REPORT NUMBER: SINCAP-KAR-14-005

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

NISSAN MOTOR CO., LTD.

2014 INFINITI Q50 HYBRID 4-DOOR SEDAN

NHTSA No: M20145202

PREPARED BY:

KARCO ENGINEERING, LLC.

9270 HOLLY ROAD

ADELANTO, CA 92301

NOVEMBER 27, 2013

FINAL REPORT

PREPARED FOR:

U.S. DEPARTMENT OF TRANSPORTATION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

OFFICE OF CRASHWORTHINESS STANDARDS

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Approval Date: November 27, 2013

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_____

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NHTSA, Office of Crashworthiness Standards

Date: _____

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16. Abstract

A 55/28 km/h 90 deg. Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2014 Infiniti Q50 Hybrid 4-door sedan in accordance with the specifications of the Office of Crash Worthiness Standards Test Procedure for the generation of consumer information on vehicle side crash protection. The test was conducted at the KARCO Engineering, LLC. facility in Adelanto, California on November 13, 2013.

The impact velocity of the Moving Deformable Barrier was 61.81 km/h and the outside ambient temperature at the struck (driver's) side of the vehicle was 23.9 deg. C. The target vehicle's maximum post-test static crush was 323 mm located at level 3. The test vehicle's occupant performance data is as follows:

Measurement Description	Driver ATD (ES-2re)		
	Units	IARV	Result
Head Injury Criteria (HIC_{36})		1000	78.7
Maximum Thorax Rib Deflection	mm	44	23
Total Abdominal Force	N	2500	1167
Pubic Symphysis Force	N	6000	1422

Measurement Description	Passenger ATD (SID-IIs)		
	Units	IARV	Result
Head Injury Criteria (HIC_{36})		1000	196.0
Resultant Lower Spine Acceleration	g	82	46
Total Pelvic Force (Sum of Acetubular and Iliac Forces)	N	5525	1846
Maximum Thoracic Rib Deflection	mm	38*	17
Maximum Abdominal Rib Deflection	mm	45*	26

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

** Proposed IARV*

17. Key Words		18. Distribution Statement	
New Car Assessment Program (NCAP) Side Impact Moving Deformable Barrier (MDB) ES-2re SID-IIs		Copies of this report are available from: National Highway Traffic Safety Administration 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 moving deformable barrier side impact test is part of the MY 2014 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 2014 Infiniti Q50 Hybrid 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 2014 Infiniti Q50 Hybrid 4-Door sedan was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 61.81 km/h (38.41 mph). The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by KARCO Engineering, LLC. in Adelanto, California, on November 13, 2013. Pre- and post-test photographs of the test vehicle, the MDB and the dummy (ES-2re) are included in Appendix A of this report.

The dummy was placed in the driver seating position according to instructions specified in the OCWS Side Impact Laboratory Test Procedure, dated September 2013. The side impact event was documented by 10 cameras. Camera locations are included in Data Sheet No. 5 of this report.

The dummy was instrumented in the following manner:

DRIVER ATD (ES-2re)
Primary and redundant head CG tri-axial accelerometers
Chest upper rib, middle rib and lower rib y-axis displacement potentiometers
Abdomen forward, middle, and rear y-axis load cells
Lower spine (12) tri-axial accelerometers
Pubic symphysis y-axis load cell

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

Dummy injury readings were recorded as follows:

Measurement Description	Units	Driver ATD (ES-2re)	
		Threshold	Result
Head Injury Criteria (HIC_{36})		1000	78.7
Maximum Thorax Rib Deflection	mm	44	23
Combined Abdominal Force	N	2500	1167
Pubic Symphysis Force	N	6000	1422

Measurement Description	Units	Passenger ATD (SID-IIs)	
		Threshold	Result
Head Injury Criteria (HIC_{36})		1000	196.0
Lower Spine (T12) Resultant Acceleration	g	82	46
Total Pelvic Force (sum of acetabular and iliac forces	N	5525	1846
Maximum Thoracic Rib Deflection	mm	38*	17
Maximum Abdominal Rib Deflection	mm	45*	26

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

SECTION 3

OCCUPANT AND VEHICLE INFORMATION/DATA SHEETS

Test Vehicle: 2014 Infiniti Q50 Hybrid 4-Door Sedan NHTSA No. M20145202

Test Program: NCAP MDB Side Impact Test Test Date: 11/13/13

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	^oF	^oC	=(Tf -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: 2014 Infiniti Q50 Hybrid 4-Door Sedan NHTSA No. M20145202

Test Program: NCAP MDB Side Impact Test Test Date: 11/13/13

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	M20145202
Model Year	2014
Make	Infiniti
Model	Q50 Hybrid
Body Style	4-Door Sedan
VIN	JN1AV7AP0EM690572
Body Color	Hagane Blue
Odometer Reading (km / mi)	48 / 30
Engine Displacement (L)	3.5
Type / No. of Cylinders	V6 Hybrid
Engine Placement	Longitudinal
Transmission Type	Automatic
Transmission Speeds	7
Overdrive	Yes
Final Drive	Rear
Roof Rack	No
Sunroof / T-Top	Yes
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	Yes
Power Window Auto-Reverse	Yes
Other Optional Feature	No
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	No
Rear Pass. Curtain Airbag	Yes
Rear Pass. Head/Torso Airbag	No
Rear Pass. Torso Airbag	No
Rear Pass. Torso/Pelvis Airbag	No
Rear Pass. Pelvis Airbag	No
Driver Seat Belt Pretensioner	Yes
Rear Pass. Seat Belt Pretensione	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-13
Vehicle Type	Passenger Car

GVWR (kg)	2250
GAWR Front (kg)	1090
GAWR Rear (kg)	1180

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

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

VEHICLE SEAT TYPE

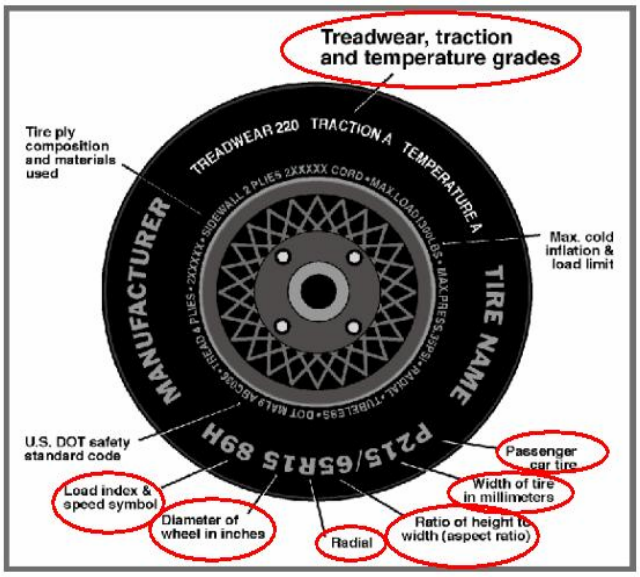
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						w/ Lever	w/ Knob
Front Seat	Yes					Yes	
Rear or Second Row Seat		Yes			Yes		
Third Row Seat							

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2014 Infiniti Q50 Hybrid 4-Door Sedan NHTSA No. M20145202

Test Program: NCAP MDB Side Impact Test Test Date: 11/13/13



Measured Parameter	Front	Rear
Max. Tire Pressure (kpa)	350	350
Cold Pressure (kPa)	240	240
Recommended Tire Size	P225/55RF17	P225/55RF17
Tire Size on Vehicle	P225/55RF17	P225/55RF17
Tire Manufacturer	Bridgestone	Bridgestone
Tire Model	Potenza RE97AS	Potenza RE97AS
Treadware	400	400
Traction Grade	A	A
Temperature Grade	A	A
Tire Plies Sidewall	1 Rayon	1 Rayon
Tire Plies Body	1 Rayon, 2 Steel, 1 Aramid & Nylon	1 Rayon, 2 Steel, 1 Aramid & Nylon
Load Index/Speed Symbol	95V	95V
Tire Material	Rayon, Steel, Aramid, Nylon	Rayon, Steel, Aramid, Nylon
DOT Safety Code Left	EJ UP CCM2213	EJ UP CCM2213
DOT Safety Code Right	EJ UP CCM2213	EJ UP CCM2213

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2014 Infiniti Q50 Hybrid 4-Door Sedan NHTSA No. M20145202

Test Program: NCAP MDB Side Impact Test Test Date: 11/13/13

TIRE PRESSURES

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

MDB TIRE SPECIFICATIONS

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

TEST VEHICLE AXLE WEIGHTS

		As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
	Units	Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	490.0	422.5		520.5	507.0		521.5	514.5	
Right	kg	465.0	407.5		466.5	475.5		464.0	478.5	
Ratio	%	53.5%	46.5%	100.0%	50.1%	49.9%	100.0%	49.8%	50.2%	100.0%
Total	kg	955.0	830.0	1785.0	987.0	982.5	1969.5	985.5	993.0	1978.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1785.0	A
Actual Weight of 2 P572 ATDs Used	kg	125.0	B
Rated Cargo/Luggage Wt (RCLW)	kg	67.8	C
Calculated Vehicle Target Wt (TVTW)	kg	1977.8	A+B+C

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

TEST VEHICLE ATTITUDE AND CG

Measurement Description	Units	Fully Loaded	As Tested	Meets Requirement***
LF	mm	699	699	Yes
RF	mm	707	699	Yes
RR	mm	675	673	Yes
LR	mm	676	675	Yes
Vehicle CG (Aft of Front Axle)	mm	1430	1421	
Vehicle CG (Left (+)/Right (-) from Longitudinal Centerline)	mm	37	34	

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

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2014 Infiniti Q50 Hybrid 4-Door Sedan NHTSA No. M20145202

Test Program: NCAP MDB Side Impact Test Test Date: 11/13/13

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Non-Struck Side Door Panels	5.0
Trunk Trim	5.0
Ballast / Equipment Added	68.3

Test Height Adjustable Setting (If Applicable)	

DATA SHEET NO. 2

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

Test Vehicle: 2014 Infiniti Q50 Hybrid 4-Door Sedan NHTSA No. M20145202

Test Program: NCAP MDB Side Impact Test Test Date: 11/13/13

SEAT POSITIONING

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

SCRL ANGLE RANGE

Seat	SCRL (°)		
	Max	Min	Mid
Driver Seat	8.4	0.0	4.2
Front Passenger Seat	9.0	0.0	4.5
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	4.2	497	Max	536	559	583
			Mid	506	527	551
			Min	474	497	519
Front Passenger Seat	4.5	497	Max	540	564	582
			Mid	507	531	554
			Min	474	497	520
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: 2014 Infiniti Q50 Hybrid 4-Door Sedan NHTSA No. M20145202

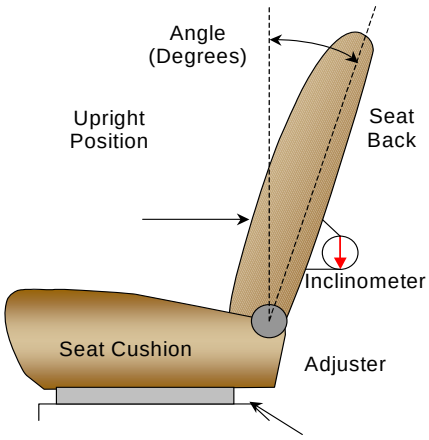
Test Program: NCAP MDB Side Impact Test Test Date: 11/13/13

SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position From Forwardmost Position	
	mm	Detents	mm	Detent
Driver Seat	260		130	
Front Passenger Seat	260		130	
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 to the manufacturer's designated design angle. The right front passenger's seat back is positioned in a similar manner as the driver's seat back. The struck side rear seat back is positioned such that the dummy's head is level. The rear center and non-struck side rear outboard seat backs are positioned in a similar manner as the struck side rear seat back. Seat back angle is measured at the seat back.



FRONT SEAT ASSEMBLY

SEAT BACK POSITION

Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents	Degree	Detent
Driver Seat w/Seated Dummy	47.1		28.0	
Front Passenger Seat	47.9		28.0	
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

DATA SHEET NO. 2 … (CONTINUED)

SEAT ADJUSTMENT, FUEL SYSTEMS, AND STEERING WHEEL DATA

Test Vehicle: 2014 Infiniti Q50 Hybrid 4-Door Sedan NHTSA No. M20145202

Test Program: NCAP MDB Side Impact Test Test Date: 11/13/13

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
Rear Seat	Fixed	Fixed

HEAD RESTRAINT ADJUSTMENT

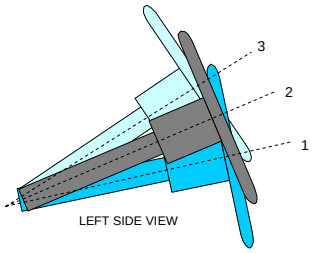
The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

	Total No. of Positions	Placed in Position
Driver Seat	5	Full Up
Rear Seat	2	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	14.4	127
Geometric Center - Position 2	17.4	147
Uppermost - Position 3	20.5	167
Telescoping Steering Wheel Travel		40
Test Position	17.4	147



STEERING COLUMN ASSEMBLY

DATA SHEET NO. 2 … (CONTINUED)

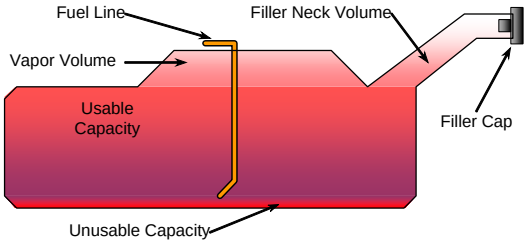
SEAT ADJUSTMENT, FUEL SYSTEMS, AND STEERING WHEEL DATA

Test Vehicle: 2014 Infiniti Q50 Hybrid 4-Door Sedan NHTSA No. M20145202

Test Program: NCAP MDB Side Impact Test Test Date: 11/13/13

FUEL PUMP

The vehicle is equipped with an electric fuel pump. The fuel pump is activated when the ignition is turned to the "ON" position.



VEHICLE FUEL TANK ASSEMBLY

FUEL TANK CAPACITY

Description	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	67.37
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	62.66
Actual amount of Solvent Used in Test	62.66
1/3 of Usable Capacity	22.46

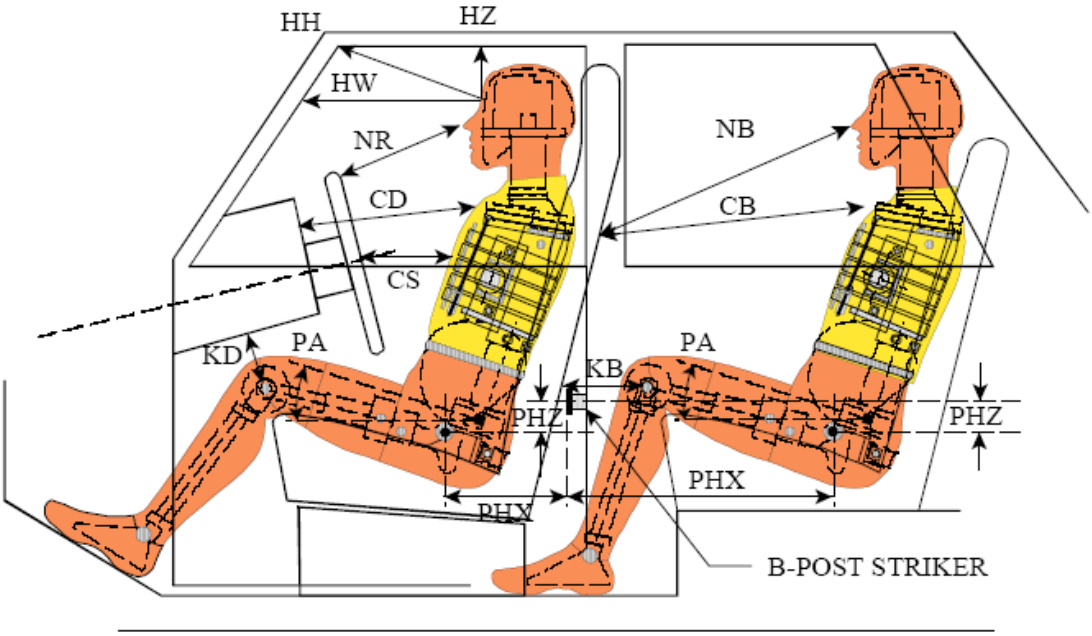
Is the Actual Amount of Solvent Used in the test equal to 93% ± 1% of the Usable Capacity stated in the Form No. 1? ☒ **Yes** ☐ **No**

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2014 Infiniti Q50 Hybrid 4-Door Sedan NHTSA No. M20145202

Test Program: NCAP MDB Side Impact Test Test Date: 11/13/13



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

LEFT SIDE VIEW

DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

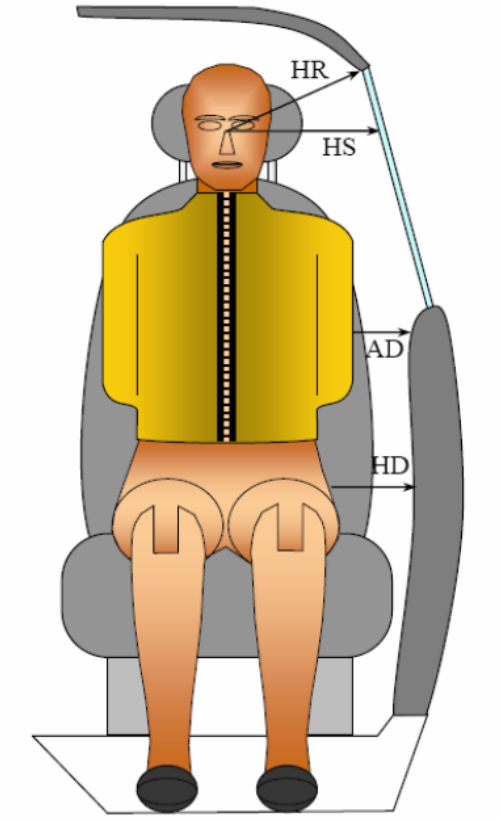
Driver Code	Pass. Code	Description	Driver		Passenger	
			Length (mm)	Angle (º)	Length (mm)	Angle (º)
HH		Head to Header	294			
HW		Head to Windshield	531			
HZ	HZ	Head to Roof	123		225	
NR	NB	Nose to Rim/Seat Back	411		637	
CD	CB	Chest to Dash/Seat Back	588		585	
CS		Chest to Steering Wheel	298			
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	188	33.4	273	28.5
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	155	20.4	294	18.8
PAX°	PAX°	Pelvic Tilt Angle X		16.3		26.6
	PAY°	Pelvic Tilt Angle Y		0.2		0.3
PHX	PHX	Hip Point to Striker (x-axis)	190		286	
PHZ	PHZ	Hip Point to Striker (z-axis)	174		383	

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2014 Infiniti Q50 Hybrid 4-Door Sedan NHTSA No. M20145202

Test Program: NCAP MDB Side Impact Test Test Date: 11/13/13



DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

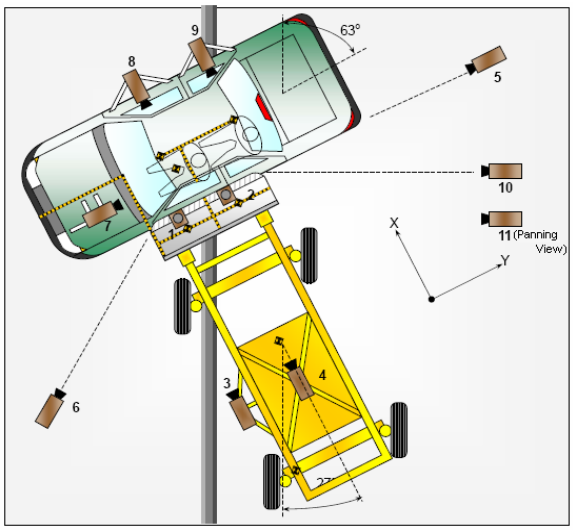
Code	Measurement Description	Units	Driver	Passenger
HR	Head to Side Header	mm	187	234
HS	Head to Side Window	mm	308	370
AD	Arm to Door	mm	83	167
HD	H-Point to Door	mm	145	183

DATA SHEET NO. 5

CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2014 Infiniti Q50 Hybrid 4-Door Sedan NHTSA No. M20145202

Test Program: NCAP MDB Side Impact Test Test Date: 11/13/13



CAMERA LOCATIONS AND DATA

No.	View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	1220	2287	-5486	14	1000
2	Overhead Close-Up	609	2287	-5102	35	1000
3	Left Impact Point (MDB)	-2134	0	-1143	25	1000
4	Side Overall (MDB)	-3912	838	-1829	12.5	1000
5	Rear	-64	2485	-1348	85	1000
6	Left Front	497	-834	649	24	1000
7	Driver Front (On-Board)	1743	896	481	35	1000
8	Driver Side (On-Board)	1695	1819	505	14	1000
9	Passenger Side (On-Board)				14	1000
10	Real Time Overall				Zoom	30
11	Real Time Inrun				Zoom	30

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

*All measurements accurate to ±6 mm

INSTRUMENTATION

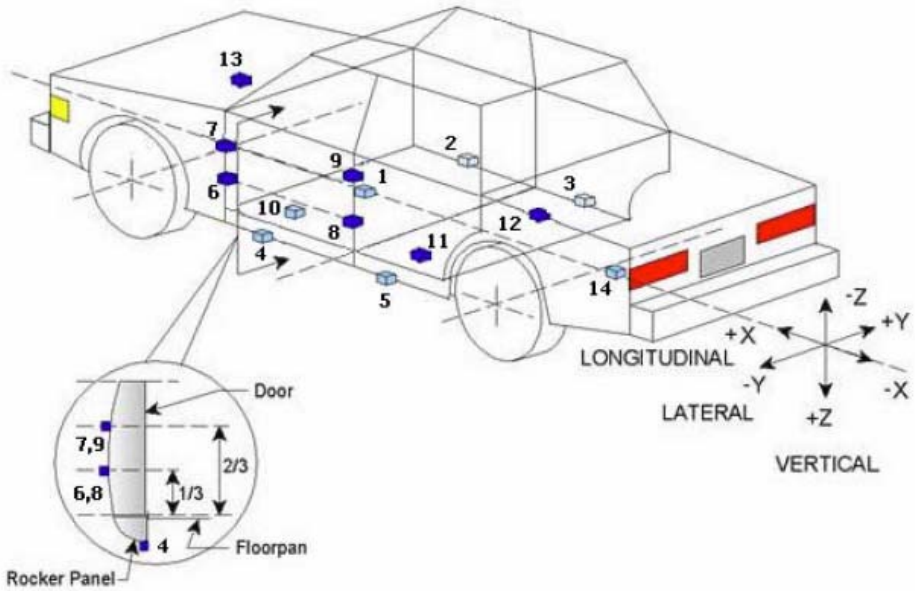
Driver Dummy Channels	16
Passenger Dummy Channels	16
Vehicle Structure Accelerometers	22
MDB Accelerometers	5
Total	59

DATA SHEET NO. 6

TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2014 Infiniti Q50 Hybrid 4-Door Sedan NHTSA No. M20145202

Test Program: NCAP MDB Side Impact Test Test Date: 11/13/13



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

Loc. No.	Sensor Description	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2115	0	-423
2	Right Sill at Front Seat	2553	723	-368
3	Right Sill at Rear Seat	1813	663	-365
4	Left Sill at Front Door	2754	-733	-205
5	Left Sill at Rear Door	1593	-738	-204
6	A-Pillar Lower	3278	-811	-514
7	A-Pillar Middle	3337	-809	-712
8	B-Pillar Lower	2289	-735	-578
9	B-Pillar Middle	2215	-738	-768
10	Front Seat Track	2472	-578	-368
11	Rear Seat Structure			
12	Right Rear Occupant Compartment	2083	356	-213
13	Engine Block	4072	40	-835
14	Rear Floorpan Above Axle	1065	-28	-453

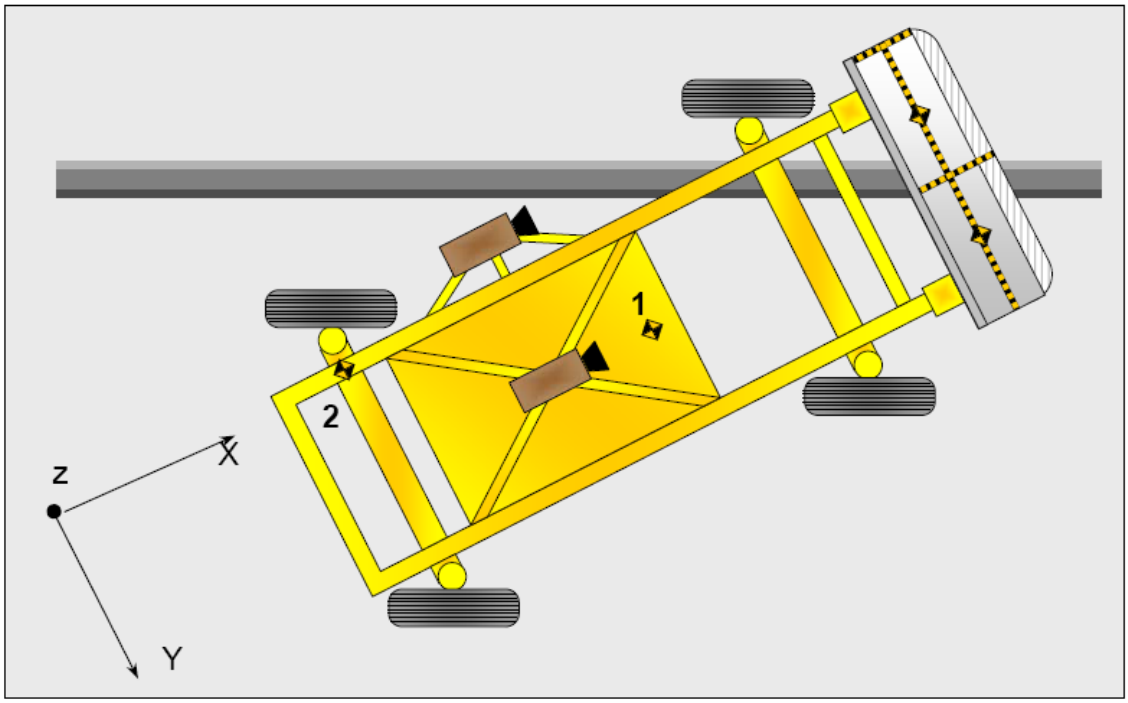
Reference: X – Rear surface of vehicle (+ forward)
Y – Vehicle centerline (+ to right)
Z – Ground plane (+ down)

DATA SHEET NO. 7

MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2014 Infiniti Q50 Hybrid 4-Door Sedan NHTSA No. M20145202

Test Program: NCAP MDB Side Impact Test Test Date: 11/13/13



MDB ACCELEROMETER LOCATIONS

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

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

DATA SHEET NO. 8

POST-TEST OBSERVATIONS

Test Vehicle: 2014 Infiniti Q50 Hybrid 4-Door Sedan NHTSA No. M20145202

Test Program: NCAP MDB Side Impact Test Test Date: 11/13/13

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Front Seat Dummy (ES-2re)	Rear Seat Dummy (SID-IIs)
Face	Curtain Airbag	Curtain Airbag
Top of Head	Curtain Airbag, Side Header	Curtain Airbag, Side Header
Left Side of Head	Curtain Airbag, Side Header	Curtain Airbag
Back of Head	Curtain Airbag, Side Header, Headrest	Curtain Airbag, Side Header, Headrest
Left Shoulder	Curtain Airbag, Door Panel	Door Panel
Upper Torso	Seat, Torso/Pelvis Airbag	Seat
Lower Torso	Seat, Torso/Pelvis Airbag	Seat, Door Panel
Left Hip	Torso/Pelvis Airbag	Seat, Door Panel
Left Knee	Door Panel, Right Knee	Door Panel, Seat

POST-TEST DOOR PERFORMANCE

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

POST-TEST SEAT PERFORMANCE

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

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	No Separation
Sill Separation	No Separation
Windshield Damage	None
Side Window Damage	Both struck side windows broken
Other Notable Effects	None

DATA SHEET NO. 8 … (CONTINUED)

POST-TEST OBSERVATIONS

Test Vehicle: 2014 Infiniti Q50 Hybrid 4-Door Sedan NHTSA No. M20145202

Test Program: NCAP MDB Side Impact Test Test Date: 11/13/13

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		2849
Vertical Impact Reference Line (Aft of Front Axle)(Intended Impact Point)	mm		485
Actual Impact Point (Aft of Front Axle)	mm		484
Horizontal Offset (+ forward / - rearward)	mm	± 50 of Intended Impact Point	1
Vertical Offset (+ down / - up)	mm	± 20 of Intended Impact Point	-10

DATA SHEET NO. 9

MDB SUMMARY OF RESULTS

Test Vehicle: 2014 Infiniti Q50 Hybrid 4-Door Sedan NHTSA No. M20145202

Test Program: NCAP MDB Side Impact Test Test Date: 11/13/13

MDB SPECIFICATIONS

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

MDB WEIGHTS

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

SPEED AND IMPACT DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	61.81
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.84
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	89.9
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	62.8
MDB Crabbed Angle to MDB Forward Line of Motion	degrees	26.0 to 28.0	27.1

MAXIMUM STATIC CRUSH OF HONEYCOMB FACE

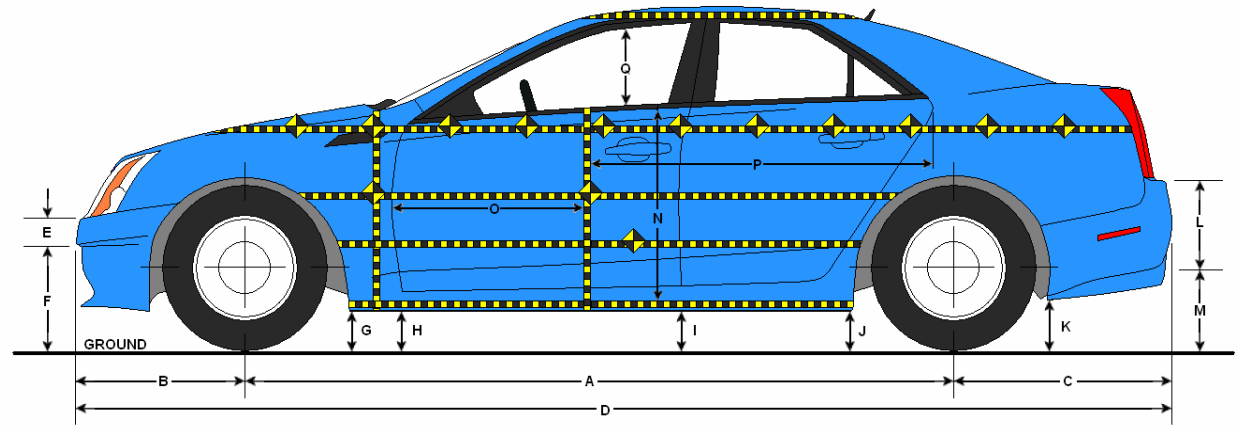
Vertical Location			From Centerline		Max. Crush (mm)
Row	Description	Height (mm)	Distance (mm)	Direction	
A	Center of Bumper	432	800	Right	231
B	Top of Bumper	533	800	Left	137
C	Mid Level	686	800	Left	197
D	Top of Stack	813	800	Left	237

DATA SHEET NO. 10

TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2014 Infiniti Q50 Hybrid 4-Door Sedan NHTSA No. M20145202

Test Program: NCAP MDB Side Impact Test Test Date: 11/13/13



LEFT SIDE VIEW

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2849	2836	-13
B	Front Axle to FSOV	838	838	0
C	Rear Axle to RSOV	1095	1099	4
D	Total Length at Centerline	4782	4772	-10
E	Front Bumper Thickness	109	107	-2
F	Fromt Bumper Bottom to Ground	330	361	31
G	Sill Height at Front Wheel Well	151	177	26
H	Sill Height at Front Door Leading Edge	158	196	38
I	Sill Height at B-Pillar	180	258	78
J1	Sill Height at Rear Wheel Well	143	220	77
J2	Pinch Weld Height at Rear Wheel Well	144	186	42
K	Sill Height Aft of Rear Wheel Well	182	221	39
L	Rear Bumper Thickness	180	178	-2
M	Rear Bumper Bottom to Ground	400	439	39
N	Sill Height to Bottom of Front Window Sill	594	578	-16
O	Front Door Leading Edge to Impact CL	697	675	-22
P	Rear Door Trailing Edge to Impact CL	1510	1414	-96
Q	Front Window Opening	428	454	26
R	Right Side Length	3395	3397	2
S	Left Side Length	3390	3365	-25
T	Vehicle Width at B-Pillar	1794	1636	-158

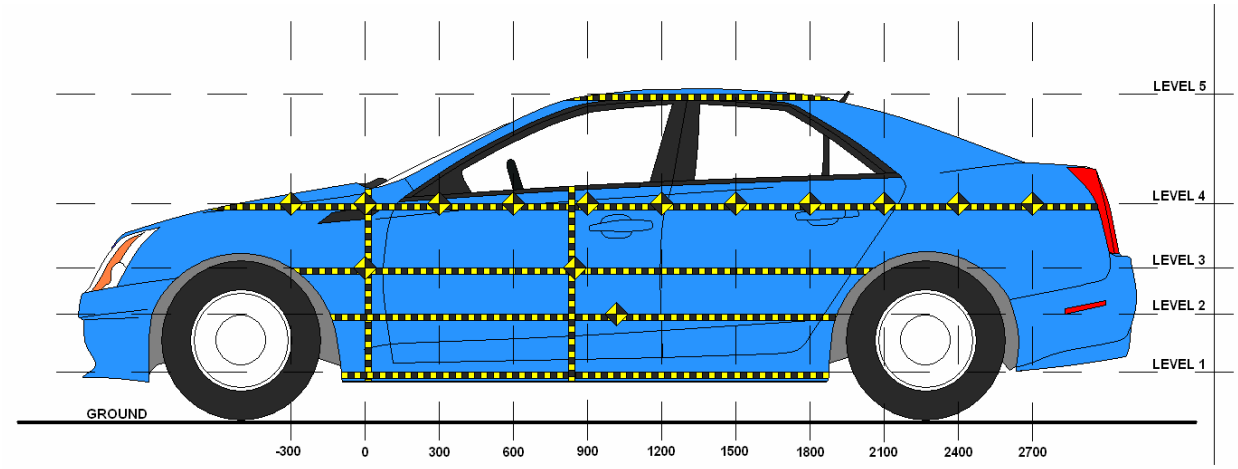
All measurements in mm with tolerance of ± 3mm

DATA SHEET NO. 11

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2014 Infiniti Q50 Hybrid 4-Door Sedan NHTSA No. M20145202

Test Program: NCAP MDB Side Impact Test Test Date: 11/13/13



LEFT SIDE VIEW

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Description	Height Above Ground (mm)	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	222	74	1350
2	Occupant H-Point	472	297	1500
3	Mid-Door	601	323	1650
4	Window Sill	883	211	1650
5	Window Top	1347	34	1350

DATA SHEET NO. 11 … (CONTINUED)

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2014 Infiniti Q50 Hybrid 4-Door Sedan NHTSA No. M20145202

Test Program: NCAP MDB Side Impact Test Test Date: 11/13/13

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

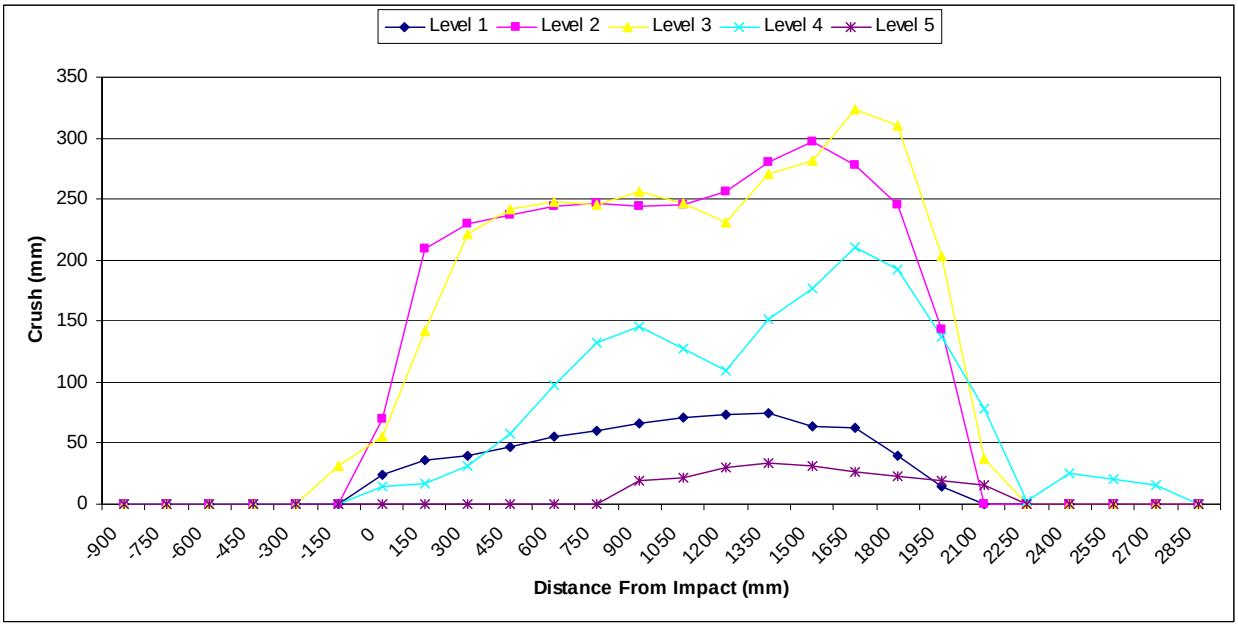
	Pre-Test (mm)					Post-Test (mm)					Difference (mm)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900															
-750															
-600															
-450															
-300															
-150			594					625					31		
0	639	603	601	706		663	673	656	720		24	70	55	14	
150	649	608	604	698		685	817	746	715		36	209	142	17	
300	652	609	604	685		692	839	825	716		40	230	221	31	
450	649	609	602	670		696	846	844	728		47	237	242	58	
600	646	609	600	659		701	853	848	757		55	244	248	98	
750	646	609	600	648		706	856	845	780		60	247	245	132	
900	646	609	599	640	908	712	853	855	786	927	66	244	256	146	19
1050	645	611	600	637	910	716	856	847	764	932	71	245	247	127	22
1200	646	611	602	640	913	719	867	833	750	943	73	256	231	110	30
1350	647	614	605	646	917	721	894	876	798	951	74	280	271	152	34
1500	648	616	608	652	918	712	913	889	829	949	64	297	281	177	31
1650	644	617	609	659	918	707	895	932	870	944	63	278	323	211	26
1800	632	609	605	660	918	672	854	915	852	941	40	245	310	192	23
1950	617	596	597	651	920	632	739	800	788	939	15	143	203	137	19
2100			589	647	927			626	725	943			37	78	16
2250				649					651					2	
2400				655					680					25	
2550				669					689					20	
2700				685					701					16	
2850															

DATA SHEET NO. 11 … (CONTINUED)

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2014 Infiniti Q50 Hybrid 4-Door Sedan NHTSA No. M20145202

Test Program: NCAP MDB Side Impact Test Test Date: 11/13/13

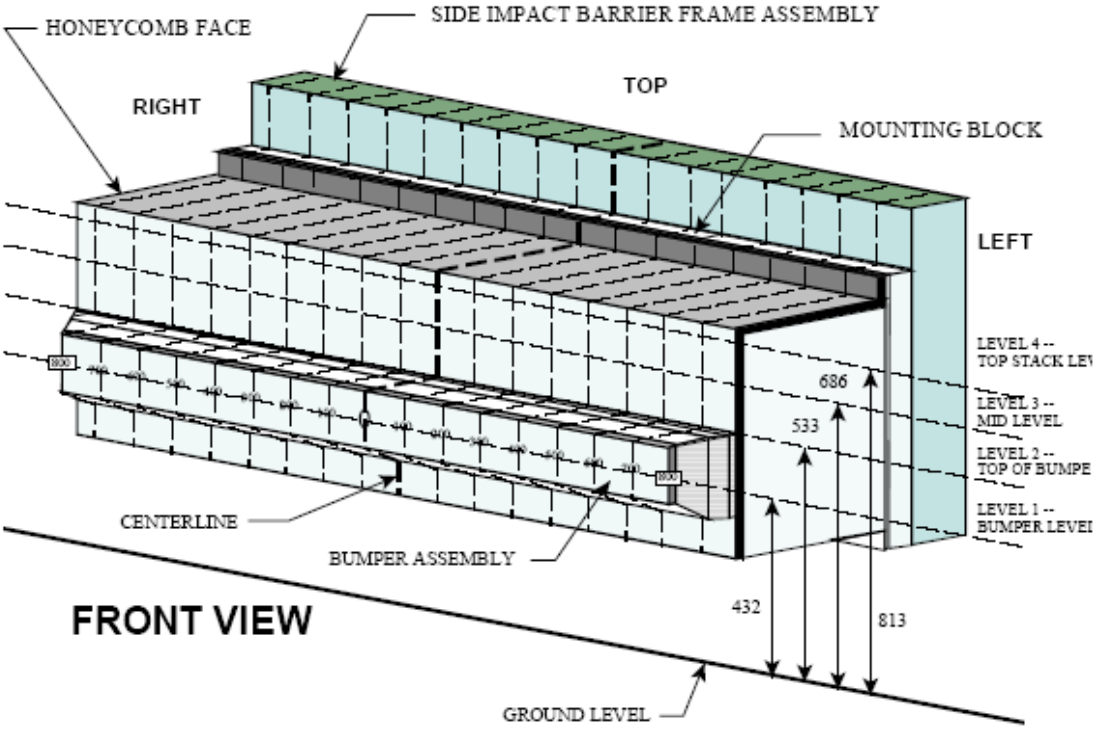


DATA SHEET NO. 12

MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2014 Infiniti Q50 Hybrid 4-Door Sedan NHTSA No. M20145202

Test Program: NCAP MDB Side Impact Test Test Date: 11/13/13



NOTE: Dimensions are shown in millimeters, mm

DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800
1	231	195	192	192	189	194	194	192	189	191	189	189	186	194	192	210	219
2	101	87	75	69	73	82	97	91	87	90	97	106	115	118	125	130	137
3	18	18	36	57	90	101	87	58	48	44	45	50	57	75	87	134	197
4	31	12	32	62	99	136	117	82	56	48	57	67	79	108	145	182	237

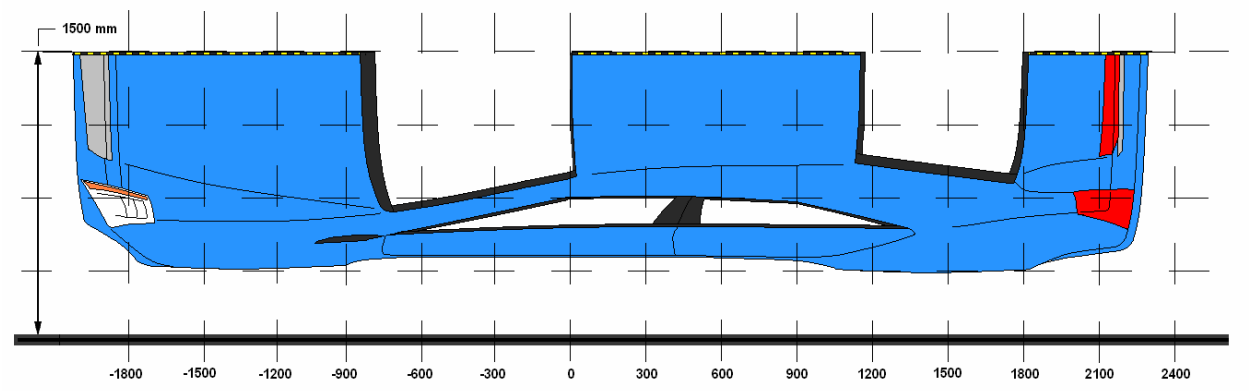
All dimensions in millimeters.

