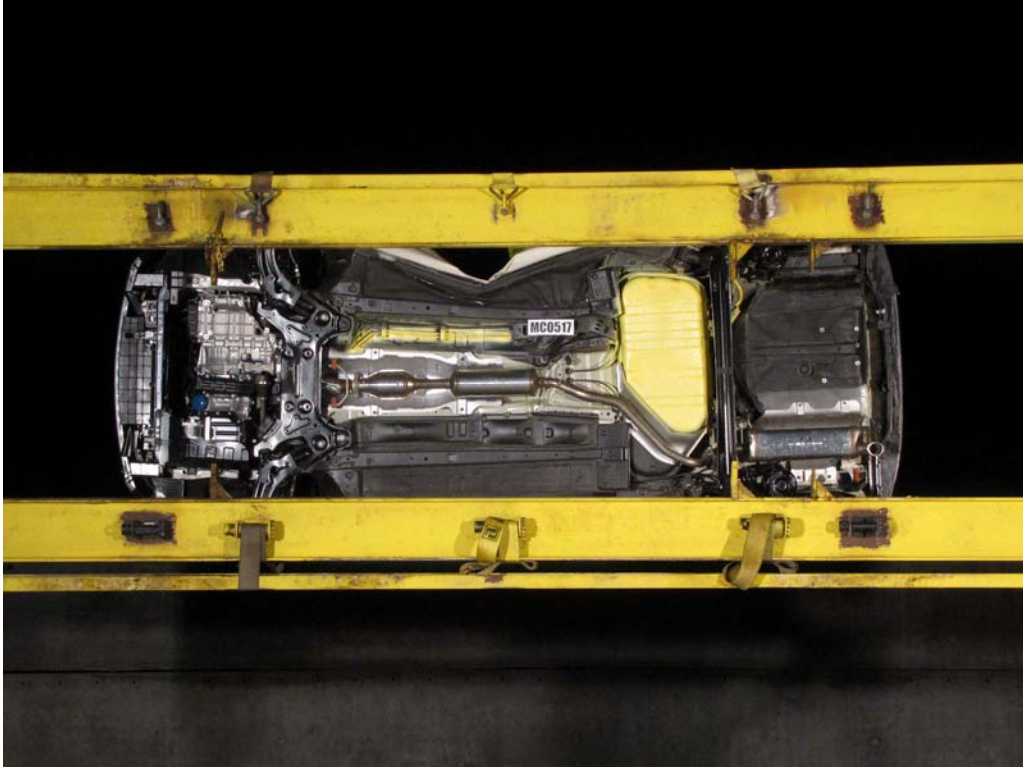


FIGURE 65. FMVSS No. 301-305 Rollover 270 Degrees



FIGURE 66. FMVSS No. 301-305 Rollover 360 Degrees



FIGURE 67. Impact Event

2012 KIA 300L MODEL YEAR: 2012 MODEL DESCRIPTION: DUNE/BLK VIN: KNDJT2A55C7381552 ENGINE NUMBER: 44FDBH11 VEHICLE NAME: HUENEME PORT OF ORIGIN: TRUCK MODE OF TRANSPORTATION: TRUCK		KIA 300L CA186 CAR PROS KIA 21243 S. AVALON BLVD. CARSON CA 90745	
STANDARD FEATURES MECHANICAL 1.8L Gas Direct Injection 4-cyl Engine 6-Speed Automatic Transmission w/ Active Eco System Electric Power Steering 15" Tires with Wheel Covers SAFETY Dual Front Advanced Airbags Front Seat Mounted Side Airbags Full-Length Side Curtain Airbags 3-Point Seatbelts for All Seating Positions Front Active Headrests Lower Anchors and Tethers for Children (LATCH) Anti-Lock Brake System (ABS) w/ Brake Assist (BAS) Traction Control System (TCS) Electronic Stability Control (ESC) Vehicle Stability Management (VSM) Hill-start Assist Control (HAC)		MANUFACTURER'S SUGGESTED RETAIL PRICE = \$15,700.00 ADDITIONAL INSTALLED EQUIPMENT: (In addition to or in place of standard features) Carpeted Floor Mats \$95.00 Cargo Net \$50.00 Cargo Cover \$50.00	
INTERIOR Air Conditioning Power Windows & Door Locks Remote Keyless Entry AM/FM/CD/MP3 Audio w/4 Speakers SIRIUS Satellite Radio w/ free 3-mo. subscription ** USB and Auxiliary Input Jacks Multi-Adjustable Front Seats 60/40 Split Folding Rear Seats Cruise Control BLUETOOTH® WIRELESS TECHNOLOGY TP & Telescopic Steering Column Steering Wheel Mounted Audio Controls Trip Computer		EXTERIOR Body Color Outside Mirrors Body Color Door Handles Privacy Glass	
WARRANTY 10 Year/100,000 Mile Limited Powertrain Warranty 5 Year/60,000 Mile Limited Basic Warranty 5 Year/60,000 Mile Roadside Assistance **Ask dealer for details		MSRP INCLUDING OPTIONS = \$15,895.00 ISLAND FREIGHT AND HANDLING = \$750.00 TOTAL MANUFACTURER'S SUGGESTED RETAIL PRICE = \$16,645.00 Manufacturer's suggested retail price includes manufacturer's recommended one-delivery service. License and title fees, state and local taxes and other dealer installed options and accessories are not included in the manufacturer's suggested retail price.	
TOTAL ADDITIONAL WEIGHT: 7.1			

EPA Fuel Economy Estimates			
These estimates reflect new EPA methods beginning with 2008 models.			
CITY MPG 27 Expected range for most drivers 22 to 32 MPG	Estimated Annual Fuel Cost \$1848.00 based on 15,000 miles at \$3.75 per gallon Combined Fuel Economy This Vehicle 14 30 34 SMALL STATION WAGON	HIGHWAY MPG 35 Expected range for most drivers 29 to 41 MPG Your actual mileage will vary depending on how you drive and maintain your vehicle.	
See the FREE Fuel Economy Guide at dealers or www.fueleconomy.gov			
GOVERNMENT SAFETY RATINGS			
Frontal Crash Driver: Not Rated Passenger: Not Rated Star ratings based on the risk of injury in a frontal impact. Frontal ratings should ONLY be compared to other vehicles of similar size and weight.	Side Crash Front seat: Not Rated Rear seat: Not Rated Star ratings based on the risk of injury in a side impact.	Rollover Star ratings based on the risk of rollover in a single vehicle crash. Star ratings range from 1 to 5 stars (★★★★★) with 5 being the highest. Source: National Highway Traffic Safety Administration (NHTSA)	PARTS CONTENT INFORMATION FOR VEHICLES IN THIS CAR LINE U.S./CANADIAN PARTS CONTENT: 3% MAJOR SOURCES OF FOREIGN PARTS: KOREA: 94% NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS.
www.safercar.gov or 1-888-327-4236 Environmental Performance Protect the environment, choose vehicles with higher scores: Global Warming Score: 8 Smog Score: 5 Using alternative fuels may improve scores. See www.DriveClean.ca.gov Vehicle emissions are a primary contributor to global warming and smog. Scores are determined by the California Air Resources Board based on			
FOR THIS VEHICLE FINAL ASSEMBLY POINT: KORE COUNTRY OF ORIGIN ENGINE: KORE TRANSMISSION: KORE			

FIGURE 68. Monroney Label

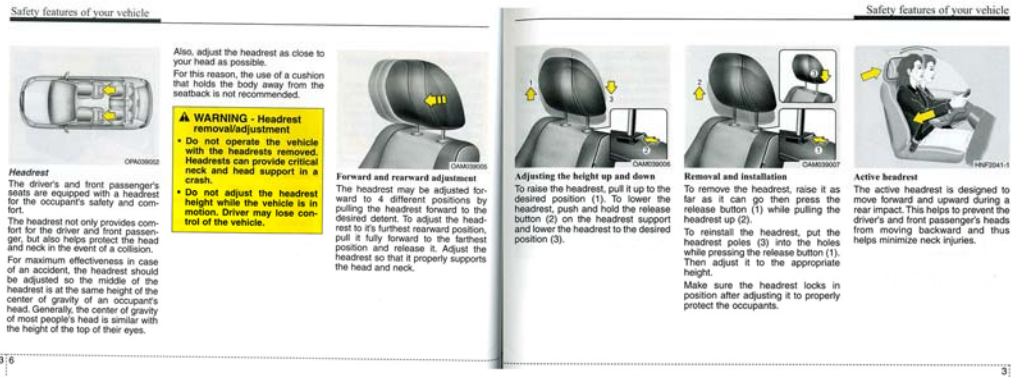


FIGURE 69. Head Restraint Use and Adjustment
Information from Vehicle Manual

APPENDIX B
DUMMY RESPONSE DATA

LIST 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 Lower Spine T12 Acceleration (X) vs. Time	B-2
6	Driver Lower Spine T12 Acceleration (Y) vs. Time	B-2
7	Driver Lower Spine T12 Acceleration (Z) vs. Time	B-2
8	Driver Lower Spine T12 Resultant Acceleration vs. Time	B-2
9	Driver Iliac Wing Force on Impact Side (Y) vs. Time	B-3
10	Driver Acetabulum Force on Impact Side (Y) vs. Time	B-3
11	Driver Total Pelvis Force on Impact Side (Y) vs. Time	B-3

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

www.NHTSA.dot.gov

Additional Driver Dummy Instrumentation Data

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

Vehicle Instrumentation Data

Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Left Floor Sill Acceleration (Y)
Left A-Pillar Sill Acceleration (Y)
Left Lower A-Pillar Acceleration (Y)
Left Mid A-Pillar Acceleration (Y)

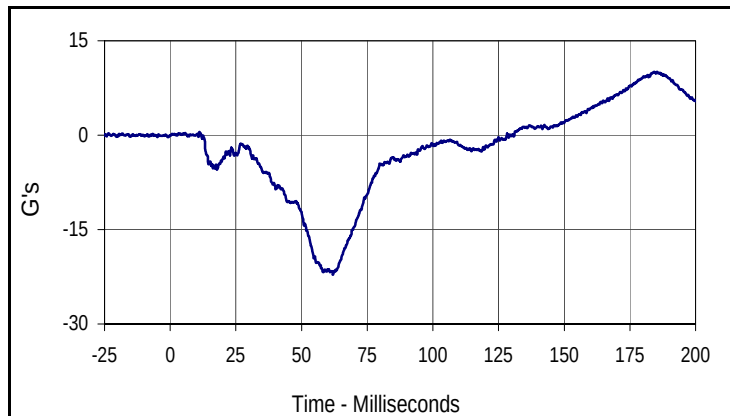
Left B-Pillar Sill Acceleration
Left Lower B-Pillar Acceleration (Y)
Left Mid B-Pillar Acceleration (Y)
Driver Seat Track at Dummy Hip Point Acceleration (Y)
Engine Top Acceleration (X)
Engine Top Acceleration (Y)
Firewall Center Acceleration (Y)
Right Roof at Vertical Impact Reference Line Acceleration (Y)
Right Sill at Vertical Impact Reference Line Acceleration (Y)
Rear Floorpan Behind Rear Axle at Centerline Acceleration (X)
Rear Floorpan Behind Rear Axle at Centerline Acceleration (Y)

Pole Instrumentation Data

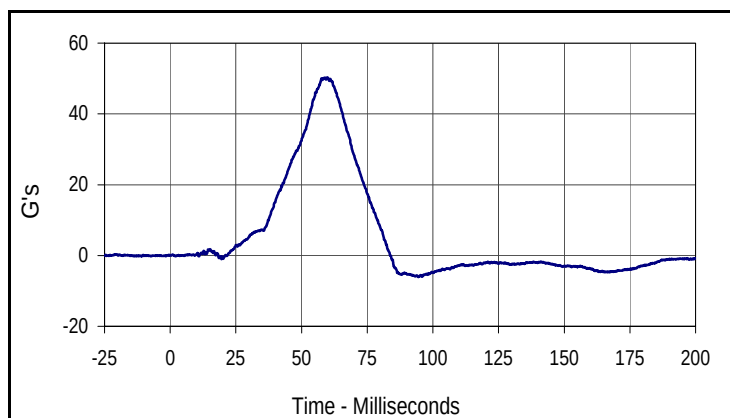
Load Cell Pole Barrier #1 Force (Y)
Load Cell Pole Barrier #2 Force (Y)
Load Cell Pole Barrier #3 Force (Y)
Load Cell Pole Barrier #4 Force (Y)
Load Cell Pole Barrier #5 Force (Y)
Load Cell Pole Barrier #6 Force (Y)
Load Cell Pole Barrier #7 Force (Y)
Load Cell Pole Barrier #8 Force (Y)

Test Vehicle: 2012 Kia Soul 5-Door MPV
 Test Program: 32 km/h (20 mph) Side Impact NCAP 75° Rigid Pole Test

