

REPORT NUMBER: SPNCAP-KAR-13-024

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

**GENERAL MOTORS LLC
2013 CADILLAC ATS 4-DOOR SEDAN
NHTSA No: MD0109**

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



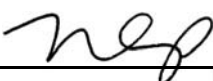
NOVEMBER 21, 2012

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: November 21, 2012

FINAL REPORT ACCEPTANCE BY OCWS:


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

Date: 


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

Date: 

TECHNICAL REPORT DOCUMENTATION PAGE

1. Report No. SPNCAP-KAR-13-024		2. Government Accession No.		3. Recipient's Catalog No.																												
4. Title and Subtitle Final Report of New Car Assessment Program Side Impact Pole Testing of 2013 Cadillac ATS 4-Door Sedan NHTSA No. MD0109				5. Report Date November 21, 2012																												
				6. Performing Organization Code KAR																												
7. Authors Mr. Kelsey A. Chiu, Engineering Department Supervisor, KARCO Mr. Frank Richardson, Program Manager, KARCO				8. Performing Organization Report No. TR-P32002-14-NC																												
9. Performing Organization Name and Address KARCO Engineering, LLC. 9270 Holly Rd. Adelanto, CA 92301				10. Work Unit No.																												
				11. Contract or Grant No. DTNH22-09-D-00122																												
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, Nov. 8 - 21, 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 2013 Cadillac ATS 4-door sedan in accordance with the specifications of the Office of Crash Worthiness 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 November 8, 2012. The impact velocity was 31.75 km/h and the outside ambient temperature at the struck (driver's) side of the vehicle was 18.0 deg. C. The target vehicle's maximum post-test static crush was 352 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>357.7</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td>g</td> <td>82</td> <td>46.0</td> </tr> <tr> <td>Total Pelvic Force (Sum of Acetabular and Iliac Forces)</td> <td>N</td> <td>5525</td> <td>3203</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38</td> <td>40</td> </tr> <tr> <td>Maximum Abdominal Rib Deflection</td> <td>mm</td> <td>45</td> <td>23</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	357.7	Resultant Lower Spine Acceleration	g	82	46.0	Total Pelvic Force (Sum of Acetabular and Iliac Forces)	N	5525	3203	Maximum Thoracic Rib Deflection	mm	38	40	Maximum Abdominal Rib Deflection	mm	45	23
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17. Key Words New Car Assessment Program (NCAP) Side Impact Pole Part 572V SID-IIs				18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Admin. Technical Information Services Division, NPO-411 1200 New Jersey Ave., SE Room W43-410 Washington, DC 20590 e-mail: tis@nhtsa.dot.gov FAX: 202-493-2833																												
19. Security Classification of this report UNCLASSIFIED		20. Security Classification of this page UNCLASSIFIED		21. No. of Pages 101																												
				22. Price																												

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SECTION 1

TEST PURPOSE AND PROCEDURE

This side impact test is part of the MY 2013 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 2013 Cadillac ATS 4-door sedan. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated September 2012.

SECTION 2

SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a 2013 Cadillac ATS 4-door sedan. The subject vehicle was towed into the rigid pole at an angle of 74.5° and a velocity of 31.75 km/h. The test was conducted by KARCO Engineering, LLC. in Adelanto, California on November 8, 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 September 2012. 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	357.7
Lower Spine (T12) Resultant Acceleration	g	82	46
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3203
Maximum Thoracic Rib Deflection	mm	38*	40
Maximum Abdominal Rib Deflection	mm	45*	23

*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	Yes	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				

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. The ATD's Thoracic Rib Deflection exceeded its threshold.

SECTION 3

OCCUPANT AND VEHICLE INFORMATION/DATA SHEETS

Test Vehicle: 2013 Cadillac ATS 4-Door Sedan NHTSA No. MD0109
Test Program: NCAP Side Pole Impact Test Test Date: 11/08/12

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: 2013 Cadillac ATS 4-Door Sedan NHTSA No. MD0109
 Test Program: NCAP Side Pole Impact Test Test Date: 11/08/12

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	MD0109
Model Year	2013
Make	Cadillac
Model	ATS
Body Style	4-Door Sedan
VIN	1G6AA5RA0D0116043
Body Color	Radiant Silver Metallic
Odometer Reading (km / mi)	211 / 131
Engine Displacement (L)	2.5
Type / No. of Cylinders	Inline 4
Engine Placement	Longitudinal
Transmission Type	Automatic
Transmission Speeds	6
Overdrive	Yes
Final Drive	Rear
Roof Rack	No
Sunroof / T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes
Anti-Lock Brakes (ABS)	Yes

Traction Control System (TCS)	Yes
Auto-Leveling System	No
Automatic Door Locks (ADL)	Yes
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	Yes
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?

Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	General Motors LLC
Date of Manufacture	Sep-12
Vehicle Type	Passenger Car

GVWR (kg)	1915
GAWR Front (kg)	851
GAWR Rear (kg)	1064

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity	2	3		5	
Capacity Weight (VCW) (kg)				396.0	A
DSC x 68.04 (kg)				340.2	B
Cargo Weight (RCLW) (kg)				55.8	A-B

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							

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2013 Cadillac ATS 4-Door Sedan NHTSA No. MD0109
 Test Program: NCAP Side Pole Impact Test Test Date: 11/08/12

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	290	290	290	290
Tire Placard	kPa	220	220	240	240
Owner's Manual	kPa	220	220	240	240
As Tested	kPa	220	220	240	240

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	393.0	382.0		415.0	413.0		407.0	430.0	
Right	kg	372.0	369.5		387.0	397.5		373.0	411.5	
Ratio	%	50.4%	49.6%	100.0%	49.7%	50.3%	100.0%	48.1%	51.9%	100.0%
Total	kg	765.0	751.5	1516.5	802.0	810.5	1612.5	780.0	841.5	1621.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1516.5	A
Actual Weight of 1 P572 O ATD Used	kg	49.0	B
Rated Cargo/Luggage Wt (RCLW)	kg	55.8	C
Calculated Vehicle Target Wt (TVTW)	kg	1621.3	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)
Non-Struck Side Outboard Mirror	1.5
Non-Struck Side Door Panels	8.0
Trunk Trim	4.5
Non-Struck Side Rear Door Windows	3.5
Rear Bumper Cover	7.5
Ballast / Equipment Added	81.5

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

Test Vehicle: 2013 Cadillac ATS 4-Door Sedan NHTSA No. MD0109
Test Program: NCAP Side Pole Impact Test Test Date: 11/08/12

TEST VEHICLE ATTITUDE AND CG

Measurement Description	Units	As Delivered	As Tested	Fully Loaded	Meets Requirement***
Driver Door Sill Angle (front-to-rear)*	°	0.0	0.0	0.1	Yes
Front Passenger Sill Angle (front-to-rear)*	°	0.1	0.0	-0.1	Yes
Front Bumper-Line Angle (left-to-right)**	°	-0.3	-0.3	-0.6	Yes
Rear Bumper-Line Angle (left-to-right)**	°	0.0	-0.2	-0.2	Yes
Vehicle CG (Aft of Front Axle)	mm	1377	1397	1442	
Vehicle CG (Left (+)/Right (-) from Longitudinal Centerline)	mm	17	21	25	

*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: 2013 Cadillac ATS 4-Door Sedan NHTSA No. MD0109
 Test Program: NCAP Side Pole Impact Test Test Date: 11/08/12

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	4.6	0.0	2.3
Front Passenger Seat	4.4	0.0	2.2
Front Center Seat			
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed

SEAT 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	2.3	497	Max	471	484	497
			Mid	471	484	497
			Min	471	484	497
Front Passenger Seat	2.2	446	Max	422	434	446
			Mid	422	434	446
			Min	422	434	446
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

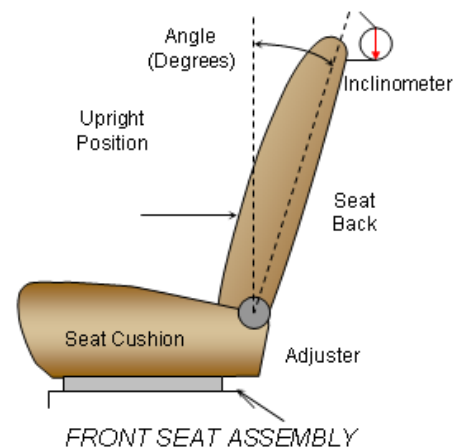
Test Vehicle: 2013 Cadillac ATS 4-Door Sedan NHTSA No. MD0109
 Test Program: NCAP Side Pole Impact Test Test Date: 11/08/12

SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position From Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	243		0	
Front Passenger Seat	242		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	52.3		10.4	
Front Passenger Seat	52.6		10.4	
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	Fixed	Fixed

DATA SHEET NO. 2 ... (CONTINUED)

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

Test Vehicle: 2013 Cadillac ATS 4-Door Sedan NHTSA No. MD0109
Test Program: NCAP Side Pole Impact Test Test Date: 11/08/12

HEAD RESTRAINT ADJUSTMENT

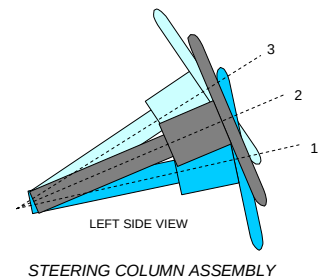
The driver's head restraint is adjusted to the lowest and most full forward in-use position.

	Total No. of Positions	Placed in Position
Driver Seat	4 Horizontal / 5 Vertical	Full Forward / 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	18.0	83
Geometric Center - Position 2	20.0	102
Uppermost - Position 3	22.0	120
Telescoping Steering Wheel Travel		37
Test Position	20.0	102



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

Test Vehicle: 2013 Cadillac ATS 4-Door Sedan NHTSA No. MD0109
Test Program: NCAP Side Pole Impact Test Test Date: 11/08/12

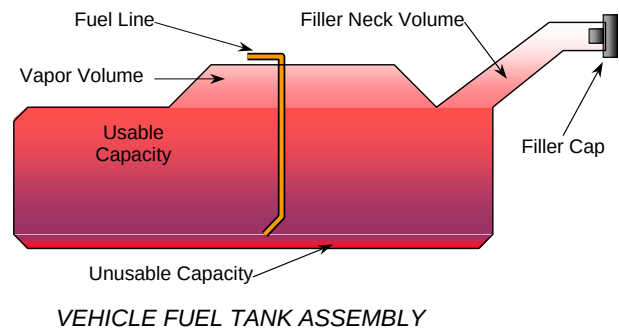
FUEL TANK CAPACITY

Description	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	62.49
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	58.12
Actual amount of Solvent Used in Test	58.12
1/3 of Usable Capacity	20.83

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

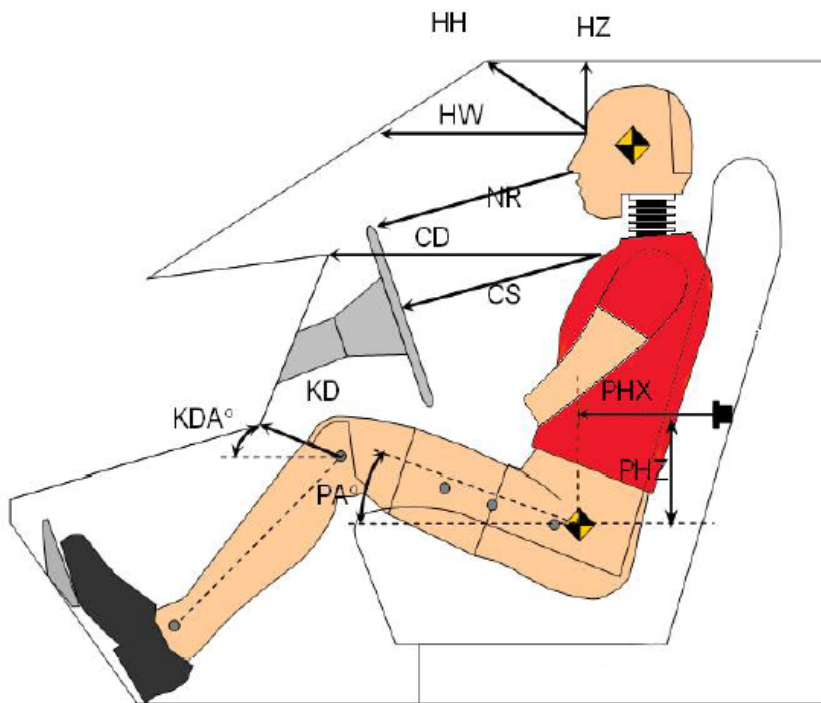
The vehicle is equipped with an electric fuel pump. If the ignition is at the "On" setting and the engine is not running, the fuel pump only operates for a short duration to prime the fuel system. If the engine is running the fuel pump operates continuously.



DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2013 Cadillac ATS 4-Door Sedan NHTSA No. MD0109
 Test Program: NCAP Side Pole Impact Test Test Date: 11/08/12



DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Description	Driver	
		Length (mm)	Angle (°)
HH	Head to Header	265	
HW	Head to Windshield	610	
HZ	Head to Roof	195	
NR	Nose to Rim	244	
CD	Chest to Dash	412	
CS	Chest to Steering Wheel	207	
KD(L)/KDA(L)°	Left Knee to Dash	159	40.5
KD(R)/KDA(R)°	Right Knee to Dash	149	35.2
PAX°	Pelvic Tilt Angle (x-axis)		20.2
PAY°	Pelvic Tilt Angle (y-axis)		0.3
PHX	Hip Point to Striker (x-axis)	251	
PHZ	Hip Point to Striker (z-axis)	169	

DATA SHEET NO. 4

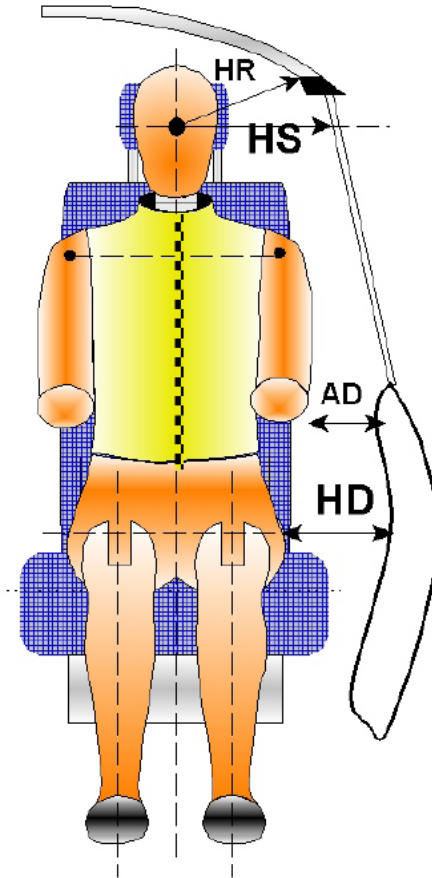
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2013 Cadillac ATS 4-Door Sedan

NHTSA No. MD0109

Test Program: NCAP Side Pole Impact Test

Test Date: 11/08/12



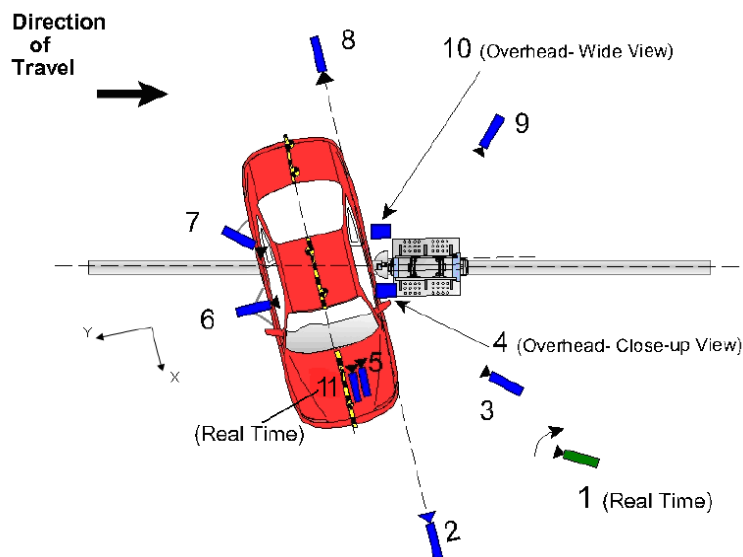
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver
HR	Head to Side Header	mm	229
HS	Head to Side Window	mm	355
AD	Arm to Door	mm	97
HD	H-Point to Door	mm	161

DATA SHEET NO. 5

CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2013 Cadillac ATS 4-Door Sedan NHTSA No. MD0109
 Test Program: NCAP Side Pole Impact Test Test Date: 11/08/12



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	1.25	0.47	-1.35	35	1000
6	On-Board - Dummy Side View	0.06	1.59	-1.11	14	1000
7	On-Board - Dummy Rear Oblique View	-0.93	1.58	-1.14	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	1.36	0.52	-1.37		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

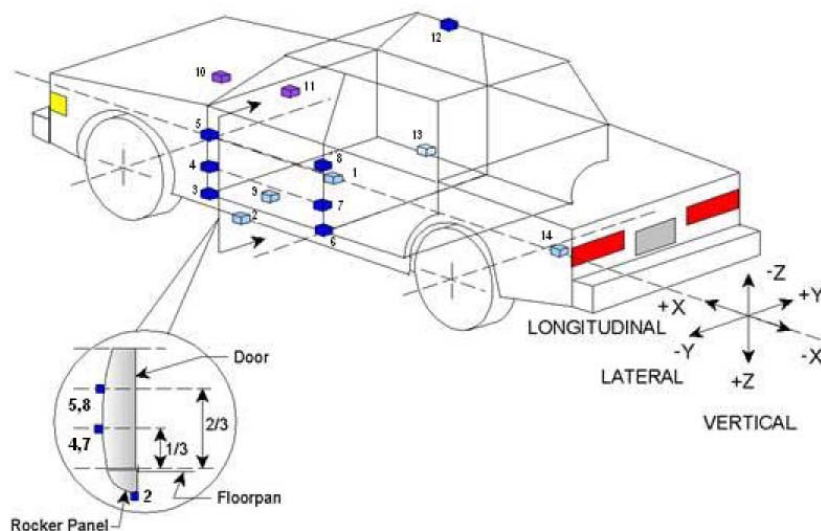
INSTRUMENTATION

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

DATA SHEET NO. 6

TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2013 Cadillac ATS 4-Door Sedan NHTSA No. MD0109
 Test Program: NCAP Side Pole Impact Test Test Date: 11/08/12



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

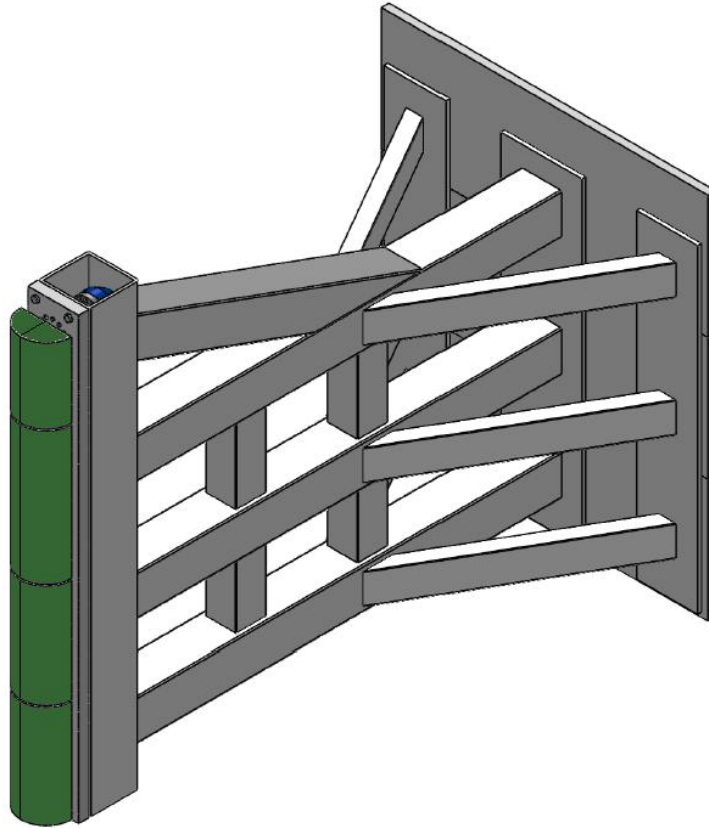
Loc. No.	Sensor Description	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2110	0	-410
2	Left Floor Sill	2560	-760	-190
3	A-Pillar Sill	3300	-790	-410
4	A-Pillar Low	3300	-790	-520
5	A-Pillar Mid	3300	-790	-760
6	B-Pillar Sill	2130	-690	-380
7	B-Pillar Low	2130	-690	-560
8	B-Pillar Mid	2130	-690	-790
9	Driver Seat Track	2570	-600	-320
10	Engine Top	3630	150	-880
11	Firewall	3370	230	-840
12	Right Roof	2230	525	-1380
13	Right Floor Sill	2230	690	-360
14	Rear Floorpan	1170	0	-510

