

REPORT NUMBER: SPNCAP-KAR-15-003

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

**NISSAN MOTOR CO., LTD.
2015 NISSAN ALTIMA 2.5 S 4-DOOR SEDAN**

NHTSA No: M20155200

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



SEPTEMBER 24, 2014

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
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16. Abstract A 32.2 km/h (20 mph) 75° oblique impact Side NCAP Test was conducted on the subject 2015 Nissan Altima 2.5 S 4-door sedan 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 September 10, 2014. The impact velocity was 31.62 km/h and the outside ambient temperature at the struck (driver's) side of the vehicle was 30.0° C. The target vehicle's maximum post-test static crush was 419 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 (SID-IIs)</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>253.7</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td>g</td> <td>82</td> <td>37</td> </tr> <tr> <td>Total Pelvic Force (Sum of Acetabular and Iliac Forces)</td> <td>N</td> <td>5525</td> <td>3443</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38</td> <td>21</td> </tr> <tr> <td>Maximum Abdominal Rib Deflection</td> <td>mm</td> <td>45</td> <td>13</td> </tr> </tbody> </table> The 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 (SID-IIs)			Units	Threshold	Result	Head Injury Criteria (HIC ₃₆)		1000	253.7	Resultant Lower Spine Acceleration	g	82	37	Total Pelvic Force (Sum of Acetabular and Iliac Forces)	N	5525	3443	Maximum Thoracic Rib Deflection	mm	38	21	Maximum Abdominal Rib Deflection	mm	45	13
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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 Washington, DC 20590 e-mail: tis@nhtsa.dot.gov FAX: 202-493-2833																												
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SECTION 1

TEST PURPOSE AND PROCEDURE

This side impact test is part of the MY 2015 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract number DTNH22-09-D-00122. The purpose of this test is to generate comparative side impact performance in a 2015 Nissan Altima 2.5 S 4-door sedan. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated September 2013.

SECTION 2

SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a 2015 Nissan Altima 2.5 S 4-door sedan. The subject vehicle was towed into the rigid pole at an angle of 74.6° and a velocity of 31.62 km/h. The test was conducted by KARCO Engineering, LLC. in Adelanto, California on September 10, 2014. 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 2013. Camera locations and other pertinent camera information are included in this report.

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

- Primary and Redundant 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. Appendix D contains the test equipment and instrumentation calibration data.

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	253.7
Lower Spine (T12) Resultant Acceleration	g	82	37
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3443
Maximum Thoracic Rib Deflection	mm	38*	21
Maximum Abdominal Rib Deflection	mm	45*	13

*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

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

Upon impact, the vehicle crushed in such a way that on rebound, the vehicle's fuel lines were caught by the tow/guidance system disconnect device. As a result, the fuel lines were pulled away from the vehicle and protruded outboard and away from the vehicle's impact zone. The fuel lines stayed intact and there was no Stoddard solvent leakage immediately after the impact or during any portion of the static rollover.

SECTION 3

OCCUPANT AND VEHICLE INFORMATION/DATA SHEETS

Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan NHTSA No. M20155200
Test Program: NCAP Side Pole Impact Test Test Date: 09/10/14

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: 2015 Nissan Altima 2.5 S 4-Door Sedan NHTSA No. M20155200
 Test Program: NCAP Side Pole Impact Test Test Date: 09/10/14

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	M20155200
Model Year	2015
Make	Nissan
Model	Altima 2.5 S
Body Style	4-Door Sedan
VIN	1N4AL3AP5FN314978
Body Color	Gun Metallic
Odometer Reading (km / mi)	204 / 127
Engine Displacement (L)	2.5
Type / No. of Cylinders	Inline 4
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	CVT
Overdrive	Yes
Final Drive	Front
Roof Rack	No
Sunroof / T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes

Traction Control System (TCS)	Yes
Auto-Leveling System	No
Automatic Door Locks	Yes
Power Window Auto-Reverse	Yes
Other Optional Feature	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	No

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

No

DATA FROM CERTIFICATION LABEL

Manufactured By	Nissan Motor Co., LTD.
Date of Manufacture	Jun-14
Vehicle Type	Passenger Car

GVWR (kg)	1910
GAWR Front (kg)	1005
GAWR Rear (kg)	940

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity	2	3		5	
Capacity Weight (VCW) (kg)				408.0	A
DSC x 68.04 (kg)				340.2	B
Cargo Weight (RCLW) (kg)				67.8	A-B

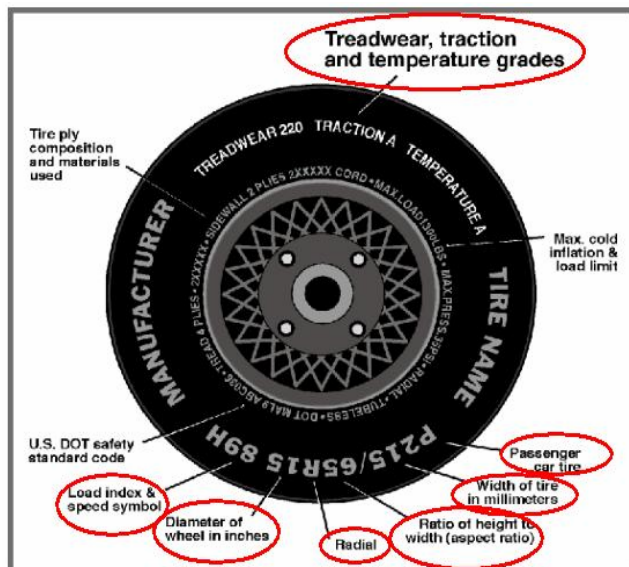
VEHICLE SEAT TYPE

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: 2015 Nissan Altima 2.5 S 4-Door Sedan NHTSA No. M20155200
 Test Program: NCAP Side Pole Impact Test Test Date: 09/10/14



Measured Parameter	Front	Rear
Max. Tire Pressure (kpa)	300	300
Cold Pressure (kPa)	220	220
Recommended Tire Size	P215/60R16	P215/60R16
Tire Size on Vehicle	P215/60R16	P215/60R16
Tire Manufacturer	Hankook	Hankook
Tire Model	Optimo H426	Optimo H426
Treadware	640	640
Traction Grade	B	B
Temperature Grade	A	A
Tire Plies Sidewall	1 Polyester	1 Polyester
Tire Plies Body	2 Steel, 1 Polyester, 1 Nylon	2 Steel, 1 Polyester, 1 Nylon
Load Index/Speed Symbol	94T	94T
Tire Material	Steel, Polyester, Nylon	Steel, Polyester, Nylon
DOT Safety Code Left	T7UP DL H 0414	T7UP DL H 0414
DOT Safety Code Right	T7UP DL H 0414	T7UP DL H 0414

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan NHTSA No. M20155200
 Test Program: NCAP Side Pole Impact Test Test Date: 09/10/14

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	235	235	235	235
Tire Placard	kPa	220	220	220	220
Owner's Manual	kPa	220	220	220	220
As Tested	kPa	220	220	220	220

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	442.5	291.0		456.5	331.0		455.5	349.0	
Right	kg	426.0	288.0		440.5	330.0		426.5	332.0	
Ratio	%	60.0%	40.0%	100.0%	57.6%	42.4%	100.0%	56.4%	43.6%	100.0%
Total	kg	868.5	579.0	1447.5	897.0	661.0	1558.0	882.0	681.0	1563.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1447.5	A
Actual Weight of 1 P572 O ATD Used	kg	49.0	B
Rated Cargo/Luggage Wt (RCLW)	kg	67.8	C
Calculated Vehicle Target Wt (TVTW)	kg	1564.3	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

TEST VEHICLE ATTITUDE AND CG

Measurement Description	Units	As Delivered	As Tested	Fully Loaded	Meets Requirement***
Driver Door Sill Angle (front-to-rear)*	°	-0.3	-0.1	0.0	Yes
Front Passenger Sill Angle (front-to-rear)*	°	-0.1	-0.1	0.0	Yes
Front Bumper-Line Angle (left-to-right)**	°	-0.2	-0.3	-0.4	Yes
Rear Bumper-Line Angle (left-to-right)**	°	0.0	-0.1	-0.1	Yes
Vehicle CG (Aft of Front Axle)	mm	1110	1177	1209	
Vehicle CG (Left (+)/Right (-) from Longitudinal Centerline)	mm	11	9	23	

*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. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan NHTSA No. M20155200
Test Program: NCAP Side Pole Impact Test Test Date: 09/10/14

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Spare Tire and Tools	16.0
Trunk Trim	1.0
Hood Soft Trim	1.0
Ballast / Equipment Added	45.0

Test Height Adjustable Setting (If Applicable)	
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DATA SHEET NO. 2**SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT, AND FUEL SYSTEM DATA**

Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan NHTSA No. M20155200
 Test Program: NCAP Side Pole Impact Test Test Date: 09/10/14

SEAT POSITIONING

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

SCRL ANGLE RANGE

Seat	SCRL (°)		
	Max	Min	Mid
Driver Seat	4.0	0.0	2.0
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	2.0	537	Max	503	520	537
			Mid	503	520	537
			Min	503	520	537
Front Passenger Seat	Fixed	540	Max	508	524	540
			Mid	508	524	540
			Min	508	524	540
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: 2015 Nissan Altima 2.5 S 4-Door Sedan NHTSA No. M20155200
 Test Program: NCAP Side Pole Impact Test Test Date: 09/10/14

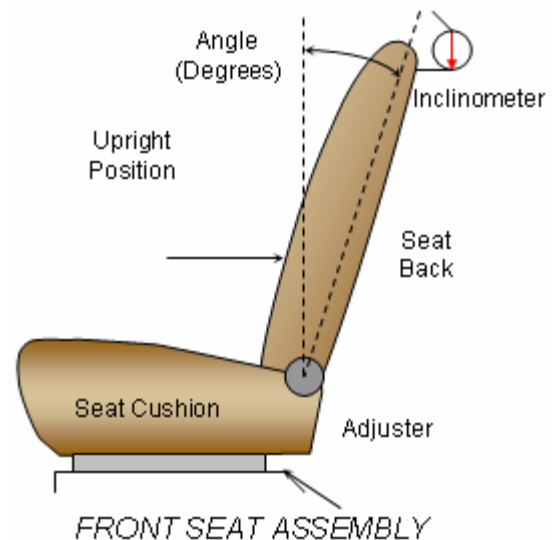
SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position From Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	240	25	0	0
Front Passenger Seat	240	25	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

*Detent zero (0) is the forward most detent

SEAT BACK ADJUSTMENT

The driver's seat back is positioned such that the dummy's head is level. The front center and front passenger's seat backs are positioned in a similar manner to the driver's seat. The struck side rear passenger seat back is positioned in accordance with the information provided by the manufacturer in Form 1 for the 5th percentile female dummy in a Side NCAP MDB Test. The rear center and non-struck side rear passenger's seat back is set to match the struck side rear seat back. Seat back angle is measured at the headrest post.



Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degree	Detent*
Driver Seat w/Seated Dummy	62.6	33	8.9	1
Front Passenger Seat	65.5	33	9.1	1
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

*Detent zero (0) is the forward most detent

DATA SHEET NO. 2 ... (CONTINUED)

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

Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan NHTSA No. M20155200
Test Program: NCAP Side Pole Impact Test Test Date: 09/10/14

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

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	5	Full Down

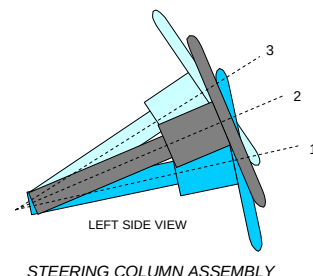
DATA SHEET NO. 2 ... (CONTINUED)

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

Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan NHTSA No. M20155200
Test Program: NCAP Side Pole Impact Test Test Date: 09/10/14

STEERING COLUMN ADJUSTMENT

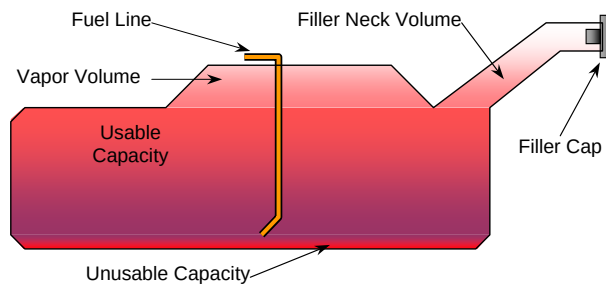
Steering wheel and column adjustments are made so that the steering wheel hub is at the center of the geometric locus it describes when it moves through its full range of motion.



	Degrees	Fore-Aft Position (mm)
Lowermost - Position 1	20.6	80
Geometric Center - Position 2	23.1	109
Uppermost - Position 3	25.7	137
Telescoping Steering Wheel Travel		57
Test Position	23.1	109

FUEL PUMP

The vehicle is equipped with an electric fuel pump.
The fuel pump is activated for one second when the ignition is turned to the "on" position.



FUEL TANK CAPACITY

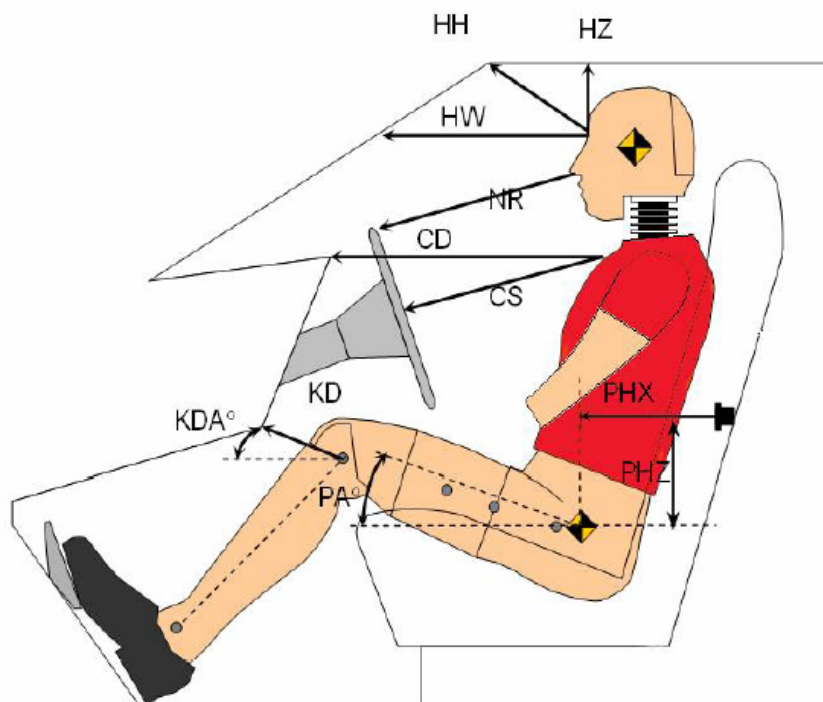
Description	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	67.98
Usable Capacity of "Optional Tank" (see Form No. 1)	
Usable Capacity of "Standard Tank" (see Owner's Manual)	
Usable Capacity of "Optional Tank" (see Owner's Manual)	
93% of Usable Capacity	63.21
Actual amount of Solvent Used in Test	63.21
1/3 of Usable Capacity	22.66

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

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan NHTSA No. M20155200
 Test Program: NCAP Side Pole Impact Test Test Date: 09/10/14

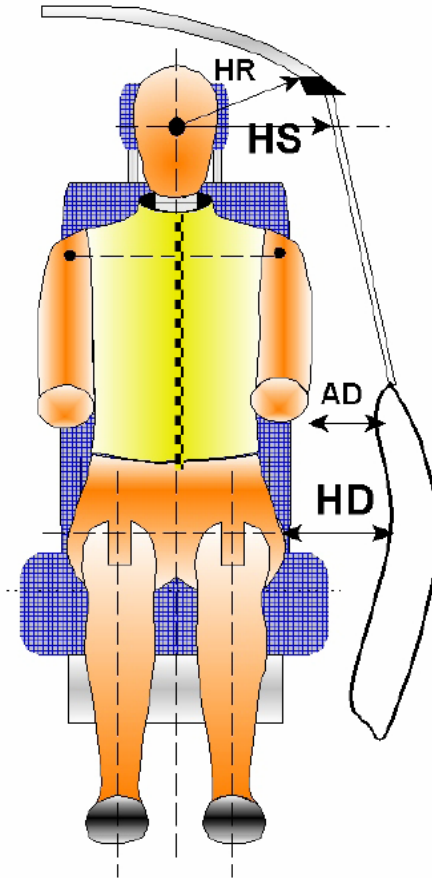


Driver Code	Description	Driver	
		Length (mm)	Angle (°)
HH	Head to Header	272	
HW	Head to Windshield	655	
HZ	Head to Roof	175	
NR	Nose to Rim	226	
CD	Chest to Dash	390	
CS	Chest to Steering Wheel	155	
KD(L)/KDA(L)°	Left Knee to Dash	114	42.7
KD(R)/KDA(R)°	Right Knee to Dash	117	35.5
PAX°	Pelvic Tilt Angle (x-axis)		19.3
PAY°	Pelvic Tilt Angle (y-axis)		0.1
PHX	Hip Point to Striker (x-axis)	352	
PHZ	Hip Point to Striker (z-axis)	128	

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan NHTSA No. M20155200
Test Program: NCAP Side Pole Impact Test Test Date: 09/10/14

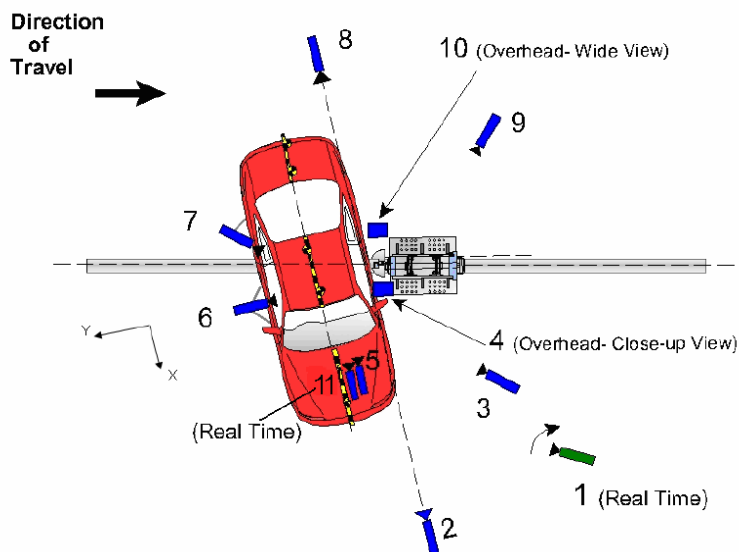


Code	Measurement Description	Units	Driver
HR	Head to Side Header	mm	236
HS	Head to Side Window	mm	373
AD	Arm to Door	mm	164
HD	Hip Point to Door	mm	178

DATA SHEET NO. 5

CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan NHTSA No. M20155200
 Test Program: NCAP Side Pole Impact Test Test Date: 09/10/14



Reference from Point of Impact for X and Y; from Ground for Z):
 +X = Forward of Vehicle, +Y = Right of Vehicle, +Z = Down

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	1.14	0.71	-1.38	35	1000
6	On-Board - Dummy Side View	-0.05	1.64	-1.17	14	1000
7	On-Board - Dummy Rear Oblique View	-0.94	1.68	-1.20	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	1.16	0.76	-1.50		30

*All measurements accurate to ± 6 mm

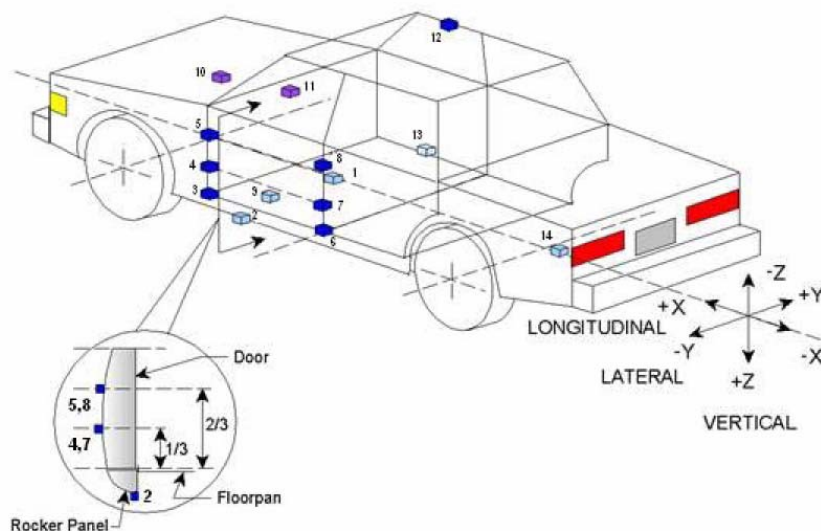
INSTRUMENTATION

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

DATA SHEET NO. 6

TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan NHTSA No. M20155200
 Test Program: NCAP Side Pole Impact Test Test Date: 09/10/14

