REPORT NUMBER: NCAP-KAR-11-062

NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

NISSAN MOTOR CO., LTD.
2011 NISSAN LEAF SL 5-DOOR HATCHBACK

NHTSA NUMBER: MB5220

PREPARED BY:

KARCO ENGINEERING, LLC.

9270 HOLLY ROAD

ADELANTO, CA 92301

JUNE 23, 2011

FINAL REPORT

U.S. DEPARTMENT OF TRANSPORTATION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

SAFETY PERFORMANCE STANDARDS

OFFICE OF CRASHWORTHINESS STANDARDS

1200 NEW JERSEY AVE, SE

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WASHINGTON, DC 20590

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Approval Date: June 30, 2011

FINAL REPORT ACCEPTANCE BY OCWS:

_____

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

Date: _____

_____

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

Date: _____

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16. Abstract

A 56.3 km/h NCAP Frontal Impact Test was conducted on a 2011 Nissan Leaf SL 5-Door Hatchback in accordance with the specifications of the Office of Crashworthiness Standards Frontal NCAP Laboratory Test Procedure. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), and 305. The test was conducted at the KARCO Engineering, LLC. facility in Adelanto, California on June 23, 2011.

The impact velocity of the vehicle was 56.60 km/h and the ambient temperature at the barrier face at the time of impact was 38.3 deg. C. The target vehicle's post-test maximum crush was 618 mm at DPD 5 to the right of the vehicle's centerline. The test vehicle's performance is as follows:

Measurement Description	Units	Driver ATD		Passenger ATD	
		Threshold	Result	Threshold	Result
Head Injury Criteria (HIC_{15})	N/A	700.0	286.9	700.0	105.8
Maximum Chest Compression	mm	63	-25	52	-17
Nij	N/A	1	0.27	1	0.41
Neck Tension	N	4170	1150.9	2620	724.7
Neck Compression	N	4000	-346.3	2520	-263.0
Left Femur Force	N	10008	-2294.0	6805	-2118.4
Right Femur Force	N	10008	-2505.6	6805	-1172.3

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TABLE OF CONTENTS

SECTION 1
PURPOSE AND SUMMARY OF TEST

PURPOSE

This 56.3 km/h frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program, sponsored by the National Highway Traffic Safety Administration (NHTSA) under contract number DTNH22-06-D-00027. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for consumer information purposes.

The 56.3 km/h frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Frontal NCAP Laboratory Test Procedure, dated January, 2010.

SUMMARY

A load cell barrier consisting of 36 load cells was impacted by a 2011 Nissan Leaf SL 5-Door Hatchback at a velocity of 56.60 km/h. The test was performed at KARCO Engineering, LLC. on June 23, 2011. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A of this report.

Three (3) real-time cameras and sixteen (16) high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in Data Sheet 6 of this report.

One Part 572E 50th percentile male anthropomorphic test device (ATD) was placed in the driver seating position and one Part 572O 5th percentile female ATD was placed in the right-front passenger seating position according to dummy placement instructions specified in the Frontal NCAP Laboratory Test Procedure.

Both ATDs were fully instrumented with head, chest and pelvis tri-axial accelerometers, chest displacement potentiometers, upper neck force transducers, right / left femur load cells, and lower leg instrumentation. Seat belt load cells were also on the driver's lap and shoulder belt and the passenger's lap belt to measure the dummy torso and pelvic section loading. The driver (position 1) ATD (Serial No. 034) and the right-front passenger (position 2) ATD (Serial No. 635) were calibrated prior to this test. Certification details, along with instrumentation calibration data, are found in Appendix C of this report.

The 136 channels of data were recorded on an on-board data acquisition system. Appendix B contains the dummy response data traces.

There was 88.2% windshield retention and no intrusion into the protected zone of the windshield during the event. There was no electrolyte leakage after the event or during any phase of the static rollover.

The maximum static crush of the test vehicle was 618 mm located at DPD 5 to the right of the vehicle's centerline. Both the driver and passenger side doors remained closed during the impact event and were operable after the impact.

The driver's visible contact points were as follows: The driver ATD's head contacted the airbag and the head restraint. The upper torso contacted the airbag. Both the left and right knees contacted the knee bolster.

The passenger's visible contact points were as follows: The passenger ATD's head contacted the airbag and the head restraint. The upper torso contacted the airbag. Both the left and right knees contacted the glovebox.

The occupant data is summarized below:

ATD Position	HIC_{15}	T^1	T^2	Chest Disp. (mm)	Nij	Neck Tension (N)	Neck Comp. (N)	Left Femur (N)	Right Femur (N)
Driver (50th)	286.9	69.0	84.0	-25	0.27	1150.9	-346.3	-2294.0	-2505.6
Passenger (5th)	105.8	62.4	77.4	-17	0.41	724.7	-263.0	-2118.4	-1172.3

Pre-test photographs of the battery were taken on 6/17/11 as indicated by the photo placards.

SECTION 2

DATA SHEETS

Test Vehicle: 2011 Nissan Leaf SL 5-Door Hatchback NHTSA No.: MB5220

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 06/23/11

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	Fluid Systems	gal	liter	3.785
Volume	Small Fluids	oz	mL	29.573
Pressure	Tire Pressures	lbf/in^2	kPa	7.0
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: 2011 Nissan Leaf SL 5-Door Hatchback NHTSA No.: MB5220

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 06/23/11

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	MB5220	Anti-Lock Brakes	Yes
Make	Nissan	All Wheel Drive	No
Model	Leaf SL	Power Steering	Yes
Body Style	5-Door Hatchback	Driver Front Airbag	Yes
VIN	JN1AZ0CP2BT002338	Driver Curtain Airbag	Yes
Body Color	Super Black	Driver Head/Torso Airbag	No
Delivery Date	6/3/2011	Driver Torso Airbag	No
Odometer Reading (mi)	88	Driver Torso/Pelvis Airbag	Yes
Odometer Reading (km)	142	Driver Pelvis Airbag	No
Dealer	Puente Hills Nissan	Driver Knee Airbag	No
Transmission	N/A	Pass. Front Airbag	Yes
Final Drive	Front	Pass. Curtain Airbag	Yes
Type / No. of Cylinders	Electric	Pass. Head/Torso Airbag	No
Engine Displacement (L)	N/A	Pass. Torso Airbag	No
Engine Placement	Transverse	Pass. Torso/Pelvis Airbag	Yes
Roof Rack	No	Pass. Pelvis Airbag	No
Sunroof / T-Top	No	Pass. Knee Airbag	No
Tinted Glass	No	Pre-Tensioners	Yes
Traction Control	Yes	Load Limiters	Yes
Power Brakes	Yes	Automatic Door Locks	Yes
Front Disc	Yes	Tilt Steering	Yes
Rear Disc	Yes	Other	

Does Owner's Manual provide instructions to turn off automatic door locks?	No

DATA FROM CERTIFICATION LABEL

Manufactured By	Nissan Motor Co., LTD.	GVWR (kg)	1960
Date of Manufacture	Mar-11	GAWR Front (kg)	999
		GAWR Rear (kg)	966

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

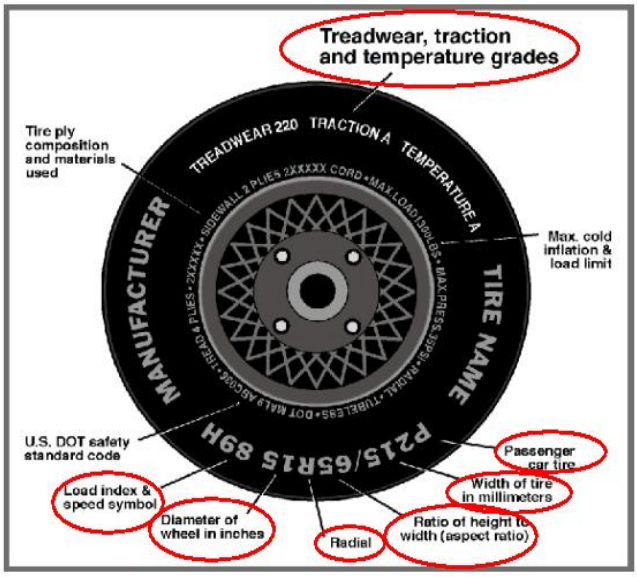
Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench		
Number of Occupants	2	3		5
Capacity Weight (VCW) (kg)				390.0
Cargo Weight (RCLW) (kg)				49.8

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Nissan Leaf SL 5-Door Hatchback NHTSA No.: MB5220

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 06/23/11



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	250	250
Recommended Tire Size	P205/55R16	P205/55R16
Tire Size on Vehicle	P205/55R16	P205/55R16
Tire Manufacturer	Bridgestone	Bridgestone
Tire Model	Ecopia	Ecopia
Treadwear	400	400
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	1 Polyester	1 Polyester
Tire Plies Body	1 Polyester, 2 Steel, 1 Nylon	1 Polyester, 2 Steel, 1 Nylon
Load Index / Speed Symbol	89H	89H
Tire Material	Polyester, Steel, Nylon	Polyester, Steel, Nylon
DOT Safety Code Left	EL8K JBC5 210	EL8K JBC5 210
DOT Safety Code Right	EL8K JBC5 210	EL8K JBC5 210

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Nissan Leaf SL 5-Door Hatchback NHTSA No.: MB5220

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 06/23/11

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	435.5	340.0		474.5	402.0	
Right	kg	422.5	325.0		446.0	386.5	
Ratio	%	56.3%	43.7%	100.0%	53.9%	46.1%	100.0%
Total	kg	858.0	665.0	1523.0	920.5	788.5	1709.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1523.0	A
Weight of 1 P572E ATD & 1 P572O ATD	kg	141.0	B
Rated Cargo/Luggage Weight (RCLW)	kg	49.8	C
Calculated Vehicle Target Weight (TVTW)	kg	1713.8	A+B+C

TEST VEHICLE ATTITUDES

Condition	Units	LF	RF	LR	RR	CG Aft of Front Axle
As Delivered	mm	708	710	710	714	1178
As Tested	mm	692	695	685	694	1245
Post-Test	mm	688	741	670	704	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2698
Total Vehicle Length at Left Side	mm	3790
Total Vehicle Length at Centerline	mm	4445
Total Vehicle Length at Right Side	mm	3790
Weight of Ballast in Cargo Area	kg	80.0
Weight of Vehicle Components Removed	kg	7.5
Amount of Stoddard Solvent in Fuel Tank	L	N/A

VEHICLE COMPONENTS REMOVED TO MEET TEST WEIGHT:

Cargo area trim panels (7.5 kg)

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Nissan Leaf SL 5-Door Hatchback NHTSA No.: MB5220

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 06/23/11

TARGET VEHICLE STRUCTURAL MEASUREMENTS

No.	Description	Pre-Test	Post-Test	Difference
1	Total Length	4445	3912	-533
2	Total Width	1770	1855	85
3	Bumper Top Height	537	573	36
4	Bumper Bottom Height	388	438	50
5	Longitudinal Member Top Height	509	567	58
6	Distance Between Longitudinal Members	1004	1030	26
7	Longitudinal Member Width	70	110	40
8	Engine Top Height	868	908	40
9	Engine Bottom Height	216	201	-15
10	Engine and Gearbox Width	410	410	0
11	Front Bumper to Engine Distance	600	295	-305
12	Front Shock Absorber Fixing Height	800	865	65
13	Bonnet Leading Edge Height	791	875	84
14	Front Shock Absorber Fixing Width	1185	1185	0
15	Front Bumper to Front Axle Distance	950	490	-460
16	Front Axle to A-Pillar Distance	470	407	-63
17	A-Pillar to B-Pillar Distance	879	875	-4
18	B-Pillar to Rear Axle Distance	1120	1125	5
19	B-Pillar to C-Pillar Distance	869	872	3
20	Roof Sill Bottom Height	1380	1380	0
21	Roof Sill Top Height	1483	1484	1
22	Floor Sill Bottom Height	186	186	0
23	Floor Sill Top Height	355	360	5

All measurements in millimeters.

DATA SHEET NO. 2

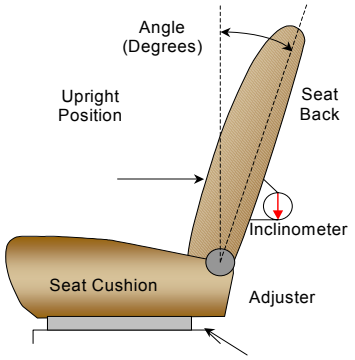
SEAT ADJUSTMENT, FUEL SYSTEMS, AND STEERING WHEEL DATA

Test Vehicle: 2011 Nissan Leaf SL 5-Door Hatchback NHTSA No.: MB5220

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 06/23/11

NOMINAL DESIGN RIDING POSITION

The procedure for the driver is as follows: the seat back is set to the manufacturer's designated angle. The procedure for the passenger is as follows: the seat back is set to position the transverse instrumentation platform of the dummy's head at 0° ± 0.5°. Seat back angle is at the head restraint post using a digital inclinometer.



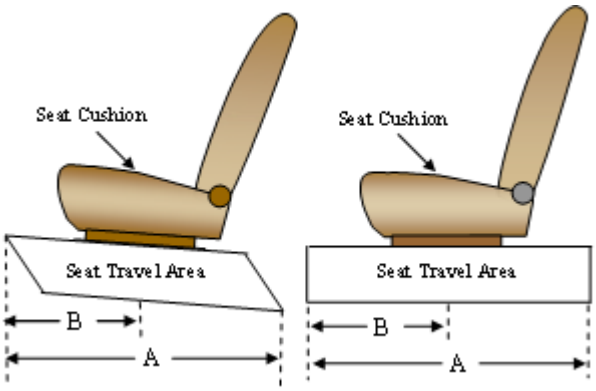
FRONT SEAT ASSEMBLY

SEAT BACK ANGLE

Seating Position	Degrees
Driver Seat Back Angle	11.5
Passenger Seat Back Angle	3.0

SEAT FORE / AFT POSITIONING

The total seat travel is measured from the forward most possible position to the rear most possible position. The driver's seat is set to the middle of the fore-aft travel. The passenger's seat is set to the forward most position where the ATD will not contact any interior panels.



SEAT FORE/AFT POSITIONS

Seating Position	Total Fore-Aft Travel	Placed in Position
Driver Seat	252 mm	132 mm
Passenger Seat	240 mm	12 mm

SEAT BELT UPPER ANCHORAGE

The seat belt upper anchorage is positioned to the manufacturer's design position for a 50th percentile adult male ATD for the driver, and a 5th percentile adult female ATD for the passenger. Position zero (0) is the uppermost position.

SEAT BELT UPPER ANCHORAGES

Seating Position	Total No. of Positions	Placed in Position
Driver Seat	4	0
Passenger Seat	4	0

DATA SHEET NO. 2 … (CONTINUED)

SEAT ADJUSTMENT, FUEL SYSTEMS, AND STEERING WHEEL DATA

Test Vehicle: 2011 Nissan Leaf SL 5-Door Hatchback NHTSA No.: MB5220

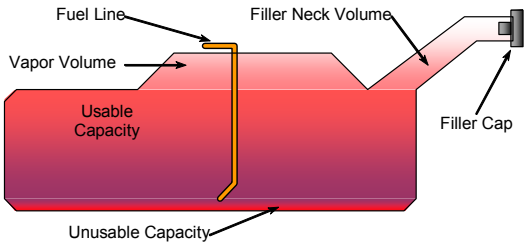
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 06/23/11

FUEL TANK CAPACITY

Description	Liters
Usable Capacity of "Standard Tank"	
Usable Capacity of "Optional Tank"	
92 - 94% of Usable Capacit	
Actual Amount of Stoddard Solvent Used	
1/3 of Usable Capacity	

FUEL PUMP

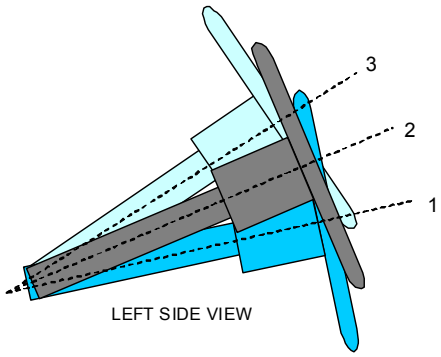
The test vehicle is electric and is not equipped with any liquid fuel system, including a fuel pump or tank. There is no fuel filler door.



VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when moved through its full range of motion. A digital inclinometer is used to measure a plate which is placed across the rim of the steering wheel for angular measurements. The telescoping steering wheel travel is fixed.



STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITIONING

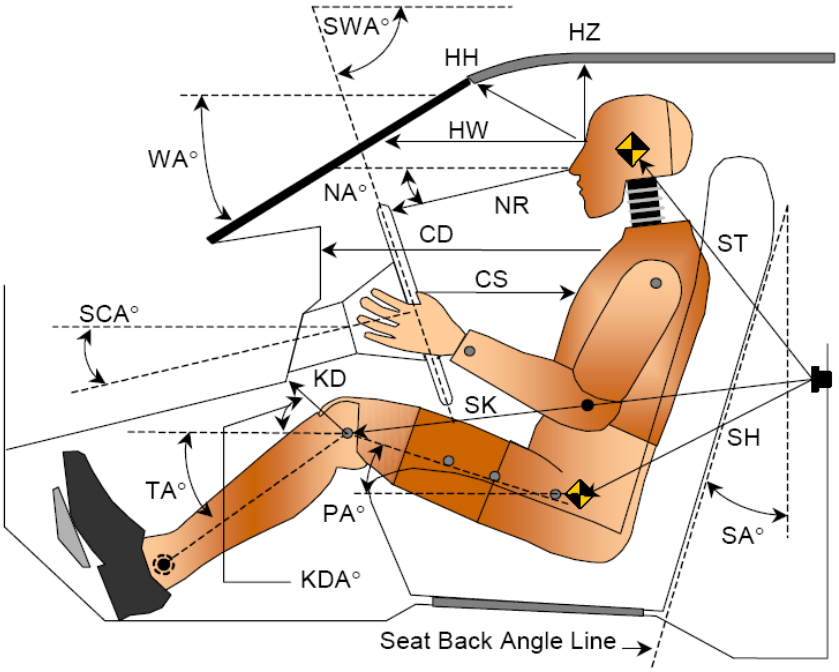
	Degrees	Fore-Aft Position (mm)
Lowermost Position, No. 1	23.9	
Geometric Center Position, No. 2	26.5	
Uppermost Position, No. 3	29.1	
Telescoping Steering Wheel Travel		0
Test Position	26.5	

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2011 Nissan Leaf SL 5-Door Hatchback NHTSA No.: MB5220

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 06/23/11



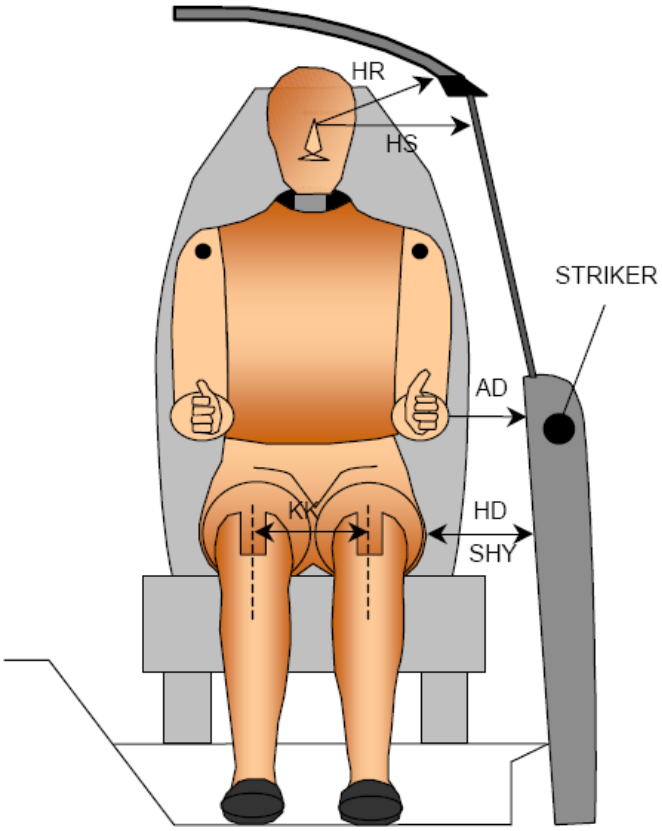
Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		24.3		
SWA°	Steering Wheel Angle		63.7		
SCA°	Steering Column Angle		26.3		
SA°	Seat Back Angle (On Headrest Post)		11.5		3.0
HZ	Head to Roof	255	90.0	253	90.0
HH	Head to Header	415	25.1	339	39.5
HW	Head to Windshield	790	0.0	711	0.0
HR	Head to Side Header	263	42.0	268	49.0
NR	Nose to Rim	404	7.7	511	13.5
CD	Chest to Dash	528	10.6	360	5.7
CS	Chest to Steering Hub	298	5.1		
RA	Rim to Abdomen	182	0.0		
KDL	Left Knee to Dash	107	12.4	70	38.7
KDR	Right Knee to Dash	117	32.7	79	35.6
PA°	Pelvic Angle		24.7		19.5
TA°	Tibia Angle		47.5		49.0
SK	Striker to Knee	675	7.0	756	7.4
ST	Striker to Head	514	65.3	506	50.5
SH	Striker to H-Point	323	36.6	446	21.4

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2011 Nissan Leaf SL 5-Door Hatchback NHTSA No.: MB5220

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 06/23/11



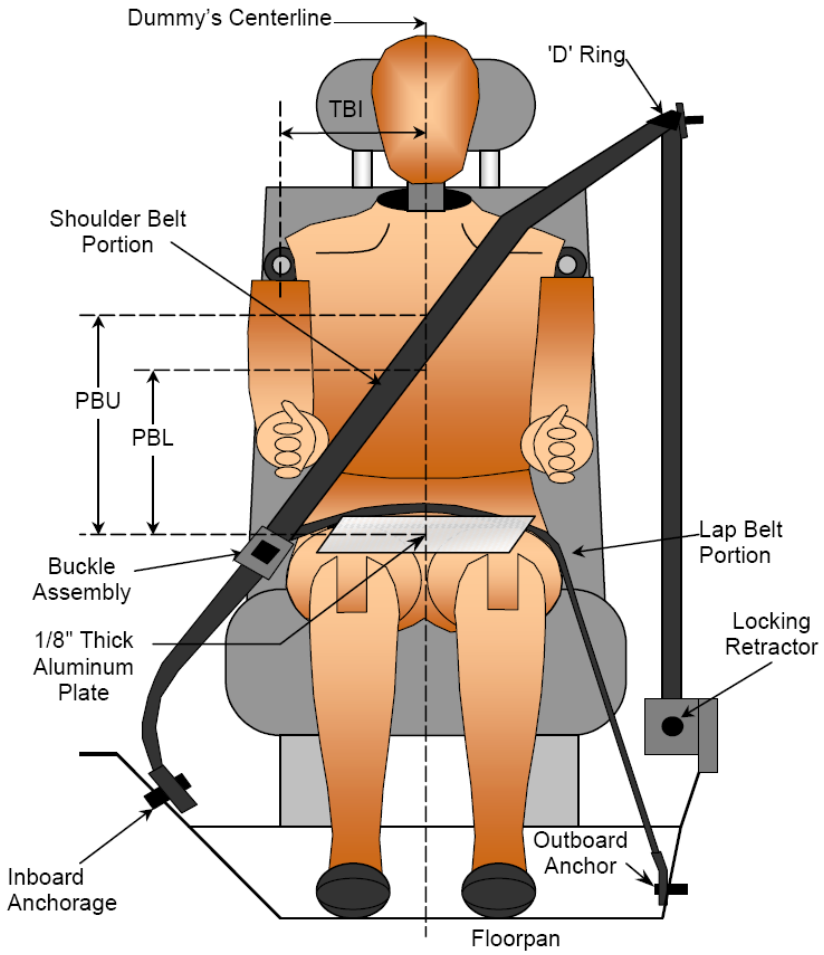
Code	Description	Driver (mm)	Passenger (mm)
AD	Arm to Door	124	69
HD	H-Point to Door	140	215
HR	Head to Side Header	263	268
HS	Head to Side Window	369	339
KK	Knee to Knee	326	225
SHY	Striker to H-Point (Y-Direction)	240	285
AA	Ankle to Ankle	319	164

DATA SHEET NO. 5

SEAT BELT POSITIONING DATA

Test Vehicle: 2011 Nissan Leaf SL 5-Door Hatchback NHTSA No.: MB5220

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 06/23/11



FRONT VIEW OF DUMMY

SEAT BELT POSITIONING MEASUREMENTS

Code	Measurement Description	Units	Driver	Passenger
PBU	Top Surface of Aluminum Plate to Belt Upper Edge	mm	410	286
PBL	Top Surface of Aluminum Plate to Belt Lower Edge	mm	329	203

BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Shoulder Belt Length as Measured on ATD	mm	921	1018
Lap Belt Length as Measured on ATD	mm	755	890
Remainder of Belt on Reel	mm	948	605
Total Belt Length for Continuous Webbing Systems	mm	2624	2513

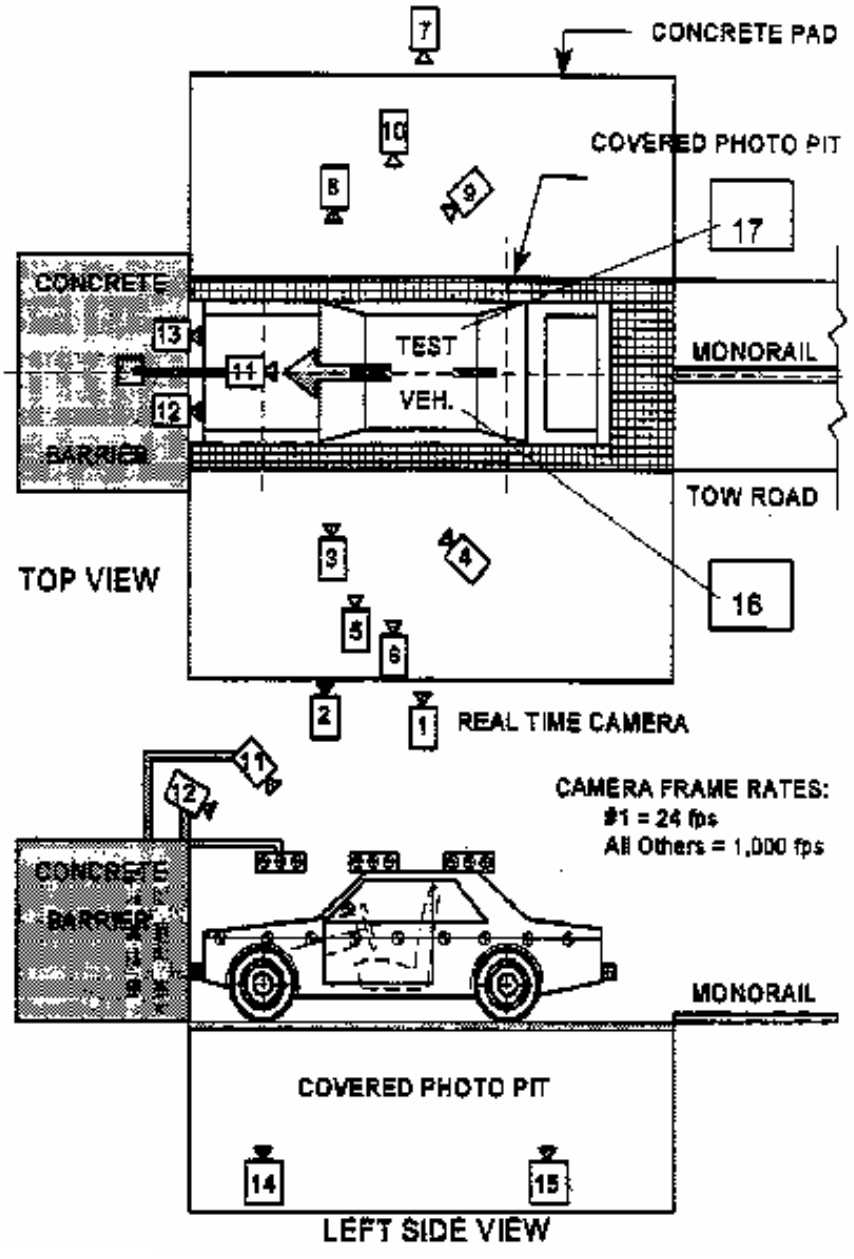
DATA SHEET NO. 6

HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2011 Nissan Leaf SL 5-Door Hatchback NHTSA No.: MB5220

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 06/23/11

CAMERA POSITIONS FOR FRONTAL IMPACTS



DATA SHEET NO. 6 … (CONTINUED)

HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2011 Nissan Leaf SL 5-Door Hatchback NHTSA No.: MB5220

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 06/23/11

CAMERA LOCATIONS

No.	Description	Location			Angle (°)	Film Plane to Head Target	Lens (mm)	Speed (fps)
		X	Y	Z				
1	Real-Time Left Overall	-11412	-8150	-1484				30
2	Overall Left Side	-2590	-7950	-1371	0	9881	24	1000
3	Left Side A-Pillar	-1701	-6197	-1701	0	7921	50	1000
4	Left Side B-Pillar	-6696	-10308	-3211	-17	11281	ZOOM	1000
5	Steering Column Upper	-1966	-10412	-3688	-13	9887	50	1000
6	Steering Column Lower	-1972	-10412	-3379	-13	9870	50	1000
7	Overall Right Side	-2336	7569	-1012	0	9417	24	1000
8	Right Side A-Pillar	-1733	7581	-1408	0	7789	50	1000
9	Passenger IP View	-1600	8214	-1811	0	7795	ZOOM	1000
10	Right Side B-Pillar	-6217	9516	-4830	-10	12626	ZOOM	1000
11	Overhead Windshield View	-354	0	-5749	-90		12	1000
12	Overhead Driver View	297	-366	-2460	-34		12	1000
13	Overhead Passenger View	297	366	-2460	-34		24	1000
14	Pit View of Engine Compartment	-756	0	1495	90		12	1000
15	Pit View of Fuel Tank	-3398	0	1495	90		8	1000
16	Driver's On Board View	-3225	170	-1450	-22		12	1000
17	Passenger's On Board View	-3225	-170	-1450	-22		12	1000
18	Real-Time Left View of Impact							
19	Real-Time Right View of Impact							

Coordinates: +X = forward impact plane

+Y = right of monorail center

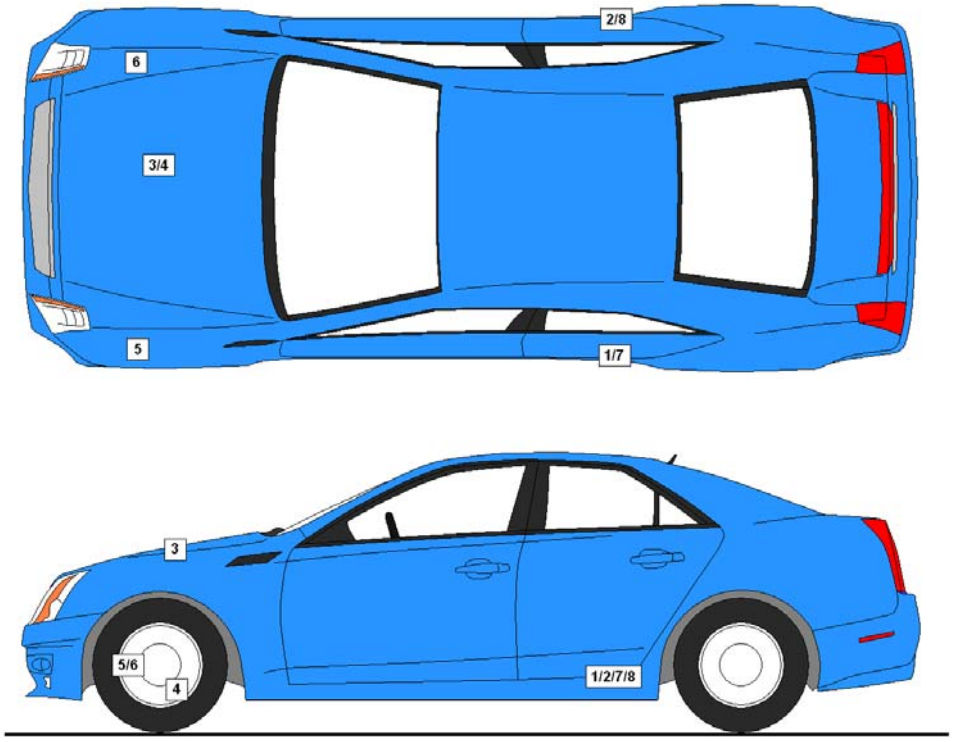
+Z = into ground

DATA SHEET NO. 7

VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2011 Nissan Leaf SL 5-Door Hatchback NHTSA No.: MB5220

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 06/23/11



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Description	Location		
		X	Y	Z
1	Left Rear Cross Member X	1540	-690	-345
2	Right Rear Cross Member X	1540	690	-345
3	Engine Top X	3762	85	-880
4	Engine Bottom X	3517	95	-196
5	Left Brake Caliper X	3405	-890	-350
6	Right Brake Caliper X	3405	890	-350
7	Left Rear Cross Member Z	1540	-690	-345
8	Right Rear Cross Member Z	1540	690	-345

Reference Points: X – Rear Surface of Vehicle (+ forward)

Y – Vehicle Centerline (+ to right)

Z – Ground Plane (+ down)

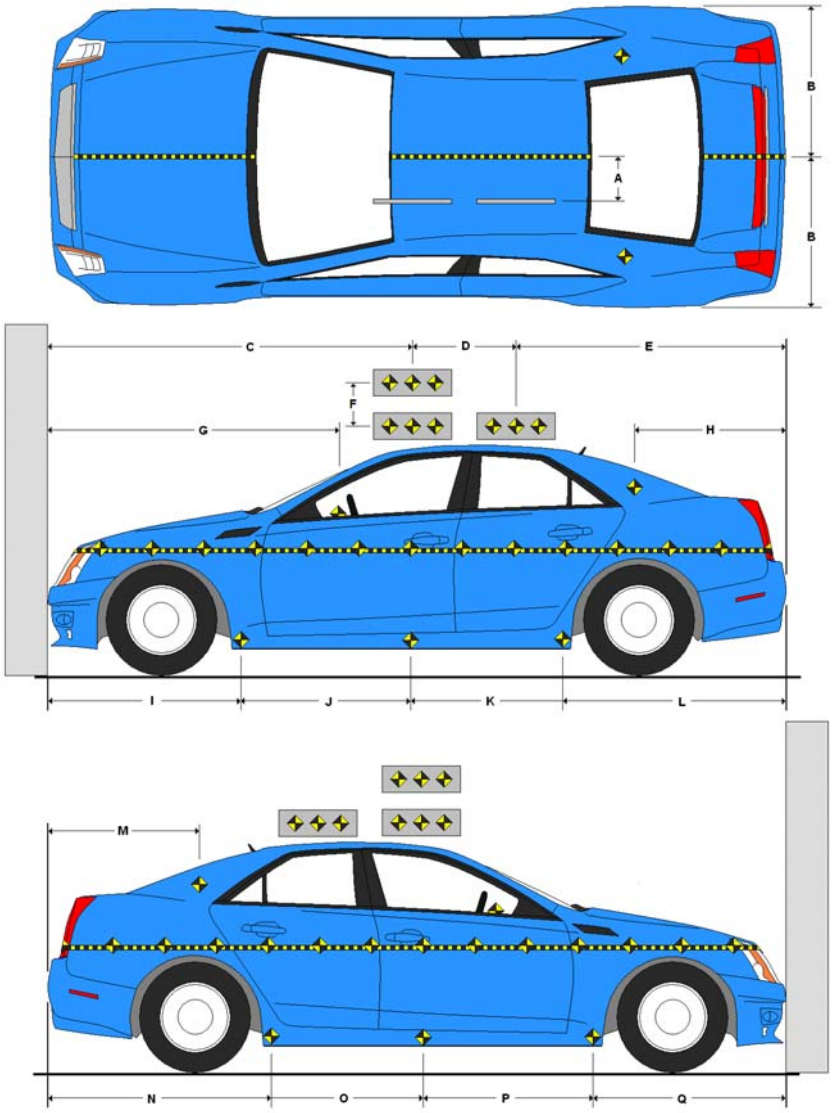
DATA SHEET NO. 8

PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2011 Nissan Leaf SL 5-Door Hatchback NHTSA No.: MB5220

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 06/23/11

Item	Value
A	350
B	885
C	2025
D	610
E	1795
F	305
G	1688
H	880
I	1386
J	914
K	914
L	1215
M	880
N	1212
O	914
P	914
Q	1390



All measurements in millimeters.