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: 2013 Cadillac ATS 4-Door Sedan NHTSA No. MD0109
Test Program: NCAP Side Pole Impact Test Test Date: 11/08/12



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: 2013 Cadillac ATS 4-Door Sedan NHTSA No. MD0109Test Program: NCAP Side Pole Impact Test Test Date: 11/08/12**TEST DUMMY INFORMATION AND CONTACT POINTS**

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

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: 2013 Cadillac ATS 4-Door Sedan NHTSA No. MD0109
 Test Program: NCAP Side Pole Impact Test Test Date: 11/08/12

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side Driver		Struck Side Rear Passenger	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No	No	
Knee Airbag	Yes	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				

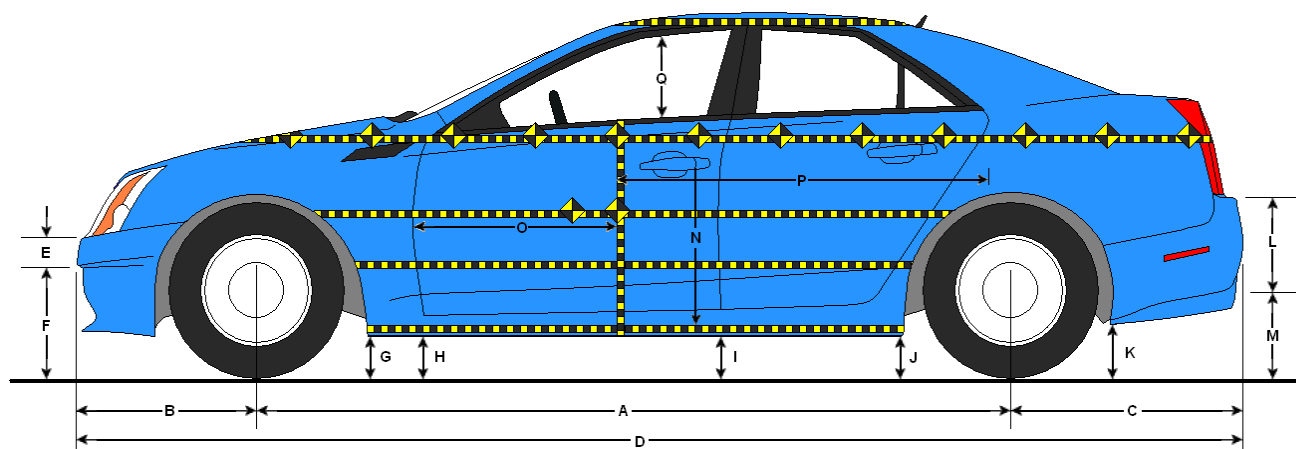
IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vertical Impact Reference Line (Aft of Front Axle)(Intended Impact Point)	mm		1316
Actual Impact Point (Aft of Front Axle)	mm		1319
Horizontal Offset (+ forward / - rearward)	mm	± 38 of Intended Impact Point	-3
Angle Between Vehicle's Longitudinal Centerline and Line of Forward Motion	°	75 ± 3	74.5
Trap No. 1 Velocity (Primary)	km/h	31.4 to 33.0	31.75
Trap No. 2 Velocity (Redundant)	km/h	31.4 to 33.0	31.97

DATA SHEET NO. 9

TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2013 Cadillac ATS 4-Door Sedan NHTSA No. MD0109
 Test Program: NCAP Side Pole Impact Test Test Date: 11/08/12



LEFT SIDE VIEW

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

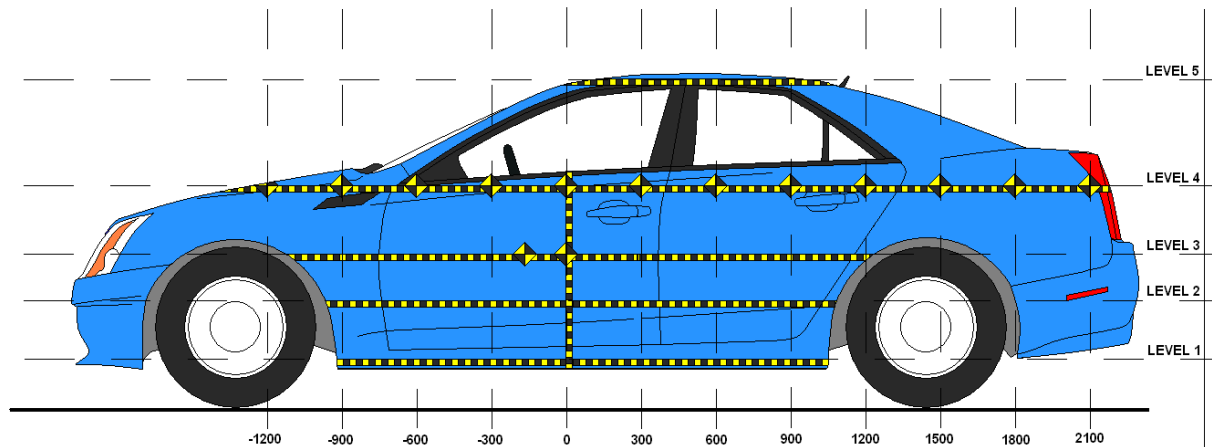
Code	Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2779	2729	-50
B	Front Axle to FSOV	826	823	-3
C	Rear Axle to RSOV	986	1006	20
D	Total Length at Centerline	4583	4559	-24
E	Front Bumper Thickness	149	148	-1
F	Front Bumper Bottom to Ground	357	397	40
G	Sill Height at Front Wheel Well	187	198	11
H	Sill Height at Front Door Leading Edge	207	195	-12
I	Sill Height at B-Pillar	207	209	2
J1	Sill Height at Rear Wheel Well	178	199	21
J2	Pinch Weld Height at Rear Wheel Well	179	193	14
K	Sill Height Aft of Rear Wheel Well	367	386	19
L	Rear Bumper Thickness	104	104	0
M	Rear Bumper Bottom to Ground	416	433	17
N	Sill Height to Bottom of Front Window Sill	573	663	90
O	Front Door Leading Edge to Impact CL	732	660	-72
P	Rear Door Trailing Edge to Impact CL	1491	1407	-84
Q	Front Window Opening	353	406	53
R	Right Side Length	3352	3360	8
S	Left Side Length	3352	3272	-80
T	Vehicle Width at B-Pillar	1747	1652	-95

All measurements in mm with tolerance of ± 3 mm

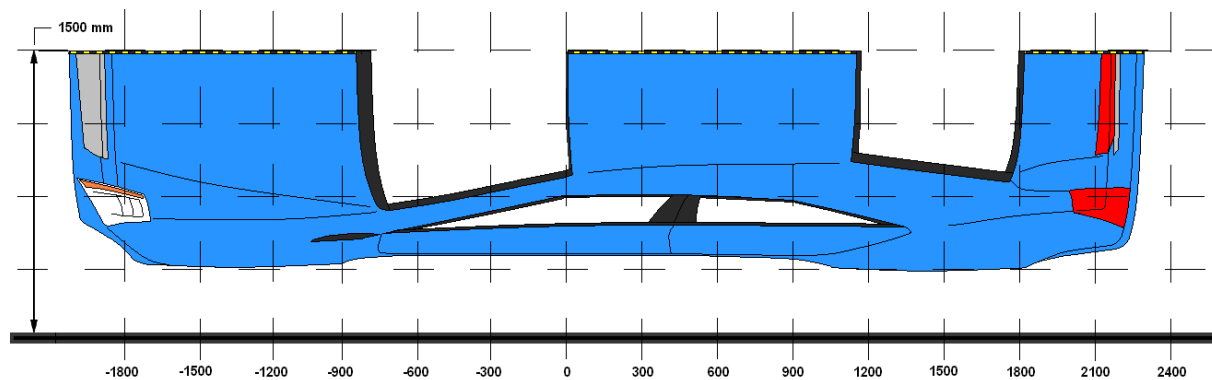
DATA SHEET NO. 10

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2013 Cadillac ATS 4-Door Sedan NHTSA No. MD0109
 Test Program: NCAP Side Pole Impact Test Test Date: 11/08/12



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	243	327	0
2	Occupant H-Point	505	342	0
3	Mid-Door	638	352	0
4	Window Sill	908	302	0
5	Window Top	1354	139	150

DATA SHEET NO. 10 ... (CONTINUED)

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2013 Cadillac ATS 4-Door Sedan NHTSA No. MD0109
 Test Program: NCAP Side Pole Impact Test Test Date: 11/08/12

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	653	627	630	758		696	672	674	780		43	45	44	22	
-750	651	633	632	730		718	684	678	764		67	51	46	34	
-600	650	636	631	711		758	733	716	742		108	97	85	31	
-450	650	636	630	694		804	779	768	765		154	143	138	71	
-300	649	635	629	687		854	830	828	827		205	195	199	140	
-150	647	634	629	684		910	901	907	901		263	267	278	217	
0	647	633	628	680	925	974	975	980	982	1035	327	342	352	302	110
150	646	633	628	679	918	927	944	954	967	1057	281	311	326	288	139
300	645	632	628	677	921	843	823	831	852	1025	198	191	203	175	104
450	646	632	629	676	924	790	763	758	801	1008	144	131	129	125	84
600	645	632	629	674	925	750	735	732	773	989	105	103	103	99	64
750	644	631	630	673	924	714	707	707	745	975	70	76	77	72	51
900	641	627	629	671	922	681	678	682	717	960	40	51	53	46	38
1050	635	616	622	671	922	654	643	649	691	954	19	27	27	20	32
1200			606	647	929			627	641	954			21	-6	25
1350				656	944				625	962				-31	18
1500				688					708					20	
1650				699					715					16	
1800				713					725					12	
1950				732					739					7	
2100				754					757					3	
2250															
2400															
2550															
2700															
2850															

DATA SHEET NO. 10 ... (CONTINUED)

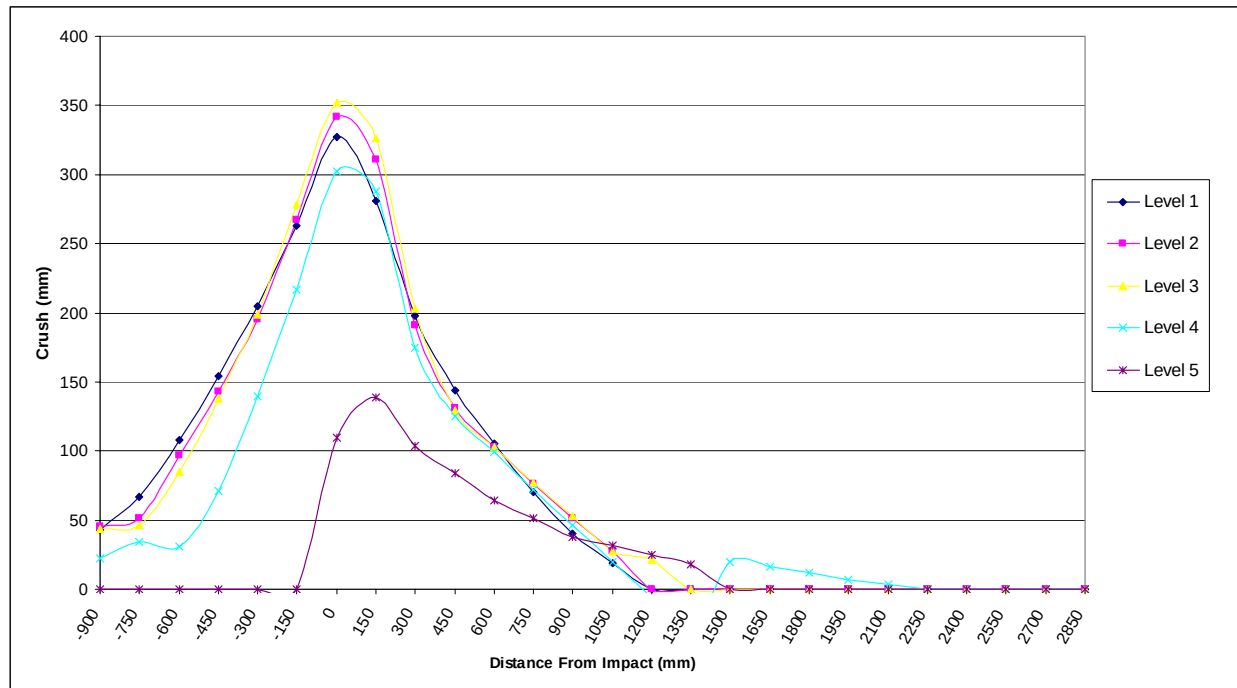
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2013 Cadillac ATS 4-Door Sedan

NHTSA No. MD0109

Test Program: NCAP Side Pole Impact Test

Test Date: 11/08/12

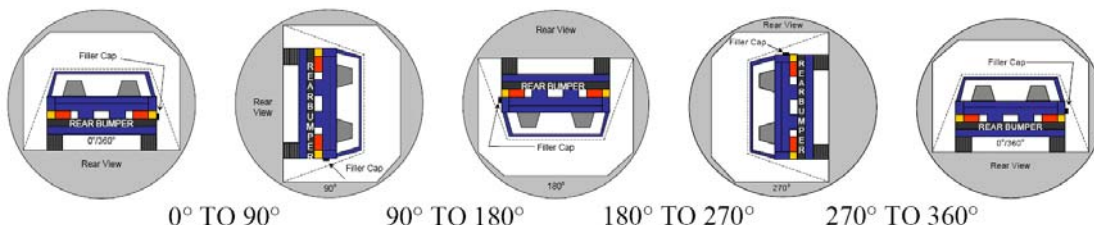


DATA SHEET NO. 11

FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2013 Cadillac ATS 4-Door Sedan NHTSA No. MD0109
 Test Program: NCAP Side Pole Impact Test Test Date: 11/08/12
 Temperature at Time of Impact: 18.0° C Test Time: 12:02 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°	81	300	381
90° To 180°	80	300	380
180° To 270°	82	300	382
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			

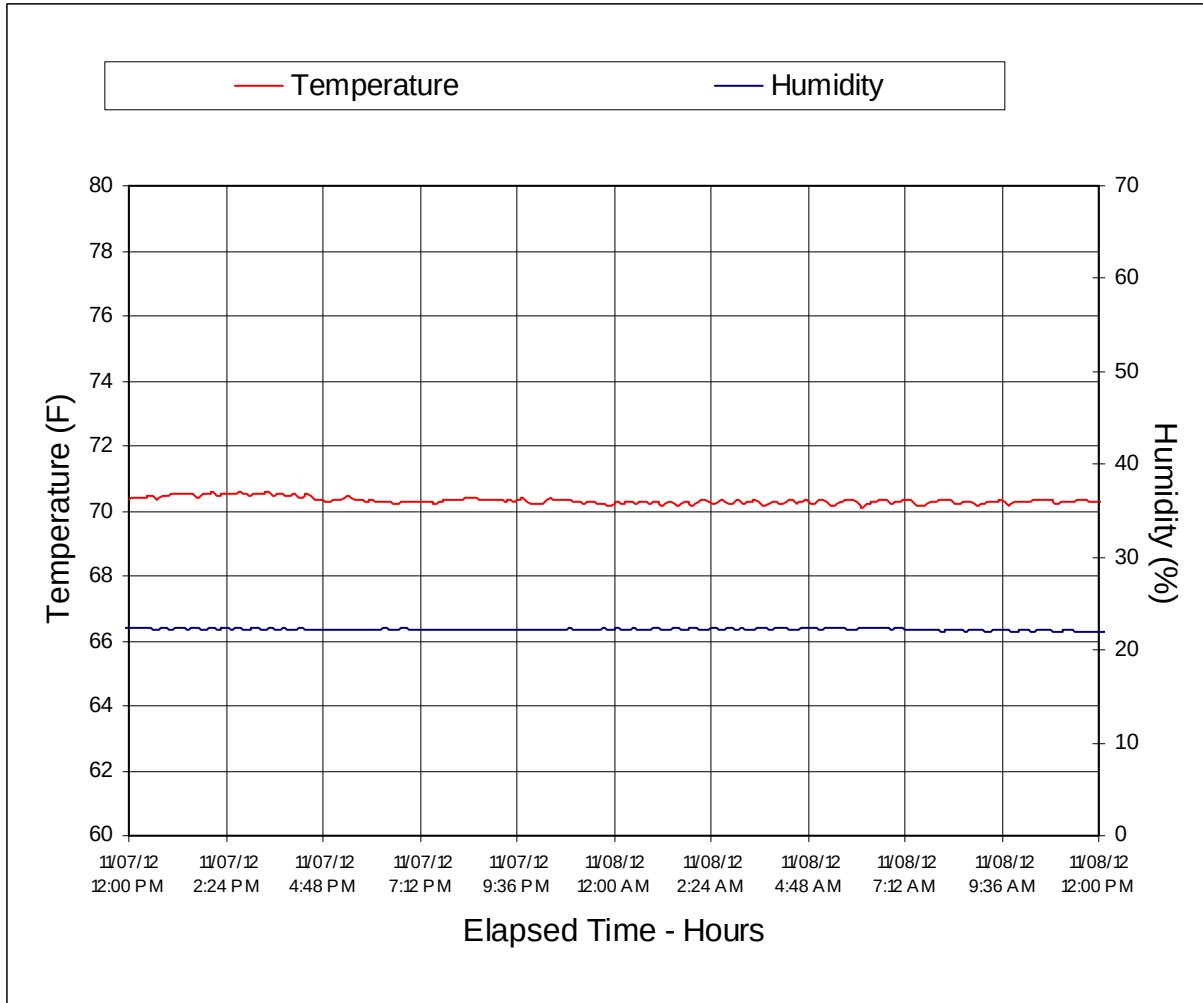
SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0° To 90°	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: 2013 Cadillac ATS 4-Door Sedan NHTSA No. MD0109
Test Program: NCAP Side Pole Impact Test Test Date: 11/08/12



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

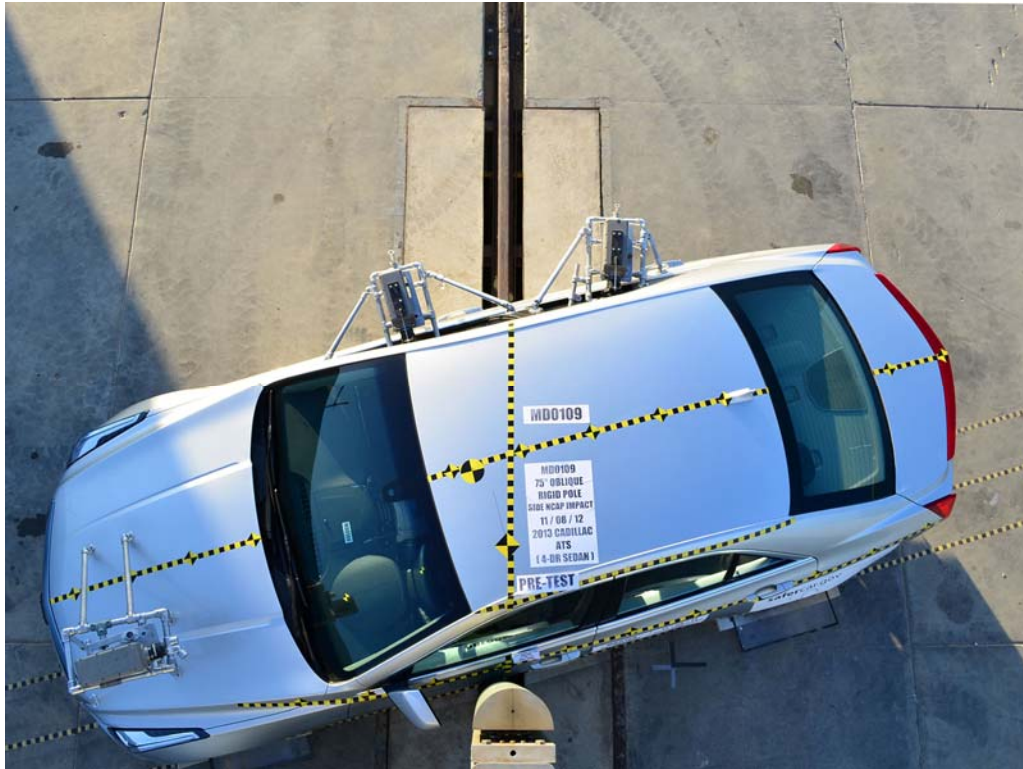


FIGURE 15. Pre-Test Overhead View of Test Area

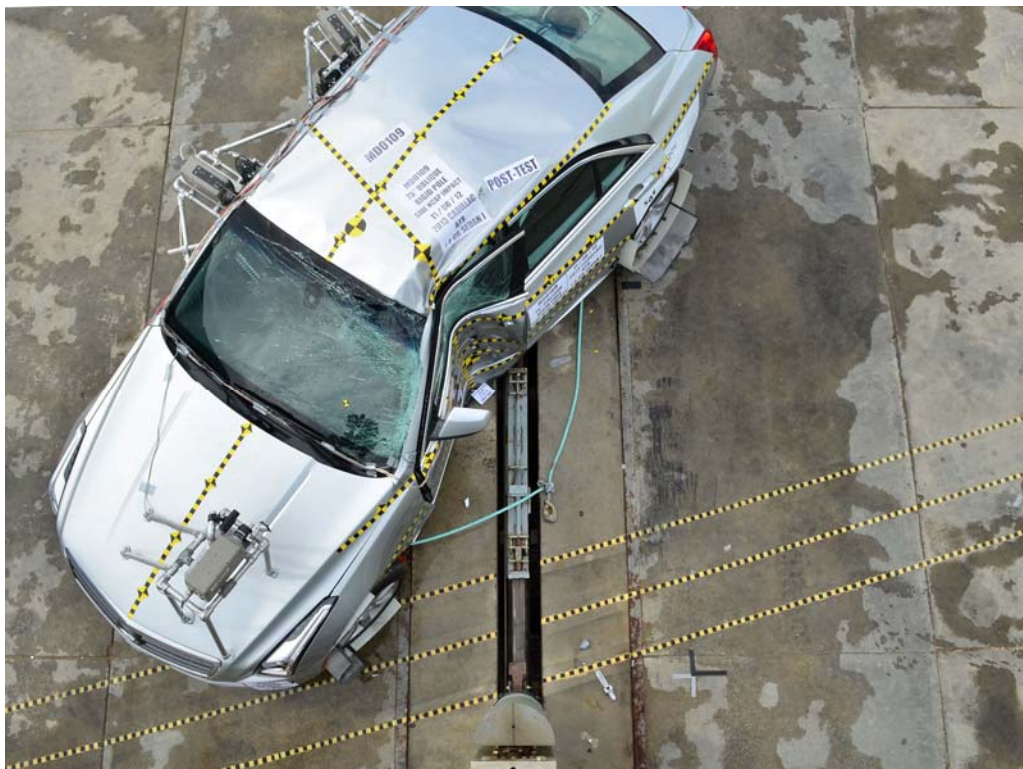


FIGURE 16. Post-Test Overhead View of Area



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 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

