

REPORT NUMBER: NCAP-KAR-12-008

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

**HYUNDAI MOTOR COMPANY
2012 HYUNDAI TUCSON GLS AWD PZEV 5-DOOR MPV**

NHTSA NUMBER: MC0506

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



OCTOBER 31, 2011

FINAL REPORT

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

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15. Supplementary Notes																																																							
16. Abstract <p>A 56.3 km/h NCAP Frontal Impact Test was conducted on a 2012 Hyundai Tucson GLS AWD PZEV 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 October 17, 2011.</p> <p>The impact velocity of the vehicle was 56.56 km/h and the ambient temperature at the barrier face at the time of impact was 28.9 deg. C. The target vehicle's post-test maximum crush was 383 mm at the vehicle's centerline. The test vehicle's performance is as follows:</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th rowspan="2">Units</th> <th colspan="2">Driver ATD</th> <th colspan="2">Passenger ATD</th> </tr> <tr> <th>Threshold</th> <th>Result</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₁₅)</td> <td>N/A</td> <td>700.0</td> <td>279.8</td> <td>700.0</td> <td>367.9</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>-23</td> <td>52</td> <td>-7</td> </tr> <tr> <td>Nij</td> <td>N/A</td> <td>1</td> <td>0.43</td> <td>1</td> <td>0.54</td> </tr> <tr> <td>Neck Tension</td> <td>N</td> <td>4170</td> <td>1958.0</td> <td>2620</td> <td>879.4</td> </tr> <tr> <td>Neck Compression</td> <td>N</td> <td>4000</td> <td>-54.9</td> <td>2520</td> <td>-280.1</td> </tr> <tr> <td>Left Femur Force</td> <td>N</td> <td>10008</td> <td>-641.8</td> <td>6805</td> <td>-1765.9</td> </tr> <tr> <td>Right Femur Force</td> <td>N</td> <td>10008</td> <td>-1067.5</td> <td>6805</td> <td>-303.4</td> </tr> </tbody> </table>				Measurement Description	Units	Driver ATD		Passenger ATD		Threshold	Result	Threshold	Result	Head Injury Criteria (HIC ₁₅)	N/A	700.0	279.8	700.0	367.9	Maximum Chest Compression	mm	63	-23	52	-7	Nij	N/A	1	0.43	1	0.54	Neck Tension	N	4170	1958.0	2620	879.4	Neck Compression	N	4000	-54.9	2520	-280.1	Left Femur Force	N	10008	-641.8	6805	-1765.9	Right Femur Force	N	10008	-1067.5	6805	-303.4
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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 Hyundai Tucson GLS AWD PZEV 5-door MPV at a velocity of 56.56 km/h. The test was performed at KARCO Engineering, LLC. on October 17, 2011. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A of this report.

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

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

Both ATDs were fully instrumented with head, chest and pelvis tri-axial accelerometers, chest displacement potentiometers, upper neck force transducers, right / left femur load cells, and lower leg instrumentation. Seat belt load cells were also on the driver's and the passenger's lap and shoulder belts to measure the dummy torso and pelvic section loading. 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 136 channels of data were recorded on an on-board data acquisition system. Appendix B contains the dummy response data traces.

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

The maximum static crush of the test vehicle was 383 mm located at the vehicle's centerline. Both the driver and passenger side doors remained closed during the impact event and were operable after the impact.

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

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

The occupant data is summarized below:

ATD Position	HIC ₁₅	T ¹	T ²	Chest Disp. (mm)	Nij	Neck Tension (N)	Neck Comp. (N)	Left Femur (N)	Right Femur (N)
Driver (50th)	279.8	63.8	78.8	-23	0.43	1958.0	-54.9	-641.8	-1067.5
Passenger (5th)	367.9	63.2	78.2	-7	0.54	879.4	-280.1	-1765.9	-303.4

SECTION 2
DATA SHEETS

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV NHTSA No.: MC0506
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/17/11

CONVERSION FACTORS

Quantity	Typical Application	Std Units	Metric Unit	Multiply By
Mass	Vehicle Weight	lb	kg	0.4536
Linear Velocity	Impact Velocity	miles/hr	km/hr	1.609344
Length or Distance	Measurements	in	mm	25.4
Volume	Fluid Systems	gal	liter	3.785
Volume	Small Fluids	oz	mL	29.573
Pressure	Tire Pressures	lbf/in ²	kPa	7.0
Temperature	General Use	°F	°C	$=(tf - 32)/1.8$
Force	Dynamic Forces	lbf	N	4.448
Moment	Torque	lbf•ft	N•m	1.355

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV NHTSA No.: MC0506
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/17/11

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	MC0506
Model Year	2012
Make	Hyundai
Model	Tucson GLS AWD PZEV
Body Style	5-Door MPV
VIN	KM8JUCAC0CU351471
Body Color	Kiwi Green
Odometer Reading (km / mi)	158 / 98
Engine Displacement (L)	2.4
Type / No. of Cylinders	Inline 4
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	6
Overdrive	Yes
Final Drive	AWD
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)	Yes
Traction Control System	Yes

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

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

DATA FROM CERTIFICATION LABEL

Manufactured By	Hyundai Motor Company
Date of Manufacture	Jul-11

GVWR (kg)	2090
GAWR Front (kg)	1055
GAWR Rear (kg)	1125

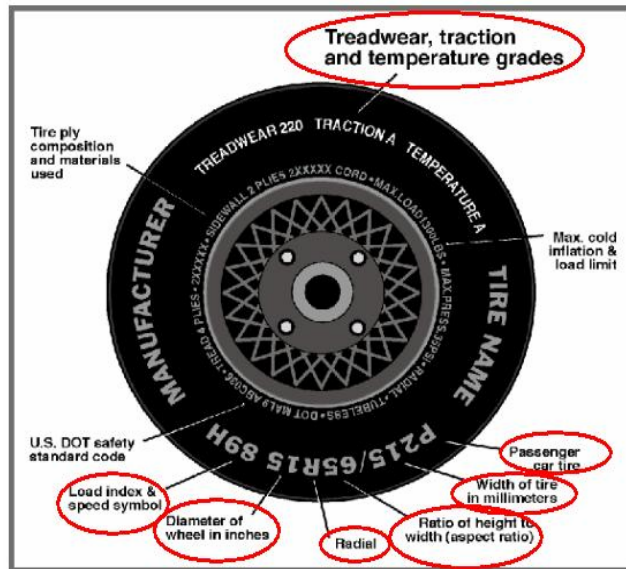
VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total	
Type of Seats	Bucket	Bench			
Designated Seating Capacity	2	3		5	
Capacity Weight (VCW) (kg)				420.0	A
DSC x 68.04 (kg)				340.2	B
Cargo Weight (RCLW) (kg)				79.8	A-B

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV NHTSA No.: MC0506
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VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	230	230
Recommended Tire Size	225/60R17	225/60R17
Tire Size on Vehicle	225/60R17	225/60R17
Tire Manufacturer	Kumho	Kumho
Tire Model	Solus KL21	Solus KL21
Treadwear	500	500
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Steel, 2 Polyester, 1 Nylon	2 Steel, 2 Polyester, 1 Nylon
Load Index / Speed Symbol	99H	99H
Tire Material	Steel, Polyester, Nylon	Steel, Polyester, Nylon
DOT Safety Code Left	27ZA YAL9 2711	27ZA YAL9 2711
DOT Safety Code Right	27ZA YAL9 2711	27ZA YAL9 2711

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV NHTSA No.: MC0506
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/17/11

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	460.0	339.0		486.5	432.0	
Right	kg	441.5	311.0		456.0	393.0	
Ratio	%	58.1%	41.9%	100.0%	53.3%	46.7%	100.0%
Total	kg	901.5	650.0	1551.5	942.5	825.0	1767.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1551.5	A
Weight of 1 P572E ATD & 1 P572O ATD	kg	141.0	B
Rated Cargo/Luggage Weight (RCLW)	kg	79.8	C
Calculated Vehicle Target Weight (TVTW)	kg	1772.3	A+B+C

TEST VEHICLE ATTITUDES

Condition	Units	LF	RF	LR	RR	CG Aft of Front Axle
As Delivered	mm	752	752	752	752	1106
As Tested	mm	735	736	720	721	1232
Post-Test	mm	711	726	725	715	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2640
Total Vehicle Length at Left Side	mm	3644
Total Vehicle Length at Centerline	mm	4402
Total Vehicle Length at Right Side	mm	3646
Weight of Ballast in Cargo Area	kg	81.0
Weight of Vehicle Components Removed	kg	23.0
Amount of Stoddard Solvent in Fuel Tank	L	53.90

VEHICLE COMPONENTS REMOVED TO MEET TEST WEIGHT:

Rear liner (2.0 kg), Spare tire (15.0 kg), Rear trunk cover (2.5 kg), Spare tire tools (3.5 kg)

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

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV NHTSA No.: MC0506
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/17/11

TARGET VEHICLE STRUCTURAL MEASUREMENTS

No.	Description	Pre-Test	Post-Test	Difference
1	Total Length	4402	4019	-383
2	Total Width	1810	1905	95
3	Bumper Top Height	780	700	-80
4	Bumper Bottom Height	615	525	-90
5	Longitudinal Member Top Height	540	560	20
6	Distance Between Longitudinal Members	970	1025	55
7	Longitudinal Member Width	60	65	5
8	Engine Top Height	890	886	-4
9	Engine Bottom Height	230	227	-3
10	Engine and Gearbox Width	590	590	0
11	Front Bumper to Engine Distance	385	320	-65
12	Front Shock Absorber Fixing Height	900	910	10
13	Bonnet Leading Edge Height	864	888	24
14	Front Shock Absorber Fixing Width	1200	1160	-40
15	Front Bumper to Front Axle Distance	873	495	-378
16	Front Axle to A-Pillar Distance	510	465	-45
17	A-Pillar to B-Pillar Distance	963	958	-5
18	B-Pillar to Rear Axle Distance	1100	1080	-20
19	B-Pillar to C-Pillar Distance	943	943	0
20	Roof Sill Bottom Height	1476	1483	7
21	Roof Sill Top Height	1602	1610	8
22	Floor Sill Bottom Height	253	249	-4
23	Floor Sill Top Height	410	410	0

All measurements in millimeters.

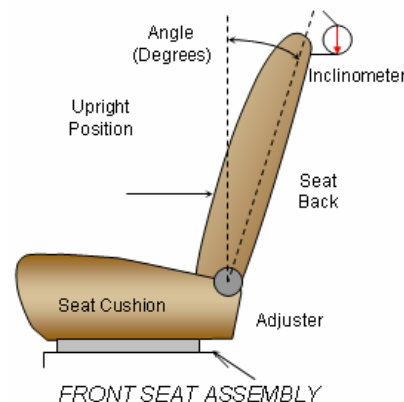
DATA SHEET NO. 2

SEAT ADJUSTMENT, FUEL SYSTEMS, AND STEERING WHEEL DATA

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV NHTSA No.: MC0506
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/17/11

NOMINAL DESIGN RIDING POSITION

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

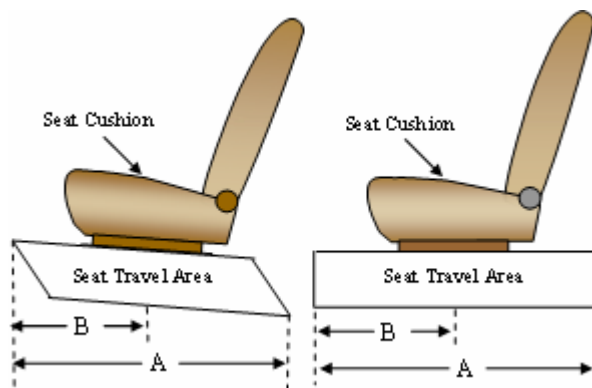


SEAT BACK ANGLE

Seating Position	Degrees
Driver Seat Back Angle	10.1
Passenger Seat Back Angle	5.0

SEAT FORE / AFT POSITIONING

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



SEAT FORE/AFT POSITIONS

Seating Position	Total Fore-Aft Travel	Placed in Position
Driver Seat	294 mm	154 mm
Passenger Seat	220 mm	0 mm

SEAT BELT UPPER ANCHORAGE

The seat belt upper anchorage is positioned to the manufacturer's design position for a 50th percentile adult male ATD for the driver, and a 5th percentile adult female ATD for the passenger. Position "H" is the uppermost position, followed by position "M1". Position "L" is the lowermost position.

SEAT BELT UPPER ANCHORAGES

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

DATA SHEET NO. 2 ... (CONTINUED)

SEAT ADJUSTMENT, FUEL SYSTEMS, AND STEERING WHEEL DATA

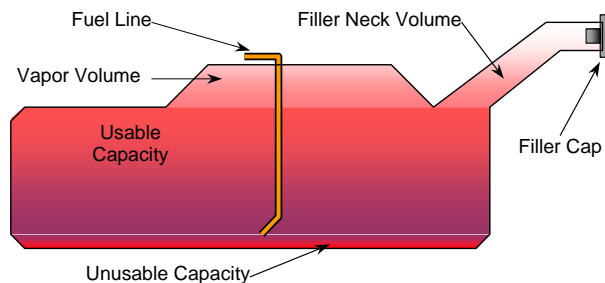
Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV NHTSA No.: MC0506
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/17/11

FUEL TANK CAPACITY

Description	Liters
Usable Capacity of "Standard Tank"	57.99
Usable Capacity of "Optional Tank"	
92 - 94% of Usable Capacity	53.35 to 54.51
Actual Amount of Stoddard Solvent Used	53.90
1/3 of Usable Capacity	19.33

FUEL PUMP

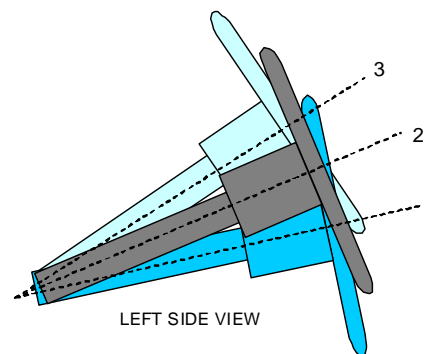
The vehicle is equipped with an electric fuel pump. The fuel pump will pump fuel when the ignition key is turned to the "on" position.



VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

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



STEERING COLUMN ASSEMBLY

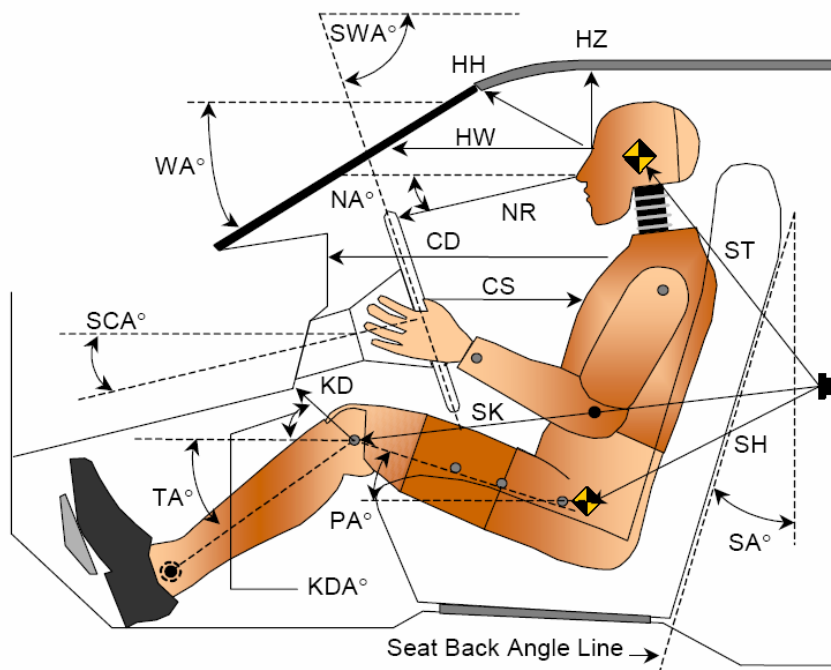
STEERING COLUMN POSITIONING

	Degrees	Fore-Aft Position (mm)
Lowermost Position, No. 1	25.4	0
Geometric Center Position, No. 2	27.5	19
Uppermost Position, No. 3	29.7	38
Telescoping Steering Wheel Travel		38
Test Position	27.5	19

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV NHTSA No.: MC0506
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/17/11