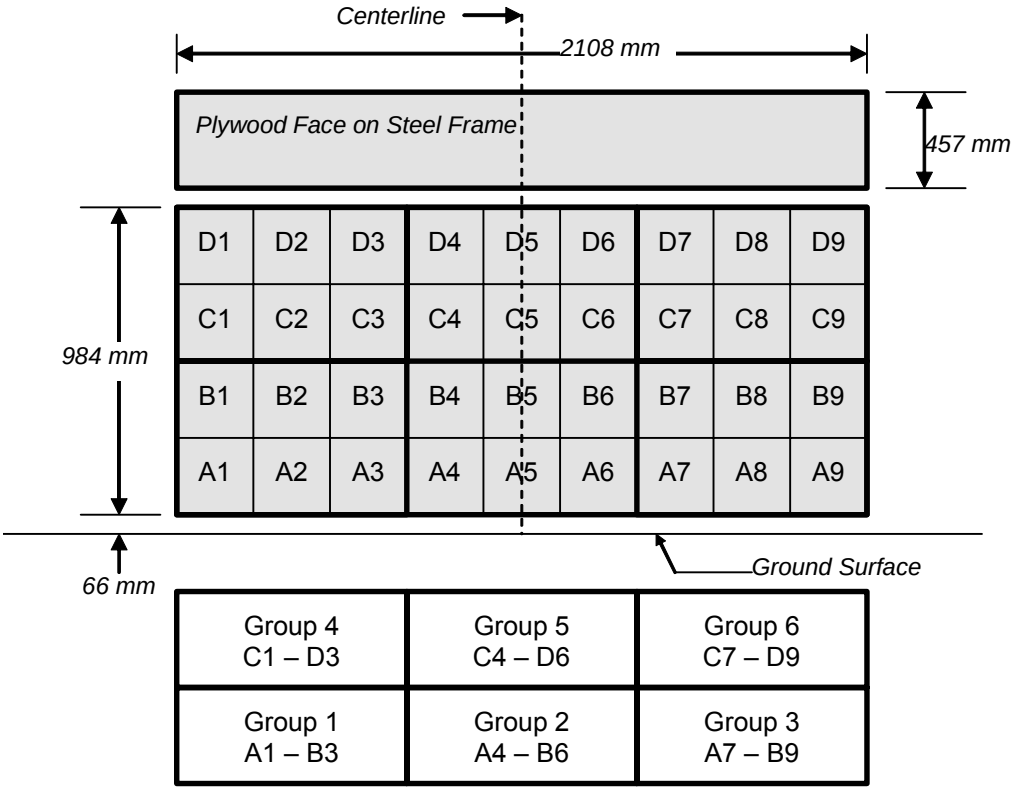
DATA SHEET NO. 9

LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2011 Nissan Leaf SL 5-Door Hatchback NHTSA No.: MB5220

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 06/23/11

36 Load Cell Rigid Barrier (NHTSA Standard)
Load Cell Locations on Fixed Barrier



6 Groups of 6 Load Cells Each

DATA SHEET NO. 10

TEST VEHICLE CAMERA AND INSTRUMENTATION SUMMARY

Test Vehicle: 2011 Nissan Leaf SL 5-Door Hatchback NHTSA No.: MB5220

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 06/23/11

INSTRUMENTATION

Driver Dummy Accelerometers	46
Passenger Dummy Accelerometers	46
Vehicle Structure Accelerometers	8
Load Cell Barrier	36
Total	136

CAMERA COVERAGE

High-Speed Vehicle On Board	2
High-Speed Off board	14
Real Time	3
Total	19

DATA SHEET NO. 11

POST-TEST OBSERVATIONS

Test Vehicle: 2011 Nissan Leaf SL 5-Door Hatchback NHTSA No.: MB5220

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 06/23/11

TEST DUMMY INFORMATION AND CONTACT

Description	Driver	Passenger
Dummy Type/Serial No.	P572E 50th Percentile Male ATD / 034	P572O 5th Percentile Female ATD / 635
Head Contact	Airbag, Head Restraint	Airbag, Head Restraint
Upper Torso Contact	Airbag	Airbag
Lower Torso Contact	None	None
Left Knee Contact	Knee Bolster	Glovebox
Right Knee Contact	Knee Bolster, Steering Column	Glovebox

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Locked / Unlocked Doors	Locked	Locked
Front Door Opening	Remained closed and latched, operational	Remained closed and latched, operational
Rear Door Opening	Remained closed and latched, operational	Remained closed and latched, operational
Seat Track Shift (mm)	8	10
Seat Back Failure	None	None
Glazing Damage	None	None

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Windshield Damage	Broken
Window Damage	None
Other Notable Effects	None

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	2791
Center	mm	2686
Right Side	mm	2690
Average	mm	2722

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

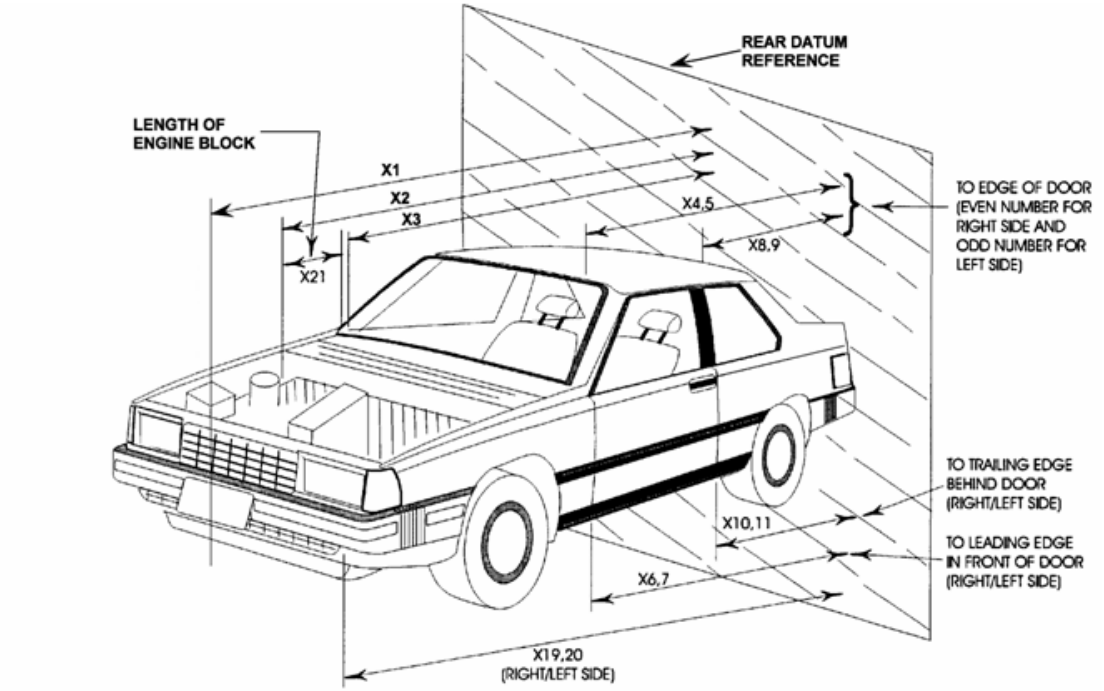
Restraint Type	Driver		Passenger	
	Installed	Operated	Installed	Operated
Front Airbag	Yes	Yes	Yes	Yes
Curtain Airbag	Yes	No	Yes	No
Torso/Pelvis Airbag	Yes	No	Yes	No
Knee Airbag	No		No	
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes
Other				

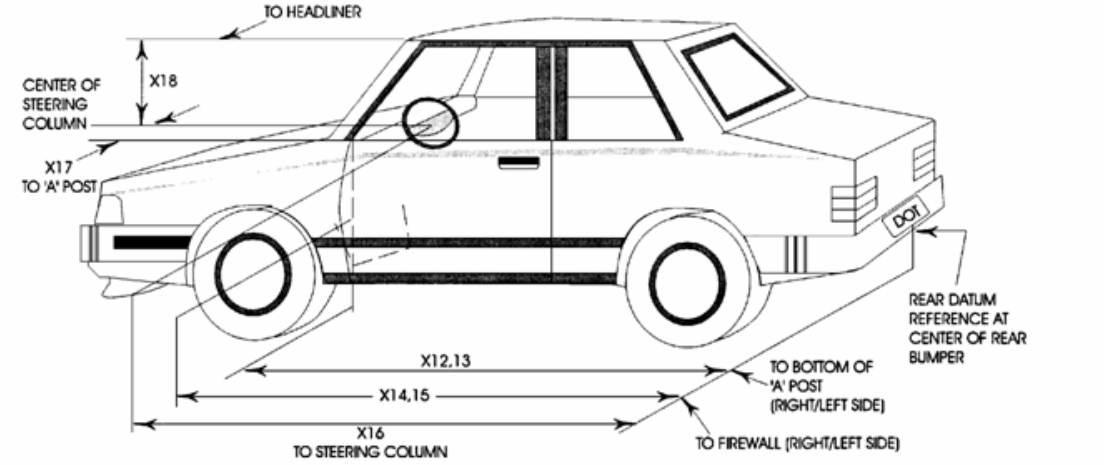
DATA SHEET NO. 12

VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2011 Nissan Leaf SL 5-Door Hatchback NHTSA No.: MB5220

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 06/23/11





DATA SHEET NO. 12 … (CONTINUED)

VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2011 Nissan Leaf SL 5-Door Hatchback NHTSA No.: MB5220

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 06/23/11

No.	Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	4445	3912	-533
2	Rear Surface of Vehicle to Front of Engine	3845	3560	-285
3	RSOV to Firewall	3515	3395	-120
4	RSOV to Upper Leading Edge of Right Door	3040	3057	17
5	RSOV to Upper Leading Edge of Left Door	3046	3033	-13
6	RSOV to Lower Leading Edge of Right Door	3010	3016	6
7	RSOV to Lower Leading Edge of Left Door	3015	3020	5
8	RSOV to Upper Trailing Edge of Right Door	1908	1930	22
9	RSOV to Upper Trailing Edge of Left Door	1911	1915	4
10	RSOV to Lower Trailing Edge of Right Door	1918	1930	12
11	RSOV to Lower Trailing Edge of Left Door	1918	1920	2
12	RSOV to Bottom of A-Pillar, Right Side	2851	2866	15
13	RSOV to Bottom of A-Pillar, Left Side	2848	2851	3
14	RSOV to Firewall, Right Side	3540	3269	-271
15	RSOV to Firewall, Left Side	3531	3285	-246
16	RSOV to Steering Column	2565	2555	-10
17	Center of Steering Column to A-Pillar	425	425	0
18	Center of Steering Column to Headliner	445	397	-48
19	RSOV to Right Side of Front Bumper	3790	3640	-150
20	RSOV to Left Side of Front Bumper	3790	3600	-190
21	Length of Engine Block	440	430	-10
RD	RSOV to Right Side of Dash Panel	2790	2805	15
CD	RSOV to Center of Dash Panel	2725	2731	6
LD	RSOV to Left Side of Dash Panel	2790	2795	5

All measurements in millimeters.

DATA SHEET NO. 13

ACCIDENT INVESTIGATION DATA

Test Vehicle: 2011 Nissan Leaf SL 5-Door Hatchback NHTSA No.: MB5220

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 06/23/11

VEHICLE INFORMATION

VIN: JN1AZ0CP2BT002338 Wheelbase (mm): 2698

Vehicle Size Category: 5-Door Hatchback Test Weight (kg): 1709.0

ACCELEROMETER DATA

Accelerometer Locations: Left Rear Crossmember

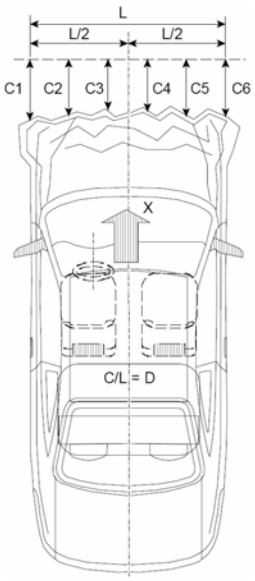
Cal. Procedure/Interval: Drop Test / 6 months

Integration Algorithm: NHTSA Standard Linearity: Good

Impact Velocity (km/h): 56.60

Velocity Change (km/h): 67.0

Time of Separation (msec): 78.8



CRUSH PROFILE

Collision Deformation Classification: 12FDEW2

Midpoint of Damage: Vehicle Centerline

Damage Region Length (mm): 1303

Impact Mode: Full Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush Zone 1 at Left Side	mm	220	593	373
C2	Crush Zone 2 at Left Side	mm	65	630	565
C3	Crush Zone 3 at Left Side	mm	10	613	603
C4	Crush Zone 4 at Right Side	mm	10	612	602
C5	Crush Zone 5 at Right Side	mm	65	683	618
C6	Crush Zone 6 at Right Side	mm	220	636	416
L	C1 to C6	mm	1303		

DATA SHEET NO. 14

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2011 Nissan Leaf SL 5-Door Hatchback NHTSA No.: MB5220

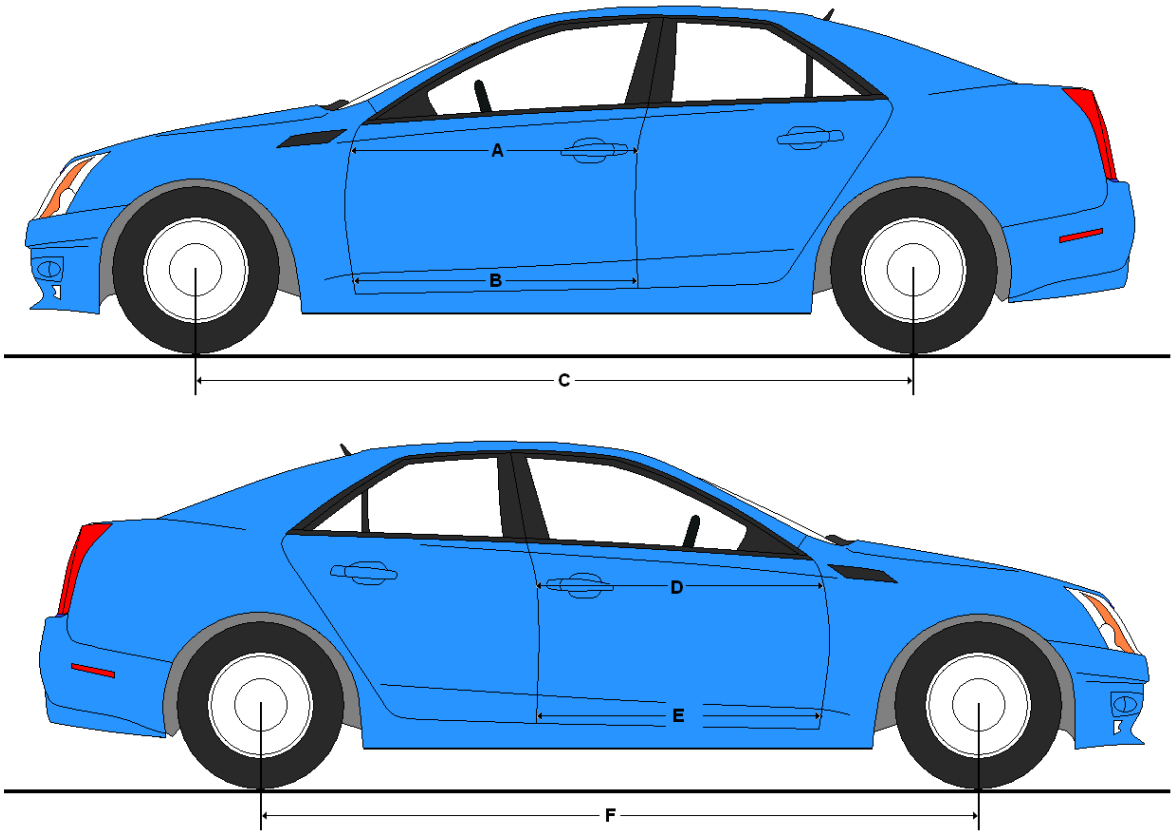
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 06/23/11

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	878	575	303
B	Left Side Lower	mm	884	877	7
D	Right Side Upper	mm	876	875	1
E	Right Side Lower	mm	894	906	-12

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2698	2635	63
F	Right Side Wheelbase	mm	2698	2625	73



DATA SHEET NO. 14 ... (CONTINUED)

VEHICLE INTRUSION MEASUREMENTS

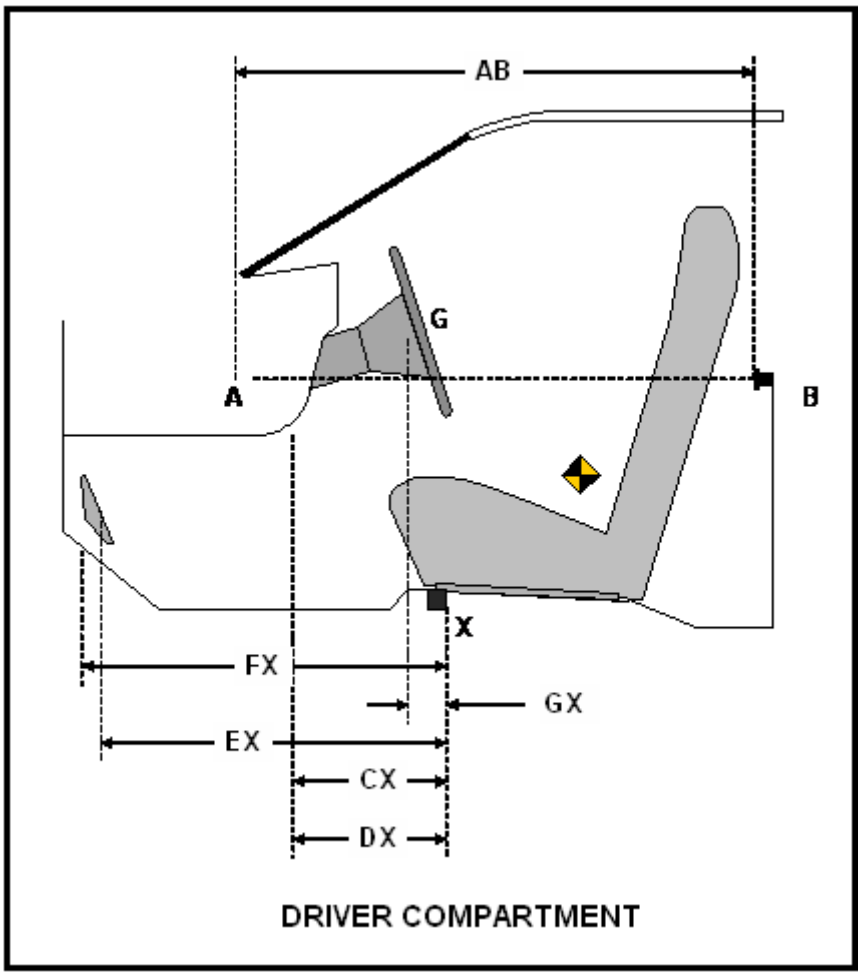
Test Vehicle: 2011 Nissan Leaf SL 5-Door Hatchback NHTSA No.: MB5220

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 06/23/11

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	819	821	-2
CX	Left Knee Bolster to X	mm	298	275	23
DX	Right Knee Bolster to X	mm	286	270	16
EX	Brake Pedal to X	mm	540	580	-40
FX	Foot Rest to X	mm	542	530	12
GX	Center of Steering Wheel Hub to X	mm	41	15	26

X = Front of Seat Track (Stationary)



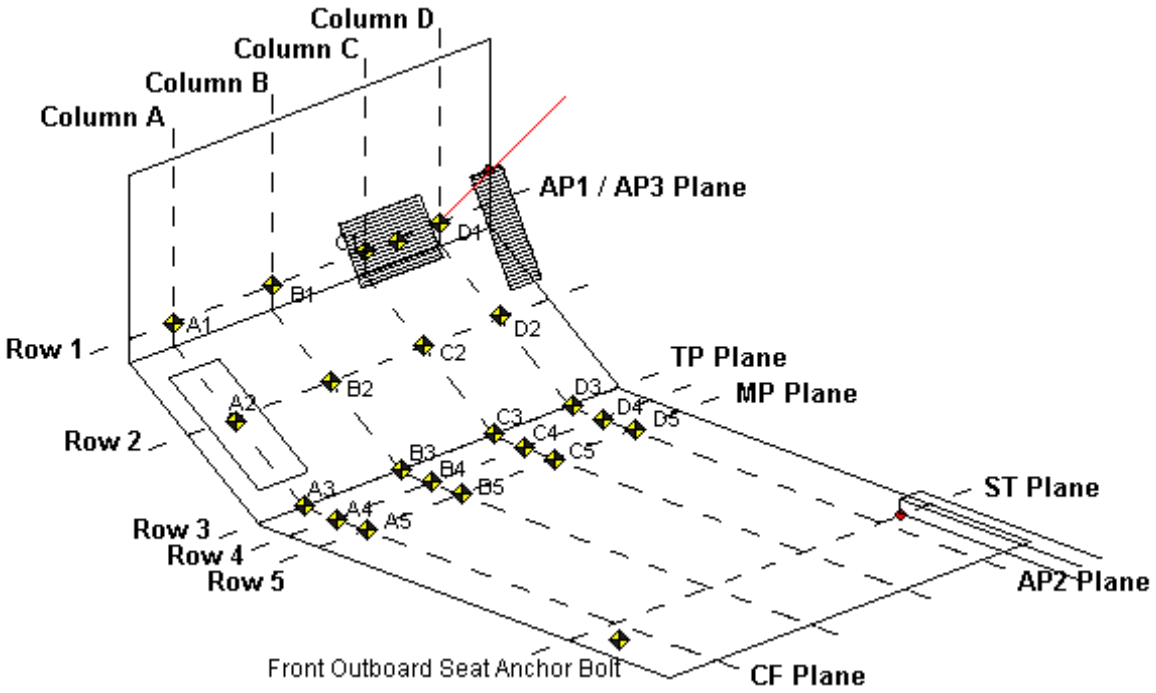
DRIVER COMPARTMENT

DATA SHEET NO. 14 … (CONTINUED)

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2011 Nissan Leaf SL 5-Door Hatchback NHTSA No.: MB5220

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 06/23/11



AP1: Y-Z Plane passing through D1

AP2: X-Z Plane passing through D1

AP3: X-Y plane passing through D1

MP: Y-Z plane, halfway between the ST plane and AP1 plane

CF Plane: X-Z plane passes through center of footrest.

BP Plane: X-Z plane passes through center of brake pedal

TP Plane: Y-Z plane, intersection of BP Plane and the intersection of the toe pan and floorboard

Column A: intersection of vehicle and CF plane

Column D: Intersection of vehicle and AP2 plane

Row 1: intersection of the vehicle and the AP3 Plane

Row 3: intersection of the vehicle and TP plane

Row 5: intersection of the vehicle and MP plane

Row 2: evenly spaced between row 1 and 3

Row 4: evenly spaced between row 3 and 5

DATA SHEET NO. 14 … (CONTINUED)

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2011 Nissan Leaf SL 5-Door Hatchback NHTSA No.: MB5220

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 06/23/11

DRIVER FLOORPAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1												
2												
3												
4												
5												

DRIVER FLOORPAN Y-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1												
2												
3												
4												
5												

DRIVER FLOORPAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1												
2												
3												
4												
5												

All measurements in millimeters

*Floor pan measurements not taken per NHTSA's instruction.

DATA SHEET NO. 14 … (CONTINUED)

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2011 Nissan Leaf SL 5-Door Hatchback NHTSA No.: MB5220

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 06/23/11

PASSENGER FLOORPAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1												
2												
3												
4												
5												

PASSENGER FLOORPAN Y-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1												
2												
3												
4												
5												

PASSENGER FLOORPAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1												
2												
3												
4												
5												

All measurements in millimeters

*Floor pan measurements not taken per NHTSA's instruction

DATA SHEET NO. 15

SUMMARY OF FMVSS 212 AND 219 (PARTIAL) DATA

Test Vehicle: 2011 Nissan Leaf SL 5-Door Hatchback NHTSA No.: MB5220

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 06/23/11

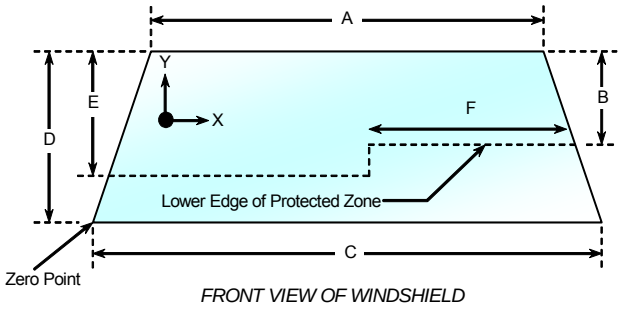
Windshield Mounting Details: Windshield glass is secured to the vehicle frame with plastic and rubber molding sealed with rubber cement.

The standard requires that the post-test retention measurement be a minimum of 75% of the pre-test total periphery measurement for vehicles not equipped with occupant passive restraints and 50% for each side of the windshield for vehicles which are equipped with occupant passive restraints.

Temperature of windshield molding during test: 21.0° C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2146	1991	92.8%
Right Side	2146	1796	83.7%
Total	4292	3787	88.2%



FRONT VIEW OF WINDSHIELD

Item	Units	Value
A	mm	1197
B	mm	462
C	mm	1355
D	mm	870
E	mm	540
F	mm	568

AREAS OF PROTECTED ZONE FAILURES

A. Provide Coordinates of the area that the protected zone was penetrated more than 0.25 inches by a vehicle component other than one that is normally in contact with the windshield.

X	Y

B. Provide coordinates of the area beneath the protected zone that the inner surface of the windshield was penetrated by a vehicle component.

X	Y

DATA SHEET NO. 16

FMVSS 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2011 Nissan Leaf SL 5-Door Hatchback NHTSA No.: MB5220

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 06/23/11

FMVSS 301 FUEL SYSTEM INTEGRITY DATA

Temperature at Time of Impact: 38.3° C Test Time: 1:31 PM

Stoddard Solvent Spillage Measurements

A. From impact until vehicle motion ceases: N/A oz.
(Maximum allowable = 1 oz.)

B. For the 5 minute period after motion ceases: N/A oz.
(Maximum allowable = 5 oz.)

C. For the following 25 minutes: N/A oz.
(Maximum allowable = 1 oz./minute)

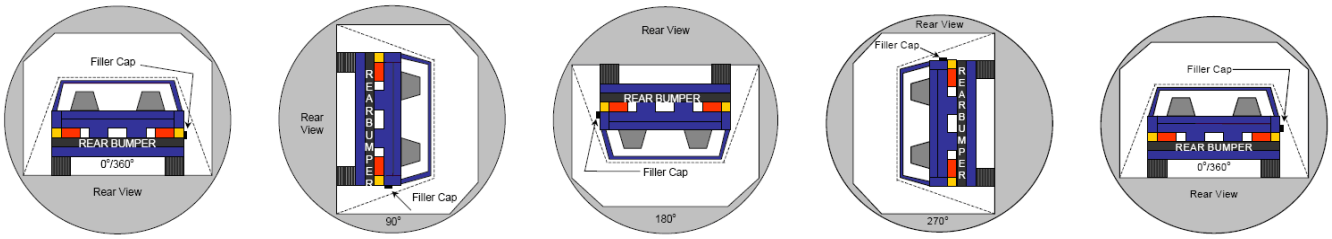
D. Spillage: There is no liquid fuel system on this vehicle

DATA SHEET NO. 17

FMVSS 301 STATIC ROLLOVER

Test Vehicle: 2011 Nissan Leaf SL 5-Door Hatchback NHTSA No.: MB5220

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 06/23/11



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

1. The specified fixture rollover rate for each 90° of rotation is 60 to 180 seconds.
2. The position hold time at each position is 300 seconds (minimum).
3. Details of Stoddard solvent spillage: There is no liquid fuel system on this vehicle

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SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° To 90°	83	302	385
90° To 180°	84	300	384
180° To 270°	77	300	377
270° To 360°	83	300	383

FMVSS 301 SPILLAGE TABLE

Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° To 90°	N/A			
90° To 180°	N/A			
180° To 270°	N/A			
270° To 360°	N/A			

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. 18

FMVSS 305 ELECTRIC VEHICLE PROPULSION SYSTEM DATA

Test Vehicle: 2011 Nissan Leaf SL 5-Door Hatchback NHTSA No.: MB5220

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 06/23/11

ELECTRIC VEHICLE PROPULSION SYSTEM DATA

Type of Electric Vehicle	Electric
Propulsion Battery Type	Lithium-Ion
Nominal Voltage	360 V
Physical Location of Automatic Propulsion Battery Disconnect	Inside the Battery Pack System
Auxilliary Battery Type	Lead-Acid Battery

PROPULSION BATTERY SYSTEM DATA

Electrolyte Fluid Type	Organic Electrolyte
Electrolyte Fluid Specific Gravity	1.192
Electrolyte Fluid Kinematic Viscosity	4.8
Electrolyte Fluid Color	Clear
Propulsion Battery Coolant Type, Color, Specific Gravity	Air Cooled
Location of Battery Modules	Underside of Vehicle

DATA SHEET NO. 19

FMVSS 305 POST-IMPACT DATA

Test Vehicle: 2011 Nissan Leaf SL 5-Door Hatchback NHTSA No.: MB5220

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 06/23/11

ELECTROLYTE SPILLAGE MEASUREMENTS

A. From impact until 30 minutes later: 0.0 L

(Maximum Allowable = 5.0 L total)

B. Spillage Details: No leakage occurred

MEASUREMENT DESCRIPTIONS

Code	Units	Description
V_b	V	Propulsion Battery Voltage
V_1	V	Propulsion Battery Negative to Chassis
V_2	V	Propulsion Battery Positive to Chassis
R_O	Ω	Resistance of Grounding Circuit
V_1'	V	Propulsion Battery Negative to Chassis with R_O installed
V_2'	V	Propulsion Battery Positive to Chassis with R_O installed
R_{i1}	Ω	Electrical Isolation Value of Propulsion Battery Negative to Chassis Ground
R_{i2}	Ω	Electrical Isolation Value of Propulsion Battery Positive to Chassis Ground
R_i	Ω	Electrical Isolation Value of Propulsion Battery - The Minimum of R_{i1} and R_{i2}
R_i/V_b	Ω/v	Electrical Isolation per Volt of Propulsion Battery

ELECTRICAL ISOLATION DATA

Code	Units	Threshold	Pre-Test	Post-Test
V_b	V		392.6	3.4
V_1	V		250.0	0.5
V_2	V		133.0	0.1
R_o	Ω		221,900	221,900
V_1'	V		12.0	0.0
V_2'	V		13.0	0.0
R_{i1}	Ω		6,742,358	Zero Volts
R_{i2}	Ω		5,898,510	Zero Volts
R_i	Ω		5,898,510	Zero Volts
R_i/V_b	Ω/V	500	16,385	Zero Volts

* “Zero Volts” is considered as being compliant.

DATA SHEET NO. 20

FMVSS 305 STATIC ROLLOVER DATA

Test Vehicle: 2011 Nissan Leaf SL 5-Door Hatchback NHTSA No.: MB5220

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 06/23/11

STATIC ROLLOVER ELECTRICAL ISOLATION DATA

Code	Units	Threshold	Rollover Position			
			90°	180°	270°	360°
V_b	V		0.0	0.0	0.0	0.0
V_1	V		1.6	1.5	2.2	2.2
V_2	V		0.4	0.3	0.2	0.4
R_o	Ω		221,900	221,900	221,900	221,900
V_1'	V		0.0	0.0	0.0	0.0
V_2'	V		0.0	0.0	0.0	0.0
R_{i1}	Ω		Zero Volts	Zero Volts	Zero Volts	Zero Volts
R_{i2}	Ω		Zero Volts	Zero Volts	Zero Volts	Zero Volts
R_i	Ω		Zero Volts	Zero Volts	Zero Volts	Zero Volts
R_i/V_b	Ω/V	500	Zero Volts*	Zero Volts*	Zero Volts*	Zero Volts*

FMVSS 305 Requirements: Maximum allowable propulsion battery electrolyte spillage is 5.0 L.