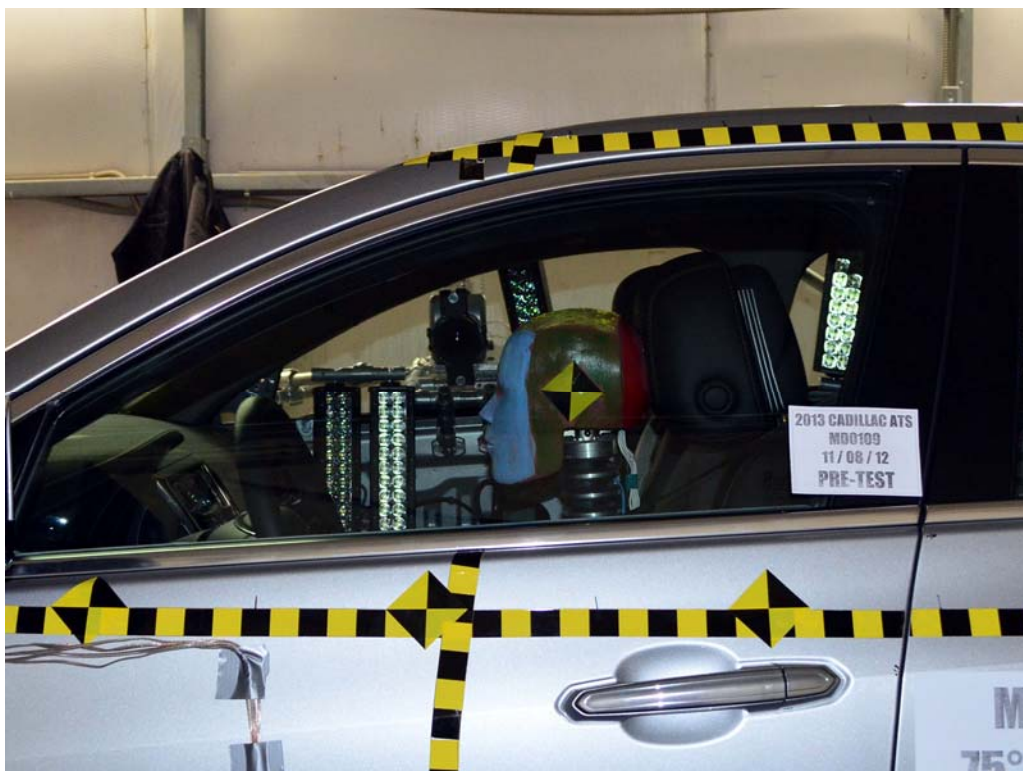


FIGURE 24. Pre-Test Left Side View of Dummy Shoulder and Door Top View



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

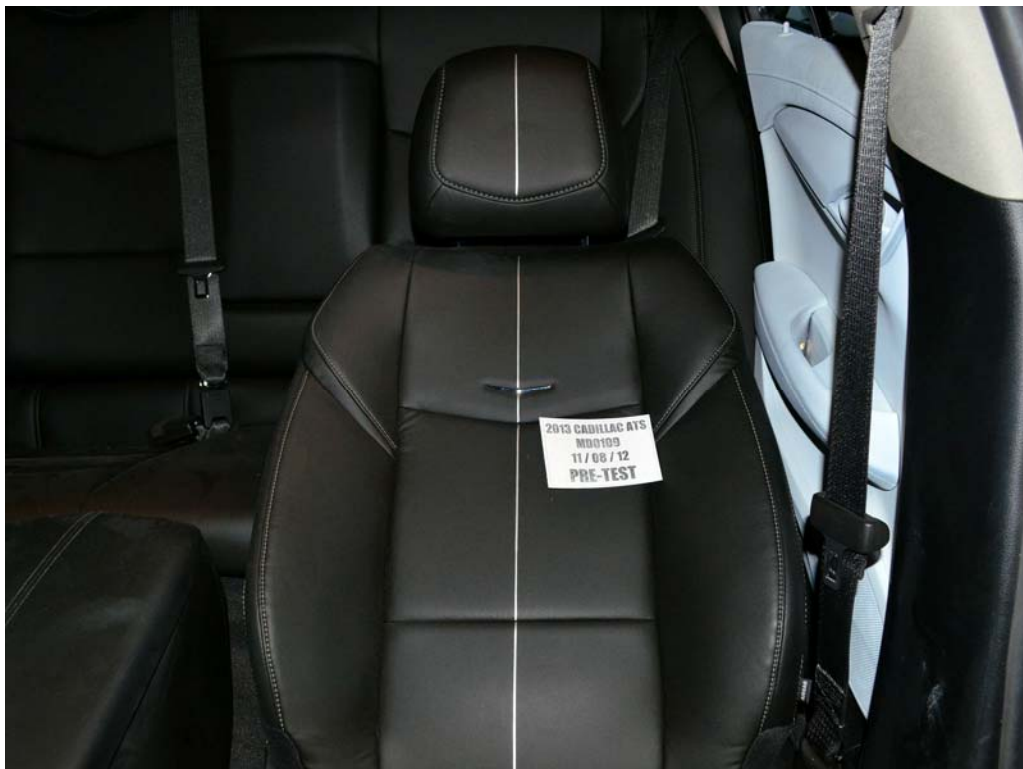


FIGURE 26. Pre-Test Frontal View of Seat Back Prior to Dummy Positioning



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

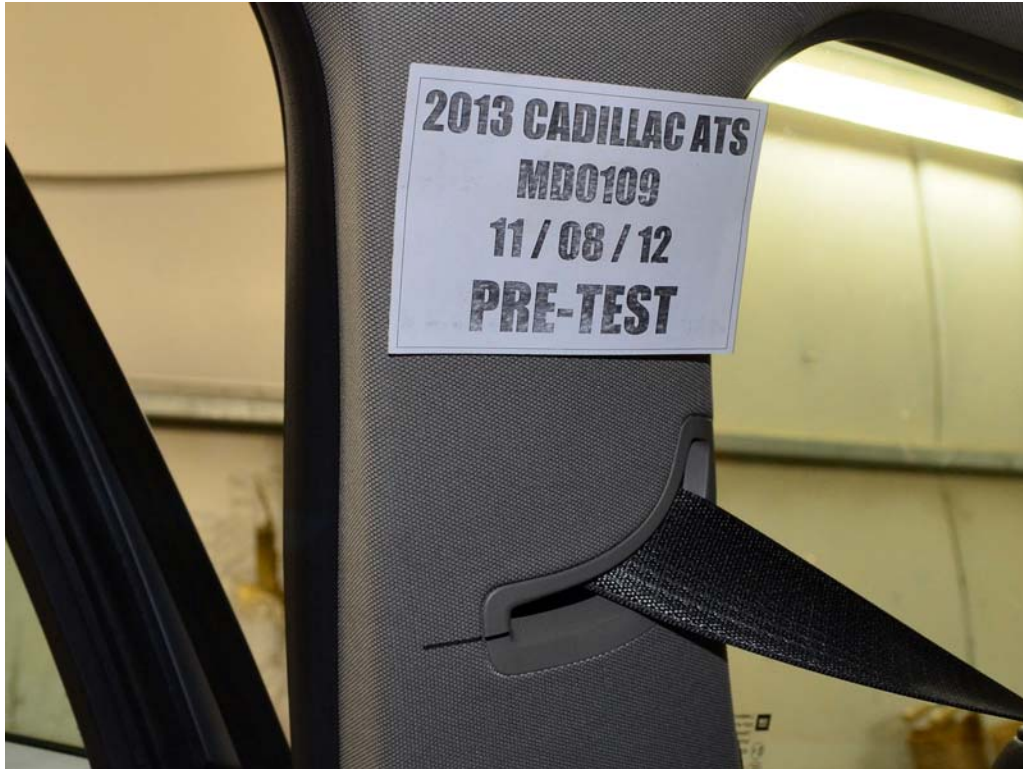


FIGURE 33. Pre-Test View of Belt Anchorage for Dummy

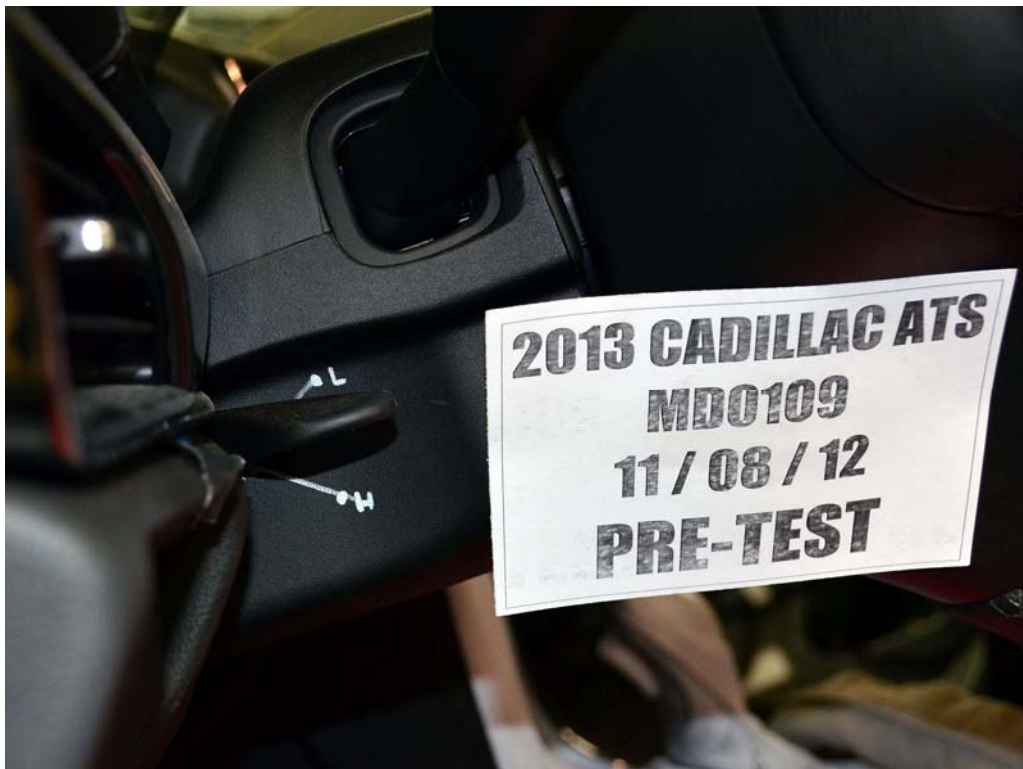


FIGURE 34. Pre-Test Left Side View of Steering Wheel



FIGURE 35. View of Disengaged Parking Brake



FIGURE 36. Pre-Test View of Parking Brake



FIGURE 37. Pre-Test Close-Up Left Side View of Driver Seat Track



FIGURE 38. Pre-Test Close-Up Left Side View of Driver Seat Back



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

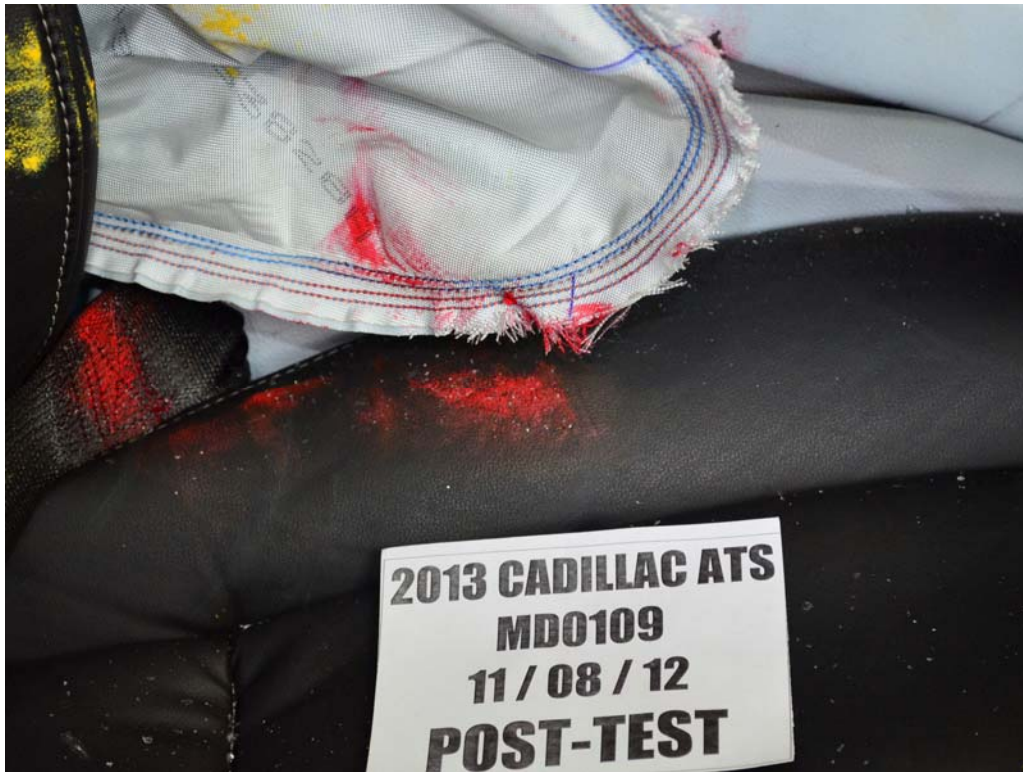


FIGURE 51. Post-Test Dummy Close-Up Pelvis Contact with Side Airbag View



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



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



FIGURE 54. Post-Test View of Fuel Filler Cap or Fuel Filler Neck



FIGURE 55. Close-Up View of Vehicle's Certification Label

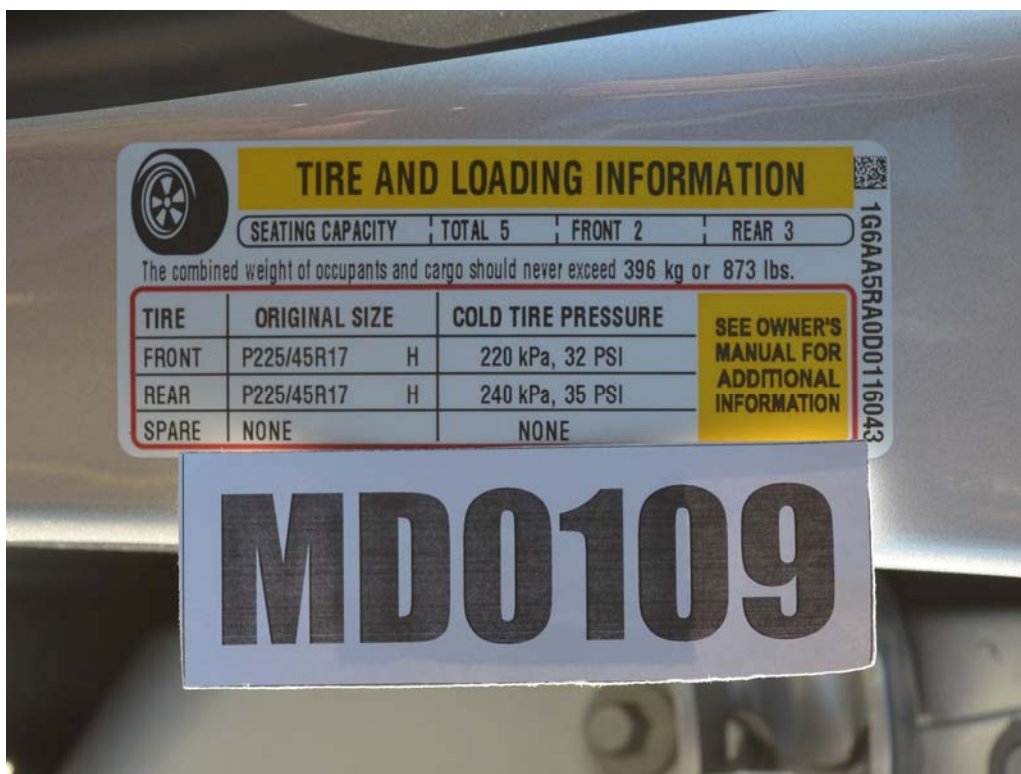


FIGURE 56. Close-Up View of Vehicle's Tire Information Placard



FIGURE 57. Pre-Test Pole Barrier Front View



FIGURE 58. Post-Test Pole Barrier Front View



FIGURE 59. Pre-Test Pole Barrier Side View



FIGURE 60. Post-Test Pole Barrier Side View

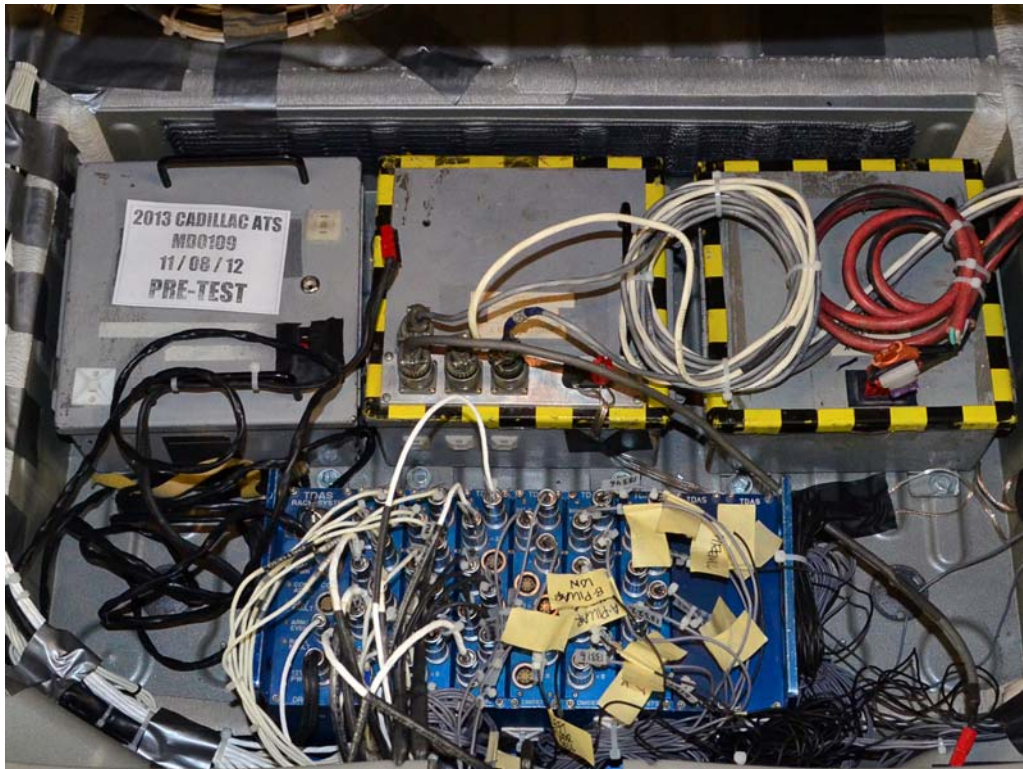


FIGURE 61. Pre-Test Ballast View



FIGURE 62. Post-Test Primary and Redundant Speed Trap Read-Out



FIGURE 63. FMVSS No. 301-305 Rollover 0 Degrees



FIGURE 64. FMVSS No. 301-305 Rollover 90 Degrees

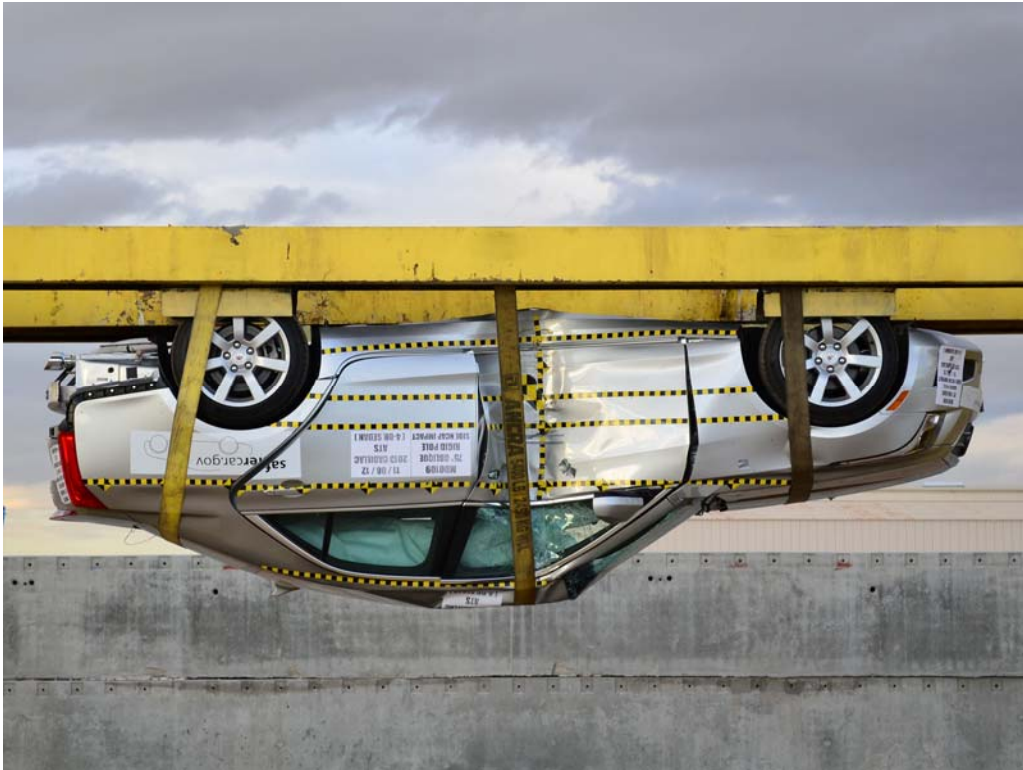


FIGURE 65. FMVSS No. 301-305 Rollover 180 Degrees

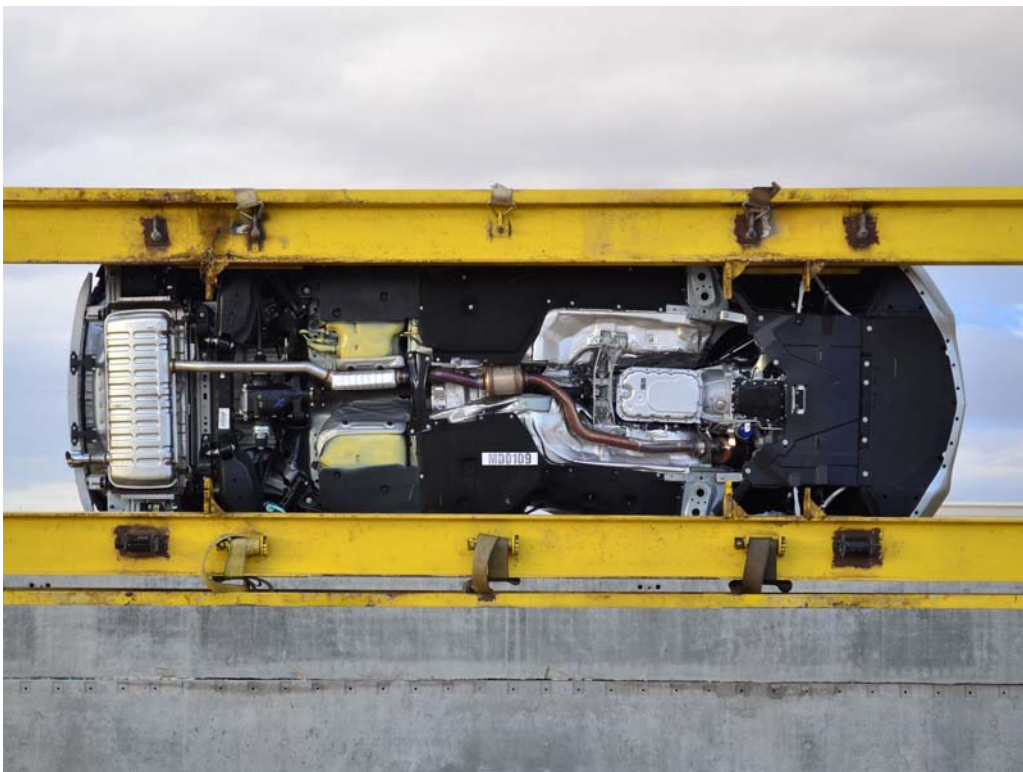


FIGURE 66. FMVSS No. 301-305 Rollover 270 Degrees

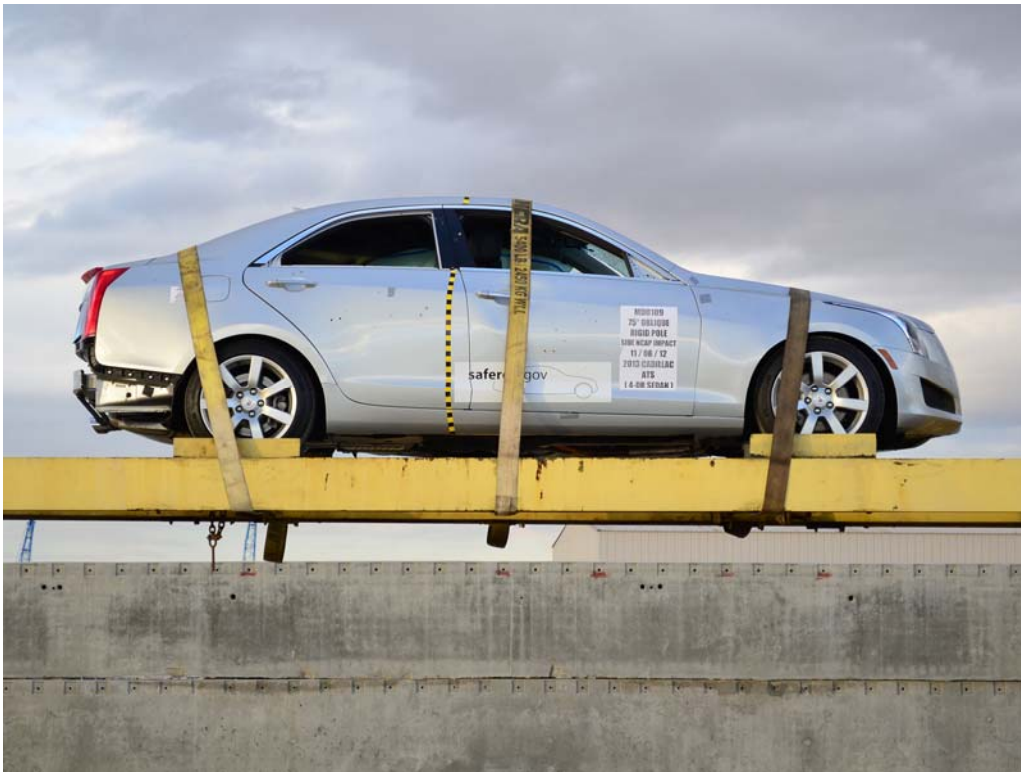


FIGURE 67. FMVSS No. 301-305 Rollover 360 Degrees



FIGURE 68. Impact Event

2013 ATS 2.5L SEVAN

EXTERIOR: RADIANT SILVER METALLIC
INTERIOR: JET BLACK W/ JET BLACK ACCENTS

ENGINE: 2.5L 4-CYL 262HP
TRANSMISSION: 6 SPD AUTOMATIC

STANDARD EQUIPMENT

CADILLAC ATS

- 4 YEAR / 50,000 MILE* BUMPER TO BUMPER WARRANTY
- 5 YEAR / 75,000 MILE* POWERTRAIN LIMITED WARRANTY
- 4 YEAR / 50,000 MILE* PREMIUM CARE MAINTENANCE
- 5 YEAR / 75,000 MILE* COURTESY TRANSPORTATION
- 8 YEAR / 100,000 MILE* ROADSIDE ASSISTANCE
- 12 MOD. ONSTAR DIRECTIONS & CONNECTIONS MULTIMATIC CRASH RESPONSE, TURN-BY-TURN NAVIGATION, AND ONSTAR REMOTELOCK (ASK DEALER ABOUT GEOGRAPHIC COVERAGE)

PERFORMANCE

- ENGINE, 2.5L 4-CYL 262HP WITH DIRECT INJECTION
- TRANSMISSION, 6 SPD AUTOMATIC
- POWER ALGORITHMIC TAPSHIFT
- 20 PREMIUM ELECTRIC VARIABLE STEERING
- WHEELS, 17" FINISHED ALUMINUM
- TIRES, ALL SEASON
- STABILITRAK STABILITY CONTROL, 8W TRACTION CONTROL
- TIRE PRESSURE MONITOR
- TIRE SEALANT & INFLATOR KIT (IN PLACE OF RUN-FLAT TIRES)

LUXURY/CONVENIENCE

- HANDCRAFTED CUT & SEWN INTERIOR
- LEATHERETTE SEATING SURFACES
- PWR SEAT ADJUST DRIVER AND

FRONT PASSENGER 6-WAY

- LUMBAR 1ST DRIVER/PASS PWR
- 5.7" FULL-COLOR DIC
- 4.2" FULL-COLOR RADIO DISPLAY
- AM/FM STEREO, BOSE SOUND SYS
- XM RADIO + SERVICE, SUBSCRIPTION SOLD SEPARATELY BY SERVICE AFTER 3 MONTHS
- BLUETOOTH FOR PHONE
- LEATHER WRAP STEERING WHEEL
- DUAL ZONE CLIMATE CONTROL
- AIR FILTRATION SYSTEM
- AIRRINGS, OUTSIDE HEATED & PWR
- LED INTERIOR LIGHTING ACCENTS
- KEYLESS PUSH-BUTTON START

SAFETY AND SECURITY

- AIRRINGS, DRIVER & PASSENGER
- FRONTAL, KNEE, AND SIDE PROTECTORS
- 4-WAY ADJUSTABLE FRONT HEAD RESTRAINTS
- PARKING, ABS, & 4W AUTO DRIV

OPTIONS & PRICING

MSRP INCLUDES \$500 DESTINATION CHARGE

STANDARD VEHICLE PRICE	\$33,095.00
TOTAL OPTIONS	\$5.00
TOTAL VEHICLE & OPTIONS	\$33,095.00
DESTINATION CHARGE	\$5.00
TOTAL VEHICLE PRICE*	\$33,095.00

EPA DOT Fuel Economy and Environment

Gasoline Vehicle

26 MPG combined city/hwy
22 city
33 highway
3.8 gallons per 100 miles

You save \$1,350 in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost \$2,050

Fuel Economy & Greenhouse Gas Rating (better until)

Smog Rating (better until)