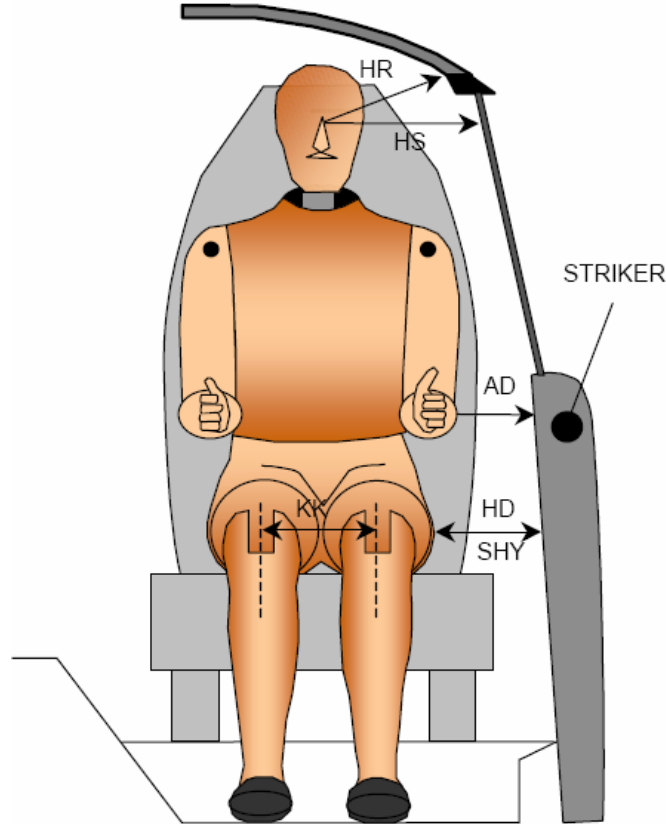
LEFT SIDE VIEW

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		26.4		
SWA°	Steering Wheel Angle		62.1		
SCA°	Steering Column Angle		27.9		
SA°	Seat Back Angle (On Headrest Post)		10.1		5.0
HZ	Head to Roof	234	90.0	267	90.0
HH	Head to Header	340	28.6	321	45.4
HW	Head to Windshield	684	0.0	679	0.0
NR	Nose to Rim	430	12.3	512	45.7
CD	Chest to Dash	581	10.6	454	11.4
CS	Chest to Steering Hub	322	0.0		
RA	Rim to Abdomen	216	0.0		
KDL	Left Knee to Dash	190	25.6	117	28.0
KDR	Right Knee to Dash	146	30.5	145	31.4
PA°	Pelvic Angle		24.8		18.6
TA°	Tibia Angle		42.2		57.1
SK	Striker to Knee	602	9.7	644	11.4
ST	Striker to Head	460	81.2	410	66.8
SH	Striker to H-Point	294	45.8	377	35.7

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV NHTSA No.: MC0506
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/17/11



Code	Description	Driver (mm)	Passenger (mm)
AD	Arm to Door	140	91
HD	H-Point to Door	140	181
HR	Head to Side Header	229	278
HS	Head to Side Window	315	345
KK	Knee to Knee	298	225
SHY	Striker to H-Point (Y-Direction)	240	274
AA	Ankle to Ankle	346	170

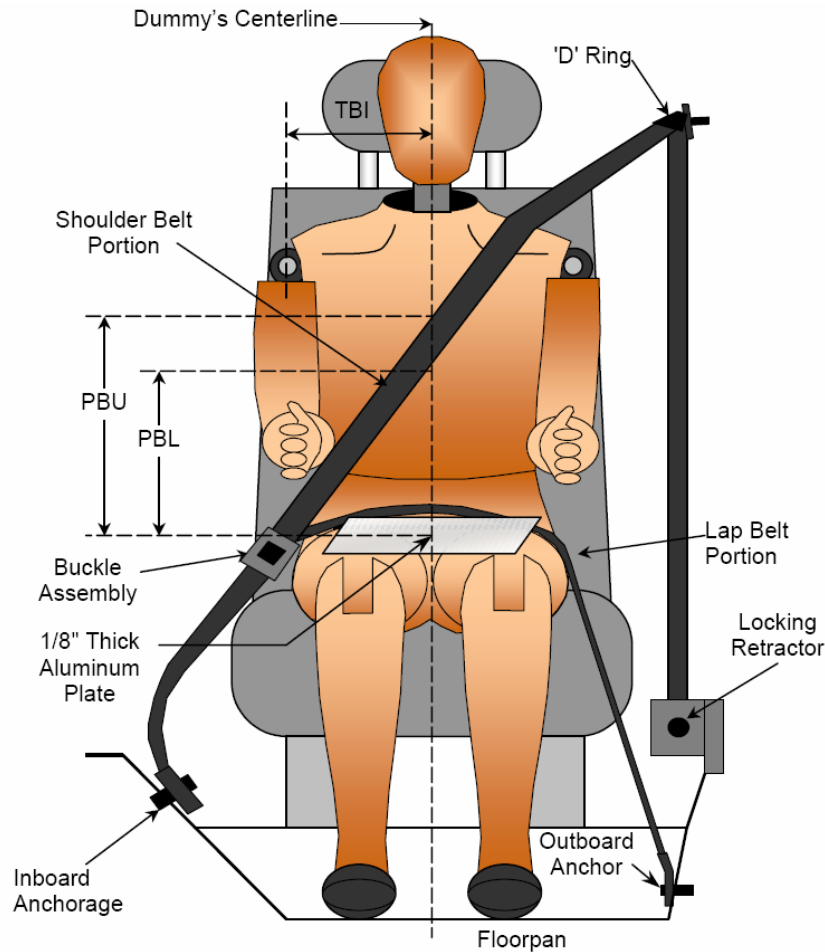
DATA SHEET NO. 5
SEAT BELT POSITIONING DATA

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV

NHTSA No.: MC0506

Test Program: 56 km/h Frontal Impact NCAP Test

Test Date: 10/17/11



FRONT VIEW OF DUMMY

SEAT BELT POSITIONING MEASUREMENTS

Code	Measurement Description	Units	Driver	Passenger
PBU	Top Surface of Aluminum Plate to Belt Upper Edge	mm	374	350
PBL	Top Surface of Aluminum Plate to Belt Lower Edge	mm	300	261

BELT LENGTH DATA

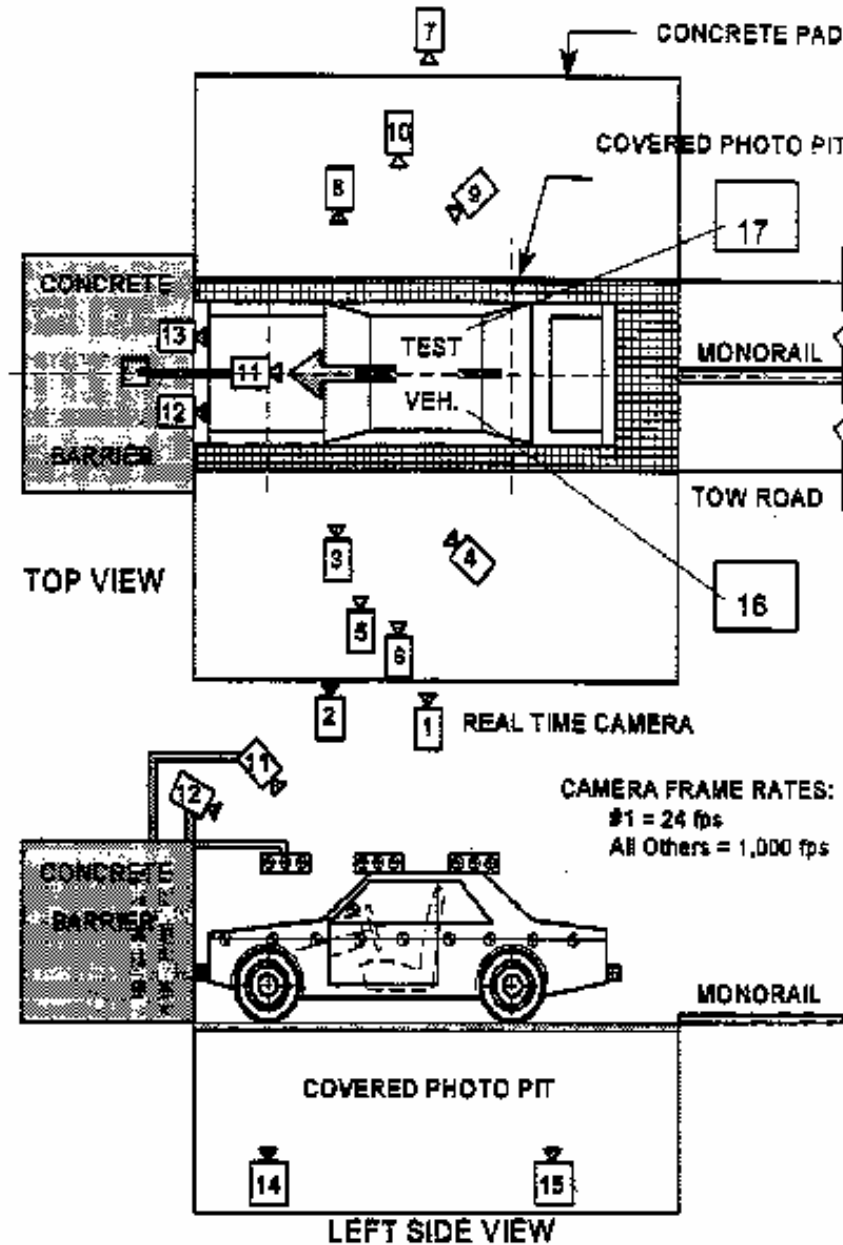
Measurement Description	Units	Driver	Passenger
Shoulder Belt Length as Measured on ATD	mm	883	900
Lap Belt Length as Measured on ATD	mm	605	637
Remainder of Belt on Reel	mm	848	789
Total Belt Length for Continuous Webbing Systems	mm	2336	2326

DATA SHEET NO. 6

HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV NHTSA No.: MC0506
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/17/11

CAMERA POSITIONS FOR FRONTAL IMPACTS



DATA SHEET NO. 6 ... (CONTINUED)

HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV NHTSA No.: MC0506
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/17/11

CAMERA LOCATIONS

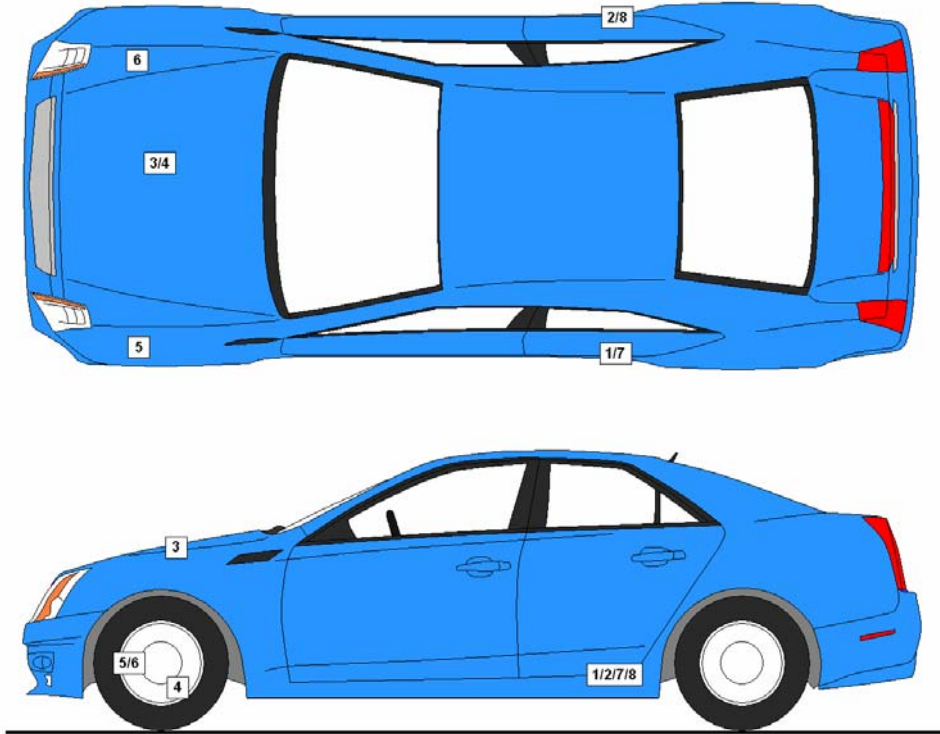
No.	Description	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Overall	-11412	-8150	-1484		30
2	Driver Close-Up	-2590	-7950	-1371	24	1000
3	Left Front Half	-1701	-6197	-1701	50	1000
4	Left Angle	-6696	-10308	-3211	ZOOM	1000
5	Steering Column - Top	-1966	-10412	-3688	50	1000
6	Steering Column - Bottom	-1972	-10412	-3379	50	1000
7	Right Overall	-2336	7569	-1012	24	1000
8	Passenger Close-Up	-1733	7581	-1408	50	1000
9	Right Front Half	-1600	8214	-1811	ZOOM	1000
10	Right Angle	-6217	9516	-4830	ZOOM	1000
11	Windshield	-354	0	-5749	12	1000
12	Driver Windshield	297	-366	-2460	12	1000
13	Passenger Windshield	297	366	-2460	24	1000
14	Pit Front	-756	0	1495	12	1000
15	Pit Rear	-3398	0	1495	8	1000
16	Onboard Driver Airbag	-3070	390	-1460	12	1000
17	Onboard Passenger Airbag (Optional)	-3070	-390	-1460	12	1000
18	Real-Time Left View of Impact (Optional)					
19	Real-Time Right View of Impact					

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

DATA SHEET NO. 7

VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV NHTSA No.: MC0506
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/17/11



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Description	Location		
		X	Y	Z
1	Left Rear Accelerometer X-Direction	2650	-810	-470
2	Right Rear Accelerometer X-Direction	2650	810	-470
3	Engine Top X	730	130	-890
4	Engine Bottom X	710	410	-230
5	Left Brake Caliper X	730	-775	-340
6	Right Brake Caliper X	730	775	-340
7	Left Rear Accelerometer Z-Direction	2650	-810	-470
8	Right Rear Accelerometer Z-Direction	2650	810	-470

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

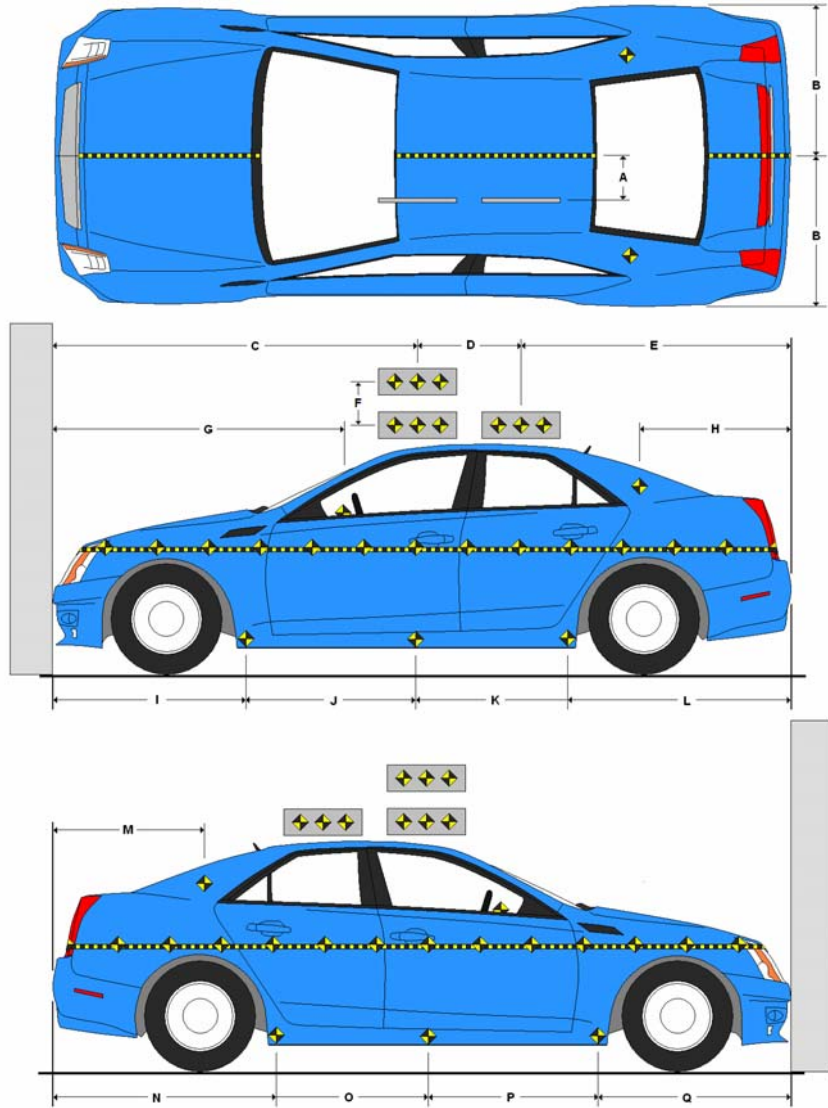
DATA SHEET NO. 8

PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV NHTSA No.: MC0506

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/17/11

Item	Value
A	420
B	905
C	2213
D	610
E	1580
F	305
G	1680
H	651
I	1374
J	843
K	843
L	1332
M	682
N	1345
O	838
P	838
Q	1361



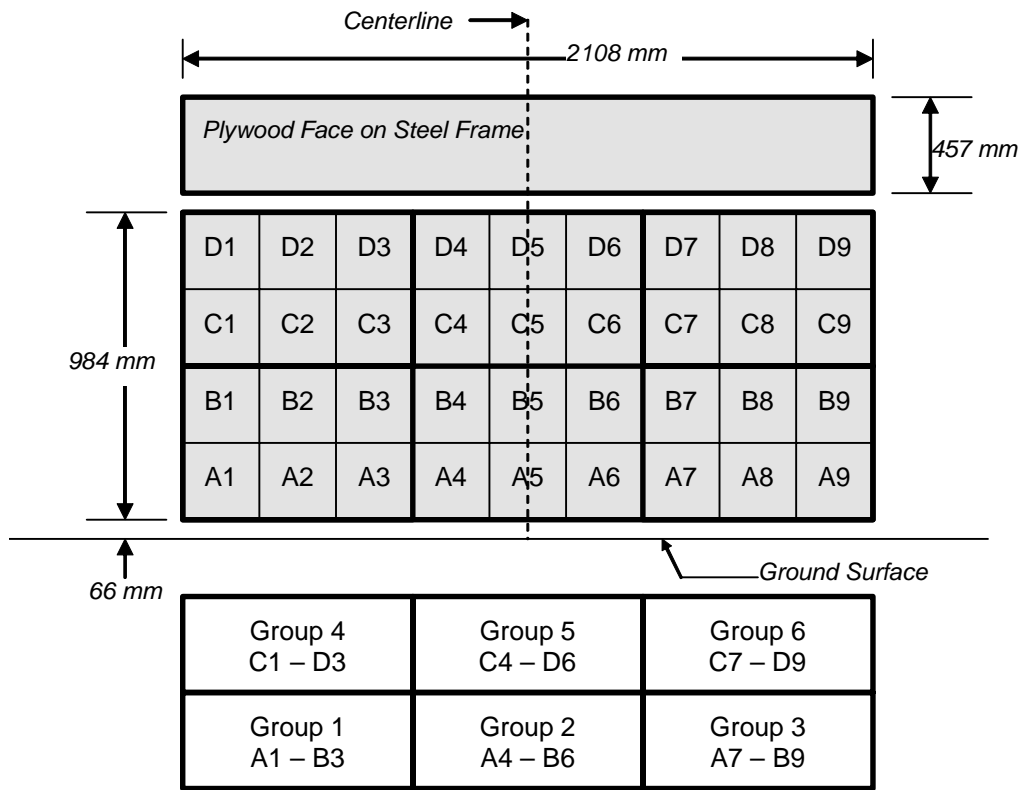
All measurements in millimeters.

