

REPORT NUMBER: NCAP-KAR-12-036

**NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST**

**TOYOTA MOTOR CORPORATION
2012 LEXUS ES350 4-DOOR SEDAN**

NHTSA NUMBER: MC5115

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



JANUARY 25, 2012

FINAL REPORT

**U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
SAFETY PERFORMANCE STANDARDS
OFFICE OF CRASHWORTHINESS STANDARDS
1200 NEW JERSEY AVE, SE
ROOM W43-410
WASHINGTON, DC 20590**

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Prepared By: 
Mr. Kelsey A. Chiu, Engineering Department Supervisor
KARCO Engineering, LLC.

Reviewed By: 
Mr. Michael L. Dunlap, Director of Operations
KARCO Engineering, LLC.

Approved By: 
Mr. Frank D. Richardson, Program Manager
KARCO Engineering, LLC.

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FINAL REPORT ACCEPTANCE BY OCWS:

Division Chief, 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 2012 Lexus ES350 4-door sedan 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), 301, and footwell intrusion performance. The test was conducted at the KARCO Engineering, LLC. facility in Adelanto, California on January 11, 2012. The impact velocity of the vehicle was 55.92 km/h and the ambient temperature at the barrier face at the time of impact was 17.2 deg. C. The target vehicle's post-test maximum crush was 489 mm at the vehicle's centerline. The test vehicle's performance is as follows: <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th rowspan="2">Units</th> <th colspan="2">Driver ATD</th> <th colspan="2">Passenger ATD</th> </tr> <tr> <th>Threshold</th> <th>Result</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₁₅)</td> <td>N/A</td> <td>700.0</td> <td>314.9</td> <td>700.0</td> <td>253.7</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>-19</td> <td>52</td> <td>-13</td> </tr> <tr> <td>Nij</td> <td>N/A</td> <td>1</td> <td>0.44</td> <td>1</td> <td>0.35</td> </tr> <tr> <td>Neck Tension</td> <td>N</td> <td>4170</td> <td>2160.4</td> <td>2620</td> <td>815.6</td> </tr> <tr> <td>Neck Compression</td> <td>N</td> <td>4000</td> <td>-492.2</td> <td>2520</td> <td>-335.1</td> </tr> <tr> <td>Left Femur Force</td> <td>N</td> <td>10008</td> <td>-2518.3</td> <td>6805</td> <td>-2140.2</td> </tr> <tr> <td>Right Femur Force</td> <td>N</td> <td>10008</td> <td>-3398.0</td> <td>6805</td> <td>-2358.1</td> </tr> </tbody> </table>						Measurement Description	Units	Driver ATD		Passenger ATD		Threshold	Result	Threshold	Result	Head Injury Criteria (HIC ₁₅)	N/A	700.0	314.9	700.0	253.7	Maximum Chest Compression	mm	63	-19	52	-13	Nij	N/A	1	0.44	1	0.35	Neck Tension	N	4170	2160.4	2620	815.6	Neck Compression	N	4000	-492.2	2520	-335.1	Left Femur Force	N	10008	-2518.3	6805	-2140.2	Right Femur Force	N	10008	-3398.0	6805	-2358.1
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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 August, 2011.

SUMMARY

A load cell barrier consisting of 36 load cells was impacted by a 2012 Lexus ES350 4-door sedan at a velocity of 55.92 km/h. The test was performed at KARCO Engineering, LLC. on January 11, 2012. 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. The driver (position 1) ATD (Serial No. 034) and the right-front passenger (position 2) ATD (Serial No. 141) were calibrated prior to this test. Certification details, along with instrumentation calibration data, are found in Appendix C of this report.

The 132 channels of data were recorded on an on-board data acquisition system. Appendix B contains the dummy response data traces.

There was 100% windshield retention and no intrusion into the protected zone of the windshield during the event. There was no Stoddard solvent leakage after the event or during any phase of the static rollover.

The maximum static crush of the test vehicle was 489 mm located at 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 headrest. The upper torso contacted the airbag. Both the left and right knees contacted the knee airbag.

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

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)	314.9	67.9	82.9	-19	0.44	2160.4	-492.2	-2518.3	-3398.0
Passenger (5th)	253.7	62.1	77.1	-13	0.35	815.6	-335.1	-2140.2	-2358.1

SECTION 2
DATA SHEETS

Test Vehicle: 2012 Lexus ES350 4-Door Sedan NHTSA No.: MC5115
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 1/11/12

CONVERSION FACTORS

Quantity	Typical Application	Std Units	Metric Unit	Multiply By
Mass	Vehicle Weight	lb	kg	0.4536
Linear Velocity	Impact Velocity	miles/hr	km/hr	1.609344
Length or Distance	Measurements	in	mm	25.4
Volume	Fuel Systems	gal	liter	3.785
Volume	Small Fluids	oz	mL	29.574
Pressure	Tire Pressures	lbf/in ²	kPa	6.895
Temperature	General Use	°F	°C	$=(T_f - 32)/1.8$
Force	Dynamic Forces	lbf	N	4.448
Moment	Torque	lbf-ft	N•m	1.355

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2012 Lexus ES350 4-Door Sedan NHTSA No.: MC5115
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 1/11/12

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	MC5115
Model Year	2012
Make	Lexus
Model	ES350
Body Style	4-Door Sedan
VIN	JTHBK1EG2C2480046
Body Color	Deep Sea Mica
Odometer Reading (km / mi)	14 / 9
Engine Displacement (L)	3.5
Type / No. of Cylinders	V6
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	6
Overdrive	Yes
Final Drive	Front
Roof Rack	No
Sunroof / T-Top	Yes
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes
Anti-Lock Brakes (ABS)	Yes
All Wheel Drive (AWD)	No
Traction Control System	Yes

Auto-Leveling System	No
Automatic Door Locks	Yes
Power Window Auto-Reverse	Yes
Other Optional Feature	None
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	Yes
Driver Torso/Pelvis Airbag	No
Driver Pelvis Airbag	No
Driver Knee Airbag	Yes
Pass. Front Airbag	Yes
Pass. Curtain Airbag	Yes
Pass. Head/Torso Airbag	No
Pass. Torso Airbag	Yes
Pass. Torso/Pelvis Airbag	No
Pass. Pelvis Airbag	No
Pass. Knee Airbag	Yes
Driver Seat Belt Pretensioner	Yes
Pass. Seat Belt Pretensioner	Yes
Driver Load Limiter	Yes
Pass. Load Limiter	Yes
Other Safety Restraint	None

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

DATA FROM CERTIFICATION LABEL

Manufactured By	Toyota Motor Corporation
Date of Manufacture	Oct-11

GVWR (kg)	2122
GAWR Front (kg)	1210
GAWR Rear (kg)	1070

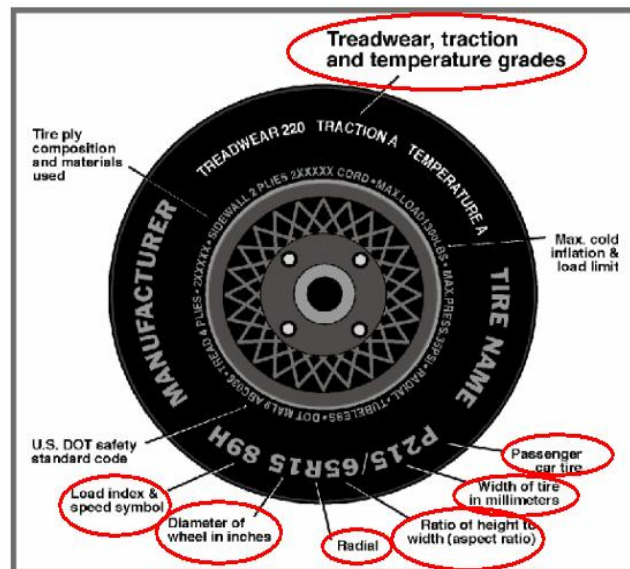
VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total	
Type of Seats	Bucket	Bench			
Designated Seating Capacity	2	3		5	
Capacity Weight (VCW) (kg)				407.0	A
DSC x 68.04 (kg)				340.2	B
Cargo Weight (RCLW) (kg)				66.8	A-B

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle:	2012 Lexus ES350 4-Door Sedan	NHTSA No.:	MC5115
Test Program:	56 km/h Frontal Impact NCAP Test	Test Date:	1/11/12



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	210	210
Recommended Tire Size	P215/55R17	P215/55R17
Tire Size on Vehicle	P215/55R17	P215/55R17
Tire Manufacturer	Michelin	Michelin
Tire Model	Energy MXV4	Energy MXV4
Treadwear	440	440
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 1 Polyamide, 2 Steel	2 Polyester, 1 Polyamide, 2 Steel
Load Index / Speed Symbol	93V	93V
Tire Material	Polyester, Polyamide, Steel	Polyester, Polyamide, Steel
DOT Safety Code Left	B93F MK6X 1611	B93F MK6X 1611
DOT Safety Code Right	B93F MK6X 1611	B93F MK6X 1611

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

Test Vehicle: 2012 Lexus ES350 4-Door Sedan NHTSA No.: MC5115
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 1/11/12

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	504.5	330.0		533.5	416.0	
Right	kg	492.5	323.5		505.0	395.0	
Ratio	%	60.4%	39.6%	100.0%	56.2%	43.8%	100.0%
Total	kg	997.0	653.5	1650.5	1038.5	811.0	1849.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1650.5	A
Weight of 1 P572E ATD & 1 P572O ATD	kg	141.0	B
Rated Cargo/Luggage Weight (RCLW)	kg	66.8	C
Calculated Vehicle Target Weight (TVTW)	kg	1858.3	A+B+C

TEST VEHICLE ATTITUDES

Condition	Units	LF	RF	LR	RR	CG Aft of Front Axle
As Delivered	mm	716	717	731	729	1099
As Tested	mm	705	705	695	700	1217
Post-Test	mm	741	711	689	692	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2776
Total Vehicle Length at Left Side	mm	4122
Total Vehicle Length at Centerline	mm	4865
Total Vehicle Length at Right Side	mm	4108
Weight of Ballast in Cargo Area	kg	71.4
Weight of Vehicle Components Removed	kg	26.0
Amount of Stoddard Solvent in Fuel Tank	L	65.12

VEHICLE COMPONENTS REMOVED TO MEET TEST WEIGHT:

Spare Tire (22.0 kg), Spare Tire Tools (4.0 kg),

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

Test Vehicle: 2012 Lexus ES350 4-Door Sedan NHTSA No.: MC5115
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 1/11/12

TARGET VEHICLE STRUCTURAL MEASUREMENTS

No.	Description	Pre-Test	Post-Test	Difference
1	Total Length	4865	4376	-489
2	Total Width	1820	2210	390
3	Bumper Top Height	570	620	50
4	Bumper Bottom Height	432	485	53
5	Longitudinal Member Top Height	530	640	110
6	Distance Between Longitudinal Members	1090	1190	100
7	Longitudinal Member Width	65	120	55
8	Engine Top Height	845	908	63
9	Engine Bottom Height	508	206	-302
10	Engine and Gearbox Width	630	630	0
11	Front Bumper to Engine Distance	510	224	-286
12	Front Shock Absorber Fixing Height	890	912	22
13	Bonnet Leading Edge Height	720	697	-23
14	Front Shock Absorber Fixing Width	1235	1140	-95
15	Front Bumper to Front Axle Distance	974	499	-475
16	Front Axle to A-Pillar Distance	487	406	-81
17	A-Pillar to B-Pillar Distance	1040	1042	2
18	B-Pillar to Rear Axle Distance	1142	1140	-2
19	B-Pillar to C-Pillar Distance	1010	1005	-5
20	Roof Sill Bottom Height	1294	1333	39
21	Roof Sill Top Height	1400	1437	37
22	Floor Sill Bottom Height	185	210	25
23	Floor Sill Top Height	330	366	36

All measurements in millimeters.

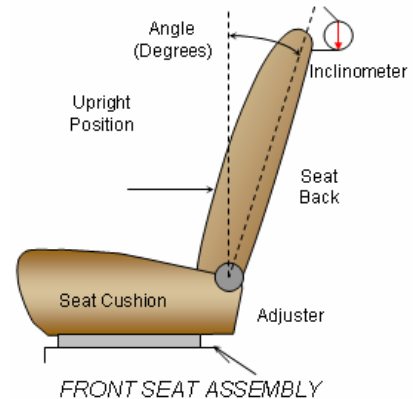
DATA SHEET NO. 2

SEAT ADJUSTMENT, FUEL SYSTEMS, AND STEERING WHEEL DATA

Test Vehicle:	2012 Lexus ES350 4-Door Sedan	NHTSA No.:	MC5115
Test Program:	56 km/h Frontal Impact NCAP Test	Test Date:	1/11/12

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 $0^\circ \pm 0.5^\circ$. Seat back angle is measured at the headrest post using a digital inclinometer.

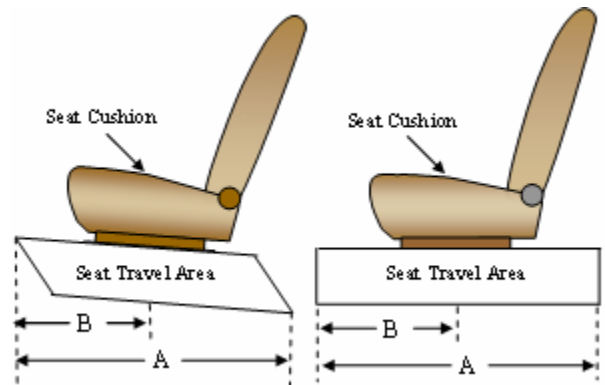


SEAT BACK ANGLE

Seating Position	Degrees
Driver Seat Back Angle	3.0
Passenger Seat Back Angle	2.2

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	305 mm	153 mm
Passenger Seat	260 mm	0 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 "H" is the uppermost position, followed by position "M1". Position "L" is the lowermost position.

SEAT BELT UPPER ANCHORAGES

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

DATA SHEET NO. 2 ... (CONTINUED)

SEAT ADJUSTMENT, FUEL SYSTEMS, AND STEERING WHEEL DATA

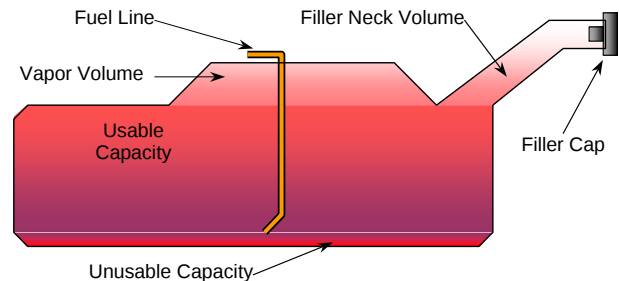
Test Vehicle: 2012 Lexus ES350 4-Door Sedan NHTSA No.: MC5115
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 1/11/12

FUEL TANK CAPACITY

Description	Liters
Usable Capacity of "Standard Tank"	70.02
Usable Capacity of "Optional Tank"	
92 - 94% of Usable Capacity	64.42 to 65.82
Actual Amount of Stoddard Solvent Used	65.12
1/3 of Usable Capacity	23.34

FUEL PUMP

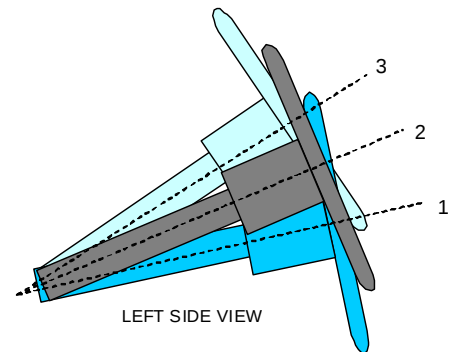
The vehicle is equipped with an electric fuel pump.
The fuel pump is activated when the ignition is turned on.



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. A tape measure is used to measure telescoping steering wheel travel.



STEERING COLUMN ASSEMBLY

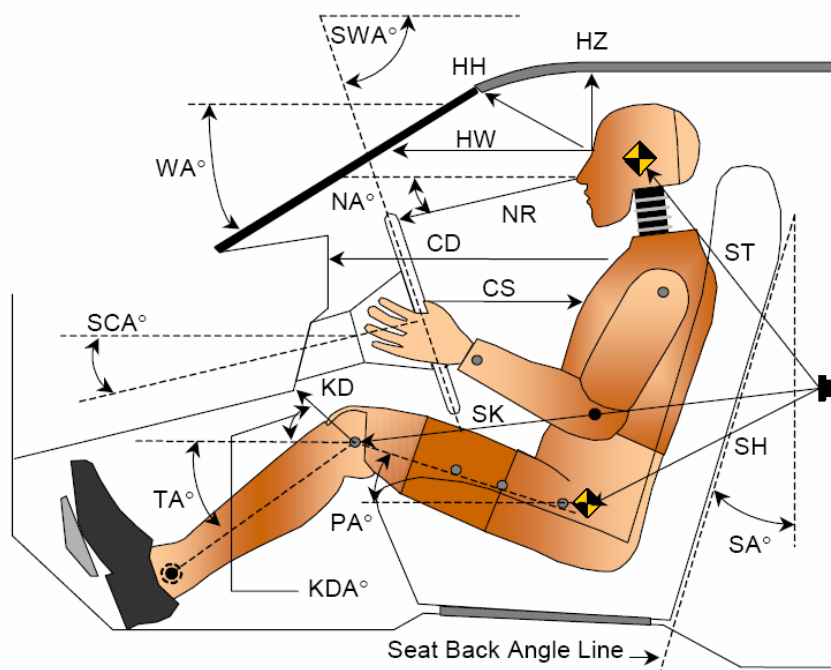
STEERING COLUMN POSITIONING

	Degrees	Fore-Aft Position (mm)
Lowermost Position, No. 1	17.8	75
Geometric Center Position, No. 2	25.0	98
Uppermost Position, No. 3	32.2	120
Telescoping Steering Wheel Travel		45
Test Position	25.0	98

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle:	2012 Lexus ES350 4-Door Sedan	NHTSA No.:	MC5115
Test Program:	56 km/h Frontal Impact NCAP Test	Test Date:	1/11/12



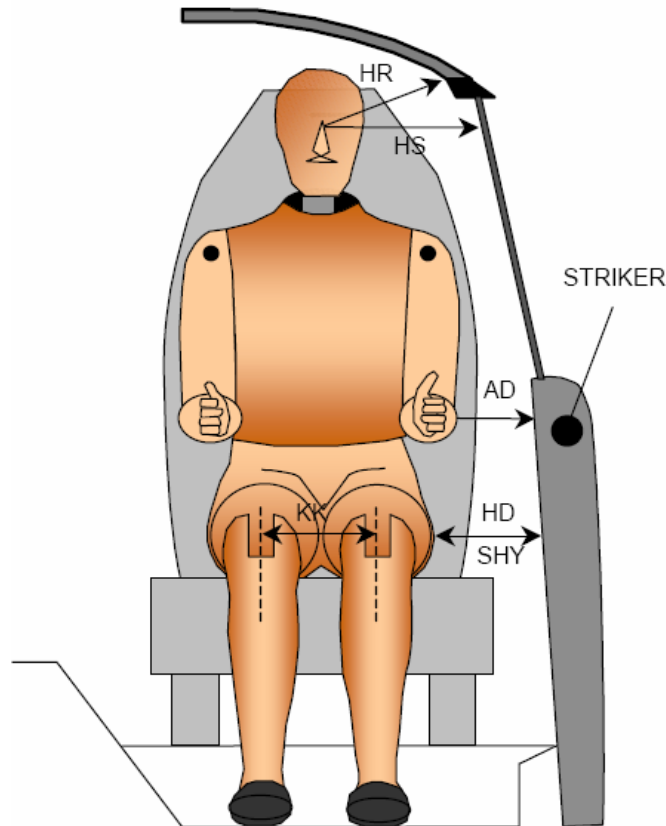
LEFT SIDE VIEW

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		22.8		
SWA°	Steering Wheel Angle		65.0		
SCA°	Steering Column Angle		25.0		
SA°	Seat Back Angle (On Headrest Post)		3.0		2.2
HZ	Head to Roof	155	90.0	171	90.0
HH	Head to Header	315	35.1	254	49.1
HW	Head to Windshield	592	0.0	573	0.0
NR	Nose to Rim	408	7.2	469	29.9
CD	Chest to Dash	484	10.2	418	9.4
CS	Chest to Steering Hub	294	0.0		
RA	Rim to Abdomen	175	0.0		
KDL	Left Knee to Dash	194	25.6	100	40.6
KDR	Right Knee to Dash	167	32.4	112	38.8
PA°	Pelvic Angle		20.4		21.5
TA°	Tibia Angle		45.0		52.3
SK	Striker to Knee	656	16.5	756	11.3
ST	Striker to Head	617	63.8	444	51.6
SH	Striker to H-Point	364	46.6	485	27.2

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle:	2012 Lexus ES350 4-Door Sedan	NHTSA No.:	MC5115
Test Program:	56 km/h Frontal Impact NCAP Test	Test Date:	1/11/12



Code	Description	Driver (mm)	Passenger (mm)
AD	Arm to Door	161	98
HD	H-Point to Door	146	234
HR	Head to Side Header	209	234
HS	Head to Side Window	327	362
KK	Knee to Knee	337	225
SHY	Striker to H-Point (Y-Direction)	254	270
AA	Ankle to Ankle	345	150

DATA SHEET NO. 5

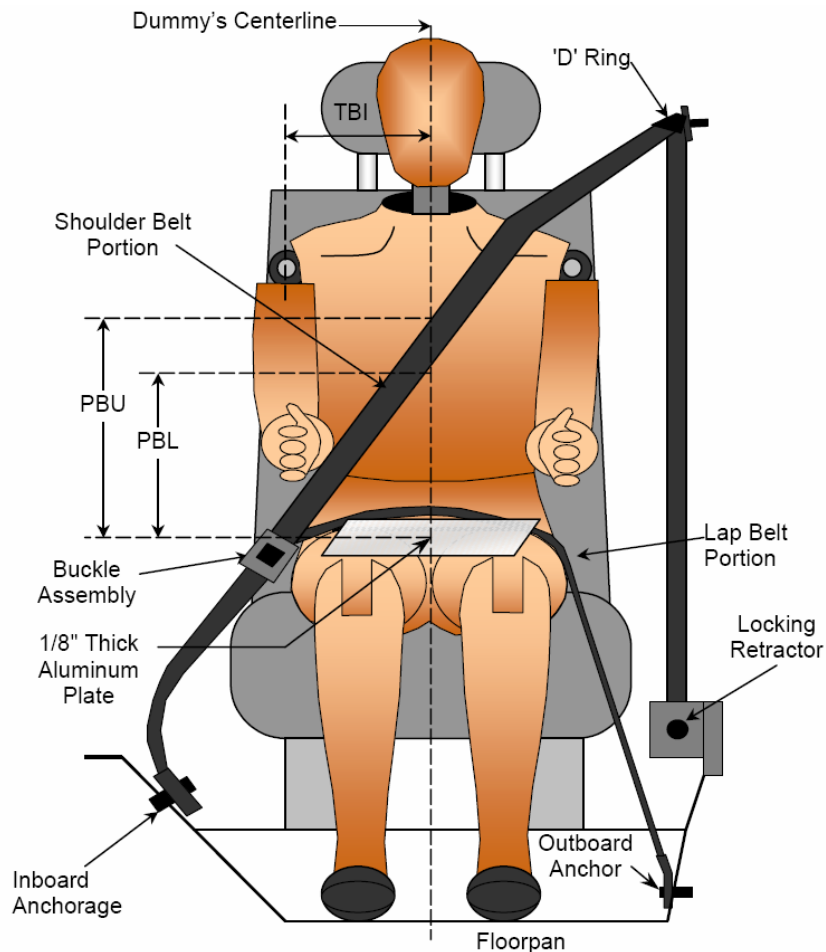
SEAT BELT POSITIONING DATA

Test Vehicle: 2012 Lexus ES350 4-Door Sedan

NHTSA No.: MC5115

Test Program: 56 km/h Frontal Impact NCAP Test

Test Date: 1/11/12



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	375	334
PBL	Top Surface of Aluminum Plate to Belt Lower Edge	mm	295	246

BELT LENGTH DATA

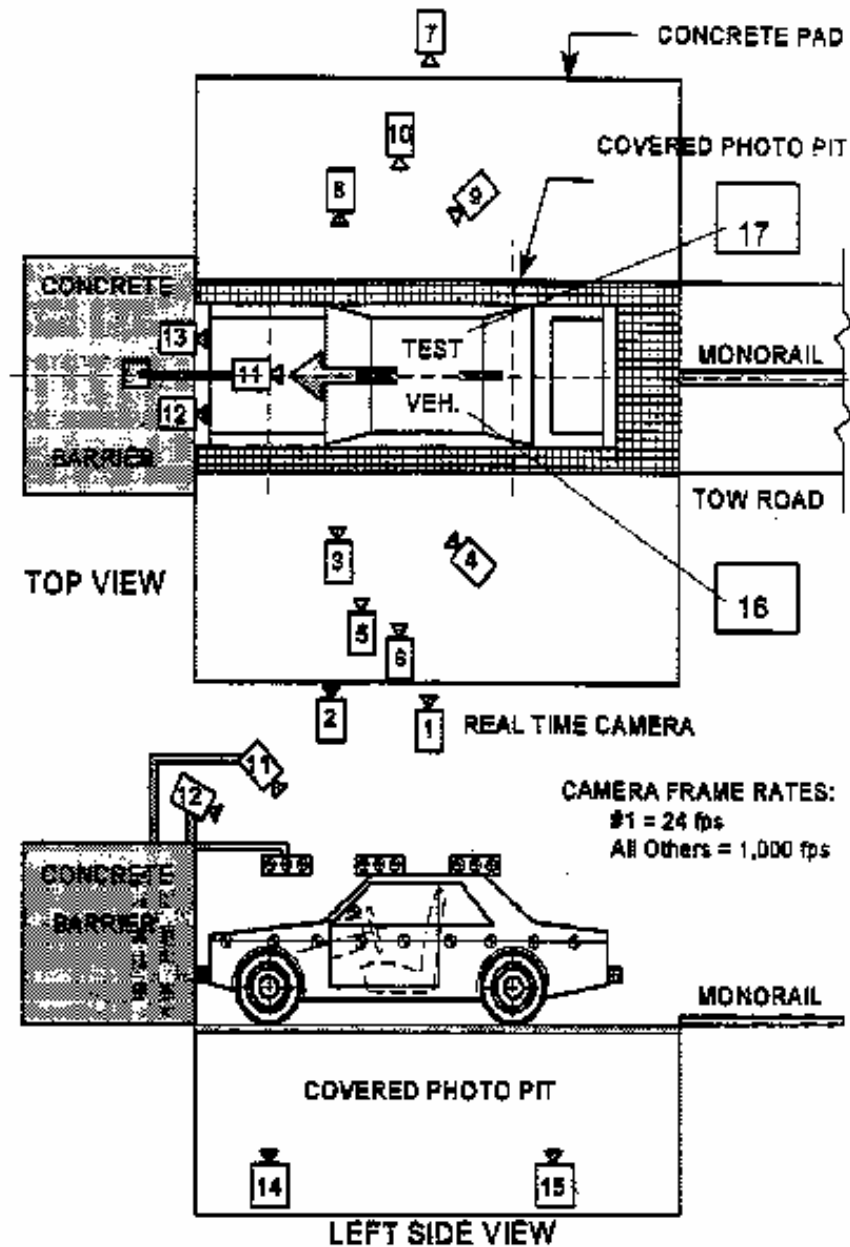
Measurement Description	Units	Driver	Passenger
Shoulder Belt Length as Measured on ATD	mm	952	1032
Lap Belt Length as Measured on ATD	mm	588	572
Remainder of Belt on Reel	mm	1100	850
Total Belt Length for Continuous Webbing Systems	mm	2640	2454

DATA SHEET NO. 6

HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2012 Lexus ES350 4-Door Sedan NHTSA No.: MC5115
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 1/11/12

CAMERA POSITIONS FOR FRONTAL IMPACTS



DATA SHEET NO. 6 ... (CONTINUED)

HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2012 Lexus ES350 4-Door Sedan NHTSA No.: MC5115
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 1/11/12

CAMERA LOCATIONS

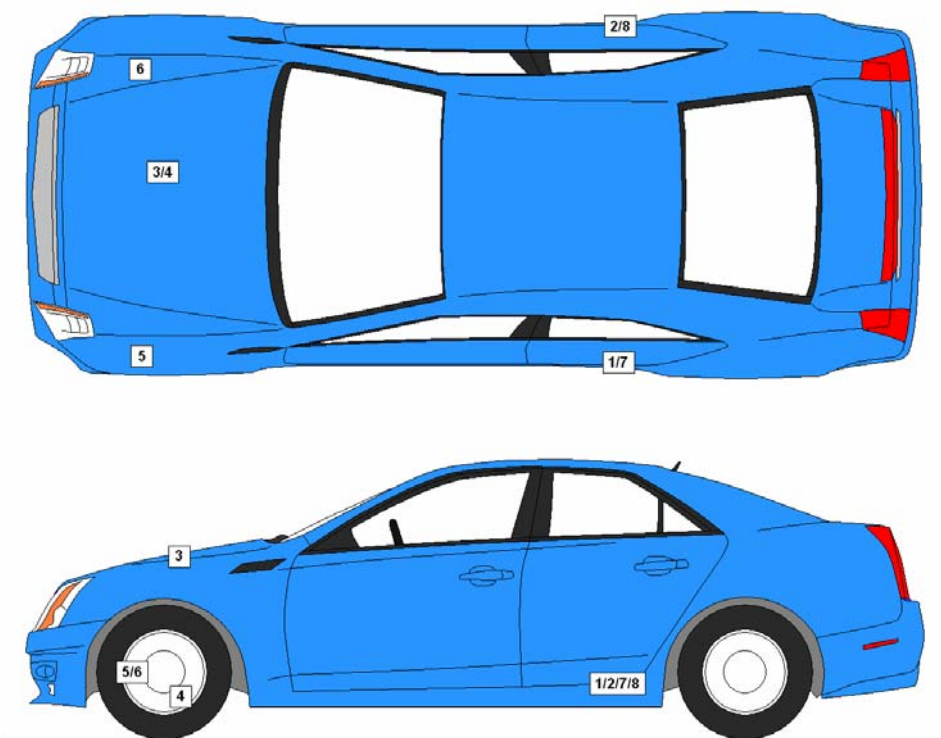
No.	Description	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Overall	-11412	-8150	-1484		30
2	Driver Close-Up	-2590	-7950	-1371	24	1000
3	Left Front Half	-1701	-6197	-1701	50	1000
4	Left Angle	-6696	-10308	-3211	ZOOM	1000
5	Steering Column - Top	-1966	-10412	-3688	50	1000
6	Steering Column - Bottom	-1972	-10412	-3379	50	1000
7	Right Overall	-2336	7569	-1012	24	1000
8	Passenger Close-Up	-1733	7581	-1408	50	1000
9	Right Front Half	-1600	8214	-1811	ZOOM	1000
10	Right Angle	-6217	9516	-4830	ZOOM	1000
11	Windshield	-354	0	-5749	12	1000
12	Driver Windshield	297	-366	-2460	12	1000
13	Passenger Windshield	297	366	-2460	24	1000
14	Pit Front	-756	0	1495	12	1000
15	Pit Rear	-3398	0	1495	8	1000
16	Onboard Driver Airbag (Optional)	-3415	300	-1310	12	1000
17	Onboard Passenger Airbag (Optional)	-3415	-300	-1310	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: 2012 Lexus ES350 4-Door Sedan NHTSA No.: MC5115
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 1/11/12



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Description	Location		
		X	Y	Z
1	Left Rear Accelerometer X-Direction	1842	-744	-341
2	Right Rear Accelerometer X-Direction	1842	744	-341
3	Engine Top X	4105	429	-765
4	Engine Bottom X	3967	270	-158
5	Left Brake Caliper X	3884	-711	-290
6	Right Brake Caliper X	3884	711	-290
7	Left Rear Accelerometer Z-Direction	1842	-744	-341
8	Right Rear Accelerometer Z-Direction	1842	744	-341