Annual vehicle will vary for many reasons. Emissions testing conditions will have one drive and engine test results. The average new vehicle gets 23 mpg and costs \$21,000 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$3.50 per gallon. Mileage is subject to change and engine wear. Fuel economy and emissions are a significant cause of climate change and smog.

fuel economy.gov

GOVERNMENT 5-STAR SAFETY RATINGS

This vehicle has not been rated by the government for overall vehicle score, frontal crash, side crash or rollover risk.

Source: National Highway Traffic Safety Administration (NHTSA)
www.safercar.gov or 1-888-327-4236

PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS COUNTRY:
U.S./CANADIAN PARTS CONTENT: 65%
MAJOR SOURCES OF FOREIGN PARTS CONTENT: MEXICO 17%

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

FOR THIS VEHICLE:
FINAL ASSEMBLY POINT: LANSING, MI U.S.A.
COUNTRY OF ORIGIN: U.S.A.
ENGINE: UNITED STATES
TRANSMISSION: UNITED STATES

VIN 1G6AA8R00D0116043
ORANGE COAST BUICK GMC CADILLAC
3001 HANCOCK BLVD
COSTA MESA, CA 92626-5266

DV 10A0917591

FIGURE 69. Monroney Label

3-2 Seats and Restraints

Head Restraints

WARNING

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

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

Front Seats

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

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

To lower the head restraint, press the button located on the side of the head restraint, push the head restraint down, and release the button. Pull and push on the head restraint after the button is released to make sure that it is locked in place.

The head restraints can be adjusted forward or rearward. To adjust the head restraint forward, grasp the head restraint and pull it forward to the desired locking position. To adjust the head restraint rearward, press the button located on the side of the head restraint and push the head restraint rearward to the desired locking position.

3-3 Seats and Restraints

Front Seats

Power Seat Adjustment

WARNING

You can lose control of the vehicle if you try to adjust a driver seat while the vehicle is moving. Adjust the driver seat only when the vehicle is not moving.

of the head restraint and move the head restraint rearward until the desired locking position is reached. Try to move the head restraint after the button is released to make sure that it is locked in place.

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

Rear Seats

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

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

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

Rear outboard head restraints are not designed to be removed.

FIGURE 70. Head Restraint Use and Adjustment Information from Vehicle 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 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)

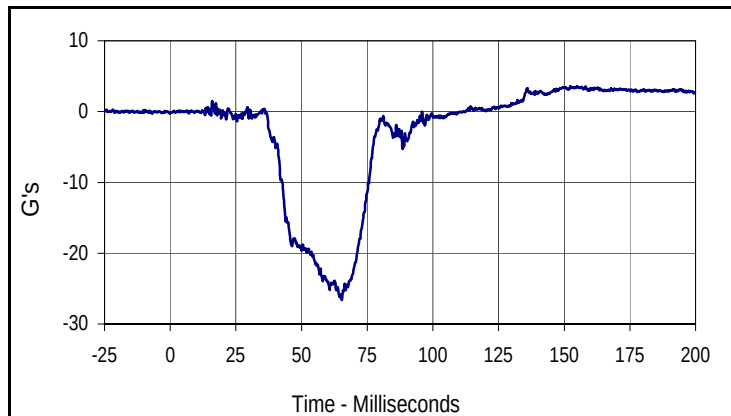
Left B-Pillar Sill Acceleration
Left Lower B-Pillar Acceleration (Y)
Left Mid B-Pillar Acceleration (Y)
Driver Seat Track at Dummy Hip Point Acceleration (Y)
Engine Top Acceleration (X)
Engine Top Acceleration (Y)
Firewall Center Acceleration (Y)
Right Roof at Vertical Impact Reference Line Acceleration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

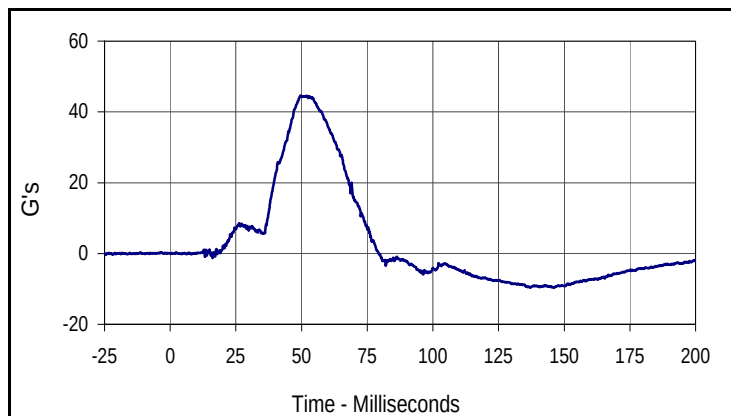
Load Cell Pole Barrier #1 Force (Y)
Load Cell Pole Barrier #2 Force (Y)
Load Cell Pole Barrier #3 Force (Y)
Load Cell Pole Barrier #4 Force (Y)
Load Cell Pole Barrier #5 Force (Y)
Load Cell Pole Barrier #6 Force (Y)
Load Cell Pole Barrier #7 Force (Y)
Load Cell Pole Barrier #8 Force (Y)

Test Vehicle: 2013 Cadillac ATS 4-Door Sedan
 Test Program: 32 km/h (20 mph) Side Impact NCAP 75° Rigid Pole Test

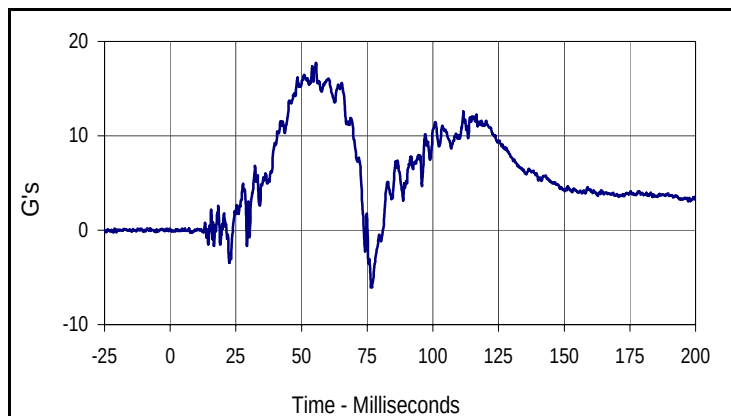
Test Date: 11/8/12
 NHTSA No.: MD0109



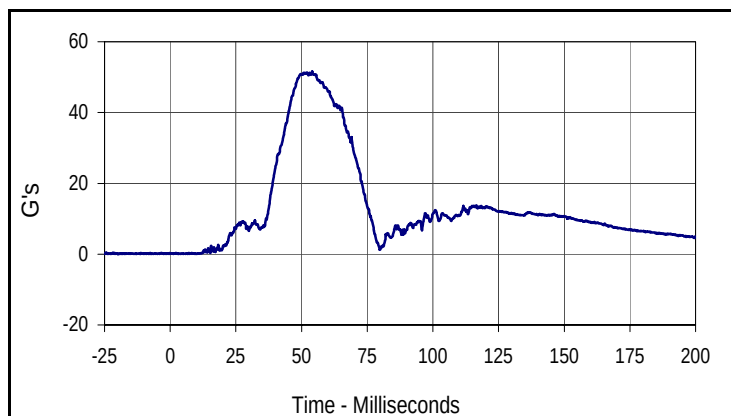
Curve Description			
Driver Head Acceleration X Primary			
Plot No.	Type	SAE Class	Units
001	FIL	1000	G's
Max	Time	Min	Time
3.6	152.4	-26.6	65.4



Curve Description			
Driver Head Acceleration Y Primary			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
44.7	49.7	-9.7	146.1



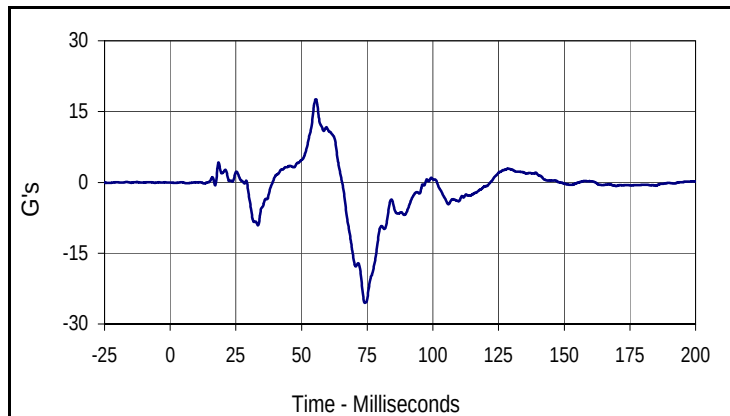
Curve Description			
Driver Head Acceleration Z Primary			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
17.7	55.5	-6.1	76.4



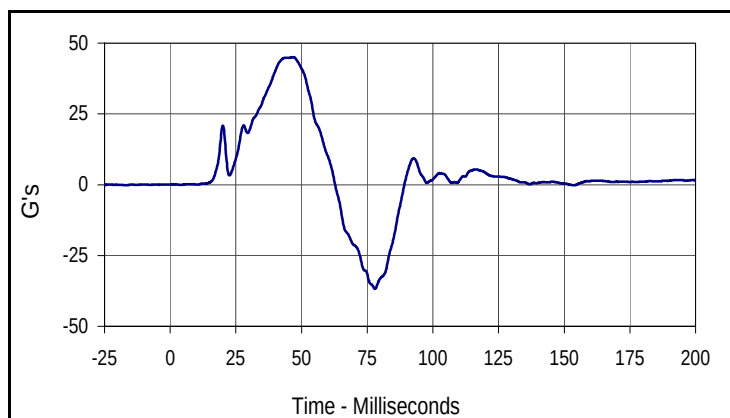
Curve Description			
Driver Head Acceleration Primary Res.			
Plot No.	Type	SAE Class	Units
004	RES	1000	G's
Max	Time	Min	Time
51.6	54.0	0.0	5.0