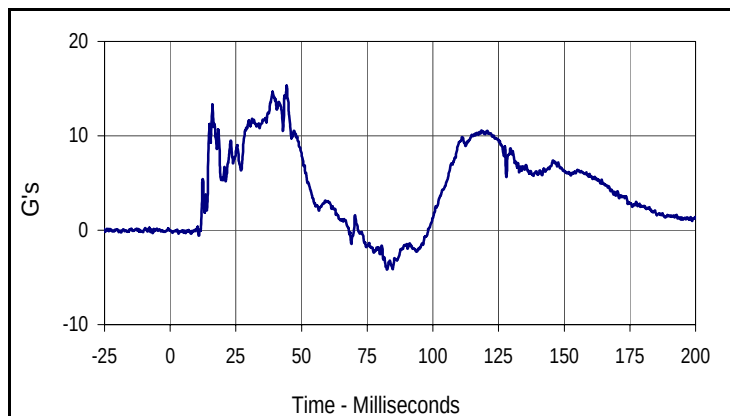
Test Date: 1/27/12
 NHTSA No.: MC0517



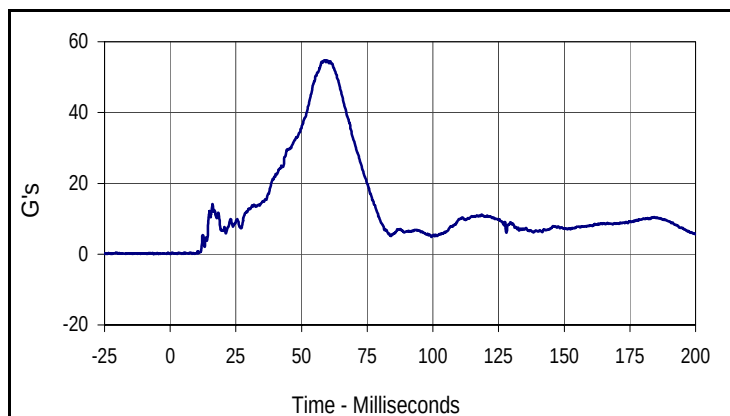
Curve Description			
Driver Head Acceleration X Primary			
Plot No.	Type	SAE Class	Units
001	FIL	1000	G's
Max	Time	Min	Time
10.1	185.4	-22.2	62.0



Curve Description			
Driver Head Acceleration Y Primary			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
50.3	58.9	-6.1	94.4



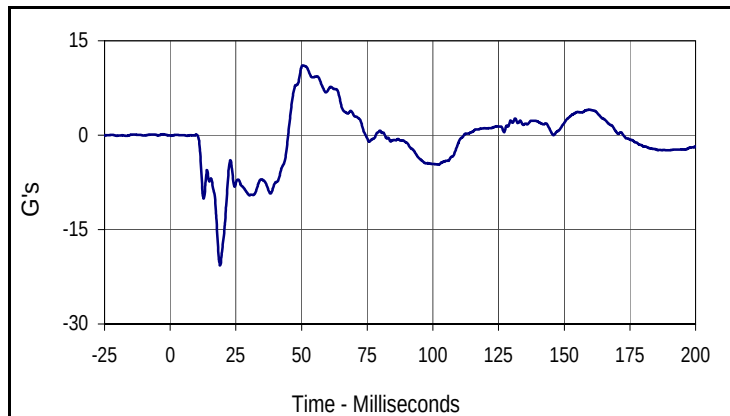
Curve Description			
Driver Head Acceleration Z Primary			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
15.3	44.3	-4.2	82.6



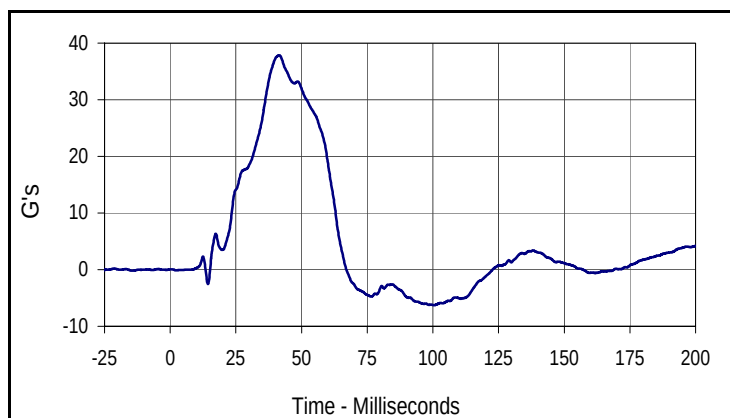
Curve Description			
Driver Head Acceleration Primary Res.			
Plot No.	Type	SAE Class	Units
004	RES	1000	G's
Max	Time	Min	Time
54.8	59.7	0.0	2.8

Test Vehicle: 2012 Kia Soul 5-Door MPV
 Test Program: 32 km/h (20 mph) Side Impact NCAP 75° Rigid Pole Test

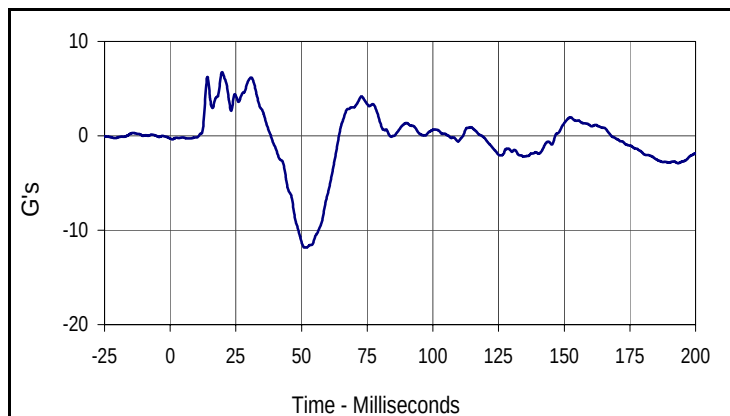
Test Date: 1/27/12
 NHTSA No.: MC0517



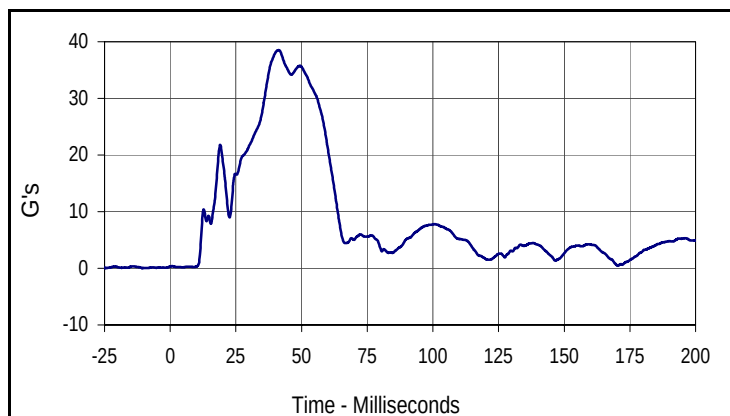
Curve Description			
Driver Lower Spine T12 Acceleration X			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
11.1	50.5	-20.7	19.0



Curve Description			
Driver Lower Spine T12 Acceleration Y			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
37.8	41.5	-6.3	100.4



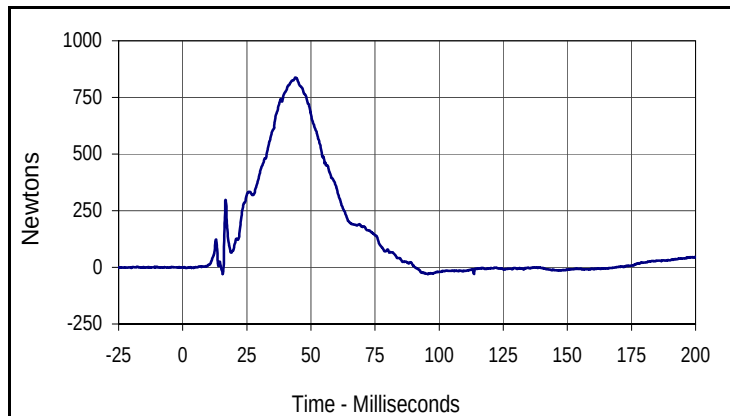
Curve Description			
Driver Lower Spine T12 Acceleration Z			
Plot No.	Type	SAE Class	Units
007	FIL	180	G's
Max	Time	Min	Time
6.7	19.8	-11.8	51.2



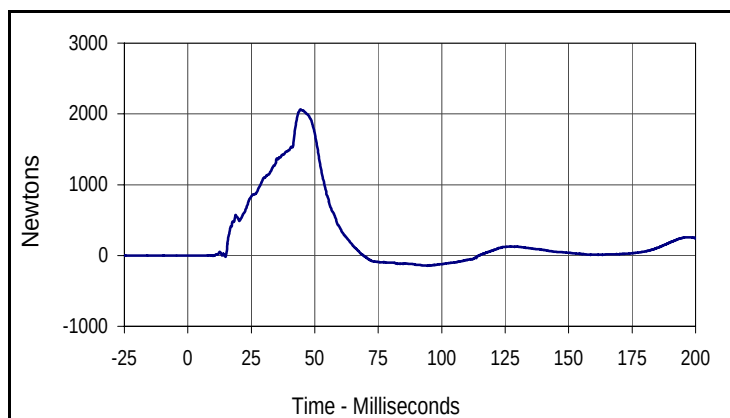
Curve Description			
Driver Lower Spine T12 Acceleration Res.			
Plot No.	Type	SAE Class	Units
008	RES	180	G's
Max	Time	Min	Time
38.5	41.2	0.2	4.7

Test Vehicle: 2012 Kia Soul 5-Door MPV
 Test Program: 32 km/h (20 mph) Side Impact NCAP 75° Rigid Pole Test

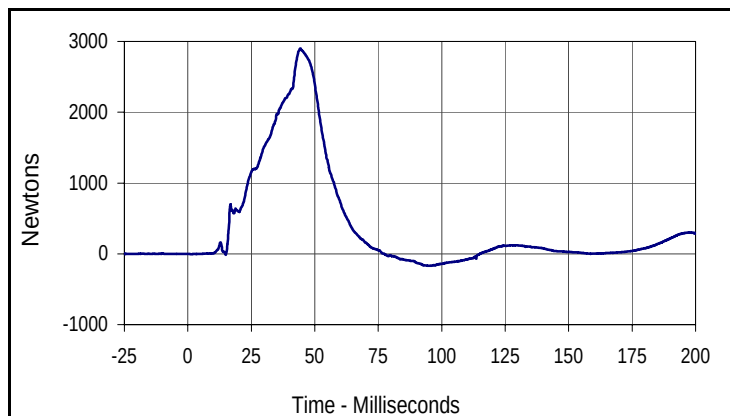
Test Date: 1/27/12
 NHTSA No.: MC0517



Curve Description			
Driver Iliac Wing Force on Impact Side Y			
Plot No.	Type	SAE Class	Units
009	FIL	600	Newtons
Max	Time	Min	Time
838.2	43.9	-30.3	15.6



Curve Description			
Driver Acetabulum Force on Impact Side Y			
Plot No.	Type	SAE Class	Units
010	FIL	600	Newtons
Max	Time	Min	Time
2064.5	44.3	-143.6	94.5



Curve Description			
Driver Total Pelvic Force on Impact Side Y			
Plot No.	Type	SAE Class	Units
011	SUM	600	Newtons
Max	Time	Min	Time
2899.4	44.3	-170.2	94.7

APPENDIX C
DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

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

Test Program: SID IIs External Measurements
 ATD Serial No.: 299

Test Date: 1/25/12
 Test I.D.: N/A



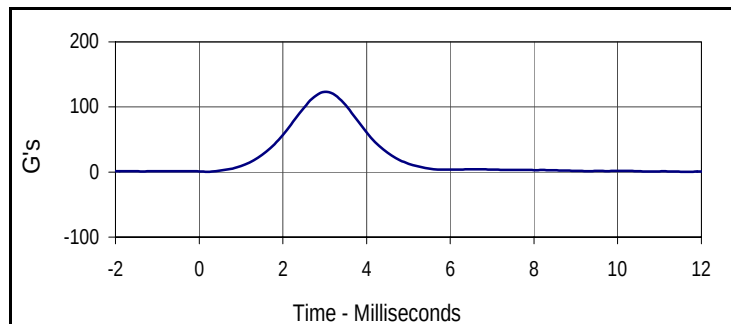
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity		%	10 to 70	34	Pass
A	Sitting Height	mm	772 - 788	778	Pass
B	Shoulder Pivot Height	mm	437 - 453	445	Pass
C	H-Point Height	mm	79 - 89	84	Pass
D	H-Point from Seatback	mm	141 - 151	146	Pass
E	Shoulder Pivot from Backline	mm	97 - 107	101	Pass
F	Thigh Clearance	mm	119 - 135	126	Pass
G	Head Breadth	mm	140 - 148	145	Pass
H	Head Back from Backline	mm	40 - 46	44	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	528	Pass
L	Popliteal Height	mm	343 - 369	355	Pass
M	Knee Pivot to Floor Height	mm	392 - 409	402	Pass
N	Buttock Popliteal Length	mm	416 - 442	429	Pass
O	Chest Depth w/o Jacket	mm	195 - 211	200	Pass
P	Foot Length	mm	216 - 232	220	Pass
Q	Hip Breadth with Pelvic Plug	mm	313 - 323	318	Pass
R	Arm Length	mm	249 - 259	256	Pass
S	Knee Joint to Seatback	mm	477 - 493	485	Pass
V	Shoulder Width	mm	341 - 357	351	Pass
W	Foot Width	mm	78 - 94	92	Pass
Y	Chest Circumference with Jacket	mm	851 - 881	877	Pass
Z	Waist Circumference	mm	760 - 791	773	Pass
Overall Test Results					Pass