FMVSS 305 ELECTROLYTE SPILLAGE REQUIREMENT

Maximum Allowable Spillage	5.0L throughout impact test and static rollover

FMVSS 305 ELECTROLYTE COLLECTED

Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° to 90°	0	0		
90° to 180°	0			
180° to 270°	0			
270° to 360°	0			

ELECTROLYTE SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0° to 90°	None
90° to 180°	None
180° to 270°	None
270° to 360°	None

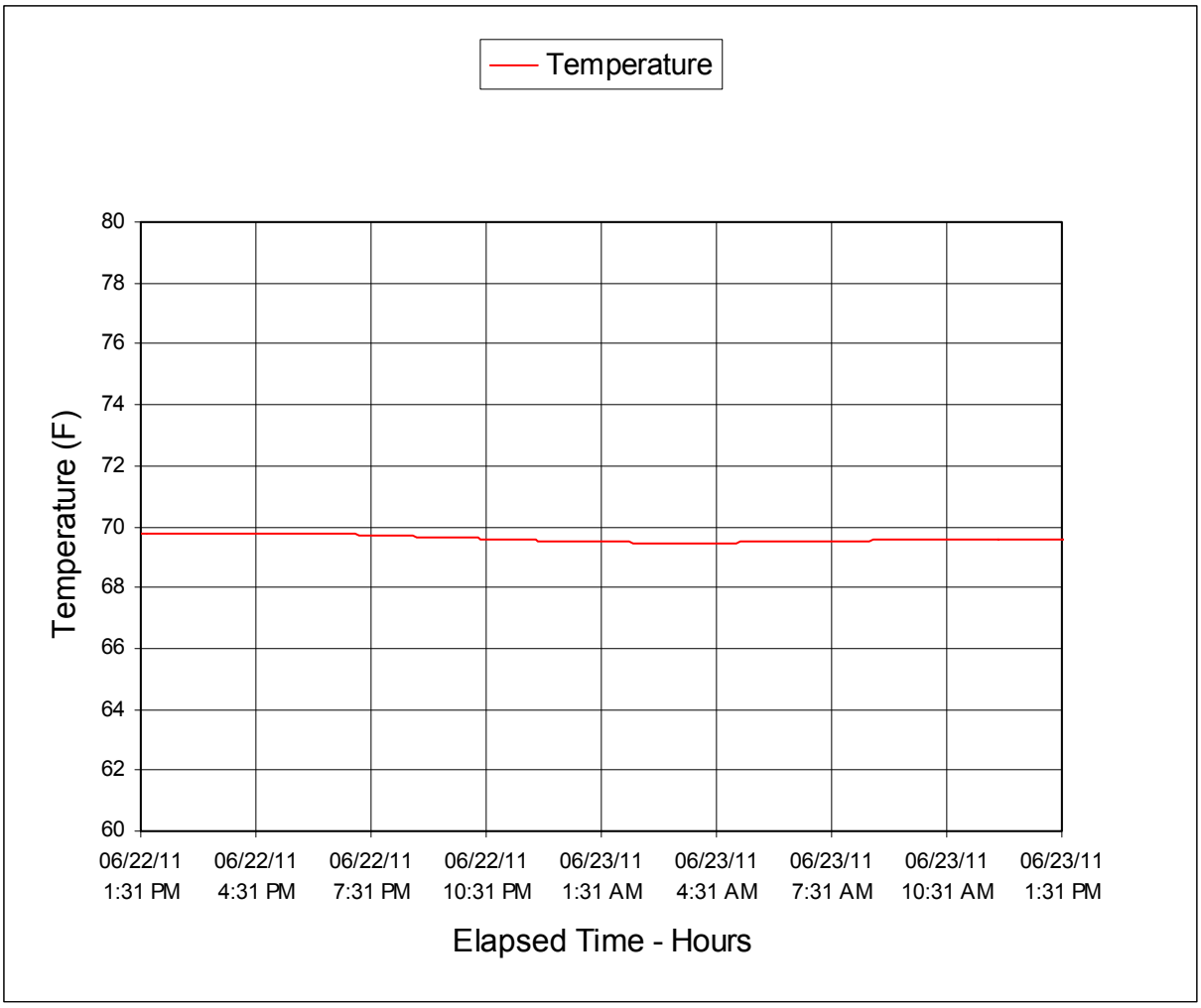
* “Zero Volts” is considered as being compliant.

DATA SHEET NO. 21

DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART

Test Vehicle: 2011 Nissan Leaf SL 5-Door Hatchback NHTSA No.: MB5220

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 06/23/11



APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

TABLE OF PHOTOGRAPHS … (CONTINUED)

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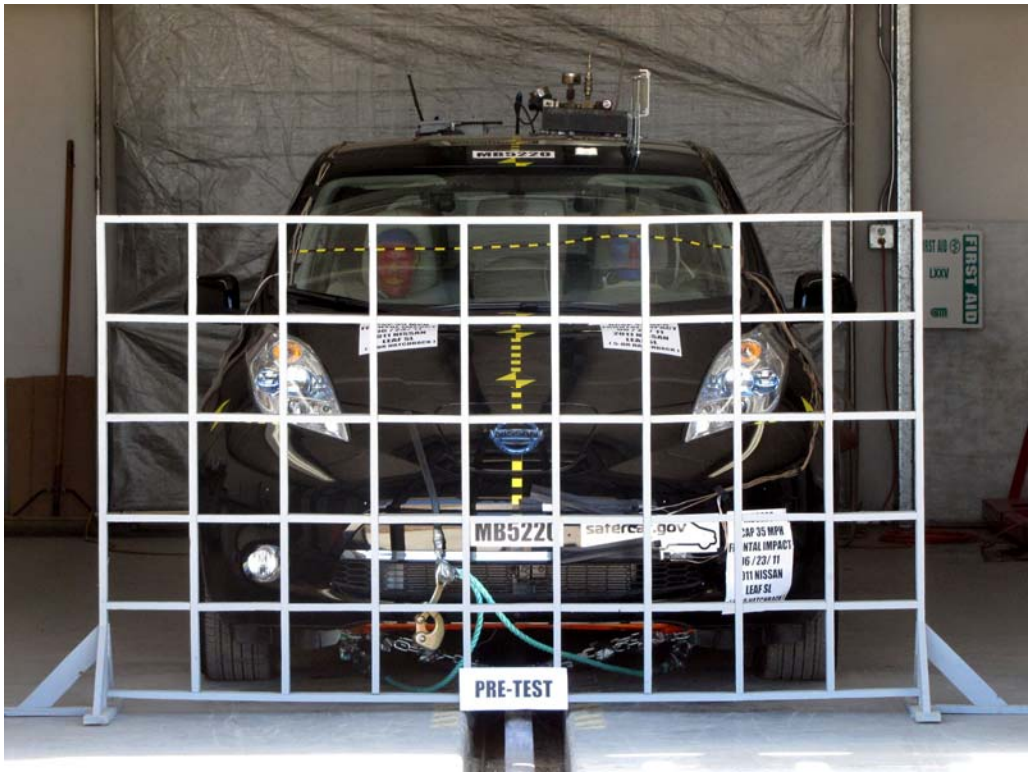