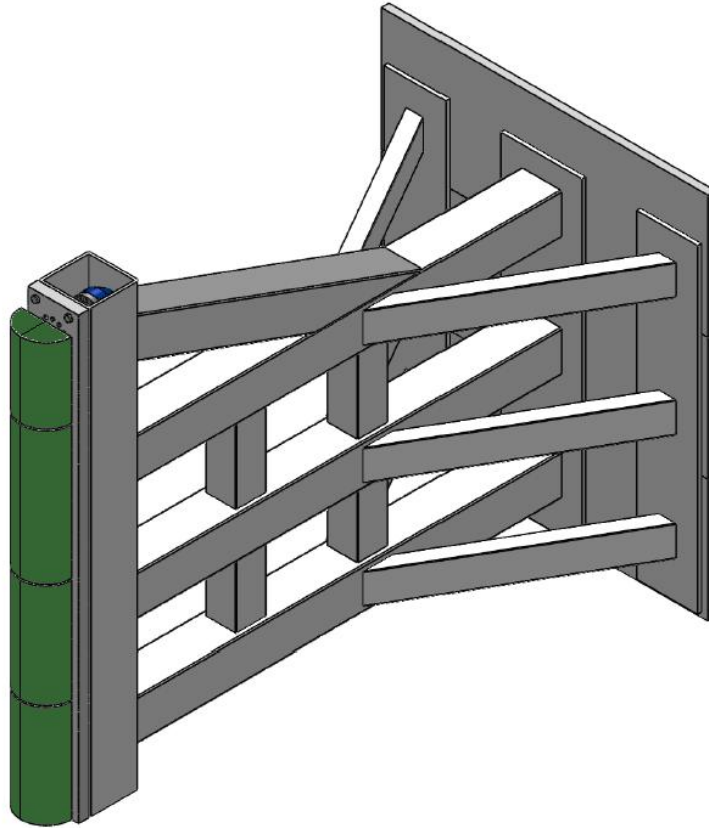


Loc. No.	Sensor Description	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2161	0	-271
2	Left Floor Sill	3045	-803	-209
3	A-Pillar Sill	3346	-794	-395
4	A-Pillar Low	3346	-794	-548
5	A-Pillar Mid	3346	-794	-748
6	B-Pillar Sill	2300	-745	-370
7	B-Pillar Low	2300	-745	-608
8	B-Pillar Mid	2300	-745	-820
9	Driver Seat Track	2511	-190	-242
10	Engine Top	4050	409	-840
11	Firewall	3702	0	-861
12	Right Roof	2375	520	-1436
13	Right Floor Sill	2236	730	-345
14	Rear Floorpan	1277	0	-477

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: 2015 Nissan Altima 2.5 S 4-Door Sedan NHTSA No. M20155200
Test Program: NCAP Side Pole Impact Test Test Date: 09/10/14



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: 2015 Nissan Altima 2.5 S 4-Door Sedan NHTSA No. M20155200Test Program: NCAP Side Pole Impact Test Test Date: 09/10/14**TEST DUMMY INFORMATION AND CONTACT POINTS**

Dummy Body Part	Driver SID-IIs Dummy
Face	Curtain Airbag
Top of Head	Curtain Airbag, Headrest
Left Side of Head	Curtain Airbag
Back of Head	Curtain Airbag, Headrest
Left Shoulder	Seat, Torso/Pelvis Airbag
Upper Torso	Seat, Torso/Pelvis Airbag
Lower Torso	Seat, Torso/Pelvis Airbag
Left Hip	Seat, Torso/Pelvis Airbag, Door Panel
Left Knee	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 occurred
Sill Separation	No separation occurred
Windshield Damage	Broken
Side Window Damage	Left front window broken
Other Notable Effects	None

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

Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan NHTSA No. M20155200
 Test Program: NCAP Side Pole Impact Test Test Date: 09/10/14

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	

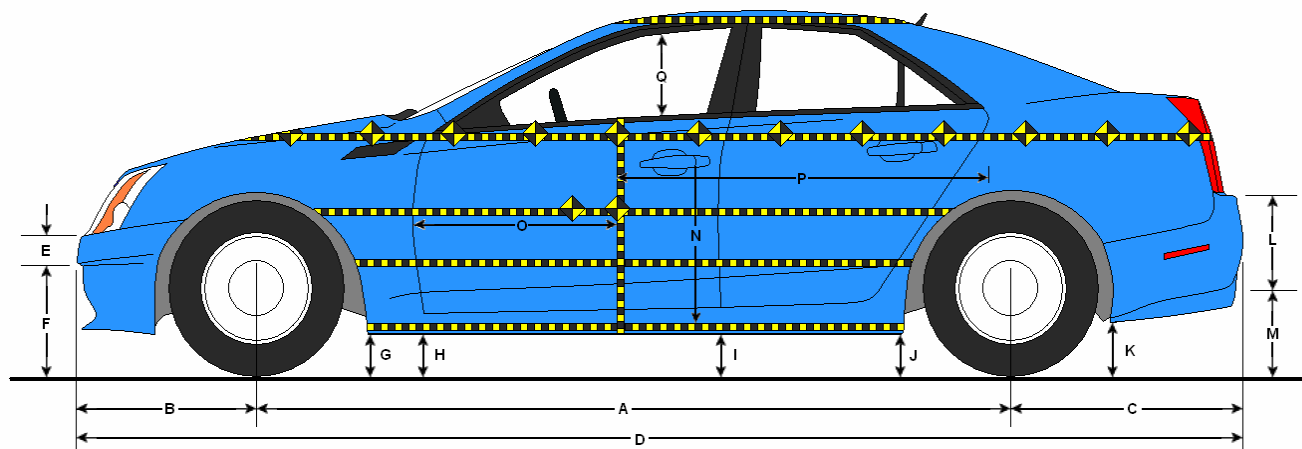
IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vertical Impact Reference Line (Aft of Front Axle)(Intended Impact Point)	mm		1134
Actual Impact Point (Aft of Front Axle)	mm		1139
Horizontal Offset (+ forward / - rearward)	mm	± 38 of Intended Impact Point	-5
Angle Between Vehicle's Longitudinal Centerline and Line of Forward Motion	°	75 ± 3	74.6
Trap No. 1 Velocity (Primary)	km/h	31.4 to 33.0	31.62
Trap No. 2 Velocity (Redundant)	km/h	31.4 to 33.0	31.66

DATA SHEET NO. 9

TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan NHTSA No. M20155200
 Test Program: NCAP Side Pole Impact Test Test Date: 09/10/14



LEFT SIDE VIEW

All measurements in mm with tolerance of $\pm 3\text{mm}$

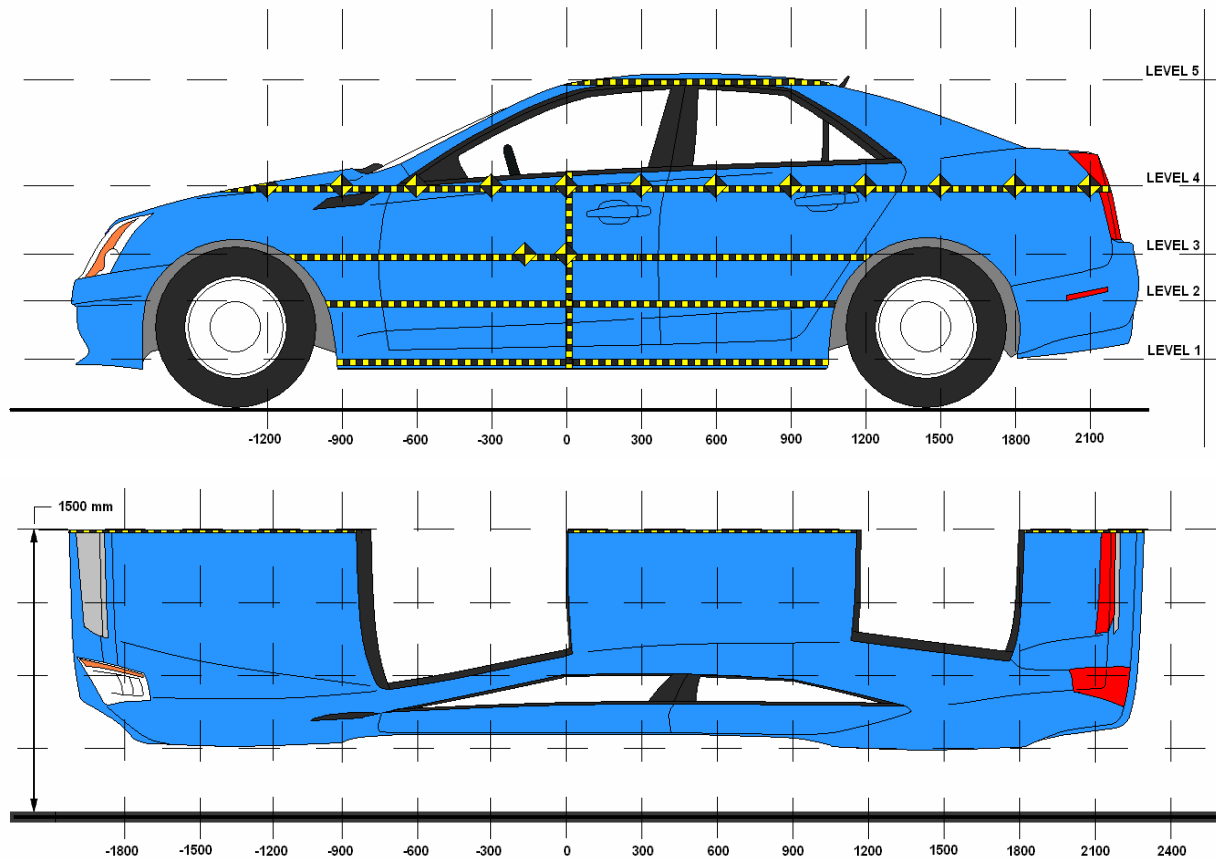
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2774	2716	-58
B	Front Axle to FSOV	975	989	14
C	Rear Axle to RSOV	1115	1132	17
D	Total Length at Centerline	4863	4837	-26
E	Front Bumper Thickness	152	150	-2
F	Front Bumper Bottom to Ground	386	418	32
G	Sill Height at Front Wheel Well	191	201	10
H	Sill Height at Front Door Leading Edge	192	200	8
I	Sill Height at B-Pillar	254	258	4
J1	Sill Height at Rear Wheel Well	222	259	37
J2	Pinch Weld Height at Rear Wheel Well	205	229	24
K	Sill Height Aft of Rear Wheel Well	274	298	24
L	Rear Bumper Thickness	181	179	-2
M	Rear Bumper Bottom to Ground	428	440	12
N	Sill Height to Bottom of Front Window Sill	668	663	-5
O	Front Door Leading Edge to Impact CL	658	574	-84
P	Rear Door Trailing Edge to Impact CL	1544	1467	-77
Q	Front Window Opening	420	431	11
R	Right Side Length	3252	3264	12
S	Left Side Length	3249	3165	-84
T	Vehicle Width at B-Pillar	1821	1710	-111

DATA SHEET NO. 10

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan NHTSA No. M20155200
 Test Program: NCAP Side Pole Impact Test Test Date: 09/10/14



NOTE: All measurements in mm with tolerance of $\pm 3\text{mm}$

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Description	Height Above Ground (mm)	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	238	363	0
2	Occupant H-Point	532	407	0
3	Mid-Door	667	419	0
4	Window Sill	919	350	0
5	Window Top	1385	178	0

DATA SHEET NO. 10 ... (CONTINUED)

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan NHTSA No. M20155200
 Test Program: NCAP Side Pole Impact Test Test Date: 09/10/14

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			581	701				630	749				49	48	
-750	598	585	590	694		610	641	644	750		12	56	54	56	
-600	623	596	604	686		703	686	689	754		80	90	85	68	
-450	633	605	602	686		771	757	766	790		138	152	164	104	
-300	634	604	599	678		837	833	850	858		203	229	251	180	
-150	635	601	596	672		909	917	934	936		274	316	338	264	
0	636	600	593	665	887	999	1007	1012	1015	1065	363	407	419	350	178
150	635	599	592	658	896	933	978	988	990	1058	298	379	396	332	162
300	635	598	591	650	901	871	886	871	886	1030	236	288	280	236	129
450	634	598	590	645	905	815	781	765	798	1011	181	183	175	153	106
600	631	598	590	636	908	763	730	720	761	993	132	132	130	125	85
750	627	596	590	635	909	715	705	698	741	976	88	109	108	106	67
900	620	596	591	637	908	675	679	677	724	965	55	83	86	87	57
1050	610	594	591	640	905	639	655	656	708	958	29	61	65	68	53
1200	600	589	590	642	901	606	629	634	692	954	6	40	44	50	53
1350			583	654	904			607	685	953			24	31	49
1500				650	909				660	953				10	44
1650				656					690					34	
1800				663					694					31	
1950				676					703					27	
2100				693					715					22	
2250															
2400															
2550															
2700															
2850															

DATA SHEET NO. 10 ... (CONTINUED)

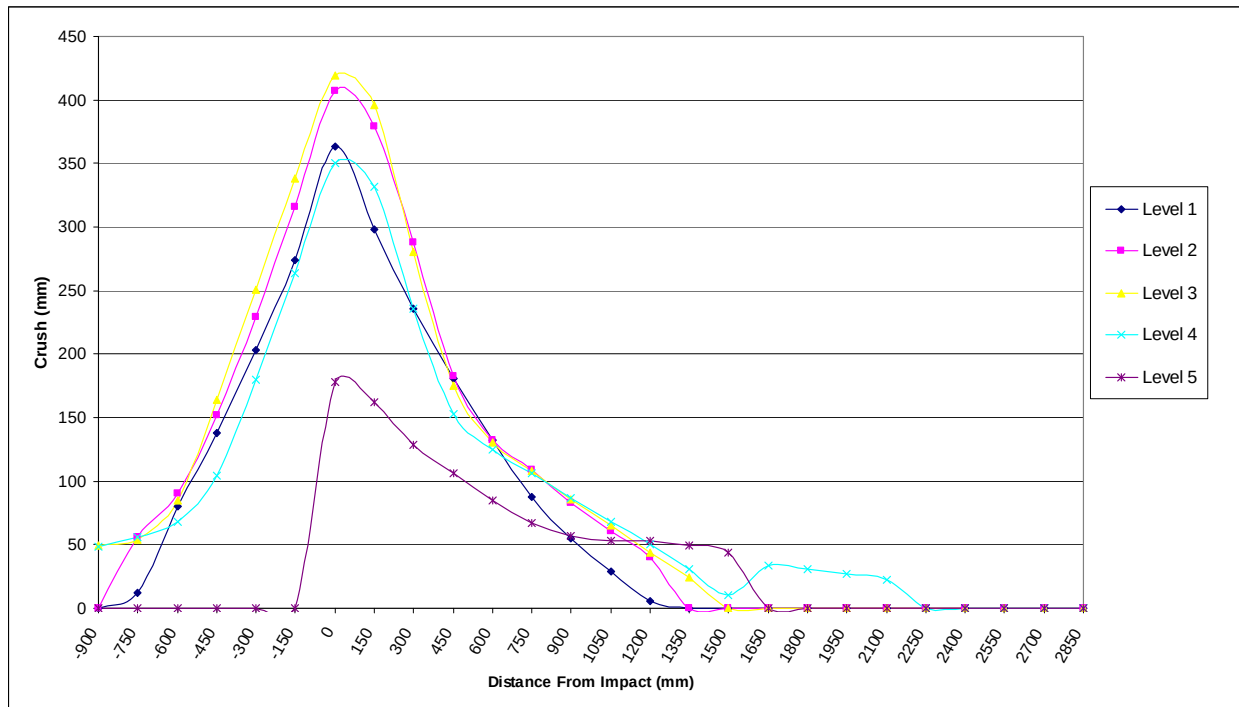
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan

NHTSA No. M20155200

Test Program: NCAP Side Pole Impact Test

Test Date: 09/10/14

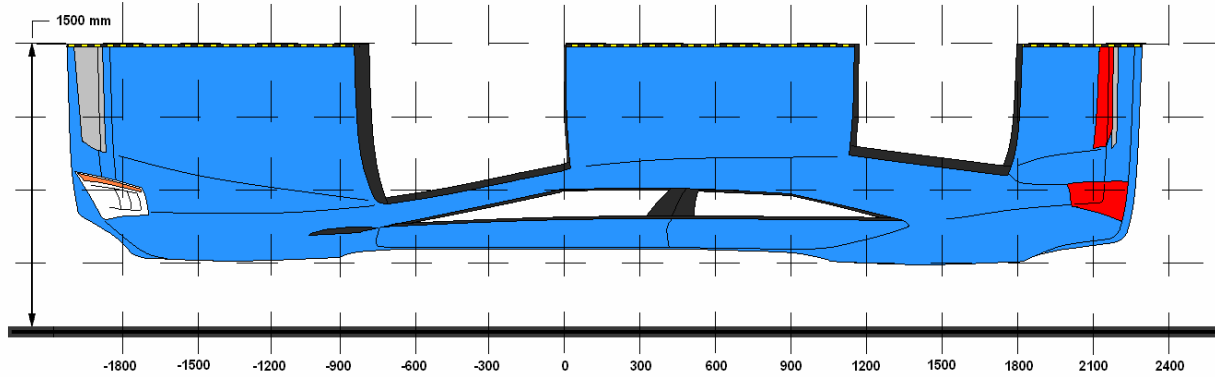


DATA SHEET NO. 11

VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan NHTSA No. M20155200

Test Program: NCAP Side Pole Impact Test Test Date: 09/10/14



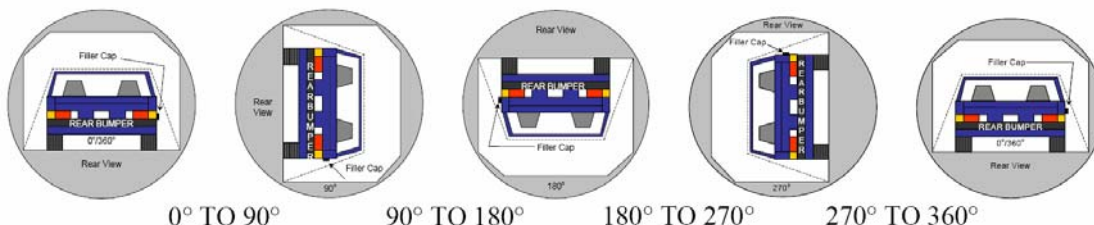
DPD	Distance From Impact Point (mm)	Level	Pre-Test (mm)	Post-Test (mm)	Crush (mm)
1	2100	4	693	715	22
2	1500	5	909	953	44
3	900	4	637	724	87
4	300	2	598	886	288
5	-300	4	599	850	251
6	-900	3	581	630	49

DATA SHEET NO. 12

FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan NHTSA No. M20155200
 Test Program: NCAP Side Pole Impact Test Test Date: 09/10/14
 Temperature at Time of Impact: 30.0° C Test Time: 12:44 PM

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



SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° To 90°	84	300	384
90° To 180°	82	300	382
180° To 270°	80	300	380
270° To 360°	82	300	382