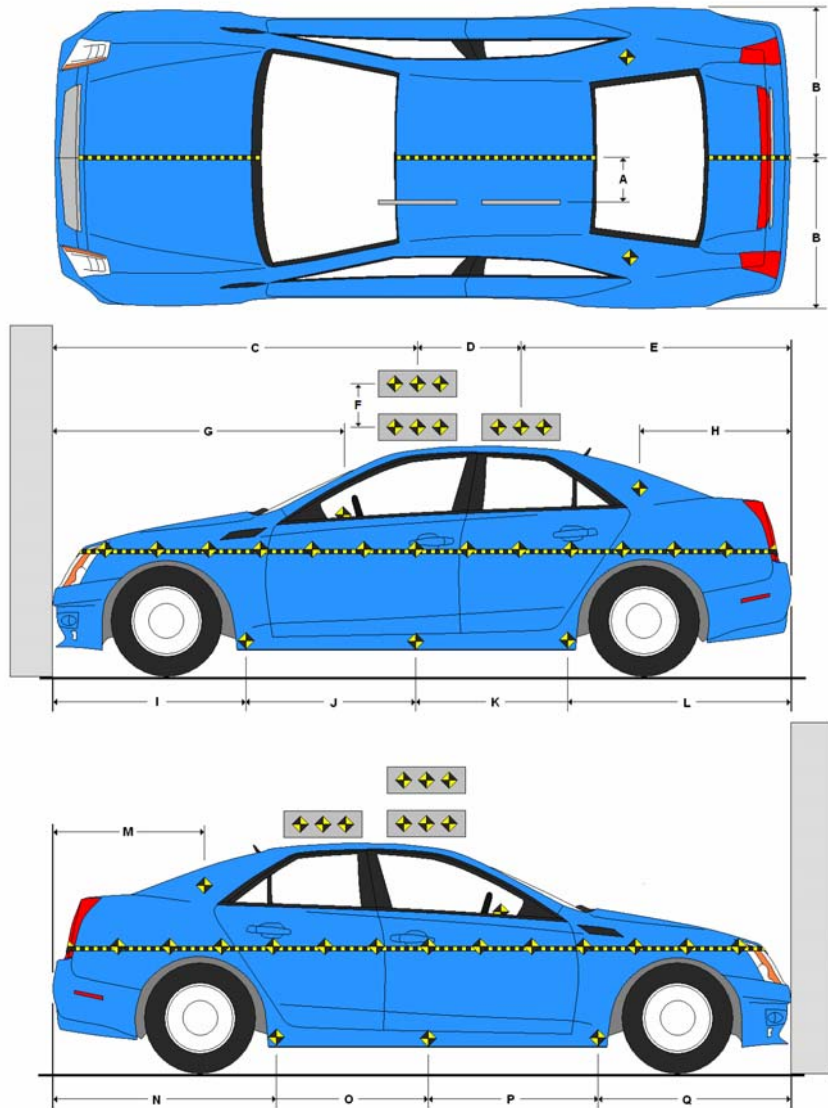
Reference Points: X – Rear Surface of Vehicle (+ forward)
Y – Vehicle Centerline (+ to right)
Z – Ground Plane (+ down)

DATA SHEET NO. 8

PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2012 Lexus ES350 4-Door Sedan NHTSA No.: MC5115
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 1/11/12

Item	Value
A	
B	910
C	
D	
E	
F	
G	1820
H	1000
I	1417
J	945
K	945
L	1548
M	930
N	1542
O	947
P	947
Q	1421



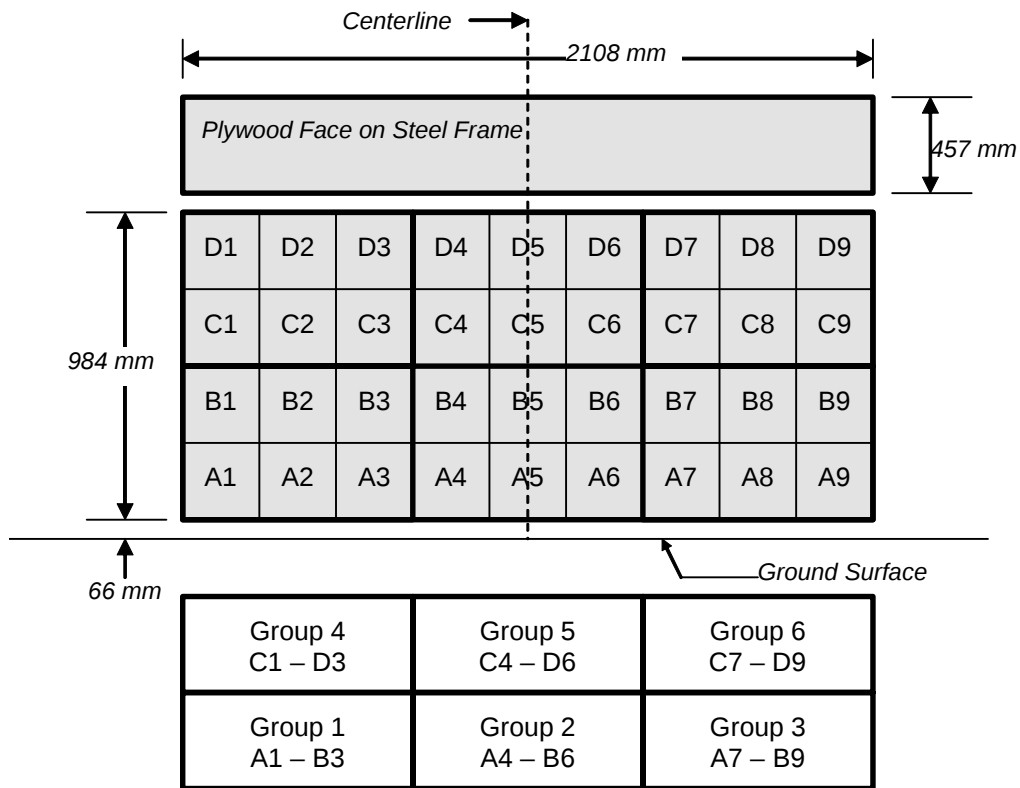
All measurements in millimeters.

DATA SHEET NO. 9

LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2012 Lexus ES350 4-Door Sedan NHTSA No.: MC5115
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 1/11/12

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: 2012 Lexus ES350 4-Door Sedan NHTSA No.: MC5115
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 1/11/12

INSTRUMENTATION

Driver Dummy Accelerometers	44
Passenger Dummy Accelerometers	44
Vehicle Structure Accelerometers	8
Seat Belt Load Cells	0
Load Cell Barrier	36
Total	132

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: 2012 Lexus ES350 4-Door Sedan NHTSA No.: MC5115
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 1/11/12

TEST DUMMY INFORMATION AND CONTACT

Description	Driver	Passenger
Dummy Type/Serial No.	P572E 50th Percentile Male ATD / 034	P572O 5th Percentile Female ATD / 141
Head Contact	Airbag, Headrest	Airbag, Headrest
Upper Torso Contact	Airbag	Airbag
Lower Torso Contact	None	None
Left Knee Contact	Knee Airbag	Knee Airbag
Right Knee Contact	Knee Airbag	Knee Airbag

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Locked / Unlocked Doors	Unlocked	Unlocked
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)	2	0
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

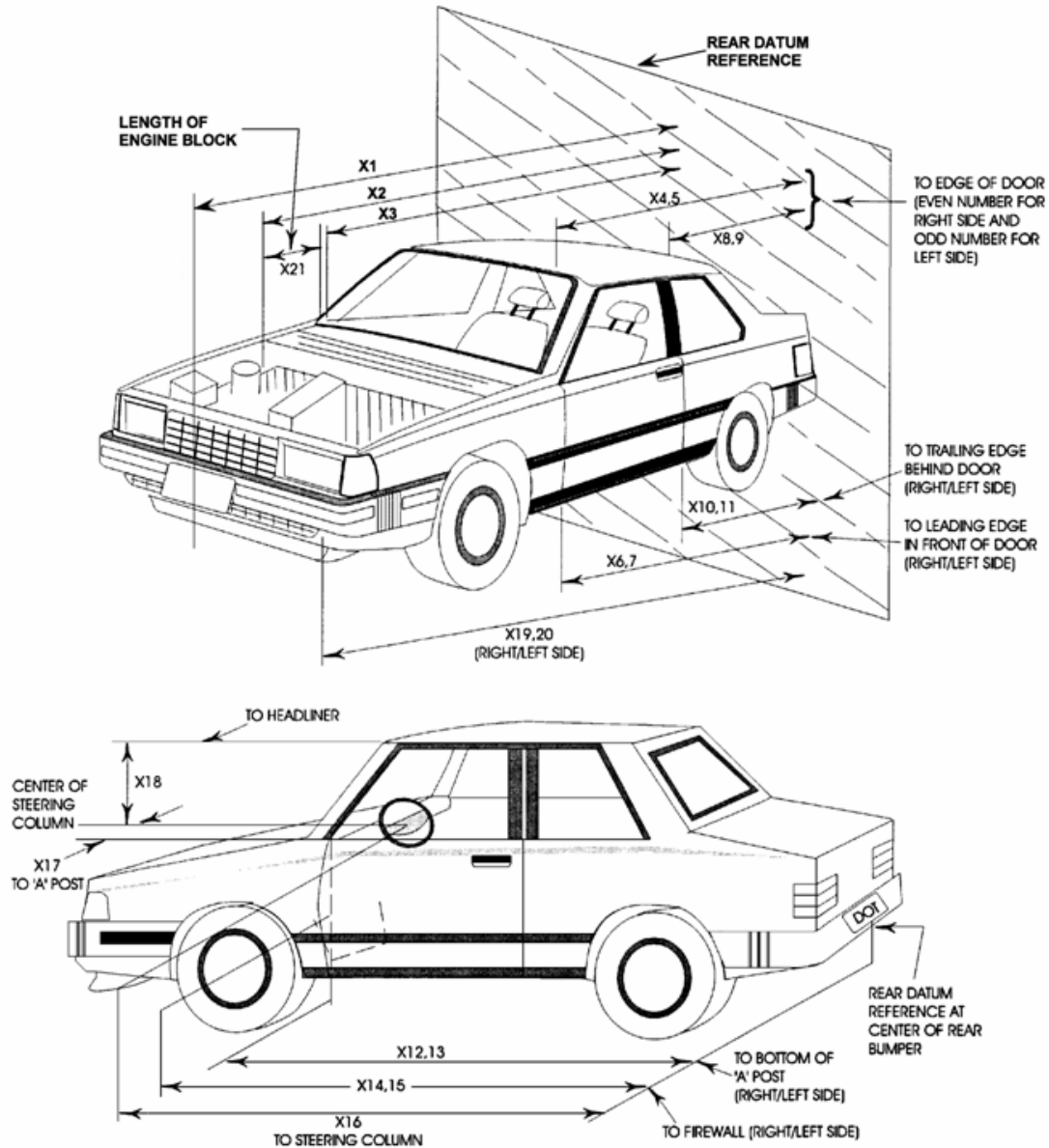
Measured Parameter	Units	Value
Left Side	mm	1848
Center	mm	1782
Right Side	mm	1764
Average	mm	1798

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Driver		Passenger	
	Installed	Operated	Installed	Operated
Front Airbag	Yes	Yes	Yes	Yes
Side Airbag 1 (Curtain)	Yes	No	Yes	No
Side Airbag 2 (Torso)	Yes	No	Yes	No
Knee Airbag	Yes	Yes	Yes	Yes
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: 2012 Lexus ES350 4-Door Sedan NHTSA No.: MC5115
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 1/11/12

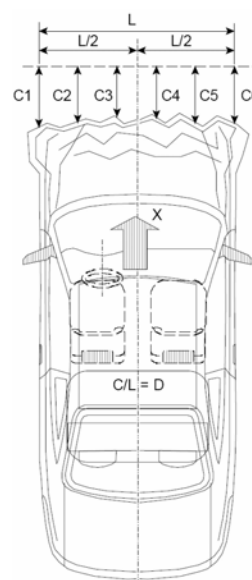


DATA SHEET NO. 12 ... (CONTINUED)**VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2012 Lexus ES350 4-Door Sedan NHTSA No.: MC5115
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 1/11/12

No.	Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	4865	4376	-489
2	Rear Surface of Vehicle to Front of Engine	4355	3985	-370
3	RSOV to Firewall	3710	3633	-77
4	RSOV to Upper Leading Edge of Right Door	3392	3433	41
5	RSOV to Upper Leading Edge of Left Door	3405	3422	17
6	RSOV to Lower Leading Edge of Right Door	3385	3404	19
7	RSOV to Lower Leading Edge of Left Door	3394	3400	6
8	RSOV to Upper Trailing Edge of Right Door	2247	2280	33
9	RSOV to Upper Trailing Edge of Left Door	2257	2272	15
10	RSOV to Lower Trailing Edge of Right Door	2250	2269	19
11	RSOV to Lower Trailing Edge of Left Door	2255	2262	7
12	RSOV to Bottom of A-Pillar, Right Side	3360	3369	9
13	RSOV to Bottom of A-Pillar, Left Side	3367	3365	-2
14	RSOV to Firewall, Right Side	3655	3674	19
15	RSOV to Firewall, Left Side	3695	3631	-64
16	RSOV to Steering Column	2880	2916	36
17	Center of Steering Column to A-Pillar	445	396	-49
18	Center of Steering Column to Headliner	415	365	-50
19	RSOV to Right Side of Front Bumper	4108	3926	-182
20	RSOV to Left Side of Front Bumper	4122	4038	-84
21	Length of Engine Block	565	565	0
RD	RSOV to Right Side of Dash Panel	3070	3128	58
CD	RSOV to Center of Dash Panel	3040	3330	290
LD	RSOV to Left Side of Dash Panel	3090	3130	40

All measurements in millimeters.

DATA SHEET NO. 13**ACCIDENT INVESTIGATION DATA**Test Vehicle: 2012 Lexus ES350 4-Door SedanNHTSA No.: MC5115Test Program: 56 km/h Frontal Impact NCAP TestTest Date: 1/11/12**VEHICLE INFORMATION**VIN: JTHBK1EG2C2480046Wheelbase (mm): 2776Vehicle Size Category: 4-Door SedanTest Weight (kg): 1849.5**ACCELEROMETER DATA**Accelerometer Locations: Left Rear CrossmemberCal. Procedure/Interval: Drop Test / 6 monthsIntegration Algorithm: NHTSA StandardImpact Velocity (km/h): 55.92Velocity Change (km/h): 64.7Time of Separation (msec): 70.4Linearity: Good**CRUSH PROFILE**Collision Deformation Classification: 12FDEW2Midpoint of Damage: Vehicle CenterlineDamage Region Length (mm): 1605Impact Mode: Full Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush Zone 1 at Left Side	mm	270	572	302
C2	Crush Zone 2 at Left Side	mm	141	566	425
C3	Crush Zone 3 at Left Side	mm	72	500	428
C4	Crush Zone 4 at Right Side	mm	72	485	413
C5	Crush Zone 5 at Right Side	mm	141	545	404
C6	Crush Zone 6 at Right Side	mm	270	567	297
L	C1 to C6	mm	1605		

DATA SHEET NO. 14

VEHICLE INTRUSION MEASUREMENTS

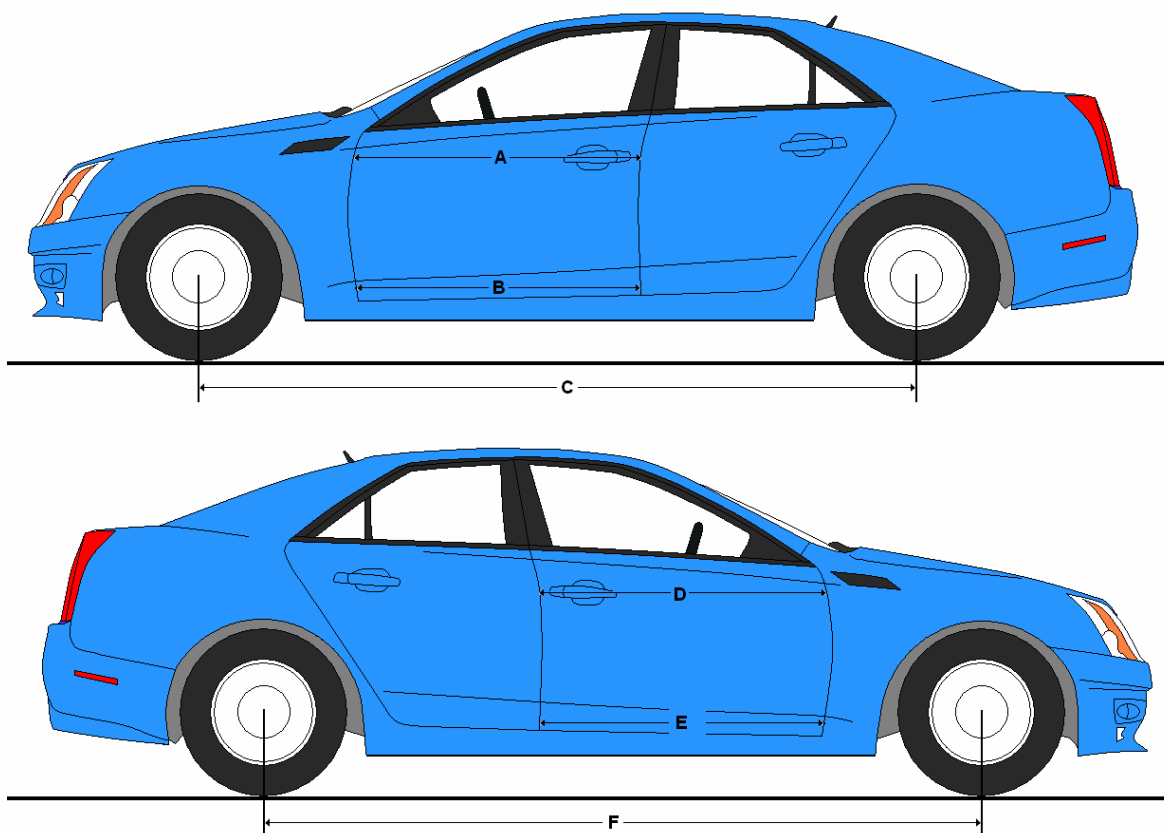
Test Vehicle: 2012 Lexus ES350 4-Door Sedan NHTSA No.: MC5115
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 1/11/12

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	1040	1038	2
B	Left Side Lower	mm	969	981	-12
D	Right Side Upper	mm	1043	1040	3
E	Right Side Lower	mm	985	1001	-16

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2776	2714	62
F	Right Side Wheelbase	mm	2776	2714	62



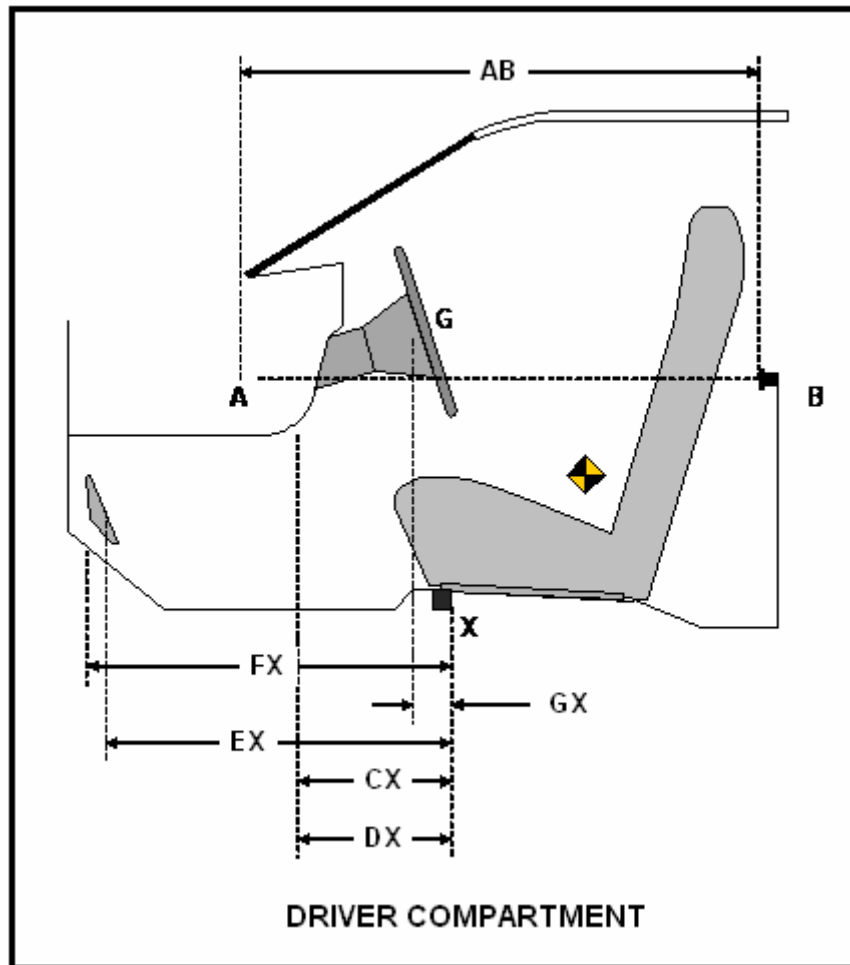
DATA SHEET NO. 14 ... (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2012 Lexus ES350 4-Door Sedan NHTSA No.: MC5115
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 1/11/12

DRIVER COMPARTMENT INTRUSION

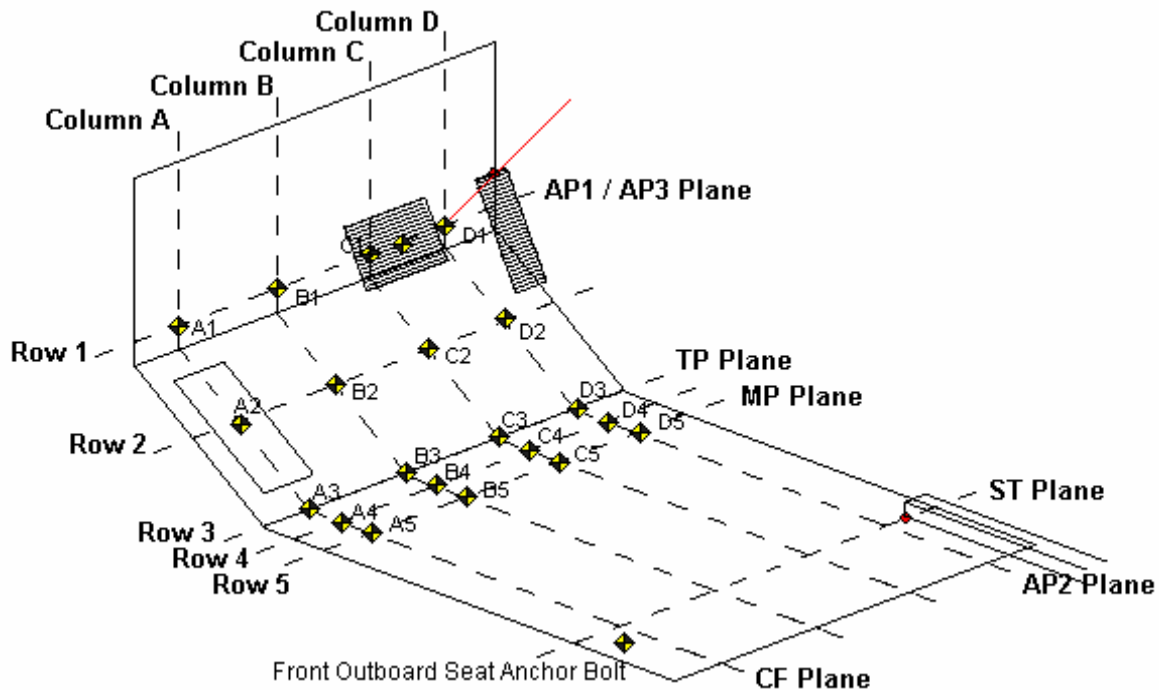
Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	843	853	-10
CX	Left Knee Bolster to X	mm	350	351	-1
DX	Right Knee Bolster to X	mm	350	312	38
EX	Brake Pedal to X	mm	540	538	2
FX	Foot Rest to X	mm	650	540	110
GX	Center of Steering Wheel Hub to X	mm	91	122	-31

X = Front of Seat Track (Stationary)



DATA SHEET NO. 14 ... (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle:	2012 Lexus ES350 4-Door Sedan	NHTSA No.:	MC5115
Test Program:	56 km/h Frontal Impact NCAP Test	Test Date:	1/11/12



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: 2012 Lexus ES350 4-Door Sedan NHTSA No.: MC5115
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 1/11/12

DRIVER FLOORPAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	634	648	642	640	610	656	637	635	24	-8	5	5
2	593	578	583	569	582	585	583	564	11	-7	0	5
3	522	511	510	501	541	522	515	497	-19	-11	-5	4
4	398	393	390	384	415	406	402	391	-17	-13	-12	-7
5	275	271	270	266	294	283	284	281	-19	-12	-14	-15

DRIVER FLOORPAN Y-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	-44	-153	-269	-453	-8	-126	-240	-423	-36	-27	-29	-30
2	-42	-149	-265	-445	-5	-115	-232	-416	-37	-34	-33	-29
3	-38	-147	-257	-444	-7	-110	-219	-406	-31	-37	-38	-38
4	-34	-143	-252	-440	6	-101	-208	-395	-40	-42	-44	-45
5	-31	-139	-248	-432	4	-98	-206	-387	-35	-41	-42	-45

DRIVER FLOORPAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	64	54	48	43	97	45	44	26	-33	9	4	17
2	5	15	2	-7	36	7	-5	-21	-31	8	7	14
3	-35	-26	-37	-43	-44	-36	-52	-56	9	10	15	13
4	-56	-46	-52	-55	-67	-59	-55	-52	11	13	3	-3
5	-74	-58	-65	-81	-92	-73	-81	-89	18	15	16	8

All measurements in millimeters

DATA SHEET NO. 14 ... (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2012 Lexus ES350 4-Door Sedan NHTSA No.: MC5115
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 1/11/12

PASSENGER FLOORPAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	679	679	679	655	617	629	626	629	62	50	53	26
2	615	612	612	611	588	580	573	568	27	32	39	43
3	548	540	541	538	519	520	511	511	29	20	30	27
4	419	421	422	420	413	416	408	369	6	5	14	51
5	304	301	299	301	290	294	299	295	14	7	0	6

PASSENGER FLOORPAN Y-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	416	220	105	0	398	212	103	-2	18	8	2	2
2	417	218	109	-4	387	203	101	8	30	15	8	-12
3	413	220	109	-2	403	213	104	-7	10	7	5	5
4	410	221	111	-1	412	214	106	-9	-2	7	5	8
5	412	221	111	-1	413	219	104	-4	-1	2	7	3

PASSENGER FLOORPAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	58	58	57	60	66	71	72	66	-8	-13	-15	-6
2	8	8	7	5	2	3	8	14	6	5	-1	-9
3	-38	-35	-35	-36	-39	-50	-49	-35	1	15	14	-1
4	-48	-53	-55	-59	-60	-76	-52	-23	12	23	-3	-36
5	-73	-64	-64	-76	-100	-83	-86	-58	27	19	22	-18

All measurements in millimeters

DATA SHEET NO. 15

SUMMARY OF FMVSS 212 AND 219 (PARTIAL) DATA

Test Vehicle: 2012 Lexus ES350 4-Door Sedan NHTSA No.: MC5115

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 1/11/12

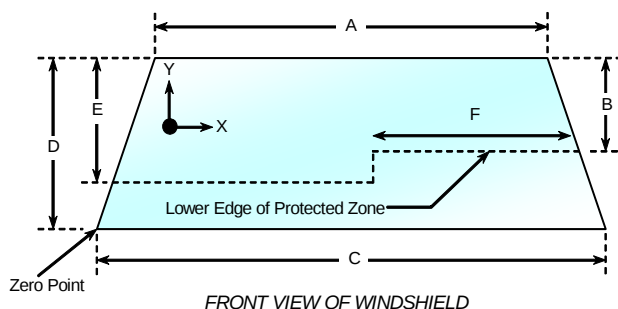
Windshield Mounting Details: Windshield glass is secured to the vehicle frame with rubber cement.

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	2160	2160	100.0%
Right Side	2160	2160	100.0%
Total	4320	4320	100.0%



Item	Units	Value
A	mm	1240
B	mm	362
C	mm	1450
D	mm	815
E	mm	472
F	mm	505

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. 15 ... (CONTINUED)

SUMMARY OF FMVSS 212 AND 219 (PARTIAL) DATA

Test Vehicle: 2012 Lexus ES350 4-Door Sedan NHTSA No.: MC5115
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 1/11/12

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 17.2° C Test Time: 12:36 PM

Stoddard Solvent Spillage Measurements

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

DATA SHEET NO. 16

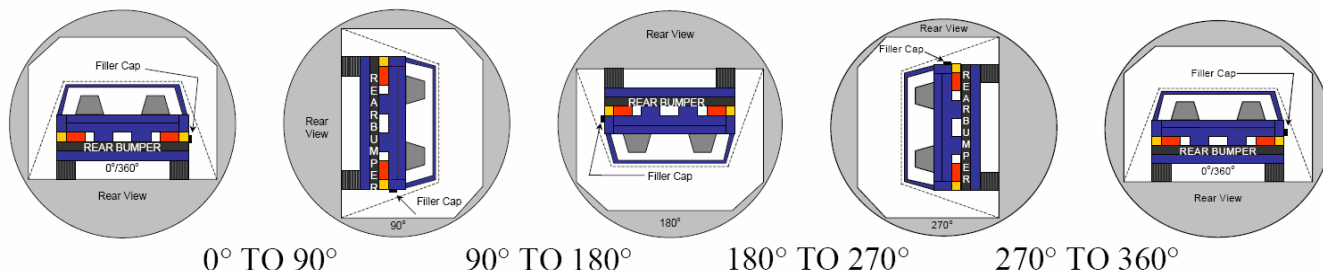
FMVSS 301 STATIC ROLLOVER

Test Vehicle: 2012 Lexus ES350 4-Door Sedan

NHTSA No.: MC5115

Test Program: 56 km/h Frontal Impact NCAP Test

Test Date: 1/11/12



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 was no Stoddard solvent spillage.