DATA SHEET NO. 13

VEHICLE AND MDB DAMAGE PROFILE DISTANCES

Test Vehicle: 2014 Infiniti Q50 Hybrid 4-Door Sedan NHTSA No. M20145202

Test Program: NCAP MDB Side Impact Test Test Date: 11/13/13



VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance From Impact Point (mm)	Level	Pre-Test (mm)	Post-Test (mm)	Crush (mm)
1	2100	4	694	725	31
2	1500	4	637	671	34
3	900	3	602	735	133
4	300	3	595	955	360
5	-300	2	599	884	285
6	-900	2	589	679	90

MDB DAMAGE PROFILE DISTANCES

DPD	From MDB Centerline		Level	Crush (mm)
	Distance (mm)	Direction		
1	800	Left	4	237
2	500	Left	4	194
3	200	Left	3	189
4	200	Right	3	194
5	500	Right	2	192
6	800	Right	2	231

DATA SHEET NO. 14

FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2014 Infiniti Q50 Hybrid 4-Door Sedan NHTSA No. M20145202

Test Program: NCAP MDB Side Impact Test Test Date: 11/13/13

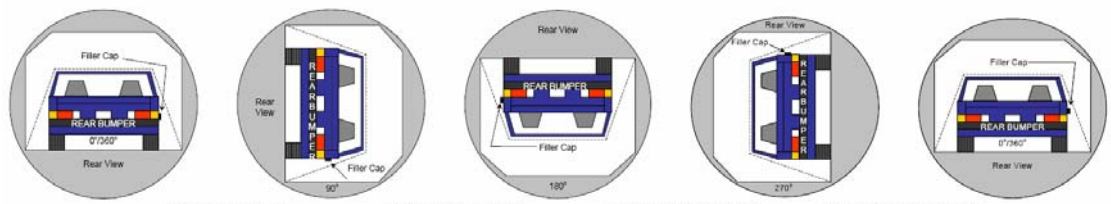
Temperature at Time of Impact: 23.9° C Test Time: 12:08 PM

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 spilage.



0° TO 90° 90° TO 180° 180° TO 270° 270° TO 360°

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°	79	300	379
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

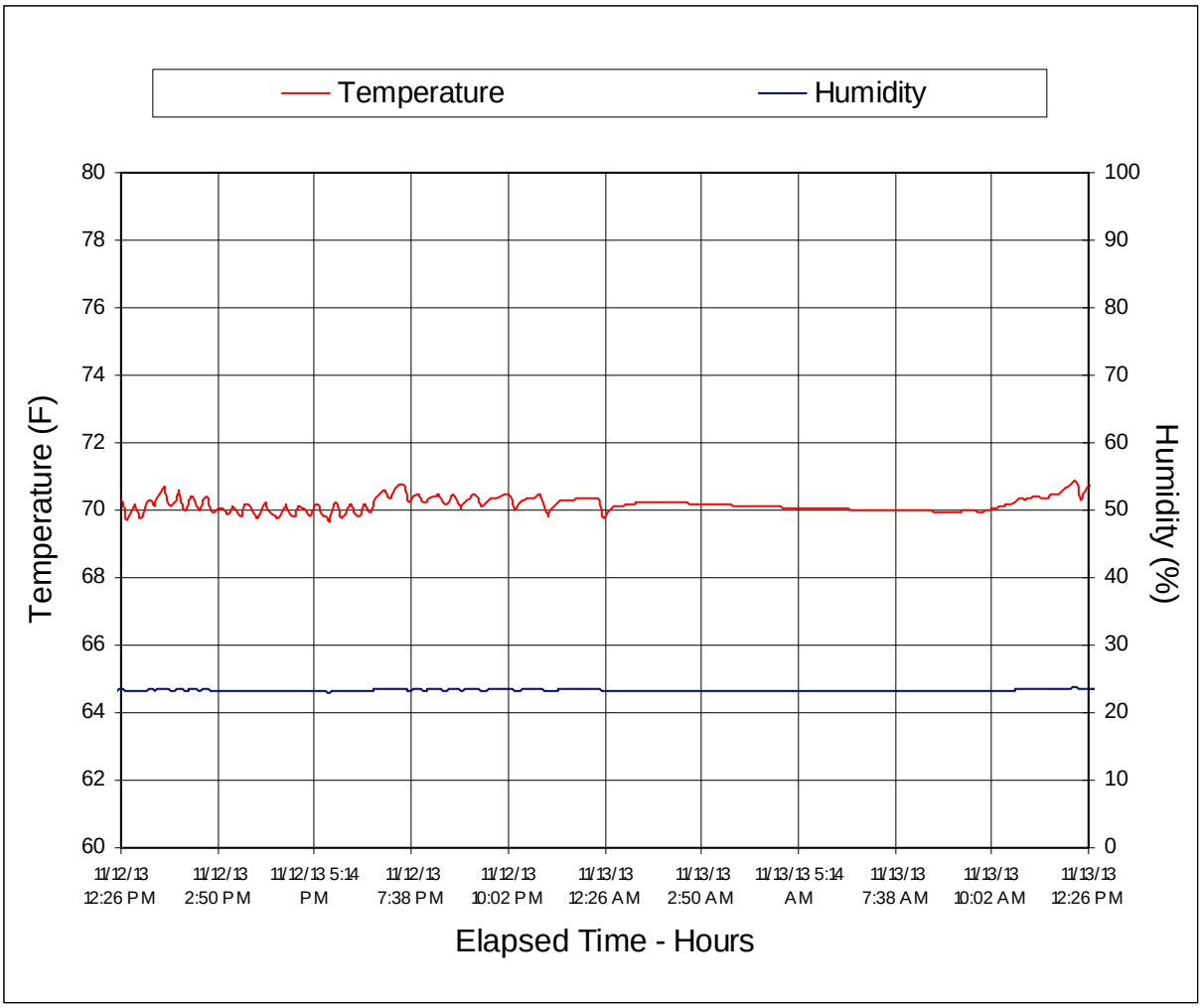
Test Phase	Spillage Location
0° To 90°	N/A
90° To 180°	N/A
180° To 270°	N/A
270° To 360°	N/A

DATA SHEET NO. 15

DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION

Test Vehicle: 2014 Infiniti Q50 Hybrid 4-Door Sedan NHTSA No. M20145202

Test Program: NCAP MDB Side Impact Test Test Date: 11/13/13



APPENDIX A
PHOTOGRAPHS

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FIGURE 1. As-Delivered Right Front ¾ View of Test Vehicle

FIGURE 2. As-Delivered Left Rear ¾ View of Test Vehicle

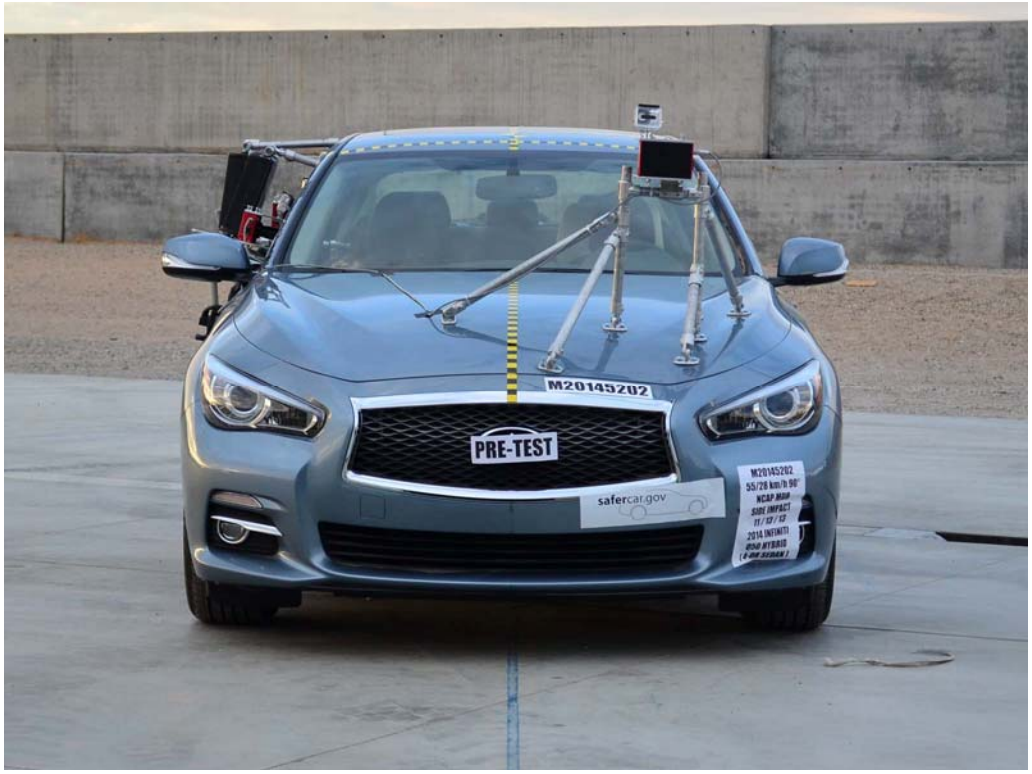

FIGURE 3. Pre-Test Frontal View of Test Vehicle

FIGURE 4. Post-Test Frontal View of Test Vehicle

FIGURE 5. Pre-Test Left Front ¾ View of Test Vehicle

FIGURE 6. Post-Test Left Front ¾ 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 ¾ View of Test Vehicle

FIGURE 10. Post-Test Left Rear ¾ View of Test Vehicle

FIGURE 11. Pre-Test Rear View of Test Vehicle

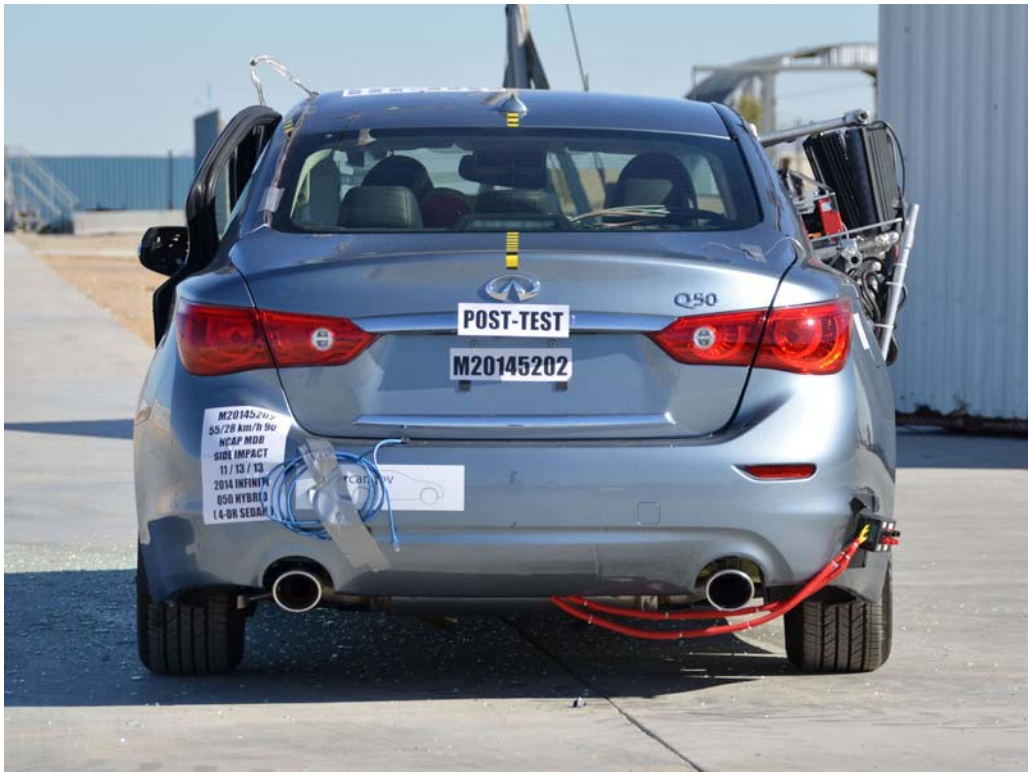

FIGURE 12. Post-Test Rear View of Test Vehicle

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

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

FIGURE 15. Pre-Test Overhead View of Test Area

FIGURE 16. Post-Test Overhead View of Test Area

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

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

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

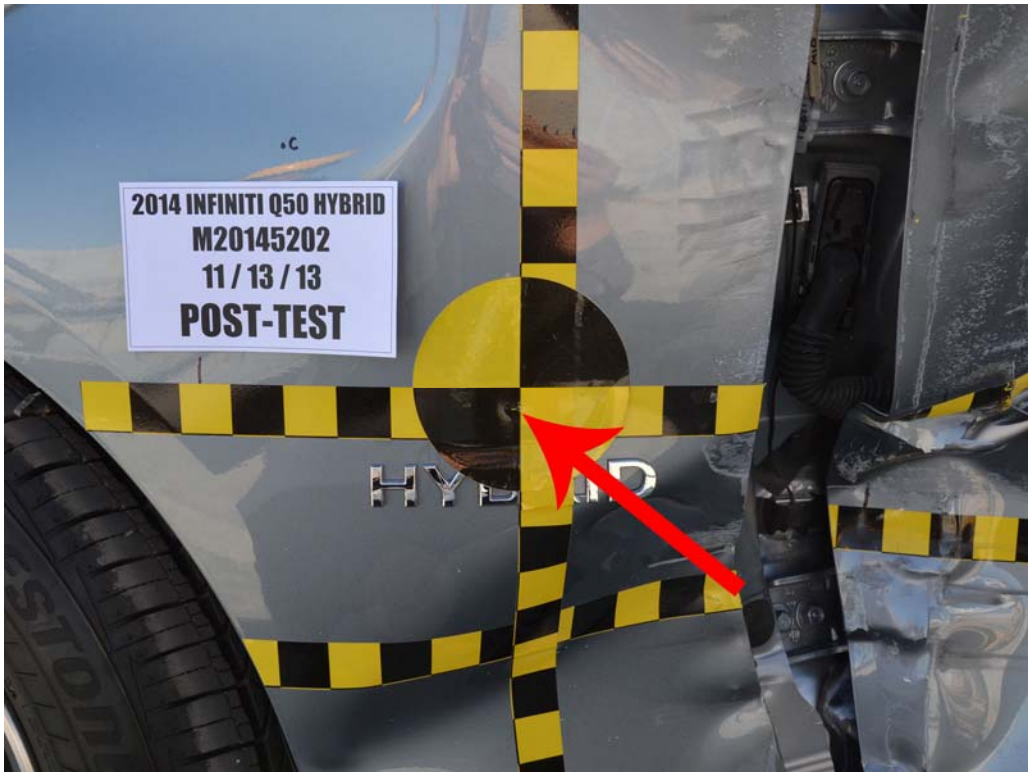

FIGURE 20. Post-Test Close-Up View of Impact Point Target

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

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

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

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

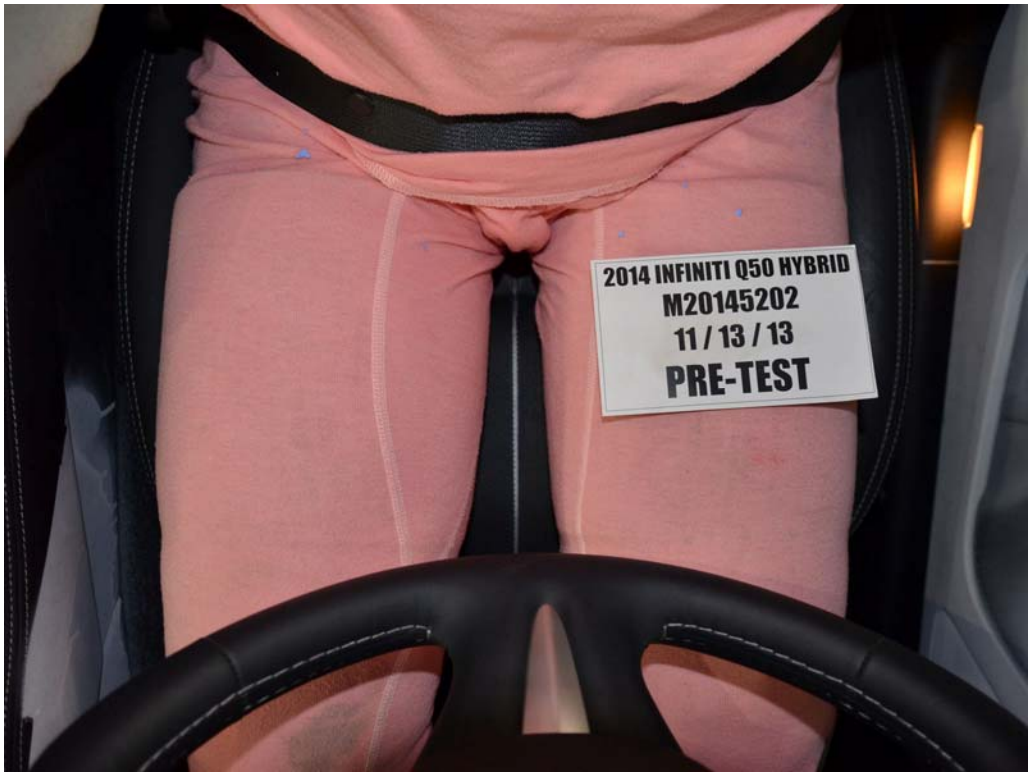

FIGURE 33. Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan

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

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

FIGURE 37. View of Disengaged Parking Brake

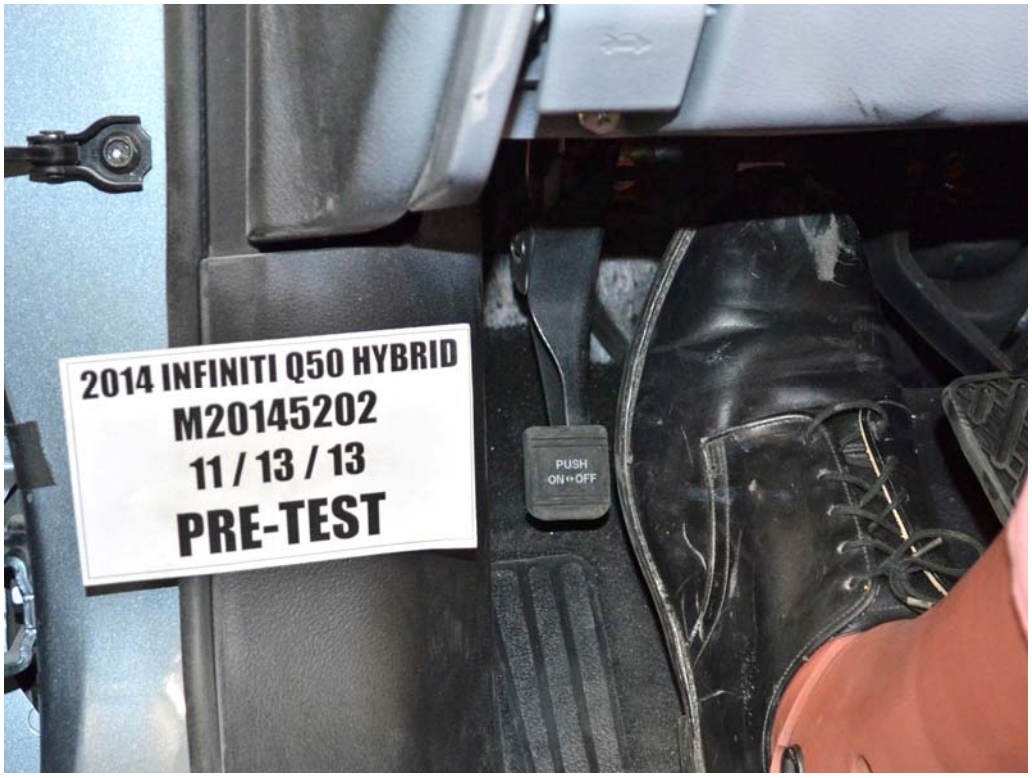

FIGURE 38. Pre-Test View of Parking Brake

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FIGURE 46. Pre-Test Driver Inner Door Panel View

FIGURE 47. Post-Test Driver Inner Door Panel View

Showing Driver Dummy Contact Locations

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

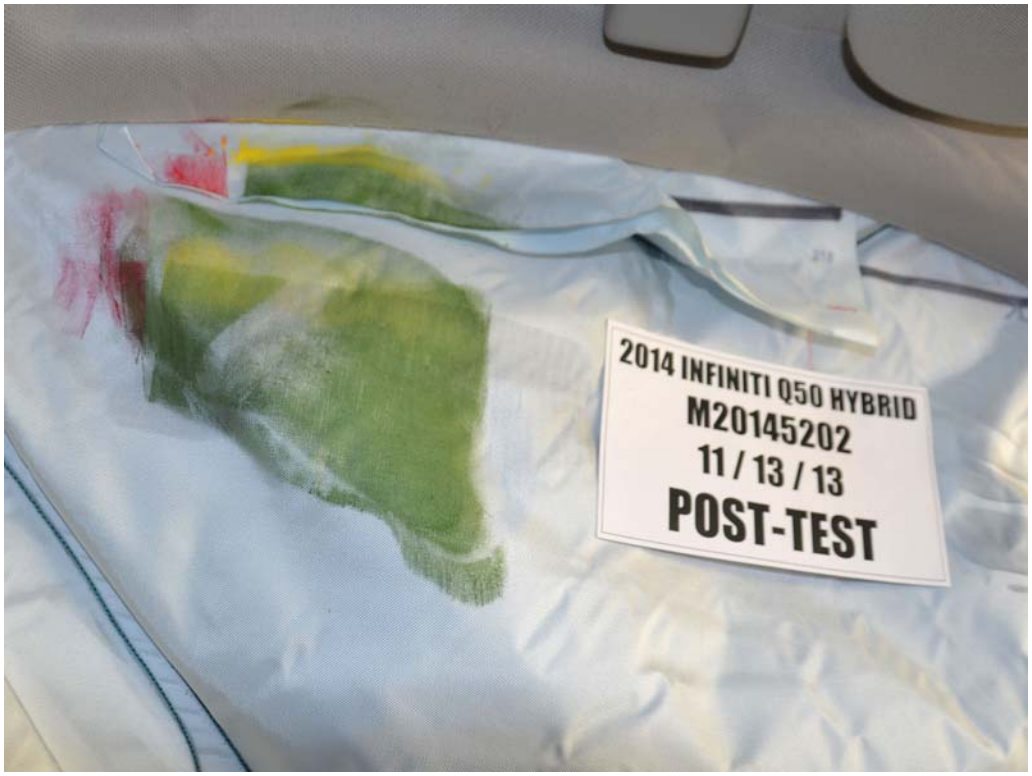

FIGURE 49. Post-Test Driver Dummy Close-Up Head Contact with Side Airbag View

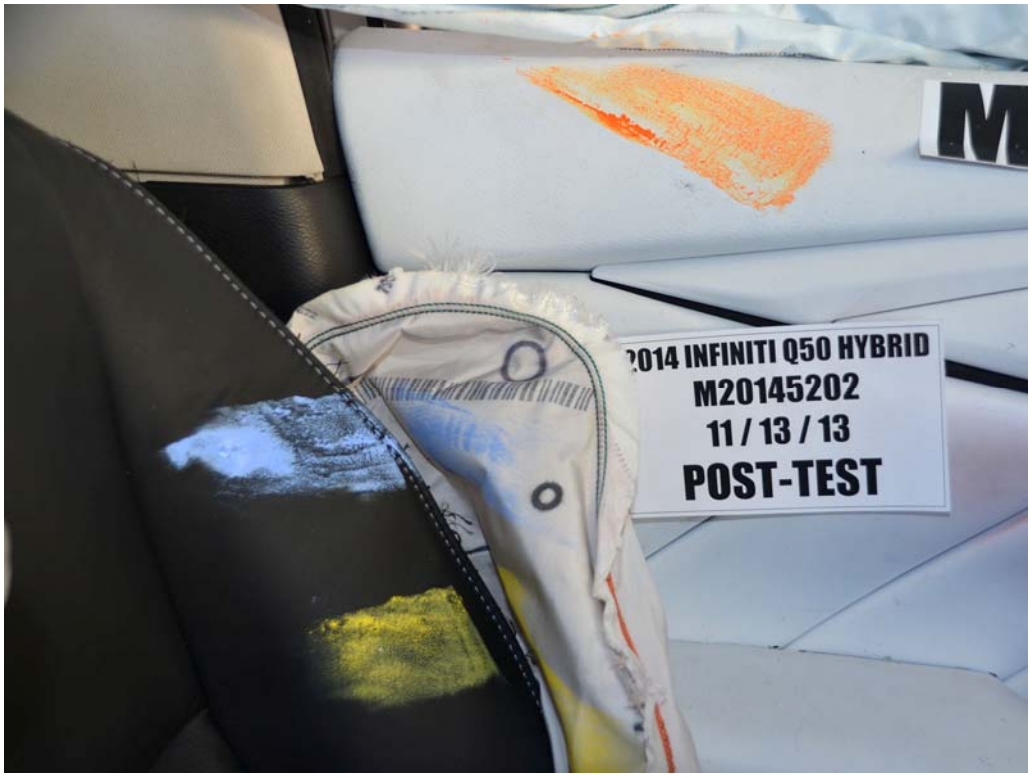

FIGURE 50. Post-Test Driver Dummy Close-Up Torso Contact with Vehicle Interior View