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. 13

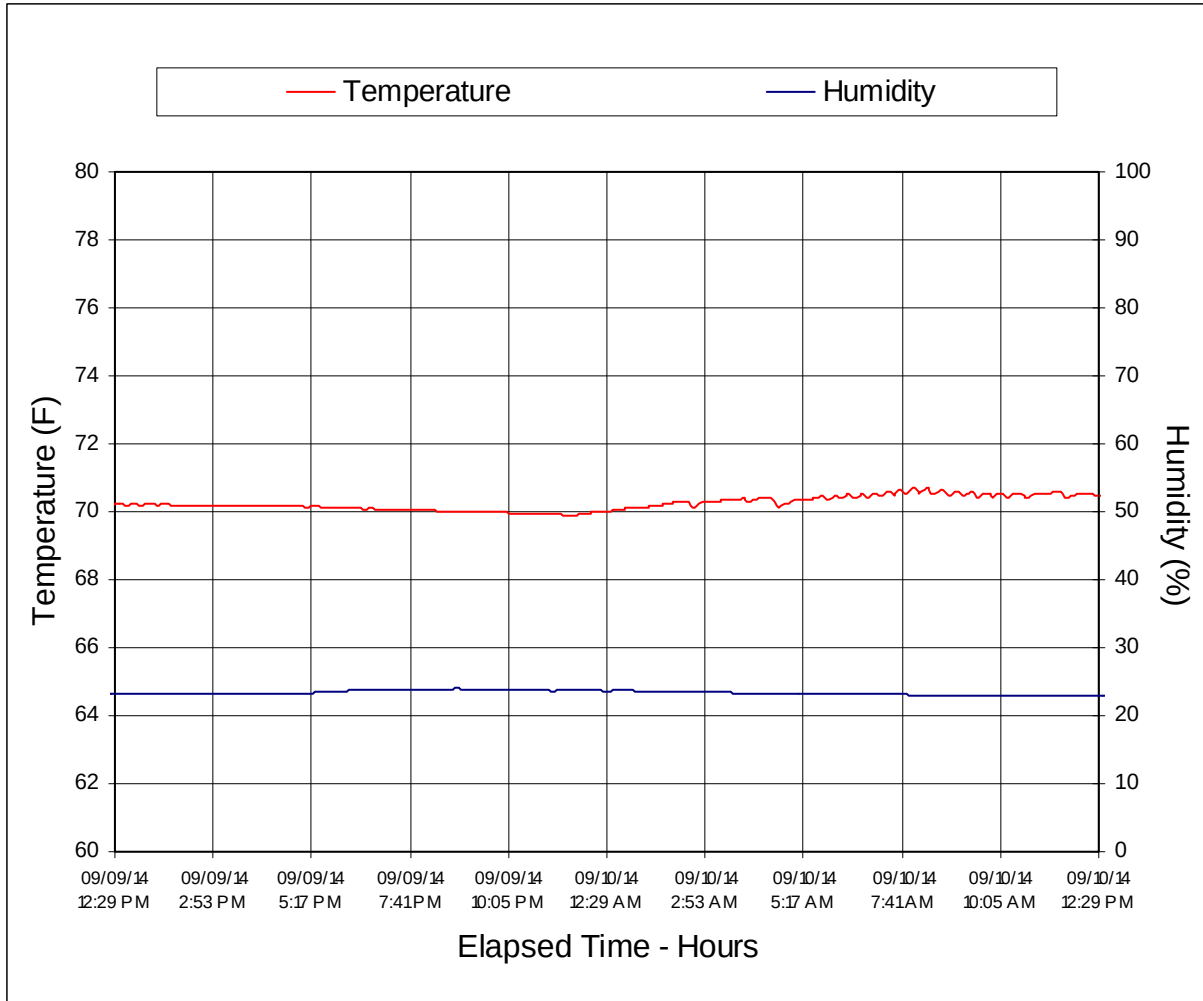
DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION

Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan

NHTSA No. M20155200

Test Program: NCAP Side Pole Impact Test

Test Date: 09/10/14



APPENDIX A
PHOTOGRAPHS

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



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



FIGURE 3. Pre-Test Frontal View of Test Vehicle



FIGURE 4. Post-Test Frontal View of Test Vehicle



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



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



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

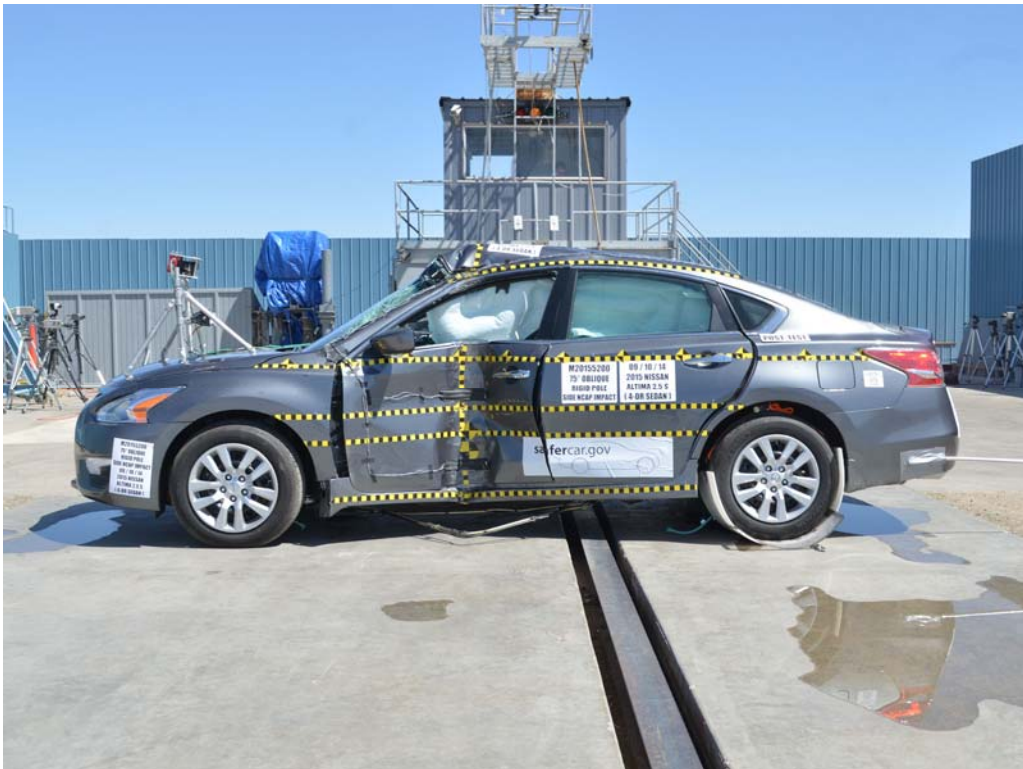


FIGURE 8. Post-Test Left Side View of Test Vehicle



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



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



FIGURE 11. Pre-Test Rear View of Test Vehicle

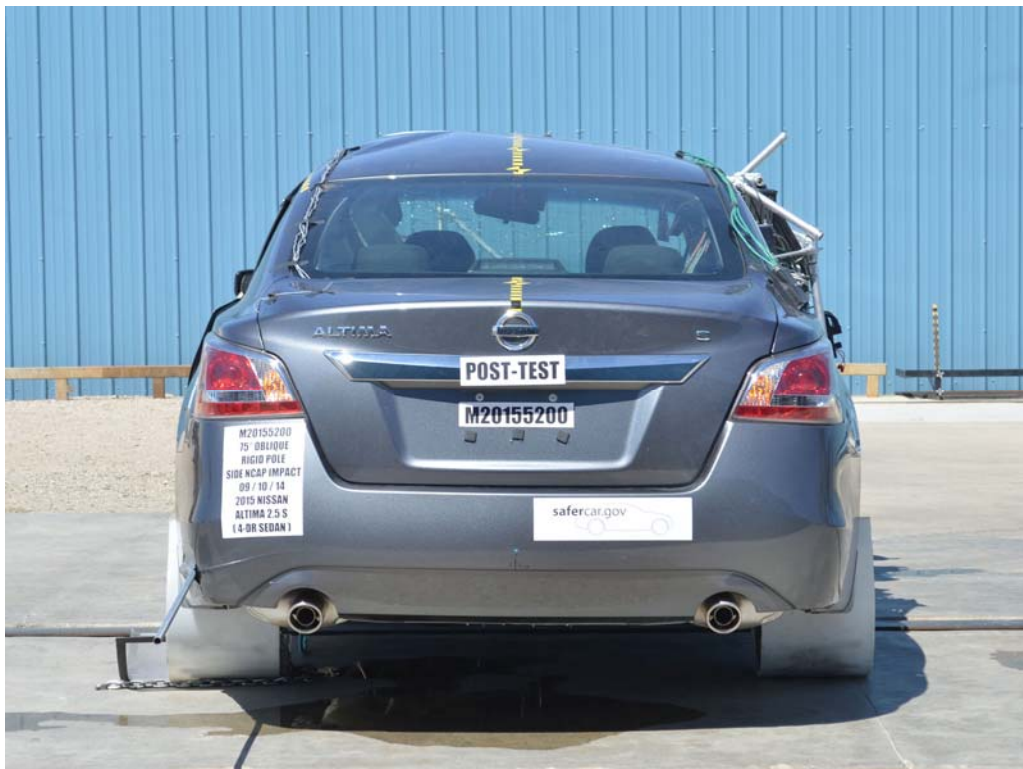


FIGURE 12. Post-Test Rear View of Test Vehicle



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



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



FIGURE 15. Pre-Test Overhead View of Test Area

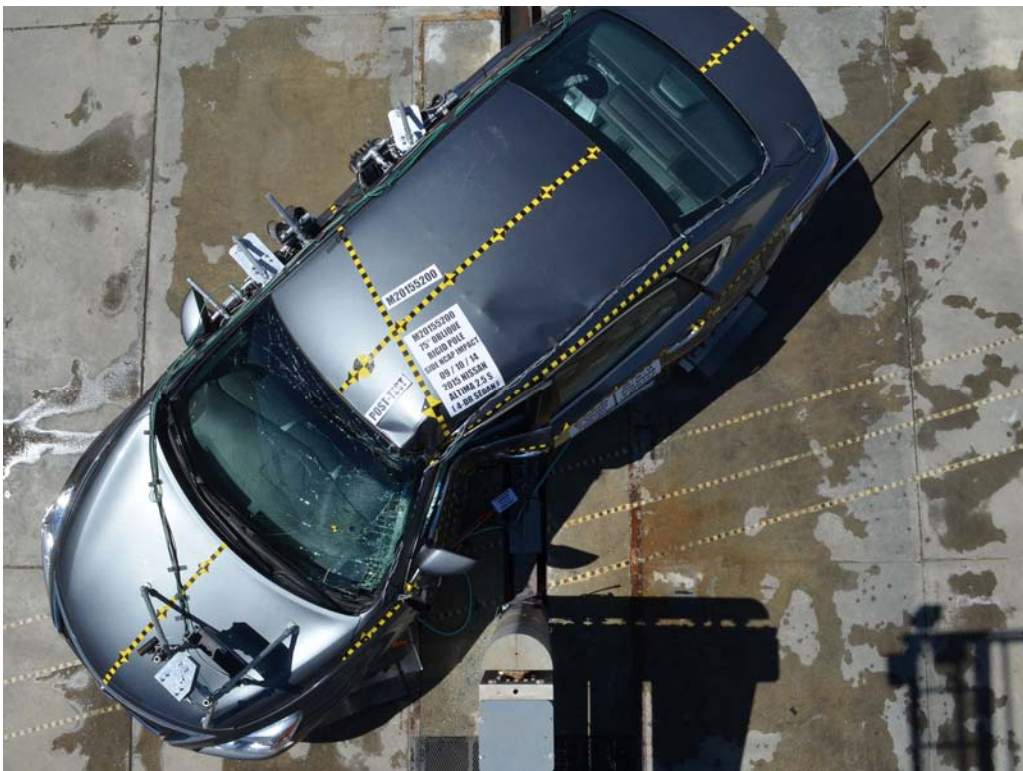


FIGURE 16. Post-Test Overhead View of Test Area



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



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



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 Head and Chest



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



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



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

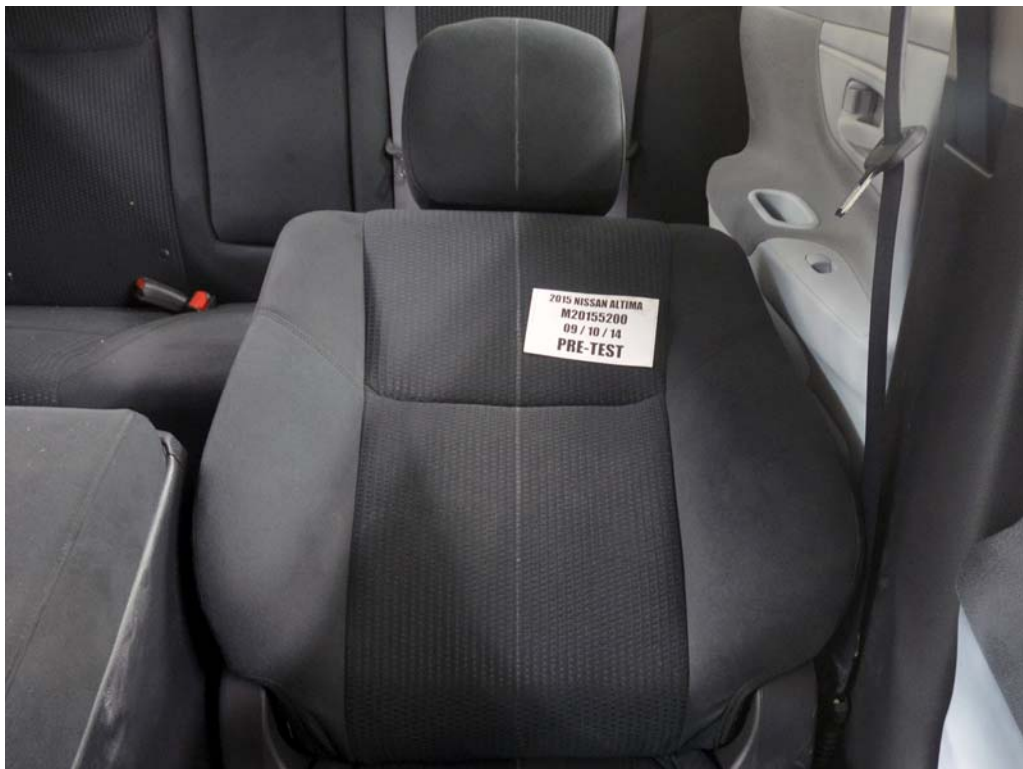


FIGURE 26. Pre-Test Frontal View of Seat Back Prior to Dummy Positioning



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



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



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



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



FIGURE 31. Pre-Test Left Side View of Dummy's Head Showing 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 Dummy and Door Clearance View



FIGURE 41. Post-Test Dummy and Door Clearance View



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



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



FIGURE 44. Pre-Test Inner Door Panel View



FIGURE 45. Post-Test Inner 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

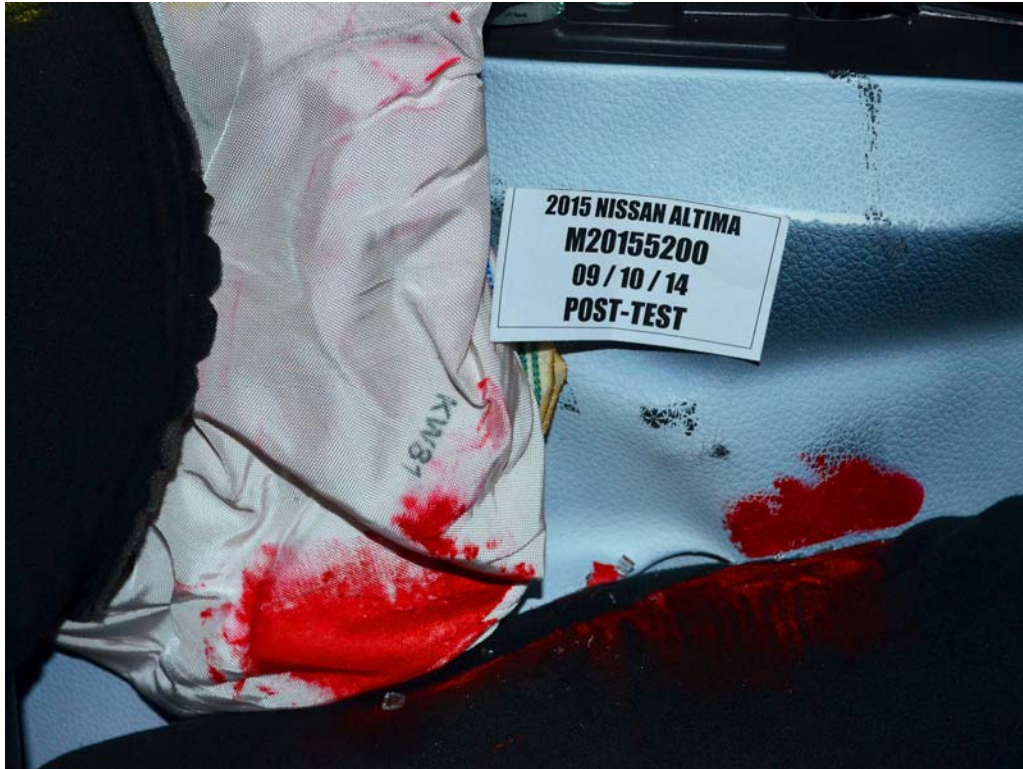


FIGURE 51. Post-Test Dummy Close-Up Pelvis Contact With Side Airbag View

Photograph Not Applicable

No Driver Dummy Knee
Contact with Vehicle
Interior

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 or Label



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

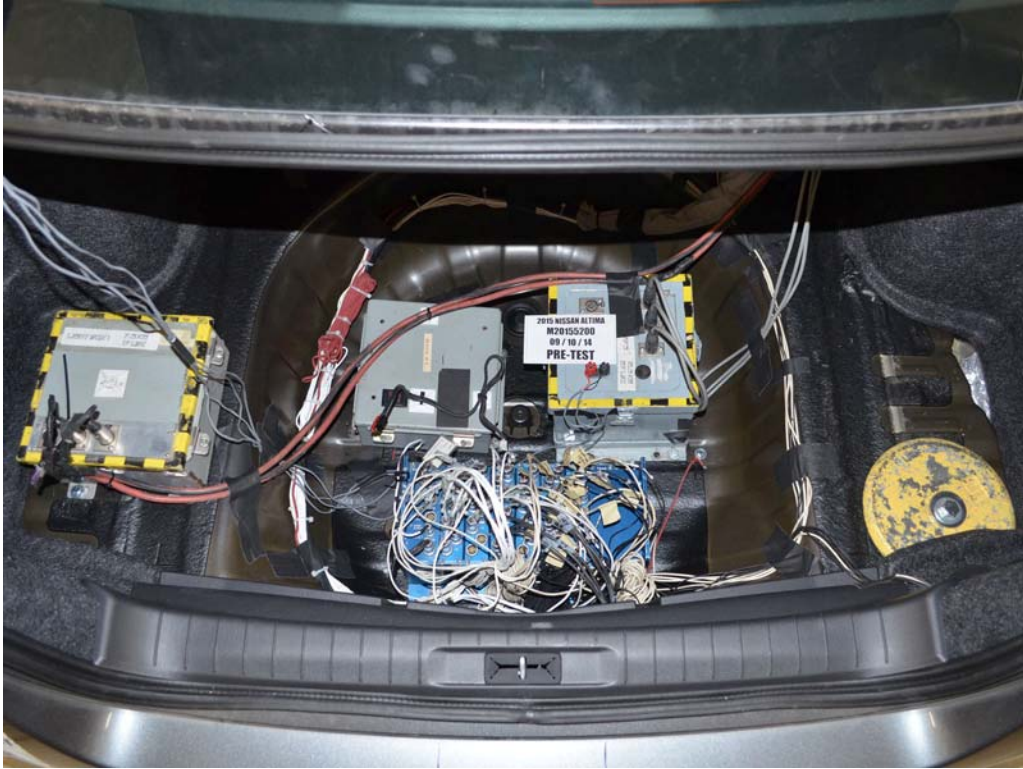


FIGURE 61. Pre-Test Ballast View



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



FIGURE 63. FMVSS No. 301 Static Rollover 0 Degrees



FIGURE 64. FMVSS No. 301 Static Rollover 90 Degrees



FIGURE 65. FMVSS No. 301 Static Rollover 180 Degrees



FIGURE 66. FMVSS No. 301 Static Rollover 270 Degrees



FIGURE 67. FMVSS No. 301 Static Rollover 360 Degrees

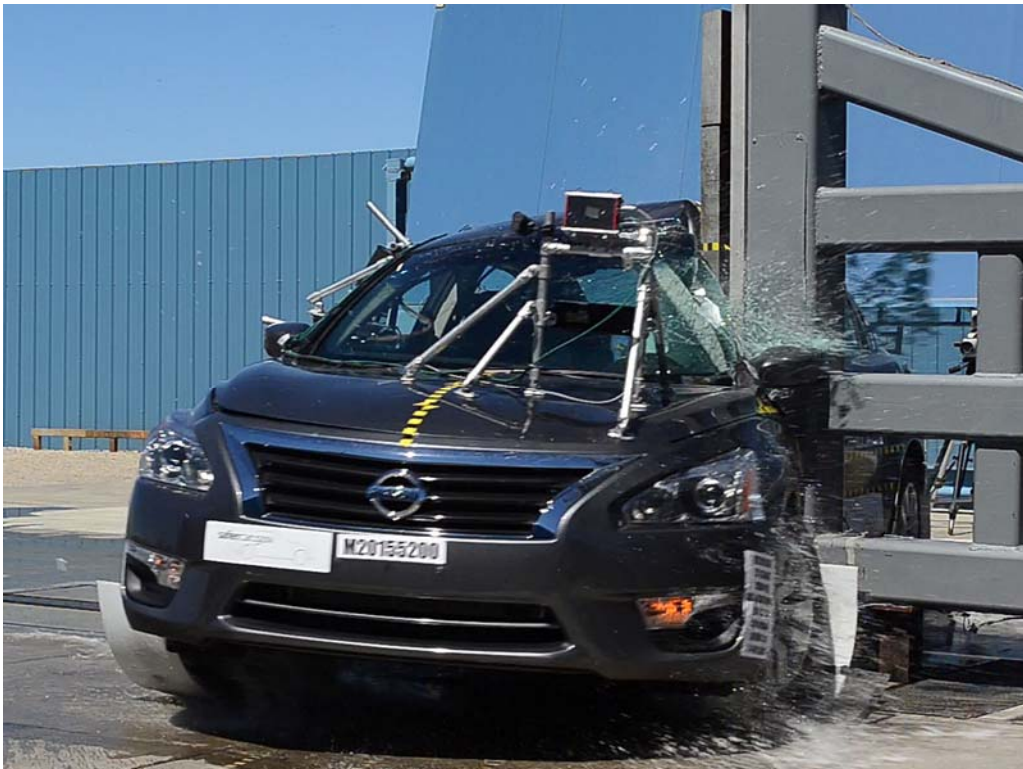


FIGURE 68. Impact Event

2015 ALTIMA 2.5 S

Scan QR code for general model information & options

Standard Equipment Included at No Extra Charge

MECHANICAL & PERFORMANCE
 2.5-Liter DOHC 16-Valve 4-Cylinder Engine
 Xtronic CVT
 (Continuously Variable Transmission)
 Active Understeer Control (AUC)
 18" Steel Wheels w/Full Wheel Covers