DATA SHEET NO. 9

LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV NHTSA No.: MC0506
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/17/11

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



6 Groups of 6 Load Cells Each

DATA SHEET NO. 10

TEST VEHICLE CAMERA AND INSTRUMENTATION SUMMARY

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV NHTSA No.: MC0506
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/17/11

INSTRUMENTATION

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

CAMERA COVERAGE

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

DATA SHEET NO. 11
POST-TEST OBSERVATIONS

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV NHTSA No.: MC0506
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/17/11

TEST DUMMY INFORMATION AND CONTACT

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	Locked	Locked
Front Door Opening	Remained closed and latched, operational	Remained closed and latched, operational
Rear Door Opening	Remained closed and latched, operational	Remained closed and latched, operational
Seat Track Shift (mm)	19	6
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

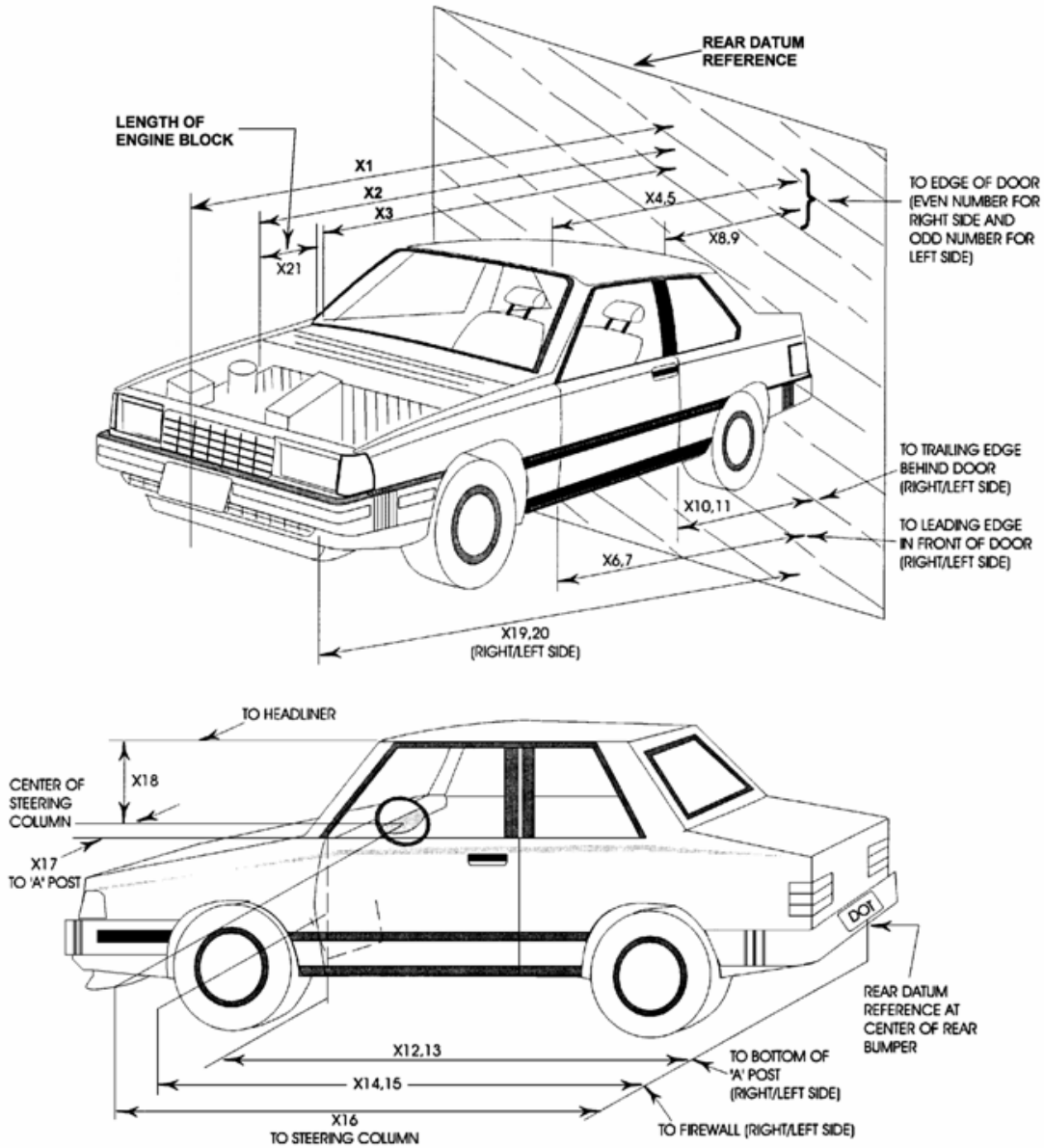
Measured Parameter	Units	Value
Left Side	mm	1519
Center	mm	1505
Right Side	mm	1627
Average	mm	1550

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

DATA SHEET NO. 12
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV NHTSA No.: MC0506
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/17/11



DATA SHEET NO. 12 ... (CONTINUED)

VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV NHTSA No.: MC0506
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/17/11

No.	Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	4402	4019	-383
2	Rear Surface of Vehicle to Front of Engine	4017	3773	-244
3	RSOV to Firewall	3347	3372	25
4	RSOV to Upper Leading Edge of Right Door	3041	3053	12
5	RSOV to Upper Leading Edge of Left Door	3037	3060	23
6	RSOV to Lower Leading Edge of Right Door	3023	3008	-15
7	RSOV to Lower Leading Edge of Left Door	3004	3017	13
8	RSOV to Upper Trailing Edge of Right Door	1955	1976	21
9	RSOV to Upper Trailing Edge of Left Door	1955	1980	25
10	RSOV to Lower Trailing Edge of Right Door	1984	1982	-2
11	RSOV to Lower Trailing Edge of Left Door	1980	1988	8
12	RSOV to Bottom of A-Pillar, Right Side	2988	3003	15
13	RSOV to Bottom of A-Pillar, Left Side	2982	3068	86
14	RSOV to Firewall, Right Side	3322	3315	-7
15	RSOV to Firewall, Left Side	3322	3433	111
16	RSOV to Steering Column	2577	2667	90
17	Center of Steering Column to A-Pillar	420	410	-10
18	Center of Steering Column to Headliner	435	460	25
19	RSOV to Right Side of Front Bumper	3646	3450	-196
20	RSOV to Left Side of Front Bumper	3644	3590	-54
21	Length of Engine Block	540	540	0
RD	RSOV to Right Side of Dash Panel	2774	2786	12
CD	RSOV to Center of Dash Panel	2680	2724	44
LD	RSOV to Left Side of Dash Panel	2777	2787	10

All measurements in millimeters.

DATA SHEET NO. 13
ACCIDENT INVESTIGATION DATA

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV NHTSA No.: MC0506
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/17/11

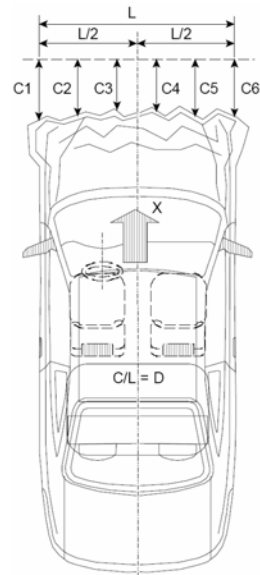
VEHICLE INFORMATION

VIN: KM8JUCAC0CU351471 Wheelbase (mm): 2640
 Vehicle Size Category: 5-Door MPV Test Weight (kg): 1767.5

ACCELEROMETER DATA

Accelerometer Locations: Left Rear Crossmember
 Cal. Procedure/Interval: Drop Test / 6 months
 Integration Algorithm: NHTSA Standard
 Impact Velocity (km/h): 56.56
 Velocity Change (km/h): 64.3
 Time of Separation (msec): 63.1

Linearity: Good



CRUSH PROFILE

Collision Deformation Classification: 12FDEW2
 Midpoint of Damage: Vehicle Centerline
 Damage Region Length (mm): 1395
 Impact Mode: Full Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush Zone 1 at Left Side	mm	170	400	230
C2	Crush Zone 2 at Left Side	mm	75	407	332
C3	Crush Zone 3 at Left Side	mm	23	370	347
C4	Crush Zone 4 at Right Side	mm	23	390	367
C5	Crush Zone 5 at Right Side	mm	75	448	373
C6	Crush Zone 6 at Right Side	mm	170	467	297
L	C1 to C6	mm	1395		

DATA SHEET NO. 14

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV NHTSA No.: MC0506

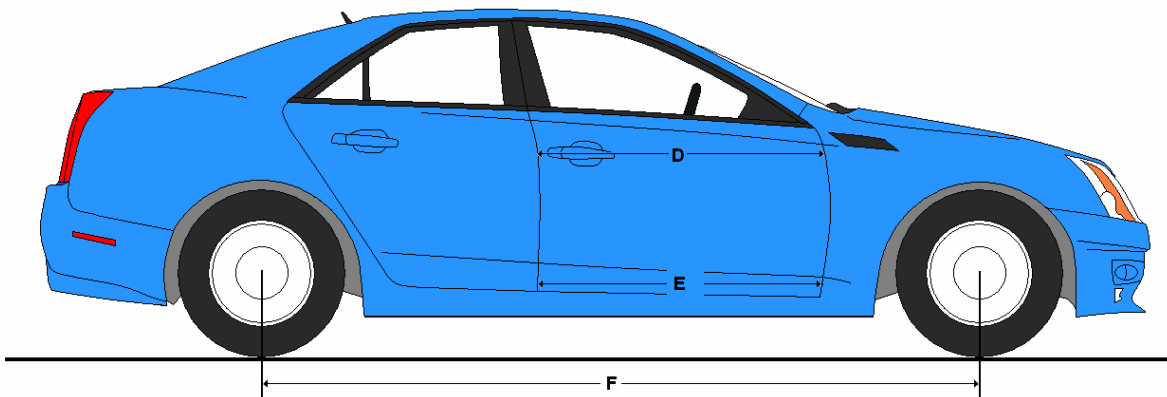
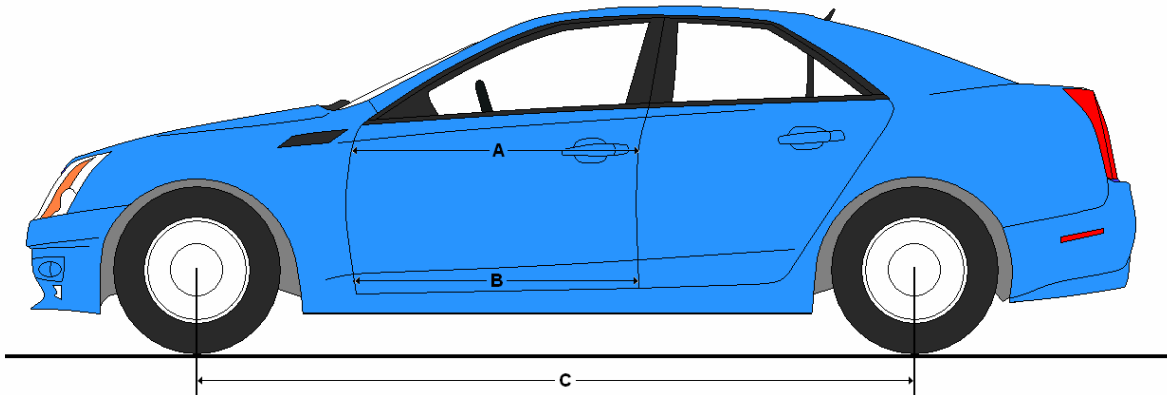
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/17/11

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	959	958	1
B	Left Side Lower	mm	908	908	0
D	Right Side Upper	mm	966	966	0
E	Right Side Lower	mm	904	908	-4

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2640	2592	48
F	Right Side Wheelbase	mm	2640	2625	15



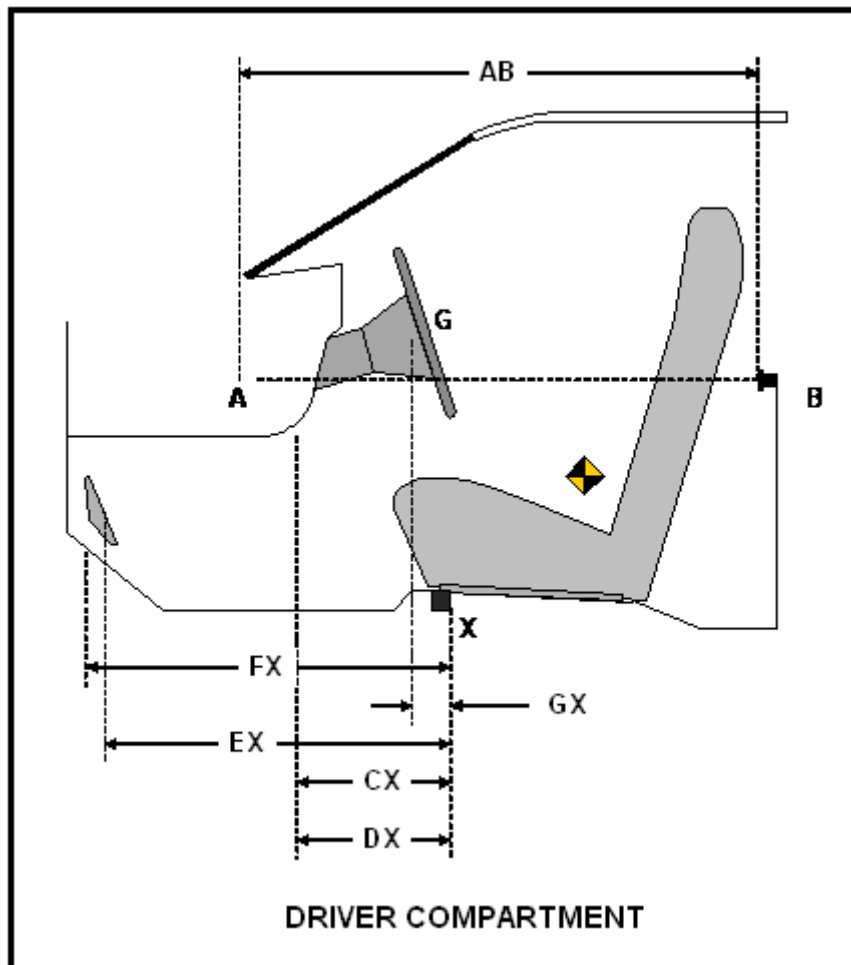
DATA SHEET NO. 14 ... (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV NHTSA No.: MC0506
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/17/11