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

Photograph Not Applicable

No Dummy Pelvis Contact
with Vehicle Interior

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

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

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

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

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

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

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

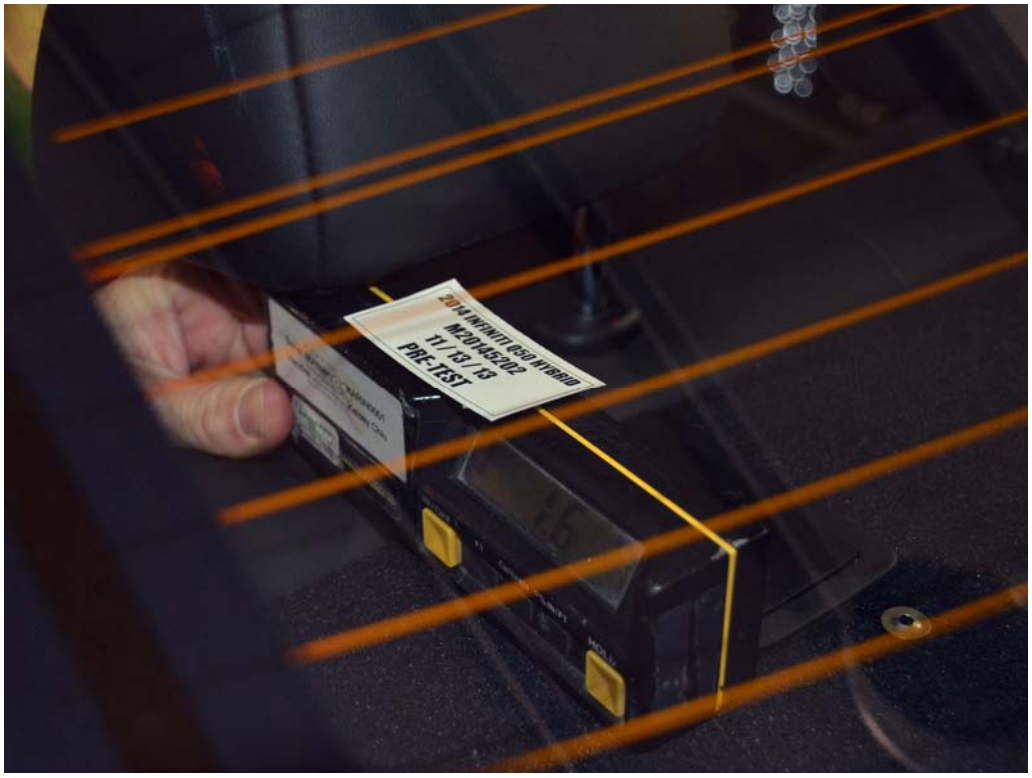

FIGURE 68. Pre-Test Close-Up View of Rear Passenger Seat Back or Head Restraint

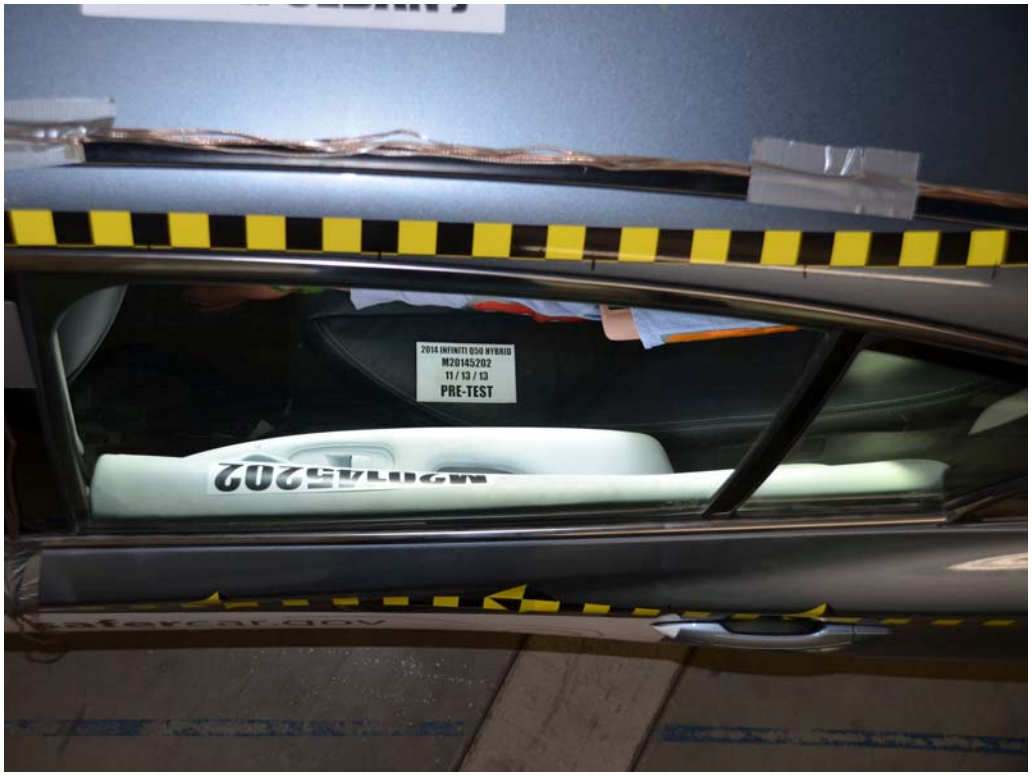

FIGURE 69. Pre-Test Rear Passenger Dummy and Door Clearance View

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

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

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

FIGURE 75. Post-Test Rear Passenger Dummy Close-Up

Head Contact with Vehicle Interior View

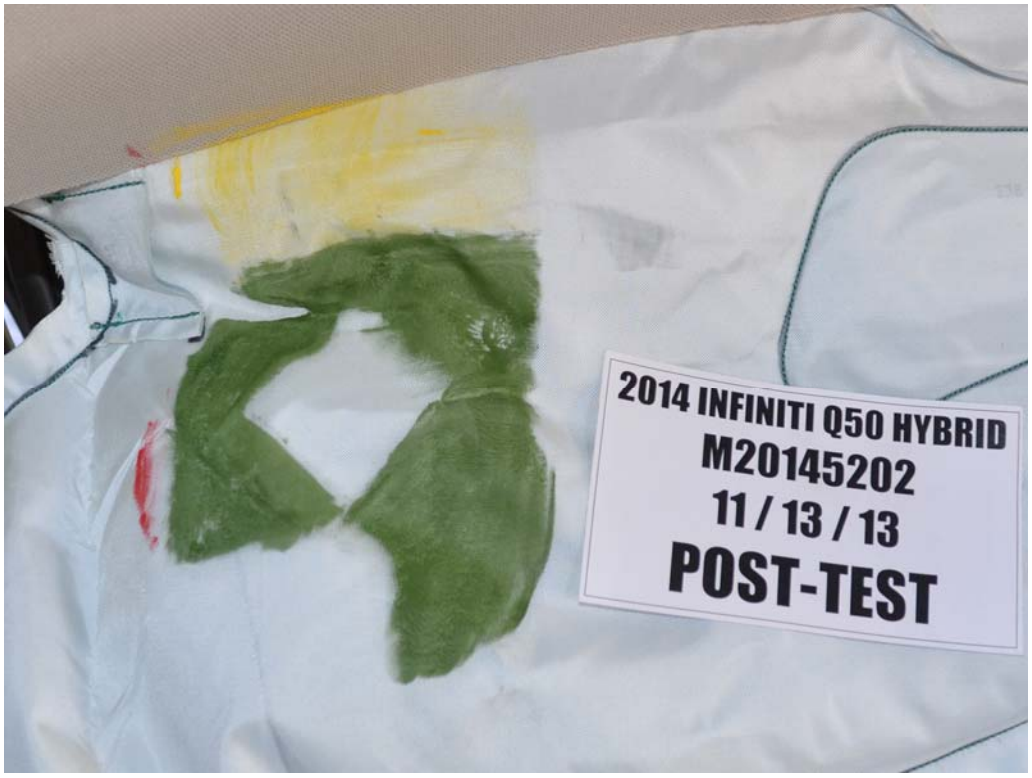


FIGURE 76. Post-Test Rear Passenger Dummy Close-Up

Head Contact with Side Airbag View

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

Photograph Not Applicable

Vehicle Not Equipped with
Rear Passenger Side Airbags

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

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

Photograph Not Applicable

Vehicle Not Equipped with
Rear Passenger Side Airbags

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

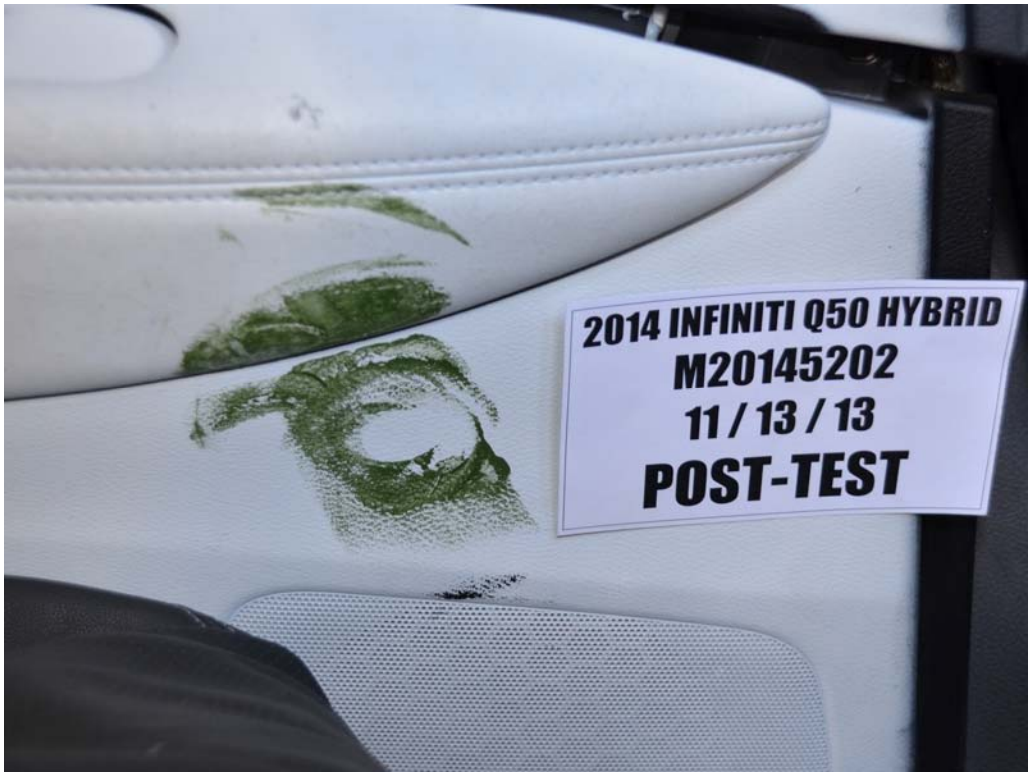


FIGURE 81. Post-Test Rear Passenger Dummy Close-Up Knee Contact View

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

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

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

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

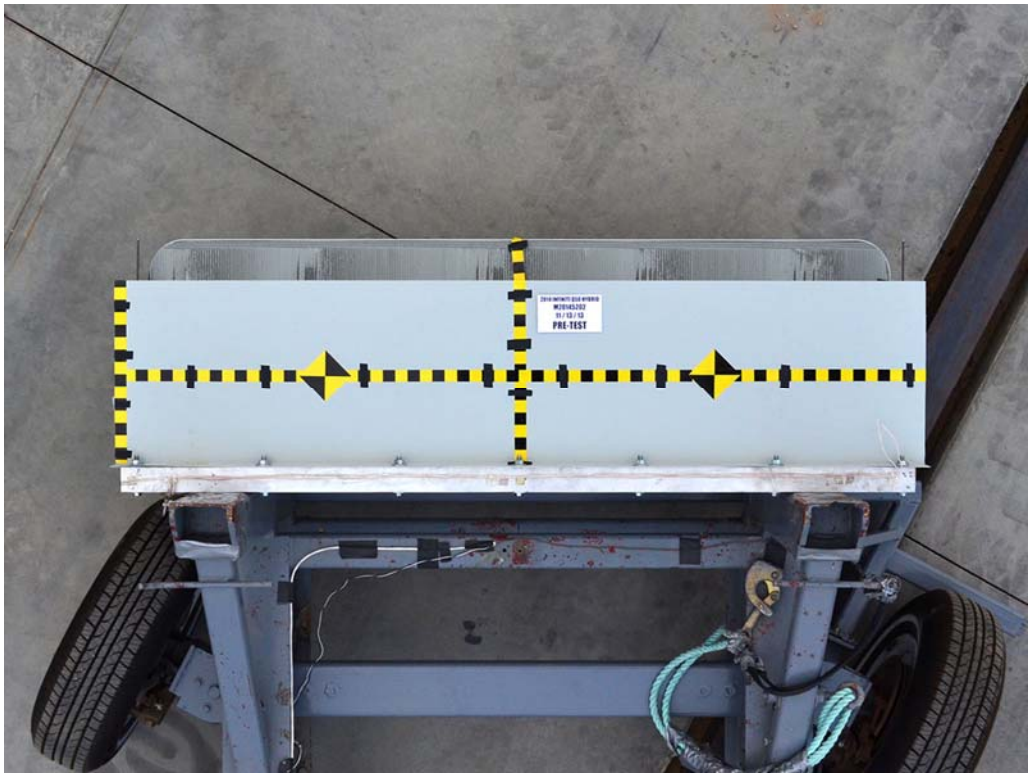


FIGURE 86. Pre-Test Top View of MDB Impactor Face

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

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

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

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

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

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

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

FIGURE 94. Pre-Test Ballast View

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

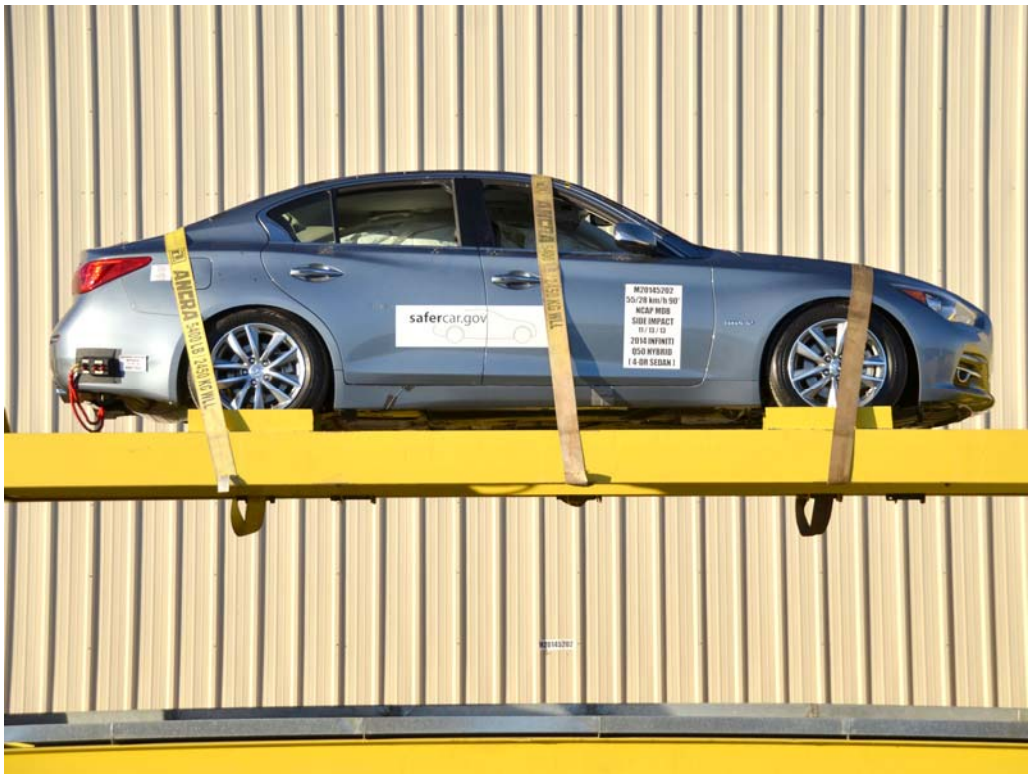


FIGURE 96. FMVSS No. 301 Static Rollover 0 Degrees

FIGURE 97. FMVSS No. 301 Static Rollover 90 Degrees

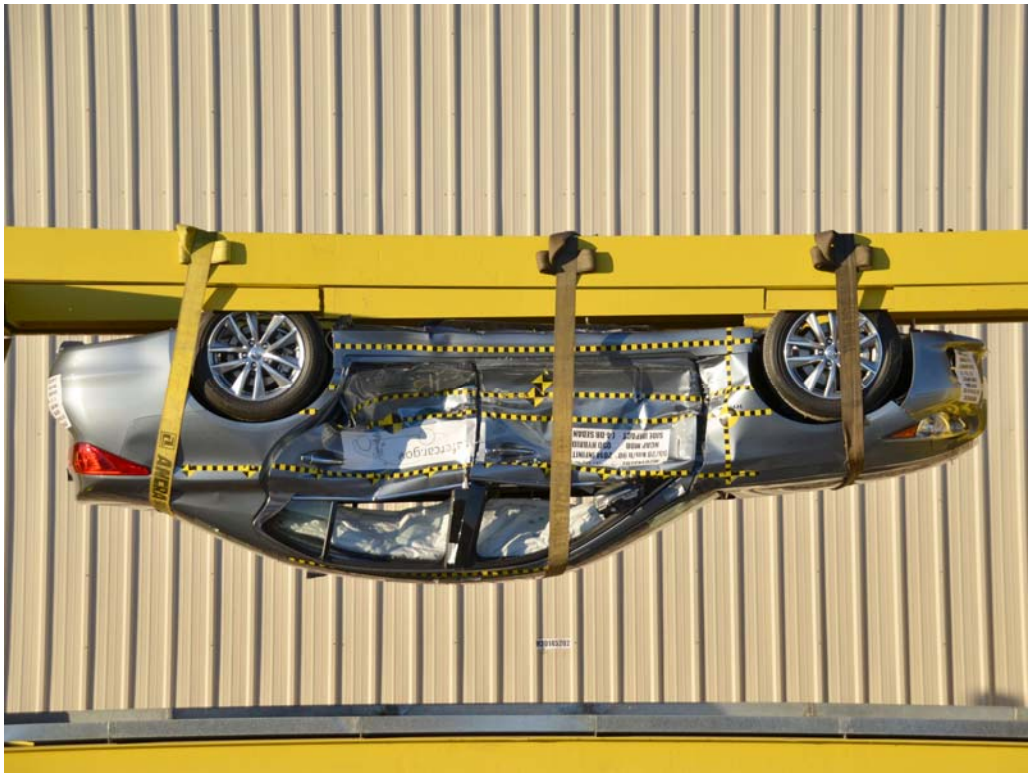


FIGURE 98. FMVSS No. 301 Static Rollover 180 Degrees

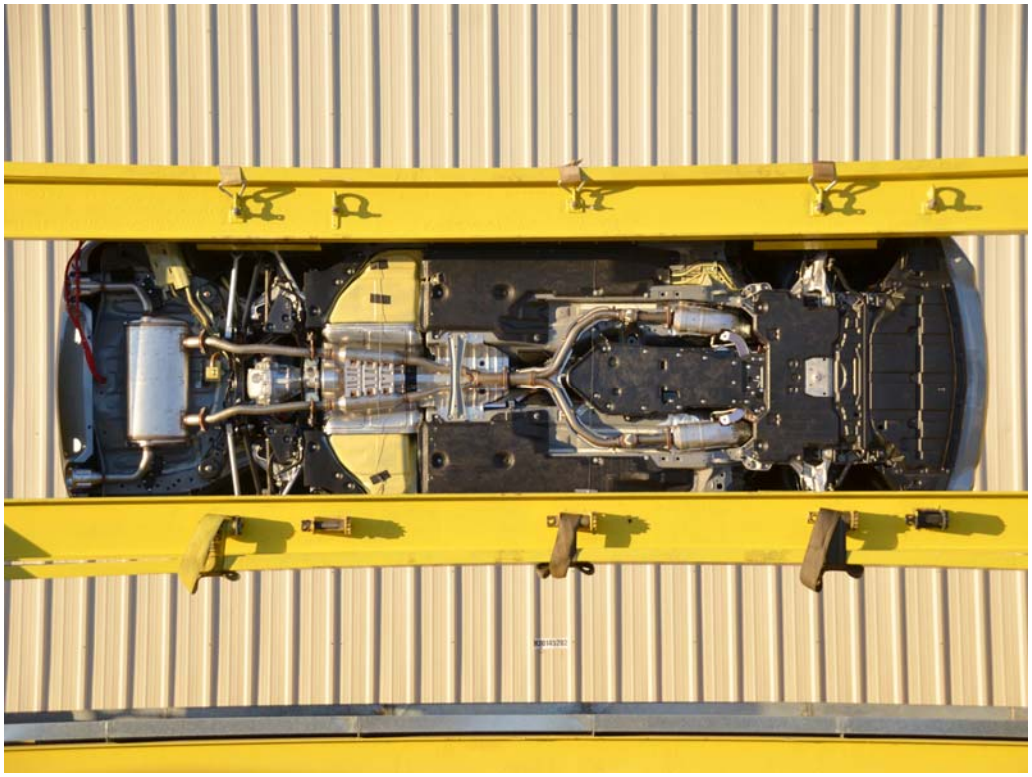


FIGURE 99. FMVSS No. 301 Static Rollover 270 Degrees

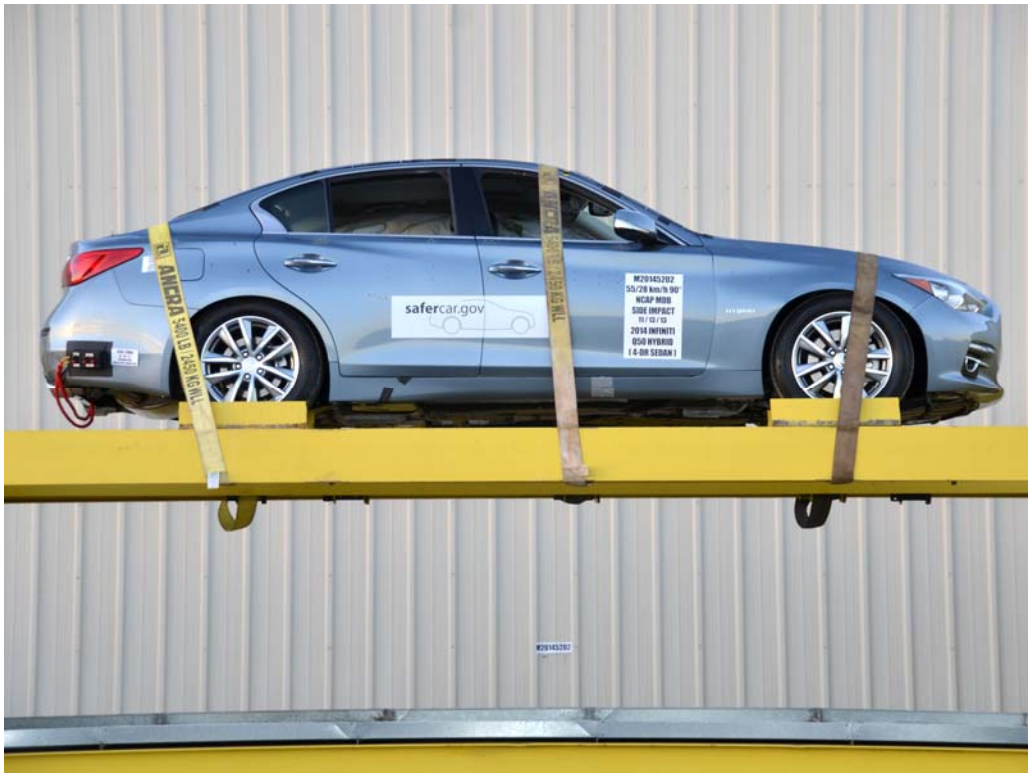
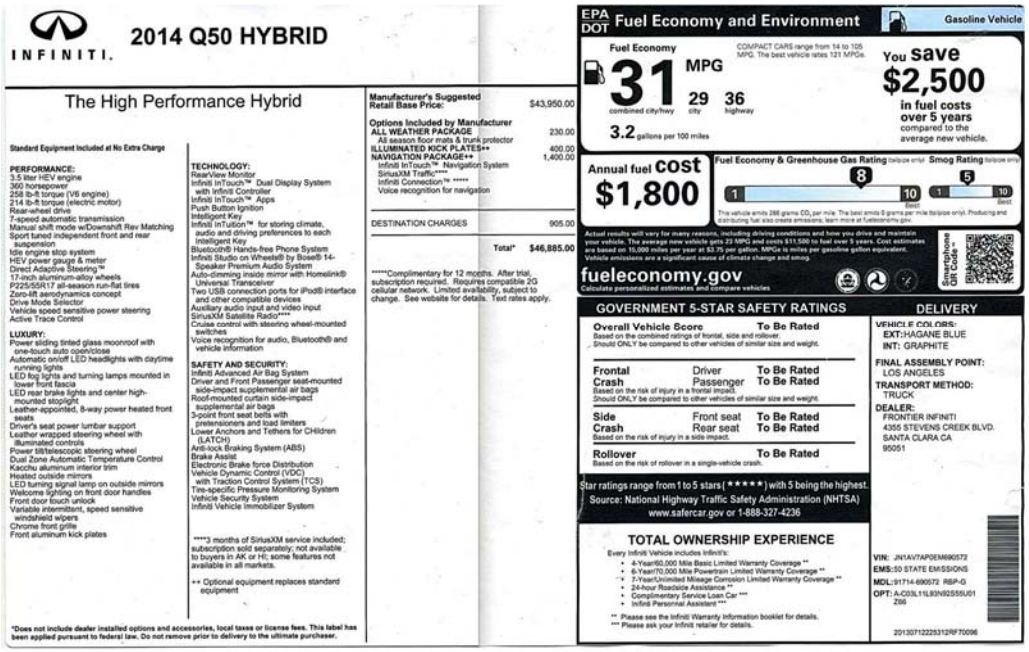


FIGURE 100. FMVSS No. 301 Static Rollover 360 Degrees

FIGURE 101. Impact Event



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Standard Equipment Included at No Extra Charge

PERFORMANCE:
3.5 liter HEV engine
360 horsepower
258 lb-ft torque (V6 engine)
214 lb-ft torque (electric motor)
Rear-wheel drive
7-speed automatic transmission
Manual shift mode w/Downshift Rev Matching
Sport tuned independent front and rear suspension
Idle engine stop system
HEV power gauge & meter
Direct Adaptive Steering™
17-inch aluminum-alloy wheels
P225/55R17 all-season run-flat tires
Zero-lift aerodynamics concept
Drive Mode Selector
Vehicle speed sensitive power steering
Active Trace Control

LUXURY:
Power sliding tinted glass moonroof with one-touch auto open/close
Automatic on/off LED headlights with daytime running lights
LED fog lights and turning lamps mounted in lower front fascia
LED rear brake lights and center high-mounted stoplight
Leather-appointed, 8-way power heated front seats
Driver's seat power lumbar support
Leather wrapped steering wheel with illuminated controls
Power tilt/telescopic steering wheel
Dual Zone Automatic Temperature Control
Kacchu aluminum interior trim
Heated outside mirrors
LED turning signal lamp on outside mirrors
Welcome lighting on front door handles
Front door touch unlock
Variable intermittent, speed sensitive windshield wipers
Chrome front grille
Front aluminum kick plates

TECHNOLOGY:
RearView Monitor
Infiniti InTouch™ Dual Display System with Infiniti Controller
Infiniti InTouch™ Apps
Push Button Ignition
Intelligent Key
Infiniti InTuition™ for storing climate, audio and driving preferences to each Intelligent Key
Bluetooth® Hands-free Phone System
Infiniti Studio on Wheels® by Bose® 14-Speaker Premium Audio System
Auto-dimming inside mirror with HomeLink® Universal Transceiver
Two USB connection ports for iPod® interface and other compatible devices
Auxiliary audio input and video input
SiriusXM Satellite Radio****
Cruise control with steering wheel-mounted switches
Voice recognition for audio, Bluetooth® and vehicle information

SAFETY AND SECURITY:
Infiniti Advanced Air Bag System
Driver and Front Passenger seat-mounted side-impact supplemental air bags
Roof-mounted curtain side-impact supplemental air bags
3-point front seat belts with pretensioners and load limiters
Lower Anchors and Tethers for CHildren (LATCH)
Anti-lock Braking System (ABS)
Brake Assist
Electronic Brake force Distribution
Vehicle Dynamic Control (VDC) with Traction Control System (TCS)
Tire-specific Pressure Monitoring System
Vehicle Security System
Infiniti Vehicle Immobilizer System

****3 months of SiriusXM service included; subscription sold separately; not available to buyers in AK or HI; some features not available in all markets.

++ Optional equipment replaces standard equipment

*Does not include dealer installed options and accessories, local taxes or license fees. This label has been applied pursuant to federal law. Do not remove prior to delivery to the ultimate purchaser.

Manufacturer's Suggested Retail Base Price:	$43,950.00
Options Included by Manufacturer	
ALL WEATHER PACKAGE	230.00
All season floor mats & trunk protector	
ILLUMINATED KICK PLATES++	400.00
NAVIGATION PACKAGE++	1,400.00
Infiniti InTouch™ Navigation System	
SiriusXM Traffic*****	
Infiniti Connection™ *****	
Voice recognition for navigation	
DESTINATION CHARGES	905.00
Total*	$46,885.00

*****Complimentary for 12 months. After trial, subscription required. Requires compatible 2G cellular network. Limited availability, subject to change. See website for details. Text rates apply.

EPA DOT Fuel Economy and Environment — Gasoline Vehicle

Fuel Economy: 31 MPG combined city/hwy — 29 city — 36 highway — 3.2 gallons per 100 miles

COMPACT CARS range from 14 to 105 MPG. The best vehicle rates 121 MPGe.

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

Annual fuel cost $1,800

Fuel Economy & Greenhouse Gas Rating (tailpipe only): 8 (1 – 10, best)

Smog Rating (tailpipe only): 5 (1 – 10, best)

This vehicle emits 286 grams CO_2 per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also create emissions; learn more at fueleconomy.gov.

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 23 MPG and costs $11,500 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at $3.75 per gallon. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fueleconomy.gov
Calculate personalized estimates and compare vehicles

Smartphone Site Scan

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score — To Be Rated
Based on the combined ratings of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight.

Frontal Crash — Driver: To Be Rated; Passenger: To Be Rated
Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.

Side Crash — Front seat: To Be Rated; Rear seat: To Be Rated
Based on the risk of injury in a side impact.

Rollover — To Be Rated
Based on the risk of rollover in a single-vehicle crash.

Star ratings range from 1 to 5 stars (★★★★★) with 5 being the highest.
Source: National Highway Traffic Safety Administration (NHTSA)
www.safercar.gov or 1-888-327-4236

TOTAL OWNERSHIP EXPERIENCE
Every Infiniti Vehicle includes Infiniti's:
- 4-Year/60,000 Mile Basic Limited Warranty Coverage **
- 6-Year/70,000 Mile Powertrain Limited Warranty Coverage **
- 7-Year/Unlimited Mileage Corrosion Limited Warranty Coverage **
- 24-hour Roadside Assistance **
- Complimentary Service Loan Car ***
- Infiniti Personnal Assistant ***

** Please see the Infiniti Warranty Information booklet for details.
*** Please ask your Infiniti retailer for details.

DELIVERY

VEHICLE COLORS:
EXT: HAGANE BLUE
INT: GRAPHITE

FINAL ASSEMBLY POINT:
LOS ANGELES

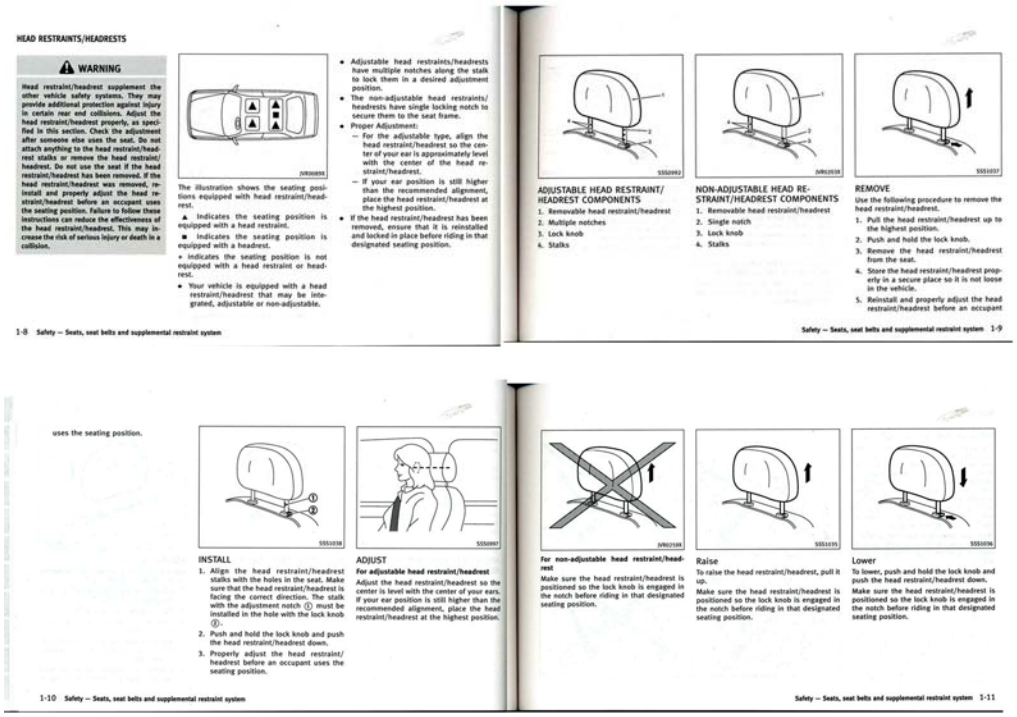
TRANSPORT METHOD:
TRUCK

DEALER:
FRONTIER INFINITI
4355 STEVENS CREEK BLVD.
SANTA CLARA CA
95051

VIN: JN1AV7AP0EM690572
EMS: 50 STATE EMISSIONS
MDL: 91714.690572 RSP-G
OPT: A-C03L11L93N92S55U01 Z66

20130712225312RF70096

FIGURE 102. Monroney Label



HEAD RESTRAINTS/HEADRESTS

WARNING

Head restraint/headrest supplement the other vehicle safety systems. They may provide additional protection against injury in certain rear end collisions. Adjust the head restraint/headrest 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 restraint/headrest. This may increase the risk of serious injury or death in a collision.

The illustration shows the seating positions equipped with head restraint/headrest.

▲ 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.

- Your vehicle is equipped with a head restraint/headrest that may be integrated, adjustable or non-adjustable.
- Adjustable head restraints/headrests have multiple notches along the stalk to lock them in a desired adjustment position.
- The non-adjustable head restraints/headrests have single locking notch to secure them to the seat frame.
- Proper Adjustment:
  - For the adjustable type, align the head restraint/headrest so the center of your ear is approximately level with the center of the head restraint/headrest.
  - If your ear position is still higher than the recommended alignment, place the head restraint/headrest at the highest position.
- If the head restraint/headrest has been removed, ensure that it is reinstalled and locked in place before riding in that designated seating position.

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

ADJUSTABLE HEAD RESTRAINT/HEADREST COMPONENTS
1. Removable head restraint/headrest
2. Multiple notches
3. Lock knob
4. Stalks

NON-ADJUSTABLE HEAD RESTRAINT/HEADREST COMPONENTS
1. Removable head restraint/headrest
2. Single notch
3. Lock knob
4. Stalks

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.
5. Reinstall and properly adjust the head restraint/headrest before an occupant

Safety — Seats, seat belts and supplemental restraint system 1-9

uses the seating position.

INSTALL
1. Align the head restraint/headrest stalks with the holes in the seat. Make sure that the head restraint/headrest is facing the correct direction. The stalk with the adjustment notch 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.

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.

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

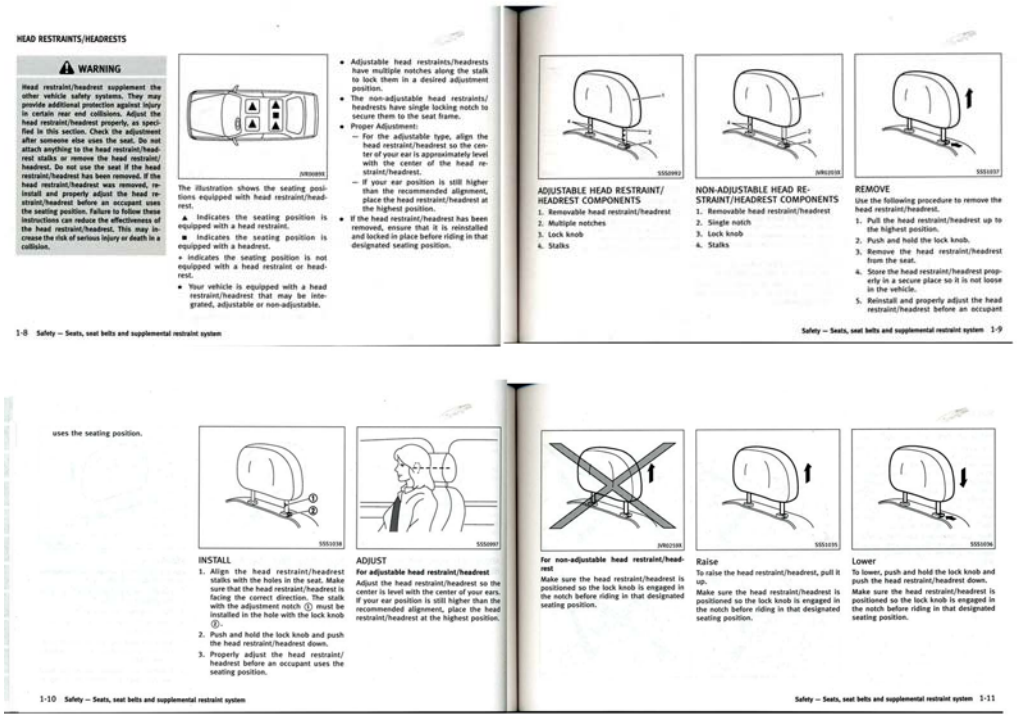
For non-adjustable head restraint/headrest
Make sure the head restraint/headrest is positioned so the lock knob is engaged in the notch before riding in that designated seating position.

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.

Lower
To lower, push and hold the lock knob and push the head restraint/headrest down.
Make sure the head restraint/headrest is positioned so the lock knob is engaged in the notch before riding in that designated seating position.

Safety — Seats, seat belts and supplemental restraint system 1-11

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



HEAD RESTRAINTS/HEADRESTS

WARNING

Head restraint/headrest supplement the other vehicle safety systems. They may provide additional protection against injury in certain rear end collisions. Adjust the head restraint/headrest 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 restraint/headrest. This may increase the risk of serious injury or death in a collision.

The illustration shows the seating positions equipped with head restraint/headrest.

▲ 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.

- Your vehicle is equipped with a head restraint/headrest that may be integrated, adjustable or non-adjustable.
- Adjustable head restraints/headrests have multiple notches along the stalk to lock them in a desired adjustment position.
- The non-adjustable head restraints/headrests have single locking notch to secure them to the seat frame.
- Proper Adjustment:
  - For the adjustable type, align the head restraint/headrest so the center of your ear is approximately level with the center of the head restraint/headrest.
  - If your ear position is still higher than the recommended alignment, place the head restraint/headrest at the highest position.
- If the head restraint/headrest has been removed, ensure that it is reinstalled and locked in place before riding in that designated seating position.

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

ADJUSTABLE HEAD RESTRAINT/HEADREST COMPONENTS
1. Removable head restraint/headrest
2. Multiple notches
3. Lock knob
4. Stalks

NON-ADJUSTABLE HEAD RESTRAINT/HEADREST COMPONENTS
1. Removable head restraint/headrest
2. Single notch
3. Lock knob
4. Stalks

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.
5. Reinstall and properly adjust the head restraint/headrest before an occupant

Safety — Seats, seat belts and supplemental restraint system 1-9

uses the seating position.

INSTALL
1. Align the head restraint/headrest stalks with the holes in the seat. Make sure that the head restraint/headrest is facing the correct direction. The stalk with the adjustment notch 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.

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.

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

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.

Lower
To lower, push and hold the lock knob and push the head restraint/headrest down.
Make sure the head restraint/headrest is positioned so the lock knob is engaged in the notch before riding in that designated seating position.

Safety — Seats, seat belts and supplemental restraint system 1-11

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

APPENDIX B
DUMMY RESPONSE DATA

TABLE OF DATA PLOTS

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

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

Additional Driver & Passenger Dummy Instrumentation Data

Driver Lower Spine T12 Acceleration (X)

Driver Lower Spine T12 Acceleration (Y)

Driver Lower Spine T12 Acceleration (Z)

Passenger Upper Thorax Rib Deflection (Y)

Passenger Middle Thorax Rib Deflection (Y)

Passenger Lower Thorax Rib Deflection (Y)

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

Vehicle Instrumentation Data

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

MDB Instrumentation Data

MDB Center of Gravity Acceleration (X)

MDB Center of Gravity Acceleration (Y)

MDB Center of Gravity Acceleration (Z)

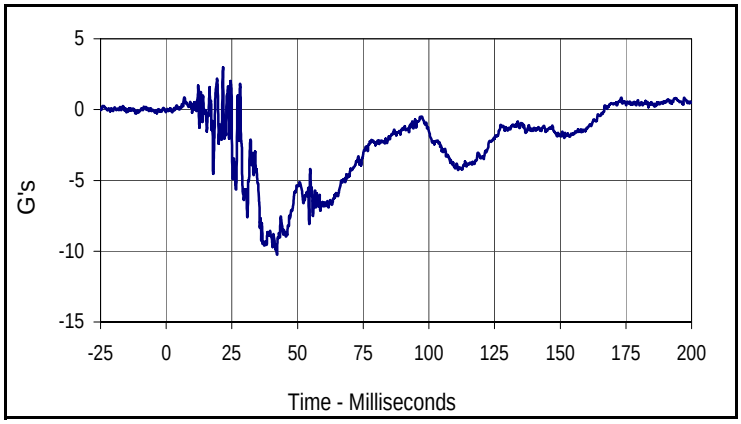
MDB Rear Acceleration (X)

MDB Rear Acceleration (Y)

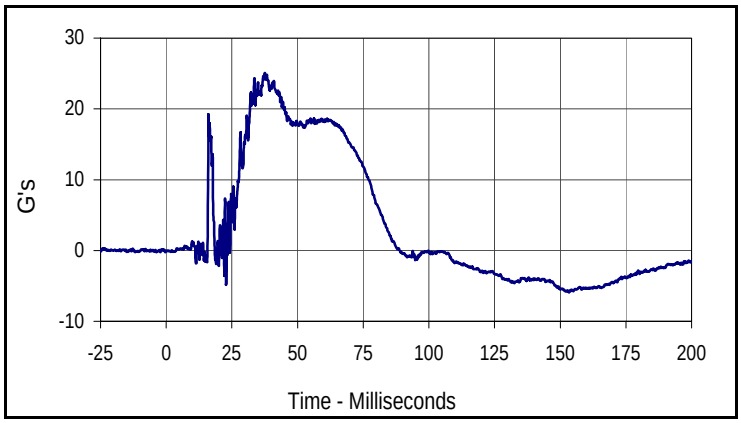
Left MDB Contact Switch

Right MDB Contact Switch

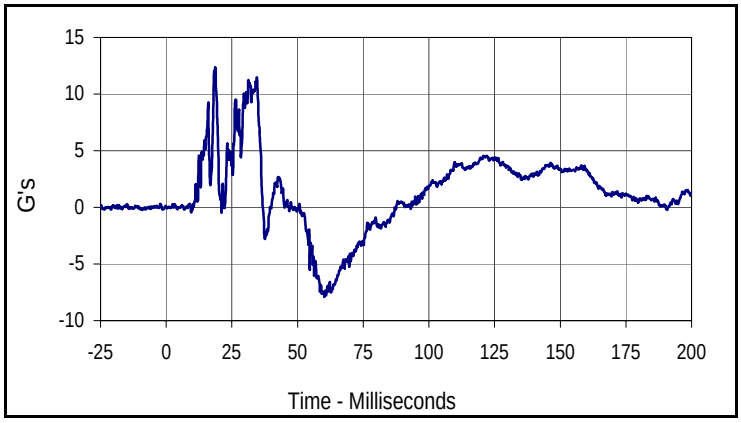
Test Vehicle:	2014 Infiniti Q50 Hybrid 4-Door Sedan	NHTSA No.:	M20145202
Test Program:	61 km/h (38 mph) Side Impact NCAP 27° Moving Deformable Barrier Test	Test Date:	11/13/13



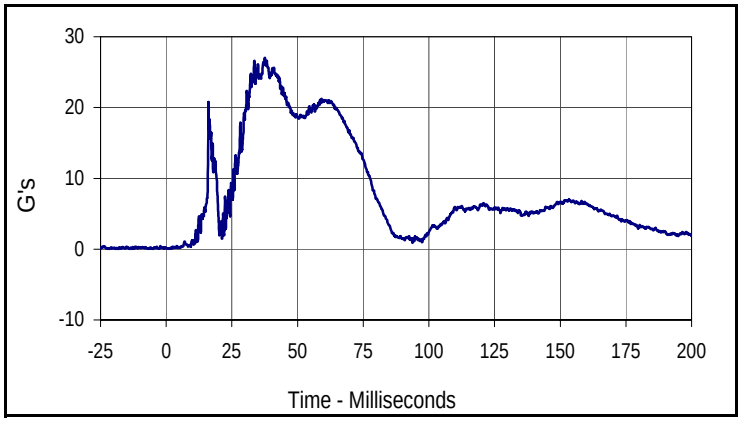
Curve Description			
Driver Head Acceleration X Primary			
Plot No.	Type	SAE Class	Units
001	FIL	1000	G's
Max	Time	Min	Time
3.0	21.6	-10.3	42.2



Curve Description			
Driver Head Acceleration Y Primary			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
25.1	37.6	-5.9	153.3