Test Vehicle: 2013 Cadillac ATS 4-Door Sedan
 Test Program: 32 km/h (20 mph) Side Impact NCAP 75° Rigid Pole Test

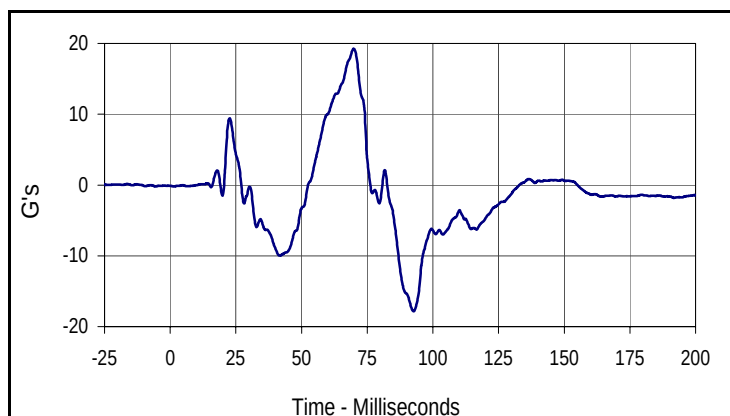
Test Date: 11/8/12
 NHTSA No.: MD0109



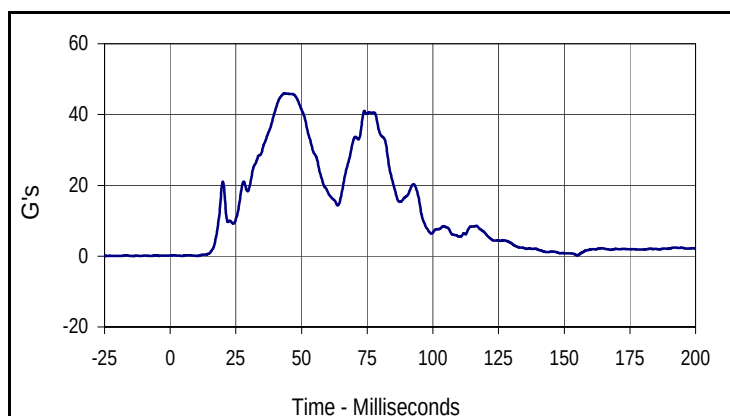
Curve Description			
Driver Lower Spine T12 Acceleration X			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
17.6	55.4	-25.6	74.1



Curve Description			
Driver Lower Spine T12 Acceleration Y			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
45.1	46.6	-36.8	78.0



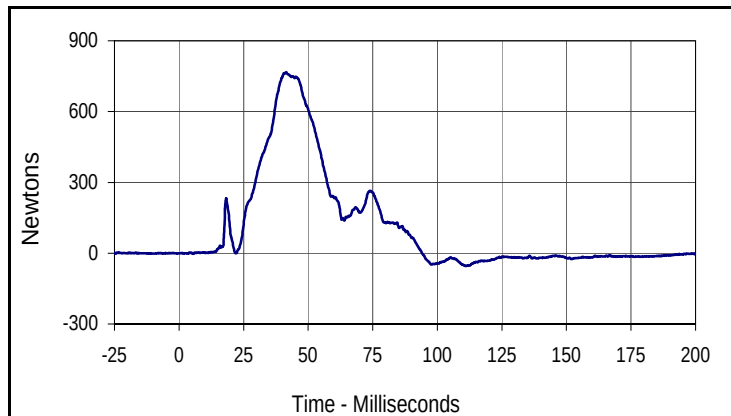
Curve Description			
Driver Lower Spine T12 Acceleration Z			
Plot No.	Type	SAE Class	Units
007	FIL	180	G's
Max	Time	Min	Time
19.2	69.9	-17.8	92.6



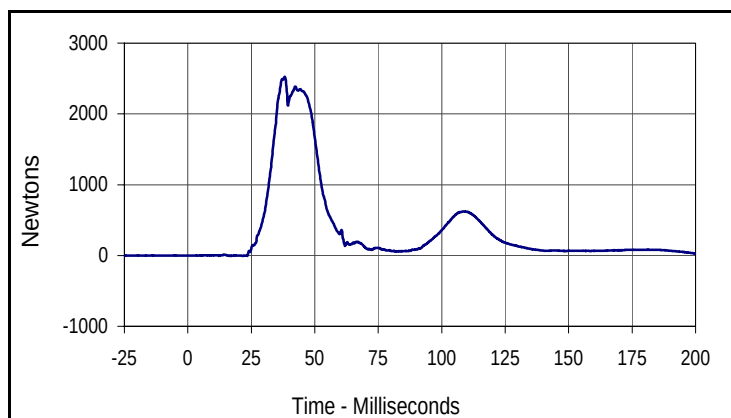
Curve Description			
Driver Lower Spine T12 Acceleration Res.			
Plot No.	Type	SAE Class	Units
008	RES	180	G's
Max	Time	Min	Time
46.0	43.7	0.0	4.9

Test Vehicle: 2013 Cadillac ATS 4-Door Sedan
 Test Program: 32 km/h (20 mph) Side Impact NCAP 75° Rigid Pole Test

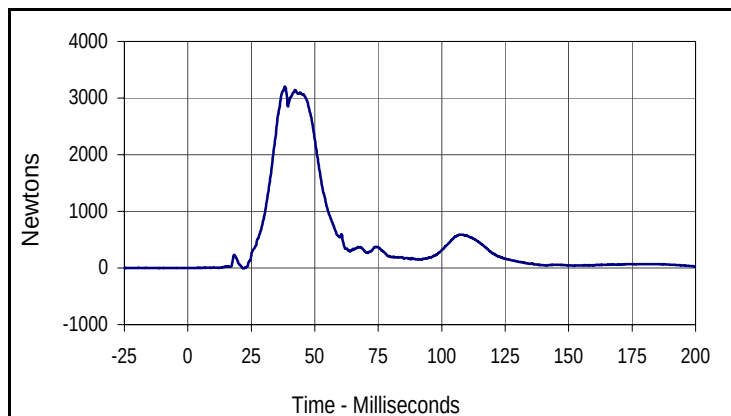
Test Date: 11/8/12
 NHTSA No.: MD0109



Curve Description			
Driver Iliac Wing Force on Impact Side Y			
Plot No.	Type	SAE Class	Units
009	FIL	600	Newtons
Max	Time	Min	Time
766.9	41.4	-54.8	111.1



Curve Description			
Driver Acetabulum Force on Impact Side Y			
Plot No.	Type	SAE Class	Units
010	FIL	600	Newtons
Max	Time	Min	Time
2525.1	38.2	-6.6	17.2



Curve Description			
Driver Total Pelvic Force on Impact Side Y			
Plot No.	Type	SAE Class	Units
011	SUM	600	Newtons
Max	Time	Min	Time
3203.0	38.2	-7.0	21.9

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: 10/23/12
 Test I.D.: N/A



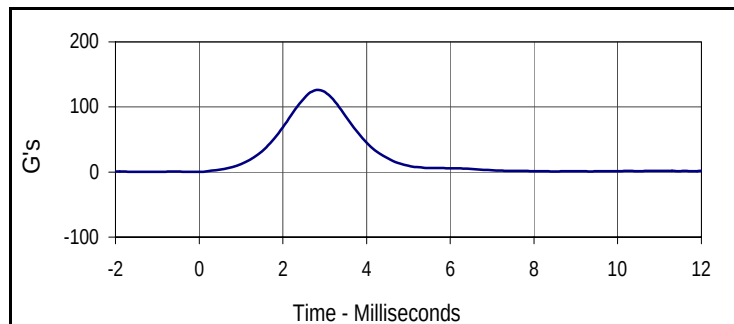
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
A	Sitting Height	mm	772 - 788	779	Pass
B	Shoulder Pivot Height	mm	437 - 453	444	Pass
C	H-Point Height	mm	79 - 89	85	Pass
D	H-Point from Seatback	mm	141 - 151	145	Pass
E	Shoulder Pivot from Backline	mm	97 - 107	102	Pass
F	Thigh Clearance	mm	119 - 135	125	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	183	Pass
J	Head Circumference	mm	541 - 551	545	Pass
K	Buttock to Knee Length	mm	514 - 540	527	Pass
L	Popliteal Height	mm	343 - 369	351	Pass
M	Knee Pivot to Floor Height	mm	392 - 409	401	Pass
N	Buttock Popliteal Length	mm	416 - 442	432	Pass
O	Chest Depth w/o Jacket	mm	195 - 211	202	Pass
P	Foot Length	mm	216 - 232	221	Pass
Q	Hip Breadth with Pelvic Plug	mm	313 - 323	314	Pass
R	Arm Length	mm	249 - 259	252	Pass
S	Knee Joint to Seatback	mm	477 - 493	481	Pass
V	Shoulder Width	mm	341 - 357	352	Pass
W	Foot Width	mm	78 - 94	86	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.: 299

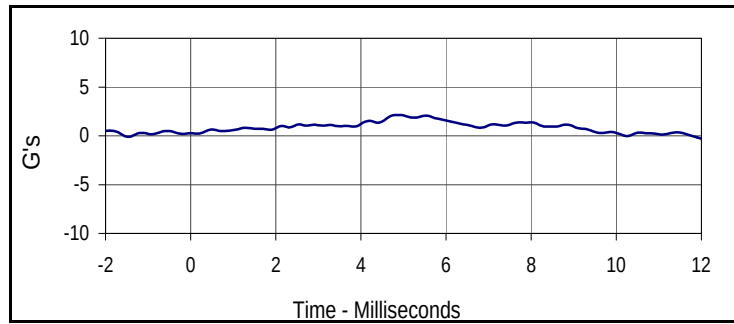
Test Date: 10/23/12
 Test I.D.: 299HD047



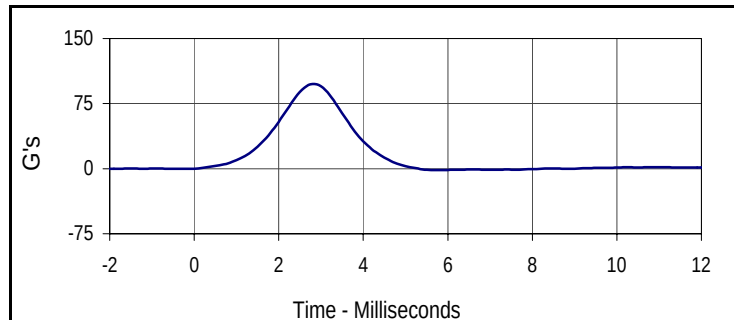
Tested Parameter		Units	Specification	Result	Pass/Fail
Head Assembly Soak Time		Minutes	≥240	265	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.4	Pass
	Min	°C		20.8	Pass
Humidity During Soak	Max	%	10.0 to 70.0	29.8	Pass
	Min	%		28.1	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.3	Pass
Peak Head Resultant Acceleration		G's	115 to 137	126.1	Pass
Peak Head X Acceleration		G's	<15	2.1	Pass
Is Acceleration Unimodal?		Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse		%	<15	2.1	Pass
Overall Test Results				Pass	



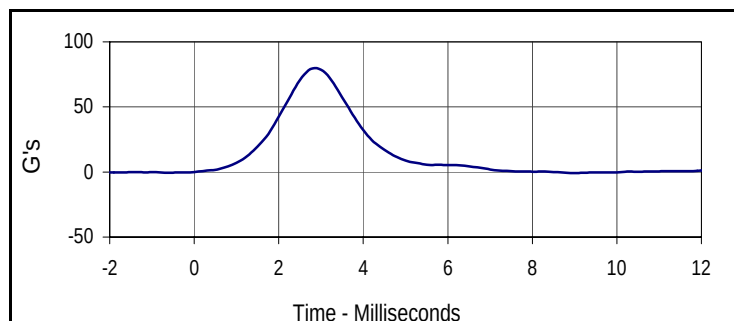
Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
126.1	2.8	0.2	-1.4



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
2.1	4.9	-0.1	-1.5



Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
97.7	2.8	-1.6	5.9



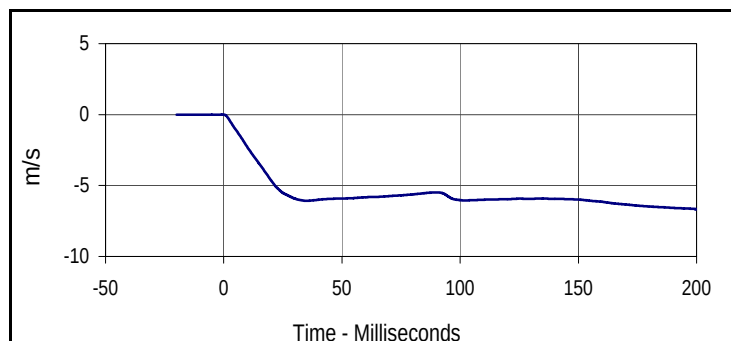
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
79.9	2.9	-0.9	8.9

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

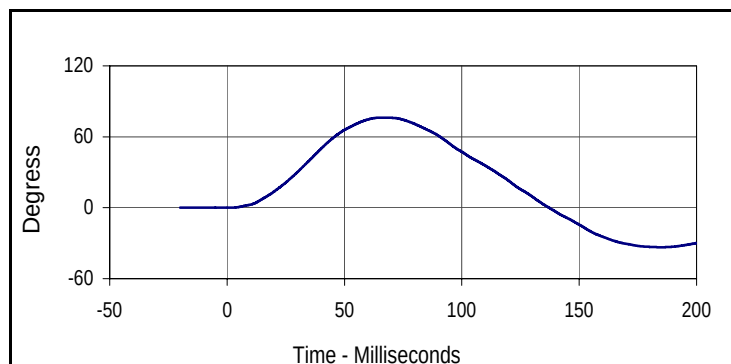
Test Date: 10/23/12
 Test I.D.: 299NB047



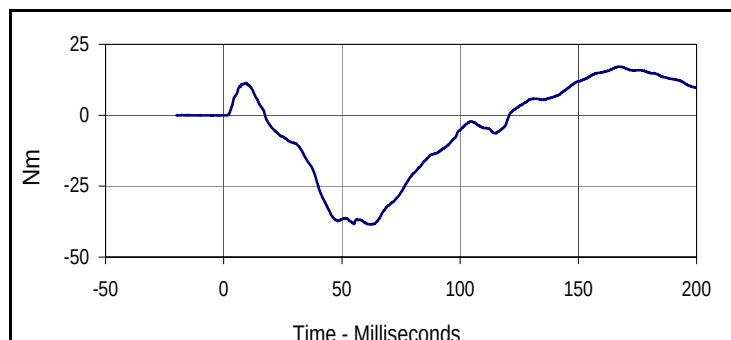
Tested Parameter	Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time	Minutes	≥240	310	Pass
Temperature During Soak	Max	20.6 to 22.2	21.4	Pass
	Min		20.8	Pass
Humidity During Soak	Max	10.0 to 70.0	29.8	Pass
	Min		28.1	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	29.9	Pass
Pendulum Velocity	m/s	5.51 to 5.63	5.53	Pass
Pendulum Deceleration	10 msec	-2.20 to -2.80	-2.30	Pass
	15 msec	-3.30 to -4.10	-3.45	Pass
	20 msec	-4.40 to -5.40	-4.64	Pass
	25 msec	-5.40 to -6.10	-5.51	Pass
	25-100 msec	-5.50 to -6.20	-6.07	Pass
D-Plane Rotation	Max	71 to 81	76.2	Pass
	Time	50 to 70	65.6	Pass
Peak Occipital Condyle Moment	Nm	-36 to -44	-38.5	Pass
Decaying Moment Time to Cross 0 Nm	msec	102 to 126	120.7	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	-0.5	-6.7	200.0



Curve Description			
Maximum Translation Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degress
Max	Time	Min	Time
76.2	65.6	-33.4	184.8



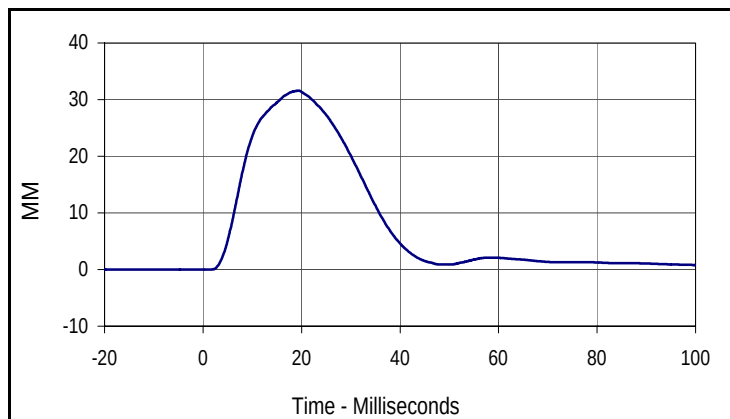
Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
17.1	167.2	-38.5	62.5

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

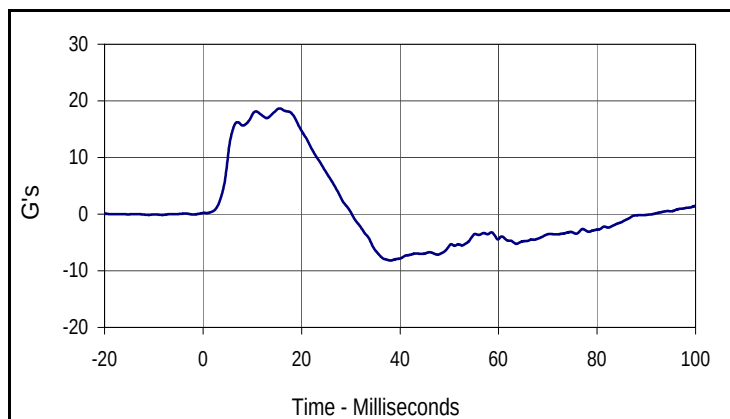
Test Date: 10/23/12
 Test I.D.: 299SH047



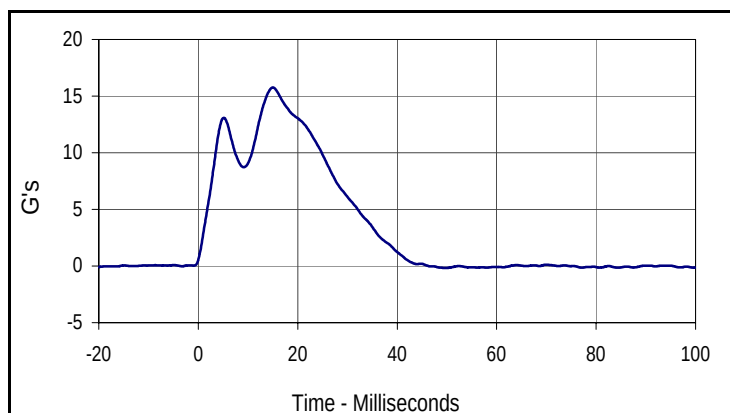
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	365	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.4	Pass
	Min	°C		20.8	Pass
Humidity During Soak	Max	%	10.0 to 70.0	29.8	Pass
	Min	%		28.1	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.5	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.4	Pass
Impactor Velocity		m/s	4.20 to 4.40	4.32	Pass
Peak Shoulder Deflection		mm	28 to 37	31.6	Pass
Peak Lateral Spine Acceleration Y		G's	17 to 22	18.7	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
31.6	19.4	0.0	-4.0



Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
18.7	15.5	-8.2	38.1



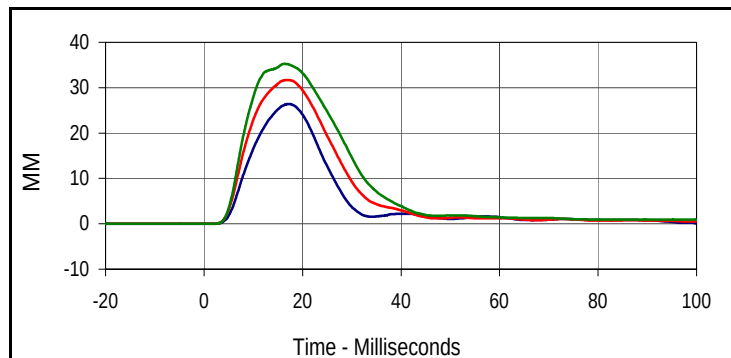
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
15.8	15.0	-0.2	49.8

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

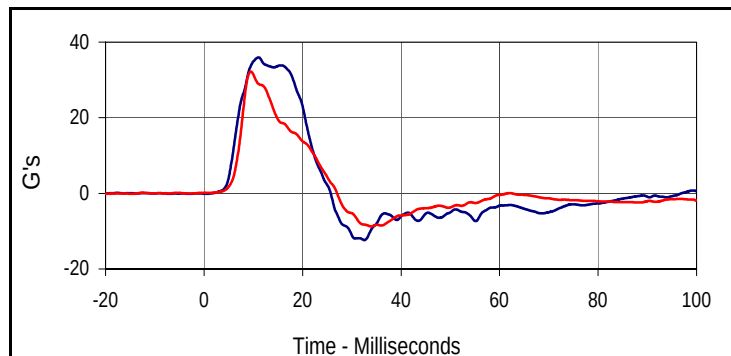
Test Date: 10/23/12
 Test I.D.: 299TWA047