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

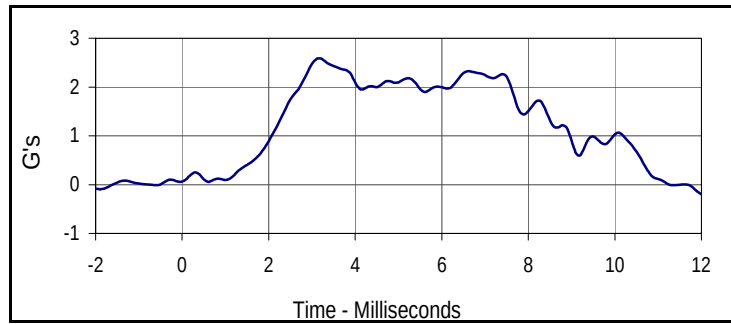
Test Date: 1/25/12
 Test I.D.: 299HD030



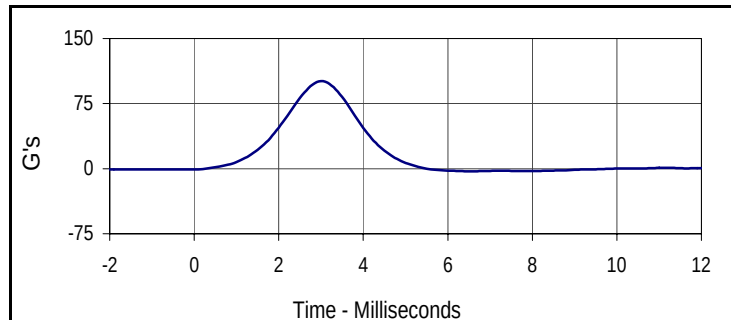
Tested Parameter	Units	Specification	Result	Pass/Fail
Head Assembly Soak Time	Minutes	≥240	290	Pass
Temperature During Soak	Max	18.9 to 25.6	21.7	Pass
	Min		20.7	Pass
Humidity During Soak	Max	10.0 to 70.0	35.0	Pass
	Min		29.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.3	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	34.5	Pass
Peak Head Resultant Acceleration	G's	115 to 137	123.2	Pass
Peak Head X Acceleration	G's	<15	2.6	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	10.4	Pass
Overall Test Results				Pass



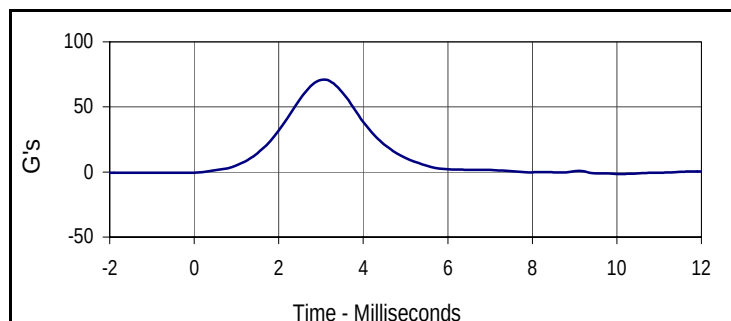
Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
123.2	3.0	0.4	0.2



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
2.6	3.2	-0.1	-1.9



Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
100.8	3.0	-3.0	6.5



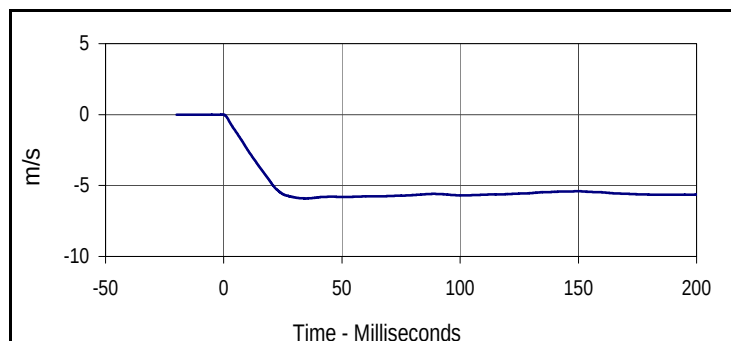
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
70.9	3.1	-1.5	10.0

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

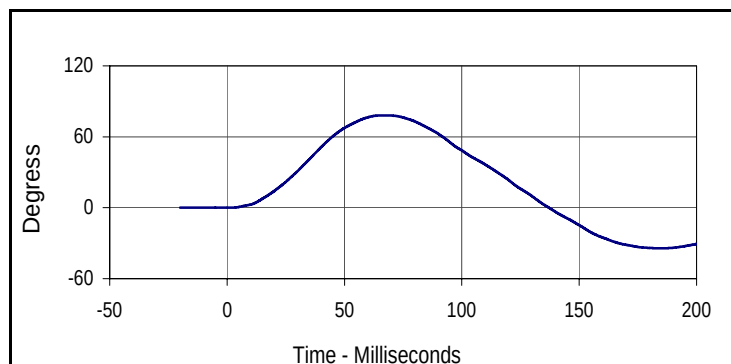
Test Date: 1/25/12
 Test I.D.: 299NB030



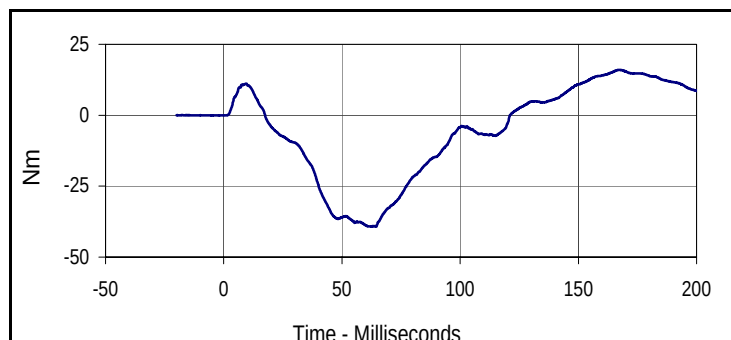
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	320	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	35.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.4	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	32.7	Pass
Pendulum Velocity		m/s	5.51 to 5.63	5.59	Pass
Pendulum Deceleration	10 msec	m/s	-2.20 to -2.80	-2.46	Pass
	15 msec	m/s	-3.30 to -4.10	-3.65	Pass
	20 msec	m/s	-4.40 to -5.40	-4.80	Pass
	25 msec	m/s	-5.40 to -6.10	-5.61	Pass
	25-100 msec	m/s	-5.50 to -6.20	-5.91	Pass
D-Plane Rotation	Max	Degrees	71 to 81	78.1	Pass
	Time	msec	50 to 70	65.7	Pass
Peak Occipital Condyle Moment		Nm	-36 to -44	-39.3	Pass
Decaying Moment Time to Cross 0 Nm		msec	102 to 126	121.1	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
0.0	-0.6	-5.9	34.7



Curve Description			
Maximum Translation Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degress
Max	Time	Min	Time
78.1	65.7	-34.3	184.7



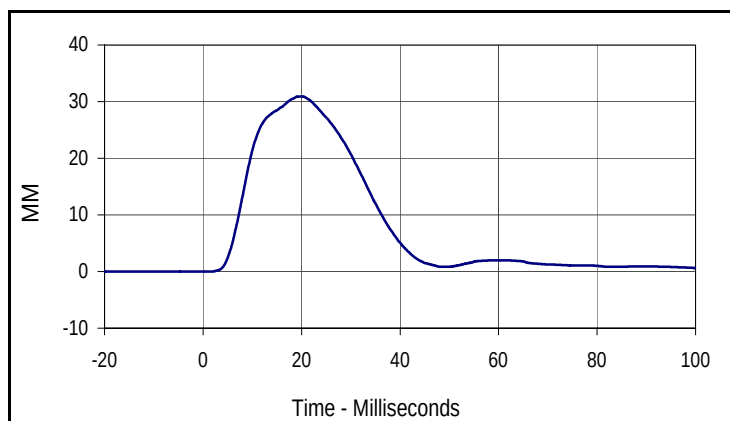
Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
16.0	167.2	-39.3	64.4

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

Test Date: 1/25/12
 Test I.D.: 299SH030



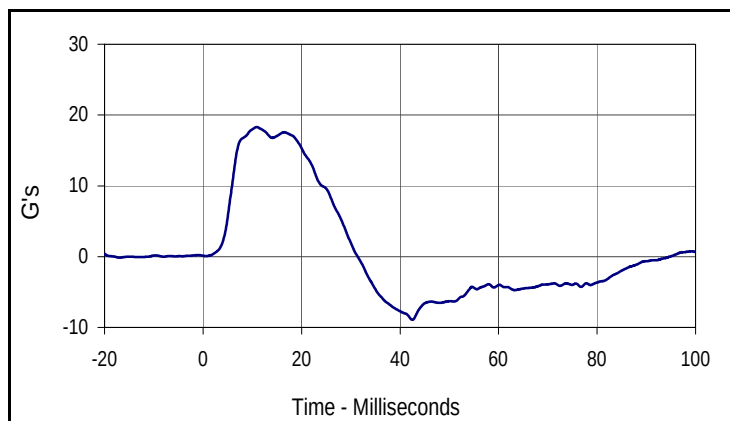
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	350	Pass
Temperature During Soak	Max °C	20.6 to 22.2	21.7	Pass
	Min °C		20.7	Pass
Humidity During Soak	Max %	10.0 to 70.0	35.0	Pass
	Min %		29.0	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	33.7	Pass
Impactor Velocity	m/s	4.20 to 4.40	4.35	Pass
Peak Shoulder Deflection	mm	28 to 37	30.9	Pass
Peak Lateral Spine Acceleration Y	G's	17 to 22	18.3	Pass
Peak Impactor Acceleration	G's	13 to 18	16.2	Pass
Overall Test Results			Pass	



Curve Description

Shoulder Deflection

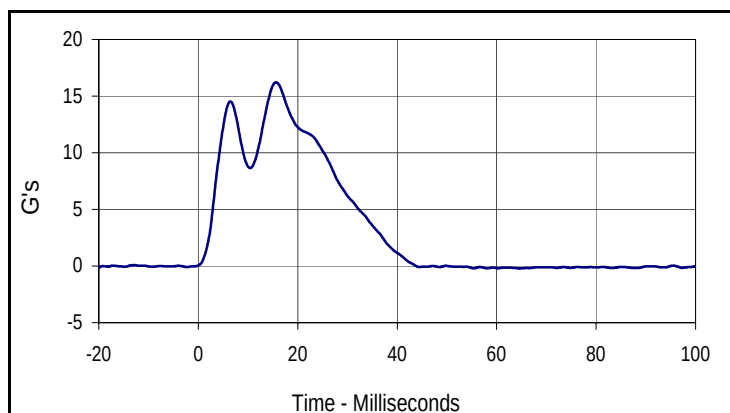
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
30.9	19.6	0.0	-2.6



Curve Description

Upper Spine Y Acceleration

Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
18.3	10.9	-8.9	42.5



Curve Description

Impactor Acceleration

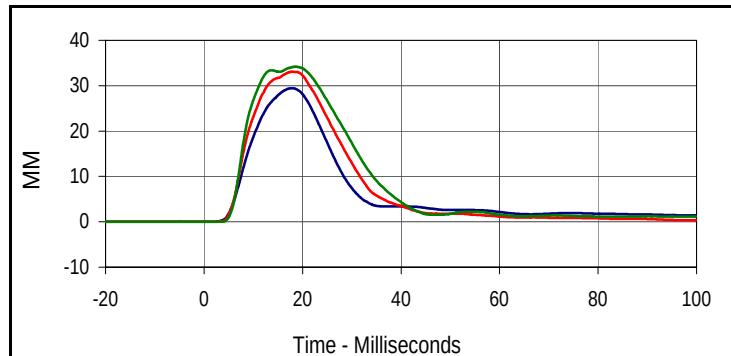
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
16.2	15.6	-0.2	64.7

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

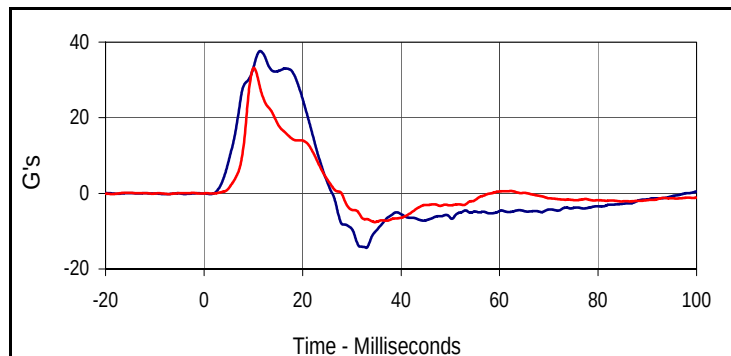
Test Date: 1/25/12
 Test I.D.: 299TWA030