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° To 90°	84	300	384
90° To 180°	82	300	382
180° To 270°	78	300	378
270° To 360°	78	300	378

FMVSS 301 SPILLAGE TABLE

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

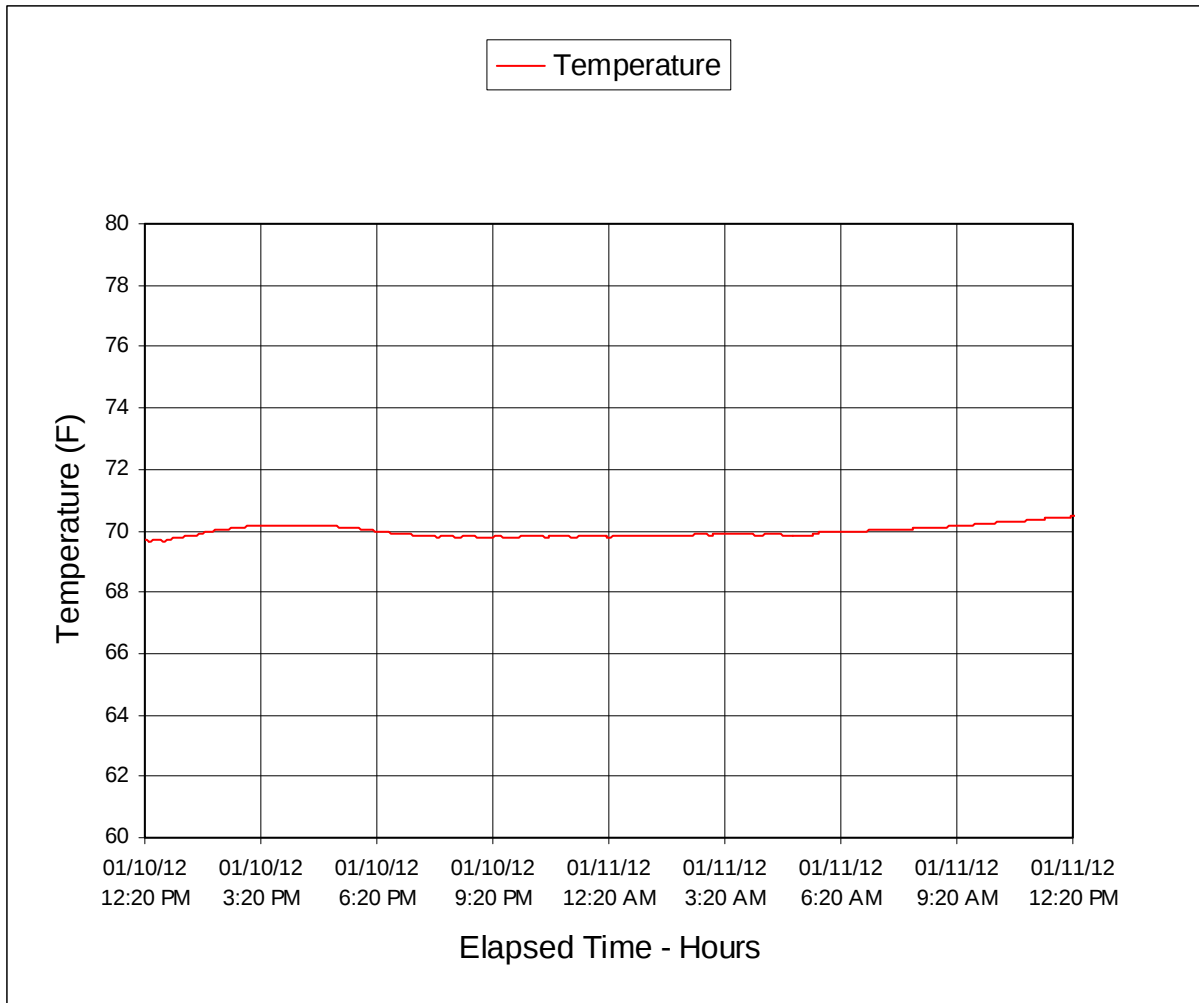
SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0° To 90°	
90° To 180°	
180° To 270°	
270° To 360°	

DATA SHEET NO. 17

DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART

Test Vehicle: 2012 Lexus ES350 4-Door Sedan NHTSA No.: MC5115
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 1/11/12



APPENDIX A
PHOTOGRAPHS

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FIGURE 1. Load Cell Location