FIGURE 1. Load Cell Location

FIGURE 2. Load Cell Wall

FIGURE 3. Manufacturer's Label

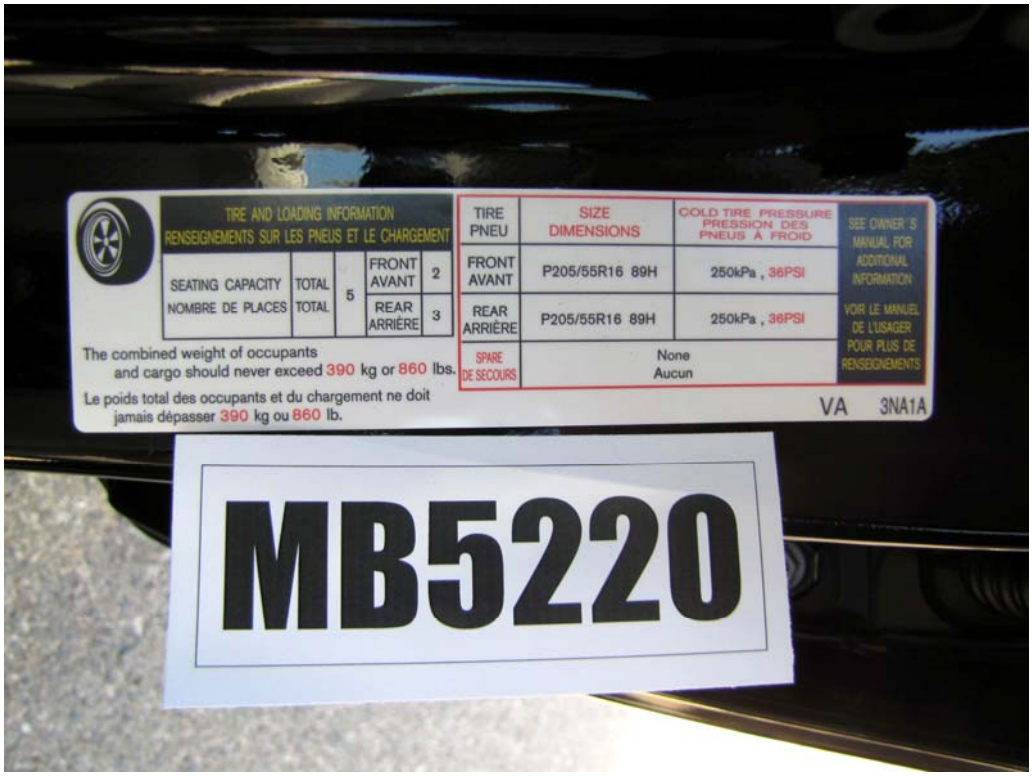


FIGURE 4. Tire Placard

FIGURE 5. Right Front ¾ View, As Delivered

FIGURE 6. Left Rear ¾ View, As Delivered

FIGURE 7. Pre-Test Front View of Test Vehicle

FIGURE 8. Post-Test Front View of Test Vehicle

FIGURE 9. Pre-Test Left View of Test Vehicle

FIGURE 10. Post-Test Left View of Test Vehicle

FIGURE 11. Pre-Test Right View of Test Vehicle

FIGURE 12. Post-Test Right View of Test Vehicle

FIGURE 13. Pre-Test Right Front ¾ View

FIGURE 14. Post-Test Right Front ¾ View

FIGURE 15. Pre-Test Left Rear ¾ View

FIGURE 16. Post-Test Left Rear ¾ View

FIGURE 17. Pre-Test Windshield View

FIGURE 18. Post-Test Windshield View

FIGURE 19. Pre-Test Engine Compartment View

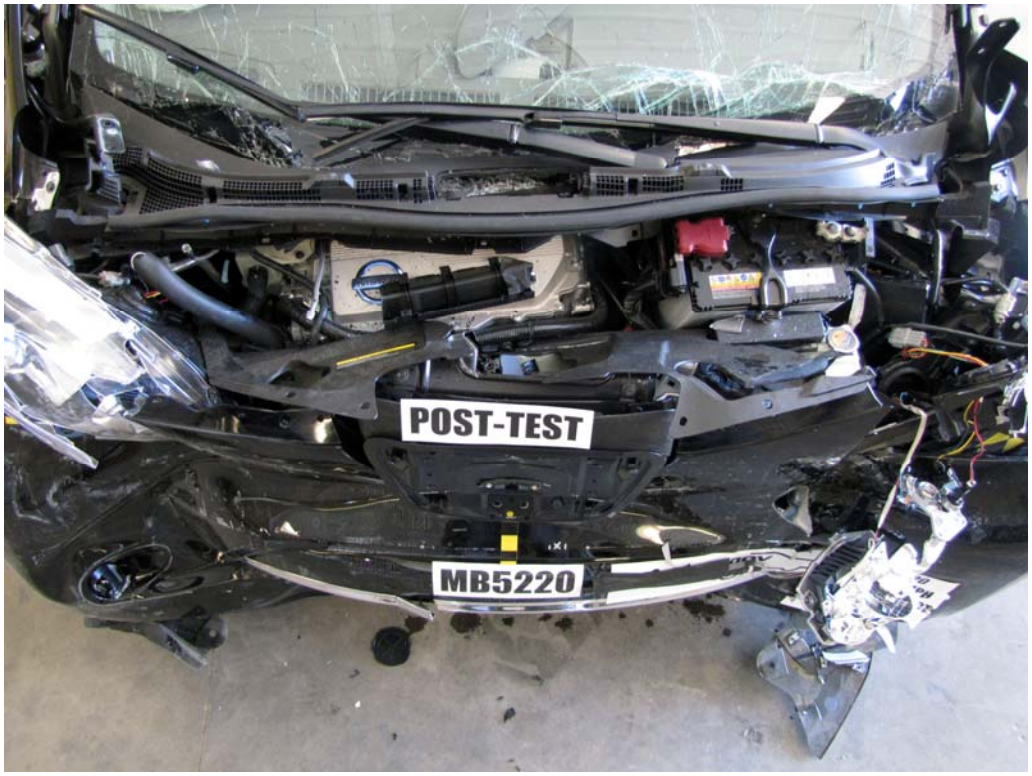


FIGURE 20. Post-Test Engine Compartment View

FIGURE 21. Pre-Test Fuel Filler Cap View

FIGURE 22. Post-Test Fuel Filler Cap View

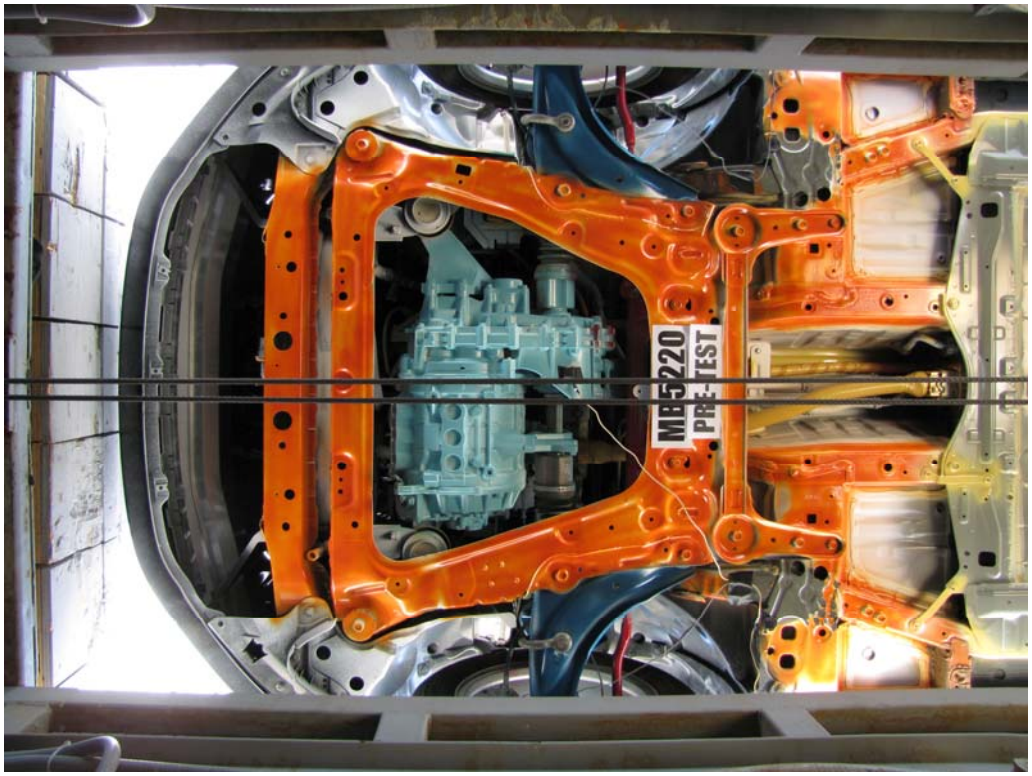


FIGURE 23. Pre-Test Front Underbody View

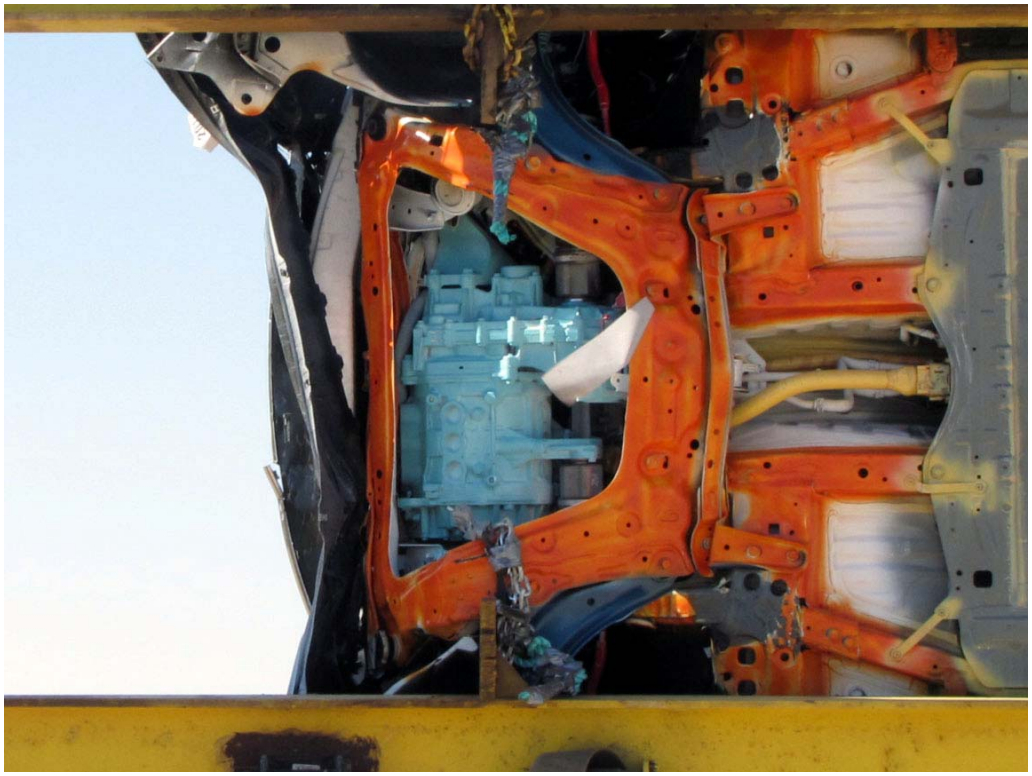


FIGURE 24. Post-Test Front Underbody View

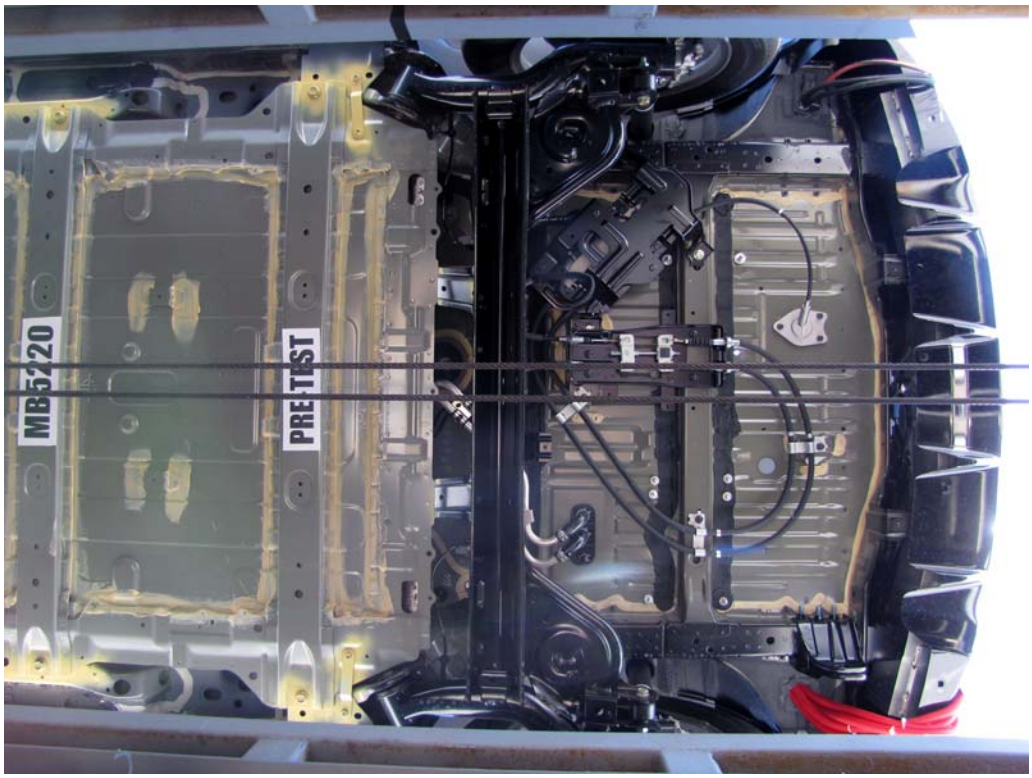


FIGURE 25. Pre-Test Rear Underbody View

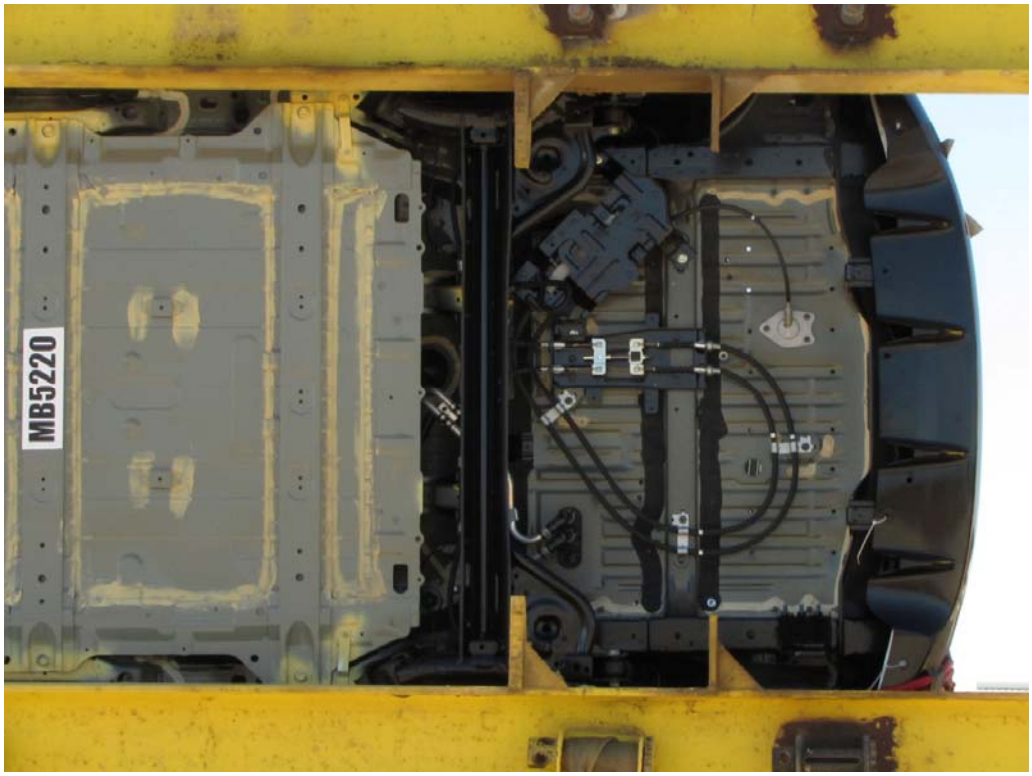


FIGURE 26. Post-Test Rear Underbody View

FIGURE 27. Pre-Test Dummy Cable Routing

FIGURE 28. Post-Test Dummy Cable Routing

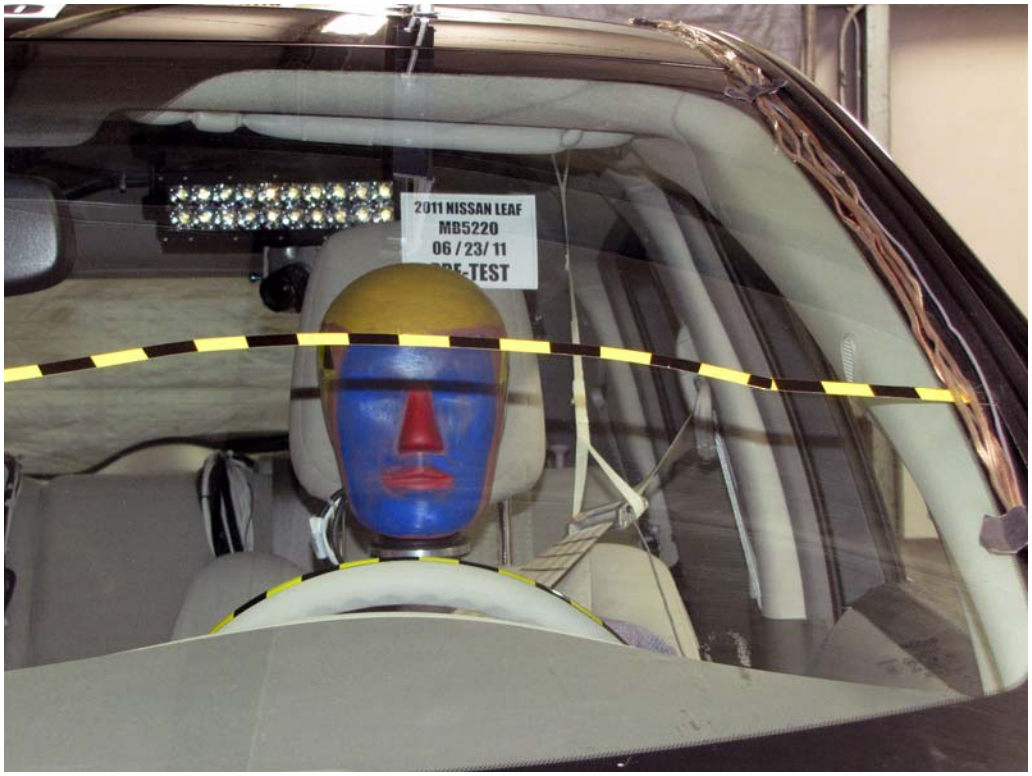


FIGURE 29. Pre-Test Driver Dummy Front View

FIGURE 30. Post-Test Driver Dummy Front View

FIGURE 31. Pre-Test Driver Dummy Window View

FIGURE 32. Post-Test Driver Dummy Window View

FIGURE 33. Pre-Test Driver Dummy and Vehicle Interior View

FIGURE 34. Post-Test Driver Dummy and Vehicle Interior View

FIGURE 35. Pre-Test Driver's Seat Fore-Aft Markings

FIGURE 36. Post-Test Driver's Seat Fore-Aft Markings

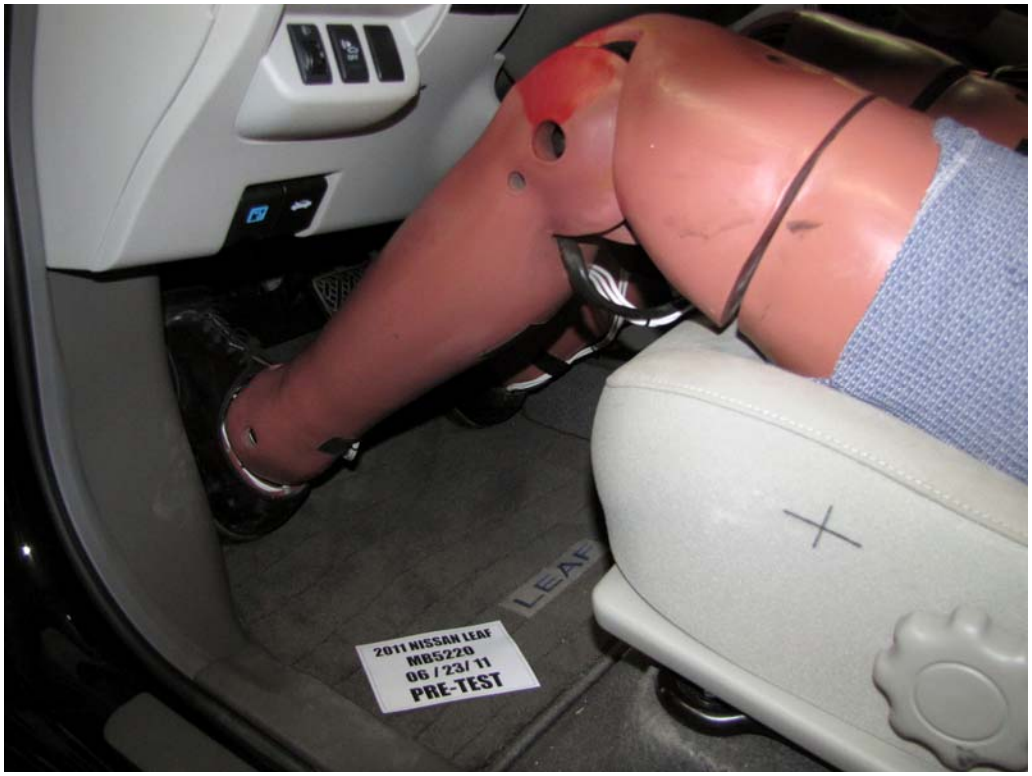


FIGURE 37. Pre-Test Driver Dummy Feet

FIGURE 38. Post-Test Driver Dummy Feet

FIGURE 39. Pre-Test Driver's Side Knee Bolster

FIGURE 40. Post-Test Driver's Side Knee Bolster

Photograph Not Available

FIGURE 41. Pre-Test Driver's Side Floorpan

FIGURE 42. Post-Test Driver's Side Floorpan

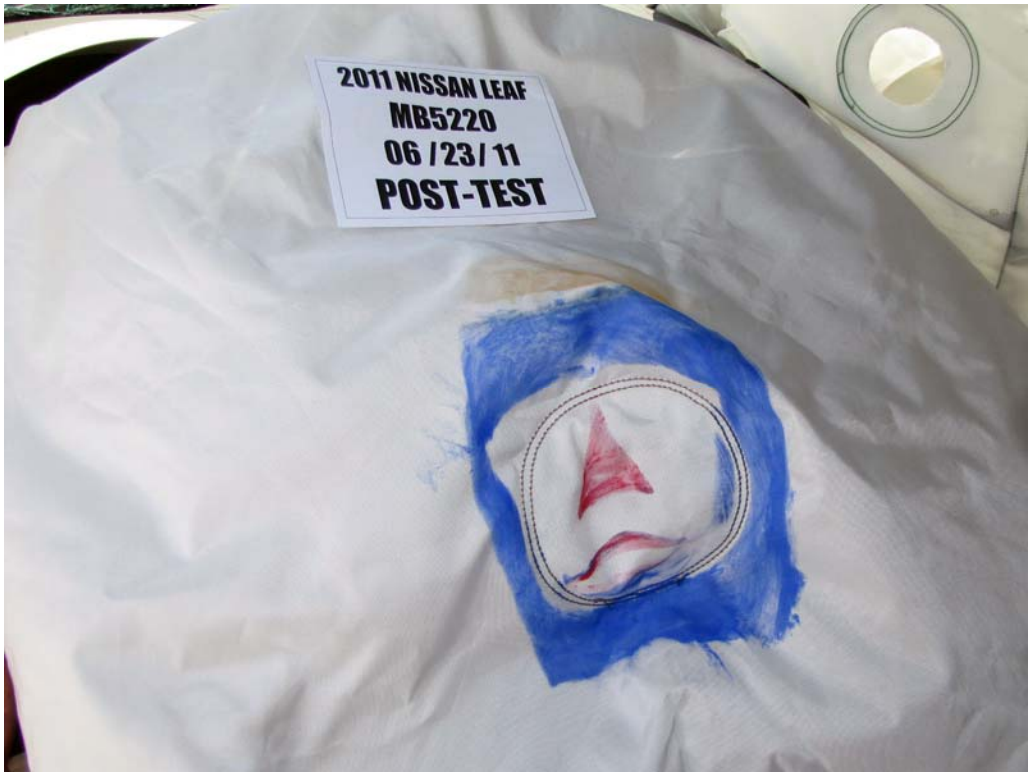


FIGURE 43. Post-Test Driver Dummy Contact With Airbag

FIGURE 43a. Post-Test Driver Dummy Contact With Head Restraint

FIGURE 43b. Post-Test Driver Dummy Contact With Knee Bolster

FIGURE 43c. Post-Test Driver Dummy Contact With Steering Column

FIGURE 44. Pre-Test View of Steering Column Shear Capsule

FIGURE 45. Post-Test View of Steering Column Shear Capsule

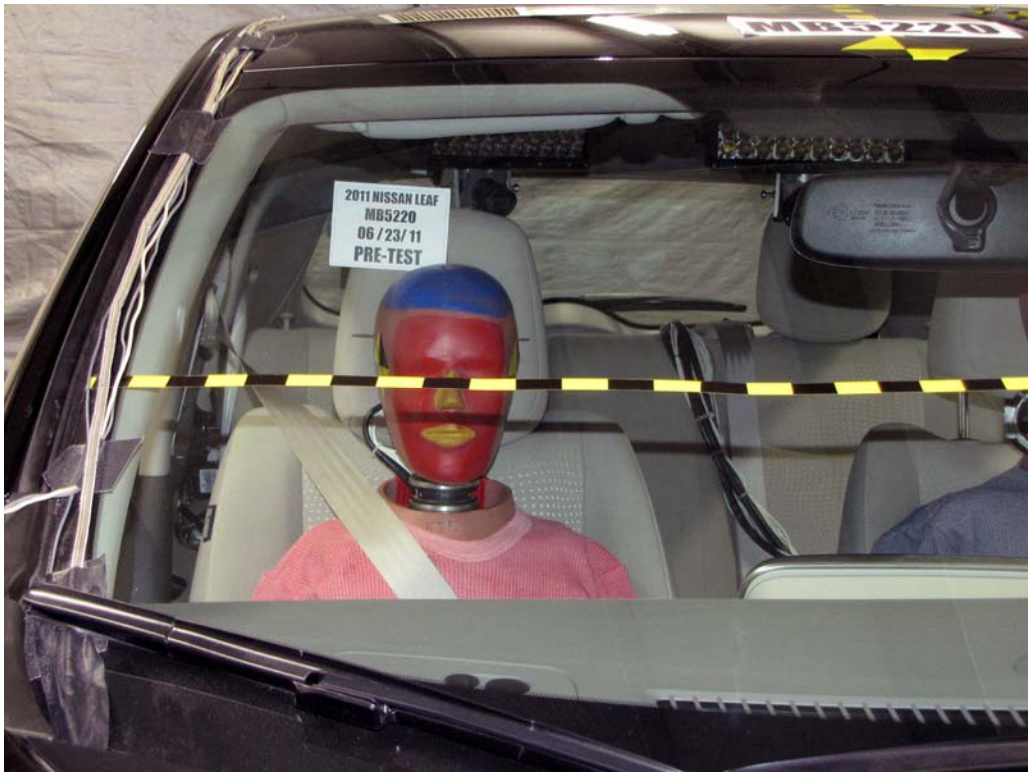


FIGURE 46. Pre-Test Passenger Dummy Front View

FIGURE 47. Post-Test Passenger Dummy Front View

FIGURE 48. Pre-Test Passenger Dummy Window View

FIGURE 49. Post-Test Passenger Dummy Window View

FIGURE 50. Pre-Test Passenger Dummy and Vehicle Interior View

FIGURE 51. Post-Test Passenger Dummy and Vehicle Interior View

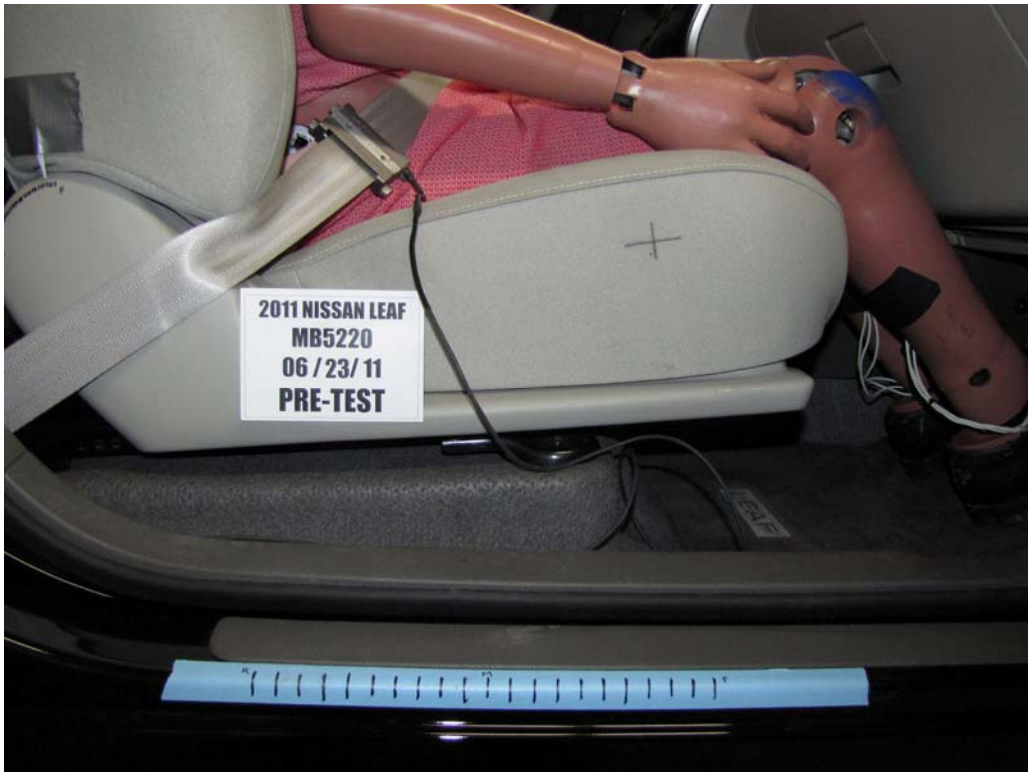


FIGURE 52. Pre-Test Passenger's Seat Fore-Aft Markings

FIGURE 53. Post-Test Passenger's Seat Fore-Aft Markings

FIGURE 54. Pre-Test Passenger Dummy Feet

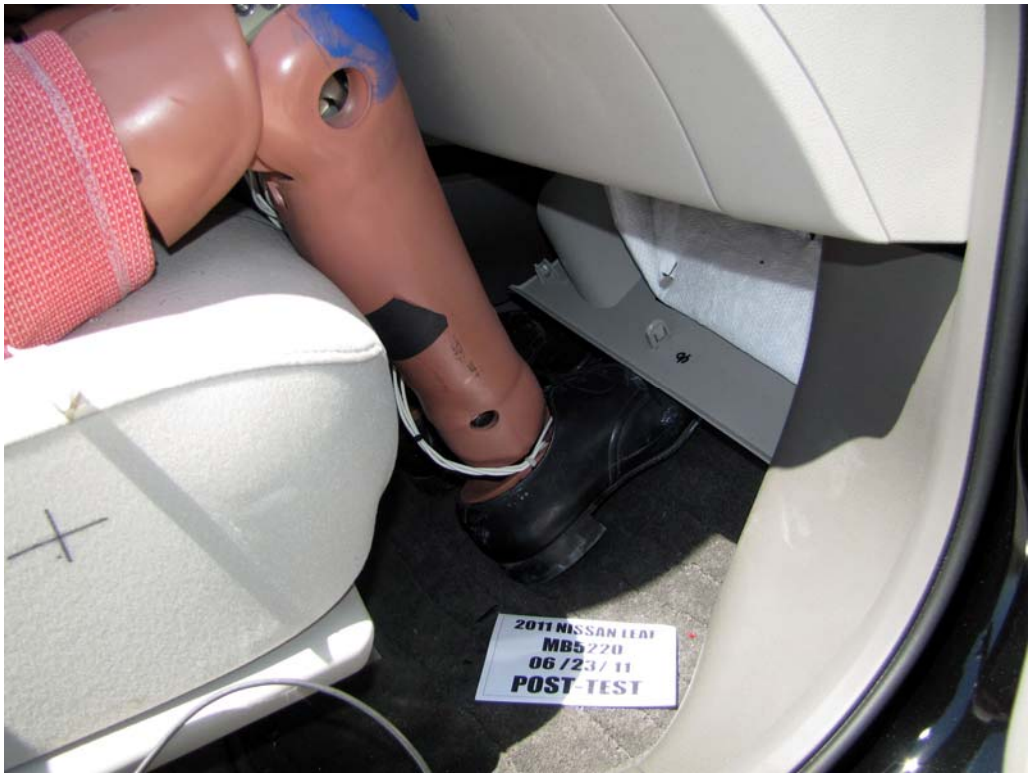


FIGURE 55. Post-Test Passenger Dummy Feet

FIGURE 56. Pre-Test Passenger's Side Knee Bolster

FIGURE 57. Post-Test Passenger's Side Knee Bolster

Photograph Not Available

FIGURE 58. Pre-Test Passenger's Side Floorpan

FIGURE 59. Post-Test Passenger's Side Floorpan

FIGURE 60. Post-Test Passenger Dummy Contact With Airbag

FIGURE 60a. Post-Test Passenger Dummy Contact With Head Restraint

FIGURE 60b. Post-Test Passenger Dummy Contact With Glovebox

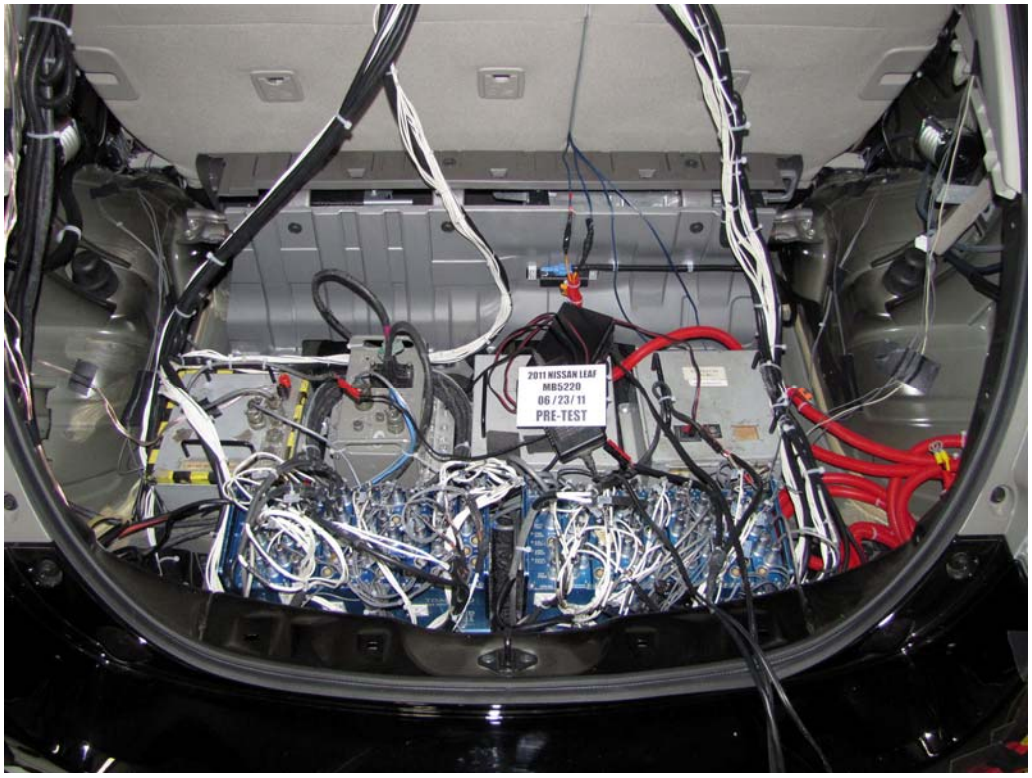


FIGURE 61. Pre-Test of Ballast Installed in Vehicle

Photograph Not Applicable

Stoddard Solvent Not Added

FIGURE 62. Post-Test Stoddard Solvent Spillage Location

FIGURE 63. Post-Test Speed Trap Read Out

FIGURE 64. Vehicle at 0°on Static Rollover Device

FIGURE 65. Vehicle at 90°on Static Rollover Device

FIGURE 66. Vehicle at 180°on Static Rollover Device

FIGURE 67. Vehicle at 270°on Static Rollover Device

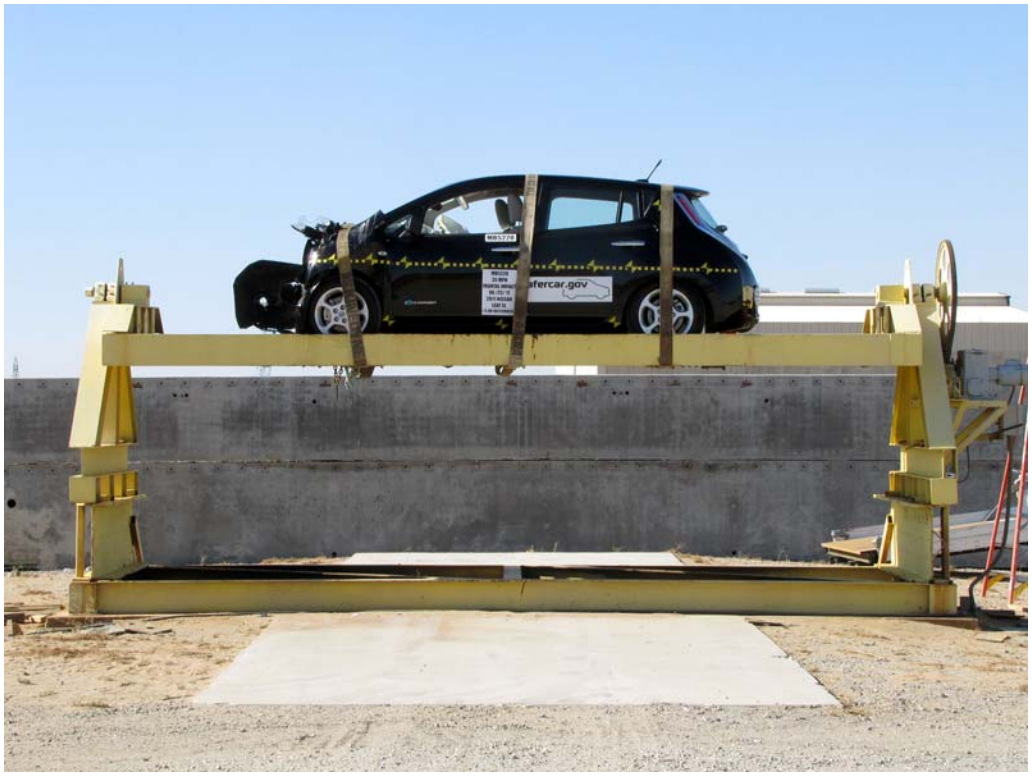


FIGURE 68. Vehicle at 360°on Static Rollover Device

FIGURE 69. Impact Event

FIGURE 70. Monroney Label Photograph

FIGURE 71. Electric System Label

FIGURE 72. Electric System Label

FIGURE 73. Electric System Label

FIGURE 74. Electric System Label

FIGURE 75. Electric System Label

FIGURE 76. Pre-Test Electric Drive Motor

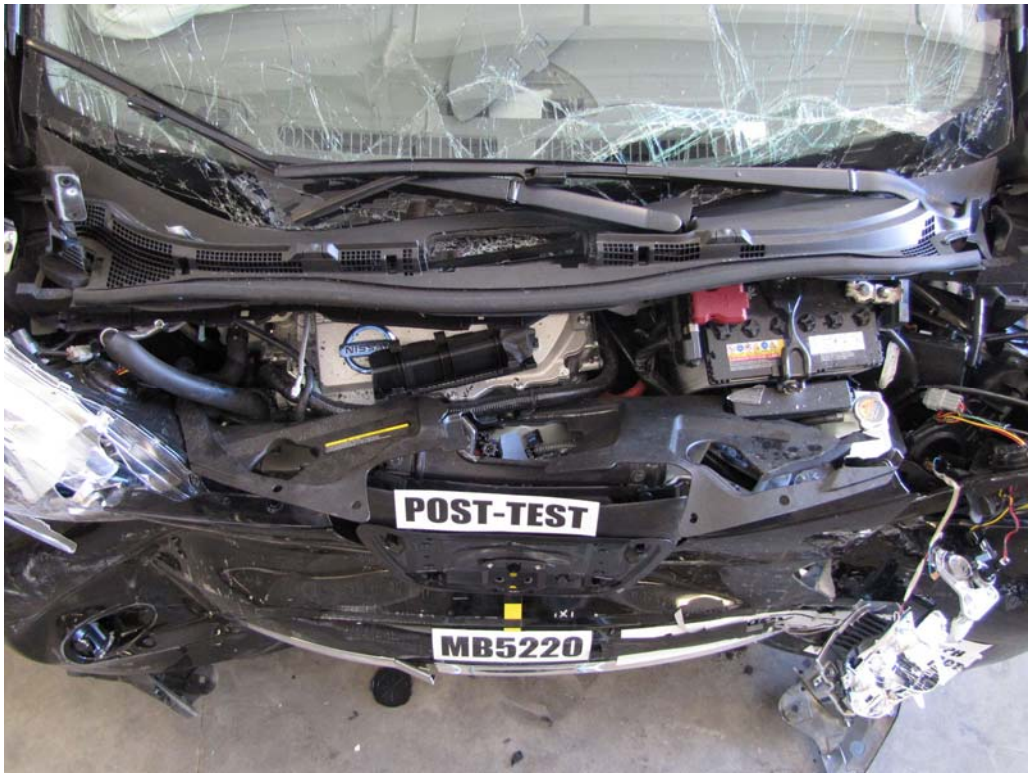


FIGURE 77. Post-Test Electric Drive Motor

FIGURE 78. Pre-Test Propulsion Battery Disconnect

FIGURE 79. Post-Test Propulsion Battery Disconnect

FIGURE 80. Pre-Test Battery Charging Port

FIGURE 81. Post-Test Battery Charging Port

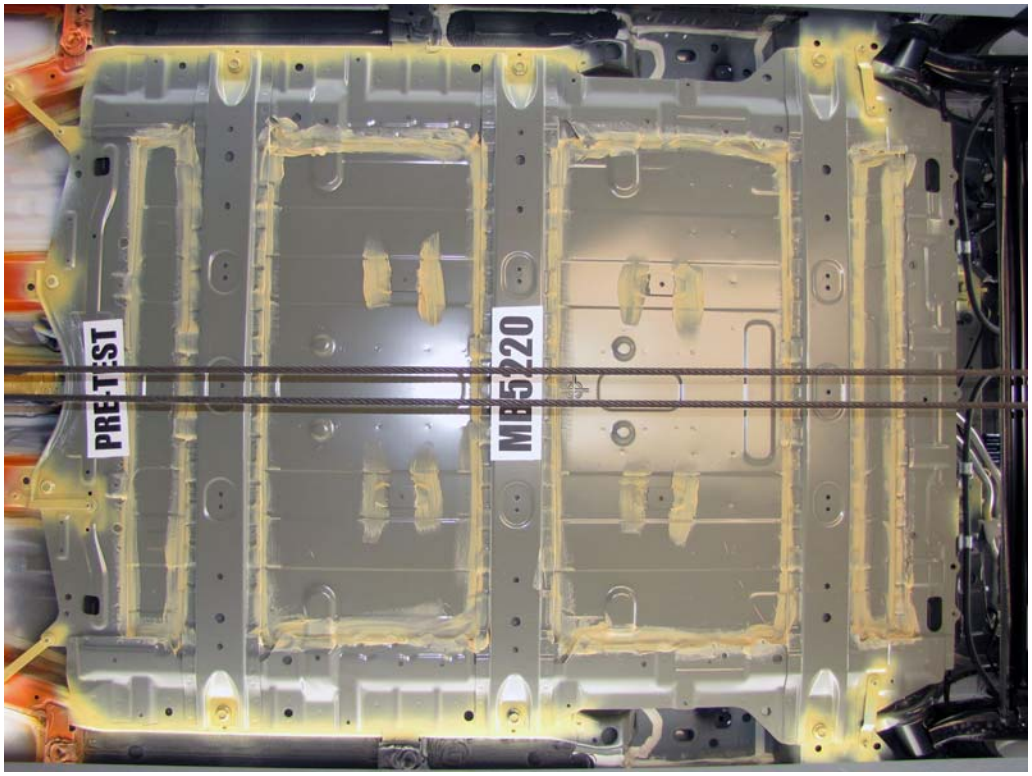


FIGURE 82. Pre-Test Battery Pack Assembly

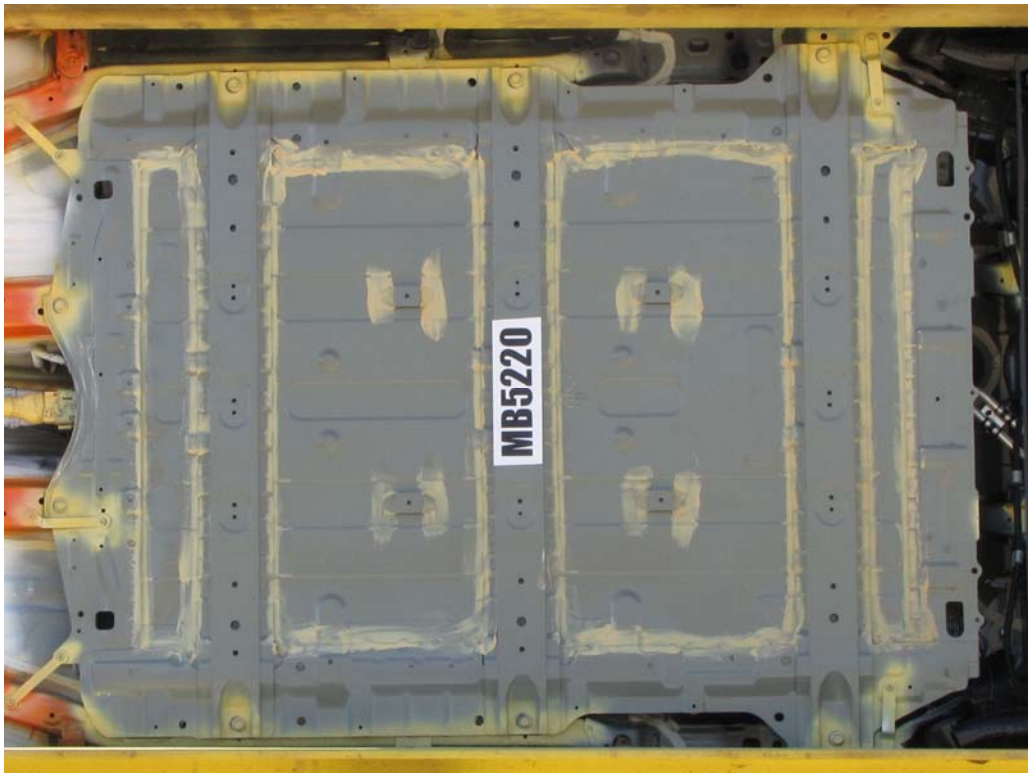


FIGURE 83. Post-Test Battery Pack Assembly

FIGURE 84. Pre-Test Battery Mounting Hardware

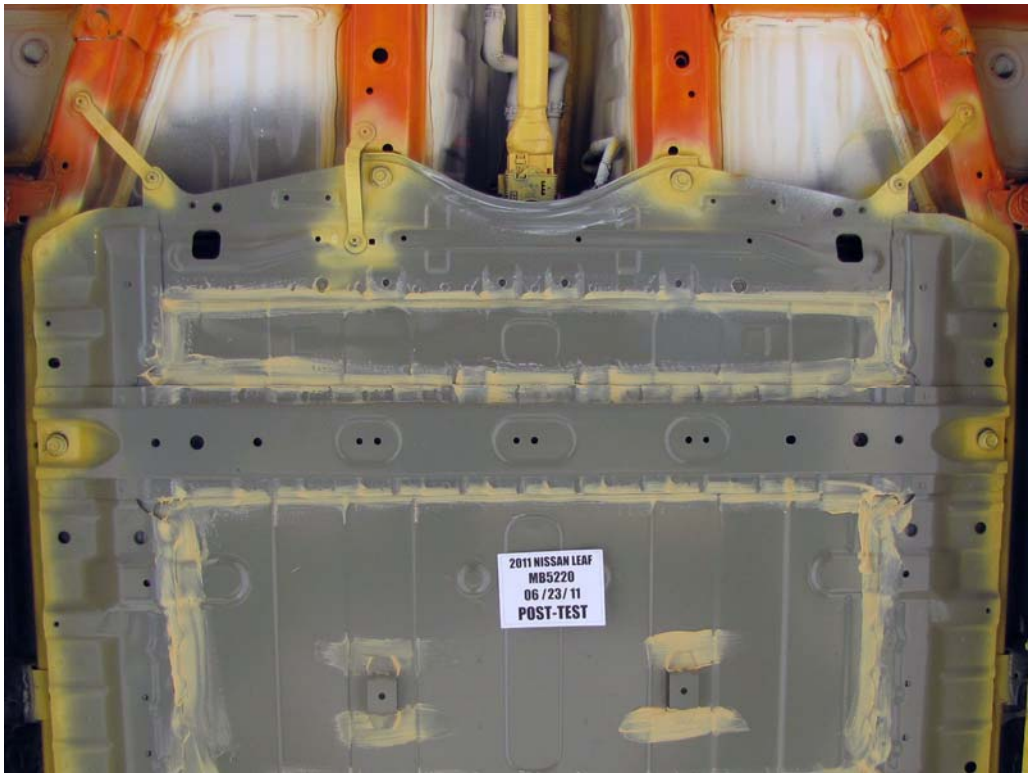


FIGURE 85. Post-Test Battery Mounting Hardware

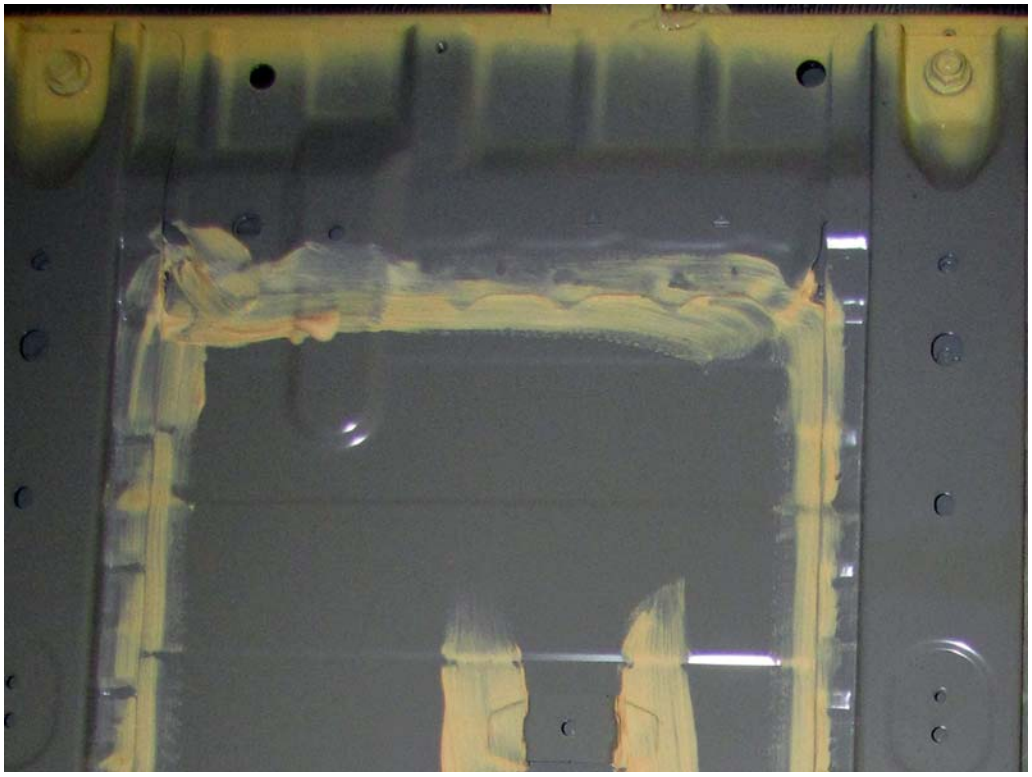


FIGURE 86. Pre-Test Battery Mounting Hardware

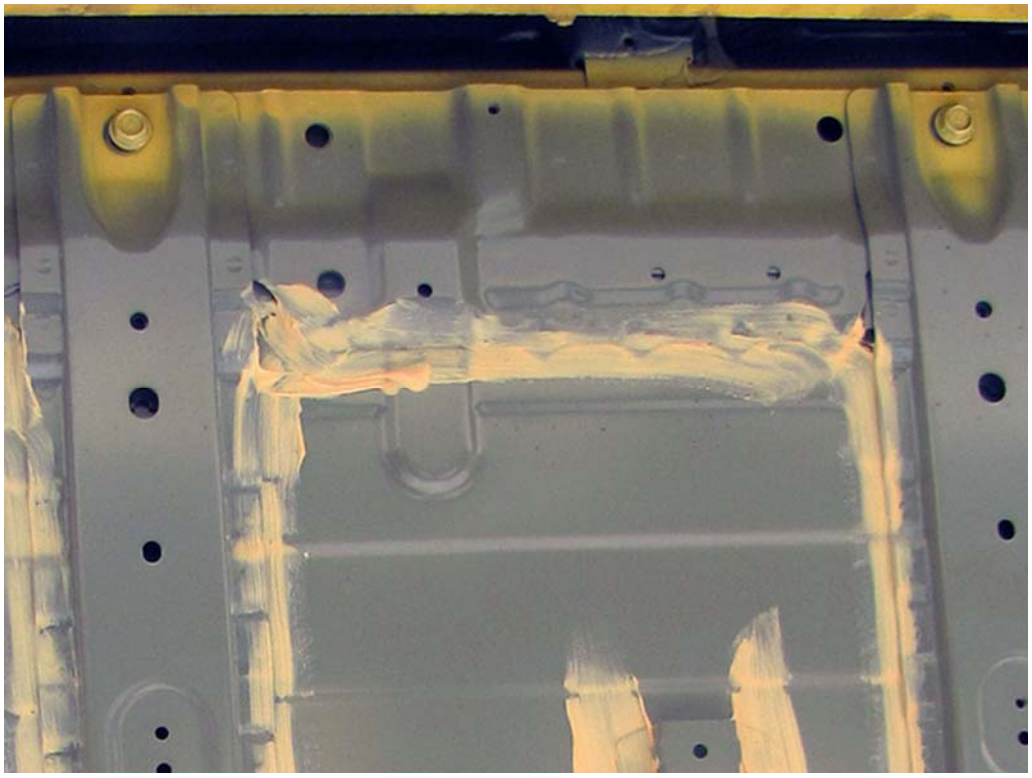


FIGURE 87. Post-Test Battery Mounting Hardware

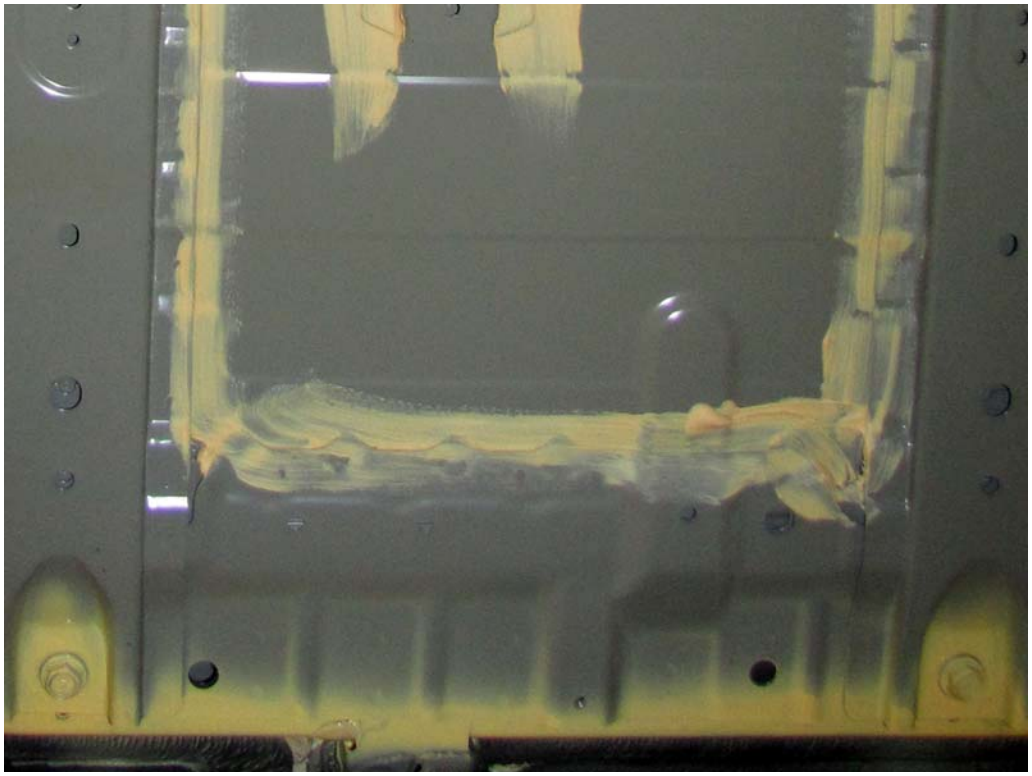


FIGURE 88. Pre-Test Battery Mounting Hardware

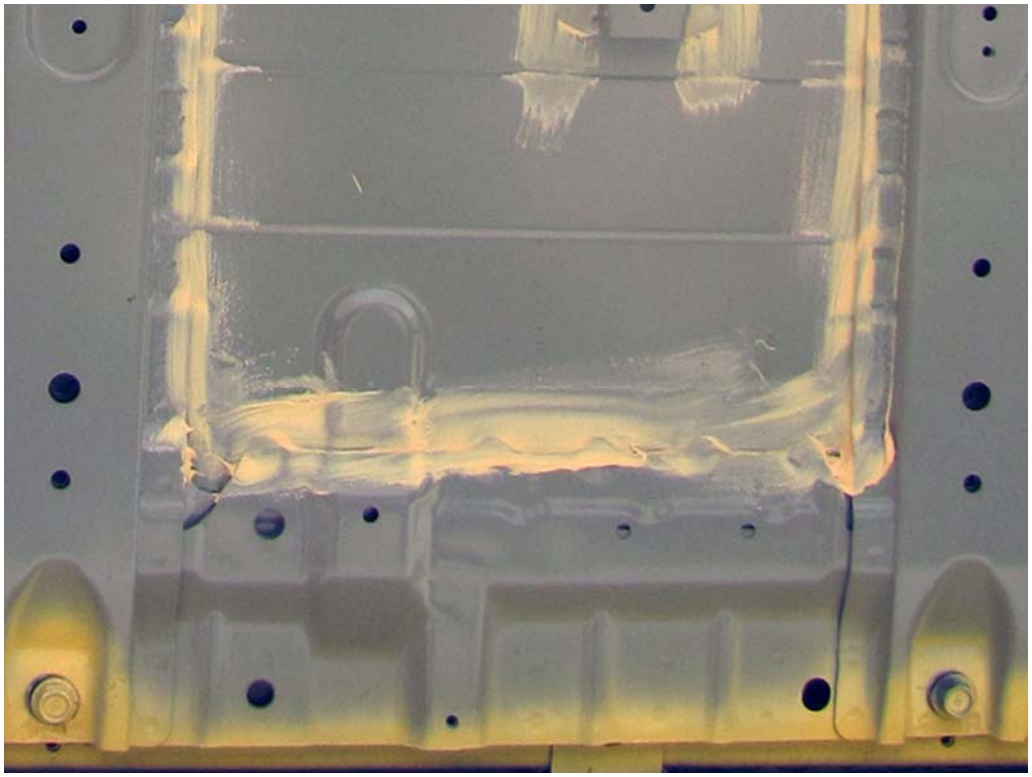


FIGURE 89. Post-Test Battery Mounting Hardware

FIGURE 90. Pre-Test Battery Mounting Hardware

FIGURE 91. Post-Test Battery Mounting Hardware

FIGURE 92. Pre-Test High Voltage Connections

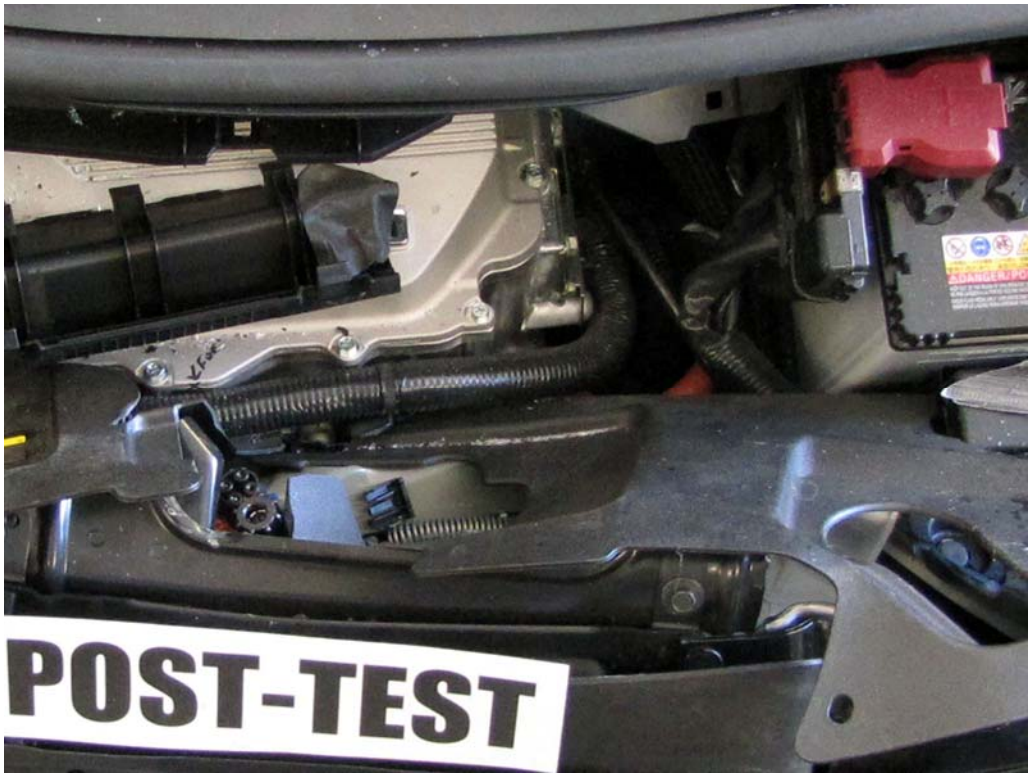


FIGURE 93. Post-Test High Voltage Connections

FIGURE 94. Pre-Test High Voltage Connections

FIGURE 95. Post-Test High Voltage Connections

FIGURE 96. Pre-Test High Voltage Connections

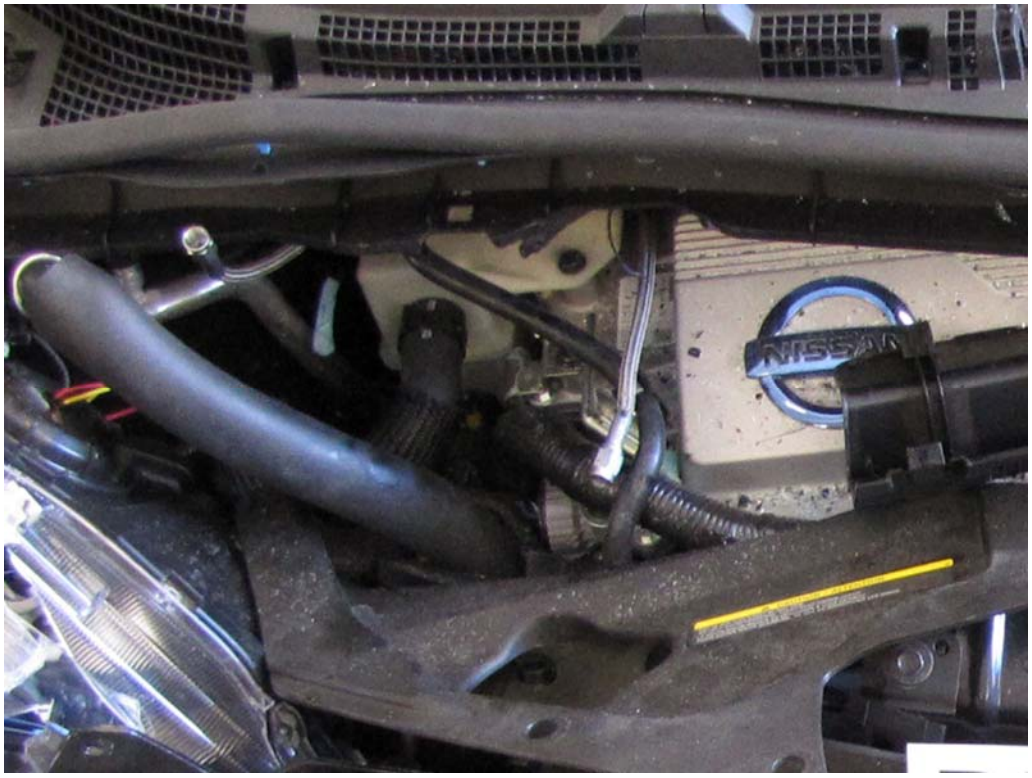


FIGURE 97. Post-Test High Voltage Connections

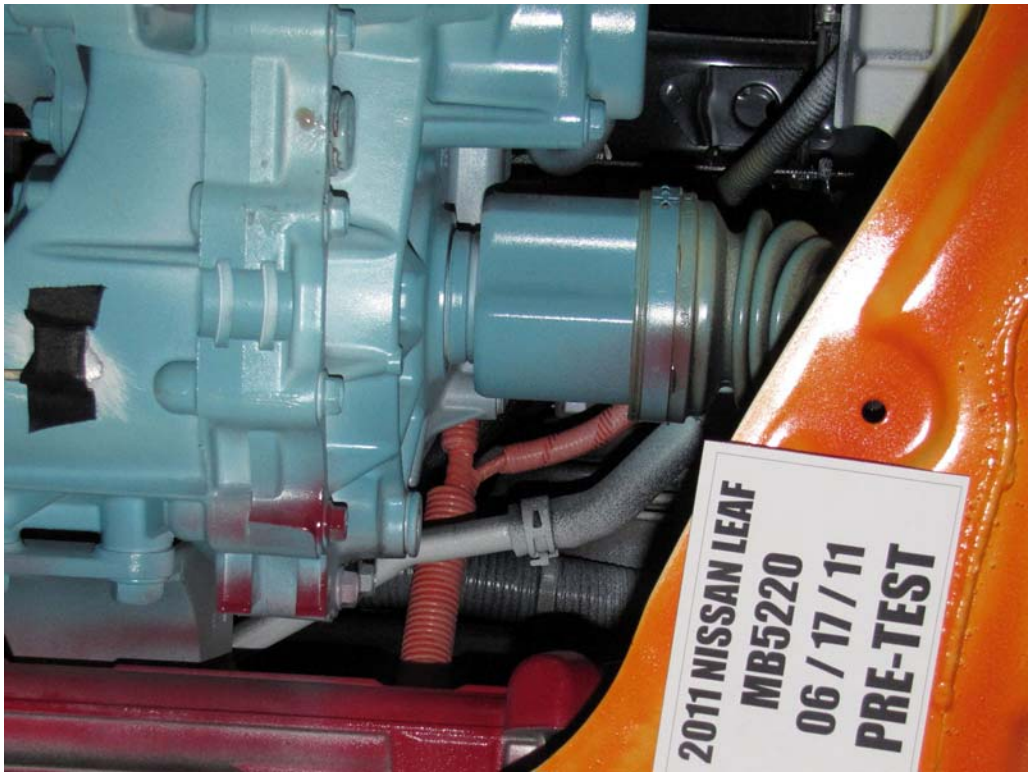


FIGURE 98. Pre-Test High Voltage Connections

FIGURE 99. Post-Test High Voltage Connections

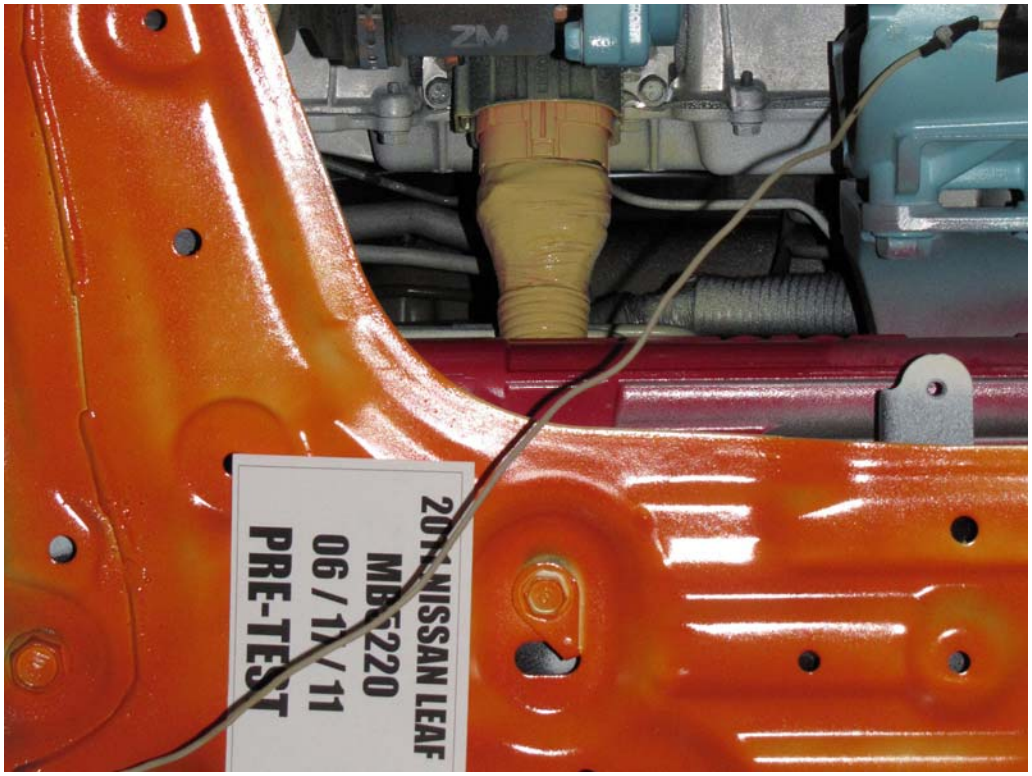