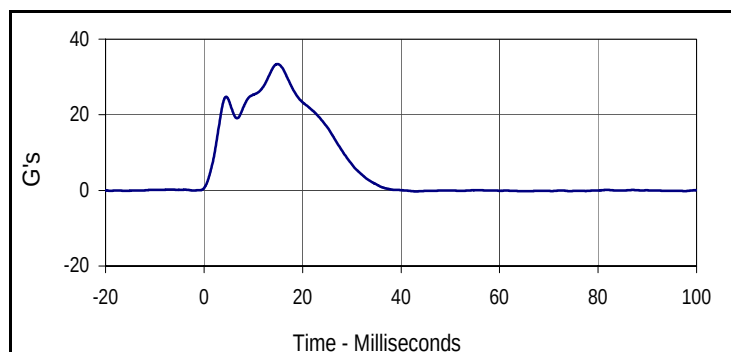
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	360	Pass
Temperature During Soak	Max	20.6 to 22.2	21.7	Pass
	Min		20.7	Pass
Humidity During Soak	Max	10.0 to 70.0	35.0	Pass
	Min		29.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	31.4	Pass
Impactor Velocity	m/s	6.6 to 6.8	6.7	Pass
Peak Shoulder Deflection	mm	31 to 40	36.9	Pass
Peak Upper Thorax Rib Deflection	mm	25 to 32	29.4	Pass
Peak Middle Thorax Rib Deflection	mm	30 to 36	33.1	Pass
Peak Lower Thorax Rib Deflection	mm	32 to 38	34.2	Pass
Peak Upper Spine Y Acceleration	G's	34 to 43	37.6	Pass
Peak Lower Spine Y Acceleration	G's	29 to 37	33.2	Pass
Peak Impactor Acceleration	G's	30 to 36	33.4	Pass
Overall Test Results				Pass



Curve Description			
Upper Thorax Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
29.4	17.8	0.0	-19.0
Middle Thorax Deflection			
Max	Time	Min	Time
33.1	17.9	0.0	-14.9
Lower Thorax Deflection			
Max	Time	Min	Time
34.2	18.6	0.0	-14.3



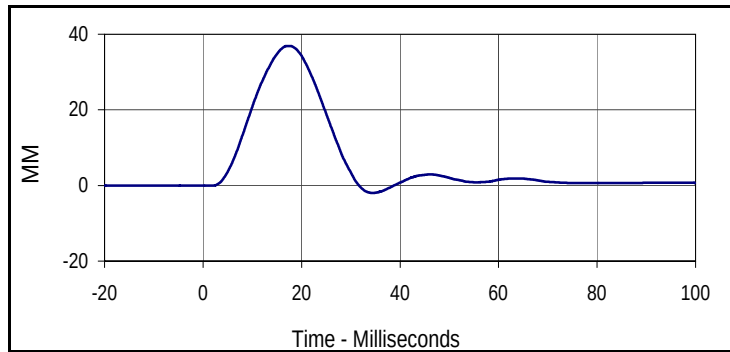
Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
37.6	11.4	-14.4	32.9
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
33.2	10.1	-7.6	34.7



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
33.4	14.9	-0.3	43.0

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

Test Date: 1/25/12
 Test I.D.: 299TWA030



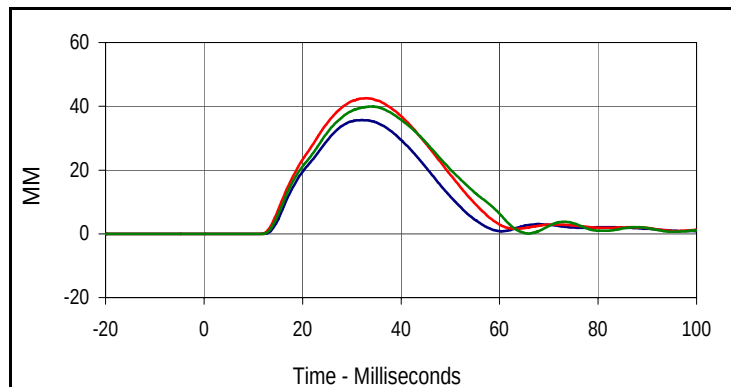
Curve Description			
Shoulder Deflection			
Plot No.	Type	SAE Class	Units
007	FIL	600	MM
Max	Time	Min	Time
36.9	17.6	-2.0	34.5

Test Program: SID IIs Thorax without Arm Impact Test
 ATD Serial No.: 299

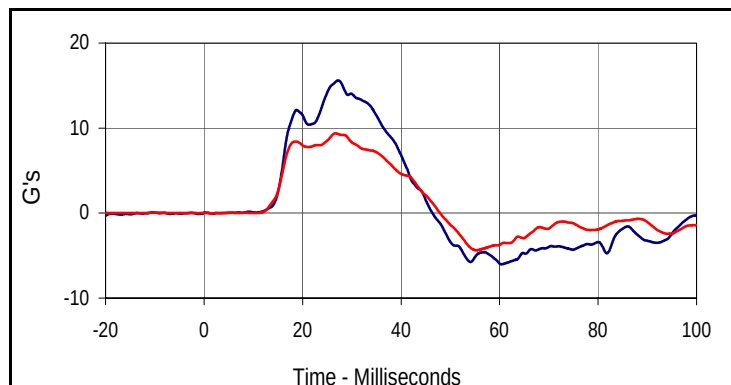
Test Date: 1/25/12
 Test I.D.: 299TWOA030



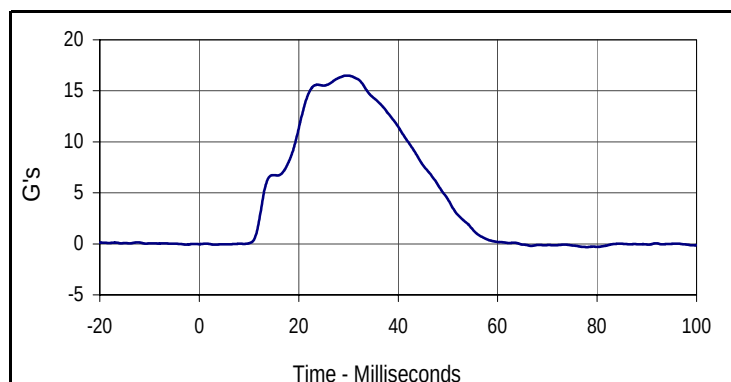
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	400	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	35.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	32.9	Pass
Impactor Velocity		m/s	4.2 to 4.4	4.36	Pass
Peak Upper Thorax Rib Deflection		mm	32 to 40	35.7	Pass
Peak Middle Thorax Rib Deflection		mm	39 to 45	42.5	Pass
Peak Lower Thorax Rib Deflection		mm	35 to 43	39.9	Pass
Peak Upper Spine Y Acceleration		G's	13 to 17	15.6	Pass
Peak Lower Spine Y Acceleration		G's	7 to 11	9.4	Pass
Peak Impactor Acceleration		G's	14 to 18	16.5	Pass
Overall Test Results				Pass	



Curve Description			
Upper Thorax Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
35.7	32.1	0.0	10.0
Middle Thorax Deflection			
Max	Time	Min	Time
42.5	32.9	0.0	9.6
Lower Thorax Deflection			
Max	Time	Min	Time
39.9	34.0	0.0	7.1



Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
15.6	27.3	-6.0	60.4
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
9.4	26.6	-4.4	55.3



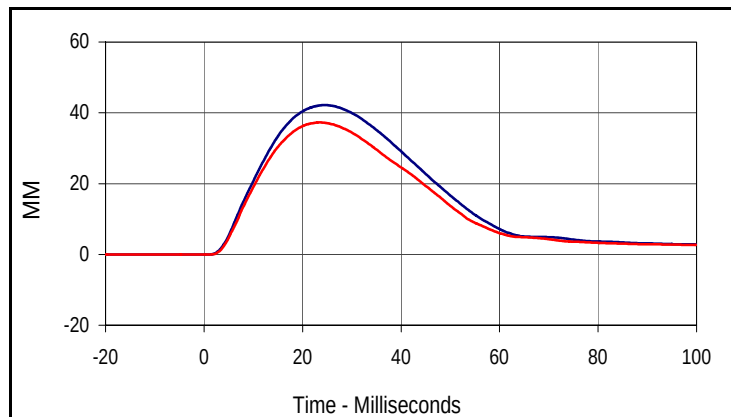
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
16.5	29.6	-0.3	77.9

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

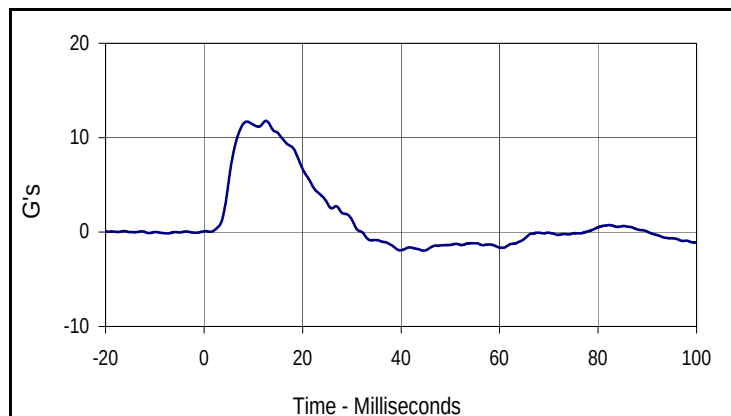
Test Date: 1/25/12
 Test I.D.: 299ABD030



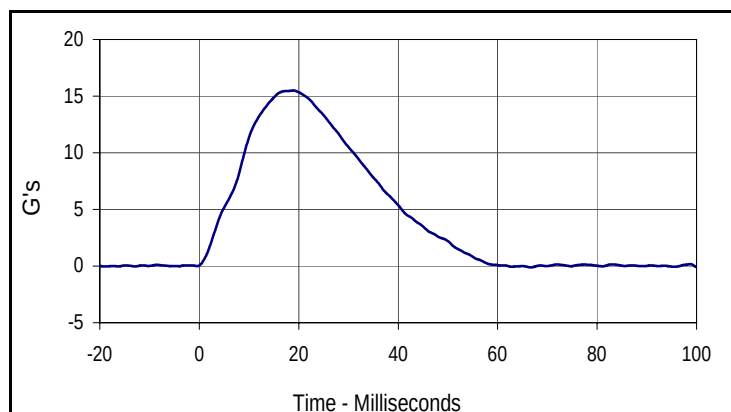
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	420	Pass
Temperature During Soak	Max °C	20.6 to 22.2	21.7	Pass
	Min °C		20.7	Pass
Humidity During Soak	Max %	10.0 to 70.0	35.0	Pass
	Min %		29.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.5	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	33.4	Pass
Impactor Velocity	m/s	4.2 to 4.4	4.3	Pass
Peak Upper Abdominal Rib Deflection	mm	36 to 47	42.2	Pass
Peak Lower Abdominal Rib Deflection	mm	33 to 44	37.3	Pass
Peak Lower Spine Y Acceleration	G's	9 to 14	11.8	Pass
Peak Impactor Acceleration	G's	12 to 16	15.5	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
42.2	24.5	0.0	-20.0
Curve Description			
Lower Abdominal Rib Deflection			
Plot No.	Type	SAE Class	Units
002	FIL	600	MM
Max	Time	Min	Time
37.3	23.3	0.0	-18.9