DRIVER COMPARTMENT INTRUSION

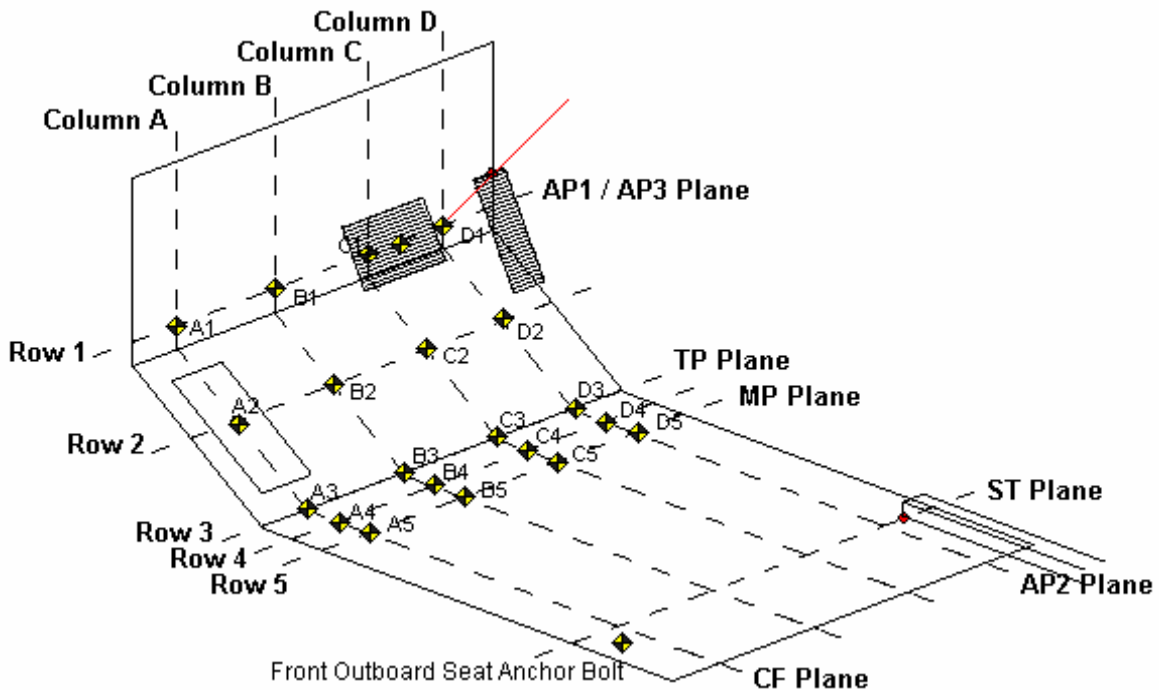
Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	893	890	3
CX	Left Knee Bolster to X	mm	265	265	0
DX	Right Knee Bolster to X	mm	270	260	10
EX	Brake Pedal to X	mm	510	510	0
FX	Foot Rest to X	mm	520	540	-20
GX	Center of Steering Wheel Hub to X	mm	80	65	15

X = Front of Seat Track (Stationary)



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

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV NHTSA No.: MC0506
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/17/11



AP1: Y-Z Plane passing through D1

AP2: X-Z Plane passing through D1

AP3: X-Y plane passing through D1

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

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

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

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

Column A: intersection of vehicle and CF plane

Column D: Intersection of vehicle and AP2 plane

Row 1: intersection of the vehicle and the AP3 Plane

Row 3: intersection of the vehicle and TP plane

Row 5: intersection of the vehicle and MP plane

Row 2: evenly spaced between row 1 and 3

Row 4: evenly spaced between row 3 and 5

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

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV NHTSA No.: MC0506
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/17/11

DRIVER FLOORPAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	602	685	694	695	598	677	683	680	-4	-8	-11	-15
2	524	584	591	589	540	576	579	578	16	-8	-12	-11
3	425	425	430	429	418	417	423	418	-7	-8	-7	-11
4	326	329	334	339	320	322	325	330	-6	-7	-9	-9
5	233	235	234	238	228	228	227	229	-5	-7	-7	-9

DRIVER FLOORPAN Y-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	-9	-127	-251	-387	-7	-132	-259	-390	2	-5	-8	-3
2	-10	-129	-252	-387	-1	-131	-257	-391	9	-2	-5	-4
3	-8	-132	-250	-379	-9	-133	-254	-383	-1	-1	-4	-4
4	-9	-130	-252	-382	-7	-131	-255	-386	2	-1	-3	-4
5	-10	-130	-253	-381	-11	-134	-255	-383	-1	-4	-2	-2

DRIVER FLOORPAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	71	-39	-50	-47	55	-52	-64	-54	-16	-13	-14	-7
2	-2	-82	-81	-84	-33	-90	-94	-101	-31	-8	-13	-17
3	-92	-90	-92	-88	-97	-95	-101	-104	-5	-5	-9	-16
4	-101	-86	-93	-94	-97	-90	-100	-106	4	-4	-7	-12
5	-115	-88	-93	-91	-115	-90	-99	-100	0	-2	-6	-9

All measurements in millimeters

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

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV NHTSA No.: MC0506
 Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/17/11

PASSENGER FLOORPAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	716	717	694	609	691	682	643	620	-25	-35	-51	11
2	609	607	602	591	599	602	597	587	-10	-5	-5	-4
3	444	436	431	430	441	432	426	426	-3	-4	-5	-4
4	337	335	330	332	333	331	327	328	-4	-4	-3	-4
5	232	232	229	236	230	228	226	231	-2	-4	-3	-5

PASSENGER FLOORPAN Y-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	386	247	120	14	385	242	121	-8	-1	-5	1	-22
2	386	251	121	9	380	252	116	3	-6	1	-5	-6
3	385	251	128	8	385	250	123	5	0	-1	-5	-3
4	386	251	129	8	386	251	125	3	0	0	-4	-5
5	386	251	129	6	385	252	127	5	-1	1	-2	-1

PASSENGER FLOORPAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	-15	-32	-16	15	-14	-33	-26	-12	1	-1	-10	-27
2	-62	-78	-79	-77	-81	-95	-93	-97	-19	-17	-14	-20
3	-93	-92	-92	-92	-113	-104	-101	-104	-20	-12	-9	-12
4	-96	-94	-87	-98	-110	-103	-95	-101	-14	-9	-8	-3
5	-93	-95	-89	-113	-104	-100	-94	-118	-11	-5	-5	-5

All measurements in millimeters

DATA SHEET NO. 15

SUMMARY OF FMVSS 212 AND 219 (PARTIAL) DATA

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV NHTSA No.: MC0506

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/17/11

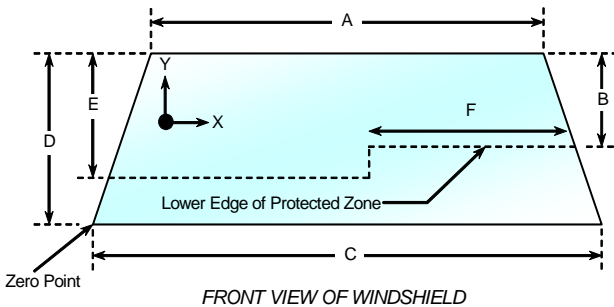
Windshield Mounting Details: Windshield glass is secured to the vehicle frame with plastic and rubber molding sealed with rubber cement.

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

Temperature of windshield molding during test: 21.5° C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2263	2263	100.0%
Right Side	2263	2263	100.0%
Total	4526	4526	100.0%



Item	Units	Value
A	mm	1210
B	mm	435
C	mm	1445
D	mm	935
E	mm	537
F	mm	475

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 Hyundai Tucson GLS AWD PZEV 5-Door MPV NHTSA No.: MC0506
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/17/11

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 28.9° C Test Time: 12:40 PM

Stoddard Solvent Spillage Measurements

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

DATA SHEET NO. 16

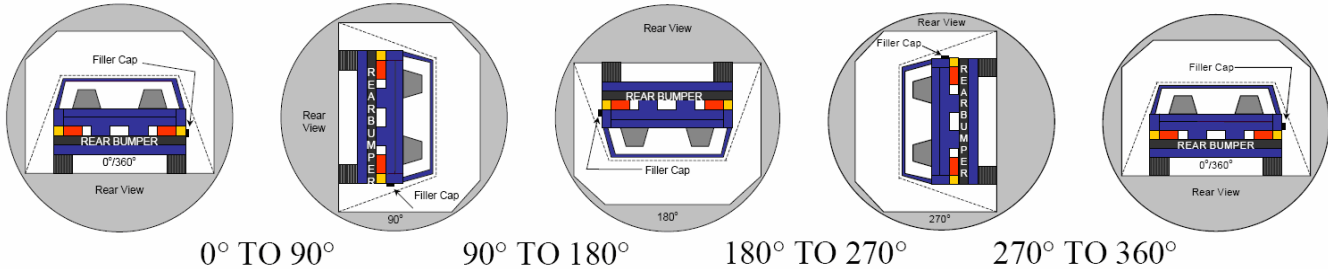
FMVSS 301 STATIC ROLLOVER

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV

NHTSA No.: MC0506

Test Program: 56 km/h Frontal Impact NCAP Test

Test Date: 10/17/11



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

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° To 90°	80	300	380
90° To 180°	84	300	384
180° To 270°	79	300	379
270° To 360°	79	300	379

FMVSS 301 SPILLAGE TABLE

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

SOLVENT SPILLAGE LOCATION TABLE

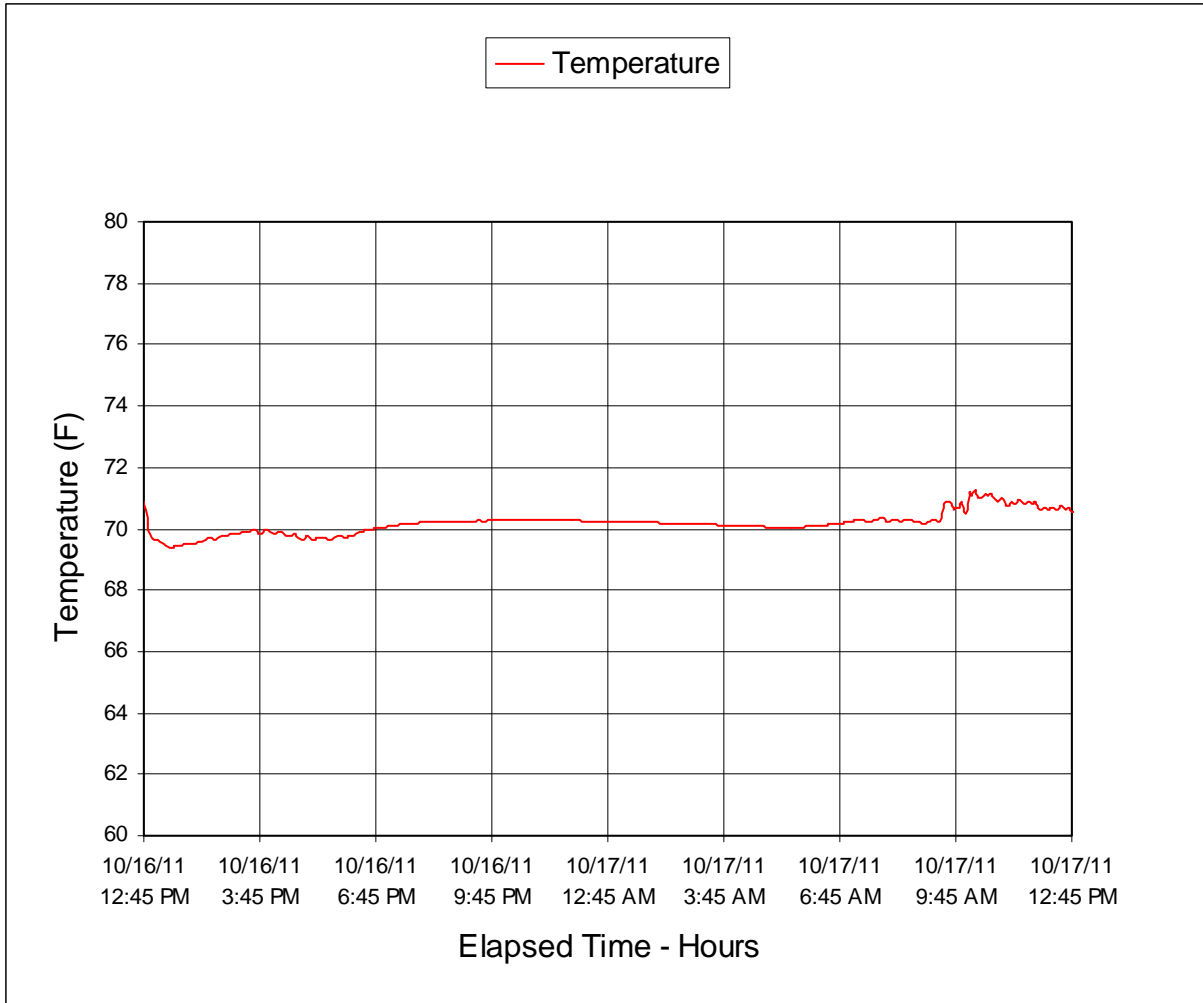
Test Phase	Spillage Location
0° To 90°	N/A
90° To 180°	N/A
180° To 270°	N/A
270° To 360°	N/A

DATA SHEET NO. 17

DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV NHTSA No.: MC0506

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 10/17/11



**APPENDIX A
PHOTOGRAPHS**

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FIGURE 1. Load Cell Location