FIGURE 100. Pre-Test High Voltage Connections

FIGURE 101. Post-Test High Voltage Connections

FIGURE 102. Pre-Test High Voltage Connections

FIGURE 103. Post-Test High Voltage Connections

Photograph Not Applicable
No Electrolyte Leakage

FIGURE 104. Post-Test Electrolyte Leakage

FIGURE 105. Pre-Test FMVSS 305 Measuring Equipment

FIGURE 106. Post-Test FMVSS 305 Measuring Equipment

APPENDIX B
DUMMY RESPONSE DATA TRACES

TABLE OF DATA PLOTS

The following additional dummy and vehicle response data can be found in the R&D section of the NHTSA website at www.nhtsa.dot.gov

Driver Head X Acceleration Redundant
Driver Head Y Acceleration Redundant
Driver Head Z Acceleration Redundant
Driver Upper Neck Force Y
Driver Upper Neck Moment X
Driver Upper Neck Moment Z
Driver Chest X Acceleration Redundant
Driver Chest Y Acceleration Redundant
Driver Chest Z Acceleration Redundant
Driver Pelvis X
Driver Pelvis Y
Driver Pelvis Z
Driver Left Femur Force Z Redundant
Driver Right Femur Force Z Redundant
Driver Shoulder Belt Force
Driver Lap Belt Force
Driver Left Upper Tibia Moment X
Driver Left Upper Tibia Moment Y
Driver Left Upper Tibia Force Z
Driver Left Lower Tibia Moment X
Driver Left Lower Tibia Moment Y
Driver Left Lower Tibia Force Z
Driver Right Upper Tibia Moment X
Driver Right Upper Tibia Moment Y
Driver Right Upper Tibia Force Z
Driver Right Lower Tibia Moment X
Driver Right Lower Tibia Moment Y
Driver Right Lower Tibia Force Z
Driver Left Foot Fore Z
Driver Left Foot Aft X
Driver Left Foot Aft Z
Driver Right Foot Fore Z
Driver Right Foot Aft X

Driver Right Foot Aft Z
Passenger Head X Acceleration Redundant
Passenger Head Y Acceleration Redundant
Passenger Head Z Acceleration Redundant
Passenger Upper Neck Force X
Passenger Upper Neck Force Z
Passenger Upper Neck Moment Y
Passenger Chest X Acceleration Redundant
Passenger Chest Y Acceleration Redundant
Passenger Chest Z Acceleration Redundant
Passenger Pelvis X
Passenger Pelvis Y
Passenger Pelvis Z
Passenger Left Femur Force Z Redundant
Passenger Right Femur Force Z Redundant
Passenger Shoulder Belt Force
Passenger Lap Belt Force
Passenger Left Upper Tibia Moment X
Passenger Left Upper Tibia Moment Y
Passenger Left Upper Tibia Force Z
Passenger Left Lower Tibia Moment X
Passenger Left Lower Tibia Moment Y
Passenger Left Lower Tibia Force Z
Passenger Right Upper Tibia Moment X
Passenger Right Upper Tibia Moment Y
Passenger Right Upper Tibia Force Z
Passenger Right Lower Tibia Moment X
Passenger Right Lower Tibia Moment Y
Passenger Right Lower Tibia Force Z
Passenger Left Foot Fore Z
Passenger Left Foot Aft X
Passenger Left Foot Aft Z
Passenger Right Foot Fore Z
Passenger Right Foot Aft X
Passenger Right Foot Aft Z
Left Rear Seat Crossmember X

Left Rear Seat Crossmember Z

Right Rear Seat Crossmember X

Right Rear Seat Crossmember Z

Vehicle Engine Top X

Vehicle Engine Bottom X

Vehicle Left Brake Caliper X

Vehicle Right Brake Caliper X

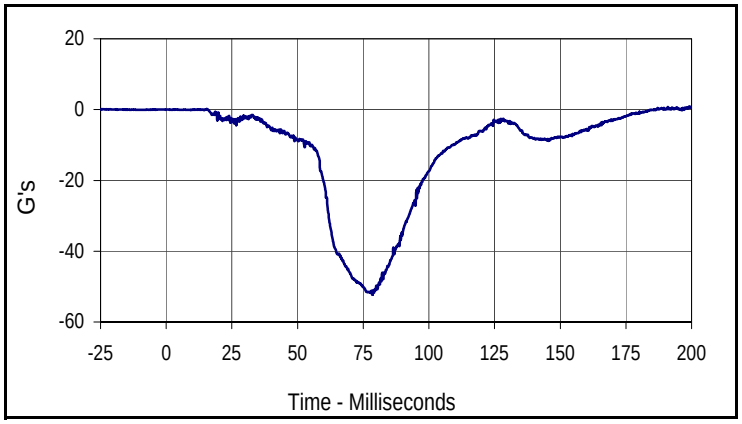
Load Cell Barrier A1-A9

Load Cell Barrier B1-B9

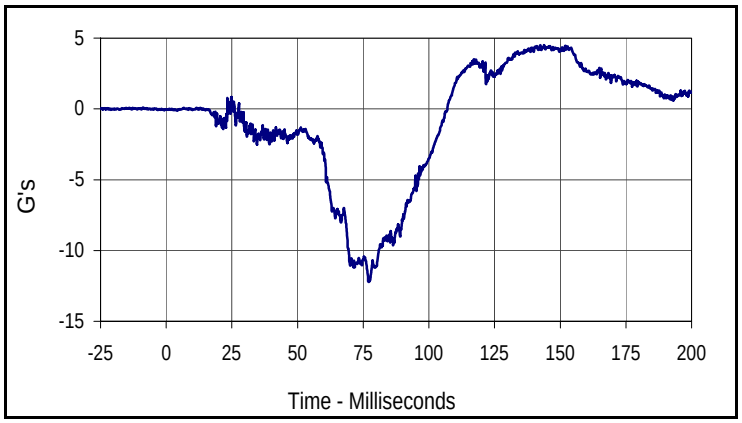
Load Cell Barrier C1-C9

Load Cell Barrier D1-D9

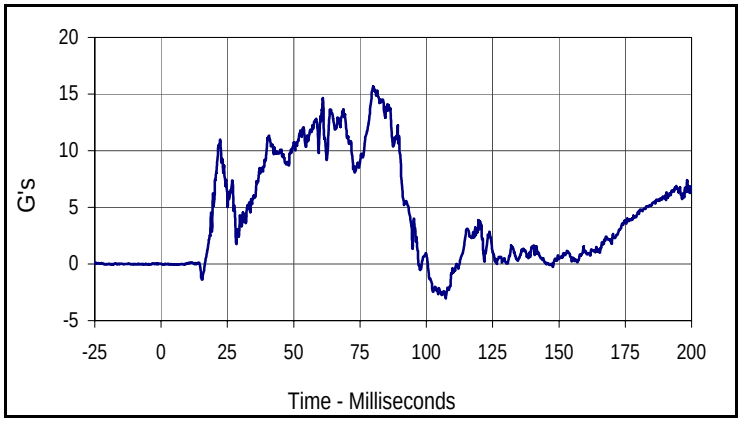
Test Vehicle:	2011 Nissan Leaf SL 5-Door Hatchback	Test Date:	6/23/11
Test Program:	56 km/h (35 mph) Frontal Impact NCAP Rigid Barrier Test	NHTSA No.:	MB5220



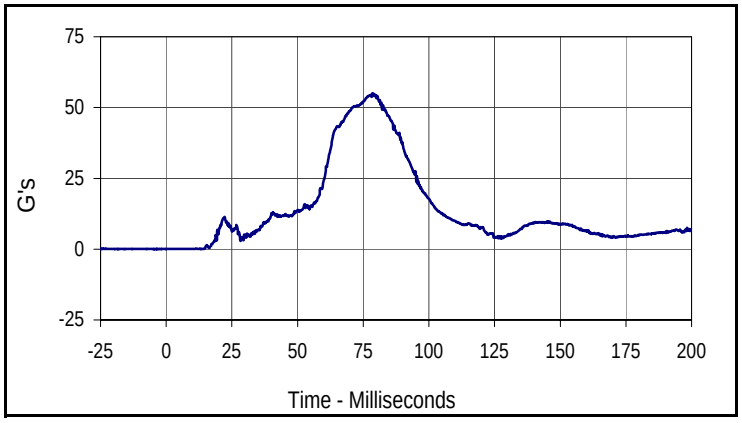
Curve Description			
Driver Head Acceleration X Primary			
CURNO	Type	SAE Class	Units
001	FIL	1000	G's
Max	Time	Min	Time
0.9	199.1	-52.3	78.5



Curve Description			
Driver Head Acceleration Y Primary			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
4.5	142.4	-12.2	77.1

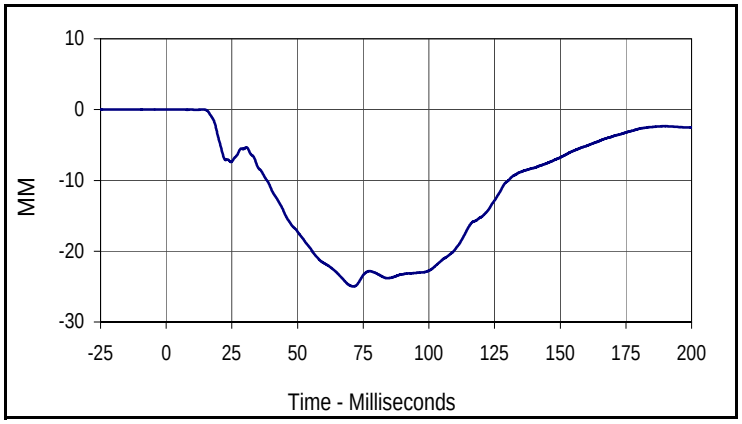


Curve Description			
Driver Head Acceleration Z Primary			
CURNO	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
15.7	80.0	-3.0	107.3

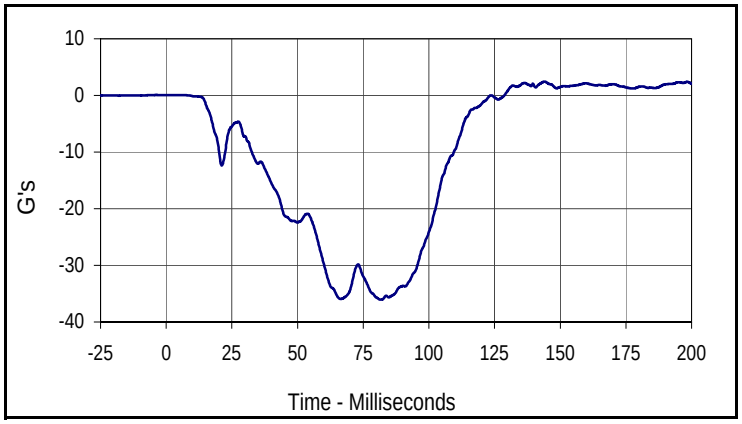


Curve Description			
Driver Head Resultant Acceleration Primary			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
55.0	78.5	0.0	13.4

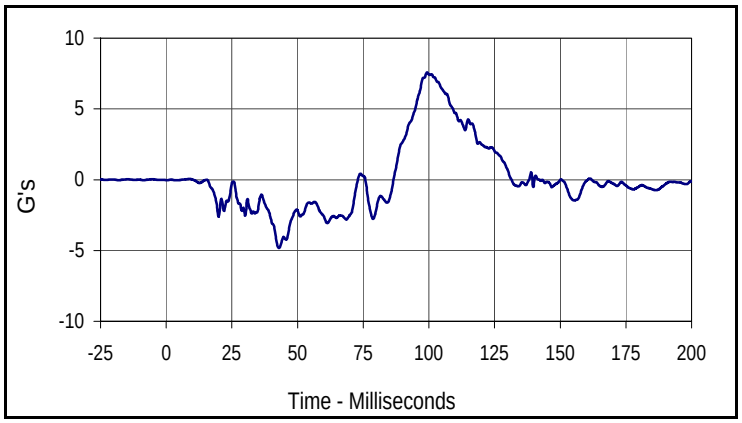
Test Vehicle:	2011 Nissan Leaf SL 5-Door Hatchback	Test Date:	6/23/11
Test Program:	56 km/h (35 mph) Frontal Impact NCAP Rigid Barrier Test	NHTSA No.:	MB5220



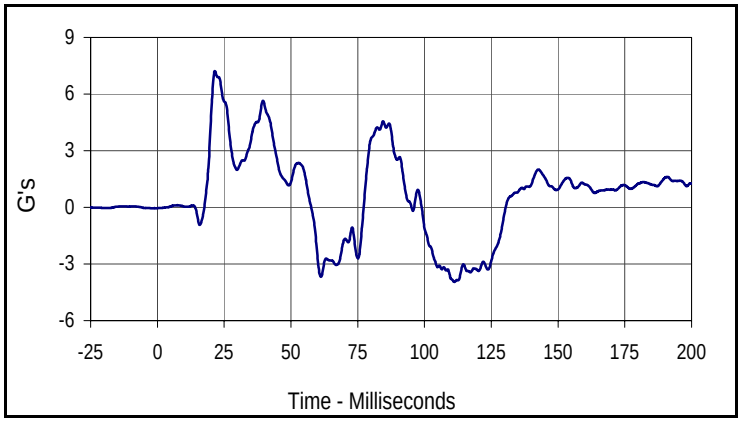
Curve Description			
Driver Chest Deflection			
CURNO	Type	SAE Class	Units
019	FIL	180	MM
Max	Time	Min	Time
0.0	0.0	-25.0	71.3



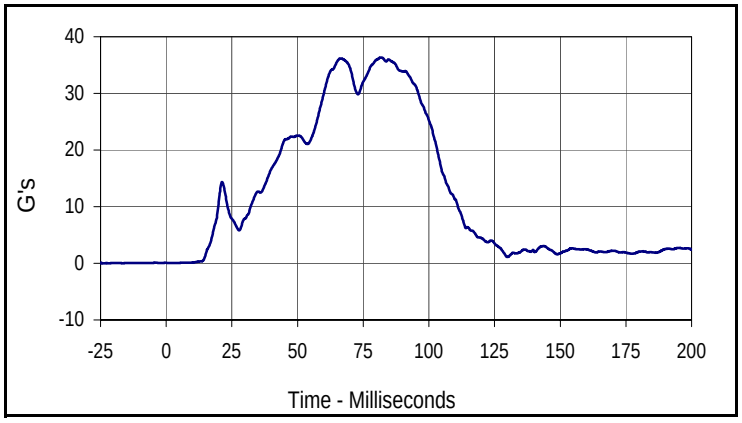
Curve Description			
Driver Chest Acceleration X Primary			
CURNO	Type	SAE Class	Units
013	FIL	180	G's
Max	Time	Min	Time
2.4	143.9	-36.1	81.6



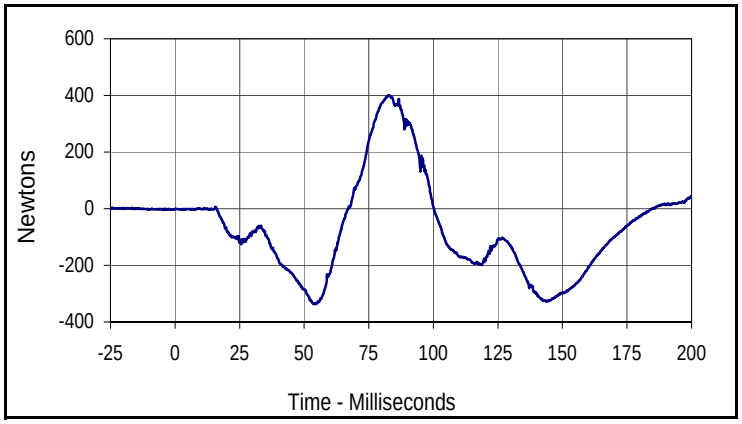
Curve Description			
Driver Chest Acceleration Y Primary			
CURNO	Type	SAE Class	Units
014	FIL	180	G's
Max	Time	Min	Time
7.6	99.3	-4.8	42.9



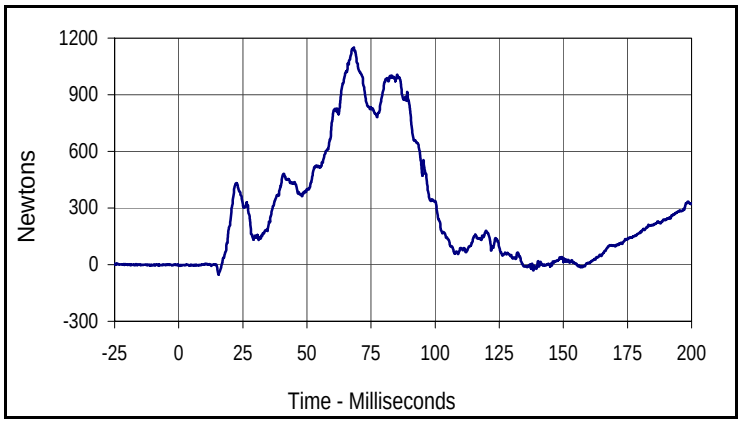
Curve Description			
Driver Chest Acceleration Z Primary			
CURNO	Type	SAE Class	Units
015	FIL	180	G's
Max	Time	Min	Time
7.2	21.5	-3.9	111.2



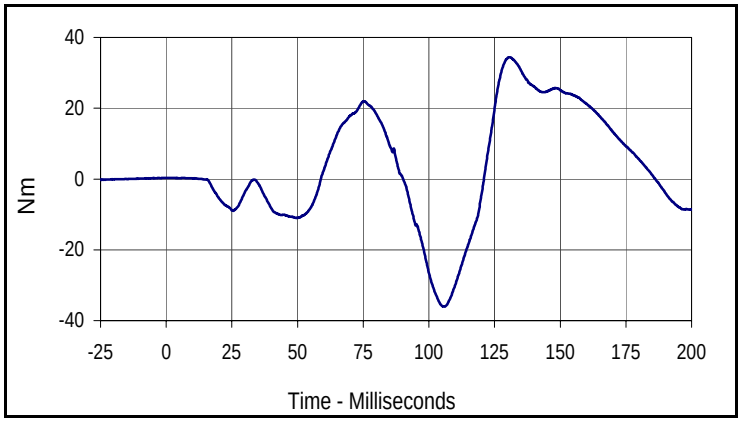
Curve Description			
Driver Chest Resultant Acceleration Primary			
CURNO	Type	SAE Class	Units
013	RES	180	G's
Max	Time	Min	Time
36.3	81.8	0.1	3.2



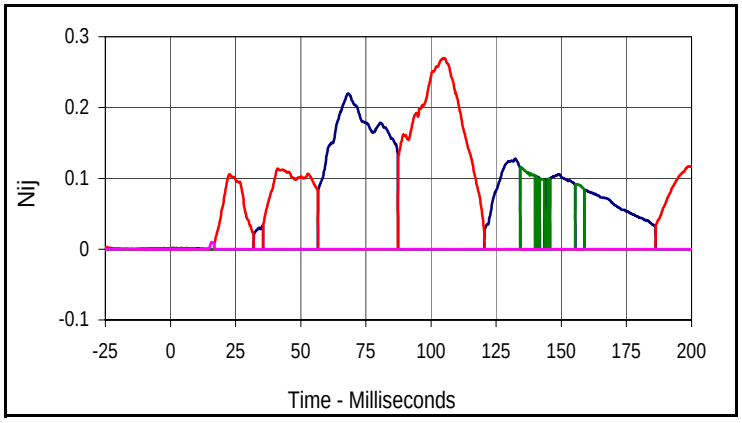
Curve Description			
Driver Upper Neck Force X			
CURNO	Type	SAE Class	Units
007	FIL	1000	Newtons
Max	Time	Min	Time
401.0	82.7	-336.8	53.7



Curve Description			
Driver Upper Neck Force Z			
CURNO	Type	SAE Class	Units
009	FIL	1000	Newtons
Max	Time	Min	Time
1150.9	68.3	-52.0	15.5

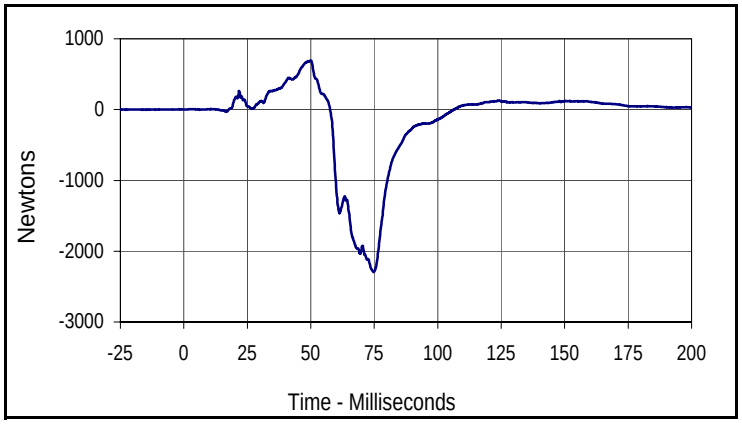


Curve Description			
Driver Upper Neck Moment Y			
CURNO	Type	SAE Class	Units
011	FIL	600	Nm
Max	Time	Min	Time
34.4	130.3	-36.1	105.5

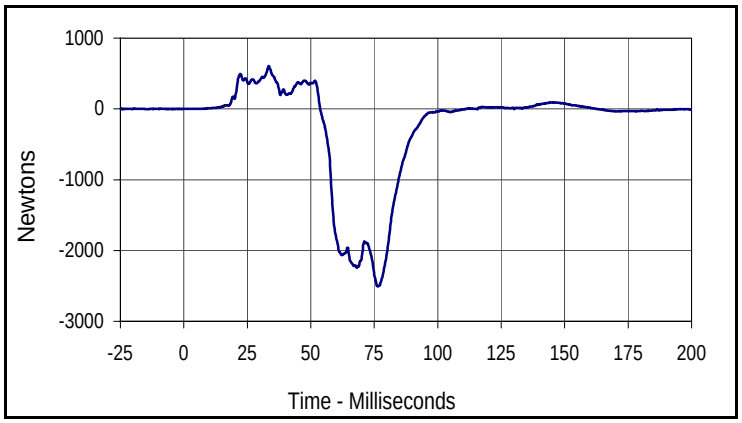


Curve Description			
Driver Nij			
Units	Type	Max	Time
Ntf	FIL	0.22	68.3
Units	Type	Max	Time
Nte	FIL	0.27	104.7
Units	Type	Max	Time
Ncf	FIL	0.12	134.5
Units	Type	Max	Time
Nce	FIL	0.21	243.1

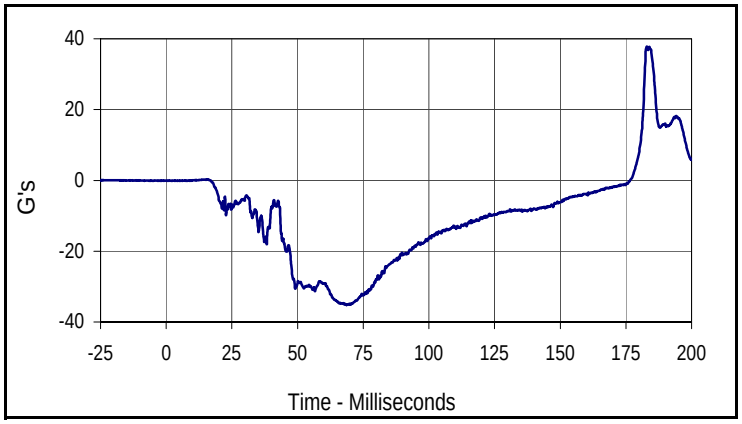
Test Vehicle:	2011 Nissan Leaf SL 5-Door Hatchback	Test Date:	6/23/11
Test Program:	56 km/h (35 mph) Frontal Impact NCAP Rigid Barrier Test	NHTSA No.:	MB5220