FIGURE 2. Load Cell Wall



FIGURE 3. Manufacturer's Label

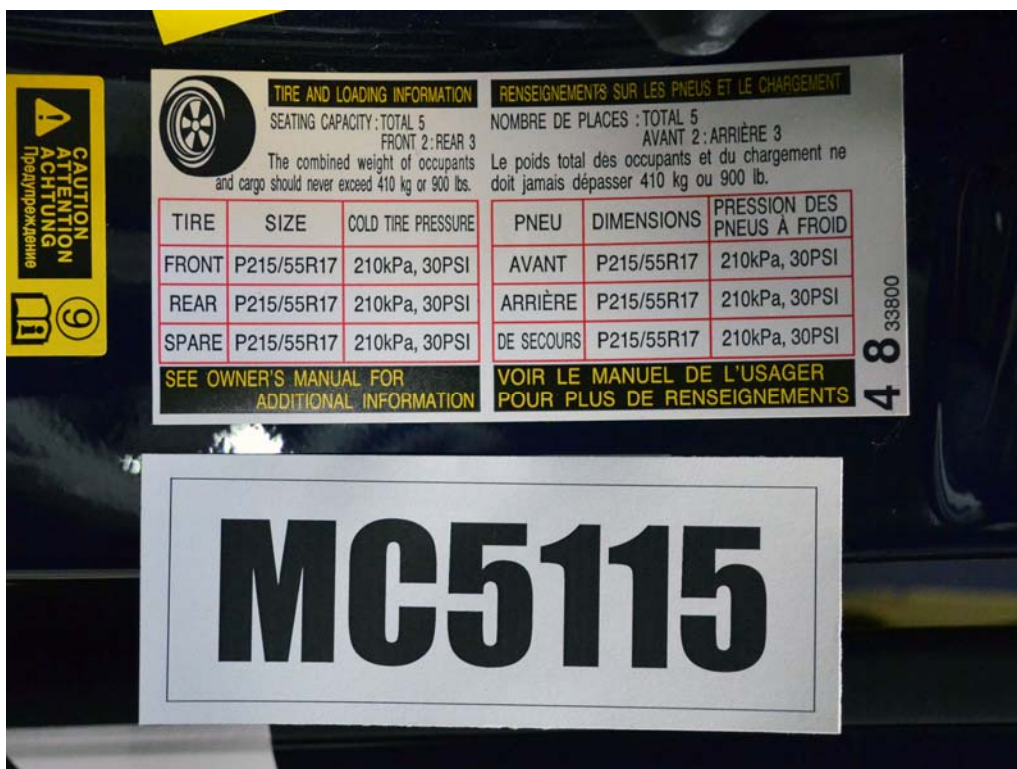


FIGURE 4. Tire Placard



FIGURE 5. 2012 Lexus ES350 Frontal As Delivered



FIGURE 6. Left Rear $\frac{3}{4}$ View, As Delivered

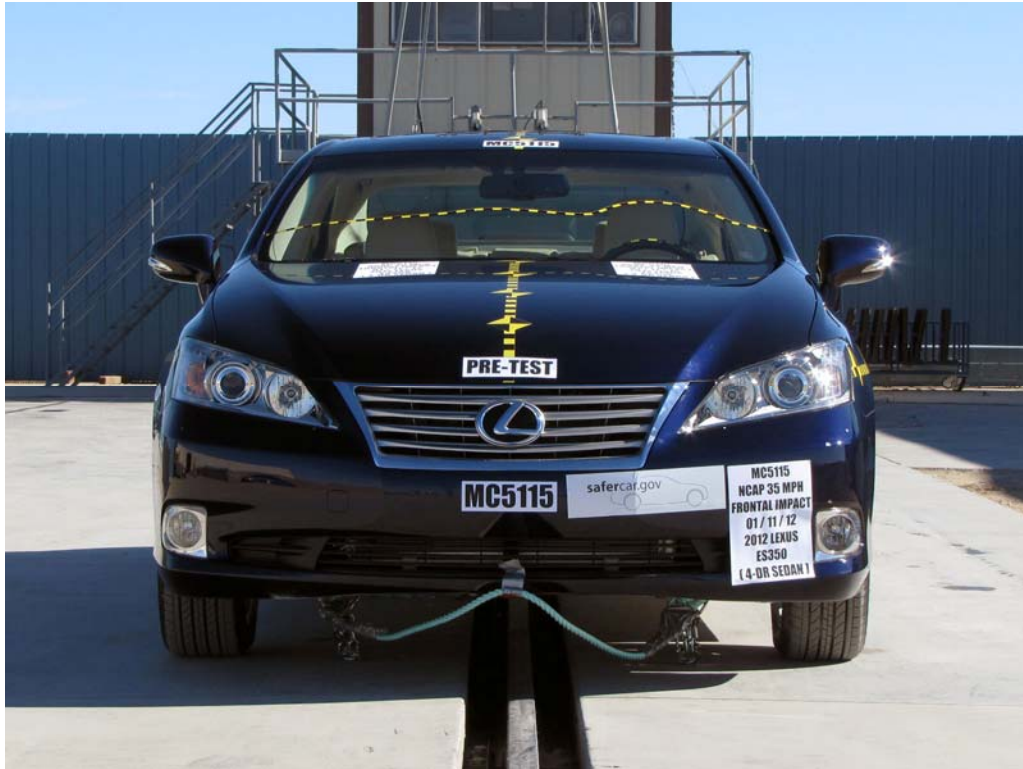


FIGURE 7. Pre-Test Front View of Test Vehicle

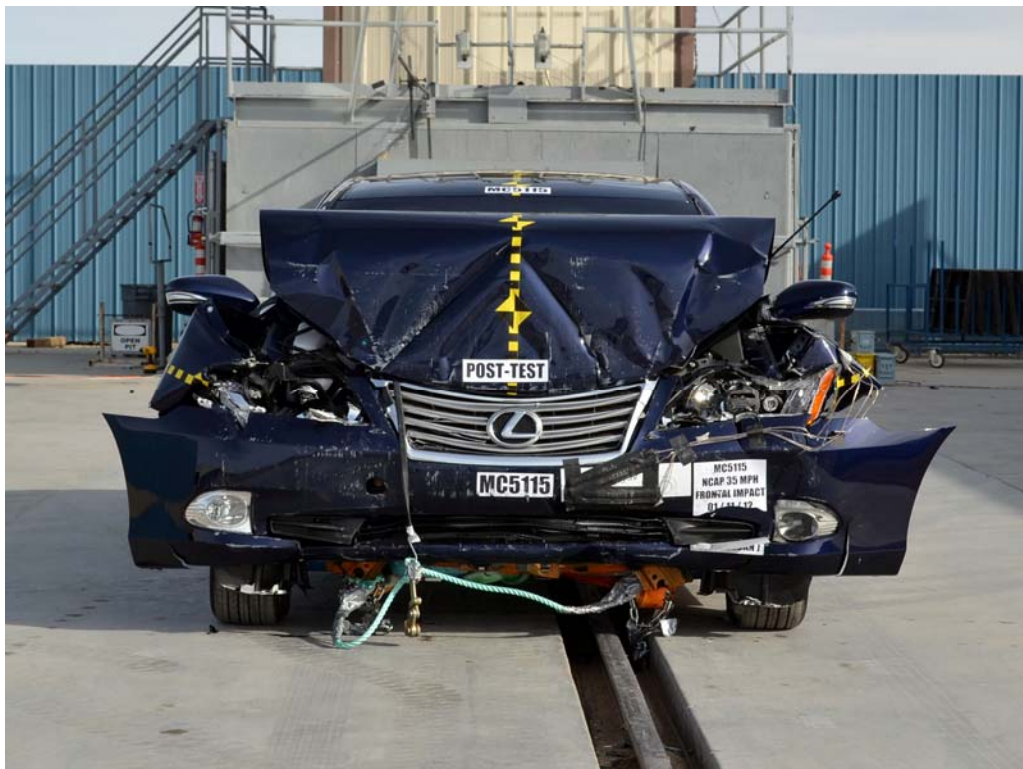


FIGURE 8. Post-Test Front View of Test Vehicle



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 $\frac{3}{4}$ View



FIGURE 14. Post-Test Right Front $\frac{3}{4}$ View



FIGURE 15. Pre-Test Left Rear $\frac{3}{4}$ View



FIGURE 16. Post-Test Left Rear $\frac{3}{4}$ View

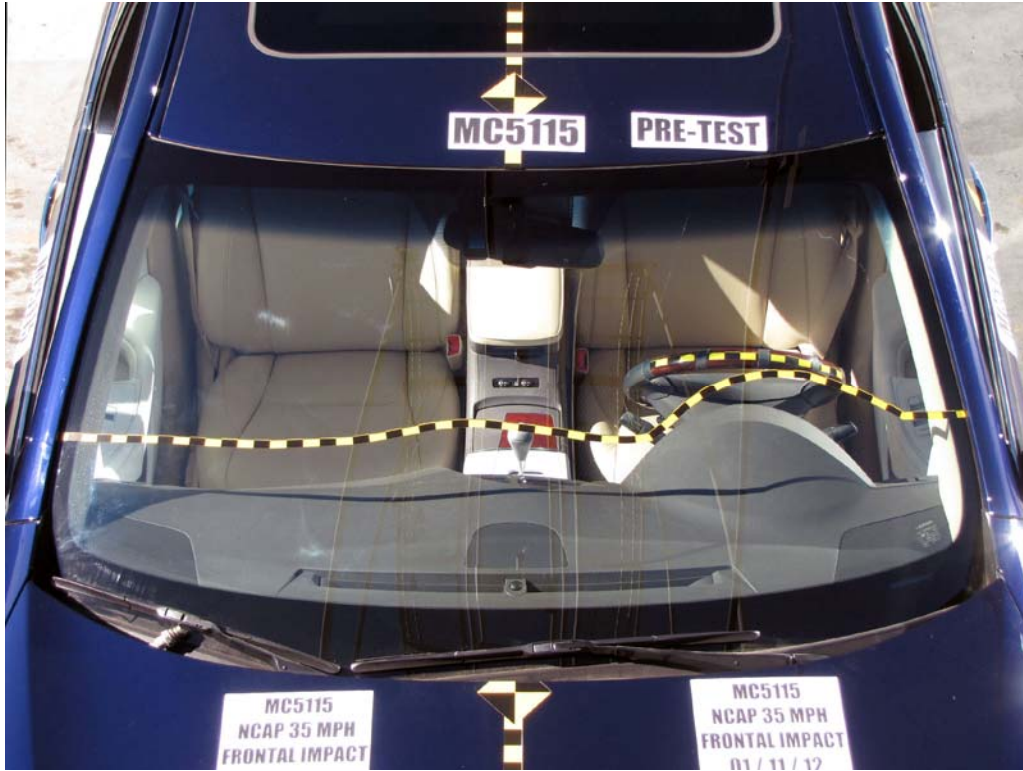


FIGURE 17. Pre-Test Windshield View



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

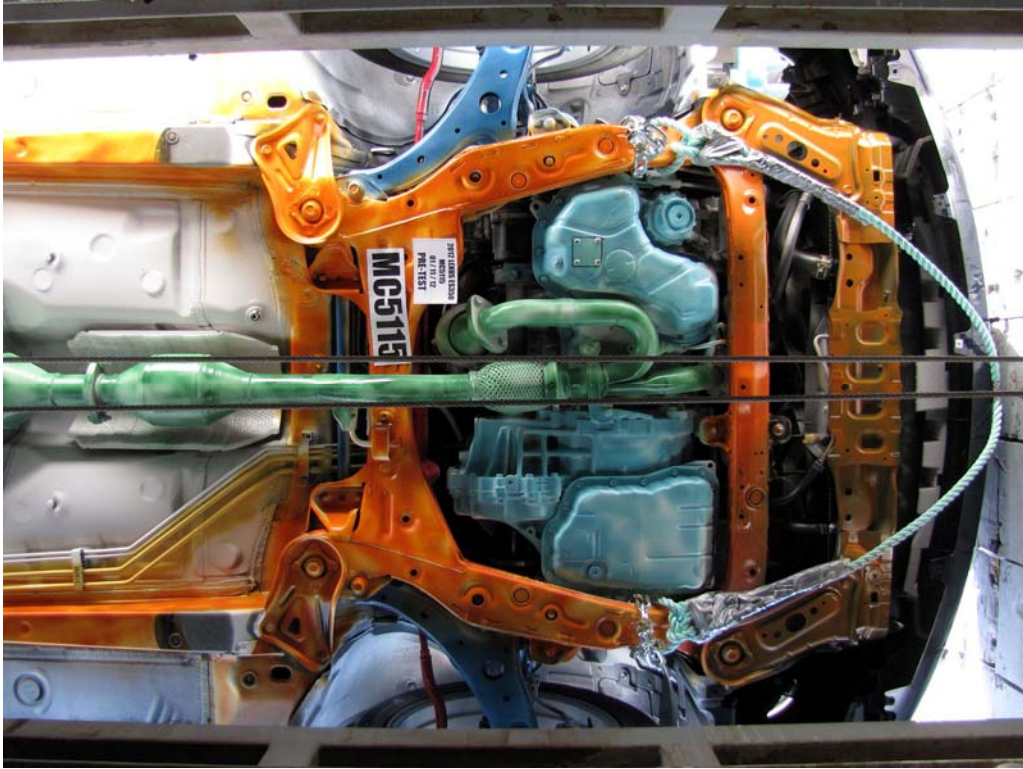


FIGURE 23. Pre-Test Front Underbody View

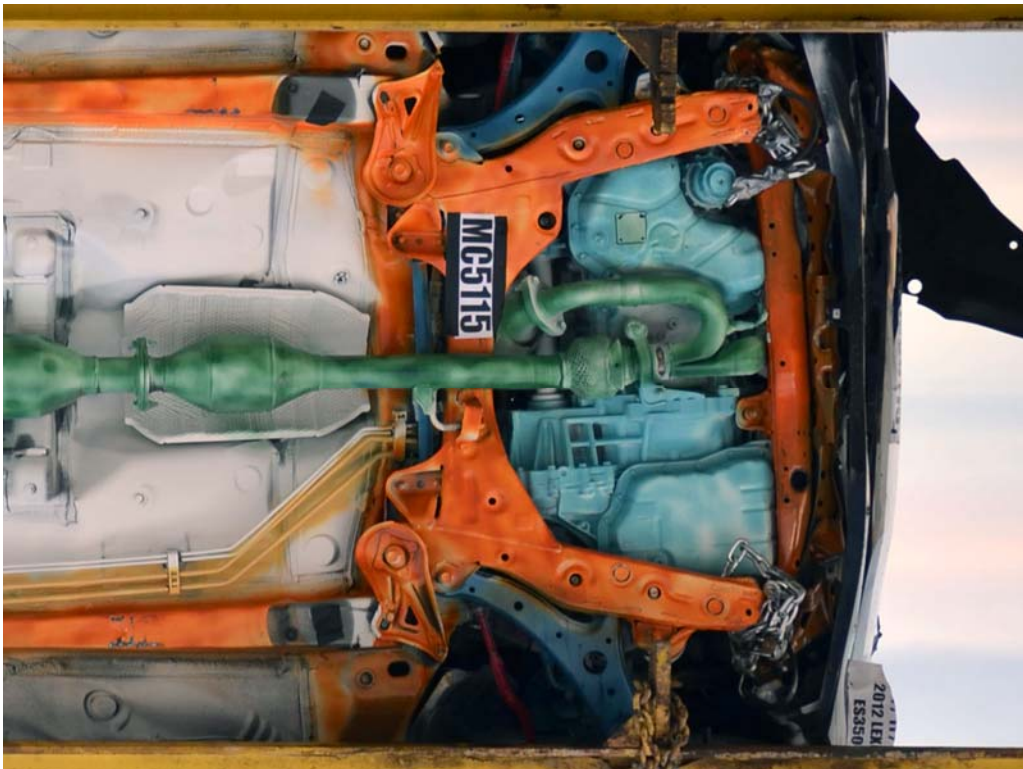


FIGURE 24. Post-Test Front Underbody View

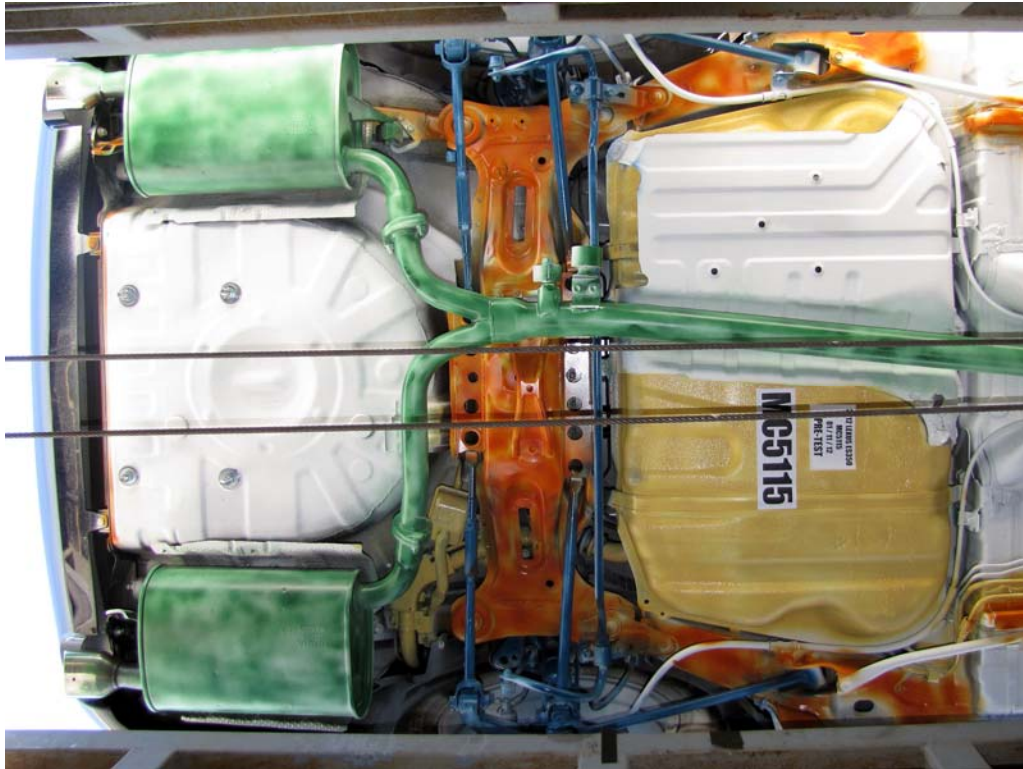


FIGURE 25. Pre-Test Rear Underbody View

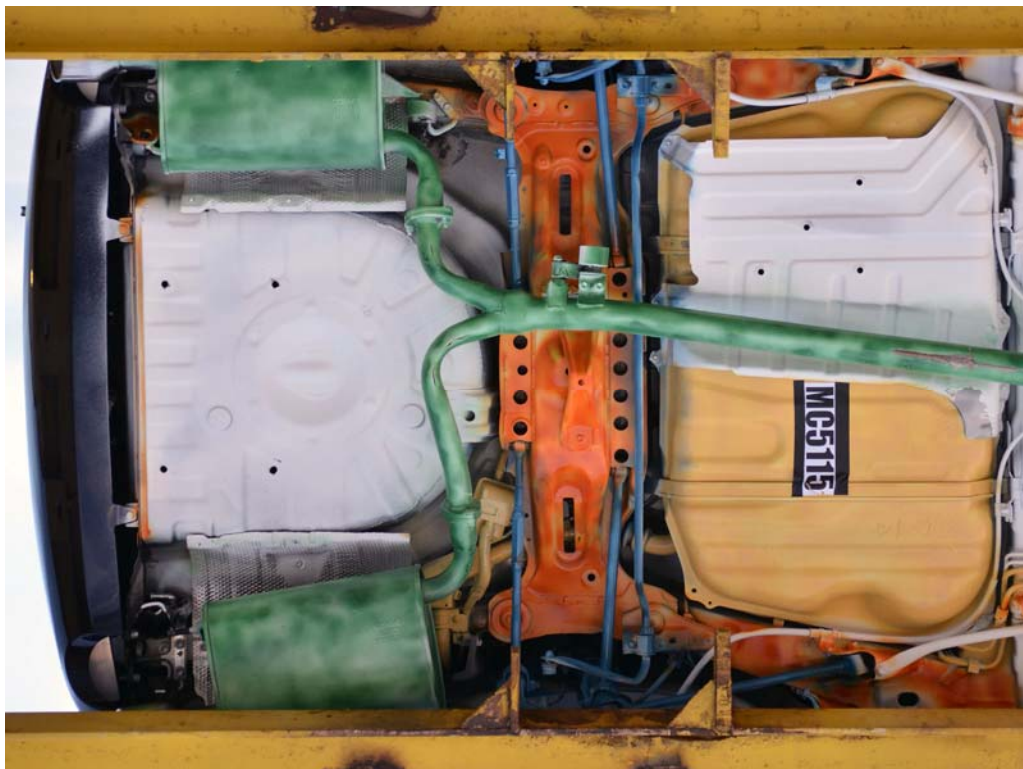


FIGURE 26. Post-Test Rear Underbody View



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

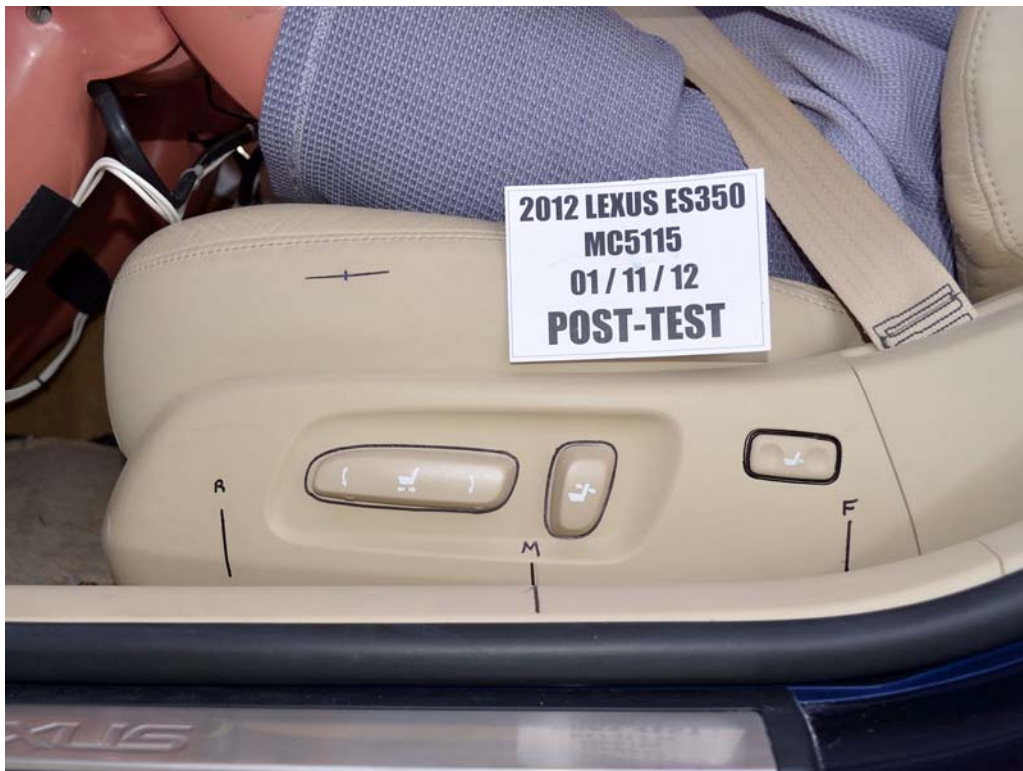


FIGURE 36. Post-Test Driver's Seat Fore-Aft Markings



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



FIGURE 41. Pre-Test Driver's Side Floorpan



FIGURE 42. Post-Test Driver's Side Floorpan



FIGURE 43. Post-Test Driver Dummy Face

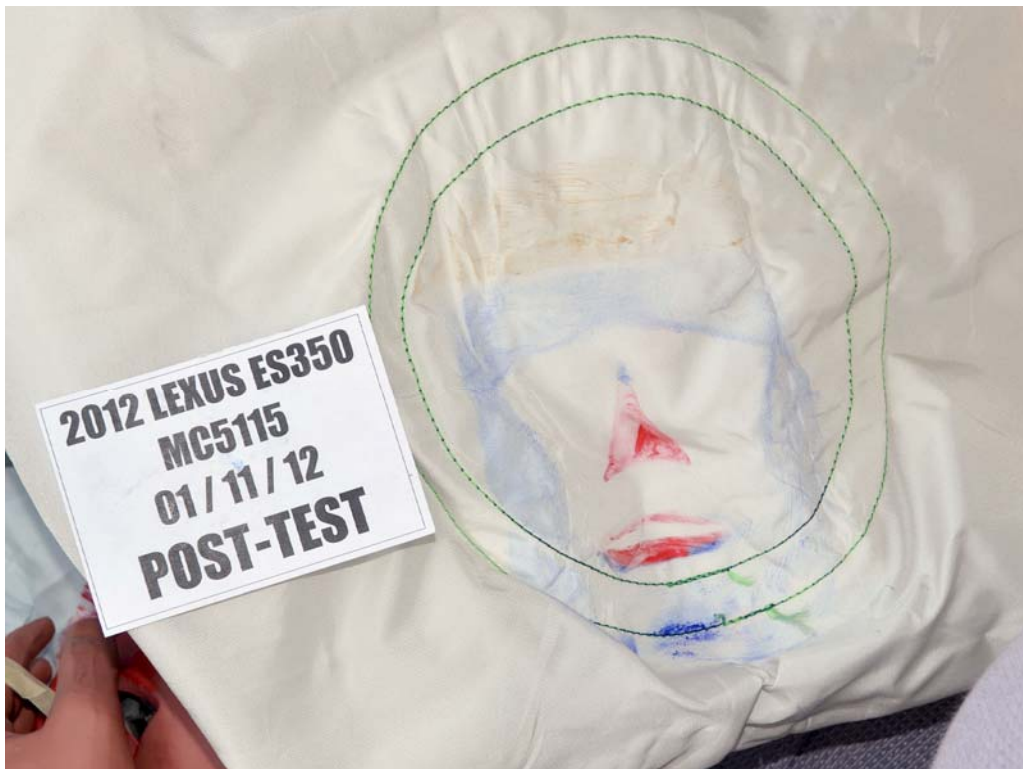


FIGURE 44. Post-Test Driver Dummy Contact With Airbag



FIGURE 45. Post-Test Driver Dummy Contact With Headrest



FIGURE 45a. Post-Test Driver Dummy Contact With Knee Airbag



FIGURE 46. Pre-Test View Of Steering Wheel



FIGURE 47. Post-Test View Of Steering Wheel

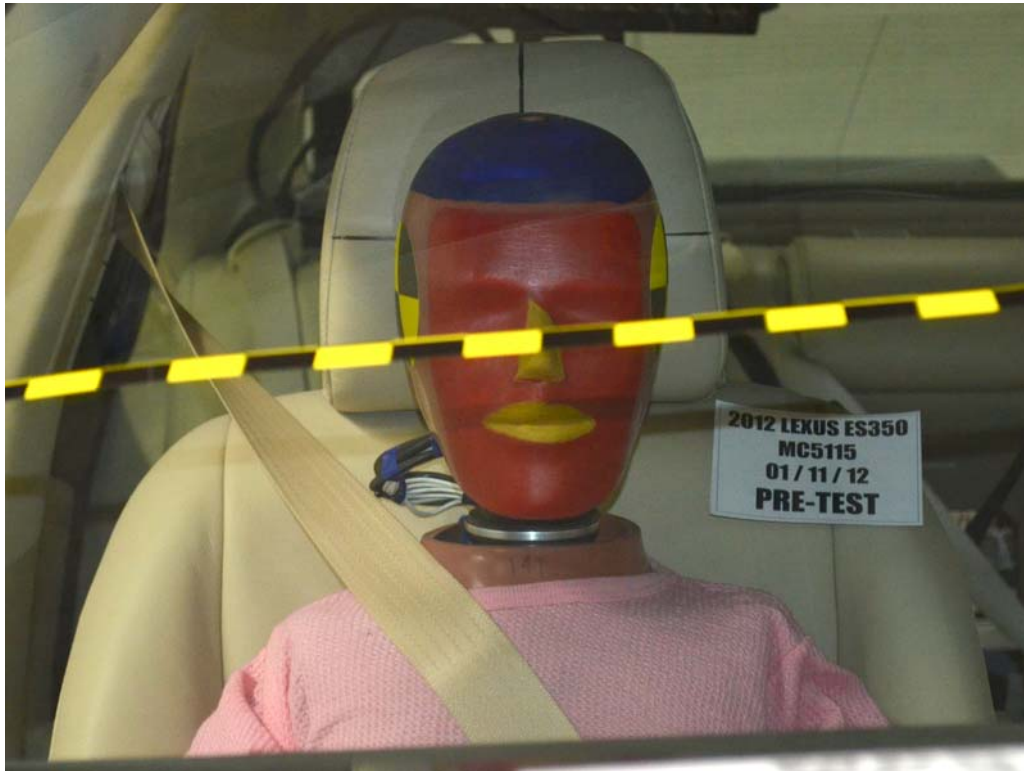


FIGURE 48. Pre-Test Passenger Dummy Front View



FIGURE 49. Post-Test Passenger Dummy Front View



FIGURE 50. Pre-Test Passenger Dummy Window View



FIGURE 51. Post-Test Passenger Dummy Window View



FIGURE 52. Pre-Test Passenger Dummy and Vehicle Interior View



FIGURE 53. Post-Test Passenger Dummy and Vehicle Interior View



FIGURE 54. Pre-Test Passenger's Seat Fore-Aft Markings



FIGURE 55. Post-Test Passenger's Seat Fore-Aft Markings



FIGURE 56. Pre-Test Passenger Dummy Feet



FIGURE 57. Post-Test Passenger Dummy Feet



FIGURE 58. Pre-Test Passenger's Side Glovebox



FIGURE 59. Post-Test Passenger's Side Knee Airbag



FIGURE 60. Pre-Test Passenger's Side Floorpan



FIGURE 61. Post-Test Passenger's Side Floorpan



FIGURE 62. Post-Test Passenger Dummy Contact With Airbag



FIGURE 62a. Post-Test Passenger Dummy Contact With Headrest

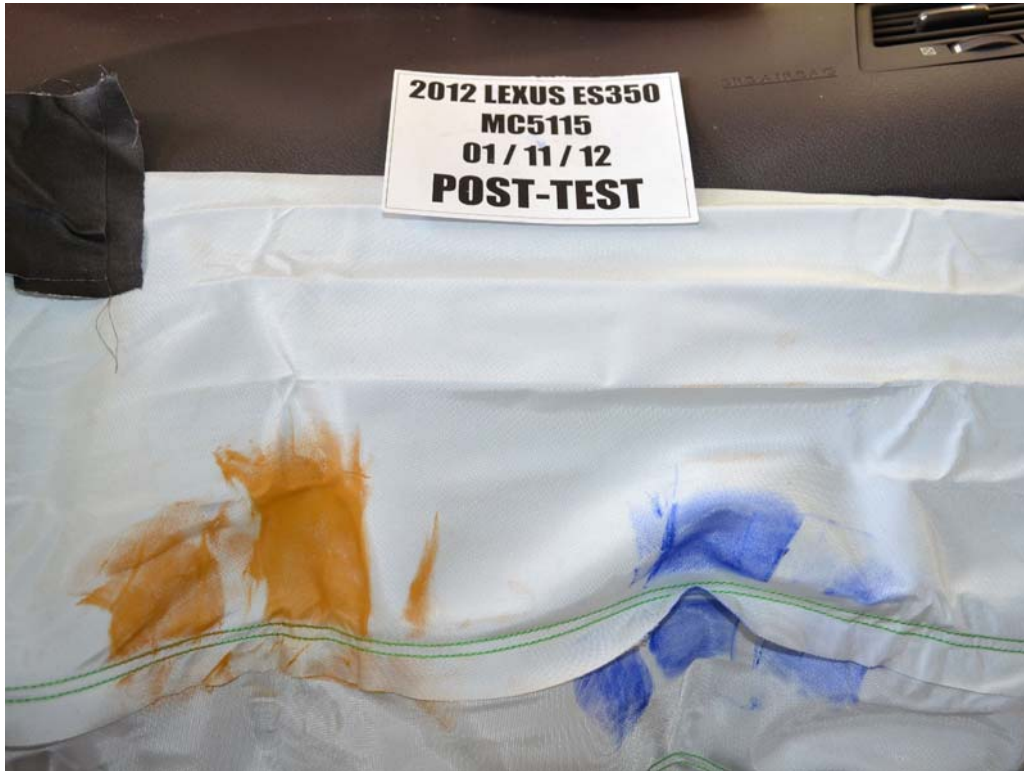


FIGURE 62b. Post-Test Passenger Dummy Contact With Knee Airbag

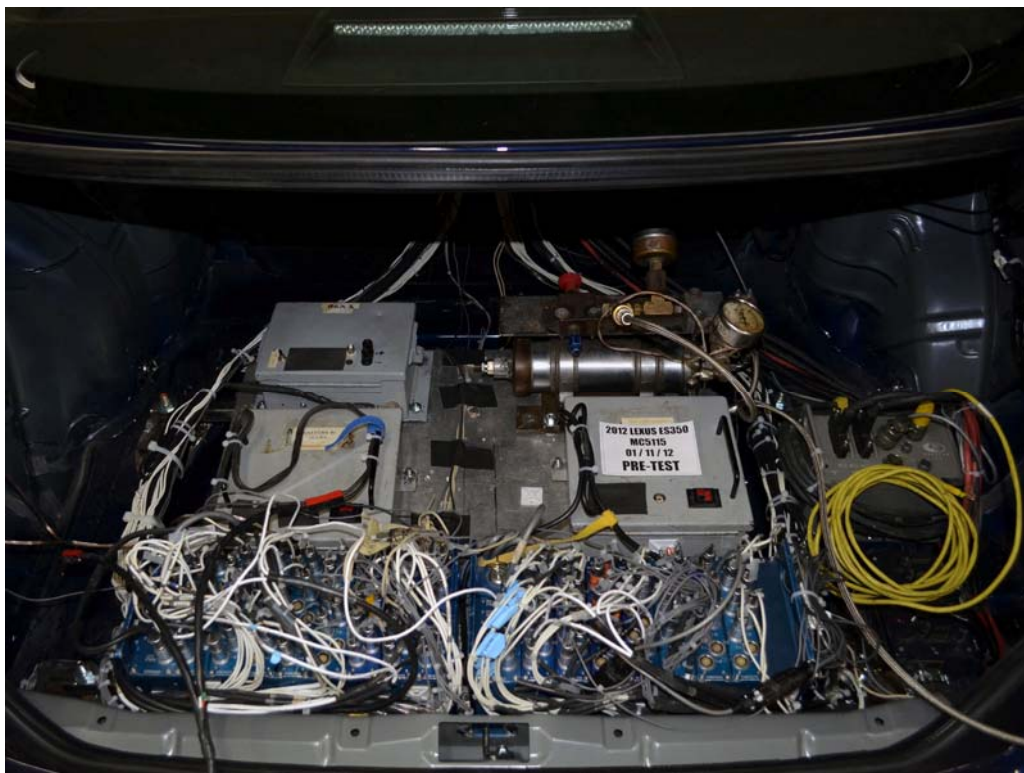


FIGURE 63. Pre-Test of Ballast Installed in Vehicle

Photograph Not Applicable No Stoddard Solvent Spillage

FIGURE 64. Post-Test Stoddard Solvent Spillage Location



FIGURE 65. Post-Test Speed Trap Read Out



FIGURE 66. Vehicle at 0°on Static Rollover Device



FIGURE 67. Vehicle at 90°on Static Rollover Device



FIGURE 68. Vehicle at 180°on Static Rollover Device

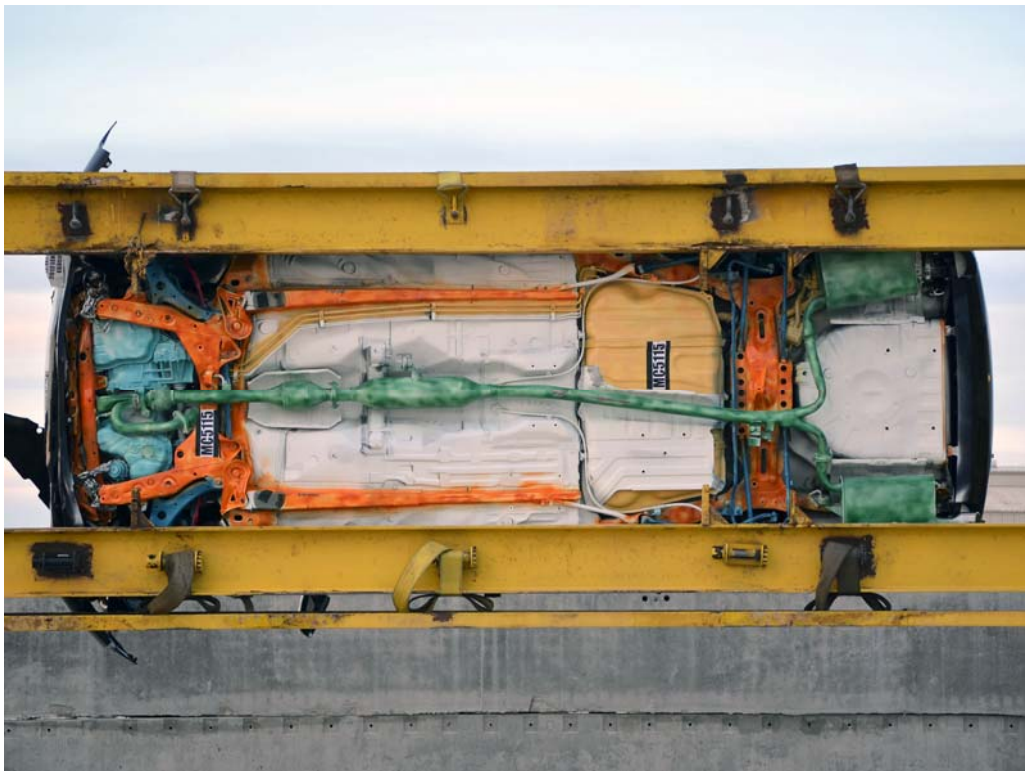


FIGURE 69. Vehicle at 270°on Static Rollover Device



FIGURE 70. Vehicle at 360° on Static Rollover Device



FIGURE 71. 2012 Lexus ES350 Impact Event

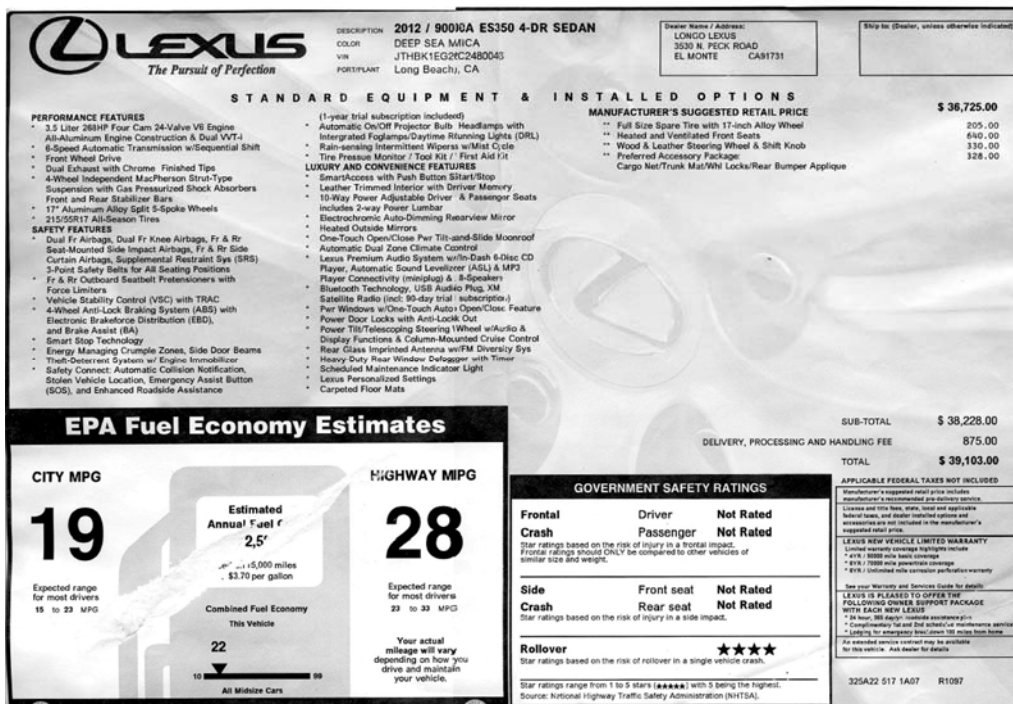


FIGURE 72. Monroney Label Photograph

APPENDIX B
DUMMY RESPONSE DATA TRACES

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30	Passenger Right Femur Force vs. Time	B-10

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

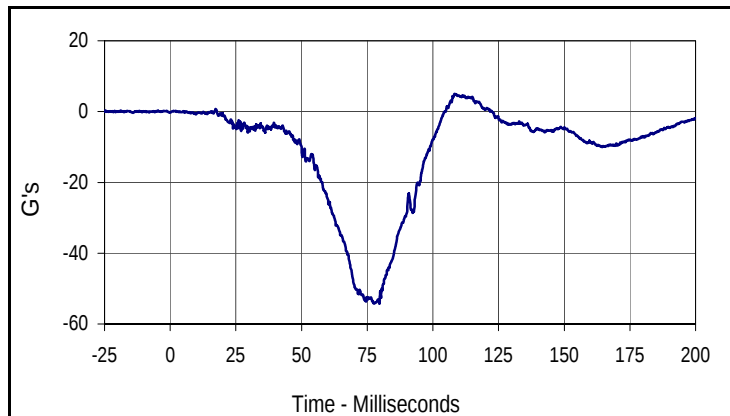
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Driver Head Y Acceleration Redundant
Driver Head Z Acceleration Redundant
Driver Upper Neck Force Y
Driver Upper Neck Moment X
Driver Upper Neck Moment Z
Driver Chest X Acceleration Redundant
Driver Chest Y Acceleration Redundant
Driver Chest Z Acceleration 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

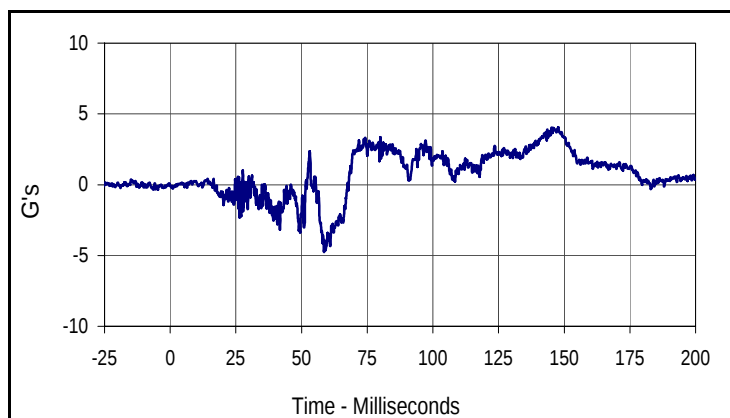
Left Rear Seat Crossmember Z
Right Rear Seat Crossmember X
Right Rear Seat Crossmember Z
Vehicle Engine Top X
Vehicle Engine Bottom X
Vehicle Left Brake Caliper X
Vehicle Right Brake Caliper X
Load Cell Barrier A1-A9
Load Cell Barrier B1-B9
Load Cell Barrier C1-C9
Load Cell Barrier D1-D9

Test Vehicle: 2012 Lexus ES350 4-Door Sedan
 Test Program: 56 km/h Frontal Impact NCAP Test

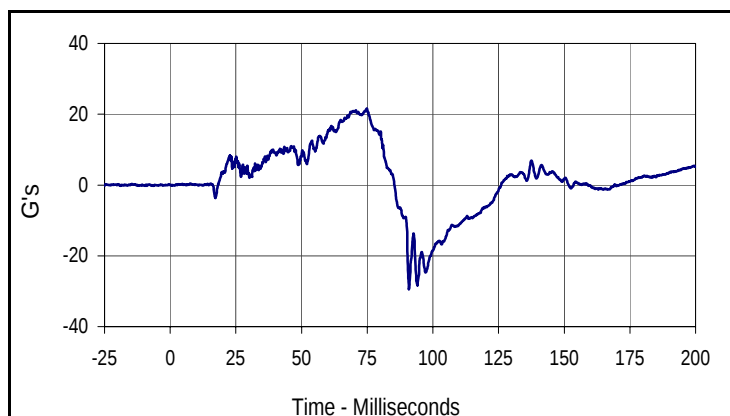
NHTSA No.: MC5115
 Test Date: 1/11/12



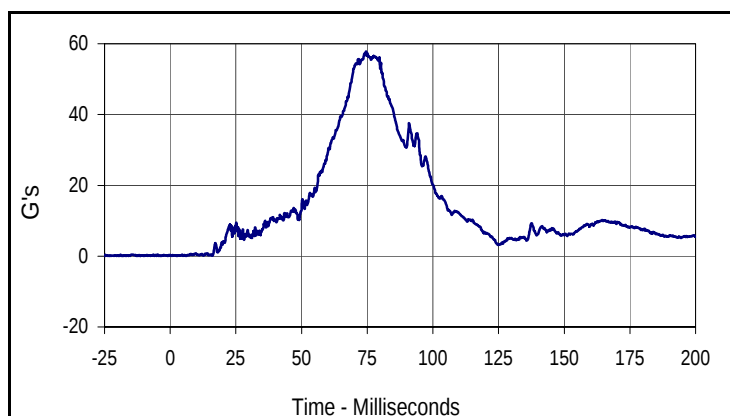
Curve Description			
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Plot No.	Type	SAE Class	Units
001	FIL	1000	G's
Max	Time	Min	Time
5.0	108.3	-54.2	77.4



Curve Description			
Driver Head Acceleration Y Primary			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
4.0	147.7	-4.7	58.6



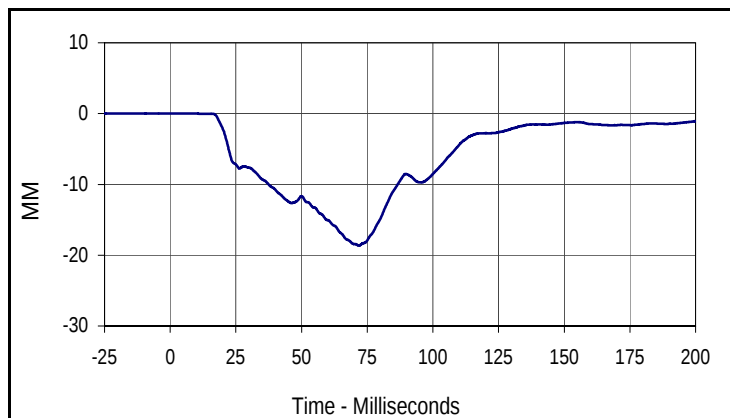
Curve Description			
Driver Head Acceleration Z Primary			
Plot No.	Type	SAE Class	Units
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Max	Time	Min	Time
21.6	74.9	-29.5	90.9



Curve Description			
Driver Head Resultant Acceleration Primary			
Plot No.	Type	SAE Class	Units
004	RES	1000	G's
Max	Time	Min	Time
57.8	74.5	0.1	2.7

Test Vehicle: 2012 Lexus ES350 4-Door Sedan
 Test Program: 56 km/h Frontal Impact NCAP Test

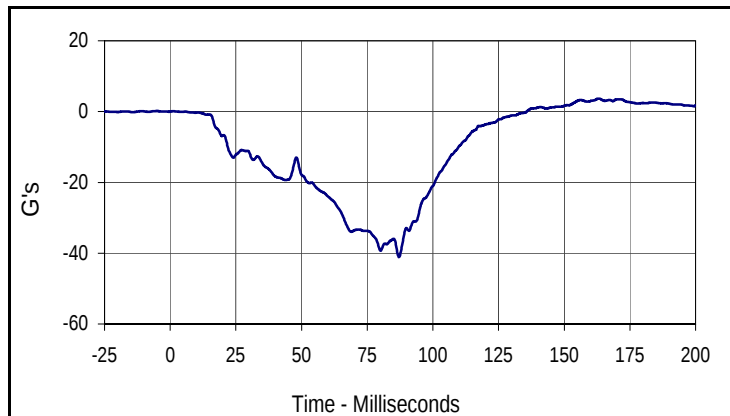
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 Test Date: 1/11/12



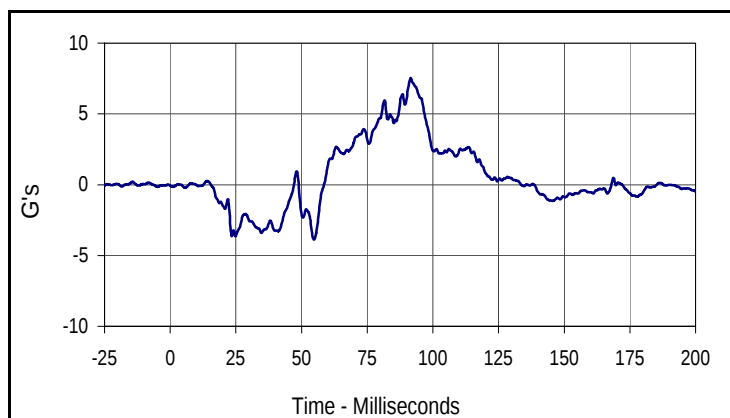
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Driver Chest Deflection			
Plot No.	Type	SAE Class	Units
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0.0	5.4	-18.6	71.8

Test Vehicle: 2012 Lexus ES350 4-Door Sedan
 Test Program: 56 km/h Frontal Impact NCAP Test

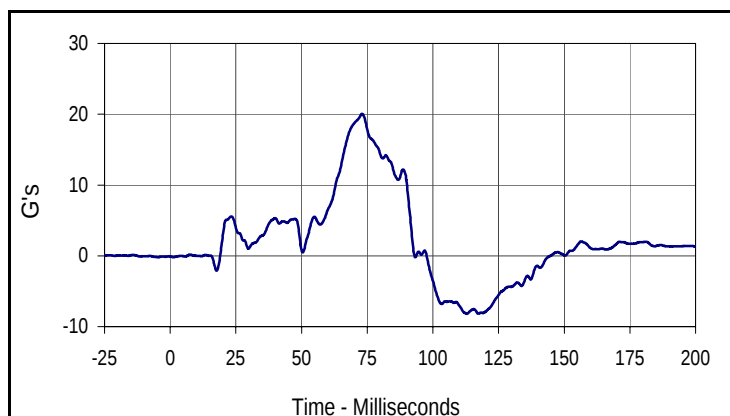
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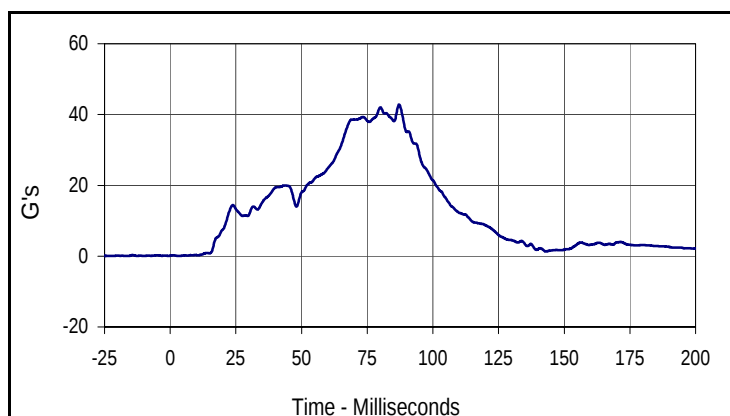
Curve Description			
Driver Chest Acceleration X Primary			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
3.7	163.2	-41.1	87.1



Curve Description			
Driver Chest Acceleration Y Primary			
Plot No.	Type	SAE Class	Units
007	FIL	180	G's
Max	Time	Min	Time
7.5	91.6	-3.9	54.7



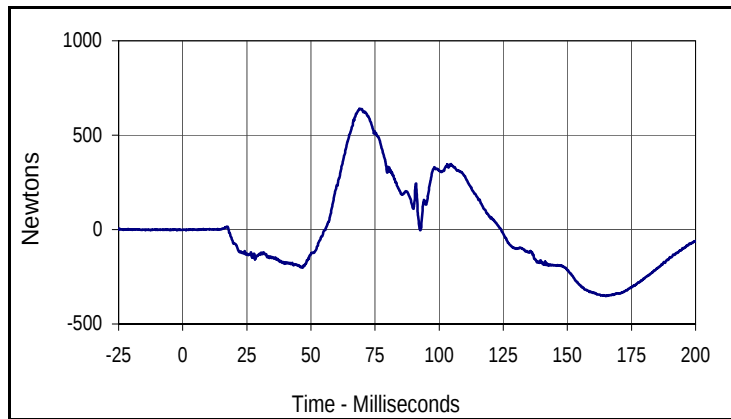
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Driver Chest Acceleration Z Primary			
Plot No.	Type	SAE Class	Units
008	FIL	180	G's
Max	Time	Min	Time
20.0	73.1	-8.2	112.9



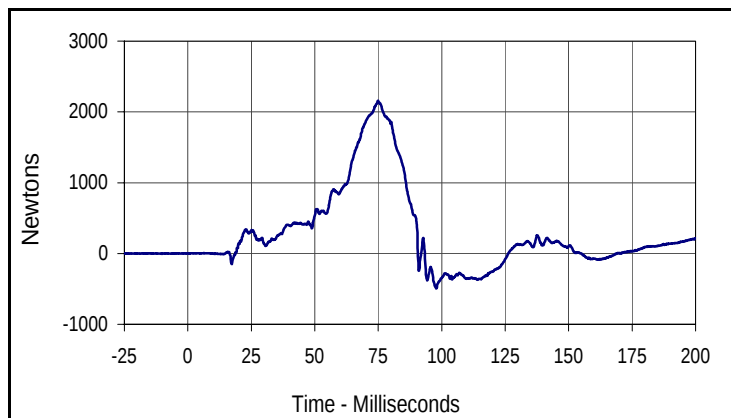
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Driver Chest Resultant Acceleration Primary			
Plot No.	Type	SAE Class	Units
009	RES	180	G's
Max	Time	Min	Time
42.8	87.1	0.1	3.3

Test Vehicle: 2012 Lexus ES350 4-Door Sedan
 Test Program: 56 km/h Frontal Impact NCAP Test

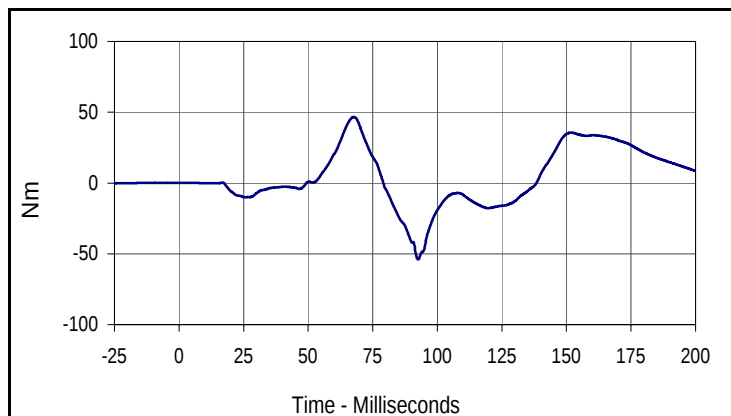
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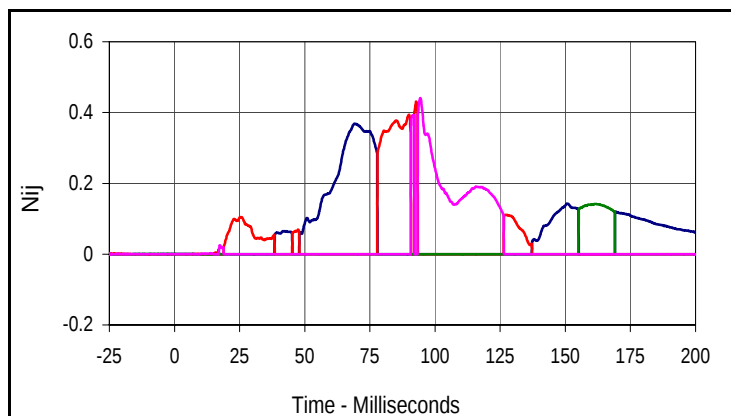
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Driver Upper Neck Force X			
Plot No.	Type	SAE Class	Units
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639.9	69.0	-352.3	165.0



Curve Description			
Driver Upper Neck Force Z			
Plot No.	Type	SAE Class	Units
011	FIL	1000	Newtons
Max	Time	Min	Time
2160.4	74.9	-492.2	97.9



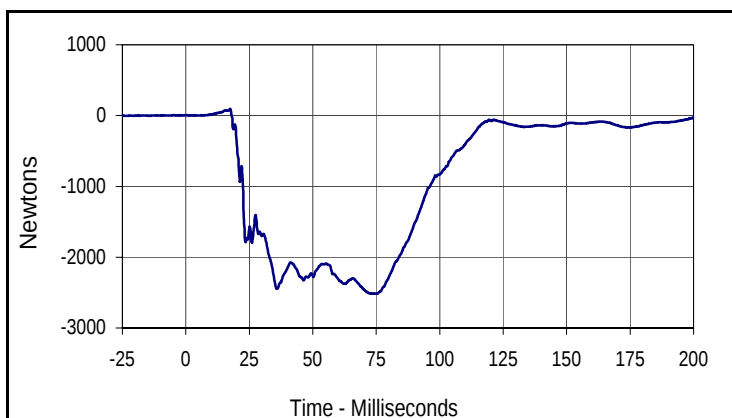
Curve Description			
Driver Upper Neck Moment Y			
Plot No.	Type	SAE Class	Units
012	FIL	600	Nm
Max	Time	Min	Time
46.6	67.6	-54.0	92.6



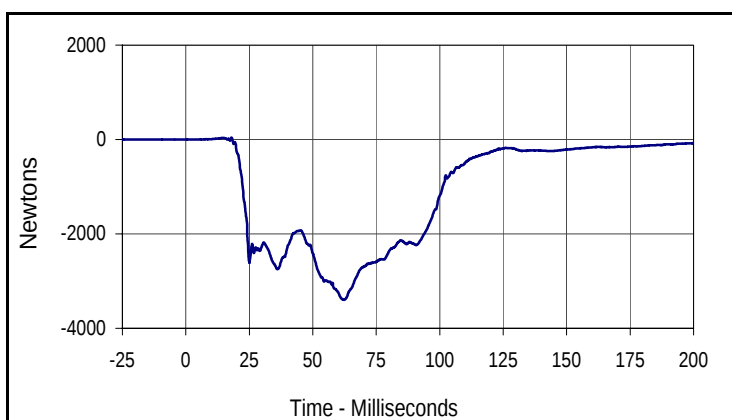
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Driver Nij			
Units	Type	Max	Time
Ntf	FIL	0.37	69.0
Units	Type	Max	Time
Nte	FIL	0.43	92.8
Units	Type	Max	Time
Ncf	FIL	0.14	161.4
Units	Type	Max	Time
Nce	FIL	0.44	94.3

Test Vehicle: 2012 Lexus ES350 4-Door Sedan
 Test Program: 56 km/h Frontal Impact NCAP Test

NHTSA No.: MC5115
 Test Date: 1/11/12



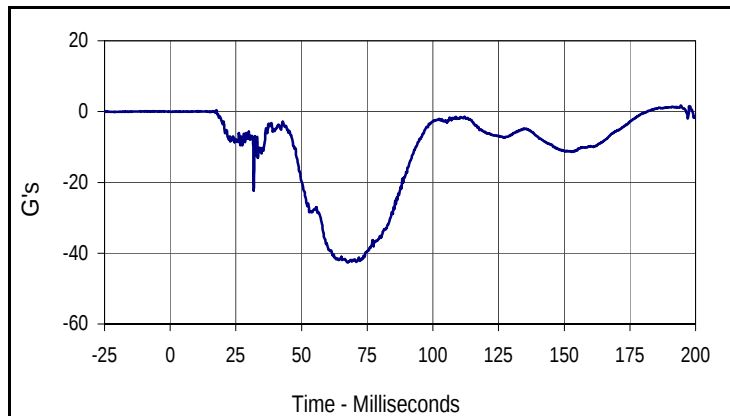
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Driver Left Femur Force Z			
Plot No.	Type	SAE Class	Units
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Max	Time	Min	Time
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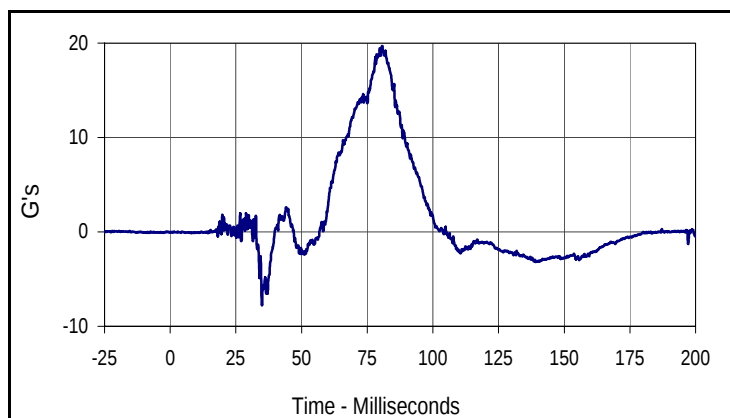
Curve Description			
Driver Right Femur Force Z			
Plot No.	Type	SAE Class	Units
014	FIL	600	Newtons
Max	Time	Min	Time
42.1	17.9	-3398.0	62.3

Test Vehicle: 2012 Lexus ES350 4-Door Sedan
 Test Program: 56 km/h Frontal Impact NCAP Test

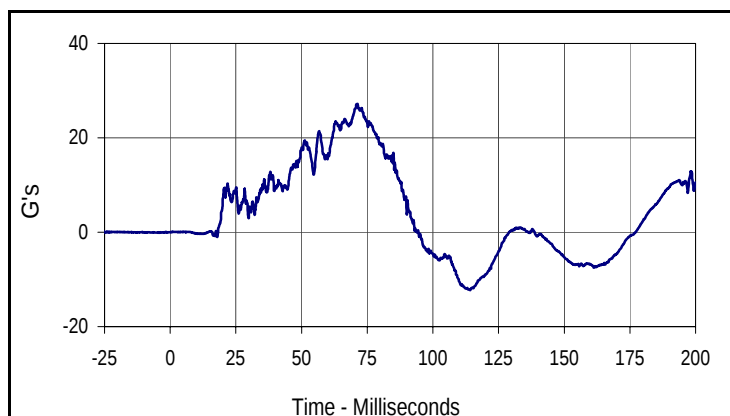
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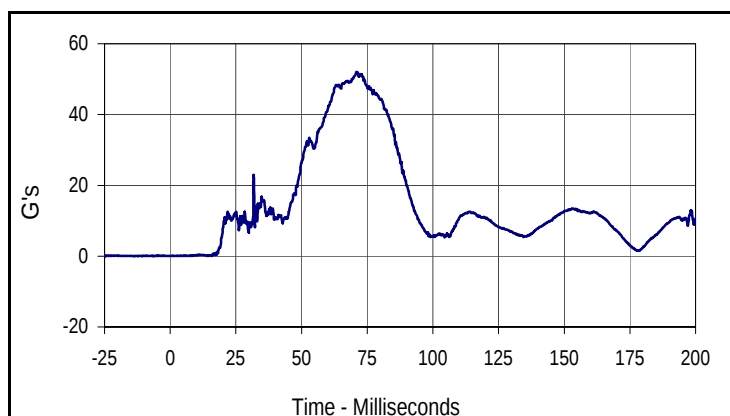
Curve Description			
Passenger Head Acceleration X Primary			
Plot No.	Type	SAE Class	Units
015	FIL	1000	G's
Max	Time	Min	Time
1.7	194.4	-42.7	67.6