FIGURE 2. Load Cell Wall



FIGURE 3. Manufacturer's Label



FIGURE 4. Tire Placard



FIGURE 5. 2012 Hyundai Tucson GLS AWD PZEV Frontal As Delivered



FIGURE 6. Left Rear ¾ View, As Received



FIGURE 7. Pre-Test Front View of Test Vehicle

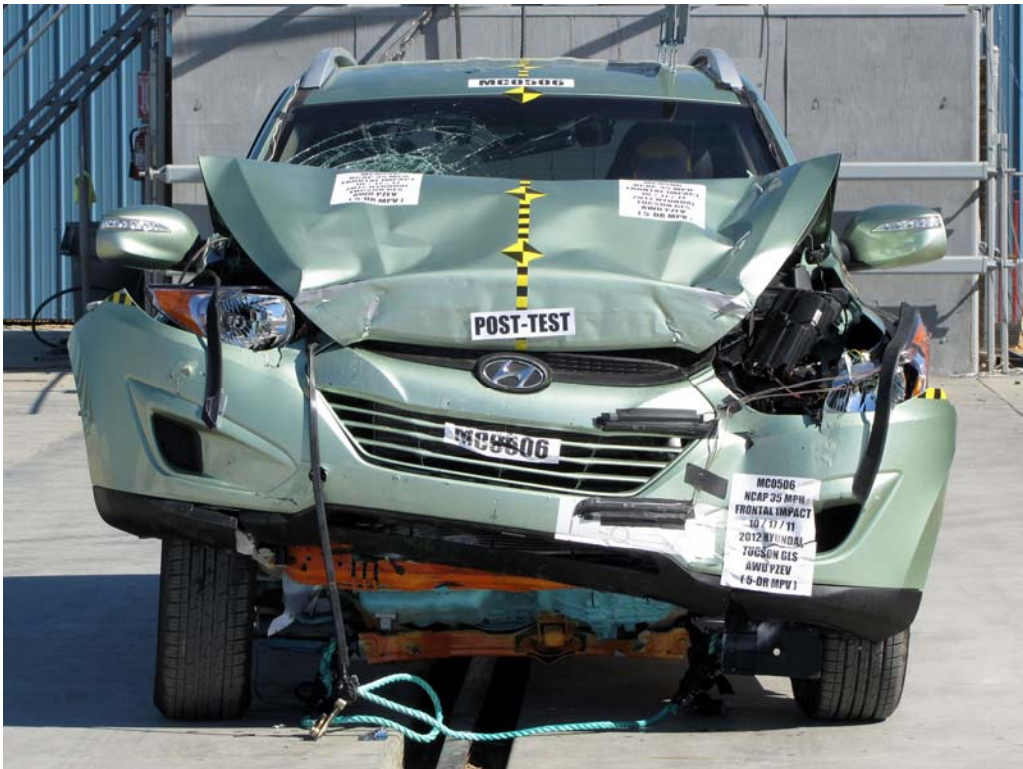


FIGURE 8. Post-Test Front View of Test Vehicle



FIGURE 9. Pre-Test Left View of Test Vehicle



FIGURE 10. Post-Test Left View of Test Vehicle



FIGURE 11. Pre-Test Right View of Test Vehicle



FIGURE 12. Post-Test Right View of Test Vehicle



FIGURE 13. Pre-Test Right Front $\frac{3}{4}$ View



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



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



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

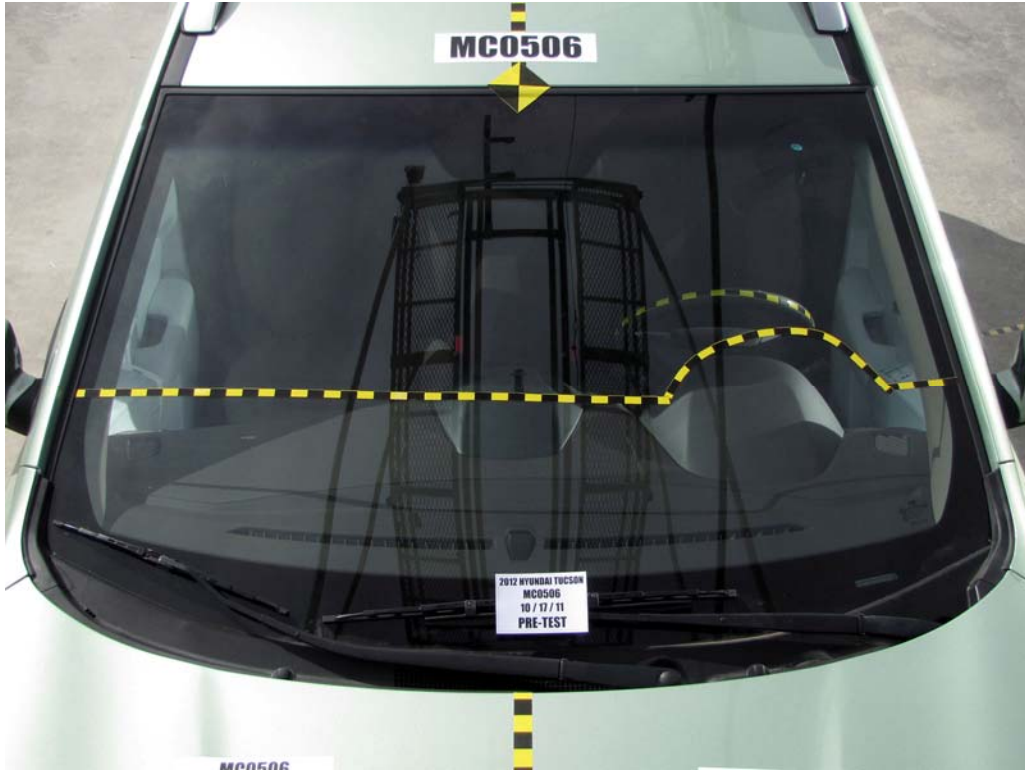


FIGURE 17. Pre-Test Windshield View



FIGURE 18. Post-Test Windshield View



FIGURE 19. Pre-Test Engine Compartment View



FIGURE 20. Post-Test Engine Compartment View



FIGURE 21. Pre-Test Fuel Filler Cap View



FIGURE 22. Post-Test Fuel Filler Cap View

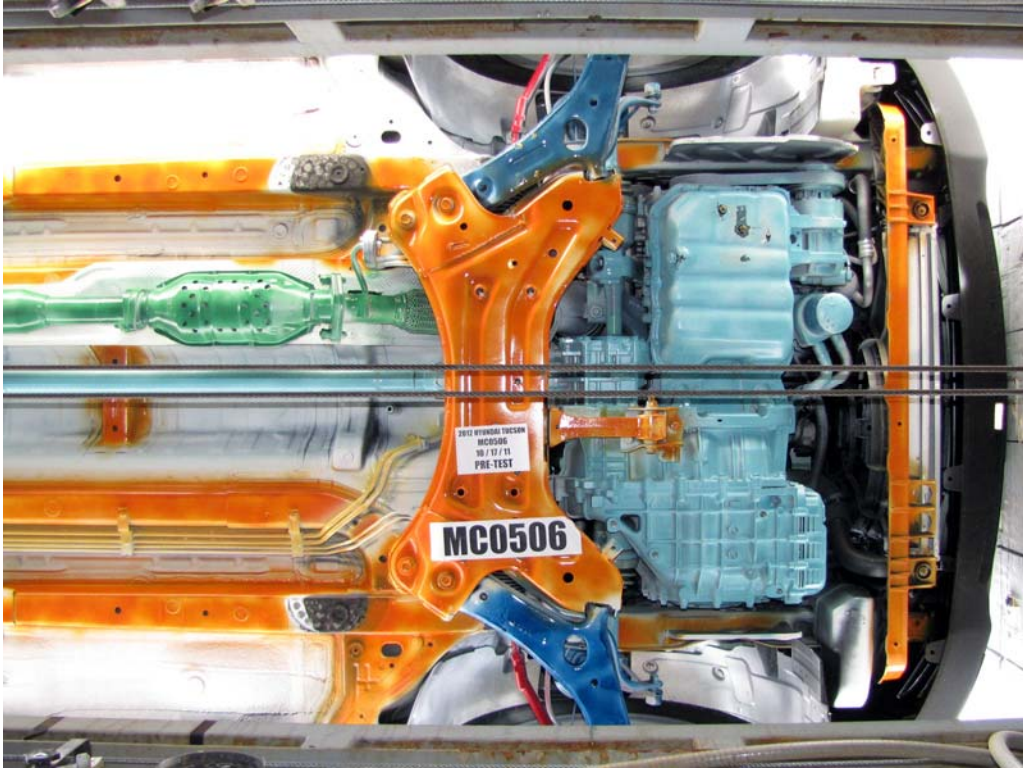


FIGURE 23. Pre-Test Front Underbody View

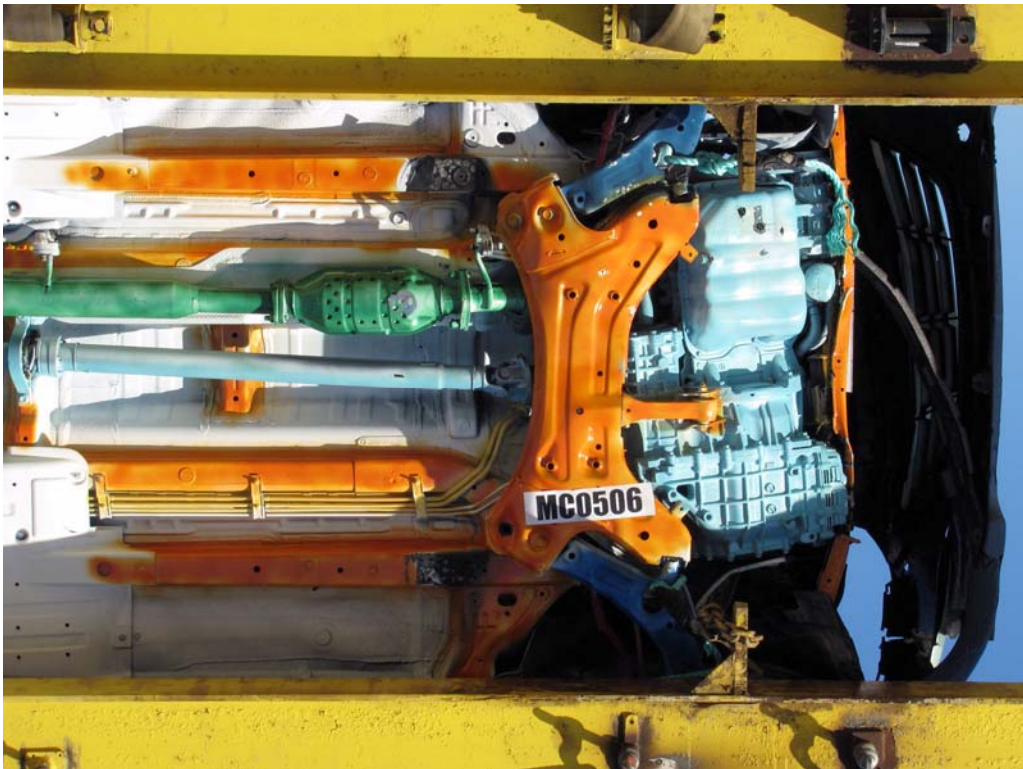


FIGURE 24. Post-Test Front Underbody View

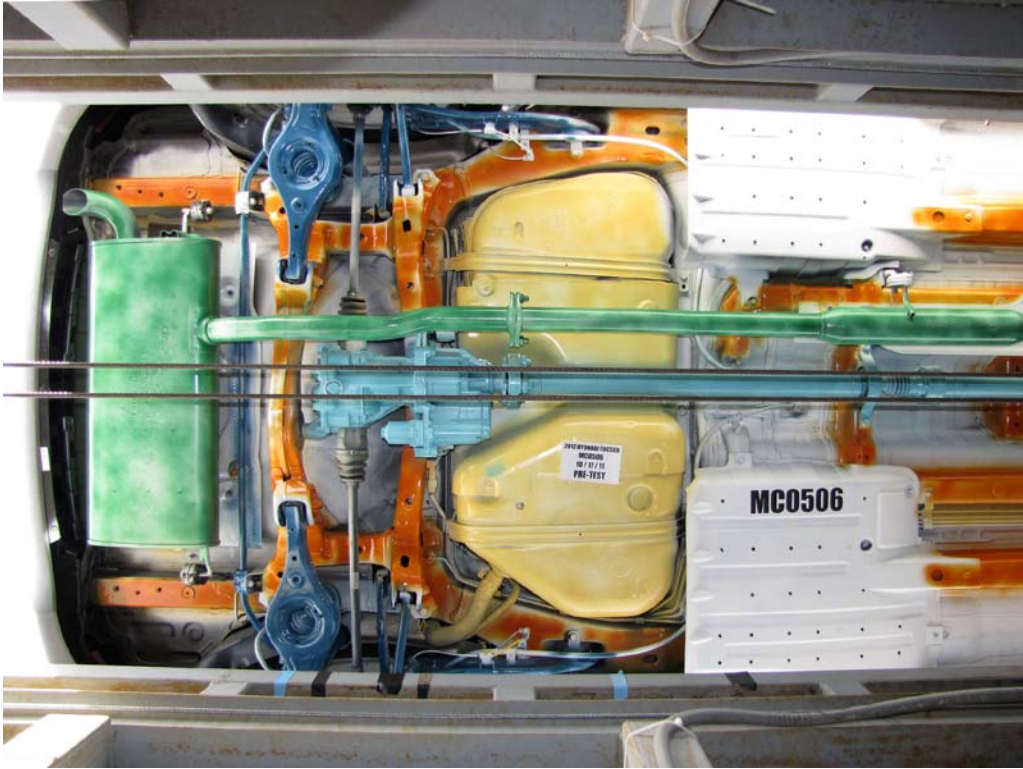


FIGURE 25. Pre-Test Rear Underbody View

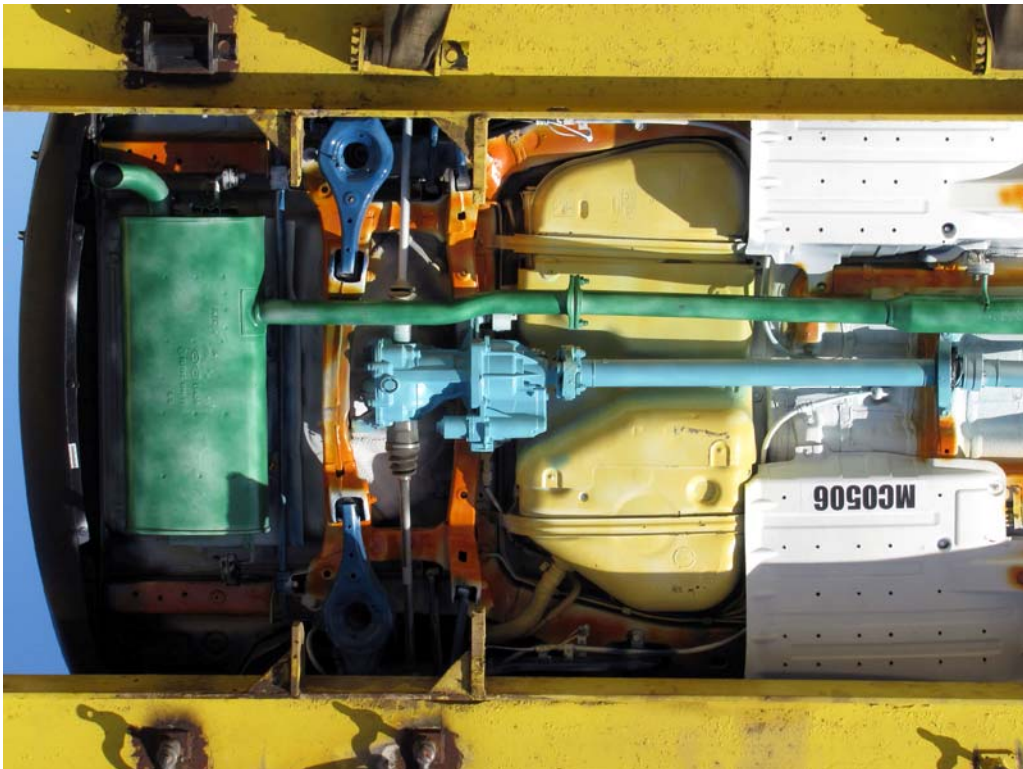


FIGURE 26. Post-Test Rear Underbody View



FIGURE 27. Pre-Test Dummy Cable Routing



FIGURE 28. Post-Test Dummy Cable Routing



FIGURE 29. Pre-Test Driver Dummy Front View



FIGURE 30. Post-Test Driver Dummy Front View



FIGURE 31. Pre-Test Driver Dummy Window View



FIGURE 32. Post-Test Driver Dummy Window View



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



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



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



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



FIGURE 37. Pre-Test Driver Dummy Feet



FIGURE 38. Post-Test Driver Dummy Feet



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



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



FIGURE 41. Pre-Test Driver's Side Floorpan



FIGURE 42. Post-Test Driver's Side Floorpan



FIGURE 43. Post-Test Driver Dummy Face



FIGURE 44. Post-Test Driver Dummy Contact With Airbag



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



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



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



FIGURE 46. Pre-Test View Of Steering Wheel



FIGURE 47. Post-Test View Of Steering Wheel



FIGURE 48. Pre-Test Passenger Dummy Front View



FIGURE 49. Post-Test Passenger Dummy Front View



FIGURE 50. Pre-Test Passenger Dummy Window View



FIGURE 51. Post-Test Passenger Dummy Window View



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



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



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



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

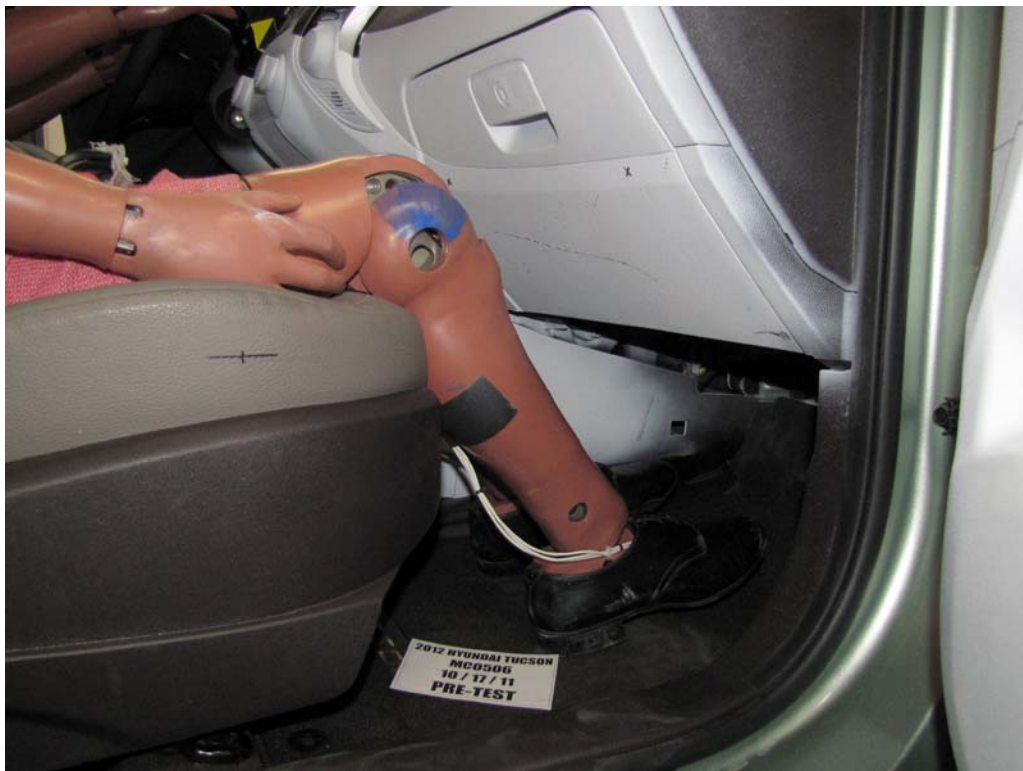


FIGURE 56. Pre-Test Passenger Dummy Feet

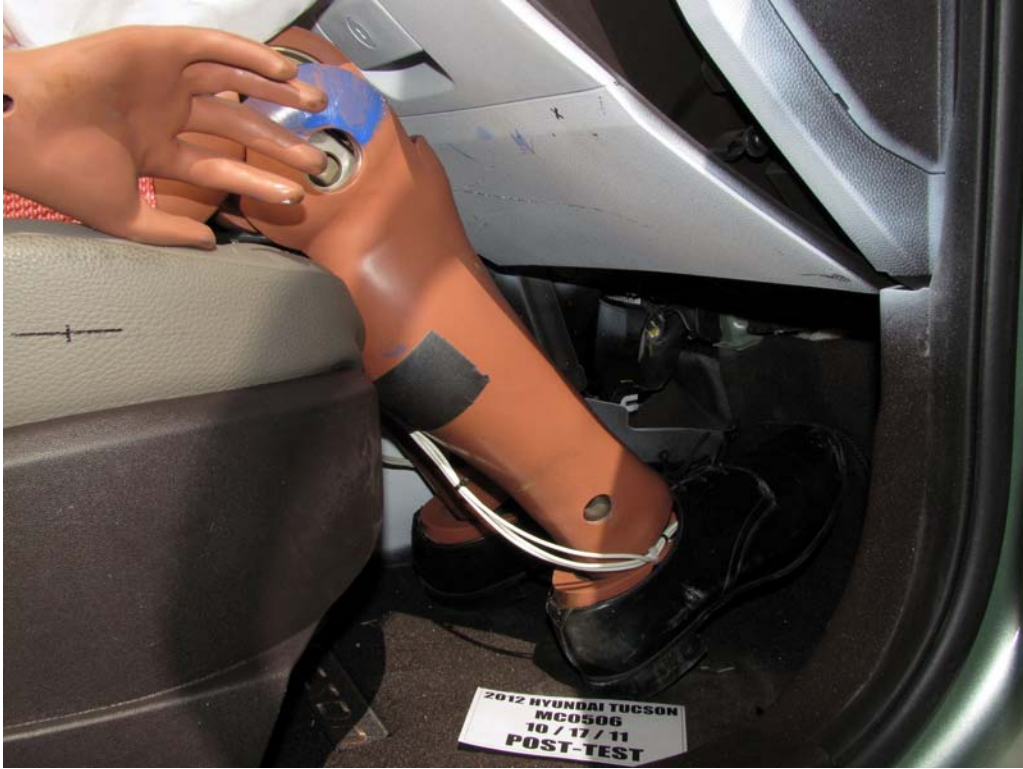


FIGURE 57. Post-Test Passenger Dummy Feet



FIGURE 58. Pre-Test Passenger's Side Knee Bolster



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



FIGURE 60. Pre-Test Passenger's Side Floorpan



FIGURE 61. Post-Test Passenger's Side Floorpan



FIGURE 62. Post-Test Passenger Dummy Contact With Airbag



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



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



FIGURE 63. Photograph 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

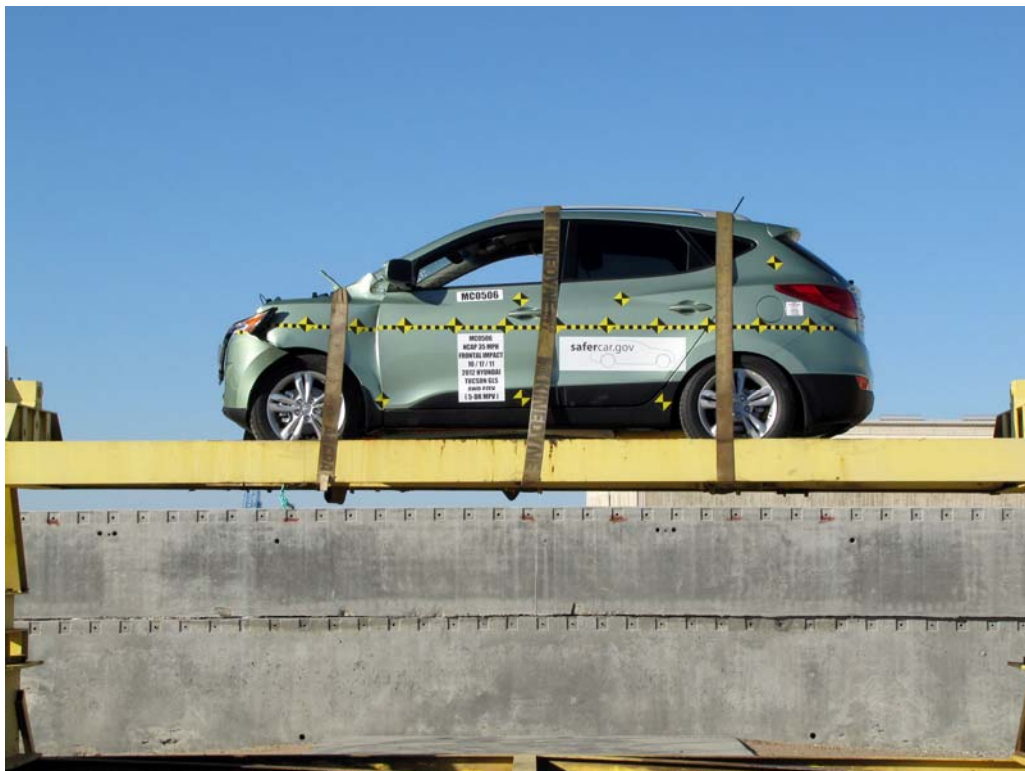


FIGURE 66. Vehicle at 0° on Static Rollover Device



FIGURE 67. Vehicle at 90° on Static Rollover Device

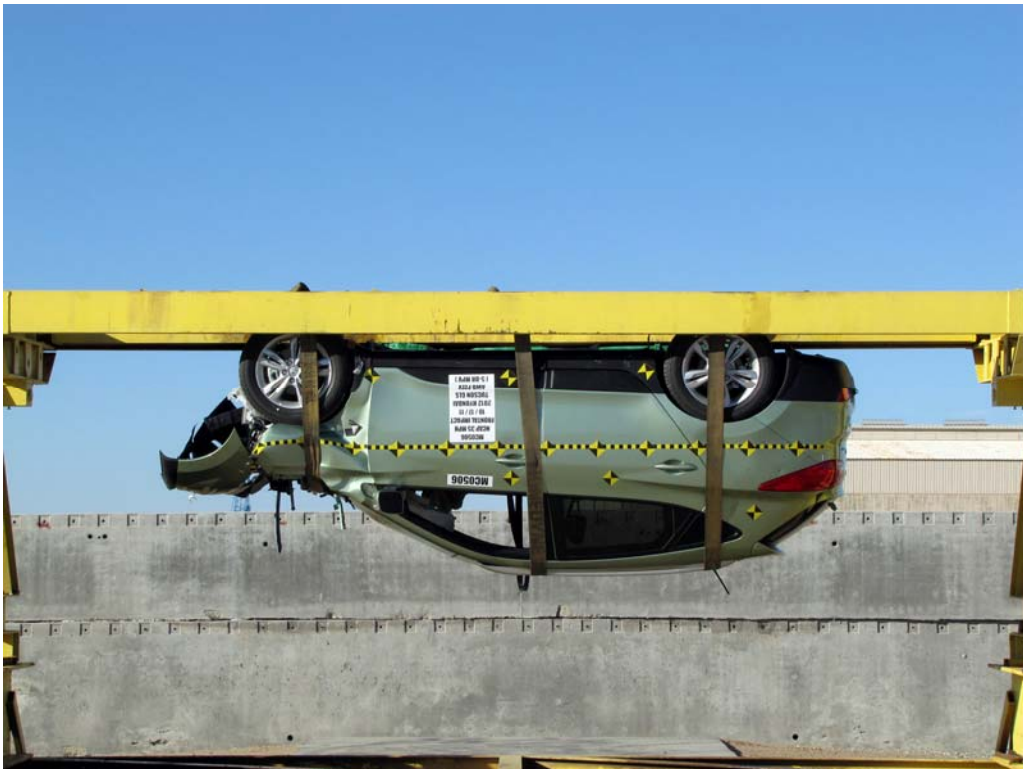


FIGURE 68. Vehicle at 180° on Static Rollover Device



FIGURE 71. 2012 Hyundai Tucson GLS AWD PZEV Frontal Impact Event

HYUNDAI 2012 TUCSON GLS AWD PZEV		Tucson delivers sleek European design coupled to excellent safety and efficient operation.	
SOLD TO: CA293 HARDY HYUNDAI 1271 AUTO CENTER DRIVE ANAHEIM CA 92806 SHIPPED TO: CA293		VIN: KMLJUCAC0J351471 MODEL: B3422AAP ENGINE: D4KEB04H9908 PORT OF ENTRY: HJ EXTERIOR COLOR: KWI GREEN INTERIOR COLOR: TAUPE MODE OF TRANSPORT: TRUCK ACCESSORY WEIGHT: 22 lbs. EMISSIONS: This vehicle meets California Emissions regulations and is Certified as a Partial Zero Emission Vehicle (PZEV)	