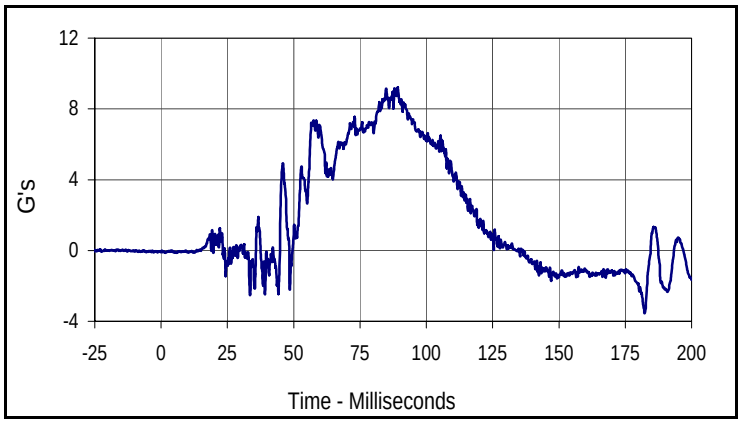
Curve Description			
Driver Driver Left Femur			
CURNO	Type	SAE Class	Units
023	FIL	600	Newtons
Max	Time	Min	Time
692.8	50.1	-2294.0	74.7



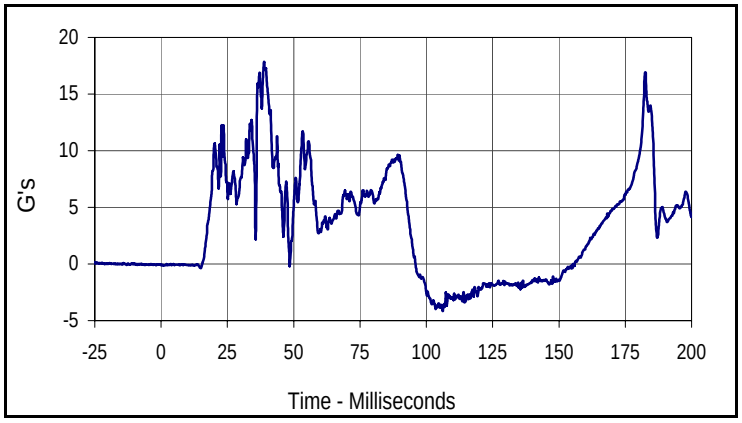
Curve Description			
Driver Driver Right Femur			
CURNO	Type	SAE Class	Units
024	FIL	600	Newtons
Max	Time	Min	Time
604.8	33.4	-2505.6	76.4



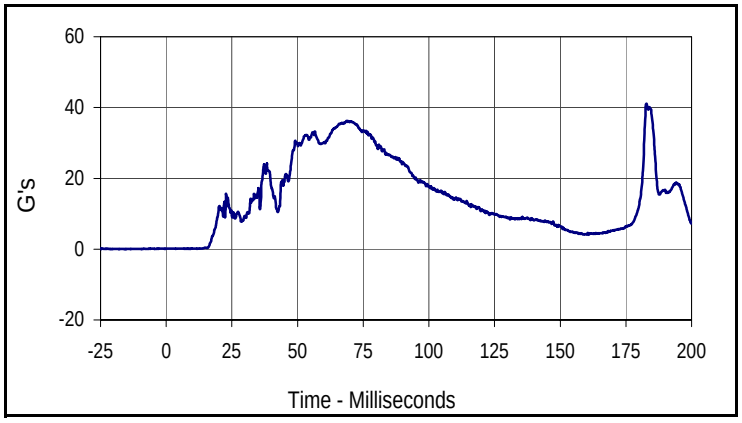
Curve Description			
Passenger Head Acceleration X Primary			
CURNO	Type	SAE Class	Units
045	FIL	1000	G's
Max	Time	Min	Time
37.8	183.0	-35.2	68.6



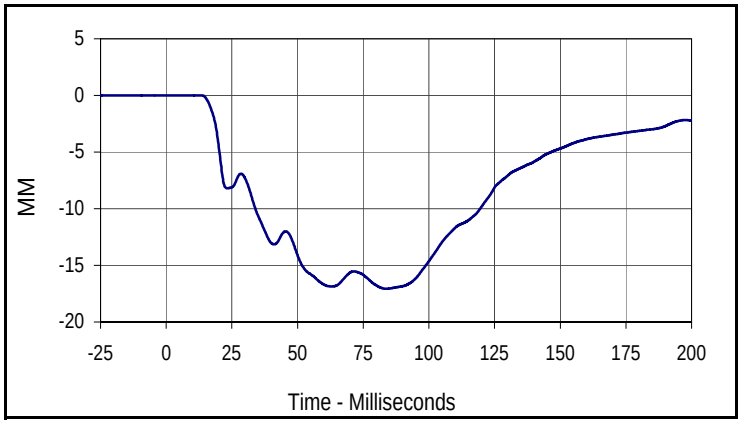
Curve Description			
Passenger Head Acceleration Y Primary			
CURNO	Type	SAE Class	Units
046	FIL	1000	G's
Max	Time	Min	Time
9.2	89.2	-3.6	182.3



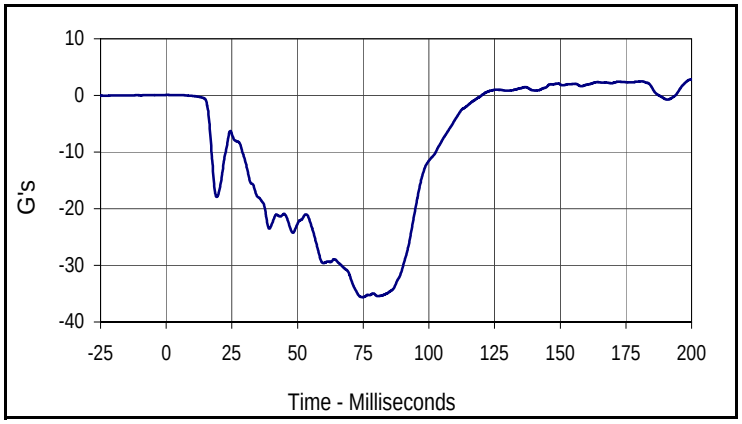
Curve Description			
Passenger Head Acceleration Z Primary			
CURNO	Type	SAE Class	Units
047	FIL	1000	G's
Max	Time	Min	Time
17.8	38.8	-4.1	106.2



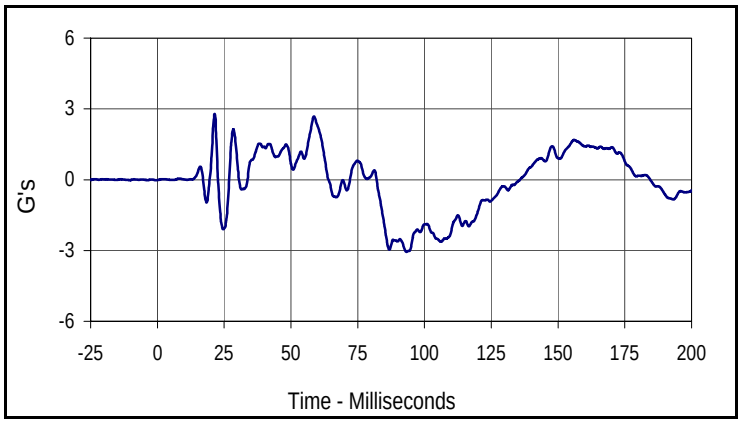
Curve Description			
Passenger Head Resultant Acceleration Primary			
CURNO	Type	SAE Class	Units
045	RES	1000	G's
Max	Time	Min	Time
41.1	182.8	0.1	9.2



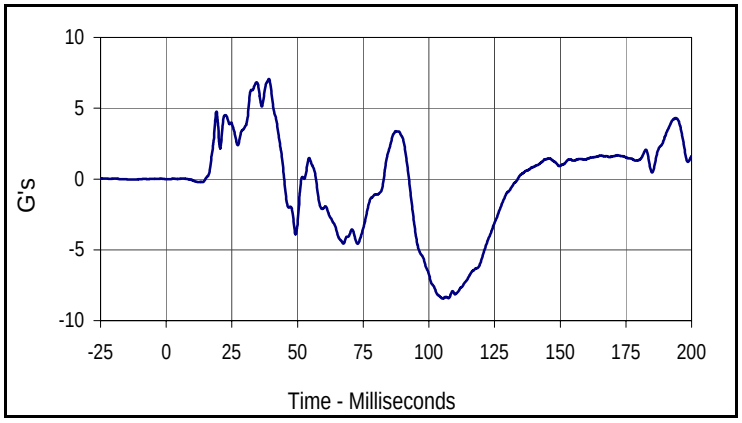
Curve Description			
Passenger Chest Deflection			
CURNO	Type	SAE Class	Units
063	FIL	180	MM
Max	Time	Min	Time
0.0	13.2	-17.1	83.6



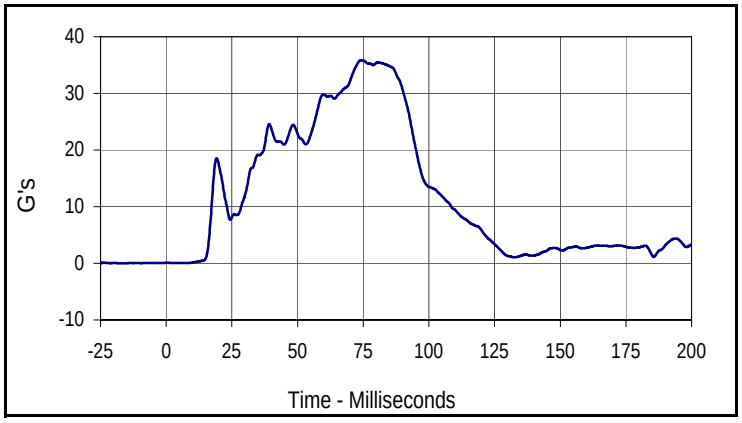
Curve Description			
Passenger Chest Acceleration X Primary			
CURNO	Type	SAE Class	Units
057	FIL	180	G's
Max	Time	Min	Time
2.8	200.0	-35.6	74.8



Curve Description			
Passenger Chest Acceleration Y Primary			
CURNO	Type	SAE Class	Units
058	FIL	180	G's
Max	Time	Min	Time
2.8	21.5	-3.1	93.2

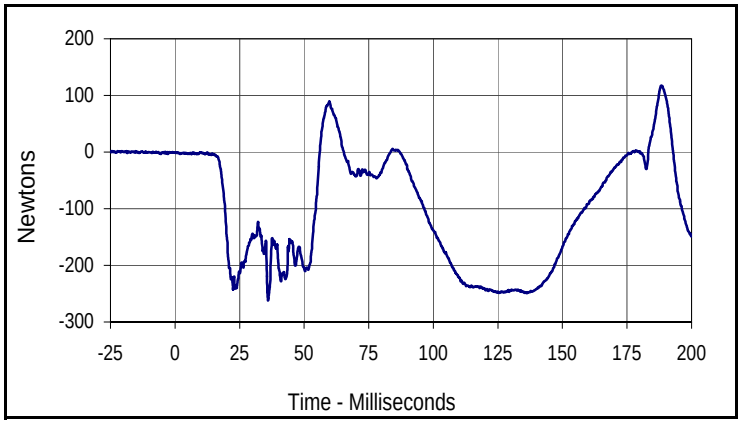


Curve Description			
Passenger Chest Acceleration Z Primary			
CURNO	Type	SAE Class	Units
059	FIL	180	G's
Max	Time	Min	Time
7.1	39.1	-8.4	105.3

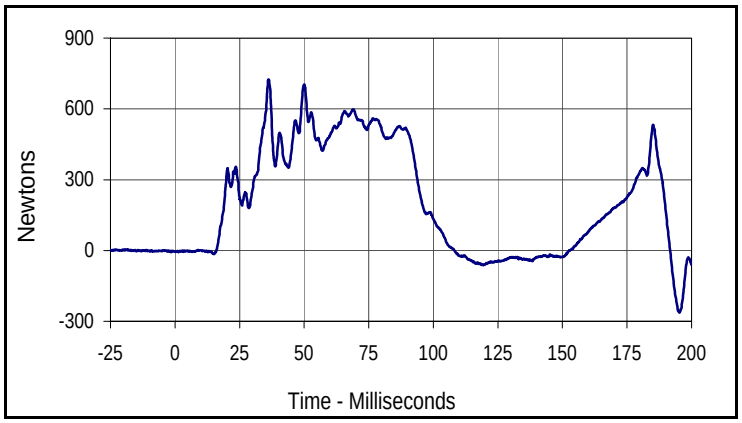


Curve Description			
Passenger Chest Resultant Acceleration Primary			
CURNO	Type	SAE Class	Units
057	RES	180	G's
Max	Time	Min	Time
35.8	74.3	0.0	7.3

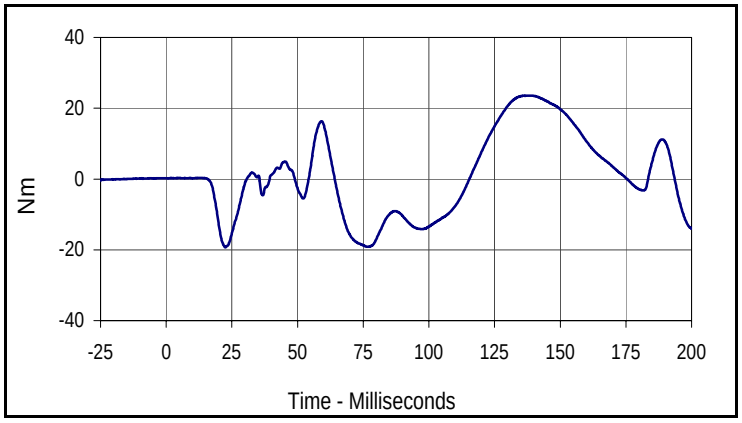
Test Vehicle:	2011 Nissan Leaf SL 5-Door Hatchback	Test Date:	6/23/11
Test Program:	56 km/h (35 mph) Frontal Impact NCAP Rigid Barrier Test	NHTSA No.:	MB5220



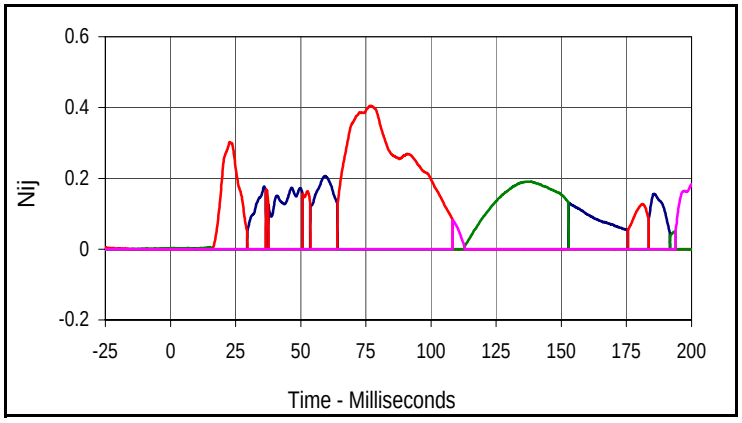
Curve Description			
Passenger Upper Neck Force X			
CURNO	Type	SAE Class	Units
051	FIL	1000	Newtons
Max	Time	Min	Time
117.5	188.3	-262.1	36.0



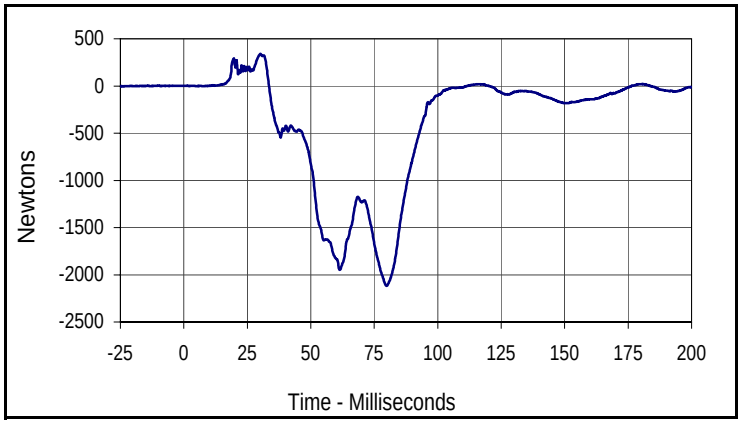
Curve Description			
Passenger Upper Neck Force Z			
CURNO	Type	SAE Class	Units
053	FIL	1000	Newtons
Max	Time	Min	Time
724.7	36.2	-263.0	195.3



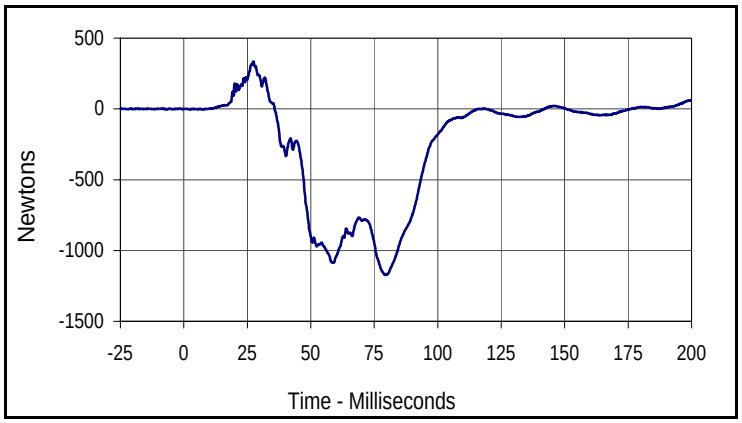
Curve Description			
Passenger Upper Neck Moment Y			
CURNO	Type	SAE Class	Units
055	FIL	600	Nm
Max	Time	Min	Time
23.6	137.7	-19.3	22.5



Curve Description			
Passenger Nij			
Units	Type	Max	Time
Ntf	FIL	0.21	59.3
Units	Type	Max	Time
Nte	FIL	0.40	76.7
Units	Type	Max	Time
Ncf	FIL	0.19	138.5
Units	Type	Max	Time
Nce	FIL	0.19	200.5



Curve Description			
Passenger Passenger Left Femur			
CURNO	Type	SAE Class	Units
067	FIL	600	Newtons
Max	Time	Min	Time
339.9	30.2	-2118.4	79.8



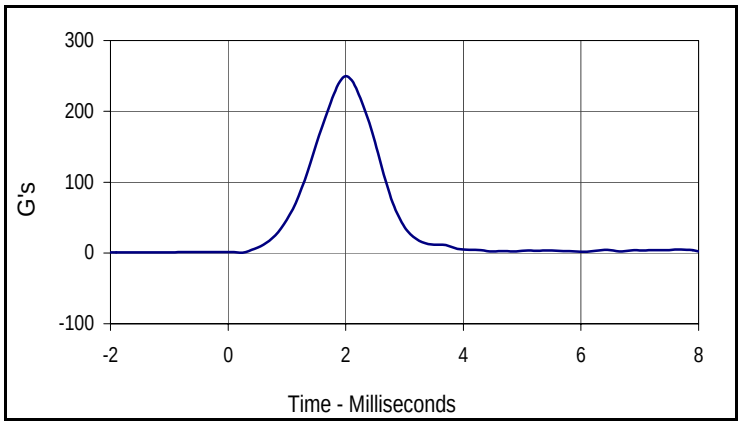
Curve Description			
Passenger Passenger Right Femur			
CURNO	Type	SAE Class	Units
068	FIL	600	Newtons
Max	Time	Min	Time
334.1	27.4	-1172.3	79.2

APPENDIX C
DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA

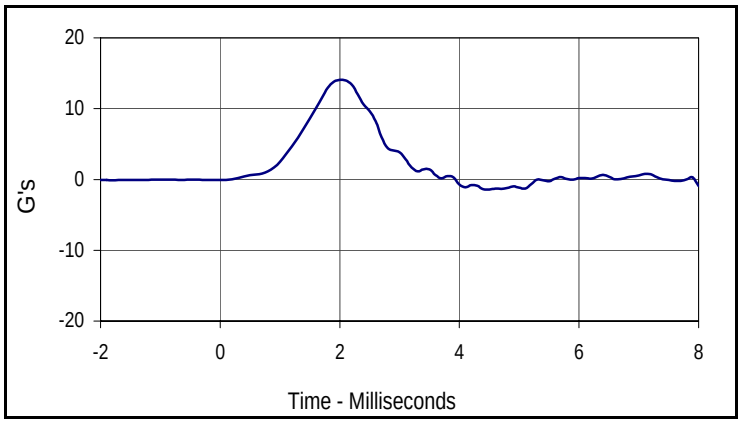
APPENDIX C
PRE-TEST / HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Test Program:	Hybrid III 50th Percentile Male Head Drop Test	Test Date:	6/13/11
ATD Serial No.:	034	Test I.D.:	34HD012

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Peak Resultant Acceleration	G's	225.0 to 275.0	249.6	Pass
Peak Lateral Acceleration	G's	≤15.0	14.1	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
		Overall Test Results		Pass



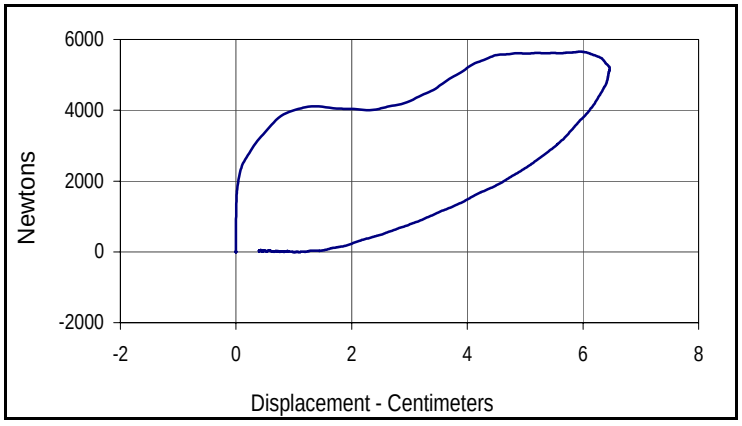
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
249.6	2.0	0.5	0.2



Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
14.1	2.0	-1.4	4.5

Test Program:	Hybrid III 50th Percentile Male Thorax Impact Test	Test Date:	6/13/11
ATD Serial No.:	034	Test I.D.:	34CH012

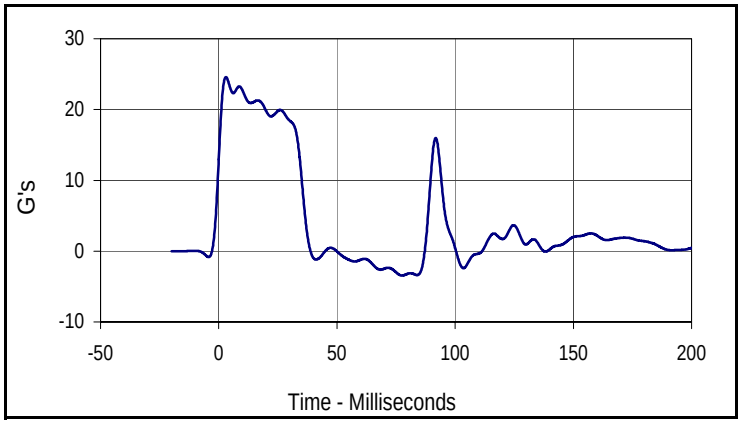
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Probe Velocity	m/s	6.58 to 6.82	6.71	Pass
Peak Probe Force	Newtons	5159 to 5893	5654	Pass
Peak Sternum Deflection	CM	6.35 to 7.26	6.46	Pass
Internal Hysterysis	%	69 to 85	71.1	Pass
		Overall Test Results		Pass



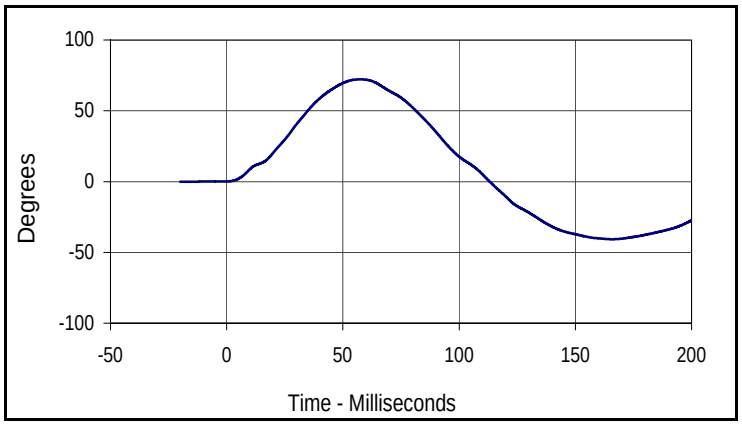
Curve Description			
Probe Force vs. Chest Deflection			
CURNO	Type	SAE Class	Hysterysis
001	FIL	180	71.1
Peak Probe Force		Peak Chest Deflection	
5654		6.46	

Test Program:	Hybrid III 50th Percentile Male Neck Flexion Test	Test Date:	6/13/11
ATD Serial No.:	034	Test I.D.:	34NF012

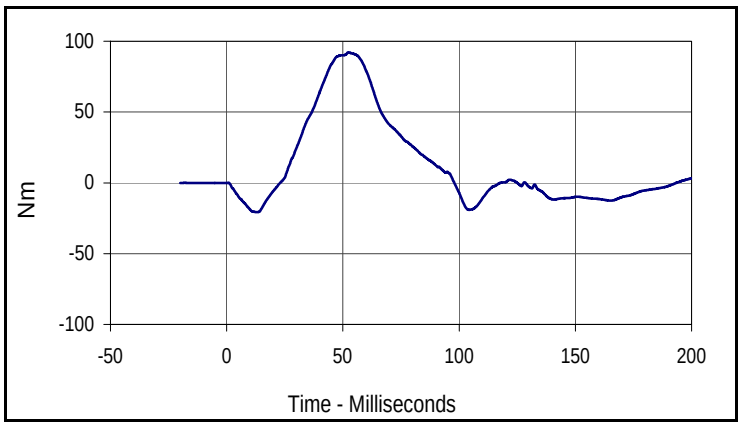
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity		%	10 to 70	20	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.02	Pass
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	22.7	Pass
	20 Msec.	G's	17.6 to 22.6	19.8	Pass
	30 Msec.	G's	12.5 to 18.5	18.4	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 29.0	18.4	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	34.0 to 42.0	36.6	Pass
Maximum "D" Plane Rotation	Max	Degrees	64.0 to 78.0	72.2	Pass
	Time	Msec.	57.0 to 64.0	57.3	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	113.0 to 128.0	113.2	Pass
Moment About Occ. Condyle	Max	Nm	84.1 to 108.5	92.1	Pass
	Time	Msec.	47.0 to 58.0	52.9	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	97.0 to 107.0	98.0	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Deceleration			
CURNO	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
24.6	3.0	-3.4	77.6



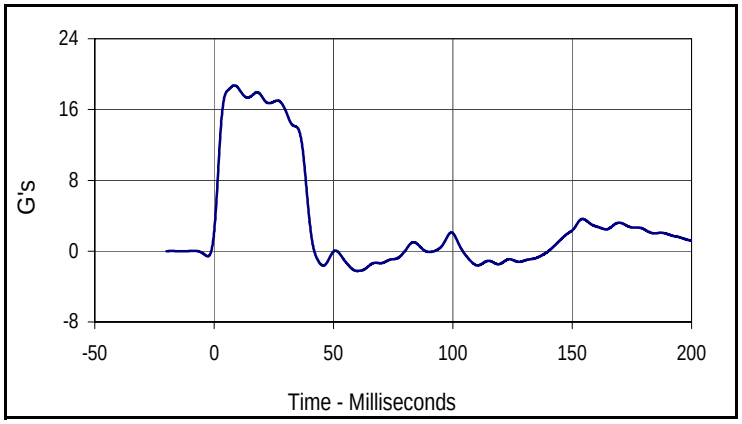
Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
72.2	57.3	-40.7	165.8



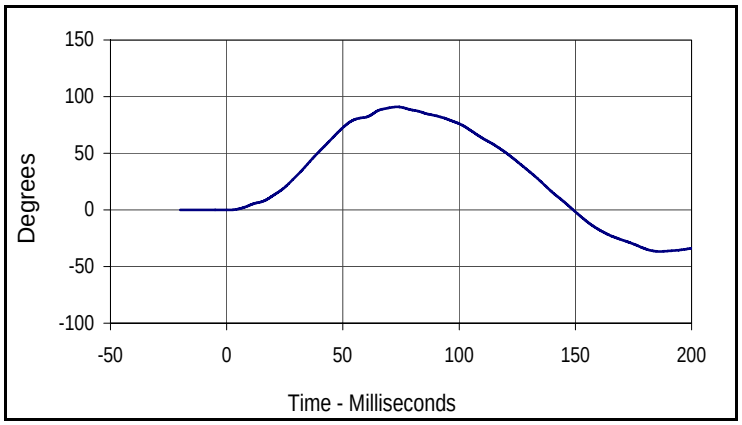
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
92.1	52.9	-20.8	12.8

Test Program:	Hybrid III 50th Percentile Male Neck Extension Test	Test Date:	6/13/11
ATD Serial No.:	034	Test I.D.:	34NE012

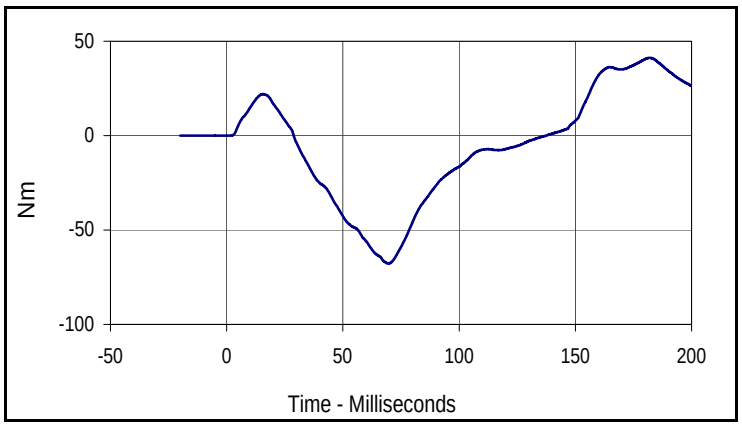
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity		%	10 to 70	20	Pass
Pendulum Velocity		m/s	5.94 to 6.19	6.08	Pass
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	18.5	Pass
	20 Msec.	G's	14.0 to 19.0	17.5	Pass
	30 Msec.	G's	11.0 to 16.0	15.8	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 22.0	15.8	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	38.0 to 46.0	39.4	Pass
Maximum "D" Plane Rotation	Max	Degrees	81.0 to 106.0	90.9	Pass
	Time	Msec.	72.0 to 82.0	73.3	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	147.0 to 174.0	149.1	Pass
Moment About Occ. Condyle	Max	Nm	-52.9 to- 79.9	-67.7	Pass
	Time	Msec.	65.0 to 79.0	69.7	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	120.0 to 148.0	137.5	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Deceleration			
CURNO	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
18.7	8.5	-2.2	60.0



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
90.9	73.3	-36.7	186.3



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
41.1	181.5	-67.7	69.7

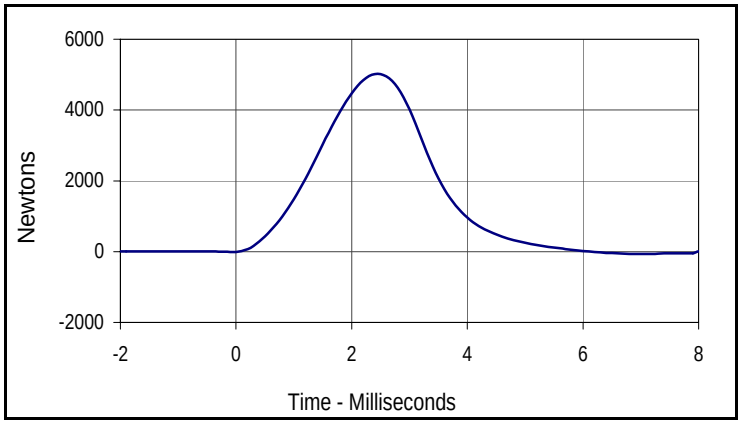
Test Program:	Hybrid III 50th Percentile Male Knee Impact Test	Test Date:	6/13/11
ATD Serial No.:	034	Test I.D.:	34LK012 , 34RK012

Left Knee

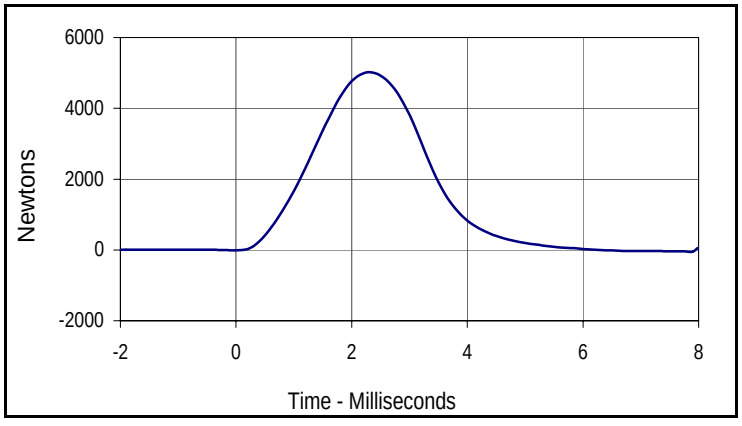
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.10	Pass
Peak Probe Force	Newtons	4715 to 5782	5019	Pass
		Overall Test Results		Pass

Right Knee

Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.09	Pass
Peak Probe Force	Newtons	4715 to 5782	5022	Pass
		Overall Test Results		Pass



Curve Description			
Left Knee Probe Force			
CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
5019.0	2.5	-69.7	7.0



Curve Description			
Right Knee Probe Force			
CURNO	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
5021.6	2.3	-44.4	7.9

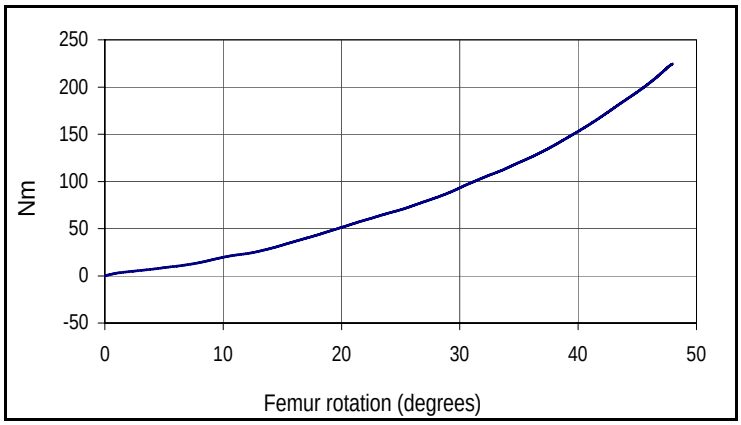
Test Program:	Hybrid III 50th Percentile Male Femur Flexion Test	Test Date:	6/13/11
ATD Serial No.:	034	Test I.D.:	34LF012,34RF012