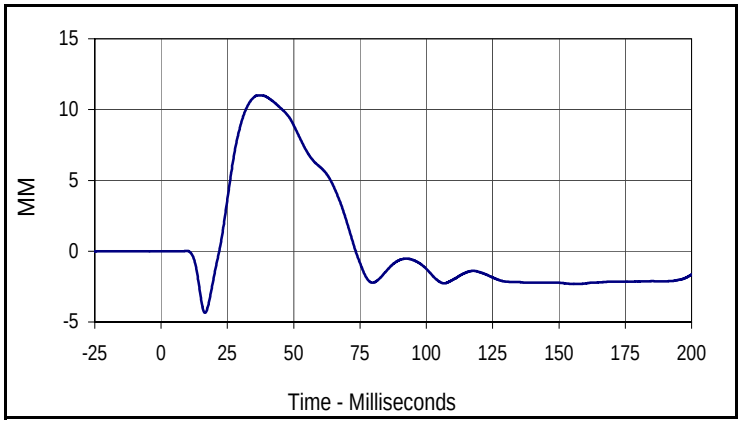


Curve Description			
Driver Head Acceleration Z Primary			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
12.4	18.6	-7.9	60.2

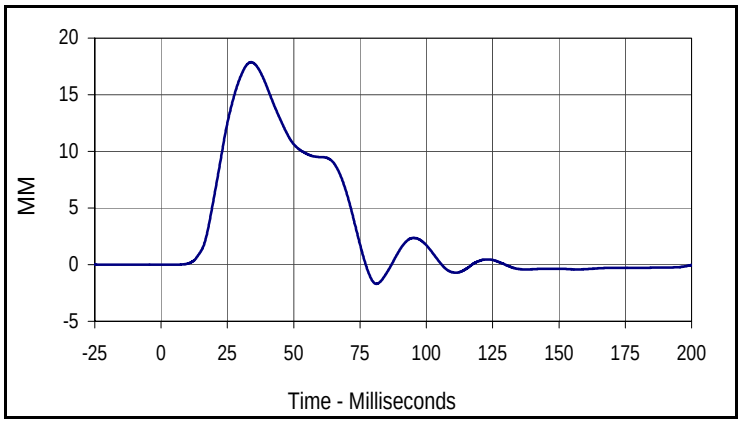


Curve Description			
Driver Head Resultant Acceleration Primary			
Plot No.	Type	SAE Class	Units
004	RES	1000	G's
Max	Time	Min	Time
27.0	37.6	0.1	1.0

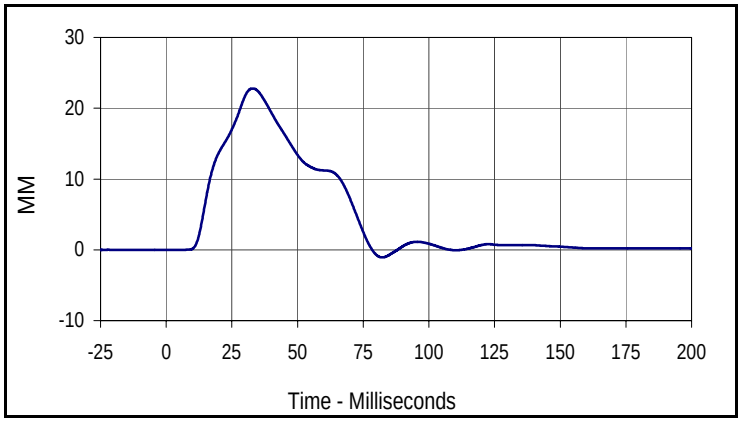
Test Vehicle:	2014 Infiniti Q50 Hybrid 4-Door Sedan	NHTSA No.:	M20145202
Test Program:	61 km/h (38 mph) Side Impact NCAP 27° Moving Deformable Barrier Test	Test Date:	11/13/13



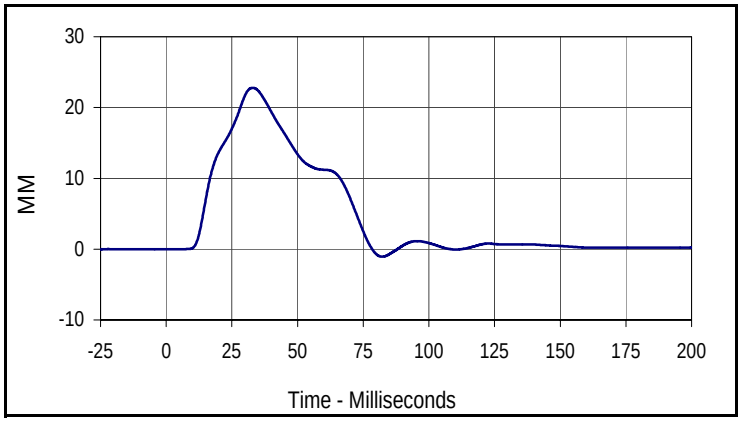
Curve Description			
Driver Upper Thorax Rib Deflection Y			
Plot No.	Type	SAE Class	Units
005	FIL	180	MM
Max	Time	Min	Time
11.0	37.1	-4.4	16.6



Curve Description			
Driver Middle Thorax Rib Deflection Y			
Plot No.	Type	SAE Class	Units
006	FIL	180	MM
Max	Time	Min	Time
17.9	33.9	-1.7	81.2

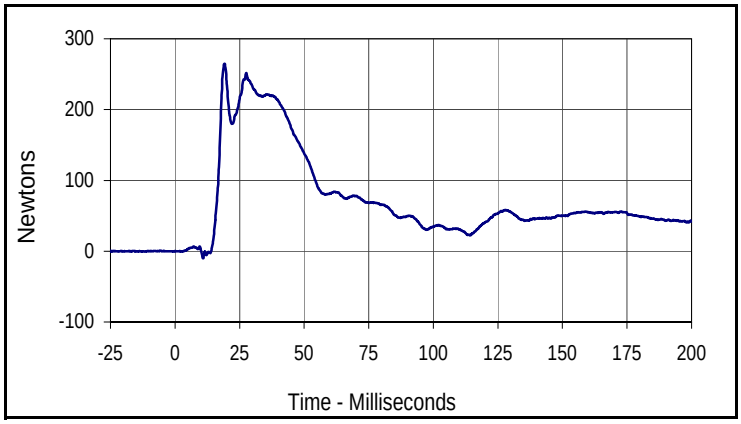


Curve Description			
Driver Lower Thorax Rib Deflection Y			
Plot No.	Type	SAE Class	Units
007	FIL	180	MM
Max	Time	Min	Time
22.8	32.9	-1.1	82.2

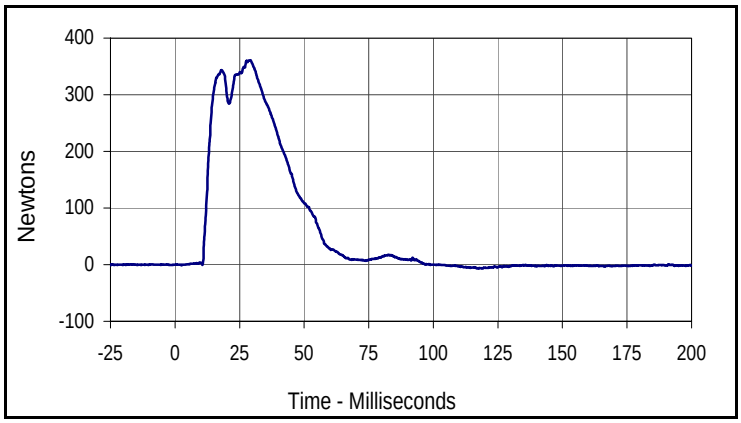


Curve Description			
Driver Thorax Rib Deflection Maximum			
Plot No.	Type	SAE Class	Units
010	FIL	180	MM
Max	Time	Min	Time
22.8	32.9	-1.1	82.2

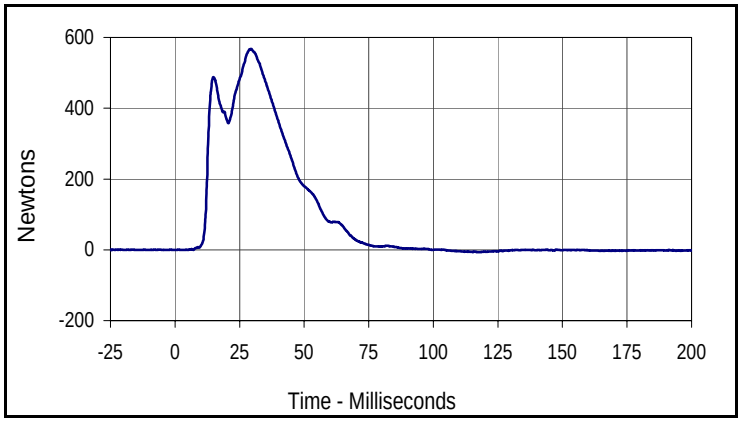
Test Vehicle:	2014 Infiniti Q50 Hybrid 4-Door Sedan	NHTSA No.:	M20145202
Test Program:	61 km/h (38 mph) Side Impact NCAP 27° Moving Deformable Barrier Test	Test Date:	11/13/13



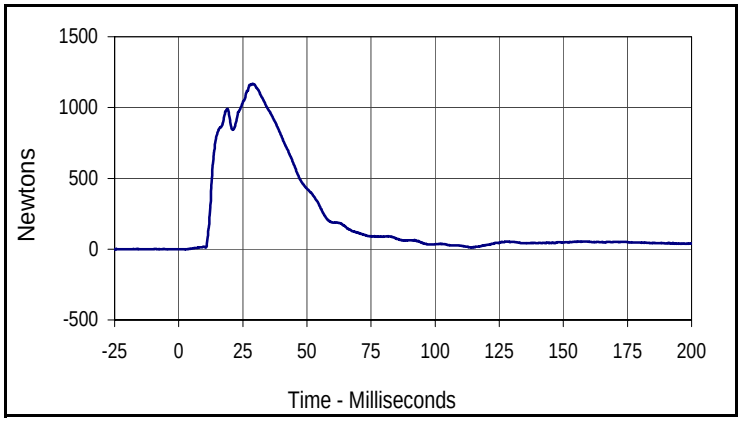
Curve Description			
Driver Anterior Abdominal Force Y			
Plot No.	Type	SAE Class	Units
008	FIL	600	Newtons
Max	Time	Min	Time
264.8	19.1	-10.0	10.9



Curve Description			
Driver Middle Abdominal Force Y			
Plot No.	Type	SAE Class	Units
009	FIL	600	Newtons
Max	Time	Min	Time
360.8	29.1	-6.6	117.2

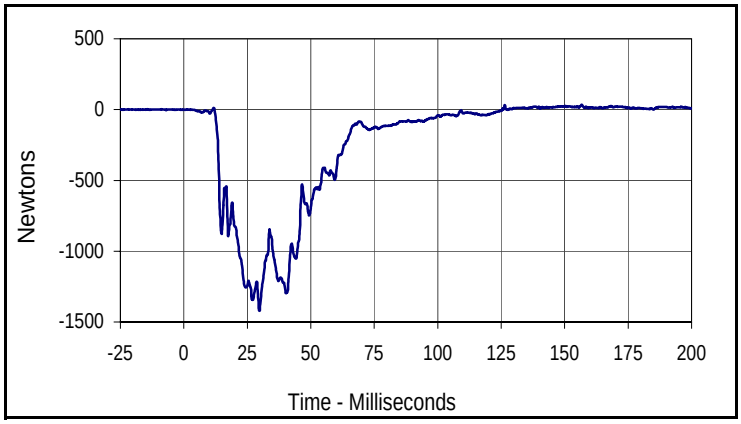


Curve Description			
Driver Posterior Abdominal Force Y			
Plot No.	Type	SAE Class	Units
011	FIL	600	Newtons
Max	Time	Min	Time
567.9	29.4	-6.5	117.7



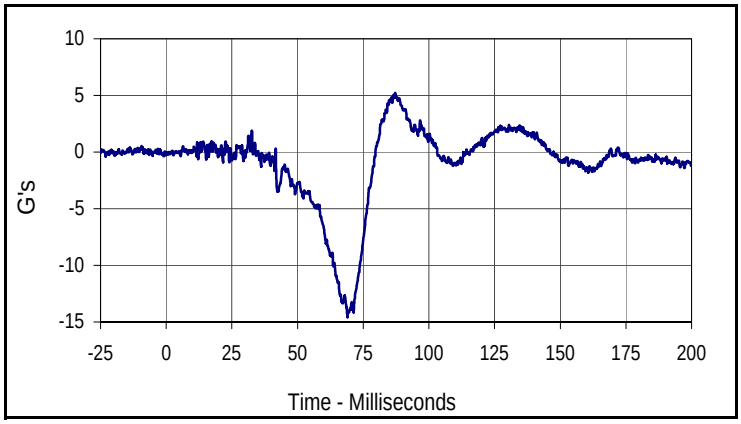
Curve Description			
Driver Total Abdominal Force			
Plot No.	Type	SAE Class	Units
012	SUM	600	Newtons
Max	Time	Min	Time
1166.7	28.9	-1.7	2.4

Test Vehicle:	2014 Infiniti Q50 Hybrid 4-Door Sedan	NHTSA No.:	M20145202
Test Program:	61 km/h (38 mph) Side Impact NCAP 27° Moving Deformable Barrier Test	Test Date:	11/13/13

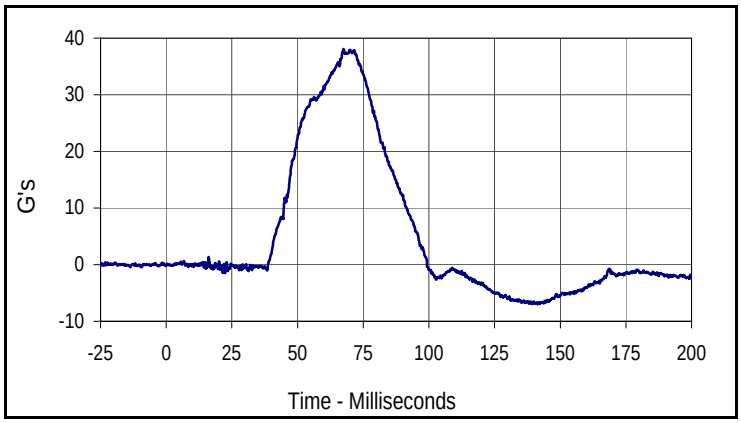


Curve Description			
Driver Pubic Symphysis Force Y			
Plot No.	Type	SAE Class	Units
013	FIL	600	Newtons
Max	Time	Min	Time
34.8	156.7	-1421.9	29.8

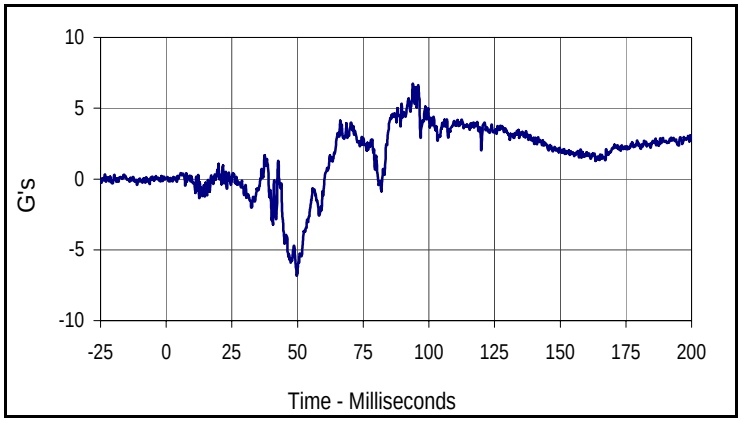
Test Vehicle:	2014 Infiniti Q50 Hybrid 4-Door Sedan	NHTSA No.:	M20145202
Test Program:	61 km/h (38 mph) Side Impact NCAP 27° Moving Deformable Barrier Test	Test Date:	11/13/13



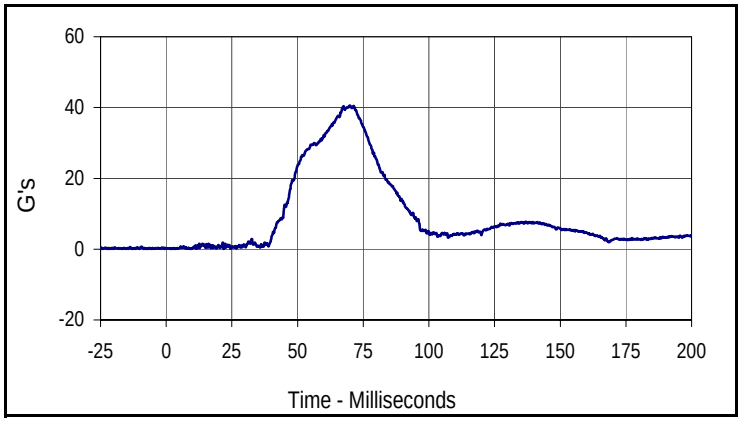
Curve Description			
Passenger Head Acceleration X Primary			
Plot No.	Type	SAE Class	Units
014	FIL	1000	G's
Max	Time	Min	Time
5.2	87.2	-14.6	69.0



Curve Description			
Passenger Head Acceleration Y Primary			
Plot No.	Type	SAE Class	Units
015	FIL	1000	G's
Max	Time	Min	Time
38.1	67.5	-7.0	141.3



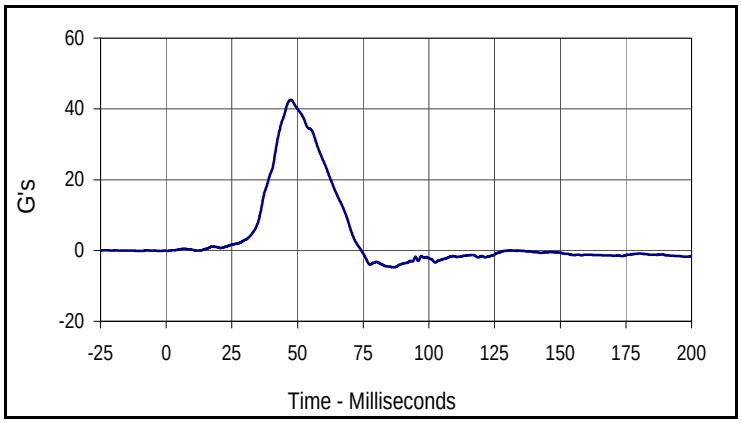
Curve Description			
Passenger Head Acceleration Z Primary			
Plot No.	Type	SAE Class	Units
016	FIL	1000	G's
Max	Time	Min	Time
6.7	93.9	-6.8	49.7



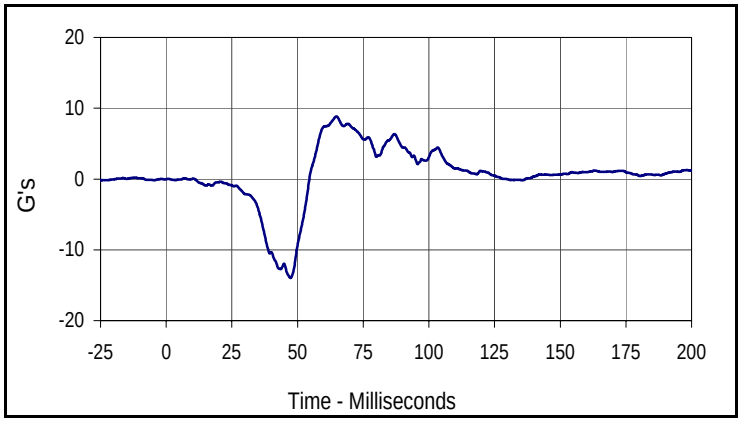
Curve Description			
Passenger Head Acceleration Resultant Primary			
Plot No.	Type	SAE Class	Units
017	RES	1000	G's
Max	Time	Min	Time
40.6	69.8	0.0	21.9

Test Vehicle:	2014 Infiniti Q50 Hybrid 4-Door Sedan	NHTSA No.:	M20145202
Test Program:	61 km/h (38 mph) Side Impact NCAP 27° Moving Deformable Barrier Test	Test Date:	11/13/13

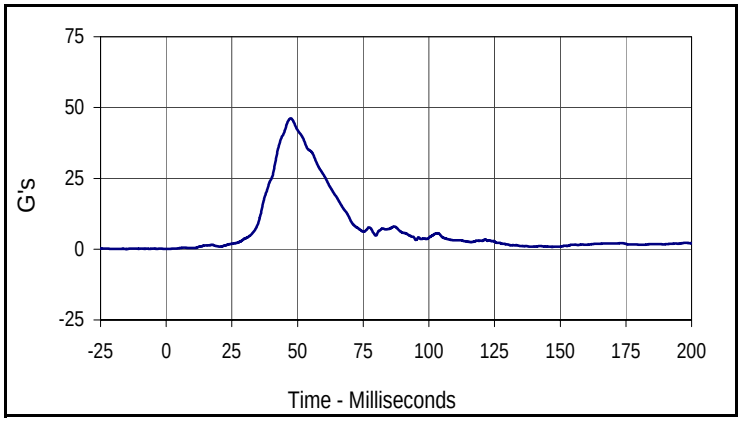
Curve Description			
Passenger Lower Spine T12 Acceleration X			
Plot No.	Type	SAE Class	Units
019	FIL	180	G's
Max	Time	Min	Time
3.8	69.0	-11.3	47.4



Curve Description			
Passenger Lower Spine T12 Acceleration Y			
Plot No.	Type	SAE Class	Units
020	FIL	180	G's
Max	Time	Min	Time
42.6	47.4	-4.7	86.5

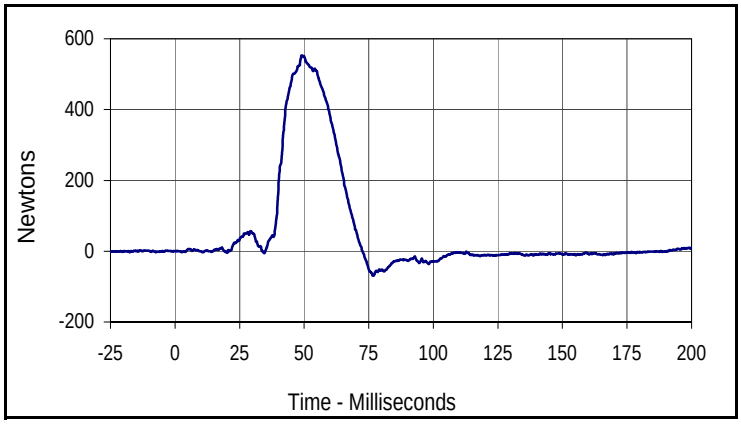


Curve Description			
Passenger Lower Spine T12 Acceleration Z			
Plot No.	Type	SAE Class	Units
021	FIL	180	G's
Max	Time	Min	Time
8.8	64.8	-14.0	47.3

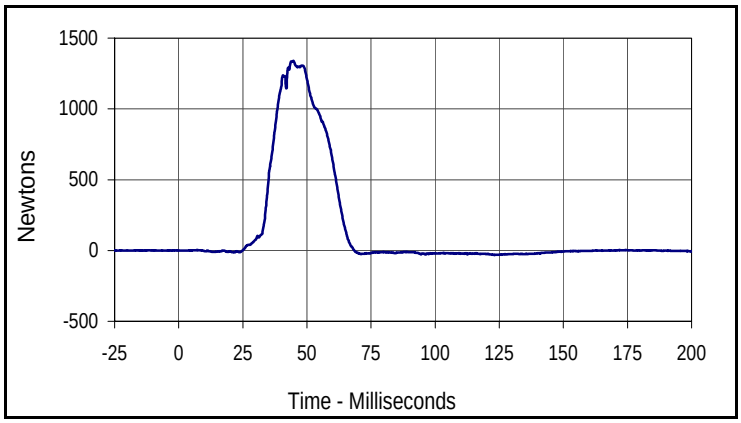


Curve Description			
Passenger Lower Spine T12 Acceleration Resultant			
Plot No.	Type	SAE Class	Units
022	RES	180	G's
Max	Time	Min	Time
46.2	47.4	0.0	1.4

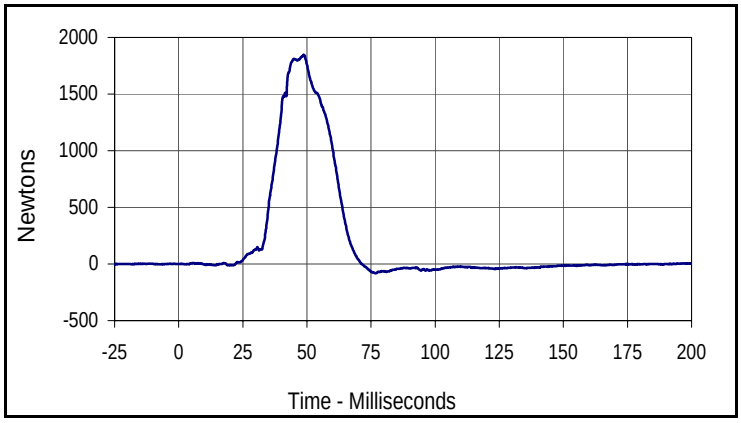
Test Vehicle:	2014 Infiniti Q50 Hybrid 4-Door Sedan	NHTSA No.:	M20145202
Test Program:	61 km/h (38 mph) Side Impact NCAP 27° Moving Deformable Barrier Test	Test Date:	11/13/13



Curve Description			
Passenger Iliac Wing Force on Impact Side Y			
Plot No.	Type	SAE Class	Units
023	FIL	600	Newtons
Max	Time	Min	Time
553.3	49.1	-69.3	76.7



Curve Description			
Passenger Acetabulum Force on Impact Side Y			
Plot No.	Type	SAE Class	Units
024	FIL	600	Newtons
Max	Time	Min	Time
1339.4	44.6	-31.3	123.1



Curve Description			
Passenger Total Pelvic Force			
Plot No.	Type	SAE Class	Units
018	SUM	600	Newtons
Max	Time	Min	Time
1846.5	48.8	-82.2	76.6

APPENDIX C

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

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

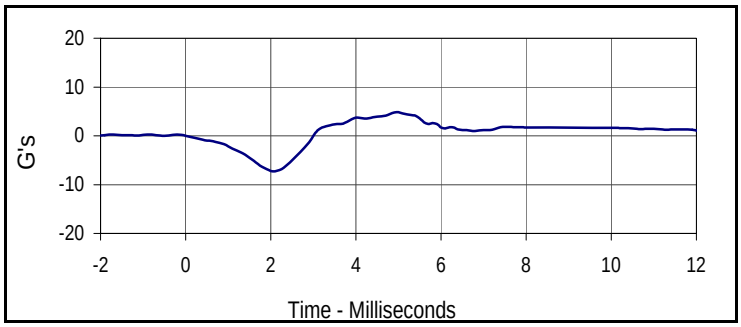
Test Program:	ES2re External Measurements	Test Date:	11/5/13
ATD Serial No.:	F035	Test I.D.:	N/A

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

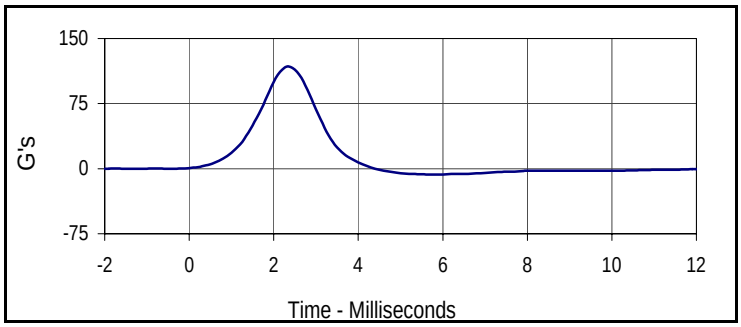
Test Program:	ES2re Head Drop Test	Test Date:	11/5/13
ATD Serial No.:	F035	Test I.D.:	F035HD050

Tested Parameter		Units	Specification	Result	Pass/Fail
Head Assembly Soak Time		Minutes	≥240	300	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.3	Pass
	Min	°C		21.2	Pass
Humidity During Soak	Max	%	10.0 to 70.0	33.5	Pass
	Min	%		32.5	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	32.5	Pass
Peak Head Resultant Acceleration		G's	125 to 155	136.5	Pass
Peak Head X Acceleration		G's	≤15	7.3	Pass
Is Acceleration Unimodal?		Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse		%	<15	6.3	Pass
			Overall Test Results		Pass

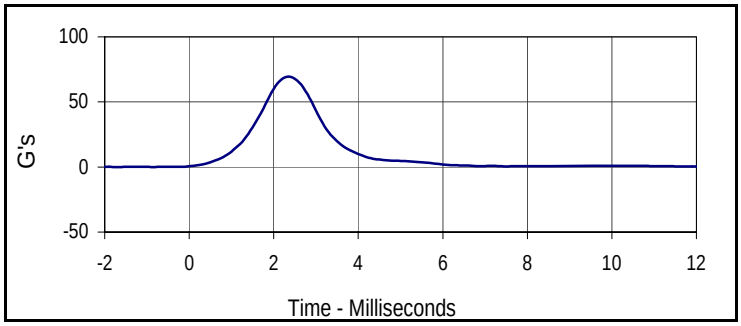
Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
136.5	2.3	0.2	-1.5



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
4.8	5.0	-7.3	2.1



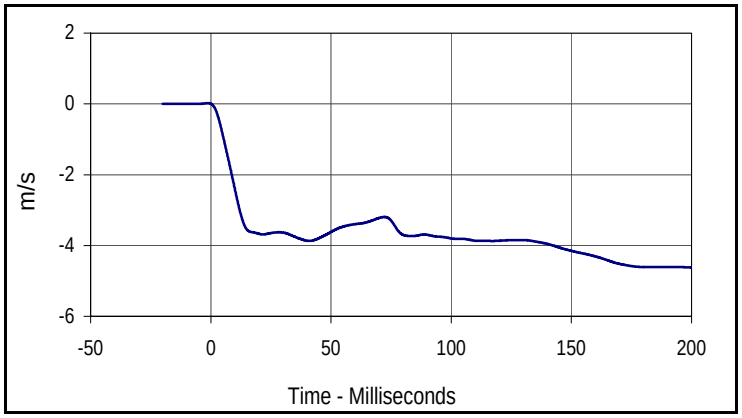
Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
117.4	2.3	-6.8	5.8



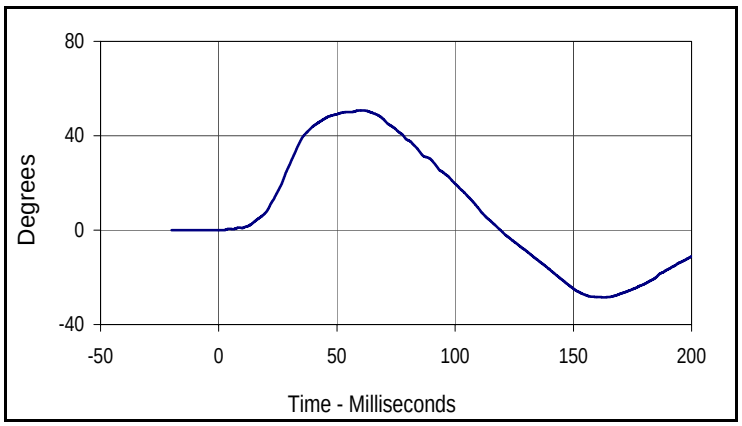
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
69.3	2.4	0.0	-1.7

Test Program:	ES2re Neck Flexion Test	Test Date:	11/5/13
ATD Serial No.:	F035	Test I.D.:	F035NB050

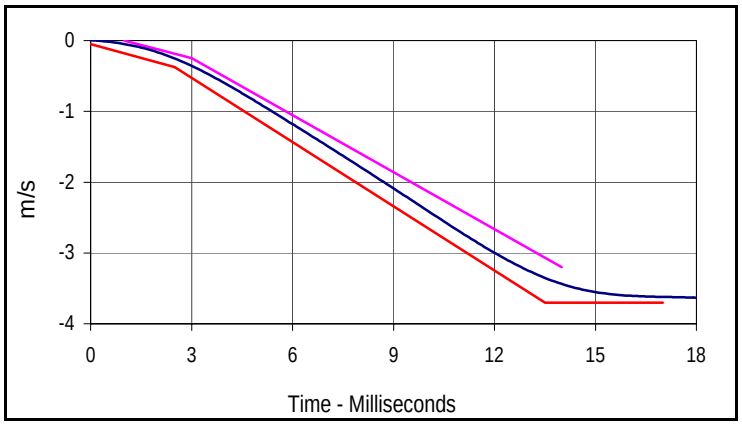
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	335	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.3	Pass
	Min	°C		21.2	Pass
Humidity During Soak	Max	%	10.0 to 70.0	33.5	Pass
	Min	%		32.5	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	32.6	Pass
Pendulum Velocity		m/s	3.3 to 3.5	3.39	Pass
Headform Flexion	Max	Degrees	49 to 59	50.7	Pass
	Time	msec	54 to 66	60.9	Pass
Headform Flexion Decay (Peak to Zero)		msec	53 to 88	58.3	Pass
			Overall Test Results		Pass



Curve Description			
Plot No.	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.2	-4.6	199.4



Curve Description			
Headform Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	180	Degrees
Max	Time	Min	Time
50.7	60.9	-28.4	162.6

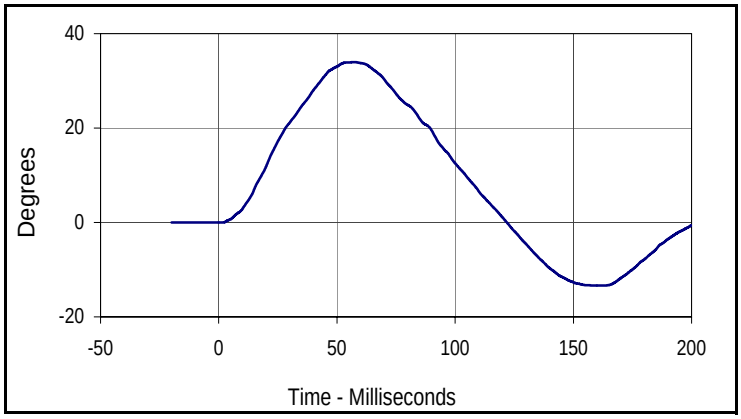


Curve Description			
Plot No.	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.2	-4.6	199.4

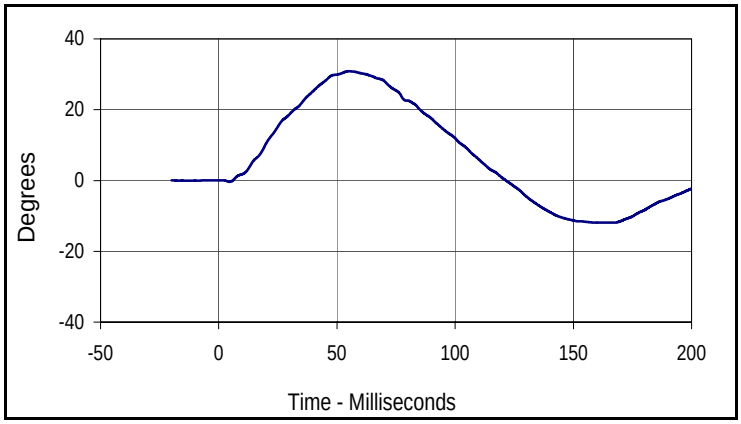
Velocity Corridors

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

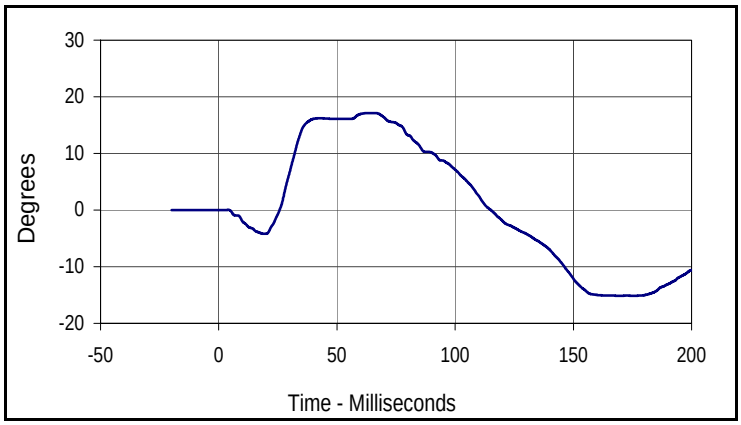
Test Program:	ES2re Neck Flexion Test	Test Date:	11/5/13
ATD Serial No.:	F035	Test I.D.:	F035NB050



Curve Description			
Potentiometer A			
Plot No.	Type	SAE Class	Units
003	FIL	180	Degrees
Max	Time	Min	Time
34.0	57.4	-13.4	159.4



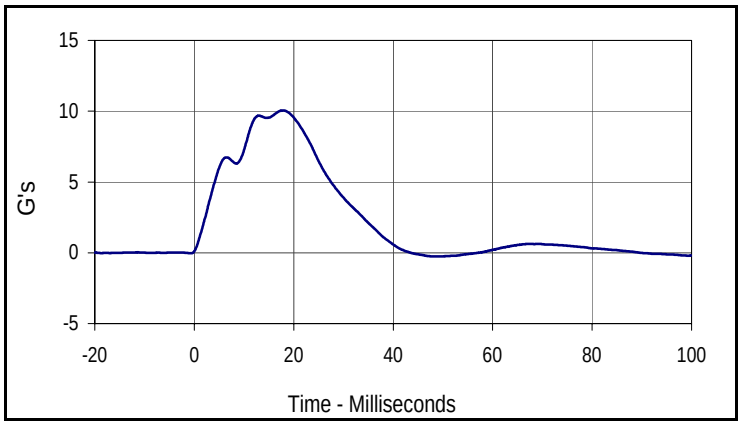
Curve Description			
Potentiometer B			
Plot No.	Type	SAE Class	Units
004	FIL	180	Degrees
Max	Time	Min	Time
30.9	55.1	-11.9	166.6



Curve Description			
Potentiometer C			
Plot No.	Type	SAE Class	Units
005	FIL	180	Degrees
Max	Time	Min	Time
17.1	64.7	-15.1	175.7

Test Program:	ES2re Shoulder Impact Test	Test Date:	11/5/13
ATD Serial No.:	F035	Test I.D.:	F035SH050

