

REPORT NUMBER: NCAP-KAR-12-057

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

**TOYOTA MOTOR MANUFACTURING CANADA INC.
2012 TOYOTA RAV4 4X4 5-DOOR MPV**

NHTSA NUMBER: MC5102

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



MARCH 14, 2012

FINAL REPORT

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

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15. Supplementary Notes																																																									
16. Abstract A 56.3 km/h NCAP Frontal Impact Test was conducted on a 2012 Toyota Rav4 4x4 5-door MPV 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 March 2, 2012. The impact velocity of the vehicle was 56.67 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 481 mm at DPD 4, to the right of the vehicle's centerline. The test vehicle's performance is as follows: <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th rowspan="2">Units</th> <th colspan="2">Driver ATD</th> <th colspan="2">Passenger ATD</th> </tr> <tr> <th>Threshold</th> <th>Result</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₁₅)</td> <td>N/A</td> <td>700.0</td> <td>218.5</td> <td>700.0</td> <td>385.8</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>-25</td> <td>52</td> <td>-16</td> </tr> <tr> <td>Nij</td> <td>N/A</td> <td>1</td> <td>0.44</td> <td>1</td> <td>0.47</td> </tr> <tr> <td>Neck Tension</td> <td>N</td> <td>4170</td> <td>1918.9</td> <td>2620</td> <td>865.2</td> </tr> <tr> <td>Neck Compression</td> <td>N</td> <td>4000</td> <td>-158.4</td> <td>2520</td> <td>-199.1</td> </tr> <tr> <td>Left Femur Force</td> <td>N</td> <td>10008</td> <td>-3445.0</td> <td>6805</td> <td>-1532.3</td> </tr> <tr> <td>Right Femur Force</td> <td>N</td> <td>10008</td> <td>-3053.0</td> <td>6805</td> <td>-1115.9</td> </tr> </tbody> </table>						Measurement Description	Units	Driver ATD		Passenger ATD		Threshold	Result	Threshold	Result	Head Injury Criteria (HIC ₁₅)	N/A	700.0	218.5	700.0	385.8	Maximum Chest Compression	mm	63	-25	52	-16	Nij	N/A	1	0.44	1	0.47	Neck Tension	N	4170	1918.9	2620	865.2	Neck Compression	N	4000	-158.4	2520	-199.1	Left Femur Force	N	10008	-3445.0	6805	-1532.3	Right Femur Force	N	10008	-3053.0	6805	-1115.9
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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 Toyota Rav4 4x4 5-door MPV at a velocity of 56.67 km/h. The test was performed at KARCO Engineering, LLC. on March 2, 2012. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A of this report.

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

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

Both ATDs were fully instrumented with head, chest and pelvis tri-axial accelerometers, chest displacement potentiometers, upper neck force transducers, right / left femur load cells, and lower leg instrumentation. The driver (position 1) ATD (Serial No. 035) and the right-front passenger (position 2) ATD (Serial No. 141) were calibrated prior to this test. Certification details, along with instrumentation calibration data, are found in Appendix C of this report.

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

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

The maximum static crush of the test vehicle was 481 mm located at DPD 4, to the right of the vehicle's centerline. Both the driver and passenger side doors remained closed during the impact event and were operable after the impact.

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

The passenger's visible contact points were as follows: The passenger ATD's head contacted the airbag and 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)	218.5	62.8	77.8	-25	0.44	1918.9	-158.4	-3445.0	-3053.0
Passenger (5th)	385.8	59.3	74.3	-16	0.47	865.2	-199.1	-1532.3	-1115.9

SECTION 2
DATA SHEETS

Test Vehicle:	2012 Toyota Rav4 4x4 5-Door MPV	NHTSA No.:	MC5102
Test Program:	56 km/h Frontal Impact NCAP Test	Test Date:	3/2/12

CONVERSION FACTORS

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

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2012 Toyota Rav4 4x4 5-Door MPV NHTSA No.: MC5102
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 3/2/12

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	MC5102
Model Year	2012
Make	Toyota
Model	Rav4
Body Style	5-Door MPV
VIN	2T3BF4DVXCW181628
Body Color	Pyrite Myca
Odometer Reading (km / mi)	64 / 40
Engine Displacement (L)	2.5
Type / No. of Cylinders	Inline 4
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	4
Overdrive	Yes
Final Drive	4x4
Roof Rack	Yes
Sunroof / T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes
All Wheel Drive (AWD)	No
Traction Control System	Yes

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

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

DATA FROM CERTIFICATION LABEL

Manufactured By	Toyota Motor Manufacturing Canada Inc.
Date of Manufacture	Jan-12

GVWR (kg)	2055
GAWR Front (kg)	1145
GAWR Rear (kg)	1135

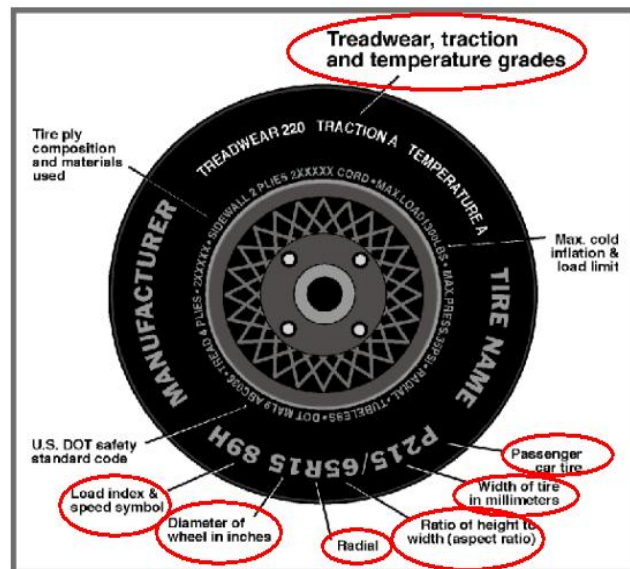
VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total	
Type of Seats	Bucket	Split Bench			
Designated Seating Capacity	2	3		5	
Capacity Weight (VCW) (kg)				370.0	A
DSC x 68.04 (kg)				340.2	B
Cargo Weight (RCLW) (kg)				29.8	A-B

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle:	2012 Toyota Rav4 4x4 5-Door MPV	NHTSA No.:	MC5102
Test Program:	56 km/h Frontal Impact NCAP Test	Test Date:	3/2/12



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	220	220
Recommended Tire Size	225/65R17	225/65R17
Tire Size on Vehicle	225/65R17	225/65R17
Tire Manufacturer	Toyo	Toyo
Tire Model	Open Country	Open Country
Treadwear	300	300
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	1 Polyester	1 Polyester
Tire Plies Body	1 Polyester, 2 Steel, 1 Nylon	1 Polyester, 2 Steel, 1 Nylon
Load Index / Speed Symbol	101H	101H
Tire Material	Polyester, Steel, Nylon	Polyester, Steel, Nylon
DOT Safety Code Left	CSF5 FHM 4311	CSF5 FHM 4311
DOT Safety Code Right	CSF5 FHM 4311	CSF5 FHM 4311

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

Test Vehicle: 2012 Toyota Rav4 4x4 5-Door MPV NHTSA No.: MC5102
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 3/2/12

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	475.0	348.0		516.0	413.0	
Right	kg	446.5	339.5		458.0	385.0	
Ratio	%	57.3%	42.7%	100.0%	55.0%	45.0%	100.0%
Total	kg	921.5	687.5	1609.0	974.0	798.0	1772.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1609.0	A
Weight of 1 P572E ATD & 1 P572O ATD	kg	141.0	B
Rated Cargo/Luggage Weight (RCLW)	kg	29.8	C
Calculated Vehicle Target Weight (TVTW)	kg	1779.8	A+B+C

TEST VEHICLE ATTITUDES

Condition	Units	LF	RF	LR	RR	CG Aft of Front Axle
As Delivered	mm	808	815	835	830	1137
As Tested	mm	801	804	805	815	1199
Post-Test	mm	775	796	806	824	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2662
Total Vehicle Length at Left Side	mm	3917
Total Vehicle Length at Centerline	mm	4535
Total Vehicle Length at Right Side	mm	3917
Weight of Ballast in Cargo Area	kg	69.0
Weight of Vehicle Components Removed	kg	46.0
Amount of Stoddard Solvent in Fuel Tank	L	55.79

VEHICLE COMPONENTS REMOVED TO MEET TEST WEIGHT:

Spare tire and cover (28.0 kg), spare tire holder (2.5 kg), spare tire tools (4.5 kg), rear bumper cover (3.0 kg), rear bumper beam (2.0 kg), taillights (3.0 kg), outboard mirrors (3.0 kg)

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

Test Vehicle: 2012 Toyota Rav4 4x4 5-Door MPV NHTSA No.: MC5102
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 3/2/12

TARGET VEHICLE STRUCTURAL MEASUREMENTS

No.	Description	Pre-Test	Post-Test	Difference
1	Total Length	4535	4080	-455
2	Total Width	1810	2035	225
3	Bumper Top Height	752	765	13
4	Bumper Bottom Height	600	610	10
5	Longitudinal Member Top Height	590	620	30
6	Distance Between Longitudinal Members	960	960	0
7	Longitudinal Member Width	65	74	9
8	Engine Top Height	915	925	10
9	Engine Bottom Height	223	233	10
10	Engine and Gearbox Width	610	610	0
11	Front Bumper to Engine Distance	420	310	-110
12	Front Shock Absorber Fixing Height	928	925	-3
13	Bonnet Leading Edge Height	868	925	57
14	Front Shock Absorber Fixing Width	1180	1290	110
15	Front Bumper to Front Axle Distance	872	490	-382
16	Front Axle to A-Pillar Distance	522	485	-37
17	A-Pillar to B-Pillar Distance	953	954	1
18	B-Pillar to Rear Axle Distance	1105	1118	13
19	B-Pillar to C-Pillar Distance	933	934	1
20	Roof Sill Bottom Height	1487	1503	16
21	Roof Sill Top Height	1597	1622	25
22	Floor Sill Bottom Height	285	309	24
23	Floor Sill Top Height	397	415	18

All measurements in millimeters.

DATA SHEET NO. 2

SEAT ADJUSTMENT, FUEL SYSTEMS, AND STEERING WHEEL DATA

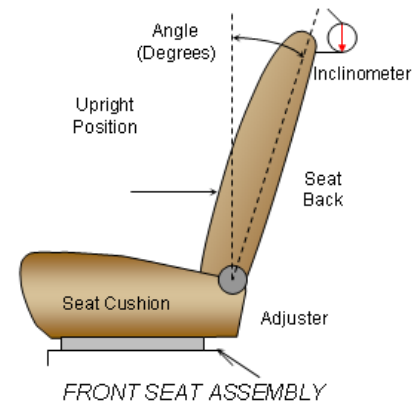
Test Vehicle: 2012 Toyota Rav4 4x4 5-Door MPV NHTSA No.: MC5102
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 3/2/12

NOMINAL DESIGN RIDING POSITION

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

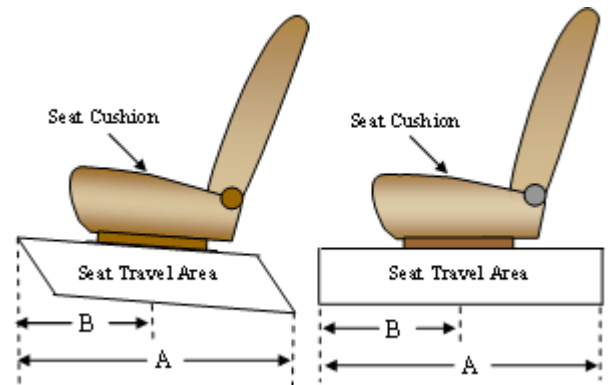
SEAT BACK ANGLE

Seating Position	Degrees
Driver Seat Back Angle	2.9
Passenger Seat Back Angle	0.3



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	260 mm [17 detents]	140 mm [7th detent]
Passenger Seat	240 mm [17 detents]	14 mm [1st detent]

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

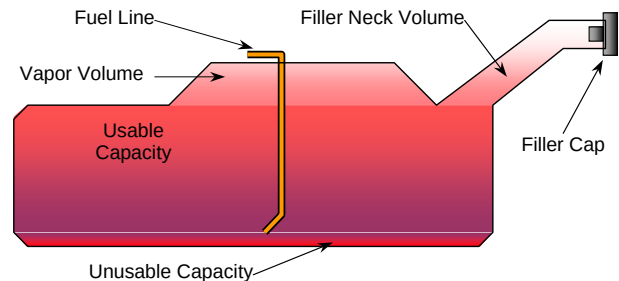
Test Vehicle: 2012 Toyota Rav4 4x4 5-Door MPV NHTSA No.: MC5102
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 3/2/12

FUEL TANK CAPACITY

Description	Liters
Usable Capacity of "Standard Tank"	59.99
Usable Capacity of "Optional Tank"	
92 - 94% of Usable Capacity	55.19 to 56.39
Actual Amount of Stoddard Solvent Used	55.79
1/3 of Usable Capacity	20.00

FUEL PUMP

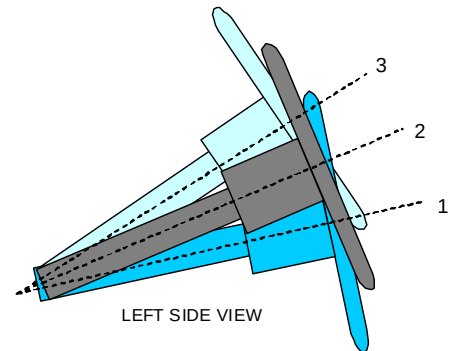
The vehicle is equipped with an electric fuel pump.
The fuel pump is activated when the ignition is turned on.



VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

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



LEFT SIDE VIEW

STEERING COLUMN ASSEMBLY

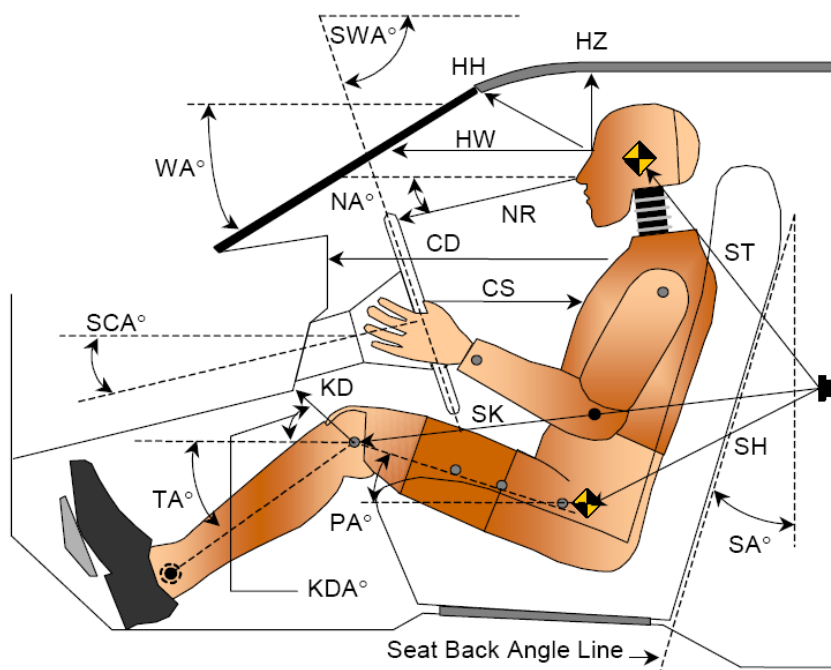
STEERING COLUMN POSITIONING

	Degrees	Fore-Aft Position (mm)
Lowermost Position, No. 1	26.4	88
Geometric Center Position, No. 2	28.1	108
Uppermost Position, No. 3	29.8	128
Telescoping Steering Wheel Travel		40
Test Position	28.1	108

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2012 Toyota Rav4 4x4 5-Door MPV NHTSA No.: MC5102
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 3/2/12



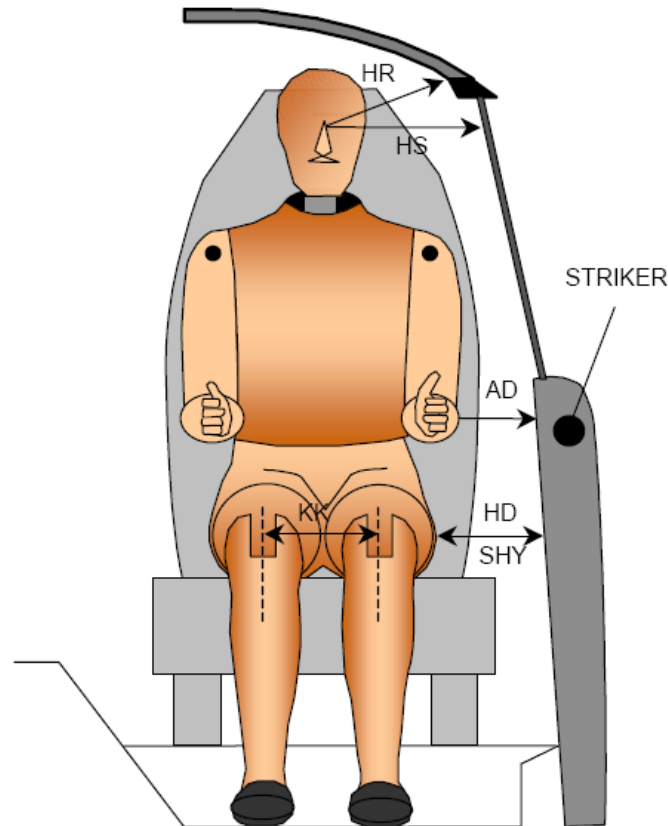
LEFT SIDE VIEW

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		27.5		
SWA°	Steering Wheel Angle		61.9		
SCA°	Steering Column Angle		28.1		
SA°	Seat Back Angle (On Headrest Post)		2.9		0.3
HZ	Head to Roof	240	90.0	245	90.0
HH	Head to Header	343	31.3	295	52.1
HW	Head to Windshield	647	0.0	600	0.0
NR	Nose to Rim	413	12.4	475	31.1
CD	Chest to Dash	530	7.5	418	19.5
CS	Chest to Steering Hub	302	0.0		
RA	Rim to Abdomen	188	0.0		
KDL	Left Knee to Dash	152	24.5	72	42.6
KDR	Right Knee to Dash	100	35.3	94	28.9
PA°	Pelvic Angle		23.5		20.7
TA°	Tibia Angle		48.4		47.6
SK	Striker to Knee	627	10.1	715	12.5
ST	Striker to Head	469	76.1	450	57.2
SH	Striker to H-Point	300	38.6	409	25.9

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle:	2012 Toyota Rav4 4x4 5-Door MPV	NHTSA No.:	MC5102
Test Program:	56 km/h Frontal Impact NCAP Test	Test Date:	3/2/12



Code	Description	Driver (mm)	Passenger (mm)
AD	Arm to Door	142	82
HD	H-Point to Door	148	192
HR	Head to Side Header	247	256
HS	Head to Side Window	364	350
KK	Knee to Knee	347	225
SHY	Striker to H-Point (Y-Direction)	240	294
AA	Ankle to Ankle	351	165

DATA SHEET NO. 5

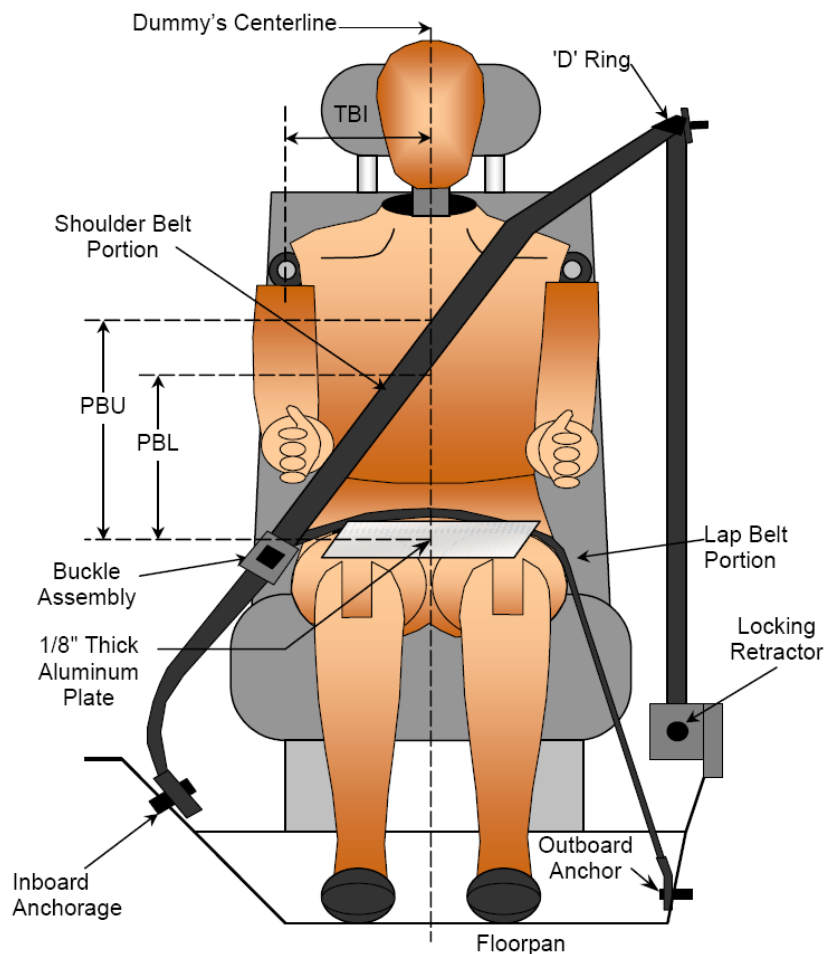
SEAT BELT POSITIONING DATA

Test Vehicle: 2012 Toyota Rav4 4x4 5-Door MPV

NHTSA No.: MC5102

Test Program: 56 km/h Frontal Impact NCAP Test

Test Date: 3/2/12



FRONT VIEW OF DUMMY

SEAT BELT POSITIONING MEASUREMENTS

Code	Measurement Description	Units	Driver	Passenger
PBU	Top Surface of Aluminum Plate to Belt Upper Edge	mm	384	346
PBL	Top Surface of Aluminum Plate to Belt Lower Edge	mm	306	249

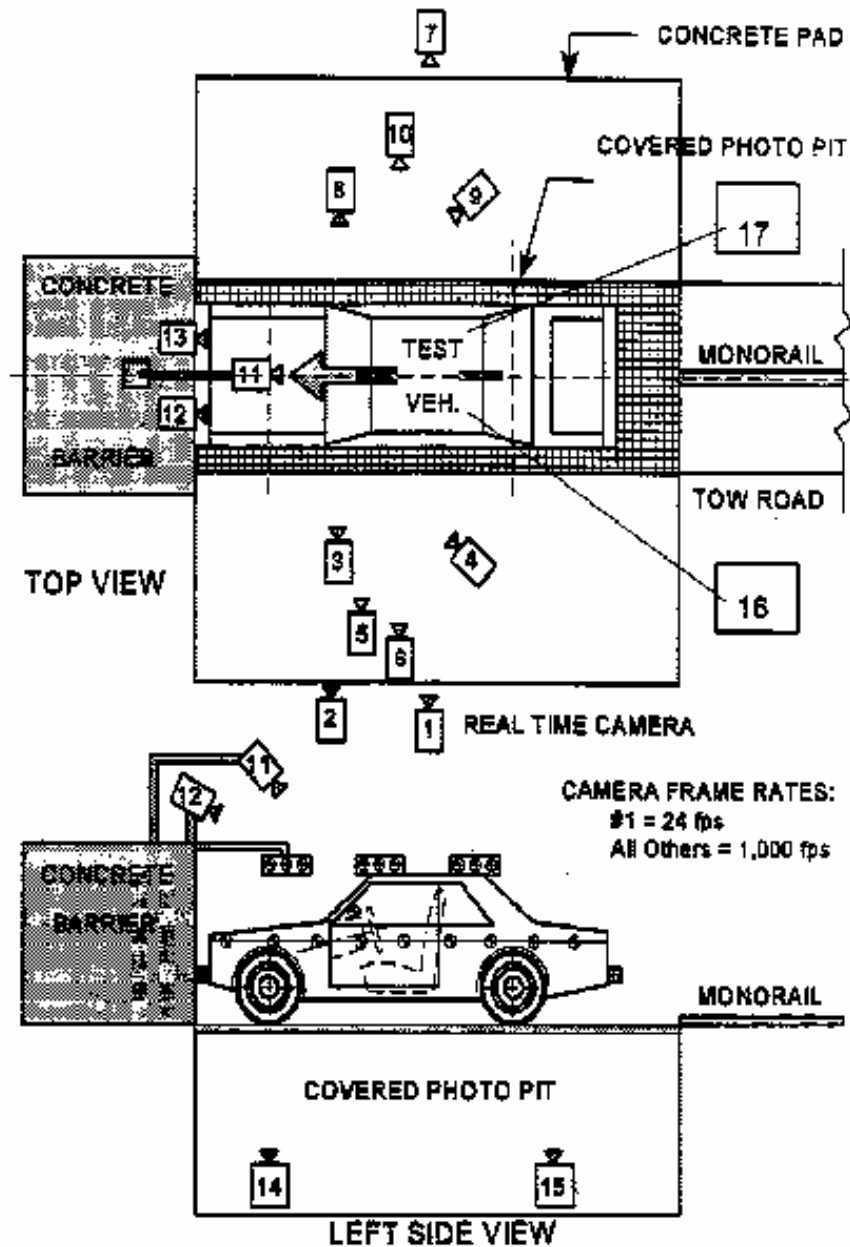
BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Shoulder Belt Length as Measured on ATD	mm	925	1000
Lap Belt Length as Measured on ATD	mm	805	845
Remainder of Belt on Reel	mm	770	642
Total Belt Length for Continuous Webbing Systems	mm	2500	2487

HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle:	<u>2012 Toyota Rav4 4x4 5-Door MPV</u>	NHTSA No.:	<u>MC5102</u>
Test Program:	<u>56 km/h Frontal Impact NCAP Test</u>	Test Date:	<u>3/2/12</u>

CAMERA POSITIONS FOR FRONTAL IMPACTS



DATA SHEET NO. 6 ... (CONTINUED)

HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2012 Toyota Rav4 4x4 5-Door MPV NHTSA No.: MC5102
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 3/2/12

CAMERA LOCATIONS

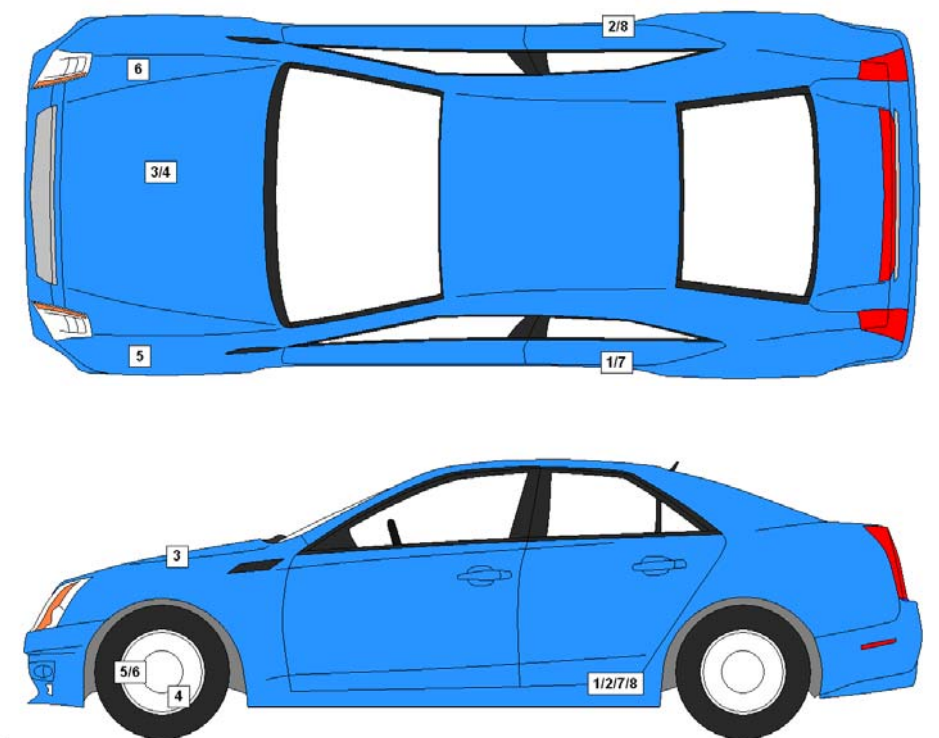
No.	Description	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Overall	-11412	-8150	-1484		30
2	Driver Close-Up	-2590	-7950	-1371	24	1000
3	Left Front Half	-1701	-6197	-1701	50	1000
4	Left Angle	-6696	-10308	-3211	ZOOM	1000
5	Steering Column - Top	-1966	-10412	-3688	50	1000
6	Steering Column - Bottom	-1972	-10412	-3379	50	1000
7	Right Overall	-2336	7569	-1012	24	1000
8	Passenger Close-Up	-1733	7581	-1408	50	1000
9	Right Front Half	-1600	8214	-1811	ZOOM	1000
10	Right Angle	-6217	9516	-4830	ZOOM	1000
11	Windshield	-354	0	-5749	12	1000
12	Driver Windshield	297	-366	-2460	12	1000
13	Passenger Windshield	297	366	-2460	24	1000
14	Pit Front	-756	0	1495	12	1000
15	Pit Rear	-3398	0	1495	8	1000
16	Onboard Driver Airbag (Optional)	-1500	350	-1470	13	1000
17	Onboard Passenger Airbag (Optional)	-1500	-350	-1470	13	1000
18	Real-Time Left View of Impact					
19	Real-Time Right View of Impact					

Coordinates: +X = forward impact plane
 +Y = right of monorail center
 +Z = into ground

DATA SHEET NO. 7

VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2012 Toyota Rav4 4x4 5-Door MPV NHTSA No.: MC5102
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 3/2/12



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Description	Location		
		X	Y	Z
1	Left Rear Accelerometer X-Direction	1642	-709	-430
2	Right Rear Accelerometer X-Direction	1642	709	-430
3	Engine Top X	3849	368	-909
4	Engine Bottom X	3916	220	-204
5	Left Brake Caliper X	3685	-688	-311
6	Right Brake Caliper X	3685	688	-311
7	Left Rear Accelerometer Z-Direction	1642	-709	-430
8	Right Rear Accelerometer Z-Direction	1642	709	-430

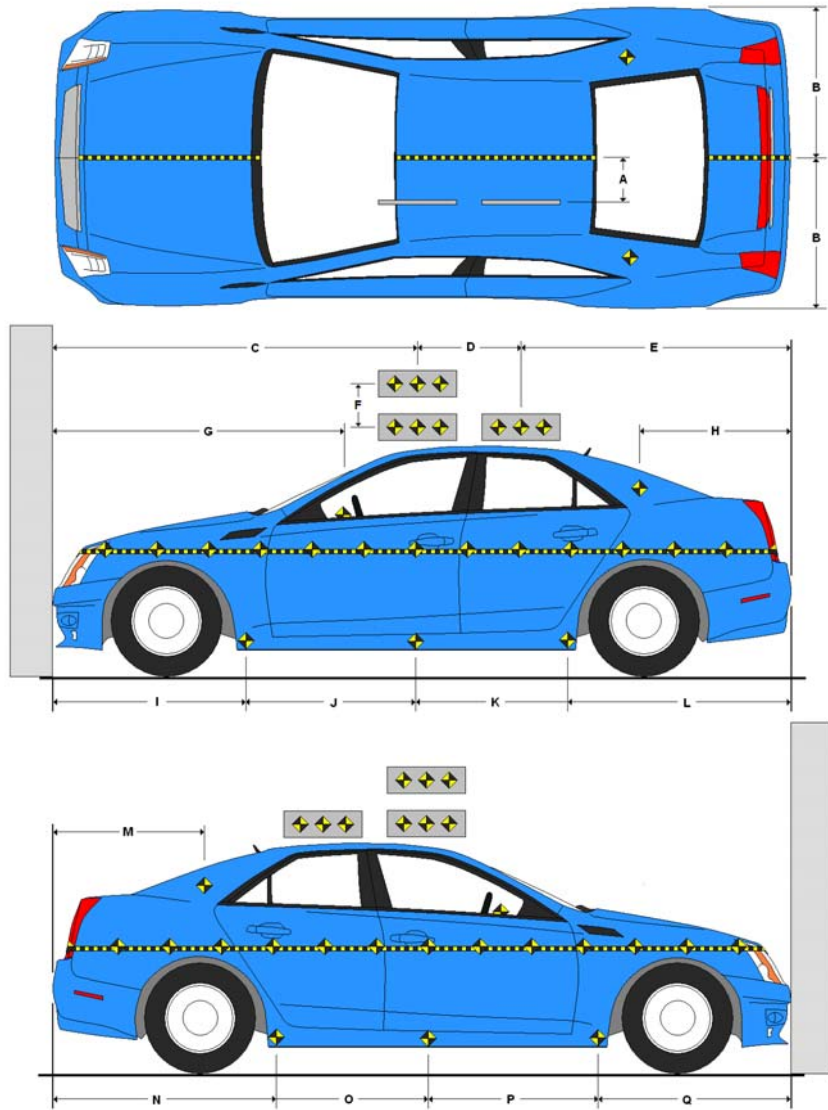
Reference Points:
 X – Rear Surface of Vehicle (+ forward)
 Y – Vehicle Centerline (+ to right)
 Z – Ground Plane (+ down)

DATA SHEET NO. 8

PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2012 Toyota Rav4 4x4 5-Door MPV NHTSA No.: MC5102
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 3/2/12

Item	Value
A	375
B	905
C	2148
D	610
E	1770
F	305
G	1645
H	618
I	1392
J	833
K	833
L	1477
M	1615
N	1479
O	833
P	833
Q	1377



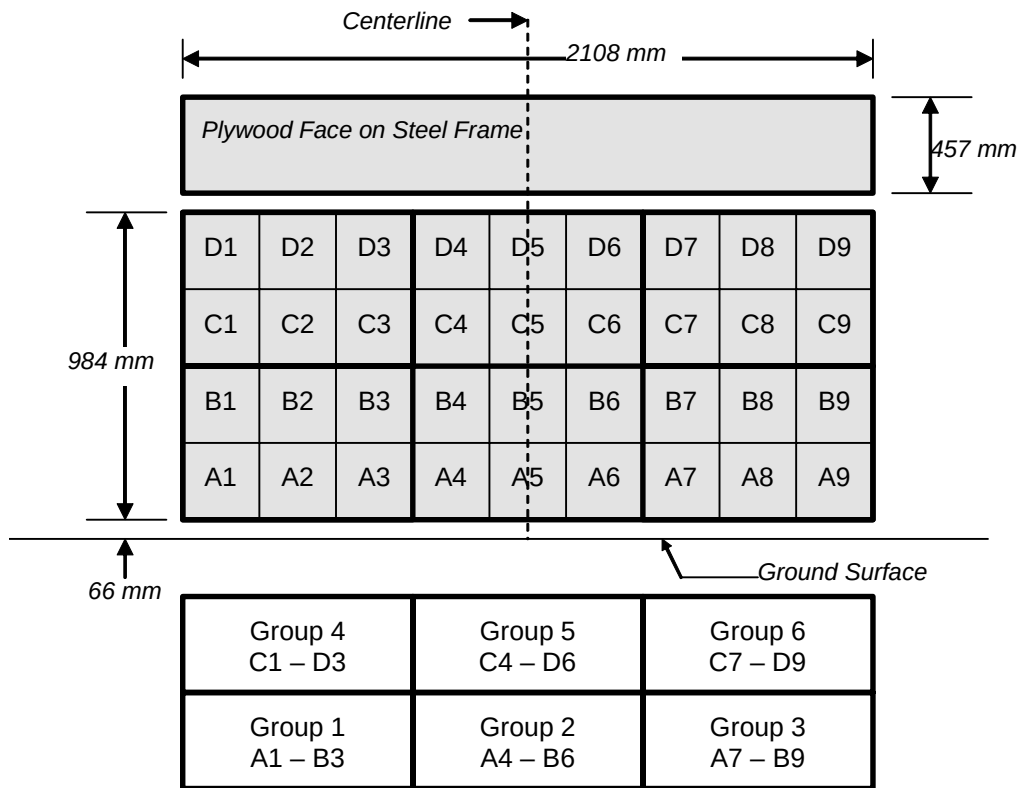
All measurements in millimeters.

DATA SHEET NO. 9

LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2012 Toyota Rav4 4x4 5-Door MPV NHTSA No.: MC5102
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 3/2/12

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



6 Groups of 6 Load Cells Each

DATA SHEET NO. 10

TEST VEHICLE CAMERA AND INSTRUMENTATION SUMMARY

Test Vehicle: 2012 Toyota Rav4 4x4 5-Door MPV NHTSA No.: MC5102
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 3/2/12

INSTRUMENTATION

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

CAMERA COVERAGE

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

DATA SHEET NO. 11
POST-TEST OBSERVATIONS

Test Vehicle: 2012 Toyota Rav4 4x4 5-Door MPV

NHTSA No.: MC5102

Test Program: 56 km/h Frontal Impact NCAP Test

Test Date: 3/2/12

Description	Driver	Passenger
Dummy Type/Serial No.	P572E 50th Percentile Male ATD / 035	P572O 5th Percentile Female ATD / 141
Head Contact	Airbag, Headrest	Airbag, Headrest
Upper Torso Contact	Airbag	Airbag
Lower Torso Contact	None	None
Left Knee Contact	Knee 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)	0	-1
Seat Back Failure	None	None
Glazing Damage	None	None

POST TEST STRUCTURAL OBSERVATIONS

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

VEHICLE REBOUND FROM BARRIER

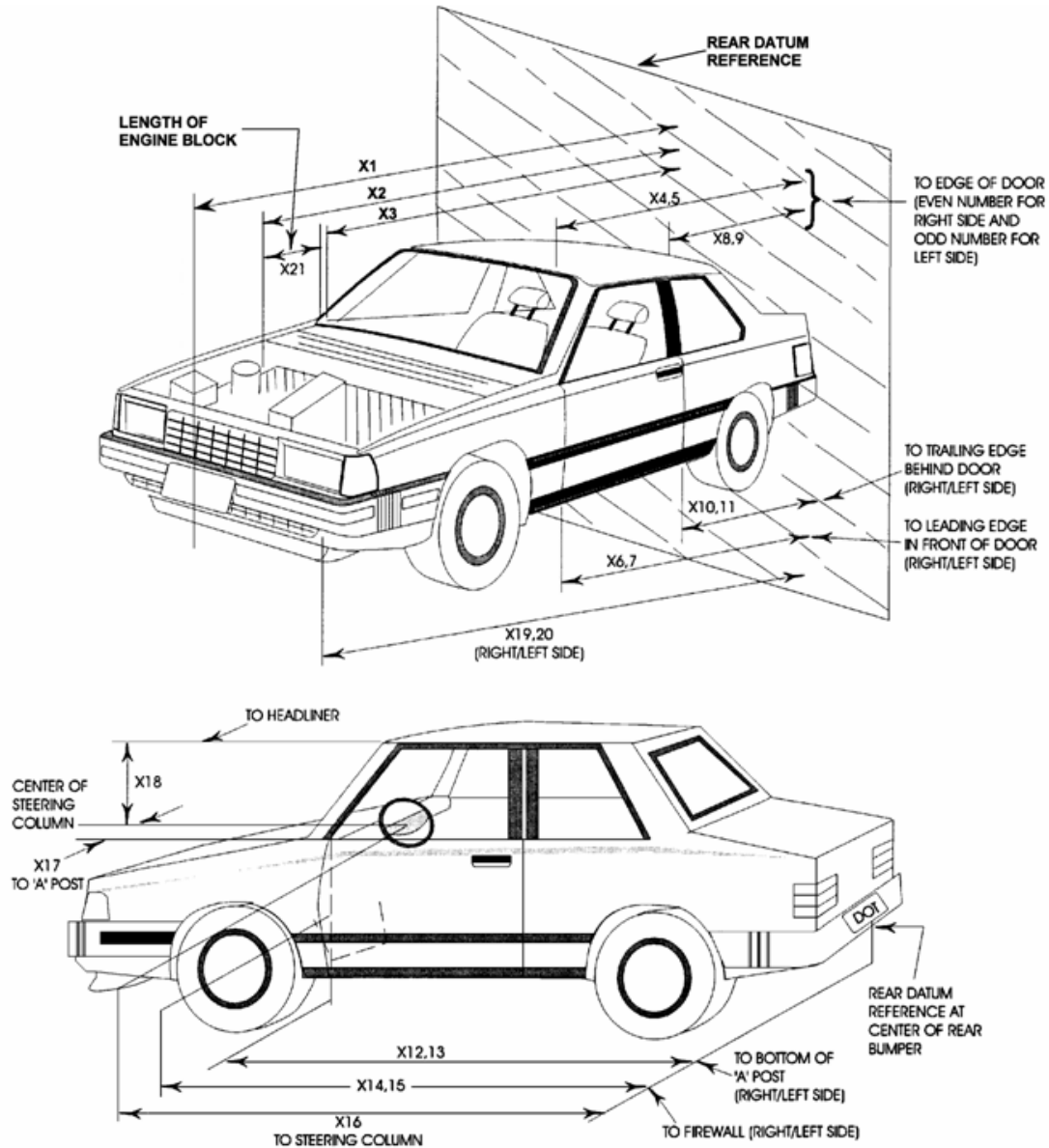
Measured Parameter	Units	Value
Left Side	mm	949
Center	mm	927
Right Side	mm	949
Average	mm	942

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Driver		Passenger	
	Installed	Operated	Installed	Operated
Front Airbag	Yes	Yes	Yes	Yes
Side Airbag 1 (Curtain)	Yes	No	Yes	No
Side Airbag 2 (Torso)	Yes	No	Yes	No
Knee Airbag	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 Toyota Rav4 4x4 5-Door MPV NHTSA No.: MC5102
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 3/2/12

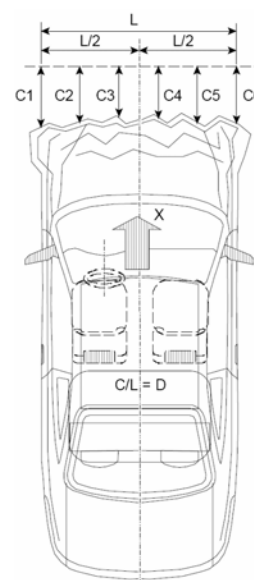


DATA SHEET NO. 12 ... (CONTINUED)**VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2012 Toyota Rav4 4x4 5-Door MPV NHTSA No.: MC5102
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 3/2/12

No.	Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	4535	4080	-455
2	Rear Surface of Vehicle to Front of Engine	4115	3875	-240
3	RSOV to Firewall	3452	3447	-5
4	RSOV to Upper Leading Edge of Right Door	3193	3216	23
5	RSOV to Upper Leading Edge of Left Door	3188	3215	27
6	RSOV to Lower Leading Edge of Right Door	3147	3148	1
7	RSOV to Lower Leading Edge of Left Door	3158	3165	7
8	RSOV to Upper Trailing Edge of Right Door	2093	2122	29
9	RSOV to Upper Trailing Edge of Left Door	2087	2111	24
10	RSOV to Lower Trailing Edge of Right Door	2102	2100	-2
11	RSOV to Lower Trailing Edge of Left Door	2097	2100	3
12	RSOV to Bottom of A-Pillar, Right Side	3123	3138	15
13	RSOV to Bottom of A-Pillar, Left Side	3109	3133	24
14	RSOV to Firewall, Right Side	3458	3515	57
15	RSOV to Firewall, Left Side	3455	3520	65
16	RSOV to Steering Column	2721	2798	77
17	Center of Steering Column to A-Pillar	405	395	-10
18	Center of Steering Column to Headliner	460	480	20
19	RSOV to Right Side of Front Bumper	3917	3850	-67
20	RSOV to Left Side of Front Bumper	3917	3858	-59
21	Length of Engine Block	540	570	30
RD	RSOV to Right Side of Dash Panel	2940	2950	10
CD	RSOV to Center of Dash Panel	2816	2905	89
LD	RSOV to Left Side of Dash Panel	2932	2955	23

All measurements in millimeters.

DATA SHEET NO. 13**ACCIDENT INVESTIGATION DATA**Test Vehicle: 2012 Toyota Rav4 4x4 5-Door MPVNHTSA No.: MC5102Test Program: 56 km/h Frontal Impact NCAP TestTest Date: 3/2/12**VEHICLE INFORMATION**VIN: 2T3BF4DVXCW181628Wheelbase (mm): 2662Vehicle Size Category: 5-Door MPVTest Weight (kg): 1772.0**ACCELEROMETER DATA**Accelerometer Locations: Left Rear CrossmemberCal. Procedure/Interval: Drop Test / 6 monthsIntegration Algorithm: NHTSA StandardImpact Velocity (km/h): 56.67Velocity Change (km/h): 64.1Time of Separation (msec): 61.0Linearity: Good**CRUSH PROFILE**Collision Deformation Classification: 12FDEW2Midpoint of Damage: Vehicle CenterlineDamage Region Length (mm): 1530Impact Mode: Full Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush Zone 1 at Left Side	mm	220	465	245
C2	Crush Zone 2 at Left Side	mm	45	497	452
C3	Crush Zone 3 at Left Side	mm	14	487	473
C4	Crush Zone 4 at Right Side	mm	14	495	481
C5	Crush Zone 5 at Right Side	mm	45	500	455
C6	Crush Zone 6 at Right Side	mm	220	487	267
L	C1 to C6	mm	1530		

DATA SHEET NO. 14

VEHICLE INTRUSION MEASUREMENTS

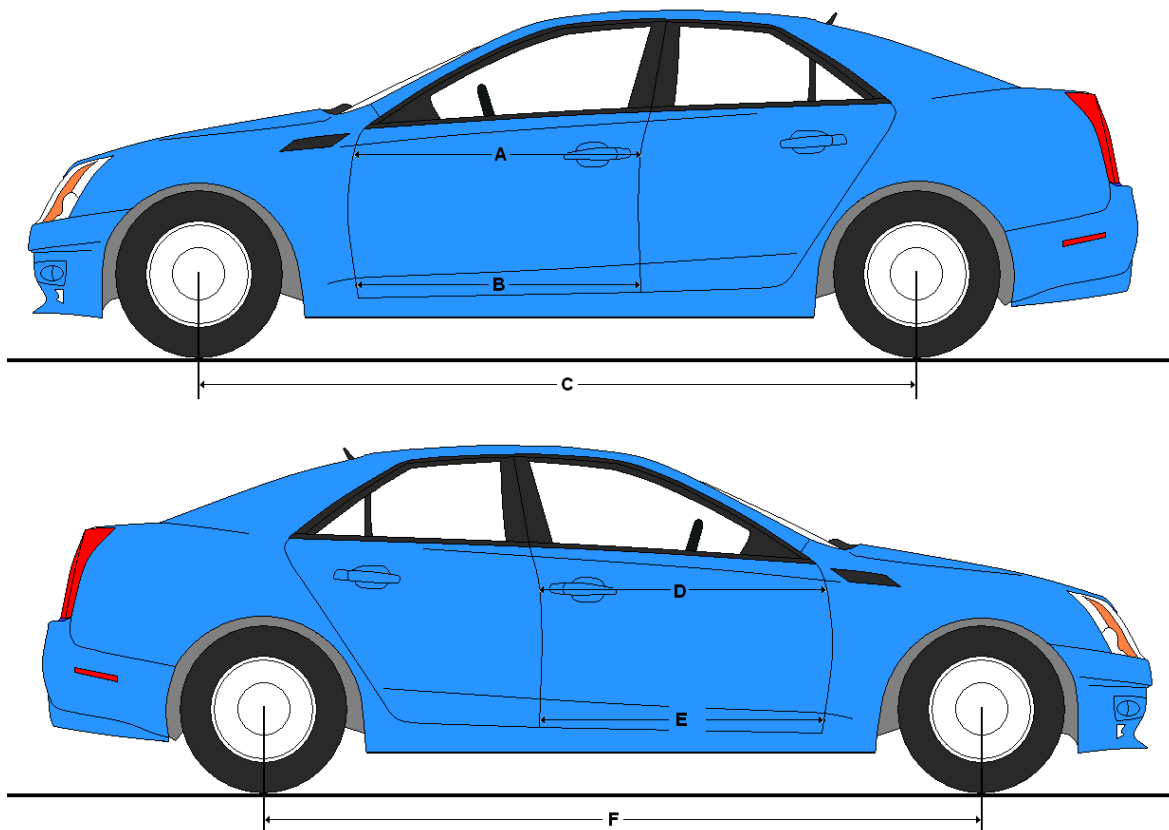
Test Vehicle: 2012 Toyota Rav4 4x4 5-Door MPV NHTSA No.: MC5102
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 3/2/12

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	951	956	-5
B	Left Side Lower	mm	860	857	3
D	Right Side Upper	mm	956	952	4
E	Right Side Lower	mm	846	854	-8

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2662	2625	37
F	Right Side Wheelbase	mm	2662	2650	12



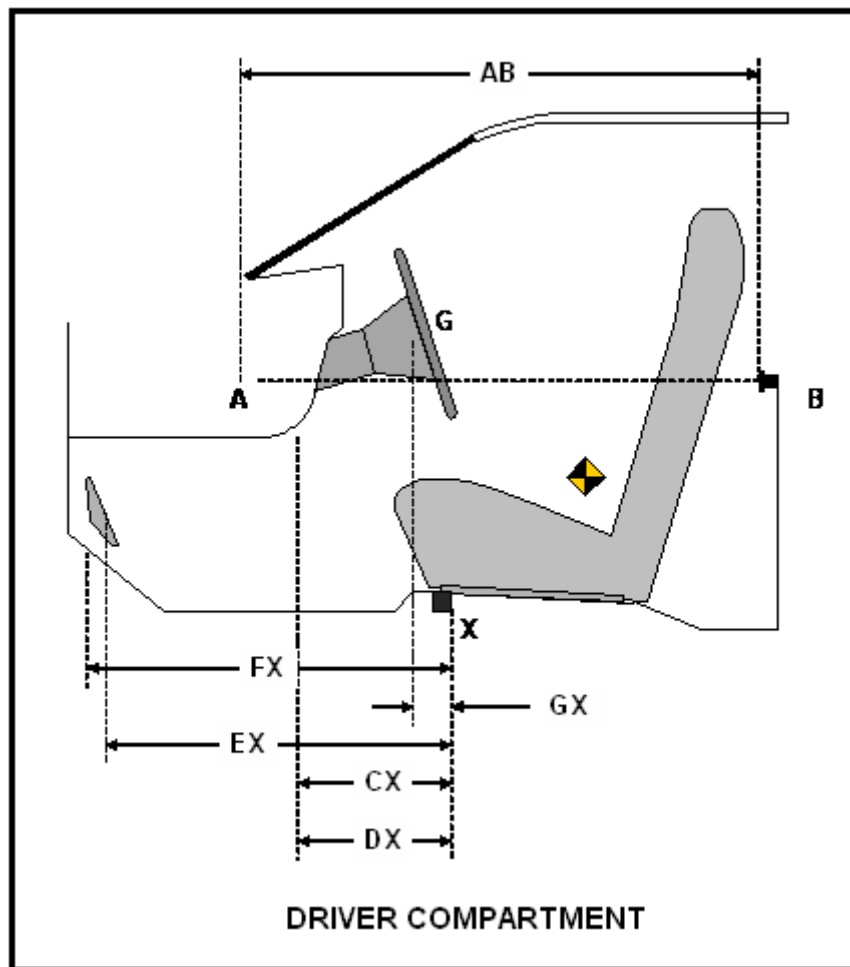
DATA SHEET NO. 14 ... (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2012 Toyota Rav4 4x4 5-Door MPV NHTSA No.: MC5102
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 3/2/12

DRIVER COMPARTMENT INTRUSION

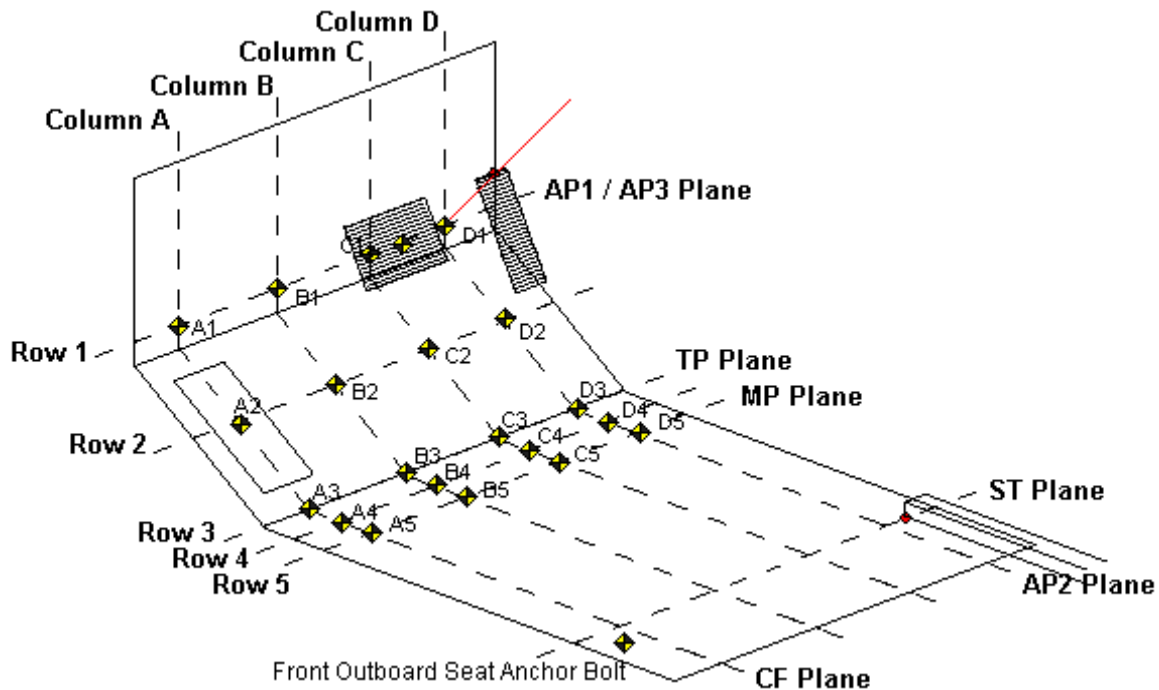
Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	842	849	-7
CX	Left Knee Bolster to X	mm	335	340	-5
DX	Right Knee Bolster to X	mm	315	320	-5
EX	Brake Pedal to X	mm	533	500	33
FX	Foot Rest to X	mm	570	605	-35
GX	Center of Steering Wheel Hub to X	mm	115	140	-25

X = Front of Seat Track (Stationary)



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

Test Vehicle:	2012 Toyota Rav4 4x4 5-Door MPV	NHTSA No.:	MC5102
Test Program:	56 km/h Frontal Impact NCAP Test	Test Date:	3/2/12



AP1: Y-Z Plane passing through D1

AP2: X-Z Plane passing through D1

AP3: X-Y plane passing through D1

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

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

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

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

Column A: intersection of vehicle and CF plane

Column D: Intersection of vehicle and AP2 plane

Row 1: intersection of the vehicle and the AP3 Plane

Row 3: intersection of the vehicle and TP plane

Row 5: intersection of the vehicle and MP plane

Row 2: evenly spaced between row 1 and 3

Row 4: evenly spaced between row 3 and 5

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

Test Vehicle: 2012 Toyota Rav4 4x4 5-Door MPV NHTSA No.: MC5102
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 3/2/12

DRIVER FLOORPAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	642	737	745	721	613	683	710	680	29	54	35	41
2	571	654	653	643	553	632	628	621	18	22	25	22
3	506	555	553	548	499	540	532	529	7	15	21	19
4	445	445	445	446	439	430	426	431	6	15	19	15
5	342	342	343	343	335	326	325	335	7	16	18	8

DRIVER FLOORPAN Y-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	18	-100	-216	-383	15	-122	-227	-379	3	22	11	-4
2	18	-100	-214	-384	20	-107	-218	-391	-2	7	4	7
3	17	-98	-212	-383	16	-102	-214	-389	1	4	2	6
4	19	-97	-211	-378	20	-98	-211	-375	-1	1	0	-3
5	19	-95	-209	-376	25	-92	-207	-375	-6	-3	-2	-1

DRIVER FLOORPAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	89	-6	-18	1	91	12	-9	-2	-2	-18	-9	3
2	25	-55	-57	-60	23	-54	-59	-76	2	-1	2	16
3	-50	-86	-86	-86	-60	-96	-96	-109	10	10	10	23
4	-107	-98	-96	-101	-113	-113	-112	-126	6	15	16	25
5	-117	-96	-95	-101	-107	-116	-117	-124	-10	20	22	23

All measurements in millimeters

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

Test Vehicle: 2012 Toyota Rav4 4x4 5-Door MPV NHTSA No.: MC5102
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 3/2/12

PASSENGER FLOORPAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	730	742	723	624	685	711	691	600	45	31	32	24
2	660	650	643	607	633	624	620	588	27	26	23	19
3	551	545	542	538	531	525	523	520	20	20	19	18
4	437	433	433	430	422	415	416	422	15	18	17	8
5	335	331	326	322	323	312	307	317	12	19	19	5

PASSENGER FLOORPAN Y-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	368	195	91	-24	378	202	102	-22	-10	-7	-11	-2
2	382	202	94	-28	387	207	100	-23	-5	-5	-6	-5
3	379	204	94	-27	386	208	98	-23	-7	-4	-4	-4
4	381	211	95	-23	384	213	97	-23	-3	-2	-2	0
5	380	215	96	-20	381	216	95	-22	-1	-1	1	2

PASSENGER FLOORPAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	5	-20	-5	48	13	-10	3	44	-8	-10	-8	4
2	-55	-55	-58	-29	-64	-57	-61	-35	9	2	3	6
3	-85	-88	-89	-93	-106	-102	-104	-105	21	14	15	12
4	-101	-98	-98	-110	-130	-122	-122	-119	29	24	24	9
5	-101	-95	-95	-119	-125	-131	-129	-121	24	36	34	2

All measurements in millimeters

DATA SHEET NO. 15

SUMMARY OF FMVSS 212 AND 219 (PARTIAL) DATA

Test Vehicle: 2012 Toyota Rav4 4x4 5-Door MPV NHTSA No.: MC5102

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 3/2/12

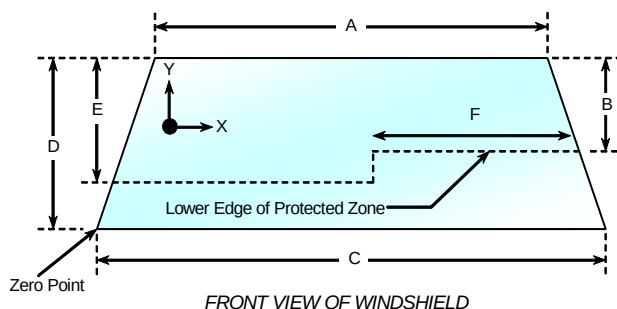
Windshield Mounting Details: Windshield glass is secured to the vehicle frame with rubber cement.

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

Temperature of windshield molding during test: 21.2 ° C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2127	2127	100.0%
Right Side	2127	2127	100.0%
Total	4254	4254	100.0%



Item	Units	Value
A	mm	1170
B	mm	435
C	mm	1388
D	mm	848
E	mm	523
F	mm	523

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 Toyota Rav4 4x4 5-Door MPV NHTSA No.: MC5102
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 3/2/12

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 12.8° C Test Time: 1:35 PM

Stoddard Solvent Spillage Measurements

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

DATA SHEET NO. 16

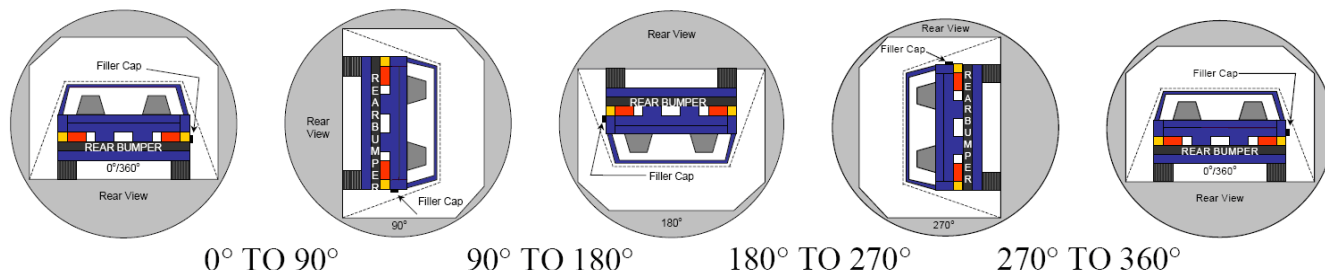
FMVSS 301 STATIC ROLLOVER

Test Vehicle: 2012 Toyota Rav4 4x4 5-Door MPV

NHTSA No.: MC5102

Test Program: 56 km/h Frontal Impact NCAP Test

Test Date: 3/2/12



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

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° To 90°	83	300	383
90° To 180°	81	300	381
180° To 270°	80	300	380
270° To 360°	81	300	381

FMVSS 301 SPILLAGE TABLE

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

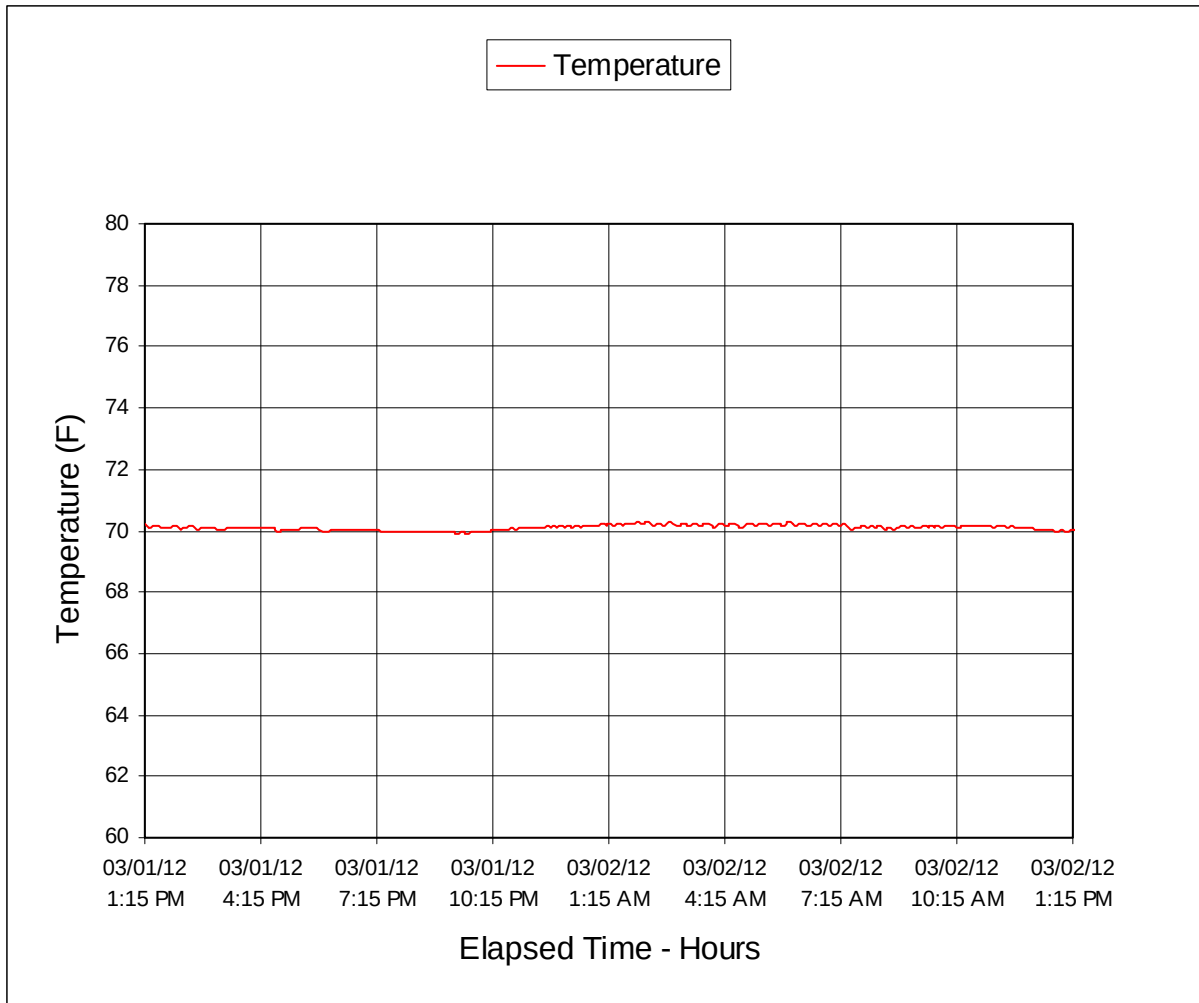
SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 17

DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART

Test Vehicle: 2012 Toyota Rav4 4x4 5-Door MPV NHTSA No.: MC5102
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 3/2/12



APPENDIX A
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FIGURE 1. Load Cell Location



FIGURE 2. Load Cell Wall



FIGURE 3. Manufacturer's Label



FIGURE 4. Tire Placard



FIGURE 4a. Vehicle Label



FIGURE 5. 2012 Toyota RAV4 Frontal, As Delivered



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



FIGURE 7. Pre-Test Front View of Test Vehicle

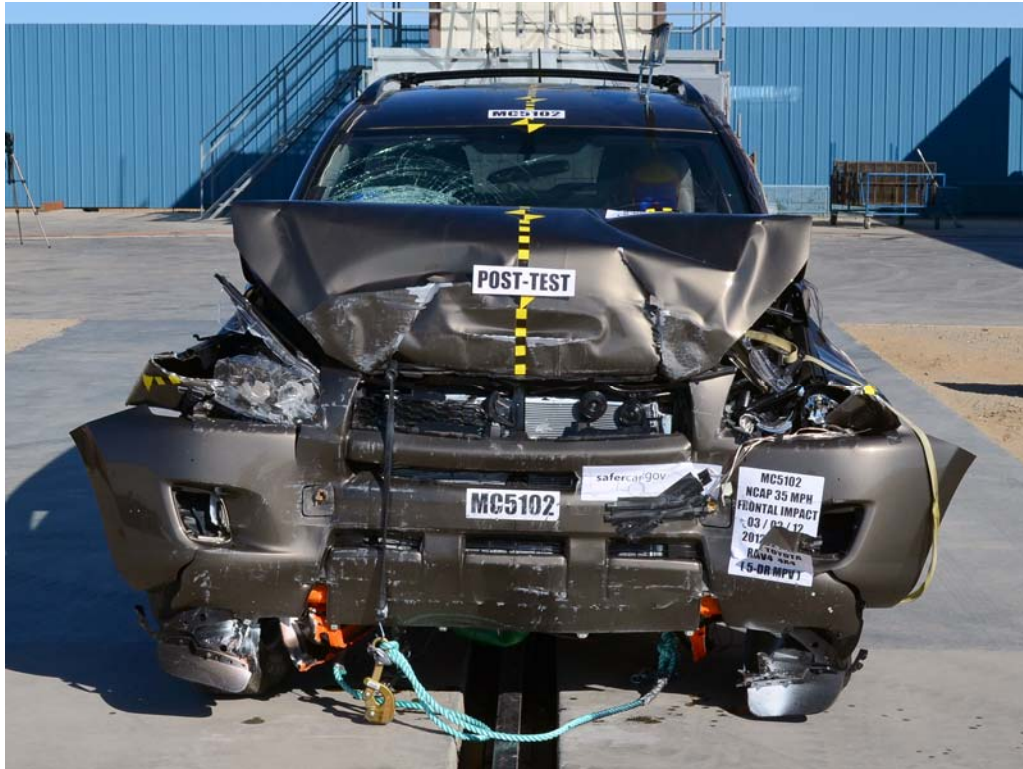


FIGURE 8. Post-Test Front View of Test Vehicle



FIGURE 9. Pre-Test Left View of Test Vehicle

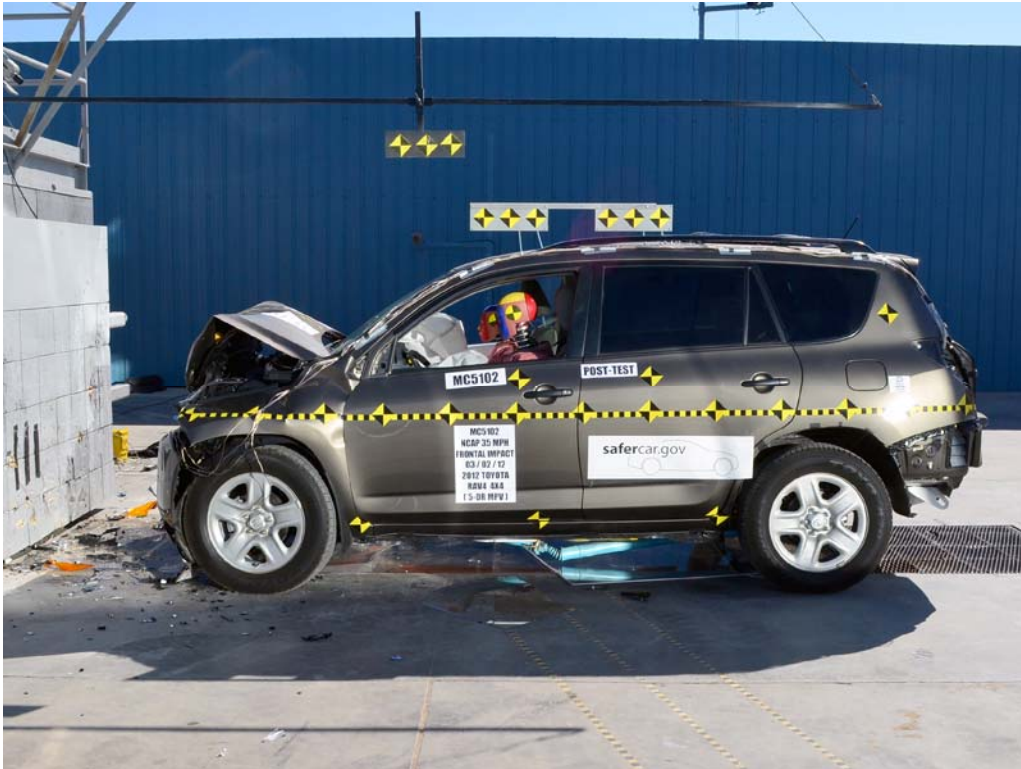


FIGURE 10. Post-Test Left View of Test Vehicle



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

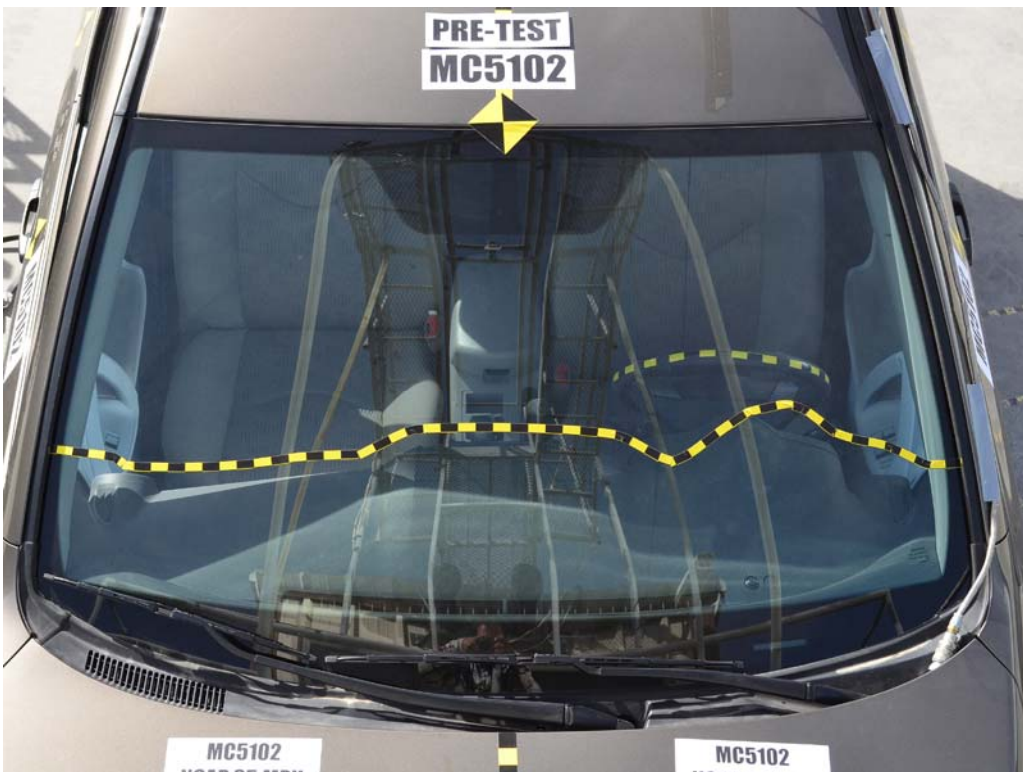


FIGURE 17. Pre-Test Windshield View



FIGURE 18. Post-Test Windshield View



FIGURE 19. Pre-Test Engine Compartment View

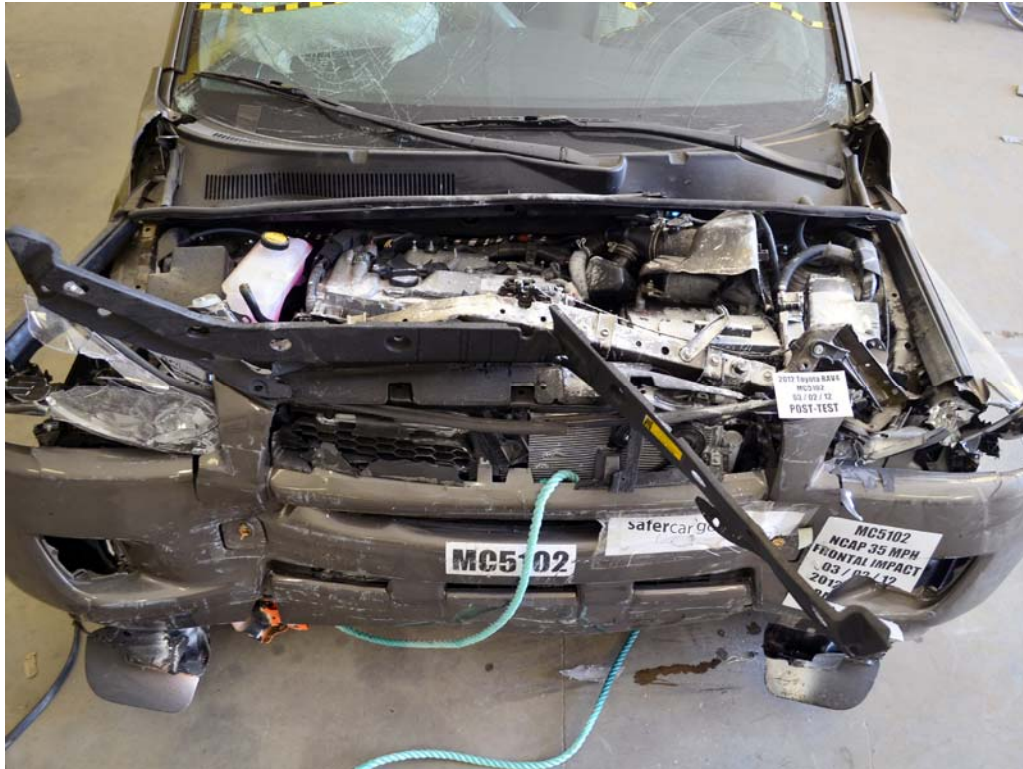


FIGURE 20. Post-Test Engine Compartment View



FIGURE 21. Pre-Test Fuel Filler Cap View



FIGURE 22. Post-Test Fuel Filler Cap View

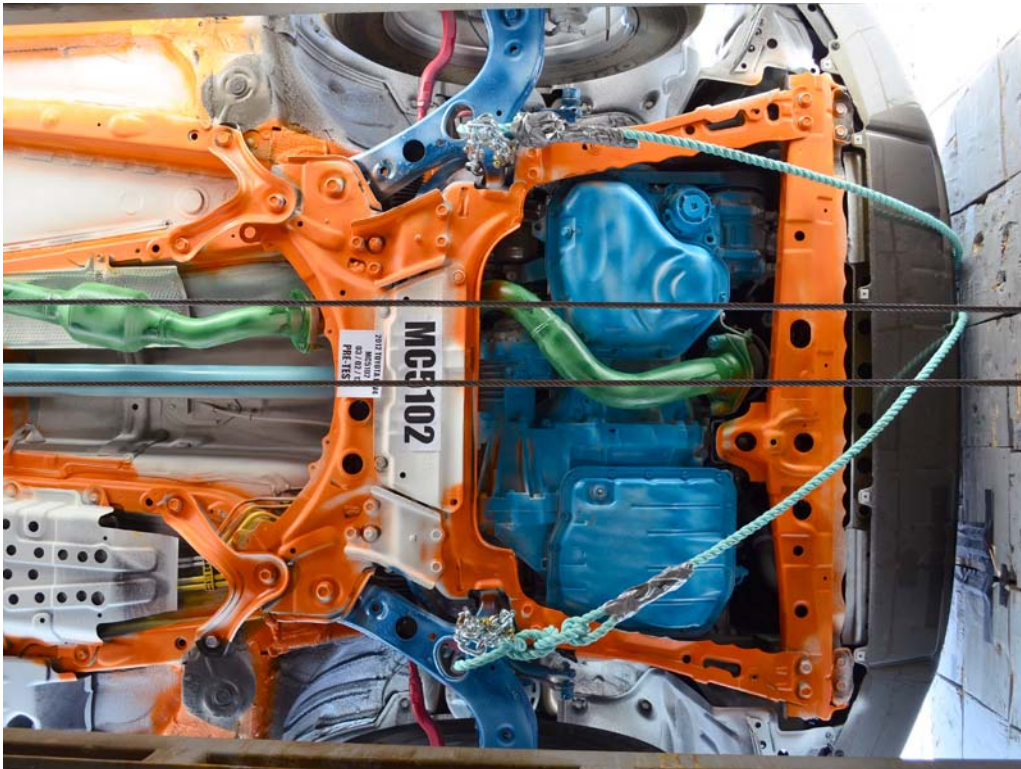


FIGURE 23. Pre-Test Front Underbody View

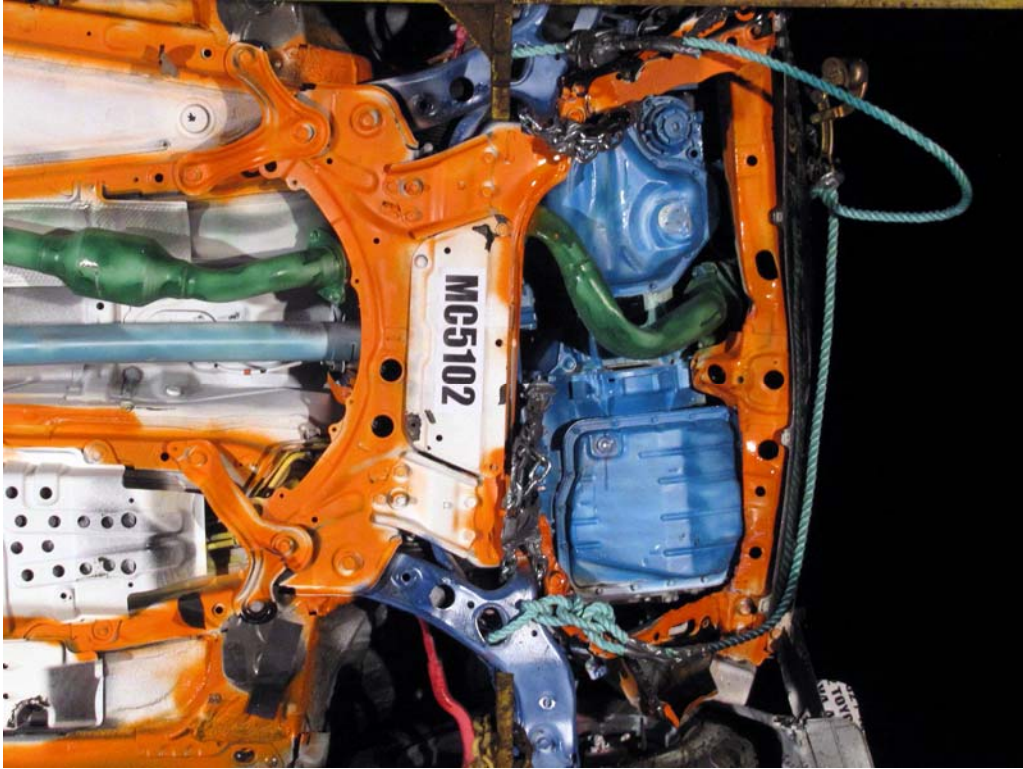


FIGURE 24. Post-Test Front Underbody View

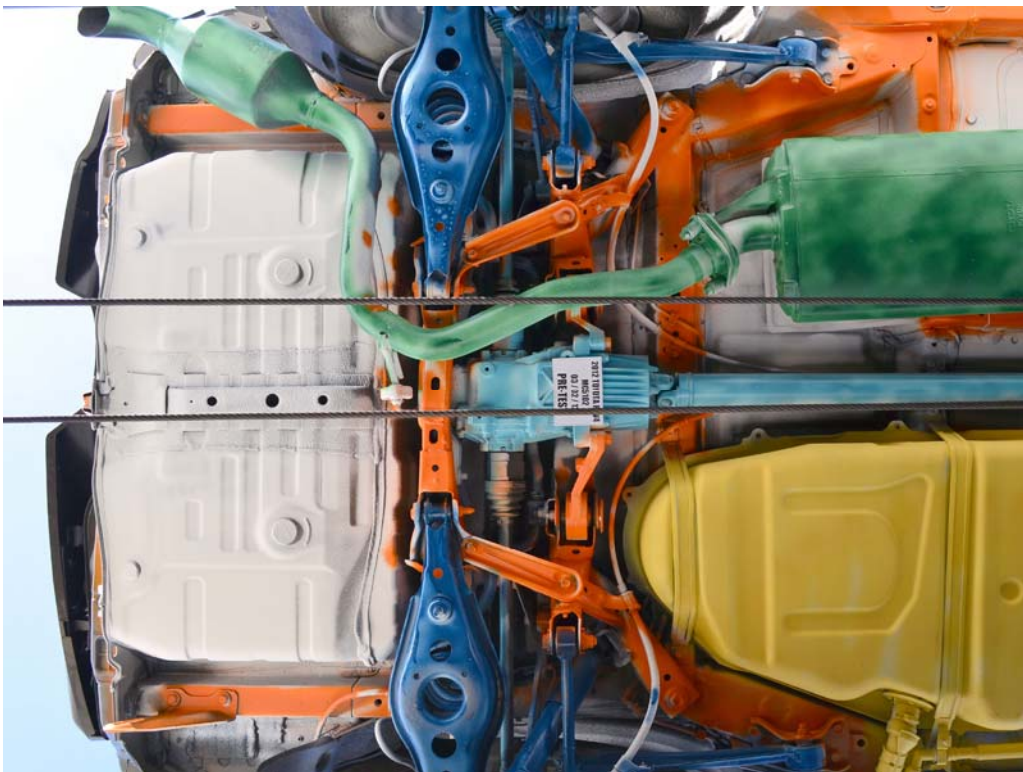


FIGURE 25. Pre-Test Rear Underbody View

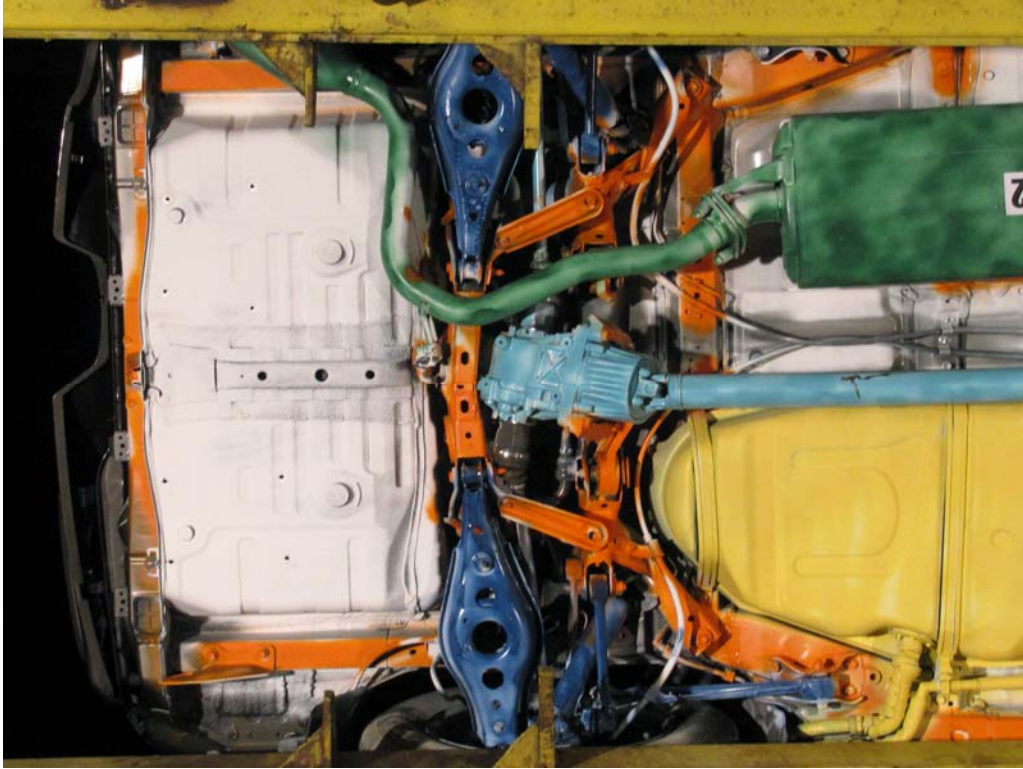


FIGURE 26. Post-Test Rear Underbody View



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

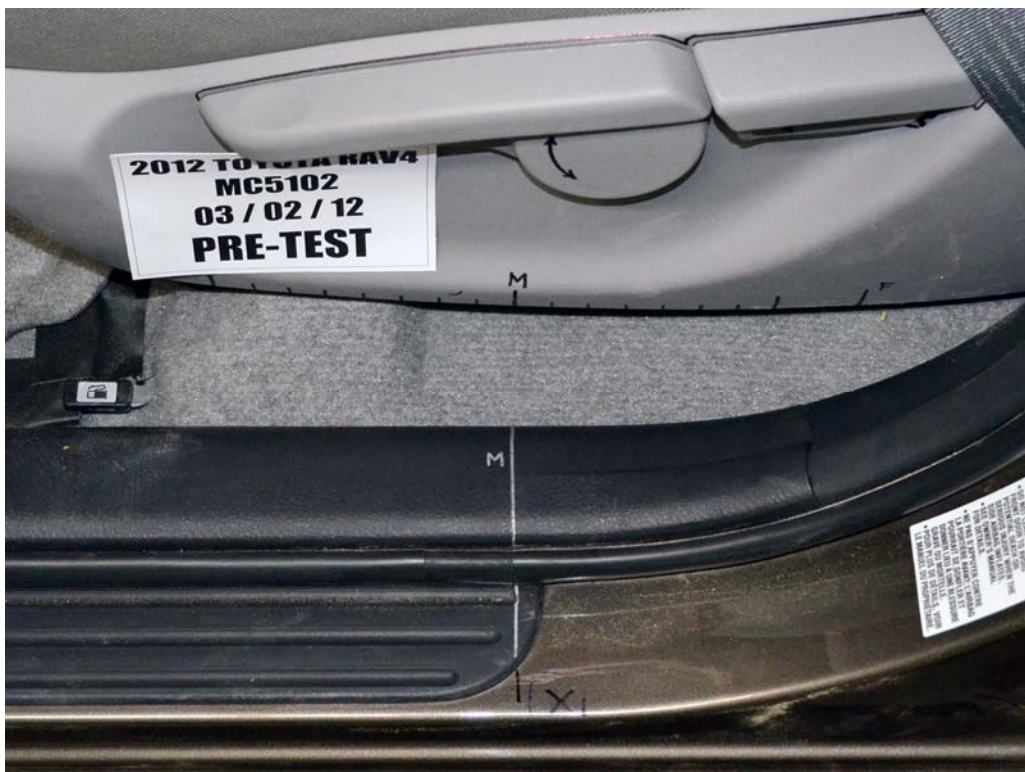


FIGURE 35. Pre-Test Driver's Seat Fore-Aft Markings



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

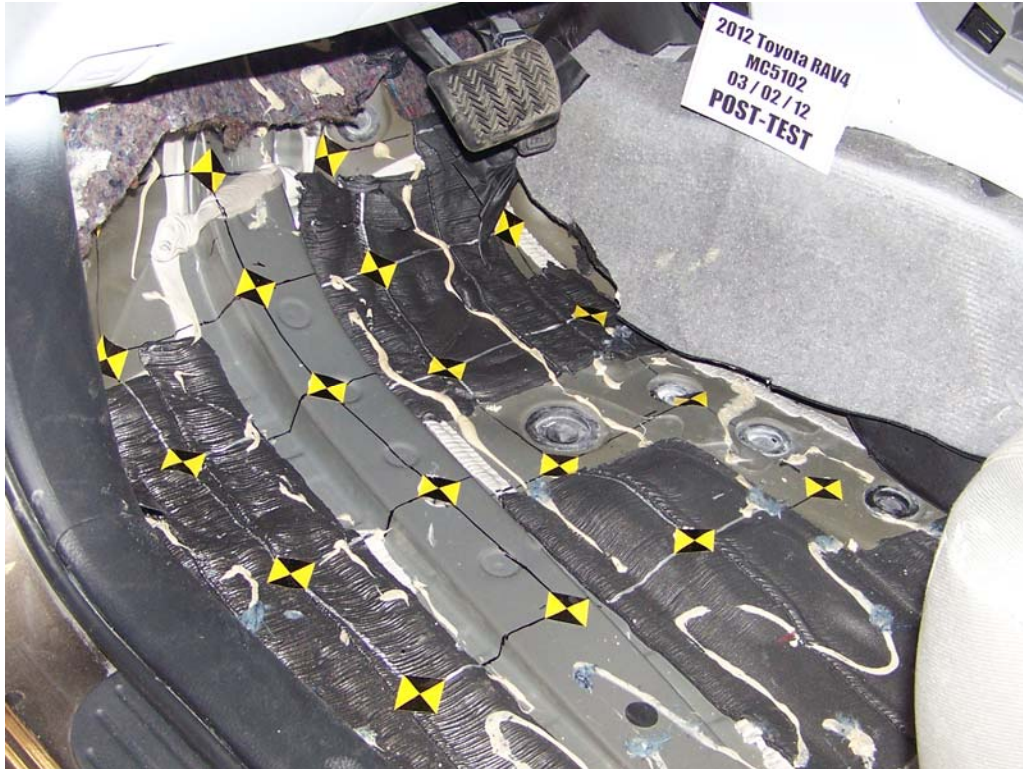


FIGURE 42. Post-Test Driver's Side Floorpan



FIGURE 43. Post-Test Driver Dummy Face

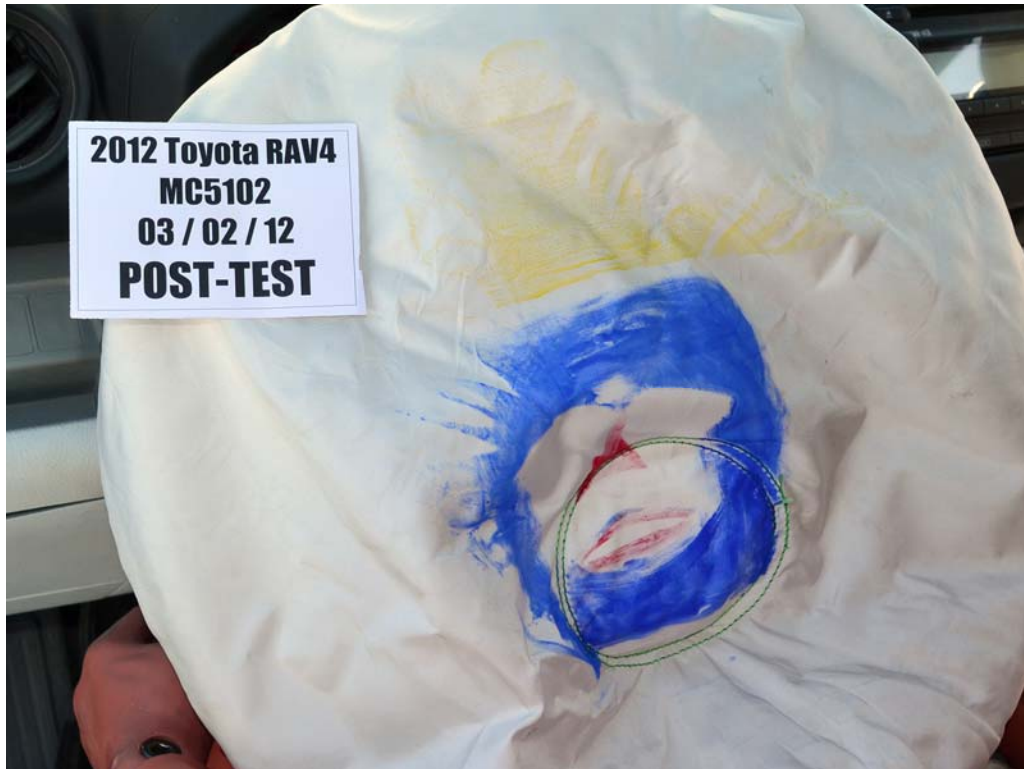


FIGURE 44. Post-Test Driver Dummy Contact With Airbag



FIGURE 45. Post-Test Driver Dummy Contact With Headrest



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 Headrest



FIGURE 62b. Post-Test Passenger Dummy Contact With Glovebox

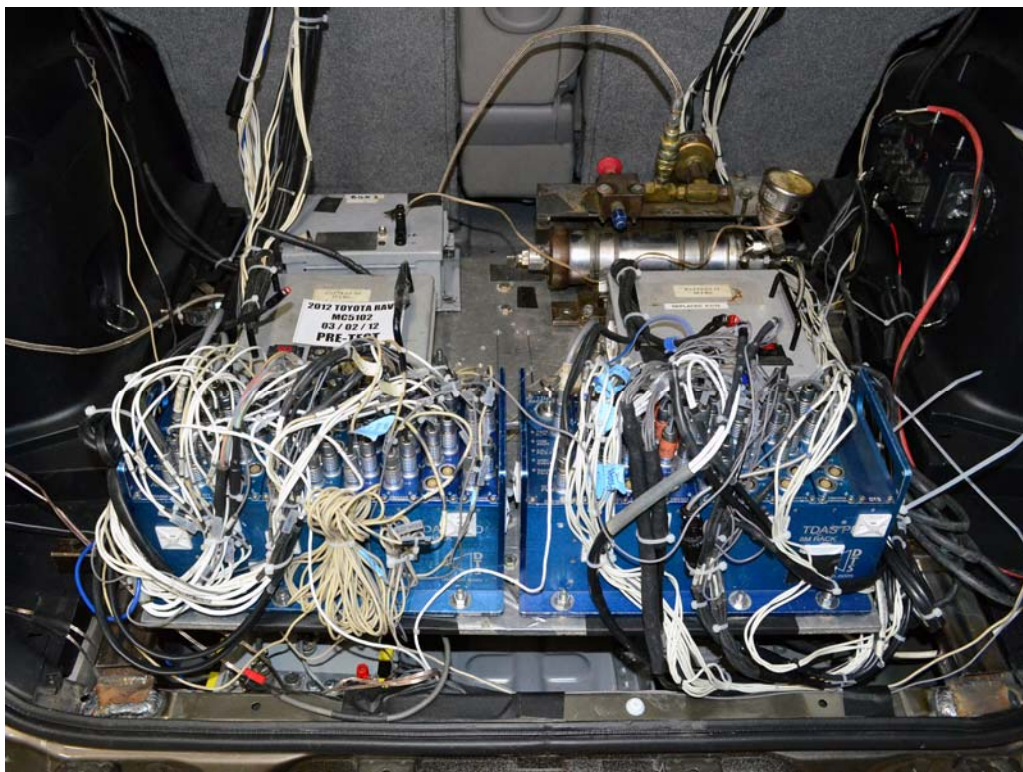


FIGURE 63. Pre-Test of Ballast Installed in Vehicle

Photograph Not Applicable No Stoddard Solvent Spillage

FIGURE 64. Post-Test Stoddard Solvent Spillage Location



FIGURE 65. Post-Test Speed Trap Read Out

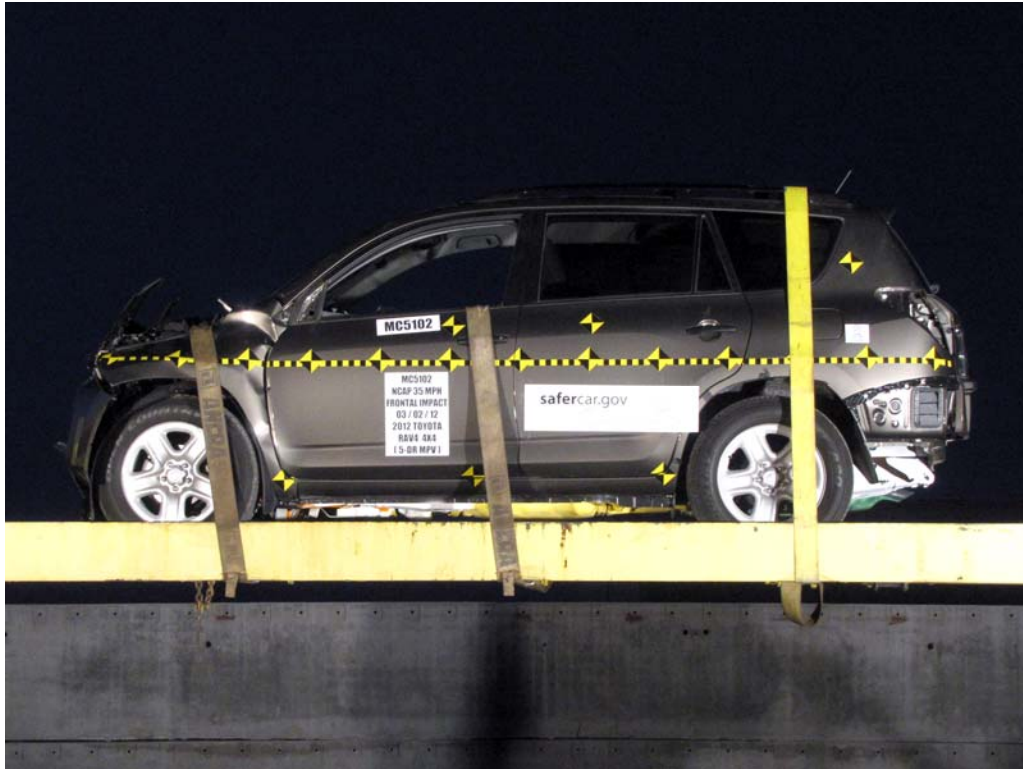


FIGURE 66. Vehicle at 0°on Static Rollover Device

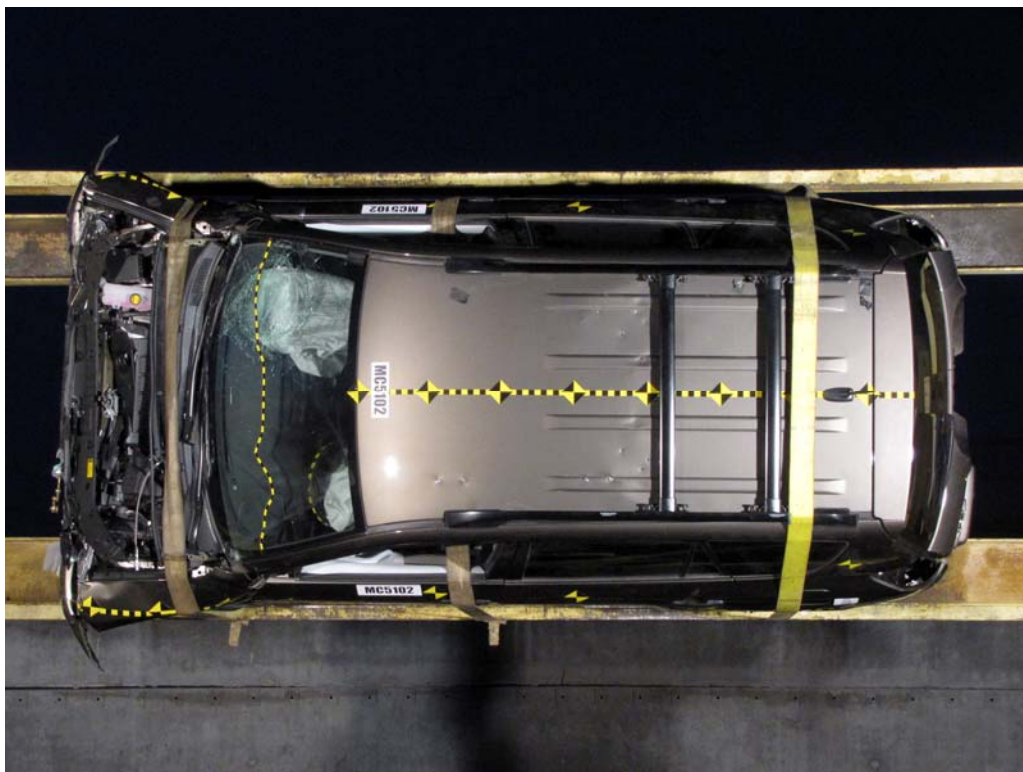


FIGURE 67. Vehicle at 90°on Static Rollover Device

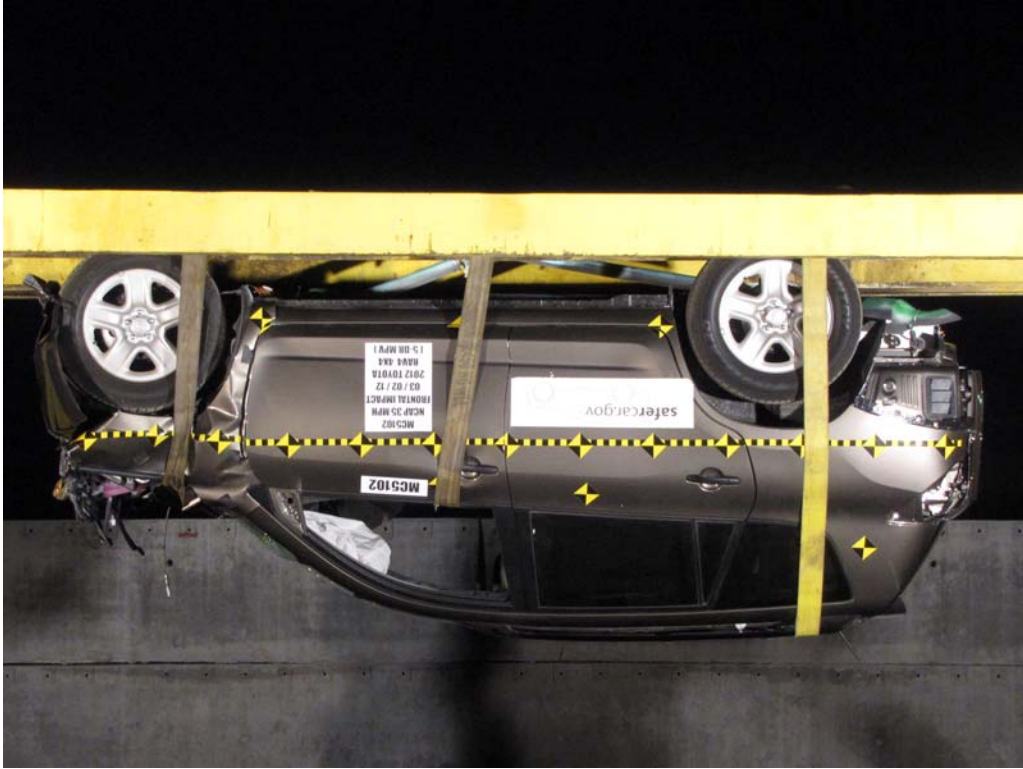


FIGURE 68. Vehicle at 180° on Static Rollover Device

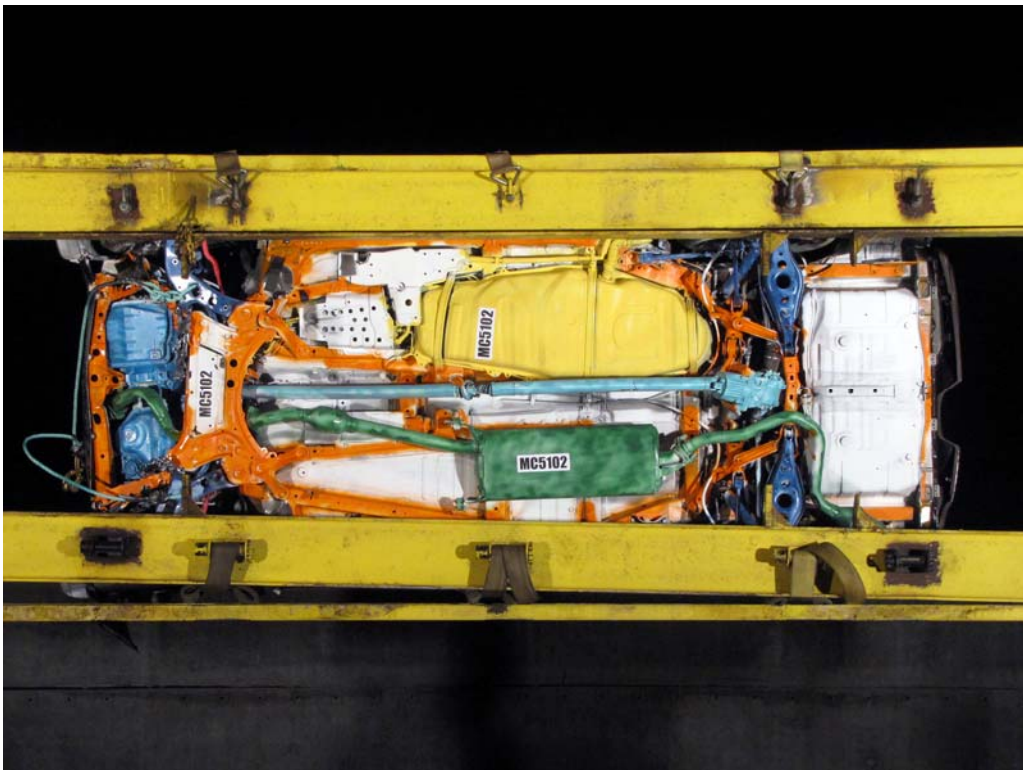


FIGURE 69. Vehicle at 270° on Static Rollover Device

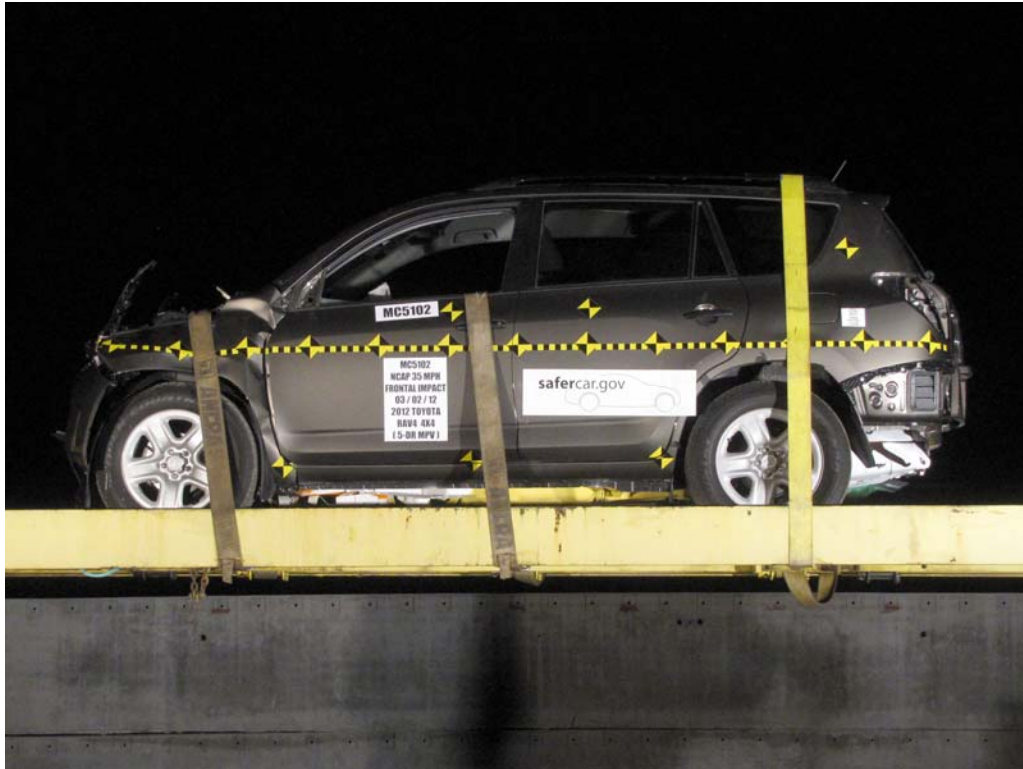


FIGURE 70. Vehicle at 360° on Static Rollover Device



FIGURE 71. Toyota RAV4 Frontal] Frontal Impact Event

APPENDIX B
DUMMY RESPONSE DATA TRACES

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11	Driver Upper Neck Force Z vs. Time Primary	B-4
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13	Driver Nij vs. Time Primary	B-4
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18	Passenger Head Z Acceleration vs. Time Primary	B-6
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21	Passenger Chest X Acceleration vs. Time Primary	B-8
22	Passenger Chest Y Acceleration vs. Time Primary	B-8
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24	Passenger Chest Resultant Acceleration vs. Time Primary	B-8
25	Passenger Upper Neck Force X vs. Time Primary	B-9
26	Passenger Upper Neck Force Z vs. Time Primary	B-9
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

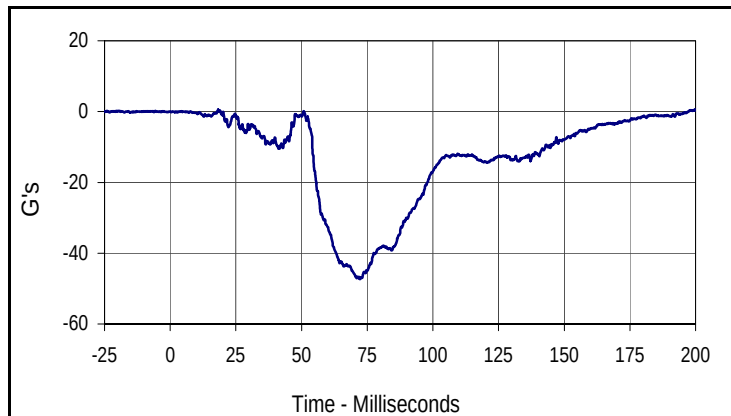
Driver Head X Acceleration Redundant
Driver Head Y Acceleration Redundant
Driver Head Z Acceleration Redundant
Driver Upper Neck Force Y
Driver Upper Neck Moment X
Driver Upper Neck Moment Z
Driver Chest X Acceleration Redundant
Driver Chest Y Acceleration Redundant
Driver Chest Z Acceleration Redundant
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
Passenger Left Foot Aft X
Passenger Left Foot Aft Z
Passenger Right Foot Fore Z
Passenger Right Foot Aft X
Passenger Right Foot Aft Z
Left Rear Seat Crossmember X

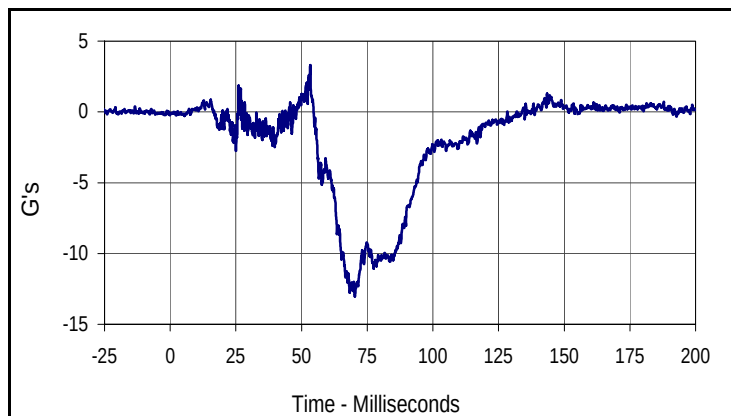
Left Rear Seat Crossmember Z
Right Rear Seat Crossmember X
Right Rear Seat Crossmember Z
Vehicle Engine Top X
Vehicle Engine Bottom X
Vehicle Left Brake Caliper X
Vehicle Right Brake Caliper X
Load Cell Barrier A1-A9
Load Cell Barrier B1-B9
Load Cell Barrier C1-C9
Load Cell Barrier D1-D9

Test Vehicle: 2012 Toyota Rav4 4WD 5-Door MPV
 Test Program: 56 km/h Frontal Impact NCAP Test

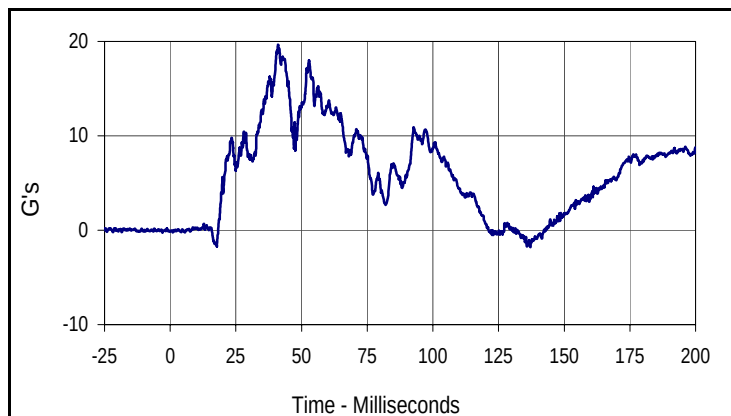
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 Test Date: 3/2/12



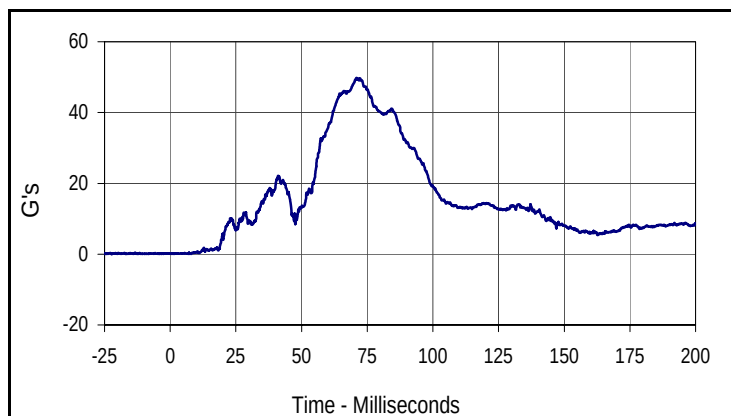
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Plot No.	Type	SAE Class	Units
001	FIL	1000	G's
Max	Time	Min	Time
0.6	199.7	-47.3	72.2



Curve Description			
Driver Head Acceleration Y Primary			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
3.3	53.3	-13.0	70.3



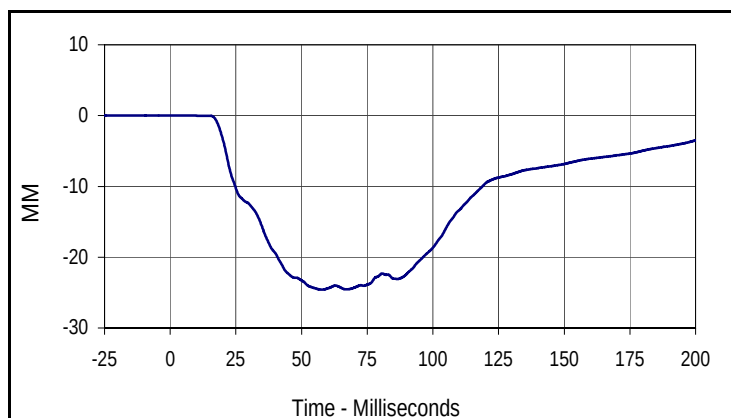
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Plot No.	Type	SAE Class	Units
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Curve Description			
Driver Head Resultant Acceleration Primary			
Plot No.	Type	SAE Class	Units
004	RES	1000	G's
Max	Time	Min	Time
49.8	71.0	0.0	6.8

Test Vehicle: 2012 Toyota Rav4 4WD 5-Door MPV
 Test Program: 56 km/h Frontal Impact NCAP Test

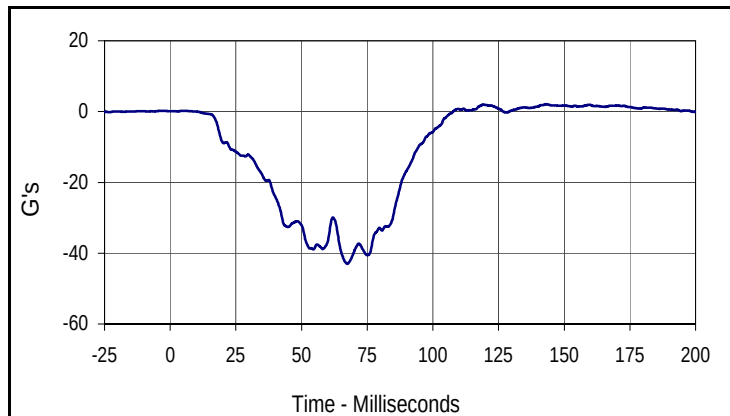
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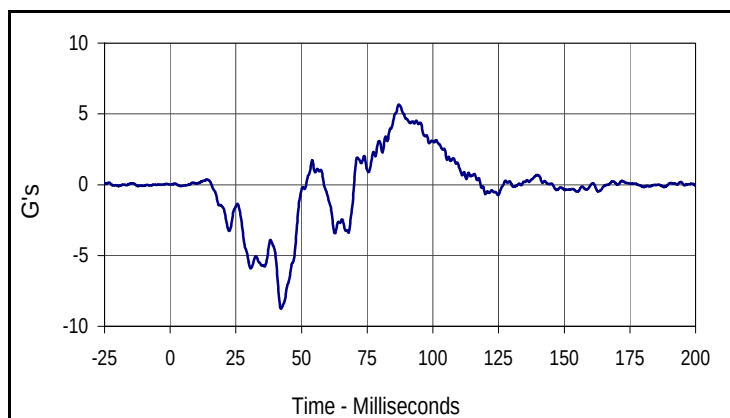
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Driver Chest Deflection			
Plot No.	Type	SAE Class	Units
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Max	Time	Min	Time
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Test Vehicle: 2012 Toyota Rav4 4WD 5-Door MPV
 Test Program: 56 km/h Frontal Impact NCAP Test

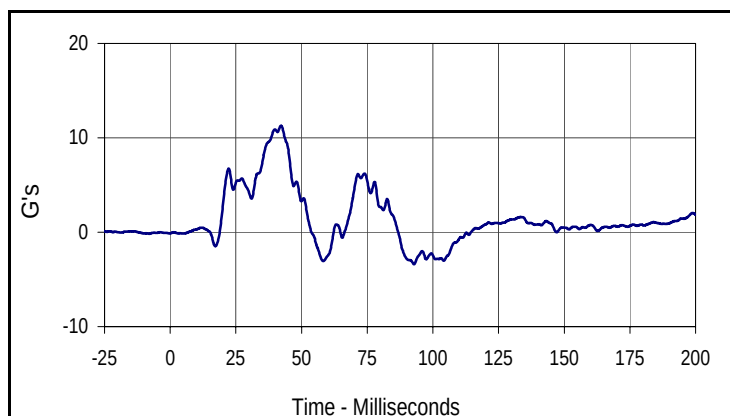
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 Test Date: 3/2/12



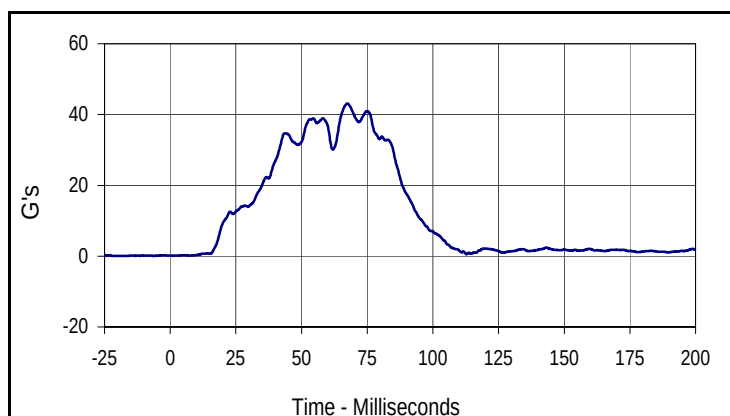
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Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
2.1	143.2	-43.0	67.4



Curve Description			
Driver Chest Acceleration Y Primary			
Plot No.	Type	SAE Class	Units
007	FIL	180	G's
Max	Time	Min	Time
5.7	87.0	-8.8	42.1



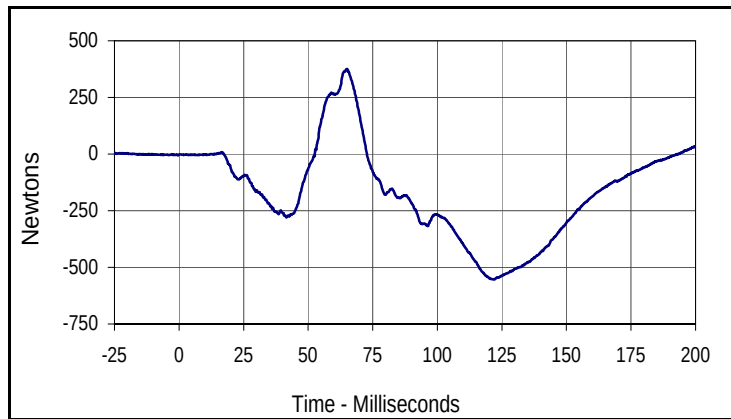
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Plot No.	Type	SAE Class	Units
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Max	Time	Min	Time
11.3	42.2	-3.4	92.8



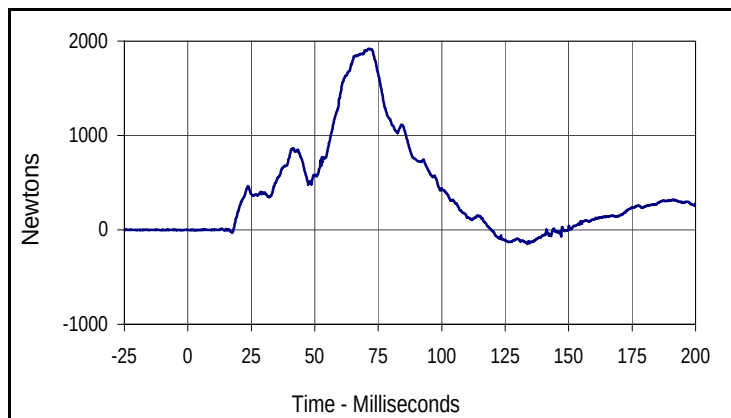
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Driver Chest Resultant Acceleration Primary			
Plot No.	Type	SAE Class	Units
009	RES	180	G's
Max	Time	Min	Time
43.1	67.5	0.1	0.9

Test Vehicle: 2012 Toyota Rav4 4WD 5-Door MPV
 Test Program: 56 km/h Frontal Impact NCAP Test

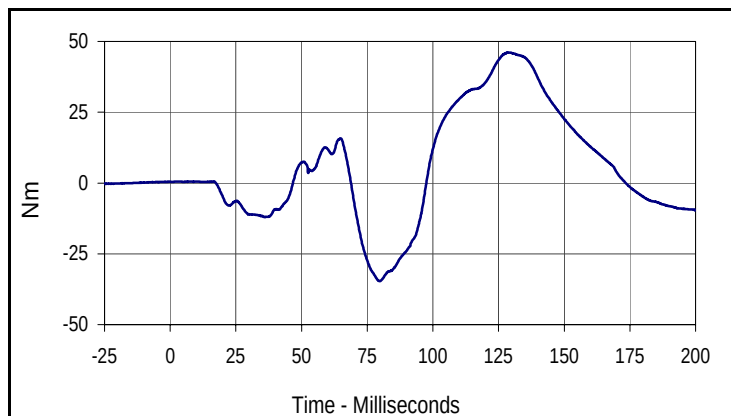
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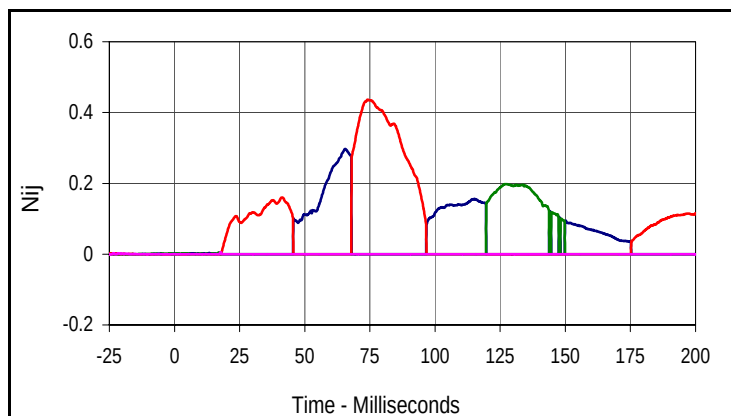
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Driver Upper Neck Force X			
Plot No.	Type	SAE Class	Units
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Max	Time	Min	Time
375.1	65.1	-554.2	122.0



Curve Description			
Driver Upper Neck Force Z			
Plot No.	Type	SAE Class	Units
011	FIL	1000	Newtons
Max	Time	Min	Time
1918.9	71.1	-148.0	133.7



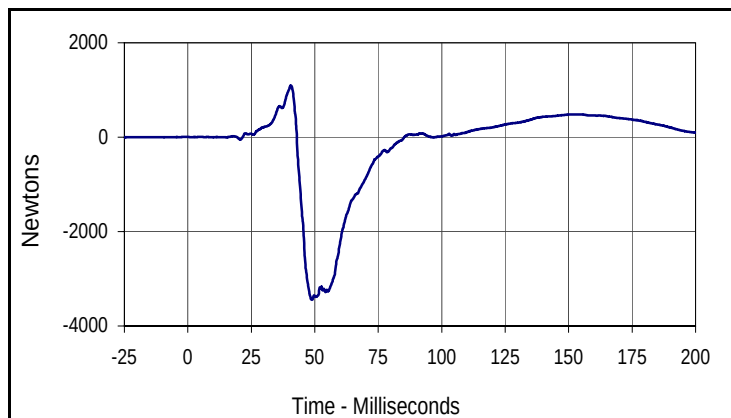
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Driver Upper Neck Moment Y			
Plot No.	Type	SAE Class	Units
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Max	Time	Min	Time
46.1	128.5	-34.7	79.7



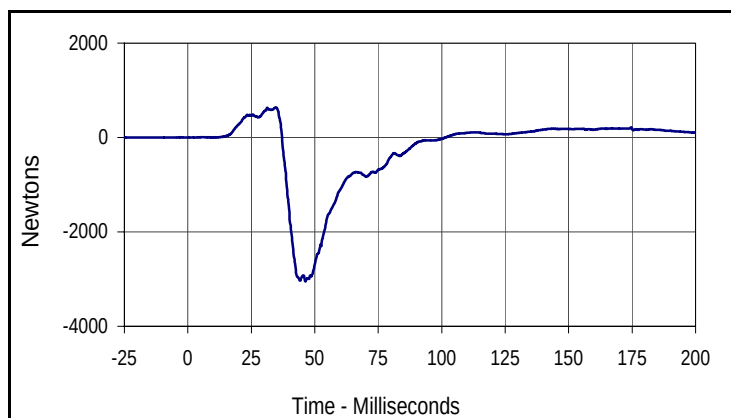
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Driver Nij			
Units	Type	Max	Time
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Units	Type	Max	Time
Nte	FIL	0.44	74.1
Units	Type	Max	Time
Ncf	FIL	0.20	127.5
Units	Type	Max	Time
Nce	FIL	0.17	285.4

Test Vehicle: 2012 Toyota Rav4 4WD 5-Door MPV
Test Program: 56 km/h Frontal Impact NCAP Test

NHTSA No.: MC5102
Test Date: 3/2/12



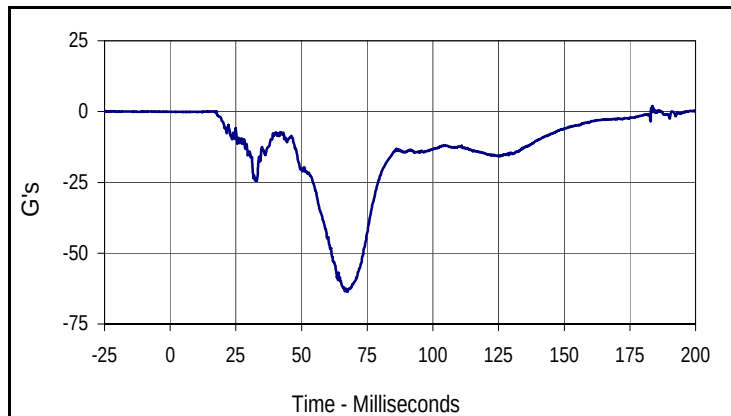
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Driver Left Femur Force Z			
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Max	Time	Min	Time
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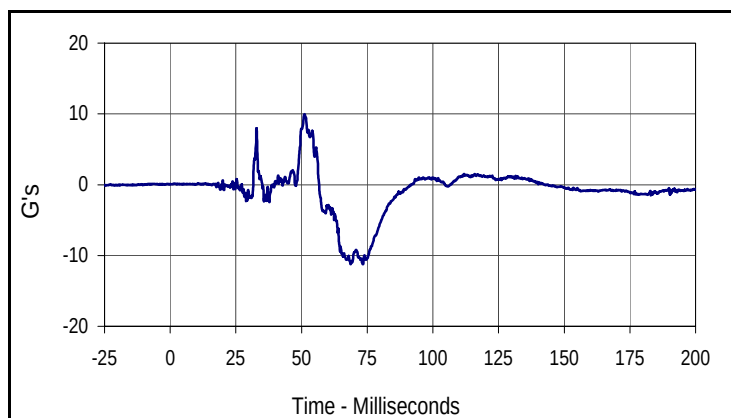
Curve Description			
Driver Right Femur Force Z			
Plot No.	Type	SAE Class	Units
014	FIL	600	Newtons
Max	Time	Min	Time
634.3	34.8	-3053.0	46.3

Test Vehicle: 2012 Toyota Rav4 4WD 5-Door MPV
 Test Program: 56 km/h Frontal Impact NCAP Test

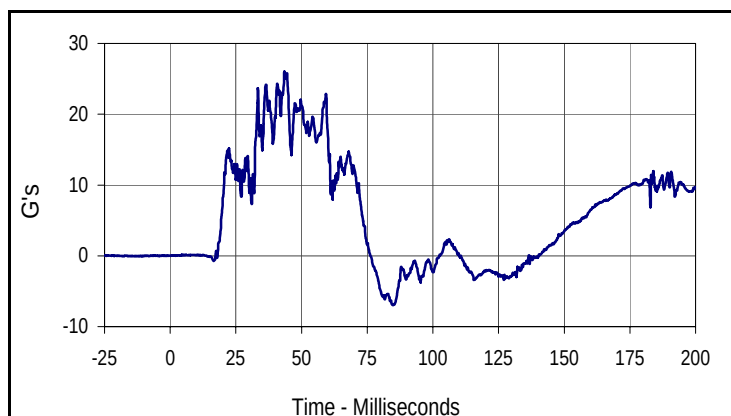
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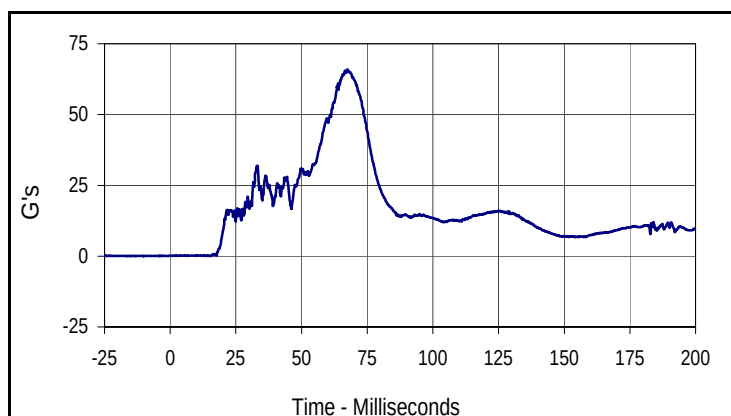
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Plot No.	Type	SAE Class	Units
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Max	Time	Min	Time
1.9	183.5	-63.6	67.5



Curve Description			
Passenger Head Acceleration Y Primary			
Plot No.	Type	SAE Class	Units
016	FIL	1000	G's
Max	Time	Min	Time
10.0	51.1	-11.3	73.3



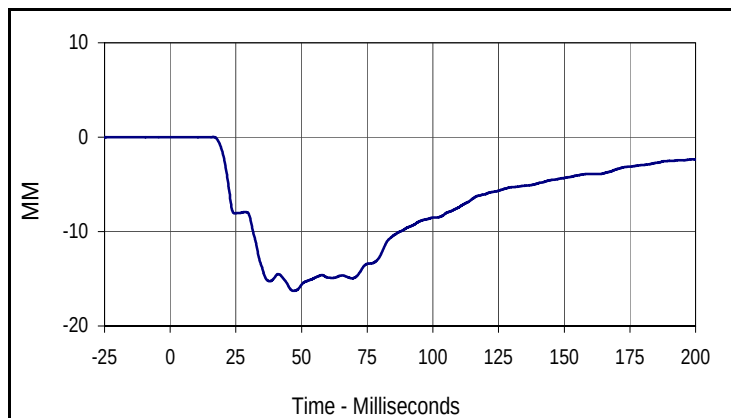
Curve Description			
Passenger Head Acceleration Z Primary			
Plot No.	Type	SAE Class	Units
017	FIL	1000	G's
Max	Time	Min	Time
26.0	43.5	-7.0	84.9



Curve Description			
Passenger Head Resultant Acceleration Primary			
Plot No.	Type	SAE Class	Units
018	RES	1000	G's
Max	Time	Min	Time
66.0	67.5	0.1	0.3

Test Vehicle: 2012 Toyota Rav4 4WD 5-Door MPV
 Test Program: 56 km/h Frontal Impact NCAP Test

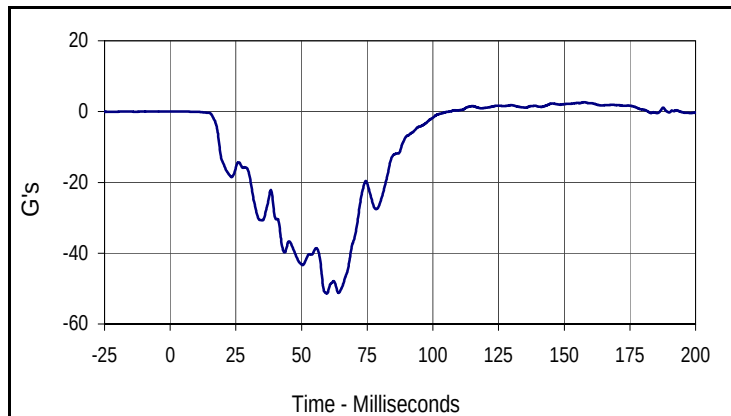
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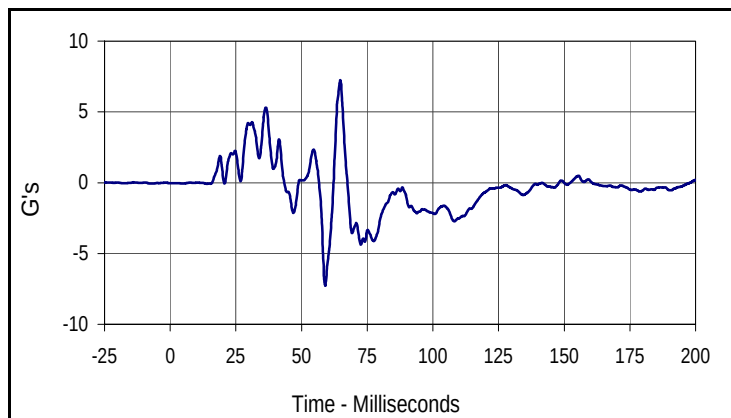
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Passenger Chest Deflection			
Plot No.	Type	SAE Class	Units
019	FIL	180	MM
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Test Vehicle: 2012 Toyota Rav4 4WD 5-Door MPV
 Test Program: 56 km/h Frontal Impact NCAP Test

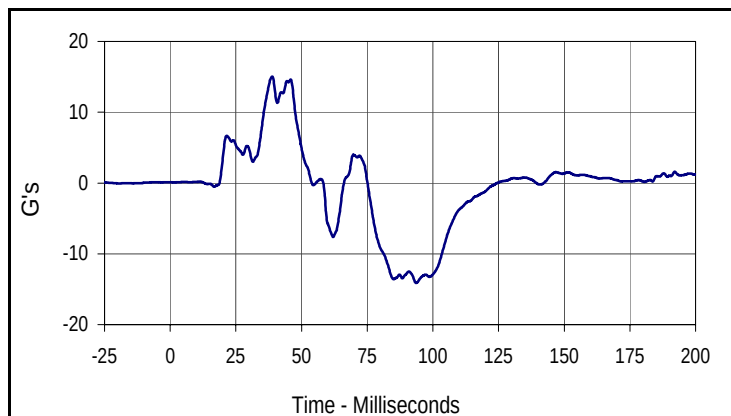
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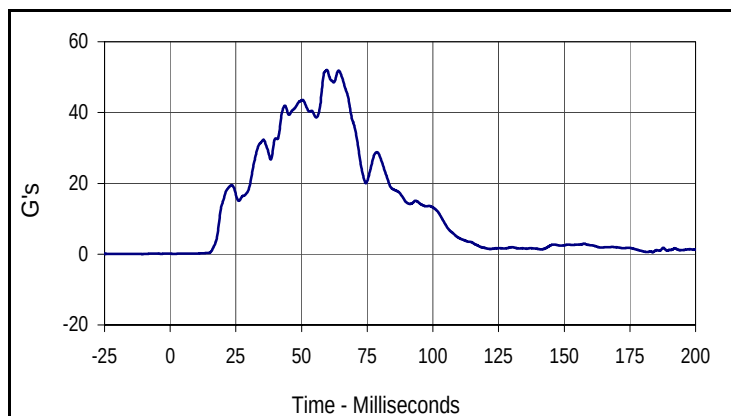
Curve Description			
Passenger Chest Acceleration X Primary			
Plot No.	Type	SAE Class	Units
020	FIL	180	G's
Max	Time	Min	Time
2.7	157.6	-51.4	59.7



Curve Description			
Passenger Chest Acceleration Y Primary			
Plot No.	Type	SAE Class	Units
021	FIL	180	G's
Max	Time	Min	Time
7.3	64.7	-7.3	59.0



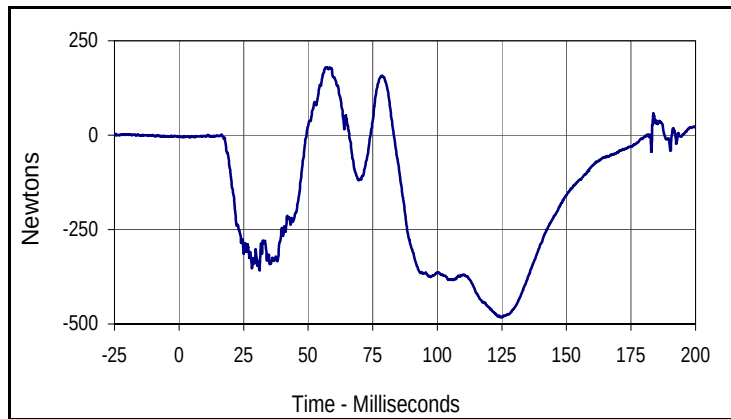
Curve Description			
Passenger Chest Acceleration Z Primary			
Plot No.	Type	SAE Class	Units
022	FIL	180	G's
Max	Time	Min	Time
15.0	38.9	-14.1	93.6



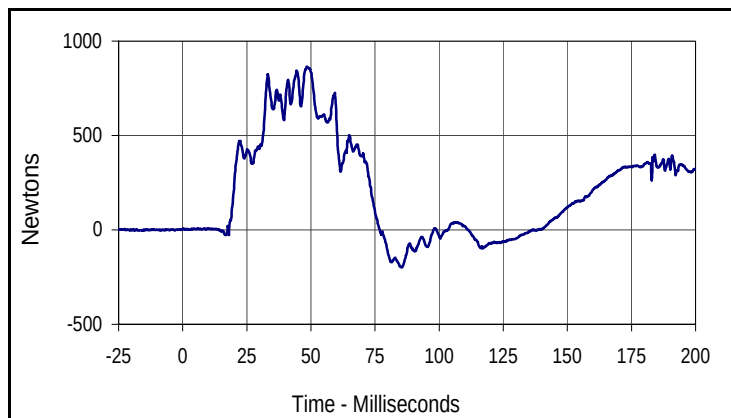
Curve Description			
Passenger Chest Resultant Acceleration Primary			
Plot No.	Type	SAE Class	Units
023	RES	180	G's
Max	Time	Min	Time
52.0	59.7	0.1	1.3

Test Vehicle: 2012 Toyota Rav4 4WD 5-Door MPV
 Test Program: 56 km/h Frontal Impact NCAP Test

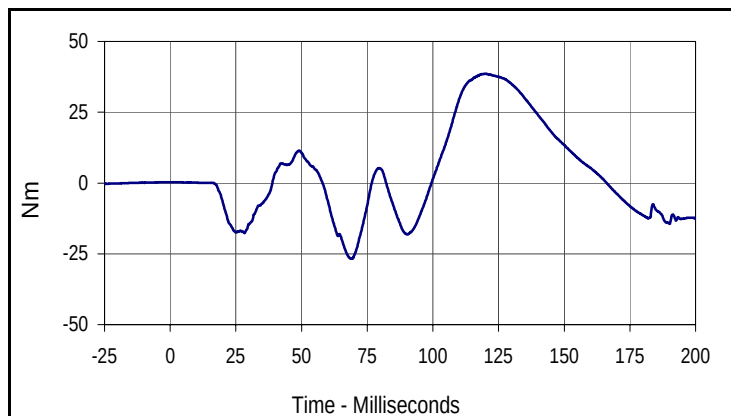
NHTSA No.: MC5102
 Test Date: 3/2/12



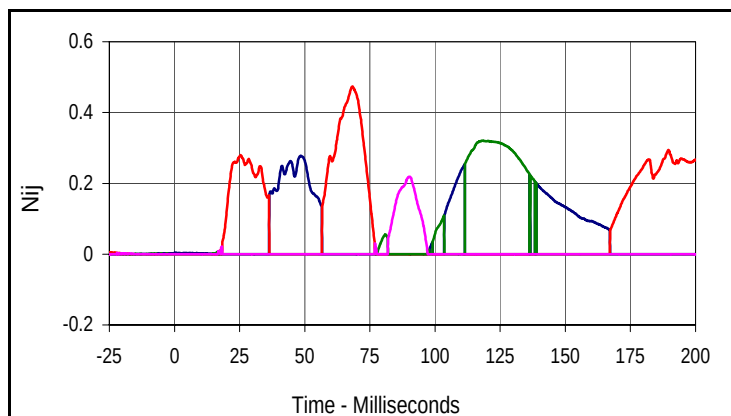
Curve Description			
Passenger Upper Neck Force X			
Plot No.	Type	SAE Class	Units
024	FIL	1000	Newtons
Max	Time	Min	Time
179.9	56.9	-482.5	124.3



Curve Description			
Passenger Upper Neck Force Z			
Plot No.	Type	SAE Class	Units
025	FIL	1000	Newtons
Max	Time	Min	Time
865.2	48.4	-199.1	85.5



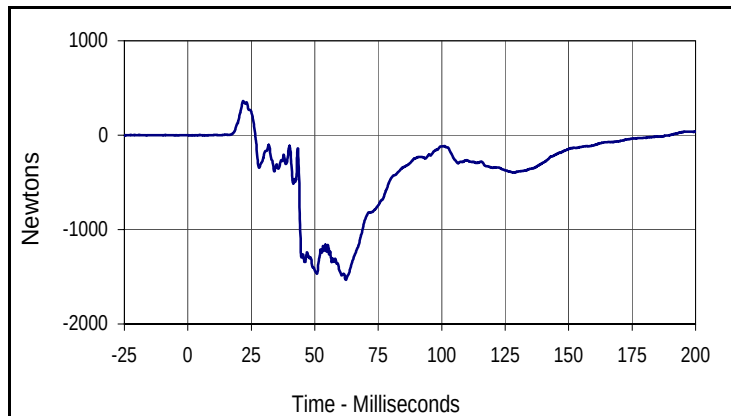
Curve Description			
Passenger Upper Neck Moment Y			
Plot No.	Type	SAE Class	Units
026	FIL	600	Nm
Max	Time	Min	Time
38.6	120.0	-26.8	69.0



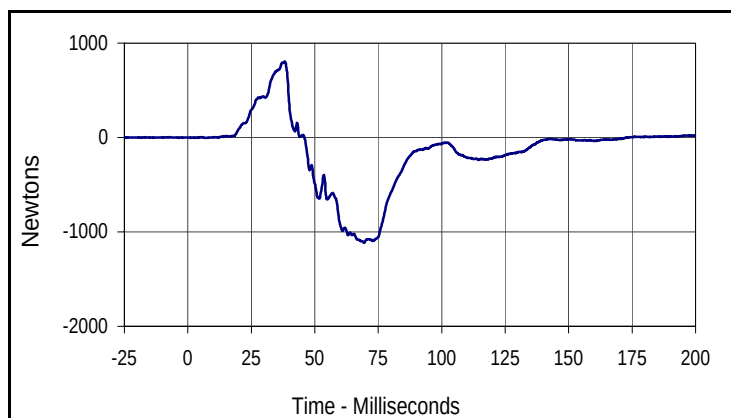
Curve Description			
Passenger Nij			
Units	Type	Max	Time
Ntf	FIL	0.28	48.5
Units	Type	Max	Time
Nte	FIL	0.47	68.2
Units	Type	Max	Time
Ncf	FIL	0.32	118.1
Units	Type	Max	Time
Nce	FIL	0.24	230.7

Test Vehicle: 2012 Toyota Rav4 4WD 5-Door MPV
 Test Program: 56 km/h Frontal Impact NCAP Test

NHTSA No.: MC5102
 Test Date: 3/2/12



Curve Description			
Passenger Left Femur Force Z			
Plot No.	Type	SAE Class	Units
027	FIL	600	Newtons
Max	Time	Min	Time
361.5	21.8	-1532.3	62.3



Curve Description			
Passenger Right Femur Force Z			
Plot No.	Type	SAE Class	Units
028	FIL	600	Newtons
Max	Time	Min	Time
805.9	38.2	-1115.9	69.4

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: 2/27/12

ATD Serial No.: 035

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: 2/27/12

ATD Serial No.: 035

Test I.D.: N/A



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.33	Pass
Laboratory Relative Humidity	%	10 to 70	28.7	Pass
A - Total sitting height	mm	879 to 889	885	Pass
B - Shoulder pivot height	mm	505 to 521	515	Pass
C - H point height	mm	84 to 89	88	Pass
D - H point location from backline	mm	135 to 140	138	Pass
E - Shoulder pivot from backline	mm	84 to 94	87	Pass
F - Thigh clearance	mm	140 to 155	148	Pass
G - Back of elbow to wrist pivot	mm	290 to 305	298	Pass
H - Head back to backline	mm	41 to 46	44	Pass
I - Shoulder to elbow length	mm	330 to 345	335	Pass
J - Elbow rest height	mm	190 to 211	202	Pass
K - Buttock to knee length	mm	579 to 604	586	Pass
L - Popliteal length	mm	429 to 455	438	Pass
M - Knee pivot height	mm	485 to 500	490	Pass
N - Buttock popliteal length	mm	452 to 477	472	Pass
O - Chest depth without jacket	mm	213 to 229	225	Pass
P - Foot length	mm	251 to 267	260	Pass
V - Shoulder breadth	mm	422 to 437	433	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	865	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

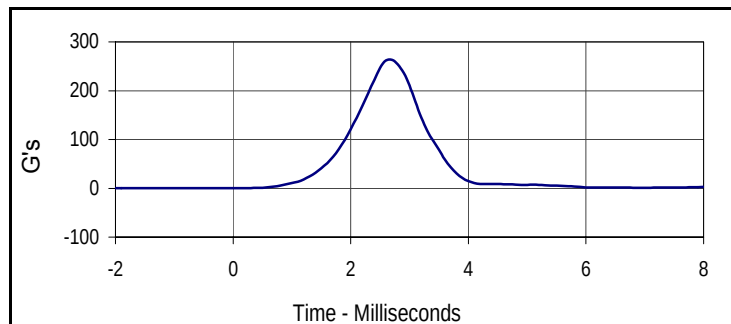
Test Date: 2/27/12

ATD Serial No.: 035

Test I.D.: M035HD033



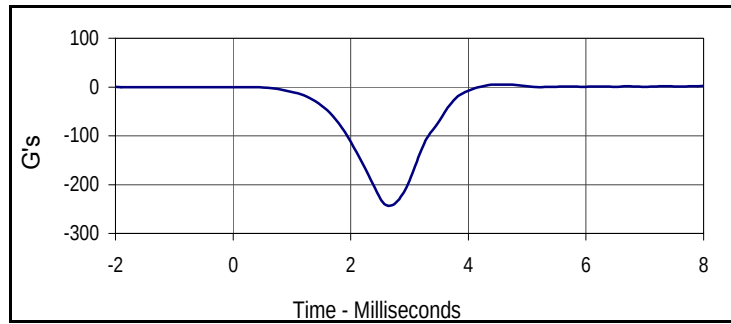
Tested Parameter		Units	Specification	Result	Pass/Fail
Head Assembly Soak Time		Minutes	≥240	240	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.9	Pass
	Min	%		28.4	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.7	Pass
Peak Resultant Acceleration		G's	225.0 to 275.0	263.3	Pass
Peak Lateral Acceleration		G's	≤15.0	5.5	Pass
Oscillations After Main Pulse		%	<10% of peak Res. Acceleration	5.6	Pass
Is Acceleration Unimodal?		Yes/No	Yes	Yes	Pass
Overall Test Results				Pass	



Curve Description

Head Resultant

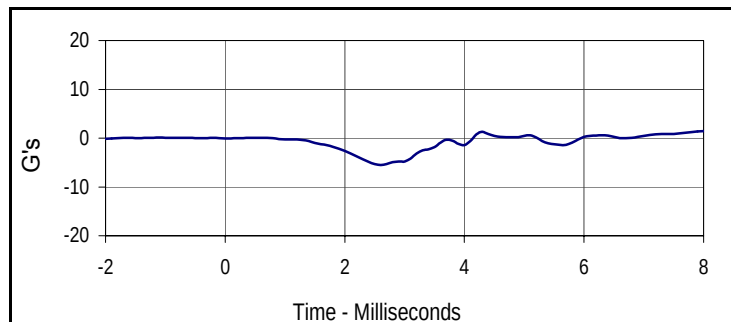
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
263.3	2.7	0.1	-2.0



Curve Description

Head X

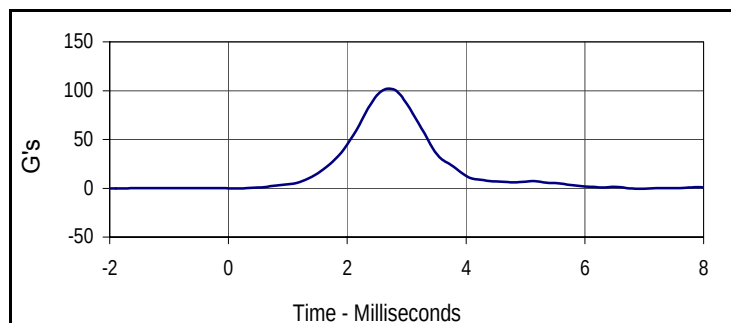
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
5.1	4.5	-242.6	2.7



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

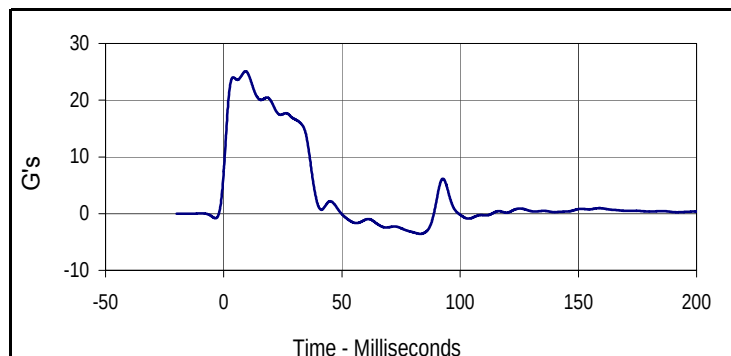
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
102.0	2.7	-0.2	0.1

Test Program: Hybrid III 50th Percentile Male Neck Flexion Test
 ATD Serial No.: 035

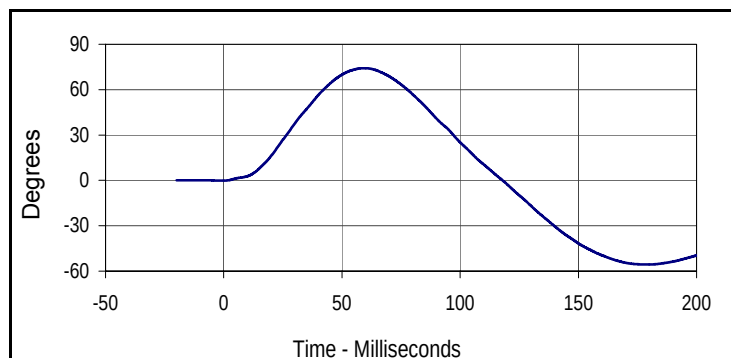
Test Date: 2/27/12
 Test I.D.: M035NF033



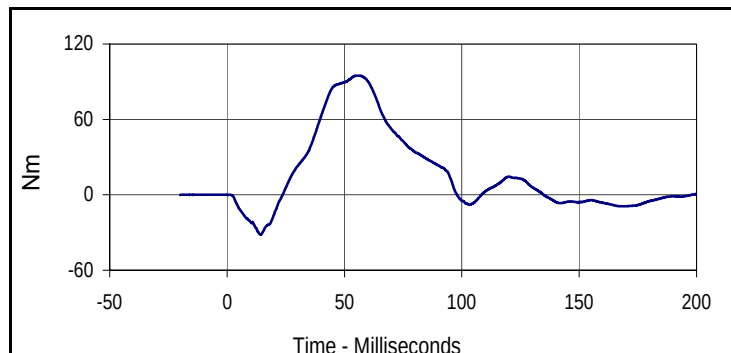
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	275	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.9	Pass
	Min	%		28.4	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	28.9	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.08	Pass
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	24.9	Pass
	20 Msec.	G's	17.6 to 22.6	19.9	Pass
	30 Msec.	G's	12.5 to 18.5	16.7	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 29.0	16.7	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	34.0 to 42.0	38.1	Pass
Maximum "D" Plane Rotation	Max	Degrees	64.0 to 78.0	74.2	Pass
	Time	Msec.	57.0 to 64.0	59.5	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	113.0 to 128.0	118	Pass
Moment About Occ. Condyle	Max	Nm	84.1 to 108.5	94.9	Pass
	Time	Msec.	47.0 to 58.0	56.0	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	97.0 to 107.0	98.0	Pass
Overall Test Results					Pass



Curve Description			
Pendulum Deceleration			
Plot No.	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
25.1	9.2	-3.6	83.2



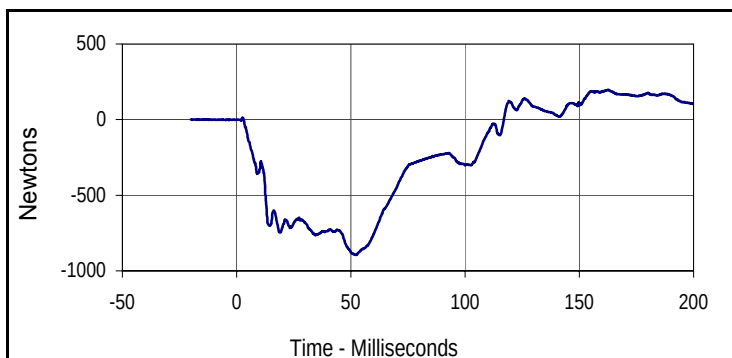
Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
74.2	59.5	-55.7	179.3



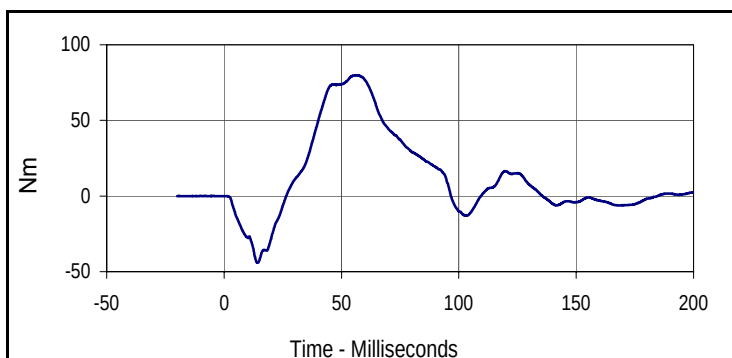
Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
94.9	56.0	-31.7	14.3

Test Program: Hybrid III 50th Percentile Male Neck Flexion Test
ATD Serial No.: 035

Test Date: 2/27/12
Test I.D.: M035NF033



Curve Description			
Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
197.2	162.5	-895.1	52.5



Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
79.8	56.0	-44.1	14.3

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

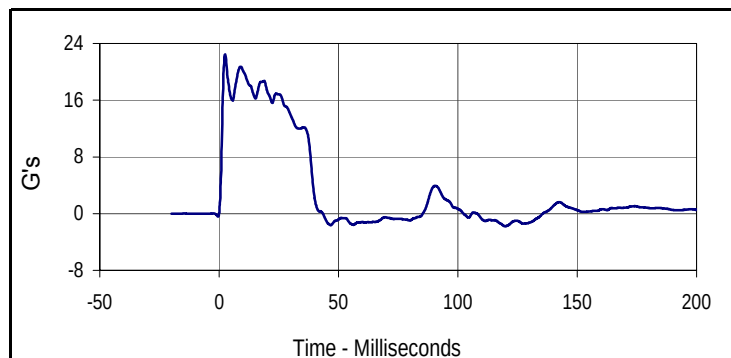
Test Date: 2/27/12

ATD Serial No.: 035

Test I.D.: M035NE033



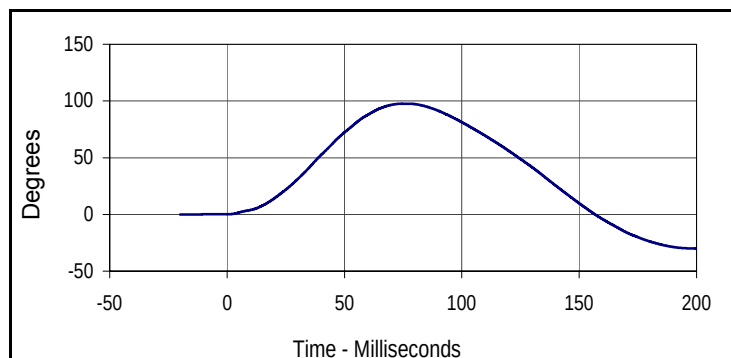
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	305	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.9	Pass
	Min	%		28.4	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	28.7	Pass
Pendulum Velocity		m/s	5.94 to 6.19	6.04	Pass
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	20.2	Pass
	20 Msec.	G's	14.0 to 19.0	17.4	Pass
	30 Msec.	G's	11.0 to 16.0	13.8	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 22.0	13.8	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	38.0 to 46.0	39.1	Pass
Maximum "D" Plane Rotation	Max	Degrees	81.0 to 106.0	97.6	Pass
	Time	Msec.	72.0 to 82.0	75.4	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	147.0 to 174.0	156.8	Pass
Moment About Occ. Condyle	Max	Nm	-52.9 to -79.9	-70.6	Pass
	Time	Msec.	65.0 to 79.0	68.0	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	120.0 to 148.0	141.0	Pass
Overall Test Results					Pass



Curve Description

Pendulum Deceleration

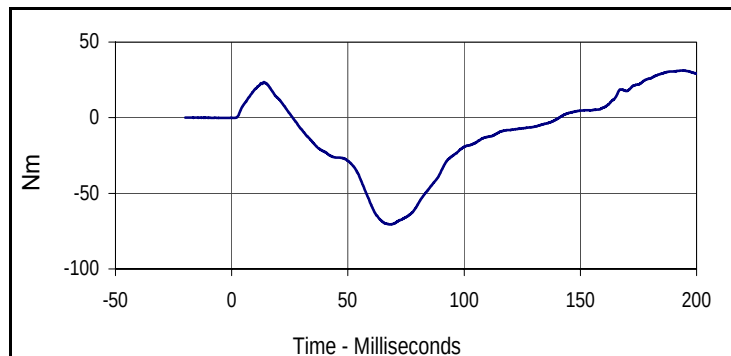
Plot No.	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
22.5	2.5	-1.8	120.0



Curve Description

"D" Plane Rotation

Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
97.6	75.4	-30.0	199.7



Curve Description

Moment About Occipital Condyle

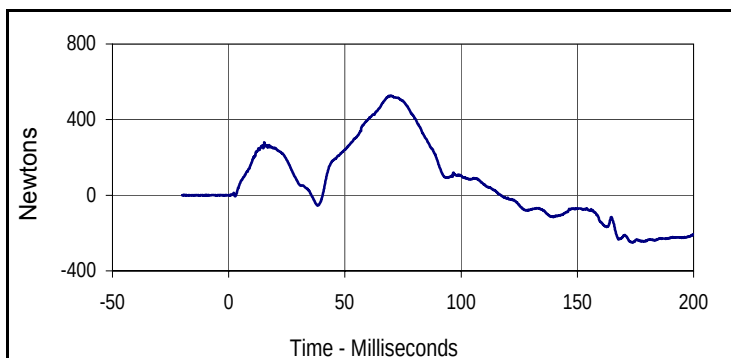
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
31.2	193.9	-70.6	68.0

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

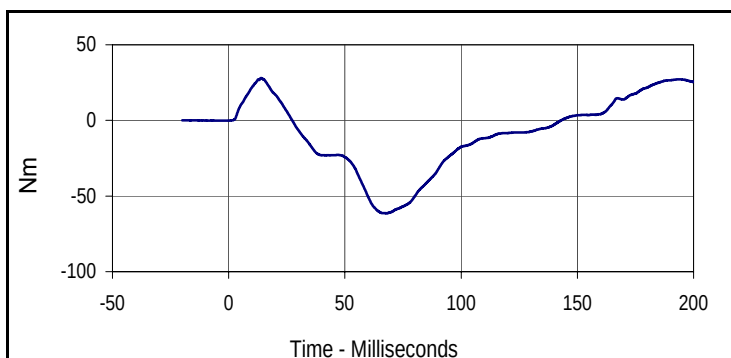
Test Date: 2/27/12

ATD Serial No.: 035

Test I.D.: M035NE033



Curve Description			
Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
526.9	69.8	-250.1	173.3



Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
28.1	13.9	-61.4	67.8

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

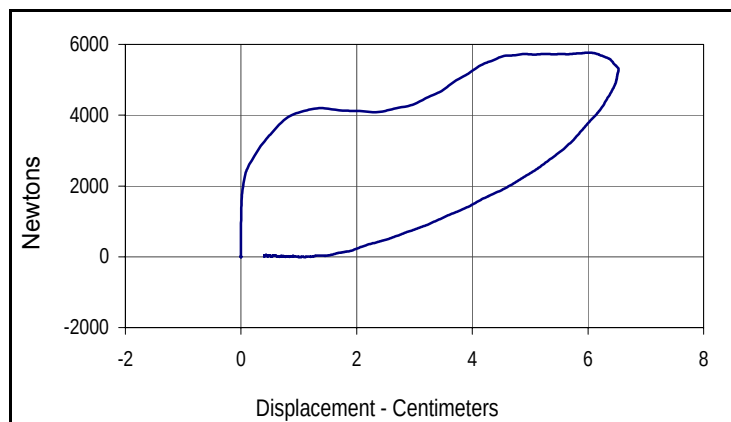
Test Date: 2/27/12

ATD Serial No.: 035

Test I.D.: M035CH033



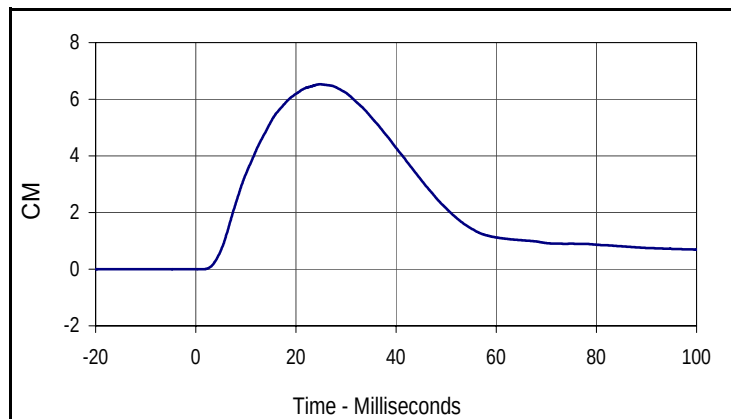
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	360	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.9	Pass
	Min	%		28.4	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	20.8	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.0	Pass
Probe Velocity		m/s	6.58 to 6.82	6.69	Pass
Peak Probe Force		Newtons	5159 to 5893	5769	Pass
Peak Sternum Deflection		CM	6.35 to 7.26	6.53	Pass
Internal Hysteresis		%	69 to 85	71.1	Pass
Overall Test Results				Pass	



Curve Description

Probe Force vs. Chest Deflection

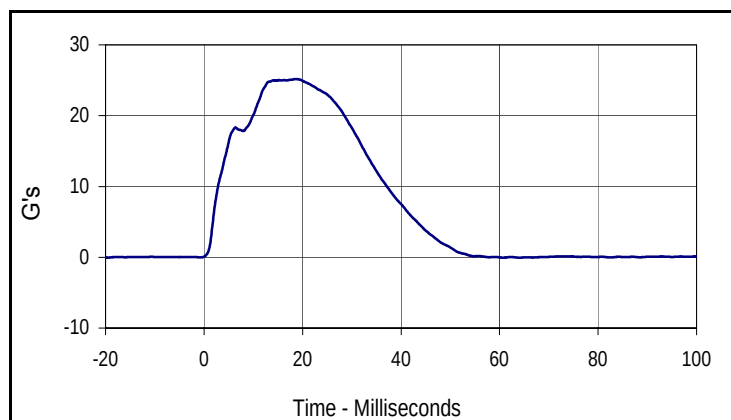
Plot No.	Type	SAE Class	Hysteresis
001	FIL	180	71.1
Peak Probe Force		Peak Chest Deflection	
5769		6.53	



Curve Description

Chest Deflection

Plot No.	Type	SAE Class	Units
002	FIL	180	CM
Max	Time	Min	Time
6.5	24.8	0.0	1.2



Curve Description

Impactor Acceleration

Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
25.2	18.6	-0.1	-20.0

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

Test Date: 2/27/12

ATD Serial No.: 035

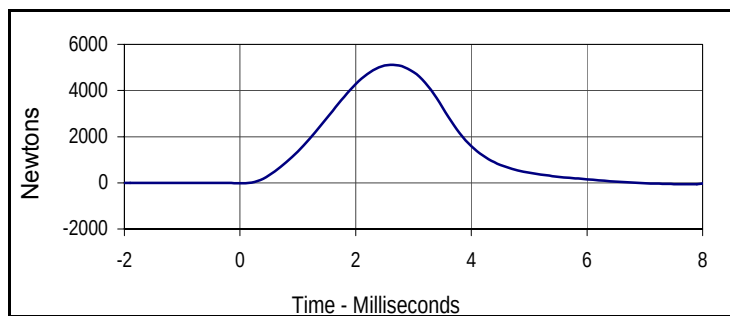
Test I.D.: M035LK033 , M035RK033

**Left Knee**

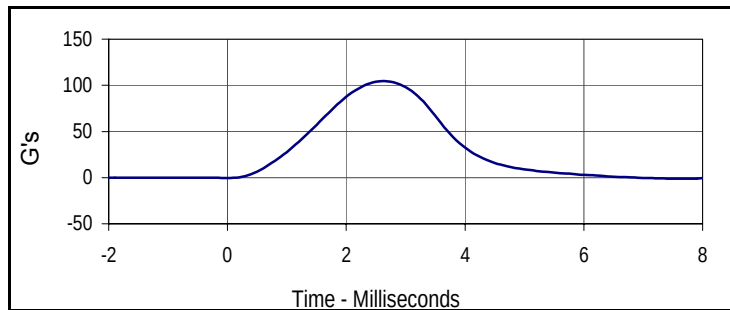
Tested Parameter		Units	Specification	Result	Pass/Fail
Knee Assembly Soak Time		Minutes	≥240	320	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.9	Pass
	Min	%		28.4	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.1	Pass
Pendulum Velocity at T=0		m/sec	2.07 to 2.13	2.12	Pass
Peak Probe Force		Newtons	4715 to 5782	5114	Pass
Overall Test Results					Pass

Right Knee

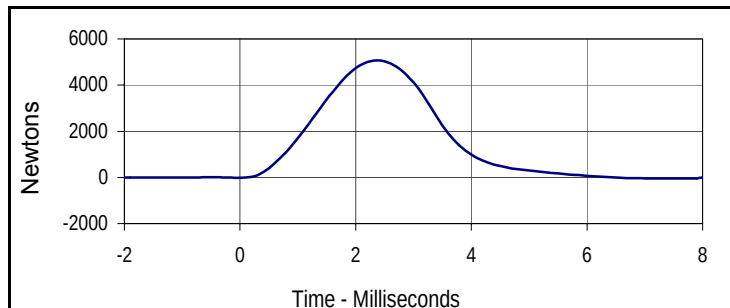
Pendulum Velocity at T=0		m/sec	2.07 to 2.13	2.11	Pass
Peak Probe Force		Newtons	4715 to 5782	5070	Pass
Overall Test Results					Pass

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

Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
5114.5	2.6	-56.6	7.8

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

Plot No.	Type	SAE Class	Units
002	FIL	600	G's
Max	Time	Min	Time
104.5	2.6	-1.2	7.8

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

Plot No.	Type	SAE Class	Units
003	FIL	600	Newtons
Max	Time	Min	Time
5069.8	2.4	-49.3	7.9

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

Plot No.	Type	SAE Class	Units
004	FIL	600	G's
Max	Time	Min	Time
103.6	2.4	-1.0	7.9

Test Program: Hybrid III 50th Percentile Male Hip Joint-Femur Flexion Test
 ATD Serial No.: 035

Test Date: 2/27/12
 Test I.D.: M035LF033, M035RF033

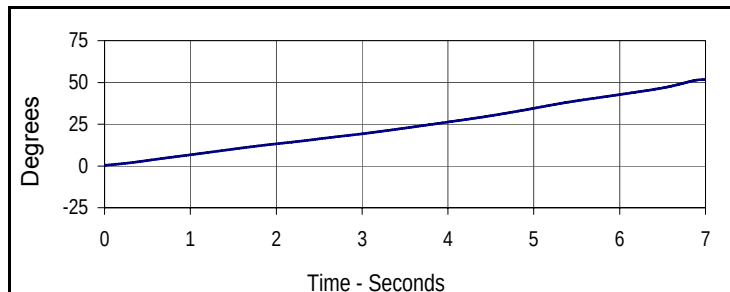


Left Hip Joint-Femur Results

Tested Parameter	Units	Specification	Result	Pass/Fail
Hip Joint-Femur Assembly Soak Time	Minutes	≥240	395	Pass
Temperature During Soak	Max	18.9 to 25.6	21.7	Pass
	Min		20.7	Pass
Humidity During Soak	Max	10.0 to 70.0	31.9	Pass
	Min		28.4	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	20.7	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	28.6	Pass
Rotation Rate	deg/sec	5 to 10	7.4	Pass
Femur Torque at 30°	Nm	≤ 95	88.3	Pass
Rotation at 203 Nm	Degrees	40.0 to 50.0	48.2	Pass
Overall Test Results				Pass

Right Hip Joint-Femur Results

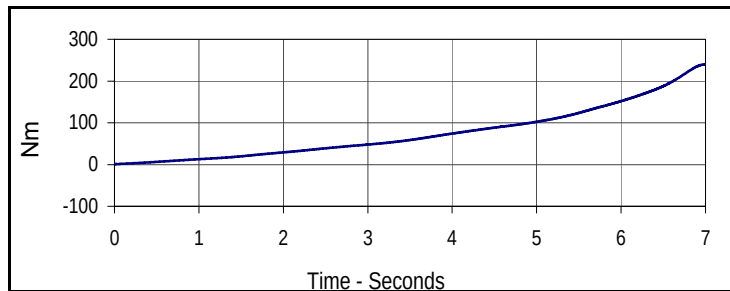
Rotation Rate	deg/sec	5 to 10	7.3	Pass
Femur Torque at 30°	Nm	≤ 95	87.4	Pass
Rotation at 203 Nm	Degrees	40.0 to 50.0	47.9	Pass
Overall Test Results				Pass



Curve Description

Left Hip-Femur Rotation

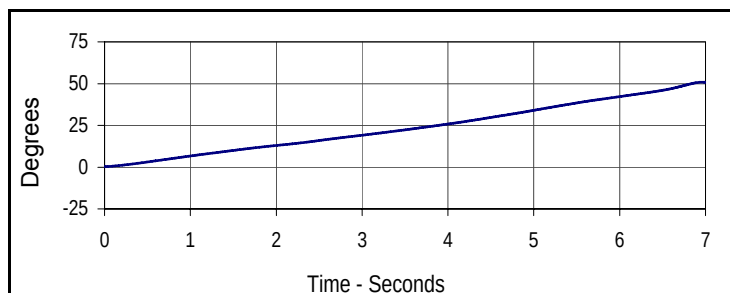
Plot No.	Type	SAE Class	Units
001	FIL	60	Degrees
Max	Time	Min	Time
51.7	7.0	0.4	0.0



Curve Description

Left Femur Torque

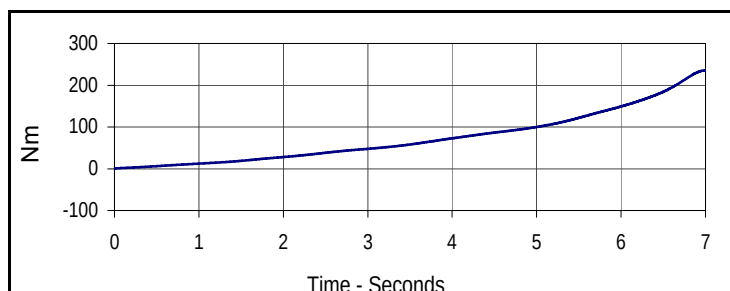
Plot No.	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
239.8	7.0	1.0	0.0



Curve Description

Right Hip-Femur Rotation

Plot No.	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
50.9	7.0	0.2	0.0



Curve Description

Right Femur Torque

Plot No.	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
235.3	7.0	1.0	0.0

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

Test Date: 2/27/12

ATD Serial No.: 141

Test I.D.: N/A



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

Describe the repair on repair or replacement of parts:

Test Program: Hybrid III 5th Percentile Female External Measurements

Test Date: 2/27/12

ATD Serial No.: 141

Test I.D.: N/A



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	20.94	Pass
Laboratory Relative Humidity	%	10 to 70	33.0	Pass
A - Total sitting height	mm	774.7 to 800.1	785	Pass
B - Shoulder pivot height	mm	431.8 to 457.2	451	Pass
C - H point height	mm	81.3 to 86.3	84	Pass
D - H point location from backline	mm	144.8 to 149.8	146	Pass
E - Shoulder pivot from backline	mm	68.6 to 83.8	79	Pass
F - Thigh clearance	mm	119.4 to 134.6	126	Pass
G - Back of elbow to wrist pivot	mm	243.9 to 259.1	250	Pass
H - Head back to backline	mm	40.7 to 45.7	44	Pass
I - Shoulder to elbow length	mm	276.8 to 297.2	285	Pass
J - Elbow rest height	mm	182.8 to 203.2	195	Pass
K - Buttock to knee length	mm	520.7 to 546.1	530	Pass
L - Popliteal length	mm	355.6 to 376.0	372	Pass
M - Knee pivot height	mm	393.7 to 419.1	399	Pass
N - Buttock popliteal length	mm	414.0 to 439.4	420	Pass
O - Chest depth without jacket	mm	175.3 to 190.5	186	Pass
P - Foot length	mm	218.5 to 233.7	221	Pass
R - Buttock to Knee Pivot Length	mm	457.2 to 482.6	475	Pass
S - Head Breadth	mm	137.1 to 147.3	144	Pass
T - Head Depth	mm	177.8 to 188.0	180	Pass
U - Hip Breadth	mm	299.7 to 314.9	302	Pass
V - Shoulder breadth	mm	350.5 to 365.7	359	Pass
W - Foot breadth	mm	78.8 to 94.0	90	Pass
X - Head circumference	mm	528.3 to 548.7	541	Pass
Y - Chest circumference (with chest jacket)	mm	850.8 to 881.3	861	Pass
Z - Waist circumference	mm	759.5 to 789.9	766	Pass
AA - Location for chest circumference	mm	299.7 to 309.9	300	Pass
BB - Location for waist circumference	mm	160.1 to 170.2	164	Pass
Overall Test Results				Pass

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

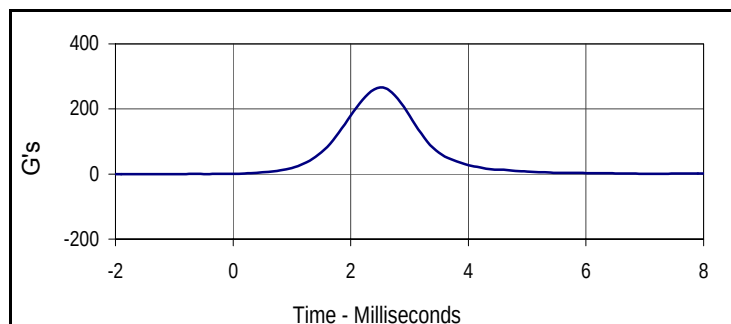
Test Date: 2/27/12

ATD Serial No.: 141

Test I.D.: F141HD036



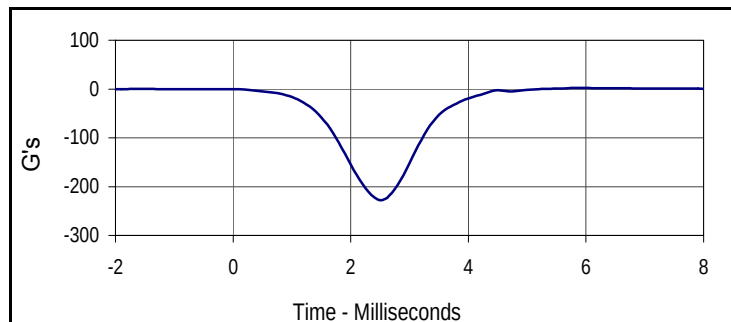
Tested Parameter		Units	Specification	Result	Pass/Fail
Head Assembly Soak Time		Minutes	≥240	260	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	33.5	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.0	Pass
Peak Resultant Acceleration		G's	250.0 to 300.0	266.3	Pass
Peak Lateral Acceleration		G's	≤15.0	4.1	Pass
Oscillations After Main Pulse		%	<10% of peak Res. Acceleration	1.1	Pass
Is Acceleration Unimodal?		Yes/No	Yes	Yes	Pass
Overall Test Results				Pass	



Curve Description

Head Resultant

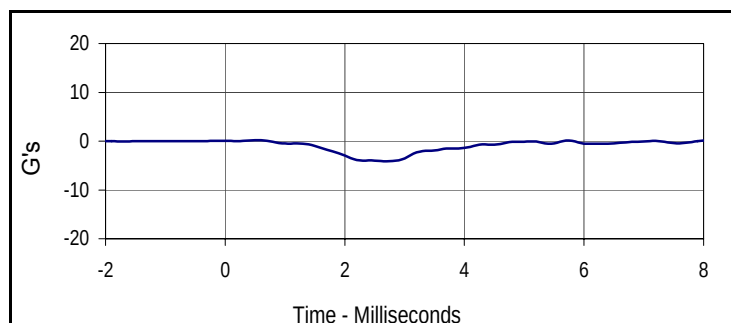
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
266.3	2.5	0.0	-2.0



Curve Description

Head X

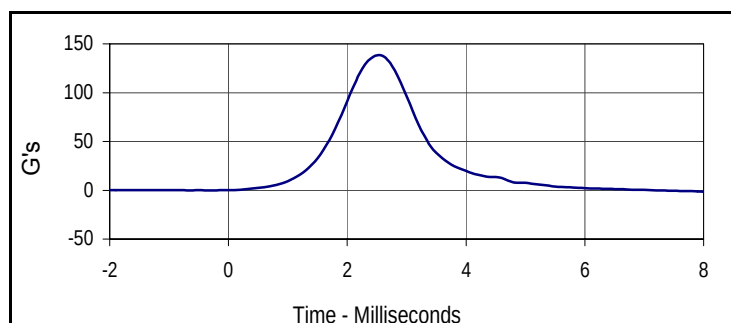
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
2.2	5.9	-227.6	2.5



Curve Description

Head Y

Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
0.2	0.5	-4.1	2.7



Curve Description

Head Z

Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
138.2	2.5	0.0	-0.7

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

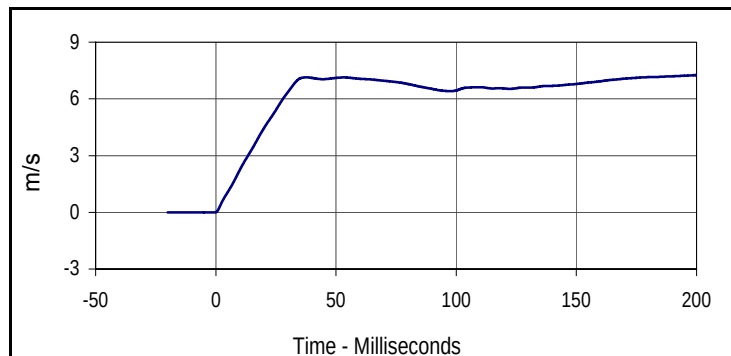
Test Date: 2/27/12

ATD Serial No.: 141

Test I.D.: F141NF036



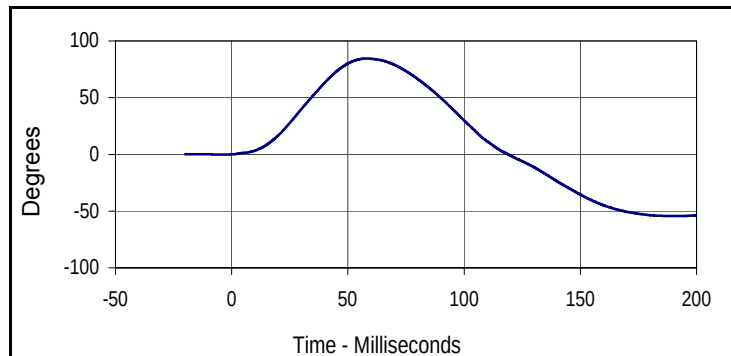
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	285	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	33.5	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	20.8	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	31.0	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.08	Pass
Pendulum Deceleration	10 Msec.	m/s	2.1 to 2.5	2.2	Pass
	20 Msec.	m/s	4.0 to 5.0	4.4	Pass
	30 Msec.	m/s	5.8 to 7.0	6.4	Pass
"D" Plane Rotation	Max	Degrees	77.0 to 91.0	84.6	Pass
Peak Moment in Rotation	Max	Nm	69.0 to 83.0	80.0	Pass
Positive Moment Decay, Time To 10 Nm		Msec.	80.0 to 100.0	87.5	Pass
Overall Test Results				Pass	



Curve Description

Pendulum Velocity

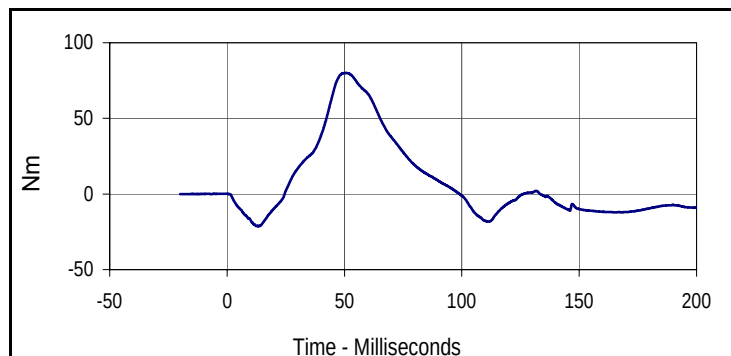
Plot No.	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
7.3	200.0	0.0	-0.6



Curve Description

"D" Plane Rotation

Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
84.6	58.1	-54.4	191.5



Curve Description

Moment About Occipital Condyle

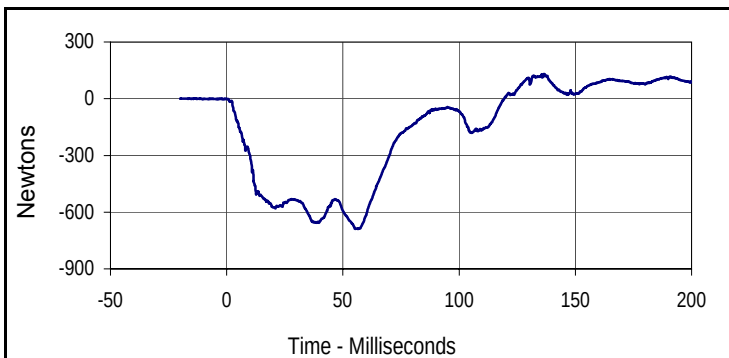
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
80.0	50.5	-21.3	13.5

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

Test Date: 2/27/12

ATD Serial No.: 141

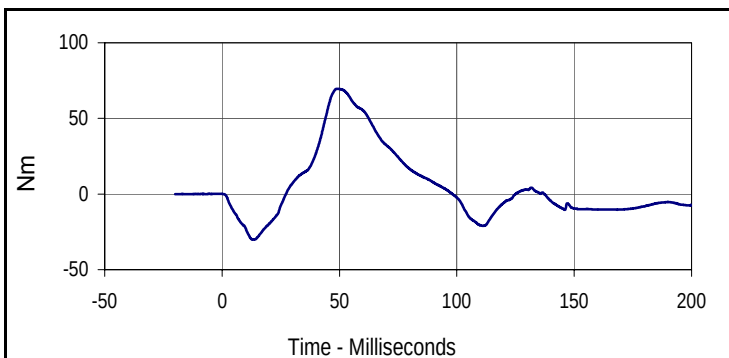
Test I.D.: F141NF036



Curve Description

Upper Neck Force X

Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
131.2	136.5	-688.3	55.2



Curve Description

Neck Moment Y

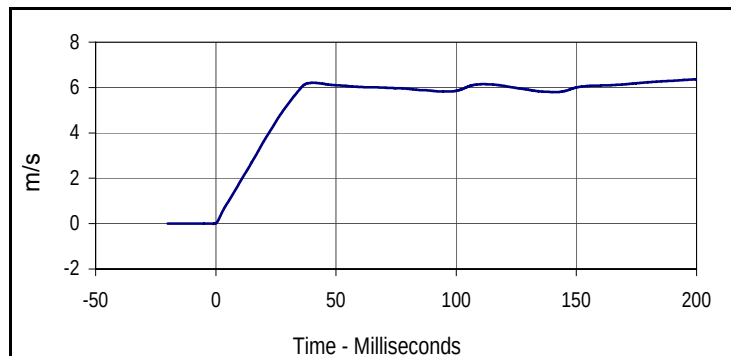
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
69.6	49.2	-30.1	12.8

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

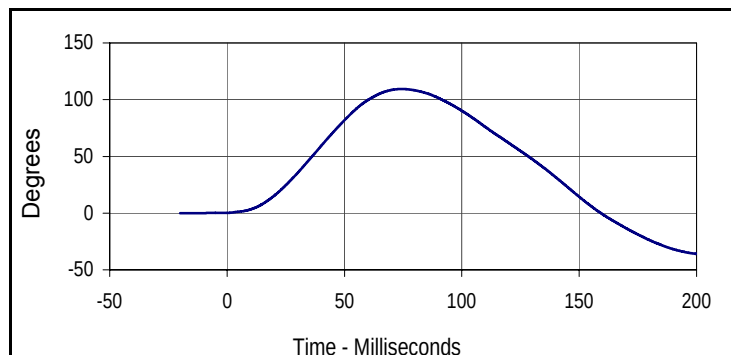
Test Date: 2/27/12
 Test I.D.: F141NE036



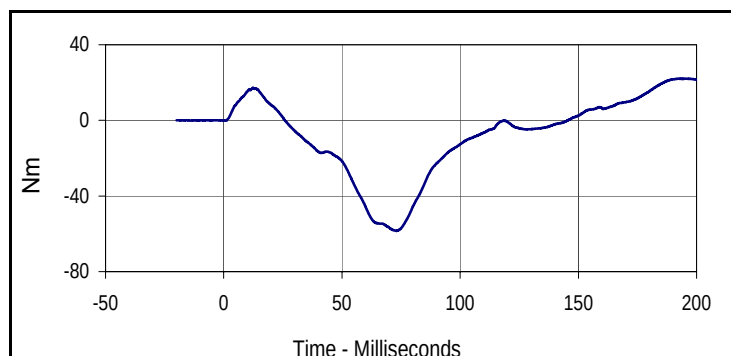
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	325	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	33.5	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.1	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.2	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.11	Pass
Pendulum Deceleration	10 Msec.	m/s	1.5 to 1.9	1.8	Pass
	20 Msec.	m/s	3.1 to 3.9	3.6	Pass
	30 Msec.	m/s	4.6 to 5.6	5.3	Pass
"D" Plane Rotation	Max	Degrees	99.0 to 114.0	109.4	Pass
Peak Moment in Rotation	Max	Nm	-53.0 to -65.0	-58.4	Pass
Positive Moment Decay, Time To -10 Nm		Msec.	94.0 to 114.0	103.3	Pass
Overall Test Results				Pass	



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
6.4	200.0	0.0	-0.9



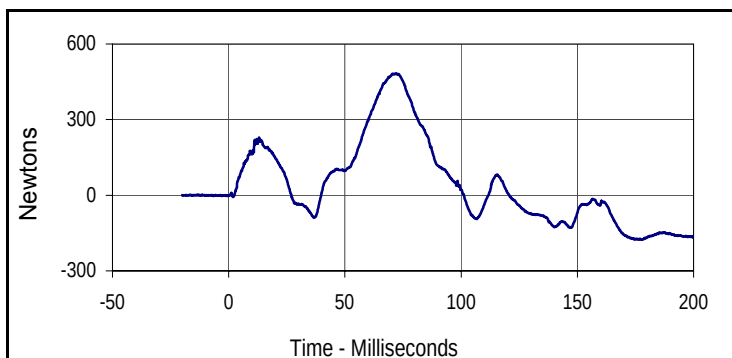
Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
109.4	74.4	-35.9	200.0



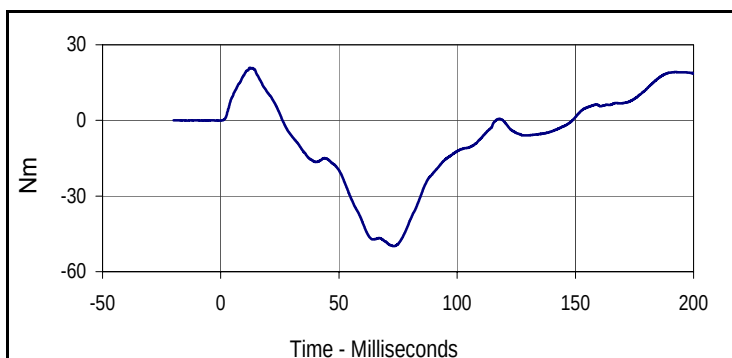
Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
22.1	192.2	-58.4	73.0

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

Test Date: 2/27/12
 Test I.D.: F141NE036



Curve Description			
Upper Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
482.9	71.7	-176.4	177.9



Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
20.9	12.2	-49.9	73.1

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

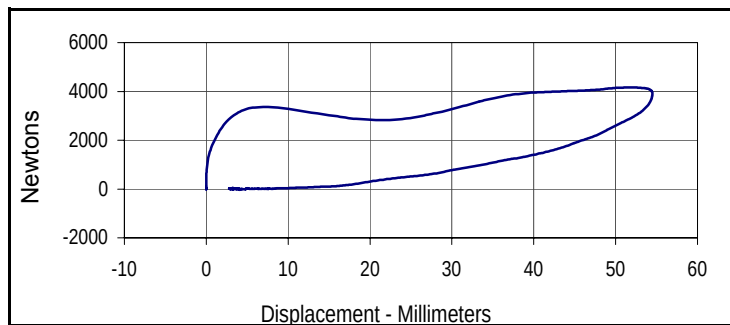
Test Date: 2/27/12

ATD Serial No.: 141

Test I.D.: F141CH036



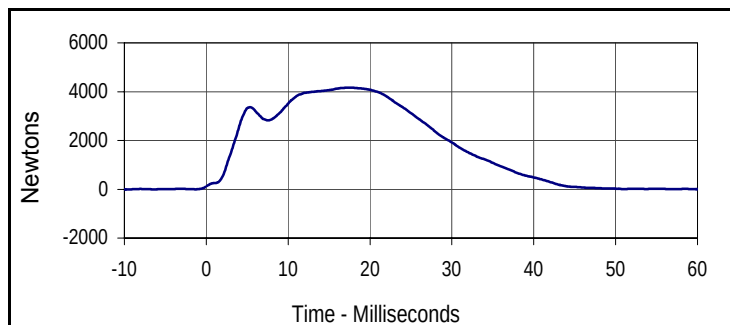
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	425	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	33.5	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.1	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	32.7	Pass
Probe Velocity		m/s	6.59 to 6.83	6.68	Pass
Peak Chest Deflection		mm	50.0 to 58.0	54.5	Pass
Peak Force Between 50 and 58 MM		Newtons	3900 to 4400	4148	Pass
Peak Force Between 18 and 50 MM		Newtons	≤4600	4165	Pass
Internal Hysteresis		%	69 to 85	72.9	Pass
Overall Test Results					Pass



Curve Description

Probe Force vs. Chest Deflection

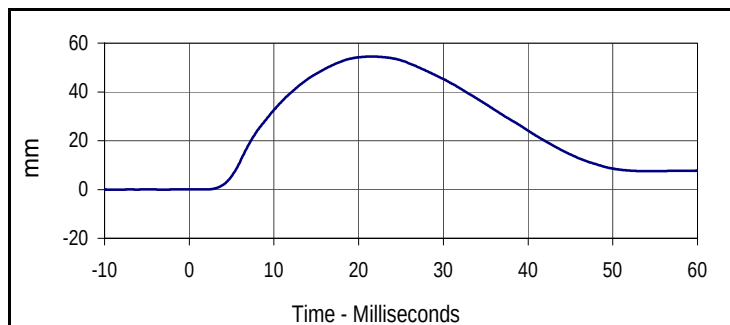
Plot No.	Type	SAE Class	Hysteresis
001	FIL	180	72.9
Peak Probe Force		Peak Chest Deflection	
4164.8		54.5	



Curve Description

Probe Force

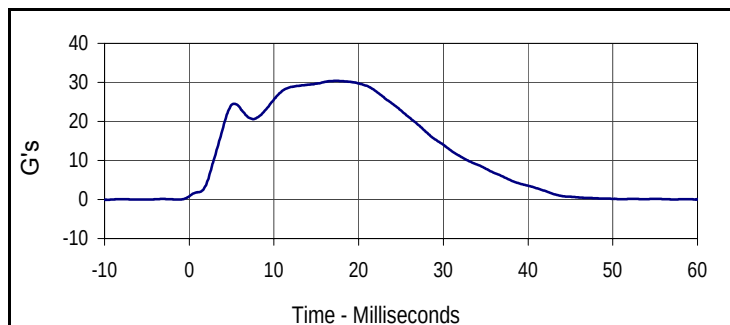
Plot No.	Type	SAE Class	Units
002	FIL	180	Newtons
Max	Time	Min	Time
4164.8	17.3	-27.1	100.7



Curve Description

Chest Deflection

Plot No.	Type	SAE Class	Units
003	FIL	600	mm
Max	Time	Min	Time
54.5	21.5	0.0	-9.1



Curve Description

Impactor Acceleration

Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
30.4	17.3	-0.1	90.7

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

Test Date: 2/27/12

ATD Serial No.: 141

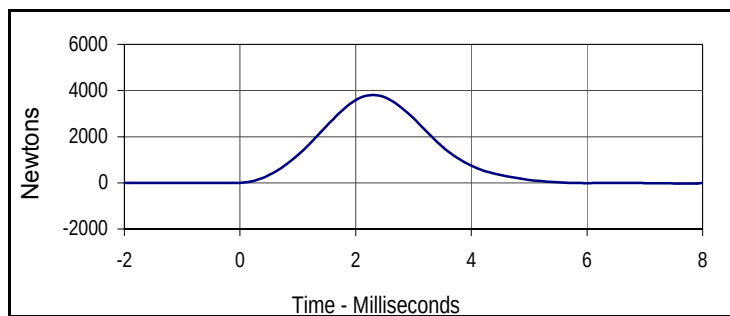
Test I.D.: F141LK036, F141LK036

**Left Knee**

Tested Parameter		Units	Specification	Result	Pass/Fail
Knee Assembly Soak Time		Minutes	≥240	460	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	33.5	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	33.4	Pass
Pendulum Velocity at T=0		m/sec	2.07 to 2.13	2.12	Pass
Peak Probe Force		Newtons	3450 to 4060	3810	Pass
Overall Test Results				Pass	

Right Knee

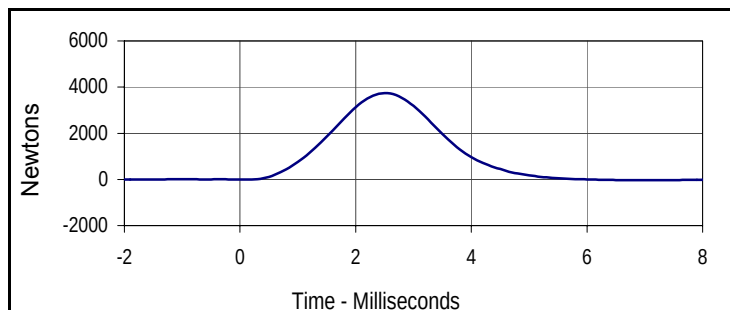
Pendulum Velocity at T=0		m/sec	2.07 to 2.13	2.11	Pass
Peak Probe Force		Newtons	3450 to 4060	3745	Pass
Overall Test Results				Pass	

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

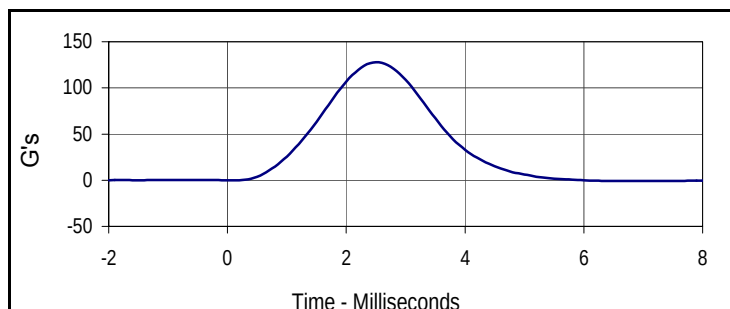
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
3809.8	2.3	-37.4	7.9

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

Plot No.	Type	SAE Class	Units
002	FIL	600	G's
Max	Time	Min	Time
130.0	2.3	-1.3	7.9

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

Plot No.	Type	SAE Class	Units
003	FIL	600	Newtons
Max	Time	Min	Time
3744.8	2.5	-27.7	7.1

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

Plot No.	Type	SAE Class	Units
004	FIL	600	G's
Max	Time	Min	Time
127.8	2.5	-0.9	7.1

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

Test Date: 2/27/12

ATD Serial No.: 141

Test I.D.: F141TF036

**Left Hip Joint-Femur Results**

Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	490	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	33.5	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	29.1	Pass
Initial Reference Plane Angle		Degrees	≤ 20	8.3	Pass
Peak Force at 45° +/-0.5°		Newtons	320.0 to 390.0	368.4	Pass
Torso Rotation Rate		deg/sec	0.5 to 1.5	1.3	Pass
Final Reference Plane Angle		Degrees	+/-8	1.2	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: 3/3/12

ATD Serial No.: 035

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: 3/3/12

ATD Serial No.: 035

Test I.D.: N/A



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.17	Pass
Laboratory Relative Humidity	%	10 to 70	30.0	Pass
A - Total sitting height	mm	879 to 889	884	Pass
B - Shoulder pivot height	mm	505 to 521	515	Pass
C - H point height	mm	84 to 89	88	Pass
D - H point location from backline	mm	135 to 140	138	Pass
E - Shoulder pivot from backline	mm	84 to 94	87	Pass
F - Thigh clearance	mm	140 to 155	148	Pass
G - Back of elbow to wrist pivot	mm	290 to 305	298	Pass
H - Head back to backline	mm	41 to 46	44	Pass
I - Shoulder to elbow length	mm	330 to 345	335	Pass
J - Elbow rest height	mm	190 to 211	202	Pass
K - Buttock to knee length	mm	579 to 604	586	Pass
L - Popliteal length	mm	429 to 455	438	Pass
M - Knee pivot height	mm	485 to 500	490	Pass
N - Buttock popliteal length	mm	452 to 477	472	Pass
O - Chest depth without jacket	mm	213 to 229	225	Pass
P - Foot length	mm	251 to 267	260	Pass
V - Shoulder breadth	mm	422 to 437	433	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	865	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

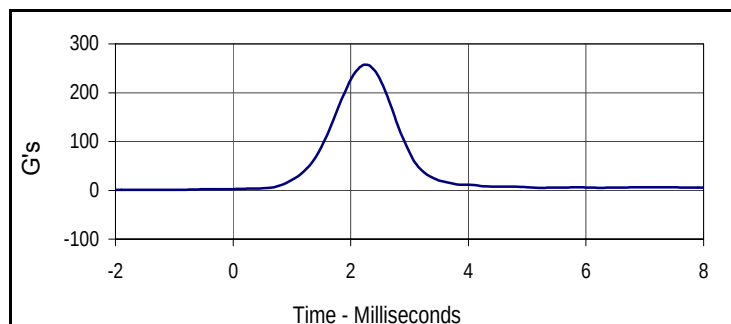
Test Date: 3/3/12

ATD Serial No.: 035

Test I.D.: M035HD034



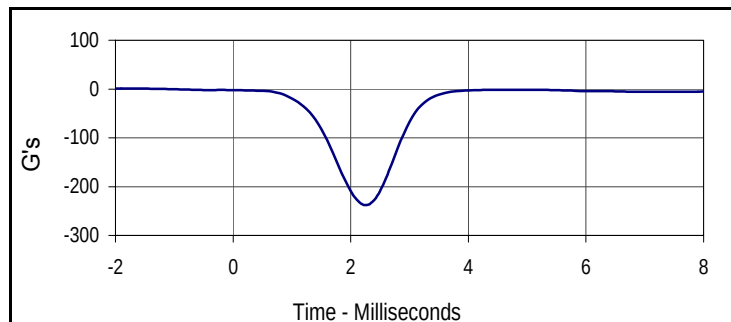
Tested Parameter		Units	Specification	Result	Pass/Fail
Head Assembly Soak Time		Minutes	≥240	240	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	32.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.4	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.2	Pass
Peak Resultant Acceleration		G's	225.0 to 275.0	256.4	Pass
Peak Lateral Acceleration		G's	≤15.0	6.3	Pass
Oscillations After Main Pulse		%	<10% of peak Res. Acceleration	4.4	Pass
Is Acceleration Unimodal?		Yes/No	Yes	Yes	Pass
Overall Test Results				Pass	



Curve Description

Head Resultant

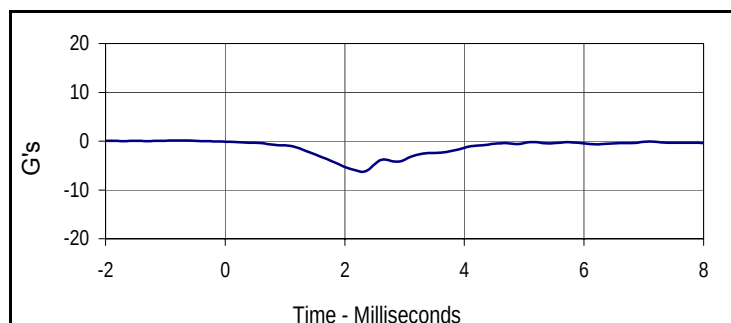
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
256.4	2.3	0.7	-1.1



Curve Description

Head X

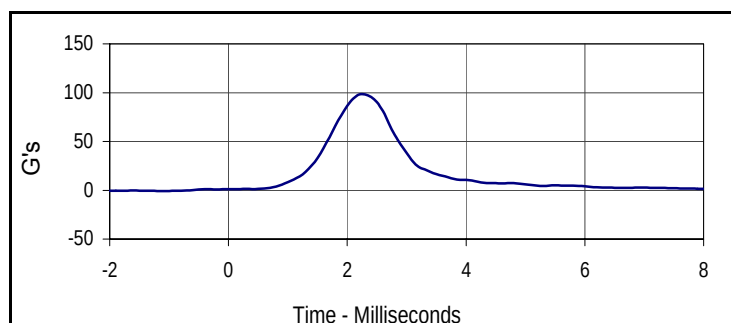
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.9	-2.0	-236.8	2.3



Curve Description

Head Y

Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
0.2	-0.8	-6.3	2.3



Curve Description

Head Z

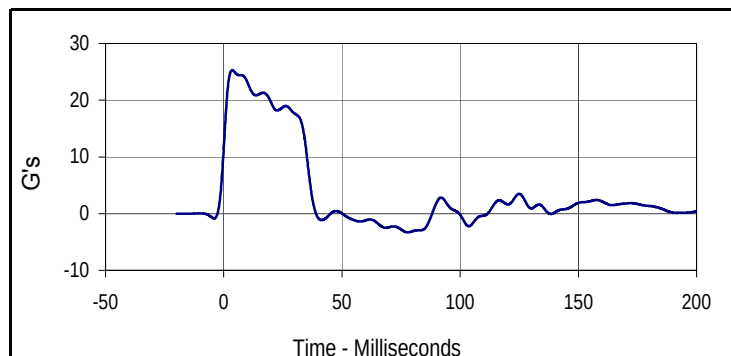
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
98.2	2.3	-0.7	-1.1

Test Program: Hybrid III 50th Percentile Male Neck Flexion Test
 ATD Serial No.: 035

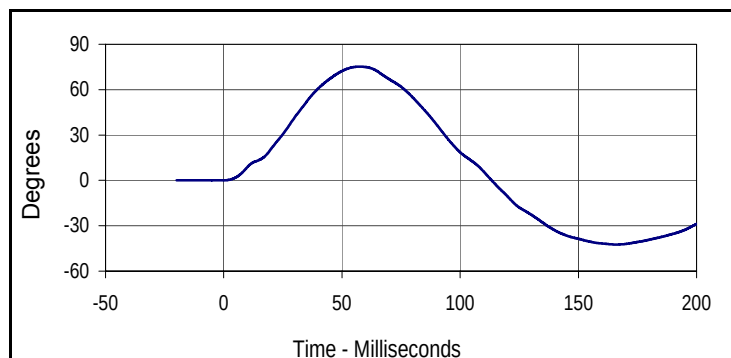
Test Date: 3/3/12
 Test I.D.: M035NF034



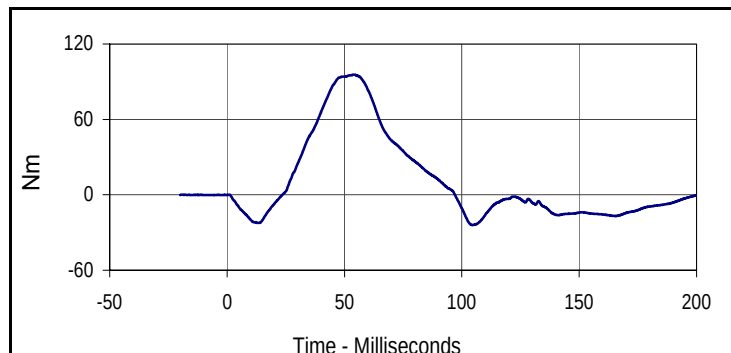
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	275	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	32.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.2	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.08	Pass
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	23.2	Pass
	20 Msec.	G's	17.6 to 22.6	19.6	Pass
	30 Msec.	G's	12.5 to 18.5	17.6	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 29.0	17.6	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	34.0 to 42.0	36.7	Pass
Maximum "D" Plane Rotation	Max	Degrees	64.0 to 78.0	75.2	Pass
	Time	Msec.	57.0 to 64.0	57.5	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	113.0 to 128.0	113.4	Pass
Moment About Occ. Condyle	Max	Nm	84.1 to 108.5	95.5	Pass
	Time	Msec.	47.0 to 58.0	54.2	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	97.0 to 107.0	97.1	Pass
Overall Test Results					Pass



Curve Description			
Pendulum Deceleration			
Plot No.	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
25.3	3.6	-3.3	77.8



Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
75.2	57.5	-42.4	166.0



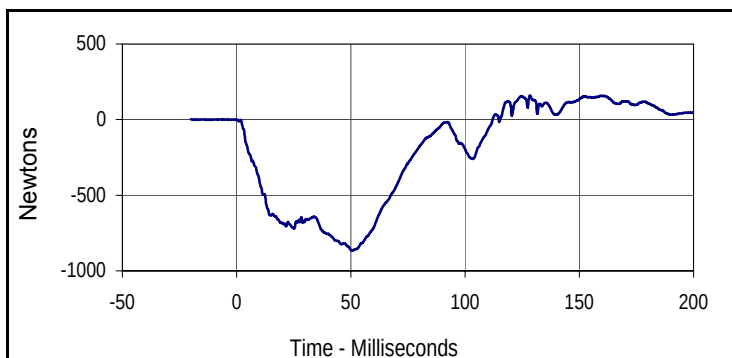
Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
95.5	54.2	-24.0	104.5

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

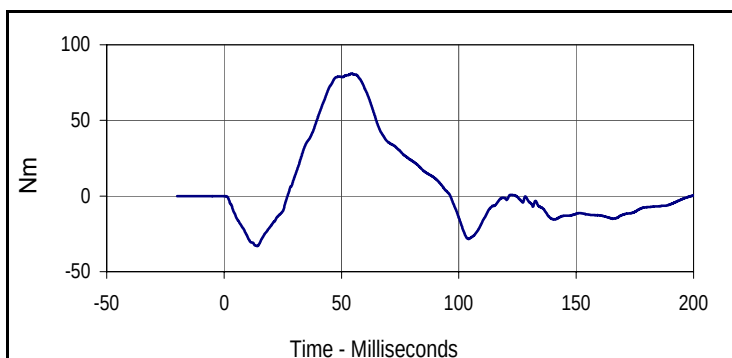
ATD Serial No.: 035

Test Date: 3/3/12

Test I.D.: M035NF034



Curve Description			
Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
159.3	128.4	-867.5	50.4



Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
80.9	54.3	-33.1	14.1

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

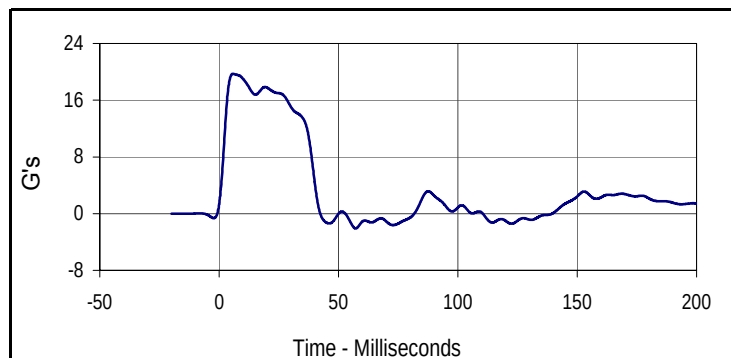
Test Date: 3/3/12

ATD Serial No.: 035

Test I.D.: M035NE034



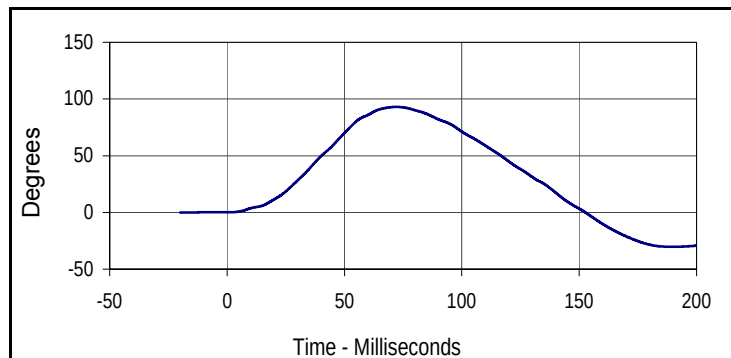
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	305	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	32.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.2	Pass
Pendulum Velocity		m/s	5.94 to 6.19	6.09	Pass
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	19.0	Pass
	20 Msec.	G's	14.0 to 19.0	17.8	Pass
	30 Msec.	G's	11.0 to 16.0	15.1	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 22.0	15.1	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	38.0 to 46.0	39.9	Pass
Maximum "D" Plane Rotation	Max	Degrees	81.0 to 106.0	93.0	Pass
	Time	Msec.	72.0 to 82.0	72.1	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	147.0 to 174.0	152.7	Pass
Moment About Occ. Condyle	Max	Nm	-52.9 to -79.9	-76.8	Pass
	Time	Msec.	65.0 to 79.0	68.1	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	120.0 to 148.0	145.2	Pass
Overall Test Results					Pass



Curve Description

Pendulum Deceleration

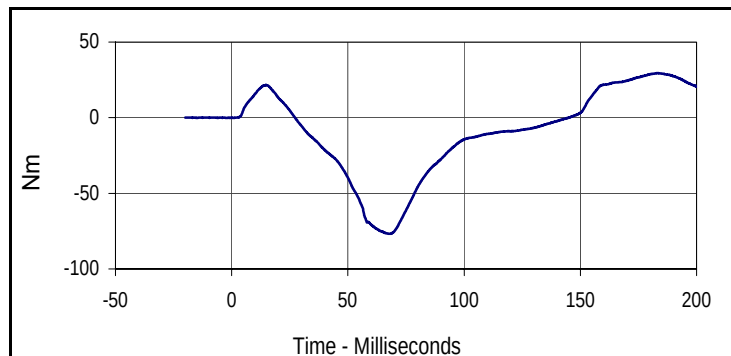
Plot No.	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
19.7	5.8	-2.1	57.2



Curve Description

"D" Plane Rotation

Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
93.0	72.1	-30.4	190.4



Curve Description

Moment About Occipital Condyle

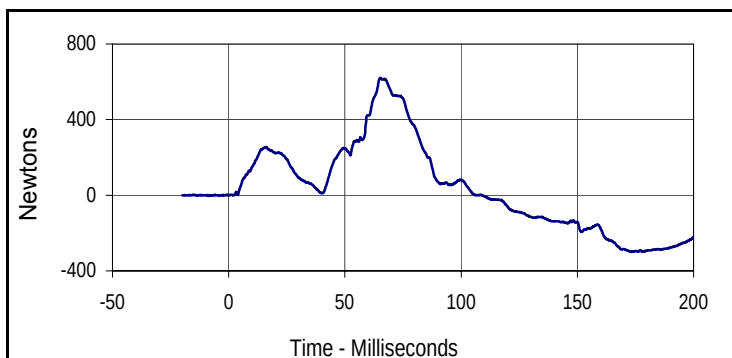
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
29.5	183.3	-76.8	68.1

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

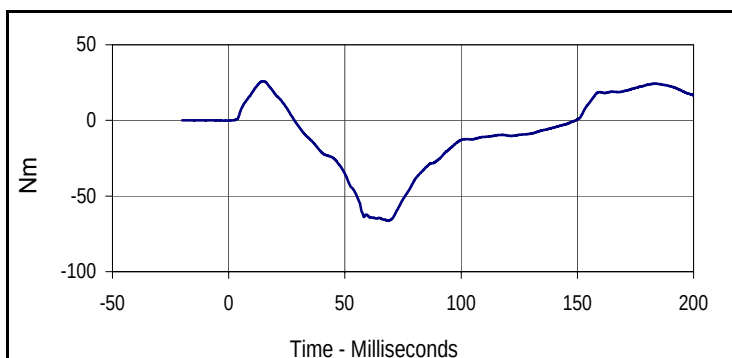
Test Date: 3/3/12

ATD Serial No.: 035

Test I.D.: M035NE034



Curve Description			
Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
620.1	65.2	-299.5	173.1



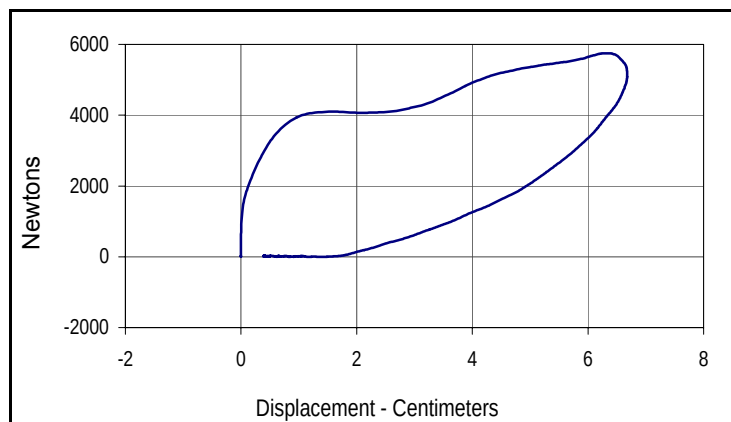
Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
26.0	14.8	-66.3	68.5

Test Program: Hybrid III 50th Percentile Male Thorax Impact Test
 ATD Serial No.: 035

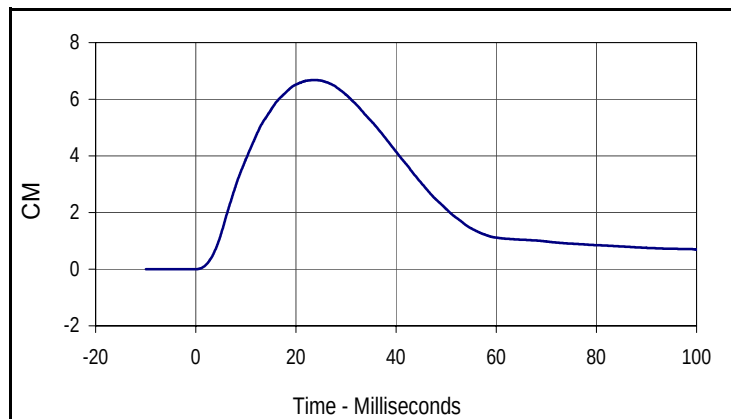
Test Date: 3/3/12
 Test I.D.: M035CH034



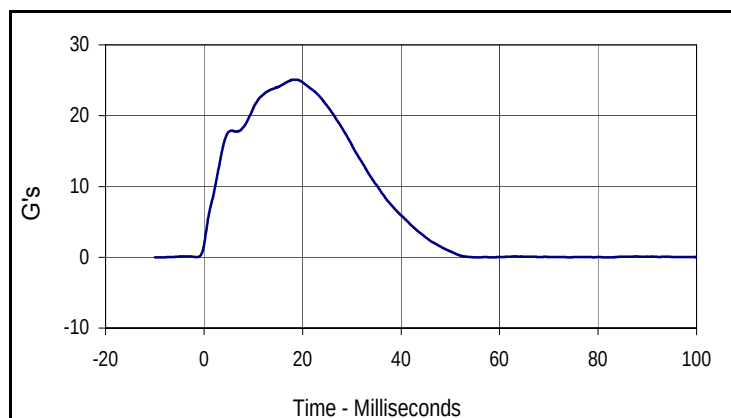
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	360	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	32.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	20.8	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.1	Pass
Probe Velocity		m/s	6.58 to 6.82	6.74	Pass
Peak Probe Force		Newtons	5159 to 5893	5748	Pass
Peak Sternum Deflection		CM	6.35 to 7.26	6.68	Pass
Internal Hysteresis		%	69 to 85	72.4	Pass
Overall Test Results				Pass	



Curve Description			
Probe Force vs. Chest Deflection			
Plot No.	Type	SAE Class	Hysteresis
001	FIL	180	72.4
Peak Probe Force		Peak Chest Deflection	
5748		6.68	



Curve Description			
Chest Deflection			
Plot No.	Type	SAE Class	Units
002	FIL	180	CM
Max	Time	Min	Time
6.7	23.8	0.0	-0.2



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
25.1	18.6	0.0	55.4

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

Test Date: 3/3/12

ATD Serial No.: 035

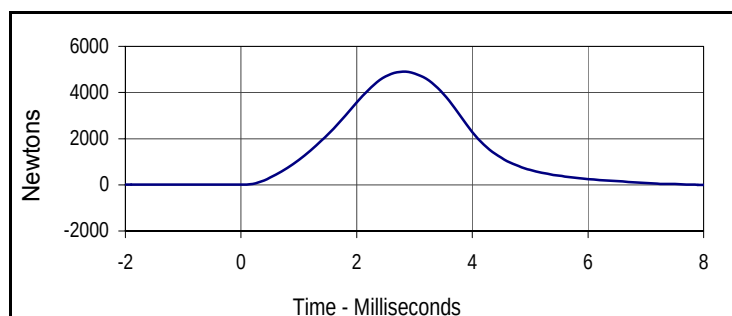
Test I.D.: M035LK034 , M035RK034

**Left Knee**

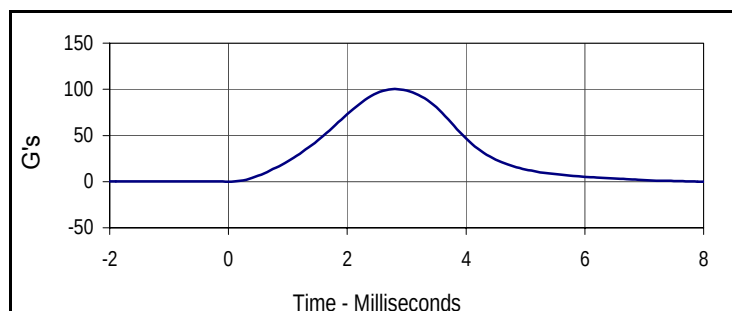
Tested Parameter		Units	Specification	Result	Pass/Fail
Knee Assembly Soak Time		Minutes	≥240	320	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	32.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	20.9	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.2	Pass
Pendulum Velocity at T=0		m/sec	2.07 to 2.13	2.11	Pass
Peak Probe Force		Newtons	4715 to 5782	4906	Pass
Overall Test Results					Pass

Right Knee

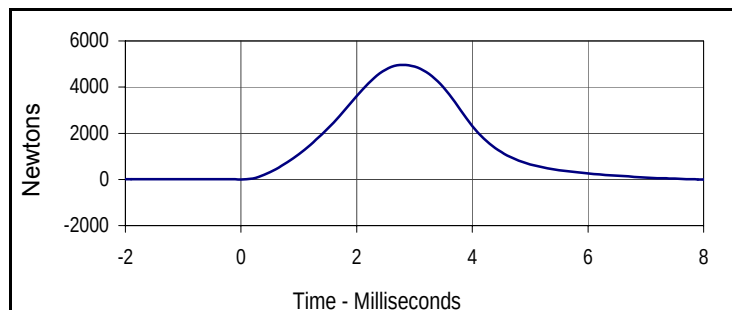
Pendulum Velocity at T=0		m/sec	2.07 to 2.13	2.11	Pass
Peak Probe Force		Newtons	4715 to 5782	4967	Pass
Overall Test Results					Pass

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

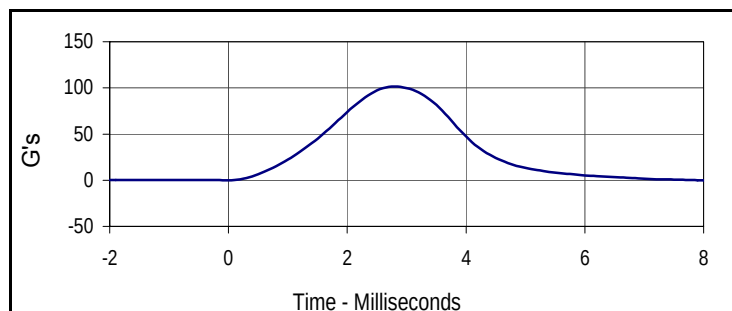
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4905.8	2.8	-12.9	8.7

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

Plot No.	Type	SAE Class	Units
002	FIL	600	G's
Max	Time	Min	Time
100.3	2.8	-0.3	8.7

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

Plot No.	Type	SAE Class	Units
003	FIL	600	Newtons
Max	Time	Min	Time
4966.6	2.8	-12.8	8.7

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

Plot No.	Type	SAE Class	Units
004	FIL	600	G's
Max	Time	Min	Time
101.5	2.8	-0.3	8.7

Test Program: Hybrid III 50th Percentile Male Hip Joint-Femur Flexion Test
 ATD Serial No.: 035

Test Date: 3/3/12
 Test I.D.: M035LF034, M035RF034

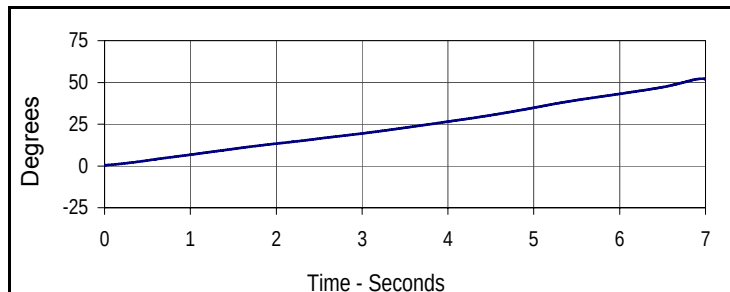


Left Hip Joint-Femur Results

Tested Parameter	Units	Specification	Result	Pass/Fail
Hip Joint-Femur Assembly Soak Time	Minutes	≥240	395	Pass
Temperature During Soak	Max	18.9 to 25.6	21.7	Pass
	Min		20.7	Pass
Humidity During Soak	Max	10.0 to 70.0	32.0	Pass
	Min		29.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.0	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	29.2	Pass
Rotation Rate	deg/sec	5 to 10	7.5	Pass
Femur Torque at 30°	Nm	≤ 95	87.1	Pass
Rotation at 203 Nm	Degrees	40.0 to 50.0	48.8	Pass
Overall Test Results				Pass

Right Hip Joint-Femur Results

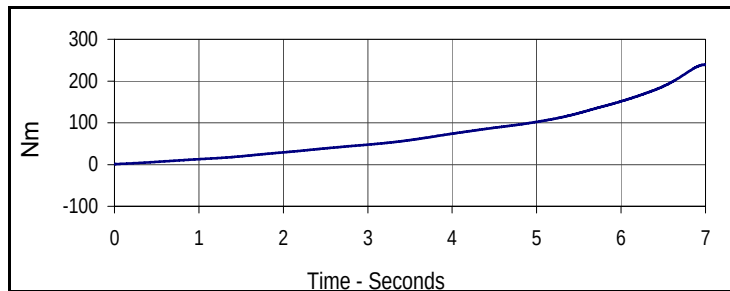
Rotation Rate	deg/sec	5 to 10	7.3	Pass
Femur Torque at 30°	Nm	≤ 95	88.1	Pass
Rotation at 203 Nm	Degrees	40.0 to 50.0	47.6	Pass
Overall Test Results				Pass



Curve Description

Left Hip-Femur Rotation

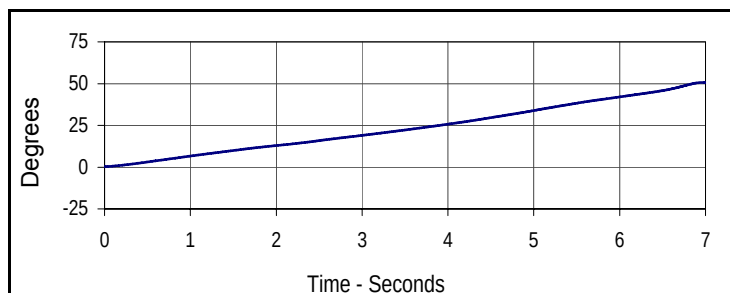
Plot No.	Type	SAE Class	Units
001	FIL	60	Degrees
Max	Time	Min	Time
52.2	7.0	0.4	0.0



Curve Description

Left Femur Torque

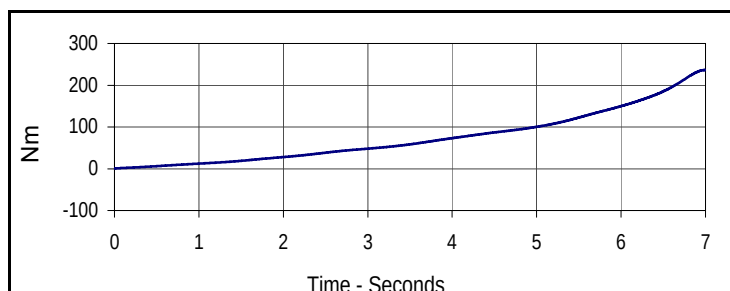
Plot No.	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
239.1	7.0	1.0	0.0



Curve Description

Right Hip-Femur Rotation

Plot No.	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
50.7	7.0	0.2	0.0



Curve Description

Right Femur Torque

Plot No.	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
236.4	7.0	1.0	0.0

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

Test Date: 3/5/12

ATD Serial No.: 141

Test I.D.: N/A



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

Describe the repair on repair or replacement of parts:

Test Program: Hybrid III 5th Percentile Female External Measurements

Test Date: 3/5/12

ATD Serial No.: 141

Test I.D.: N/A



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.11	Pass
Laboratory Relative Humidity	%	10 to 70	31.9	Pass
A - Total sitting height	mm	774.7 to 800.1	788	Pass
B - Shoulder pivot height	mm	431.8 to 457.2	453	Pass
C - H point height	mm	81.3 to 86.3	84	Pass
D - H point location from backline	mm	144.8 to 149.8	146	Pass
E - Shoulder pivot from backline	mm	68.6 to 83.8	79	Pass
F - Thigh clearance	mm	119.4 to 134.6	126	Pass
G - Back of elbow to wrist pivot	mm	243.9 to 259.1	250	Pass
H - Head back to backline	mm	40.7 to 45.7	44	Pass
I - Shoulder to elbow length	mm	276.8 to 297.2	285	Pass
J - Elbow rest height	mm	182.8 to 203.2	195	Pass
K - Buttock to knee length	mm	520.7 to 546.1	530	Pass
L - Popliteal length	mm	355.6 to 376.0	372	Pass
M - Knee pivot height	mm	393.7 to 419.1	399	Pass
N - Buttock popliteal length	mm	414.0 to 439.4	420	Pass
O - Chest depth without jacket	mm	175.3 to 190.5	186	Pass
P - Foot length	mm	218.5 to 233.7	221	Pass
R - Buttock to Knee Pivot Length	mm	457.2 to 482.6	475	Pass
S - Head Breadth	mm	137.1 to 147.3	144	Pass
T - Head Depth	mm	177.8 to 188.0	180	Pass
U - Hip Breadth	mm	299.7 to 314.9	302	Pass
V - Shoulder breadth	mm	350.5 to 365.7	359	Pass
W - Foot breadth	mm	78.8 to 94.0	90	Pass
X - Head circumference	mm	528.3 to 548.7	541	Pass
Y - Chest circumference (with chest jacket)	mm	850.8 to 881.3	861	Pass
Z - Waist circumference	mm	759.5 to 789.9	766	Pass
AA - Location for chest circumference	mm	299.7 to 309.9	300	Pass
BB - Location for waist circumference	mm	160.1 to 170.2	164	Pass
Overall Test Results				Pass

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

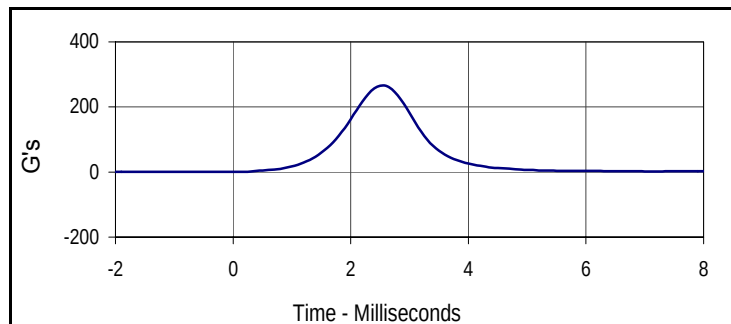
Test Date: 3/5/12

ATD Serial No.: 141

Test I.D.: F141HD037



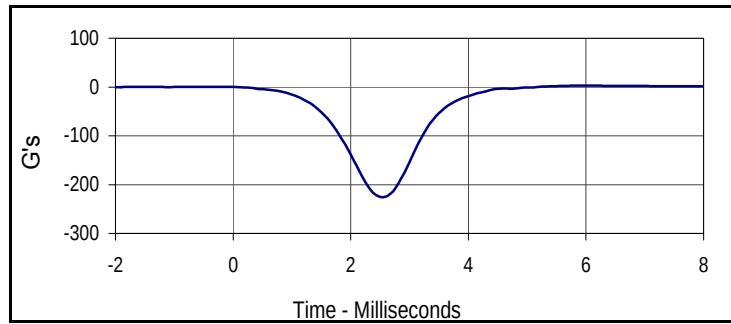
Tested Parameter		Units	Specification	Result	Pass/Fail
Head Assembly Soak Time		Minutes	≥240	260	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	32.1	Pass
	Min	%		28.7	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.6	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	31.8	Pass
Peak Resultant Acceleration		G's	250.0 to 300.0	265.4	Pass
Peak Lateral Acceleration		G's	≤15.0	6.5	Pass
Oscillations After Main Pulse		%	<10% of peak Res. Acceleration	1.3	Pass
Is Acceleration Unimodal?		Yes/No	Yes	Yes	Pass
Overall Test Results				Pass	



Curve Description

Head Resultant

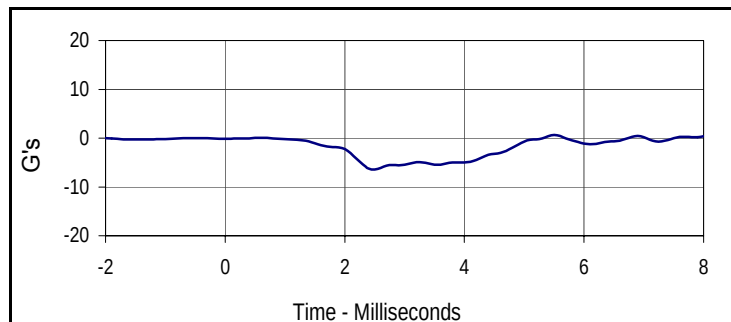
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
265.4	2.5	0.4	-1.3



Curve Description

Head X

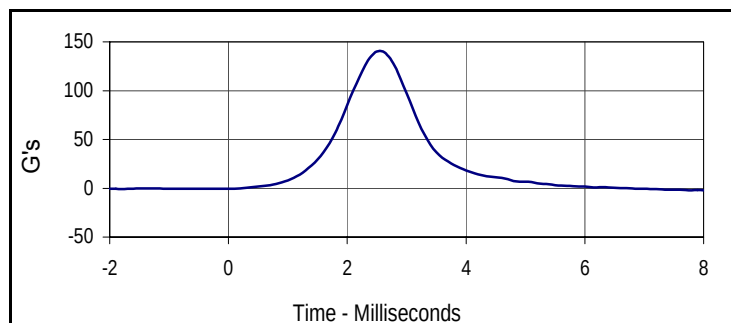
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
2.9	6.0	-225.3	2.5



Curve Description

Head Y

Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
0.6	5.5	-6.5	2.5



Curve Description

Head Z

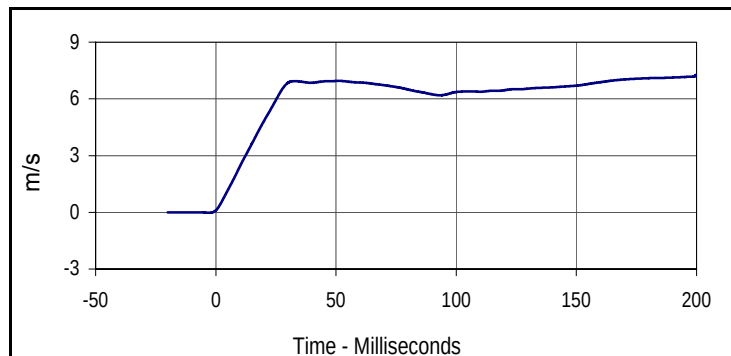
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
140.2	2.6	-0.7	-1.8

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

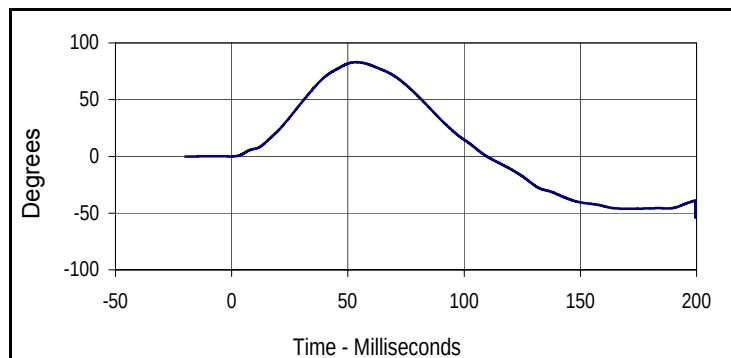
Test Date: 3/5/12
 Test I.D.: F141NF037



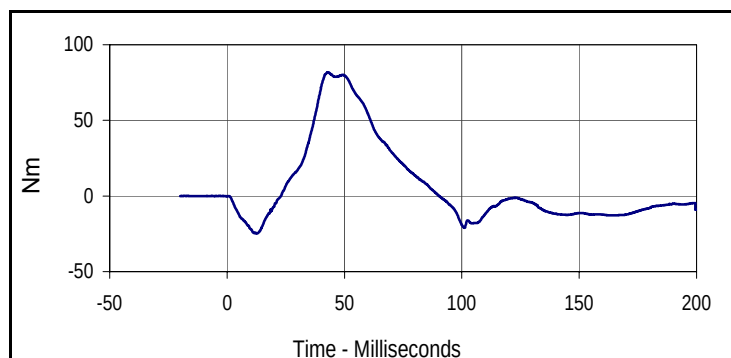
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	285	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	32.1	Pass
	Min	%		28.7	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.1	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.8	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.97	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	6.8	Pass
"D" Plane Rotation	Max	Degrees	77.0 to 91.0	83.0	Pass
Peak Moment in Rotation	Max	Nm	69.0 to 83.0	80.1	Pass
Positive Moment Decay, Time To 10 Nm		Msec.	80.0 to 100.0	81.9	Pass
Overall Test Results				Pass	



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
7.3	200.0	0.0	-2.7



Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
83.0	53.6	-53.8	199.5



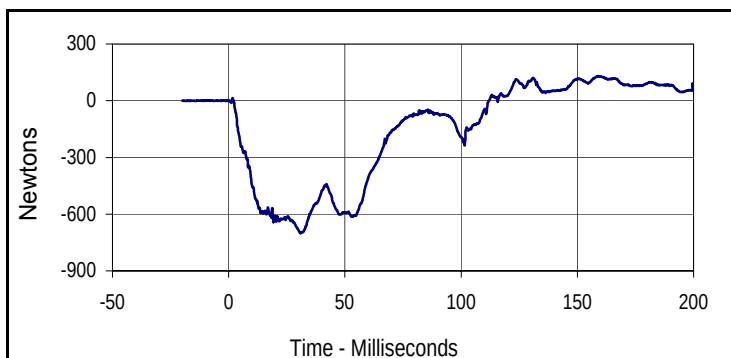
Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
81.8	42.9	-24.8	12.7

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

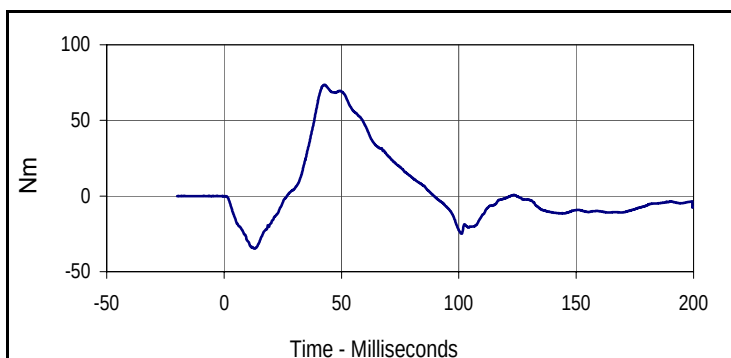
Test Date: 3/5/12

ATD Serial No.: 141

Test I.D.: F141NF037



Curve Description			
Upper Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
130.7	158.9	-702.5	30.9



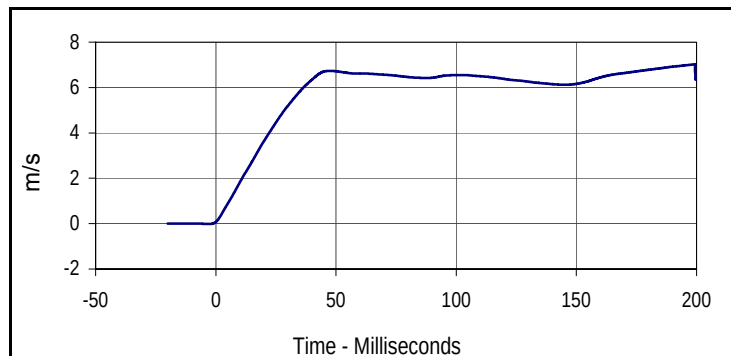
Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
73.5	42.7	-34.7	12.9

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

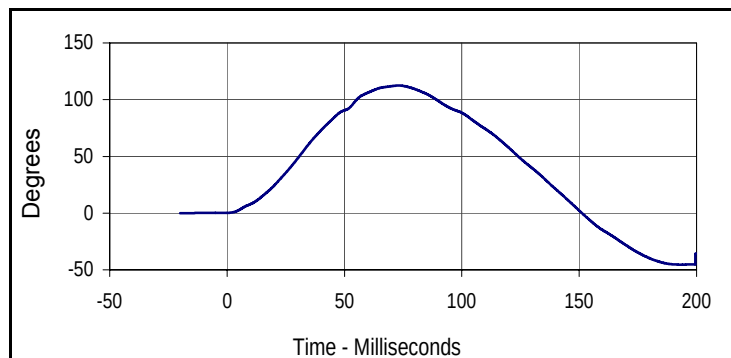
Test Date: 3/5/12
 Test I.D.: F141NE037



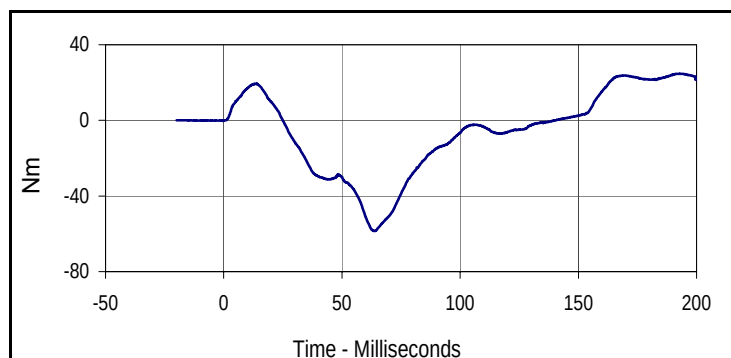
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	325	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	32.1	Pass
	Min	%		28.7	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	28.8	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.08	Pass
Pendulum Deceleration	10 Msec.	m/s	1.5 to 1.9	1.8	Pass
	20 Msec.	m/s	3.1 to 3.9	3.6	Pass
	30 Msec.	m/s	4.6 to 5.6	5.2	Pass
"D" Plane Rotation	Max	Degrees	99.0 to 114.0	112.5	Pass
Peak Moment in Rotation	Max	Nm	-53.0 to -65.0	-58.5	Pass
Positive Moment Decay, Time To -10 Nm		Msec.	94.0 to 114.0	96.9	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	199.4	0.0	-2.7



Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
112.5	73.1	-45.4	193.5



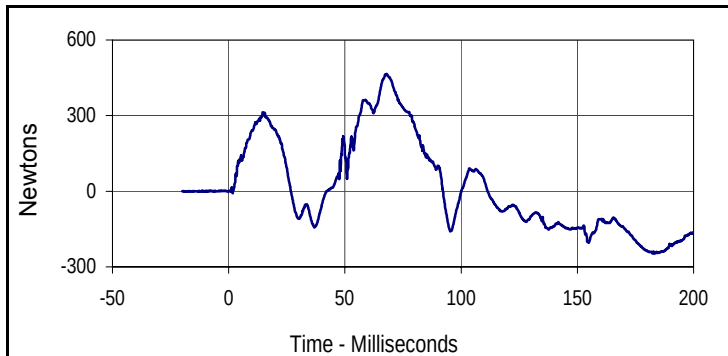
Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
24.7	193.0	-58.5	64.0

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

ATD Serial No.: 141

Test Date: 3/5/12

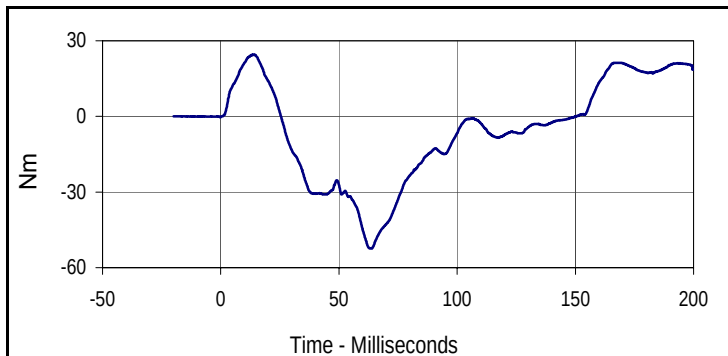
Test I.D.: F141NE037



Curve Description

Upper Neck Force X

Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
464.9	67.9	-247.6	183.1



Curve Description

Neck Moment Y

Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
24.5	13.9	-52.4	63.4

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

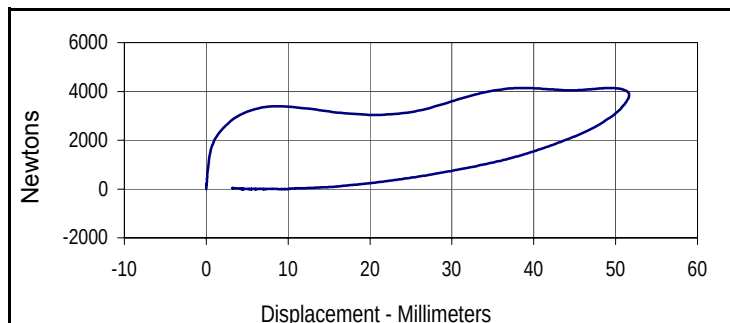
Test Date: 3/5/12

ATD Serial No.: 141

Test I.D.: F141CH037



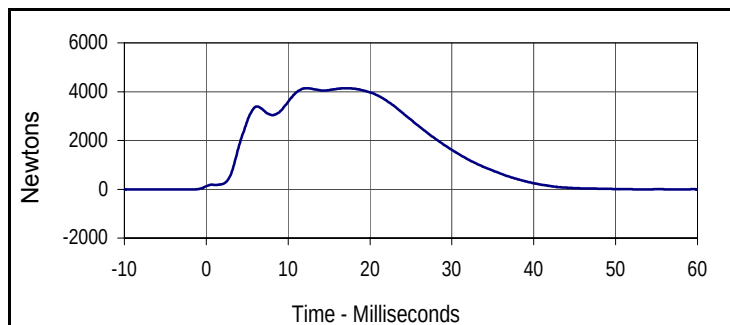
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	425	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	32.1	Pass
	Min	%		28.7	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	20.8	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	32.0	Pass
Probe Velocity		m/s	6.59 to 6.83	6.71	Pass
Peak Chest Deflection		mm	50.0 to 58.0	51.7	Pass
Peak Force Between 50 and 58 MM		Newtons	3900 to 4400	4142	Pass
Peak Force Between 18 and 50 MM		Newtons	≤4600	4130	Pass
Internal Hysteresis		%	69 to 85	75.3	Pass
Overall Test Results					Pass



Curve Description

Probe Force vs. Chest Deflection

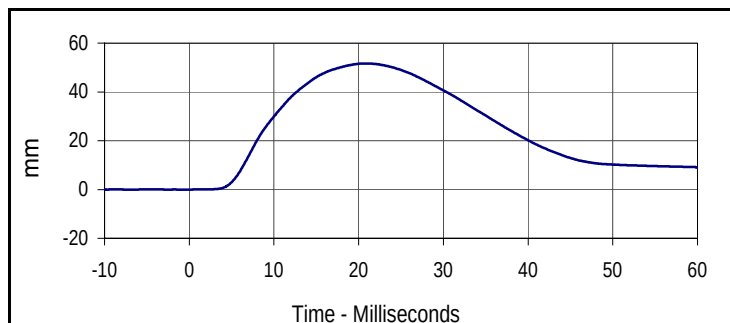
Plot No.	Type	SAE Class	Hysteresis
001	FIL	180	75.3
Peak Probe Force		Peak Chest Deflection	
4142.3		51.7	



Curve Description

Probe Force

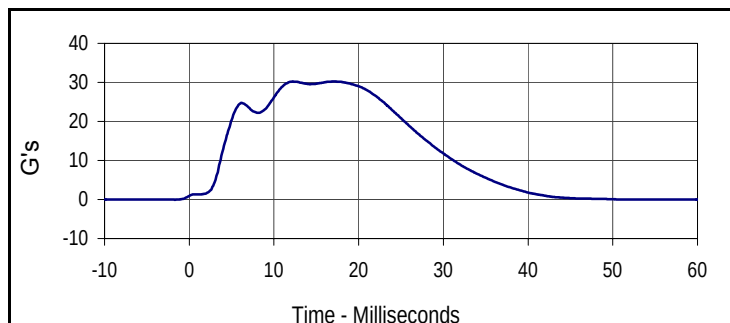
Plot No.	Type	SAE Class	Units
002	FIL	180	Newtons
Max	Time	Min	Time
4142.3	17.1	-7.1	61.1



Curve Description

Chest Deflection

Plot No.	Type	SAE Class	Units
003	FIL	600	mm
Max	Time	Min	Time
51.7	20.8	0.0	-0.1



Curve Description

Impactor Acceleration

Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
30.2	17.1	-0.1	61.1

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

Test Date: 3/5/12

ATD Serial No.: 141

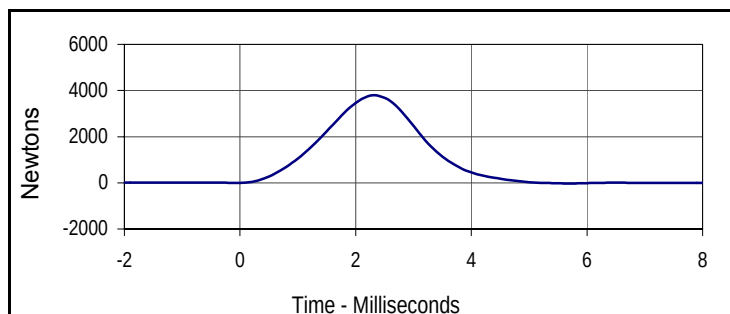
Test I.D.: F141LK037, F141LK037

**Left Knee**

Tested Parameter		Units	Specification	Result	Pass/Fail
Knee Assembly Soak Time		Minutes	≥240	460	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	32.1	Pass
	Min	%		28.7	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	20.8	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	31.9	Pass
Pendulum Velocity at T=0		m/sec	2.07 to 2.13	2.10	Pass
Peak Probe Force		Newtons	3450 to 4060	3790	Pass
Overall Test Results				Pass	

Right Knee

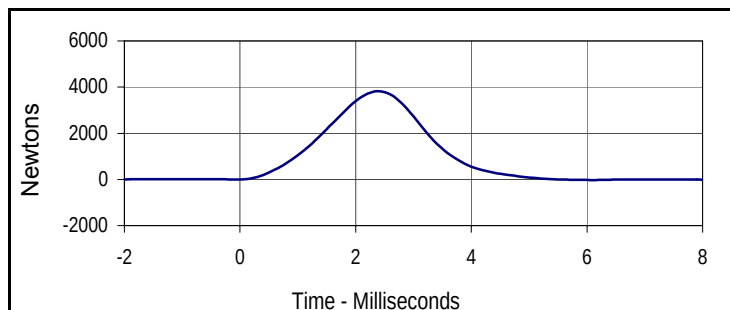
Pendulum Velocity at T=0		m/sec	2.07 to 2.13	2.10	Pass
Peak Probe Force		Newtons	3450 to 4060	3824	Pass
Overall Test Results				Pass	

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

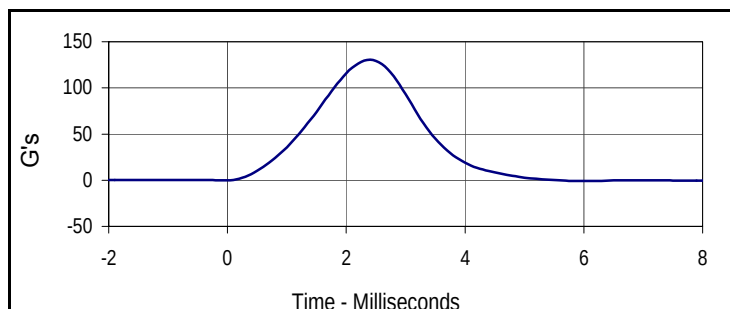
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
3790.3	2.3	-27.9	5.7

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

Plot No.	Type	SAE Class	Units
002	FIL	600	G's
Max	Time	Min	Time
129.3	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
3824.0	2.4	-25.2	6.1

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

Plot No.	Type	SAE Class	Units
004	FIL	600	G's
Max	Time	Min	Time
130.5	2.4	-0.9	6.1

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

Test Date: 3/5/12

ATD Serial No.: 141

Test I.D.: F141TF037

**Left Hip Joint-Femur Results**

Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	490	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	32.1	Pass
	Min	%		28.7	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.1	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	28.9	Pass
Initial Reference Plane Angle		Degrees	≤ 20	7.9	Pass
Peak Force at 45° +/-0.5°		Newtons	320.0 to 390.0	349.3	Pass
Torso Rotation Rate		deg/sec	0.5 to 1.5	1.3	Pass
Final Reference Plane Angle		Degrees	+/-8	2.2	Pass
Overall Test Results				Pass	