Left Femur

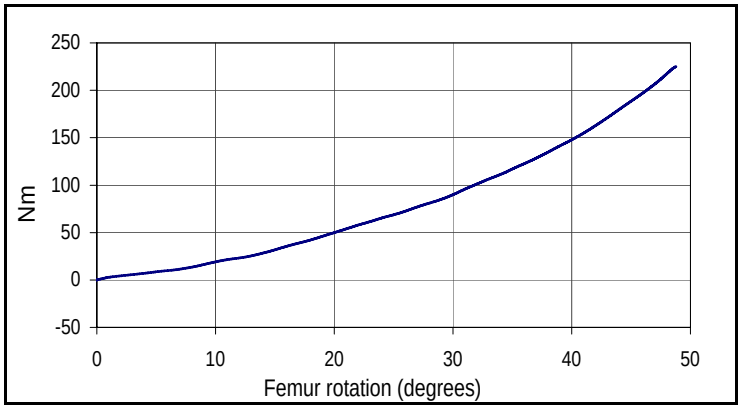
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Rotation Rate	deg/s	5 to 10	7	Pass
Torque at 30 degrees	Nm	≤94.9	93.2	Pass
150 ft-lb$_f$ / 203.4 Nm	Deg	40 to 50	45.9	Pass
		Overall Test Results		Pass

Right Femur

Rotation Rate	deg/s	5 to 10	7	Pass
Torque at 30 degrees	Nm	≤94.9	89.9	Pass
150 ft-lb$_f$ / 203.4 Nm	Deg	40 to 50	46.7	Pass
		Overall Test Results		Pass



Curve Description			
Moment vs. Left Femur Rotation			
CURNO	Type	SAE Class	Units
001	RES	600	Nm
Max (Nm)	Min (Nm)	Max (degrees)	Min (degrees)
224.5	-0.1	48.0	-0.1



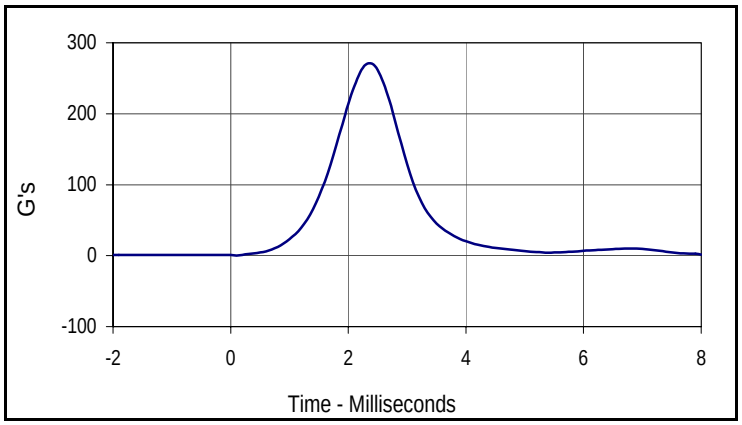
Curve Description			
Moment vs. Right Femur Rotation			
CURNO	Type	SAE Class	Units
002	RES	600	Nm
Max (Nm)	Min (Nm)	Max (degrees)	Min (degrees)
225.2	-0.1	48.8	-0.1

Test Program:	Hybrid III 50th Percentile Male External Measurements	Test Date:	6/13/11
ATD Serial No.:	034	Test I.D.:	N/A

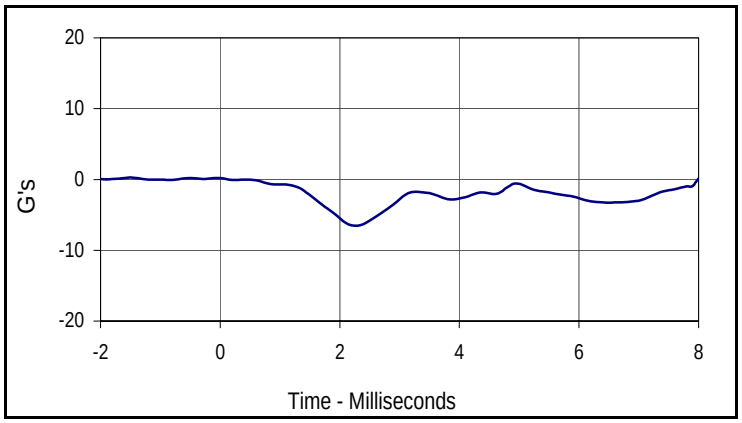
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
A - Total sitting height	mm	879 to 889	885	Pass
B - Shoulder pivot height	mm	505 to 521	506	Pass
C - "H" point height	mm	84 to 89	87	Pass
D - "H" point from seat back	mm	135 to 140	137	Pass
E - Shoulder pivot from back	mm	84 to 94	89	Pass
F - Thigh clearance	mm	140 to 155	148	Pass
G - Elbow back to wrist pivot	mm	290 to 305	298	Pass
H - Skull cap to back line	mm	41 to 46	43	Pass
I - Shoulder to elbow length	mm	330 to 345	333	Pass
J - Elbow rest height	mm	190 to 211	206	Pass
K - Buttock to knee length	mm	579 to 604	590	Pass
L - Poplipteal length	mm	429 to 455	445	Pass
M - Knee pivot height	mm	485 to 500	492	Pass
N - Buttock poplipteal length	mm	452 to 477	473	Pass
O - Chest depth	mm	213 to 229	216	Pass
P - Foot length	mm	251 to 267	256	Pass
V - Shoulder breadth	mm	422 to 437	427	Pass
W - Foot breadth	mm	91 to 107	101	Pass
Y - Chest circumference	mm	970 to 1001	990	Pass
Z - Waist circumference	mm	836 to 866	855	Pass
AA - Location for chest circumference	mm	429 to 434	429	Pass
BB - Location for waist circumference	mm	226 to 231	228	Pass
		Overall Test Results		Pass

Test Program:	Hybrid III 5th Percentile Female Head Drop Test	Test Date:	6/14/11
ATD Serial No.:	635	Test I.D.:	635HD012

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Peak Resultant Acceleration	G's	250.0 to 300.0	270.5	Pass
Peak Lateral Acceleration	G's	≤15.0	6.5	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
		Overall Test Results		Pass



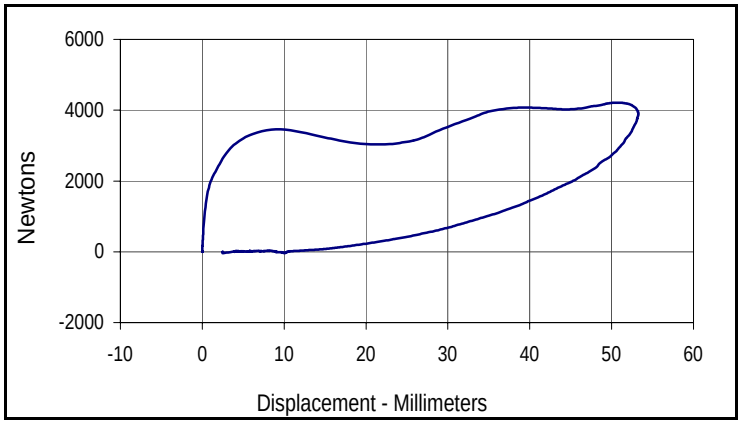
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
270.5	2.4	0.3	0.1



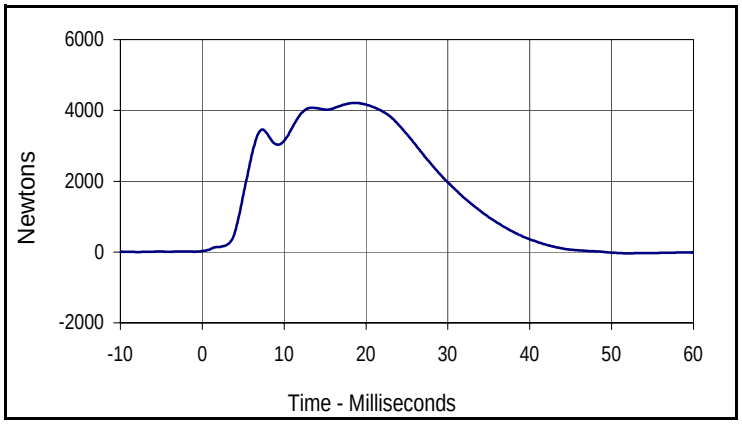
Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.3	-1.5	-6.5	2.3

Test Program:	Hybrid III 5th Percentile Female Thorax Impact Test	Test Date:	6/14/11
ATD Serial No.:	635	Test I.D.:	635CH012

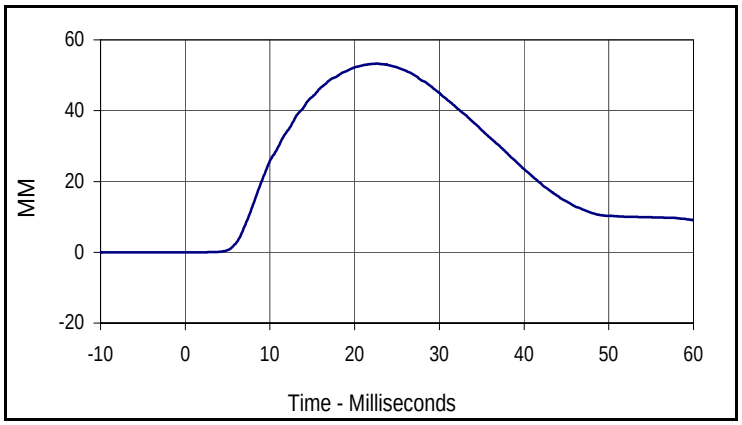
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Probe Velocity	m/s	6.59 to 6.83	6.71	Pass
Peak Chest Deflection	MM	50.0 to 58.0	53.3	Pass
Peak Force Between 50 and 58 MM	Newtons	3900 to 4400	4202	Pass
Peak Force Between 18 and 50 MM	Newtons	≤4600	4211	Pass
Internal Hysterysis	%	69 to 85	75.2	Pass
		Overall Test Results		Pass



Curve Description			
Probe Force vs. Chest Deflection			
CURNO	Type	SAE Class	Hysterysis
003	FIL	180	75.2
Peak Probe Force		Peak Chest Displ.	
4210.8		53.3	



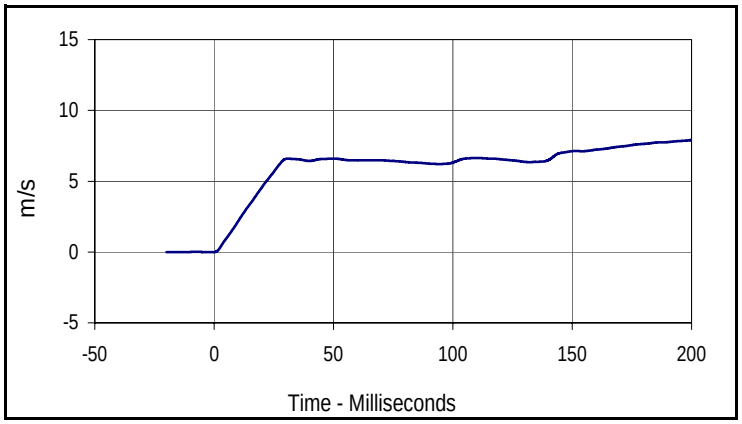
Curve Description			
Probe Force			
CURNO	Type	SAE Class	Units
002	FIL	180	Newtons
Max	Time	Min	Time
4210.8	18.6	-37.7	52.1



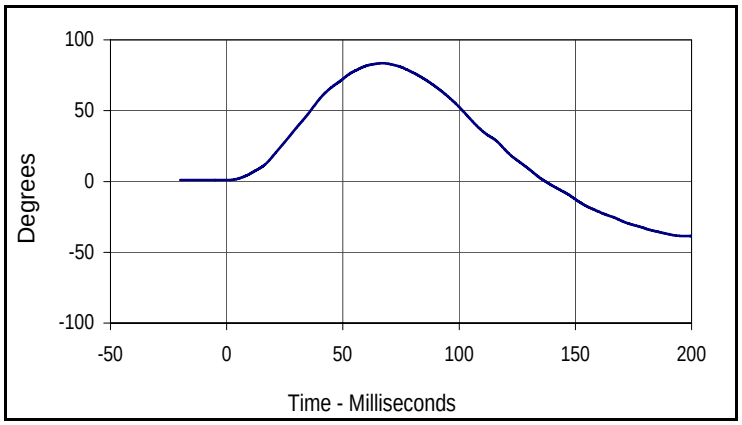
Curve Description			
Chest Deflection			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
53.3	22.6	0.0	-4.6

Test Program:	Hybrid III 5th Percentile Female Neck Flexion Test	Test Date:	6/14/11
ATD Serial No.:	635	Test I.D.:	NF012

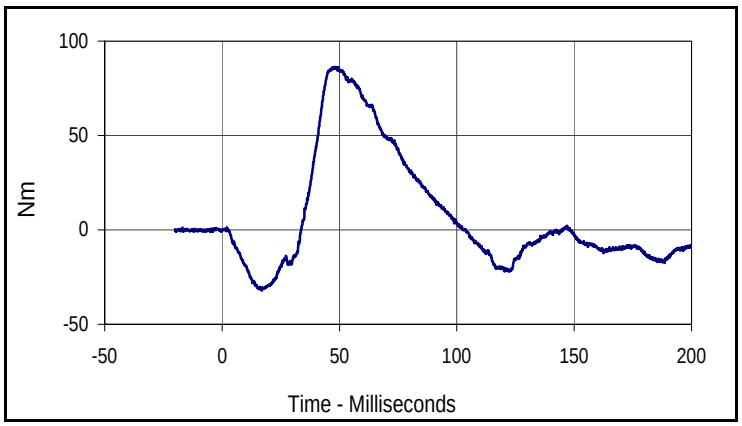
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity		%	10 to 70	19	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.02	Pass
Pendulum Deceleration	10 Msec.	m/s	2.1 to 2.5	2.2	Pass
	20 Msec.	m/s	4.0 to 5.0	4.6	Pass
	30 Msec.	m/s	5.8 to 7.0	6.6	Pass
"D" Plane Rotation	Max	Degrees	77.0 to 91.0	83.5	Pass
Peak Moment in Rotation	Max	Nm	69.0 to 83.0	79.9	Pass
Positive Moment Decay, Time To 10 Nm		Msec.	80.0 to 100.0	93.4	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
7.9	200.0	0.0	-20.0



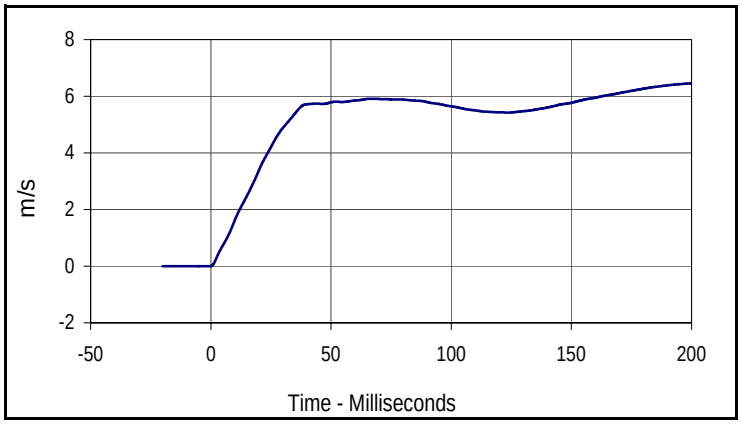
Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
83.5	67.1	-38.6	200.0



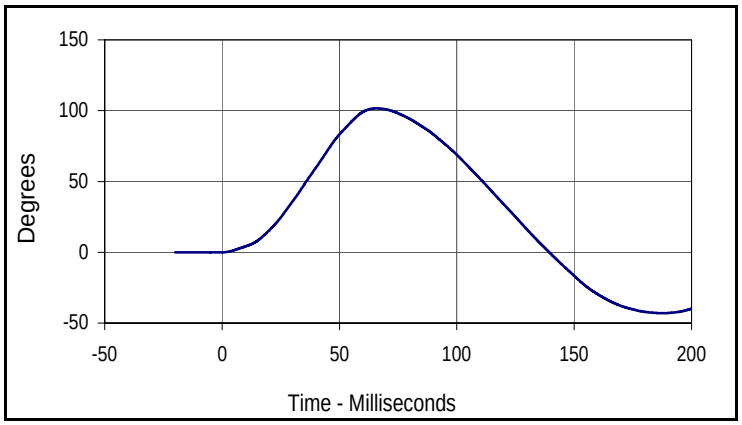
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
86.3	48.3	-32.2	16.9

Test Program:	Hybrid III 5th Percentile Female Neck Extension Test	Test Date:	6/14/11
ATD Serial No.:	635	Test I.D.:	NE012

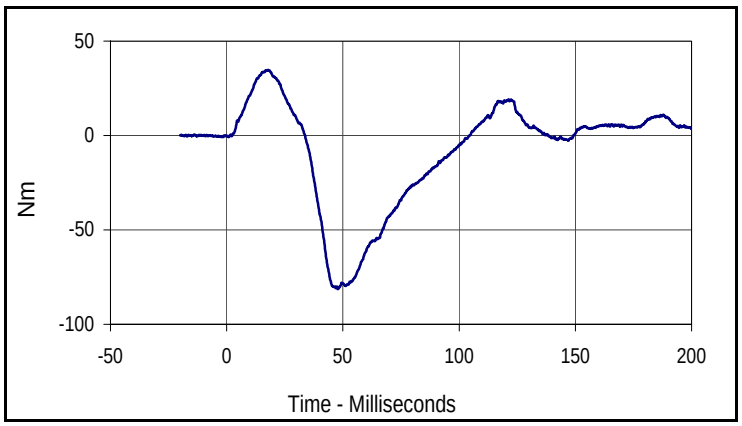
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.6	Pass
Laboratory Relative Humidity		%	10 to 70	19	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.07	Pass
Pendulum Deceleration	10 Msec.	m/s	1.5 to 1.9	1.6	Pass
	20 Msec.	m/s	3.1 to 3.9	3.4	Pass
	30 Msec.	m/s	4.6 to 5.6	4.9	Pass
"D" Plane Rotation	Max	Degrees	99.0 to 114.0	101.6	Pass
Peak Moment in Rotation	Max	Nm	-53.0 to -65.0	-54.4	Pass
Positive Moment Decay, Time To -10 Nm		Msec.	94.0 to 114.0	96.0	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
6.5	200.0	0.0	-16.5



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
101.6	65.6	-43.0	187.9



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
34.8	17.8	-81.4	47.8

Test Program:	Hybrid III 5th Percentile Female Knee Impact Test	Test Date:	6/14/11
ATD Serial No.:	635	Test I.D.:	635LK012 , 635RK012

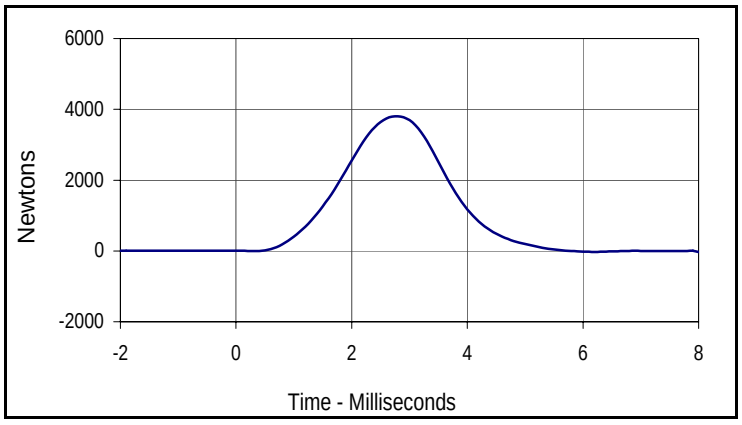
Left Knee

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.09	Pass
Peak Probe Force	Newtons	3450 to 4060	3825	Pass
		Overall Test Results		Pass

Right Knee

Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.11	Pass
Peak Probe Force	Newtons	3450 to 4060	3808	Pass
		Overall Test Results		Pass

Curve Description			
Left Knee Probe Force			
CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
3825.1	2.8	-23.4	8.0



Curve Description			
Right Knee Probe Force			
CURNO	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
3807.6	2.8	-34.3	8.7

Test Program:	Hybrid III 5th Percentile Female Torso Flexion Test	Test Date:	6/14/11
ATD Serial No.:	635	Test I.D.:	635FF012

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	^{o}C	18.9 to 25.6	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Initial reference plane angle	Degrees	≤20.0	3.7	Pass
Peak Force at 45 +/-0.5 degrees	Newtons	320.0 to 390.0	348.7	Pass
Torso rotation rate	deg/sec	0.5 to 1.5	1.2	Pass
Final reference plane angle	Degrees	+/-8	2.7	Pass
		Overall Test Results		Pass

Test Program:	Hybrid III 5th Percentile Female External Measurements	Test Date:	6/14/11
ATD Serial No.:	635	Test I.D.:	N/A

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory relative humidity	%	10 to 70	20	Pass
A - Total sitting height	mm	774.7 to 800.1	780	Pass
B - Shoulder pivot height	mm	431.8 to 457.2	446	Pass
C - "H" point height (Reference)	mm	81.3 to 86.3	84	Pass
D - "H" point from seat back (Ref.)	mm	144.8 to 149.8	145	Pass
E - Shoulder pivot from backline	mm	68.6 to 83.8	80	Pass
F - Thigh clearance	mm	119.4 to 134.6	130	Pass
G - Back of elbow to wrist pivot	mm	243.9 to 259.1	255	Pass
H - Head to back line	mm	40.7 to 45.7	43	Pass
I - Shoulder to elbow length	mm	276.8 to 297.2	289	Pass
J - Elbow rest heignt	mm	182.8 to 203.2	200	Pass
K - Buttock to knee length	mm	520.7 to 546.1	543	Pass
L - Poplipteal height	mm	355.6 to 376.0	365	Pass
M - Knee pivot height	mm	393.7 to 419.1	414	Pass
N - Buttock poplipteal length	mm	414.0 to 439.4	421	Pass
O - Chest depth without jacket	mm	175.3 to 190.5	185	Pass
P - Foot length	mm	218.5 to 233.7	230	Pass
R - Buttock to knee pivot length	mm	457.2 to 482.6	474	Pass
S - Head breadth	mm	137.1 to 147.3	144	Pass
T - Head depth	mm	177.8 to 188.0	180	Pass
U - Hip breadth	mm	299.7 to 314.9	311	Pass
V - Shoulder breadth	mm	350.5 to 365.7	363	Pass
W - Foot breadth	mm	78.8 to 94.0	90	Pass
X - Head circumference	mm	528.3 to 548.7	540	Pass
Y - Chest circumference with jacket	mm	850.8 to 881.3	879	Pass
Z - Waist circumference	mm	759.5 to 789.9	775	Pass
AA - Location for chest circumference	mm	299.7 to 309.9	305	Pass
BB - Location for waist circumference	mm	160.1 to 170.2	165	Pass
		Overall Test Results		Pass

Test Program:	Dummy Damage Checklist	Test Date:	6/13/11
ATD Serial No.:	034	Test I.D.:	N/A

GENERAL	DAMAGED	OK
Outer skin on entire dummy		X
Head ballast secure		X
Gashes, rips, general appearance, etc.		X
Neck-Broken or cracks in rubber		X
Check that upper neck bracket is firmly attached to lwr neck bracket		X
Three rubber bumpers in place		X
Spine- Broken or cracks in rubber		X
Check for looseness at the condyle joint		X
Nodding blocks- cracked or out of position		X
Ribs- Check all ribs and rib supports for damage (bent or broken)		X
Check damping material or separation or cracks		X
OTHER		
CHEST DISPLACEMENT ASSEMBLY		
Bent shaft		X
Slider arm riding correctly, in track		X
TRANSDUCER LEADS		
Torn cables		X
ACCELEROMETER MOUNTINGS		
Check for secure mounting		X
KNEES		
Check outer skin, insert and casting (without removing insert)		X
Knee sliders - Wires intact		X
Knee sliders- Rubber returned to "at rest position"		X
LIMBS		
Check for normal movement and adjustment		X
PELVIS		
Inspect for breakage, especially at iliac crest		X

Comments on repair or replacement parts:

Test Program:	Dummy Damage Checklist	Test Date:	6/14/11
ATD Serial No.:	635	Test I.D.:	N/A

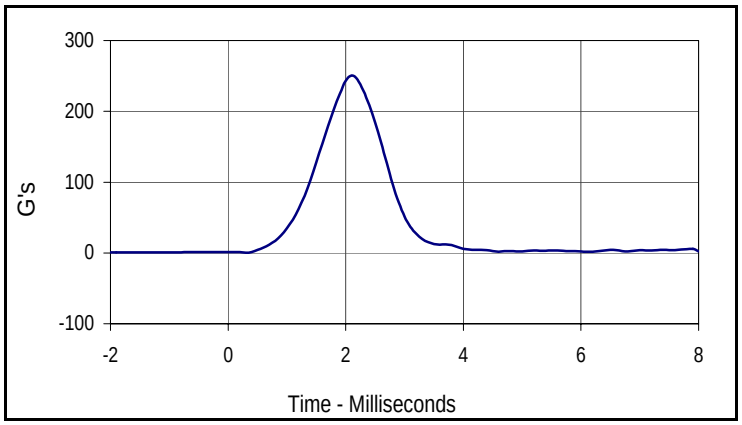
GENERAL	DAMAGED	OK
Outer skin on entire dummy		X
Head ballast secure		X
Gashes, rips, general appearance, etc.		X
Neck-Broken or cracks in rubber		X
Check that upper neck bracket is firmly attached to lwr neck bracket		X
Three rubber bumpers in place		X
Spine- Broken or cracks in rubber		X
Check for looseness at the condyle joint		X
Nodding blocks- cracked or out of position		X
Ribs- Check all ribs and rib supports for damage (bent or broken)		X
Check damping material or separation or cracks		X
OTHER		
CHEST DISPLACEMENT ASSEMBLY		
Bent shaft		X
Slider arm riding correctly, in track		X
TRANSDUCER LEADS		
Torn cables		X
ACCELEROMETER MOUNTINGS		
Check for secure mounting		X
KNEES		
Check outer skin, insert and casting (without removing insert)		X
Knee sliders - Wires intact		X
Knee sliders- Rubber returned to "at rest position"		X
LIMBS		
Check for normal movement and adjustment		X
PELVIS		
Inspect for breakage, especially at iliac crest		X

Comments on repair or replacement parts:

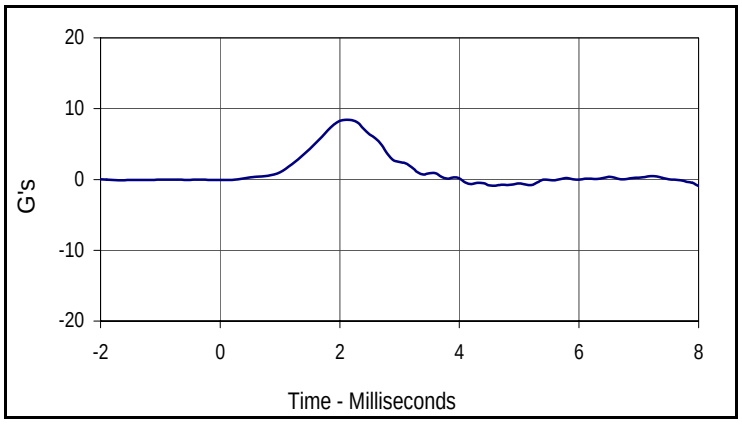
APPENDIX C
POST-TEST / HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Test Program:	Hybrid III 50th Percentile Male Head Drop Test	Test Date:	6/24/11
ATD Serial No.:	034	Test I.D.:	34HD013

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Peak Resultant Acceleration	G's	225.0 to 275.0	250.7	Pass
Peak Lateral Acceleration	G's	≤15.0	8.4	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
		Overall Test Results		Pass



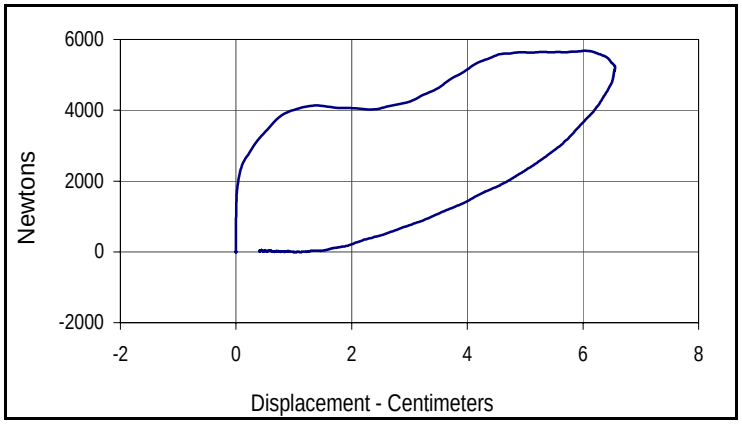
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
250.7	2.1	0.5	0.3



Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
8.4	2.1	-0.9	4.6

Test Program:	Hybrid III 50th Percentile Male Thorax Impact Test	Test Date:	6/24/11
ATD Serial No.:	034	Test I.D.:	34CH013

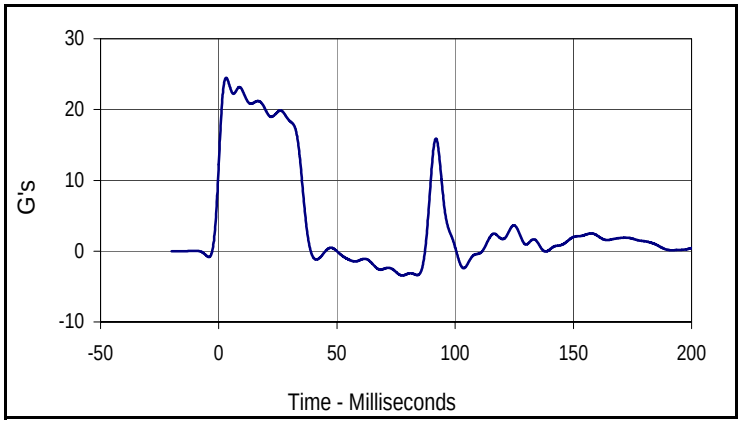
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	21	Pass
Probe Velocity	m/s	6.58 to 6.82	6.73	Pass
Peak Probe Force	Newtons	5159 to 5893	5681	Pass
Peak Sternum Deflection	CM	6.35 to 7.26	6.56	Pass
Internal Hysterysis	%	69 to 85	71.2	Pass
		Overall Test Results		Pass



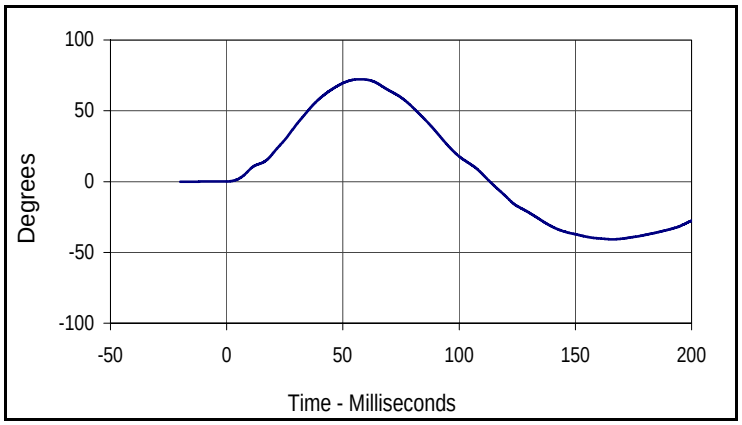
Curve Description			
Probe Force vs. Chest Deflection			
CURNO	Type	SAE Class	Hysterysis
001	FIL	180	71.2
Peak Probe Force		Peak Chest Deflection	
5681		6.56	

Test Program:	Hybrid III 50th Percentile Male Neck Flexion Test	Test Date:	6/24/11
ATD Serial No.:	034	Test I.D.:	34NF013

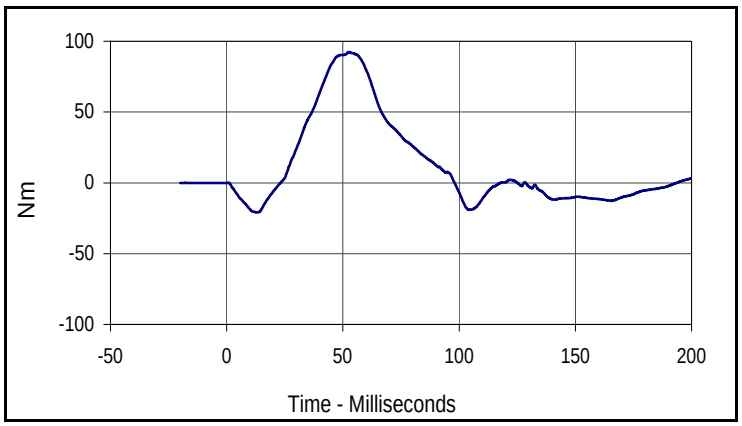
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity		%	10 to 70	21	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.04	Pass
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	22.7	Pass
	20 Msec.	G's	17.6 to 22.6	19.8	Pass
	30 Msec.	G's	12.5 to 18.5	18.4	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 29.0	18.4	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	34.0 to 42.0	36.6	Pass
Maximum "D" Plane Rotation	Max	Degrees	64.0 to 78.0	72.3	Pass
	Time	Msec.	57.0 to 64.0	57.4	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	113.0 to 128.0	113.3	Pass
Moment About Occ. Condyle	Max	Nm	84.1 to 108.5	92.4	Pass
	Time	Msec.	47.0 to 58.0	53.0	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	97.0 to 107.0	98.1	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Deceleration			
CURNO	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
24.5	3.1	-3.4	77.7