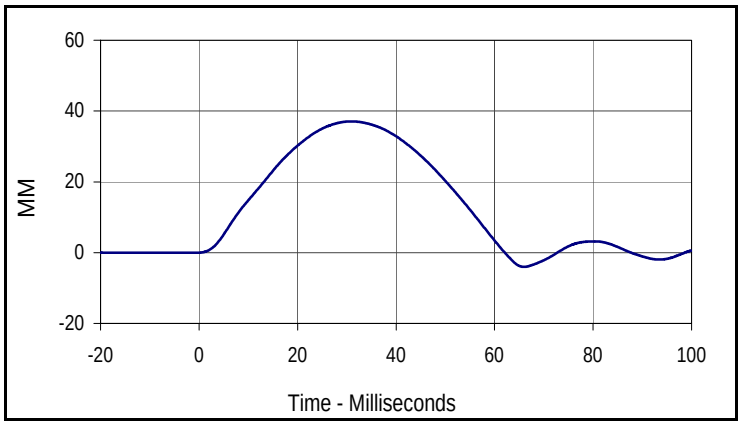
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	400	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.3	Pass
	Min	°C		21.2	Pass
Humidity During Soak	Max	%	10.0 to 70.0	33.5	Pass
	Min	%		32.5	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	32.9	Pass
Pendulum Speed		m/s	4.2 to 4.4	4.30	Pass
Peak Impactor Acceleration		G's	7.5 to 10.5	10.1	Pass
			Overall Test Results		Pass



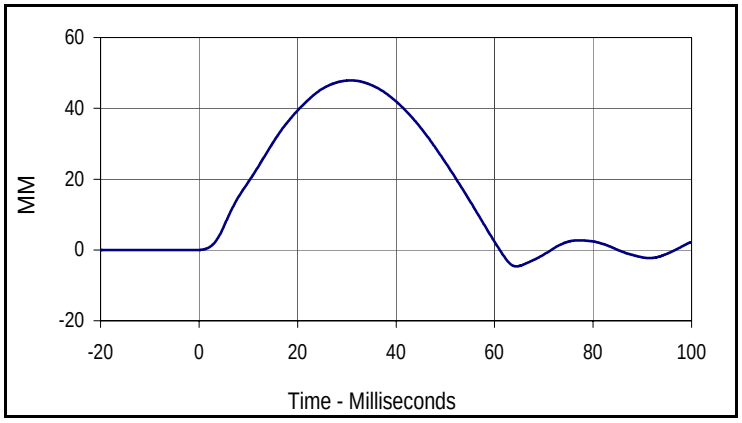
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
001	FIL	180	G's
Max	Time	Min	Time
10.1	17.9	-0.3	49.4

Test Program:	ES2re Thorax - Rib Drop Test	Test Date:	11/5/13
ATD Serial No.:	F035 Rib # 1	Test I.D.:	F035RB1050

Tested Parameter		Units	Specification	Result	Pass/Fail
Rib Module Soak Time		Minutes	≥240	455	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.3	Pass
	Min	°C		21.2	Pass
Humidity During Soak	Max	%	10.0 to 70.0	33.5	Pass
	Min	%		32.5	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	32.5	Pass
Peak Rib Deflection at 459 +/- 5 mm Drop Height		mm	36 to 40	37.1	Pass
Peak Rib Deflection at 815 +/- 8 mm Drop Height		mm	46 to 51	47.9	Pass
			Overall Test Results		Pass



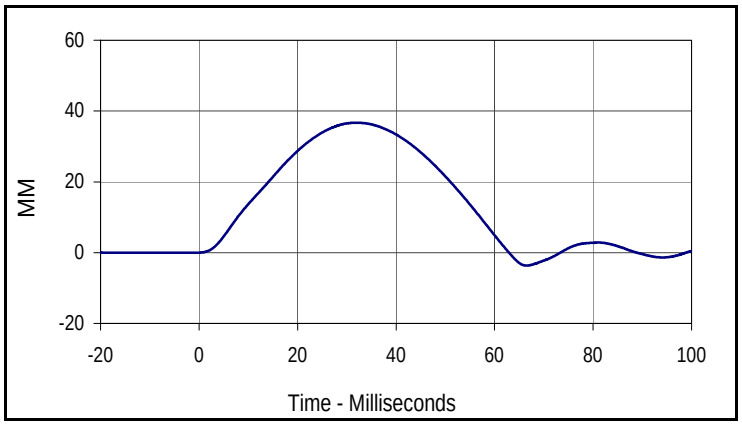
Curve Description			
Upper Rib Deflection (459 mm Drop Height)			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
37.1	31.0	-4.0	66.0



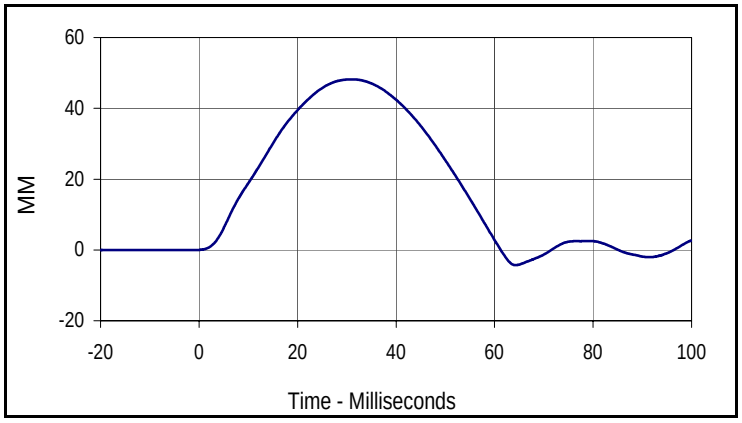
Curve Description			
Upper Rib Deflection (815 mm Drop Height)			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max	Time	Min	Time
47.9	30.8	-4.7	64.4

Test Program:	ES2re Thorax - Rib Drop Test	Test Date:	11/5/13
ATD Serial No.:	F035 Rib # 2	Test I.D.:	F035RB2050

Tested Parameter		Units	Specification	Result	Pass/Fail
Rib Module Soak Time		Minutes	≥240	500	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.3	Pass
	Min	°C		21.2	Pass
Humidity During Soak	Max	%	10.0 to 70.0	33.5	Pass
	Min	%		32.5	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	32.8	Pass
Peak Rib Deflection at 459 +/- 5 mm Drop Height		mm	36 to 40	36.7	Pass
Peak Rib Deflection at 815 +/- 8 mm Drop Height		mm	46 to 51	48.2	Pass
			Overall Test Results		Pass



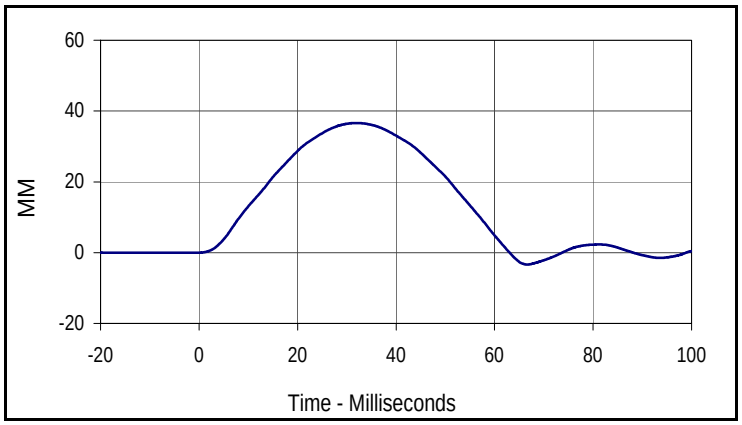
Curve Description			
Middle Rib Deflection (459 mm Drop Height)			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
36.7	31.9	-3.7	66.5



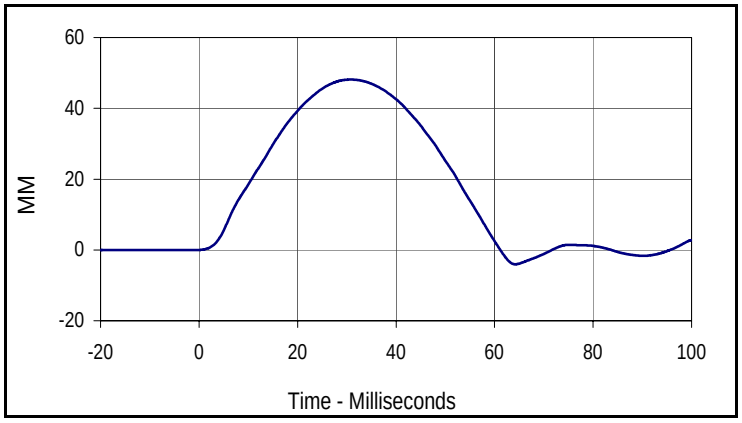
Curve Description			
Middle Rib Deflection (815 mm Drop Height)			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max	Time	Min	Time
48.2	31.0	-4.3	64.3

Test Program:	ES2re Thorax - Rib Drop Test	Test Date:	11/5/13
ATD Serial No.:	F035 Rib # 3	Test I.D.:	F035RB3050

Tested Parameter		Units	Specification	Result	Pass/Fail
Rib Module Soak Time		Minutes	≥240	545	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.3	Pass
	Min	°C		21.2	Pass
Humidity During Soak	Max	%	10.0 to 70.0	33.5	Pass
	Min	%		32.5	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	32.6	Pass
Peak Rib Deflection at 459 +/- 5 mm Drop Height		mm	36 to 40	36.6	Pass
Peak Rib Deflection at 815 +/- 8 mm Drop Height		mm	46 to 51	48.1	Pass
			Overall Test Results		Pass



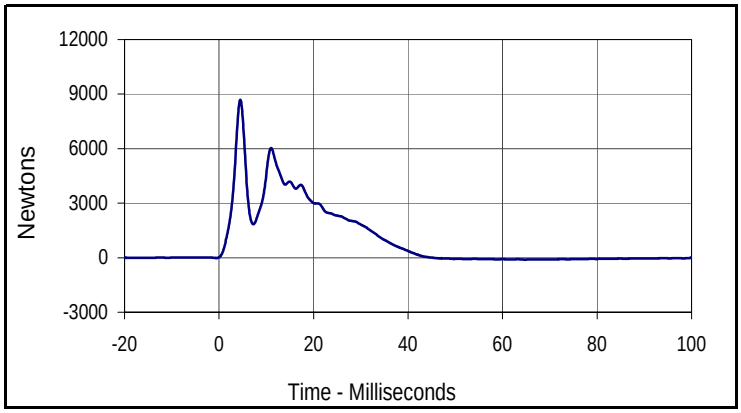
Curve Description			
Lower Rib Deflection (459 mm Drop Height)			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
36.6	32.0	-3.4	66.6



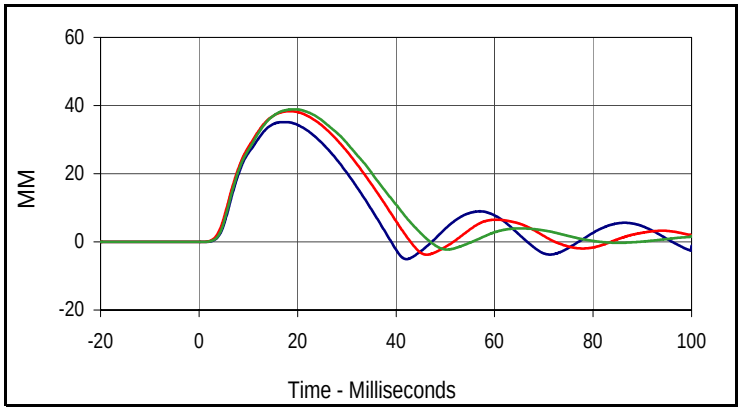
Curve Description			
Lower Rib Deflection (815 mm Drop Height)			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max	Time	Min	Time
48.1	30.8	-4.1	64.2

Test Program:	ES2re Thorax - Full Body Impact Test	Test Date:	11/5/13
ATD Serial No.:	F035	Test I.D.:	F035TH050

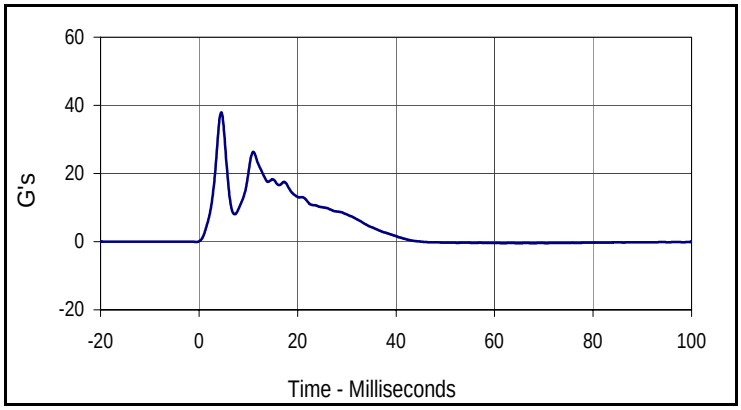
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	590	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.3	Pass
	Min	°C		21.2	Pass
Humidity During Soak	Max	%	10.0 to 70.0	33.5	Pass
	Min	%		32.5	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	32.8	Pass
Peak Impactor Velocity		m/s	5.4 to 5.6	5.54	Pass
Peak Impactor Force		N	5100 to 6200	6036.5	Pass
		msec	> 6.0 msec	11	Pass
Peak Upper Rib Deflection		mm	34 to 41	35.2	Pass
Peak Middle Rib Deflection		mm	37 to 45	38.3	Pass
Peak Lower Rib Deflection		mm	37 to 44	38.9	Pass
			Overall Test Results		Pass



Curve Description			
Impactor Force			
Plot No.	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
8693.5	4.5	-104.5	64.7



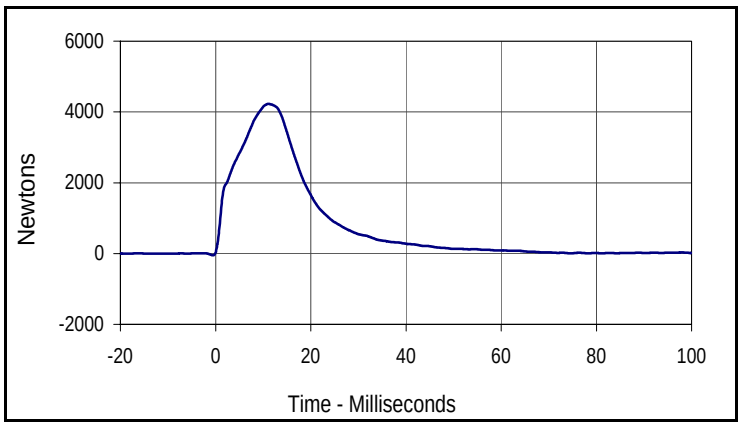
Curve Description			
Upper, Middle, Lower Rib Deflections			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max (Upper)	Time	Min (Upper)	Time
35.2	17.1	-5.1	42.1
Max (Middle)	Time	Min (Middle)	Time
38.3	18.5	-3.8	46.2
Max (Lower)	Time	Min (Lower)	Time
38.9	19.3	-2.2	50.4



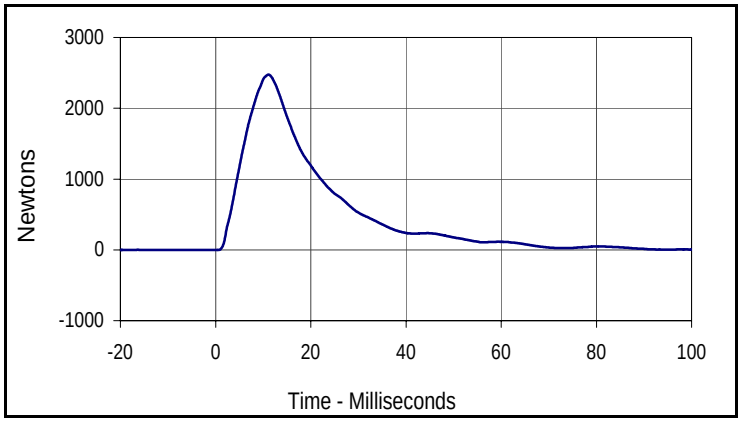
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
38.0	4.5	-0.5	64.7

Test Program:	ES2re Abdomen Impact Test	Test Date:	11/5/13
ATD Serial No.:	F035	Test I.D.:	F035ABD050

Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	660	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.3	Pass
	Min	°C		21.2	Pass
Humidity During Soak	Max	%	10.0 to 70.0	33.5	Pass
	Min	%		32.5	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	32.9	Pass
Probe Velocity		m/s	3.9 to 4.1	3.95	Pass
Peak Impactor Force		N	4000 to 4800	4229.5	Pass
		msec	10.6 to 13.0	11.1	Pass
Sum of Abdominal Forces		N	2200 to 2700	2476.8	Pass
		msec	10.0 to 12.3	11.1	Pass
			Overall Test Results		Pass

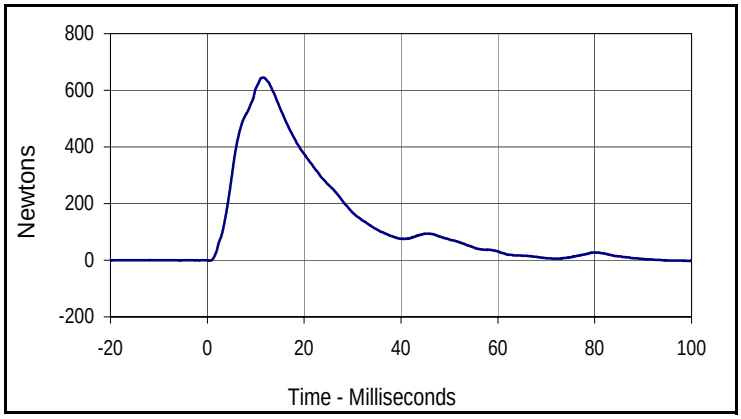


Curve Description			
Impactor Force			
Plot No.	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
4229.5	11.1	-48.7	-0.6

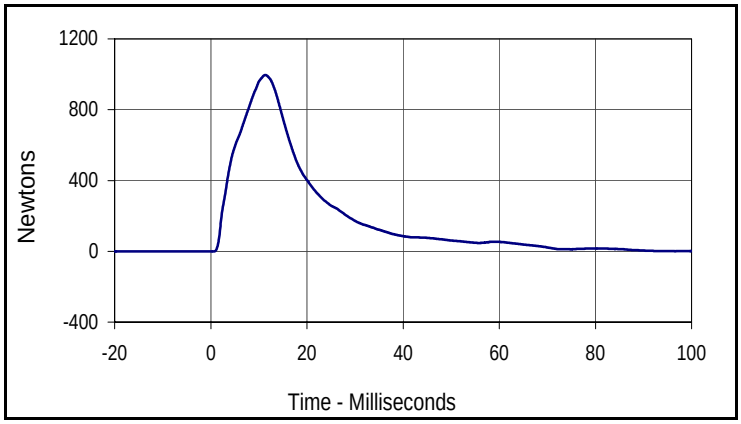


Curve Description			
Abdomen Sum Resultant			
Plot No.	Type	SAE Class	Units
002	RES	600	Newtons
Max	Time	Min	Time
2476.8	11.1	-1.7	-1.8

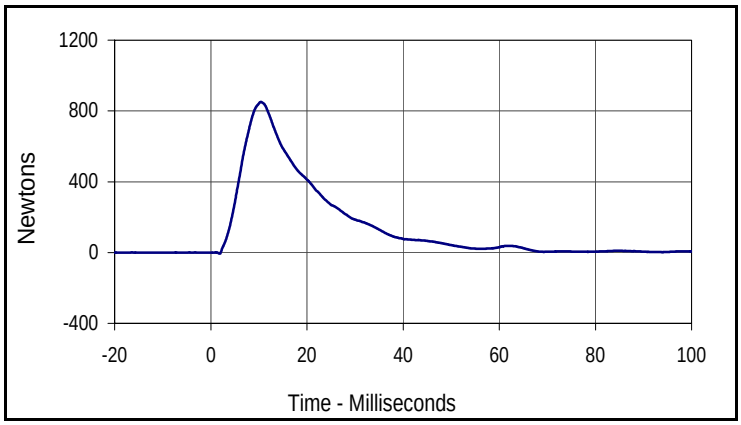
Test Program:	ES2re Abdomen Impact Test	Test Date:	11/5/13
ATD Serial No.:	F035	Test I.D.:	F035ABD050



Curve Description			
Front Abdomen Force			
Plot No.	Type	SAE Class	Units
003	FIL	600	Newtons
Max	Time	Min	Time
644.7	11.6	-2.5	0.0



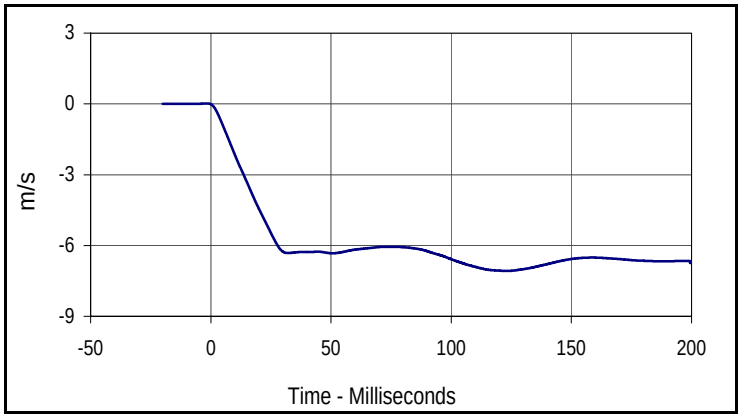
Curve Description			
Middle Abdomen Force			
Plot No.	Type	SAE Class	Units
004	FIL	600	Newtons
Max	Time	Min	Time
995.9	11.3	-0.8	-7.1



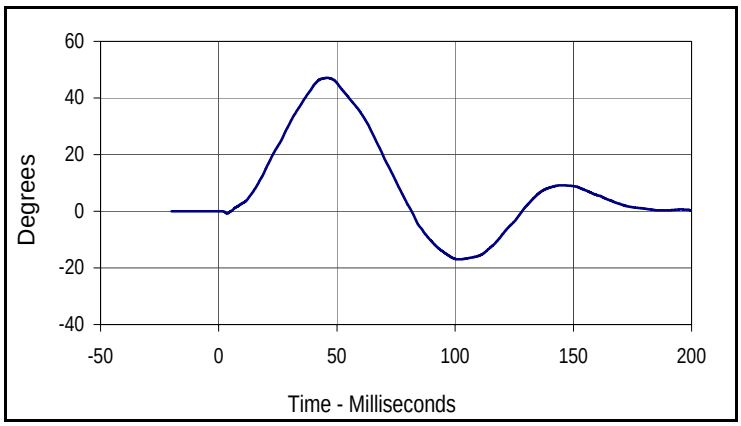
Curve Description			
Rear Abdomen Force			
Plot No.	Type	SAE Class	Units
005	FIL	600	Newtons
Max	Time	Min	Time
850.6	10.4	-6.3	1.8

Test Program:	ES2re Lumbar Flexion Test	Test Date:	11/5/13
ATD Serial No.:	F035	Test I.D.:	F035LB050

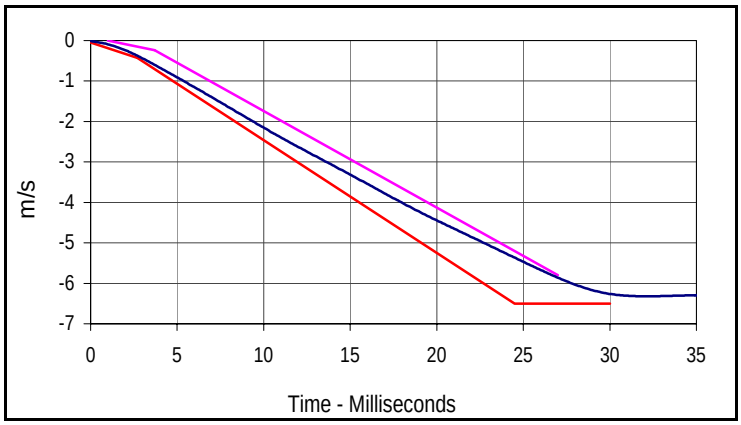
Tested Parameter		Units	Specification	Result	Pass/Fail
Lumbar Spine Assembly Soak Time		Minutes	≥240	735	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.3	Pass
	Min	°C		21.2	Pass
Humidity During Soak	Max	%	10.0 to 70.0	33.5	Pass
	Min	%		32.5	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	32.9	Pass
Pendulum Velocity		m/s	5.95 to 6.15	5.96	Pass
Headform Rotation	Max	Degrees	45 to 55	47.1	Pass
	Time	msec	39 to 53	46.5	Pass
Time of Decay to Zero Angle from Peak		msec	37 to 57	39.8	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.1	-7.1	123.9



Curve Description			
Headform Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	180	Degrees
Max	Time	Min	Time
47.1	46.5	-17.0	102.1

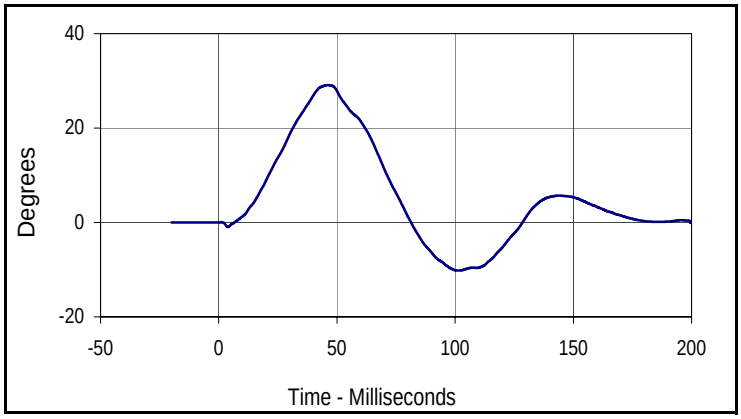


Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.1	-7.1	123.9

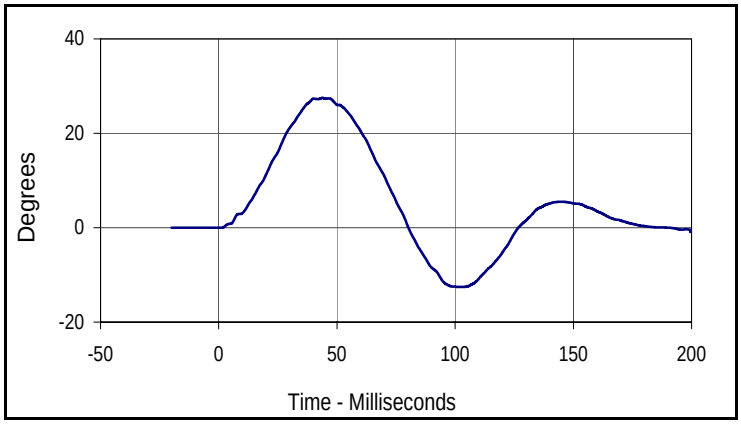
Velocity Corridors

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

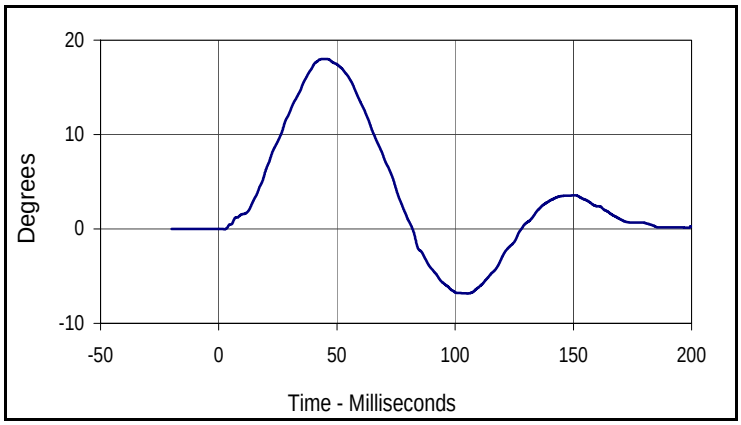
Test Program:	ES2re Lumbar Flexion Test	Test Date:	11/5/13
ATD Serial No.:	F035	Test I.D.:	F035LB050



Curve Description			
Potentiometer A			
Plot No.	Type	SAE Class	Units
003	FIL	180	Degrees
Max	Time	Min	Time
29.1	46.6	-10.2	102.0



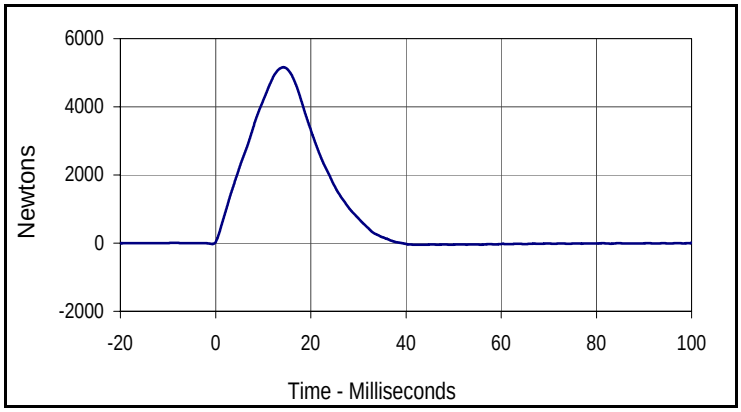
Curve Description			
Potentiometer B			
Plot No.	Type	SAE Class	Units
004	FIL	180	Degrees
Max	Time	Min	Time
27.5	44.5	-12.6	102.5



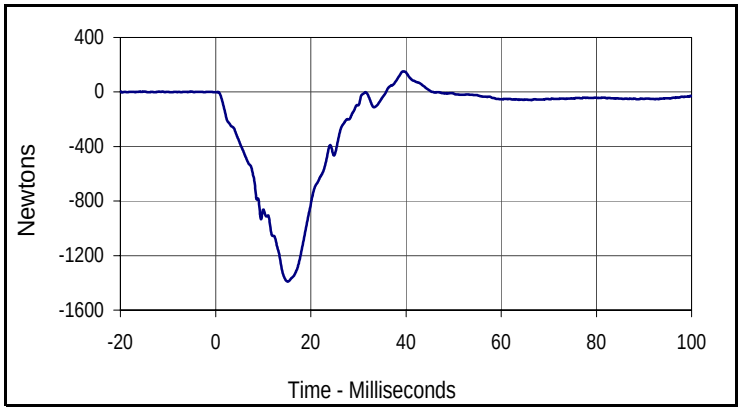
Curve Description			
Potentiometer C			
Plot No.	Type	SAE Class	Units
005	FIL	180	Degrees
Max	Time	Min	Time
18.0	46.2	-6.8	105.9

Test Program:	ES2re Pelvis Impact Test	Test Date:	11/5/13
ATD Serial No.:	F035	Test I.D.:	F035PL050

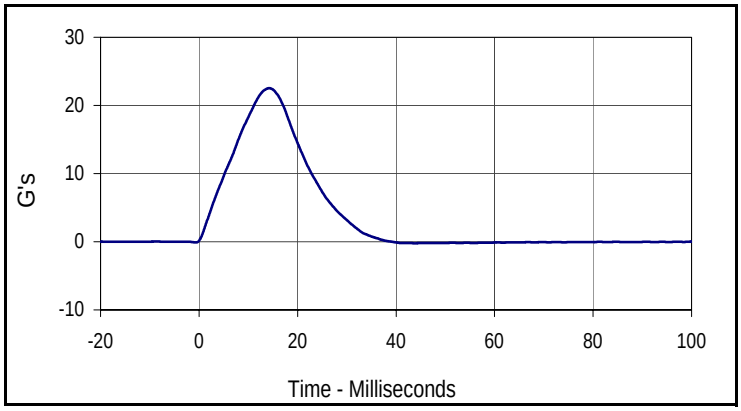
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	790	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.3	Pass
	Min	°C		21.2	Pass
Humidity During Soak	Max	%	10.0 to 70.0	33.5	Pass
	Min	%		32.5	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	32.9	Pass
Pendulum Velocity		m/s	4.2 to 4.4	4.37	Pass
Peak Impactor Force		N	4700 to 5400	5160.7	Pass
		msec	11.8 to 16.1	14.2	Pass
Peak Pubic Symphysis Load		N	-1230 to -1590	-1390.8	Pass
		msec	12.2 to 17.0	15.1	Pass
			Overall Test Results		Pass



Curve Description			
Impactor Force			
Plot No.	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
5160.7	14.2	-51.6	43.8



Curve Description			
Pubic Symphysis Force Y			
Plot No.	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
151.2	39.5	-1390.8	15.1



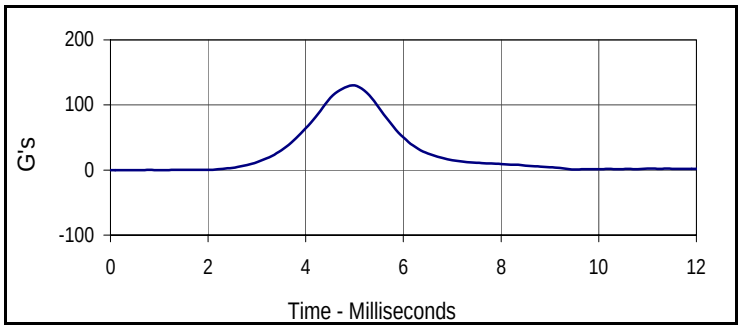
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
22.5	14.2	-0.2	43.8

Test Program:	SID IIs External Measurements	Test Date:	11/6/13
ATD Serial No.:	307	Test I.D.:	N/A

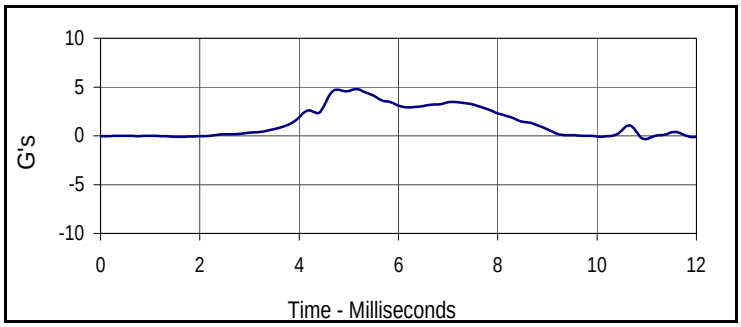
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		^{o}C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity		%	10 to 70	33	Pass
A	Sitting Height	mm	772 - 788	778	Pass
B	Shoulder Pivot Height	mm	437 - 453	443	Pass
C	H-Point Height	mm	79 - 89	85	Pass
D	H-Point from Seatback	mm	141 - 151	144	Pass
E	Shoulder Pivot from Backline	mm	97 - 107	102	Pass
F	Thigh Clearance	mm	119 - 135	128	Pass
G	Head Breadth	mm	140 - 148	145	Pass
H	Head Back from Backline	mm	40 - 46	43	Pass
I	Head Depth	mm	178 - 188	185	Pass
J	Head Circumference	mm	541 - 551	546	Pass
K	Buttock to Knee Length	mm	514 - 540	525	Pass
L	Popliteal Height	mm	343 - 369	351	Pass
M	Knee Pivot to Floor Height	mm	392 - 409	400	Pass
N	Buttock Popliteal Length	mm	416 - 442	432	Pass
O	Chest Depth w/o Jacket	mm	195 - 211	205	Pass
P	Foot Length	mm	216 - 232	223	Pass
Q	Hip Breadth with Pelvic Plug	mm	313 -323	319	Pass
R	Arm Length	mm	249 - 259	254	Pass
S	Knee Joint to Seatback	mm	477 - 493	483	Pass
V	Shoulder Width	mm	341 - 357	351	Pass
W	Foot Width	mm	78 - 94	89	Pass
Y	Chest Circumference with Jacket	mm	851 - 881	872	Pass
Z	Waist Circumference	mm	760 - 791	774	Pass
			Overall Test Results		Pass

Test Program:	SID IIs Head Drop Test	Test Date:	11/6/13
ATD Serial No.:	307	Test I.D.:	307HD058

Tested Parameter		Units	Specification	Result	Pass/Fail
Head Assembly Soak Time		Minutes	≥240	325	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.3	Pass
	Min	°C		21.2	Pass
Humidity During Soak	Max	%	10.0 to 70.0	33.3	Pass
	Min	%		33.2	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	33.2	Pass
Peak Head Resultant Acceleration		G's	115 to 137	130.0	Pass
Peak Head X Acceleration		G's	<15	4.8	Pass
Is Acceleration Unimodal?		Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse		%	<15	3.4	Pass
			Overall Test Results		Pass



Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
130.0	5.0	0.0	1.1



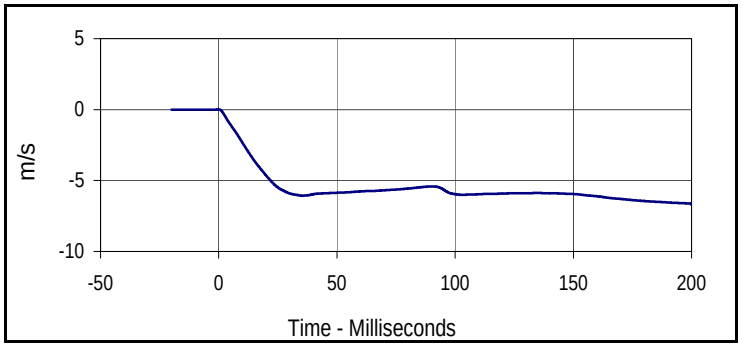
Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
4.8	5.2	-0.1	1.6

Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
104.7	5.0	-1.3	9.7

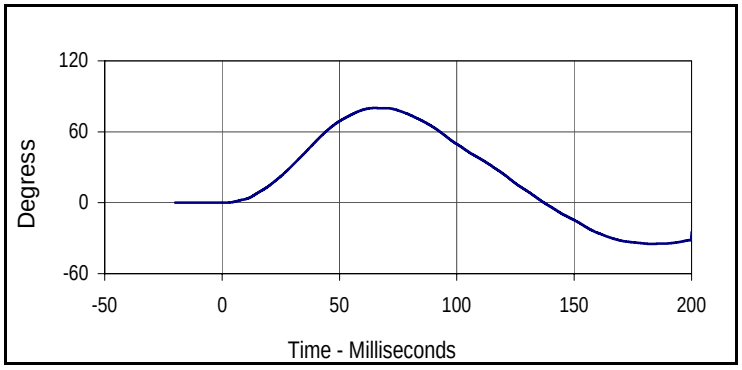
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
76.9	5.0	-2.2	11.0

Test Program:	SID IIs Neck Flexion Test	Test Date:	11/6/13
ATD Serial No.:	307	Test I.D.:	307NB058