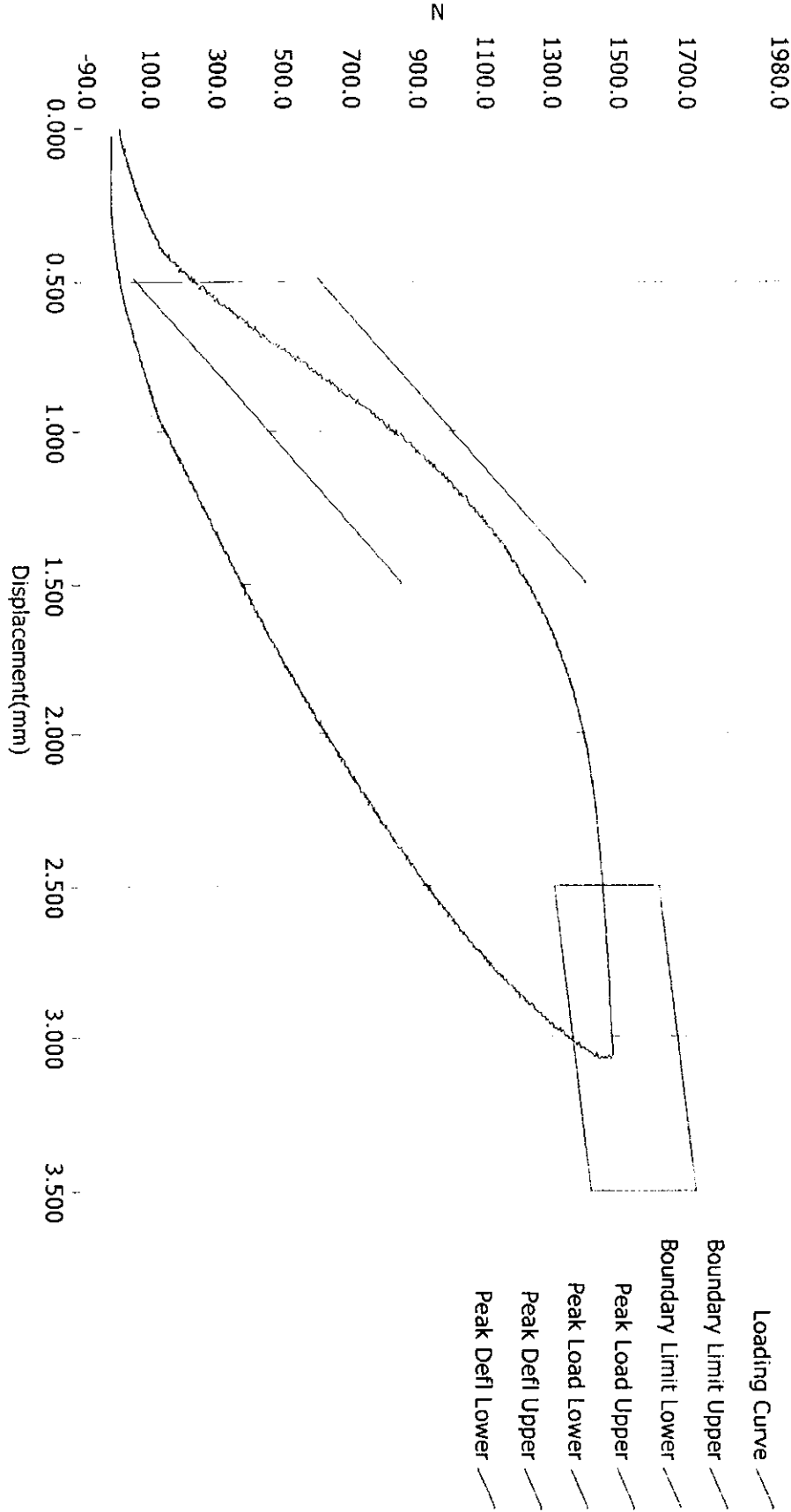
Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
11.8	12.6	-2.4	0.0



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
15.5	18.9	-0.1	66.6

MC0517 PRE TEST

Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
Cert ID	ATD Serial Number	ATD Type	
	36315	SIDIIs	

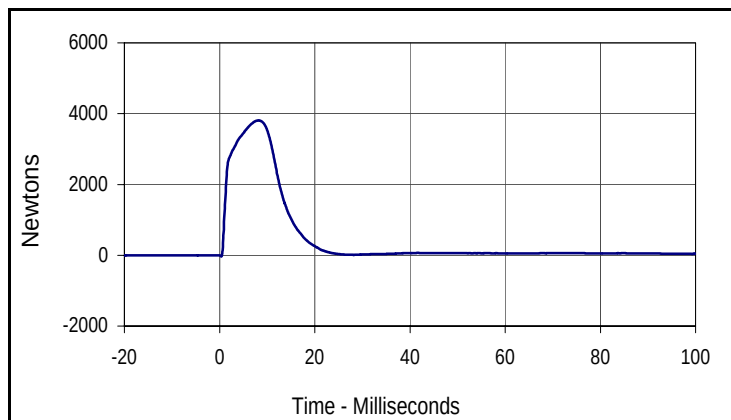
Current Date : 9/22/2010 Current Time : 13:04:54

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

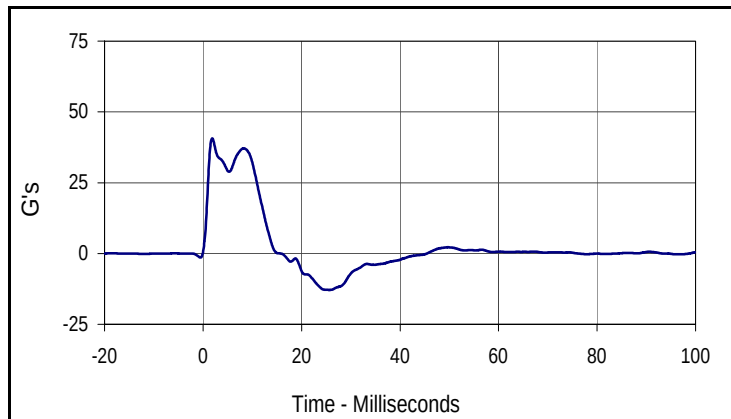
Test Date: 1/25/12
 Test I.D.: 299ACET030



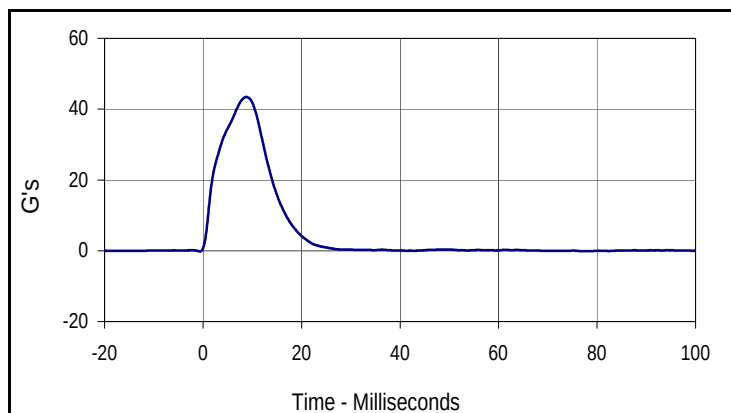
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	450	Pass
Temperature During Soak	Max	20.6 to 22.2	21.7	Pass
	Min		20.7	Pass
Humidity During Soak	Max	10.0 to 70.0	35.0	Pass
	Min		29.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.3	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	32.9	Pass
Impactor Velocity	m/s	6.6 to 6.8	6.7	Pass
Peak Acetabulum Force Y	Newtons	3600 to 4300	3809.1	Pass
Peak Pelvis Y Acceleration After 6 msec.	G's	34 to 42	37.1	Pass
Peak Impactor Acceleration	G's	38 to 47	43.4	Pass
Overall Test Results			Pass	



Curve Description			
Pelvis Acetabulum Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
3809.1	8.2	-33.7	0.4



Curve Description			
Pelvis Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
40.6	1.9	-12.9	25.7



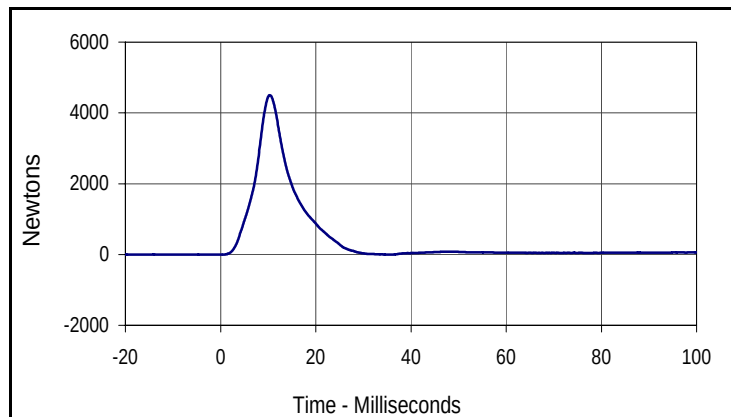
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
43.4	8.8	-0.2	-0.6

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

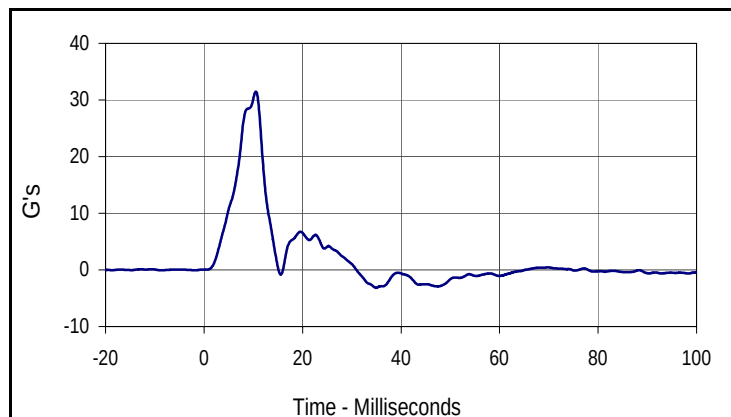
Test Date: 1/25/12
 Test I.D.: 299PL030



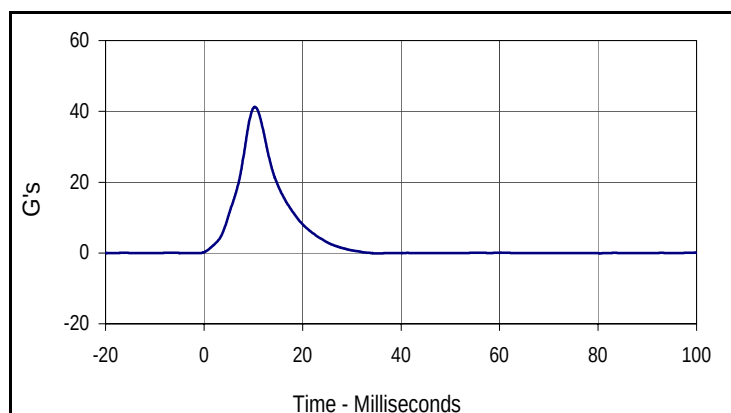
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	450	Pass
Temperature During Soak	Max °C	20.6 to 22.2	21.7	Pass
	Min °C		20.7	Pass
Humidity During Soak	Max %	10.0 to 70.0	35.0	Pass
	Min %		29.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.3	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	32.6	Pass
Impactor Velocity	m/s	4.2 to 4.4	4.3	Pass
Peak Iliac Force	Newtons	4100 to 5100	4503.5	Pass
Peak Pelvis Y Acceleration	G's	28 to 39	31.5	Pass
Peak Impactor Acceleration	G's	36 to 45	41.3	Pass
Overall Test Results				Pass



Curve Description			
Pelvis Iliac Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4503.5	10.3	-2.8	35.8



Curve Description			
Pelvis Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
31.5	10.5	-3.2	34.9



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
41.3	10.3	-0.1	34.9

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

Test Program: SID IIs External Measurements
 ATD Serial No.: 299

Test Date: 1/30/12
 Test I.D.: N/A



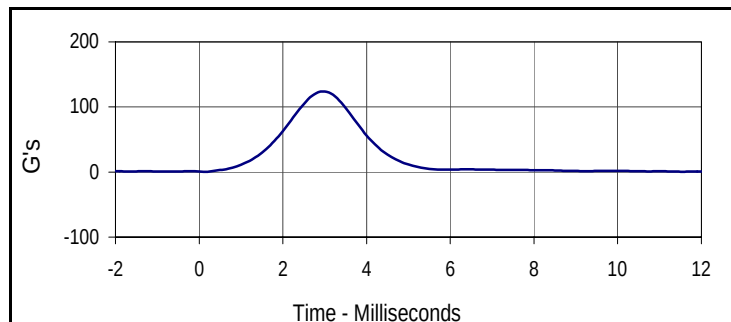
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.6	Pass
Laboratory Relative Humidity		%	10 to 70	33	Pass
A	Sitting Height	mm	772 - 788	779	Pass
B	Shoulder Pivot Height	mm	437 - 453	445	Pass
C	H-Point Height	mm	79 - 89	84	Pass
D	H-Point from Seatback	mm	141 - 151	146	Pass
E	Shoulder Pivot from Backline	mm	97 - 107	102	Pass
F	Thigh Clearance	mm	119 - 135	127	Pass
G	Head Breadth	mm	140 - 148	145	Pass
H	Head Back from Backline	mm	40 - 46	44	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	528	Pass
L	Popliteal Height	mm	343 - 369	356	Pass
M	Knee Pivot to Floor Height	mm	392 - 409	402	Pass
N	Buttock Popliteal Length	mm	416 - 442	429	Pass
O	Chest Depth w/o Jacket	mm	195 - 211	201	Pass
P	Foot Length	mm	216 - 232	220	Pass
Q	Hip Breadth with Pelvic Plug	mm	313 - 323	318	Pass
R	Arm Length	mm	249 - 259	256	Pass
S	Knee Joint to Seatback	mm	477 - 493	485	Pass
V	Shoulder Width	mm	341 - 357	351	Pass
W	Foot Width	mm	78 - 94	92	Pass
Y	Chest Circumference with Jacket	mm	851 - 881	877	Pass
Z	Waist Circumference	mm	760 - 791	773	Pass
Overall Test Results					Pass