Curve Description			
Passenger Head Acceleration Y Primary			
Plot No.	Type	SAE Class	Units
016	FIL	1000	G's
Max	Time	Min	Time
19.7	80.6	-7.8	34.9



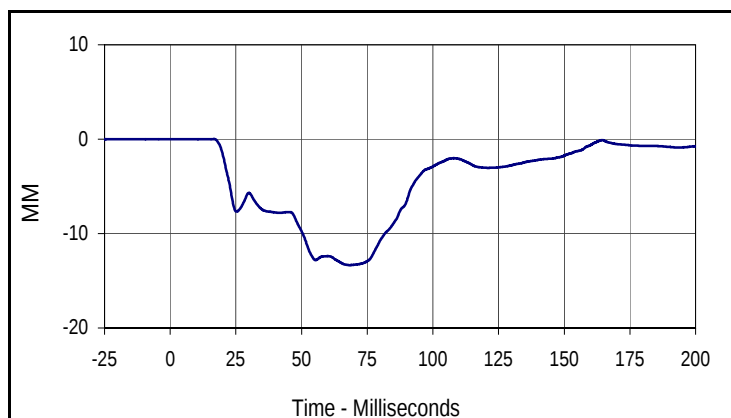
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Passenger Head Acceleration Z Primary			
Plot No.	Type	SAE Class	Units
017	FIL	1000	G's
Max	Time	Min	Time
27.2	71.3	-12.3	114.2



Curve Description			
Passenger Head Resultant Acceleration Primary			
Plot No.	Type	SAE Class	Units
018	RES	1000	G's
Max	Time	Min	Time
52.1	71.0	0.0	4.7

Test Vehicle: 2012 Lexus ES350 4-Door Sedan
 Test Program: 56 km/h Frontal Impact NCAP Test

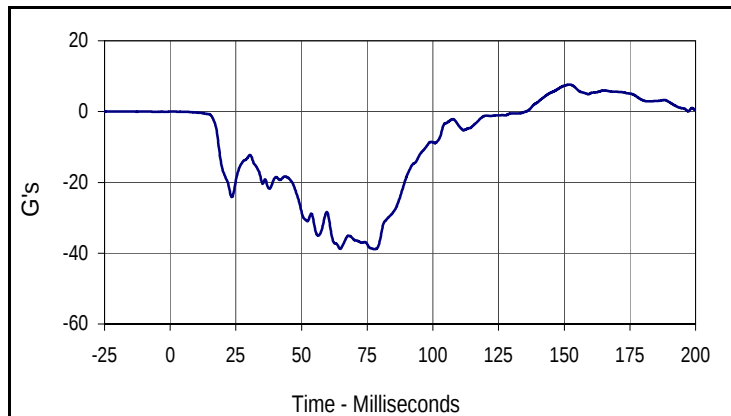
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 Test Date: 1/11/12



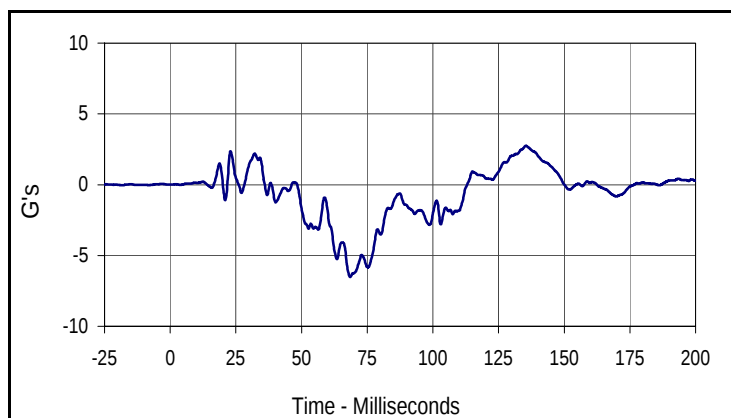
Curve Description			
Passenger Chest Deflection			
Plot No.	Type	SAE Class	Units
019	FIL	180	MM
Max	Time	Min	Time
0.0	16.7	-13.3	68.3

Test Vehicle: 2012 Lexus ES350 4-Door Sedan
 Test Program: 56 km/h Frontal Impact NCAP Test

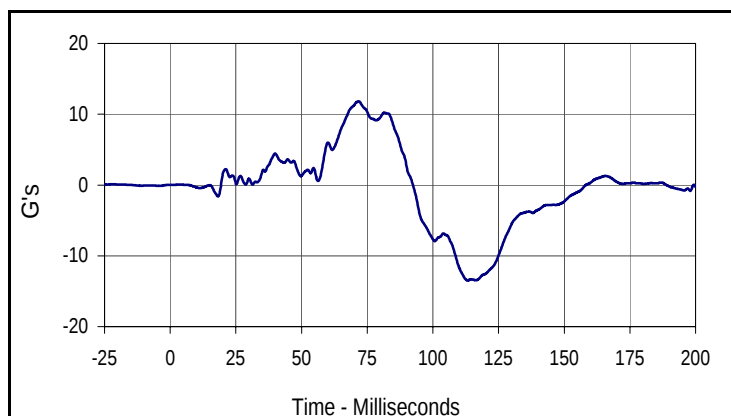
NHTSA No.: MC5115
 Test Date: 1/11/12



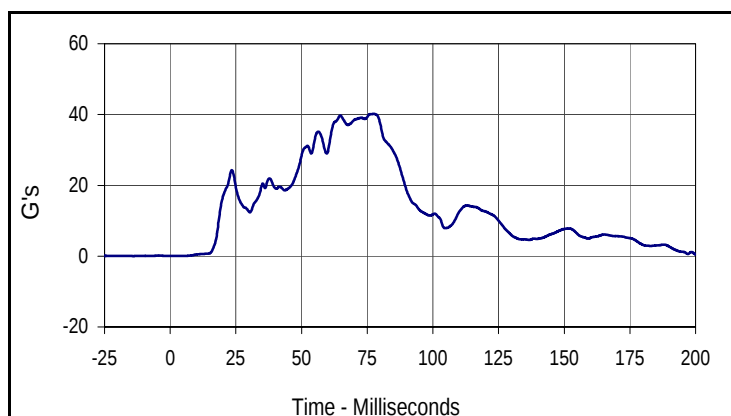
Curve Description			
Passenger Chest Acceleration X Primary			
Plot No.	Type	SAE Class	Units
020	FIL	180	G's
Max	Time	Min	Time
7.6	152.0	-38.9	77.8



Curve Description			
Passenger Chest Acceleration Y Primary			
Plot No.	Type	SAE Class	Units
021	FIL	180	G's
Max	Time	Min	Time
2.7	135.4	-6.5	68.5



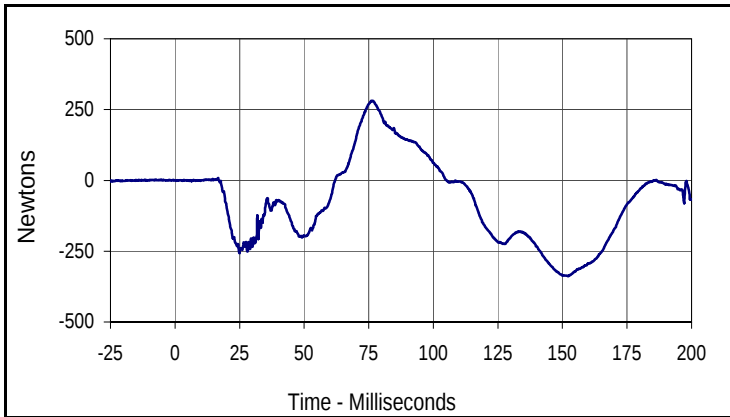
Curve Description			
Passenger Chest Acceleration Z Primary			
Plot No.	Type	SAE Class	Units
022	FIL	180	G's
Max	Time	Min	Time
11.8	71.8	-13.5	113.3



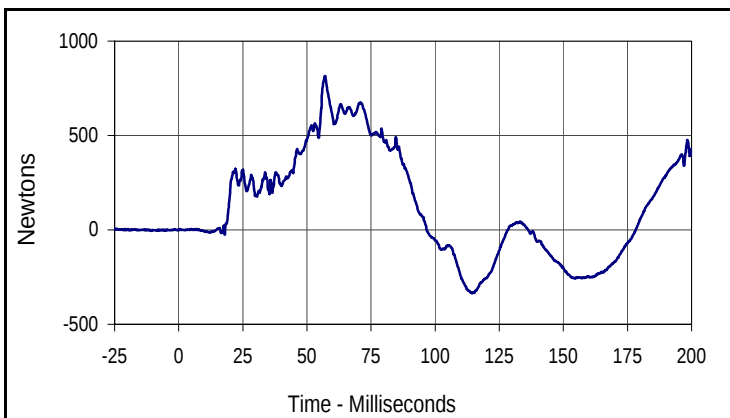
Curve Description			
Passenger Chest Resultant Acceleration Primary			
Plot No.	Type	SAE Class	Units
023	RES	180	G's
Max	Time	Min	Time
40.2	77.6	0.0	0.8

Test Vehicle: 2012 Lexus ES350 4-Door Sedan
 Test Program: 56 km/h Frontal Impact NCAP Test

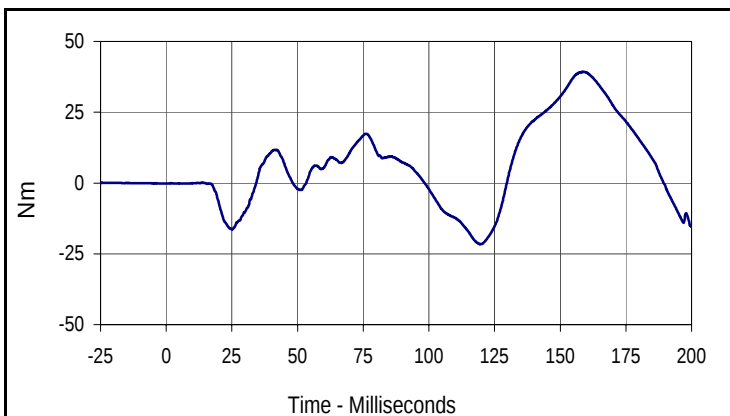
NHTSA No.: MC5115
 Test Date: 1/11/12



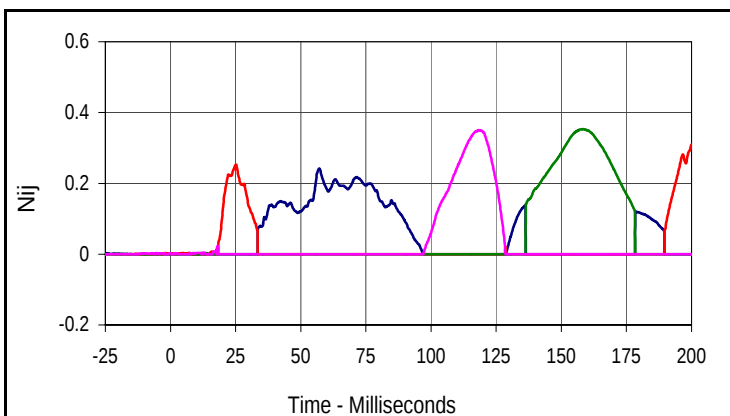
Curve Description			
Passenger Upper Neck Force X			
Plot No.	Type	SAE Class	Units
024	FIL	1000	Newtons
Max	Time	Min	Time
281.2	76.0	-338.1	152.2



Curve Description			
Passenger Upper Neck Force Z			
Plot No.	Type	SAE Class	Units
025	FIL	1000	Newtons
Max	Time	Min	Time
815.6	57.0	-335.1	114.3



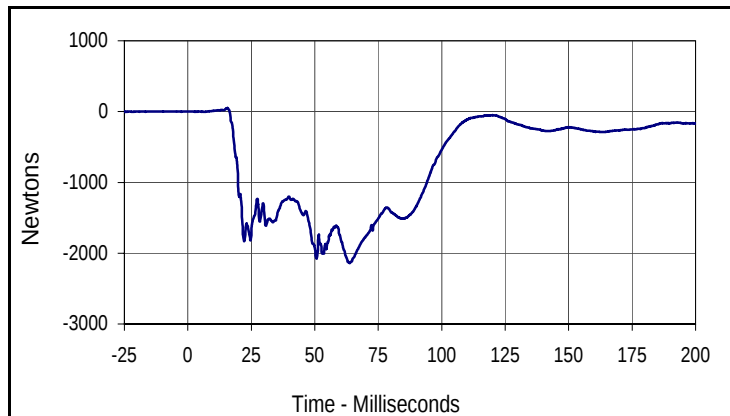
Curve Description			
Passenger Upper Neck Moment Y			
Plot No.	Type	SAE Class	Units
026	FIL	600	Nm
Max	Time	Min	Time
39.3	159.0	-21.6	119.4



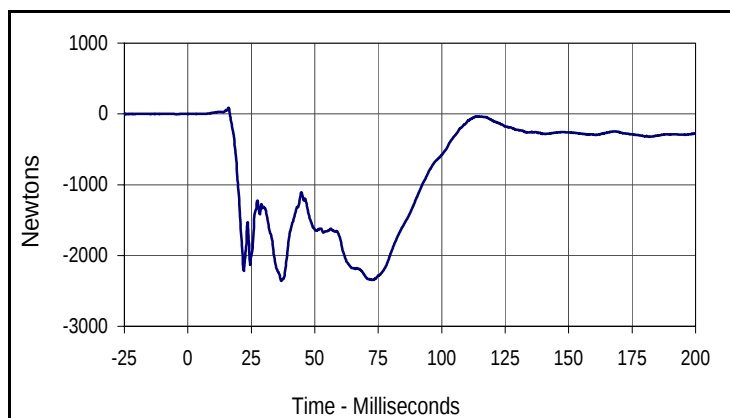
Curve Description			
Passenger Nij			
Units	Type	Max	Time
Ntf	FIL	0.24	57.1
Units	Type	Max	Time
Nte	FIL	0.34	239.7
Units	Type	Max	Time
Ncf	FIL	0.35	158.3
Units	Type	Max	Time
Nce	FIL	0.35	118.3

Test Vehicle: 2012 Lexus ES350 4-Door Sedan
 Test Program: 56 km/h Frontal Impact NCAP Test

NHTSA No.: MC5115
 Test Date: 1/11/12



Curve Description			
Passenger Left Femur Force Z			
Plot No.	Type	SAE Class	Units
027	FIL	600	Newtons
Max	Time	Min	Time
50.5	15.6	-2140.2	63.8



Curve Description			
Passenger Right Femur Force Z			
Plot No.	Type	SAE Class	Units
028	FIL	600	Newtons
Max	Time	Min	Time
87.8	16.0	-2358.1	36.8

APPENDIX C
DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA

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

Test Program: Hybrid III 50th Percentile Male Dummy Damage Checklist

Test Date: 1/10/12

ATD Serial No.: 034

Test I.D.: N/A



Dummy Item	Inspect for	Comments	Damaged	OK
Entire Dummy	Perform general cleaning			X
Outer Skin	Gashes, rips, cracks			X
Head	Ballast secure			X
	General appearance			X
Neck	Broken or cracked rubber			X
	Upper neck bracket firmly attached to the lower neck bracket			X
	Looseness at the condyle joint			X
	Nodding blocks cracked or out of position			X
Spine	Broken or cracks in rubber			X
Ribs	Broken or bent ribs			X
	Broken or bent rib supports			X
	Damping material separated or cracked			X
	Rubber bumpers in place			X
Chest Displacement Assembly	Bent shaft			X
	Slider arm riding in track			X
Transducer Leads	Torn cables			X
Accelerometer Mountings	Head mounting secure			X
	Chest mounting secure			X
Knees	Skin condition			X
	Insert (do not remove)			X
	Casting			X
Limbs	Normal movement and adjustment			X
Knee Sliders	Wires intact			X
	Rubber returned to "at rest" position			X
Pelvis	Broken			X
Other				X

Describe the repair on repair or replacement of parts:

Test Program: Hybrid III 50th Percentile Male External Measurements

Test Date: 1/10/12

ATD Serial No.: 034

Test I.D.: N/A



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.56	Pass
Laboratory Relative Humidity	%	10 to 70	27.3	Pass
A - Total sitting height	mm	879 to 889	883	Pass
B - Shoulder pivot height	mm	505 to 521	515	Pass
C - H point height	mm	84 to 89	88	Pass
D - H point location from backline	mm	135 to 140	136	Pass
E - Shoulder pivot from backline	mm	84 to 94	86	Pass
F - Thigh clearance	mm	140 to 155	149	Pass
G - Back of elbow to wrist pivot	mm	290 to 305	300	Pass
H - Head back to backline	mm	41 to 46	43	Pass
I - Shoulder to elbow length	mm	330 to 345	335	Pass
J - Elbow rest height	mm	190 to 211	205	Pass
K - Buttock to knee length	mm	579 to 604	589	Pass
L - Popliteal length	mm	429 to 455	436	Pass
M - Knee pivot height	mm	485 to 500	488	Pass
N - Buttock popliteal length	mm	452 to 477	472	Pass
O - Chest depth without jacket	mm	213 to 229	224	Pass
P - Foot length	mm	251 to 267	260	Pass
V - Shoulder breadth	mm	422 to 437	434	Pass
W - Foot breadth	mm	91 to 107	99	Pass
Y - Chest circumference (with chest jacket)	mm	970 to 1001	983	Pass
Z - Waist circumference	mm	836 to 866	864	Pass
AA - Location for chest circumference	mm	429 to 434	431	Pass
BB - Location for waist circumference	mm	226 to 231	230	Pass
Overall Test Results			Pass	

Test Program: Hybrid III 50th Percentile Male Head Drop Test

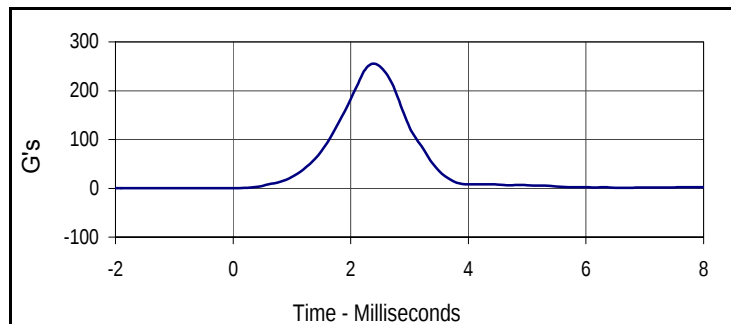
Test Date: 1/10/12

ATD Serial No.: 034

Test I.D.: M034HD026



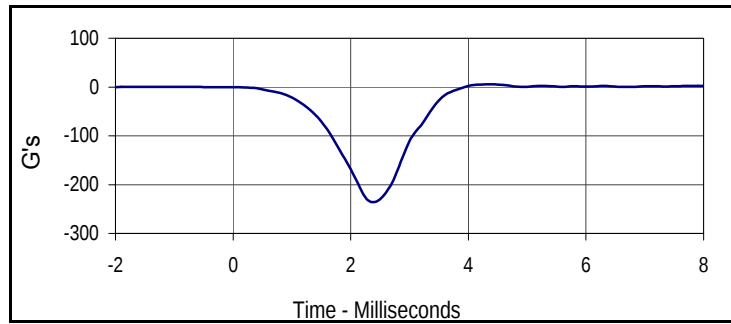
Tested Parameter		Units	Specification	Result	Pass/Fail
Head Assembly Soak Time		Minutes	≥240	255	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	40.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.6	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	27.2	Pass
Peak Resultant Acceleration		G's	225.0 to 275.0	255.1	Pass
Peak Lateral Acceleration		G's	≤15.0	4.4	Pass
Oscillations After Main Pulse		%	<10% of peak Res. Acceleration	3.3	Pass
Is Acceleration Unimodal?		Yes/No	Yes	Yes	Pass
Overall Test Results				Pass	



Curve Description

Head Resultant

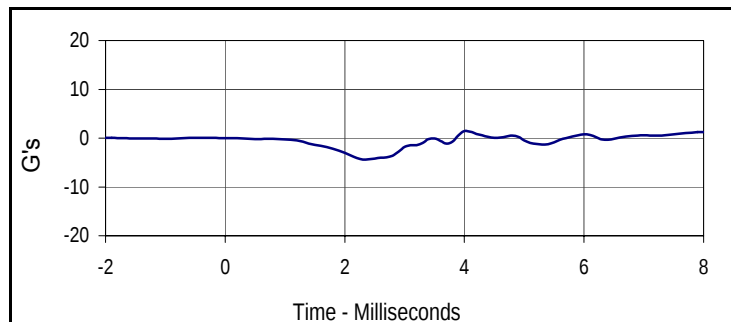
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
255.1	2.4	0.1	-0.6



Curve Description

Head X

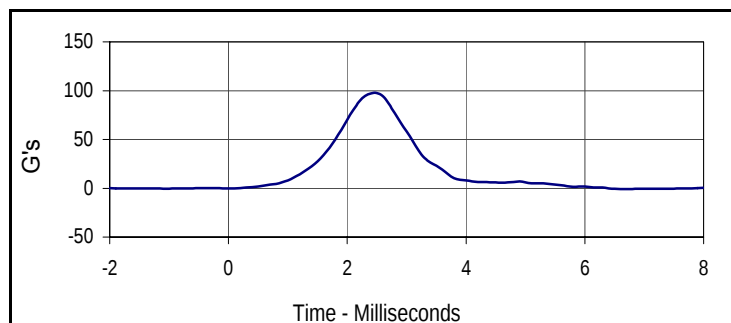
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
5.4	4.3	-235.8	2.4



Curve Description

Head Y

Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
1.5	4.0	-4.4	2.3



Curve Description

Head Z

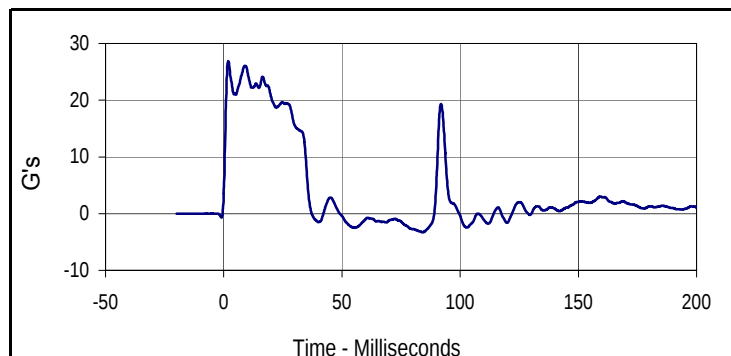
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
97.5	2.5	-0.4	-1.0

Test Program: Hybrid III 50th Percentile Male Neck Flexion Test
 ATD Serial No.: 034

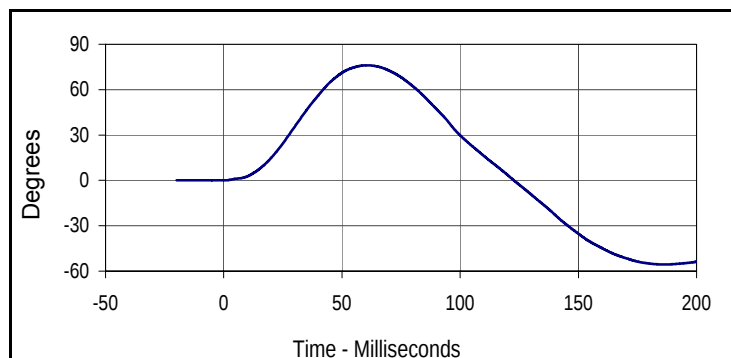
Test Date: 1/10/12
 Test I.D.: M034NF026



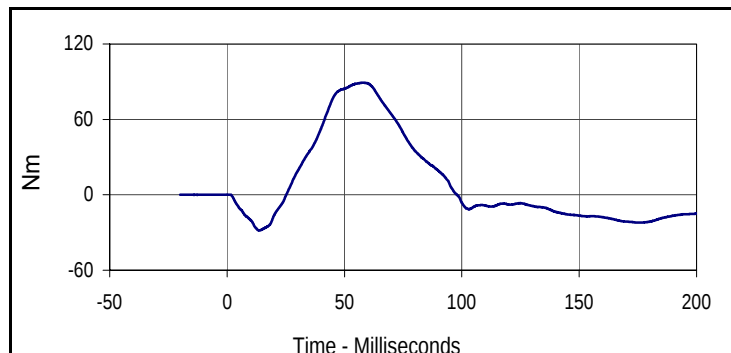
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	275	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.6	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.9	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.04	Pass
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	25.1	Pass
	20 Msec.	G's	17.6 to 22.6	20.6	Pass
	30 Msec.	G's	12.5 to 18.5	15.6	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 29.0	19.4	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	34.0 to 42.0	35.6	Pass
Maximum "D" Plane Rotation	Max	Degrees	64.0 to 78.0	76.1	Pass
	Time	Msec.	57.0 to 64.0	60.5	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	113.0 to 128.0	122.8	Pass
Moment About Occ. Condyle	Max	Nm	84.1 to 108.5	89.1	Pass
	Time	Msec.	47.0 to 58.0	57.8	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			
Plot No.	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
26.9	1.9	-3.3	84.2



Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
76.1	60.5	-55.6	186.6



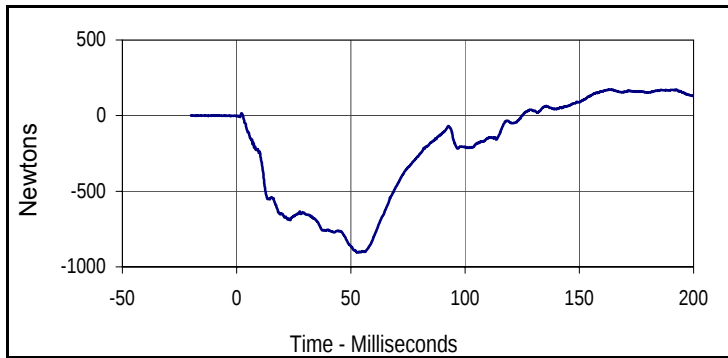
Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
89.1	57.8	-28.4	13.8

Test Program: Hybrid III 50th Percentile Male Neck Flexion Test

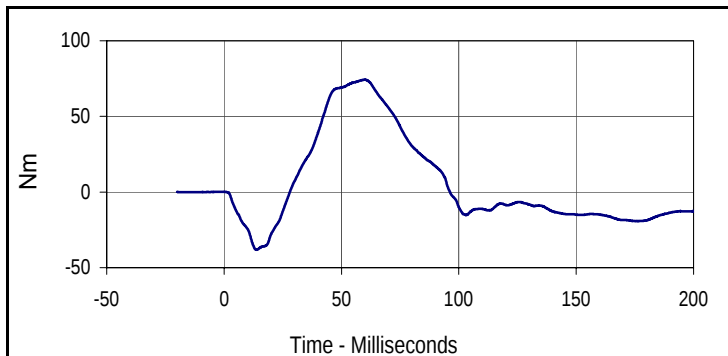
Test Date: 1/10/12

ATD Serial No.: 034

Test I.D.: M034NF026



Curve Description			
Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
172.5	163.6	-904.4	53.1



Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
74.4	59.9	-38.2	13.8

Test Program: Hybrid III 50th Percentile Male Neck Extension Test

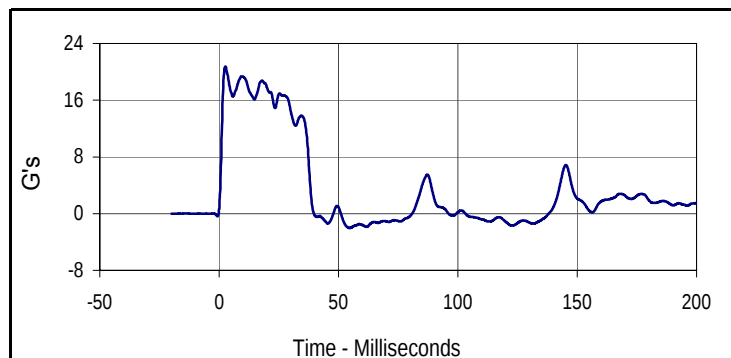
Test Date: 1/10/12

ATD Serial No.: 034

Test I.D.: M034NE026



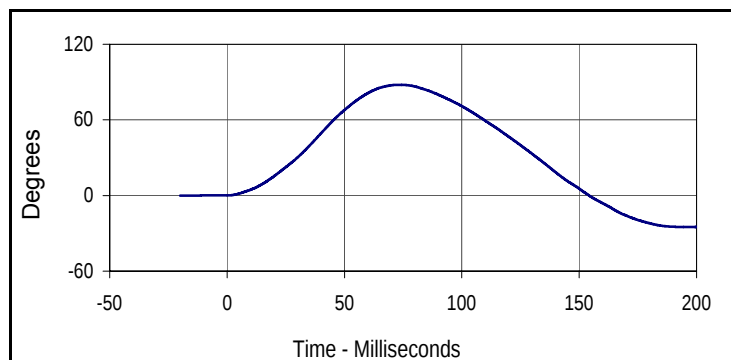
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	310	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.5	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.5	Pass
Pendulum Velocity		m/s	5.94 to 6.19	6.10	Pass
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	19.3	Pass
	20 Msec.	G's	14.0 to 19.0	17.8	Pass
	30 Msec.	G's	11.0 to 16.0	14.4	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 22.0	14.4	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	38.0 to 46.0	38.0	Pass
Maximum "D" Plane Rotation	Max	Degrees	81.0 to 106.0	87.9	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	154.2	Pass
Moment About Occ. Condyle	Max	Nm	-52.9 to -79.9	-62.8	Pass
	Time	Msec.	65.0 to 79.0	69.0	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	120.0 to 148.0	135.4	Pass
Overall Test Results					Pass



Curve Description

Pendulum Deceleration

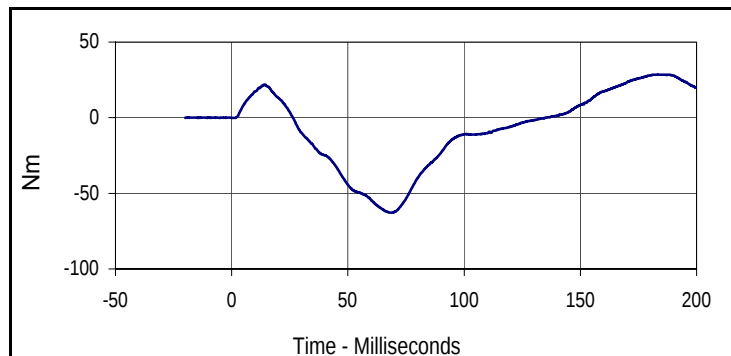
Plot No.	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
20.8	2.6	-2.0	54.7



Curve Description

"D" Plane Rotation

Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
87.9	73.5	-25.1	197.1



Curve Description

Moment About Occipital Condyle

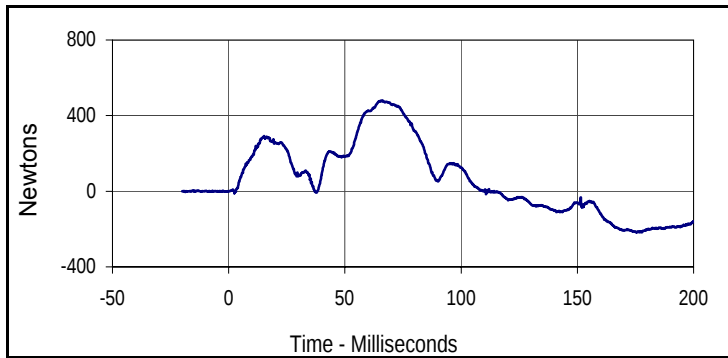
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
28.5	183.5	-62.8	69.0

Test Program: Hybrid III 50th Percentile Male Neck Extension Test

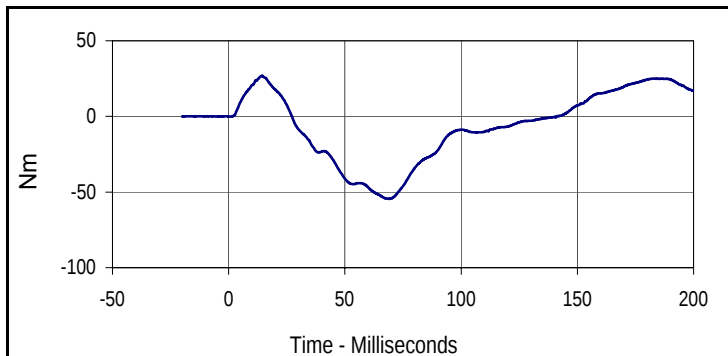
Test Date: 1/10/12

ATD Serial No.: 034

Test I.D.: M034NE026



Curve Description			
Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
478.8	66.3	-217.3	176.6



Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
26.9	14.4	-54.4	69.1

Test Program: Hybrid III 50th Percentile Male Thorax Impact Test

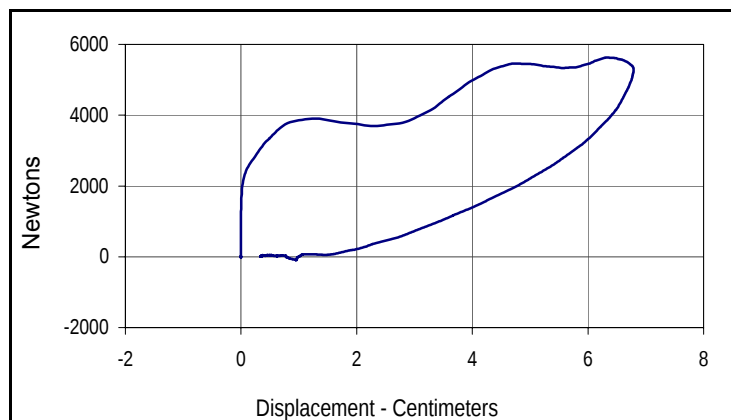
Test Date: 1/10/12

ATD Serial No.: 034

Test I.D.: M034CH026



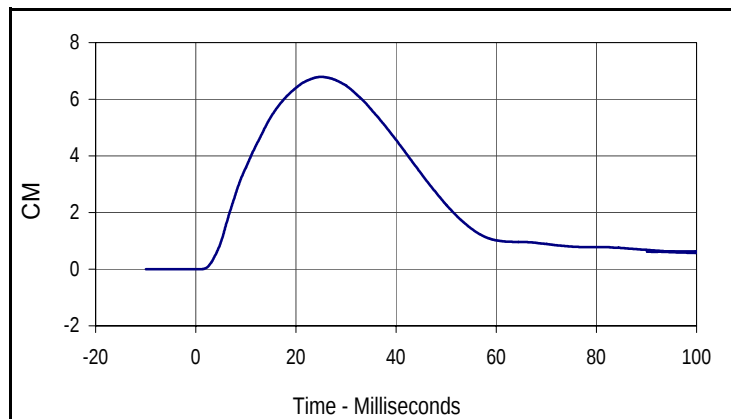
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	355	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.1	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	31.0	Pass
Probe Velocity		m/s	6.58 to 6.82	6.76	Pass
Peak Probe Force		Newtons	5159 to 5893	5628	Pass
Peak Sternum Deflection		CM	6.35 to 7.26	6.79	Pass
Internal Hysteresis		%	69 to 85	69.2	Pass
Overall Test Results				Pass	



Curve Description

Probe Force vs. Chest Deflection

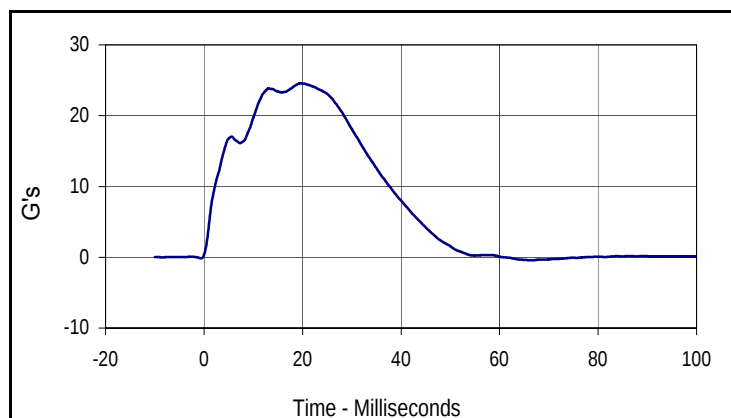
Plot No.	Type	SAE Class	Hysteresis
001	FIL	180	69.2
Peak Probe Force		Peak Chest Deflection	
5628		6.79	



Curve Description

Chest Deflection

Plot No.	Type	SAE Class	Units
002	FIL	180	CM
Max	Time	Min	Time
6.8	25.0	0.0	0.7



Curve Description

Impactor Acceleration

Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
24.6	19.5	-0.4	66.6

Test Program: Hybrid III 50th Percentile Male Knee Impact Test

Test Date: 1/10/12

ATD Serial No.: 034

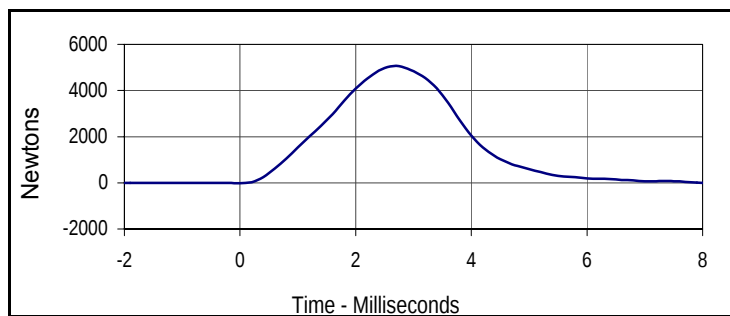
Test I.D.: M034LK026, M034RK025

**Left Knee**

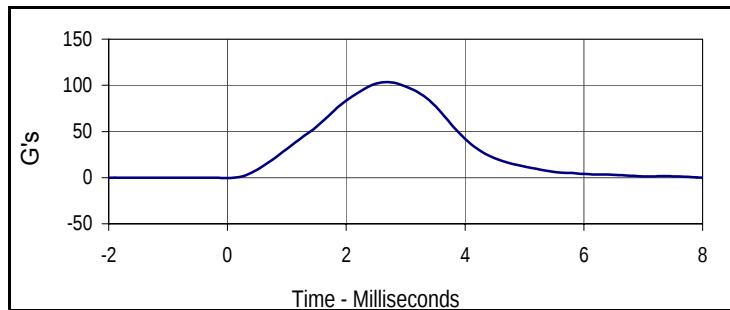
Tested Parameter		Units	Specification	Result	Pass/Fail
Knee Assembly Soak Time		Minutes	≥240	240	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		20.6	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.6	Pass
Pendulum Velocity at T=0		m/sec	2.07 to 2.13	2.10	Pass
Peak Probe Force		Newtons	4715 to 5782	5064	Pass
Overall Test Results				Pass	

Right Knee

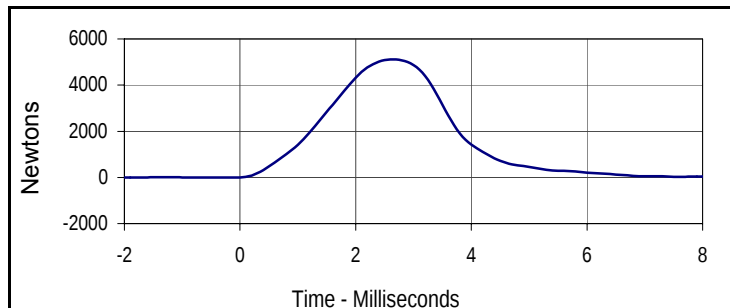
Pendulum Velocity at T=0		m/sec	2.07 to 2.13	2.09	Pass
Peak Probe Force		Newtons	4715 to 5782	5112	Pass
Overall Test Results				Pass	

**Curve Description****Left Knee Probe Force**

Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
5064.2	2.7	-62.3	9.0

**Curve Description****Left Knee Acceleration**

Plot No.	Type	SAE Class	Units
002	FIL	600	G's
Max	Time	Min	Time
103.5	2.7	-1.3	9.0

**Curve Description****Right Knee Probe Force**

Plot No.	Type	SAE Class	Units
003	FIL	600	Newtons
Max	Time	Min	Time
5111.5	2.6	-19.9	10.0

**Curve Description****Right Knee Acceleration**

Plot No.	Type	SAE Class	Units
004	FIL	600	G's
Max	Time	Min	Time
104.5	2.6	-0.4	10.0

Test Program: Hybrid III 50th Percentile Male Hip Joint-Femur Flexion Test

Test Date: 1/10/12

ATD Serial No.: 034

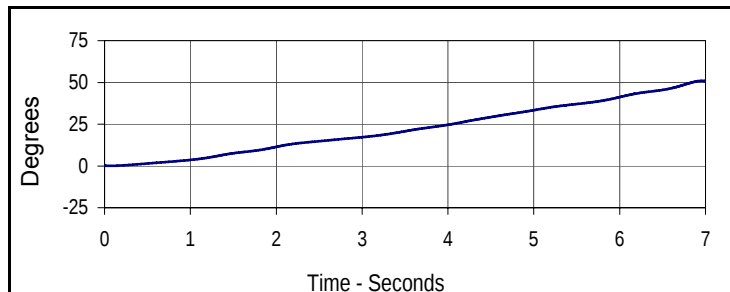
Test I.D.: M034LF026, M034RF026

**Left Hip Joint-Femur Results**

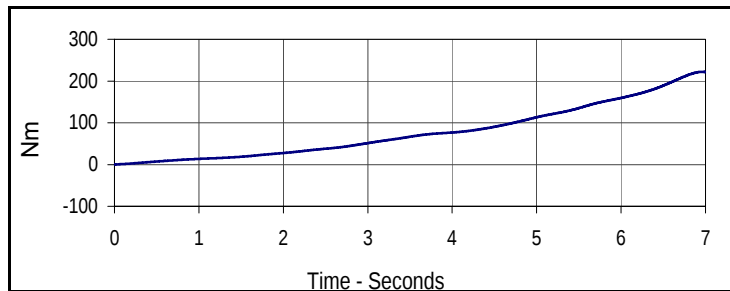
Tested Parameter	Units	Specification	Result	Pass/Fail
Hip Joint-Femur Assembly Soak Time	Minutes	≥240	450	Pass
Temperature During Soak	Max	18.9 to 25.6	21.7	Pass
	Min		20.7	Pass
Humidity During Soak	Max	10.0 to 70.0	34.0	Pass
	Min		29.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.4	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	32.1	Pass
Rotation Rate	deg/sec	5 to 10	7.3	Pass
Femur Torque at 30°	Nm	≤ 95	93.8	Pass
Rotation at 203 Nm	Degrees	40.0 to 50.0	47.3	Pass
Overall Test Results				Pass

Right Hip Joint-Femur Results

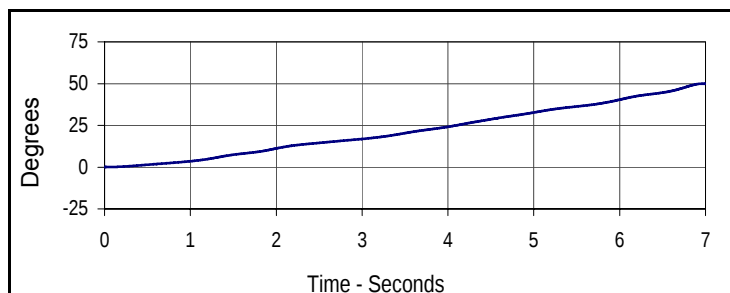
Rotation Rate	deg/sec	5 to 10	7.2	Pass
Femur Torque at 30°	Nm	≤ 95	92.2	Pass
Rotation at 203 Nm	Degrees	40.0 to 50.0	48.1	Pass
Overall Test Results				Pass

**Curve Description****Left Hip-Femur Rotation**

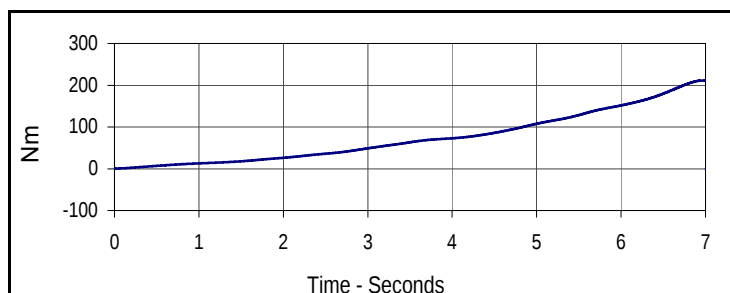
Plot No.	Type	SAE Class	Units
001	FIL	60	Degrees
Max	Time	Min	Time
51.0	7.0	0.0	0.0

**Curve Description****Left Femur Torque**

Plot No.	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
222.0	7.0	0.3	0.0

**Curve Description****Right Hip-Femur Rotation**

Plot No.	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
50.0	7.0	0.0	0.0

**Curve Description****Right Femur Torque**

Plot No.	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
211.2	7.0	0.3	0.0

Test Program: Hybrid III 5th Percentile Female Dummy Damage Checklist

Test Date: 1/10/12

ATD Serial No.: 141

Test I.D.: N/A



Dummy Item	Inspect for	Comments	Damaged	OK
Entire Dummy	Perform general cleaning			X
Outer Skin	Gashes, rips, cracks			X
Head	Ballast secure			X
	General appearance			X
Neck	Broken or cracked rubber			X
	Upper neck bracket firmly attached to the lower neck bracket			X
	Looseness at the condyle joint			X
	Nodding blocks cracked or out of position			X
Spine	Broken or cracks in rubber			X
Ribs	Broken or bent ribs			X
	Broken or bent rib supports			X
	Damping material separated or cracked			X
	Rubber bumpers in place			X
Chest Displacement Assembly	Bent shaft			X
	Slider arm riding in track			X
Transducer Leads	Torn cables			X
Accelerometer Mountings	Head mounting secure			X
	Chest mounting secure			X
Knees	Skin condition			X
	Insert (do not remove)			X
	Casting			X
Limbs	Normal movement and adjustment			X
Knee Sliders	Wires intact			X
	Rubber returned to "at rest" position			X
Pelvis	Broken			X
Other				X

Describe the repair on repair or replacement of parts:

Test Program: Hybrid III 5th Percentile Female External Measurements

Test Date: 1/10/12

ATD Serial No.: 141

Test I.D.: N/A



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.16	Pass
Laboratory Relative Humidity	%	10 to 70	30.3	Pass
A - Total sitting height	mm	774.7 to 800.1	780	Pass
B - Shoulder pivot height	mm	431.8 to 457.2	452	Pass
C - H point height	mm	81.3 to 86.3	85	Pass
D - H point location from backline	mm	144.8 to 149.8	146	Pass
E - Shoulder pivot from backline	mm	68.6 to 83.8	79	Pass
F - Thigh clearance	mm	119.4 to 134.6	125	Pass
G - Back of elbow to wrist pivot	mm	243.9 to 259.1	250	Pass
H - Head back to backline	mm	40.7 to 45.7	44	Pass
I - Shoulder to elbow length	mm	276.8 to 297.2	285	Pass
J - Elbow rest height	mm	182.8 to 203.2	199	Pass
K - Buttock to knee length	mm	520.7 to 546.1	530	Pass
L - Popliteal length	mm	355.6 to 376.0	374	Pass
M - Knee pivot height	mm	393.7 to 419.1	400	Pass
N - Buttock popliteal length	mm	414.0 to 439.4	420	Pass
O - Chest depth without jacket	mm	175.3 to 190.5	187	Pass
P - Foot length	mm	218.5 to 233.7	221	Pass
R - Buttock to Knee Pivot Length	mm	457.2 to 482.6	475	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	300	Pass
V - Shoulder breadth	mm	350.5 to 365.7	359	Pass
W - Foot breadth	mm	78.8 to 94.0	90	Pass
X - Head circumference	mm	528.3 to 548.7	541	Pass
Y - Chest circumference (with chest jacket)	mm	850.8 to 881.3	860	Pass
Z - Waist circumference	mm	759.5 to 789.9	766	Pass
AA - Location for chest circumference	mm	299.7 to 309.9	300	Pass
BB - Location for waist circumference	mm	160.1 to 170.2	164	Pass
Overall Test Results				Pass

Test Program: Hybrid III 5th Percentile Female Head Drop Test

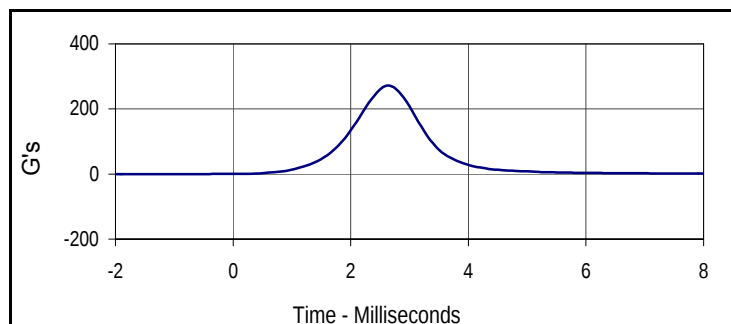
Test Date: 1/10/12

ATD Serial No.: 141

Test I.D.: F141HD029



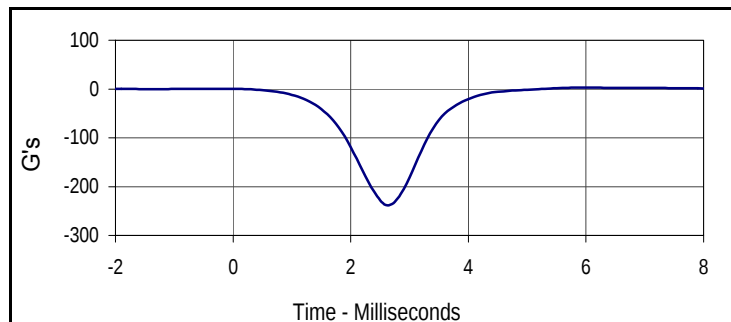
Tested Parameter		Units	Specification	Result	Pass/Fail
Head Assembly Soak Time		Minutes	≥240	290	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		21.1	Pass
Humidity During Soak	Max	%	10.0 to 70.0	36.0	Pass
	Min	%		30.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.3	Pass
Peak Resultant Acceleration		G's	250.0 to 300.0	270.7	Pass
Peak Lateral Acceleration		G's	≤15.0	9.6	Pass
Oscillations After Main Pulse		%	<10% of peak Res. Acceleration	1.4	Pass
Is Acceleration Unimodal?		Yes/No	Yes	Yes	Pass
Overall Test Results				Pass	



Curve Description

Head Resultant

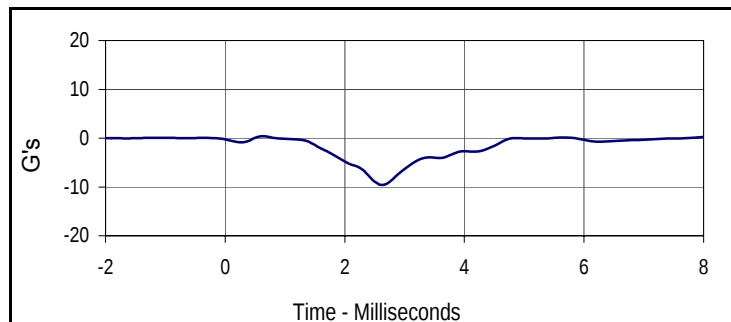
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
270.7	2.6	0.0	-2.0



Curve Description

Head X

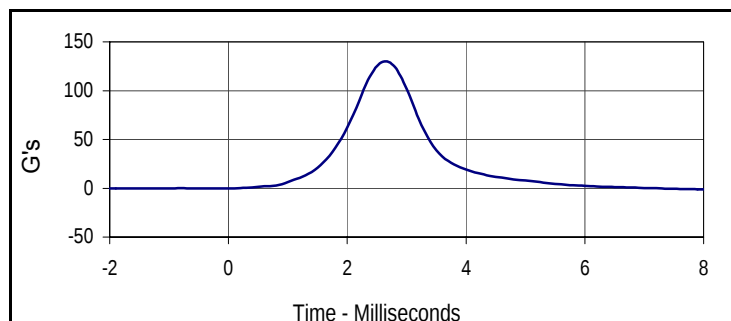
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
2.9	6.0	-237.4	2.6



Curve Description

Head Y

Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
0.4	0.6	-9.6	2.6



Curve Description

Head Z

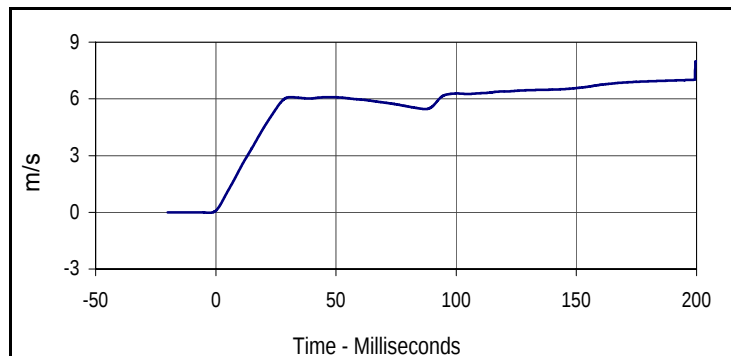
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
129.7	2.6	-0.1	-0.1

Test Program: Hybrid III 5th Percentile Female Neck Flexion Test
 ATD Serial No.: 141

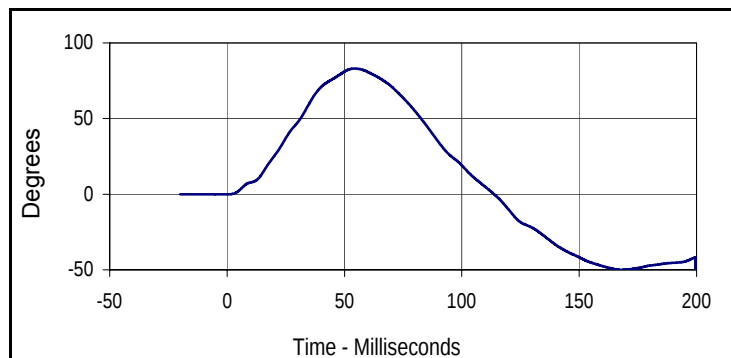
Test Date: 1/10/12
 Test I.D.: F141NF029



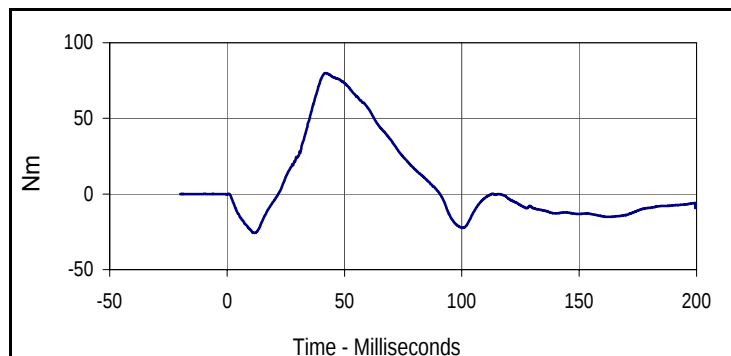
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	325	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		21.1	Pass
Humidity During Soak	Max	%	10.0 to 70.0	36.0	Pass
	Min	%		30.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.5	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.4	Pass
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	4.5	Pass
	30 Msec.	m/s	5.8 to 7.0	6.1	Pass
"D" Plane Rotation	Max	Degrees	77.0 to 91.0	83.1	Pass
Peak Moment in Rotation	Max	Nm	69.0 to 83.0	76.7	Pass
Positive Moment Decay, Time To 10 Nm		Msec.	80.0 to 100.0	83.7	Pass
Overall Test Results					Pass



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
8.0	200.0	0.0	-2.6



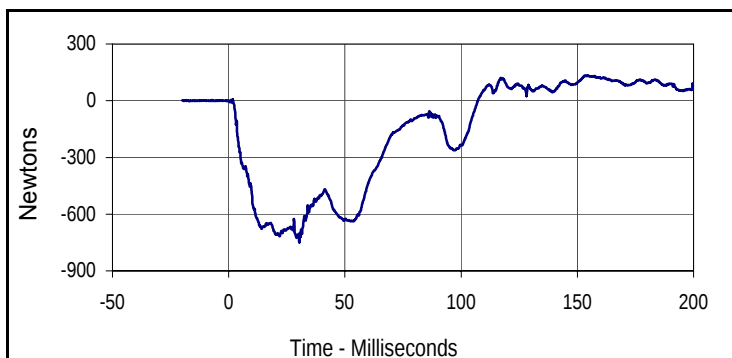
Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
83.1	54.3	-52.8	199.5



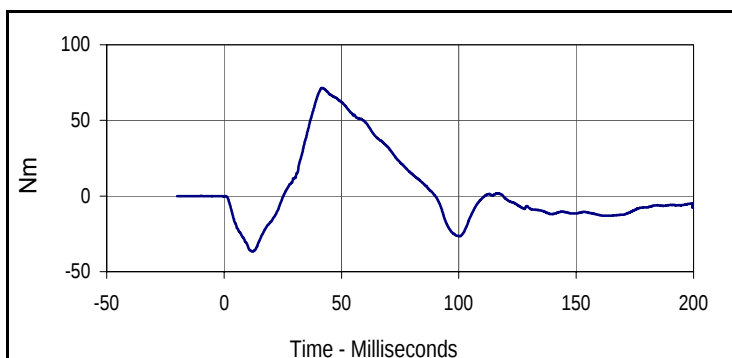
Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
80.0	42.2	-25.8	11.1

Test Program: Hybrid III 5th Percentile Female Neck Flexion Test
 ATD Serial No.: 141

Test Date: 1/10/12
 Test I.D.: F141NF029



Curve Description			
Upper Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
133.1	154.2	-749.2	30.4



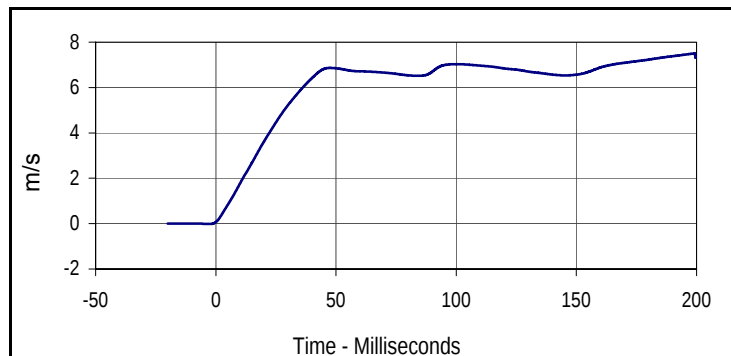
Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
71.4	41.7	-36.6	12.0

Test Program: Hybrid III 5th Percentile Female Neck Extension Test
 ATD Serial No.: 141

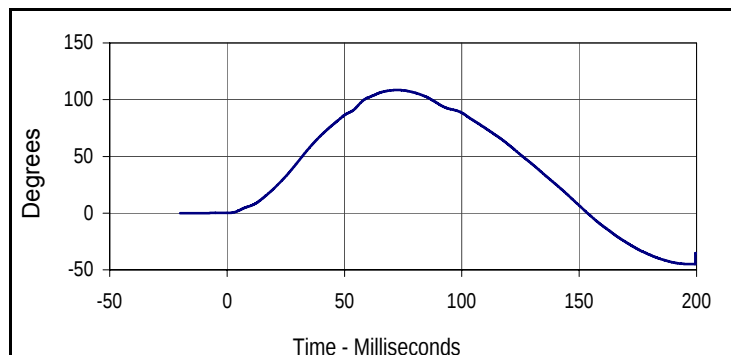
Test Date: 1/10/12
 Test I.D.: F141NE029



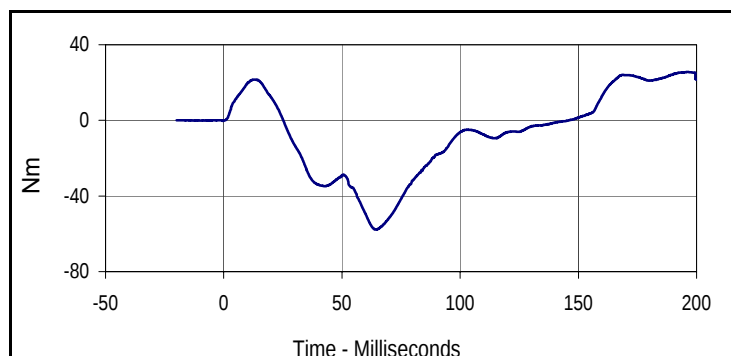
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	350	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		21.1	Pass
Humidity During Soak	Max	%	10.0 to 70.0	35.0	Pass
	Min	%		30.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.4	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.11	Pass
Pendulum Deceleration	10 Msec.	m/s	1.5 to 1.9	1.8	Pass
	20 Msec.	m/s	3.1 to 3.9	3.6	Pass
	30 Msec.	m/s	4.6 to 5.6	5.2	Pass
"D" Plane Rotation	Max	Degrees	99.0 to 114.0	108.5	Pass
Peak Moment in Rotation	Max	Nm	-53.0 to -65.0	-57.8	Pass
Positive Moment Decay, Time To -10 Nm		Msec.	94.0 to 114.0	97.0	Pass
Overall Test Results					Pass



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
7.5	199.4	0.0	-2.7



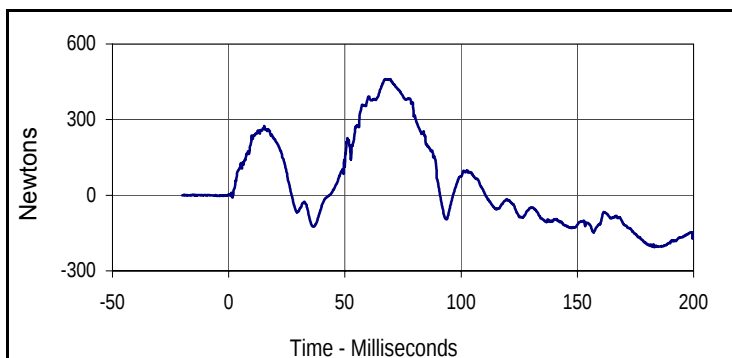
Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
108.5	72.6	-44.9	196.6



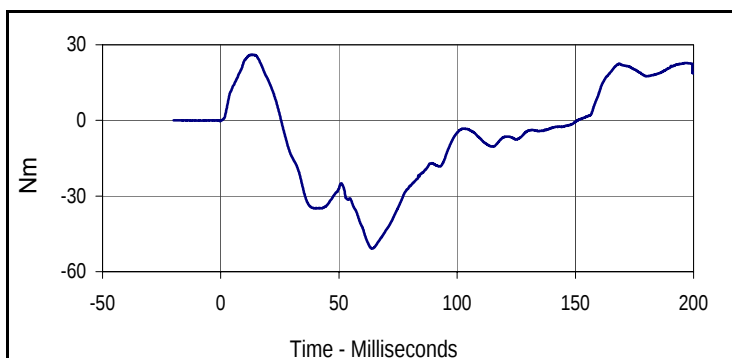
Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
25.6	196.4	-57.8	64.7

Test Program: Hybrid III 5th Percentile Female Neck Extension Test
ATD Serial No.: 141

Test Date: 1/10/12
Test I.D.: F141NE029



Curve Description			
Upper Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
460.5	67.9	-206.0	183.2



Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
26.1	13.7	-50.8	64.0

Test Program: Hybrid III 5th Percentile Female Thorax Impact Test

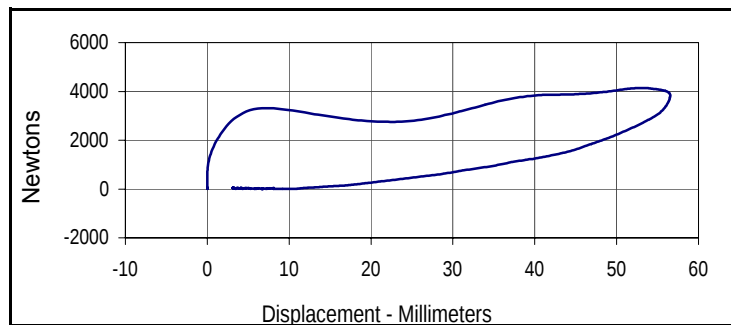
Test Date: 1/10/12

ATD Serial No.: 141

Test I.D.: F141CH029



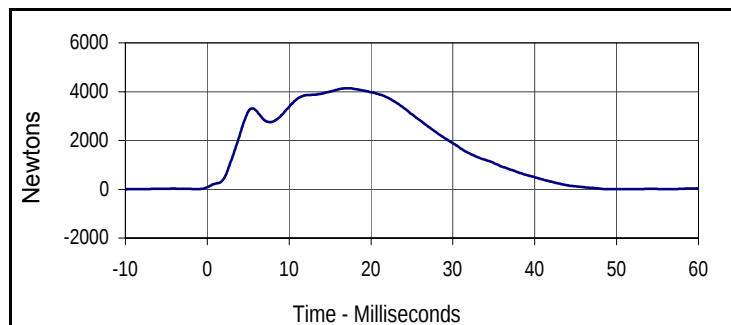
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	395	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		21.1	Pass
Humidity During Soak	Max	%	10.0 to 70.0	35.0	Pass
	Min	%		30.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.3	Pass
Probe Velocity		m/s	6.59 to 6.83	6.77	Pass
Peak Chest Deflection		mm	50.0 to 58.0	56.5	Pass
Peak Force Between 50 and 58 MM		Newtons	3900 to 4400	4047	Pass
Peak Force Between 18 and 50 MM		Newtons	≤4600	4141	Pass
Internal Hysteresis		%	69 to 85	73.1	Pass
Overall Test Results					Pass