PART CONTENT INFORMATION FOR VEHICLES IN THIS CARLINE: U.S./CANADIAN PARTS CONTENT: 1 % MAJOR SOURCES OF FOREIGN PARTS CONTENT: Korea 96 % Note: Parts content does not include Final assembly, distribution, or other non-parts costs. FOR THIS VEHICLE: FINAL ASSEMBLY POINT: Ulsan, Korea COUNTRY OF ORIGIN: ENGINE: Korea TRANSMISSION: Korea		STANDARD FEATURES: AMERICA'S BEST WARRANTY* *3-year/50,000-mile New Vehicle Warranty" INCLUDED *5-year/100,000-mile Powertrain Warranty" INCLUDED *7-year/Unlimited-mile Anti-rust/perforation Warranty" INCLUDED *3-year/Unlimited-mile Roadside Assistance" INCLUDED *Limited warranties, see dealer for details	
EPA Fuel Economy Estimates CITY MPG 21 Estimated Annual Fuel Cost \$ 1958.00 based on 15,000 miles at \$3.00 per gallon Combined Fuel Economy 23 This Vehicle 10 15 20 25 30 35 40 45 50 55 60 AT 50MPH		ADVANCED SAFETY TECHNOLOGY *Electronic Stability Control with Traction Control System INCLUDED *ABS w/ Electronic Brake-Force Distribution & Brake Assist INCLUDED *Downhill Brake Control & Hillstart Assist Control INCLUDED *Advanced Front Airbag System INCLUDED *Front Side-Impact Airbags INCLUDED *Side Curtain Airbags with Roll-over Sensors INCLUDED *Tire Pressure Monitor System INCLUDED *Active Front Seat Head Restraints INCLUDED	
Environmental Performance Protect the Environment, choose vehicles with higher scores: Global Warming Score 9 Smog Score 9 1 2 3 4 5 6 7 8 9 10 new vehicle Cleanest		GOVERNMENT SAFETY RATINGS Frontal Crash Driver Passenger Not Rated Side Crash Front seat Rear seat Not Rated Not Rated Rollover Not Rated Star ratings range from 1 to 5 stars. ★★★★★ is the highest. Source: National Highway Traffic Safety Administration (NHTSA). www.safercar.gov or 1-800-327-4276	
MANUFACTURER'S SUGGESTED RETAIL PRICE: \$23,845.00 ADDED FEATURES: *Covered Floor Mats \$100.00 *Rear Cargo Tray \$20.00 *Tire Air Kit \$25.00 *Auto-Dimming Mirror w/ HomeLink & Compass \$85.00 *Mudguards \$50.00 *Wheel Locks \$50.00		POWERTRAIN TECHNOLOGY *2.4L I4KIC 16 Valve 4-Cylinder Engine w/ Engine Cover INCLUDED *6-Speed Automatic Transmission w/SHIFTRONIC SHIF Function INCLUDED *Electronic Stability Suspension Damper INCLUDED *17" Alloy Wheels with Low Rolling Resistance Tires INCLUDED	
COMFORT & CONVENIENCE *Air Conditioning with Cabin Air Filter INCLUDED *AM/FM/CD/2 Audio System with iPod/USB/Aux Input Jacks INCLUDED *AM/FM Satellite Radio w/60 Day Trial, Not Available in AK & HI INCLUDED *Bluetooth Hands-Free Phone System and Power Cable INCLUDED *Leatherette Bolster/Cloth Inset Seating Surfaces INCLUDED *Cloth Touch Interior Panel & Front Seatback Pockets INCLUDED *Leather-Wrapped Steering Wheel and Gear Shift Knob INCLUDED *17.8" Telescopic Steering Wheel w/ Audio & Cruise controls INCLUDED *Keyless Entry System with Alarm INCLUDED *10-speaker Premium Motion with Turn Signal Repeaters INCLUDED *Power Door/Trunk Locks & Bodycolor Door Handles INCLUDED *Multi-Function Trip Computer & Active ECO System INCLUDED *Power Windows with Driver's Auto Up/Down INCLUDED *Heated Front Seats and 6-Way Power Reclining Rear Seat INCLUDED *Illuminated Vanity Mirror & Glove Box INCLUDED *Front Side Glass, Rear Privacy Glass & Rear Wiper w/ Washers INCLUDED *Hydrolock Rear Spoiler with LED Lights INCLUDED *Full Tank of Gas INCLUDED		INTEGRATED FREIGHT & HANDLING: \$310.00 Total Price: \$25,368.00	

FIGURE 72. Monroney Label Photograph

APPENDIX B
DUMMY RESPONSE DATA TRACES

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

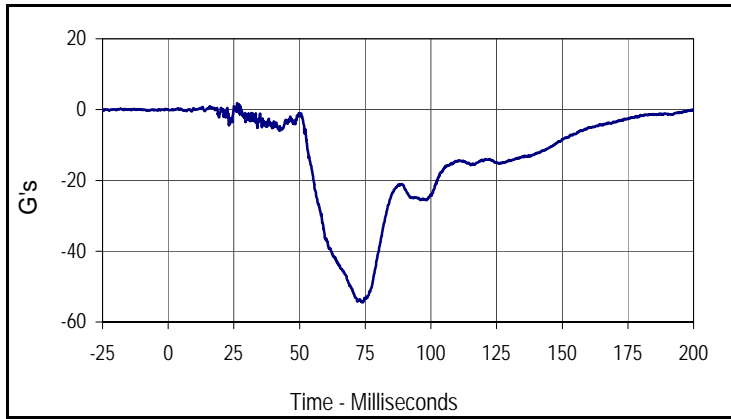
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Driver Head Y Acceleration Redundant
Driver Head Z Acceleration Redundant
Driver Upper Neck Force Y
Driver Upper Neck Moment X
Driver Upper Neck Moment Z
Driver Chest X Acceleration Redundant
Driver Chest Y Acceleration Redundant
Driver Chest Z Acceleration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

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

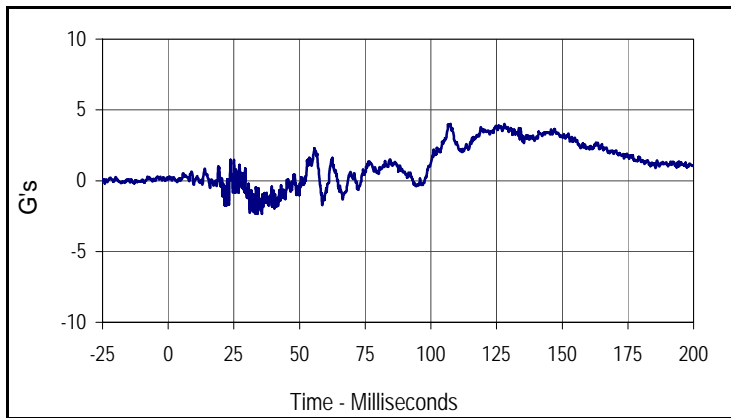
Left Rear Seat Crossmember Z
Right Rear Seat Crossmember X
Right Rear Seat Crossmember Z
Vehicle Engine Top X
Vehicle Engine Bottom X
Vehicle Left Brake Caliper X
Vehicle Right Brake Caliper X
Load Cell Barrier A1-A9
Load Cell Barrier B1-B9
Load Cell Barrier C1-C9
Load Cell Barrier D1-D9

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV
 Test Program: 56 km/h (35 mph) Frontal Impact NCAP Rigid Barrier Test

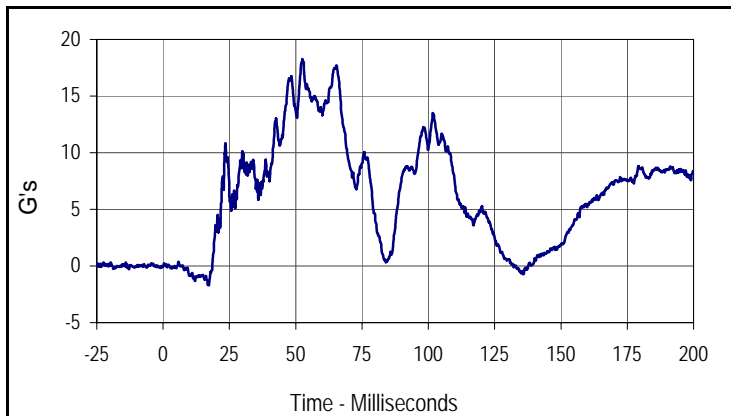
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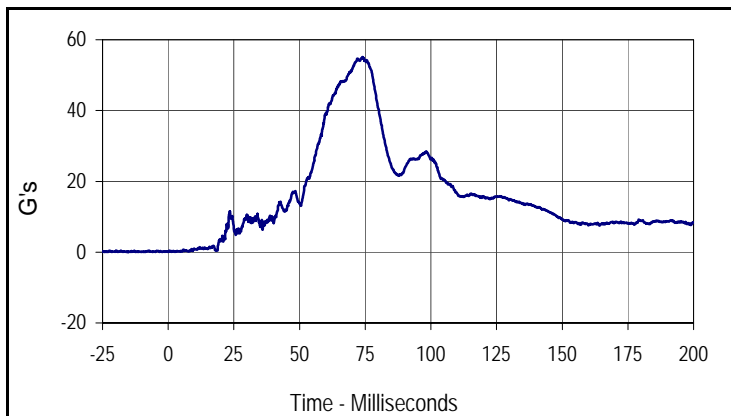
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Driver Head Acceleration X Primary			
Plot No.	Type	SAE Class	Units
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Max	Time	Min	Time
1.8	26.3	-54.5	74.0