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

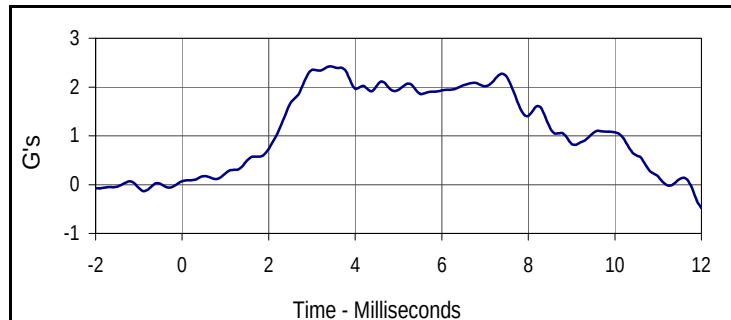
Test Date: 1/30/12
 Test I.D.: 299HD031



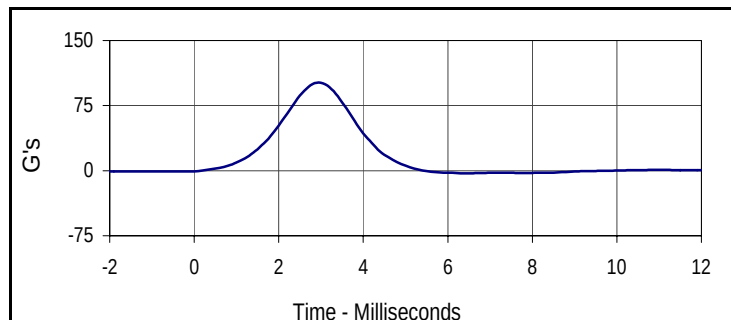
Tested Parameter	Units	Specification	Result	Pass/Fail
Head Assembly Soak Time	Minutes	≥240	250	Pass
Temperature During Soak	Max	18.9 to 25.6	21.7	Pass
	Min		20.7	Pass
Humidity During Soak	Max	10.0 to 70.0	34.0	Pass
	Min		28.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.3	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	31.8	Pass
Peak Head Resultant Acceleration	G's	115 to 137	124.0	Pass
Peak Head X Acceleration	G's	<15	2.4	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	9.3	Pass
Overall Test Results				Pass



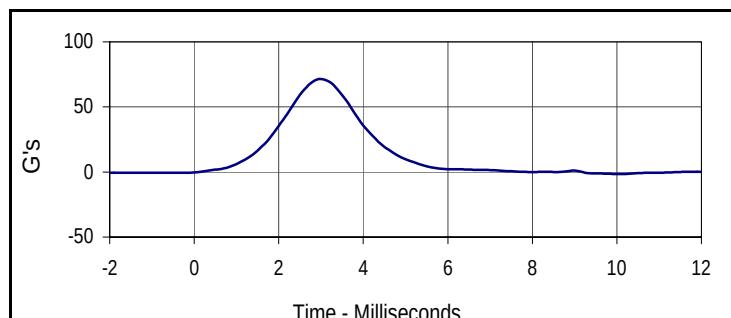
Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
124.0	3.0	0.5	0.2



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
2.4	3.4	-0.1	-0.9



Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
101.3	3.0	-3.0	6.5



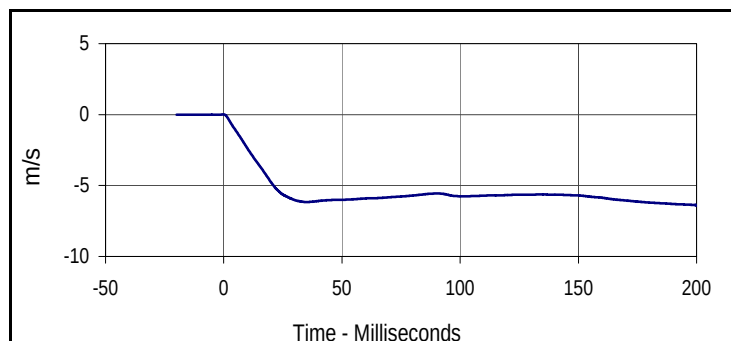
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
71.4	3.0	-1.6	10.0

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

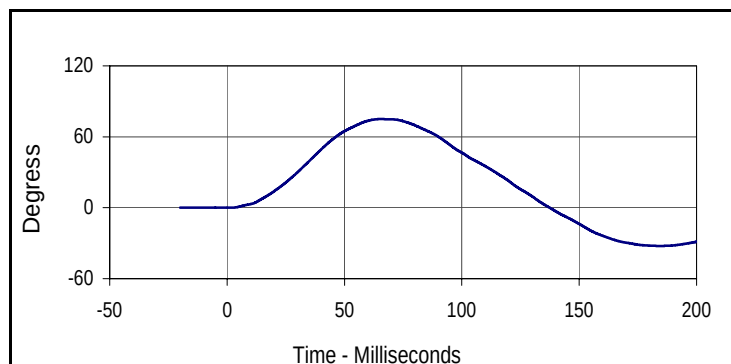
Test Date: 1/30/12
 Test I.D.: 299NB031



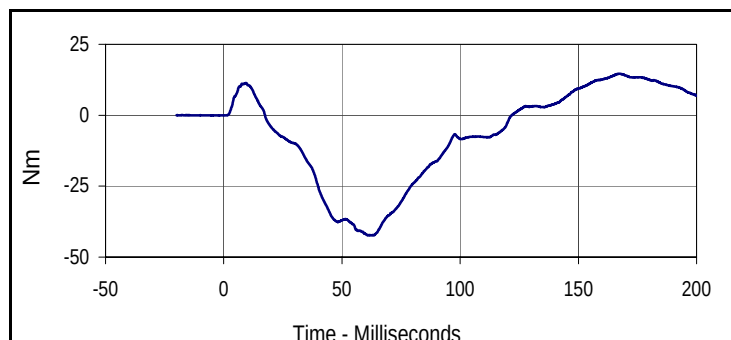
Tested Parameter	Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time	Minutes	≥240	300	Pass
Temperature During Soak	Max	20.6 to 22.2	21.7	Pass
	Min		20.7	Pass
Humidity During Soak	Max	10.0 to 70.0	34.0	Pass
	Min		28.0	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	20.8	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	31.2	Pass
Pendulum Velocity	m/s	5.51 to 5.63	5.60	Pass
Pendulum Deceleration	10 msec	-2.20 to -2.80	-2.38	Pass
	15 msec	-3.30 to -4.10	-3.56	Pass
	20 msec	-4.40 to -5.40	-4.77	Pass
	25 msec	-5.40 to -6.10	-5.64	Pass
	25-100 msec	-5.50 to -6.20	-6.16	Pass
D-Plane Rotation	Max	71 to 81	75.0	Pass
	Time	50 to 70	65.4	Pass
Peak Occipital Condyle Moment	Nm	-36 to -44	-42.4	Pass
Decaying Moment Time to Cross 0 Nm	msec	102 to 126	121.9	Pass
Overall Test Results			Pass	



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
0.0	-0.3	-6.4	200.0



Curve Description			
Maximum Translation Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degress
Max	Time	Min	Time
75.0	65.4	-32.3	184.5



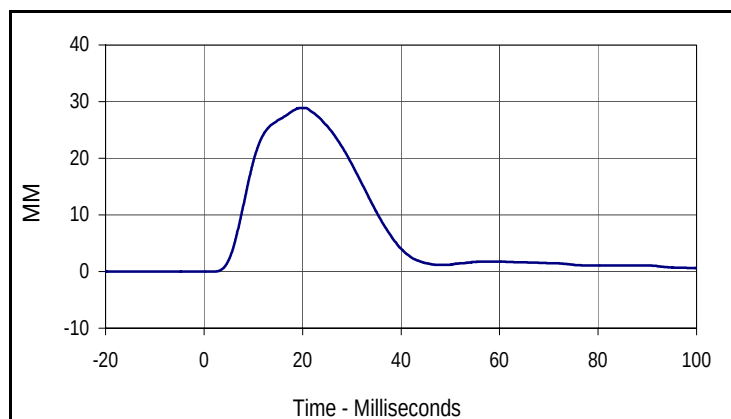
Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
14.6	167.2	-42.4	62.5

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

Test Date: 1/30/12
 Test I.D.: 299SH031



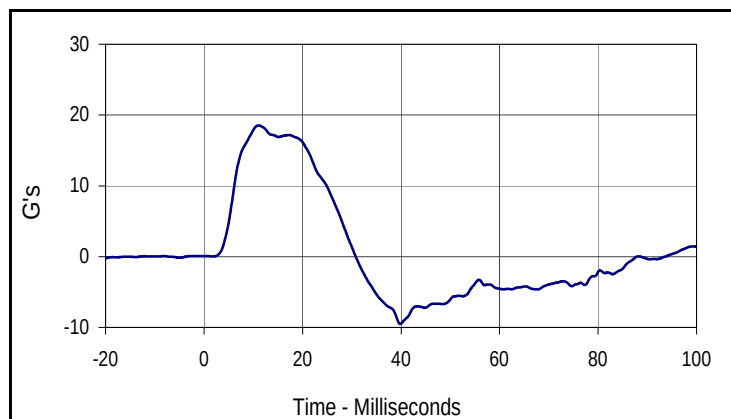
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	320	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.1	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	32.6	Pass
Impactor Velocity		m/s	4.20 to 4.40	4.28	Pass
Peak Shoulder Deflection		mm	28 to 37	28.9	Pass
Peak Lateral Spine Acceleration Y		G's	17 to 22	18.5	Pass
Peak Impactor Acceleration		G's	13 to 18	15.6	Pass
Overall Test Results				Pass	



Curve Description

Shoulder Deflection

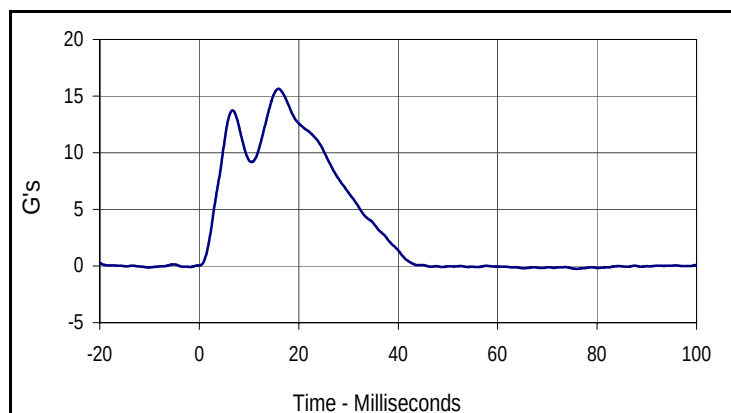
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
28.9	20.4	0.0	-3.2



Curve Description

Upper Spine Y Acceleration

Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
18.5	11.0	-9.5	39.8



Curve Description

Impactor Acceleration

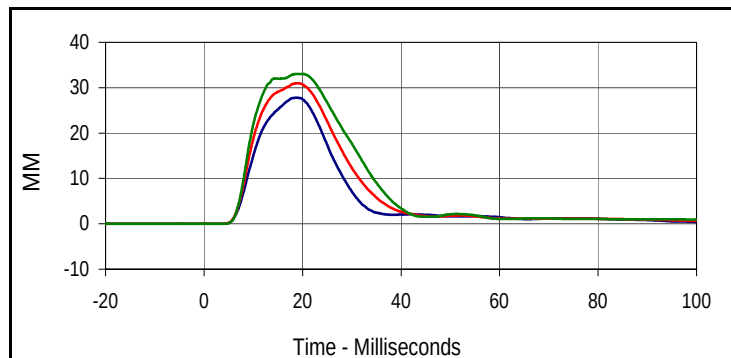
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
15.6	15.9	-0.2	76.0

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

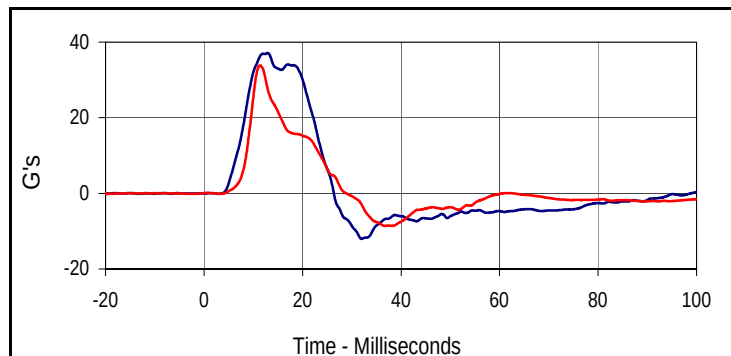
Test Date: 1/30/12
 Test I.D.: 299TWA031