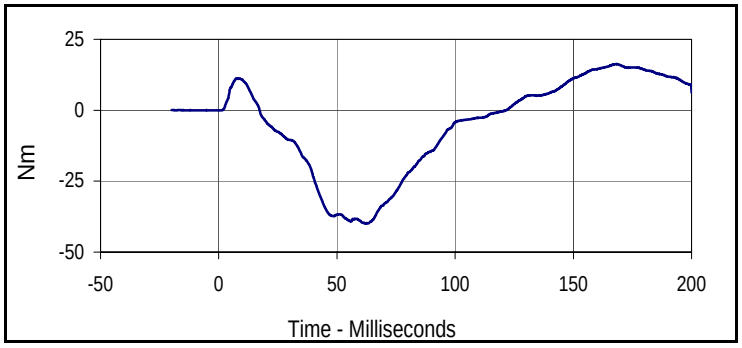
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	400	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.3	Pass
	Min	°C		21.2	Pass
Humidity During Soak	Max	%	10.0 to 70.0	33.3	Pass
	Min	%		33.2	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	33.3	Pass
Pendulum Velocity		m/s	5.51 to 5.63	5.55	Pass
Pendulum Deceleration	10 msec	m/s	-2.20 to -2.80	-2.33	Pass
	15 msec	m/s	-3.30 to -4.10	-3.60	Pass
	20 msec	m/s	-4.40 to -5.40	-4.64	Pass
	25 msec	m/s	-5.40 to -6.10	-5.49	Pass
	25-100 msec	m/s	-5.50 to -6.20	-6.07	Pass
D-Plane Rotation	Max	Degrees	71 to 81	80.1	Pass
	Time	msec	50 to 70	64.9	Pass
Peak Occipital Condyle Moment		Nm	-36 to -44	-40.0	Pass
Decaying Moment Time to Cross 0 Nm		msec	102 to 126	121.7	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	-0.2	-6.7	200.0



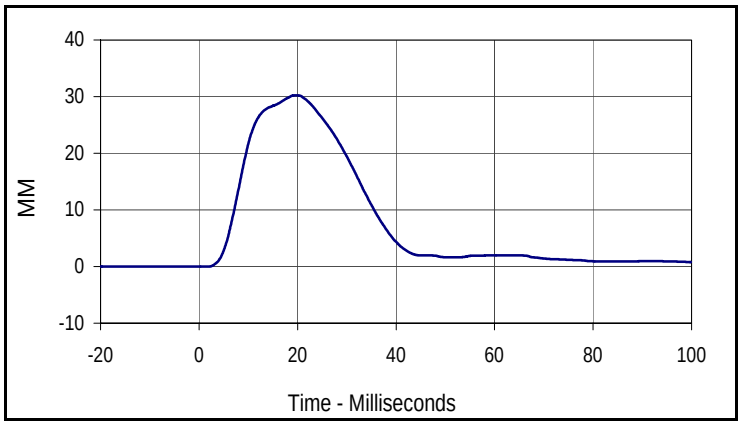
Curve Description			
Maximum Translation Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degress
Max	Time	Min	Time
80.1	64.9	-34.8	182.6



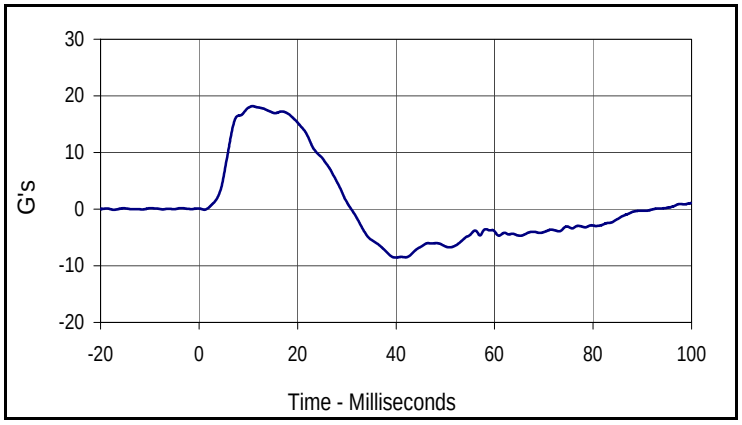
Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
16.3	168.3	-40.0	61.9

Test Program:	SID IIs Shoulder Impact Test	Test Date:	11/6/13
ATD Serial No.:	307	Test I.D.:	307SH058

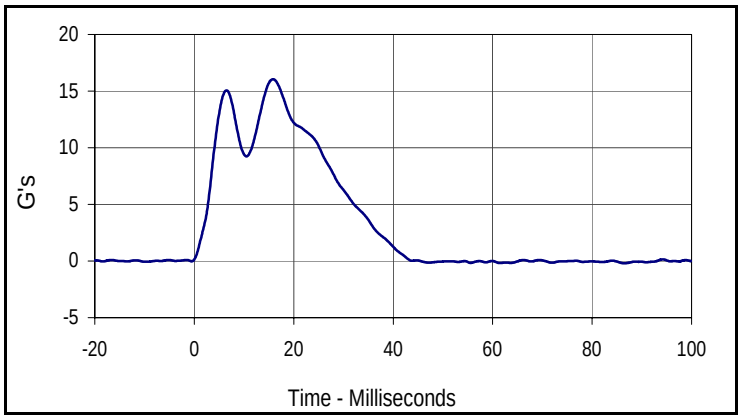
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	455	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.3	Pass
	Min	°C		21.2	Pass
Humidity During Soak	Max	%	10.0 to 70.0	33.3	Pass
	Min	%		33.2	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	33.2	Pass
Impactor Velocity		m/s	4.20 to 4.40	4.36	Pass
Peak Shoulder Deflection		mm	28 to 37	30.2	Pass
Peak Lateral Spine Acceleratrion Y		G's	17 to 22	18.2	Pass
Peak Impactor Acceleration		G's	13 to 18	16.0	Pass
			Overall Test Results		Pass



Curve Description			
Shoulder Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
30.2	19.6	0.0	-9.4



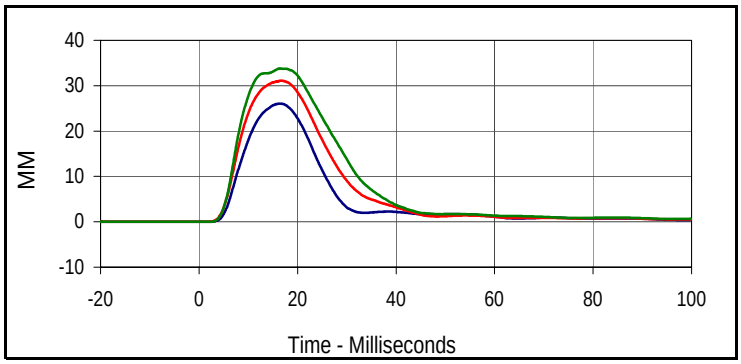
Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
18.2	10.8	-8.5	39.8



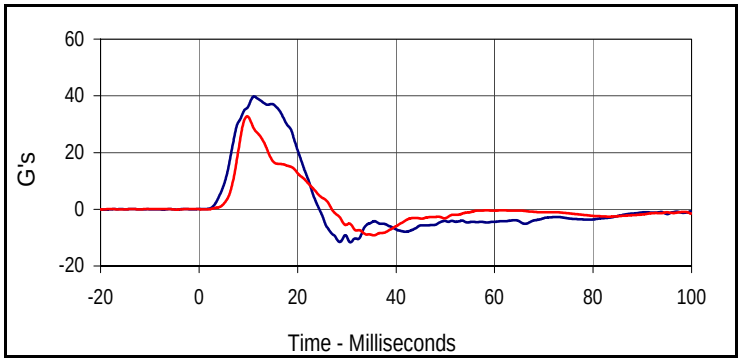
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
16.0	15.8	-0.2	86.5

Test Program:	SID IIs Thorax with Arm Impact Test	Test Date:	11/6/13
ATD Serial No.:	307	Test I.D.:	307TWA058

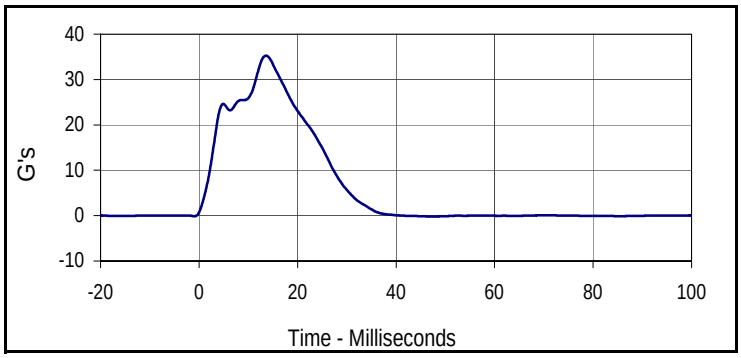
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	500	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.3	Pass
	Min	°C		21.2	Pass
Humidity During Soak	Max	%	10.0 to 70.0	33.3	Pass
	Min	%		33.2	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	33.3	Pass
Impactor Velocity		m/s	6.6 to 6.8	6.74	Pass
Peak Shoulder Deflection		mm	31 to 40	33.4	Pass
Peak Upper Thorax Rib Deflection		mm	25 to 32	26.0	Pass
Peak Middle Thorax Rib Deflection		mm	30 to 36	31.1	Pass
Peak Lower Thorax Rib Deflection		mm	32 to 38	33.8	Pass
Peak Upper Spine Y Acceleration		G's	34 to 43	39.8	Pass
Peak Lower Spine Y Acceleration		G's	29 to 37	32.8	Pass
Peak Impactor Acceleration		G's	30 to 36	35.3	Pass
			Overall Test Results		Pass



Curve Description			
Upper Thorax Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
26.0	16.4	0.0	-1.6
Middle Thorax Deflection			
Max	Time	Min	Time
31.1	16.7	0.0	-17.2
Lower Thorax Deflection			
Max	Time	Min	Time
33.8	16.5	0.0	-17.3

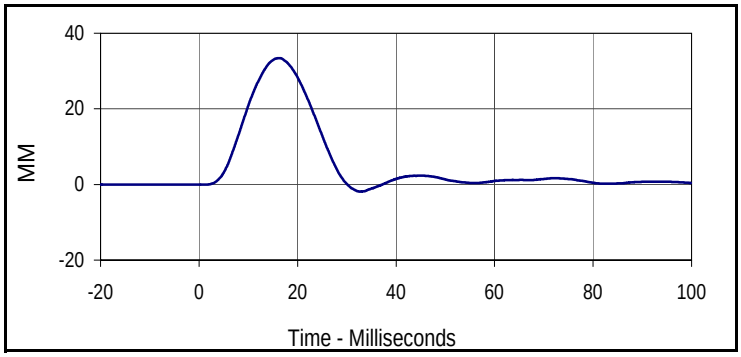


Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
39.8	11.2	-11.7	30.8
Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
32.8	9.8	-9.2	35.5



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
35.3	13.6	-0.2	47.5

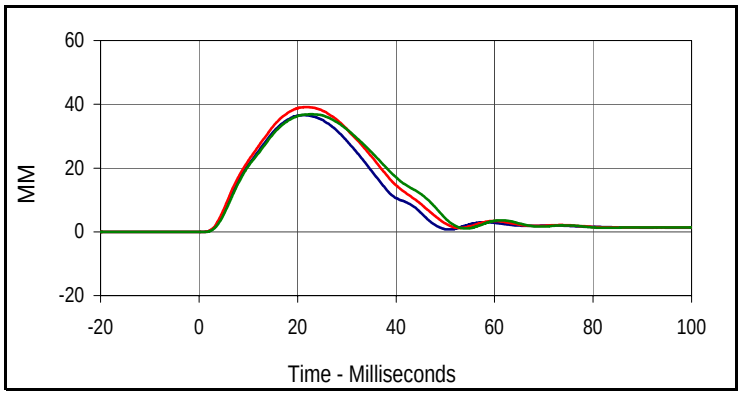
Test Program:	SID IIs Thorax with Arm Impact Test	Test Date:	11/6/13
ATD Serial No.:	307	Test I.D.:	307TWA058



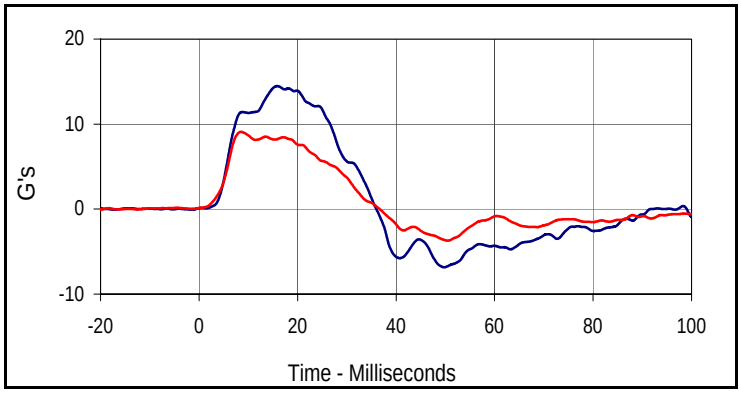
Curve Description			
Shoulder Deflection			
Plot No.	Type	SAE Class	Units
007	FIL	600	MM
Max	Time	Min	Time
33.4	16.3	-1.9	32.8

Test Program:	SID IIs Thorax without Arm Impact Test	Test Date:	11/6/13
ATD Serial No.:	307	Test I.D.:	307TWOA058

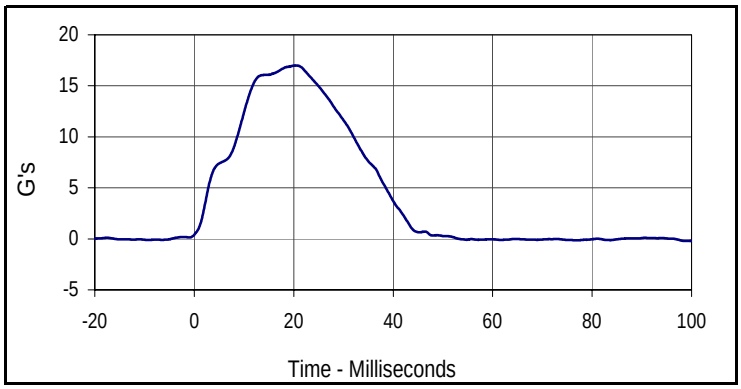
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	550	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.3	Pass
	Min	°C		21.2	Pass
Humidity During Soak	Max	%	10.0 to 70.0	33.3	Pass
	Min	%		33.2	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	33.2	Pass
Impactor Velocity		m/s	4.2 to 4.4	4.26	Pass
Peak Upper Thorax Rib Deflection		mm	32 to 40	36.6	Pass
Peak Middle Thorax Rib Deflection		mm	39 to 45	39.1	Pass
Peak Lower Thorax Rib Deflection		mm	35 to 43	36.9	Pass
Peak Upper Spine Y Acceleration		G's	13 to 17	14.5	Pass
Peak Lower Spine Y Acceleration		G's	7 to 11	9.1	Pass
Peak Impactor Acceleration		G's	14 to 18	17.0	Pass
			Overall Test Results		Pass



Curve Description			
Upper Thorax Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
36.6	21.3	0.0	-12.6
Middle Thorax Deflection			
Max	Time	Min	Time
39.1	21.8	0.0	-15.5
Lower Thorax Deflection			
Max	Time	Min	Time
36.9	22.8	0.0	-5.3



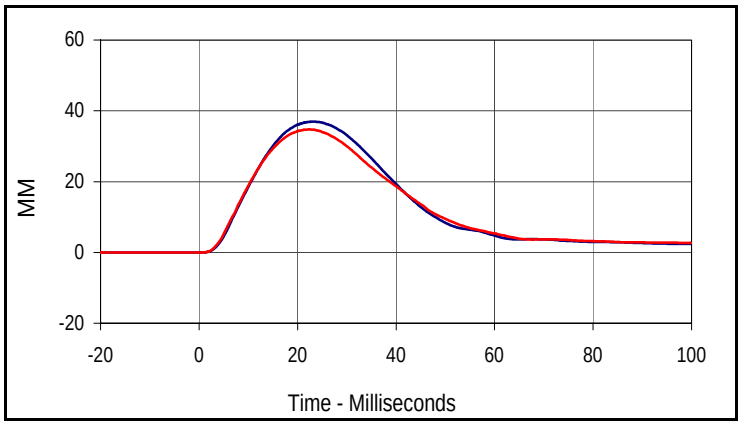
Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
14.5	15.8	-6.9	49.8
Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
9.1	8.5	-3.7	50.5



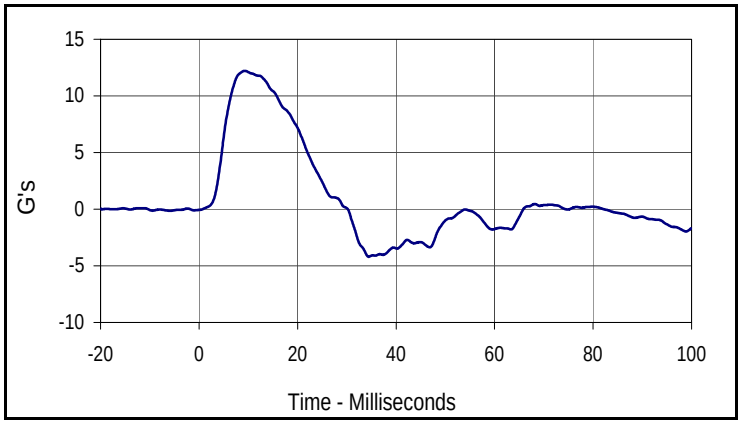
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
17.0	20.5	-0.2	98.7

Test Program:	SID IIs Abdomen Impact Test	Test Date:	11/6/13
ATD Serial No.:	307	Test I.D.:	307ABD058

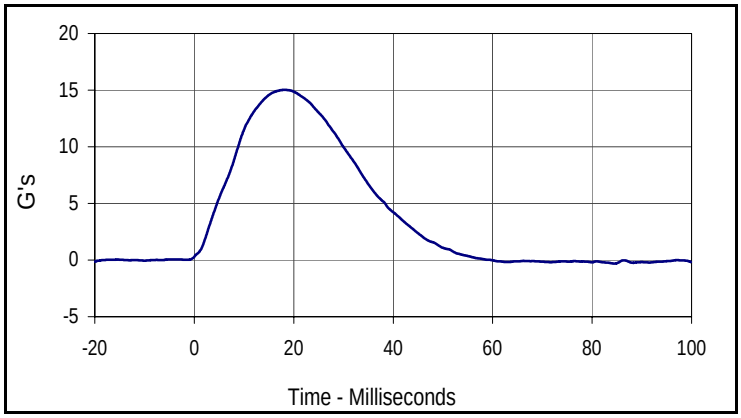
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	585	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.3	Pass
	Min	°C		21.2	Pass
Humidity During Soak	Max	%	10.0 to 70.0	33.3	Pass
	Min	%		33.2	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	33.2	Pass
Impactor Velocity		m/s	4.2 to 4.4	4.33	Pass
Peak Upper Abdominal Rib Deflection		mm	36 to 47	36.9	Pass
Peak Lower Abdominal Rib Deflection		mm	33 to 44	34.7	Pass
Peak Lower Spine Y Acceleration		G's	9 to 14	12.2	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
36.9	23.1	0.0	-18.6
Curve Description			
Lower Abdominal Rib Deflection			
Plot No.	Type	SAE Class	Units
002	FIL	600	MM
Max	Time	Min	Time
34.7	22.3	0.0	-18.2

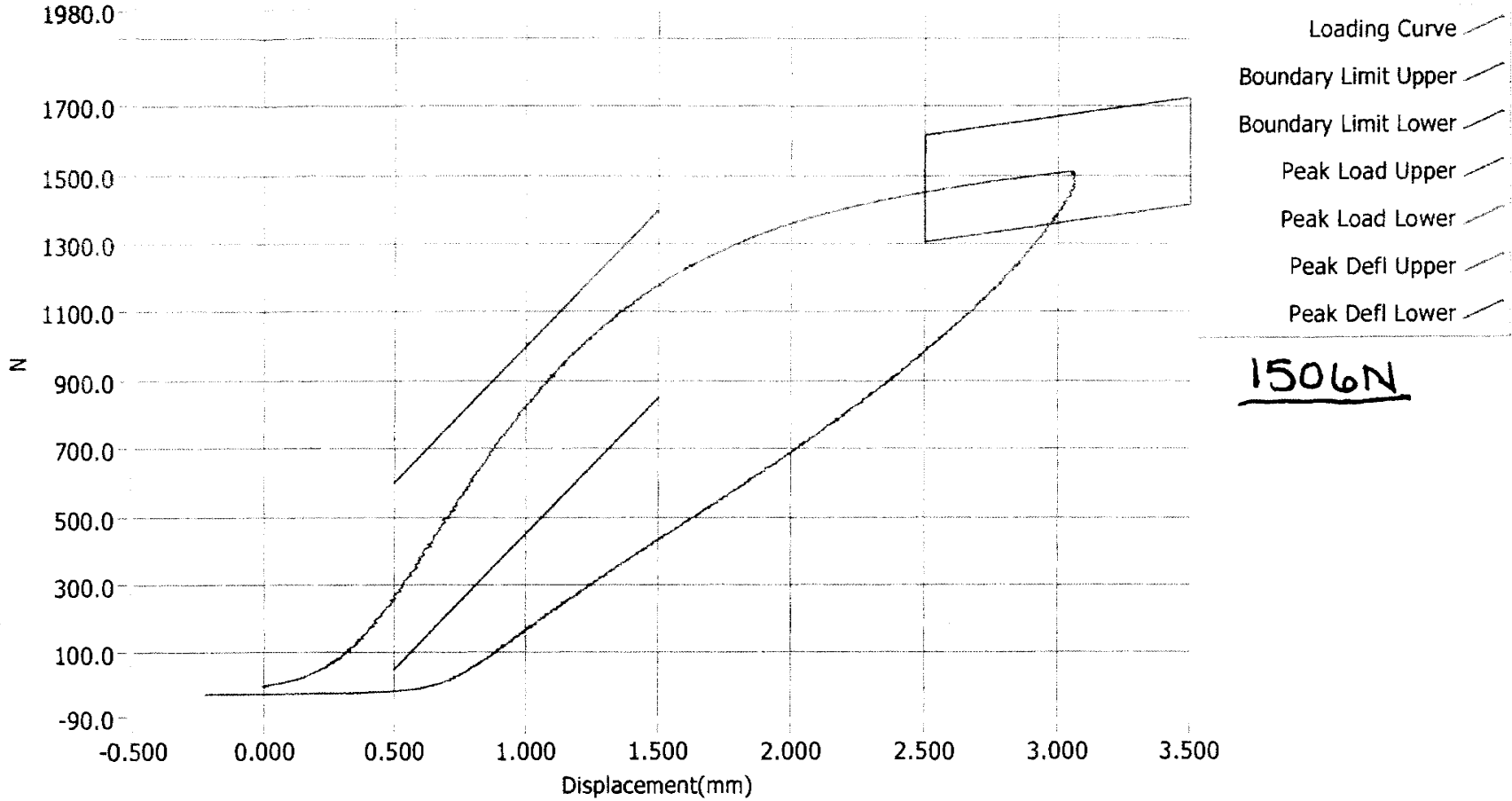


Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
12.2	9.3	-4.2	34.4



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
15.0	18.3	-0.3	84.6

Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

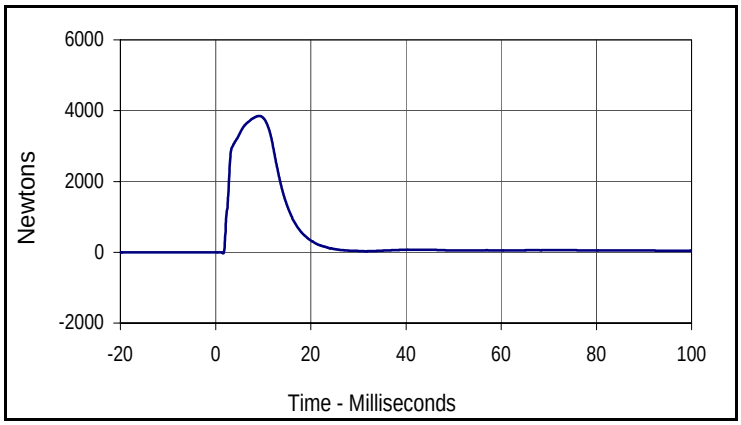
Test ID	Part Serial Number	Test Date	Test Time
	63014	1/18/2013	10:32 PM

Cert ID	ATD Serial Number	ATD Type
	N/A	SIDIIs

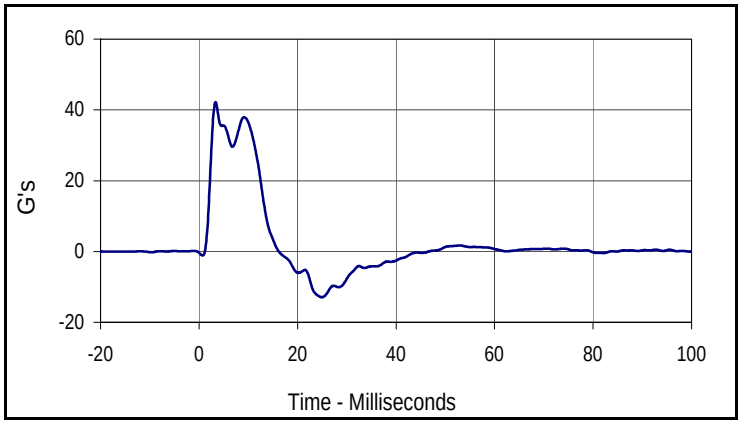
M20145202 PRE-TEST Current Date : 1/18/2013 Current Time : 22:32:38

Test Program:	SID IIs Pelvis Acetabulum Impact Test	Test Date:	11/6/13
ATD Serial No.:	307	Test I.D.:	307ACET058

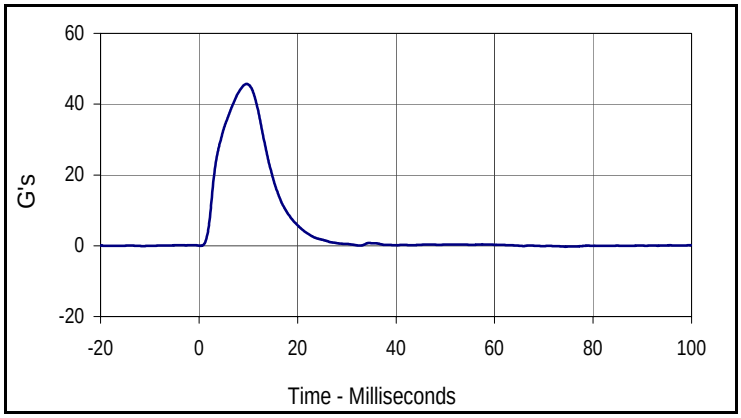
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	630	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.3	Pass
	Min	°C		21.2	Pass
Humidity During Soak	Max	%	10.0 to 70.0	33.3	Pass
	Min	%		33.2	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	33.2	Pass
Impactor Velocity		m/s	6.6 to 6.8	6.72	Pass
Peak Acetabulum Force Y		Newtons	3600 to 4300	3851.9	Pass
Peak Pelvis Y Acceleration After 6 msec.		G's	34 to 42	37.9	Pass
Peak Impactor Acceleration		G's	38 to 47	45.7	Pass
			Overall Test Results		Pass



Curve Description			
Pelvis Acetabulum Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
3851.9	9.1	-27.7	1.6



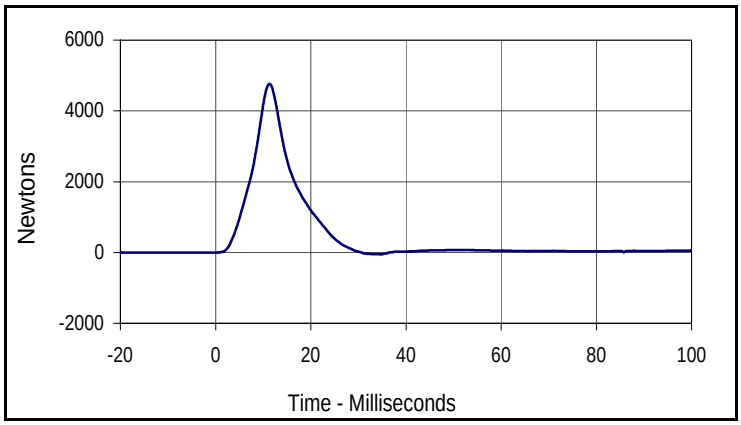
Curve Description			
Pelvis Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
42.2	3.3	-12.9	24.9



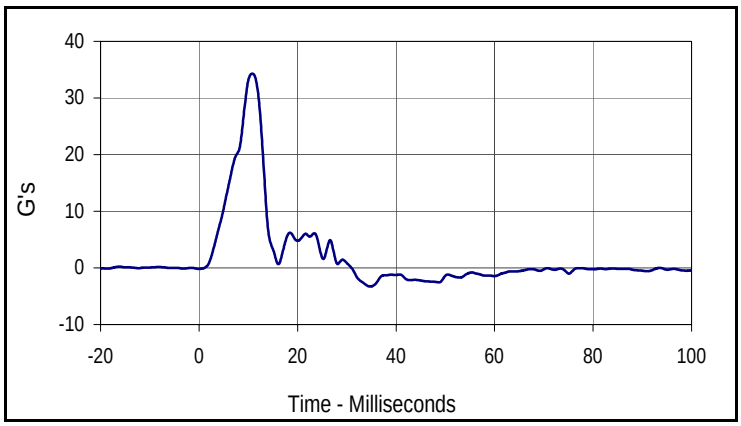
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
45.7	9.7	-0.3	74.4

Test Program:	SID IIs Pelvis Iliac Calibration	Test Date:	11/6/13
ATD Serial No.:	307	Test I.D.:	307PL058

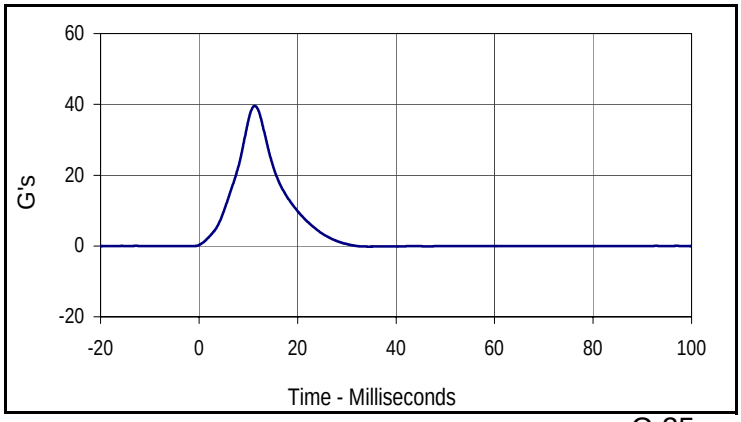
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	700	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.3	Pass
	Min	°C		21.2	Pass
Humidity During Soak	Max	%	10.0 to 70.0	33.3	Pass
	Min	%		33.2	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	33.2	Pass
Impactor Velocity		m/s	4.2 to 4.4	4.33	Pass
Peak Illiac Force		Newtons	4100 to 5100	4763.1	Pass
Peak Pelvis Y Acceleration		G's	28 to 39	34.3	Pass
Peak Impactor Acceleration		G's	36 to 45	39.6	Pass
			Overall Test Results		Pass



Curve Description			
Pelvis Iliac Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4763.1	11.3	-53.8	34.7



Curve Description			
Pelvis Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
34.3	10.8	-3.3	34.7



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
39.6	11.3	-0.2	34.5

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

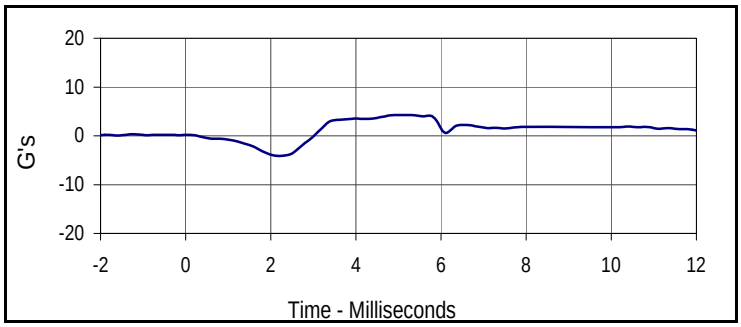
Test Program:	ES2re External Measurements	Test Date:	11/18/13
ATD Serial No.:	F035	Test I.D.:	N/A

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

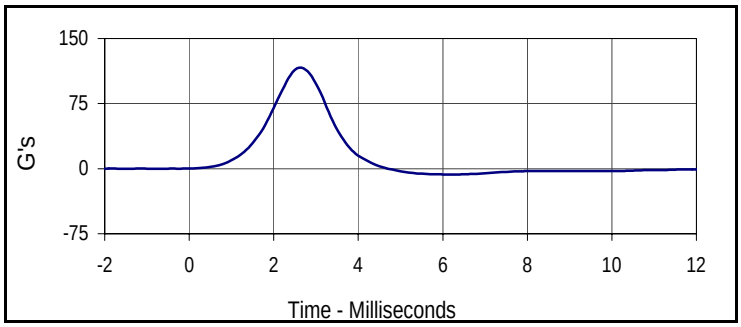
Test Program:	ES2re Head Drop Test	Test Date:	11/18/13
ATD Serial No.:	F035	Test I.D.:	F035HD051

Tested Parameter		Units	Specification	Result	Pass/Fail
Head Assembly Soak Time		Minutes	≥240	300	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.2	Pass
	Min	°C		21.0	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.6	Pass
	Min	%		33.5	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	33.6	Pass
Peak Head Resultant Acceleration		G's	125 to 155	136.6	Pass
Peak Head X Acceleration		G's	≤15	4.3	Pass
Is Acceleration Unimodal?		Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse		%	<15	6.1	Pass
			Overall Test Results		Pass

Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
136.6	2.6	0.1	-0.1



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
4.3	5.0	-4.1	2.2

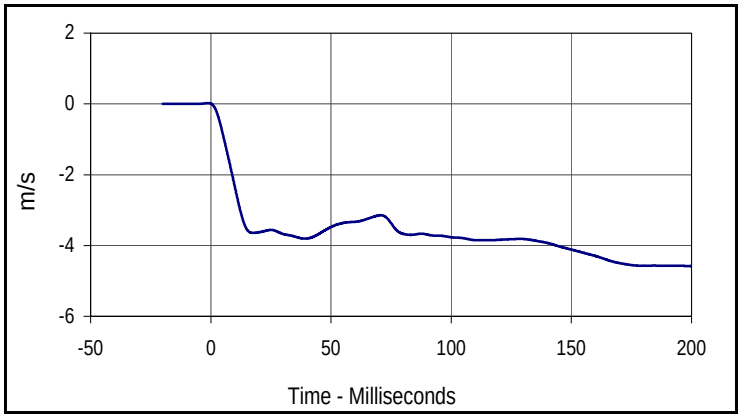


Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
116.4	2.6	-6.9	6.2

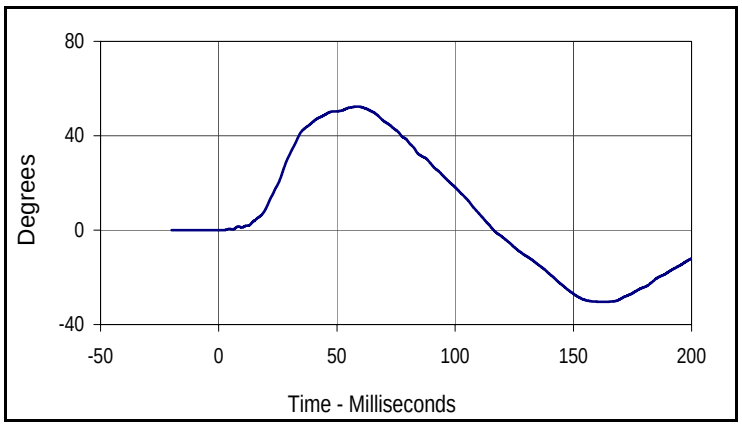
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
71.4	2.6	-0.1	-1.3

Test Program:	ES2re Neck Flexion Test	Test Date:	11/18/13
ATD Serial No.:	F035	Test I.D.:	F035NB051

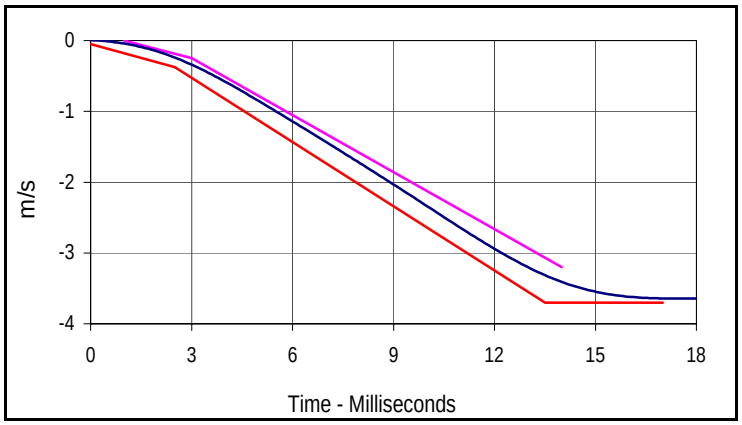
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	335	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.2	Pass
	Min	°C		21.0	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.6	Pass
	Min	%		33.5	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	33.6	Pass
Pendulum Velocity		m/s	3.3 to 3.5	3.35	Pass
Headform Flexion	Max	Degrees	49 to 59	52.4	Pass
	Time	msec	54 to 66	58.7	Pass
Headform Flexion Decay (Peak to Zero)		msec	53 to 88	57.6	Pass
			Overall Test Results		Pass



Curve Description			
Plot No.	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.1	-4.6	199.9



Curve Description			
Headform Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	180	Degrees
Max	Time	Min	Time
52.4	58.7	-30.4	162.2

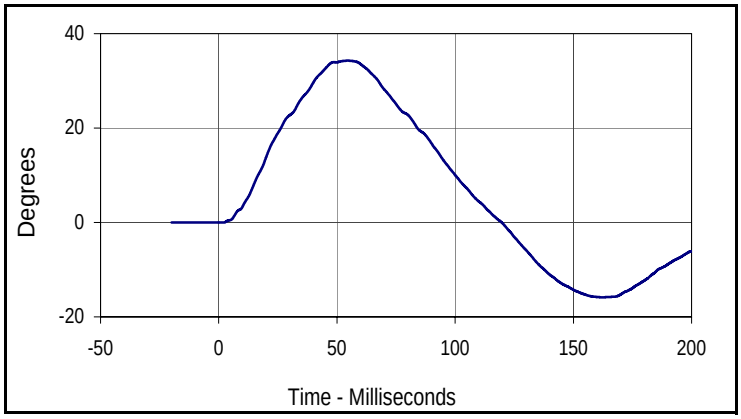


Curve Description			
Plot No.	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.1	-4.6	199.9