Curve Description			
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Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
4.0	107.4	-2.3	35.7



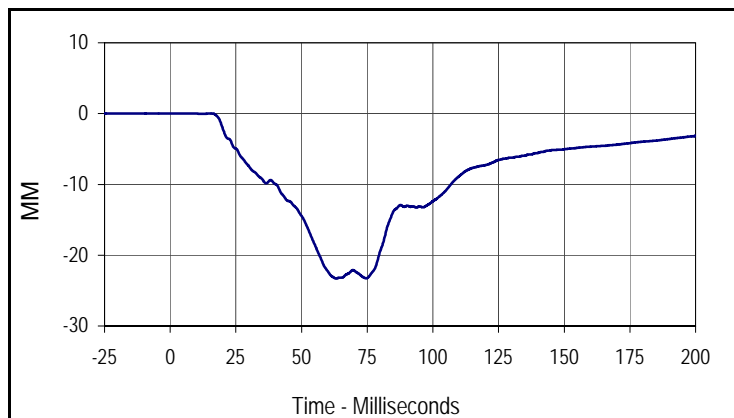
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Plot No.	Type	SAE Class	Units
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Max	Time	Min	Time
18.3	52.5	-1.7	17.3



Curve Description			
Driver Head Resultant Acceleration Primary			
Plot No.	Type	SAE Class	Units
004	RES	1000	G's
Max	Time	Min	Time
55.1	74.0	0.1	2.5

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV
Test Program: 56 km/h (35 mph) Frontal Impact NCAP Rigid Barrier Test

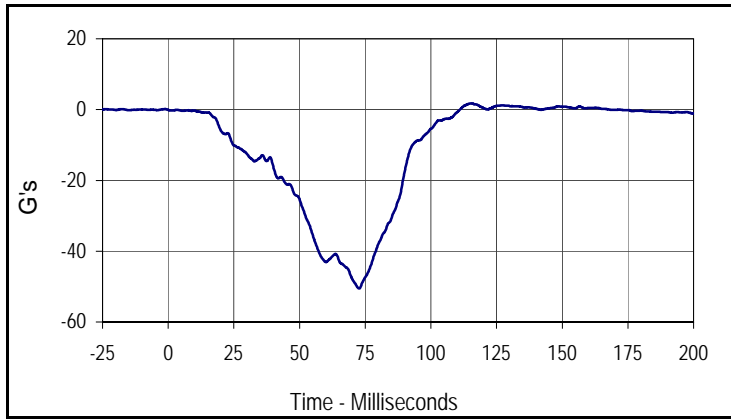
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NHTSA No.: MC0506



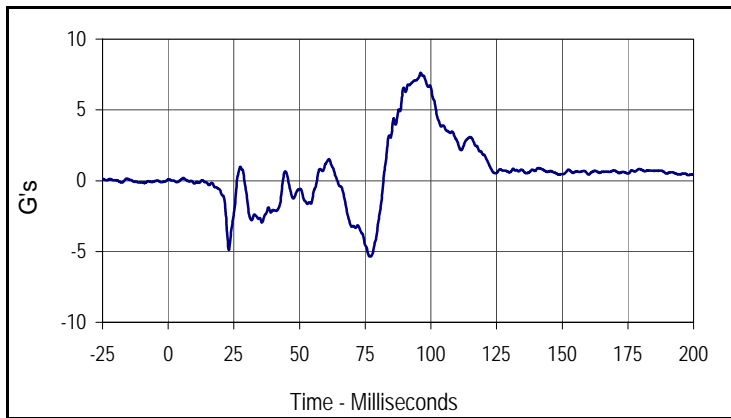
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Driver Chest Deflection			
Plot No.	Type	SAE Class	Units
005	FIL	180	MM
Max	Time	Min	Time
0.0	15.8	-23.3	63.2

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV
 Test Program: 56 km/h (35 mph) Frontal Impact NCAP Rigid Barrier Test

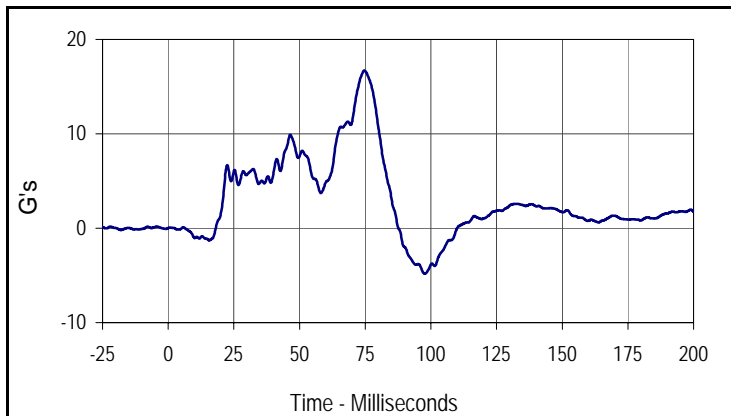
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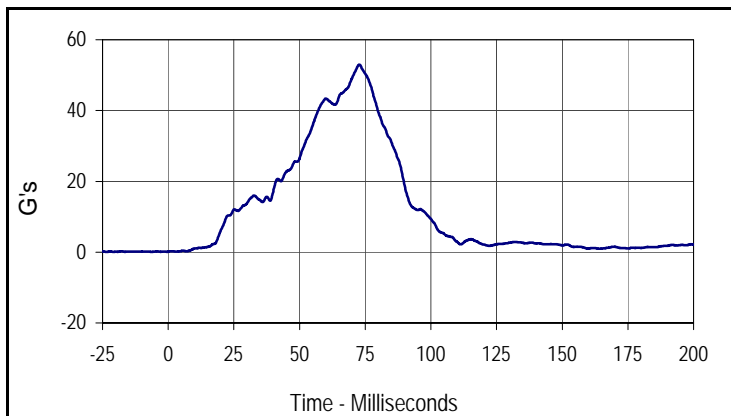
Curve Description			
Driver Chest Acceleration X Primary			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
1.8	115.4	-50.5	72.7



Curve Description			
Driver Chest Acceleration Y Primary			
Plot No.	Type	SAE Class	Units
007	FIL	180	G's
Max	Time	Min	Time
7.6	96.1	-5.3	76.8



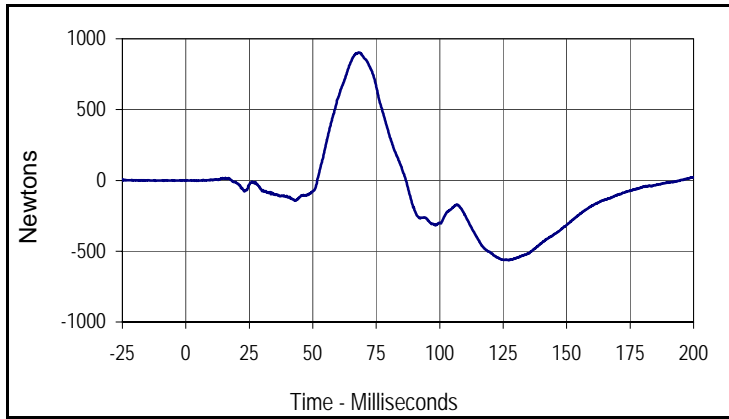
Curve Description			
Driver Chest Acceleration Z Primary			
Plot No.	Type	SAE Class	Units
008	FIL	180	G's
Max	Time	Min	Time
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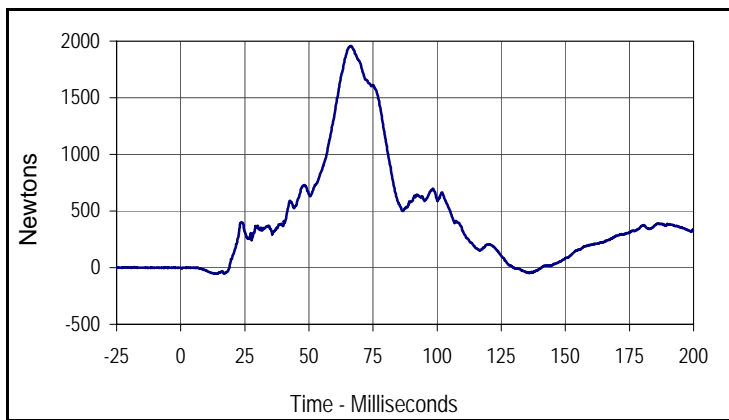
Curve Description			
Driver Chest Resultant Acceleration Primary			
Plot No.	Type	SAE Class	Units
009	RES	180	G's
Max	Time	Min	Time
53.0	72.8	0.1	0.0

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV
 Test Program: 56 km/h (35 mph) Frontal Impact NCAP Rigid Barrier Test

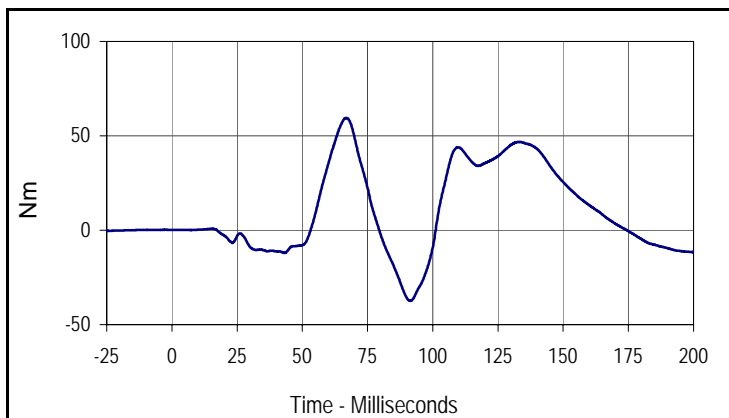
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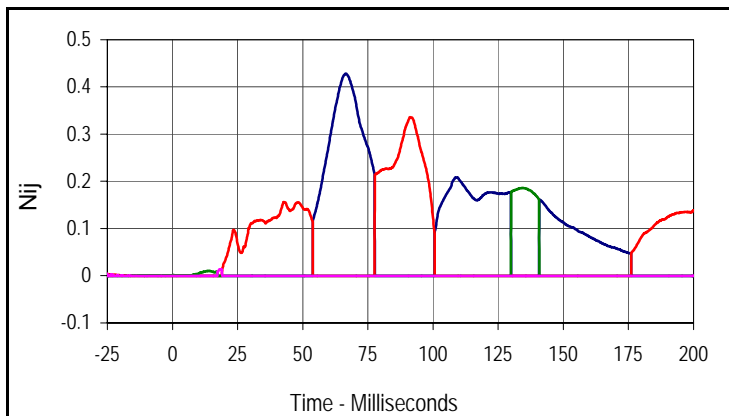
Curve Description			
Driver Upper Neck Force X			
Plot No.	Type	SAE Class	Units
010	FIL	1000	Newtons
Max	Time	Min	Time
902.4	68.3	-562.9	127.3



Curve Description			
Driver Upper Neck Force Z			
Plot No.	Type	SAE Class	Units
011	FIL	1000	Newtons
Max	Time	Min	Time
1958.0	66.5	-54.9	17.0



Curve Description			
Driver Upper Neck Moment Y			
Plot No.	Type	SAE Class	Units
012	FIL	600	Nm
Max	Time	Min	Time
59.5	66.8	-37.4	91.5



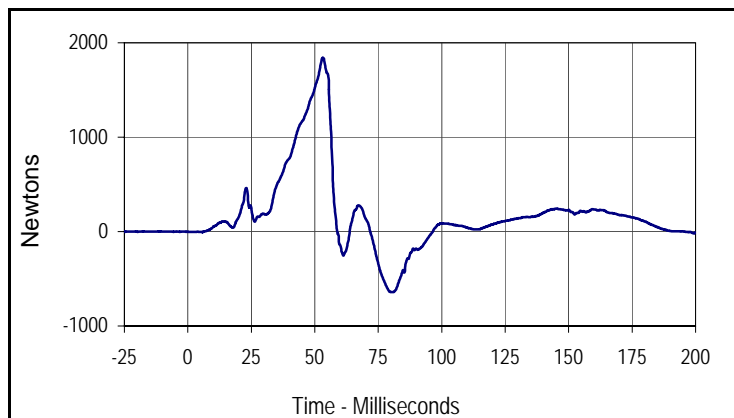
Curve Description			
Driver Nij			
Units	Type	Max	Time
Ntf	FIL	0.43	66.6
Nte	FIL	0.34	91.2
Ncf	FIL	0.19	134.5
Nce	FIL	0.01	18.6

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV

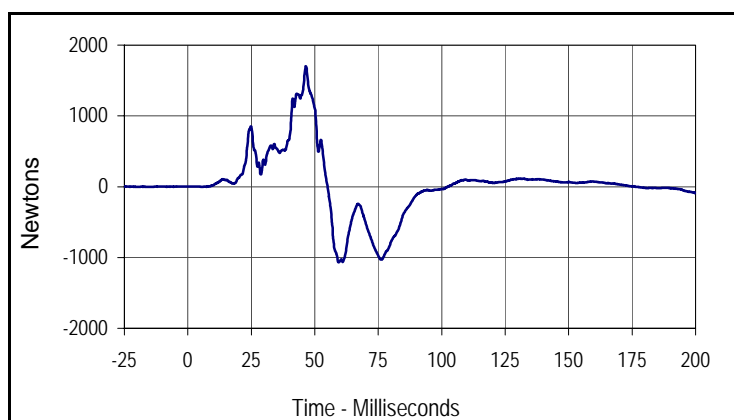
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Test Program: 56 km/h (35 mph) Frontal Impact NCAP Rigid Barrier Test

NHTSA No.: MC0506



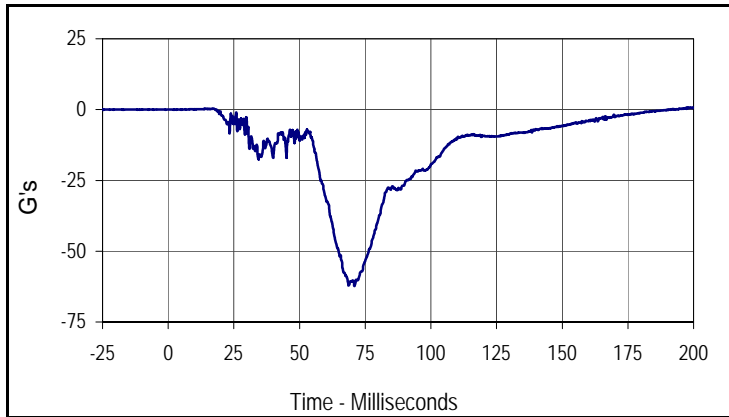
Curve Description			
Driver Driver Left Femur			
Plot No.	Type	SAE Class	Units
013	FIL	600	Newtons
Max	Time	Min	Time
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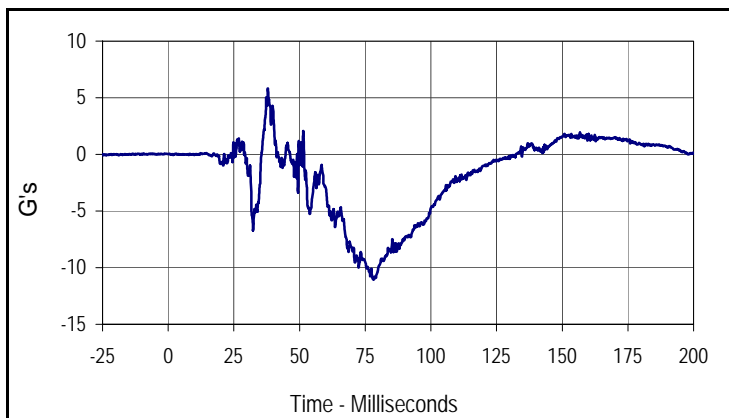
Curve Description			
Driver Driver Right Femur			
Plot No.	Type	SAE Class	Units
014	FIL	600	Newtons
Max	Time	Min	Time
1703.1	46.5	-1067.5	59.4

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV
 Test Program: 56 km/h (35 mph) Frontal Impact NCAP Rigid Barrier Test