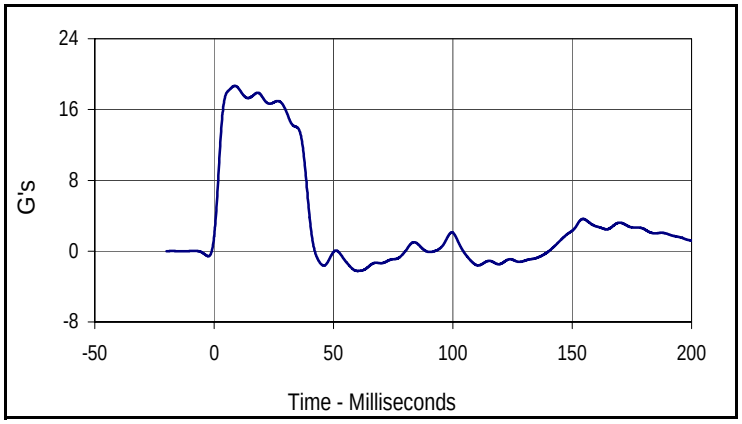
Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
72.3	57.4	-40.7	165.9



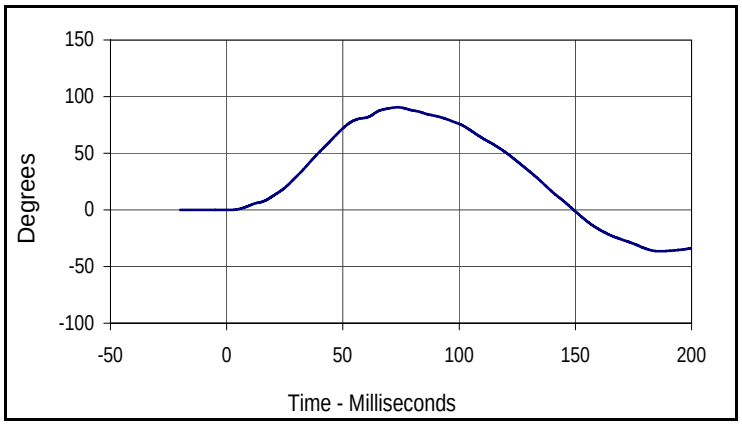
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
92.4	53.0	-20.9	12.9

Test Program:	Hybrid III 50th Percentile Male Neck Extension Test	Test Date:	6/24/11
ATD Serial No.:	034	Test I.D.:	34NE013

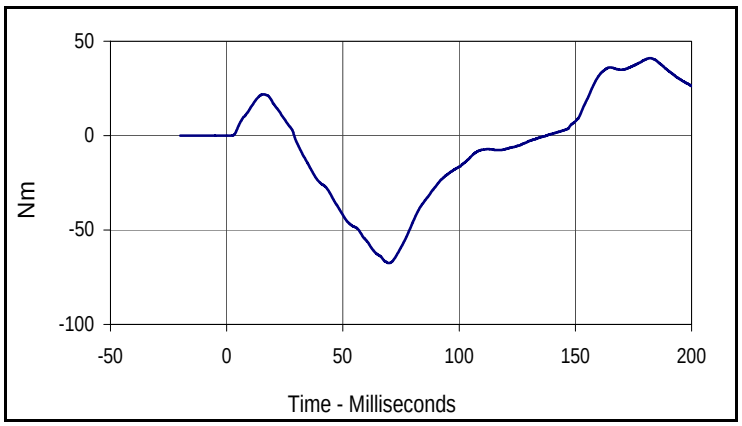
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity		%	10 to 70	21	Pass
Pendulum Velocity		m/s	5.94 to 6.19	6.10	Pass
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	18.5	Pass
	20 Msec.	G's	14.0 to 19.0	17.5	Pass
	30 Msec.	G's	11.0 to 16.0	15.9	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 22.0	15.9	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	38.0 to 46.0	39.6	Pass
Maximum "D" Plane Rotation	Max	Degrees	81.0 to 106.0	90.6	Pass
	Time	Msec.	72.0 to 82.0	73.5	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	147.0 to 174.0	149.3	Pass
Moment About Occ. Condyle	Max	Nm	-52.9 to- 79.9	-67.5	Pass
	Time	Msec.	65.0 to 79.0	69.9	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	120.0 to 148.0	137.7	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Deceleration			
CURNO	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
18.7	8.7	-2.2	60.2



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
90.6	73.5	-36.6	186.5



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
41.0	181.7	-67.5	69.9

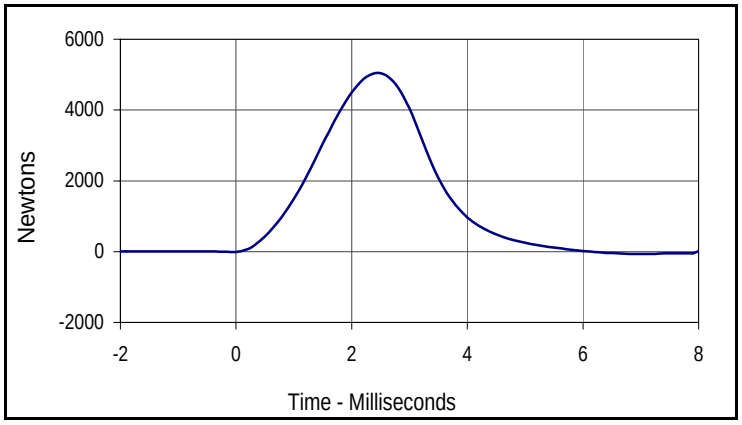
Test Program:	Hybrid III 50th Percentile Male Knee Impact Test	Test Date:	6/24/11
ATD Serial No.:	034	Test I.D.:	34LK013 , 34RK013

Left Knee

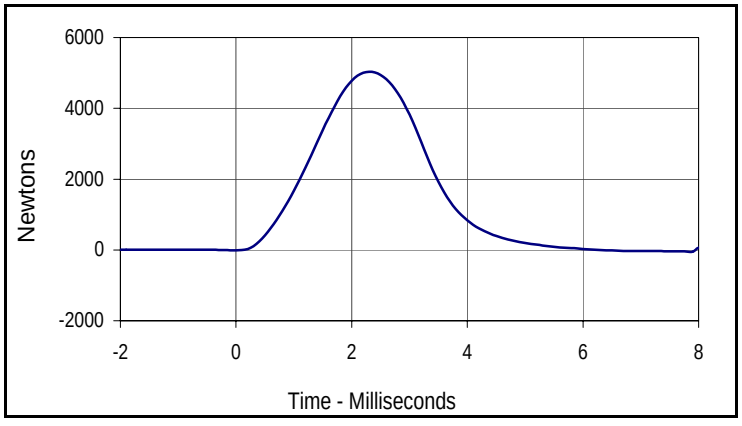
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	21	Pass
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.08	Pass
Peak Probe Force	Newtons	4715 to 5782	5044	Pass
		Overall Test Results		Pass

Right Knee

Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.11	Pass
Peak Probe Force	Newtons	4715 to 5782	5037	Pass
		Overall Test Results		Pass



Curve Description			
Left Knee Probe Force			
CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
5043.9	2.5	-69.7	7.0



Curve Description			
Right Knee Probe Force			
CURNO	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
5036.6	2.3	-44.4	7.9

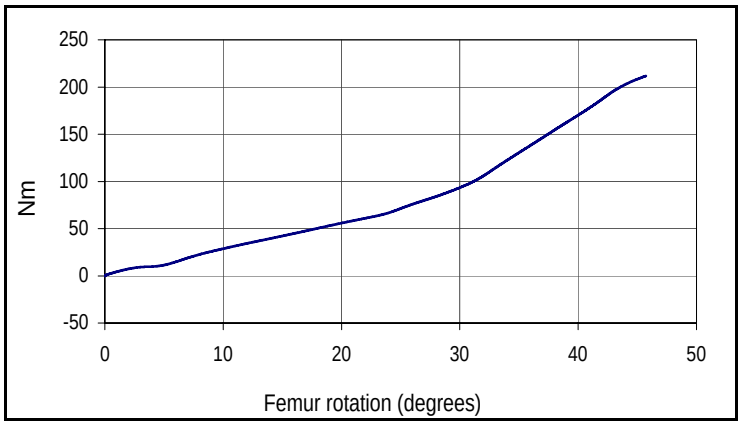
Test Program:	Hybrid III 50th Percentile Male Femur Flexion Test	Test Date:	6/24/11
ATD Serial No.:	034	Test I.D.:	34LF013,34RF013

Left Femur

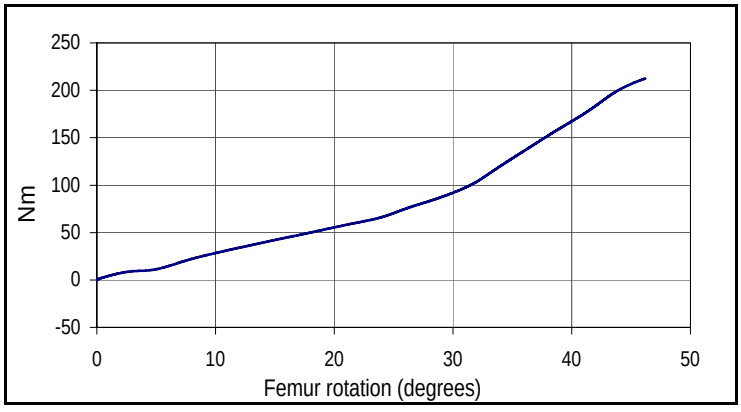
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Rotation Rate	deg/s	5 to 10	7	Pass
Torque at 30 degrees	Nm	≤94.9	93.4	Pass
150 ft-lb$_f$ / 203.4 Nm	Deg	40 to 50	44.1	Pass
		Overall Test Results		Pass

Right Femur

Rotation Rate	deg/s	5 to 10	7	Pass
Torque at 30 degrees	Nm	≤94.9	91.9	Pass
150 ft-lb$_f$ / 203.4 Nm	Deg	40 to 50	44.4	Pass
		Overall Test Results		Pass



Curve Description			
Moment vs. Left Femur Rotation			
CURNO	Type	SAE Class	Units
001	RES	600	Nm
Max (Nm)	Min (Nm)	Max (degrees)	Min (degrees)
211.7	0.0	45.7	0.0



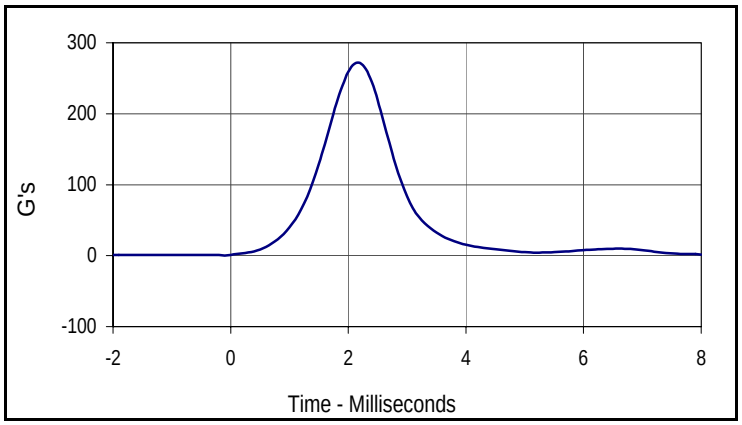
Curve Description			
Moment vs. Right Femur Rotation			
CURNO	Type	SAE Class	Units
002	RES	600	Nm
Max (Nm)	Min (Nm)	Max (degrees)	Min (degrees)
212.4	0.0	46.2	0.0

Test Program:	Hybrid III 50th Percentile Male External Measurements	Test Date:	6/24/11
ATD Serial No.:	034	Test I.D.:	N/A

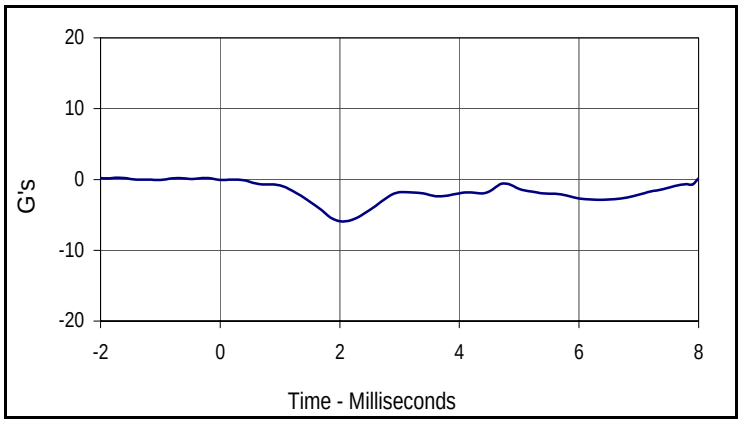
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
A - Total sitting height	mm	879 to 889	884	Pass
B - Shoulder pivot height	mm	505 to 521	507	Pass
C - "H" point height	mm	84 to 89	87	Pass
D - "H" point from seat back	mm	135 to 140	138	Pass
E - Shoulder pivot from back	mm	84 to 94	89	Pass
F - Thigh clearance	mm	140 to 155	148	Pass
G - Elbow back to wrist pivot	mm	290 to 305	297	Pass
H - Skull cap to back line	mm	41 to 46	44	Pass
I - Shoulder to elbow length	mm	330 to 345	335	Pass
J - Elbow rest height	mm	190 to 211	204	Pass
K - Buttock to knee length	mm	579 to 604	591	Pass
L - Poplipteal length	mm	429 to 455	444	Pass
M - Knee pivot height	mm	485 to 500	492	Pass
N - Buttock poplipteal length	mm	452 to 477	472	Pass
O - Chest depth	mm	213 to 229	216	Pass
P - Foot length	mm	251 to 267	256	Pass
V - Shoulder breadth	mm	422 to 437	428	Pass
W - Foot breadth	mm	91 to 107	101	Pass
Y - Chest circumference	mm	970 to 1001	991	Pass
Z - Waist circumference	mm	836 to 866	854	Pass
AA - Location for chest circumference	mm	429 to 434	429	Pass
BB - Location for waist circumference	mm	226 to 231	228	Pass
		Overall Test Results		Pass

Test Program:	Hybrid III 5th Percentile Female Head Drop Test	Test Date:	6/27/11
ATD Serial No.:	635	Test I.D.:	635HD013

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Peak Resultant Acceleration	G's	250.0 to 300.0	271.8	Pass
Peak Lateral Acceleration	G's	≤15.0	5.9	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
		Overall Test Results		Pass



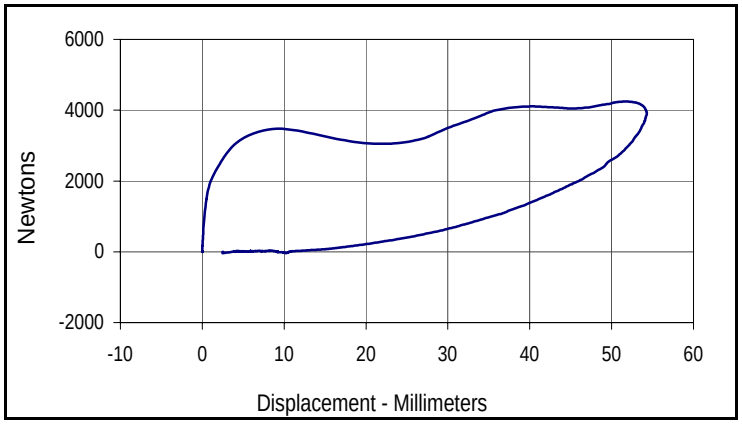
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
271.8	2.2	0.3	-0.1



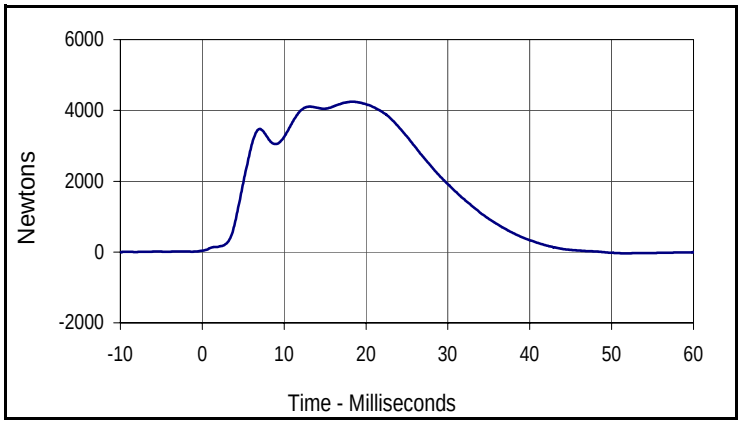
Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.3	-1.7	-5.9	2.1

Test Program:	Hybrid III 5th Percentile Female Thorax Impact Test	Test Date:	6/27/11
ATD Serial No.:	635	Test I.D.:	635CH013

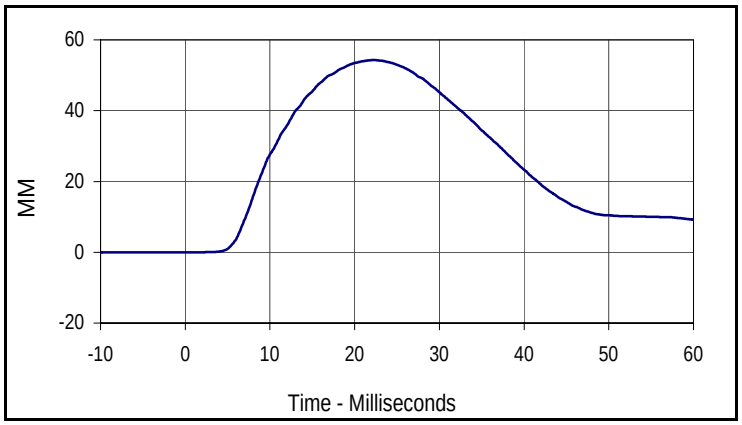
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Probe Velocity	m/s	6.59 to 6.83	6.73	Pass
Peak Chest Deflection	MM	50.0 to 58.0	54.3	Pass
Peak Force Between 50 and 58 MM	Newtons	3900 to 4400	4200	Pass
Peak Force Between 18 and 50 MM	Newtons	≤4600	4243	Pass
Internal Hysterysis	%	69 to 85	75.2	Pass
		Overall Test Results		Pass



Curve Description			
Probe Force vs. Chest Deflection			
CURNO	Type	SAE Class	Hysterysis
003	FIL	180	75.2
Peak Probe Force		Peak Chest Displ.	
4242.8		54.3	



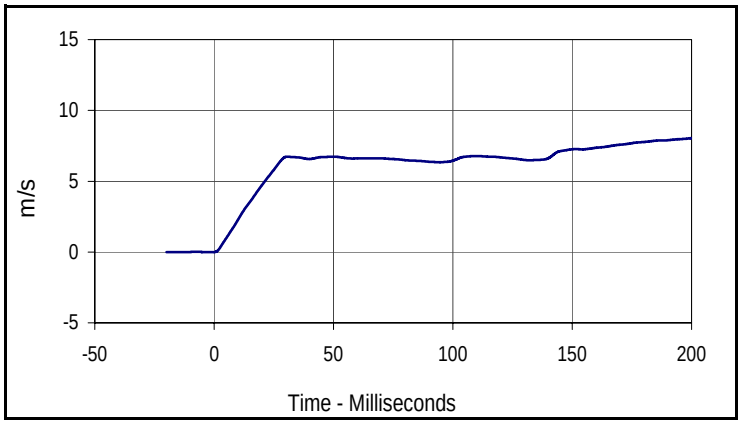
Curve Description			
Probe Force			
CURNO	Type	SAE Class	Units
002	FIL	180	Newtons
Max	Time	Min	Time
4242.8	18.3	-37.7	51.8



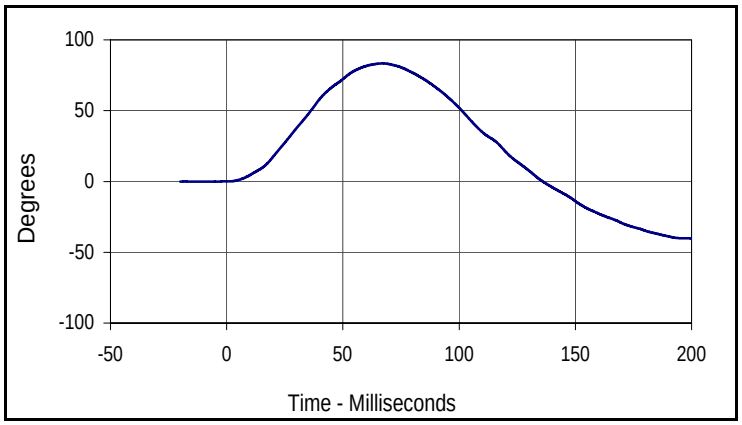
Curve Description			
Chest Deflection			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
54.3	22.3	0.0	-4.9

Test Program:	Hybrid III 5th Percentile Female Neck Flexion Test	Test Date:	6/27/11
ATD Serial No.:	635	Test I.D.:	NF013

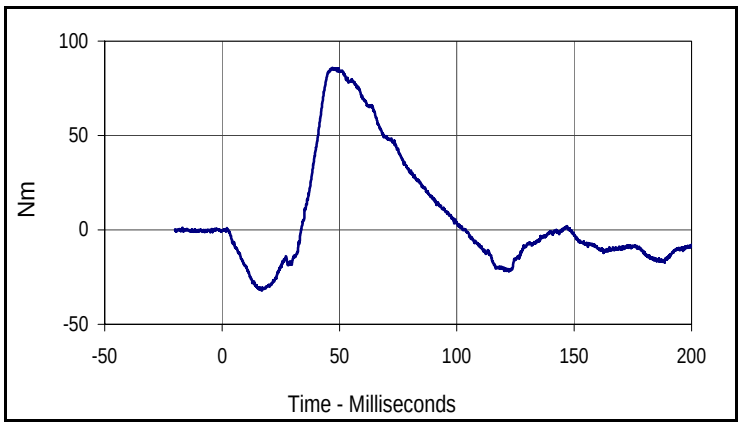
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.6	Pass
Laboratory Relative Humidity		%	10 to 70	20	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.04	Pass
Pendulum Deceleration	10 Msec.	m/s	2.1 to 2.5	2.3	Pass
	20 Msec.	m/s	4.0 to 5.0	4.7	Pass
	30 Msec.	m/s	5.8 to 7.0	6.7	Pass
"D" Plane Rotation	Max	Degrees	77.0 to 91.0	83.4	Pass
Peak Moment in Rotation	Max	Nm	69.0 to 83.0	79.8	Pass
Positive Moment Decay, Time To 10 Nm		Msec.	80.0 to 100.0	93.4	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
8.0	200.0	0.0	-20.0



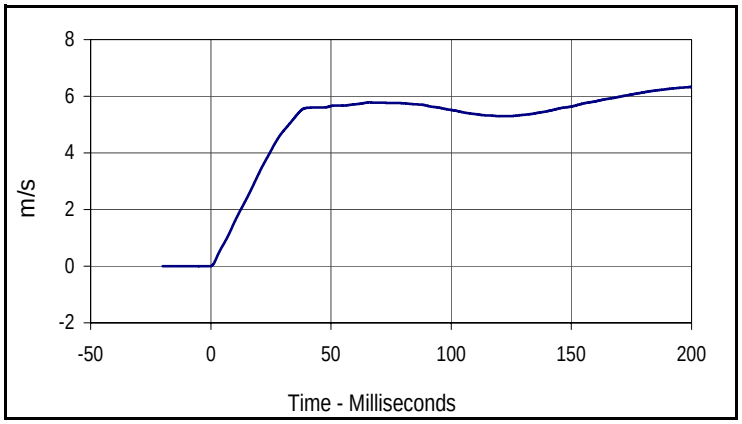
Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
83.4	67.0	-40.2	200.0



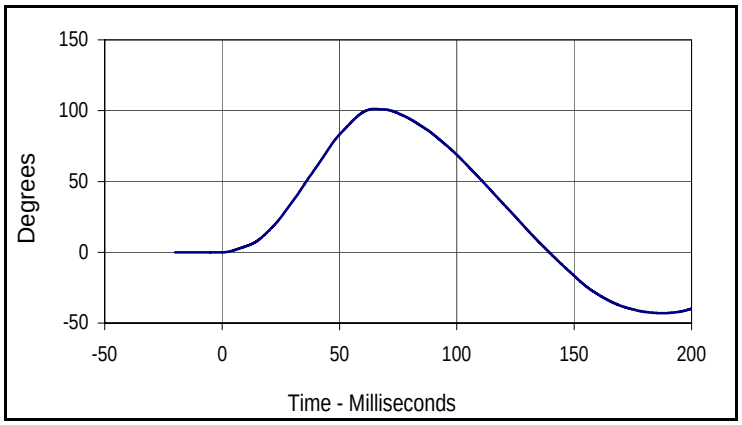
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
85.8	47.1	-32.1	16.9

Test Program:	Hybrid III 5th Percentile Female Neck Extension Test	Test Date:	6/27/11
ATD Serial No.:	635	Test I.D.:	NE013

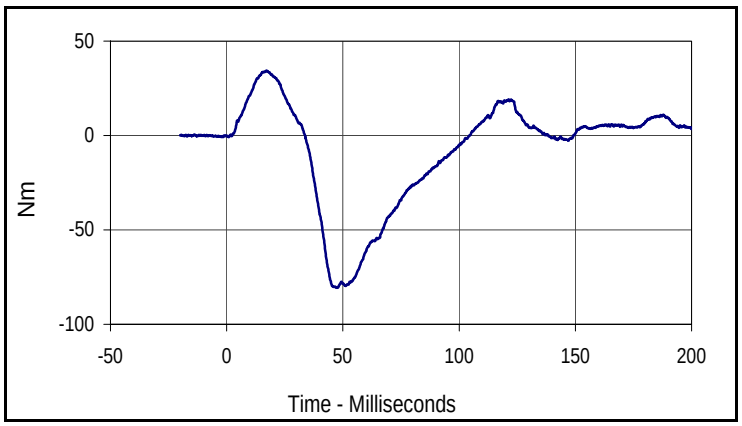
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity		%	10 to 70	20	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.08	Pass
Pendulum Deceleration	10 Msec.	m/s	1.5 to 1.9	1.6	Pass
	20 Msec.	m/s	3.1 to 3.9	3.3	Pass
	30 Msec.	m/s	4.6 to 5.6	4.8	Pass
"D" Plane Rotation	Max	Degrees	99.0 to 114.0	101.2	Pass
Peak Moment in Rotation	Max	Nm	-53.0 to -65.0	-55.0	Pass
Positive Moment Decay, Time To -10 Nm		Msec.	94.0 to 114.0	96.0	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
6.3	200.0	0.0	-16.5



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
101.2	64.8	-43.0	187.9



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
34.2	17.4	-80.7	47.7

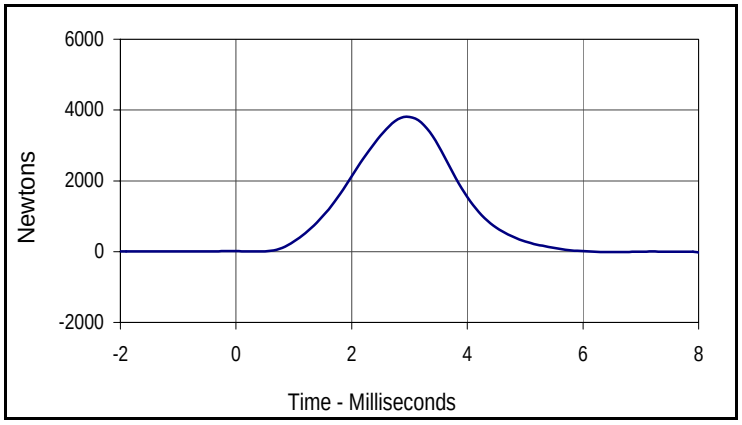
Test Program:	Hybrid III 5th Percentile Female Knee Impact Test	Test Date:	6/27/11
ATD Serial No.:	635	Test I.D.:	635LK013 , 635RK013

Left Knee

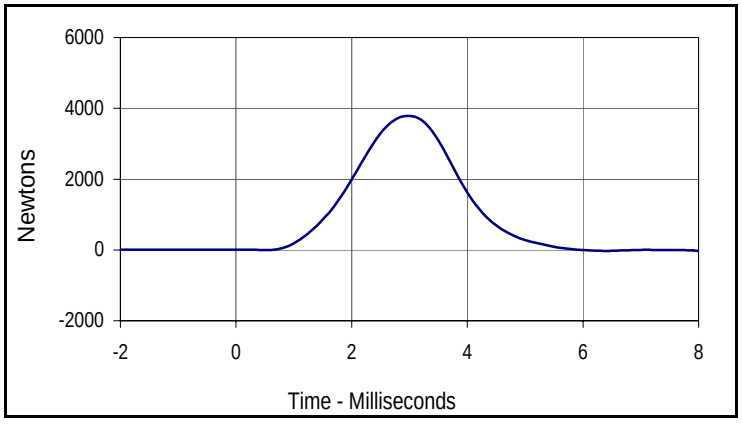
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.08	Pass
Peak Probe Force	Newtons	3450 to 4060	3807	Pass
		Overall Test Results		Pass

Right Knee

Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.10	Pass
Peak Probe Force	Newtons	3450 to 4060	3790	Pass
		Overall Test Results		Pass



Curve Description			
Left Knee Probe Force			
CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
3807.2	3.0	-23.4	8.0



Curve Description			
Right Knee Probe Force			
CURNO	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
3789.7	3.0	-34.3	8.7

Test Program:	Hybrid III 5th Percentile Female Torso Flexion Test	Test Date:	6/27/11
ATD Serial No.:	635	Test I.D.:	635FF013

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	^{o}C	18.9 to 25.6	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Initial reference plane angle	Degrees	≤20.0	3.1	Pass
Peak Force at 45 +/-0.5 degrees	Newtons	320.0 to 390.0	351.4	Pass
Torso rotation rate	deg/sec	0.5 to 1.5	0.9	Pass
Final reference plane angle	Degrees	+/-8	2.2	Pass
		Overall Test Results		Pass

Test Program:	Hybrid III 5th Percentile Female External Measurements	Test Date:	6/27/11
ATD Serial No.:	635	Test I.D.:	N/A

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory relative humidity	%	10 to 70	20	Pass
A - Total sitting height	mm	774.7 to 800.1	782	Pass
B - Shoulder pivot height	mm	431.8 to 457.2	445	Pass
C - "H" point height (Reference)	mm	81.3 to 86.3	83	Pass
D - "H" point from seat back (Ref.)	mm	144.8 to 149.8	147	Pass
E - Shoulder pivot from backline	mm	68.6 to 83.8	80	Pass
F - Thigh clearance	mm	119.4 to 134.6	128	Pass
G - Back of elbow to wrist pivot	mm	243.9 to 259.1	254	Pass
H - Head to back line	mm	40.7 to 45.7	43	Pass
I - Shoulder to elbow length	mm	276.8 to 297.2	287	Pass
J - Elbow rest heignt	mm	182.8 to 203.2	199	Pass
K - Buttock to knee length	mm	520.7 to 546.1	541	Pass
L - Poplipteal height	mm	355.6 to 376.0	365	Pass
M - Knee pivot height	mm	393.7 to 419.1	412	Pass
N - Buttock poplipteal length	mm	414.0 to 439.4	420	Pass
O - Chest depth without jacket	mm	175.3 to 190.5	183	Pass
P - Foot length	mm	218.5 to 233.7	229	Pass
R - Buttock to knee pivot length	mm	457.2 to 482.6	473	Pass
S - Head breadth	mm	137.1 to 147.3	144	Pass
T - Head depth	mm	177.8 to 188.0	180	Pass
U - Hip breadth	mm	299.7 to 314.9	311	Pass
V - Shoulder breadth	mm	350.5 to 365.7	363	Pass
W - Foot breadth	mm	78.8 to 94.0	90	Pass
X - Head circumference	mm	528.3 to 548.7	539	Pass
Y - Chest circumference with jacket	mm	850.8 to 881.3	878	Pass
Z - Waist circumference	mm	759.5 to 789.9	775	Pass
AA - Location for chest circumference	mm	299.7 to 309.9	305	Pass
BB - Location for waist circumference	mm	160.1 to 170.2	165	Pass
		Overall Test Results		Pass

Test Program:	Dummy Damage Checklist	Test Date:	6/24/11
ATD Serial No.:	034	Test I.D.:	N/A

GENERAL	DAMAGED	OK
Outer skin on entire dummy		X
Head ballast secure		X
Gashes, rips, general appearance, etc.		X
Neck-Broken or cracks in rubber		X
Check that upper neck bracket is firmly attached to lwr neck bracket		X
Three rubber bumpers in place		X
Spine- Broken or cracks in rubber		X
Check for looseness at the condyle joint		X
Nodding blocks- cracked or out of position		X
Ribs- Check all ribs and rib supports for damage (bent or broken)		X
Check damping material or separation or cracks		X
OTHER		
CHEST DISPLACEMENT ASSEMBLY		
Bent shaft		X
Slider arm riding correctly, in track		X
TRANSDUCER LEADS		
Torn cables		X
ACCELEROMETER MOUNTINGS		
Check for secure mounting		X
KNEES		
Check outer skin, insert and casting (without removing insert)		X
Knee sliders - Wires intact		X
Knee sliders- Rubber returned to "at rest position"		X
LIMBS		
Check for normal movement and adjustment		X
PELVIS		
Inspect for breakage, especially at iliac crest		X

Comments on repair or replacement parts:

Test Program:	Dummy Damage Checklist	Test Date:	6/27/11
ATD Serial No.:	635	Test I.D.:	N/A

GENERAL	DAMAGED	OK
Outer skin on entire dummy		X
Head ballast secure		X
Gashes, rips, general appearance, etc.		X
Neck-Broken or cracks in rubber		X
Check that upper neck bracket is firmly attached to lwr neck bracket		X
Three rubber bumpers in place		X
Spine- Broken or cracks in rubber		X
Check for looseness at the condyle joint		X
Nodding blocks- cracked or out of position		X
Ribs- Check all ribs and rib supports for damage (bent or broken)		X
Check damping material or separation or cracks		X
OTHER		
CHEST DISPLACEMENT ASSEMBLY		
Bent shaft		X
Slider arm riding correctly, in track		X
TRANSDUCER LEADS		
Torn cables		X
ACCELEROMETER MOUNTINGS		
Check for secure mounting		X
KNEES		
Check outer skin, insert and casting (without removing insert)		X
Knee sliders - Wires intact		X
Knee sliders- Rubber returned to "at rest position"		X
LIMBS		
Check for normal movement and adjustment		X
PELVIS		
Inspect for breakage, especially at iliac crest		X

Comments on repair or replacement parts: