

REPORT NUMBER: NCAP-KAR-12-023

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

**HONDA OF AMERICA MFG., INC.
2012 ACURA TL SH-AWD 4-DOOR SEDAN**

NHTSA NUMBER: MC5313

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



DECEMBER 21, 2011

FINAL REPORT

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

TECHNICAL REPORT DOCUMENTATION PAGE

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		14. Sponsoring Agency Code NVS-111																																																					
15. Supplementary Notes																																																							
16. Abstract <p>A 56.3 km/h NCAP Frontal Impact Test was conducted on a 2012 Acura TL SH-AWD 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 December 7, 2011.</p> <p>The impact velocity of the vehicle was 56.14 km/h and the ambient temperature at the barrier face at the time of impact was 12.8 deg. C. The target vehicle's post-test maximum crush was 547 mm at the vehicle's centerline. The test vehicle's performance is as follows:</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <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>154.6</td> <td>700.0</td> <td>388.6</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>-29</td> <td>52</td> <td>-23</td> </tr> <tr> <td>Nij</td> <td>N/A</td> <td>1</td> <td>0.28</td> <td>1</td> <td>0.60</td> </tr> <tr> <td>Neck Tension</td> <td>N</td> <td>4170</td> <td>1149</td> <td>2620</td> <td>979</td> </tr> <tr> <td>Neck Compression</td> <td>N</td> <td>4000</td> <td>-243</td> <td>2520</td> <td>-15</td> </tr> <tr> <td>Left Femur Force</td> <td>N</td> <td>10008</td> <td>-1756</td> <td>6805</td> <td>-5293</td> </tr> <tr> <td>Right Femur Force</td> <td>N</td> <td>10008</td> <td>-2910</td> <td>6805</td> <td>-3981</td> </tr> </tbody> </table>				Measurement Description	Units	Driver ATD		Passenger ATD		Threshold	Result	Threshold	Result	Head Injury Criteria (HIC ₁₅)	N/A	700.0	154.6	700.0	388.6	Maximum Chest Compression	mm	63	-29	52	-23	Nij	N/A	1	0.28	1	0.60	Neck Tension	N	4170	1149	2620	979	Neck Compression	N	4000	-243	2520	-15	Left Femur Force	N	10008	-1756	6805	-5293	Right Femur Force	N	10008	-2910	6805	-3981
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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 Acura TL SH-AWD 4-door sedan at a velocity of 56.14 km/h. The test was performed at KARCO Engineering, LLC. on December 7, 2011. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A of this report.

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

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

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

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

There was 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 547 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 bolster and steering column. The driver's thighs hit the steering wheel rim.

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 glovebox.

The occupant data is summarized below:

ATD Position	HIC ₁₅	T ¹	T ²	Chest Disp. (mm)	Nij	Neck Tension (N)	Neck Comp. (N)	Left Femur (N)	Right Femur (N)
Driver (50th)	154.6	71.3	86.3	-29	0.28	1149.0	-242.6	-1755.5	-2910.0
Passenger (5th)	388.6	76.1	91.1	-23	0.60	978.7	-15.1	-5293.4	-3980.7

SECTION 2
DATA SHEETS

Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan NHTSA No.: MC5313
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/07/11

CONVERSION FACTORS

Quantity	Typical Application	Std Units	Metric Unit	Multiply By
Mass	Vehicle Weight	lb	kg	0.4536
Linear Velocity	Impact Velocity	miles/hr	km/hr	1.609344
Length or Distance	Measurements	in	mm	25.4
Volume	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 Acura TL SH-AWD 4-Door Sedan NHTSA No.: MC5313
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/07/11

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	MC5313
Model Year	2012
Make	Acura
Model	TL SH-AWD
Body Style	4-Door Sedan
VIN	19UUA9F50CA003096
Body Color	Forged Silver Metallic
Odometer Reading (km / mi)	35 / 22
Engine Displacement (L)	3.7
Type / No. of Cylinders	V6
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	6
Overdrive	Yes
Final Drive	AWD
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)	Yes
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	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	No
Pass. Front Airbag	Yes
Pass. Curtain Airbag	Yes
Pass. Head/Torso Airbag	No
Pass. Torso Airbag	No
Pass. Torso/Pelvis Airbag	Yes
Pass. Pelvis Airbag	No
Pass. Knee Airbag	No
Driver Seat Belt Pretensioner	Yes
Pass. Seat Belt Pretensioner	Yes
Driver Load Limiter	Yes
Pass. Load Limiter	Yes
Other Safety Restraint	Active Head Restraint

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

DATA FROM CERTIFICATION LABEL

Manufactured By	Honda of America MFG., Inc.
Date of Manufacture	Aug-11

GVWR (kg)	2235
GAWR Front (kg)	1200
GAWR Rear (kg)	1055

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)				385.0	A
DSC x 68.04 (kg)				340.2	B
Cargo Weight (RCLW) (kg)				44.8	A-B

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan NHTSA No.: MC5313
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/07/11



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	220	220
Recommended Tire Size	P245/45R18	P245/45R18
Tire Size on Vehicle	P245/45R18	P245/45R18
Tire Manufacturer	Michelin	Michelin
Tire Model	Pilot	Pilot
Treadwear	300	300
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	1 Polyamide, 2 Steel, 2 Polyester	1 Polyamide, 2 Steel, 2 Polyester
Load Index / Speed Symbol	96V	96V
Tire Material	Polyester, Polyamide, Steel	Polyester, Polyamide, Steel
DOT Safety Code Left	B9BZ PHMX 1511	B9BZ PHMX 1511
DOT Safety Code Right	B9BZ PHMX 1511	B9BZ PHMX 1511

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan NHTSA No.: MC5313
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/07/11

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	552.5	370.5		584.5	439.5	
Right	kg	522.5	373.0		542.5	431.5	
Ratio	%	59.1%	40.9%	100.0%	56.4%	43.6%	100.0%
Total	kg	1075.0	743.5	1818.5	1127.0	871.0	1998.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1818.5	A
Weight of 1 P572E ATD & 1 P572O ATD	kg	141.0	B
Rated Cargo/Luggage Weight (RCLW)	kg	44.8	C
Calculated Vehicle Target Weight (TVTW)	kg	2004.3	A+B+C

TEST VEHICLE ATTITUDES

Condition	Units	LF	RF	LR	RR	CG Aft of Front Axle
As Delivered	mm	722	722	720	725	1136
As Tested	mm	712	716	698	705	1200
Post-Test	mm	759	796	691	722	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2779
Total Vehicle Length at Left Side	mm	4177
Total Vehicle Length at Centerline	mm	4940
Total Vehicle Length at Right Side	mm	4183
Weight of Ballast in Cargo Area	kg	88.0
Weight of Vehicle Components Removed	kg	35.5
Amount of Stoddard Solvent in Fuel Tank	L	65.14

VEHICLE COMPONENTS REMOVED TO MEET TEST WEIGHT:

Spare tire and tools (19.0 kg), Trunk trim (9.0 kg), Rear seat (7.5 kg)

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

Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan NHTSA No.: MC5313
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/07/11

TARGET VEHICLE STRUCTURAL MEASUREMENTS

No.	Description	Pre-Test	Post-Test	Difference
1	Total Length	4940	4393	-547
2	Total Width	1880	2145	265
3	Bumper Top Height	545	598	53
4	Bumper Bottom Height	430	546	116
5	Longitudinal Member Top Height	550	555	5
6	Distance Between Longitudinal Members	820	1002	182
7	Longitudinal Member Width	65	100	35
8	Engine Top Height	860	820	-40
9	Engine Bottom Height	176	183	7
10	Engine and Gearbox Width	580	580	0
11	Front Bumper to Engine Distance	615	267	-348
12	Front Shock Absorber Fixing Height	835	855	20
13	Bonnet Leading Edge Height	790	803	13
14	Front Shock Absorber Fixing Width	965	970	5
15	Front Bumper to Front Axle Distance	1020	603	-417
16	Front Axle to A-Pillar Distance	505	393	-112
17	A-Pillar to B-Pillar Distance	1046	1045	-1
18	B-Pillar to Rear Axle Distance	1150	1143	-7
19	B-Pillar to C-Pillar Distance	826	828	2
20	Roof Sill Bottom Height	1280	1291	11
21	Roof Sill Top Height	1395	1410	15
22	Floor Sill Bottom Height	166	175	9
23	Floor Sill Top Height	350	363	13

All measurements in millimeters.

DATA SHEET NO. 2

SEAT ADJUSTMENT, FUEL SYSTEMS, AND STEERING WHEEL DATA

Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan

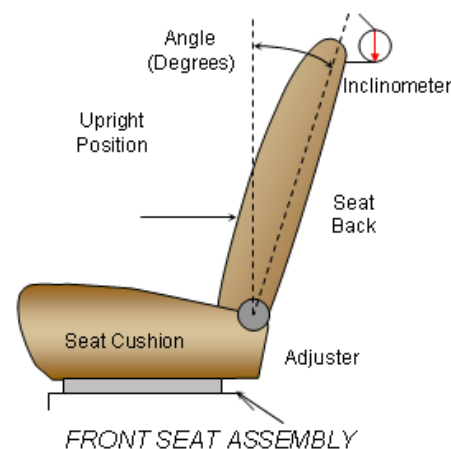
NHTSA No.: MC5313

Test Program: 56 km/h Frontal Impact NCAP Test

Test Date: 12/07/11

NOMINAL DESIGN RIDING POSITION

The procedure for the driver is as follows: the seat back is set to the manufacturer's designated angle. The procedure for the passenger is as follows: the seat back is set to position the transverse instrumentation platform of the dummy's head at $0^\circ \pm 0.5^\circ$. Seat back angle is measured at the head rest post using a digital inclinometer.

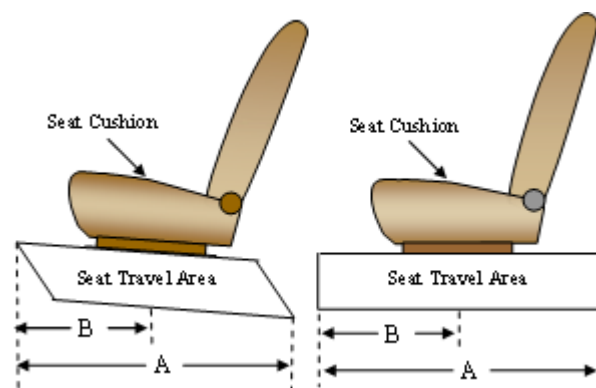


SEAT BACK ANGLE

Seating Position	Degrees
Driver Seat Back Angle	14.0
Passenger Seat Back Angle	14.6

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	278 mm	139 mm
Passenger Seat	238 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

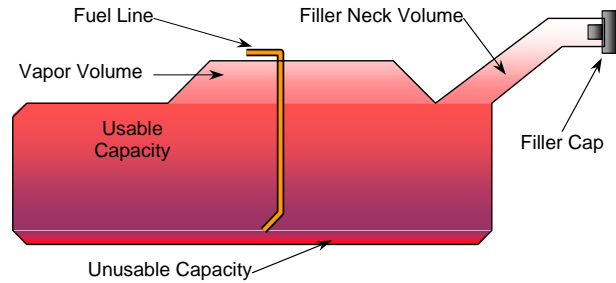
Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan NHTSA No.: MC5313
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/07/11

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	65.14
1/3 of Usable Capacity	23.34

FUEL PUMP

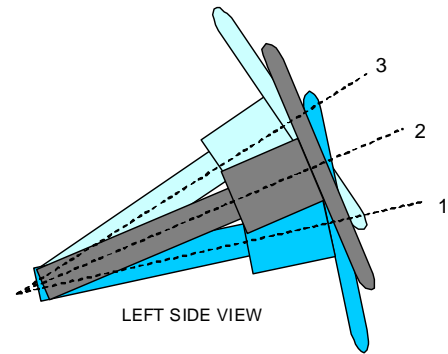
The vehicle is equipped with an electric fuel pump. The fuel pump will pump fuel when the ignition key is turned to the "on" position.



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	19.7	0
Geometric Center Position, No. 2	22.0	18
Uppermost Position, No. 3	24.4	36
Telescoping Steering Wheel Travel		36
Test Position	22.0	18

DATA SHEET NO. 3

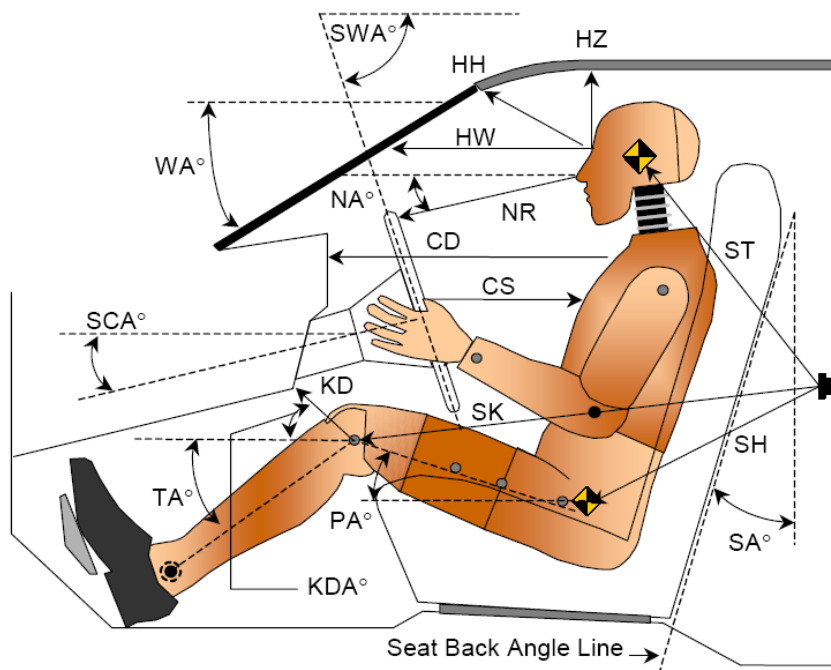
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan

NHTSA No.: MC5313

Test Program: 56 km/h Frontal Impact NCAP Test

Test Date: 12/07/11



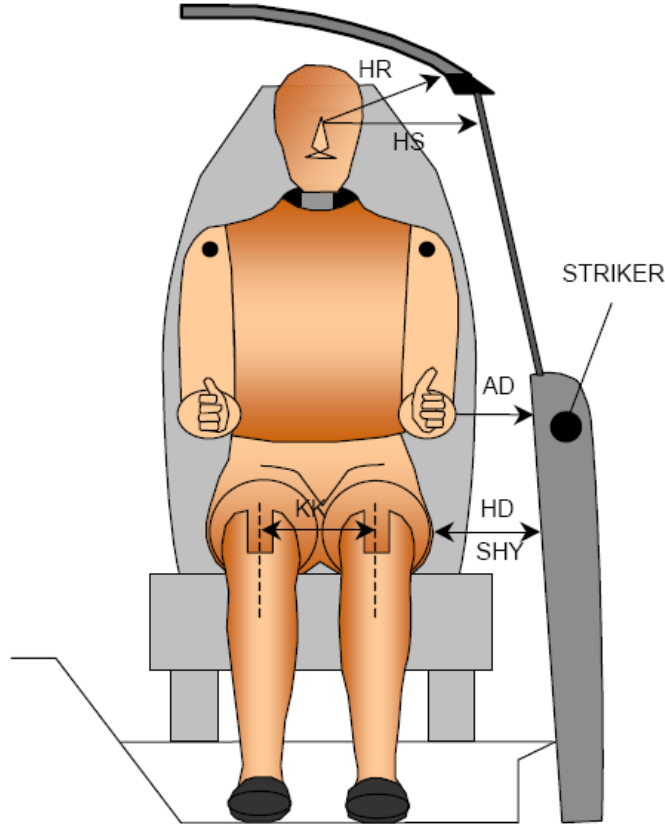
LEFT SIDE VIEW

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		24.0		
SWA°	Steering Wheel Angle		68.0		
SCA°	Steering Column Angle		22.0		
SA°	Seat Back Angle (On Headrest Post)		14.0		14.6
HZ	Head to Roof	210	90.0	190	90.0
HH	Head to Header	325	31.5	290	42.1
HW	Head to Windshield	666	0.0	671	0.0
NR	Nose to Rim	388	6.9	510	27.1
CD	Chest to Dash	536	13.5	440	14.3
CS	Chest to Steering Hub	329	0.0		
RA	Rim to Abdomen	224	0.0		
KDL	Left Knee to Dash	189	35.0	100	37.3
KDR	Right Knee to Dash	179	35.4	104	35.0
PA°	Pelvic Angle		22.6		22.4
TA°	Tibia Angle		37.8		53.3
SK	Striker to Knee	585	9.2	655	5.0
ST	Striker to Head	446	81.4	433	66.4
SH	Striker to H-Point	293	51.3	367	27.9

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan NHTSA No.: MC5313
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/07/11



Code	Description	Driver (mm)	Passenger (mm)
AD	Arm to Door	142	97
HD	H-Point to Door	148	189
HR	Head to Side Header	232	240
HS	Head to Side Window	333	343
KK	Knee to Knee	310	220
SHY	Striker to H-Point (Y-Direction)	242	288
AA	Ankle to Ankle	340	160

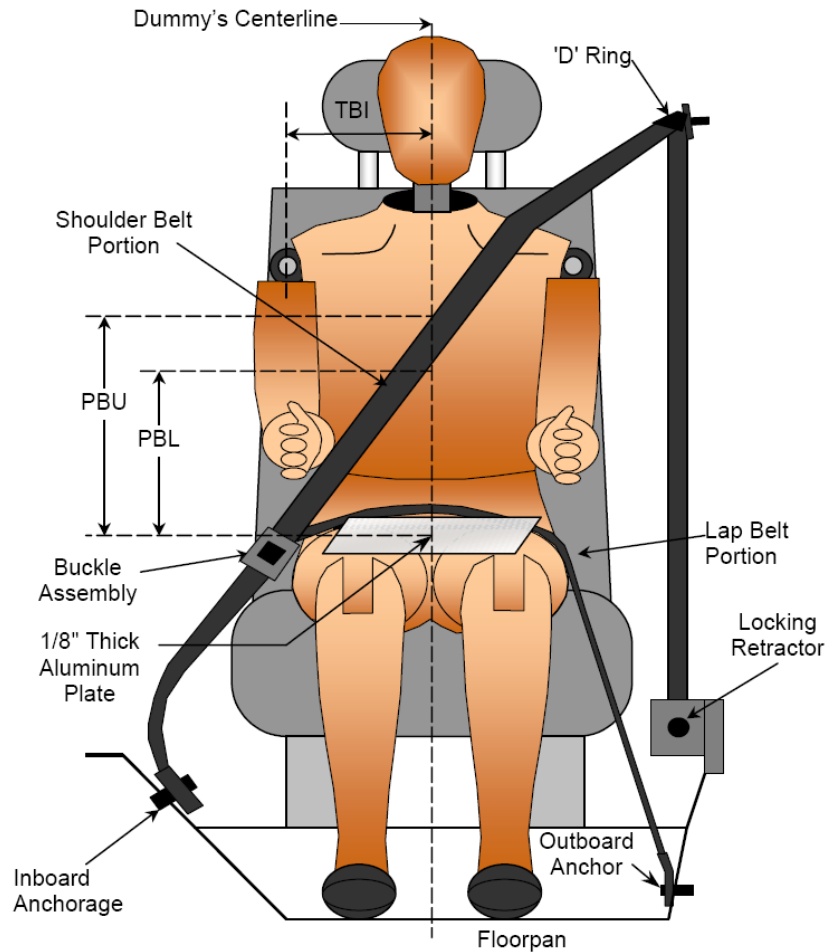
DATA SHEET NO. 5
SEAT BELT POSITIONING DATA

Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan

NHTSA No.: MC5313

Test Program: 56 km/h Frontal Impact NCAP Test

Test Date: 12/07/11



FRONT VIEW OF DUMMY

SEAT BELT POSITIONING MEASUREMENTS

Code	Measurement Description	Units	Driver	Passenger
PBU	Top Surface of Aluminum Plate to Belt Upper Edge	mm	360	283
PBL	Top Surface of Aluminum Plate to Belt Lower Edge	mm	270	200

BELT LENGTH DATA

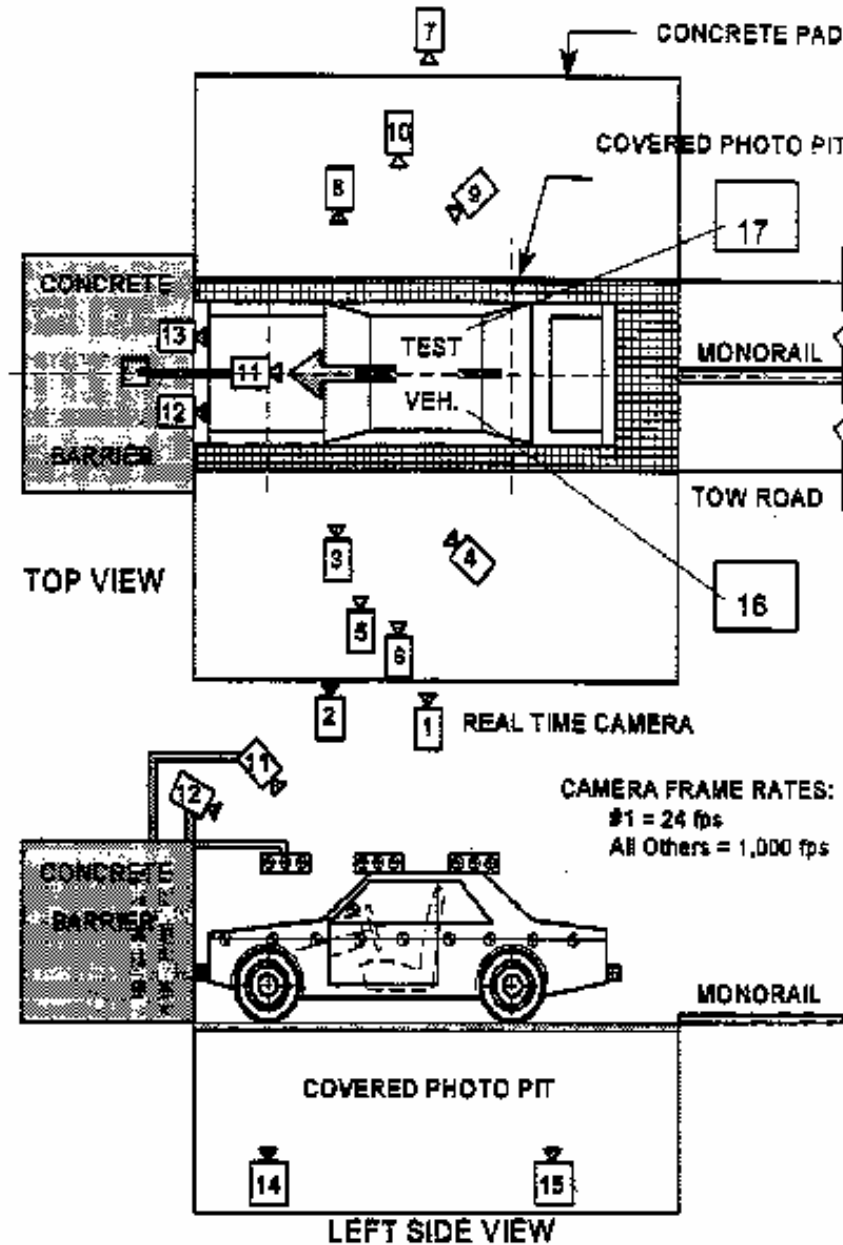
Measurement Description	Units	Driver	Passenger
Shoulder Belt Length as Measured on ATD	mm	486	915
Lap Belt Length as Measured on ATD	mm	470	508
Remainder of Belt on Reel	mm	1176	1067
Total Belt Length for Continuous Webbing Systems	mm	2132	2490

DATA SHEET NO. 6

HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan NHTSA No.: MC5313
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/07/11

CAMERA POSITIONS FOR FRONTAL IMPACTS



DATA SHEET NO. 6 ... (CONTINUED)

HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan NHTSA No.: MC5313
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/07/11

CAMERA LOCATIONS

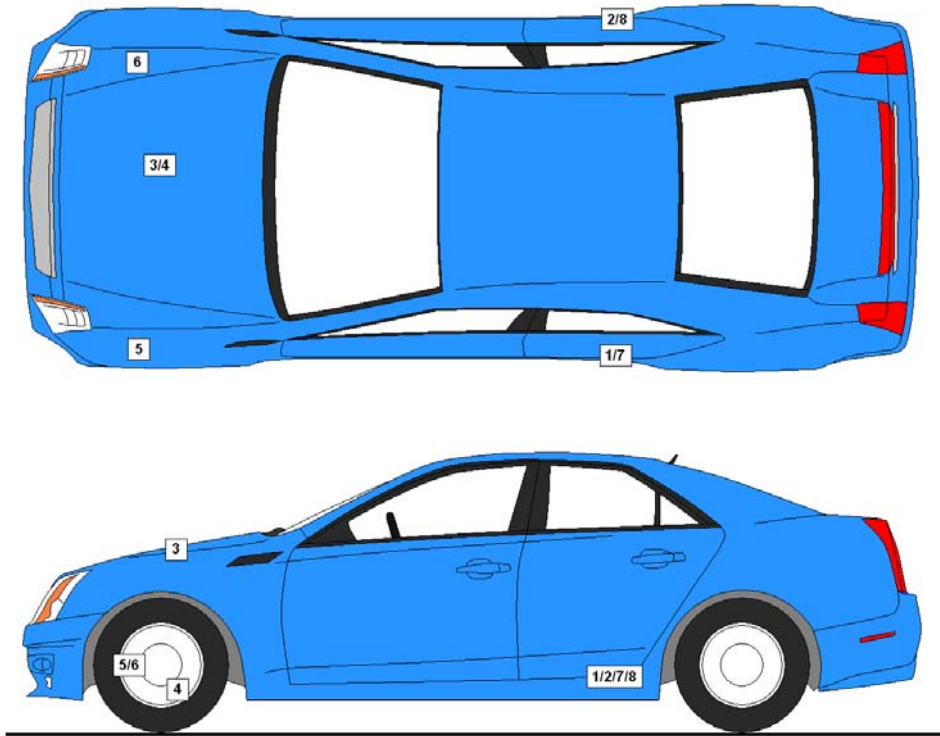
No.	Description	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Overall	-11412	-8150	-1484		30
2	Driver Close-Up	-2590	-7950	-1371	24	1000
3	Left Front Half	-1701	-6197	-1701	50	1000
4	Left Angle	-6696	-10308	-3211	ZOOM	1000
5	Steering Column - Top	-1966	-10412	-3688	50	1000
6	Steering 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	-3580	330	-1285		
17	Onboard Passenger Airbag (Optional)	-3580	-330	-1285		
18	Real-Time Left View of Impact (Optional)					
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 Acura TL SH-AWD 4-Door Sedan NHTSA No.: MC5313
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/07/11



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Description	Location		
		X	Y	Z
1	Left Rear Accelerometer X-Direction	2105	-730	-335
2	Right Rear Accelerometer X-Direction	2105	730	-335
3	Engine Top X	4105	350	-630
4	Engine Bottom X	4105	165	-145
5	Left Brake Caliper X	4075	-760	-260
6	Right Brake Caliper X	4060	760	-260
7	Left Rear Accelerometer Z-Direction	2105	-730	-335
8	Right Rear Accelerometer Z-Direction	2105	730	-335

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

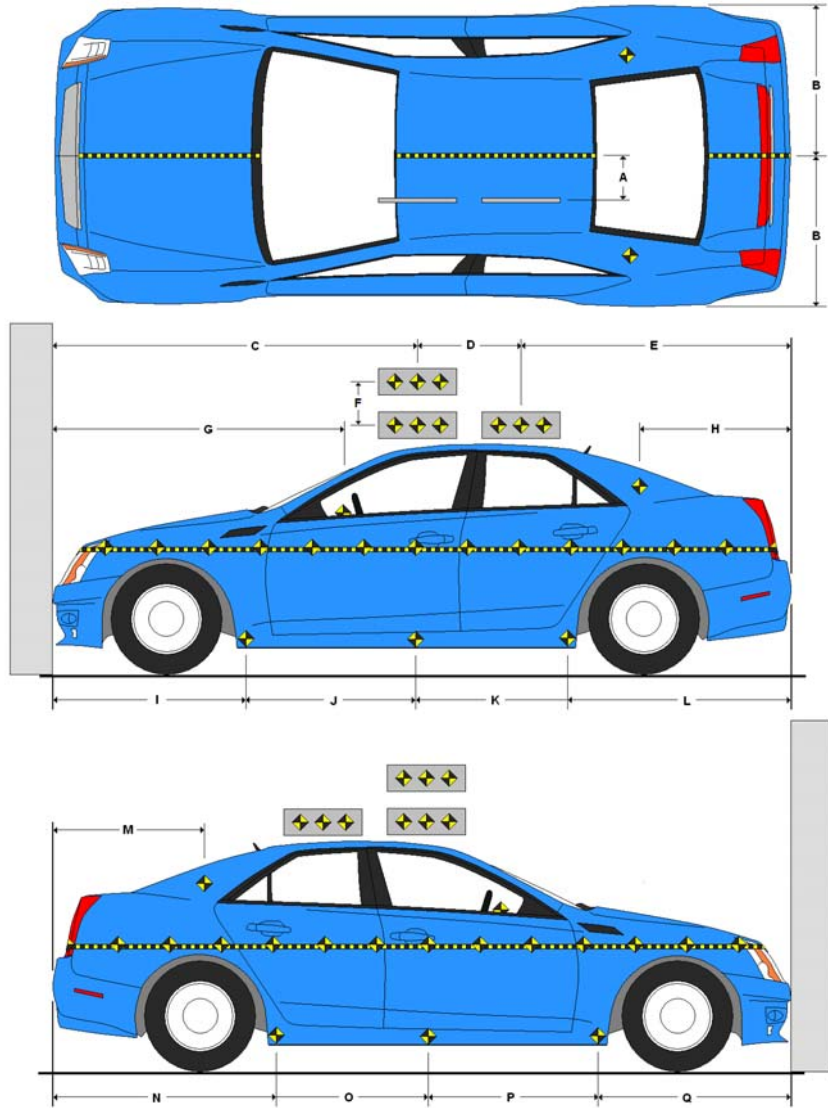
DATA SHEET NO. 8

PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan NHTSA No.: MC5313

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/07/11

Item	Value
A	
B	940
C	2350
D	610
E	1993
F	
G	1920
H	998
I	1485
J	933
K	933
L	1576
M	1005
N	1577
O	940
P	940
Q	1470



All measurements in millimeters.

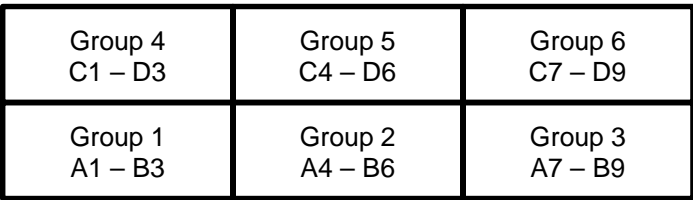
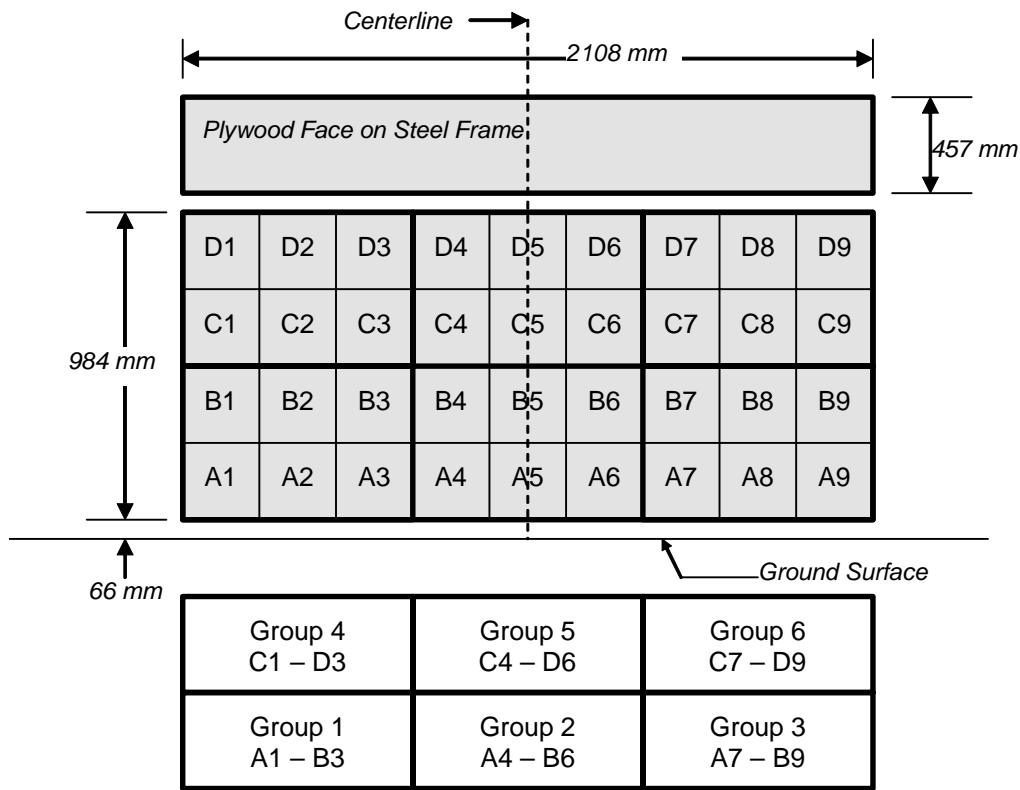
DATA SHEET NO. 9

LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan NHTSA No.: MC5313

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/07/11

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



6 Groups of 6 Load Cells Each

DATA SHEET NO. 10

TEST VEHICLE CAMERA AND INSTRUMENTATION SUMMARY

Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan NHTSA No.: MC5313
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/07/11

INSTRUMENTATION

Driver Dummy Accelerometers	44
Passenger Dummy Accelerometers	44
Vehicle Structure Accelerometers	8
Seat Belt Load Cells	4
Load Cell Barrier	36
Total	136

CAMERA COVERAGE

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

DATA SHEET NO. 11
POST-TEST OBSERVATIONS

Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan NHTSA No.: MC5313
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/07/11

TEST DUMMY INFORMATION AND CONTACT

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

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)	6	6
Seat Back Failure	None	None
Glazing Damage	None	None

POST TEST STRUCTURAL OBSERVATIONS

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

VEHICLE REBOUND FROM BARRIER

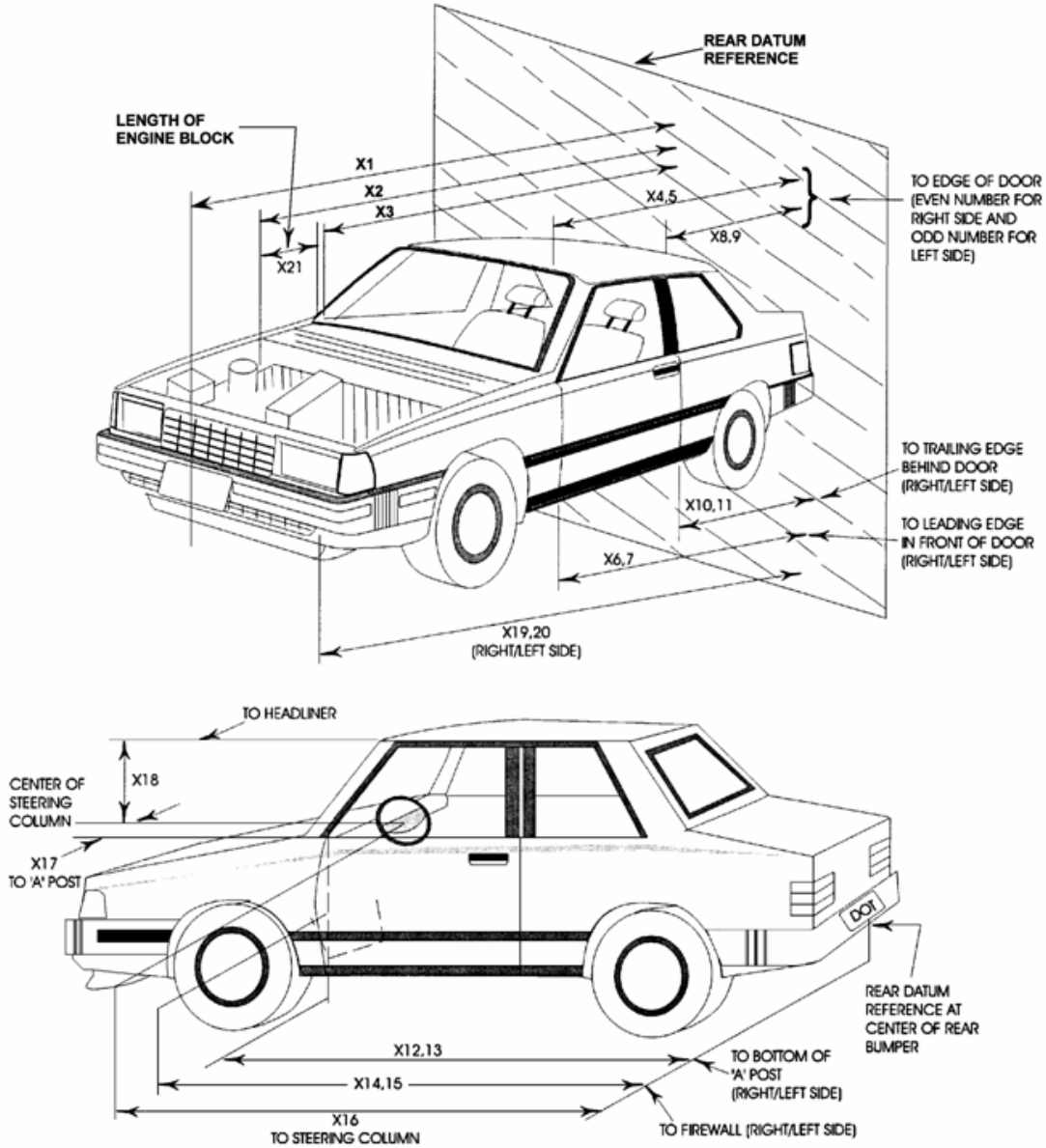
Measured Parameter	Units	Value
Left Side	mm	800
Center	mm	775
Right Side	mm	770
Average	mm	782

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Driver		Passenger	
	Installed	Operated	Installed	Operated
Front Airbag	Yes	Yes	Yes	Yes
Side Airbag 1 (Torso/Pelvis)	Yes	No	Yes	No
Side Airbag 2 (Curtain)	Yes	No	Yes	No
Knee Airbag	No		No	
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes
Other				

DATA SHEET NO. 12
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan NHTSA No.: MC5313
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/07/11



DATA SHEET NO. 12 ... (CONTINUED)

VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan NHTSA No.: MC5313
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/07/11

No.	Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	4940	4393	-547
2	Rear Surface of Vehicle to Front of Engine	4325	4126	-199
3	RSOV to Firewall	3810	3785	-25
4	RSOV to Upper Leading Edge of Right Door	3424	3423	-1
5	RSOV to Upper Leading Edge of Left Door	3430	3423	-7
6	RSOV to Lower Leading Edge of Right Door	3405	3398	-7
7	RSOV to Lower Leading Edge of Left Door	3410	3400	-10
8	RSOV to Upper Trailing Edge of Right Door	2268	2265	-3
9	RSOV to Upper Trailing Edge of Left Door	2271	2265	-6
10	RSOV to Lower Trailing Edge of Right Door	2270	2263	-7
11	RSOV to Lower Trailing Edge of Left Door	2267	2262	-5
12	RSOV to Bottom of A-Pillar, Right Side	3391	3378	-13
13	RSOV to Bottom of A-Pillar, Left Side	3391	3381	-10
14	RSOV to Firewall, Right Side	3765	3760	-5
15	RSOV to Firewall, Left Side	3740	3720	-20
16	RSOV to Steering Column	2890	2898	8
17	Center of Steering Column to A-Pillar	415	420	5
18	Center of Steering Column to Headliner	403	415	12
19	RSOV to Right Side of Front Bumper	4183	3945	-238
20	RSOV to Left Side of Front Bumper	4177	4004	-173
21	Length of Engine Block	570	570	0
RD	RSOV to Right Side of Dash Panel	3065	3063	-2
CD	RSOV to Center of Dash Panel	2550	2558	8
LD	RSOV to Left Side of Dash Panel	3040	3050	10

All measurements in millimeters.

DATA SHEET NO. 13
ACCIDENT INVESTIGATION DATA

Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan NHTSA No.: MC5313
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/07/11

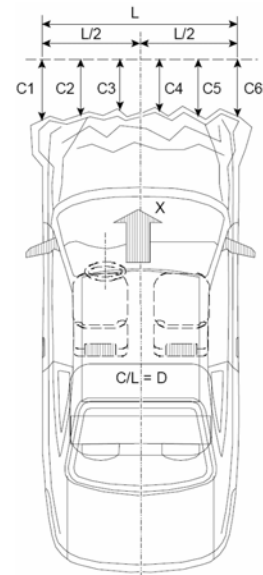
VEHICLE INFORMATION

VIN: 19UUA9F50CA003096 Wheelbase (mm): 2779
 Vehicle Size Category: 4-Door Sedan Test Weight (kg): 1998.0

ACCELEROMETER DATA

Accelerometer Locations: Left Rear Crossmember
 Cal. Procedure/Interval: Drop Test / 6 months
 Integration Algorithm: NHTSA Standard
 Impact Velocity (km/h): 56.14
 Velocity Change (km/h): 67.8
 Time of Separation (msec): 75.1

Linearity: Good



CRUSH PROFILE

Collision Deformation Classification: 12FDEW2
 Midpoint of Damage: Vehicle Centerline
 Damage Region Length (mm): 1380
 Impact Mode: Full Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush Zone 1 at Left Side	mm	230	590	360
C2	Crush Zone 2 at Left Side	mm	210	570	360
C3	Crush Zone 3 at Left Side	mm	47	558	511
C4	Crush Zone 4 at Right Side	mm	47	558	511
C5	Crush Zone 5 at Right Side	mm	210	562	352
C6	Crush Zone 6 at Right Side	mm	230	596	366
L	C1 to C6	mm	1380		

DATA SHEET NO. 14

VEHICLE INTRUSION MEASUREMENTS

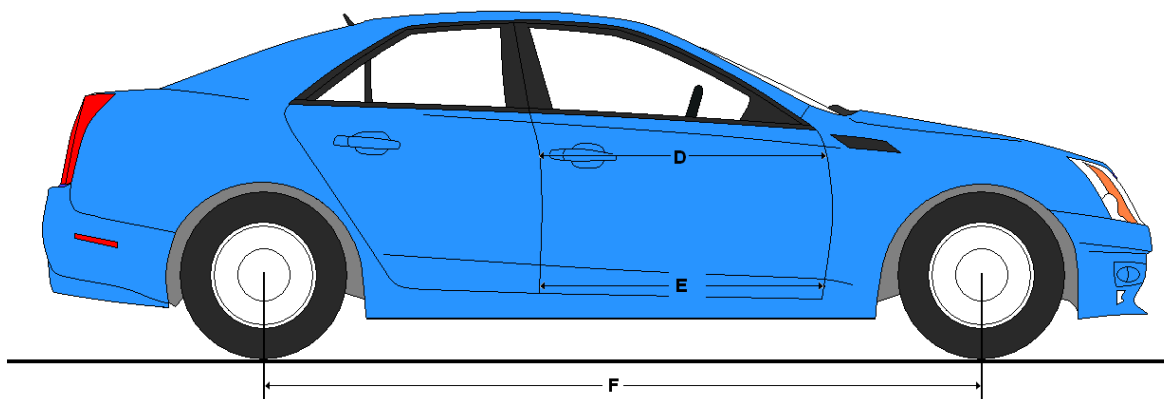
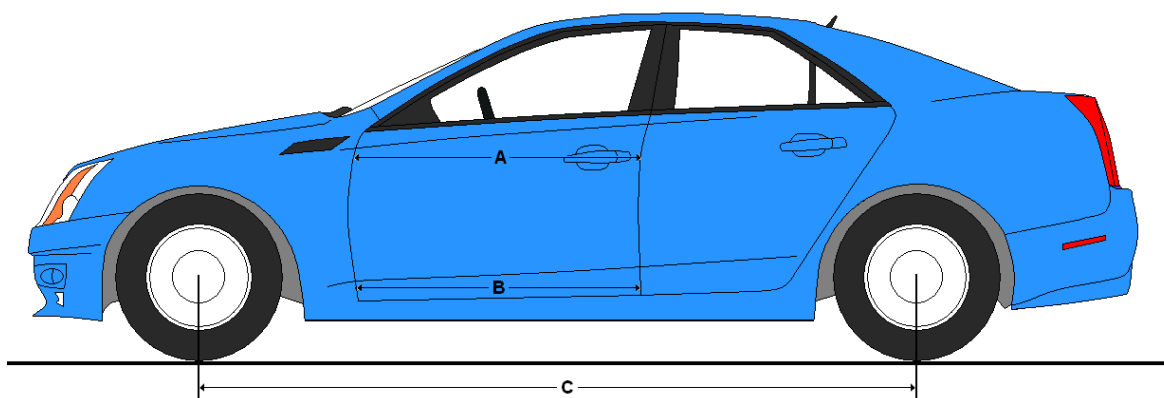
Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan NHTSA No.: MC5313
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/07/11

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	1042	1045	-3
B	Left Side Lower	mm	948	949	-1
D	Right Side Upper	mm	1053	1053	0
E	Right Side Lower	mm	968	973	-5

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2779	2670	109
F	Right Side Wheelbase	mm	2779	2655	124



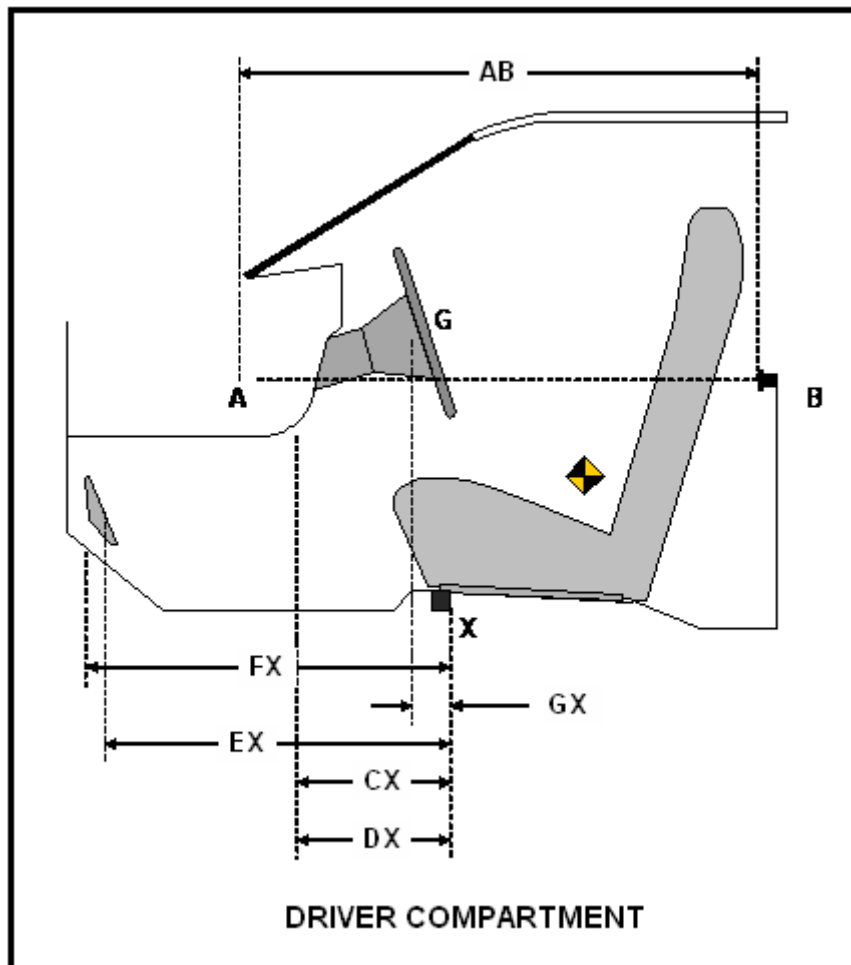
DATA SHEET NO. 14 ... (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan NHTSA No.: MC5313
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/07/11

DRIVER COMPARTMENT INTRUSION

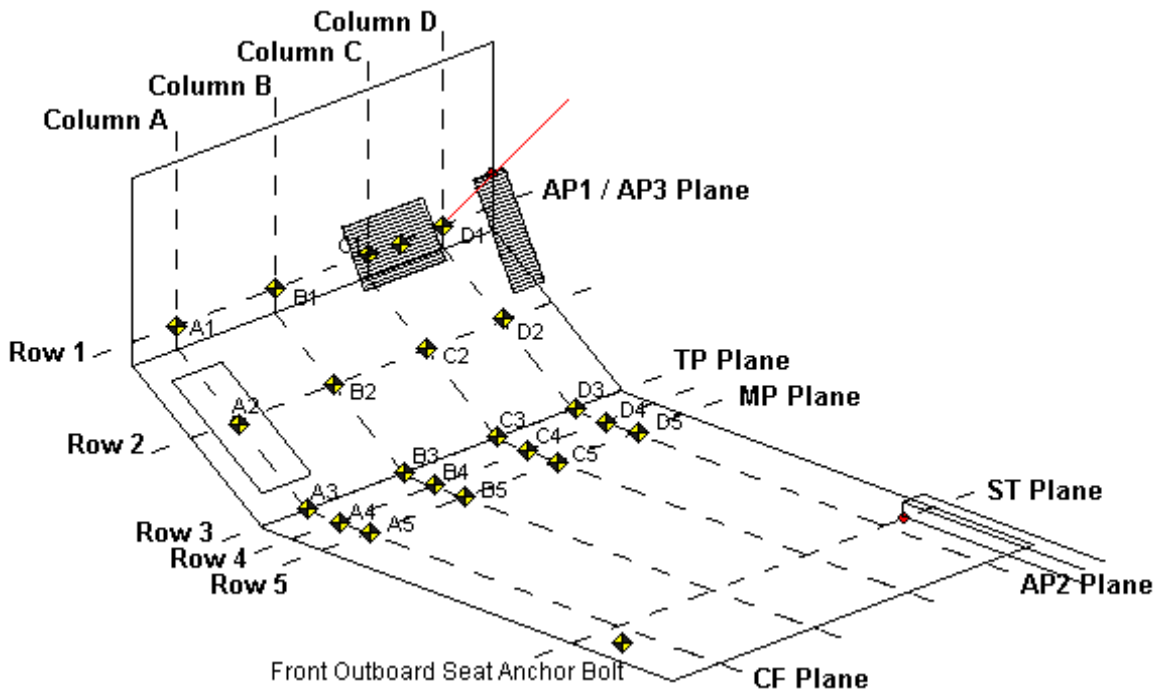
Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	825	825	0
CX	Left Knee Bolster to X	mm	335	280	55
DX	Right Knee Bolster to X	mm	335	270	65
EX	Brake Pedal to X	mm	520	565	-45
FX	Foot Rest to X	mm	610	590	20
GX	Center of Steering Wheel Hub to X	mm	80	100	-20

X = Front of Seat Track (Stationary)



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

Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan NHTSA No.: MC5313
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/07/11



- AP1: Y-Z Plane passing through D1
- AP2: X-Z Plane passing through D1
- AP3: X-Y plane passing through D1
- MP: Y-Z plane, halfway between the ST plane and AP1 plane
- CF Plane: X-Z plane passes through center of footrest.
- BP Plane: X-Z plane passes through center of brake pedal
- TP Plane: Y-Z plane, intersection of BP Plane and the intersection of the toe pan and floorboard
- Column A: intersection of vehicle and CF plane
- Column D: Intersection of vehicle and AP2 plane
- Row 1: intersection of the vehicle and the AP3 Plane
- Row 3: intersection of the vehicle and TP plane
- Row 5: intersection of the vehicle and MP plane
- Row 2: evenly spaced between row 1 and 3
- Row 4: evenly spaced between row 3 and 5

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

Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan NHTSA No.: MC5313
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/07/11

DRIVER FLOORPAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	644	710	704	699	638	685	683	679	6	25	21	20
2	588	641	632	628	581	628	621	618	7	13	11	10
3	557	550	551	548	556	549	553	550	1	1	-2	-2
4	448	446	445	438	446	447	449	443	2	-1	-4	-5
5	349	342	333	332	347	342	336	336	2	0	-3	-4

DRIVER FLOORPAN Y-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	16	-99	-224	-286	28	-87	-212	-274	-12	-12	-12	-12
2	20	-95	-223	-284	31	-84	-213	-273	-11	-11	-10	-11
3	22	-95	-227	-283	32	-84	-217	-274	-10	-11	-10	-9
4	28	-92	-225	-281	36	-83	-217	-275	-8	-9	-8	-6
5	31	-93	-223	-280	38	-86	-216	-275	-7	-7	-7	-5

DRIVER FLOORPAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	135	74	66	69	144	97	87	90	-9	-23	-21	-21
2	57	6	2	3	65	18	14	14	-8	-12	-12	-11
3	-63	-62	-60	-51	-63	-61	-62	-54	0	-1	2	3
4	-88	-83	-82	-53	-86	-86	-86	-58	-2	3	4	5
5	-87	-83	-83	-54	-85	-86	-86	-59	-2	3	3	5

All measurements in millimeters

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

Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan NHTSA No.: MC5313
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/07/11

PASSENGER FLOORPAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	705	708	710	705	662	678	675	676	43	30	35	29
2	644	643	645	649	610	623	627	636	34	20	18	13
3	546	548	558	560	548	551	553	558	-2	-3	5	2
4	437	443	445	448	443	446	445	446	-6	-3	0	2
5	336	337	342	346	341	341	342	344	-5	-4	0	2

PASSENGER FLOORPAN Y-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	309	232	104	-17	293	217	93	-28	16	15	11	11
2	308	232	104	-21	291	216	92	-33	17	16	12	12
3	304	232	103	-22	290	217	88	-36	14	15	15	14
4	295	232	102	-23	284	218	87	-38	11	14	15	15
5	294	230	99	-28	285	217	87	-40	9	13	12	12

PASSENGER FLOORPAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	70	71	73	77	82	75	87	92	-12	-4	-14	-15
2	15	12	10	10	19	6	11	13	-4	6	-1	-3
3	-44	-61	-57	-61	-72	-85	-69	-68	28	24	12	7
4	-43	-81	-82	-88	-69	-101	-98	-92	26	20	16	4
5	-46	-81	-82	-88	-68	-99	-96	-92	22	18	14	4

All measurements in millimeters

DATA SHEET NO. 15

SUMMARY OF FMVSS 212 AND 219 (PARTIAL) DATA

Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan NHTSA No.: MC5313

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/07/11

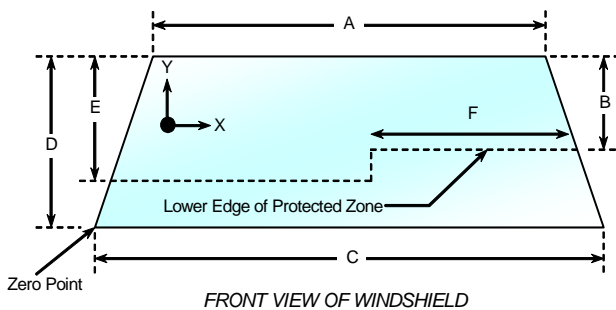
Windshield Mounting Details: Windshield glass is secured to the vehicle frame with plastic and rubber molding sealed with rubber cement.

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

Temperature of windshield molding during test: 21.1° C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2180	2180	100.0%
Right Side	2180	2180	100.0%
Total	4360	4360	100.0%



Item	Units	Value
A	mm	1185
B	mm	340
C	mm	1475
D	mm	850
E	mm	555
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 Acura TL SH-AWD 4-Door Sedan NHTSA No.: MC5313
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/07/11

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 12.8° C Test Time: 1:25 PM

Stoddard Solvent Spillage Measurements

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

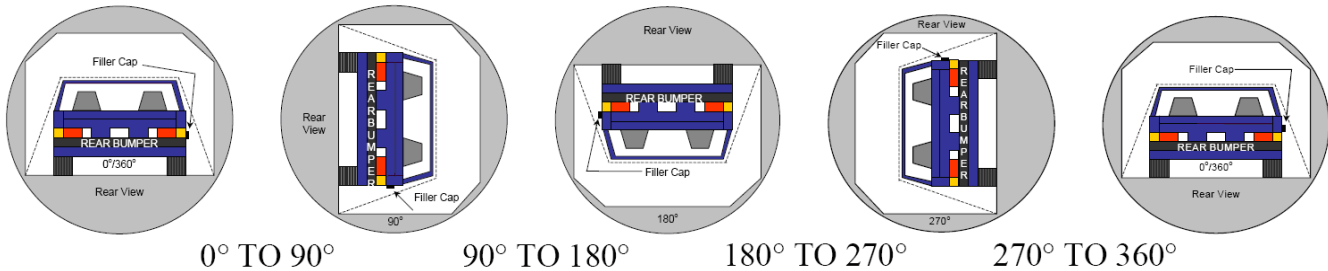
DATA SHEET NO. 16
FMVSS 301 STATIC ROLLOVER

Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan

NHTSA No.: MC5313

Test Program: 56 km/h Frontal Impact NCAP Test

Test Date: 12/07/11



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°	83	300	383
90° To 180°	84	300	384
180° To 270°	77	315	392
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	0		
270° To 360°	0			

SOLVENT SPILLAGE LOCATION TABLE

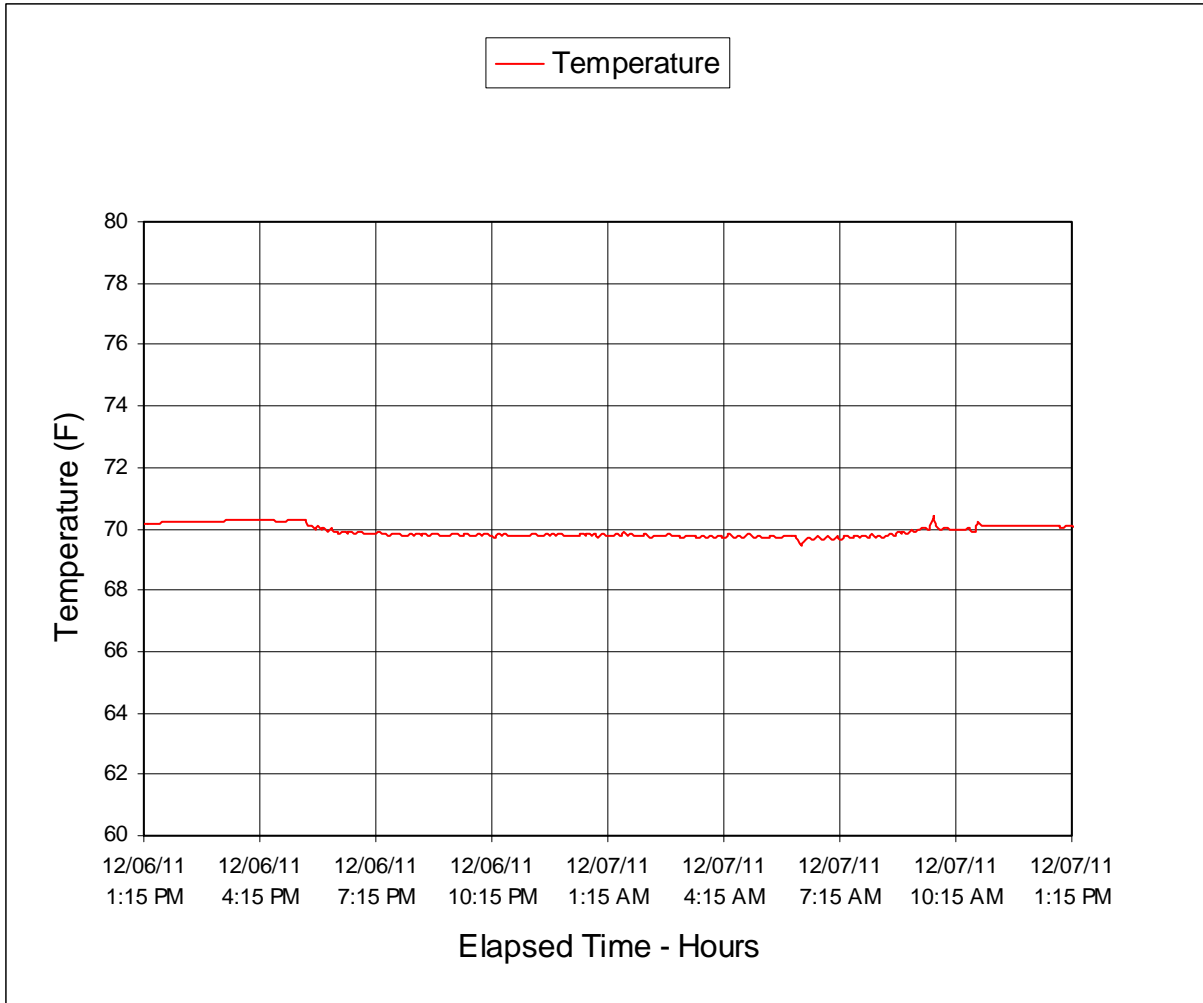
Test Phase	Spillage Location
0° To 90°	N/A
90° To 180°	N/A
180° To 270°	N/A
270° To 360°	N/A

DATA SHEET NO. 17

DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART

Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan NHTSA No.: MC5313

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/07/11



**APPENDIX A
PHOTOGRAPHS**

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FIGURE 1. Load Cell Location



FIGURE 2. Load Cell Wall



FIGURE 3. Manufacturer's Label

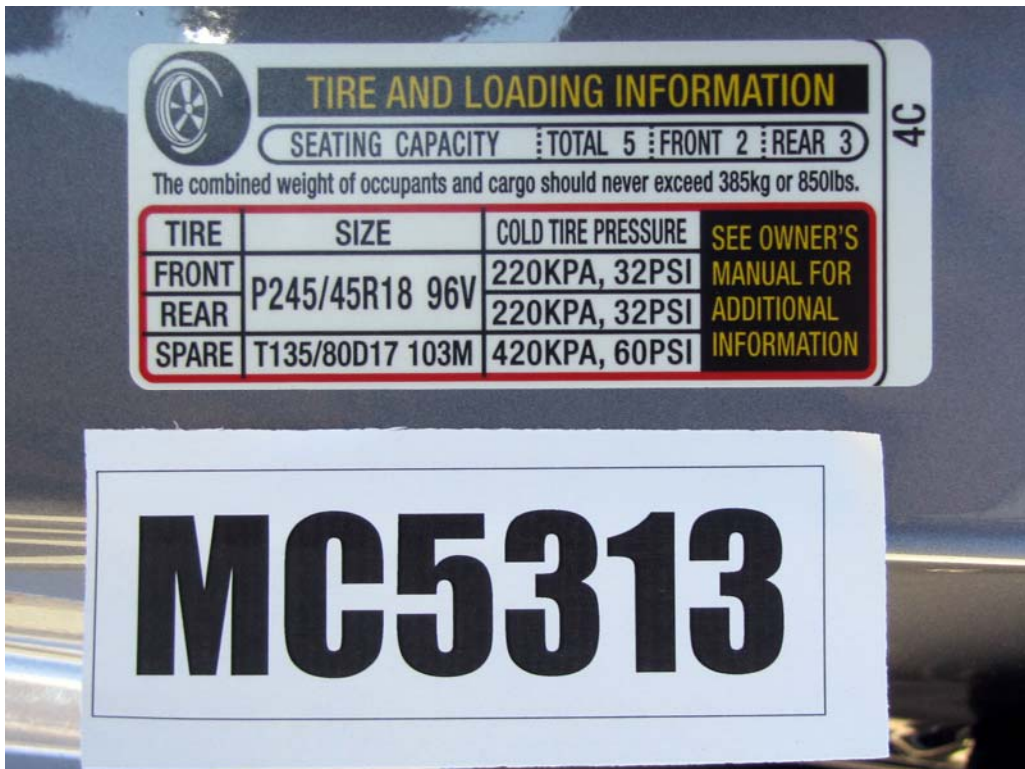


FIGURE 4. Tire Placard



FIGURE 5. 2012 Acura TL SH-AWD Frontal As Delivered



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



FIGURE 7. Pre-Test Front View of Test Vehicle

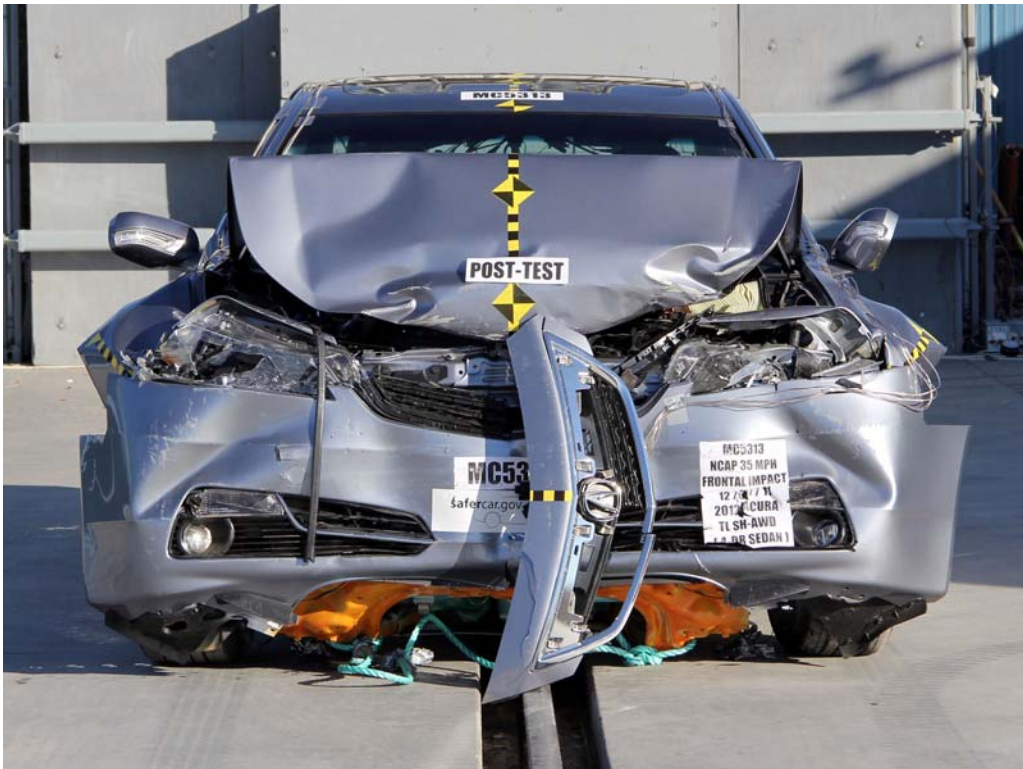


FIGURE 8. Post-Test Front View of Test Vehicle



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

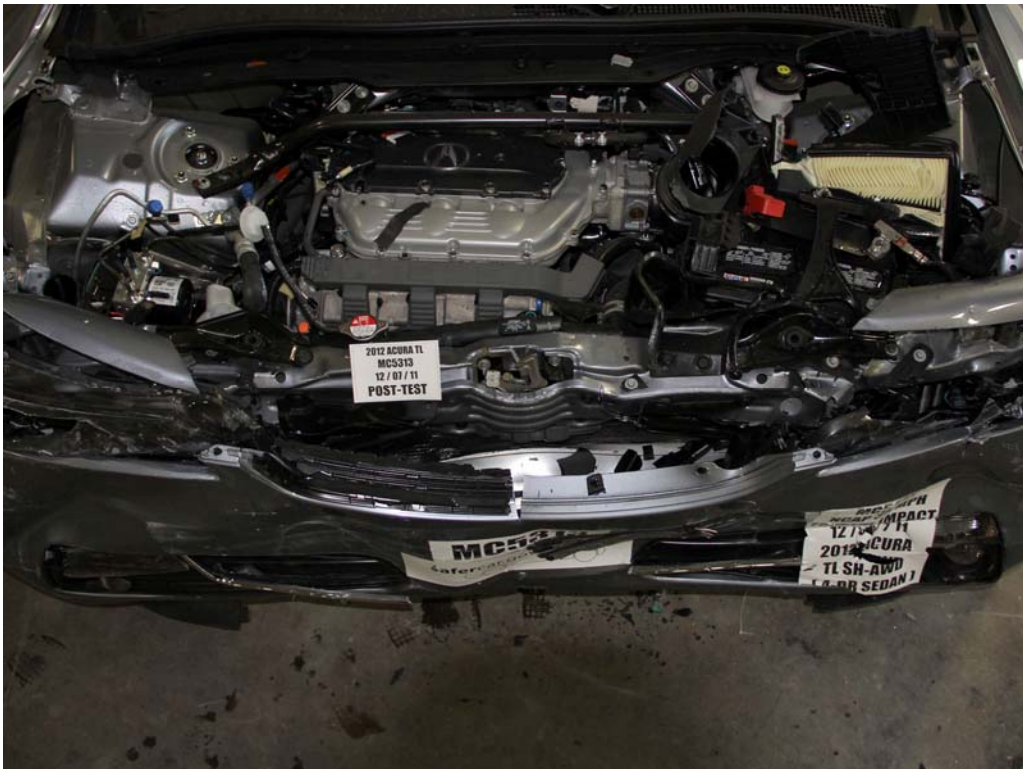


FIGURE 20. Post-Test Engine Compartment View



FIGURE 21. Pre-Test Fuel Filler Cap View



FIGURE 22. Post-Test Fuel Filler Cap View

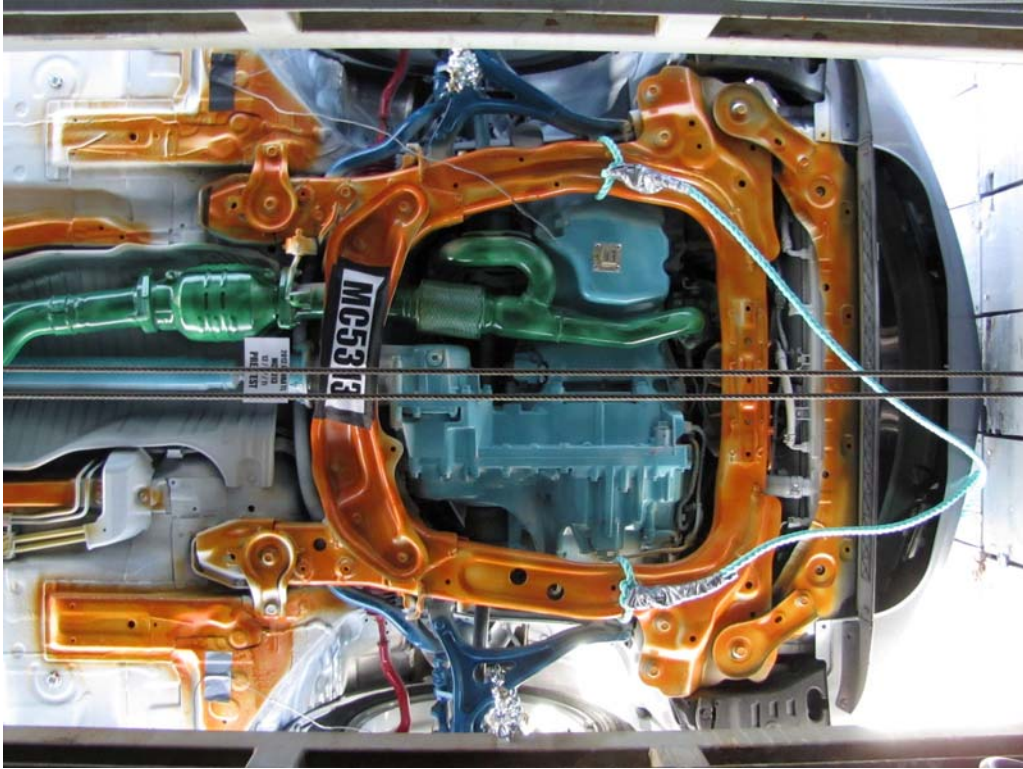


FIGURE 23. Pre-Test Front Underbody View

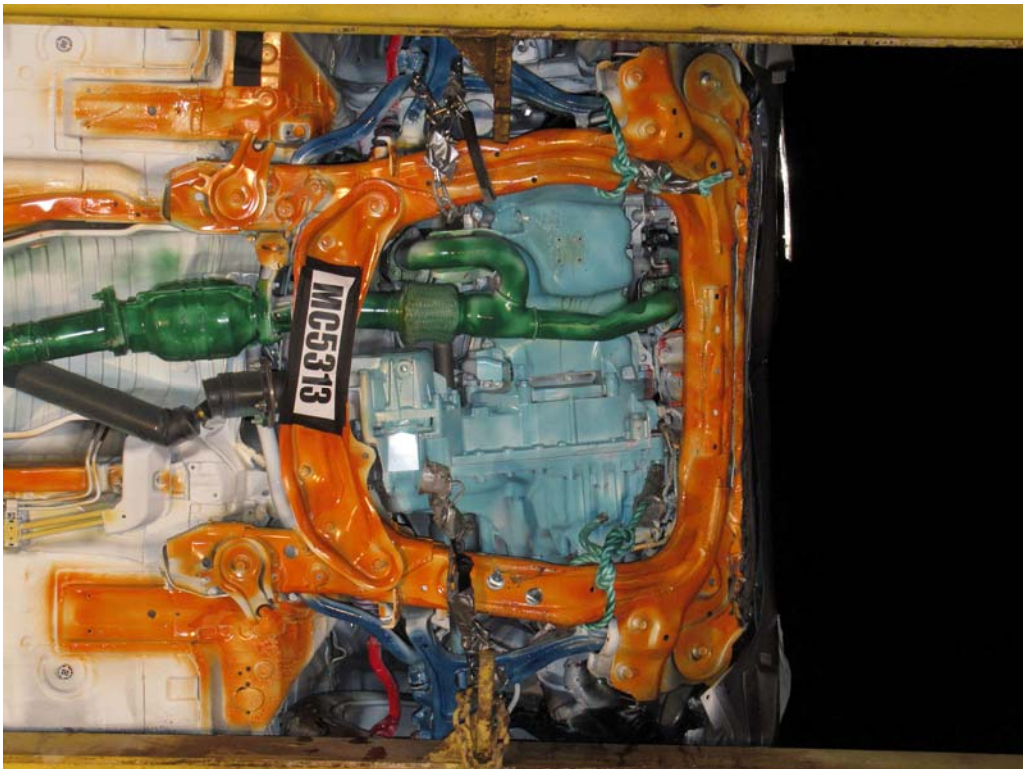


FIGURE 24. Post-Test Front Underbody View

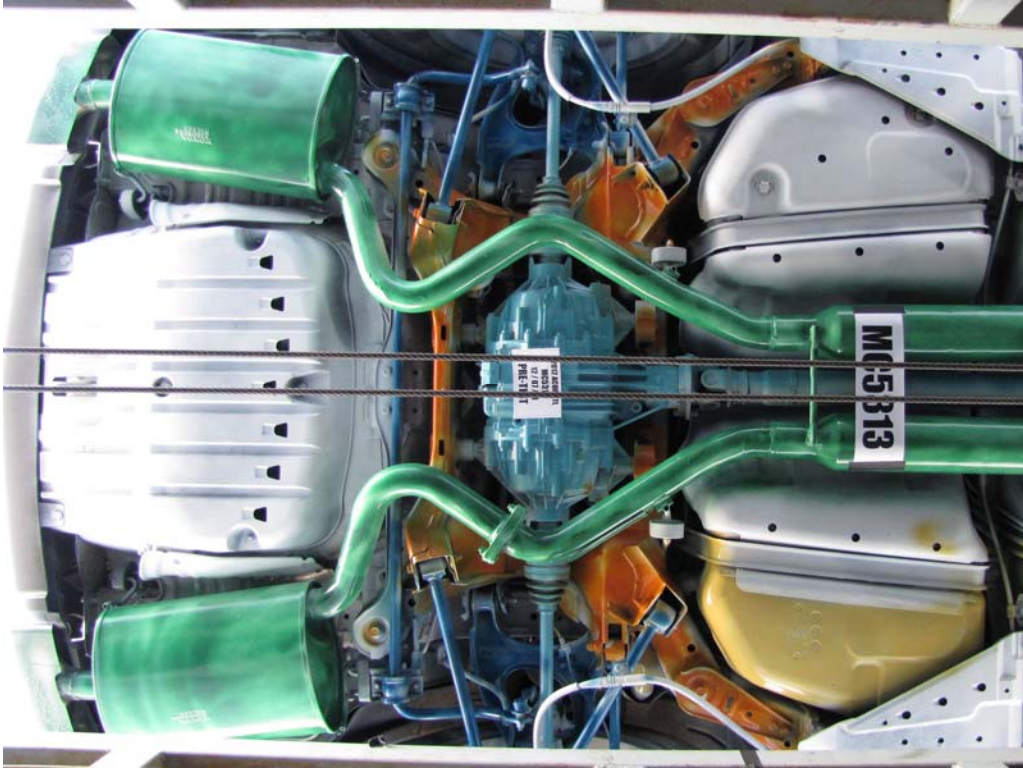


FIGURE 25. Pre-Test Rear Underbody View

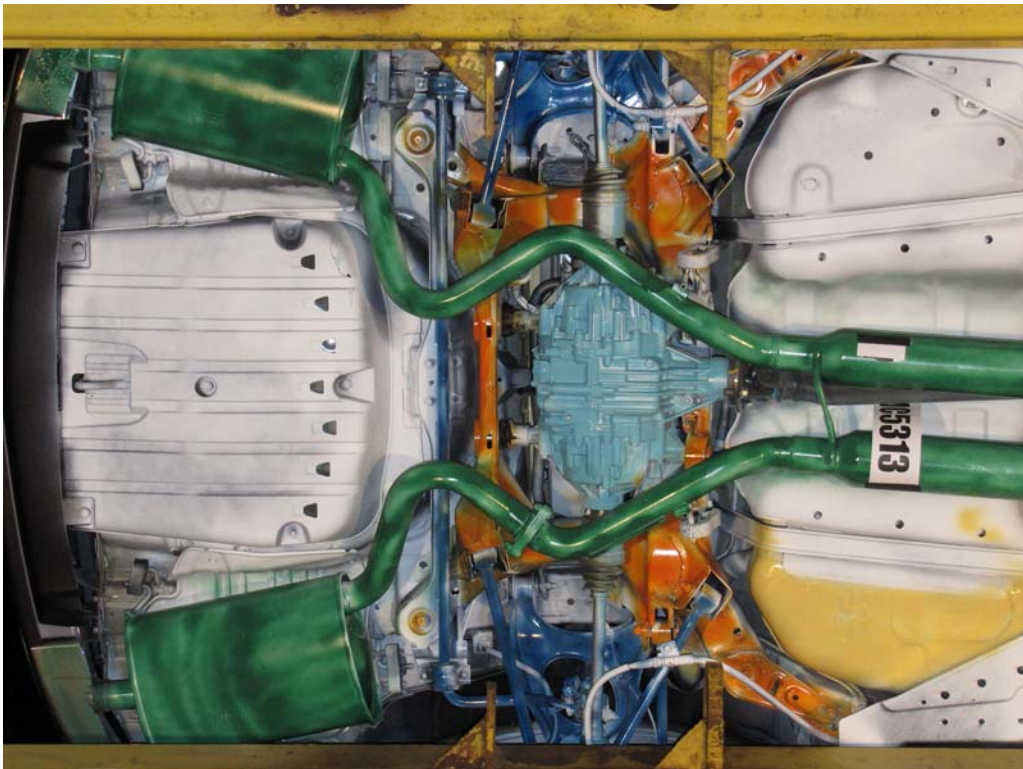


FIGURE 26. Post-Test Rear Underbody View



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

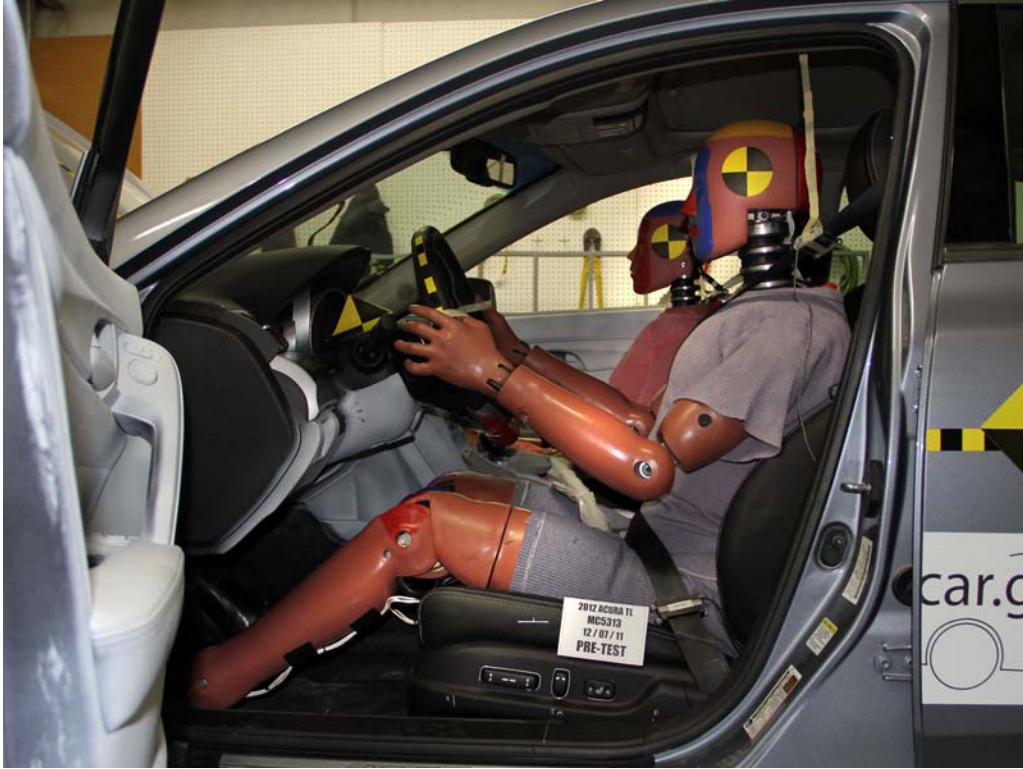


FIGURE 33. Pre-Test Driver Dummy and Vehicle Interior View



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

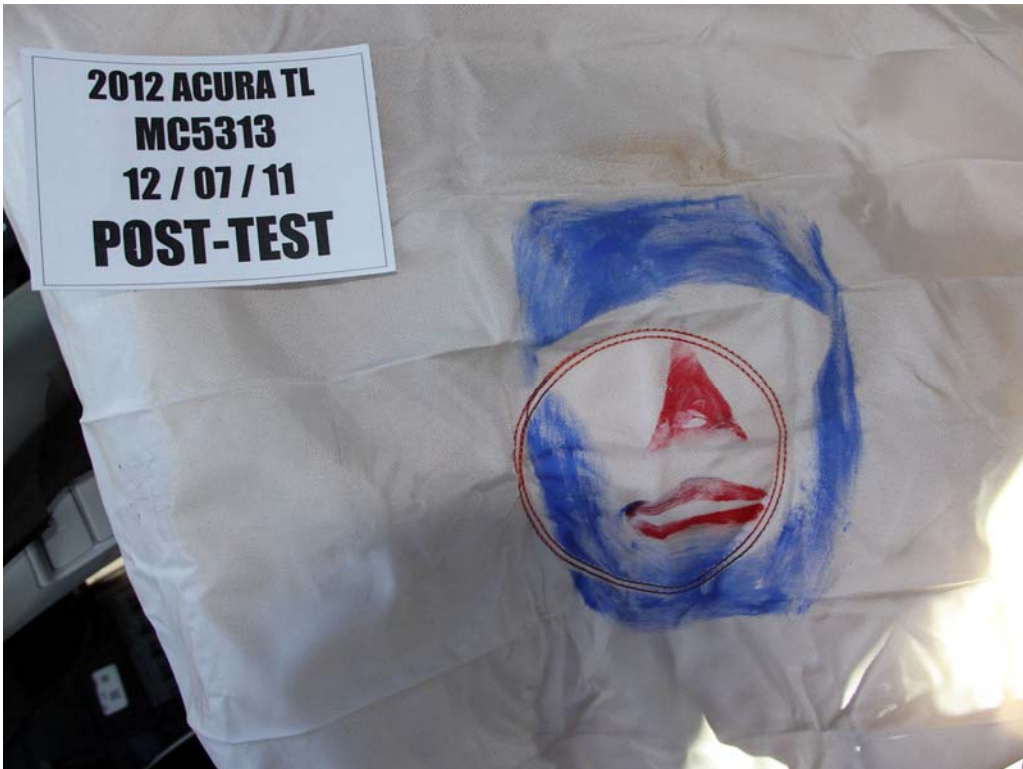


FIGURE 44. Post-Test Driver Dummy Contact With Airbag



FIGURE 45. Post-Test Driver Dummy Contact With Head Rest



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



FIGURE 45b. Post-Test Driver Dummy Contact With Steering Column



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

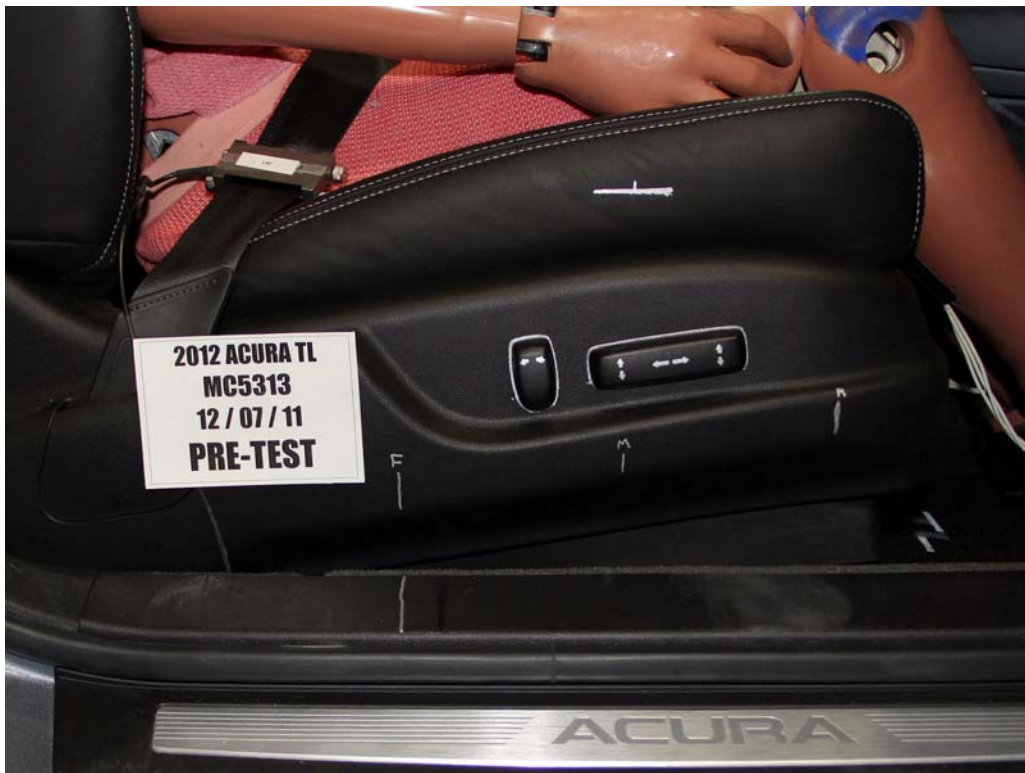


FIGURE 54. Pre-Test Passenger's Seat Fore-Aft Markings



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 Knee Bolster



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



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 Head Restraint



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



FIGURE 63. Pre-Test of Ballast Installed in Vehicle

Photograph Not Applicable
No Stoddard
Solvent Spillage

FIGURE 64. Post-Test Stoddard Solvent Spillage Location

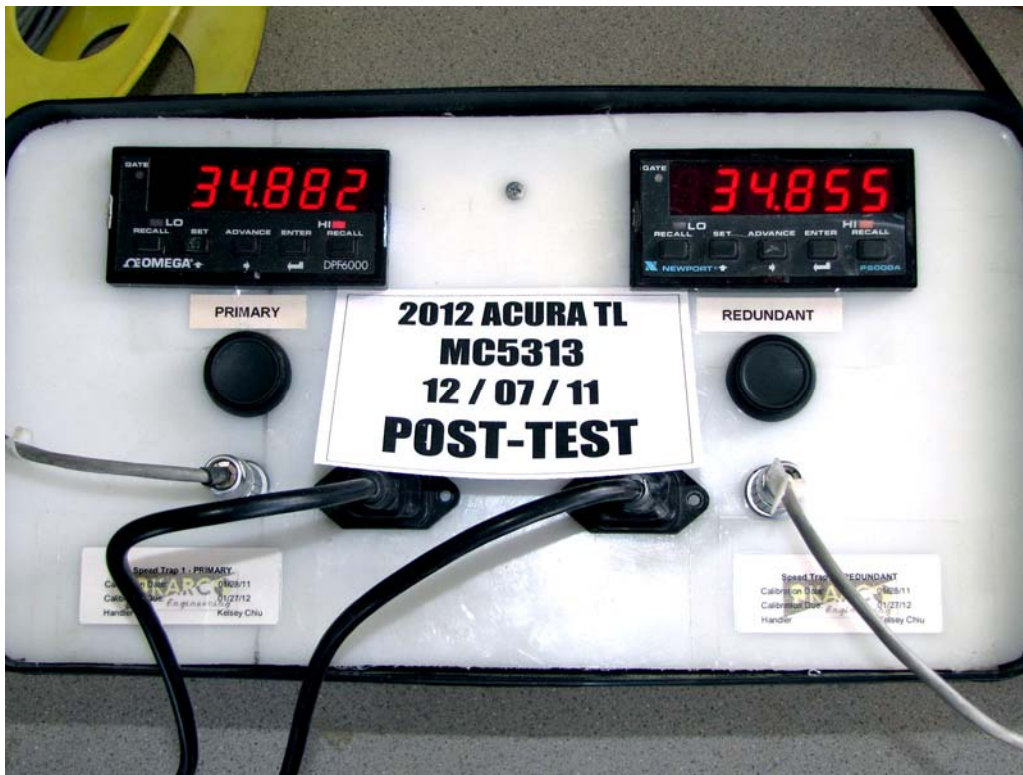


FIGURE 65. Post-Test Speed Trap Read Out

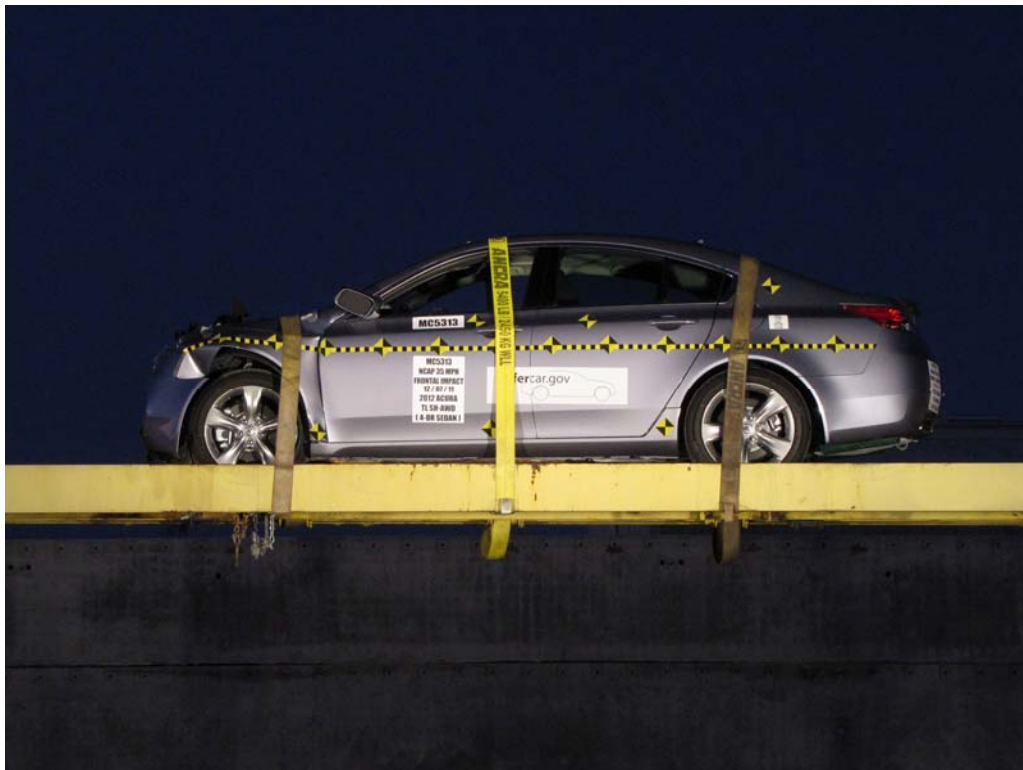


FIGURE 66. Vehicle at 0° on Static Rollover Device

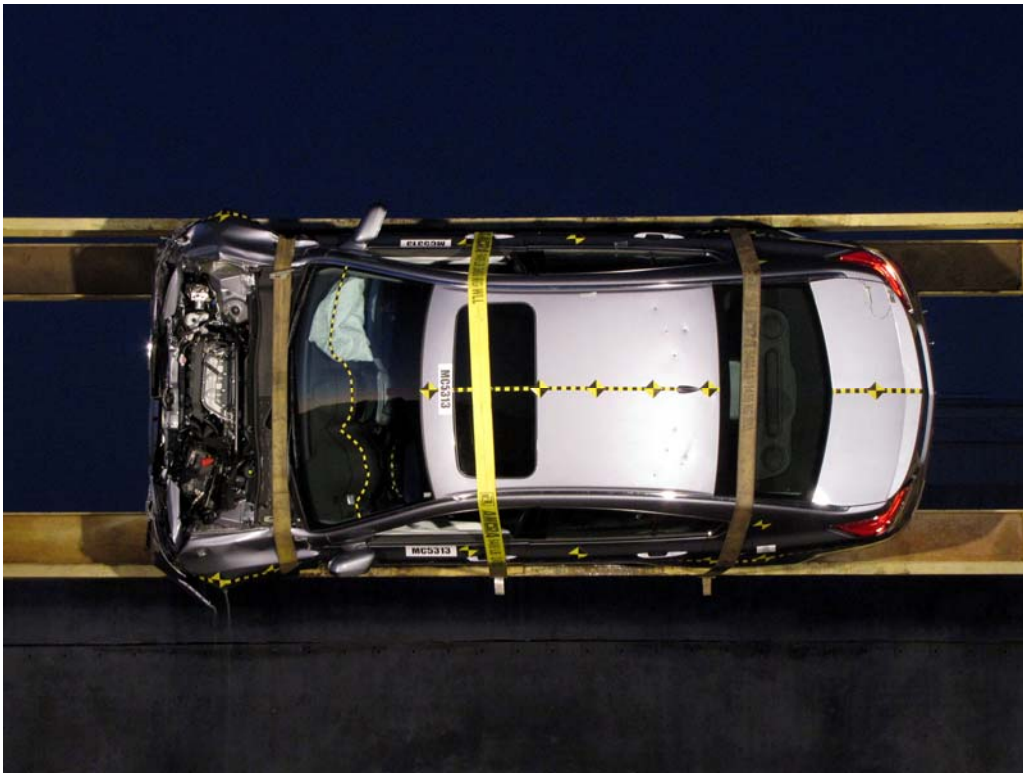


FIGURE 67. Vehicle at 90° on Static Rollover Device

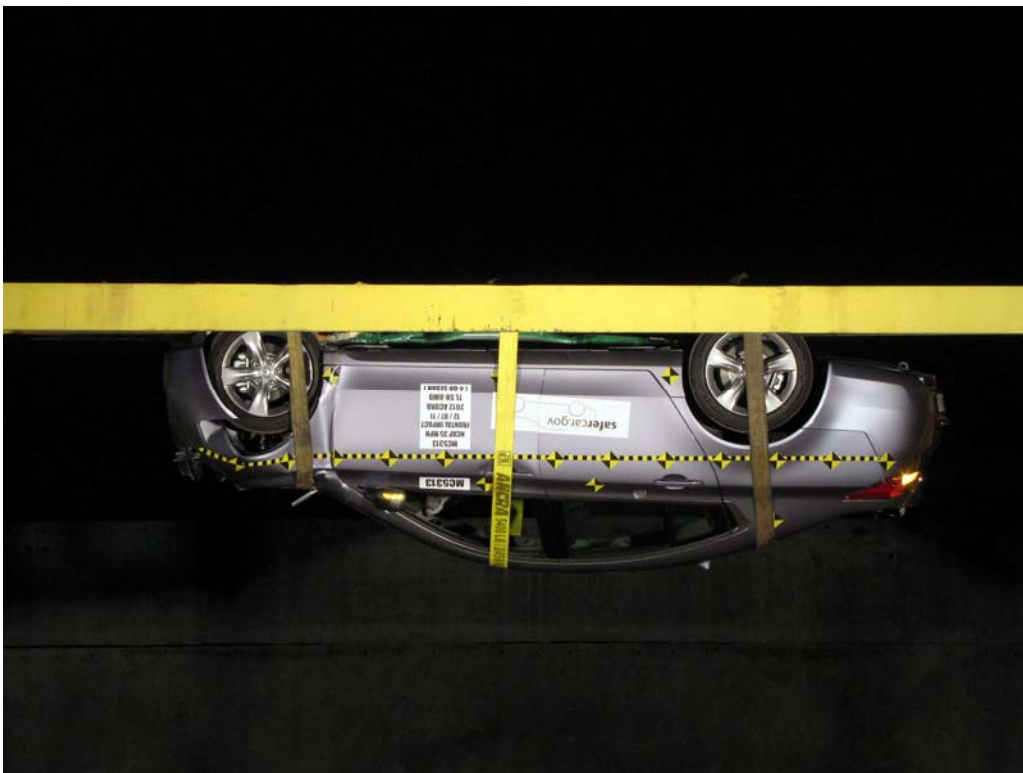


FIGURE 68. Vehicle at 180° on Static Rollover Device

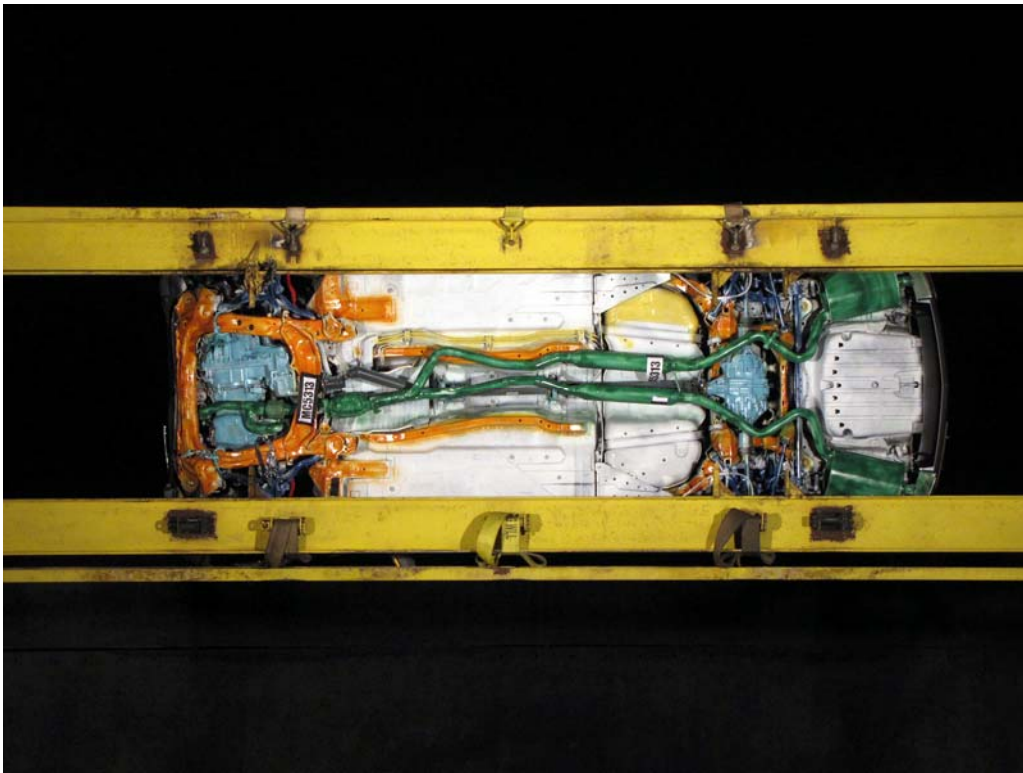


FIGURE 69. Vehicle at 270° on Static Rollover Device

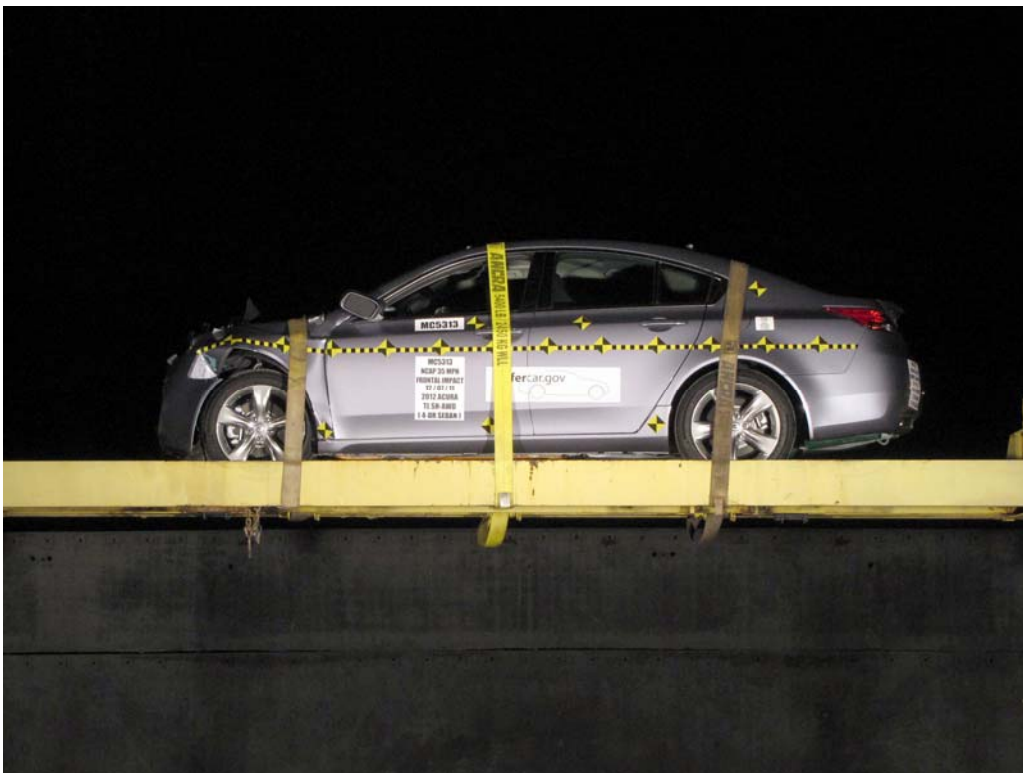


FIGURE 70. Vehicle at 360° on Static Rollover Device

APPENDIX B
DUMMY RESPONSE DATA TRACES

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10	Driver Upper Neck Force X vs. Time Primary	B-4
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18	Passenger Head Z Acceleration vs. Time Primary	B-6
19	Passenger Head Resultant Acceleration vs. Time Primary	B-6
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23	Passenger Chest Z Acceleration vs. Time Primary	B-8
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27	Passenger Upper Neck Moment Y vs. Time Primary	B-9
28	Passenger Nij vs. Time Primary	B-9
29	Passenger Left Femur Force vs. Time	B-10
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

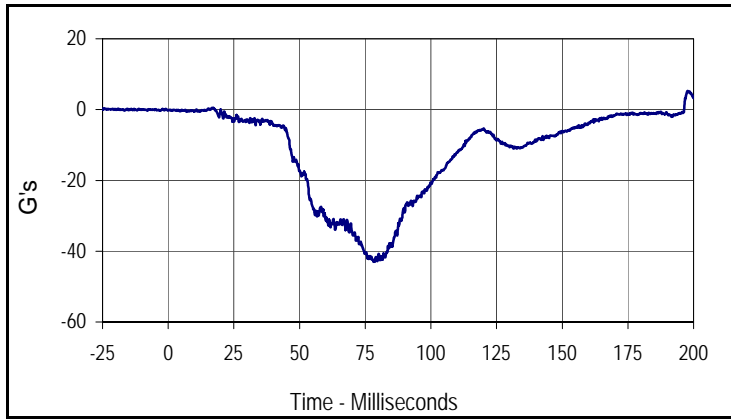
Driver Head X Acceleration Redundant
Driver Head Y Acceleration Redundant
Driver Head Z Acceleration Redundant
Driver Upper Neck Force Y
Driver Upper Neck Moment X
Driver Upper Neck Moment Z
Driver Chest X Acceleration Redundant
Driver Chest Y Acceleration Redundant
Driver Chest Z Acceleration Redundant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

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

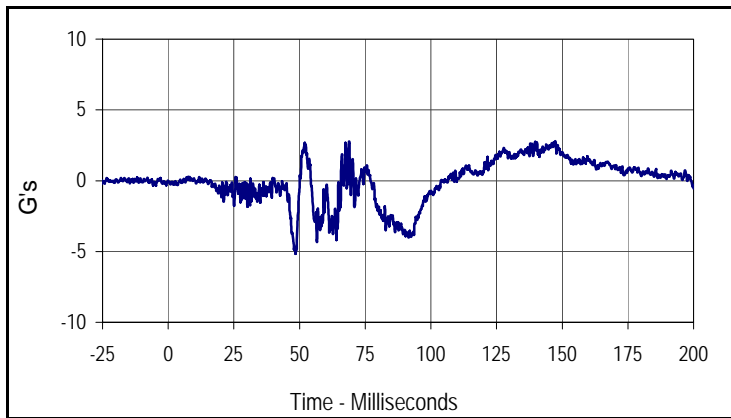
Left Rear Seat Crossmember Z
Right Rear Seat Crossmember X
Right Rear Seat Crossmember Z
Vehicle Engine Top X
Vehicle Engine Bottom X
Vehicle Left Brake Caliper X
Vehicle Right Brake Caliper X
Load Cell Barrier A1-A9
Load Cell Barrier B1-B9
Load Cell Barrier C1-C9
Load Cell Barrier D1-D9

Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan
 Test Program: 56 km/h Frontal Impact NCAP Test

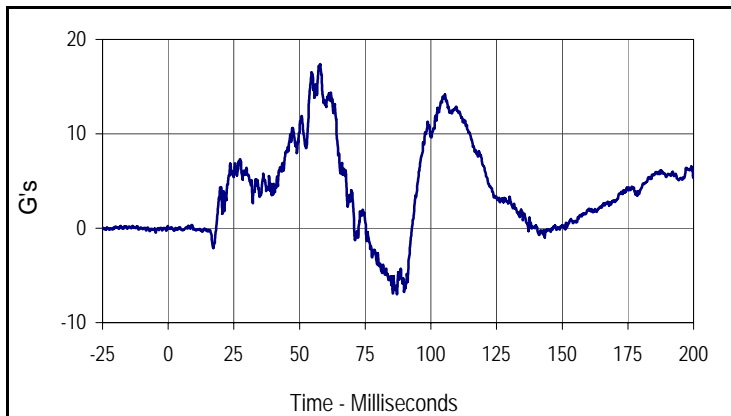
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 Test Date: 12/7/11



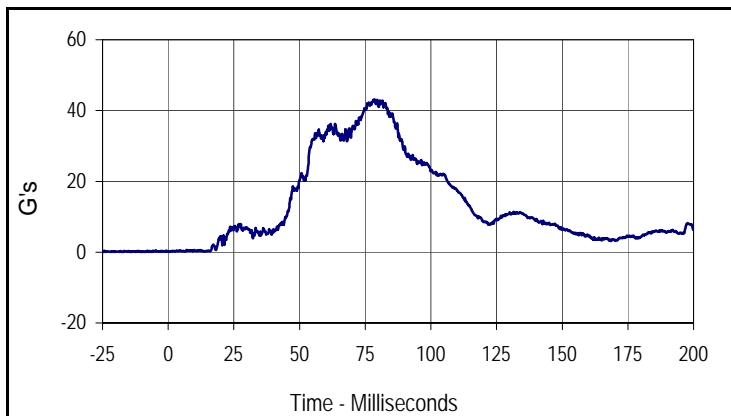
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Max	Time	Min	Time
5.3	197.8	-43.0	78.7



Curve Description			
Driver Head Acceleration Y Primary			
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002	FIL	1000	G's
Max	Time	Min	Time
2.8	147.4	-5.2	48.5



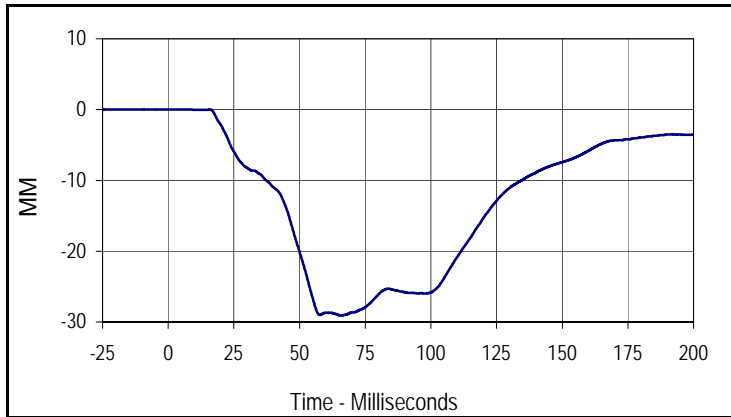
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Max	Time	Min	Time
17.4	57.8	-7.0	87.1



Curve Description			
Driver Head Resultant Acceleration Primary			
Plot No.	Type	SAE Class	Units
004	RES	1000	G's
Max	Time	Min	Time
43.1	78.7	0.1	13.9

Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan
 Test Program: 56 km/h Frontal Impact NCAP Test

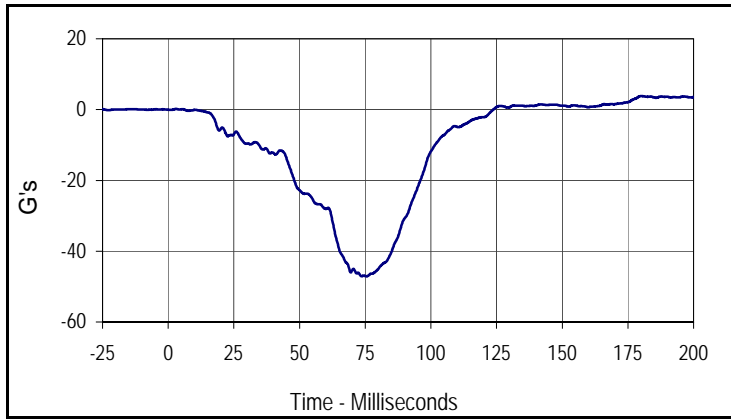
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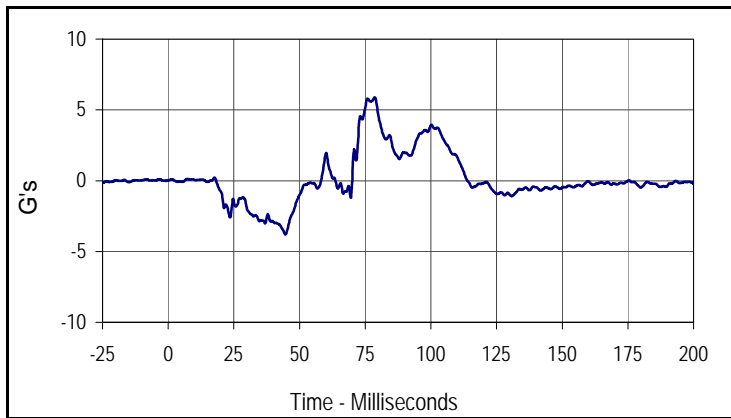
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Driver Chest Deflection			
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Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan
 Test Program: 56 km/h Frontal Impact NCAP Test

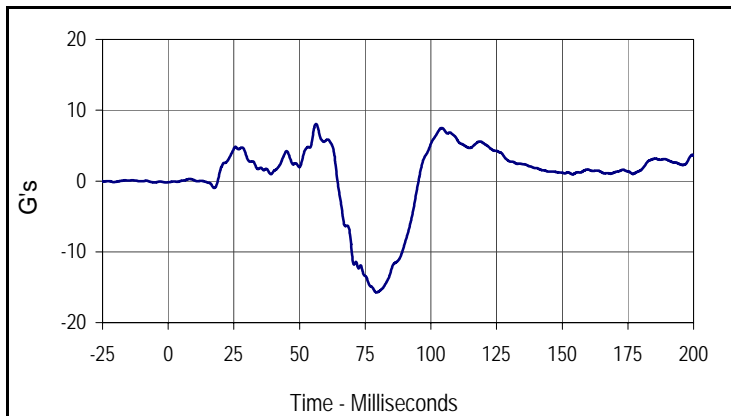
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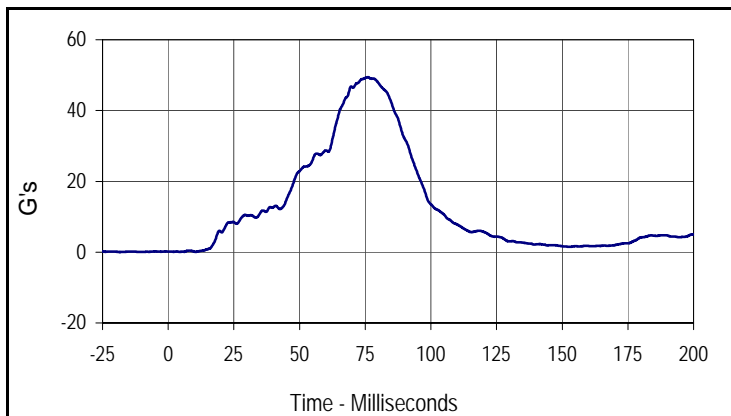
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Max	Time	Min	Time
3.8	180.1	-47.1	73.6



Curve Description			
Driver Chest Acceleration Y Primary			
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Max	Time	Min	Time
5.9	78.6	-3.8	44.6



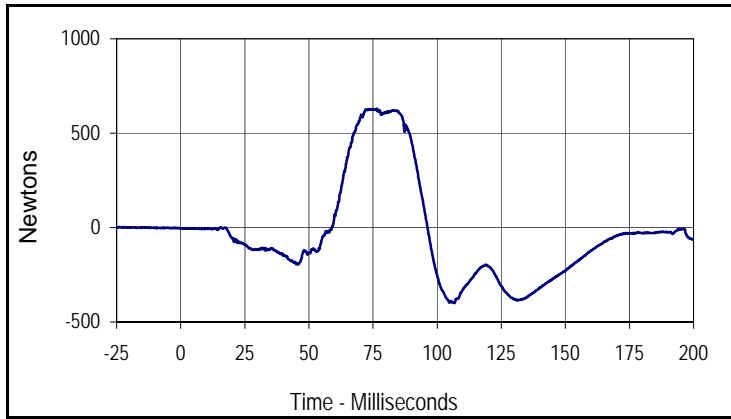
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Plot No.	Type	SAE Class	Units
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Max	Time	Min	Time
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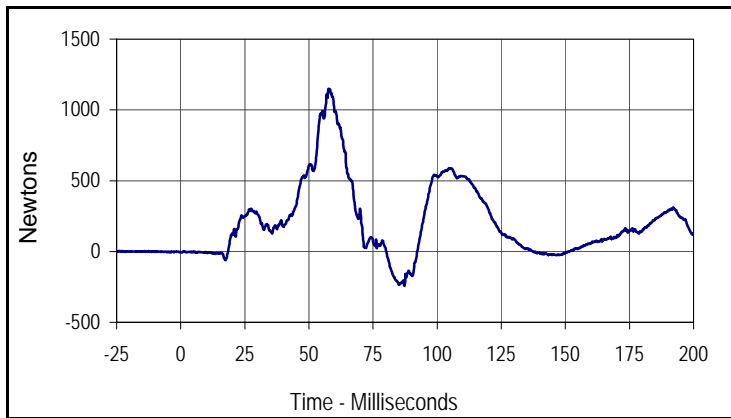
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Driver Chest Resultant Acceleration Primary			
Plot No.	Type	SAE Class	Units
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Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan
 Test Program: 56 km/h Frontal Impact NCAP Test

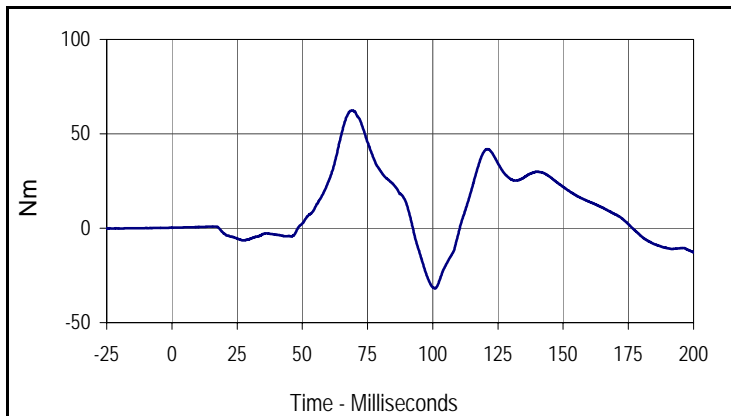
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 Test Date: 12/7/11



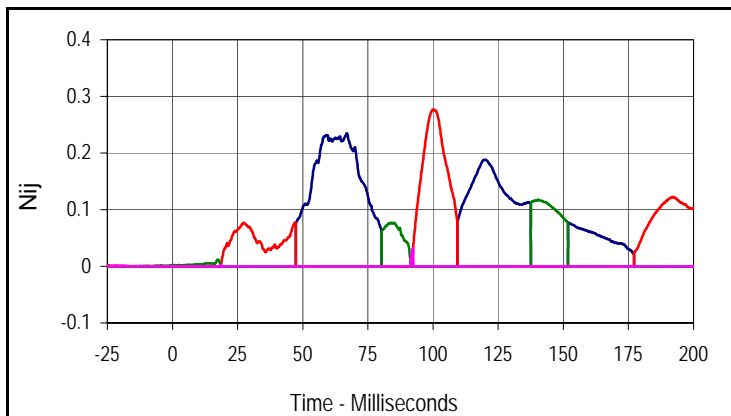
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Curve Description			
Driver Upper Neck Force Z			
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011	FIL	1000	Newtons
Max	Time	Min	Time
1149.0	57.6	-242.6	87.3



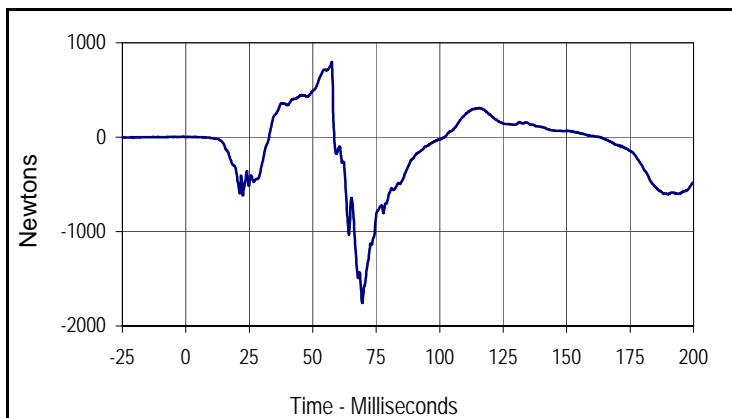
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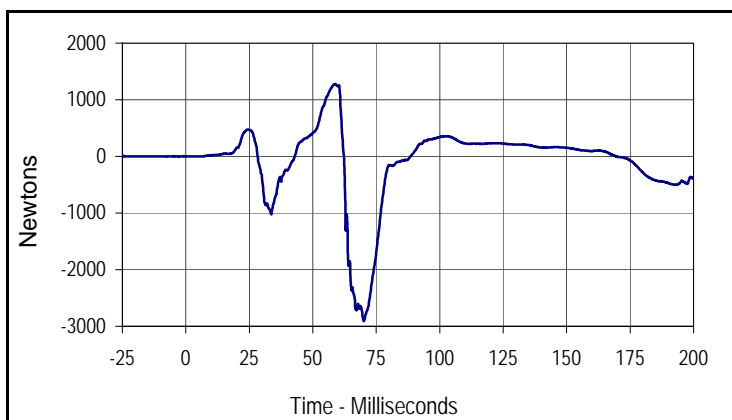
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Driver Nij			
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Ncf	FIL	0.12	140.4
Nce	FIL	0.03	92.3

Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan
 Test Program: 56 km/h Frontal Impact NCAP Test

NHTSA No.: MC5313
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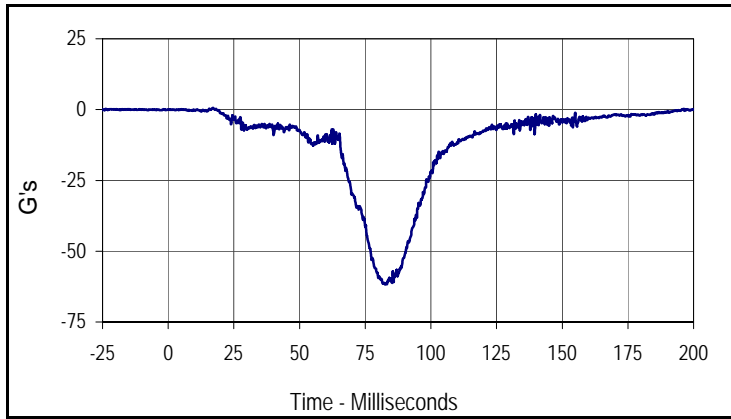
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Driver Left Femur Force Z			
Plot No.	Type	SAE Class	Units
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Max	Time	Min	Time
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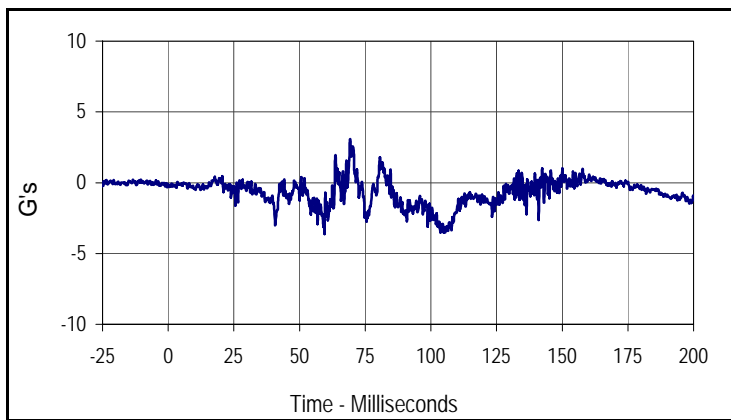
Curve Description			
Driver Right Femur Force Z			
Plot No.	Type	SAE Class	Units
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Max	Time	Min	Time
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Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan
 Test Program: 56 km/h Frontal Impact NCAP Test

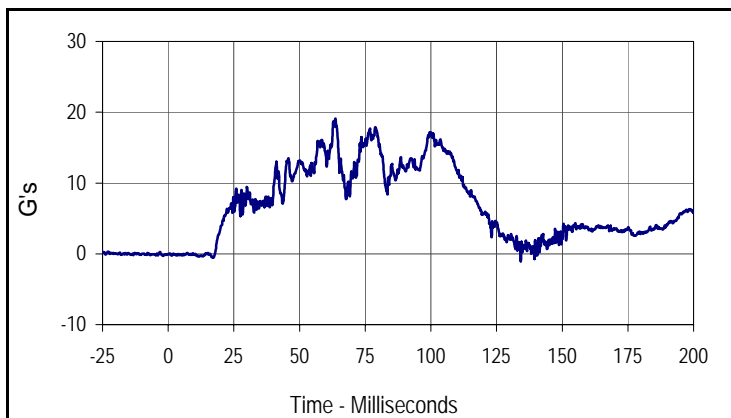
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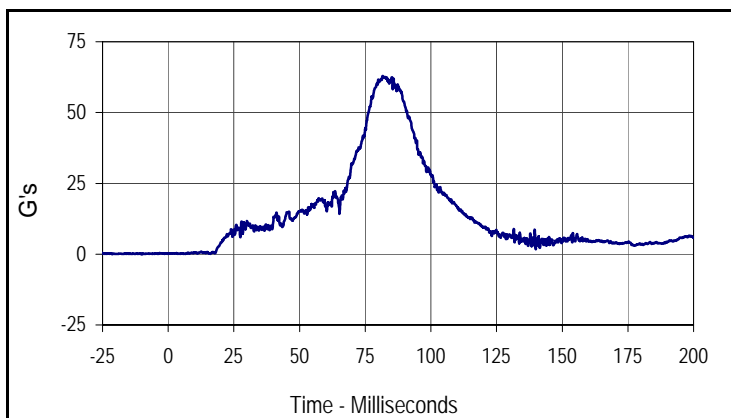
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Plot No.	Type	SAE Class	Units
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Max	Time	Min	Time
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Curve Description			
Passenger Head Acceleration Y Primary			
Plot No.	Type	SAE Class	Units
016	FIL	1000	G's
Max	Time	Min	Time
3.1	69.3	-3.6	59.5



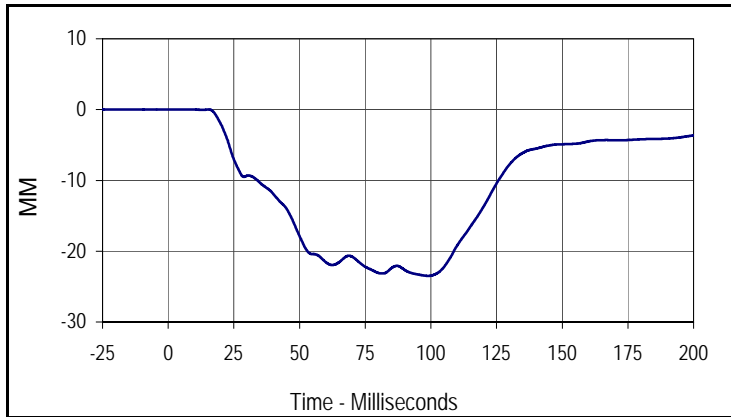
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Passenger Head Acceleration Z Primary			
Plot No.	Type	SAE Class	Units
017	FIL	1000	G's
Max	Time	Min	Time
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Curve Description			
Passenger Head Resultant Acceleration Primary			
Plot No.	Type	SAE Class	Units
018	RES	1000	G's
Max	Time	Min	Time
62.9	81.7	0.0	6.5

Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan
 Test Program: 56 km/h Frontal Impact NCAP Test

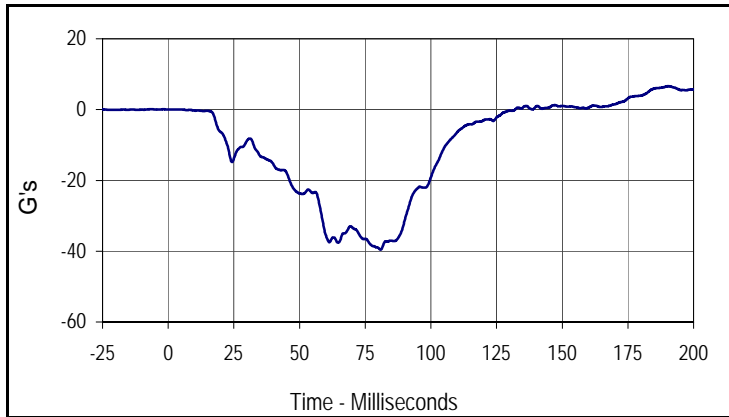
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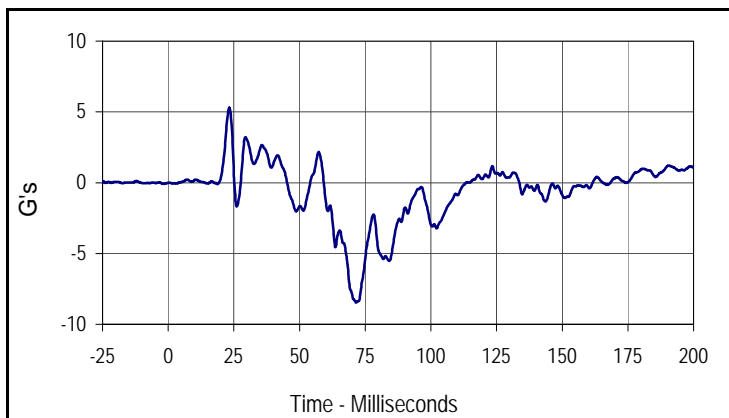
Curve Description			
Passenger Chest Deflection			
Plot No.	Type	SAE Class	Units
019	FIL	180	MM
Max	Time	Min	Time
0.0	9.1	-23.5	99.0

Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan
 Test Program: 56 km/h Frontal Impact NCAP Test

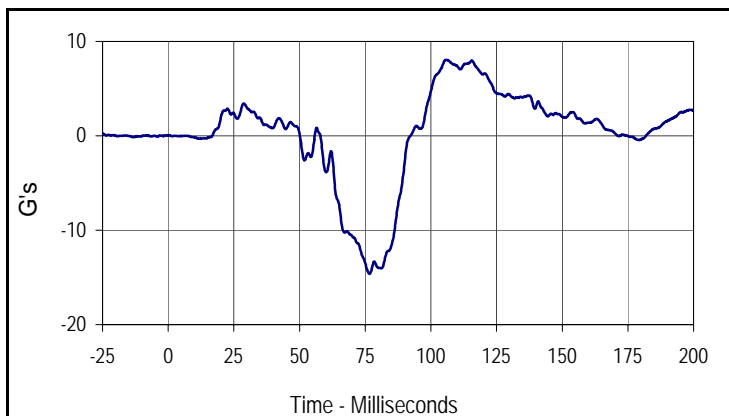
NHTSA No.: MC5313
 Test Date: 12/7/11



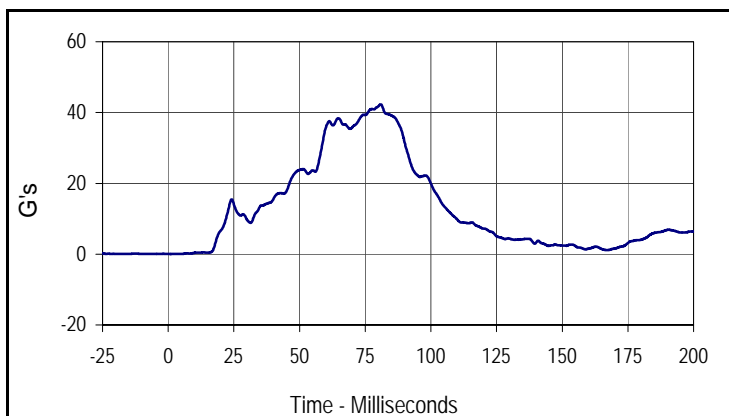
Curve Description			
Passenger Chest Acceleration X Primary			
Plot No.	Type	SAE Class	Units
020	FIL	180	G's
Max	Time	Min	Time
6.6	190.3	-39.6	80.9



Curve Description			
Passenger Chest Acceleration Y Primary			
Plot No.	Type	SAE Class	Units
021	FIL	180	G's
Max	Time	Min	Time
5.3	23.3	-8.5	71.5



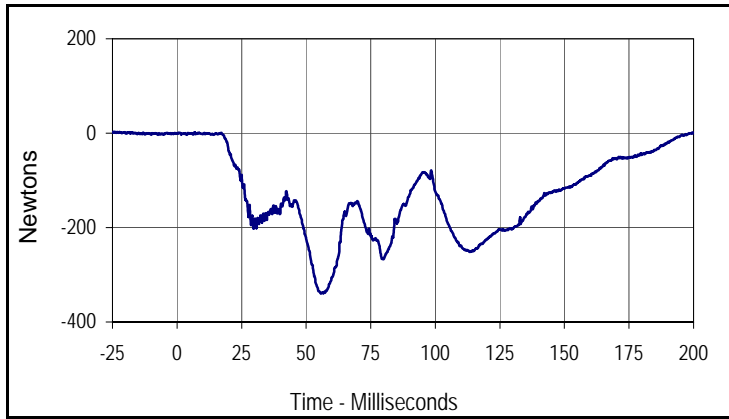
Curve Description			
Passenger Chest Acceleration Z Primary			
Plot No.	Type	SAE Class	Units
022	FIL	180	G's
Max	Time	Min	Time
8.0	105.7	-14.6	76.6



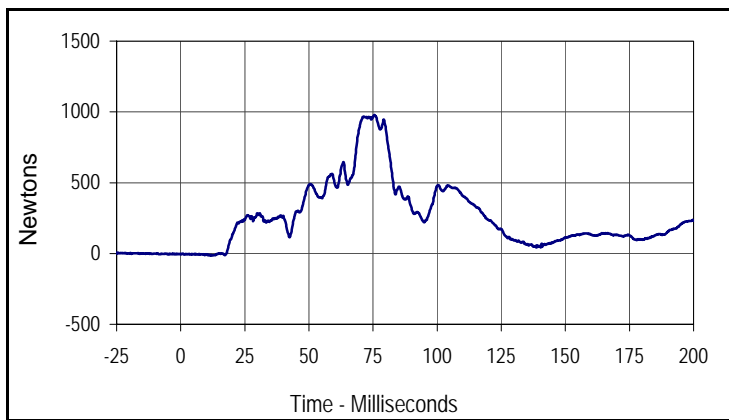
Curve Description			
Passenger Chest Resultant Acceleration Primary			
Plot No.	Type	SAE Class	Units
023	RES	180	G's
Max	Time	Min	Time
42.3	80.9	0.0	0.9

Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan
 Test Program: 56 km/h Frontal Impact NCAP Test

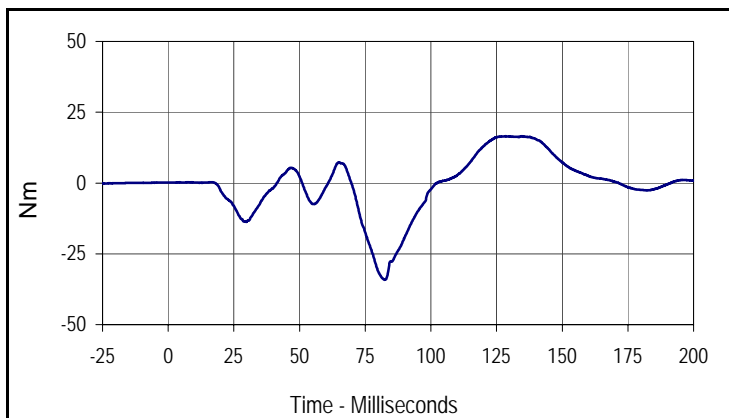
NHTSA No.: MC5313
 Test Date: 12/7/11



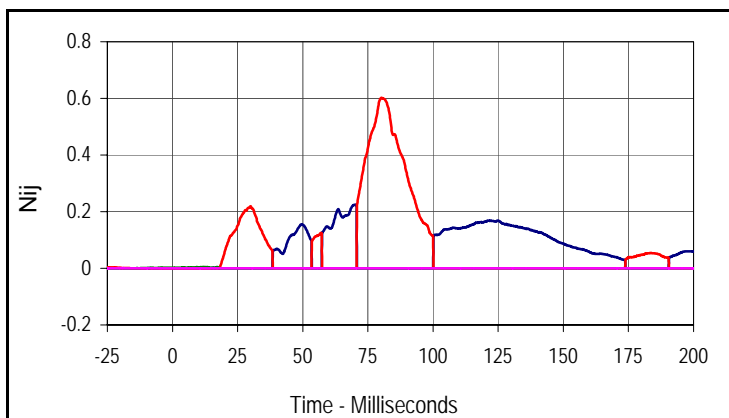
Curve Description			
Passenger Upper Neck Force X			
Plot No.	Type	SAE Class	Units
024	FIL	1000	Newtons
Max	Time	Min	Time
1.8	6.8	-339.5	55.7



Curve Description			
Passenger Upper Neck Force Z			
Plot No.	Type	SAE Class	Units
025	FIL	1000	Newtons
Max	Time	Min	Time
978.7	75.5	-15.1	12.2



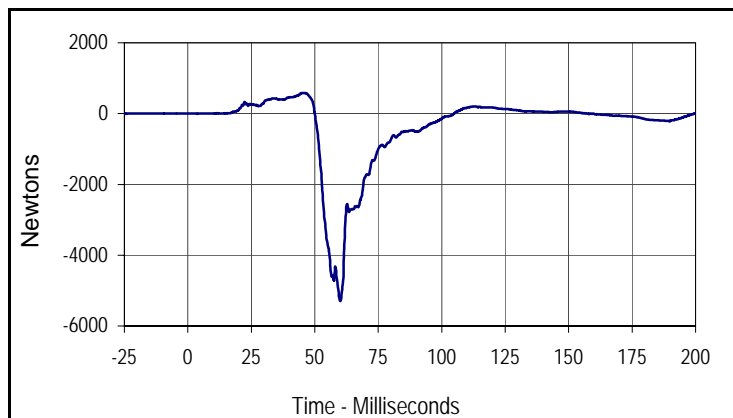
Curve Description			
Passenger Upper Neck Moment Y			
Plot No.	Type	SAE Class	Units
026	FIL	600	Nm
Max	Time	Min	Time
16.5	134.7	-34.1	82.3



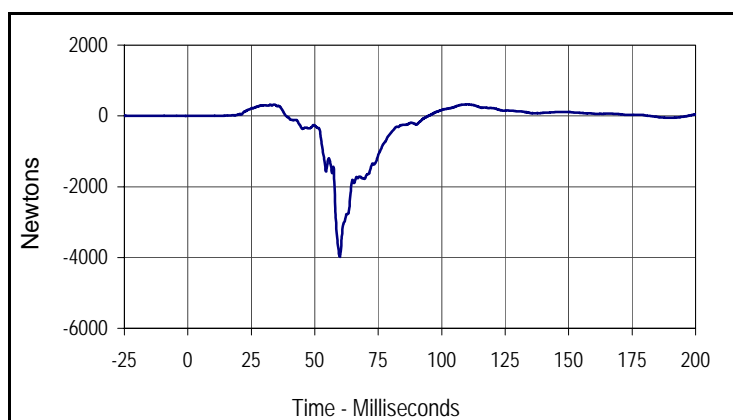
Curve Description			
Passenger Nij			
Units	Type	Max	Time
Ntf	FIL	0.23	70.3
Units	Type	Max	Time
Nte	FIL	0.60	80.2
Units	Type	Max	Time
Ncf	FIL	0.12	221.7
Units	Type	Max	Time
Nce	FIL	0.00	-20.3

Test Vehicle: 2012 Acura TL SH-AWD 4-Door Sedan
 Test Program: 56 km/h Frontal Impact NCAP Test

NHTSA No.: MC5313
 Test Date: 12/7/11



Curve Description			
Passenger Left Femur Force Z			
Plot No.	Type	SAE Class	Units
027	FIL	600	Newtons
Max	Time	Min	Time
584.5	45.3	-5293.4	60.0



Curve Description			
Passenger Right Femur Force Z			
Plot No.	Type	SAE Class	Units
028	FIL	600	Newtons
Max	Time	Min	Time
327.6	110.1	-3980.7	59.9

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: 11/21/11

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: 11/21/11

ATD Serial No.: 034

Test I.D.: N/A



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.24	Pass
Laboratory Relative Humidity	%	10 to 70	32.9	Pass
A - Total sitting height	mm	879 to 889	880	Pass
B - Shoulder pivot height	mm	505 to 521	514	Pass
C - H point height	mm	84 to 89	87	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	299	Pass
H - Head back to backline	mm	41 to 46	44	Pass
I - Shoulder to elbow length	mm	330 to 345	334	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	437	Pass
M - Knee pivot height	mm	485 to 500	486	Pass
N - Buttock popliteal length	mm	452 to 477	472	Pass
O - Chest depth without jacket	mm	213 to 229	226	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	985	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

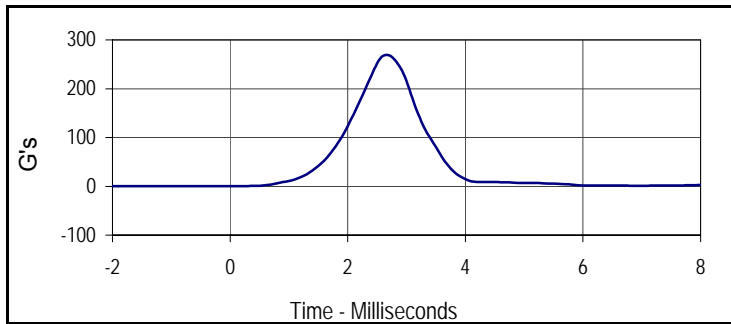
Test Date: 11/21/11

ATD Serial No.: 034

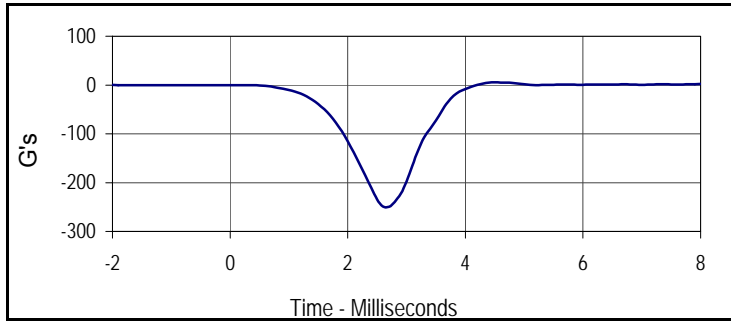
Test I.D.: M034HD022



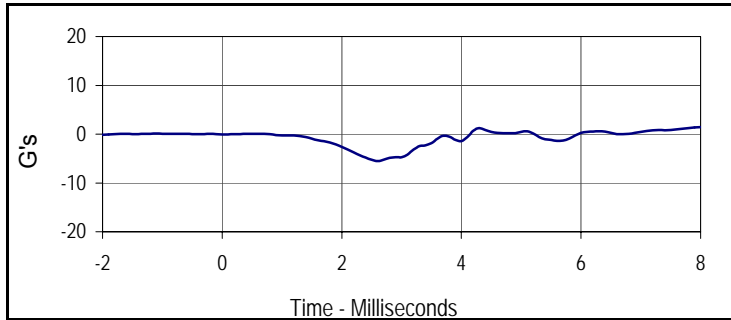
Tested Parameter	Units	Specification	Result	Pass/Fail
Head Assembly Soak Time	Minutes	≥240	250	Pass
Temperature During Soak	Max	18.9 to 25.6	21.7	Pass
	Min		20.7	Pass
Humidity During Soak	Max	10.0 to 70.0	40.0	Pass
	Min		28.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	32.5	Pass
Peak Resultant Acceleration	G's	225.0 to 275.0	268.7	Pass
Peak Lateral Acceleration	G's	≤15.0	5.5	Pass
Oscillations After Main Pulse	%	<10% of peak Res. Acceleration	5.4	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass



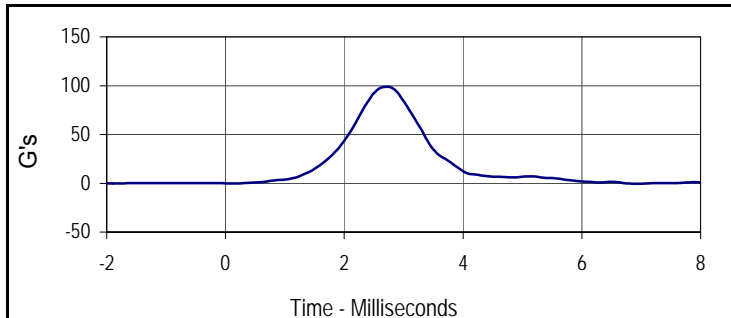
Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
268.7	2.7	0.1	-2.0



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
5.3	4.5	-249.7	2.7



Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
1.3	4.3	-5.5	2.6



Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
99.0	2.7	-0.2	0.1

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

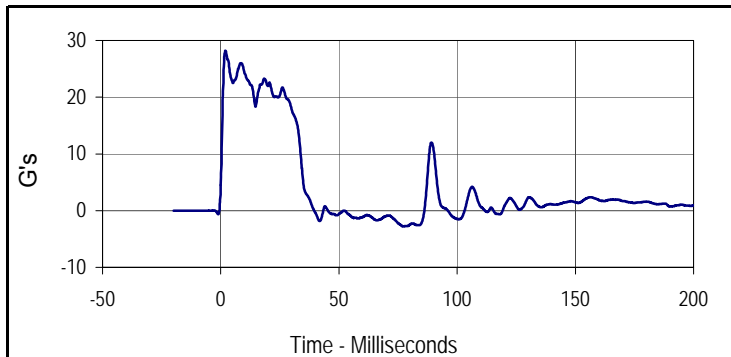
Test Date: 11/21/11

ATD Serial No.: 034

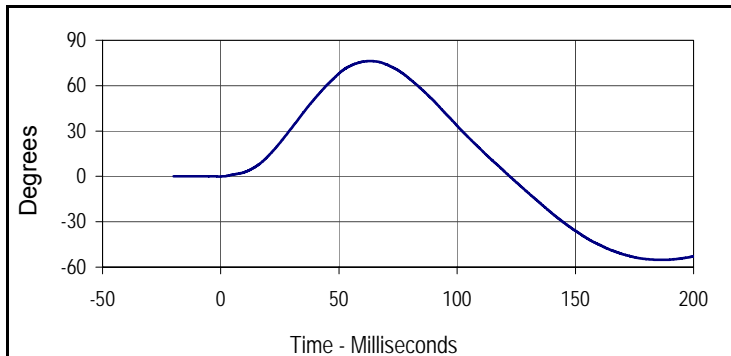
Test I.D.: M034NF022



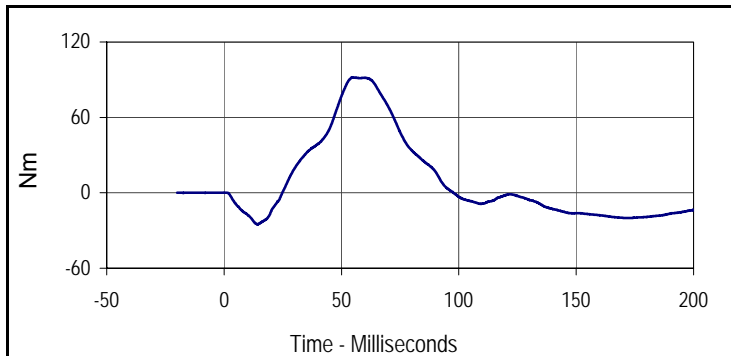
Tested Parameter	Units	Specification	Result	Pass/Fail	
Neck Assembly Soak Time	Minutes	≥240	285	Pass	
Temperature During Soak	Max	20.6 to 22.2	21.7	Pass	
	Min		20.7	Pass	
Humidity During Soak	Max	10.0 to 70.0	40.0	Pass	
	Min		29.0	Pass	
Laboratory Temperature During Test	°C	20.6 to 22.2	21.2	Pass	
Laboratory Humidity During Test	%	10.0 to 70.0	32.6	Pass	
Pendulum Velocity	m/s	6.89 to 7.13	7.06	Pass	
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	24.3	Pass
	20 Msec.	G's	17.6 to 22.6	22.0	Pass
	30 Msec.	G's	12.5 to 18.5	17.8	Pass
Peak Pendulum Decel. after 30 Msec.	G's	≤ 29.0	17.8	Pass	
Deceleration Decay, Time to Cross 5 G's	Msec.	34.0 to 42.0	34.9	Pass	
Maximum "D" Plane Rotation	Max	Degrees	64.0 to 78.0	76.2	Pass
	Time	Msec.	57.0 to 64.0	63.0	Pass
"D" Plane Rotation Decay, Time To Zero Crossing	Msec.	113.0 to 128.0	122.3	Pass	
Moment About Occ. Condyle	Max	Nm	84.1 to 108.5	91.8	Pass
	Time	Msec.	47.0 to 58.0	55.4	Pass
Positive Moment Decay, Time To Zero Crossing	Msec.	97.0 to 107.0	97.7	Pass	
Overall Test Results				Pass	



Curve Description			
Pendulum Deceleration			
Plot No.	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
28.2	2.0	-2.8	77.3



Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
76.2	63.0	-55.2	186.8



Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
91.8	55.4	-25.0	14.1

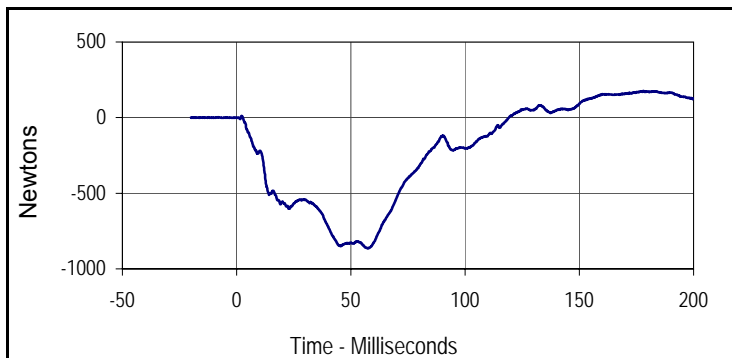
Test Program: Hybrid III 50th Percentile Male Neck Flexion Test

Test Date: 11/21/11

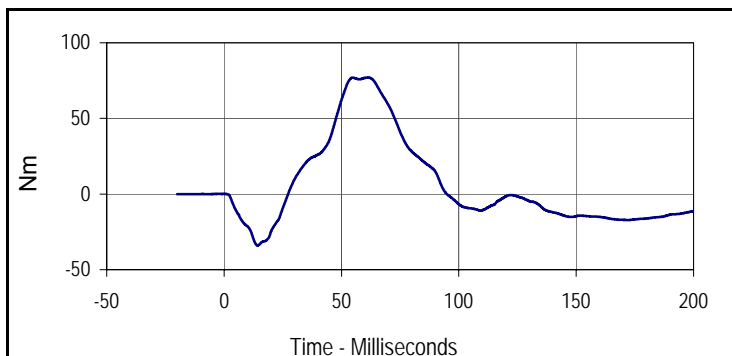


ATD Serial No.: 034

Test I.D.: M034NF022



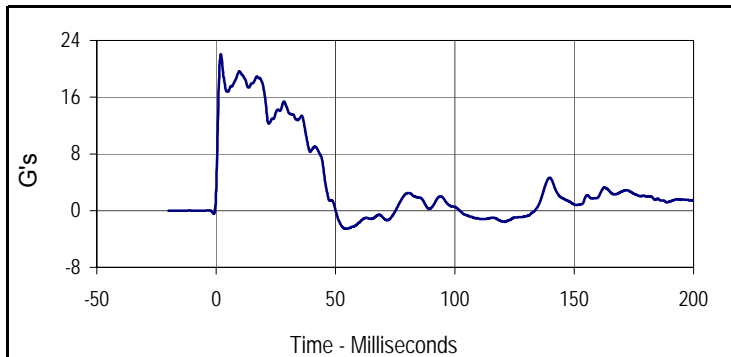
Curve Description			
Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
176.1	177.9	-864.4	57.7



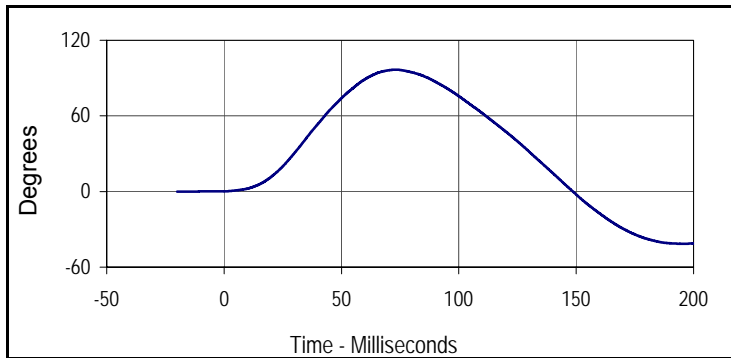
Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
77.1	61.7	-34.1	14.2



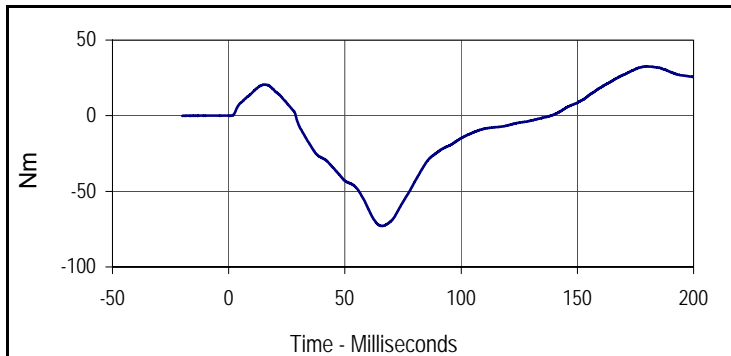
Tested Parameter	Units	Specification	Result	Pass/Fail	
Neck Assembly Soak Time	Minutes	≥240	300	Pass	
Temperature During Soak	Max	20.6 to 22.2	21.7	Pass	
	Min		20.7	Pass	
Humidity During Soak	Max	10.0 to 70.0	40.0	Pass	
	Min		29.0	Pass	
Laboratory Temperature During Test	°C	20.6 to 22.2	21.2	Pass	
Laboratory Humidity During Test	%	10.0 to 70.0	32.4	Pass	
Pendulum Velocity	m/s	5.94 to 6.19	6.18	Pass	
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	19.6	Pass
	20 Msec.	G's	14.0 to 19.0	17.0	Pass
	30 Msec.	G's	11.0 to 16.0	14.2	Pass
Peak Pendulum Decel. after 30 Msec.	G's	≤ 22.0	14.2	Pass	
Deceleration Decay, Time to Cross 5 G's	Msec.	38.0 to 46.0	45.3	Pass	
Maximum "D" Plane Rotation	Max	Degrees	81.0 to 106.0	96.7	Pass
	Time	Msec.	72.0 to 82.0	73.2	Pass
"D" Plane Rotation Decay, Time To Zero Crossing	Msec.	147.0 to 174.0	148.6	Pass	
Moment About Occ. Condyle	Max	Nm	-52.9 to -79.9	-72.9	Pass
	Time	Msec.	65.0 to 79.0	66.1	Pass
Positive Moment Decay, Time To Zero Crossing	Msec.	120.0 to 148.0	138.6	Pass	
Overall Test Results				Pass	



Curve Description			
Pendulum Deceleration			
Plot No.	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
22.1	2.0	-2.5	54.9



Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
96.7	73.2	-41.4	195.3



Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
32.6	179.6	-72.9	66.1

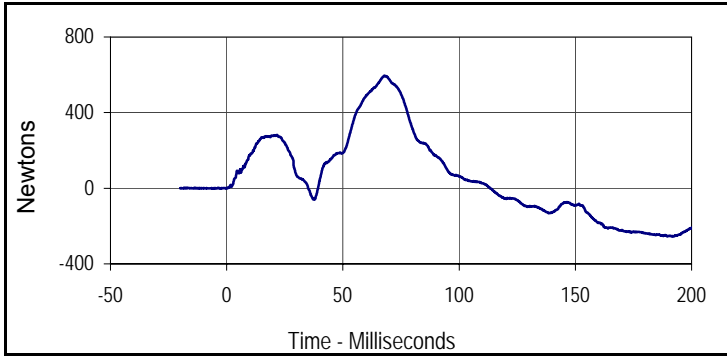
Test Program: Hybrid III 50th Percentile Male Neck Extension Test

Test Date: 11/21/11

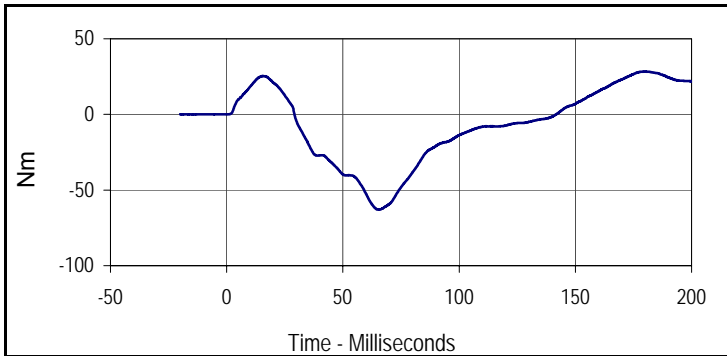


ATD Serial No.: 034

Test I.D.: M034NE022



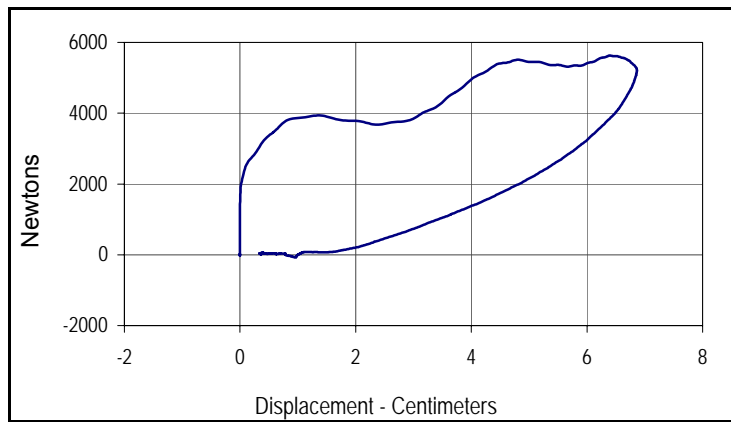
Curve Description			
Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
595.1	67.7	-255.2	191.6



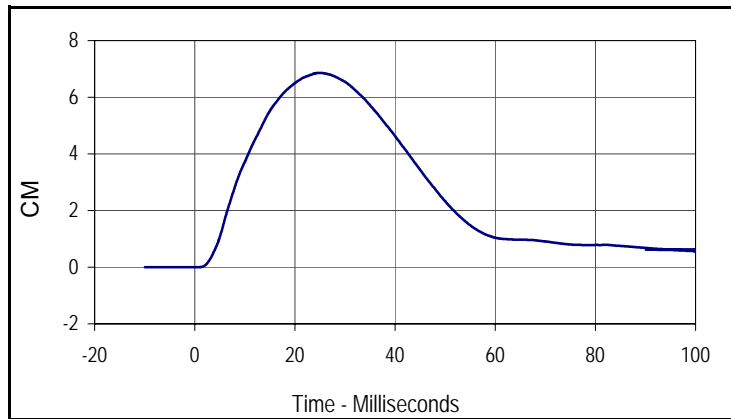
Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
28.3	179.8	-62.9	65.5



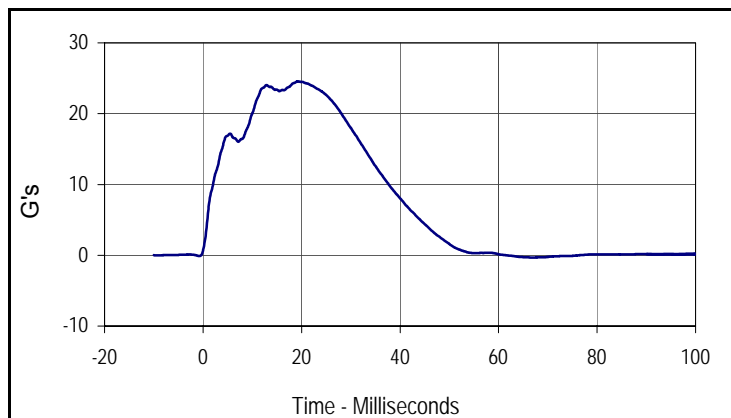
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥240	345	Pass
Temperature During Soak	Max	20.6 to 22.2	21.7	Pass
	Min		20.7	Pass
Humidity During Soak	Max	10.0 to 70.0	40.0	Pass
	Min		29.0	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	32.4	Pass
Probe Velocity	m/s	6.58 to 6.82	6.59	Pass
Peak Probe Force	Newtons	5159 to 5893	5627	Pass
Peak Sternum Deflection	CM	6.35 to 7.26	6.86	Pass
Internal Hysteresis	%	69 to 85	69.1	Pass
Overall Test Results				Pass



Curve Description			
Probe Force vs. Chest Deflection			
Plot No.	Type	SAE Class	Hysteresis
001	FIL	180	69.1
Peak Probe Force		Peak Chest Deflection	
5627		6.86	



Curve Description			
Chest Deflection			
Plot No.	Type	SAE Class	Units
002	FIL	180	CM
Max	Time	Min	Time
6.9	24.9	0.0	0.6



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
24.6	19.3	-0.3	66.6

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

Test Date: 11/21/11

ATD Serial No.: 034

Test I.D.: M034LK022, M034RK022

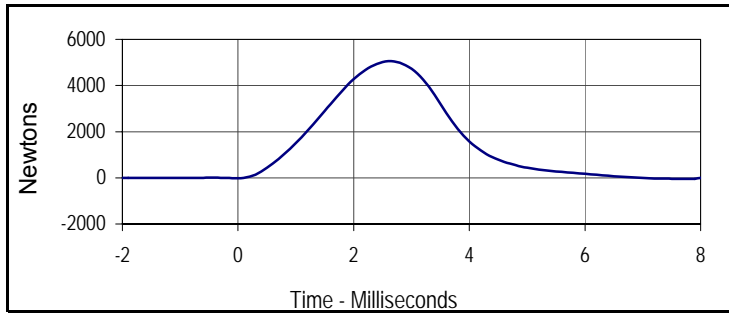


Left Knee

Tested Parameter	Units	Specification	Result	Pass/Fail
Knee Assembly Soak Time	Minutes	≥240	260	Pass
Temperature During Soak	Max	18.9 to 25.6	21.7	Pass
	Min		20.6	Pass
Humidity During Soak	Max	10.0 to 70.0	40.0	Pass
	Min		29.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.3	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	35.5	Pass
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.10	Pass
Peak Probe Force	Newtons	4715 to 5782	5051	Pass
Overall Test Results				Pass

Right Knee

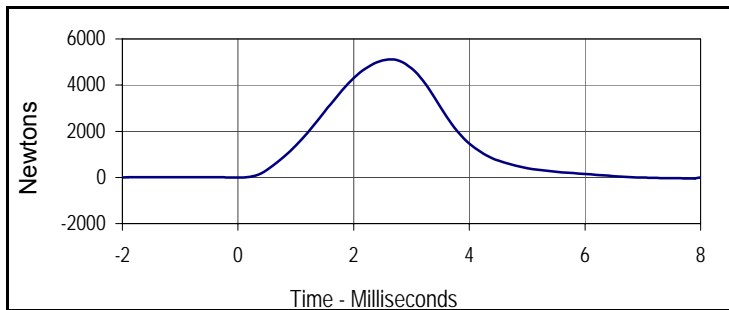
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.09	Pass
Peak Probe Force	Newtons	4715 to 5782	5116	Pass
Overall Test Results				Pass



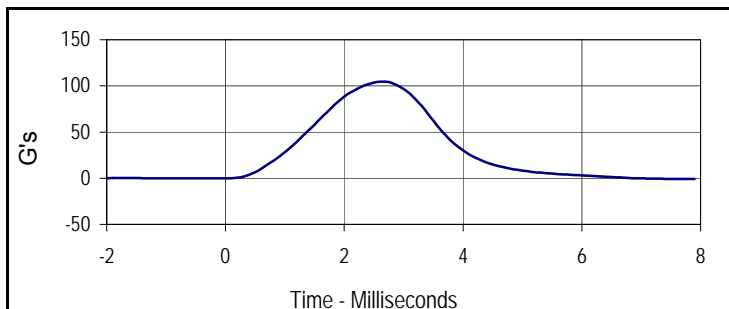
Curve Description			
Left Knee Probe Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
5050.6	2.6	-47.1	7.7



Curve Description			
Left Knee Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	600	G's
Max	Time	Min	Time
103.2	2.6	-1.0	7.7



Curve Description			
Right Knee Probe Force			
Plot No.	Type	SAE Class	Units
003	FIL	600	Newtons
Max	Time	Min	Time
5116.0	2.6	-39.0	7.8



Curve Description			
Right Knee Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	600	G's
Max	Time	Min	Time
104.6	2.6	-0.8	7.8

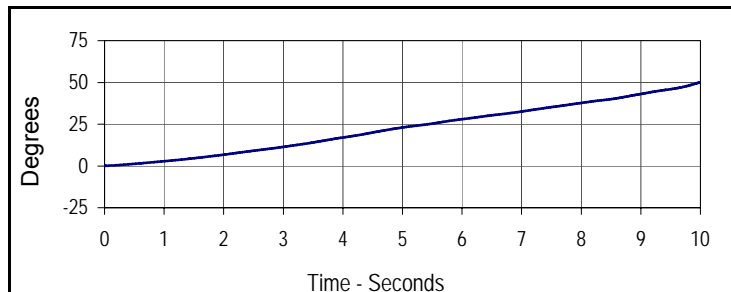


Left Hip Joint-Femur Results

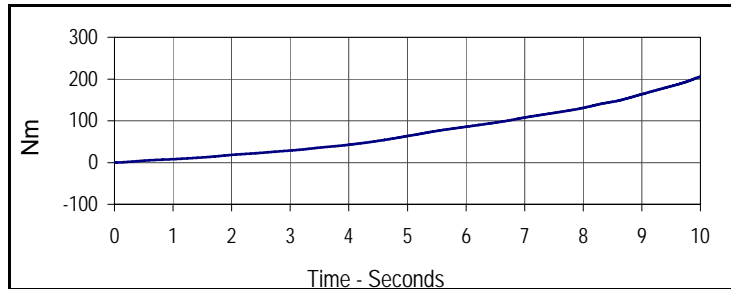
Tested Parameter	Units	Specification	Result	Pass/Fail
Hip Joint-Femur Assembly Soak Time	Minutes	≥240	420	Pass
Temperature During Soak	Max	18.9 to 25.6	21.7	Pass
	Min		20.7	Pass
Humidity During Soak	Max	10.0 to 70.0	40.0	Pass
	Min		29.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.3	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	32.2	Pass
Rotation Rate	deg/sec	5 to 10	5.0	Pass
Femur Torque at 30°	Nm	≤ 95	94.1	Pass
Rotation at 203 Nm	Degrees	40.0 to 50.0	49.6	Pass
Overall Test Results				Pass

Right Hip Joint-Femur Results

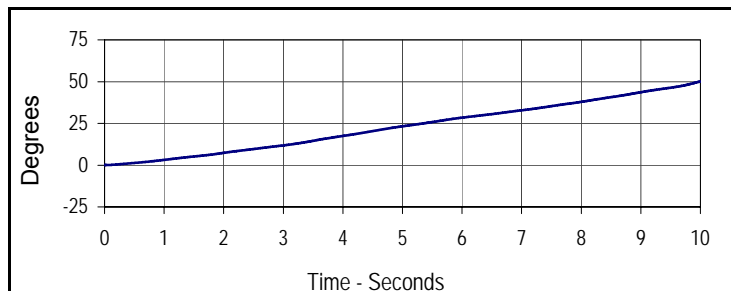
Rotation Rate	deg/sec	5 to 10	5.0	Pass
Femur Torque at 30°	Nm	≤ 95	93.8	Pass
Rotation at 203 Nm	Degrees	40.0 to 50.0	49.5	Pass
Overall Test Results				Pass



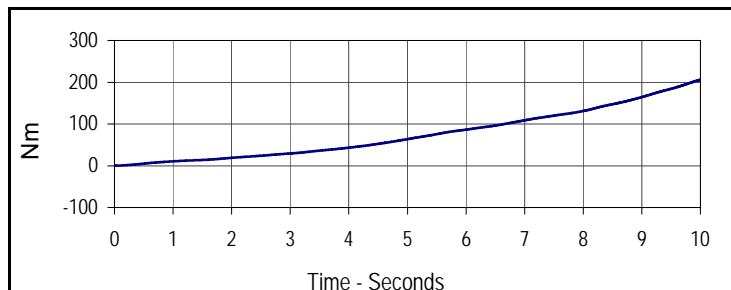
Curve Description			
Left Hip-Femur Rotation			
Plot No.	Type	SAE Class	Units
001	FIL	60	Degrees
Max	Time	Min	Time
50.0	10.0	0.1	0.0



Curve Description			
Left Femur Torque			
Plot No.	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
205.5	10.0	-0.2	0.0



Curve Description			
Right Hip-Femur Rotation			
Plot No.	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
50.0	10.0	0.0	0.0



Curve Description			
Right Femur Torque			
Plot No.	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
205.5	10.0	0.2	0.0

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

Test Date: 11/30/11

ATD Serial No.: 635

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 Head Drop Test

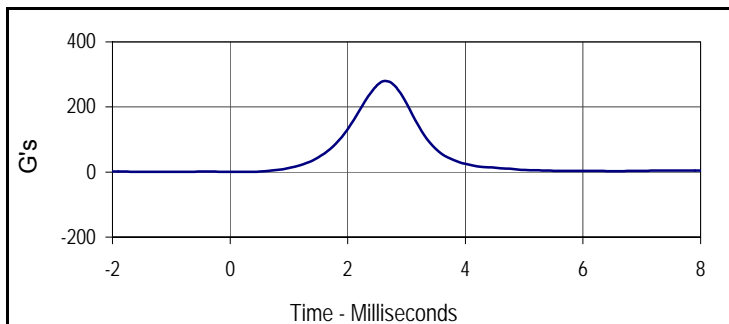
Test Date: 11/30/11

ATD Serial No.: 635

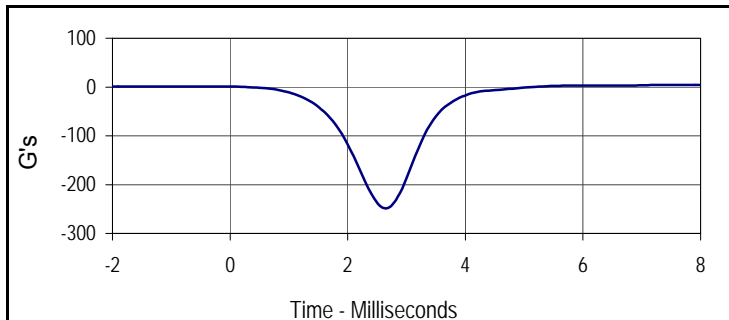
Test I.D.: F635HD023



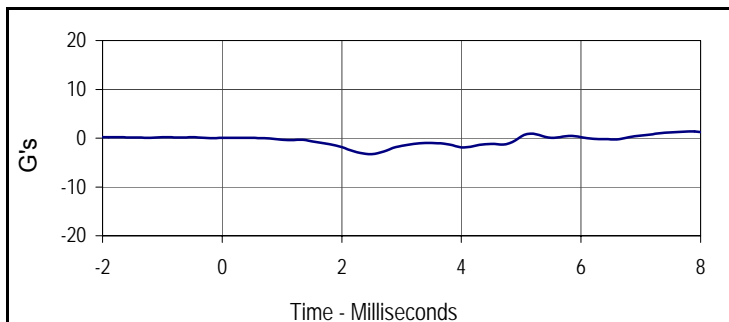
Tested Parameter	Units	Specification	Result	Pass/Fail
Head Assembly Soak Time	Minutes	≥240	270	Pass
Temperature During Soak	Max	18.9 to 25.6	21.7	Pass
	Min		20.6	Pass
Humidity During Soak	Max	10.0 to 70.0	40.0	Pass
	Min		29.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.4	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	32.7	Pass
Peak Resultant Acceleration	G's	250.0 to 300.0	279.0	Pass
Peak Lateral Acceleration	G's	≤15.0	3.3	Pass
Oscillations After Main Pulse	%	<10% of peak Res. Acceleration	1.7	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass



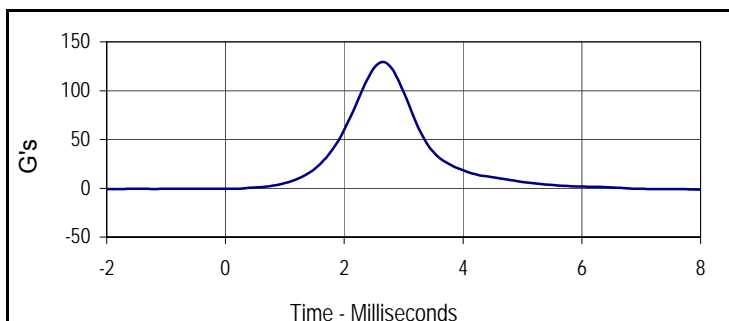
Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
279.0	2.6	0.2	0.3



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
3.1	6.0	-247.5	2.6



Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
0.9	5.2	-3.3	2.5



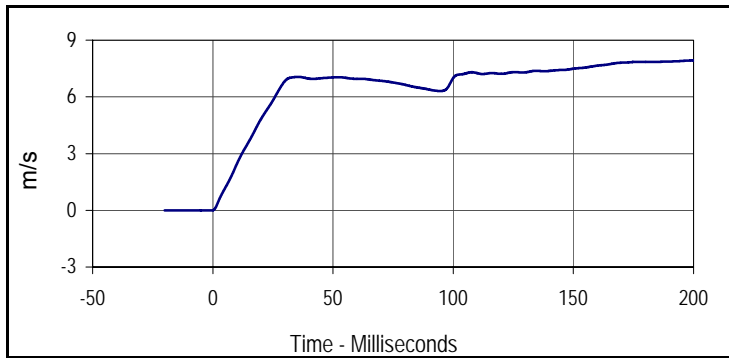
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
128.6	2.6	-0.8	-2.0

Test Program: Hybrid III 5th Percentile Female Neck Flexion Test
 ATD Serial No.: 635

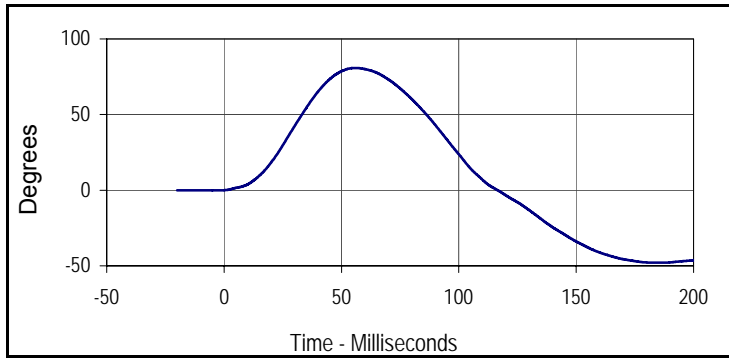
Test Date: 11/30/11
 Test I.D.: F635NF023



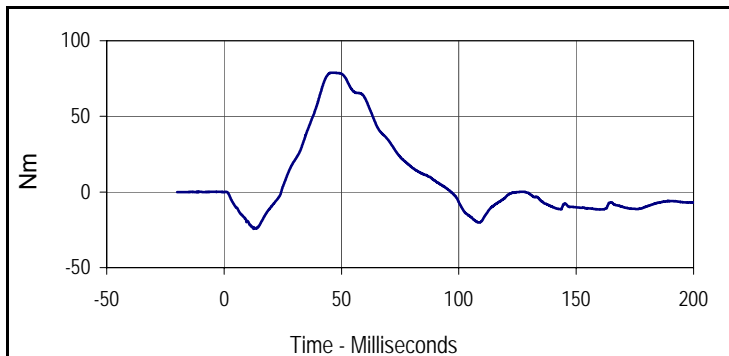
Tested Parameter	Units	Specification	Result	Pass/Fail	
Neck Assembly Soak Time	Minutes	≥240	345	Pass	
Temperature During Soak	Max	20.6 to 22.2	21.7	Pass	
	Min		21.1	Pass	
Humidity During Soak	Max	10.0 to 70.0	40.0	Pass	
	Min		29.0	Pass	
Laboratory Temperature During Test	°C	20.6 to 22.2	21.3	Pass	
Laboratory Humidity During Test	%	10.0 to 70.0	35.2	Pass	
Pendulum Velocity	m/s	6.89 to 7.13	7.02	Pass	
Pendulum Deceleration	10 Msec.	m/s	2.1 to 2.5	2.45	Pass
	20 Msec.	m/s	4.0 to 5.0	4.82	Pass
	30 Msec.	m/s	5.8 to 7.0	6.84	Pass
"D" Plane Rotation	Max	Degrees	77.0 to 91.0	80.8	Pass
Peak Moment in Rotation	Max	Nm	69.0 to 83.0	78.6	Pass
Positive Moment Decay, Time To 10 Nm	Msec.	80.0 to 100.0	86.3	Pass	
Overall Test Results				Pass	



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
7.9	200.0	0.0	-0.4



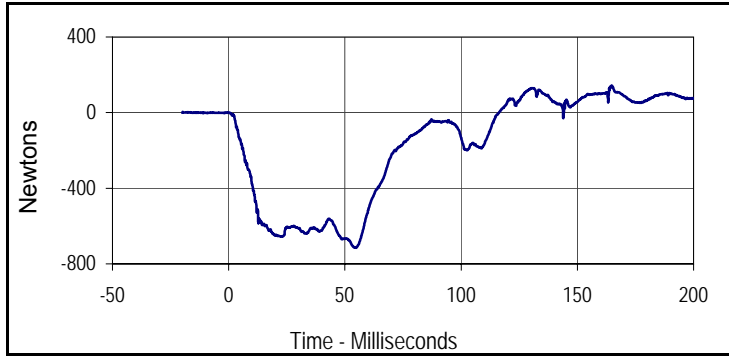
Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
80.8	55.9	-47.9	187.8



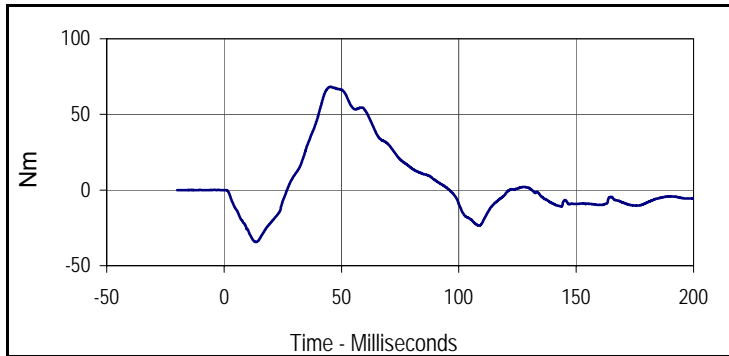
Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
78.9	47.0	-24.4	12.5

Test Program: Hybrid III 5th Percentile Female Neck Flexion Test
 ATD Serial No.: 635

Test Date: 11/30/11
 Test I.D.: F635NF023



Curve Description			
Upper Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
143.0	164.9	-714.9	54.8



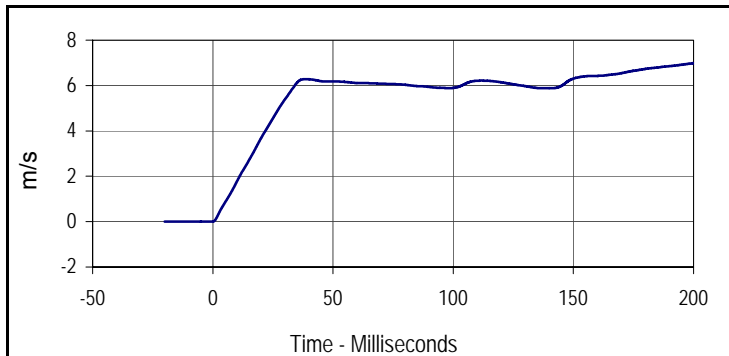
Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
68.2	45.5	-34.3	13.8

Test Program: Hybrid III 5th Percentile Female Neck Extension Test
 ATD Serial No.: 635

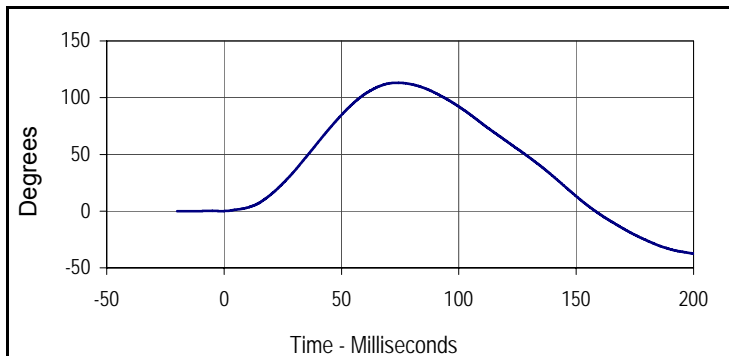
Test Date: 11/30/11
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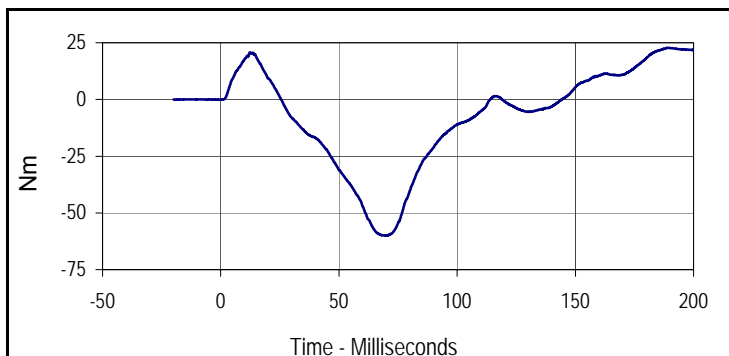
Tested Parameter	Units	Specification	Result	Pass/Fail	
Neck Assembly Soak Time	Minutes	≥240	360	Pass	
Temperature During Soak	Max	20.6 to 22.2	21.7	Pass	
	Min		20.8	Pass	
Humidity During Soak	Max	10.0 to 70.0	40.0	Pass	
	Min		29.0	Pass	
Laboratory Temperature During Test	°C	20.6 to 22.2	21.4	Pass	
Laboratory Humidity During Test	%	10.0 to 70.0	32.6	Pass	
Pendulum Velocity	m/s	5.95 to 6.19	6.13	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	113.2	Pass
Peak Moment in Rotation	Max	Nm	-53.0 to -65.0	-60.0	Pass
Positive Moment Decay, Time To -10 Nm	Msec.	94.0 to 114.0	102.9	Pass	
Overall Test Results				Pass	



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
7.0	200.0	0.0	-0.6



Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
113.2	73.7	-37.4	200.0



Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
22.8	189.7	-60.0	69.9

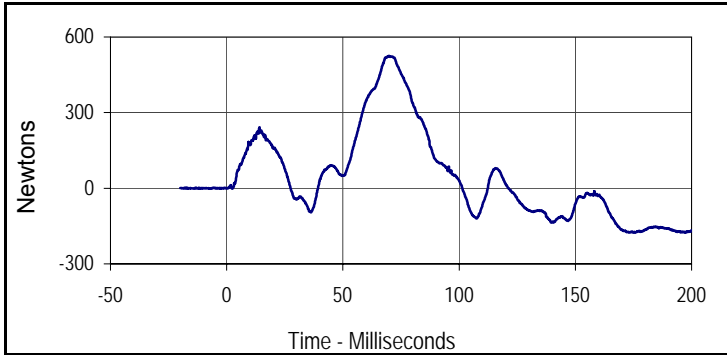
Test Program: Hybrid III 5th Percentile Female Neck Extension Test

Test Date: 11/30/11

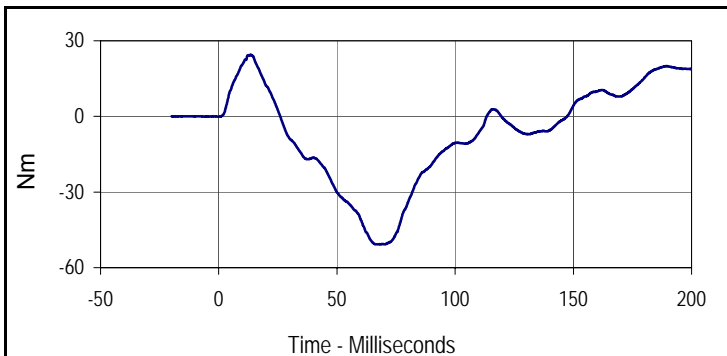


ATD Serial No.: 635

Test I.D.: F635NE023



Curve Description			
Upper Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
525.5	69.8	-175.7	175.0



Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
24.5	13.5	-50.7	67.2

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

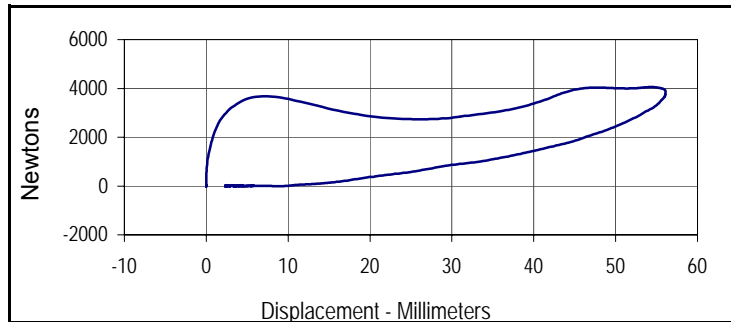
Test Date: 11/30/11

ATD Serial No.: 635

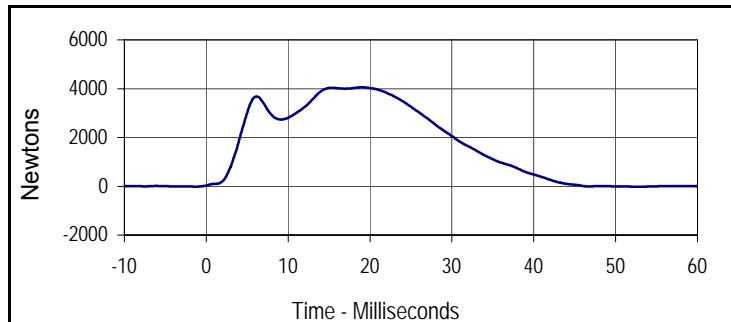
Test I.D.: F635CH023



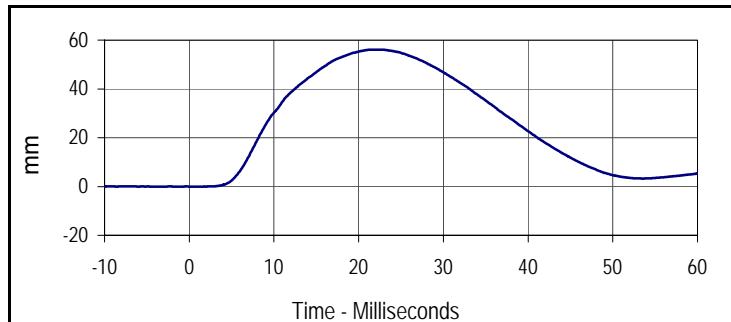
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥240	455	Pass
Temperature During Soak	Max	20.6 to 22.2	21.7	Pass
	Min		21.1	Pass
Humidity During Soak	Max	10.0 to 70.0	40.0	Pass
	Min		29.0	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.4	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	35.2	Pass
Probe Velocity	m/s	6.59 to 6.83	6.71	Pass
Peak Chest Deflection	mm	50.0 to 58.0	56.1	Pass
Peak Force Between 50 and 58 MM	Newtons	3900 to 4400	4035	Pass
Peak Force Between 18 and 50 MM	Newtons	≤4600	4054	Pass
Internal Hysteresis	%	69 to 85	69.9	Pass
Overall Test Results				Pass



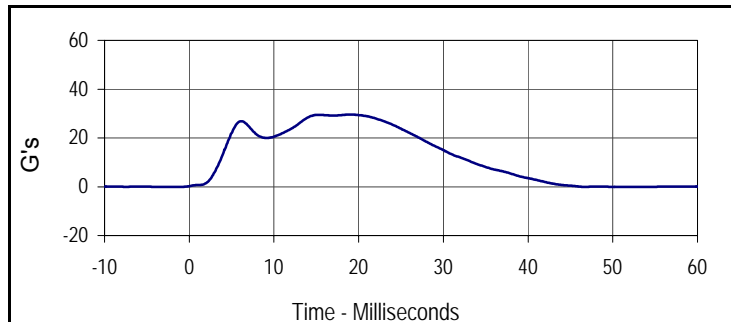
Curve Description			
Probe Force vs. Chest Deflection			
Plot No.	Type	SAE Class	Hysteresis
001	FIL	180	69.9
Peak Probe Force		Peak Chest Deflection	
4053.5		56.1	



Curve Description			
Probe Force			
Plot No.	Type	SAE Class	Units
002	FIL	180	Newtons
Max	Time	Min	Time
4053.5	19.0	-22.9	181.6



Curve Description			
Chest Deflection			
Plot No.	Type	SAE Class	Units
003	FIL	600	mm
Max	Time	Min	Time
56.1	21.7	0.0	-1.5



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
29.6	19.0	-0.1	52.8

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

Test Date: 11/30/11

ATD Serial No.: 635

Test I.D.: F635LK023 , F635RK023

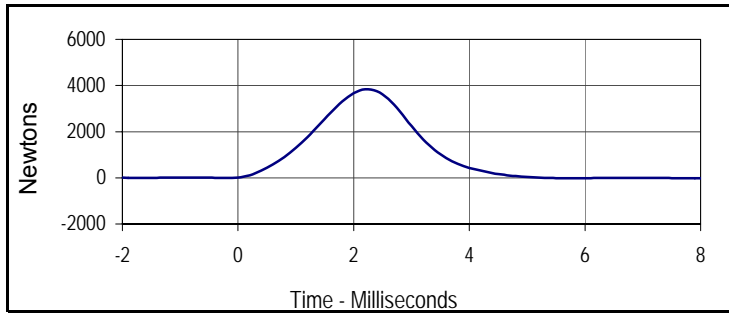


Left Knee

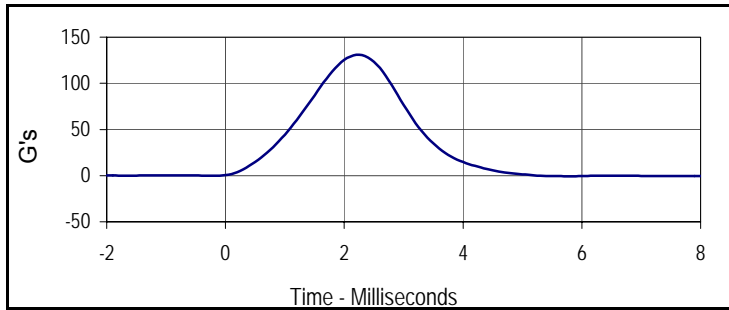
Tested Parameter	Units	Specification	Result	Pass/Fail
Knee Assembly Soak Time	Minutes	≥240	500	Pass
Temperature During Soak	Max	18.9 to 25.6	21.7	Pass
	Min		21.1	Pass
Humidity During Soak	Max	10.0 to 70.0	40.0	Pass
	Min		29.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.6	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	35.8	Pass
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.09	Pass
Peak Probe Force	Newtons	3450 to 4060	3835	Pass
Overall Test Results				Pass

Right Knee

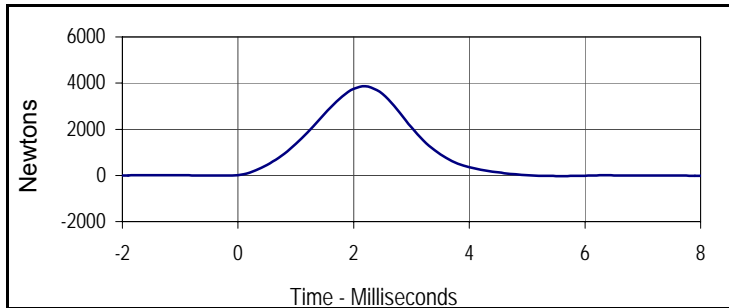
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.100	Pass
Peak Probe Force	Newtons	3450 to 4060	3861	Pass
Overall Test Results				Pass



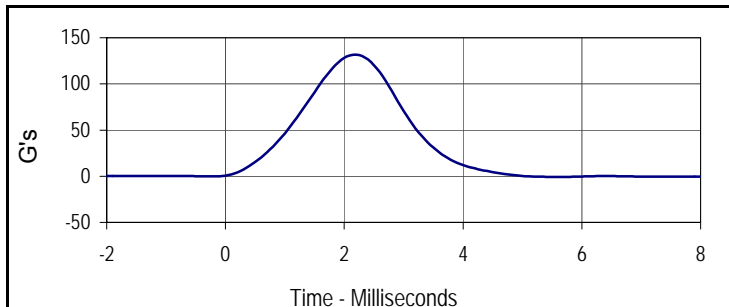
Curve Description			
Left Knee Probe Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
3834.9	2.2	-18.6	9.3



Curve Description			
Left Knee Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	600	G's
Max	Time	Min	Time
130.8	2.2	-0.6	9.3



Curve Description			
Right Knee Probe Force			
Plot No.	Type	SAE Class	Units
003	FIL	600	Newtons
Max	Time	Min	Time
3860.5	2.2	-25.5	5.6



Curve Description			
Right Knee Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	600	G's
Max	Time	Min	Time
131.7	2.2	-0.9	5.6

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

Test Date: 11/30/11

ATD Serial No.: 635

Test I.D.: F635TF023



Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy 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	40.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.5	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	34.3	Pass
Initial Reference Plane Angle		Degrees	≤ 20	8.7	Pass
Peak Force at 45° +/-0.5°		Newtons	320.0 to 390.0	341.0	Pass
Torso Rotation Rate		deg/sec	0.5 to 1.5	0.7	Pass
Final Reference Plane Angle		Degrees	+/-8	4.8	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: 12/8/11

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: 12/8/11

ATD Serial No.: 034

Test I.D.: N/A



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.14	Pass
Laboratory Relative Humidity	%	10 to 70	31.8	Pass
A - Total sitting height	mm	879 to 889	881	Pass
B - Shoulder pivot height	mm	505 to 521	514	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	299	Pass
H - Head back to backline	mm	41 to 46	44	Pass
I - Shoulder to elbow length	mm	330 to 345	334	Pass
J - Elbow rest height	mm	190 to 211	206	Pass
K - Buttock to knee length	mm	579 to 604	589	Pass
L - Popliteal length	mm	429 to 455	437	Pass
M - Knee pivot height	mm	485 to 500	487	Pass
N - Buttock popliteal length	mm	452 to 477	472	Pass
O - Chest depth without jacket	mm	213 to 229	226	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	986	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

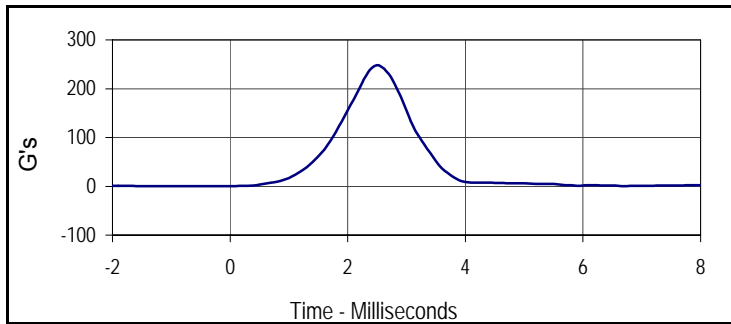
Test Date: 12/8/11

ATD Serial No.: 034

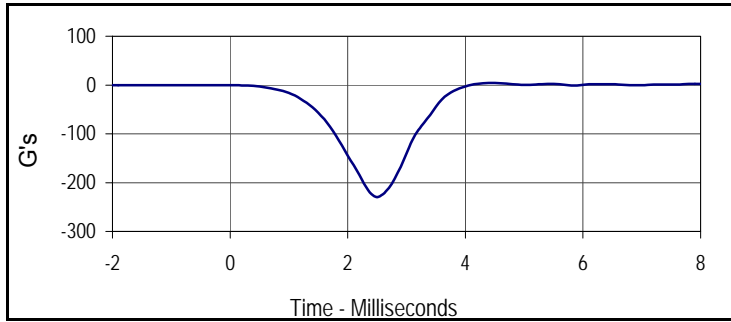
Test I.D.: M034HD023



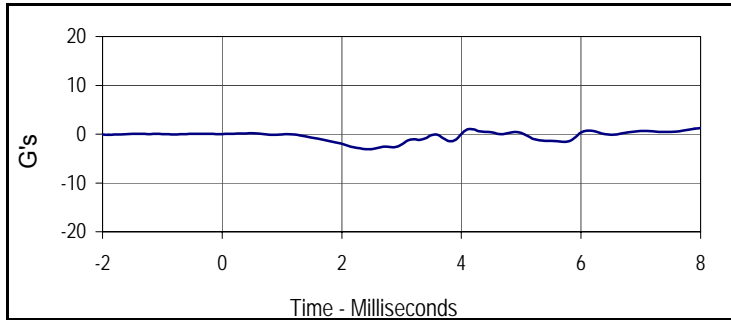
Tested Parameter	Units	Specification	Result	Pass/Fail
Head Assembly Soak Time	Minutes	≥240	247	Pass
Temperature During Soak	Max	18.9 to 25.6	21.7	Pass
	Min		20.7	Pass
Humidity During Soak	Max	10.0 to 70.0	40.0	Pass
	Min		28.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	31.6	Pass
Peak Resultant Acceleration	G's	225.0 to 275.0	248.2	Pass
Peak Lateral Acceleration	G's	≤15.0	3.1	Pass
Oscillations After Main Pulse	%	<10% of peak Res. Acceleration	3.5	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass



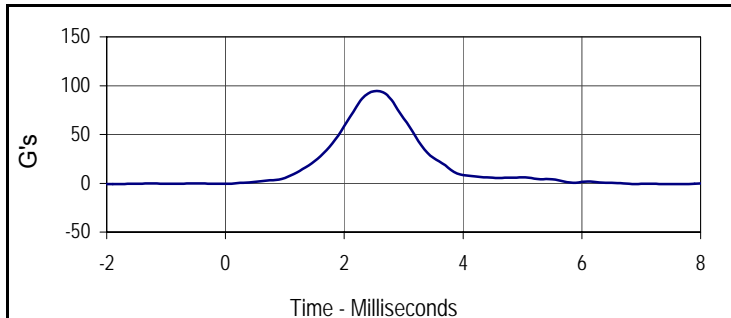
Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
248.2	2.5	0.5	-0.6



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
4.1	4.5	-229.6	2.5



Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
1.0	4.1	-3.1	2.5



Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
94.4	2.5	-0.9	-1.8

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

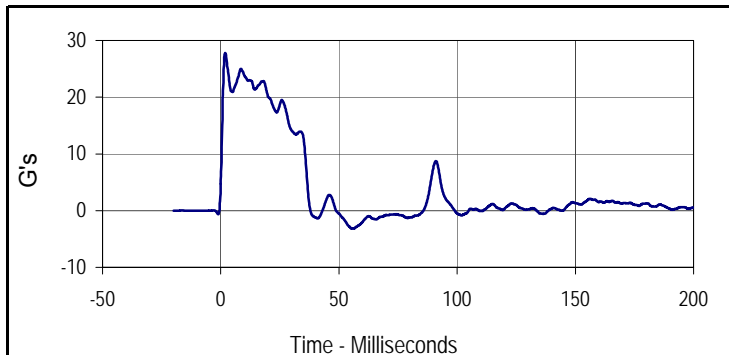
Test Date: 12/8/11

ATD Serial No.: 034

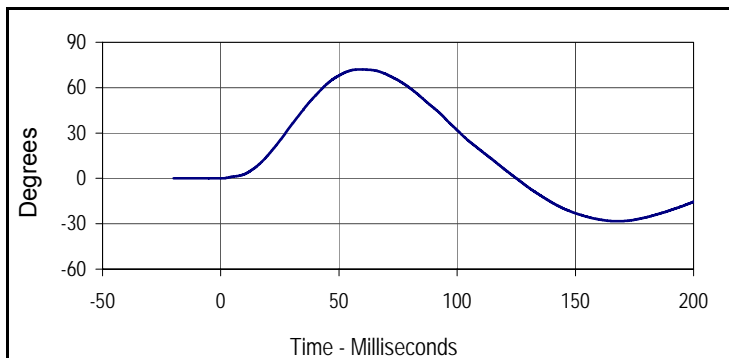
Test I.D.: M034NF023



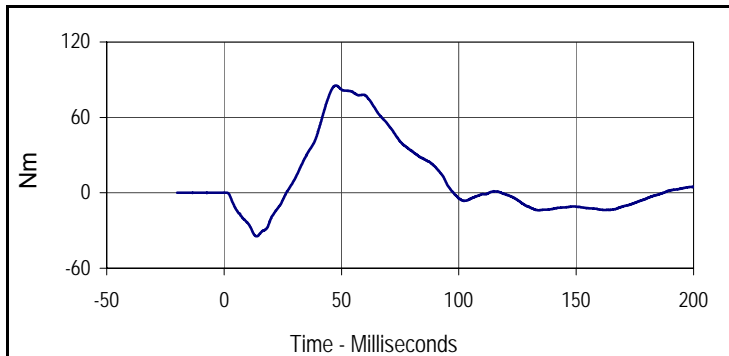
Tested Parameter	Units	Specification	Result	Pass/Fail	
Neck Assembly Soak Time	Minutes	≥240	292	Pass	
Temperature During Soak	Max	20.6 to 22.2	21.7	Pass	
	Min		20.7	Pass	
Humidity During Soak	Max	10.0 to 70.0	40.0	Pass	
	Min		29.0	Pass	
Laboratory Temperature During Test	°C	20.6 to 22.2	21.2	Pass	
Laboratory Humidity During Test	%	10.0 to 70.0	32.6	Pass	
Pendulum Velocity	m/s	6.89 to 7.13	7.10	Pass	
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	23.8	Pass
	20 Msec.	G's	17.6 to 22.6	20.1	Pass
	30 Msec.	G's	12.5 to 18.5	14.1	Pass
Peak Pendulum Decel. after 30 Msec.	G's	≤ 29.0	14.1	Pass	
Deceleration Decay, Time to Cross 5 G's	Msec.	34.0 to 42.0	36.6	Pass	
Maximum "D" Plane Rotation	Max	Degrees	64.0 to 78.0	72.0	Pass
	Time	Msec.	57.0 to 64.0	59.0	Pass
"D" Plane Rotation Decay, Time To Zero Crossing	Msec.	113.0 to 128.0	125.1	Pass	
Moment About Occ. Condyle	Max	Nm	84.1 to 108.5	85.3	Pass
	Time	Msec.	47.0 to 58.0	47.5	Pass
Positive Moment Decay, Time To Zero Crossing	Msec.	97.0 to 107.0	97.8	Pass	
Overall Test Results				Pass	



Curve Description			
Pendulum Deceleration			
Plot No.	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
27.8	1.9	-3.2	56.1



Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
72.0	59.0	-28.3	167.7



Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
85.3	47.5	-34.5	13.6

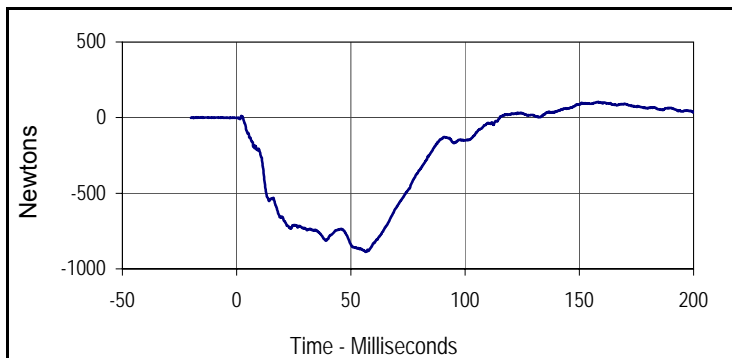
Test Program: Hybrid III 50th Percentile Male Neck Flexion Test

Test Date: 12/8/11

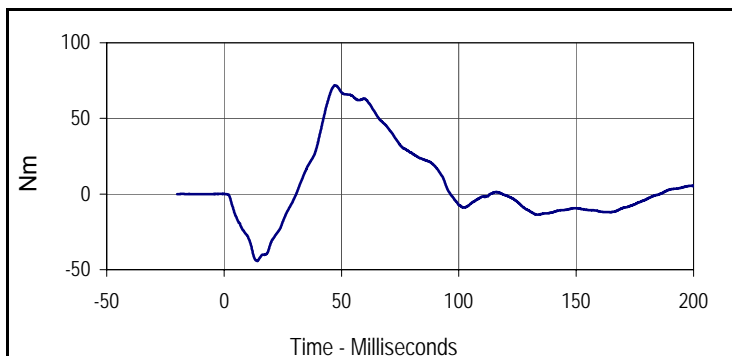


ATD Serial No.: 034

Test I.D.: M034NF023



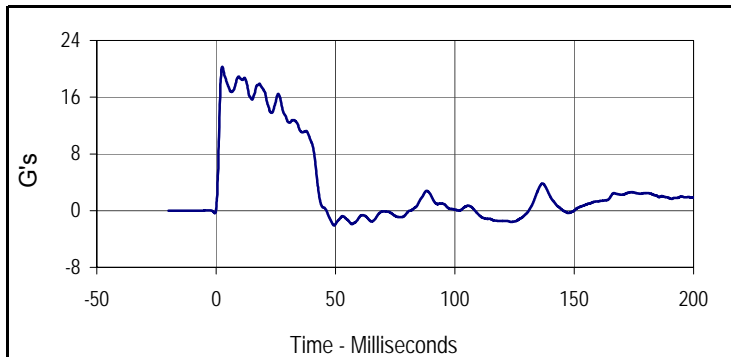
Curve Description			
Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
103.4	158.2	-887.1	56.6



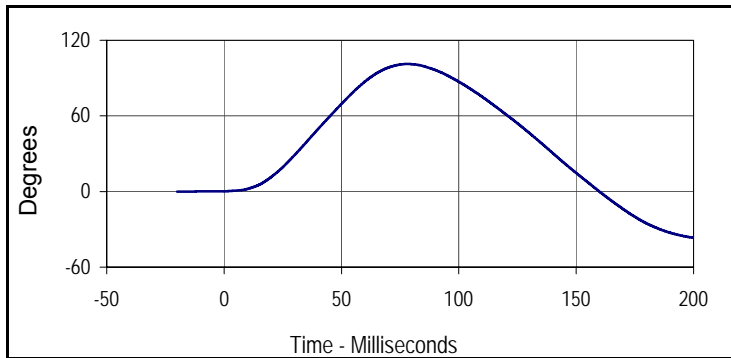
Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
71.8	47.3	-44.3	14.2



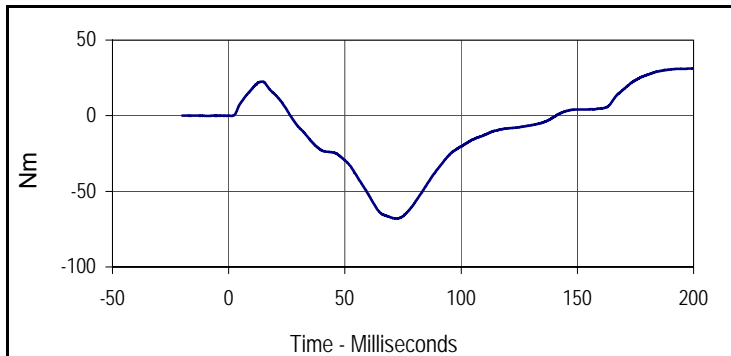
Tested Parameter	Units	Specification	Result	Pass/Fail	
Neck Assembly Soak Time	Minutes	≥240	312	Pass	
Temperature During Soak	Max	20.6 to 22.2	21.7	Pass	
	Min		20.7	Pass	
Humidity During Soak	Max	10.0 to 70.0	40.0	Pass	
	Min		29.0	Pass	
Laboratory Temperature During Test	°C	20.6 to 22.2	21.1	Pass	
Laboratory Humidity During Test	%	10.0 to 70.0	31.5	Pass	
Pendulum Velocity	m/s	5.94 to 6.19	6.07	Pass	
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	18.7	Pass
	20 Msec.	G's	14.0 to 19.0	16.9	Pass
	30 Msec.	G's	11.0 to 16.0	12.5	Pass
Peak Pendulum Decel. after 30 Msec.	G's	≤ 22.0	12.8	Pass	
Deceleration Decay, Time to Cross 5 G's	Msec.	38.0 to 46.0	42.1	Pass	
Maximum "D" Plane Rotation	Max	Degrees	81.0 to 106.0	101.2	Pass
	Time	Msec.	72.0 to 82.0	78.0	Pass
"D" Plane Rotation Decay, Time To Zero Crossing	Msec.	147.0 to 174.0	159.9	Pass	
Moment About Occ. Condyle	Max	Nm	-52.9 to -79.9	-68.1	Pass
	Time	Msec.	65.0 to 79.0	72.4	Pass
Positive Moment Decay, Time To Zero Crossing	Msec.	120.0 to 148.0	140.9	Pass	
Overall Test Results				Pass	



Curve Description			
Pendulum Deceleration			
Plot No.	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
20.3	2.6	-2.1	49.4



Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
101.2	78.0	-36.7	200.0



Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
31.2	198.7	-68.1	72.4

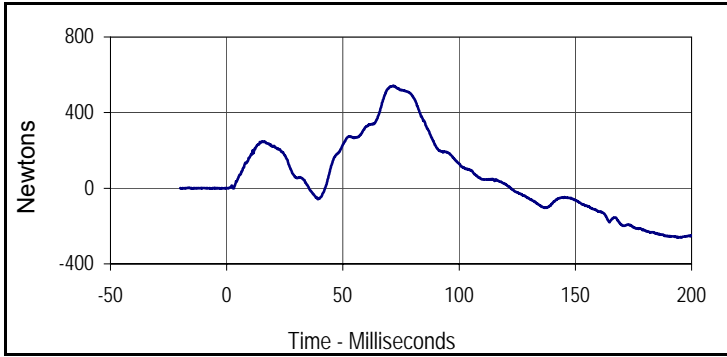
Test Program: Hybrid III 50th Percentile Male Neck Extension Test

Test Date: 12/8/11

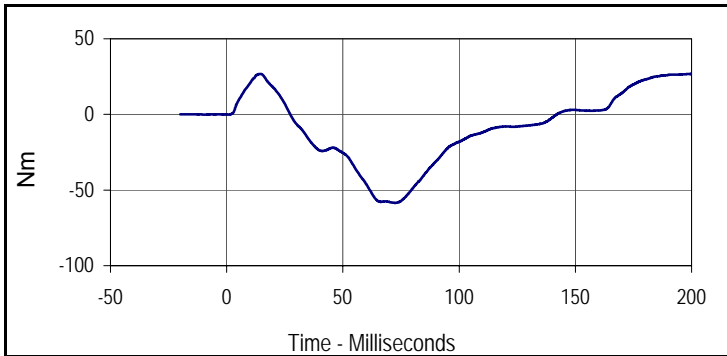


ATD Serial No.: 034

Test I.D.: M034NE023



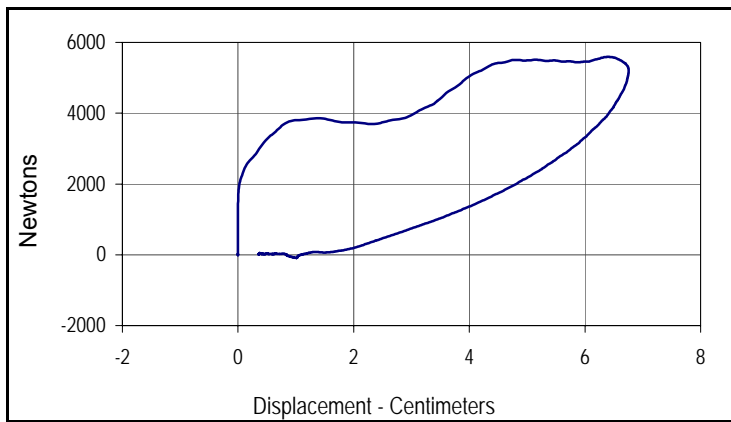
Curve Description			
Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
542.1	71.6	-260.8	195.8



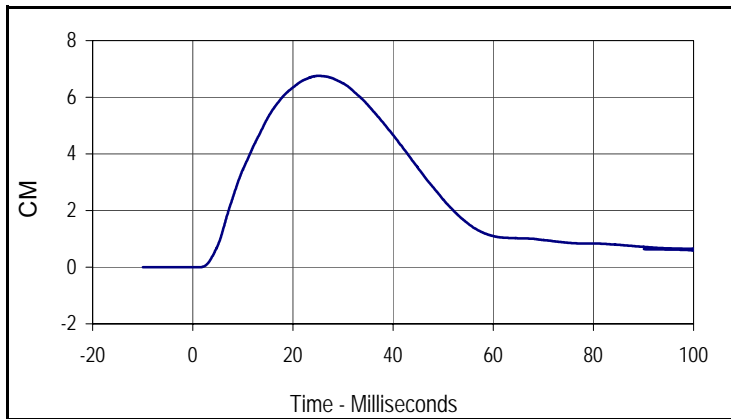
Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
26.8	14.2	-58.5	72.4



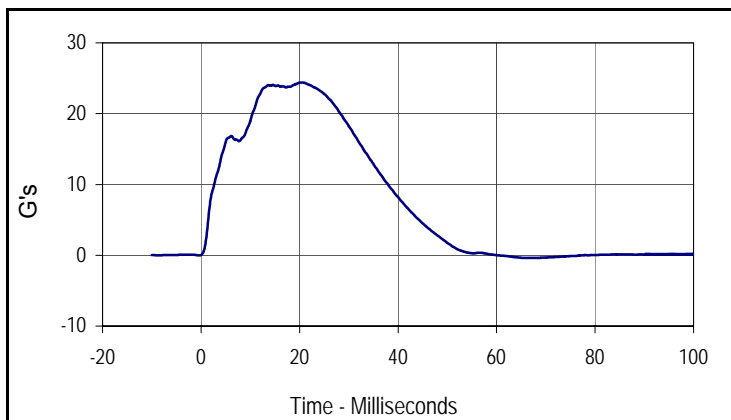
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥240	352	Pass
Temperature During Soak	Max	20.6 to 22.2	21.7	Pass
	Min		20.7	Pass
Humidity During Soak	Max	10.0 to 70.0	40.0	Pass
	Min		29.0	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	32.4	Pass
Probe Velocity	m/s	6.58 to 6.82	6.60	Pass
Peak Probe Force	Newtons	5159 to 5893	5589	Pass
Peak Sternum Deflection	CM	6.35 to 7.26	6.76	Pass
Internal Hysteresis	%	69 to 85	69.9	Pass
Overall Test Results				Pass



Curve Description			
Probe Force vs. Chest Deflection			
Plot No.	Type	SAE Class	Hysteresis
001	FIL	180	69.9
Peak Probe Force		Peak Chest Deflection	
5589		6.76	



Curve Description			
Chest Deflection			
Plot No.	Type	SAE Class	Units
002	FIL	180	CM
Max	Time	Min	Time
6.8	25.1	0.0	1.2



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
24.4	20.4	-0.4	67.0

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

Test Date: 12/8/11

ATD Serial No.: 034

Test I.D.: M034LK023, M034RK023

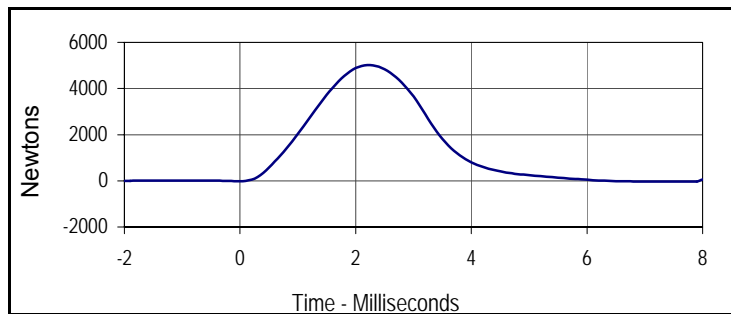


Left Knee

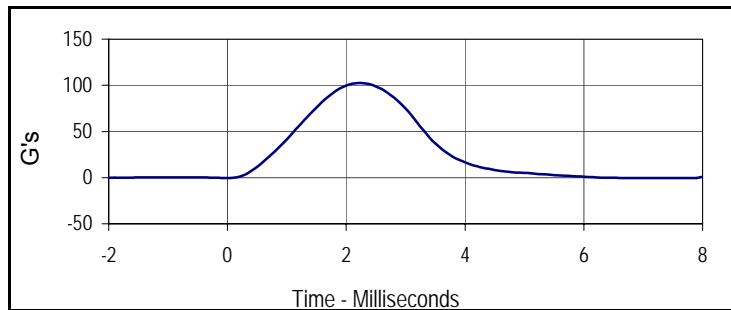
Tested Parameter	Units	Specification	Result	Pass/Fail
Knee Assembly Soak Time	Minutes	≥240	300	Pass
Temperature During Soak	Max	18.9 to 25.6	21.7	Pass
	Min		20.6	Pass
Humidity During Soak	Max	10.0 to 70.0	40.0	Pass
	Min		29.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.1	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	31.4	Pass
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.09	Pass
Peak Probe Force	Newtons	4715 to 5782	5017	Pass
Overall Test Results				Pass

Right Knee

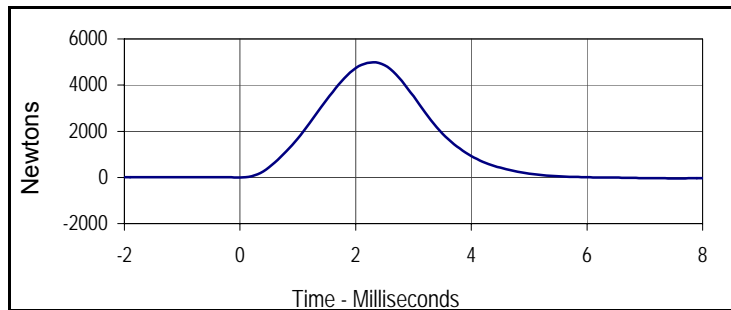
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.08	Pass
Peak Probe Force	Newtons	4715 to 5782	4995	Pass
Overall Test Results				Pass



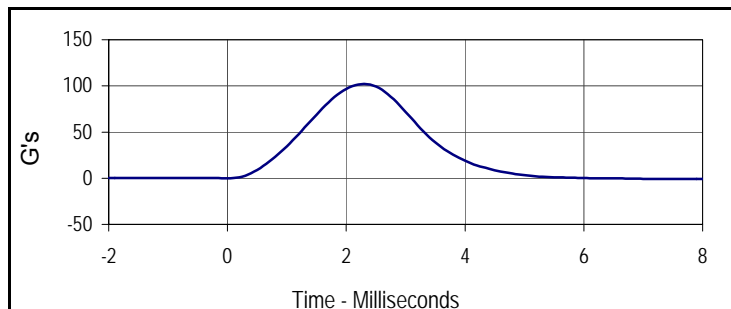
Curve Description			
Left Knee Probe Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
5017.4	2.2	-27.4	7.4



Curve Description			
Left Knee Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	600	G's
Max	Time	Min	Time
102.5	2.2	-0.6	7.4



Curve Description			
Right Knee Probe Force			
Plot No.	Type	SAE Class	Units
003	FIL	600	Newtons
Max	Time	Min	Time
4994.6	2.3	-39.8	7.5



Curve Description			
Right Knee Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	600	G's
Max	Time	Min	Time
102.1	2.3	-0.8	7.5

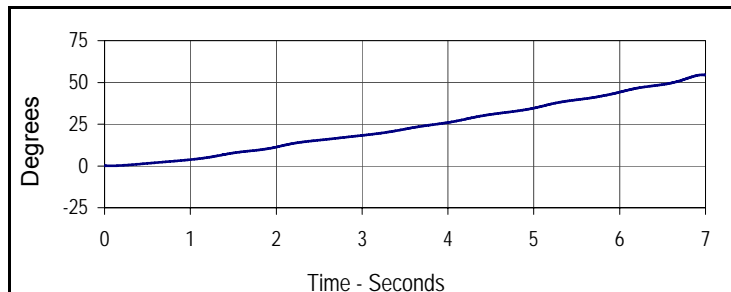


Left Hip Joint-Femur Results

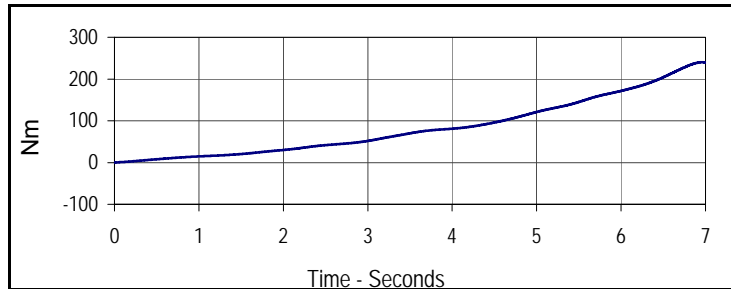
Tested Parameter	Units	Specification	Result	Pass/Fail
Hip Joint-Femur Assembly Soak Time	Minutes	≥240	420	Pass
Temperature During Soak	Max	18.9 to 25.6	21.7	Pass
	Min		20.7	Pass
Humidity During Soak	Max	10.0 to 70.0	40.0	Pass
	Min		29.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.3	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	34.2	Pass
Rotation Rate	deg/sec	5 to 10	7.8	Pass
Femur Torque at 30°	Nm	≤ 95	91.8	Pass
Rotation at 203 Nm	Degrees	40.0 to 50.0	48.6	Pass
Overall Test Results				Pass

Right Hip Joint-Femur Results

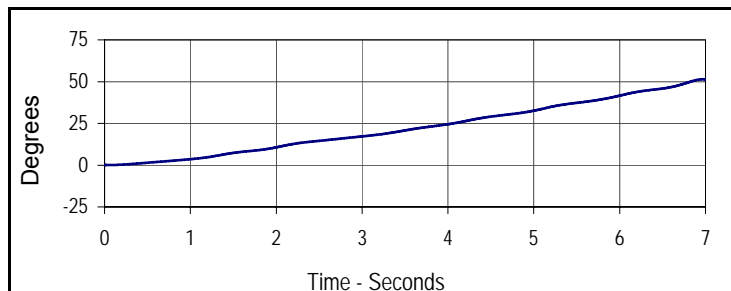
Rotation Rate	deg/sec	5 to 10	7.4	Pass
Femur Torque at 30°	Nm	≤ 95	92.2	Pass
Rotation at 203 Nm	Degrees	40.0 to 50.0	46.3	Pass
Overall Test Results				Pass



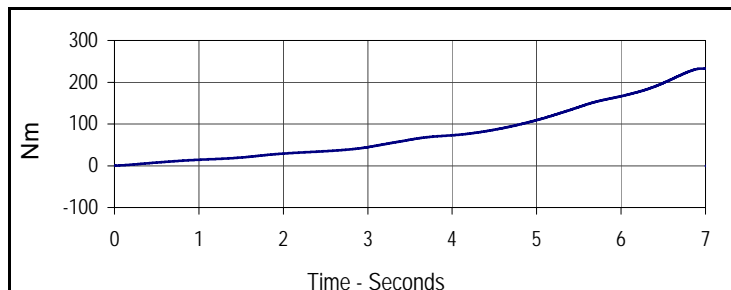
Curve Description			
Left Hip-Femur Rotation			
Plot No.	Type	SAE Class	Units
001	FIL	60	Degrees
Max	Time	Min	Time
54.6	7.0	0.0	0.0



Curve Description			
Left Femur Torque			
Plot No.	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
240.0	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
51.4	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
232.9	7.0	0.3	0.0

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

Test Date: 12/8/11

ATD Serial No.: 635

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: 12/9/11

ATD Serial No.: 635

Test I.D.: N/A



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.24	Pass
Laboratory Relative Humidity	%	10 to 70	27.5	Pass
A - Total sitting height	mm	774.7 to 800.1	778	Pass
B - Shoulder pivot height	mm	431.8 to 457.2	434	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	147	Pass
E - Shoulder pivot from backline	mm	68.6 to 83.8	78	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	246	Pass
H - Head back to backline	mm	40.7 to 45.7	45	Pass
I - Shoulder to elbow length	mm	276.8 to 297.2	283	Pass
J - Elbow rest height	mm	182.8 to 203.2	198	Pass
K - Buttock to knee length	mm	520.7 to 546.1	535	Pass
L - Popliteal length	mm	355.6 to 376.0	373	Pass
M - Knee pivot height	mm	393.7 to 419.1	395	Pass
N - Buttock popliteal length	mm	414.0 to 439.4	430	Pass
O - Chest depth without jacket	mm	175.3 to 190.5	188	Pass
P - Foot length	mm	218.5 to 233.7	220	Pass
R - Buttock to Knee Pivot Length	mm	457.2 to 482.6	476	Pass
S - Head Breadth	mm	137.1 to 147.3	142	Pass
T - Head Depth	mm	177.8 to 188.0	182	Pass
U - Hip Breadth	mm	299.7 to 314.9	302	Pass
V - Shoulder breadth	mm	350.5 to 365.7	357	Pass
W - Foot breadth	mm	78.8 to 94.0	84	Pass
X - Head circumference	mm	528.3 to 548.7	545	Pass
Y - Chest circumference (with chest jacket)	mm	850.8 to 881.3	858	Pass
Z - Waist circumference	mm	759.5 to 789.9	787	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	165	Pass
Overall Test Results				Pass

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

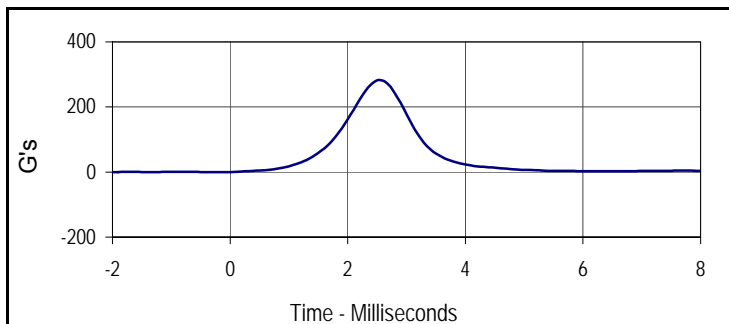
Test Date: 12/9/11

ATD Serial No.: 635

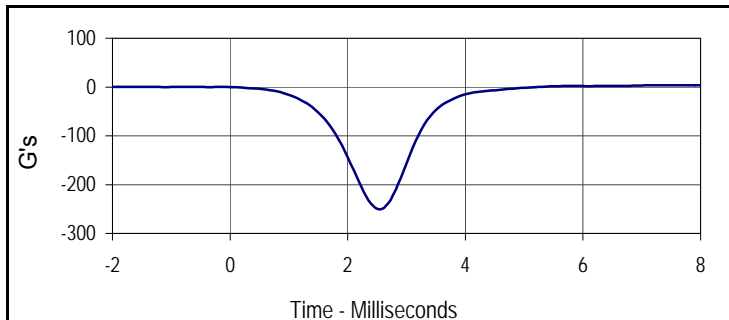
Test I.D.: F635HD024



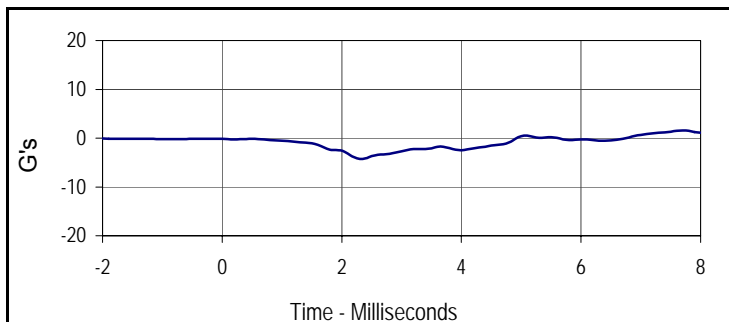
Tested Parameter	Units	Specification	Result	Pass/Fail
Head Assembly Soak Time	Minutes	≥240	320	Pass
Temperature During Soak	Max	18.9 to 25.6	21.7	Pass
	Min		20.7	Pass
Humidity During Soak	Max	10.0 to 70.0	40.0	Pass
	Min		28.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.4	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	27.5	Pass
Peak Resultant Acceleration	G's	250.0 to 300.0	281.6	Pass
Peak Lateral Acceleration	G's	≤15.0	4.3	Pass
Oscillations After Main Pulse	%	<10% of peak Res. Acceleration	1.5	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass



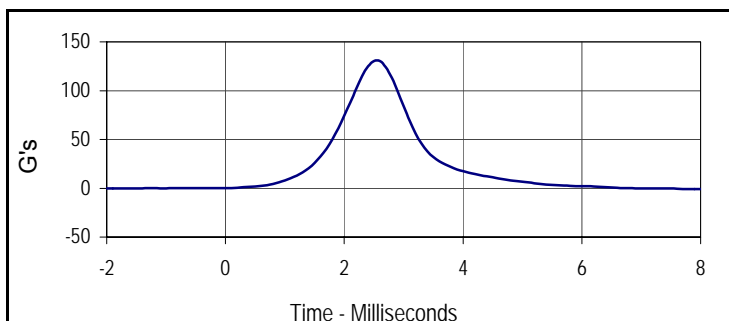
Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
281.6	2.5	0.1	-2.0



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
2.1	5.8	-249.6	2.5



Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
0.5	5.1	-4.3	2.3



Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
130.4	2.5	-0.1	-1.6

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

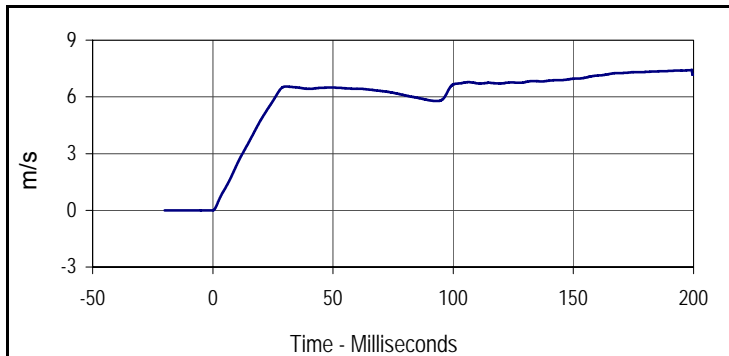
Test Date: 12/9/11

ATD Serial No.: 635

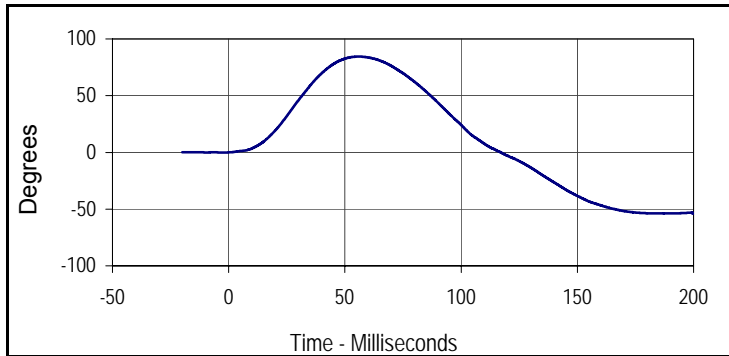
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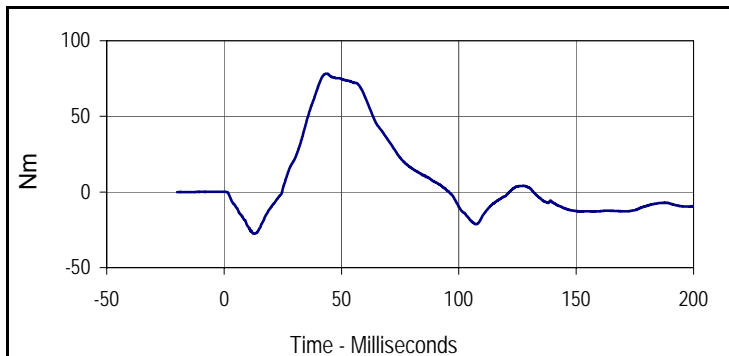
Tested Parameter	Units	Specification	Result	Pass/Fail	
Neck Assembly Soak Time	Minutes	≥240	250	Pass	
Temperature During Soak	Max	20.6 to 22.2	21.7	Pass	
	Min		20.7	Pass	
Humidity During Soak	Max	10.0 to 70.0	40.0	Pass	
	Min		28.0	Pass	
Laboratory Temperature During Test	°C	20.6 to 22.2	21.2	Pass	
Laboratory Humidity During Test	%	10.0 to 70.0	31.7	Pass	
Pendulum Velocity	m/s	6.89 to 7.13	7.00	Pass	
Pendulum Deceleration	10 Msec.	m/s	2.1 to 2.5	2.4	Pass
	20 Msec.	m/s	4.0 to 5.0	4.8	Pass
	30 Msec.	m/s	5.8 to 7.0	6.5	Pass
"D" Plane Rotation	Max	Degrees	77.0 to 91.0	84.5	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	85.1	Pass	
Overall Test Results				Pass	



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
7.4	199.4	0.0	-0.4



Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
84.5	56.1	-53.9	187.0



Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
78.2	43.6	-27.6	12.6

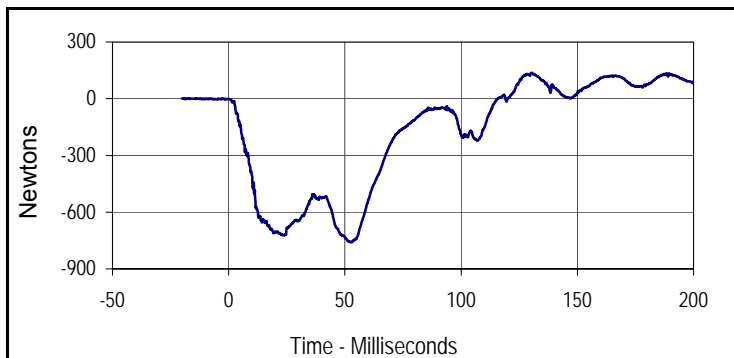
Test Program: Hybrid III 5th Percentile Female Neck Flexion Test

Test Date: 12/9/11

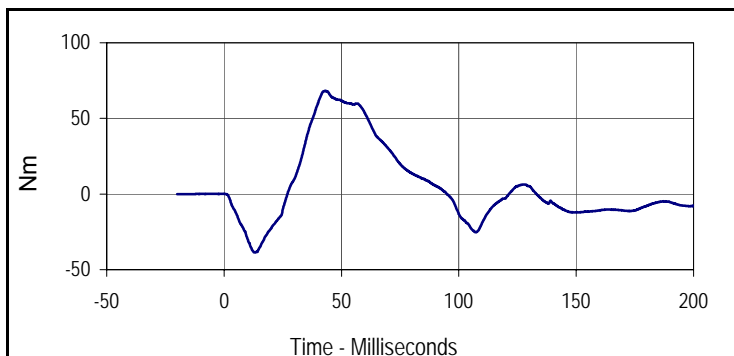


ATD Serial No.: 635

Test I.D.: F635NF024



Curve Description			
Upper Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
137.3	130.4	-759.9	52.9



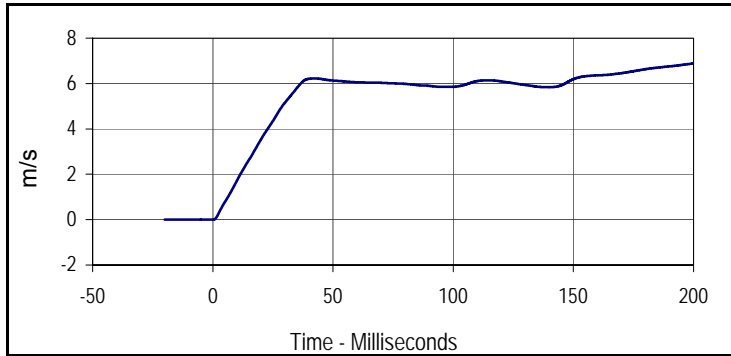
Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
68.2	43.1	-38.6	12.9

Test Program: Hybrid III 5th Percentile Female Neck Extension Test
 ATD Serial No.: 635

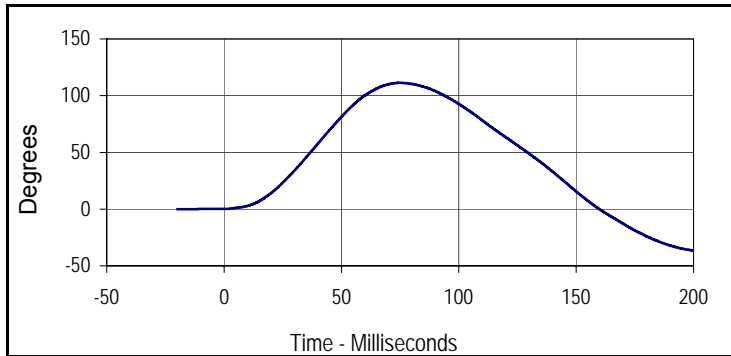
Test Date: 12/9/11
 Test I.D.: F635NE024



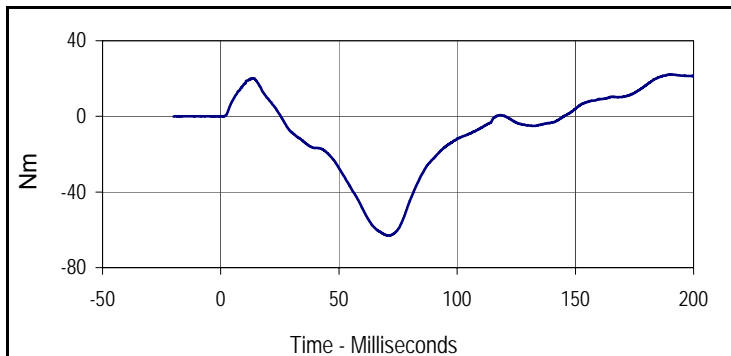
Tested Parameter	Units	Specification	Result	Pass/Fail	
Neck Assembly Soak Time	Minutes	≥240	280	Pass	
Temperature During Soak	Max	20.6 to 22.2	21.7	Pass	
	Min		20.7	Pass	
Humidity During Soak	Max	10.0 to 70.0	40.0	Pass	
	Min		28.0	Pass	
Laboratory Temperature During Test	°C	20.6 to 22.2	21.5	Pass	
Laboratory Humidity During Test	%	10.0 to 70.0	27.4	Pass	
Pendulum Velocity	m/s	5.95 to 6.19	6.10	Pass	
Pendulum Deceleration	10 Msec.	m/s	1.5 to 1.9	1.7	Pass
	20 Msec.	m/s	3.1 to 3.9	3.5	Pass
	30 Msec.	m/s	4.6 to 5.6	5.2	Pass
"D" Plane Rotation	Max	Degrees	99.0 to 114.0	111.3	Pass
Peak Moment in Rotation	Max	Nm	-53.0 to -65.0	-63.1	Pass
Positive Moment Decay, Time To -10 Nm	Msec.	94.0 to 114.0	103.7	Pass	
Overall Test Results				Pass	



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
6.9	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
111.3	74.8	-36.6	200.0



Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
22.2	190.2	-63.1	71.0

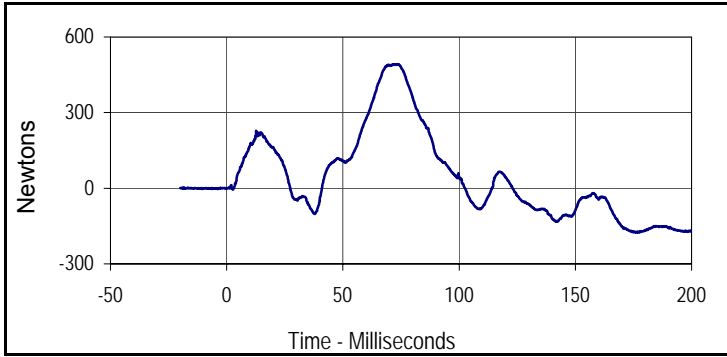
Test Program: Hybrid III 5th Percentile Female Neck Extension Test

Test Date: 12/9/11

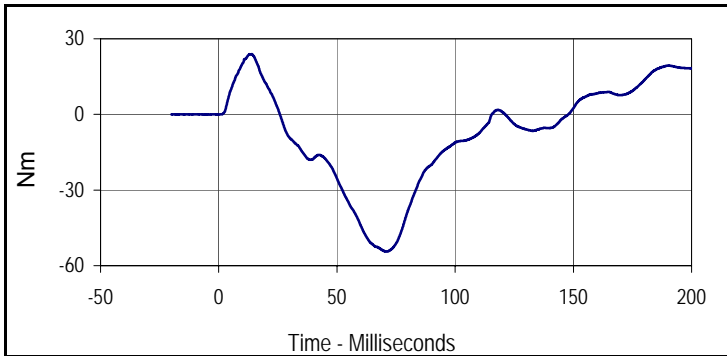


ATD Serial No.: 635

Test I.D.: F635NE024



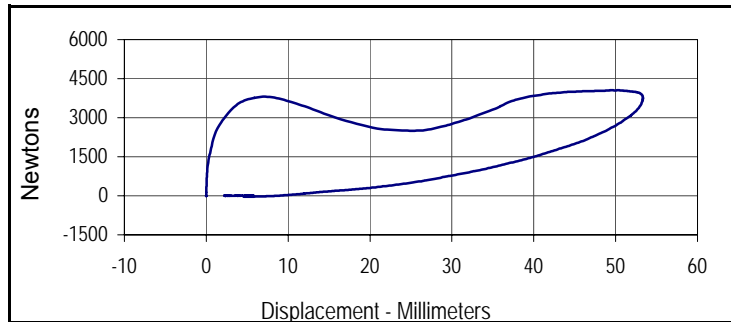
Curve Description			
Upper Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
492.7	73.6	-176.1	176.3



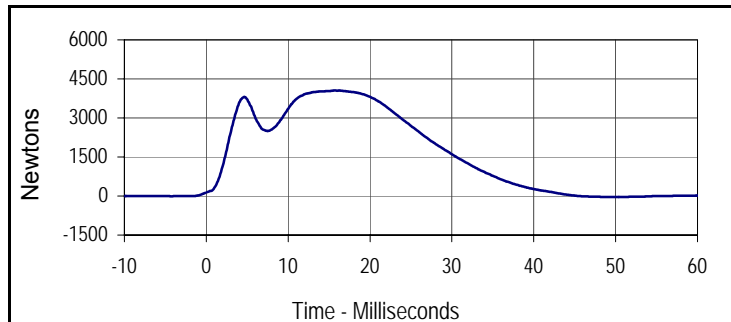
Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
23.9	13.9	-54.5	70.9



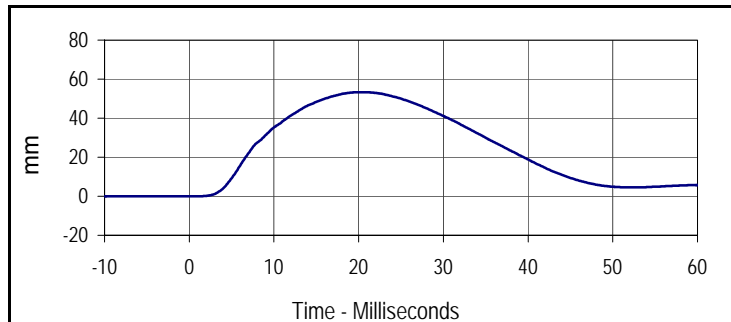
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	395	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	40.0	Pass
	Min	%		28.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	27.7	Pass
Probe Velocity		m/s	6.59 to 6.83	6.71	Pass
Peak Chest Deflection		mm	50.0 to 58.0	53.3	Pass
Peak Force Between 50 and 58 MM		Newtons	3900 to 4400	4054	Pass
Peak Force Between 18 and 50 MM		Newtons	≤4600	4052	Pass
Internal Hysteresis		%	69 to 85	72.5	Pass
Overall Test Results					Pass



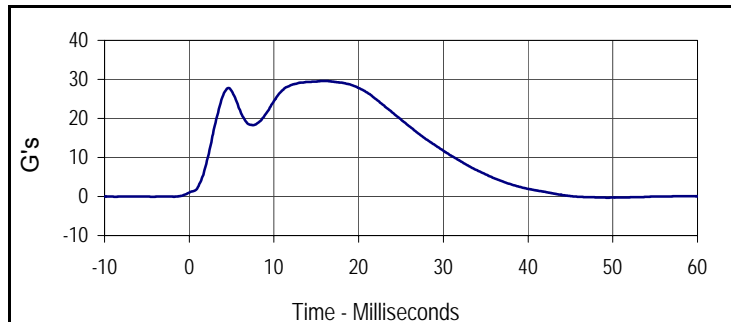
Curve Description			
Probe Force vs. Chest Deflection			
Plot No.	Type	SAE Class	Hysteresis
001	FIL	180	72.5
Peak Probe Force		Peak Chest Deflection	
4053.5		53.3	



Curve Description			
Probe Force			
Plot No.	Type	SAE Class	Units
002	FIL	180	Newtons
Max	Time	Min	Time
4053.5	15.7	-39.7	49.4



Curve Description			
Chest Deflection			
Plot No.	Type	SAE Class	Units
003	FIL	600	mm
Max	Time	Min	Time
53.3	20.4	0.0	-3.1



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
29.6	15.7	-0.3	49.4

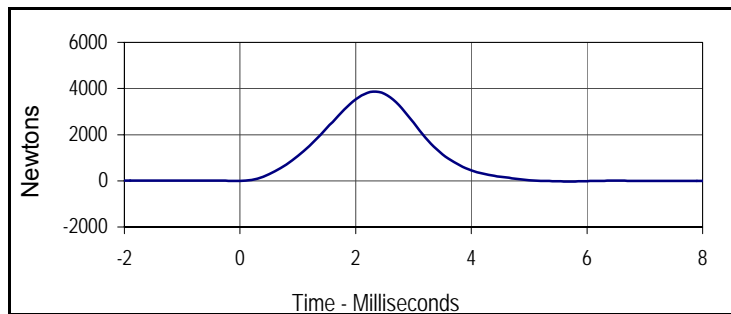


Left Knee

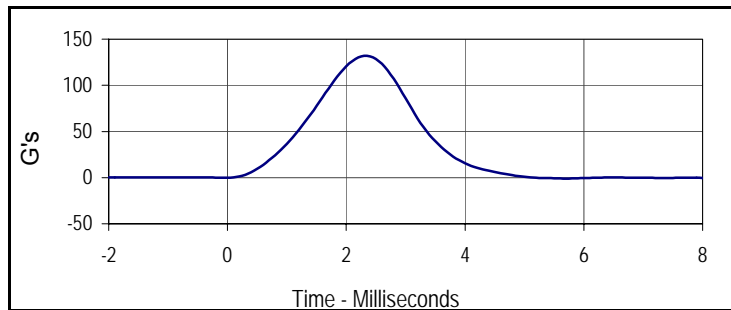
Tested Parameter	Units	Specification	Result	Pass/Fail
Knee Assembly Soak Time	Minutes	≥240	350	Pass
Temperature During Soak	Max	18.9 to 25.6	21.7	Pass
	Min		20.7	Pass
Humidity During Soak	Max	10.0 to 70.0	40.0	Pass
	Min		28.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.6	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	26.3	Pass
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.09	Pass
Peak Probe Force	Newtons	3450 to 4060	3864	Pass
Overall Test Results				Pass

Right Knee

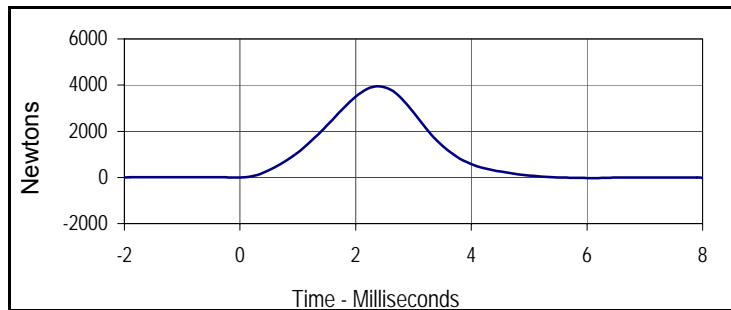
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.085	Pass
Peak Probe Force	Newtons	3450 to 4060	3949	Pass
Overall Test Results				Pass



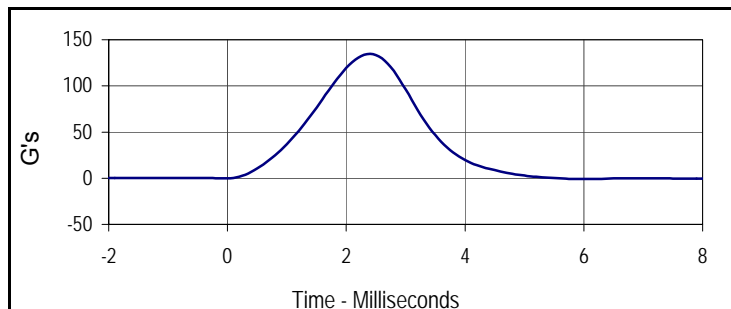
Curve Description			
Left Knee Probe Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
3863.6	2.3	-28.5	5.7



Curve Description			
Left Knee Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	600	G's
Max	Time	Min	Time
131.8	2.3	-1.0	5.7



Curve Description			
Right Knee Probe Force			
Plot No.	Type	SAE Class	Units
003	FIL	600	Newtons
Max	Time	Min	Time
3949.0	2.4	-25.7	6.1



Curve Description			
Right Knee Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	600	G's
Max	Time	Min	Time
134.7	2.4	-0.9	6.1

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

Test Date: 12/9/11

ATD Serial No.: 635

Test I.D.: F635TF024



Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	385	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	40.0	Pass
	Min	%		28.5	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.5	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	26.4	Pass
Initial Reference Plane Angle		Degrees	≤ 20	7.9	Pass
Peak Force at 45° +/-0.5°		Newtons	320.0 to 390.0	362.0	Pass
Torso Rotation Rate		deg/sec	0.5 to 1.5	0.7	Pass
Final Reference Plane Angle		Degrees	+/-8	2.8	Pass
Overall Test Results					Pass