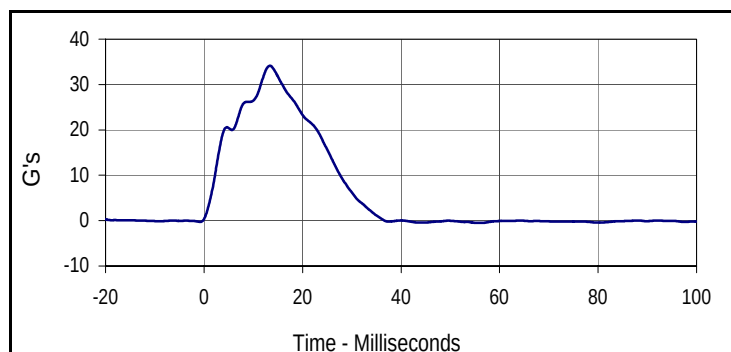
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	385	Pass
Temperature During Soak	Max	20.6 to 22.2	21.4	Pass
	Min		20.8	Pass
Humidity During Soak	Max	10.0 to 70.0	29.8	Pass
	Min		28.1	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.5	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	30.4	Pass
Impactor Velocity	m/s	6.6 to 6.8	6.7	Pass
Peak Shoulder Deflection	mm	31 to 40	33.4	Pass
Peak Upper Thorax Rib Deflection	mm	25 to 32	26.4	Pass
Peak Middle Thorax Rib Deflection	mm	30 to 36	31.7	Pass
Peak Lower Thorax Rib Deflection	mm	32 to 38	35.2	Pass
Peak Upper Spine Y Acceleration	G's	34 to 43	36.0	Pass
Peak Lower Spine Y Acceleration	G's	29 to 37	32.2	Pass
Peak Impactor Acceleration	G's	30 to 36	34.1	Pass
Overall Test Results			Pass	



Curve Description			
Upper Thorax Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
26.4	17.1	0.0	-9.1
Middle Thorax Deflection			
Max	Time	Min	Time
31.7	17.0	0.0	-1.2
Lower Thorax Deflection			
Max	Time	Min	Time
35.2	16.3	0.0	0.0



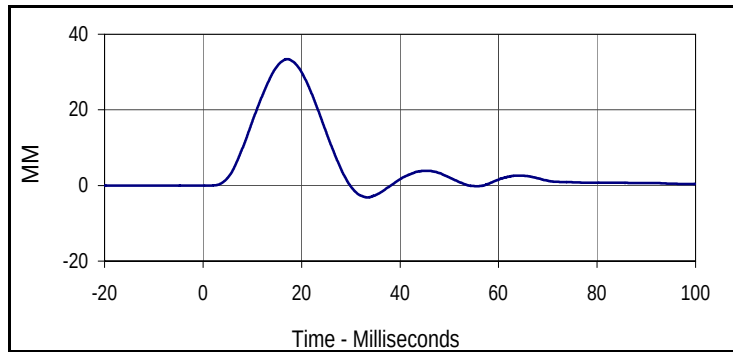
Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
36.0	11.0	-12.4	32.6
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
32.2	9.5	-8.8	34.0



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
34.1	13.4	-0.5	56.4

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

Test Date: 10/23/12
Test I.D.: 299TWA047



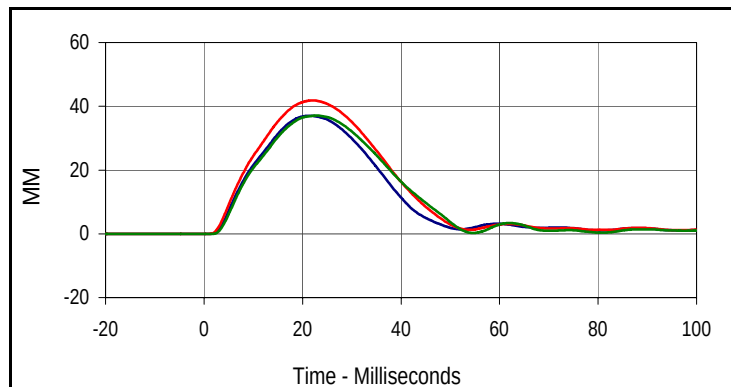
Curve Description			
Shoulder Deflection			
Plot No.	Type	SAE Class	Units
007	FIL	600	MM
Max	Time	Min	Time
33.4	17.0	-3.1	33.3

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

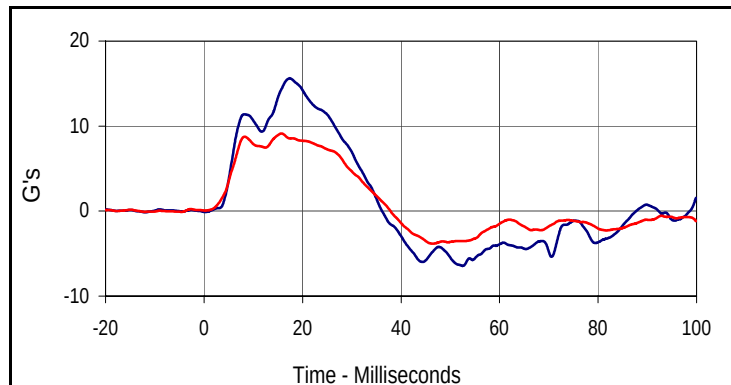
Test Date: 10/23/12
 Test I.D.: 299TWOA047



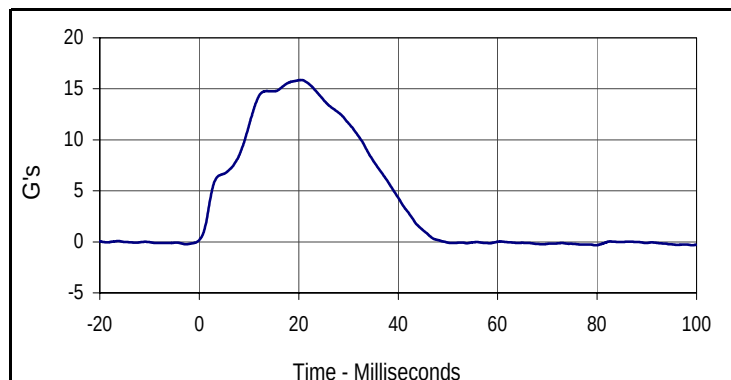
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	410	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.4	Pass
	Min	°C		20.8	Pass
Humidity During Soak	Max	%	10.0 to 70.0	29.8	Pass
	Min	%		28.1	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.2	Pass
Impactor Velocity		m/s	4.2 to 4.4	4.3	Pass
Peak Upper Thorax Rib Deflection		mm	32 to 40	37.0	Pass
Peak Middle Thorax Rib Deflection		mm	39 to 45	41.9	Pass
Peak Lower Thorax Rib Deflection		mm	35 to 43	37.1	Pass
Peak Upper Spine Y Acceleration		G's	13 to 17	15.6	Pass
Peak Lower Spine Y Acceleration		G's	7 to 11	9.1	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
37.0	21.6	0.0	-2.4
Middle Thorax Deflection			
Max	Time	Min	Time
41.9	22.1	0.0	-9.7
Lower Thorax Deflection			
Max	Time	Min	Time
37.1	23.0	0.0	-4.1



Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
15.6	17.4	-6.4	52.5
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
9.1	15.7	-3.8	46.4



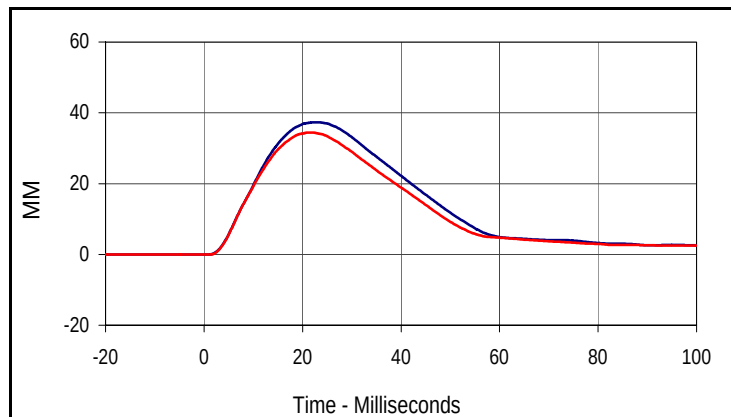
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
15.9	20.4	-0.3	79.6

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

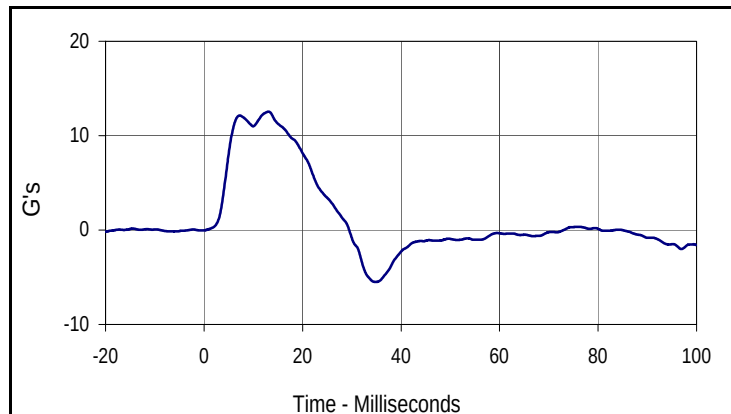
Test Date: 10/23/12
 Test I.D.: 299ABD047



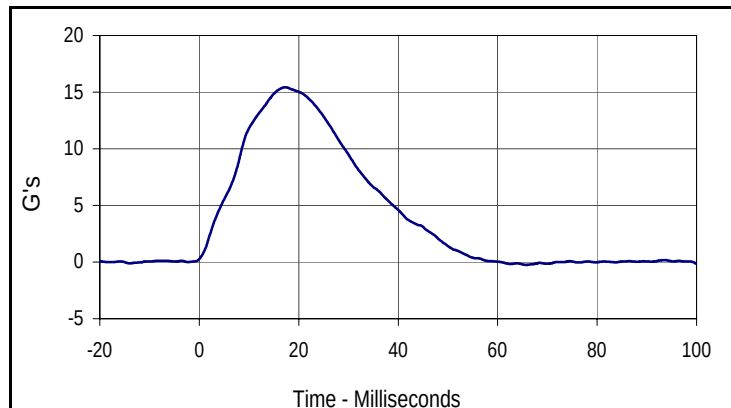
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	435	Pass
Temperature During Soak	Max	20.6 to 22.2	21.4	Pass
	Min		20.8	Pass
Humidity During Soak	Max	10.0 to 70.0	29.8	Pass
	Min		28.1	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.3	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	30.1	Pass
Impactor Velocity	m/s	4.2 to 4.4	4.3	Pass
Peak Upper Abdominal Rib Deflection	mm	36 to 47	37.3	Pass
Peak Lower Abdominal Rib Deflection	mm	33 to 44	34.4	Pass
Peak Lower Spine Y Acceleration	G's	9 to 14	12.5	Pass
Peak Impactor Acceleration	G's	12 to 16	15.4	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
37.3	22.7	0.0	-11.7
Curve Description			
Lower Abdominal Rib Deflection			
Plot No.	Type	SAE Class	Units
002	FIL	600	MM
Max	Time	Min	Time
34.4	21.5	0.0	-14.0

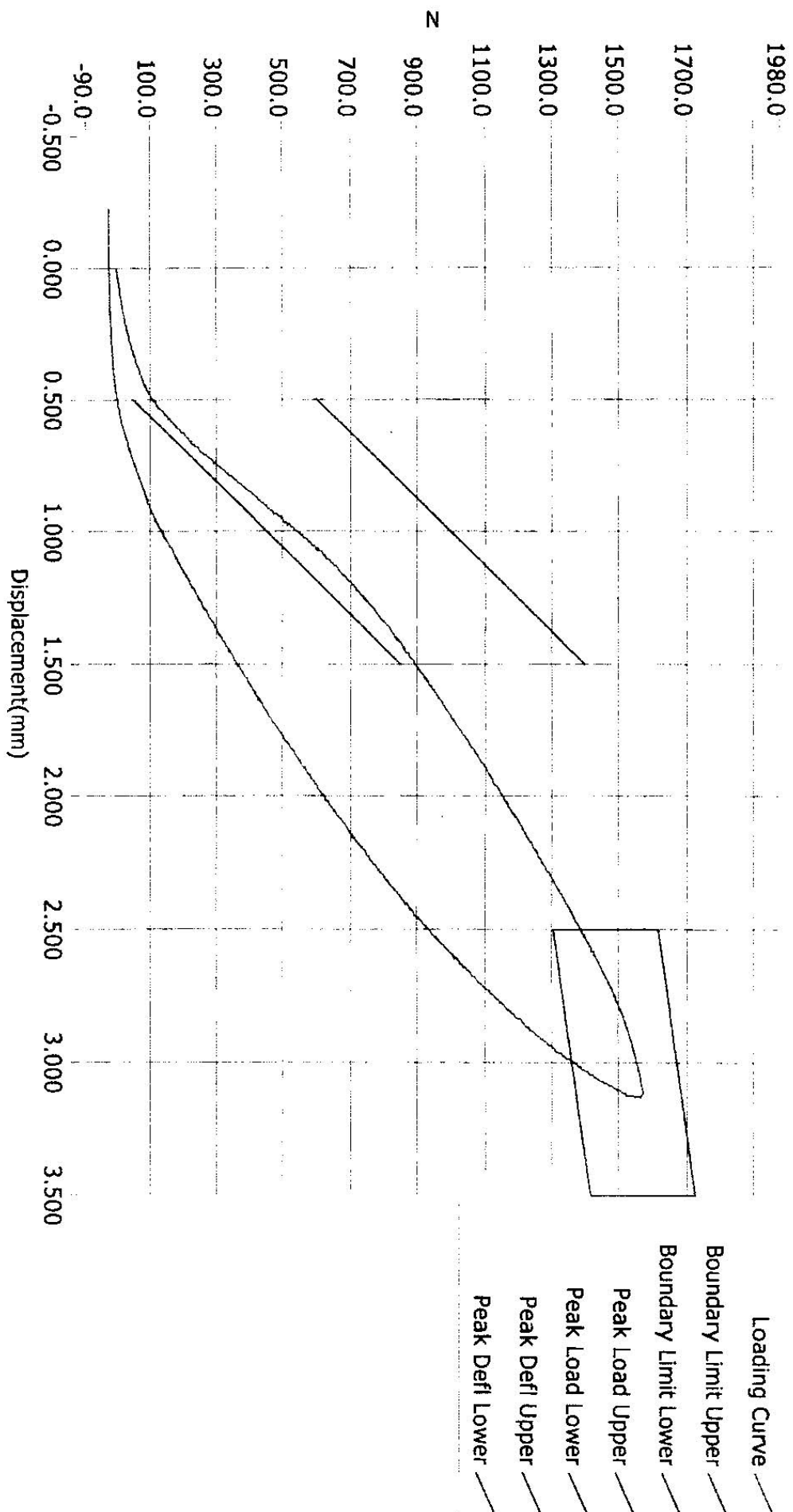


Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
12.5	13.1	-5.5	34.8



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
15.4	17.4	-0.2	65.8

Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

Test IDPart Serial NumberTest DateTest Time

49081

12/7/2011

9:20 PM

Cert IDATD Serial NumberATD Type

N/A

SIDIIs

Current Date : 12/7/2011

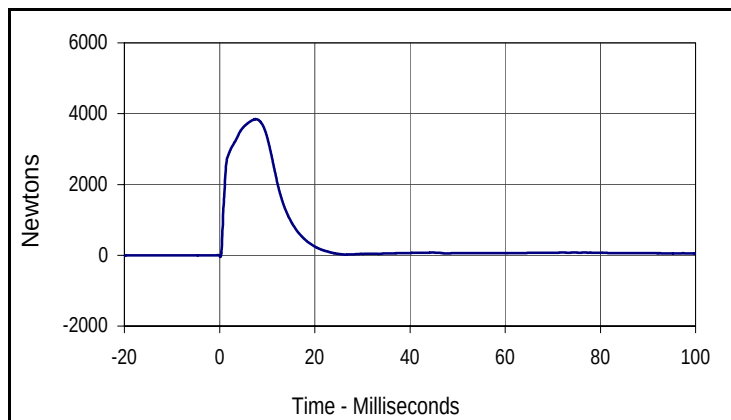
Current Time : 21:20:56

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

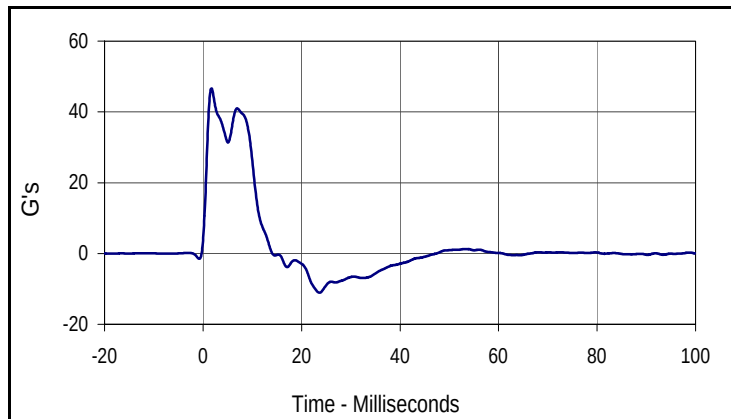
Test Date: 10/23/12
 Test I.D.: 299ACET047



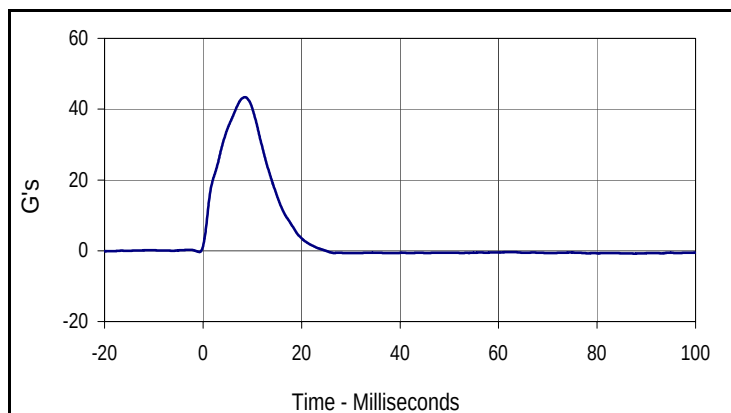
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	460	Pass
Temperature During Soak	Max	20.6 to 22.2	21.4	Pass
	Min		20.8	Pass
Humidity During Soak	Max	10.0 to 70.0	29.8	Pass
	Min		28.1	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.5	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	29.9	Pass
Impactor Velocity	m/s	6.6 to 6.8	6.7	Pass
Peak Acetabulum Force Y	Newtons	3600 to 4300	3845.1	Pass
Peak Pelvis Y Acceleration After 6 msec.	G's	34 to 42	41.0	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
3845.1	7.6	-45.6	0.2



Curve Description			
Pelvis Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
46.7	1.7	-11.1	23.6



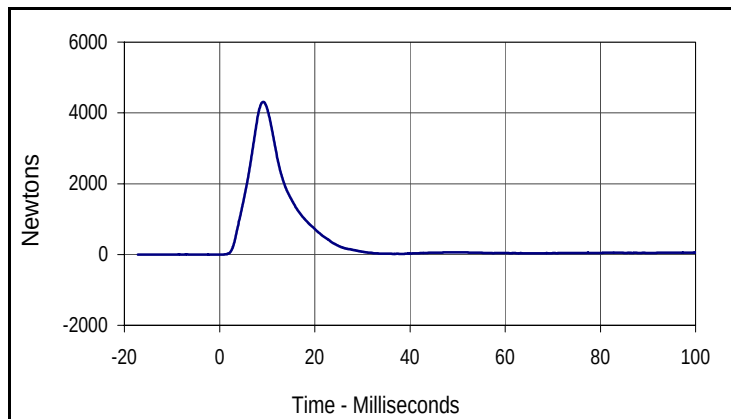
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
43.4	8.5	-0.8	87.5