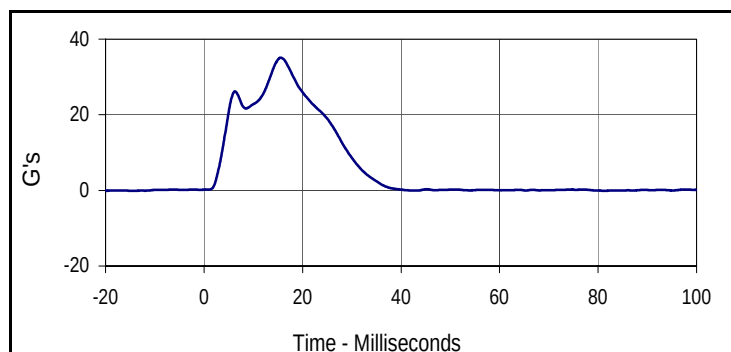
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	350	Pass
Temperature During Soak	Max	20.6 to 22.2	21.7	Pass
	Min		20.7	Pass
Humidity During Soak	Max	10.0 to 70.0	34.0	Pass
	Min		28.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.4	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	28.6	Pass
Impactor Velocity	m/s	6.6 to 6.8	6.7	Pass
Peak Shoulder Deflection	mm	31 to 40	36.2	Pass
Peak Upper Thorax Rib Deflection	mm	25 to 32	27.8	Pass
Peak Middle Thorax Rib Deflection	mm	30 to 36	31.0	Pass
Peak Lower Thorax Rib Deflection	mm	32 to 38	33.0	Pass
Peak Upper Spine Y Acceleration	G's	34 to 43	37.1	Pass
Peak Lower Spine Y Acceleration	G's	29 to 37	33.8	Pass
Peak Impactor Acceleration	G's	30 to 36	35.1	Pass
Overall Test Results			Pass	



Curve Description			
Upper Thorax Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
27.8	18.8	0.0	-20.0
Middle Thorax Deflection			
Max	Time	Min	Time
31.0	19.0	0.0	-11.1
Lower Thorax Deflection			
Max	Time	Min	Time
33.0	18.7	0.0	3.9



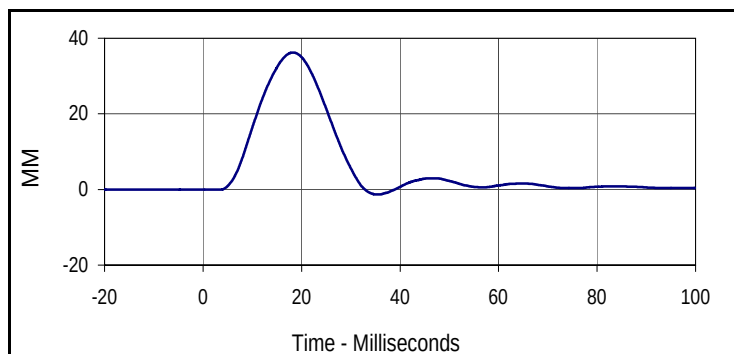
Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
37.1	12.9	-12.0	32.0
Lower Spine Y Acceleration			
Max	Time	Min	Time
33.8	11.4	-8.6	36.7



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
35.1	15.6	-0.1	-20.0

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

Test Date: 1/30/12
 Test I.D.: 299TWA031



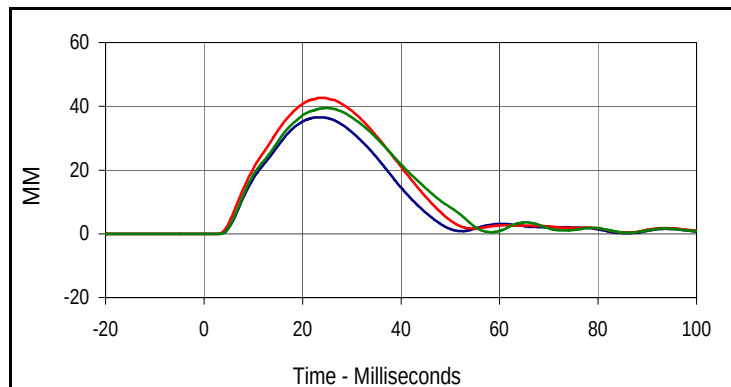
Curve Description			
Shoulder Deflection			
Plot No.	Type	SAE Class	Units
007	FIL	600	MM
Max	Time	Min	Time
36.2	18.2	-1.3	35.3

Test Program: SID IIs Thorax without Arm Impact Test
 ATD Serial No.: 299

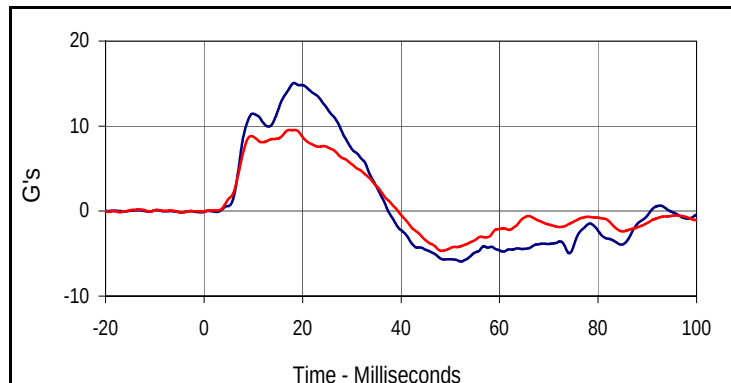
Test Date: 1/30/12
 Test I.D.: 299TWOA031



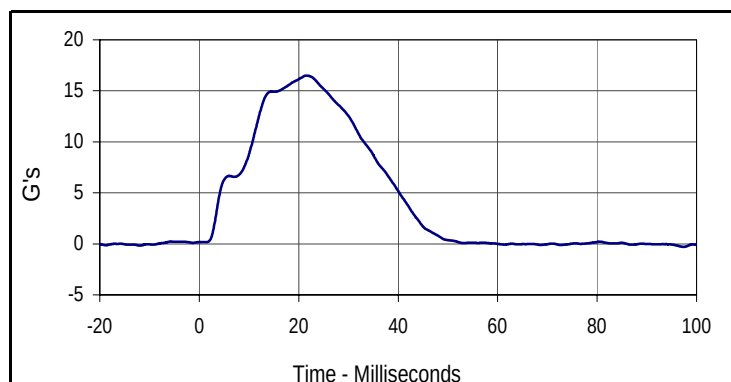
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	380	Pass
Temperature During Soak	Max	18.9 to 25.6	21.7	Pass
	Min		20.7	Pass
Humidity During Soak	Max	10.0 to 70.0	34.0	Pass
	Min		28.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	20.8	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	33.2	Pass
Impactor Velocity	m/s	4.2 to 4.4	4.32	Pass
Peak Upper Thorax Rib Deflection	mm	32 to 40	36.5	Pass
Peak Middle Thorax Rib Deflection	mm	39 to 45	42.7	Pass
Peak Lower Thorax Rib Deflection	mm	35 to 43	39.5	Pass
Peak Upper Spine Y Acceleration	G's	13 to 17	15.1	Pass
Peak Lower Spine Y Acceleration	G's	7 to 11	9.6	Pass
Peak Impactor Acceleration	G's	14 to 18	16.5	Pass
Overall Test Results			Pass	



Curve Description			
Upper Thorax Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
36.5	23.4	0.0	-12.4
Middle Thorax Deflection			
Max	Time	Min	Time
42.7	23.9	0.0	-19.1
Lower Thorax Deflection			
Max	Time	Min	Time
39.5	24.9	0.0	-19.6



Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
15.1	18.3	-5.9	52.2
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
9.6	17.3	-4.7	48.2



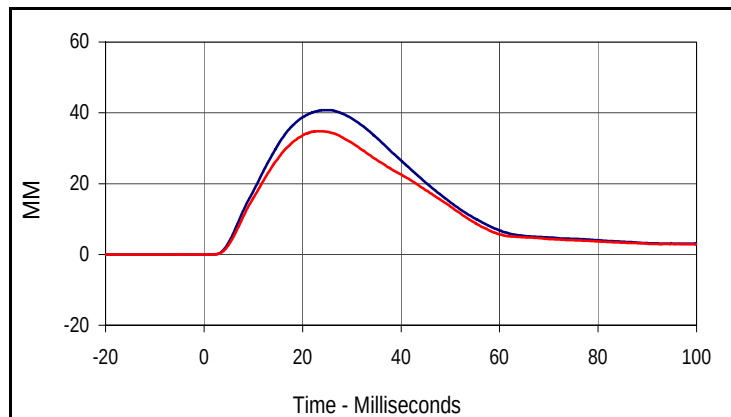
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
16.5	21.5	-0.3	97.5

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

Test Date: 1/30/12
 Test I.D.: 299ABD031

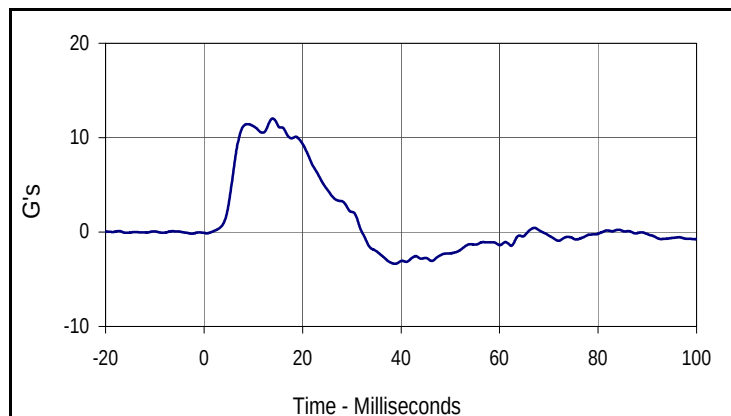


Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	400	Pass
Temperature During Soak	Max	20.6 to 22.2	21.7	Pass
	Min		20.7	Pass
Humidity During Soak	Max	10.0 to 70.0	34.0	Pass
	Min		28.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.3	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	32.9	Pass
Impactor Velocity	m/s	4.2 to 4.4	4.4	Pass
Peak Upper Abdominal Rib Deflection	mm	36 to 47	40.8	Pass
Peak Lower Abdominal Rib Deflection	mm	33 to 44	34.8	Pass
Peak Lower Spine Y Acceleration	G's	9 to 14	12.0	Pass
Peak Impactor Acceleration	G's	12 to 16	15.5	Pass
Overall Test Results			Pass	

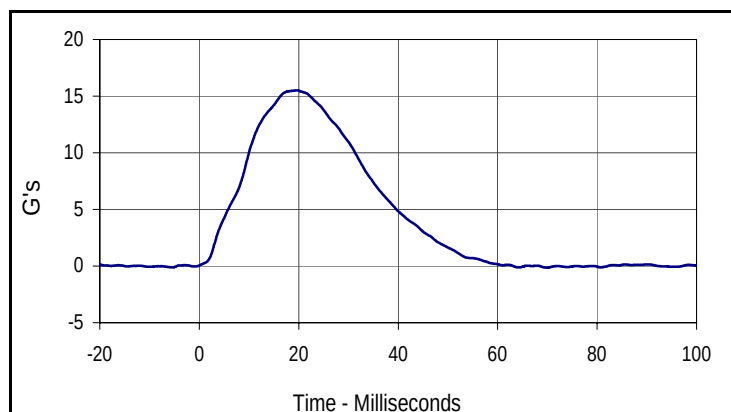


Curve Description			
Upper Abdominal Rib Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
40.8	24.8	0.0	-14.2

Curve Description			
Lower Abdominal Rib Deflection			
Plot No.	Type	SAE Class	Units
002	FIL	600	MM
Max	Time	Min	Time
34.8	22.9	0.0	-7.8