SAFETY & SECURITY
 Driver & Front Passenger
 Side-Impact & Curtain Air Bags
 Lower Anchors & Tethers for Children (LATCH)
 4-Wheel Anti-lock Braking System (ABS)
 Traction Control System (TCS)
 Vehicle Dynamic Control (VDC)
 Tire Pressure Monitoring System (TPMS)
 with Easy-Fill Tire Alert
 Electronic Brake Force Distribution (EBD)
 Vehicle Security System (VSS)
 Nissan Vehicle Immobilizer System

COMFORT & CONVENIENCE
 Zero Gravity Front Seats
 Advanced Drive-Assist Display
 Cruise Control
 Bluetooth® Hands-free Phone System
 Streaming Audio via Bluetooth®
 Nissan Intelligent Key®
 Push Button Ignition
 Power Door Locks w/Auto Locking Feature
 Power Windows w/Driver's Window
 Auto-Up/Down and Auto Reverse Feature
 Dual Illuminated View Vanity Mirrors
 w/ Rod Extensions
 Individual Tire Pressure Display
 Two 12-Volt DC Power Outlets
 60/40 Split Fold-Down Rear Seats
 Air Conditioning
 Passenger's Seatback Pocket

EXTERIOR
 Auto On/Off Headlights
 Chrome Exhaust Finishers

Manufacturer's Suggested Retail Base Price: \$22,500.00

Options Included by Manufacturer:
 SPLASH GUARDS
 CARPETED FLOOR MATS
 190.00
 135.00

DESTINATION CHARGES: \$10.00

Total: \$23,695.00

EPA DOT Fuel Economy and Environment

Fuel Economy
31 MPG
 27 city 38 highway
 3.2 gallons per 100 miles

You Save \$2,500
 in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost \$1,700

Fuel Economy & Greenhouse Gas Rating
 Smog Rating: 1 (Best) 8 (Worst)

GOVERNMENT 5-STAR SAFETY RATINGS
 Overall Vehicle Score: Not Rated
 Frontal Crash: Driver Passenger (5 stars)
 Side Crash: Front seat (Not Rated), Rear seat (Not Rated)
 Rollover: 5 stars

DELIVERY
 VEHICLE COLORS: EXT-GUN METALLIC INT: CHARCOAL CLOTH
 FINAL ASSEMBLY POINT: CANTON
 TRANSPORT METHOD: TRUCK
 DEALER: PUENTE HILLS NISSAN 17320 E GALE AVENUE CITY OF INDUSTRY CA 91748

HEAD RESTRAINTS/HEADRESTS

WARNING
 Head restraints/headrests supplement the other vehicle safety system. They may provide additional protection against injury in certain rear-end collisions. Adjustable head restraints/headrests must be adjusted properly, as specified in this section. Check the adjustment after someone else uses the seat. Do not attach anything to the head restraint/headrest stalks or remove the head restraint/headrest. Do not use the seat if the head restraint/headrest has been removed. If the head restraint/headrest was removed, reinstall and properly adjust the head restraint/headrest before an occupant uses the seating position. Failure to follow these instructions can reduce the effectiveness of the head restraints/headrests. This may increase the risk of serious injury or death in a collision.

Center armrest
 Pull the armrest down until it rests on the seat cushion.

The illustration shows the seating position equipped with head restraints/headrests.

- ▲ Indicates the seating position is equipped with a head restraint.
- Indicates the seating position is equipped with a headrest.
- Indicates the seating position is not equipped with a head restraint or headrest (if applicable).
- Your vehicle is equipped with a head restraint/headrest that may be integrated, adjustable or non-adjustable.

1-7 Safety—Seats, seat belts and supplemental restraint system

Remove
 Use the following procedure to remove the head restraint/headrest.

1. Pull the head restraint/headrest up to the highest position.
2. Push and hold the lock knob.
3. Remove the head restraint/headrest from the seat.
4. Store the head restraint/headrest properly in a secure place so it is not loose in the vehicle.

Install

1. Align the head restraint/headrest stalks with the holes in the seat. Make sure the head restraint/headrest is facing the correct direction. The stalk with the notch (notches) (1) must be installed in the hole with the lock knob (2).
2. Push and hold the lock knob and push the head restraint/headrest down.
3. Properly adjust the head restraint/headrest before an occupant uses the seating position.

1-8 Safety—Seats, seat belts and supplemental restraint system

Adjust
 For adjustable head restraint/headrest
 Adjust the head restraint/headrest so the center is level with the center of your ears. If your ear position is still higher than the recommended alignment, place the head restraint/headrest at the highest position.

For non-adjustable head restraint/headrest
 Make sure the head restraint/headrest is positioned so the lock knob is engaged in the notch before riding in that designated seating position.

Raise
 To raise the head restraint/headrest, pull it up. Make sure the head restraint/headrest is positioned so the lock knob is engaged in the notch before riding in that designated seating position.

1-10 Safety—Seats, seat belts and supplemental restraint system

FIGURE 70. Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

APPENDIX B
VEHICLE AND 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

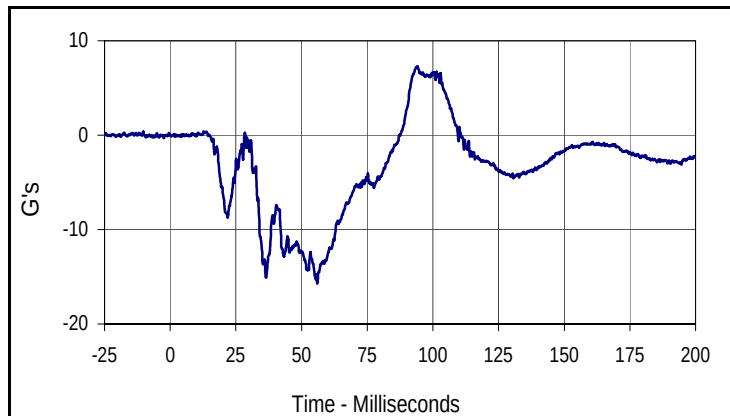
Load Cell Pole Barrier #1 Force (Y)
Load Cell Pole Barrier #2 Force (Y)
Load Cell Pole Barrier #3 Force (Y)
Load Cell Pole Barrier #4 Force (Y)
Load Cell Pole Barrier #5 Force (Y)
Load Cell Pole Barrier #6 Force (Y)
Load Cell Pole Barrier #7 Force (Y)
Load Cell Pole Barrier #8 Force (Y)

Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan

Test Program: NCAP Side Pole Impact Test

Test Date: 9/10/14

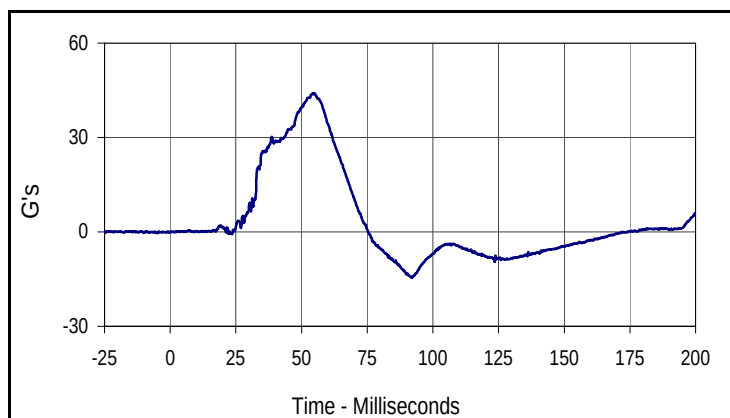
NHTSA No.: M20155200



Curve Description

Driver Head Acceleration X Primary

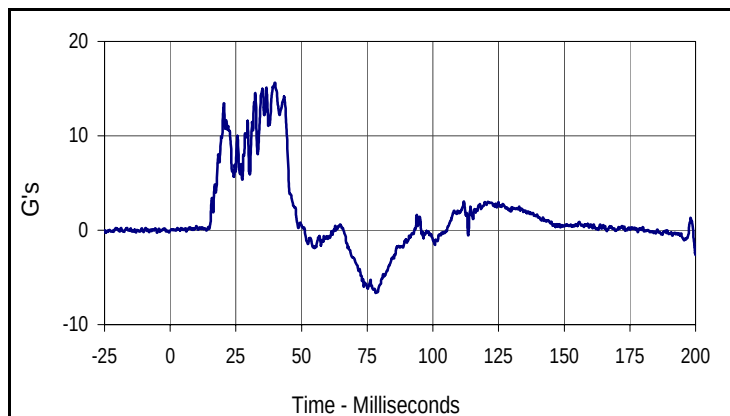
Plot No.	Type	SAE Class	Units
001	FIL	1000	G's
Max	Time	Min	Time
7.3	94.1	-15.7	56.0



Curve Description

Driver Head Acceleration Y Primary

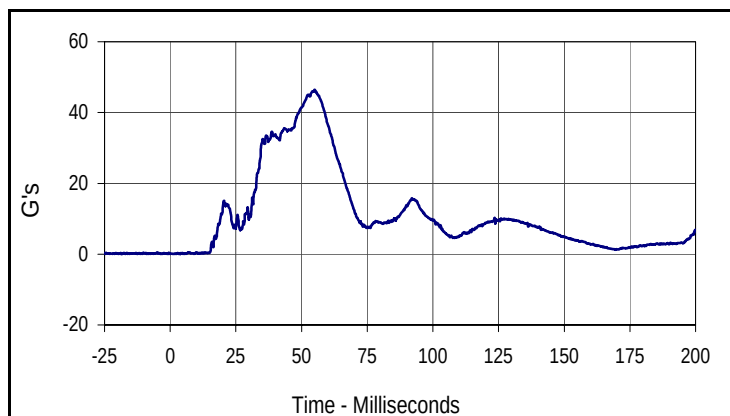
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
44.0	54.9	-14.6	92.0



Curve Description

Driver Head Acceleration Z Primary

Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
15.6	39.8	-6.7	78.2



Curve Description

Driver Head Acceleration Primary Res.

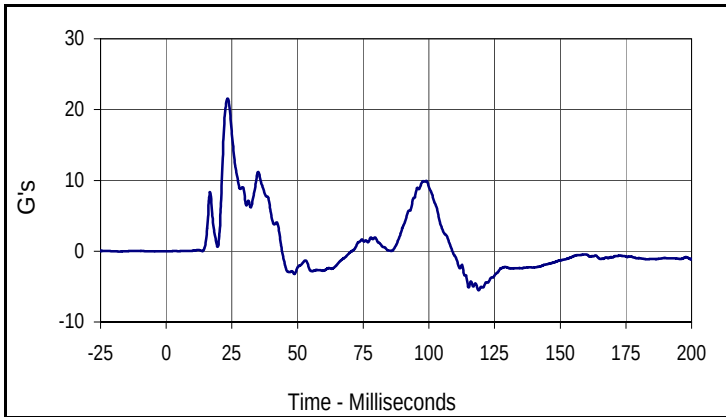
Plot No.	Type	SAE Class	Units
004	RES	1000	G's
Max	Time	Min	Time
46.5	55.0	0.0	3.7

Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan

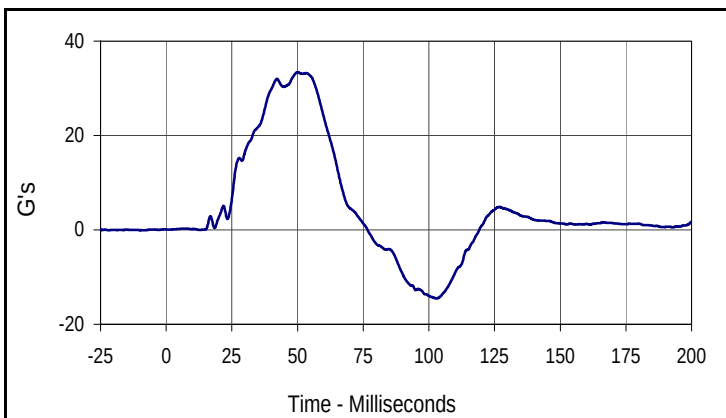
Test Program: NCAP Side Pole Impact Test

Test Date: 9/10/14

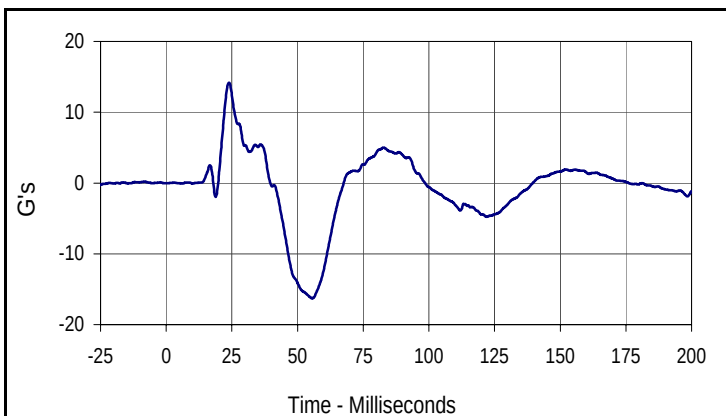
NHTSA No.: M20155200



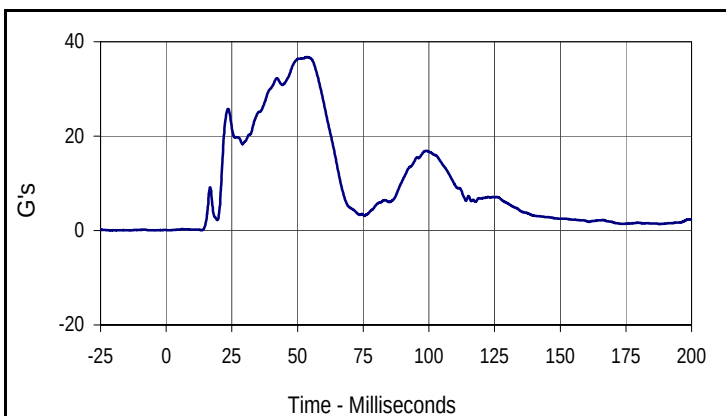
Curve Description			
Driver Lower Spine T12 Acceleration X			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
21.6	23.4	-5.5	118.9



Curve Description			
Driver Lower Spine T12 Acceleration Y			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
33.4	50.1	-14.5	102.9



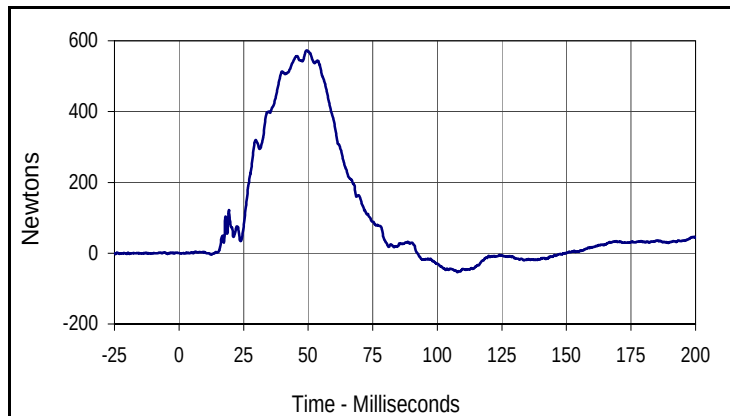
Curve Description			
Driver Lower Spine T12 Acceleration Z			
Plot No.	Type	SAE Class	Units
007	FIL	180	G's
Max	Time	Min	Time
14.2	23.9	-16.3	55.5



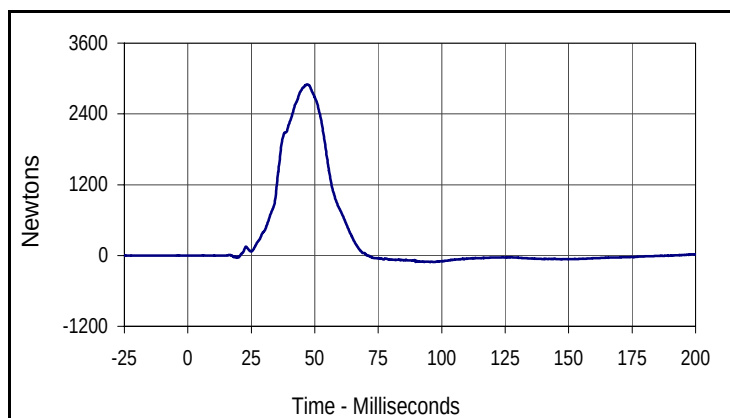
Curve Description			
Driver Lower Spine T12 Acceleration Res.			
Plot No.	Type	SAE Class	Units
008	RES	180	G's
Max	Time	Min	Time
36.8	53.6	0.0	1.3

Test Vehicle: 2015 Nissan Altima 2.5 S 4-Door Sedan
 Test Program: NCAP Side Pole Impact Test

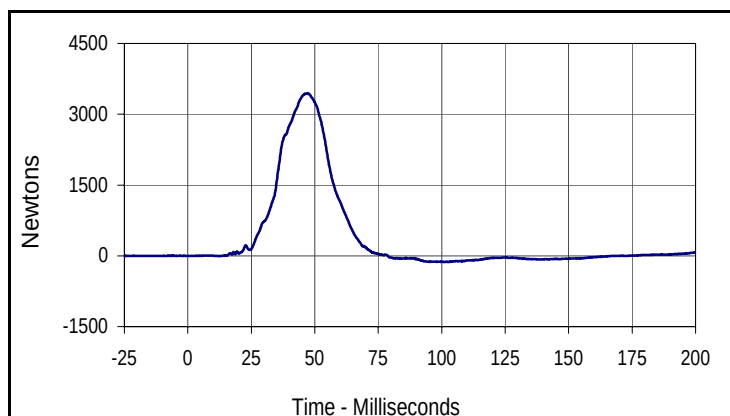
Test Date: 9/10/14
 NHTSA No.: M20155200



Curve Description			
Driver Iliac Wing Force on Impact Side Y			
Plot No.	Type	SAE Class	Units
009	FIL	600	Newtons
Max	Time	Min	Time
572.9	49.4	-53.1	107.8