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

Test Date: 10/23/12
 Test I.D.: 299PL047



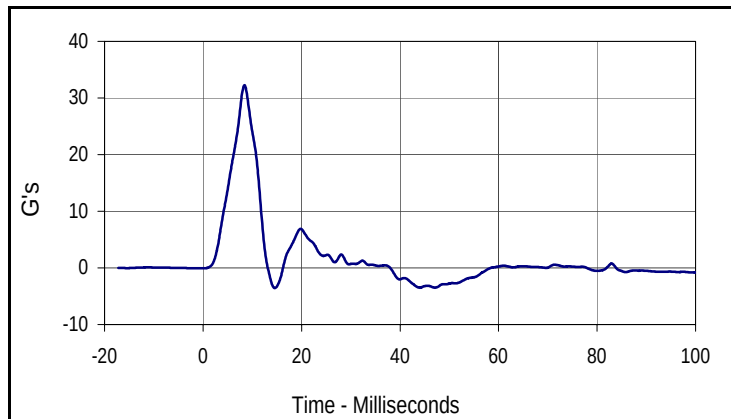
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	505	Pass
Temperature During Soak	Max	20.6 to 22.2	21.4	Pass
	Min		20.8	Pass
Humidity During Soak	Max	10.0 to 70.0	29.8	Pass
	Min		28.1	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.6	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	30.0	Pass
Impactor Velocity	m/s	4.2 to 4.4	4.3	Pass
Peak Iliac Force	Newtons	4100 to 5100	4313.3	Pass
Peak Pelvis Y Acceleration	G's	28 to 39	32.3	Pass
Peak Impactor Acceleration	G's	36 to 45	39.7	Pass
Overall Test Results			Pass	



Curve Description

Pelvis Iliac Force

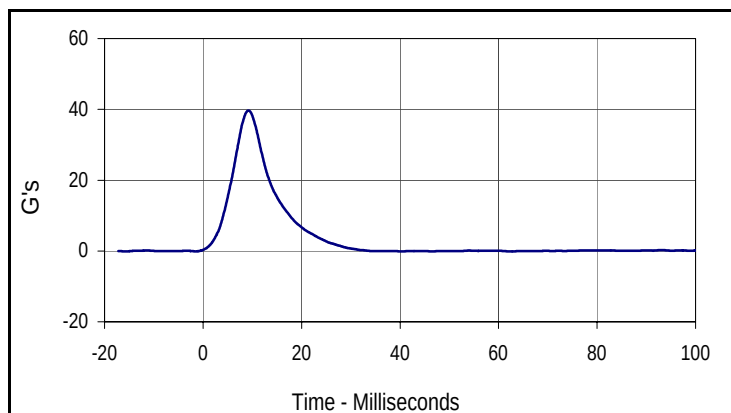
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4313.3	9.2	-3.6	-15.4



Curve Description

Pelvis Y Acceleration

Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
32.3	8.4	-3.6	14.6



Curve Description

Impactor Acceleration

Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
39.7	9.2	-0.1	62.4

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

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

Test Date: 11/12/12
 Test I.D.: N/A



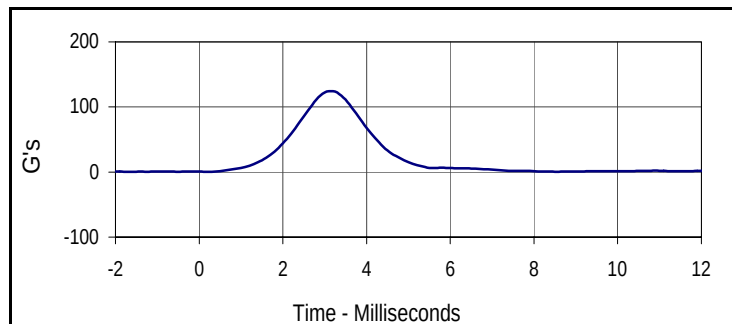
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
A	Sitting Height	mm	772 - 788	781	Pass
B	Shoulder Pivot Height	mm	437 - 453	446	Pass
C	H-Point Height	mm	79 - 89	86	Pass
D	H-Point from Seatback	mm	141 - 151	145	Pass
E	Shoulder Pivot from Backline	mm	97 - 107	102	Pass
F	Thigh Clearance	mm	119 - 135	125	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	184	Pass
J	Head Circumference	mm	541 - 551	545	Pass
K	Buttock to Knee Length	mm	514 - 540	527	Pass
L	Popliteal Height	mm	343 - 369	352	Pass
M	Knee Pivot to Floor Height	mm	392 - 409	401	Pass
N	Buttock Popliteal Length	mm	416 - 442	432	Pass
O	Chest Depth w/o Jacket	mm	195 - 211	202	Pass
P	Foot Length	mm	216 - 232	221	Pass
Q	Hip Breadth with Pelvic Plug	mm	313 - 323	315	Pass
R	Arm Length	mm	249 - 259	252	Pass
S	Knee Joint to Seatback	mm	477 - 493	481	Pass
V	Shoulder Width	mm	341 - 357	352	Pass
W	Foot Width	mm	78 - 94	86	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.: 299

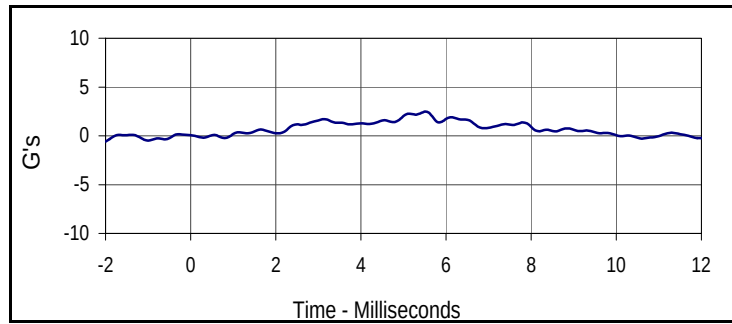
Test Date: 11/12/12
 Test I.D.: 299HD048



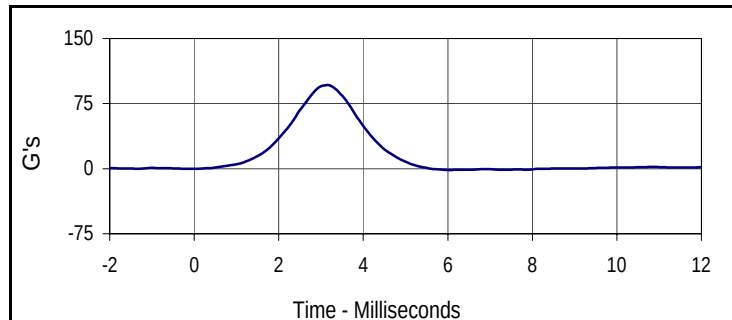
Tested Parameter	Units	Specification	Result	Pass/Fail
Head Assembly Soak Time	Minutes	≥240	250	Pass
Temperature During Soak	Max	18.9 to 25.6	21.4	Pass
	Min		20.8	Pass
Humidity During Soak	Max	10.0 to 70.0	30.5	Pass
	Min		28.1	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.1	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	30.3	Pass
Peak Head Resultant Acceleration	G's	115 to 137	124.5	Pass
Peak Head X Acceleration	G's	<15	2.5	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	2.8	Pass
Overall Test Results				Pass



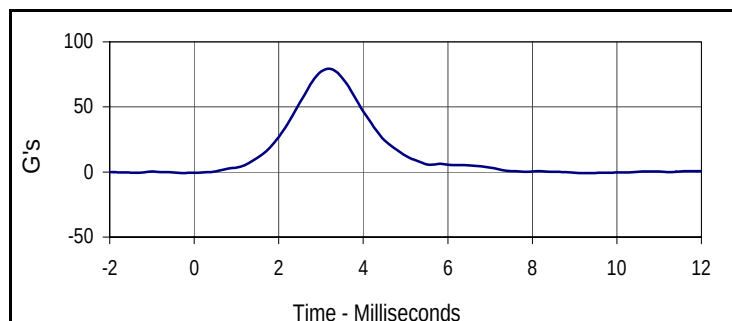
Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
124.5	3.2	0.4	-1.8



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
2.5	5.5	-0.6	-2.0



Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
96.3	3.1	-1.5	6.0



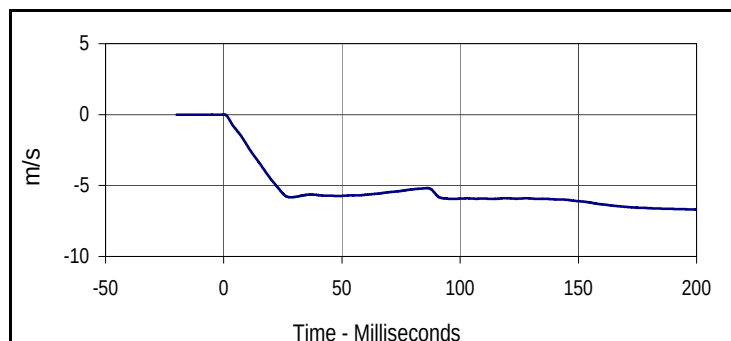
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
79.3	3.2	-0.9	9.3

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

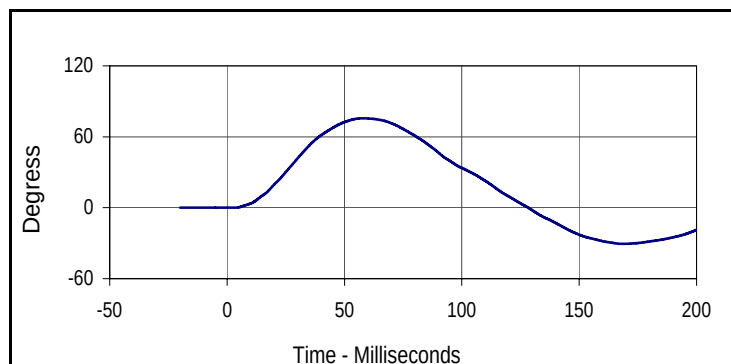
Test Date: 11/12/12
 Test I.D.: 299NB048



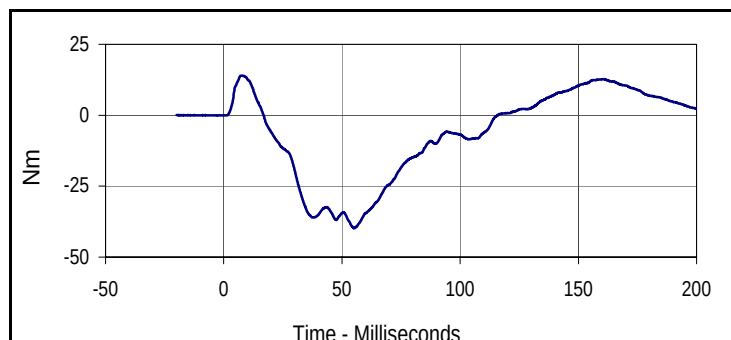
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	300	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.4	Pass
	Min	°C		20.8	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.5	Pass
	Min	%		28.1	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.1	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.9	Pass
Pendulum Velocity		m/s	5.51 to 5.63	5.53	Pass
Pendulum Deceleration	10 msec	m/s	-2.20 to -2.80	-2.20	Pass
	15 msec	m/s	-3.30 to -4.10	-3.39	Pass
	20 msec	m/s	-4.40 to -5.40	-4.57	Pass
	25 msec	m/s	-5.40 to -6.10	-5.56	Pass
	25-100 msec	m/s	-5.50 to -6.20	-5.95	Pass
D-Plane Rotation	Max	Degrees	71 to 81	75.6	Pass
	Time	msec	50 to 70	57.9	Pass
Peak Occipital Condyle Moment		Nm	-36 to -44	-39.8	Pass
Decaying Moment Time to Cross 0 Nm		msec	102 to 126	115.9	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	-0.1	-6.7	200.0



Curve Description			
Maximum Translation Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degress
Max	Time	Min	Time
75.6	57.9	-30.6	169.0



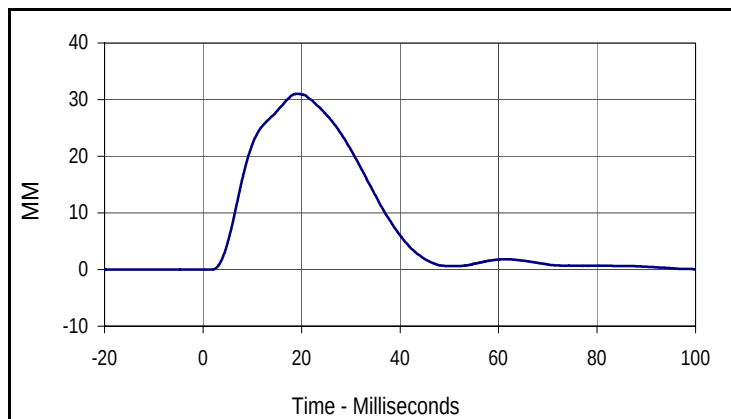
Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
14.0	7.2	-39.8	55.2

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

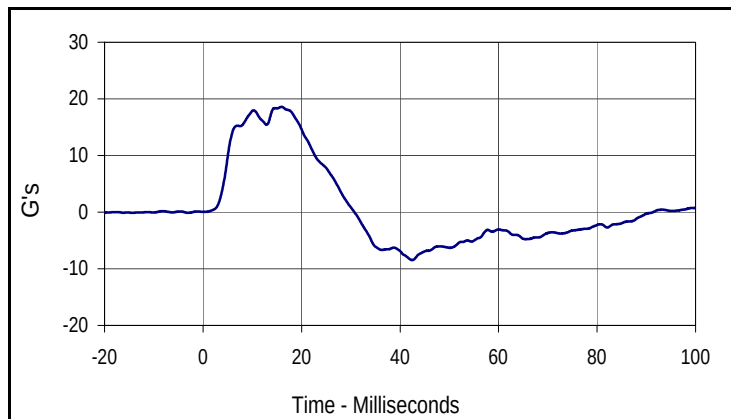
Test Date: 11/12/12
 Test I.D.: 299SH048



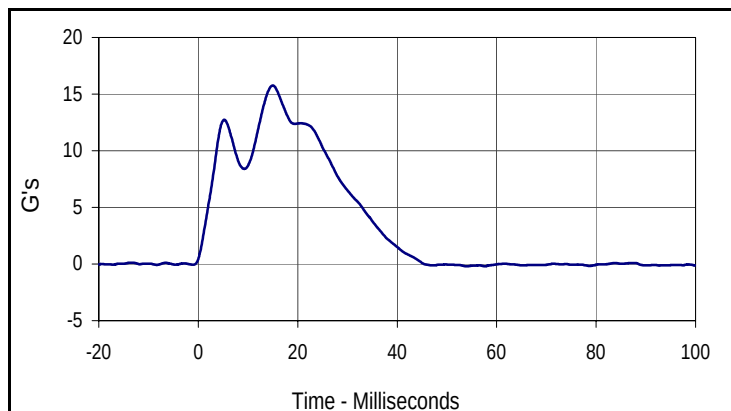
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	355	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.4	Pass
	Min	°C		20.8	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.5	Pass
	Min	%		28.1	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.1	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.4	Pass
Impactor Velocity		m/s	4.20 to 4.40	4.30	Pass
Peak Shoulder Deflection		mm	28 to 37	31.0	Pass
Peak Lateral Spine Acceleration Y		G's	17 to 22	18.6	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
31.0	19.1	0.0	-5.2



Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
18.6	16.0	-8.5	42.4



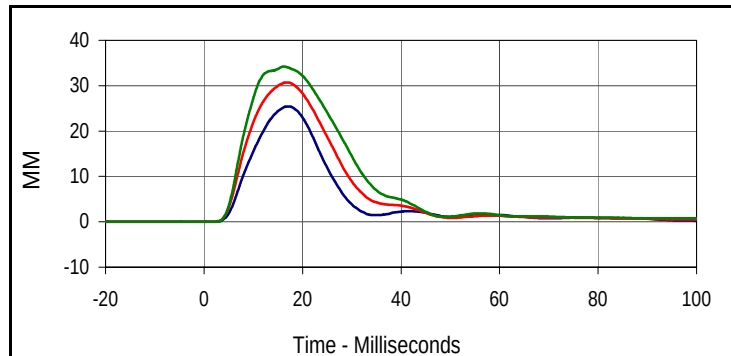
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
15.8	15.0	-0.2	53.9

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

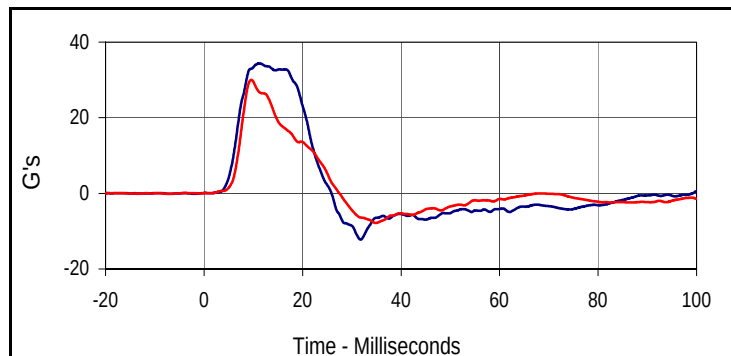
Test Date: 11/12/12
 Test I.D.: 299TWA048



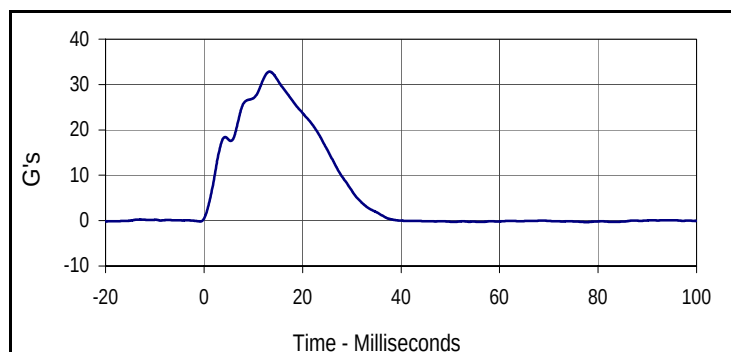
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	380	Pass
Temperature During Soak	Max	20.6 to 22.2	21.4	Pass
	Min		20.8	Pass
Humidity During Soak	Max	10.0 to 70.0	30.5	Pass
	Min		28.1	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.1	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	30.4	Pass
Impactor Velocity	m/s	6.6 to 6.8	6.68	Pass
Peak Shoulder Deflection	mm	31 to 40	32.7	Pass
Peak Upper Thorax Rib Deflection	mm	25 to 32	25.4	Pass
Peak Middle Thorax Rib Deflection	mm	30 to 36	30.7	Pass
Peak Lower Thorax Rib Deflection	mm	32 to 38	34.2	Pass
Peak Upper Spine Y Acceleration	G's	34 to 43	34.4	Pass
Peak Lower Spine Y Acceleration	G's	29 to 37	30.0	Pass
Peak Impactor Acceleration	G's	30 to 36	32.8	Pass
Overall Test Results			Pass	



Curve Description			
Upper Thorax Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
25.4	17.1	0.0	-15.9
Middle Thorax Deflection			
Max	Time	Min	Time
30.7	16.8	0.0	-17.4
Lower Thorax Deflection			
Max	Time	Min	Time
34.2	16.1	0.0	-15.3



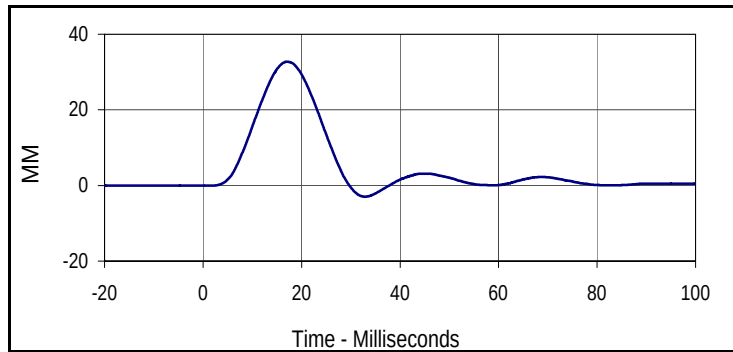
Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
34.4	11.2	-12.3	31.8
Lower Spine Y Acceleration			
Max	Time	Min	Time
30.0	9.6	-7.8	34.9



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
32.8	13.3	-0.3	77.6

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

Test Date: 11/12/12
 Test I.D.: 299TWA048



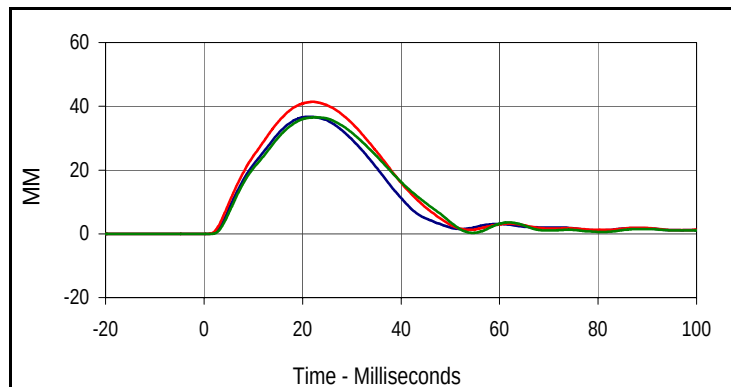
Curve Description			
Shoulder Deflection			
Plot No.	Type	SAE Class	Units
007	FIL	600	MM
Max	Time	Min	Time
32.7	17.0	-3.0	32.9