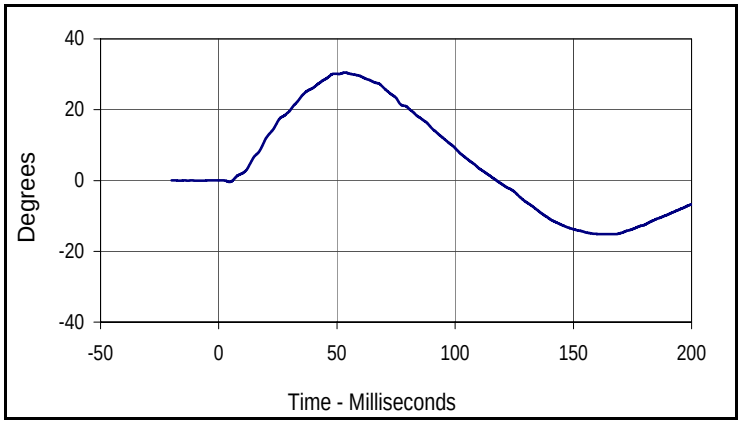
Velocity Corridors

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

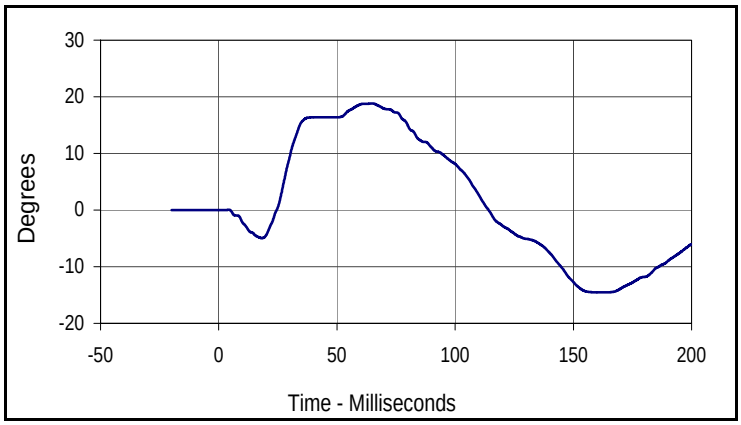
Test Program:	ES2re Neck Flexion Test	Test Date:	11/18/13
ATD Serial No.:	F035	Test I.D.:	F035NB051



Curve Description			
Potentiometer A			
Plot No.	Type	SAE Class	Units
003	FIL	180	Degrees
Max	Time	Min	Time
34.3	54.5	-15.9	162.2



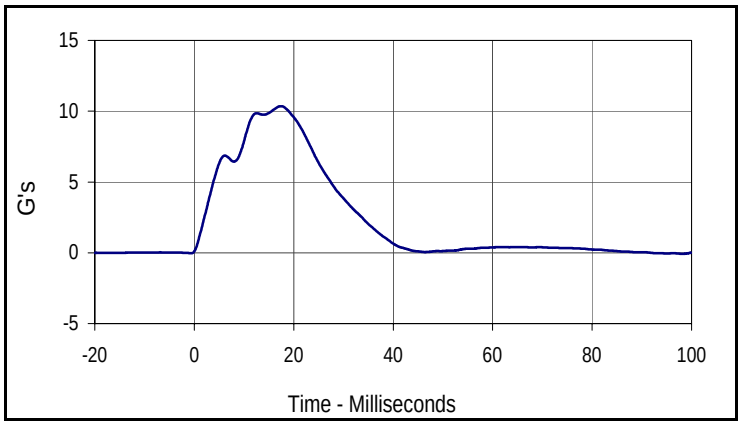
Curve Description			
Potentiometer B			
Plot No.	Type	SAE Class	Units
004	FIL	180	Degrees
Max	Time	Min	Time
30.5	53.4	-15.2	163.6



Curve Description			
Potentiometer C			
Plot No.	Type	SAE Class	Units
005	FIL	180	Degrees
Max	Time	Min	Time
18.8	64.9	-14.5	159.8

Test Program:	ES2re Shoulder Impact Test	Test Date:	11/18/13
ATD Serial No.:	F035	Test I.D.:	F035SH051

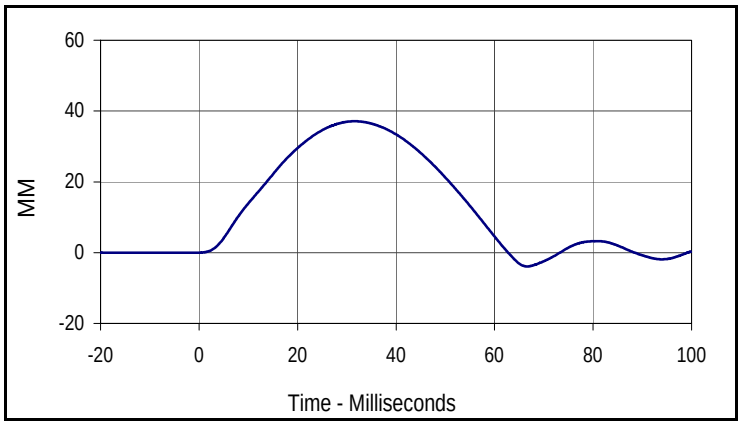
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	400	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.2	Pass
	Min	°C		21.0	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.6	Pass
	Min	%		33.5	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	33.5	Pass
Pendulum Speed		m/s	4.2 to 4.4	4.37	Pass
Peak Impactor Acceleration		G's	7.5 to 10.5	10.4	Pass
			Overall Test Results		Pass



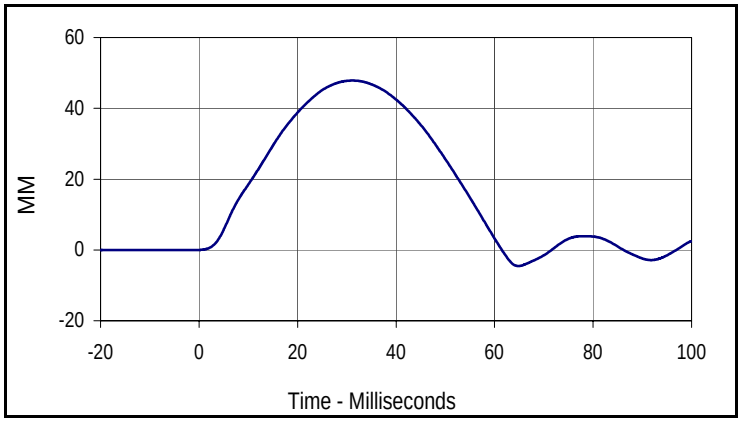
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
001	FIL	180	G's
Max	Time	Min	Time
10.4	17.4	-0.1	98.2

Test Program:	ES2re Thorax - Rib Drop Test	Test Date:	11/18/13
ATD Serial No.:	F035 Rib # 1	Test I.D.:	F035RB1051

Tested Parameter		Units	Specification	Result	Pass/Fail
Rib Module Soak Time		Minutes	≥240	455	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.2	Pass
	Min	°C		21.0	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.6	Pass
	Min	%		33.5	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	33.5	Pass
Peak Rib Deflection at 459 +/- 5 mm Drop Height		mm	36 to 40	37.1	Pass
Peak Rib Deflection at 815 +/- 8 mm Drop Height		mm	46 to 51	47.9	Pass
			Overall Test Results		Pass



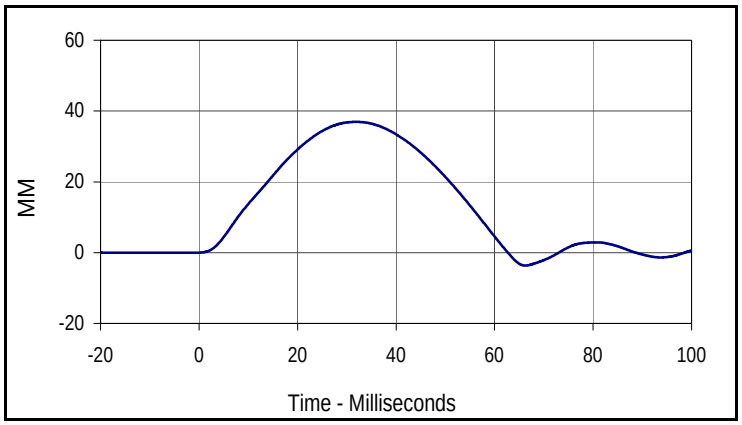
Curve Description			
Upper Rib Deflection (459 mm Drop Height)			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
37.1	31.6	-3.9	66.6



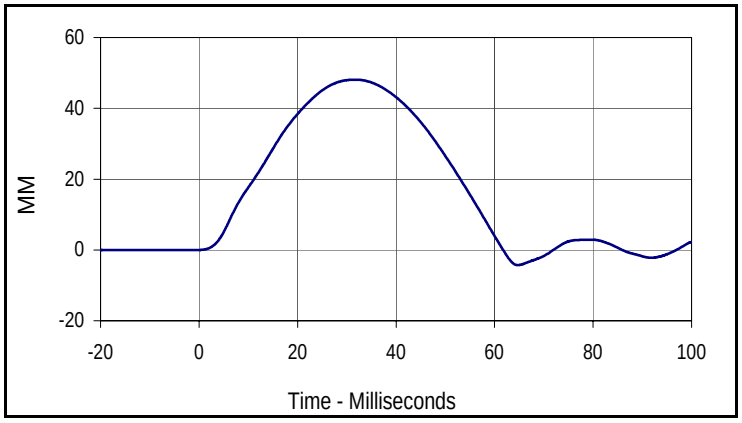
Curve Description			
Upper Rib Deflection (815 mm Drop Height)			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max	Time	Min	Time
47.9	31.1	-4.6	64.8

Test Program:	ES2re Thorax - Rib Drop Test	Test Date:	11/18/13
ATD Serial No.:	F035 Rib # 2	Test I.D.:	F035RB2051

Tested Parameter		Units	Specification	Result	Pass/Fail
Rib Module Soak Time		Minutes	≥240	500	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.2	Pass
	Min	°C		21.0	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.6	Pass
	Min	%		33.5	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	33.5	Pass
Peak Rib Deflection at 459 +/- 5 mm Drop Height		mm	36 to 40	36.9	Pass
Peak Rib Deflection at 815 +/- 8 mm Drop Height		mm	46 to 51	48.1	Pass
			Overall Test Results		Pass



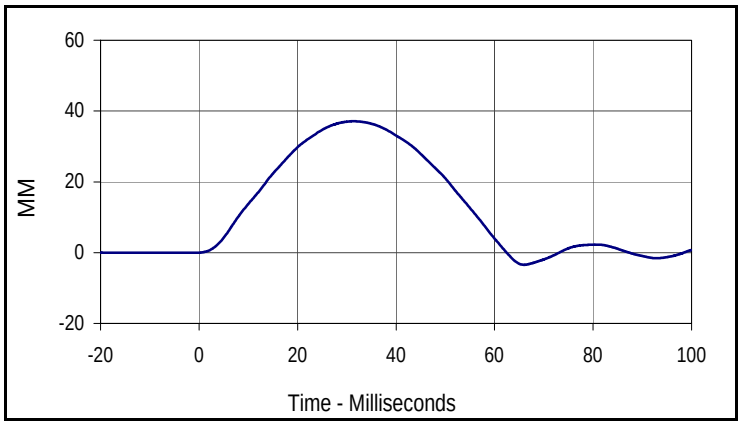
Curve Description			
Middle Rib Deflection (459 mm Drop Height)			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
36.9	31.9	-3.7	66.2



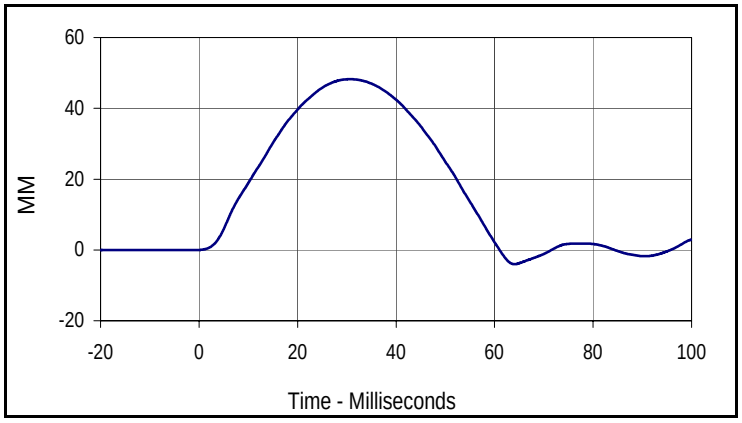
Curve Description			
Middle Rib Deflection (815 mm Drop Height)			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max	Time	Min	Time
48.1	31.8	-4.3	64.8

Test Program:	ES2re Thorax - Rib Drop Test	Test Date:	11/18/13
ATD Serial No.:	F035 Rib # 3	Test I.D.:	F035RB3051

Tested Parameter		Units	Specification	Result	Pass/Fail
Rib Module Soak Time		Minutes	≥240	545	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.2	Pass
	Min	°C		21.0	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.6	Pass
	Min	%		33.5	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	33.5	Pass
Peak Rib Deflection at 459 +/- 5 mm Drop Height		mm	36 to 40	37.1	Pass
Peak Rib Deflection at 815 +/- 8 mm Drop Height		mm	46 to 51	48.2	Pass
			Overall Test Results		Pass



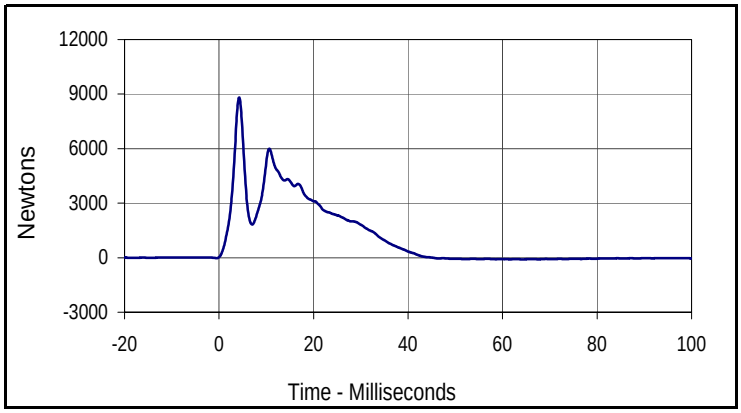
Curve Description			
Lower Rib Deflection (459 mm Drop Height)			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
37.1	31.4	-3.4	66.0



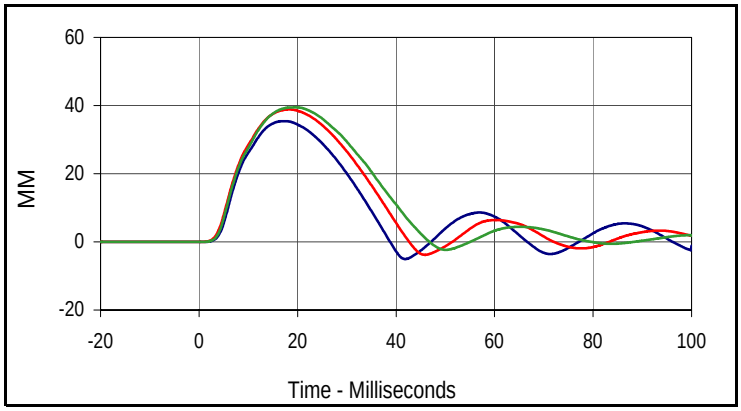
Curve Description			
Lower Rib Deflection (815 mm Drop Height)			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max	Time	Min	Time
48.2	30.7	-4.0	64.1

Test Program:	ES2re Thorax - Full Body Impact Test	Test Date:	11/18/13
ATD Serial No.:	F035	Test I.D.:	F035TH051

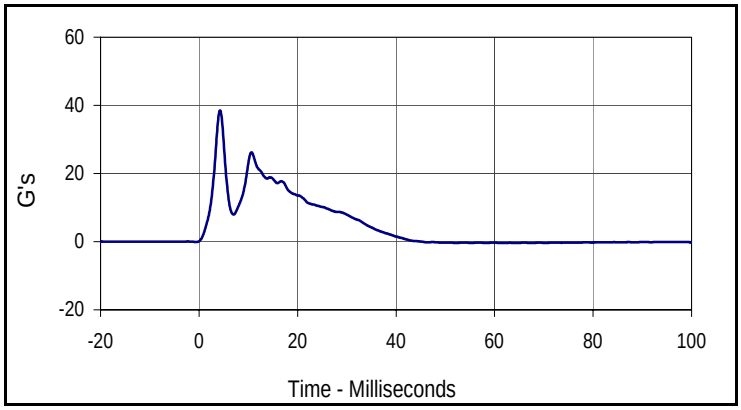
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	590	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.2	Pass
	Min	°C		21.0	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.6	Pass
	Min	%		33.5	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	33.7	Pass
Peak Impactor Velocity		m/s	5.4 to 5.6	5.57	Pass
Peak Impactor Force		N	5100 to 6200	5999.3	Pass
		msec	> 6.0 msec	10.6	Pass
Peak Upper Rib Deflection		mm	34 to 41	35.4	Pass
Peak Middle Rib Deflection		mm	37 to 45	38.9	Pass
Peak Lower Rib Deflection		mm	37 to 44	39.5	Pass
			Overall Test Results		Pass



Curve Description			
Impactor Force			
Plot No.	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
8812.7	4.3	-92.9	64.6



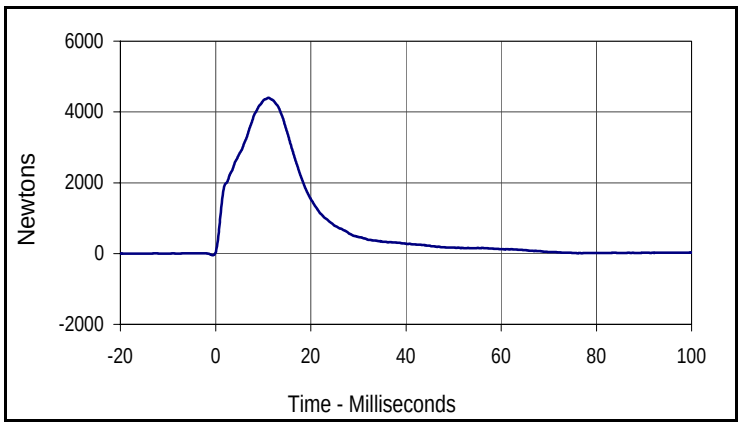
Curve Description			
Upper, Middle, Lower Rib Deflections			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max (Upper)	Time	Min (Upper)	Time
35.4	17.3	-5.0	41.9
Max (Middle)	Time	Min (Middle)	Time
38.9	18.3	-3.8	45.9
Max (Lower)	Time	Min (Lower)	Time
39.5	19.4	-2.3	50.1



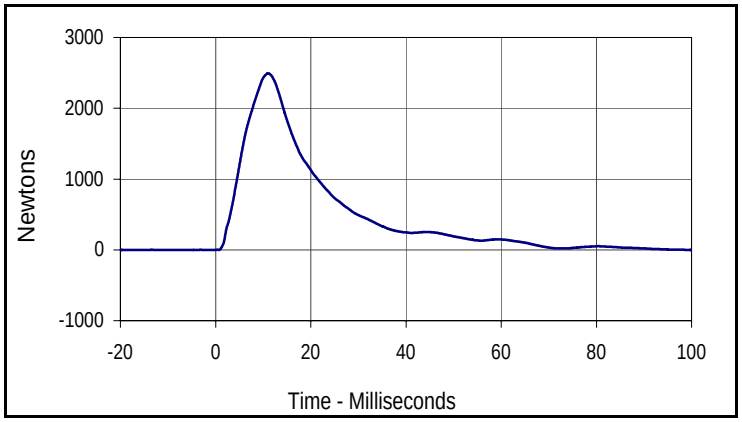
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
38.5	4.3	-0.4	64.6

Test Program:	ES2re Abdomen Impact Test	Test Date:	11/18/13
ATD Serial No.:	F035	Test I.D.:	F035ABD051

Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	660	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.2	Pass
	Min	°C		21.0	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.6	Pass
	Min	%		33.5	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	33.6	Pass
Probe Velocity		m/s	3.9 to 4.1	3.98	Pass
Peak Impactor Force		N	4000 to 4800	4399.0	Pass
		msec	10.6 to 13.0	11.1	Pass
Sum of Abdominal Forces		N	2200 to 2700	2491.9	Pass
		msec	10.0 to 12.3	11.1	Pass
			Overall Test Results		Pass

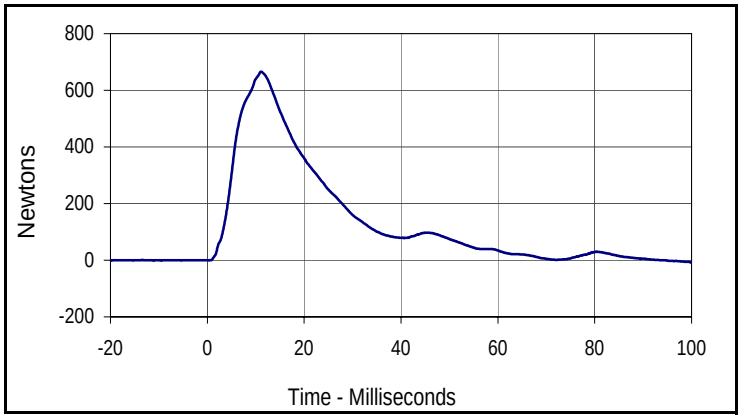


Curve Description			
Impactor Force			
Plot No.	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
4399.0	11.1	-47.8	-0.6

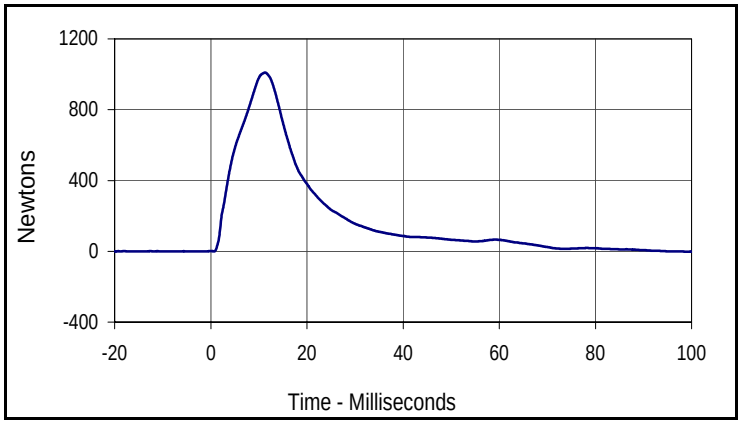


Curve Description			
Abdomen Sum Resultant			
Plot No.	Type	SAE Class	Units
002	RES	600	Newtons
Max	Time	Min	Time
2491.9	11.1	-2.5	101.3

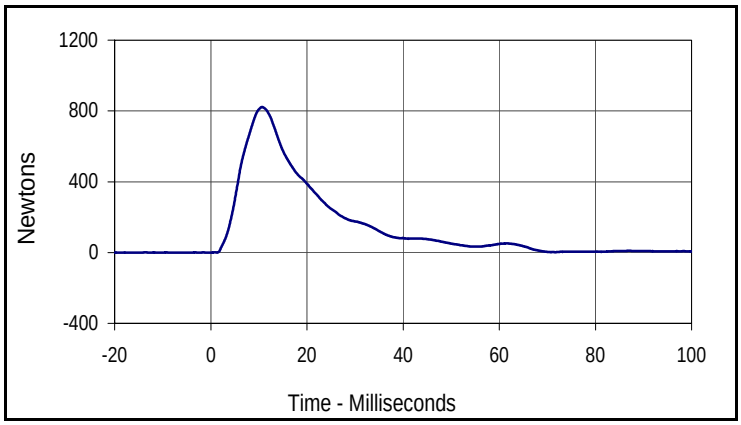
Test Program:	ES2re Abdomen Impact Test	Test Date:	11/18/13
ATD Serial No.:	F035	Test I.D.:	F035ABD051



Curve Description			
Front Abdomen Force			
Plot No.	Type	SAE Class	Units
003	FIL	600	Newtons
Max	Time	Min	Time
665.7	11.1	-8.2	0.0



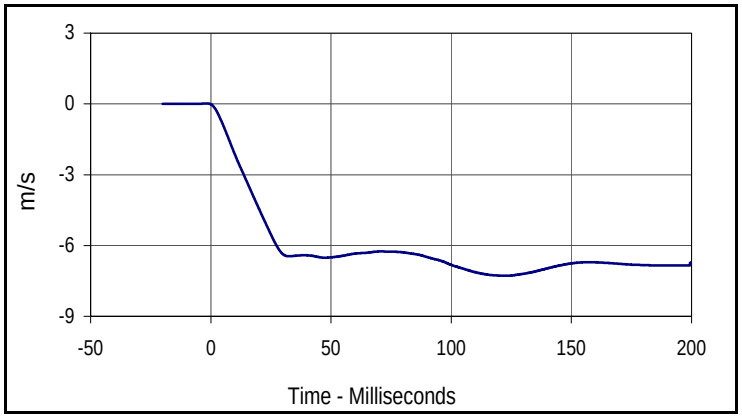
Curve Description			
Middle Abdomen Force			
Plot No.	Type	SAE Class	Units
004	FIL	600	Newtons
Max	Time	Min	Time
1009.8	11.3	-2.8	0.0



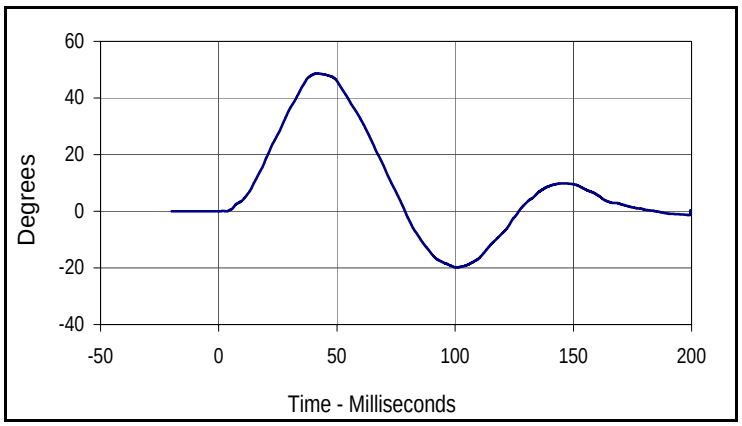
Curve Description			
Rear Abdomen Force			
Plot No.	Type	SAE Class	Units
005	FIL	600	Newtons
Max	Time	Min	Time
822.1	10.7	-2.0	0.0

Test Program:	ES2re Lumbar Flexion Test	Test Date:	11/18/13
ATD Serial No.:	F035	Test I.D.:	F035LB051

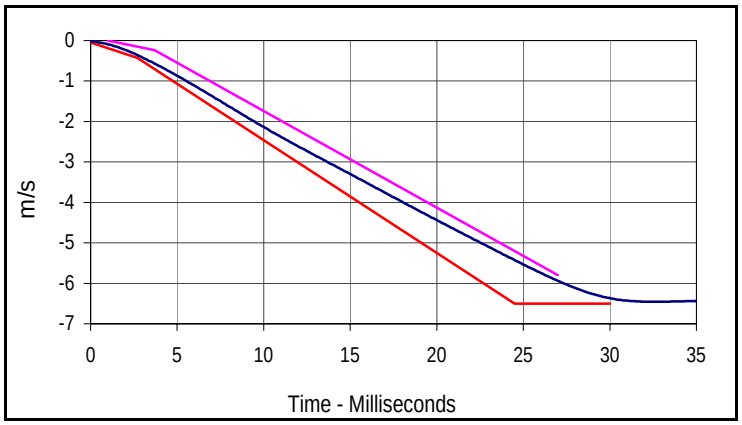
Tested Parameter		Units	Specification	Result	Pass/Fail
Lumbar Spine Assembly Soak Time		Minutes	≥240	735	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.2	Pass
	Min	°C		21.0	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.6	Pass
	Min	%		33.5	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	33.6	Pass
Pendulum Velocity		m/s	5.95 to 6.15	5.99	Pass
Headform Rotation	Max	Degrees	45 to 55	48.7	Pass
	Time	msec	39 to 53	42.0	Pass
Time of Decay to Zero Angle from Peak		msec	37 to 57	44.3	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.1	-7.3	123.2



Curve Description			
Headform Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	180	Degrees
Max	Time	Min	Time
48.7	42.0	-19.9	101.2

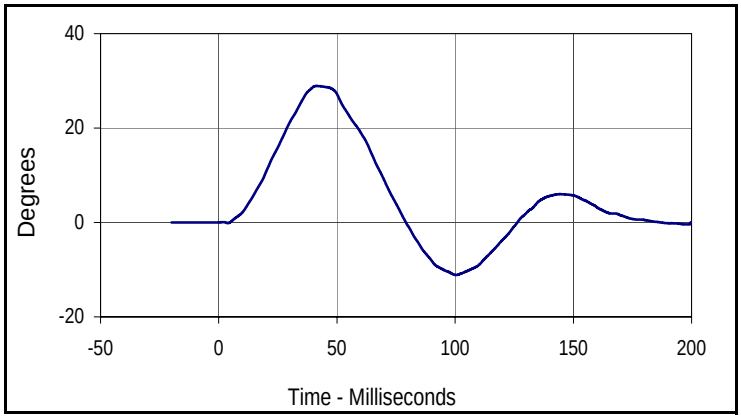


Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.1	-7.3	123.2

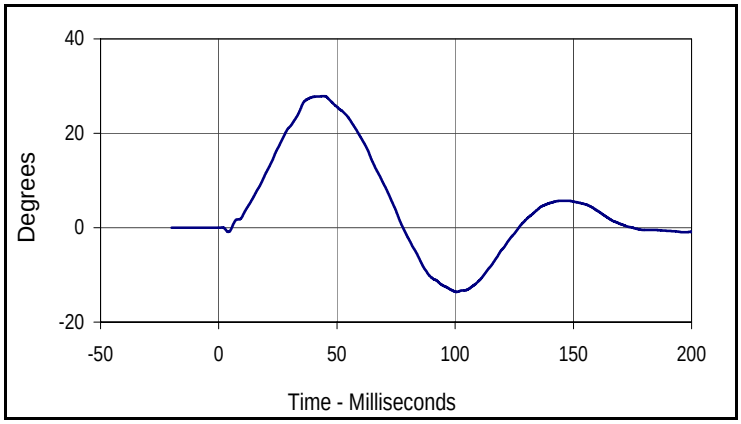
Velocity Corridors

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

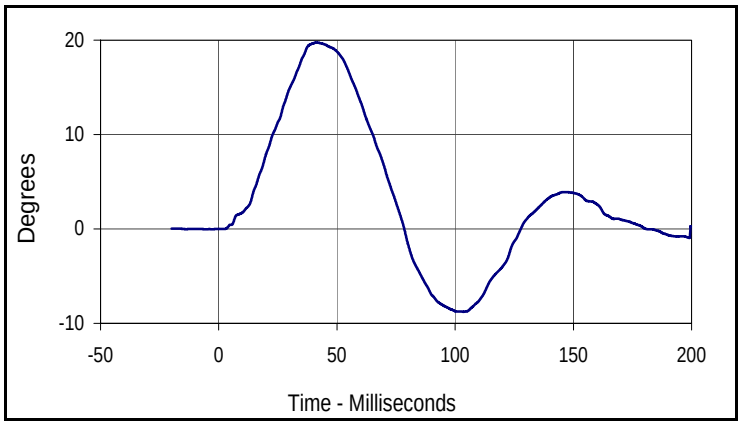
Test Program:	ES2re Lumbar Flexion Test	Test Date:	11/18/13
ATD Serial No.:	F035	Test I.D.:	F035LB051



Curve Description			
Potentiometer A			
Plot No.	Type	SAE Class	Units
003	FIL	180	Degrees
Max	Time	Min	Time
28.9	42.0	-11.1	101.0



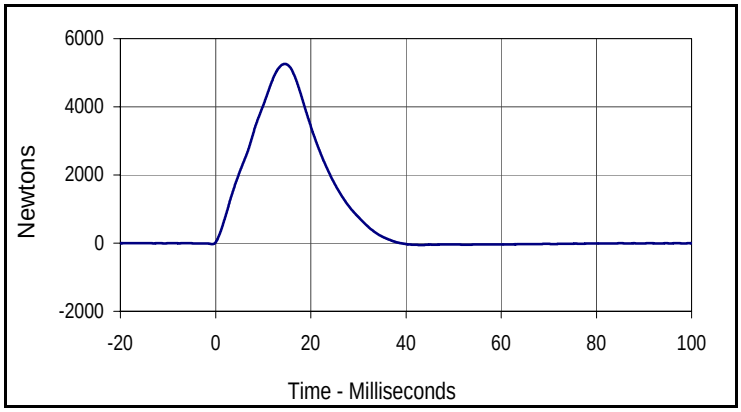
Curve Description			
Potentiometer B			
Plot No.	Type	SAE Class	Units
004	FIL	180	Degrees
Max	Time	Min	Time
27.9	45.1	-13.6	101.1



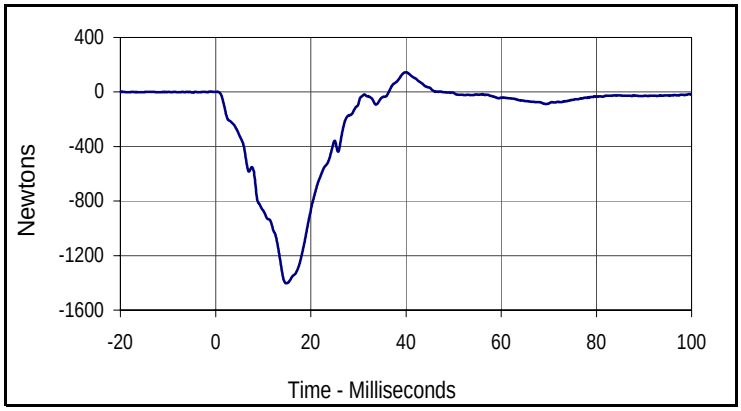
Curve Description			
Potentiometer C			
Plot No.	Type	SAE Class	Units
005	FIL	180	Degrees
Max	Time	Min	Time
19.7	42.0	-8.8	104.1

Test Program:	ES2re Pelvis Impact Test	Test Date:	11/18/13
ATD Serial No.:	F035	Test I.D.:	F035PL051

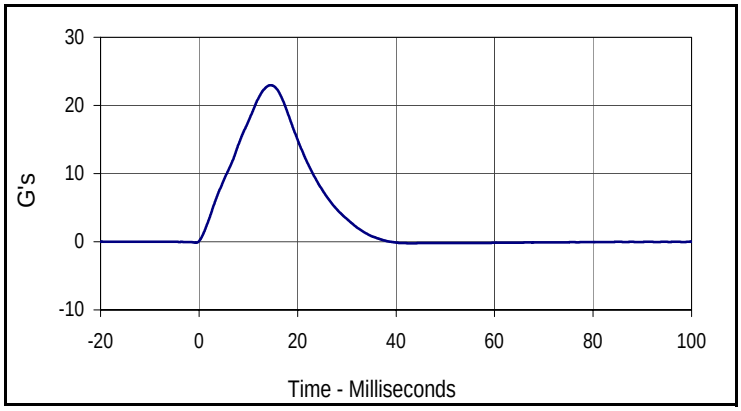
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	790	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.2	Pass
	Min	°C		21.0	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.6	Pass
	Min	%		33.5	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	33.6	Pass
Pendulum Velocity		m/s	4.2 to 4.4	4.39	Pass
Peak Impactor Force		N	4700 to 5400	5259.8	Pass
		msec	11.8 to 16.1	14.6	Pass
Peak Pubic Symphysis Load		N	-1230 to -1590	-1403.9	Pass
		msec	12.2 to 17.0	14.9	Pass
			Overall Test Results		Pass



Curve Description			
Impactor Force			
Plot No.	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
5259.8	14.6	-57.6	43.2



Curve Description			
Pubic Symphysis Force Y			
Plot No.	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
144.7	40.0	-1403.9	14.9



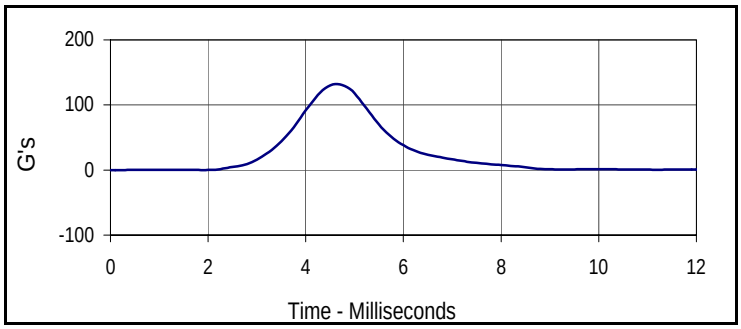
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
23.0	14.6	-0.3	43.2

Test Program:	SID IIs External Measurements	Test Date:	11/19/13
ATD Serial No.:	307	Test I.D.:	N/A

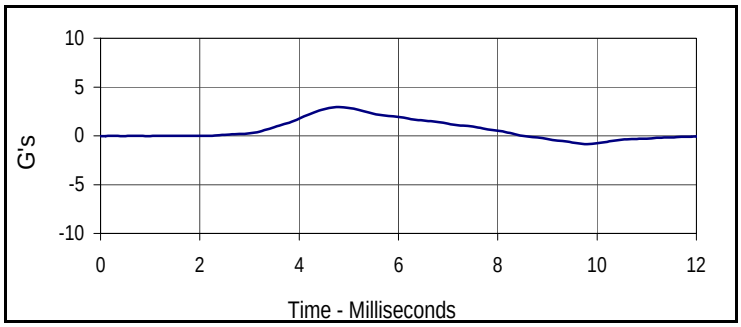
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		^{o}C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity		%	10 to 70	35	Pass
A	Sitting Height	mm	772 - 788	778	Pass
B	Shoulder Pivot Height	mm	437 - 453	443	Pass
C	H-Point Height	mm	79 - 89	85	Pass
D	H-Point from Seatback	mm	141 - 151	144	Pass
E	Shoulder Pivot from Backline	mm	97 - 107	102	Pass
F	Thigh Clearance	mm	119 - 135	128	Pass
G	Head Breadth	mm	140 - 148	145	Pass
H	Head Back from Backline	mm	40 - 46	43	Pass
I	Head Depth	mm	178 - 188	185	Pass
J	Head Circumference	mm	541 - 551	546	Pass
K	Buttock to Knee Length	mm	514 - 540	525	Pass
L	Popliteal Height	mm	343 - 369	351	Pass
M	Knee Pivot to Floor Height	mm	392 - 409	400	Pass
N	Buttock Popliteal Length	mm	416 - 442	432	Pass
O	Chest Depth w/o Jacket	mm	195 - 211	205	Pass
P	Foot Length	mm	216 - 232	223	Pass
Q	Hip Breadth with Pelvic Plug	mm	313 -323	319	Pass
R	Arm Length	mm	249 - 259	254	Pass
S	Knee Joint to Seatback	mm	477 - 493	483	Pass
V	Shoulder Width	mm	341 - 357	351	Pass
W	Foot Width	mm	78 - 94	89	Pass
Y	Chest Circumference with Jacket	mm	851 - 881	872	Pass
Z	Waist Circumference	mm	760 - 791	774	Pass
			Overall Test Results		Pass