Curve Description			
Driver Acetabulum Force on Impact Side Y			
Plot No.	Type	SAE Class	Units
010	FIL	600	Newtons
Max	Time	Min	Time
2898.0	47.1	-110.6	95.3



Curve Description			
Driver Total Pelvic Force on Impact Side Y			
Plot No.	Type	SAE Class	Units
011	SUM	600	Newtons
Max	Time	Min	Time
3442.9	47.1	-130.4	100.8

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: 9/5/14
 Test I.D.: N/A



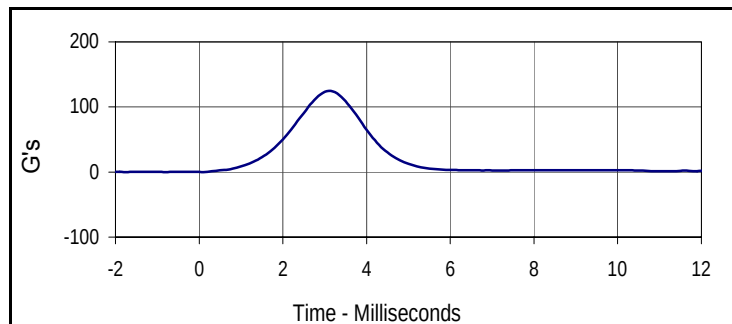
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.6	Pass
Laboratory Relative Humidity		%	10 to 70	51	Pass
A	Sitting Height	mm	772 - 788	780	Pass
B	Shoulder Pivot Height	mm	437 - 453	445	Pass
C	H-Point Height	mm	79 - 89	85	Pass
D	H-Point from Seatback	mm	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	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: 9/5/14
 Test I.D.: 299HD074



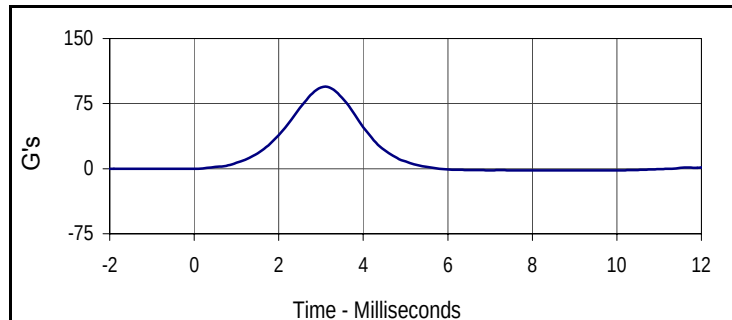
Tested Parameter	Units	Specification	Result	Pass/Fail
Head Assembly Soak Time	Minutes	≥240	291	Pass
Temperature During Soak	Max	18.9 to 25.6	21.6	Pass
	Min		20.8	Pass
Humidity During Soak	Max	10.0 to 70.0	53.1	Pass
	Min		51.1	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	51.4	Pass
Peak Head Resultant Acceleration	G's	115 to 137	124.6	Pass
Peak Head X Acceleration	G's	<15	5.1	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	2.7	Pass
Overall Test Results				Pass



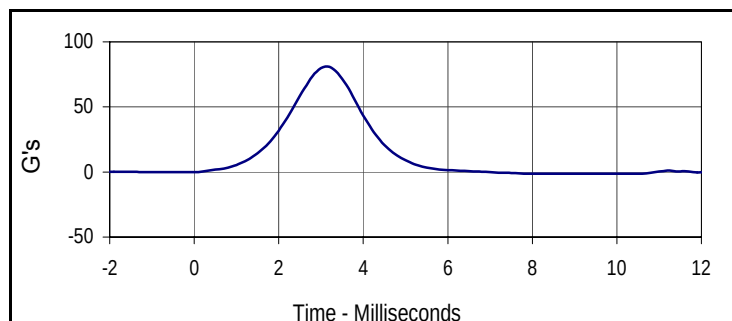
Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
124.6	3.1	0.0	0.1



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
5.1	3.4	0.0	-0.1



Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
94.6	3.1	-2.1	7.6



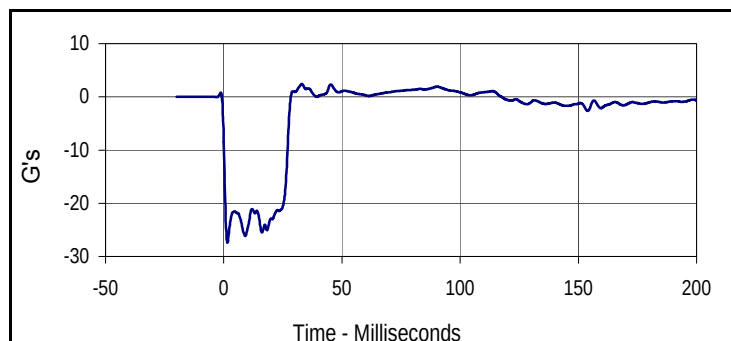
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
81.0	3.1	-1.4	10.4

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

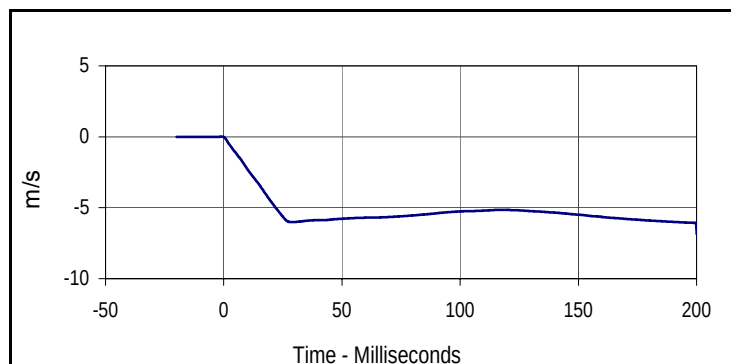
Test Date: 9/5/14
 Test I.D.: 299NB074



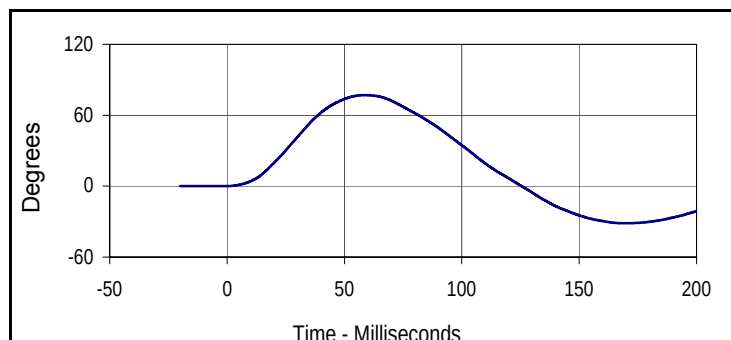
Tested Parameter	Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time	Minutes	≥240	356	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		20.8	Pass
Humidity During Soak	Max	10.0 to 70.0	53.1	Pass
	Min		51.1	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.0	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	51.6	Pass
Pendulum Velocity	m/s	5.51 to 5.63	5.56	Pass
Pendulum Deceleration	10 msec	-2.20 to -2.80	-2.29	Pass
	15 msec	-3.30 to -4.10	-3.37	Pass
	20 msec	-4.40 to -5.40	-4.57	Pass
	25 msec	-5.40 to -6.10	-5.63	Pass
	25-100 msec	-5.50 to -6.20	-6.02	Pass
D-Plane Rotation	Max	71 to 81	77.1	Pass
	Time	50 to 70	58.6	Pass
Peak Occipital Condyle Moment	Nm	-36 to -44	-39.7	Pass
Decaying Moment Time to Cross 0 Nm	msec	102 to 126	105.3	Pass
Overall Test Results			Pass	



Curve Description			
Pendulum Deceleration			
Plot No.	Type	SAE Class	Units
001	FIL	180	G's
Max	Time	Min	Time
2.4	0.0	-27.4	0.0



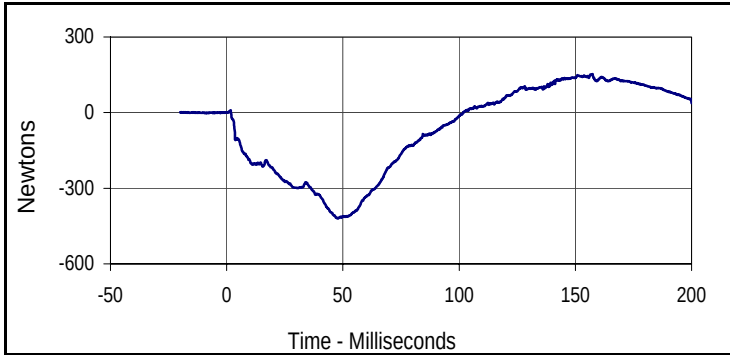
Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
002	FIL	180	m/s
Max	Time	Min	Time
0.0	-0.8	-6.8	200.0



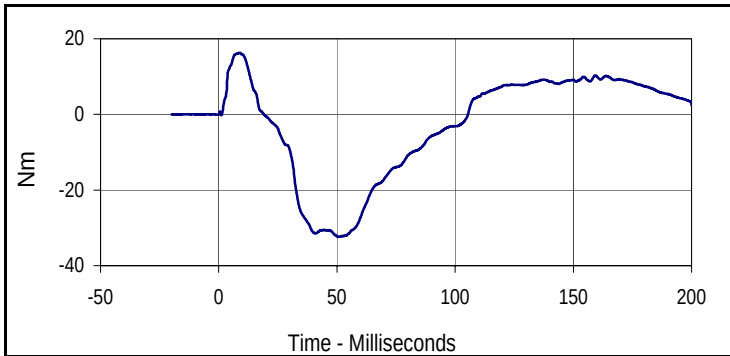
Curve Description			
D-Plane Rotation			
Plot No.	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
77.1	58.6	-31.3	169.2

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

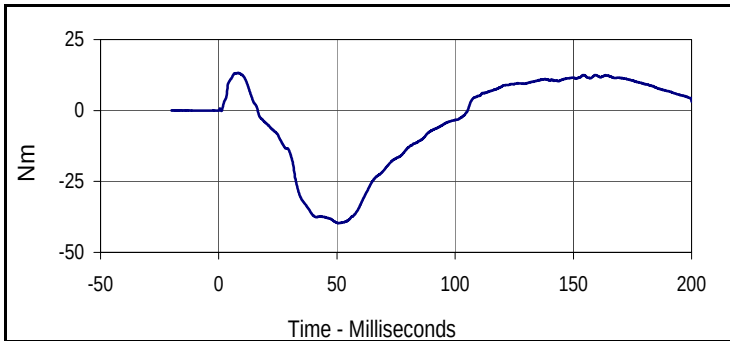
Test Date: 9/5/14
 Test I.D.: 299NB074



Curve Description			
Neck Force Y			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
152.7	157.4	-420.0	47.6



Curve Description			
Neck Moment X			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
16.3	8.8	-32.4	50.5



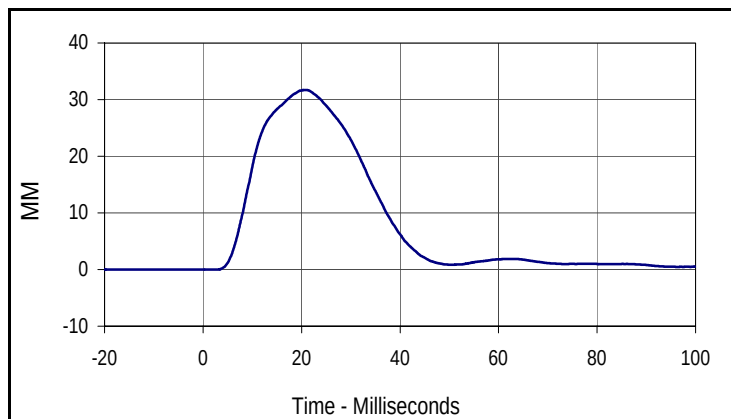
Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
006	FIL	600	Nm
Max	Time	Min	Time
13.2	8.3	-39.7	50.6

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

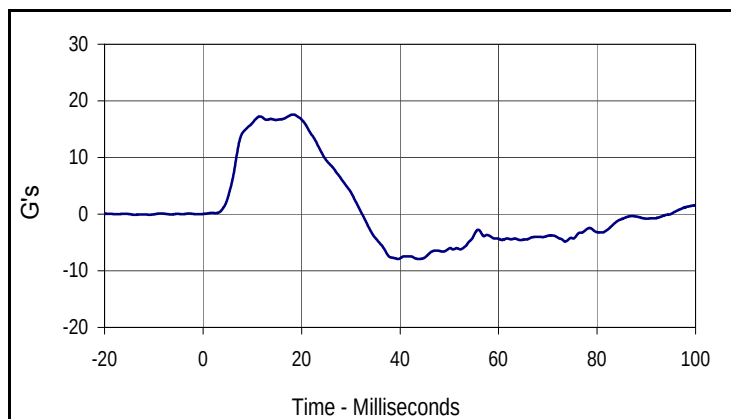
Test Date: 9/5/14
 Test I.D.: 299SH074



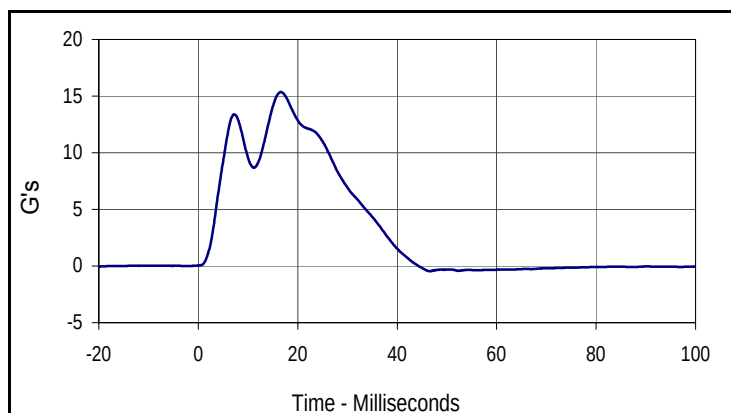
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	431	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.6	Pass
	Min	°C		20.8	Pass
Humidity During Soak	Max	%	10.0 to 70.0	53.1	Pass
	Min	%		51.1	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	20.9	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	51.7	Pass
Impactor Velocity		m/s	4.20 to 4.40	4.32	Pass
Peak Shoulder Deflection		mm	28 to 37	31.7	Pass
Peak Lateral Spine Acceleration Y		G's	17 to 22	17.6	Pass
Peak Impactor Acceleration		G's	13 to 18	15.4	Pass
Overall Test Results				Pass	



Curve Description			
Shoulder Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
31.7	20.6	0.0	-17.8



Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
17.6	18.3	-7.9	39.6



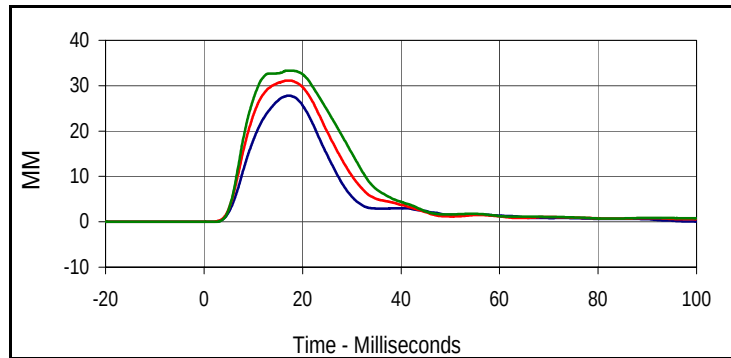
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
15.4	16.6	-0.5	46.5

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

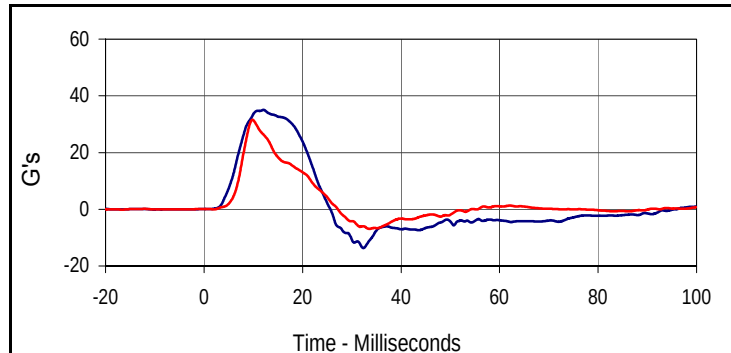
Test Date: 9/5/14
 Test I.D.: 299TWA074



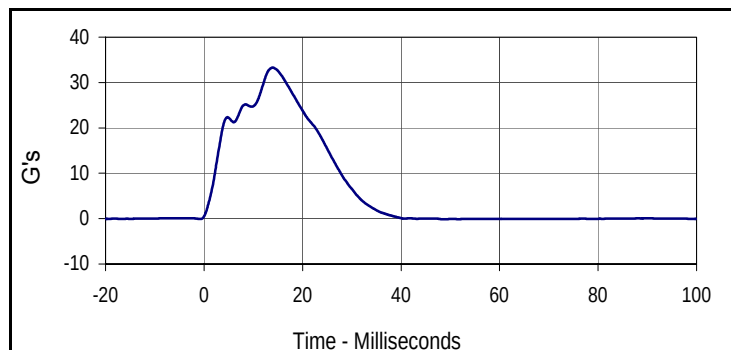
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	481	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		20.8	Pass
Humidity During Soak	Max	10.0 to 70.0	53.1	Pass
	Min		51.1	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	20.9	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	51.9	Pass
Impactor Velocity	m/s	6.6 to 6.8	6.65	Pass
Peak Shoulder Deflection	mm	31 to 40	35.2	Pass
Peak Upper Thorax Rib Deflection	mm	25 to 32	27.8	Pass
Peak Middle Thorax Rib Deflection	mm	30 to 36	31.1	Pass
Peak Lower Thorax Rib Deflection	mm	32 to 38	33.3	Pass
Peak Upper Spine Y Acceleration	G's	34 to 43	35.0	Pass
Peak Lower Spine Y Acceleration	G's	29 to 37	31.6	Pass
Peak Impactor Acceleration	G's	30 to 36	33.3	Pass
Overall Test Results			Pass	



Curve Description			
Upper Thorax Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
27.8	17.3	0.0	-13.9
Middle Thorax Deflection			
Max	Time	Min	Time
31.1	17.0	0.0	-14.4
Lower Thorax Deflection			
Max	Time	Min	Time
33.3	17.0	0.0	-13.8



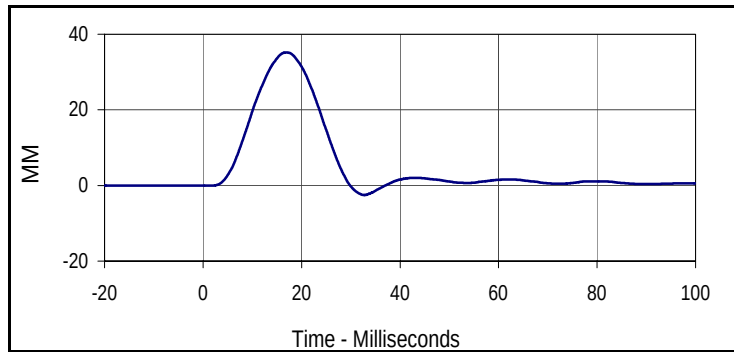
Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
35.0	12.1	-13.7	32.3
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
31.6	9.8	-7.0	33.6



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
33.3	13.9	-0.2	48.6

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

Test Date: 9/5/14
Test I.D.: 299TWA074



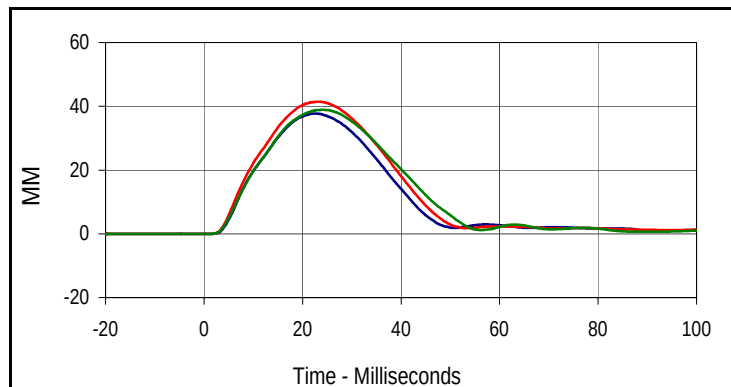
Curve Description			
Shoulder Deflection Y			
Plot No.	Type	SAE Class	Units
007	FIL	600	MM
Max	Time	Min	Time
35.2	16.9	-2.5	32.7