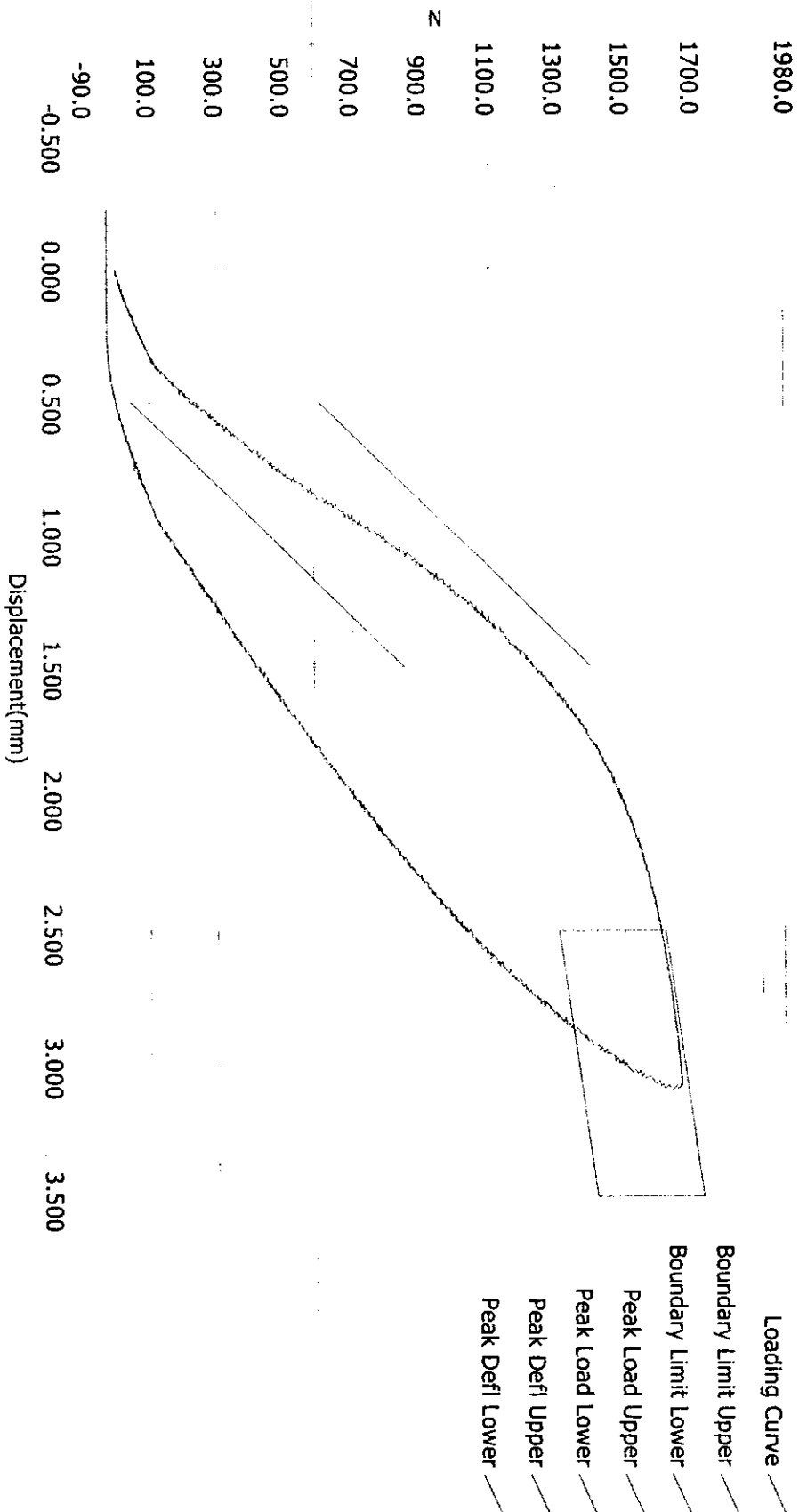
Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
12.0	13.9	-3.4	38.8



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
15.5	19.6	-0.1	69.9

MC0517 POST TEST

Resultant Data - SIDI's Plug Compression



ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
46924	10/6/2011	1:34 AM	
Cert ID	ATD Serial Number	ATD Type	
N/A	SIDI's		

Current Date : 10/6/2011

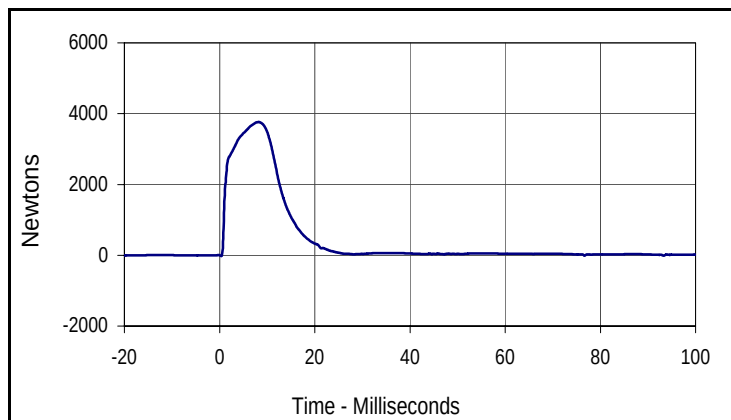
Current Time : 01:35:29

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

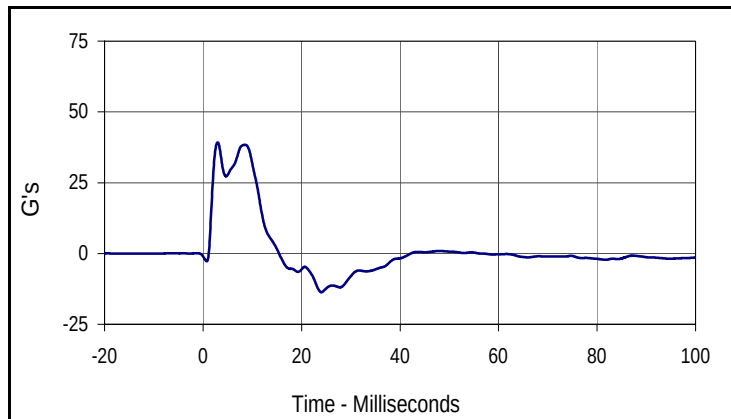
Test Date: 1/30/12
 Test I.D.: 299ACET031



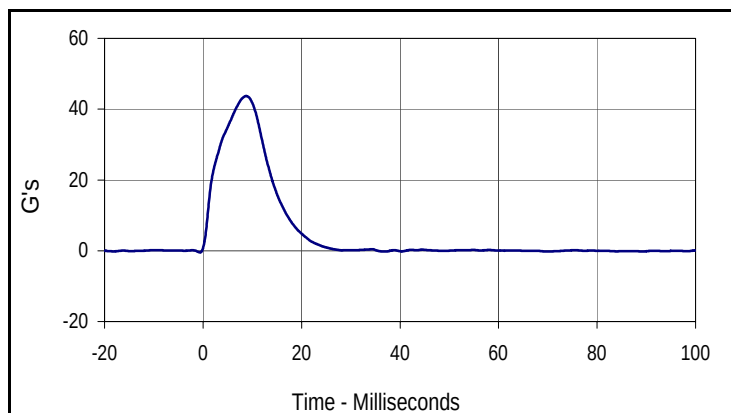
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	410	Pass
Temperature During Soak	Max	20.6 to 22.2	21.7	Pass
	Min		20.7	Pass
Humidity During Soak	Max	10.0 to 70.0	34.0	Pass
	Min		28.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	33.8	Pass
Impactor Velocity	m/s	6.6 to 6.8	6.7	Pass
Peak Acetabulum Force Y	Newtons	3600 to 4300	3764.3	Pass
Peak Pelvis Y Acceleration After 6 msec.	G's	34 to 42	38.4	Pass
Peak Impactor Acceleration	G's	38 to 47	43.7	Pass
Overall Test Results			Pass	



Curve Description			
Pelvis Acetabulum Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
3764.3	8.2	-24.9	0.0



Curve Description			
Pelvis Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
39.2	3.0	-13.6	24.0



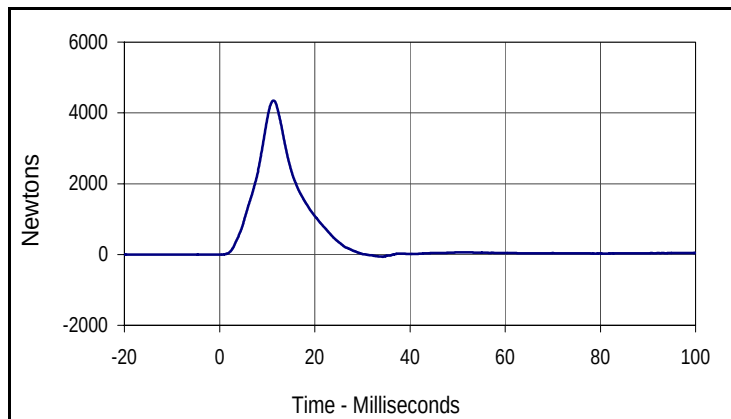
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
43.7	8.8	-0.5	-0.6

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

Test Date: 1/30/12
 Test I.D.: 299PL031



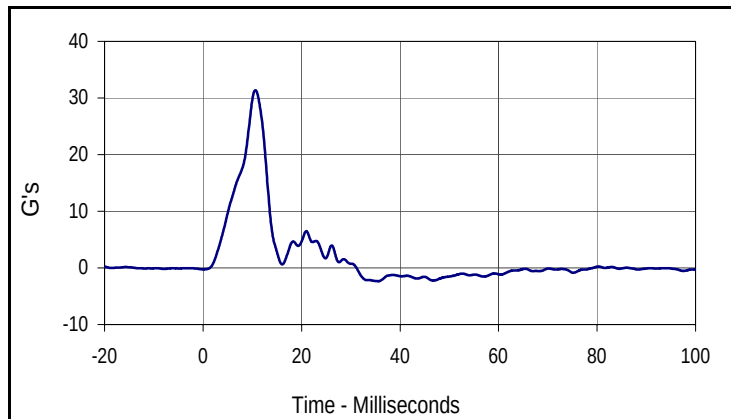
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	470	Pass
Temperature During Soak	Max	20.6 to 22.2	21.7	Pass
	Min		20.7	Pass
Humidity During Soak	Max	10.0 to 70.0	34.0	Pass
	Min		28.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	33.7	Pass
Impactor Velocity	m/s	4.2 to 4.4	4.4	Pass
Peak Iliac Force	Newtons	4100 to 5100	4348.8	Pass
Peak Pelvis Y Acceleration	G's	28 to 39	31.4	Pass
Peak Impactor Acceleration	G's	36 to 45	36.7	Pass
Overall Test Results			Pass	



Curve Description

Pelvis Iliac Force

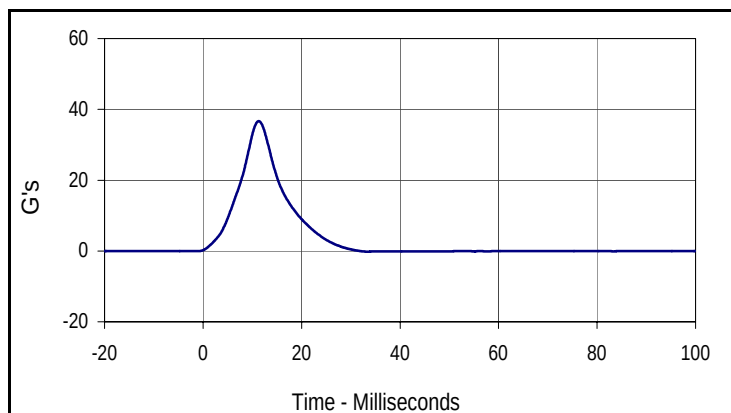
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4348.8	11.3	-61.8	34.3



Curve Description

Pelvis Y Acceleration

Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
31.4	10.6	-2.3	35.6



Curve Description

Impactor Acceleration

Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
36.7	11.3	-0.2	33.3

APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

TABLE 1 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N 299		
				Serial Number	Manufacturer	Calibration
Head Accelerometers			X	P51926	Endevco	8/8/11
			Y	P51929	Endevco	8/8/11
			Z	P51934	Endevco	8/8/11
Displacement Potentiometers	Shoulder		Y	1074	FTSS	8/8/11
	Thoracic Rib	Upper	Y	1143	FTSS	8/8/11
		Middle	Y	1160	FTSS	8/8/11
		Lower	Y	1213	FTSS	8/8/11
	Abdominal Rib	Upper	Y	1218	FTSS	8/8/11
		Lower	Y	1234	FTSS	8/8/11
Lower Spine Accelerometers (T12)			X	P63999	Endevco	8/5/11
			Y	P58872	Endevco	8/4/11
			Z	P58795	Endevco	8/4/11
Acetabulum Load Cell			Y	272	Denton	7/22/11
Iliac Wing Load Cell			Y	284	Denton	7/22/11
Pelvis Plug (Struck Side)				36693	FTSS	9/27/10
Pelvis Plug (Non-Struck Side)				36292	FTSS	9/23/10

TABLE 2 – Vehicle Instrumentation

Vehicle Instrumentation		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	Ketx5a	ICSensor	6/20/11
Vehicle Center of Gravity	Y	Ketx5b	ICSensor	6/20/11
Vehicle Center of Gravity	Z	Ketx5c	ICSensor	6/20/11
Left Floor Sill	Y	EK16J	Endevco	2/3/11
A-Pillar Sill	Y	BE68J	Endevco	1/20/12
A-Pillar Low	Y	J24533	Endevco	4/1/11
A-Pillar Mid	Y	J21776	Endevco	1/11/12
B-Pillar Sill	Y	02I16-A09	Endevco	1/6/12
B-Pillar Low	Y	J36641	Endevco	4/4/11
B-Pillar Mid	Y	BF59J	Endevco	4/29/11
Driver Seat	Y	J21907	Endevco	3/30/11
Engine Top	X	BI60H	Endevco	7/22/11
Engine Top	Y	AR17	Endevco	7/22/11
Firewall	Y	BF83H	Endevco	3/31/11
Right Roof	Y	J24583	Endevco	4/1/11
Right Floor Sill	Y	BJ15H	Endevco	5/6/11
Rear Floorpan	X	Keva201X	Endevco	11/28/11
Rear Floorpan	Y	Keva201Y	Endevco	11/28/11

TABLE 3 – Pole Instrumentation

	Serial Number	Manufacturer	Calibration Date
Load Cell 1	131822A	Interface	8/8/11
Load Cell 2	132304A	Interface	8/8/11
Load Cell 3	19477	Interface	8/8/11
Load Cell 4	19325	Interface	8/8/11
Load Cell 5	131827A	Interface	8/8/11
Load Cell 6	132302A	Interface	8/8/11
Load Cell 7	19267	Interface	8/8/11
Load Cell 8	19321	Interface	8/8/11