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

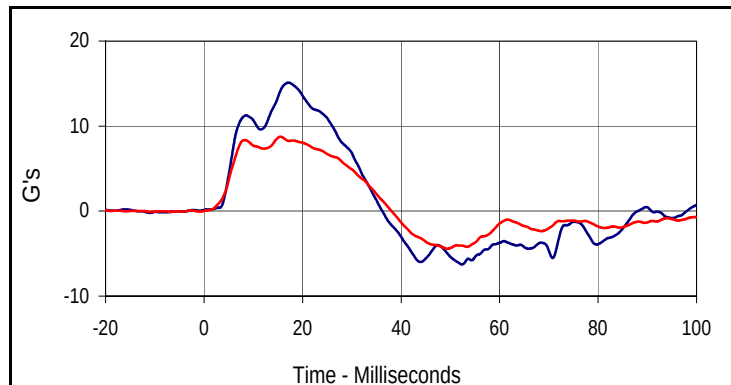
Test Date: 11/12/12
 Test I.D.: 299TWOA048



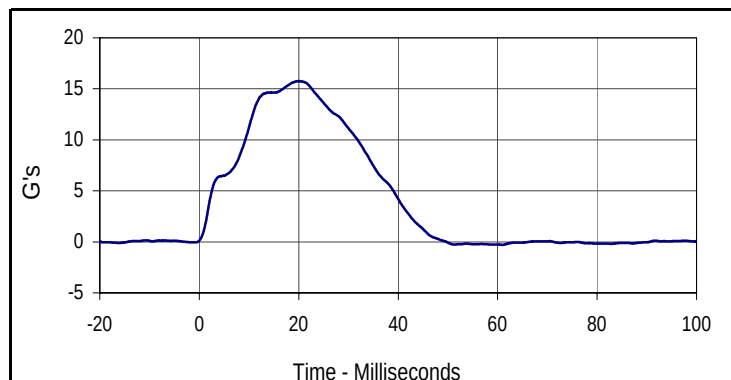
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	405	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.4	Pass
	Min	°C		20.8	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.5	Pass
	Min	%		28.1	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.1	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.2	Pass
Impactor Velocity		m/s	4.2 to 4.4	4.29	Pass
Peak Upper Thorax Rib Deflection		mm	32 to 40	36.7	Pass
Peak Middle Thorax Rib Deflection		mm	39 to 45	41.4	Pass
Peak Lower Thorax Rib Deflection		mm	35 to 43	36.6	Pass
Peak Upper Spine Y Acceleration		G's	13 to 17	15.1	Pass
Peak Lower Spine Y Acceleration		G's	7 to 11	8.7	Pass
Peak Impactor Acceleration		G's	14 to 18	15.8	Pass
Overall Test Results				Pass	



Curve Description			
Upper Thorax Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
36.7	21.5	0.0	-19.5
Middle Thorax Deflection			
Max	Time	Min	Time
41.4	22.2	0.0	-19.7
Lower Thorax Deflection			
Max	Time	Min	Time
36.6	22.7	0.0	-20.0



Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
15.1	17.1	-6.3	52.4
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
8.7	15.5	-4.4	49.5



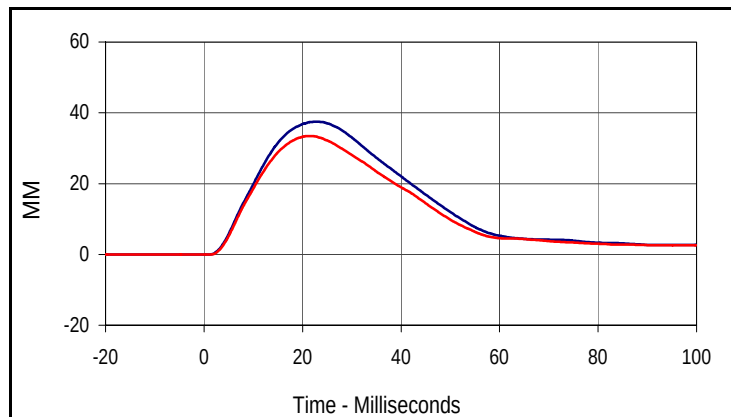
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
15.8	20.0	-0.3	61.0

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

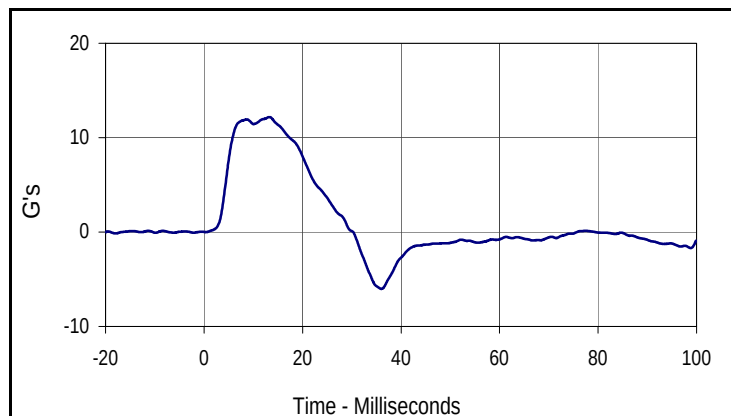
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 Test I.D.: 299ABD048



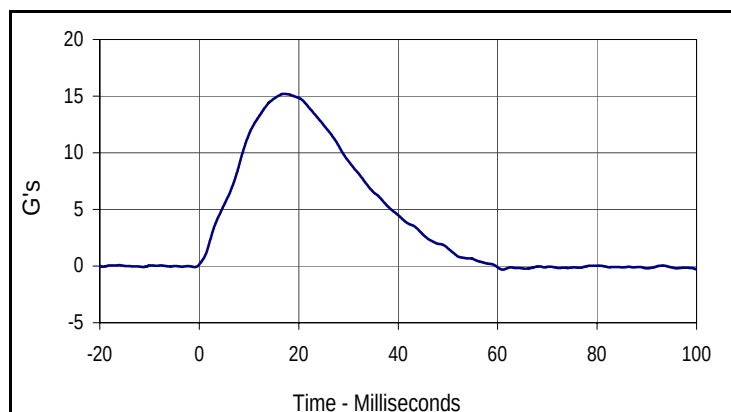
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	430	Pass
Temperature During Soak	Max °C	20.6 to 22.2	21.4	Pass
	Min °C		20.8	Pass
Humidity During Soak	Max %	10.0 to 70.0	30.5	Pass
	Min %		28.1	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.1	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	30.1	Pass
Impactor Velocity	m/s	4.2 to 4.4	4.29	Pass
Peak Upper Abdominal Rib Deflection	mm	36 to 47	37.5	Pass
Peak Lower Abdominal Rib Deflection	mm	33 to 44	33.4	Pass
Peak Lower Spine Y Acceleration	G's	9 to 14	12.2	Pass
Peak Impactor Acceleration	G's	12 to 16	15.2	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	22.9	0.0	-9.9
Curve Description			
Lower Abdominal Rib Deflection			
Plot No.	Type	SAE Class	Units
002	FIL	600	MM
Max	Time	Min	Time
33.4	21.3	0.0	-8.9

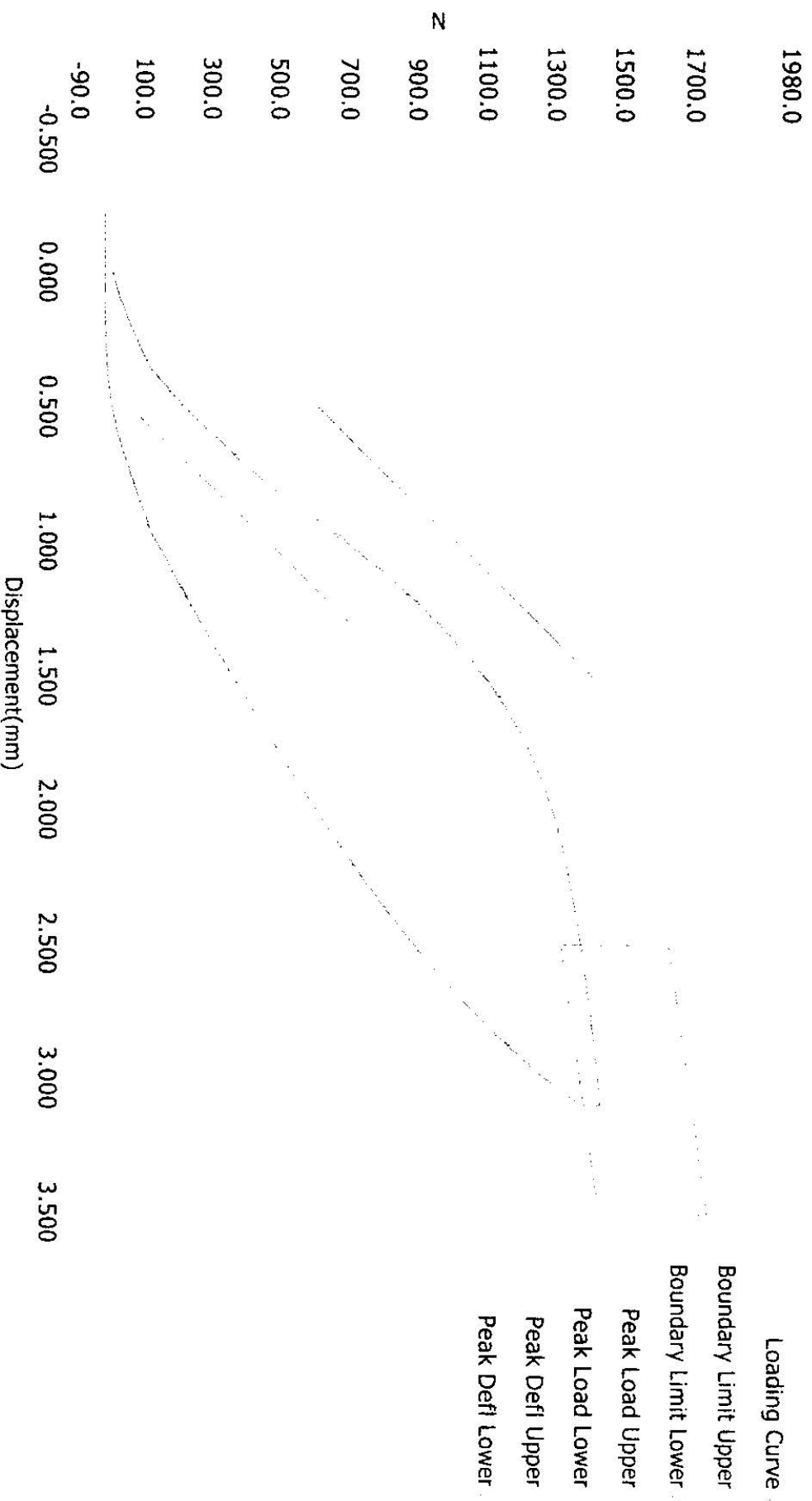


Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
12.2	13.3	-6.0	36.0



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
15.2	16.9	-0.3	61.0

Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

<u>Test ID</u>	<u>Part Serial Number</u>	<u>Test Date</u>	<u>Test Time</u>
46008		9/20/2011	9:28 PM
<u>Cert ID</u>	<u>ATD Serial Number</u>	<u>ATD Type</u>	
N/A		SIDIIs	

Current Date : 9/20/2011

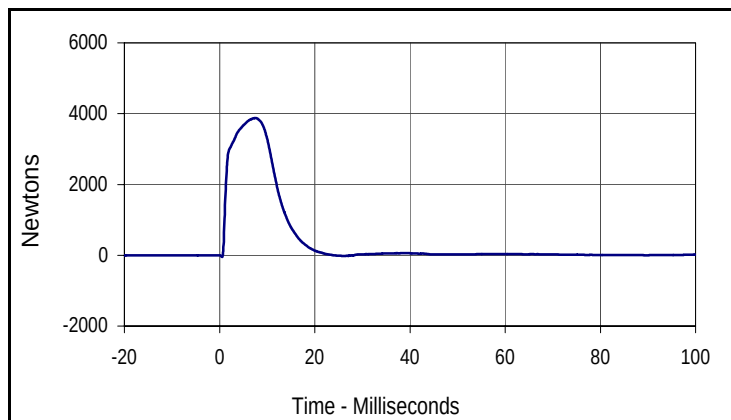
Current Time : 21:28:53

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

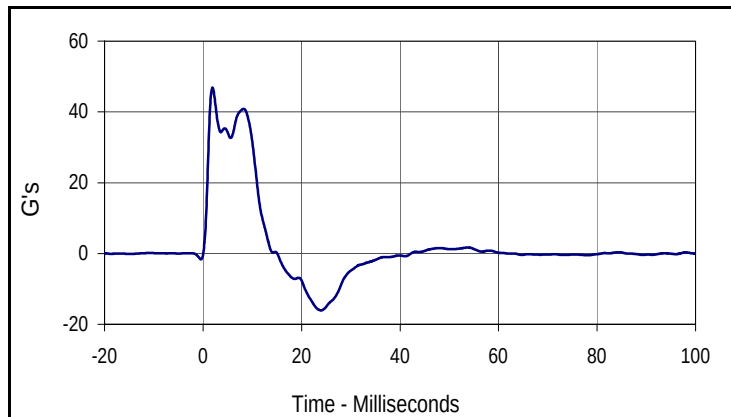
Test Date: 11/12/12
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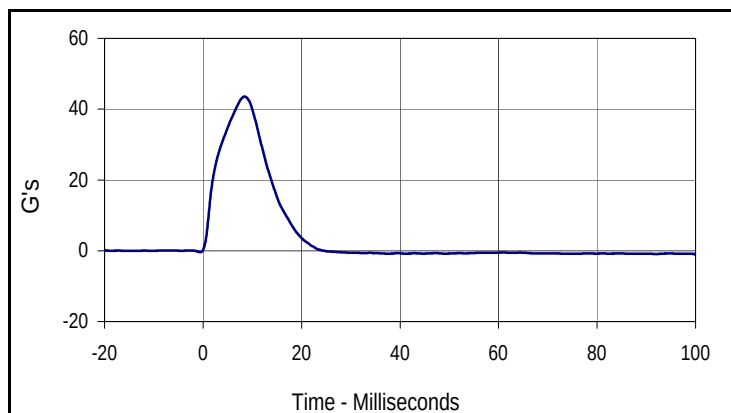
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	455	Pass
Temperature During Soak	Max	20.6 to 22.2	21.4	Pass
	Min		20.8	Pass
Humidity During Soak	Max	10.0 to 70.0	30.5	Pass
	Min		28.1	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	29.9	Pass
Impactor Velocity	m/s	6.6 to 6.8	6.72	Pass
Peak Acetabulum Force Y	Newtons	3600 to 4300	3875.7	Pass
Peak Pelvis Y Acceleration After 6 msec.	G's	34 to 42	40.8	Pass
Peak Impactor Acceleration	G's	38 to 47	43.5	Pass
Overall Test Results			Pass	



Curve Description			
Pelvis Acetabulum Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
3875.7	7.5	-46.7	0.5



Curve Description			
Pelvis Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
46.9	1.9	-16.1	24.0



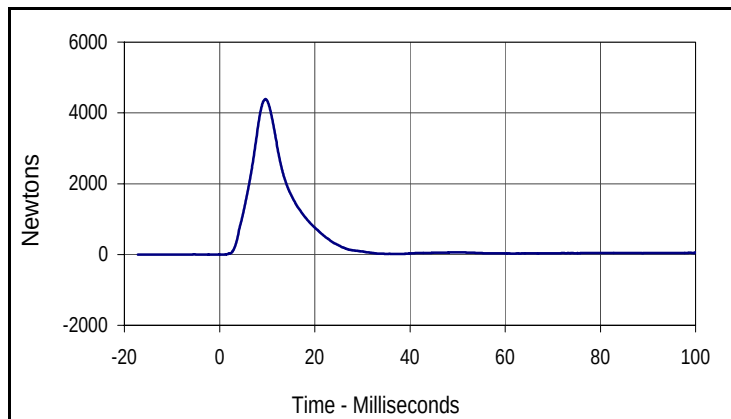
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
43.5	8.4	-1.0	99.9

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

Test Date: 11/12/12
 Test I.D.: 299PL048



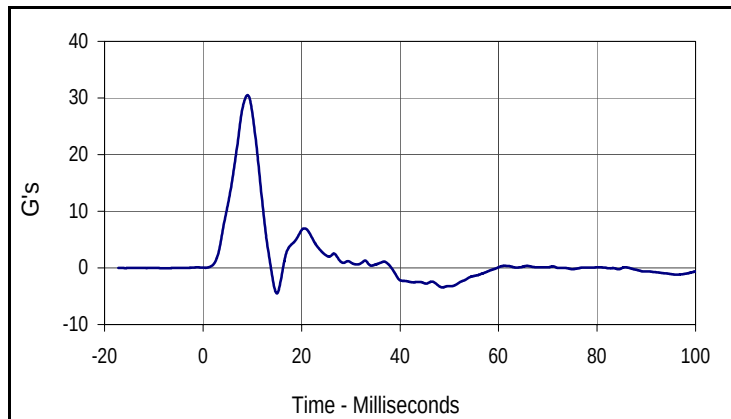
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	510	Pass
Temperature During Soak	Max	20.6 to 22.2	21.4	Pass
	Min		20.8	Pass
Humidity During Soak	Max	10.0 to 70.0	30.5	Pass
	Min		28.1	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	30.0	Pass
Impactor Velocity	m/s	4.2 to 4.4	4.33	Pass
Peak Iliac Force	Newtons	4100 to 5100	4387.5	Pass
Peak Pelvis Y Acceleration	G's	28 to 39	30.5	Pass
Peak Impactor Acceleration	G's	36 to 45	40.1	Pass
Overall Test Results			Pass	



Curve Description

Pelvis Iliac Force

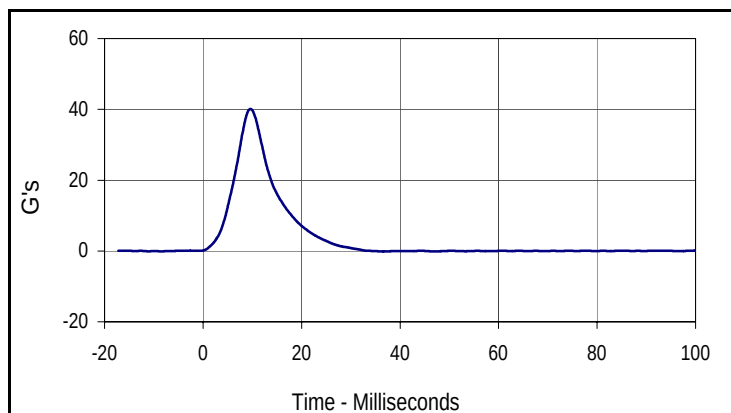
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4387.5	9.6	-3.0	-15.9



Curve Description

Pelvis Y Acceleration

Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
30.5	9.0	-4.5	15.0



Curve Description

Impactor Acceleration

Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
40.1	9.6	-0.1	36.7

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	10/2/12
				Y	P51929	Endevco	10/2/12
				Z	P51934	Endevco	10/2/12
Displacement Potentiometers	Shoulder			Y	1074	FTSS	10/5/12
	Thoracic Rib	Upper	Y	1143	FTSS	10/5/12	
		Middle	Y	1160	FTSS	10/5/12	
		Lower	Y	1213	FTSS	10/5/12	
	Abdominal Rib	Upper	Y	1218	FTSS	10/5/12	
		Lower	Y	1234	FTSS	10/5/12	
Lower Spine Accelerometers (T12)				X	P63999	Endevco	10/3/12
				Y	P58872	Endevco	10/3/12
				Z	P58795	Endevco	10/3/12
Acetabulum Load Cell				Y	272	Denton	5/24/12
Iliac Wing Load Cell				Y	284	Denton	5/24/12
Pelvis Plug (Struck Side)					45980	FTSS	9/20/11
Pelvis Plug (Non-Struck Side)					45969	FTSS	9/20/11

TABLE 2 – Vehicle Instrumentation

Vehicle Instrumentation		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	Ketx5a	ICSensor	8/20/12
Vehicle Center of Gravity	Y	Ketx5b	ICSensor	8/20/12
Vehicle Center of Gravity	Z	Ketx5c	ICSensor	8/20/12
Left Floor Sill	Y	13380	Endevco	6/21/12
A-Pillar Sill	Y	13346	Endevco	6/18/12
A-Pillar Low	Y	13325	Endevco	6/18/12
A-Pillar Mid	Y	12898	Endevco	1/11/12
B-Pillar Sill	Y	13320	Endevco	6/18/12
B-Pillar Low	Y	13336	Endevco	6/28/12
B-Pillar Mid	Y	12862	Endevco	1/11/12
Driver Seat	Y	12919	Endevco	10/30/12
Engine Top	X	13316	Endevco	6/18/12
Engine Top	Y	12887	Endevco	12/17/11
Firewall	Y	13373	Endevco	6/26/12
Right Roof	Y	13330	Endevco	6/18/12
Right Floor Sill	Y	13375	Endevco	7/9/12
Rear Floorpan	X	12489	Endevco	2/14/12
Rear Floorpan	Y	13322	Endevco	6/18/12