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

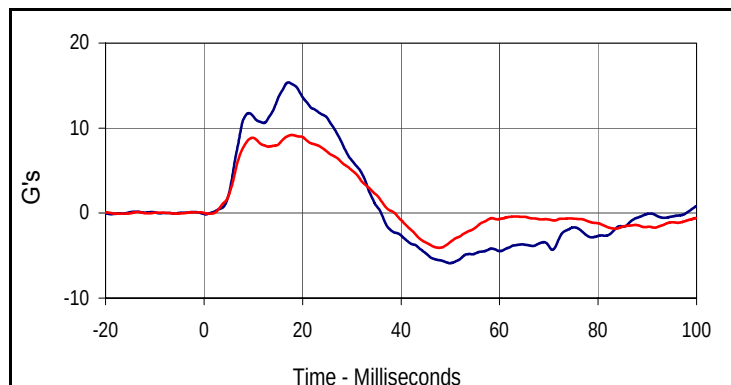
Test Date: 9/5/14
 Test I.D.: 299TWOA074



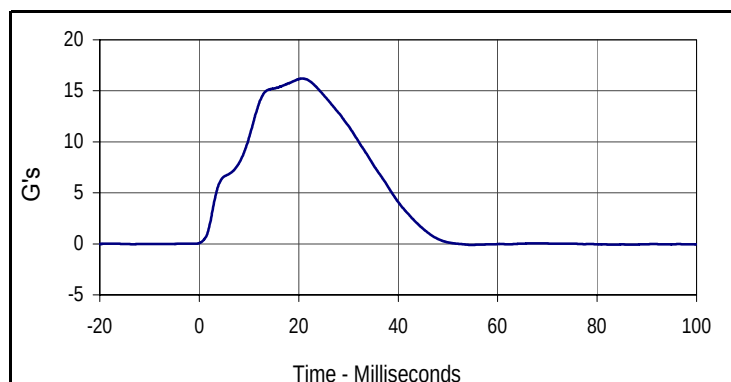
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	536	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.6	Pass
	Min	°C		20.8	Pass
Humidity During Soak	Max	%	10.0 to 70.0	53.1	Pass
	Min	%		51.1	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	20.8	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	52.5	Pass
Impactor Velocity		m/s	4.2 to 4.4	4.39	Pass
Peak Upper Thorax Rib Deflection		mm	32 to 40	37.7	Pass
Peak Middle Thorax Rib Deflection		mm	39 to 45	41.4	Pass
Peak Lower Thorax Rib Deflection		mm	35 to 43	38.9	Pass
Peak Upper Spine Y Acceleration		G's	13 to 17	15.4	Pass
Peak Lower Spine Y Acceleration		G's	7 to 11	9.2	Pass
Peak Impactor Acceleration		G's	14 to 18	16.2	Pass
Overall Test Results				Pass	



Curve Description			
Upper Thorax Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
37.7	22.5	0.0	-8.4
Middle Thorax Deflection			
Max	Time	Min	Time
41.4	23.2	0.0	-7.2
Lower Thorax Deflection			
Max	Time	Min	Time
38.9	24.0	0.0	-4.0



Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
15.4	17.1	-5.9	49.9
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
9.2	17.8	-4.1	47.6



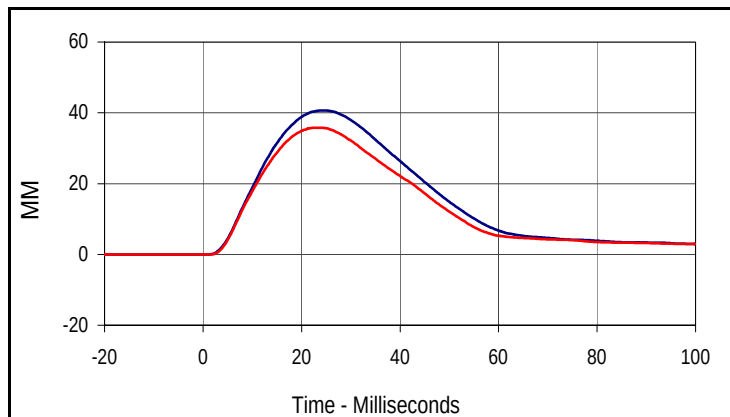
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
16.2	20.7	-0.1	54.7

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

Test Date: 9/5/14
 Test I.D.: 299ABD074

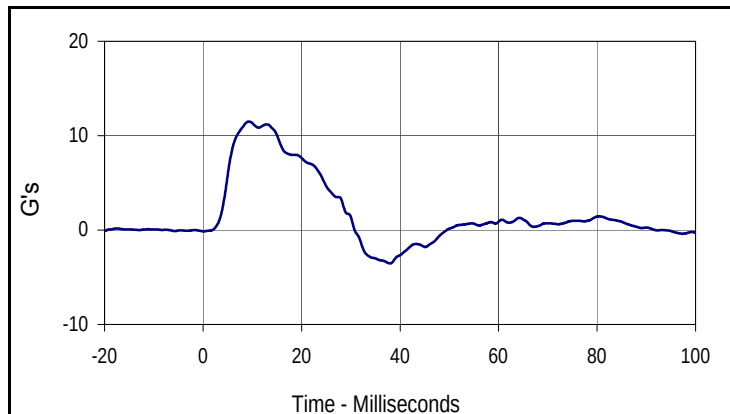


Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	596	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		20.8	Pass
Humidity During Soak	Max	10.0 to 70.0	53.1	Pass
	Min		51.1	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	20.8	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	52.5	Pass
Impactor Velocity	m/s	4.2 to 4.4	4.34	Pass
Peak Upper Abdominal Rib Deflection	mm	36 to 47	40.7	Pass
Peak Lower Abdominal Rib Deflection	mm	33 to 44	35.8	Pass
Peak Lower Spine Y Acceleration	G's	9 to 14	11.5	Pass
Peak Impactor Acceleration	G's	12 to 16	15.1	Pass
Overall Test Results			Pass	

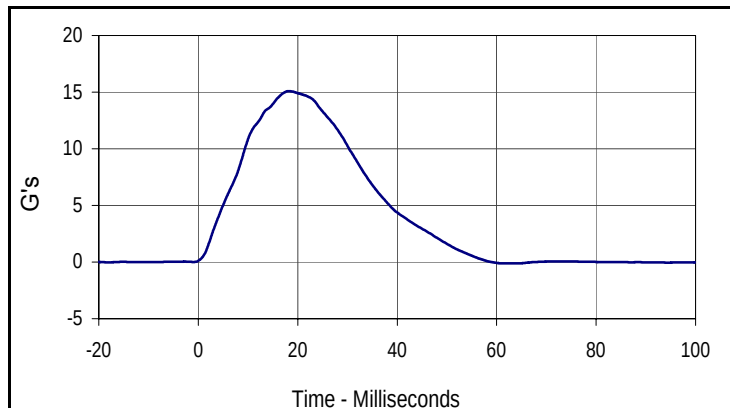


Curve Description			
Upper Abdominal Rib Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
40.7	24.3	0.0	-13.6

Curve Description			
Lower Abdominal Rib Deflection			
Plot No.	Type	SAE Class	Units
002	FIL	600	MM
Max	Time	Min	Time
35.8	22.7	0.0	-18.2

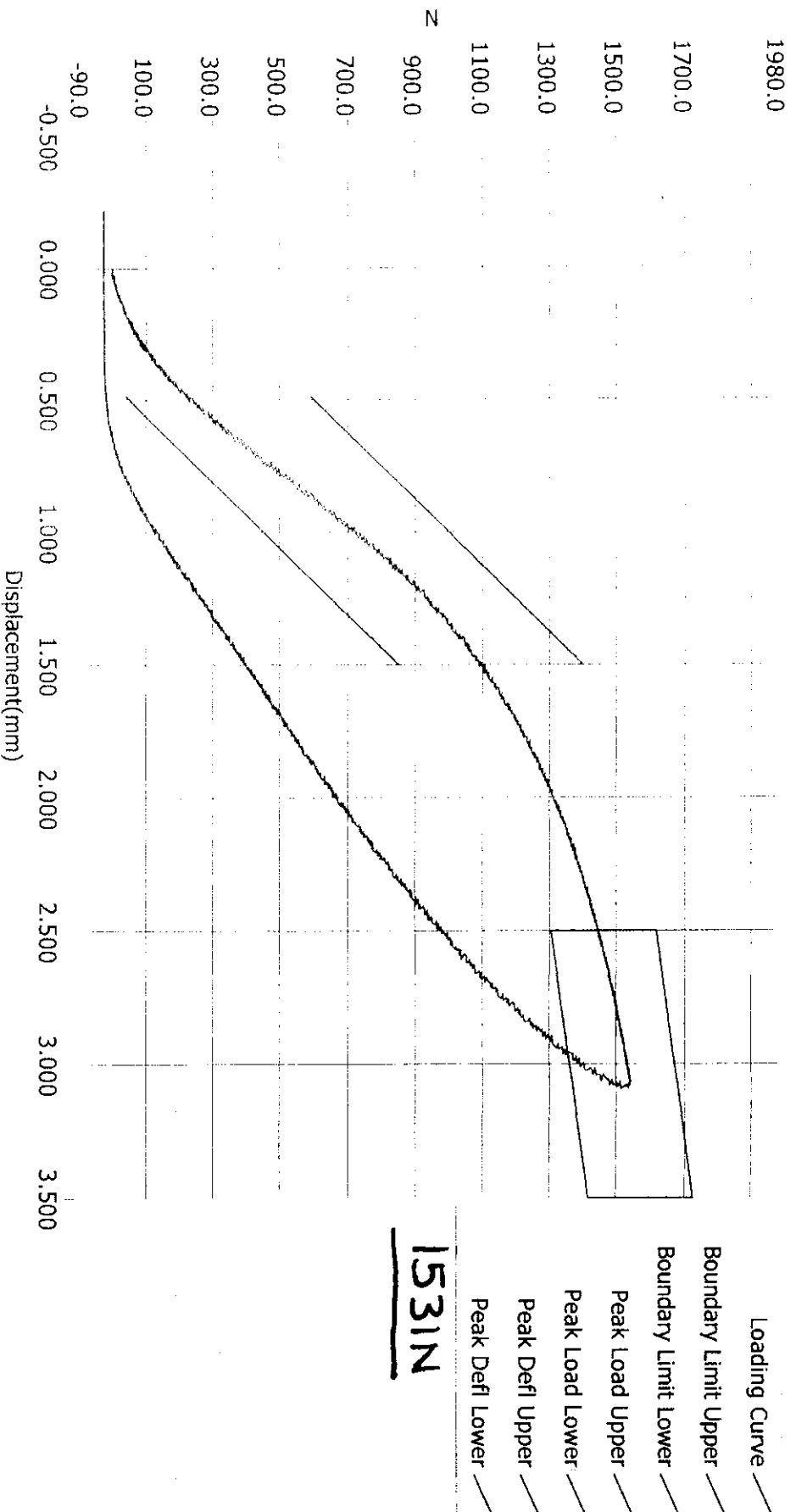


Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
11.5	9.3	-3.5	38.0



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
15.1	18.2	-0.1	62.2

Resultant Data - SIDILs Plug Compression



ATD Calibration Lab

M20155200 PRE TEST

<u>Test ID</u>	<u>Part Serial Number</u>	<u>Test Date</u>	<u>Test Time</u>
	63393	1/28/2013	6:18 PM
<u>Cert ID</u>	<u>ATD Serial Number</u>	<u>ATD Type</u>	
	N/A	SIDILs	

Current Date : 1/28/2013

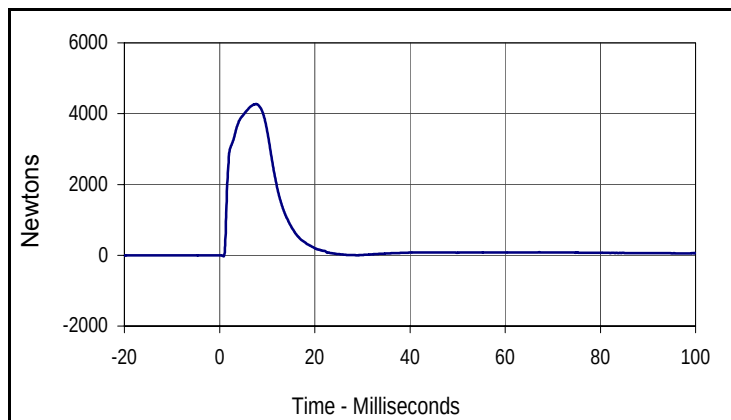
Current Time : 18:19:19

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

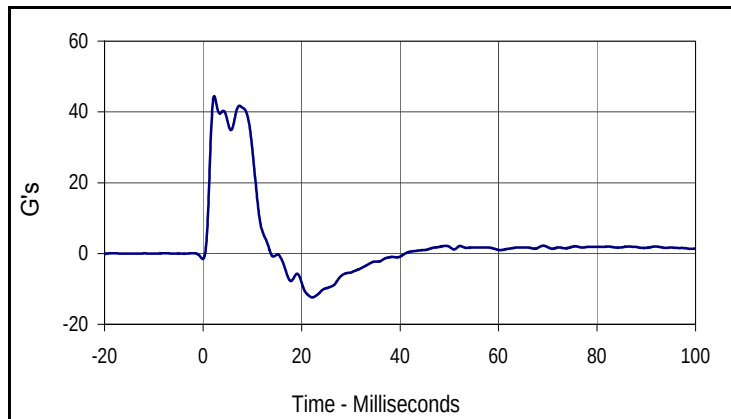
Test Date: 9/5/14
 Test I.D.: 299ACET074



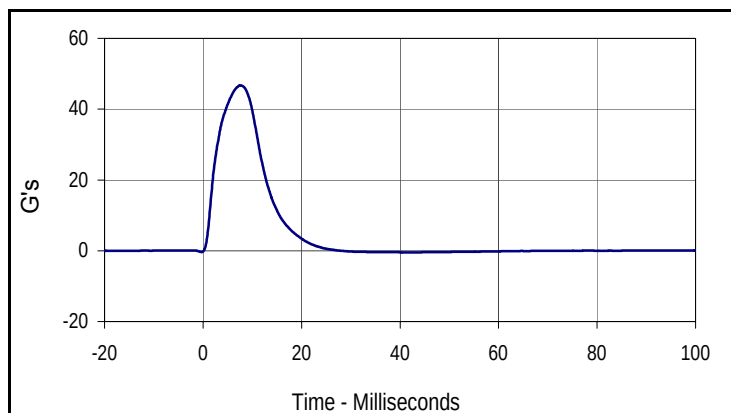
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	671	Pass
Temperature During Soak	Max	20.6 to 22.2	21.6	Pass
	Min		20.8	Pass
Humidity During Soak	Max	10.0 to 70.0	53.1	Pass
	Min		51.1	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	20.8	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	53.1	Pass
Impactor Velocity	m/s	6.6 to 6.8	6.68	Pass
Peak Acetabulum Force Y	Newtons	3600 to 4300	4269.5	Pass
Peak Pelvis Y Acceleration After 6 msec.	G's	34 to 42	41.7	Pass
Peak Impactor Acceleration	G's	38 to 47	46.7	Pass
Overall Test Results			Pass	



Curve Description			
Pelvis Acetabulum Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4269.5	7.6	-33.9	0.9



Curve Description			
Pelvis Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
44.5	2.3	-12.4	22.2



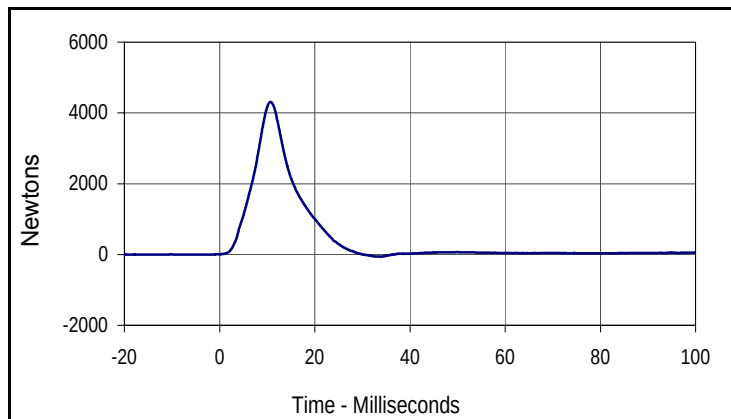
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
46.7	7.6	-0.5	41.2

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

Test Date: 9/5/14
 Test I.D.: 299PL074



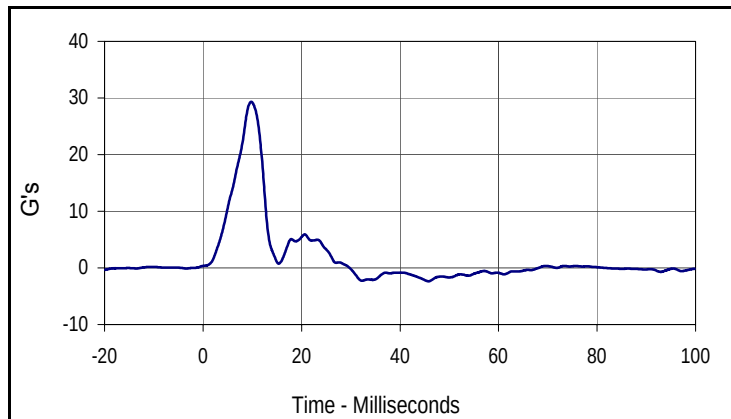
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	736	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.6	Pass
	Min	°C		20.8	Pass
Humidity During Soak	Max	%	10.0 to 70.0	53.1	Pass
	Min	%		51.1	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	20.8	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	53.1	Pass
Impactor Velocity		m/s	4.2 to 4.4	4.33	Pass
Peak Iliac Force		Newtons	4100 to 5100	4312.2	Pass
Peak Pelvis Y Acceleration		G's	28 to 39	29.3	Pass
Peak Impactor Acceleration		G's	36 to 45	37.4	Pass
Overall Test Results				Pass	



Curve Description

Pelvis Iliac Force

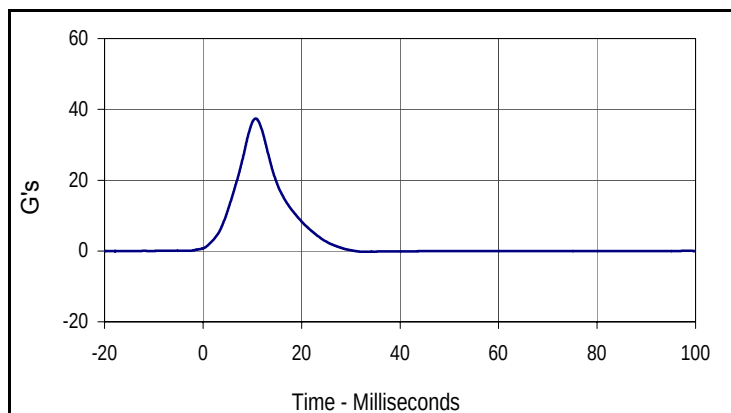
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4312.2	10.7	-61.5	34.0



Curve Description

Pelvis Y Acceleration

Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
29.3	9.8	-2.4	45.8



Curve Description

Impactor Acceleration

Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
37.4	10.7	-0.2	32.5

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

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

Test Date: 9/12/14
 Test I.D.: N/A



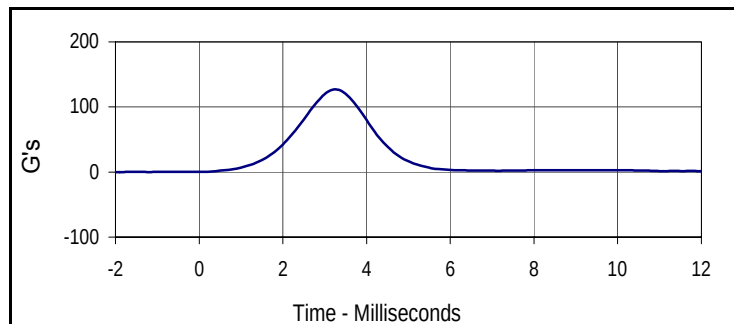
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity		%	10 to 70	47	Pass
A	Sitting Height	mm	772 - 788	780	Pass
B	Shoulder Pivot Height	mm	437 - 453	445	Pass
C	H-Point Height	mm	79 - 89	85	Pass
D	H-Point from Seatback	mm	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	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