Test Program:	SID IIs Head Drop Test	Test Date:	11/19/13
ATD Serial No.:	307	Test I.D.:	307HD059

Tested Parameter		Units	Specification	Result	Pass/Fail
Head Assembly Soak Time		Minutes	≥240	325	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.2	Pass
	Min	°C		21.0	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.7	Pass
	Min	%		34.6	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	34.7	Pass
Peak Head Resultant Acceleration		G's	115 to 137	132.3	Pass
Peak Head X Acceleration		G's	<15	3.0	Pass
Is Acceleration Unimodal?		Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse		%	<15	1.0	Pass
			Overall Test Results		Pass



Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
132.3	4.6	0.0	0.2



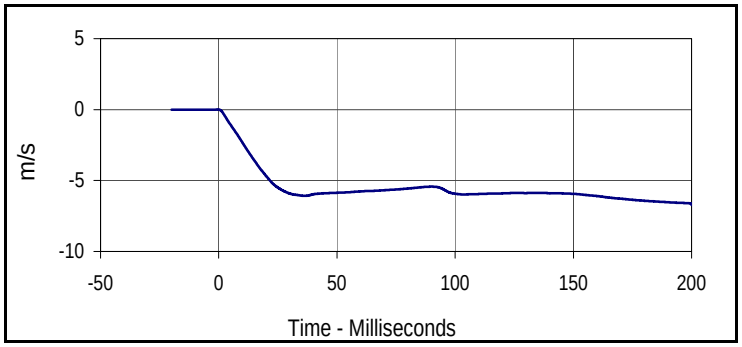
Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
3.0	4.8	0.0	0.0

Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
105.3	4.6	0.0	2.0

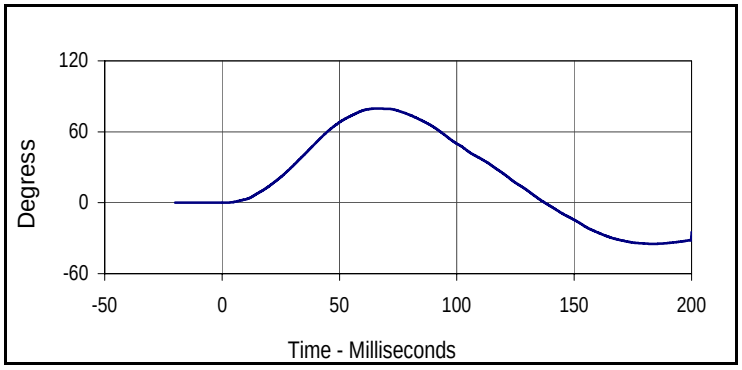
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
80.1	4.7	-0.4	10.1

Test Program:	SID IIs Neck Flexion Test	Test Date:	11/19/13
ATD Serial No.:	307	Test I.D.:	307NB059

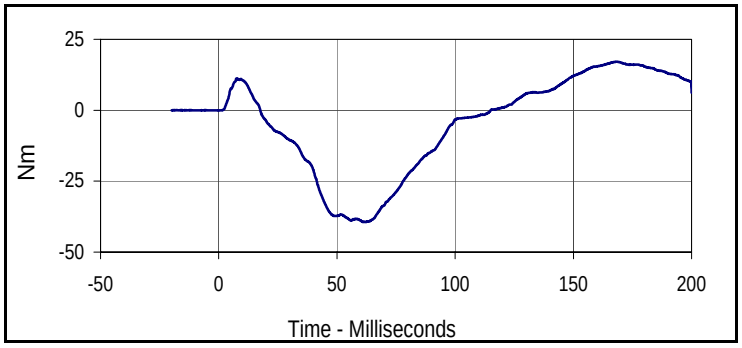
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	400	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.2	Pass
	Min	°C		21.0	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.7	Pass
	Min	%		34.6	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	34.6	Pass
Pendulum Velocity		m/s	5.51 to 5.63	5.54	Pass
Pendulum Deceleration	10 msec	m/s	-2.20 to -2.80	-2.32	Pass
	15 msec	m/s	-3.30 to -4.10	-3.58	Pass
	20 msec	m/s	-4.40 to -5.40	-4.67	Pass
	25 msec	m/s	-5.40 to -6.10	-5.50	Pass
	25-100 msec	m/s	-5.50 to -6.20	-6.07	Pass
D-Plane Rotation	Max	Degrees	71 to 81	79.7	Pass
	Time	msec	50 to 70	65.7	Pass
Peak Occipital Condyle Moment		Nm	-36 to -44	-39.5	Pass
Decaying Moment Time to Cross 0 Nm		msec	102 to 126	115.1	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
0.0	-0.5	-6.7	200.0



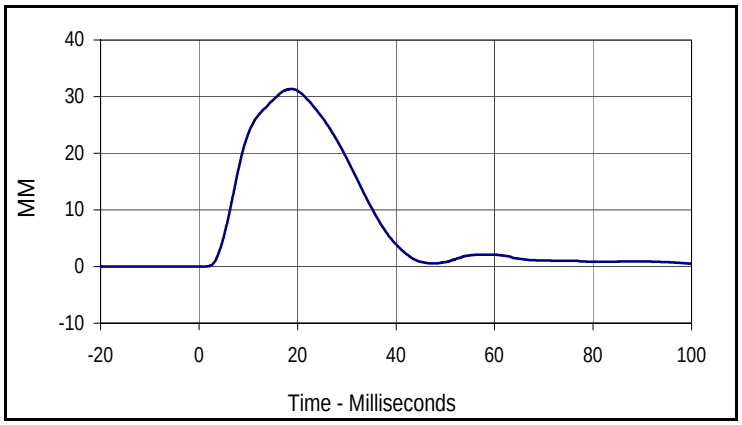
Curve Description			
Maximum Translation Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degress
Max	Time	Min	Time
79.7	65.7	-34.8	183.4



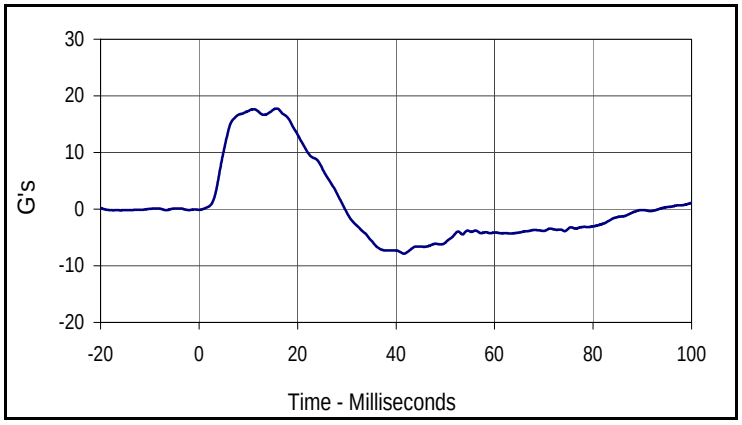
Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
17.1	168.5	-39.5	62.0

Test Program:	SID IIs Shoulder Impact Test	Test Date:	11/19/13
ATD Serial No.:	307	Test I.D.:	307SH059

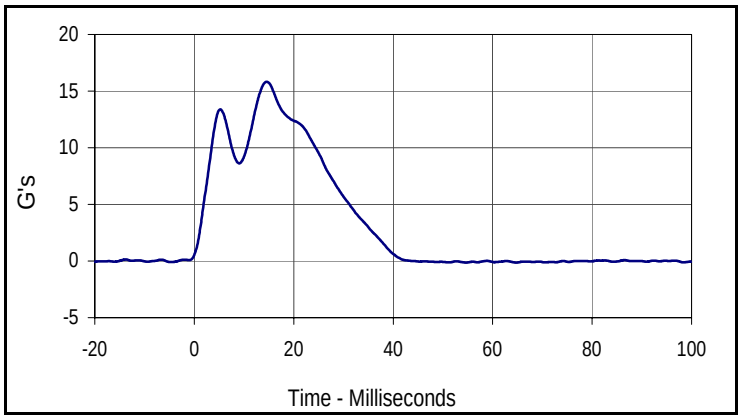
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	455	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.2	Pass
	Min	°C		21.0	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.7	Pass
	Min	%		34.6	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	34.7	Pass
Impactor Velocity		m/s	4.20 to 4.40	4.37	Pass
Peak Shoulder Deflection		mm	28 to 37	31.4	Pass
Peak Lateral Spine Acceleratrion Y		G's	17 to 22	17.8	Pass
Peak Impactor Acceleration		G's	13 to 18	15.8	Pass
			Overall Test Results		Pass



Curve Description			
Shoulder Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
31.4	18.7	0.0	-2.5



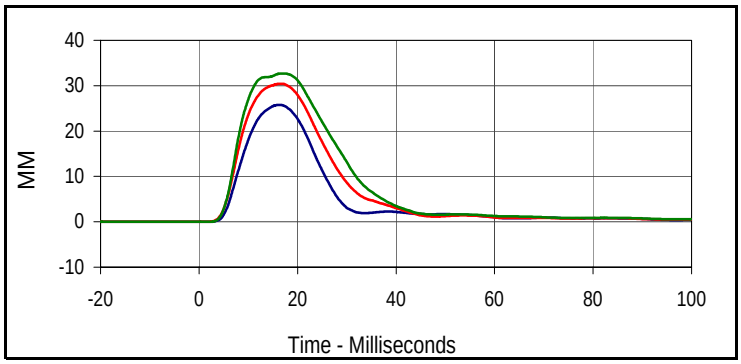
Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
17.8	15.8	-7.9	41.6



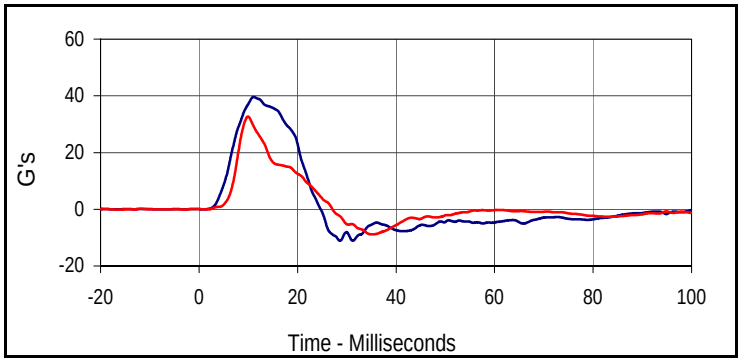
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
15.8	14.6	-0.1	64.8

Test Program:	SID IIs Thorax with Arm Impact Test	Test Date:	11/19/13
ATD Serial No.:	307	Test I.D.:	307TWA059

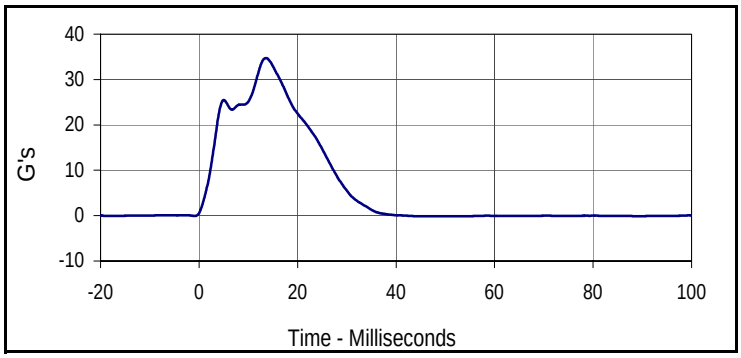
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	500	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.2	Pass
	Min	°C		21.0	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.7	Pass
	Min	%		34.6	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	34.7	Pass
Impactor Velocity		m/s	6.6 to 6.8	6.76	Pass
Peak Shoulder Deflection		mm	31 to 40	33.5	Pass
Peak Upper Thorax Rib Deflection		mm	25 to 32	25.8	Pass
Peak Middle Thorax Rib Deflection		mm	30 to 36	30.4	Pass
Peak Lower Thorax Rib Deflection		mm	32 to 38	32.7	Pass
Peak Upper Spine Y Acceleration		G's	34 to 43	39.6	Pass
Peak Lower Spine Y Acceleration		G's	29 to 37	32.7	Pass
Peak Impactor Acceleration		G's	30 to 36	34.7	Pass
			Overall Test Results		Pass



Curve Description			
Upper Thorax Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
25.8	16.2	0.0	-12.6
Middle Thorax Deflection			
Max	Time	Min	Time
30.4	16.4	0.0	-10.3
Lower Thorax Deflection			
Max	Time	Min	Time
32.7	16.5	0.0	-13.5

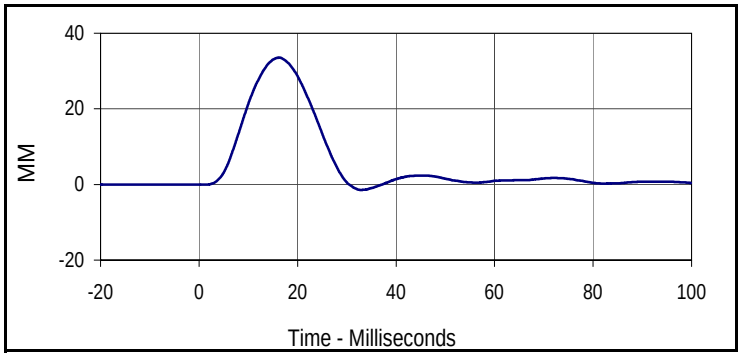


Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
39.6	11.0	-11.1	31.2
Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
32.7	9.9	-8.8	34.9



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
34.7	13.6	-0.2	54.2

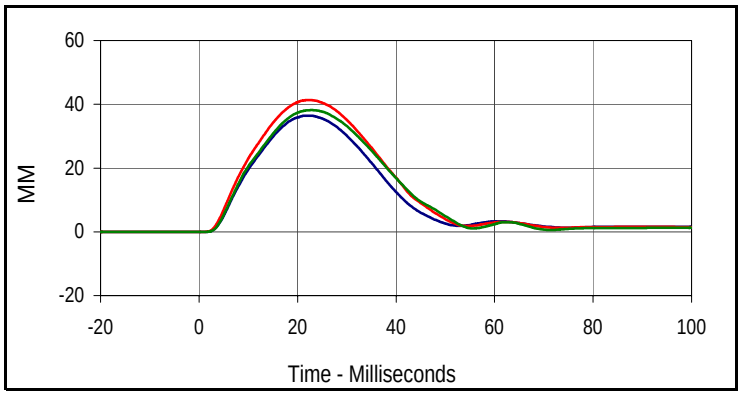
Test Program:	SID IIs Thorax with Arm Impact Test	Test Date:	11/19/13
ATD Serial No.:	307	Test I.D.:	307TWA059



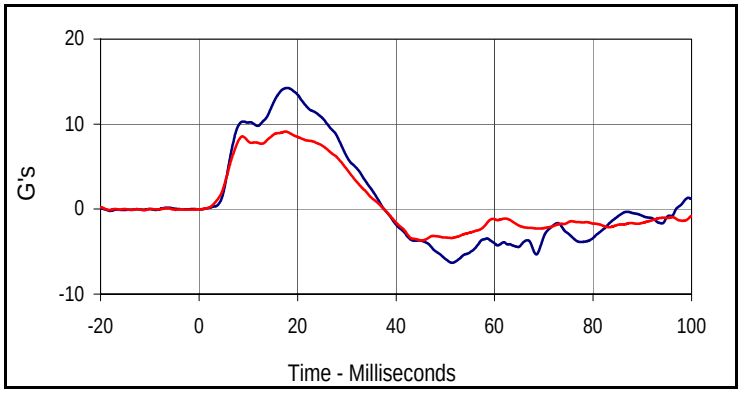
Curve Description			
Shoulder Deflection			
Plot No.	Type	SAE Class	Units
007	FIL	600	MM
Max	Time	Min	Time
33.5	16.3	-1.5	32.9

Test Program:	SID IIs Thorax without Arm Impact Test	Test Date:	11/19/13
ATD Serial No.:	307	Test I.D.:	307TWOA059

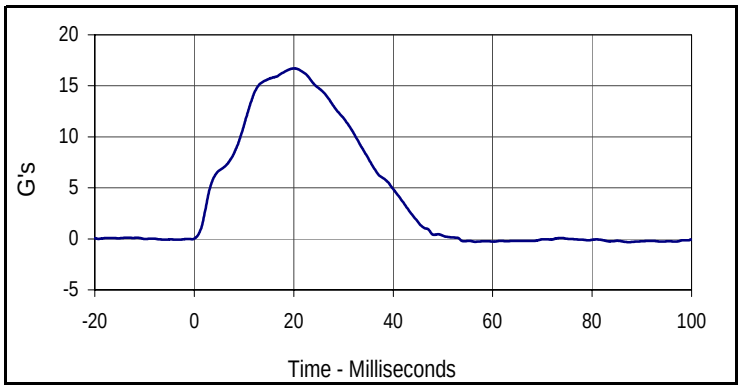
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	550	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.2	Pass
	Min	°C		21.0	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.7	Pass
	Min	%		34.6	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	34.6	Pass
Impactor Velocity		m/s	4.2 to 4.4	4.24	Pass
Peak Upper Thorax Rib Deflection		mm	32 to 40	36.5	Pass
Peak Middle Thorax Rib Deflection		mm	39 to 45	41.3	Pass
Peak Lower Thorax Rib Deflection		mm	35 to 43	38.2	Pass
Peak Upper Spine Y Acceleration		G's	13 to 17	14.3	Pass
Peak Lower Spine Y Acceleration		G's	7 to 11	9.1	Pass
Peak Impactor Acceleration		G's	14 to 18	16.7	Pass
			Overall Test Results		Pass



Curve Description			
Upper Thorax Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
36.5	22.2	0.0	-2.7
Middle Thorax Deflection			
Max	Time	Min	Time
41.3	22.2	0.0	-5.6
Lower Thorax Deflection			
Max	Time	Min	Time
38.2	22.9	0.0	-9.0



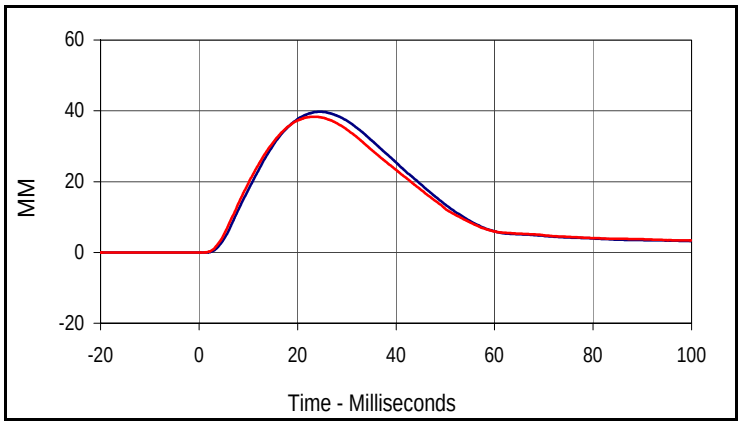
Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
14.3	17.9	-6.3	51.4
Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
9.1	17.6	-3.7	45.3



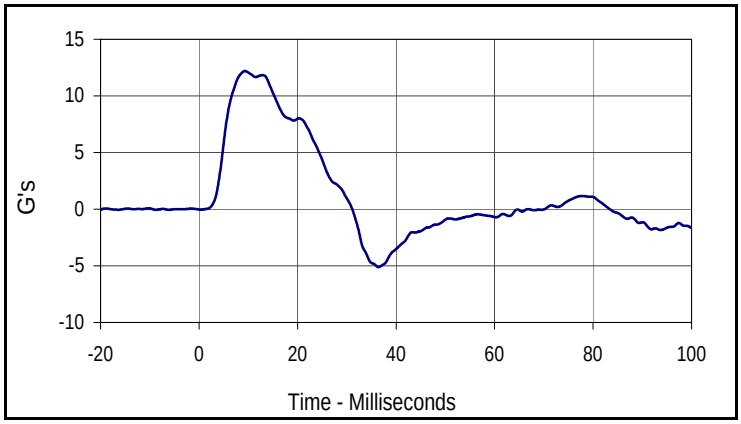
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
16.7	20.1	-0.3	87.4

Test Program:	SID IIs Abdomen Impact Test	Test Date:	11/19/13
ATD Serial No.:	307	Test I.D.:	307ABD059

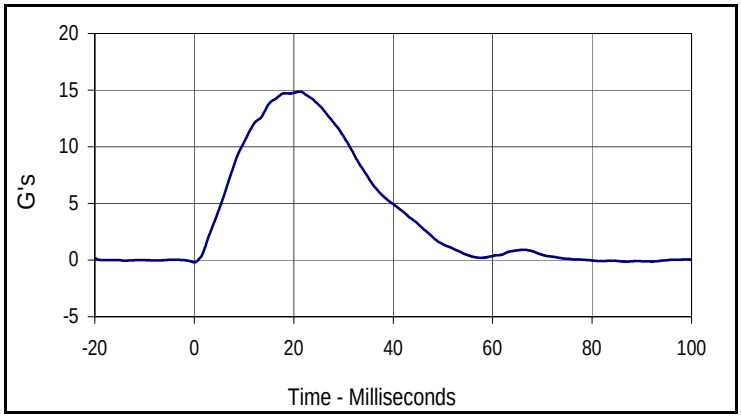
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	585	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.2	Pass
	Min	°C		21.0	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.7	Pass
	Min	%		34.6	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	34.7	Pass
Impactor Velocity		m/s	4.2 to 4.4	4.27	Pass
Peak Upper Abdominal Rib Deflection		mm	36 to 47	39.7	Pass
Peak Lower Abdominal Rib Deflection		mm	33 to 44	38.3	Pass
Peak Lower Spine Y Acceleration		G's	9 to 14	12.2	Pass
Peak Impactor Acceleration		G's	12 to 16	14.9	Pass
			Overall Test Results		Pass



Curve Description			
Upper Abdominal Rib Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
39.7	24.6	0.0	-20.0
Curve Description			
Lower Abdominal Rib Deflection			
Plot No.	Type	SAE Class	Units
002	FIL	600	MM
Max	Time	Min	Time
38.3	23.2	0.0	-19.3

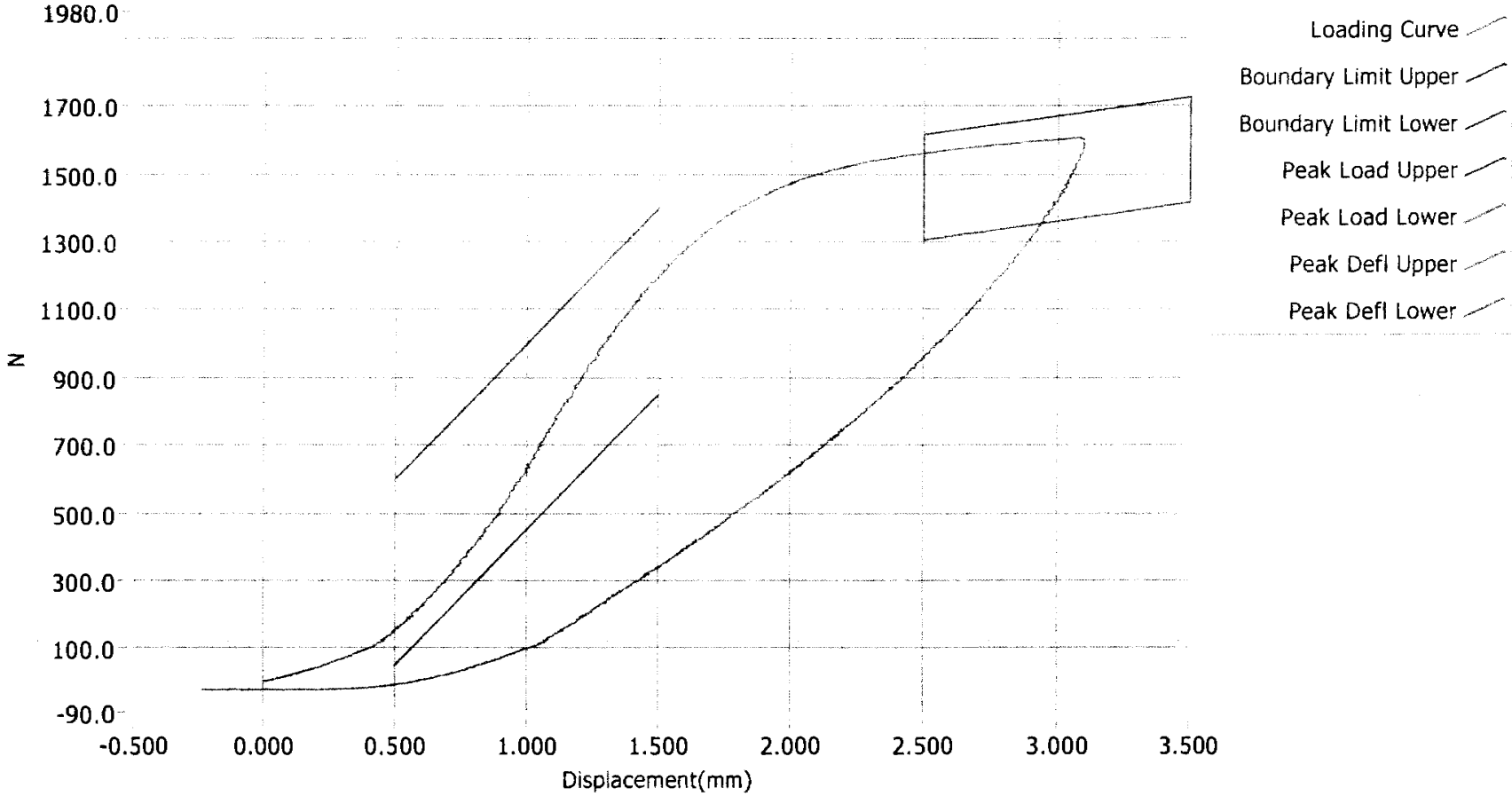


Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
12.2	9.3	-5.1	36.4



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
14.9	21.1	-0.2	0.0

Resultant Data - SIDIIs Plug Compression



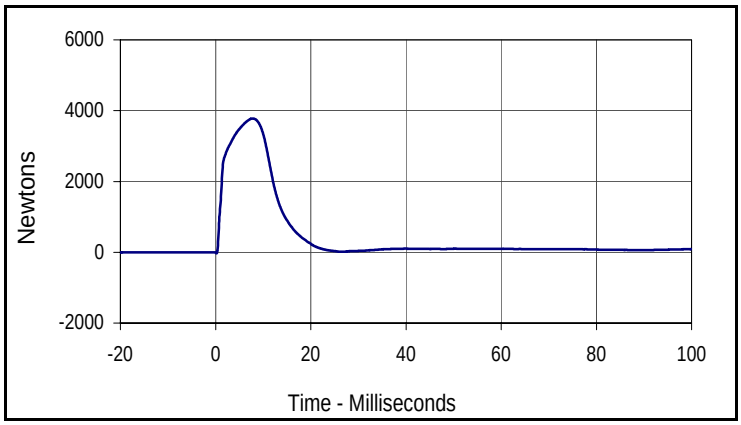
ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
	48990	12/6/2011	10:53 PM
Cert ID	**ATD Serial Number**	**ATD Type**	
	N/A	SIDIIs	

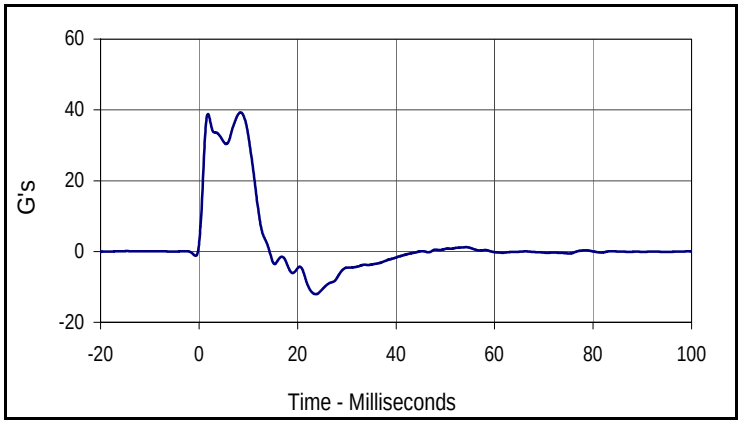
M20145202 POST-TEST Current Date : 12/6/2011 Current Time : 22:54:09

Test Program:	SID IIs Pelvis Acetabulum Impact Test	Test Date:	11/19/13
ATD Serial No.:	307	Test I.D.:	307ACET059

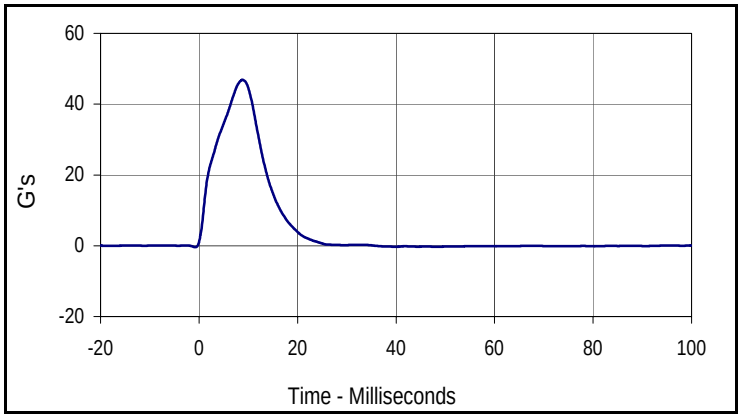
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	630	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.2	Pass
	Min	°C		21.0	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.7	Pass
	Min	%		34.6	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	34.7	Pass
Impactor Velocity		m/s	6.6 to 6.8	6.68	Pass
Peak Acetabulum Force Y		Newtons	3600 to 4300	3777.3	Pass
Peak Pelvis Y Acceleration After 6 msec.		G's	34 to 42	39.3	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
3777.3	7.8	-31.4	0.2



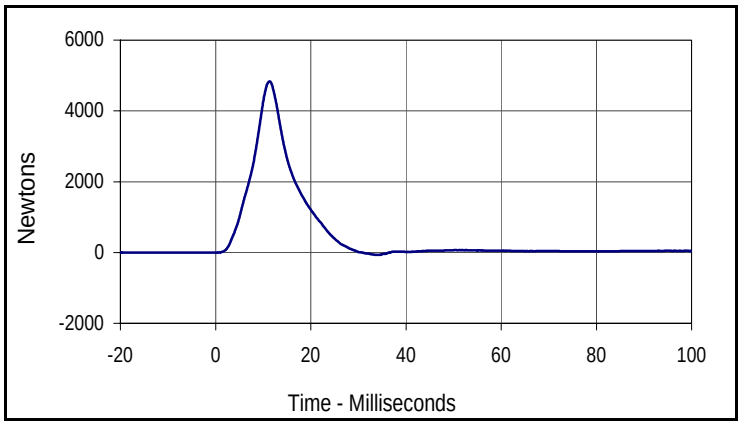
Curve Description			
Pelvis Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
39.3	8.4	-12.1	23.7



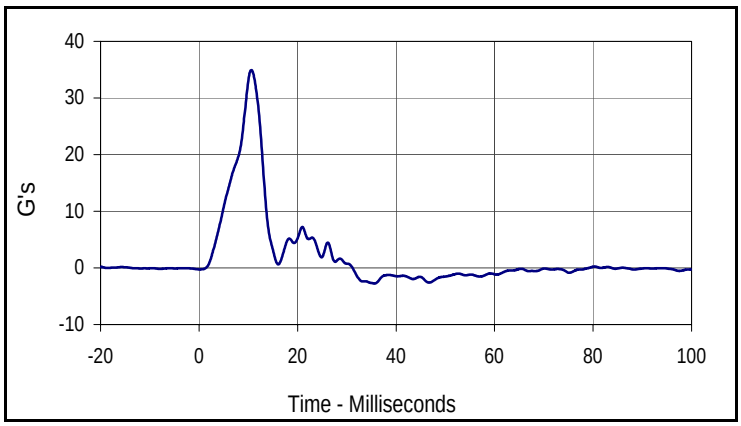
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
46.9	8.8	-0.4	-0.7

Test Program:	SID IIs Pelvis Iliac Calibration	Test Date:	11/19/13
ATD Serial No.:	307	Test I.D.:	307PL059

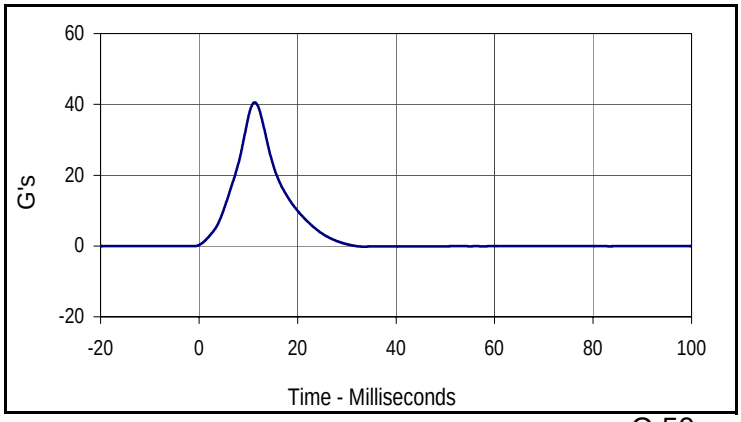
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	700	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.2	Pass
	Min	°C		21.0	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.7	Pass
	Min	%		34.6	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	34.6	Pass
Impactor Velocity		m/s	4.2 to 4.4	4.35	Pass
Peak Illiac Force		Newtons	4100 to 5100	4832.5	Pass
Peak Pelvis Y Acceleration		G's	28 to 39	34.9	Pass
Peak Impactor Acceleration		G's	36 to 45	40.6	Pass
			Overall Test Results		Pass



Curve Description			
Pelvis Iliac Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4832.5	11.3	-67.7	34.4



Curve Description			
Pelvis Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
34.9	10.6	-2.8	35.6



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
40.6	11.3	-0.2	33.3

APPENDIX D

TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

TABLE 1 – Dummy Instrumentation (ES-2re)

			ES-2re S/N F035		
			Serial Number	Manufacturer	Calibration
Head Accelerometers	Primary	X	P58760	Endevco	10/4/13
		Y	P58763	Endevco	10/4/13
		Z	P52093	Endevco	10/4/13
	Redundant	X	P52072	Endevco	10/4/13
		Y	P58768	Endevco	10/4/13
		Z	P52074	Endevco	10/4/13
Thorax Rib Displacement Potentiometers	Upper	Y	180	FTSS	10/7/13
	Middle	Y	177	FTSS	10/7/13
	Lower	Y	186	FTSS	10/7/13
Abdomen Load Cells	Forward	Y	1514	Denton	5/9/13
	Middle	Y	1510	Denton	5/9/13
	Rear	Y	1515	Denton	5/9/13
Lower Spine Accelerometers (T12)		X	P49165	Endevco	10/4/13
		Y	P49212	Endevco	10/4/13
		Z	00L20-A16	Endevco	10/7/13
Pubic Symphysis Load Cell		Y	506	Denton	5/9/13

TABLE 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N 307		
				Serial Number	Manufacturer	Calibration
Head Accelerometers		Primary	X	P58900	Endevco	8/27/13
			Y	P58902	Endevco	8/27/13
			Z	P58983	Endevco	8/27/13
		Redundant	X	P58901	Endevco	8/27/13
			Y	P58906	Endevco	8/27/13
			Z	P58989	Endevco	8/27/13
Displacement Potentiometers	Thoracic Rib	Upper	Y	1249	FTSS	3/5/13
		Middle	Y	1265	FTSS	3/5/13
		Lower	Y	1277	FTSS	3/5/13
	Abdominal Rib	Upper	Y	1286	FTSS	3/5/13
		Lower	Y	1290	FTSS	3/5/13
Lower Spine Accelerometers (T12)			X	P59007	Endevco	8/28/13
			Y	P59015	Endevco	8/28/13
			Z	P59016	Endevco	8/28/13
Acetabulum Load Cell			Y	277	Denton	4/19/13
Iliac Wing Load Cell			Y	289	Denton	4/19/13
Pelvis Plug (Struck Side)				63447	FTSS	1/28/13
Pelvis Plug (Non-Struck Side)				63431	FTSS	1/28/13

TABLE 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	Keva202x	ICSensor	7/2/13
	Vehicle Center of Gravity	Y	Keva202y	ICSensor	7/2/13
	Vehicle Center of Gravity	Z	Keva202z	ICSensor	7/1/13
2	Right Sill at Front Seat	X	13656	Endevco	4/17/13
	Right Sill at Front Seat	Y	13489	Endevco	11/8/13
	Right Sill at Front Seat	Z	13655	Endevco	10/31/13
3	Right Sill at Rear Seat	X	12489	Endevco	6/25/13
	Right Sill at Rear Seat	Y	13322	Endevco	6/25/13
	Right Sill at Rear Seat	Z	13501	Endevco	6/26/13
4	Left Sill at Front Door	Y	13496	Endevco	4/18/13
5	Left Sill at Rear Door	Y	13663	Endevco	7/1/13
6	Left A-Post Lower	Y	13492	Endevco	10/28/13
7	Left A-Post Middle	Y	12891	Endevco	7/1/13
8	Left B-Post Lower	Y	13648	Endevco	5/6/13
9	Left B-Post Middle	Y	13330	Endevco	6/25/13
10	Front Seat Track	Y	13479	Endevco	6/19/13
11	Rear Seat Structure	Y	N/A	N/A	N/A
12	Right Rear Occ. Compartment	Y	13649	Endevco	11/4/13
13	Engine Block	X	13645	Endevco	6/24/13
	Engine Block	Y	13704	Endevco	6/24/13
14	Rear Floorpan Above Axle	X	13493	Endevco	5/6/13
	Rear Floorpan Above Axle	Y	13736	Endevco	10/22/13
	Rear Floorpan Above Axle	Z	13647	Endevco	5/6/13

TABLE 4 – MDB Instrumentation

		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	13682	Endevco	6/24/13
MDB Center of Gravity	Y	13706	Endevco	6/24/13
MDB Center of Gravity	Z	13715	Endevco	6/24/13
Left Frame at Rear Axle Centerline	X	13705	Endevco	6/24/13
Left Frame at Rear Axle Centerline	Y	13711	Endevco	6/24/13