Curve Description

Probe Force vs. Chest Deflection

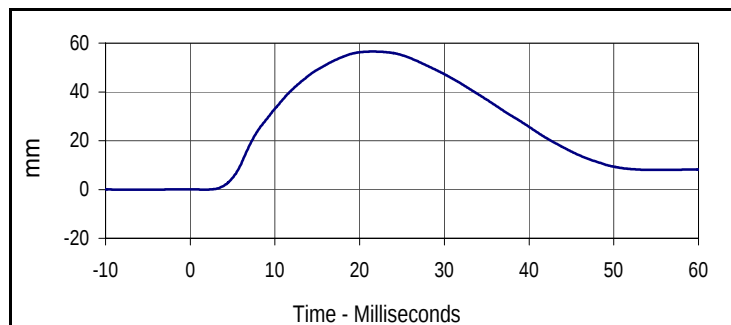
Plot No.	Type	SAE Class	Hysteresis
001	FIL	180	73.1
Peak Probe Force		Peak Chest Deflection	
4140.7		56.5	



Curve Description

Probe Force

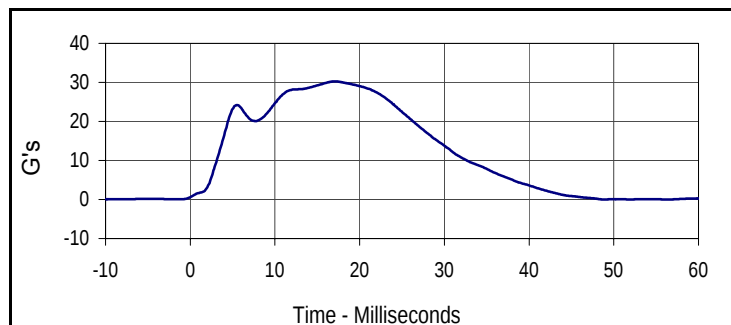
Plot No.	Type	SAE Class	Units
002	FIL	180	Newtons
Max	Time	Min	Time
4140.7	17.1	-10.5	76.1



Curve Description

Chest Deflection

Plot No.	Type	SAE Class	Units
003	FIL	600	mm
Max	Time	Min	Time
56.5	21.5	0.0	1.9



Curve Description

Impactor Acceleration

Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
30.2	17.1	-0.1	76.1

Test Program: Hybrid III 5th Percentile Female Knee Impact Test

Test Date: 1/10/12

ATD Serial No.: 141

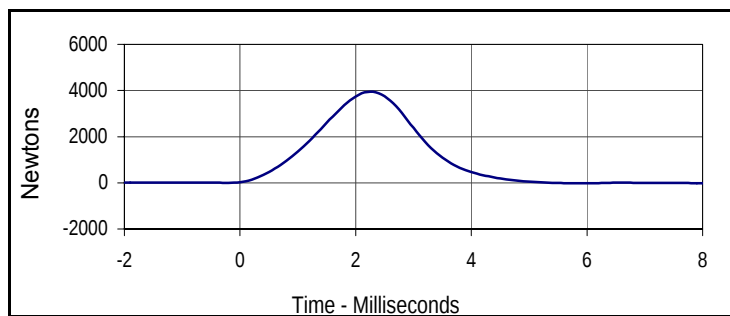
Test I.D.: F141LK029, F141LK029

**Left Knee**

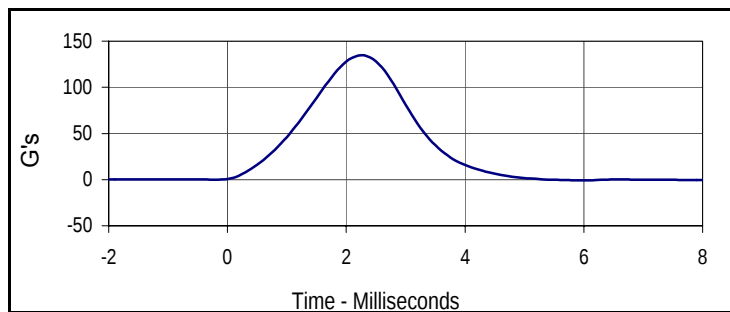
Tested Parameter		Units	Specification	Result	Pass/Fail
Knee Assembly Soak Time		Minutes	≥240	300	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		21.1	Pass
Humidity During Soak	Max	%	10.0 to 70.0	35.0	Pass
	Min	%		30.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.0	Pass
Pendulum Velocity at T=0		m/sec	2.07 to 2.13	2.09	Pass
Peak Probe Force		Newtons	3450 to 4060	3945	Pass
Overall Test Results					Pass

Right Knee

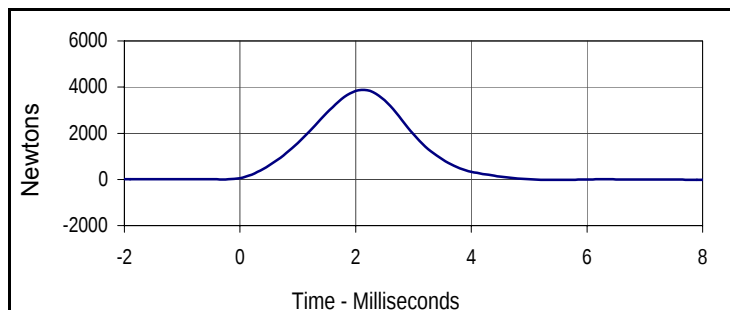
Pendulum Velocity at T=0		m/sec	2.07 to 2.13	2.09	Pass
Peak Probe Force		Newtons	3450 to 4060	3878	Pass
Overall Test Results					Pass

**Curve Description****Left Knee Probe Force**

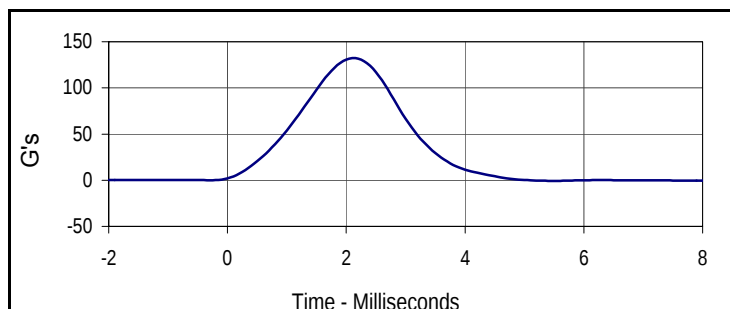
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
3945.2	2.3	-22.3	6.0

**Curve Description****Left Knee Acceleration**

Plot No.	Type	SAE Class	Units
002	FIL	600	G's
Max	Time	Min	Time
134.6	2.3	-0.8	6.0

**Curve Description****Right Knee Probe Force**

Plot No.	Type	SAE Class	Units
003	FIL	600	Newtons
Max	Time	Min	Time
3878.5	2.1	-21.6	5.5

**Curve Description****Right Knee Acceleration**

Plot No.	Type	SAE Class	Units
004	FIL	600	G's
Max	Time	Min	Time
132.3	2.1	-0.7	5.5

Test Program: Hybrid III 5th Percentile Female Torso Flexion Test

Test Date: 1/10/12

ATD Serial No.: 141

Test I.D.: F141TF029

**Left Hip Joint-Femur Results**

Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	445	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		21.1	Pass
Humidity During Soak	Max	%	10.0 to 70.0	35.0	Pass
	Min	%		30.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.5	Pass
Initial Reference Plane Angle		Degrees	≤ 20	9.2	Pass
Peak Force at 45° +/-0.5°		Newtons	320.0 to 390.0	347.6	Pass
Torso Rotation Rate		deg/sec	0.5 to 1.5	1.2	Pass
Final Reference Plane Angle		Degrees	+/-8	4.7	Pass
Overall Test Results					Pass

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

Test Program: Hybrid III 50th Percentile Male Dummy Damage Checklist

Test Date: 1/12/12

ATD Serial No.: 034

Test I.D.: N/A



Dummy Item	Inspect for	Comments	Damaged	OK
Entire Dummy	Perform general cleaning			X
Outer Skin	Gashes, rips, cracks			X
Head	Ballast secure			X
	General appearance			X
Neck	Broken or cracked rubber			X
	Upper neck bracket firmly attached to the lower neck bracket			X
	Looseness at the condyle joint			X
	Nodding blocks cracked or out of position			X
Spine	Broken or cracks in rubber			X
Ribs	Broken or bent ribs			X
	Broken or bent rib supports			X
	Damping material separated or cracked			X
	Rubber bumpers in place			X
Chest Displacement Assembly	Bent shaft			X
	Slider arm riding in track			X
Transducer Leads	Torn cables			X
Accelerometer Mountings	Head mounting secure			X
	Chest mounting secure			X
Knees	Skin condition			X
	Insert (do not remove)			X
	Casting			X
Limbs	Normal movement and adjustment			X
Knee Sliders	Wires intact			X
	Rubber returned to "at rest" position			X
Pelvis	Broken			X
Other				X

Describe the repair on repair or replacement of parts:

Test Program: Hybrid III 50th Percentile Male External Measurements

Test Date: 1/12/12

ATD Serial No.: 034

Test I.D.: N/A



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.24	Pass
Laboratory Relative Humidity	%	10 to 70	28.0	Pass
A - Total sitting height	mm	879 to 889	883	Pass
B - Shoulder pivot height	mm	505 to 521	513	Pass
C - H point height	mm	84 to 89	89	Pass
D - H point location from backline	mm	135 to 140	136	Pass
E - Shoulder pivot from backline	mm	84 to 94	86	Pass
F - Thigh clearance	mm	140 to 155	149	Pass
G - Back of elbow to wrist pivot	mm	290 to 305	300	Pass
H - Head back to backline	mm	41 to 46	43	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	589	Pass
L - Popliteal length	mm	429 to 455	436	Pass
M - Knee pivot height	mm	485 to 500	488	Pass
N - Buttock popliteal length	mm	452 to 477	472	Pass
O - Chest depth without jacket	mm	213 to 229	225	Pass
P - Foot length	mm	251 to 267	260	Pass
V - Shoulder breadth	mm	422 to 437	434	Pass
W - Foot breadth	mm	91 to 107	99	Pass
Y - Chest circumference (with chest jacket)	mm	970 to 1001	983	Pass
Z - Waist circumference	mm	836 to 866	864	Pass
AA - Location for chest circumference	mm	429 to 434	432	Pass
BB - Location for waist circumference	mm	226 to 231	230	Pass
Overall Test Results			Pass	

Test Program: Hybrid III 50th Percentile Male Head Drop Test

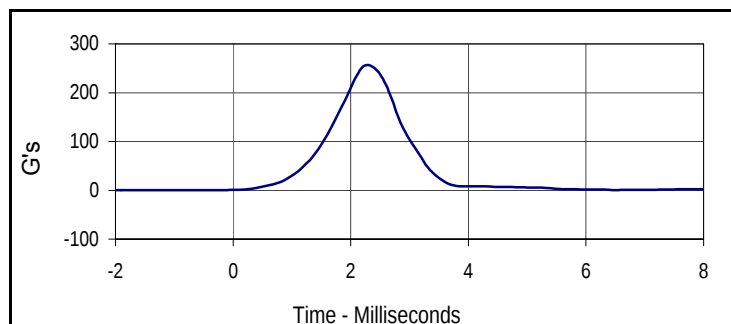
Test Date: 1/12/12

ATD Serial No.: 034

Test I.D.: M034HD027



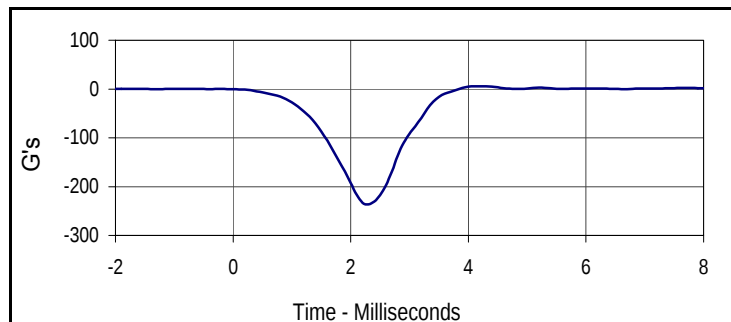
Tested Parameter		Units	Specification	Result	Pass/Fail
Head Assembly Soak Time		Minutes	≥240	260	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	40.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	28.1	Pass
Peak Resultant Acceleration		G's	225.0 to 275.0	256.9	Pass
Peak Lateral Acceleration		G's	≤15.0	4.2	Pass
Oscillations After Main Pulse		%	<10% of peak Res. Acceleration	3.3	Pass
Is Acceleration Unimodal?		Yes/No	Yes	Yes	Pass
Overall Test Results				Pass	



Curve Description

Head Resultant

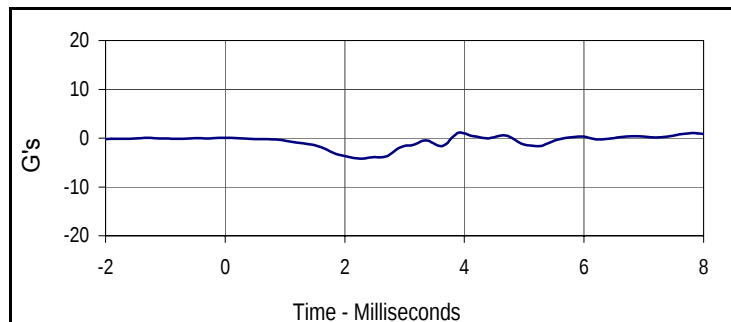
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
256.9	2.3	0.1	-1.4



Curve Description

Head X

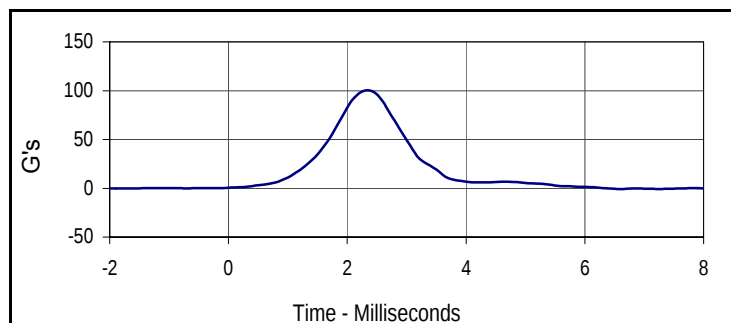
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
5.6	4.2	-236.5	2.3



Curve Description

Head Y

Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
1.1	3.9	-4.2	2.3



Curve Description

Head Z

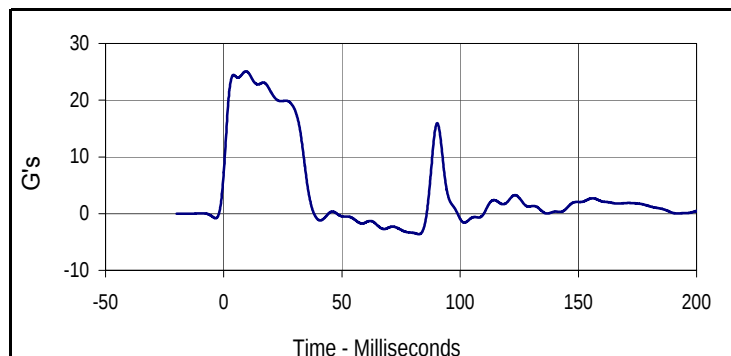
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
100.2	2.3	-0.2	-2.0

Test Program: Hybrid III 50th Percentile Male Neck Flexion Test
 ATD Serial No.: 034

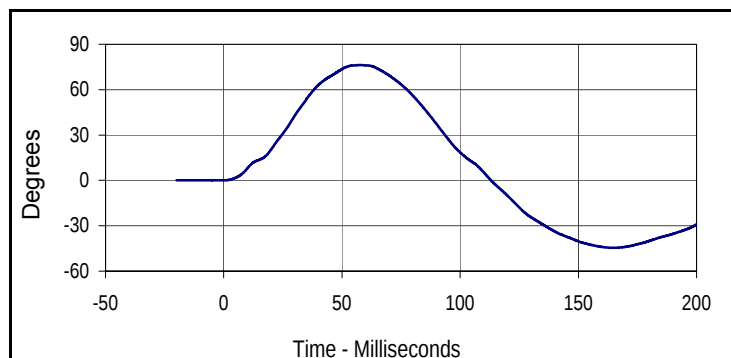
Test Date: 1/12/12
 Test I.D.: M034NF027



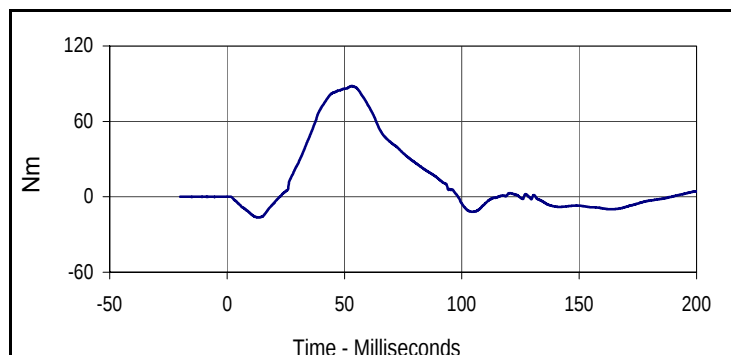
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	295	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.4	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	28.2	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.00	Pass
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	25.0	Pass
	20 Msec.	G's	17.6 to 22.6	21.4	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	35.4	Pass
Maximum "D" Plane Rotation	Max	Degrees	64.0 to 78.0	76.2	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	113.1	Pass
Moment About Occ. Condyle	Max	Nm	84.1 to 108.5	88.1	Pass
	Time	Msec.	47.0 to 58.0	53.1	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	97.0 to 107.0	98.4	Pass
Overall Test Results					Pass



Curve Description			
Pendulum Deceleration			
Plot No.	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
25.1	9.4	-3.6	82.6



Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
76.2	57.3	-44.6	164.8



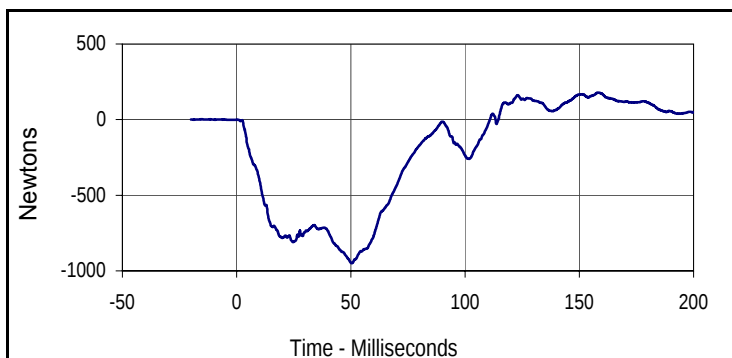
Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
88.1	53.1	-16.4	13.2

Test Program: Hybrid III 50th Percentile Male Neck Flexion Test

Test Date: 1/12/12

ATD Serial No.: 034

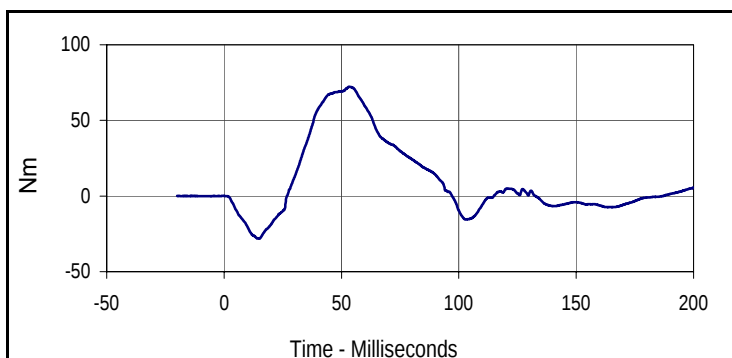
Test I.D.: M034NF027



Curve Description

Neck Force X

Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
179.4	158.4	-949.4	50.2



Curve Description

Neck Moment Y

Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
72.2	53.2	-28.2	14.9

Test Program: Hybrid III 50th Percentile Male Neck Extension Test

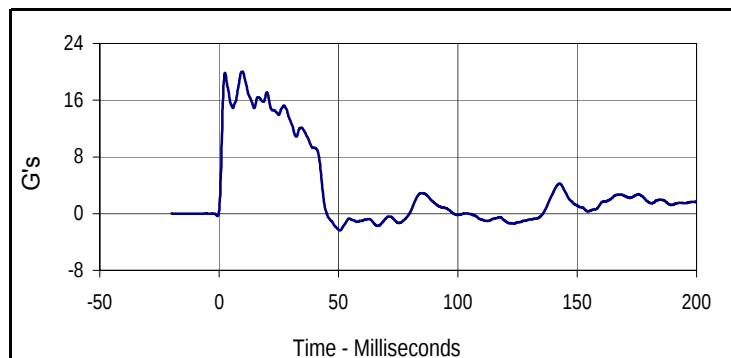
Test Date: 1/12/12

ATD Serial No.: 034

Test I.D.: M034NE027



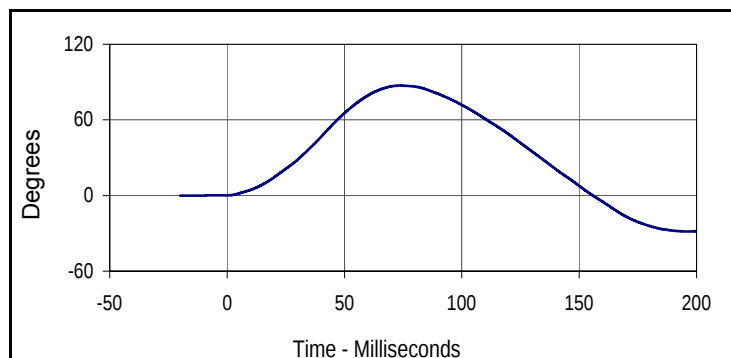
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	330	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.1	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	28.1	Pass
Pendulum Velocity		m/s	5.94 to 6.19	6.08	Pass
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	20.0	Pass
	20 Msec.	G's	14.0 to 19.0	17.1	Pass
	30 Msec.	G's	11.0 to 16.0	12.9	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 22.0	12.9	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	38.0 to 46.0	42.9	Pass
Maximum "D" Plane Rotation	Max	Degrees	81.0 to 106.0	87.2	Pass
	Time	Msec.	72.0 to 82.0	73.8	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	147.0 to 174.0	155.8	Pass
Moment About Occ. Condyle	Max	Nm	-52.9 to -79.9	-60.1	Pass
	Time	Msec.	65.0 to 79.0	65.6	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	120.0 to 148.0	136.1	Pass
Overall Test Results					Pass



Curve Description

Pendulum Deceleration

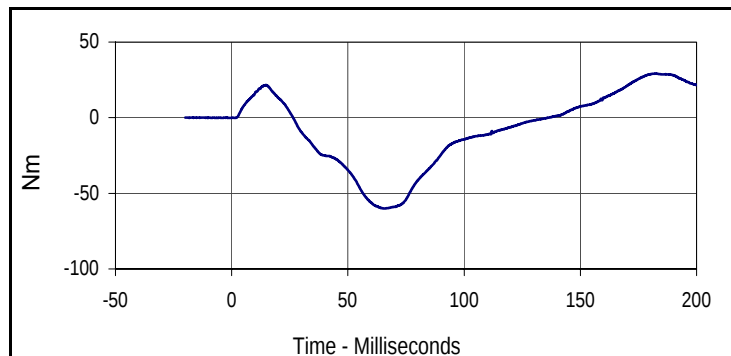
Plot No.	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
20.0	9.8	-2.4	50.6



Curve Description

"D" Plane Rotation

Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
87.2	73.8	-28.5	196.2



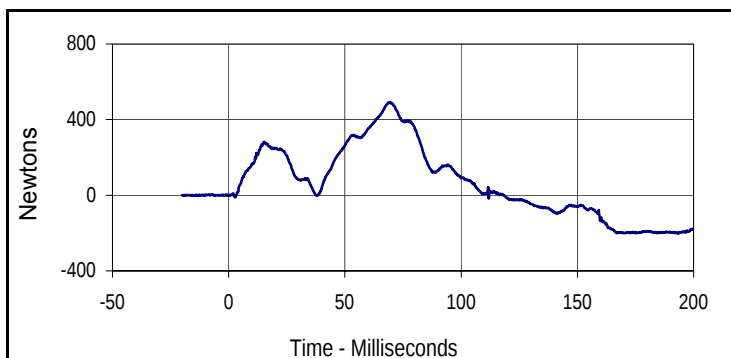
Curve Description

Moment About Occipital Condyle

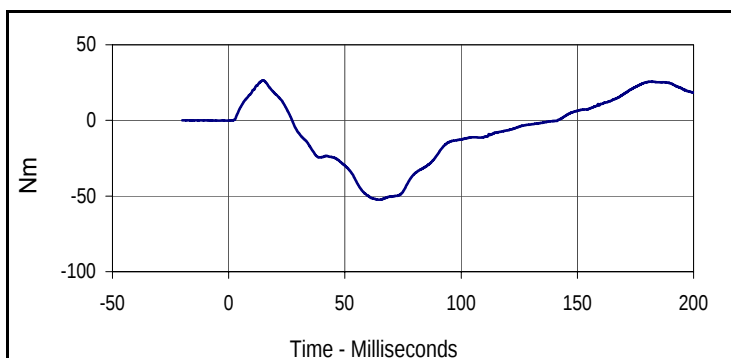
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
29.2	182.5	-60.1	65.6

Test Program: Hybrid III 50th Percentile Male Neck Extension Test
 ATD Serial No.: 034

Test Date: 1/12/12
 Test I.D.: M034NE027



Curve Description			
Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
492.0	68.9	-203.3	193.3



Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
26.4	14.8	-52.4	65.2

Test Program: Hybrid III 50th Percentile Male Thorax Impact Test

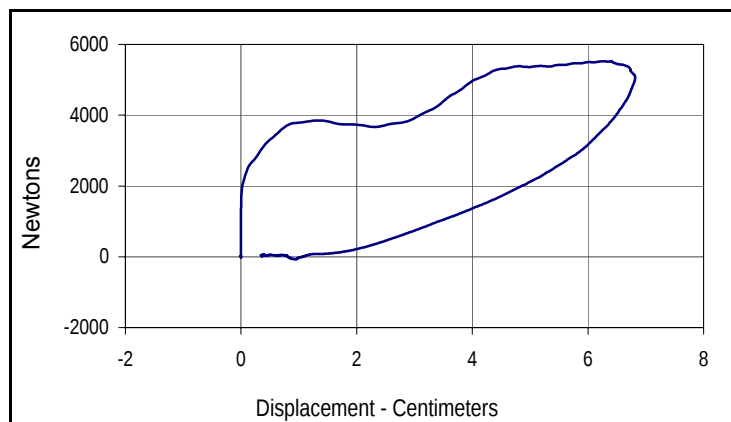
Test Date: 1/12/12

ATD Serial No.: 034

Test I.D.: M034CH027



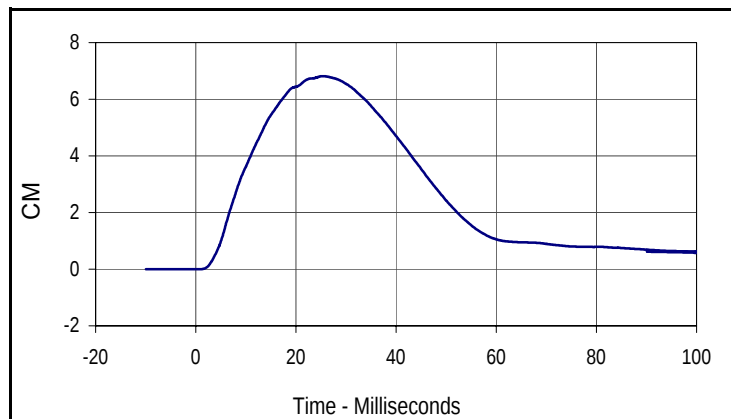
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	375	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.1	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	28.1	Pass
Probe Velocity		m/s	6.58 to 6.82	6.75	Pass
Peak Probe Force		Newtons	5159 to 5893	5523	Pass
Peak Sternum Deflection		CM	6.35 to 7.26	6.82	Pass
Internal Hysteresis		%	69 to 85	69.7	Pass
Overall Test Results				Pass	



Curve Description

Probe Force vs. Chest Deflection

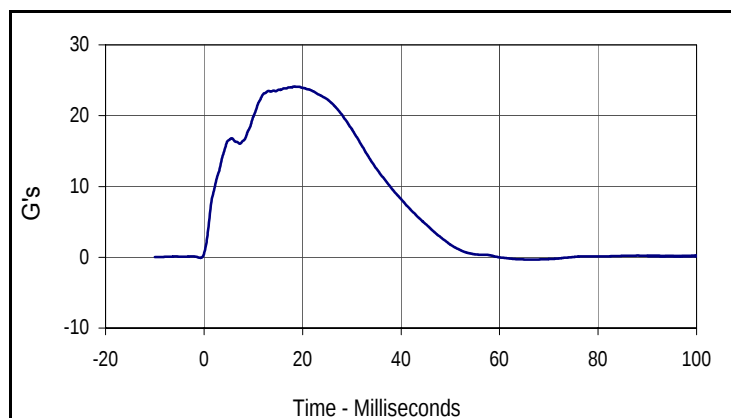
Plot No.	Type	SAE Class	Hysteresis
001	FIL	180	69.7
Peak Probe Force		Peak Chest Deflection	
5523		6.82	



Curve Description

Chest Deflection

Plot No.	Type	SAE Class	Units
002	FIL	180	CM
Max	Time	Min	Time
6.8	25.4	0.0	0.7



Curve Description

Impactor Acceleration

Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
24.1	18.3	-0.3	66.4

Test Program: Hybrid III 50th Percentile Male Knee Impact Test

Test Date: 1/12/12

ATD Serial No.: 034

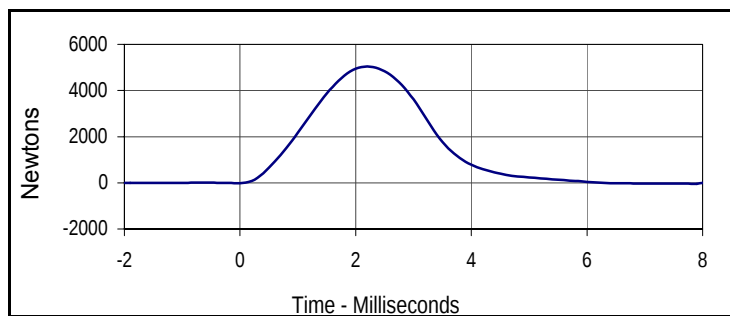
Test I.D.: M034LK027, M034RK027

**Left Knee**

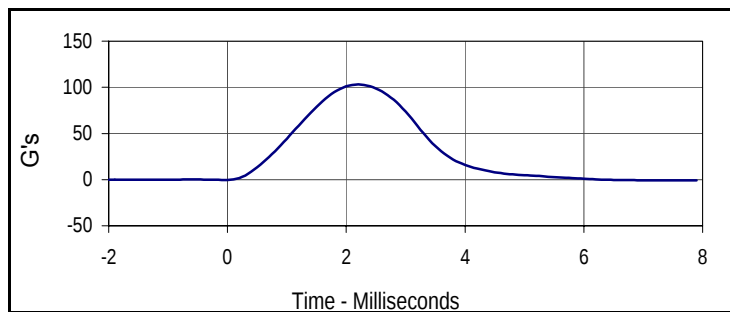
Tested Parameter		Units	Specification	Result	Pass/Fail
Knee Assembly Soak Time		Minutes	≥240	280	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		20.6	Pass
Humidity During Soak	Max	%	10.0 to 70.0	34.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	28.1	Pass
Pendulum Velocity at T=0		m/sec	2.07 to 2.13	2.09	Pass
Peak Probe Force		Newtons	4715 to 5782	5045	Pass
Overall Test Results				Pass	

Right Knee

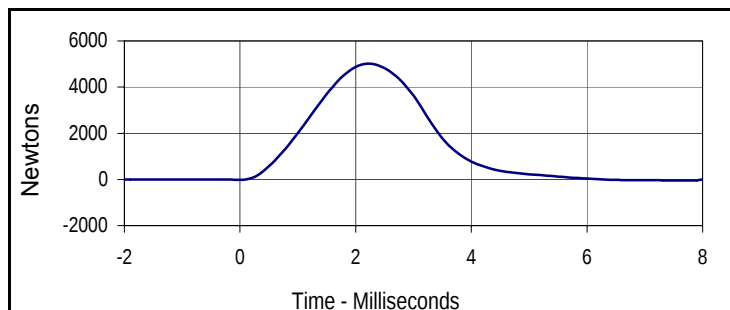
Pendulum Velocity at T=0		m/sec	2.07 to 2.13	2.09	Pass
Peak Probe Force		Newtons	4715 to 5782	5010	Pass
Overall Test Results				Pass	

**Curve Description****Left Knee Probe Force**

Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
5044.5	2.2	-41.7	7.9

**Curve Description****Left Knee Acceleration**

Plot No.	Type	SAE Class	Units
002	FIL	600	G's
Max	Time	Min	Time
103.1	2.2	-0.9	7.9

**Curve Description****Right Knee Probe Force**

Plot No.	Type	SAE Class	Units
003	FIL	600	Newtons
Max	Time	Min	Time
5009.6	2.2	-43.0	7.5

**Curve Description****Right Knee Acceleration**

Plot No.	Type	SAE Class	Units
004	FIL	600	G's
Max	Time	Min	Time
102.4	2.2	-0.9	7.5

Test Program: Hybrid III 50th Percentile Male Hip Joint-Femur Flexion Test

Test Date: 1/12/12

ATD Serial No.: 034

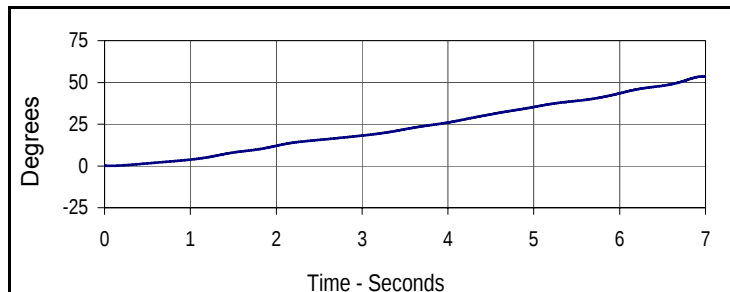
Test I.D.: M034LF027, M034RF027

**Left Hip Joint-Femur Results**

Tested Parameter	Units	Specification	Result	Pass/Fail
Hip Joint-Femur Assembly Soak Time	Minutes	≥240	395	Pass
Temperature During Soak	Max	18.9 to 25.6	21.7	Pass
	Min		20.7	Pass
Humidity During Soak	Max	10.0 to 70.0	34.0	Pass
	Min		29.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	30.0	Pass
Rotation Rate	deg/sec	5 to 10	7.7	Pass
Femur Torque at 30°	Nm	≤ 95	93.0	Pass
Rotation at 203 Nm	Degrees	40.0 to 50.0	48.2	Pass
Overall Test Results				Pass

Right Hip Joint-Femur Results

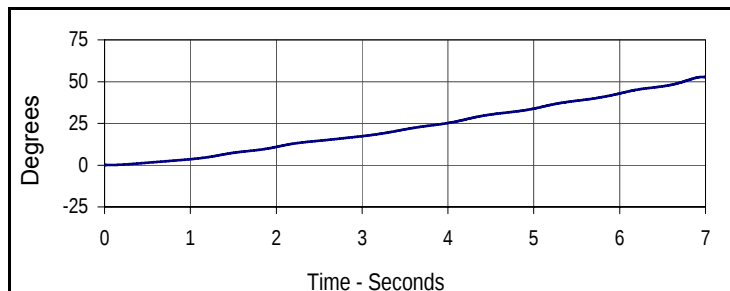
Rotation Rate	deg/sec	5 to 10	7.6	Pass
Femur Torque at 30°	Nm	≤ 95	86.1	Pass
Rotation at 203 Nm	Degrees	40.0 to 50.0	47.4	Pass
Overall Test Results				Pass

**Curve Description****Left Hip-Femur Rotation**

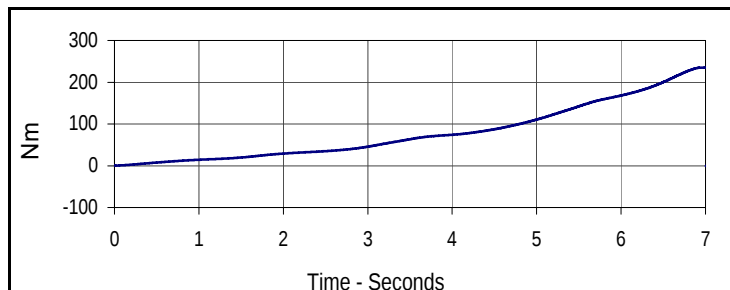
Plot No.	Type	SAE Class	Units
001	FIL	60	Degrees
Max	Time	Min	Time
53.6	7.0	0.0	0.0

**Curve Description****Left Femur Torque**

Plot No.	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
236.3	7.0	0.3	0.0

**Curve Description****Right Hip-Femur Rotation**

Plot No.	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
52.8	7.0	0.0	0.0

**Curve Description****Right Femur Torque**

Plot No.	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
235.2	7.0	0.3	0.0

Test Program: Hybrid III 5th Percentile Female Dummy Damage Checklist

Test Date: 1/11/12

ATD Serial No.: 141

Test I.D.: N/A



Dummy Item	Inspect for	Comments	Damaged	OK
Entire Dummy	Perform general cleaning			X
Outer Skin	Gashes, rips, cracks			X
Head	Ballast secure			X
	General appearance			X
Neck	Broken or cracked rubber			X
	Upper neck bracket firmly attached to the lower neck bracket			X
	Looseness at the condyle joint			X
	Nodding blocks cracked or out of position			X
Spine	Broken or cracks in rubber			X
Ribs	Broken or bent ribs			X
	Broken or bent rib supports			X
	Damping material separated or cracked			X
	Rubber bumpers in place			X
Chest Displacement Assembly	Bent shaft			X
	Slider arm riding in track			X
Transducer Leads	Torn cables			X
Accelerometer Mountings	Head mounting secure			X
	Chest mounting secure			X
Knees	Skin condition			X
	Insert (do not remove)			X
	Casting			X
Limbs	Normal movement and adjustment			X
Knee Sliders	Wires intact			X
	Rubber returned to "at rest" position			X
Pelvis	Broken			X
Other				X

Describe the repair on repair or replacement of parts:

Test Program: Hybrid III 5th Percentile Female External Measurements

Test Date: 1/11/12

ATD Serial No.: 141

Test I.D.: N/A



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.12	Pass
Laboratory Relative Humidity	%	10 to 70	28.2	Pass
A - Total sitting height	mm	774.7 to 800.1	781	Pass
B - Shoulder pivot height	mm	431.8 to 457.2	453	Pass
C - H point height	mm	81.3 to 86.3	85	Pass
D - H point location from backline	mm	144.8 to 149.8	146	Pass
E - Shoulder pivot from backline	mm	68.6 to 83.8	79	Pass
F - Thigh clearance	mm	119.4 to 134.6	125	Pass
G - Back of elbow to wrist pivot	mm	243.9 to 259.1	250	Pass
H - Head back to backline	mm	40.7 to 45.7	44	Pass
I - Shoulder to elbow length	mm	276.8 to 297.2	285	Pass
J - Elbow rest height	mm	182.8 to 203.2	198	Pass
K - Buttock to knee length	mm	520.7 to 546.1	529	Pass
L - Popliteal length	mm	355.6 to 376.0	374	Pass
M - Knee pivot height	mm	393.7 to 419.1	399	Pass
N - Buttock popliteal length	mm	414.0 to 439.4	420	Pass
O - Chest depth without jacket	mm	175.3 to 190.5	186	Pass
P - Foot length	mm	218.5 to 233.7	221	Pass
R - Buttock to Knee Pivot Length	mm	457.2 to 482.6	475	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	300	Pass
V - Shoulder breadth	mm	350.5 to 365.7	359	Pass
W - Foot breadth	mm	78.8 to 94.0	90	Pass
X - Head circumference	mm	528.3 to 548.7	541	Pass
Y - Chest circumference (with chest jacket)	mm	850.8 to 881.3	860	Pass
Z - Waist circumference	mm	759.5 to 789.9	766	Pass
AA - Location for chest circumference	mm	299.7 to 309.9	300	Pass
BB - Location for waist circumference	mm	160.1 to 170.2	164	Pass
Overall Test Results				Pass

Test Program: Hybrid III 5th Percentile Female Head Drop Test

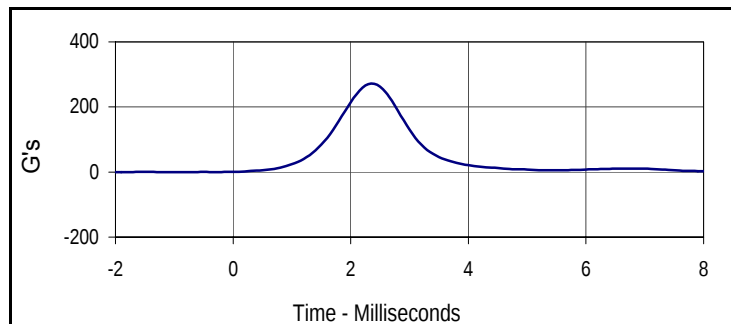
Test Date: 1/11/12

ATD Serial No.: 141

Test I.D.: F141HD030



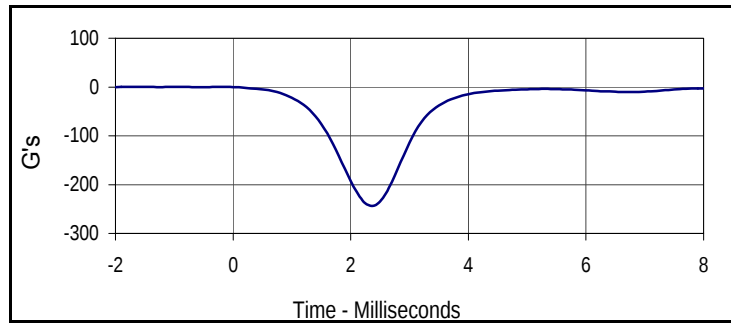
Tested Parameter		Units	Specification	Result	Pass/Fail
Head Assembly Soak Time		Minutes	≥240	350	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		21.1	Pass
Humidity During Soak	Max	%	10.0 to 70.0	36.0	Pass
	Min	%		30.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	28.2	Pass
Peak Resultant Acceleration		G's	250.0 to 300.0	271.5	Pass
Peak Lateral Acceleration		G's	≤15.0	6.5	Pass
Oscillations After Main Pulse		%	<10% of peak Res. Acceleration	4.0	Pass
Is Acceleration Unimodal?		Yes/No	Yes	Yes	Pass
Overall Test Results					Pass



Curve Description

Head Resultant

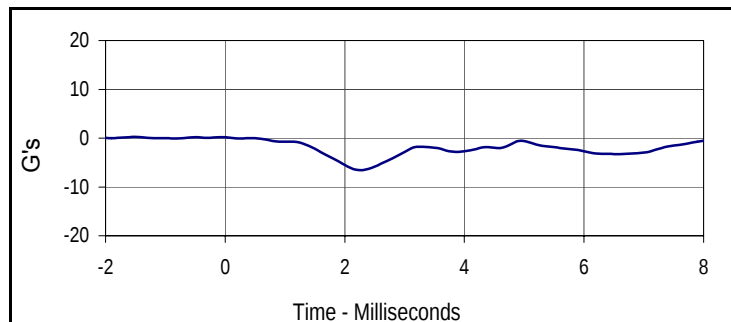
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
271.5	2.4	0.0	-0.7



Curve Description

Head X

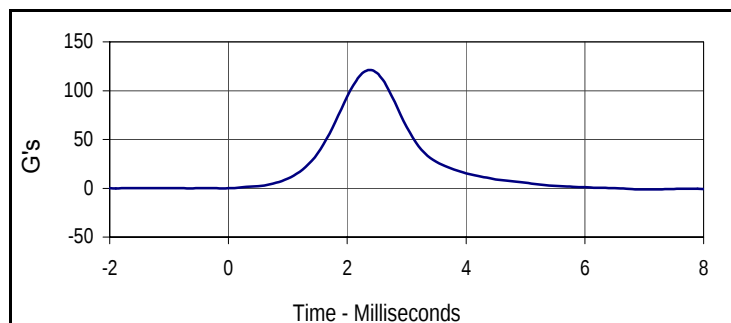
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.2	-1.5	-242.9	2.4



Curve Description

Head Y

Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
0.3	-1.5	-6.5	2.3



Curve Description

Head Z

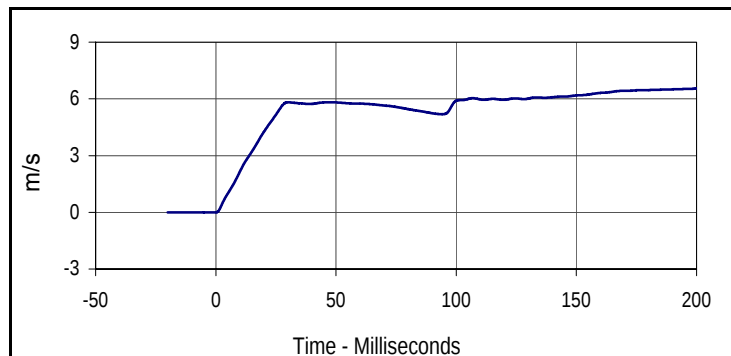
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
121.1	2.4	0.0	-0.6

Test Program: Hybrid III 5th Percentile Female Neck Flexion Test
 ATD Serial No.: 141

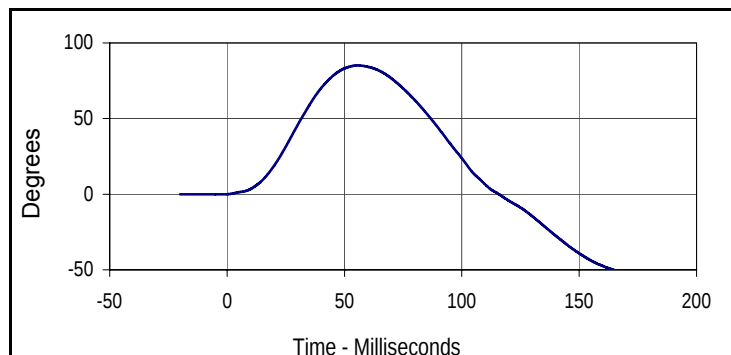
Test Date: 1/11/12
 Test I.D.: F141NF030



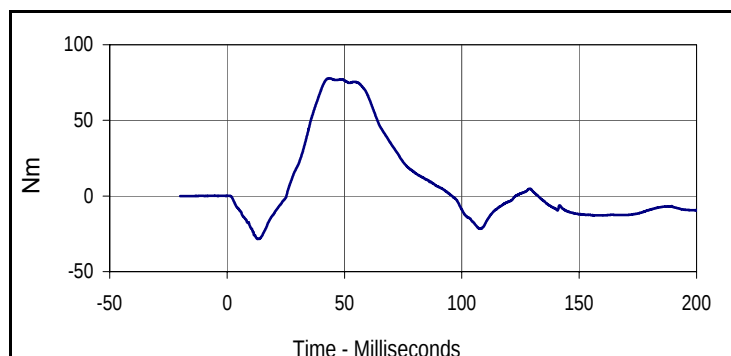
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	400	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		21.1	Pass
Humidity During Soak	Max	%	10.0 to 70.0	36.0	Pass
	Min	%		30.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.5	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.4	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.02	Pass
Pendulum Deceleration	10 Msec.	m/s	2.1 to 2.5	2.1	Pass
	20 Msec.	m/s	4.0 to 5.0	4.3	Pass
	30 Msec.	m/s	5.8 to 7.0	5.8	Pass
"D" Plane Rotation	Max	Degrees	77.0 to 91.0	85.1	Pass
Peak Moment in Rotation	Max	Nm	69.0 to 83.0	77.7	Pass
Positive Moment Decay, Time To 10 Nm		Msec.	80.0 to 100.0	84.5	Pass
Overall Test Results				Pass	



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
6.5	200.0	0.0	-0.2



Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
85.1	55.7	-54.6	186.7



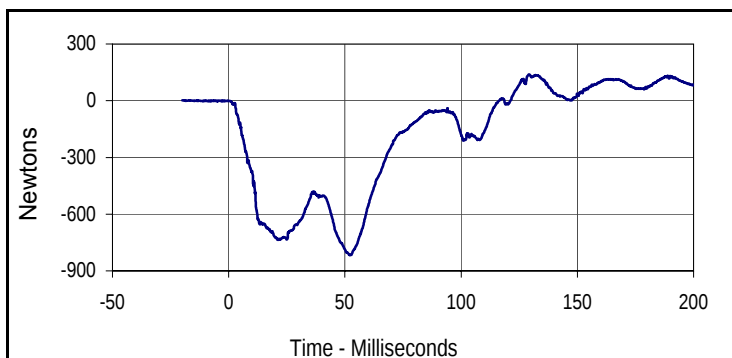
Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
77.7	43.9	-28.4	13.0

Test Program: Hybrid III 5th Percentile Female Neck Flexion Test

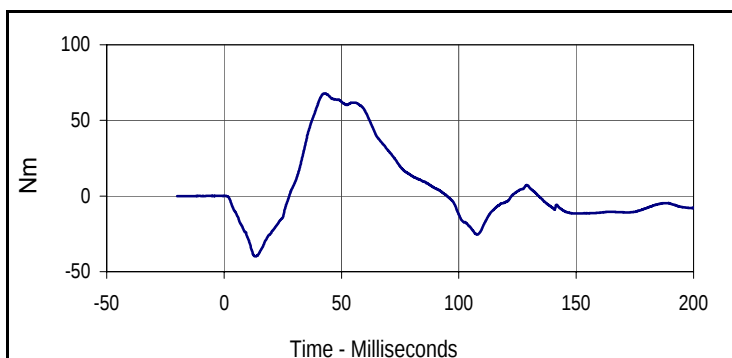
Test Date: 1/11/12

ATD Serial No.: 141

Test I.D.: F141NF030



Curve Description			
Upper Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
139.4	129.2	-816.5	52.3



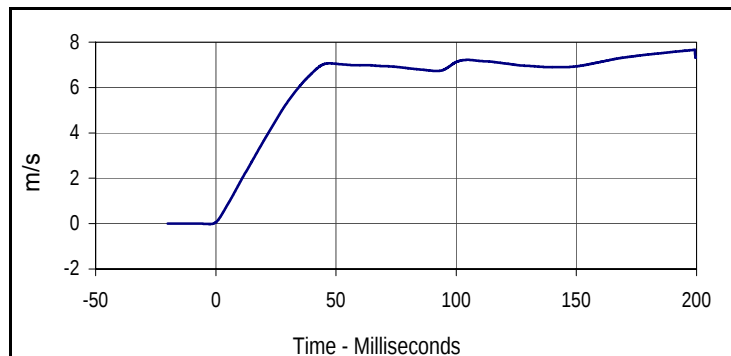
Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
67.9	42.9	-39.9	13.4

Test Program: Hybrid III 5th Percentile Female Neck Extension Test
 ATD Serial No.: 141

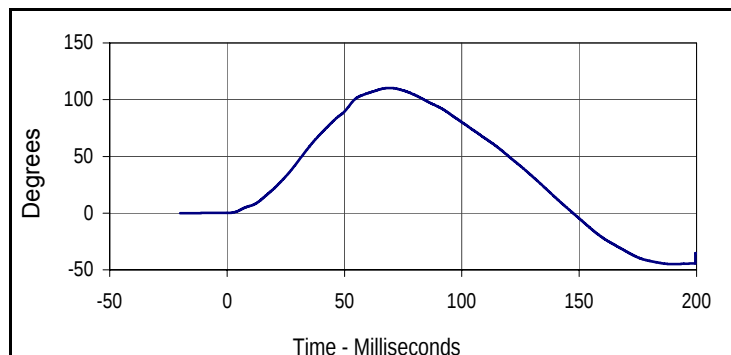
Test Date: 1/11/12
 Test I.D.: F141NE030



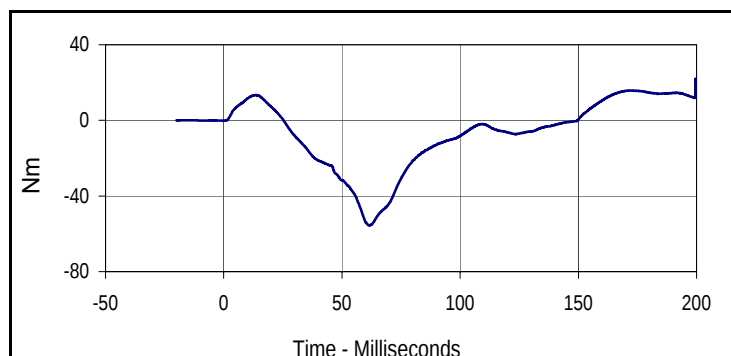
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	435	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		21.1	Pass
Humidity During Soak	Max	%	10.0 to 70.0	35.0	Pass
	Min	%		30.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.2	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.14	Pass
Pendulum Deceleration	10 Msec.	m/s	1.5 to 1.9	1.8	Pass
	20 Msec.	m/s	3.1 to 3.9	3.7	Pass
	30 Msec.	m/s	4.6 to 5.6	5.4	Pass
"D" Plane Rotation	Max	Degrees	99.0 to 114.0	110.3	Pass
Peak Moment in Rotation	Max	Nm	-53.0 to -65.0	-55.6	Pass
Positive Moment Decay, Time To -10 Nm		Msec.	94.0 to 114.0	96.7	Pass
Overall Test Results				Pass	



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
7.7	199.4	0.0	-2.5



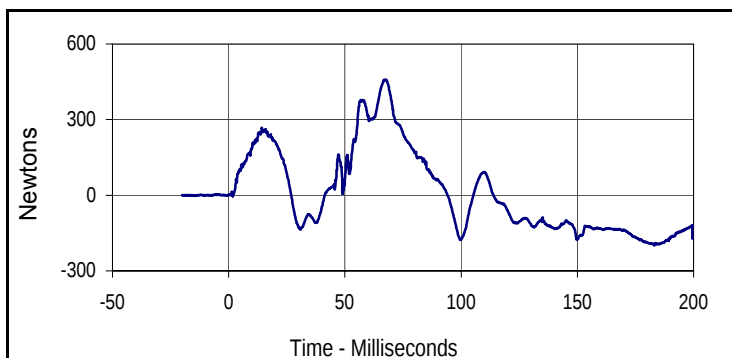
Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
110.3	69.3	-45.0	189.8



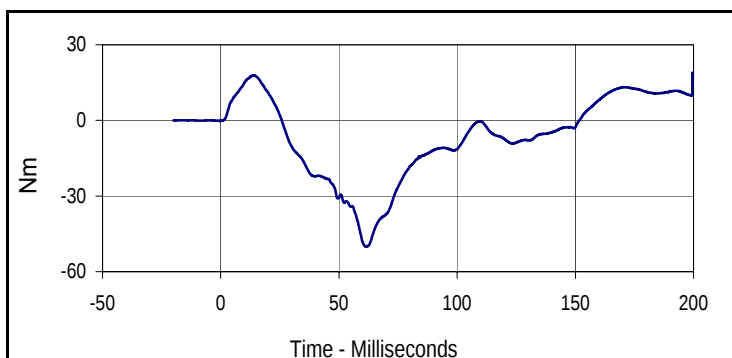
Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
21.8	199.5	-55.6	61.5

Test Program: Hybrid III 5th Percentile Female Neck Extension Test
 ATD Serial No.: 141

Test Date: 1/11/12
 Test I.D.: F141NE030



Curve Description			
Upper Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
458.3	67.3	-200.1	183.0



Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
18.8	199.7	-50.2	61.6

Test Program: Hybrid III 5th Percentile Female Thorax Impact Test

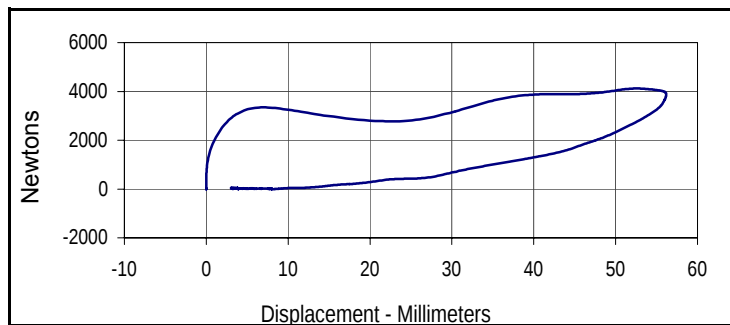
Test Date: 1/11/12

ATD Serial No.: 141

Test I.D.: F141CH030



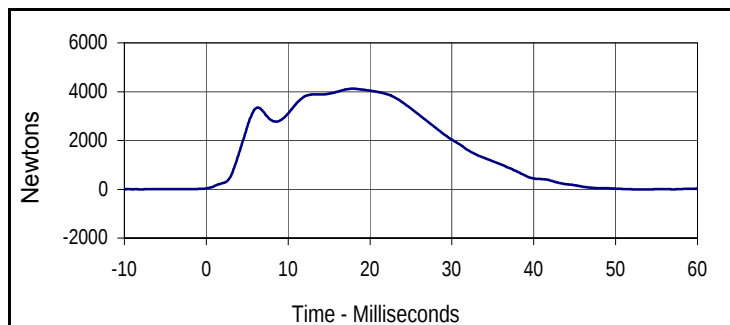
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	500	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		21.1	Pass
Humidity During Soak	Max	%	10.0 to 70.0	35.0	Pass
	Min	%		30.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.0	Pass
Probe Velocity		m/s	6.59 to 6.83	6.76	Pass
Peak Chest Deflection		mm	50.0 to 58.0	56.2	Pass
Peak Force Between 50 and 58 MM		Newtons	3900 to 4400	4043	Pass
Peak Force Between 18 and 50 MM		Newtons	≤4600	4119	Pass
Internal Hysteresis		%	69 to 85	72.8	Pass
Overall Test Results					Pass



Curve Description

Probe Force vs. Chest Deflection

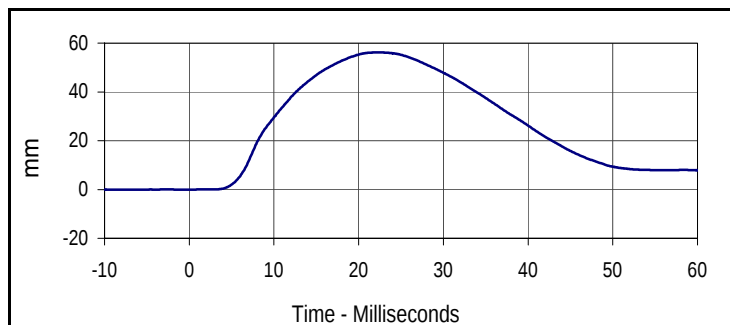
Plot No.	Type	SAE Class	Hysteresis
001	FIL	180	72.8
Peak Probe Force		Peak Chest Deflection	
4119.4		56.2	



Curve Description

Probe Force

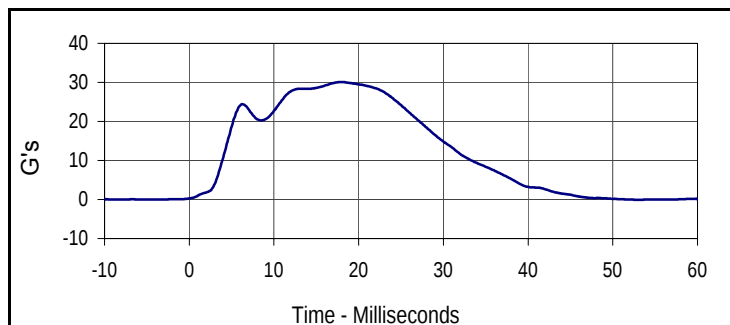
Plot No.	Type	SAE Class	Units
002	FIL	180	Newtons
Max	Time	Min	Time
4119.4	17.8	-7.0	52.8



Curve Description

Chest Deflection

Plot No.	Type	SAE Class	Units
003	FIL	600	mm
Max	Time	Min	Time
56.2	22.3	0.0	-6.7



Curve Description

Impactor Acceleration

Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
30.1	17.8	-0.1	52.8

Test Program: Hybrid III 5th Percentile Female Knee Impact Test

Test Date: 1/11/12

ATD Serial No.: 141

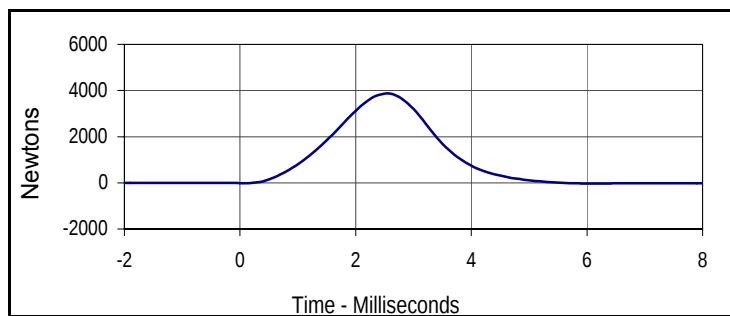
Test I.D.: F141LK030, F141LK030

**Left Knee**

Tested Parameter		Units	Specification	Result	Pass/Fail
Knee Assembly Soak Time		Minutes	≥240	525	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		21.1	Pass
Humidity During Soak	Max	%	10.0 to 70.0	35.0	Pass
	Min	%		30.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.0	Pass
Pendulum Velocity at T=0		m/sec	2.07 to 2.13	2.09	Pass
Peak Probe Force		Newtons	3450 to 4060	3869	Pass
Overall Test Results				Pass	

Right Knee

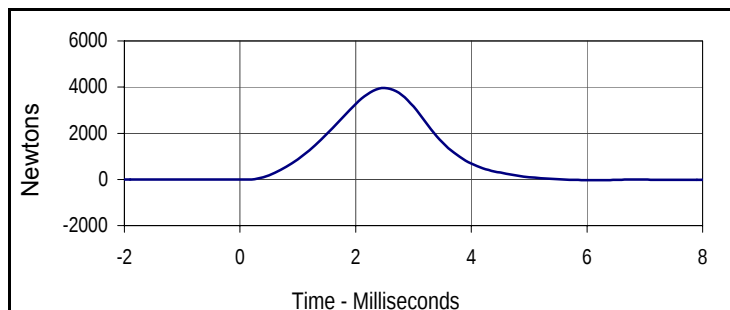
Pendulum Velocity at T=0		m/sec	2.07 to 2.13	2.10	Pass
Peak Probe Force		Newtons	3450 to 4060	3962	Pass
Overall Test Results				Pass	

**Curve Description****Left Knee Probe Force**

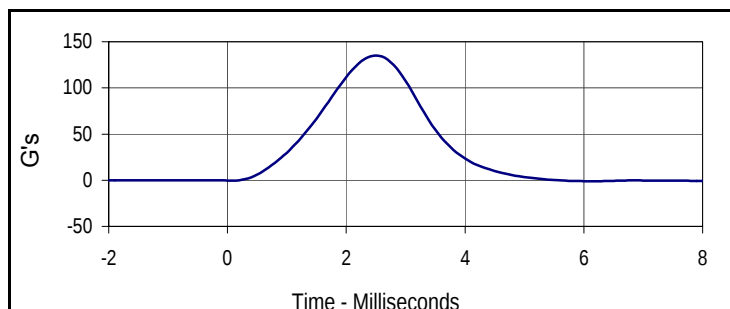
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
3868.5	2.5	-35.4	6.1

**Curve Description****Left Knee Acceleration**

Plot No.	Type	SAE Class	Units
002	FIL	600	G's
Max	Time	Min	Time
132.0	2.5	-1.2	6.1

**Curve Description****Right Knee Probe Force**

Plot No.	Type	SAE Class	Units
003	FIL	600	Newtons
Max	Time	Min	Time
3961.7	2.5	-33.4	6.2

**Curve Description****Right Knee Acceleration**

Plot No.	Type	SAE Class	Units
004	FIL	600	G's
Max	Time	Min	Time
135.2	2.5	-1.1	6.2

Test Program: Hybrid III 5th Percentile Female Torso Flexion Test

Test Date: 1/11/12

ATD Serial No.: 141

Test I.D.: F141TF030

**Left Hip Joint-Femur Results**

Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	575	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		21.1	Pass
Humidity During Soak	Max	%	10.0 to 70.0	35.0	Pass
	Min	%		30.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.0	Pass
Initial Reference Plane Angle		Degrees	≤ 20	8.9	Pass
Peak Force at 45° +/-0.5°		Newtons	320.0 to 390.0	347.6	Pass
Torso Rotation Rate		deg/sec	0.5 to 1.5	1.0	Pass
Final Reference Plane Angle		Degrees	+/-8	3.9	Pass
Overall Test Results					Pass