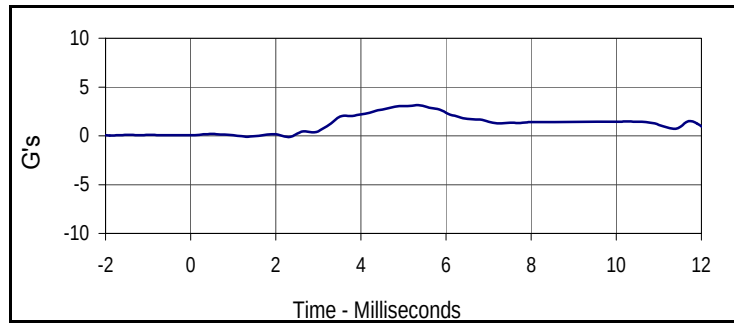
Test Date: 9/12/14
 Test I.D.: 299HD075



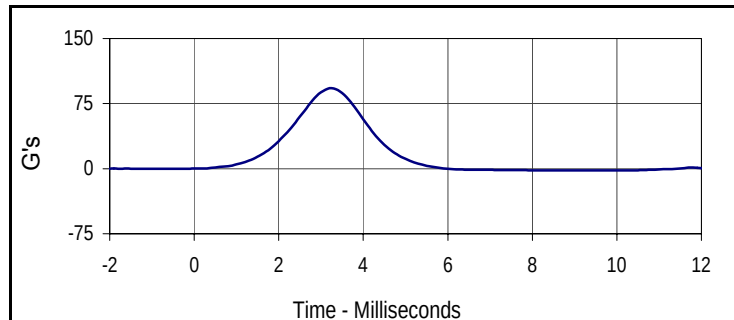
Tested Parameter	Units	Specification	Result	Pass/Fail
Head Assembly Soak Time	Minutes	≥240	366	Pass
Temperature During Soak	Max	18.9 to 25.6	21.9	Pass
	Min		21.7	Pass
Humidity During Soak	Max	10.0 to 70.0	46.7	Pass
	Min		46.1	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.9	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	46.3	Pass
Peak Head Resultant Acceleration	G's	115 to 137	126.9	Pass
Peak Head X Acceleration	G's	<15	3.1	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	2.7	Pass
Overall Test Results				Pass



Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
126.9	3.3	0.1	-2.0



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
3.1	5.3	-0.1	2.3



Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
92.7	3.2	-2.0	10.1



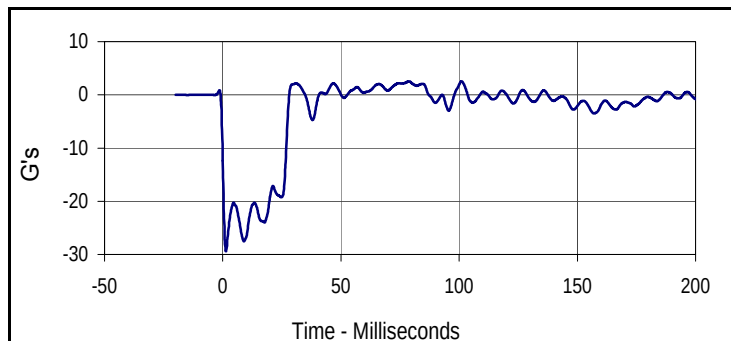
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
86.9	3.3	-1.2	7.8

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

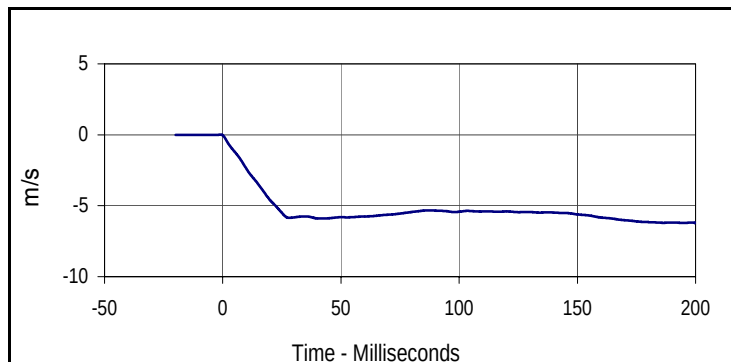
Test Date: 9/12/14
 Test I.D.: 299NB075



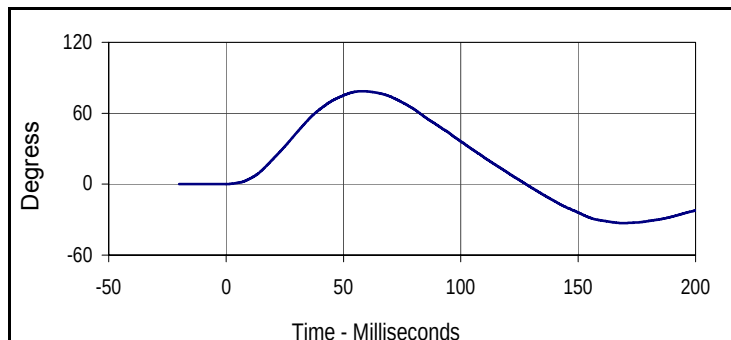
Tested Parameter	Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time	Minutes	≥240	431	Pass
Temperature During Soak	Max	20.6 to 22.2	21.9	Pass
	Min		21.7	Pass
Humidity During Soak	Max	10.0 to 70.0	46.7	Pass
	Min		46.1	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.9	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	46.5	Pass
Pendulum Velocity	m/s	5.51 to 5.63	5.59	Pass
Pendulum Deceleration	10 msec	-2.20 to -2.80	-2.39	Pass
	15 msec	-3.30 to -4.10	-3.47	Pass
	20 msec	-4.40 to -5.40	-4.60	Pass
	25 msec	-5.40 to -6.10	-5.50	Pass
	25-100 msec	-5.50 to -6.20	-5.90	Pass
D-Plane Rotation	Max	71 to 81	78.7	Pass
	Time	50 to 70	58.0	Pass
Peak Occipital Condyle Moment	Nm	-36 to -44	-41.7	Pass
Decaying Moment Time to Cross 0 Nm	msec	102 to 126	113.5	Pass
Overall Test Results			Pass	



Curve Description			
Pendulum Deceleration			
Plot No.	Type	SAE Class	Units
001	FIL	180	G's
Max	Time	Min	Time
2.5	0.0	-29.4	0.0



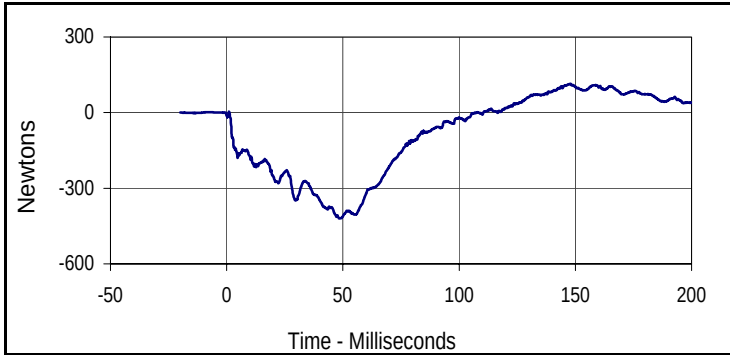
Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
002	FIL	180	m/s
Max	Time	Min	Time
0.0	-0.9	-6.2	194.6



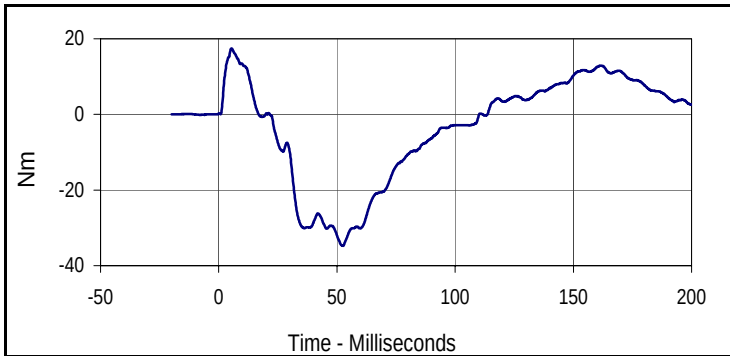
Curve Description			
D-Plane Rotation			
Plot No.	Type	SAE Class	Units
003	FIL	60	Degress
Max	Time	Min	Time
78.7	58.0	-33.0	169.1

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

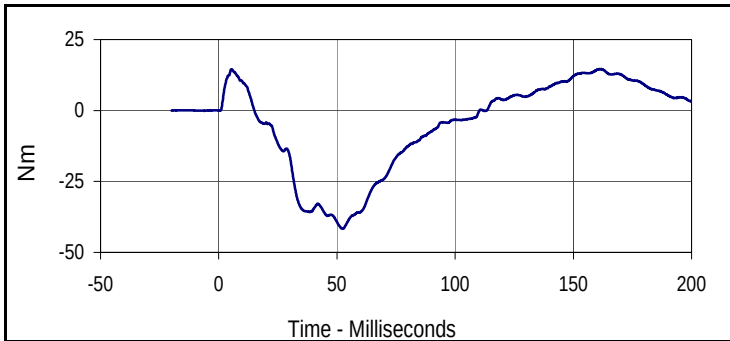
Test Date: 9/12/14
 Test I.D.: 299NB075



Curve Description			
Neck Force Y			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
114.6	147.9	-420.1	48.6



Curve Description			
Neck Moment X			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
17.4	5.3	-34.8	52.6



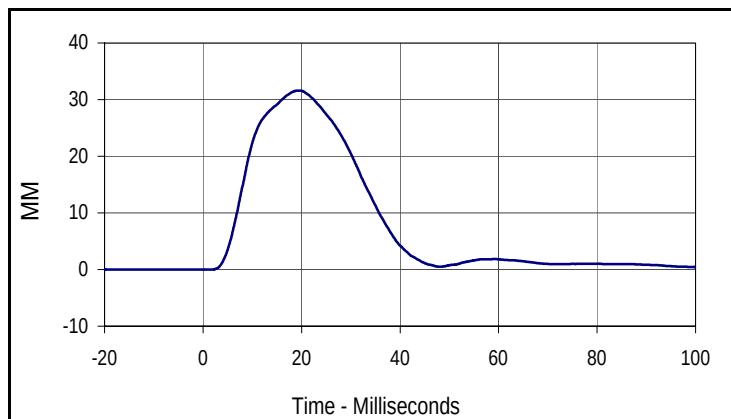
Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
006	FIL	600	Nm
Max	Time	Min	Time
14.6	160.8	-41.7	52.5

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

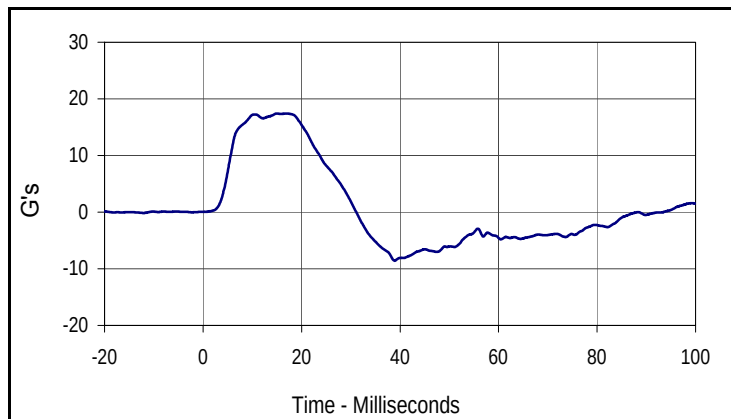
Test Date: 9/12/14
 Test I.D.: 299SH075



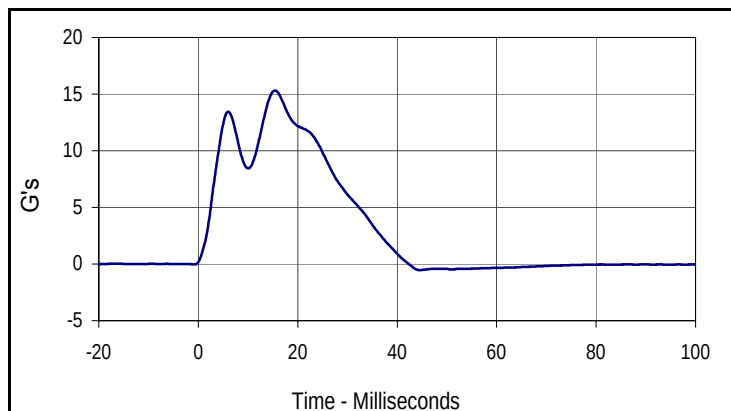
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	506	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.9	Pass
	Min	°C		21.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	46.7	Pass
	Min	%		46.1	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.7	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	46.4	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	17.4	Pass
Peak Impactor Acceleration		G's	13 to 18	15.3	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	19.6	0.0	0.4



Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
17.4	16.9	-8.6	38.9



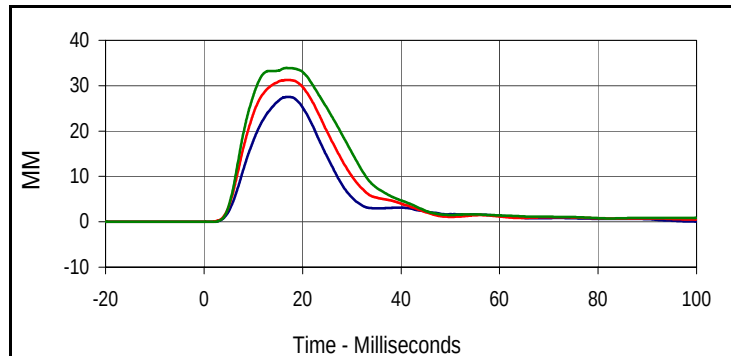
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
15.3	15.4	-0.5	44.5

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

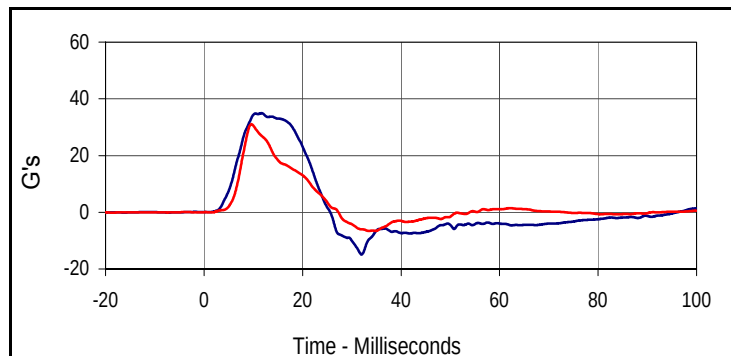
Test Date: 9/12/14
 Test I.D.: 299TWA075



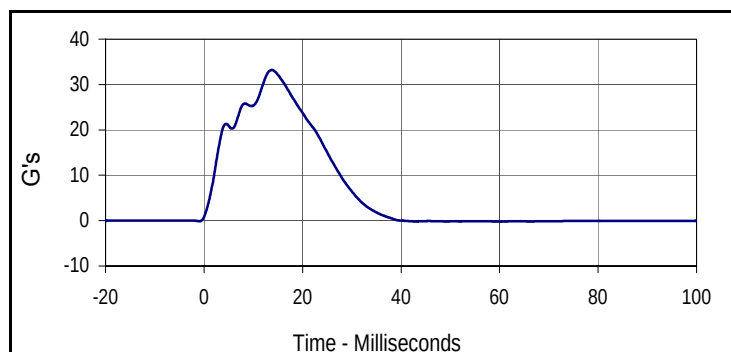
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	556	Pass
Temperature During Soak	Max	20.6 to 22.2	21.9	Pass
	Min		21.7	Pass
Humidity During Soak	Max	10.0 to 70.0	46.7	Pass
	Min		46.1	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.7	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	46.4	Pass
Impactor Velocity	m/s	6.6 to 6.8	6.71	Pass
Peak Shoulder Deflection	mm	31 to 40	34.5	Pass
Peak Upper Thorax Rib Deflection	mm	25 to 32	27.5	Pass
Peak Middle Thorax Rib Deflection	mm	30 to 36	31.3	Pass
Peak Lower Thorax Rib Deflection	mm	32 to 38	33.9	Pass
Peak Upper Spine Y Acceleration	G's	34 to 43	34.9	Pass
Peak Lower Spine Y Acceleration	G's	29 to 37	31.1	Pass
Peak Impactor Acceleration	G's	30 to 36	33.2	Pass
Overall Test Results			Pass	



Curve Description			
Upper Thorax Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
27.5	17.1	0.0	-4.0
Middle Thorax Deflection			
Max	Time	Min	Time
31.3	16.9	0.0	-5.5
Lower Thorax Deflection			
Max	Time	Min	Time
33.9	16.7	0.0	-3.5



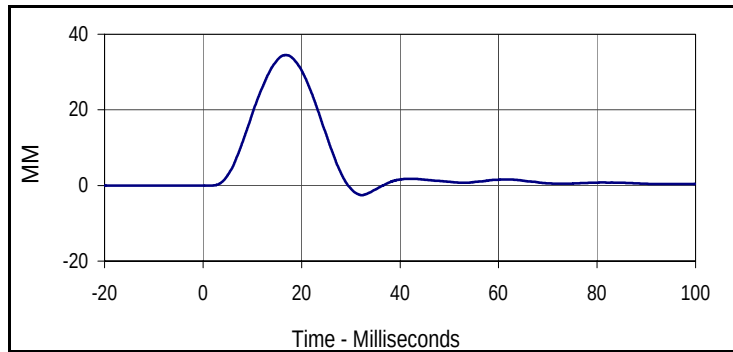
Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
34.9	11.7	-14.9	32.0
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
31.1	9.6	-6.6	33.5



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
33.2	13.7	-0.2	49.3

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

Test Date: 9/12/14
 Test I.D.: 299TWA075



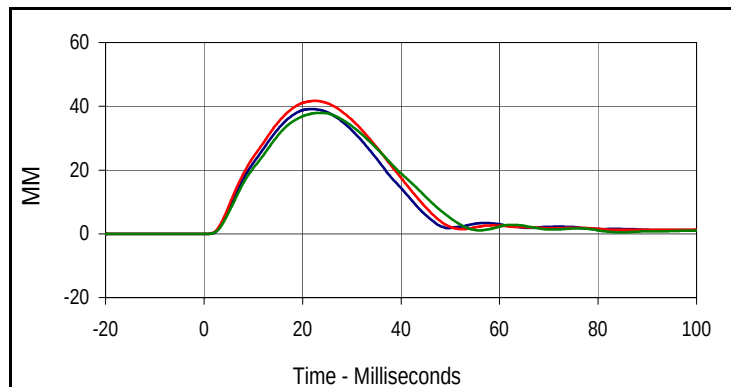
Curve Description			
Shoulder Deflection Y			
Plot No.	Type	SAE Class	Units
007	FIL	600	MM
Max	Time	Min	Time
34.5	16.8	-2.6	32.3

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

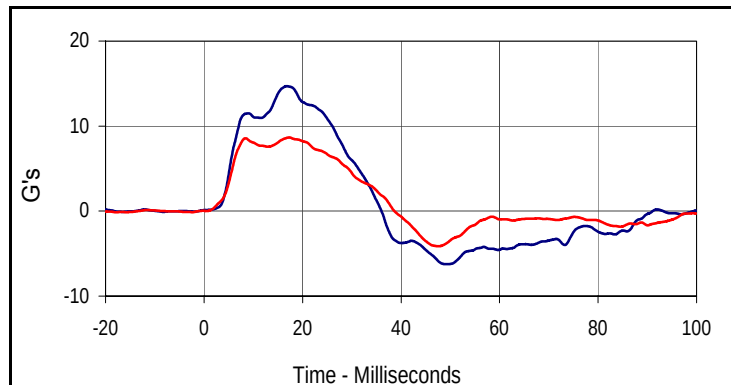
Test Date: 9/12/14
 Test I.D.: 299TWOA075



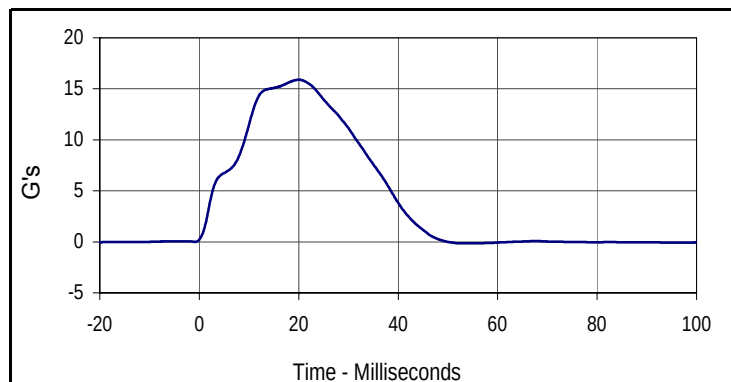
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	611	Pass
Temperature During Soak	Max °C	18.9 to 25.6	21.9	Pass
	Min °C		21.7	Pass
Humidity During Soak	Max %	10.0 to 70.0	46.7	Pass
	Min %		46.1	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.9	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	46.3	Pass
Impactor Velocity	m/s	4.2 to 4.4	4.35	Pass
Peak Upper Thorax Rib Deflection	mm	32 to 40	39.2	Pass
Peak Middle Thorax Rib Deflection	mm	39 to 45	41.7	Pass
Peak Lower Thorax Rib Deflection	mm	35 to 43	37.9	Pass
Peak Upper Spine Y Acceleration	G's	13 to 17	14.7	Pass
Peak Lower Spine Y Acceleration	G's	7 to 11	8.7	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
39.2	21.9	0.0	-12.1
Middle Thorax Deflection			
Max	Time	Min	Time
41.7	22.6	0.0	-11.7
Lower Thorax Deflection			
Max	Time	Min	Time
37.9	23.8	0.0	-10.7



Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
14.7	16.8	-6.2	49.0
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
8.7	17.3	-4.1	47.6



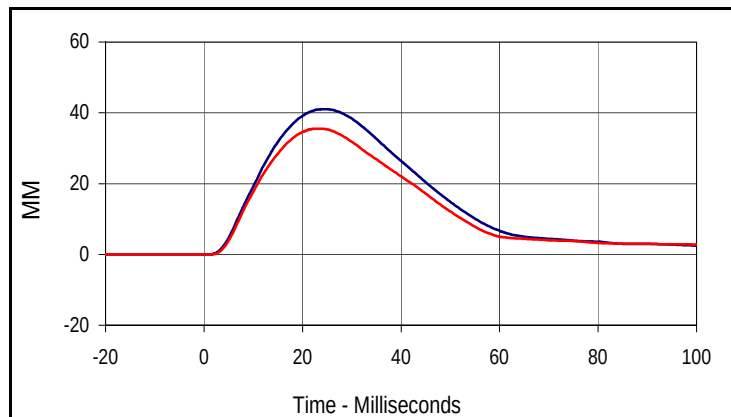
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
15.9	20.0	-0.1	52.9

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

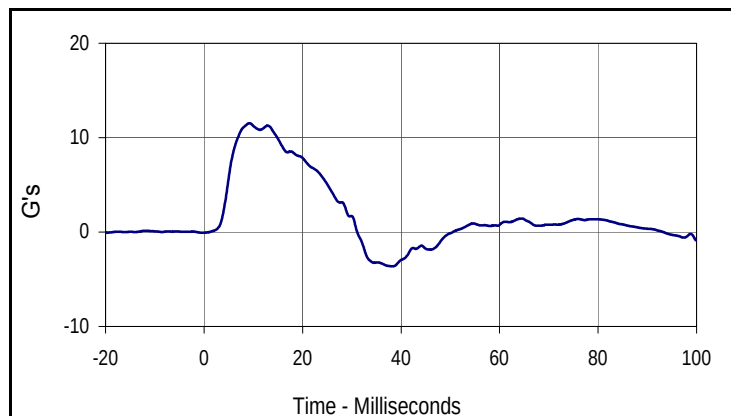
Test Date: 9/12/14
 Test I.D.: 299ABD075



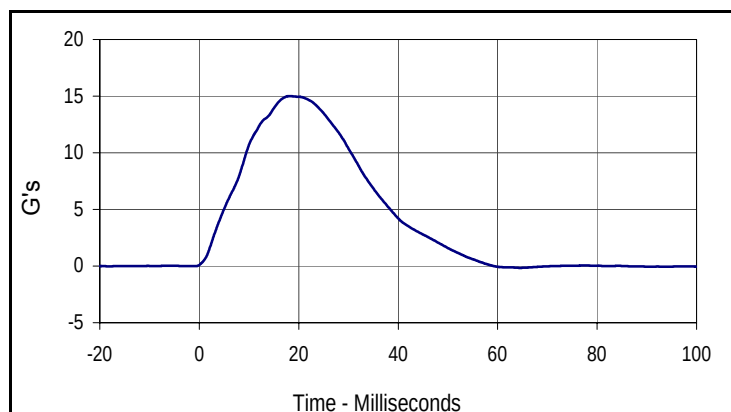
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	671	Pass
Temperature During Soak	Max °C	20.6 to 22.2	21.9	Pass
	Min °C		21.7	Pass
Humidity During Soak	Max %	10.0 to 70.0	46.7	Pass
	Min %		46.1	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.8	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	46.2	Pass
Impactor Velocity	m/s	4.2 to 4.4	4.35	Pass
Peak Upper Abdominal Rib Deflection	mm	36 to 47	41.0	Pass
Peak Lower Abdominal Rib Deflection	mm	33 to 44	35.5	Pass
Peak Lower Spine Y Acceleration	G's	9 to 14	11.5	Pass
Peak Impactor Acceleration	G's	12 to 16	15.0	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
41.0	24.2	0.0	-6.2
Curve Description			
Lower Abdominal Rib Deflection			
Plot No.	Type	SAE Class	Units
002	FIL	600	MM
Max	Time	Min	Time
35.5	23.1	0.0	-11.8

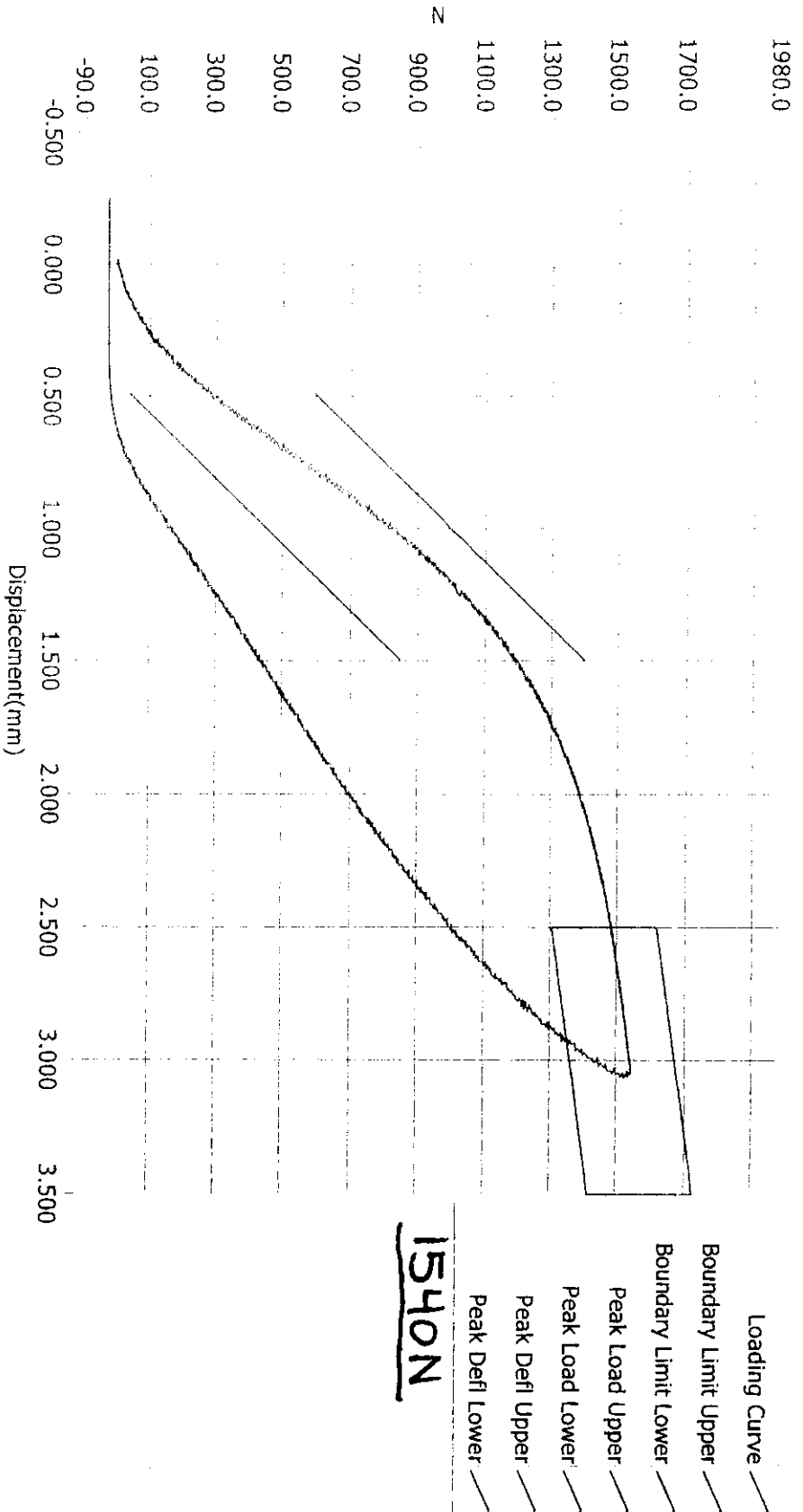


Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
11.5	9.2	-3.6	38.3



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
15.0	18.1	-0.2	64.5

Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

M20155200 POST TEST

<u>Test ID</u>	<u>Part Serial Number</u>	<u>Test Date</u>	<u>Test Time</u>
	63396	1/28/2013	6:22 PM
<u>Cert ID</u>	<u>ATD Serial Number</u>	<u>ATD Type</u>	
	N/A	SIDIIs	

Current Date : 1/28/2013

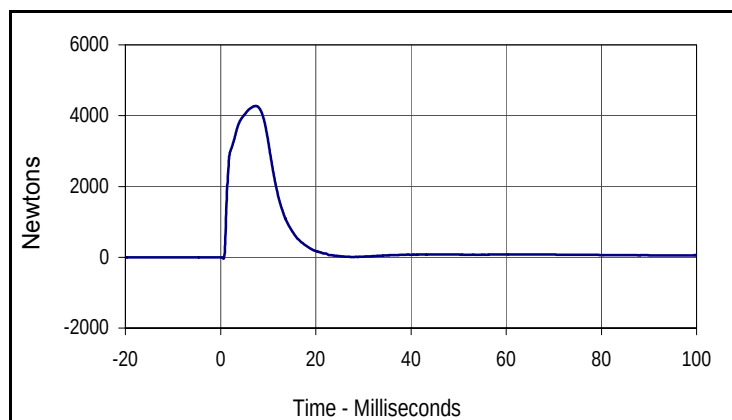
Current Time : 18:23:33

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

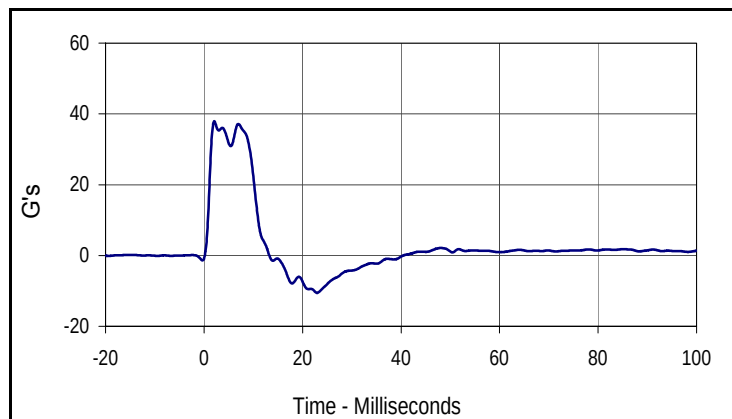
Test Date: 9/12/14
 Test I.D.: 299ACET075



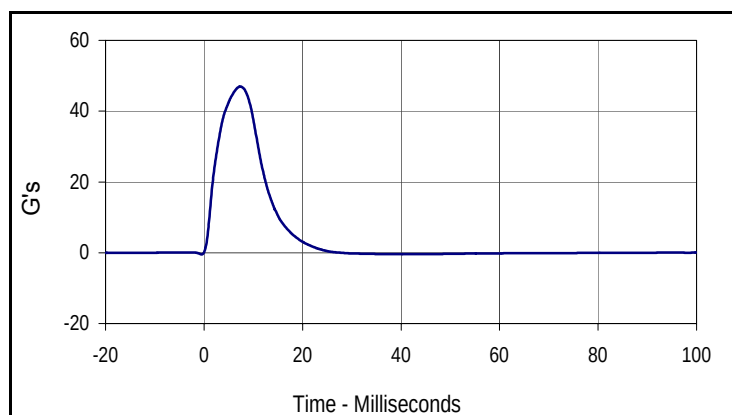
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥180	746	Pass
Temperature During Soak	Max	20.6 to 22.2	21.9	Pass
	Min		21.7	Pass
Humidity During Soak	Max	10.0 to 70.0	46.7	Pass
	Min		46.1	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.8	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	46.3	Pass
Impactor Velocity	m/s	6.6 to 6.8	6.71	Pass
Peak Acetabulum Force Y	Newtons	3600 to 4300	4272.7	Pass
Peak Pelvis Y Acceleration After 6 msec.	G's	34 to 42	37.2	Pass
Peak Impactor Acceleration	G's	38 to 47	46.9	Pass
Overall Test Results			Pass	



Curve Description			
Pelvis Acetabulum Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4272.7	7.4	-35.6	0.6



Curve Description			
Pelvis Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
37.9	2.1	-10.6	22.9



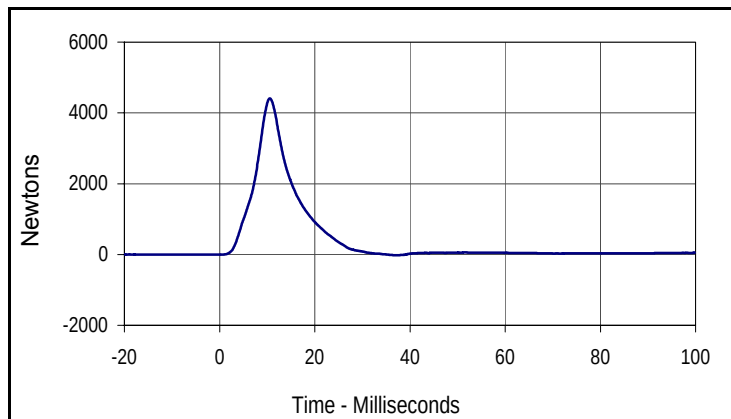
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
46.9	7.4	-0.4	-0.5

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

Test Date: 9/12/14
 Test I.D.: 299PL075



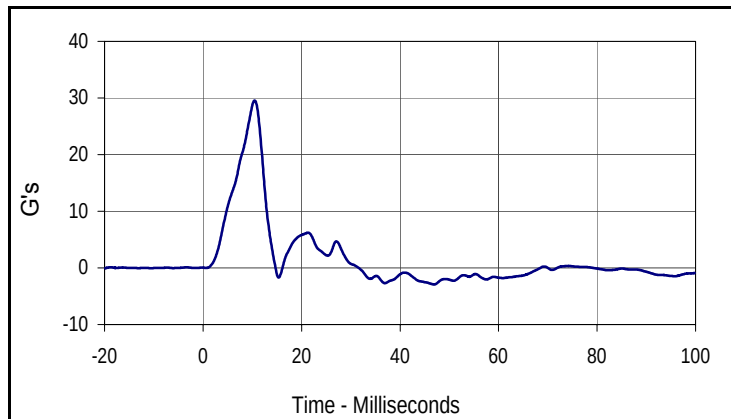
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	811	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.9	Pass
	Min	°C		21.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	46.7	Pass
	Min	%		46.1	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.8	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	46.1	Pass
Impactor Velocity		m/s	4.2 to 4.4	4.33	Pass
Peak Iliac Force		Newtons	4100 to 5100	4408.5	Pass
Peak Pelvis Y Acceleration		G's	28 to 39	29.6	Pass
Peak Impactor Acceleration		G's	36 to 45	40.7	Pass
Overall Test Results				Pass	



Curve Description

Pelvis Iliac Force

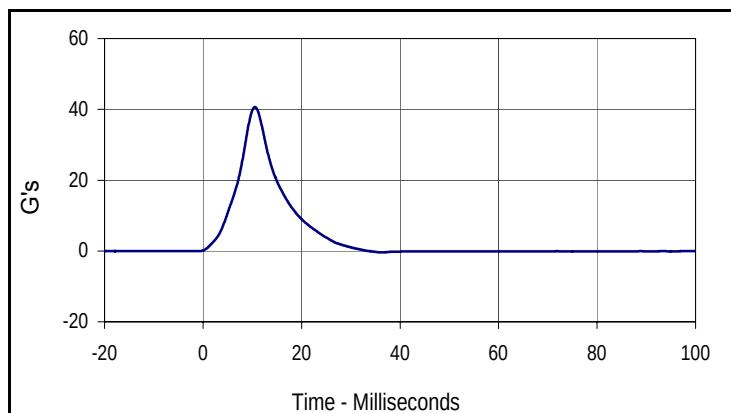
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4408.5	10.6	-22.2	37.3



Curve Description

Pelvis Y Acceleration

Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
29.6	10.5	-2.9	46.9



Curve Description

Impactor Acceleration

Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
40.7	10.5	-0.4	36.2

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	Primary		X	P58736	Endevco	5/9/14
			Y	P51929	Endevco	5/13/14
			Z	P51934	Endevco	5/13/14
	Redundant		X	P68604	Endevco	5/13/14
			Y	P51931	Endevco	5/13/14
			Z	P51939	Endevco	5/13/14
Displacement Potentiometers	Thoracic Rib	Upper	Y	1143	FTSS	5/14/14
		Middle	Y	1160	FTSS	5/14/14
		Lower	Y	1213	FTSS	5/14/14
	Abdominal Rib	Upper	Y	1218	FTSS	5/14/14
		Lower	Y	1234	FTSS	5/14/14
Lower Spine Accelerometers (T12)			X	04I20-Z04	Endevco	5/14/14
			Y	06A07-R08	Endevco	5/14/14
			Z	P58795	Endevco	5/14/14
Acetabulum Load Cell			Y	272	Denton	5/1/14
Iliac Wing Load Cell			Y	284	Denton	5/1/14
Pelvis Plug (Struck Side)				63189	FTSS	1/23/13
Pelvis Plug (Non-Struck Side)				63395	FTSS	1/28/13

TABLE 2 – Vehicle Instrumentation

Vehicle Instrumentation		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	A135446	MSI	8/25/14
Vehicle Center of Gravity	Y	A135451	MSI	8/25/14
Vehicle Center of Gravity	Z	A135444	MSI	8/25/14
Left Floor Sill	Y	A136707	MSI	8/19/14
A-Pillar Sill	Y	A136712	MSI	8/28/14
A-Pillar Low	Y	A136679	MSI	8/21/14
A-Pillar Mid	Y	A136718	MSI	8/20/14
B-Pillar Sill	Y	A136668	MSI	8/27/14
B-Pillar Low	Y	A136674	MSI	8/27/14
B-Pillar Mid	Y	A136690	MSI	8/27/14
Driver Seat	Y	A136723	MSI	8/21/14
Engine Top	X	A136717	MSI	8/21/14
Engine Top	Y	A136697	MSI	8/21/14
Firewall	Y	A135431	MSI	8/20/14
Right Roof	Y	A136720	MSI	8/20/14
Right Floor Sill	Y	A136735	MSI	8/20/14
Rear Floorpan	X	A135436	MSI	8/20/14
Rear Floorpan	Y	A128037	MSI	8/21/14

TABLE 3 – Pole Instrumentation

	Serial Number	Manufacturer	Calibration Date
Load Cell 1	131822A	Interface	5/20/14
Load Cell 2	132304A	Interface	5/20/14
Load Cell 3	19477	Interface	5/20/14
Load Cell 4	19325	Interface	5/20/14
Load Cell 5	131827A	Interface	5/20/14
Load Cell 6	132302A	Interface	5/21/14
Load Cell 7	19267	Interface	5/21/14
Load Cell 8	19321	Interface	5/21/14