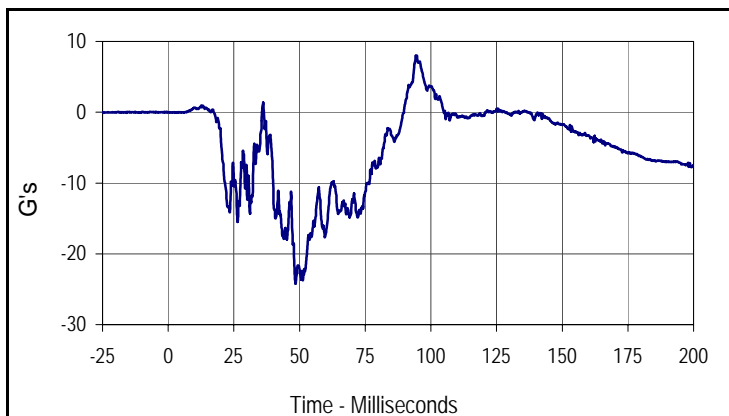
Test Date: 10/17/11
 NHTSA No.: MC0506



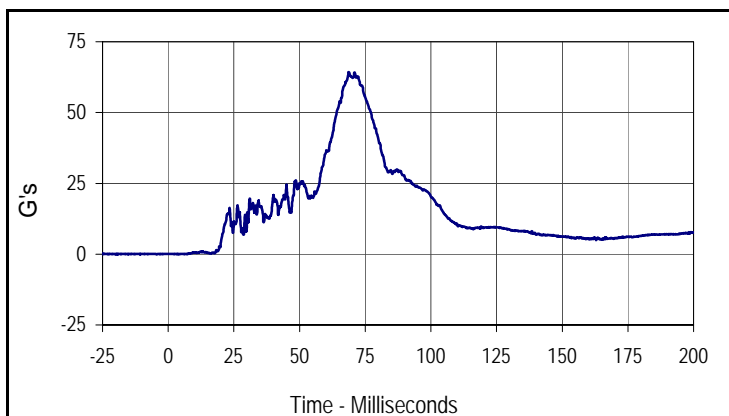
Curve Description			
Passenger Head Acceleration X Primary			
Plot No.	Type	SAE Class	Units
015	FIL	1000	G's
Max	Time	Min	Time
0.8	197.6	-62.3	70.9



Curve Description			
Passenger Head Acceleration Y Primary			
Plot No.	Type	SAE Class	Units
016	FIL	1000	G's
Max	Time	Min	Time
5.8	38.0	-11.0	78.3



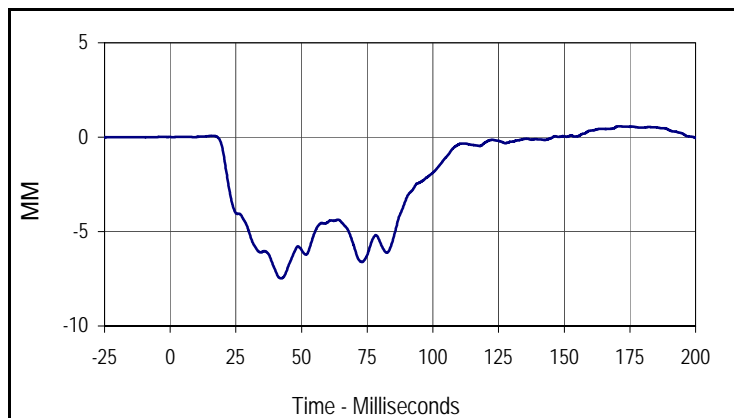
Curve Description			
Passenger Head Acceleration Z Primary			
Plot No.	Type	SAE Class	Units
017	FIL	1000	G's
Max	Time	Min	Time
8.0	94.6	-24.2	48.5



Curve Description			
Passenger Head Resultant Acceleration Primary			
Plot No.	Type	SAE Class	Units
018	RES	1000	G's
Max	Time	Min	Time
64.3	68.7	0.0	6.2

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV
 Test Program: 56 km/h (35 mph) Frontal Impact NCAP Rigid Barrier Test

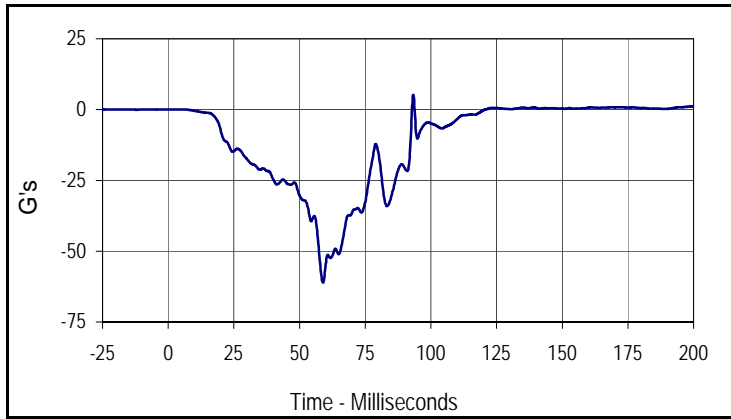
Test Date: 10/17/11
 NHTSA No.: MC0506



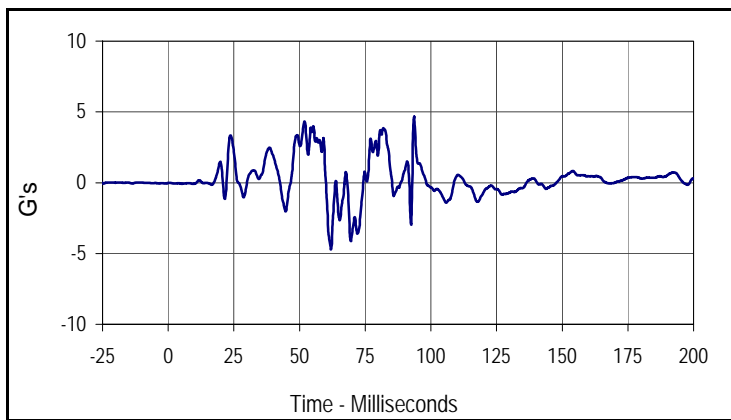
Curve Description			
Passenger Chest Deflection			
Plot No.	Type	SAE Class	Units
019	FIL	180	MM
Max	Time	Min	Time
0.6	170.5	-7.5	42.2

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV
 Test Program: 56 km/h (35 mph) Frontal Impact NCAP Rigid Barrier Test

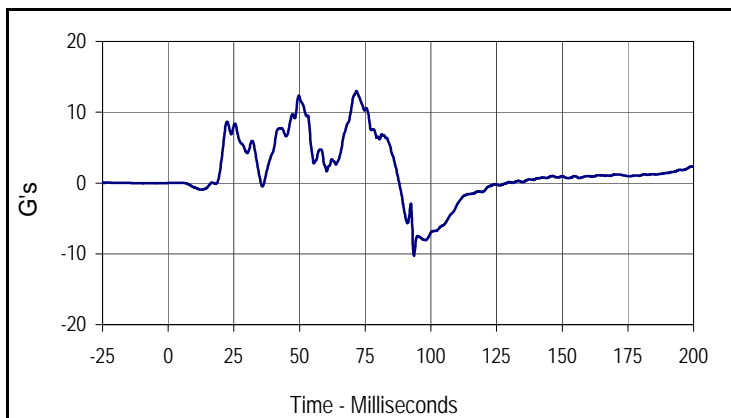
Test Date: 10/17/11
 NHTSA No.: MC0506



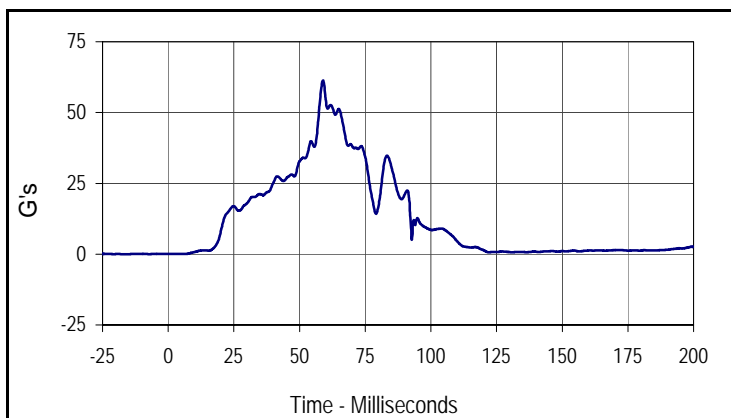
Curve Description			
Passenger Chest Acceleration X Primary			
Plot No.	Type	SAE Class	Units
020	FIL	180	G's
Max	Time	Min	Time
5.2	93.3	-61.1	58.9



Curve Description			
Passenger Chest Acceleration Y Primary			
Plot No.	Type	SAE Class	Units
021	FIL	180	G's
Max	Time	Min	Time
4.7	93.6	-4.7	62.0



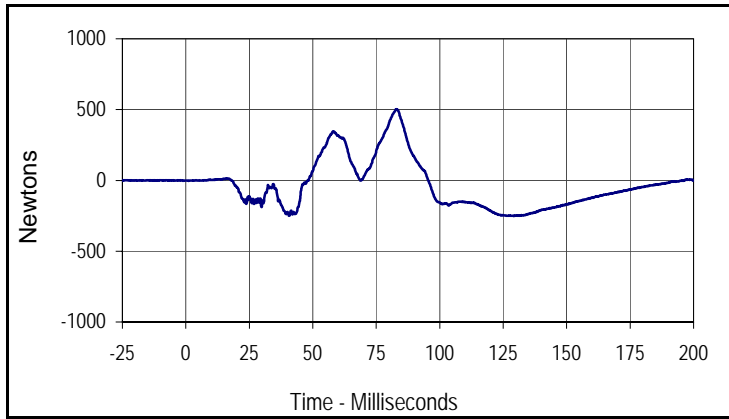
Curve Description			
Passenger Chest Acceleration Z Primary			
Plot No.	Type	SAE Class	Units
022	FIL	180	G's
Max	Time	Min	Time
13.0	71.7	-10.3	93.6



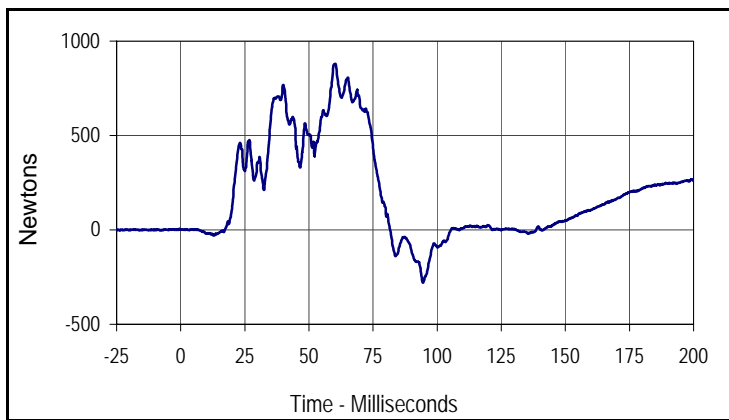
Curve Description			
Passenger Chest Resultant Acceleration Primary			
Plot No.	Type	SAE Class	Units
023	RES	180	G's
Max	Time	Min	Time
61.3	58.9	0.0	0.0

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV
 Test Program: 56 km/h (35 mph) Frontal Impact NCAP Rigid Barrier Test

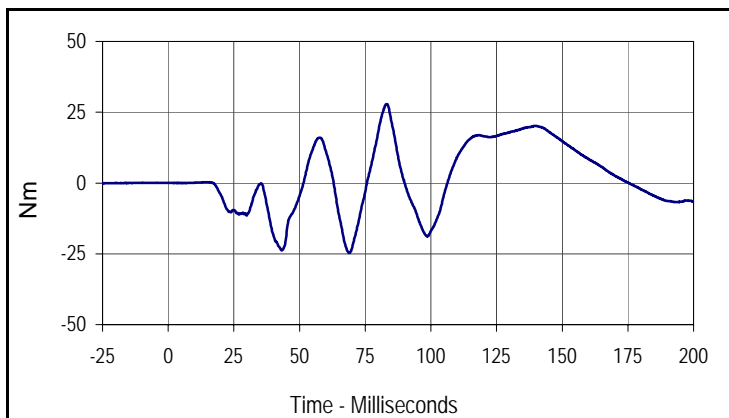
Test Date: 10/17/11
 NHTSA No.: MC0506



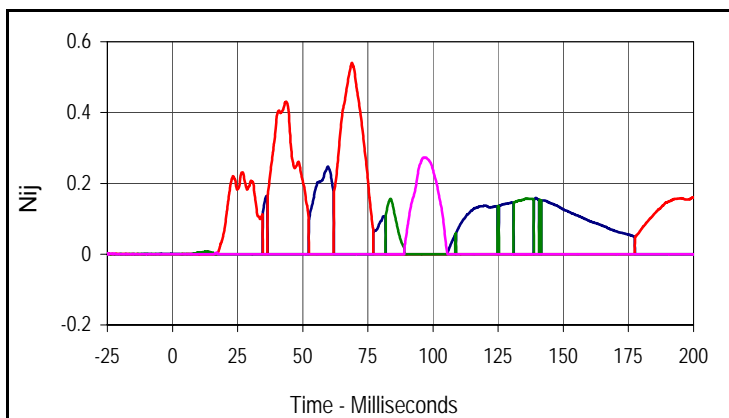
Curve Description			
Passenger Upper Neck Force X			
Plot No.	Type	SAE Class	Units
024	FIL	1000	Newtons
Max	Time	Min	Time
501.8	82.9	-251.5	129.3



Curve Description			
Passenger Upper Neck Force Z			
Plot No.	Type	SAE Class	Units
025	FIL	1000	Newtons
Max	Time	Min	Time
879.4	60.4	-280.1	94.5



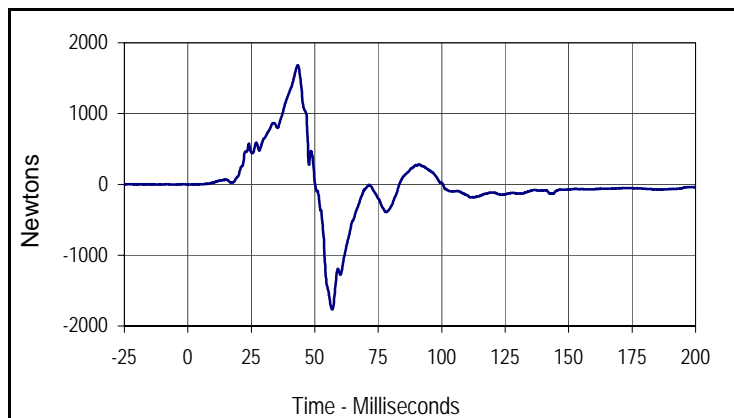
Curve Description			
Passenger Upper Neck Moment Y			
Plot No.	Type	SAE Class	Units
026	FIL	600	Nm
Max	Time	Min	Time
27.9	83.1	-24.7	68.9



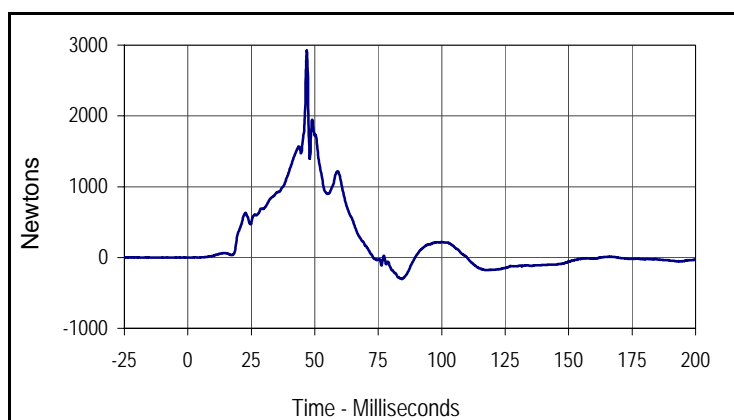
Curve Description			
Passenger Nij			
Units	Type	Max	Time
Ntf	FIL	0.25	59.6
Nte	FIL	0.54	68.9
Ncf	FIL	0.16	135.6
Nce	FIL	0.27	97.3

Test Vehicle: 2012 Hyundai Tucson GLS AWD PZEV 5-Door MPV
 Test Program: 56 km/h (35 mph) Frontal Impact NCAP Rigid Barrier Test

Test Date: 10/17/11
 NHTSA No.: MC0506



Curve Description			
Passenger Passenger Left Femur			
Plot No.	Type	SAE Class	Units
027	FIL	600	Newtons
Max	Time	Min	Time
1681.5	43.3	-1765.9	56.9



Curve Description			
Passenger Passenger Right Femur			
Plot No.	Type	SAE Class	Units
028	FIL	600	Newtons
Max	Time	Min	Time
2921.2	46.9	-303.4	84.4

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: 10/13/11

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: 10/13/11

ATD Serial No.: 035

Test I.D.: N/A



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.16	Pass
Laboratory Relative Humidity	%	10 to 70	27.1	Pass
A - Total sitting height	mm	879 to 889	881	Pass
B - Shoulder pivot height	mm	505 to 521	516	Pass
C - H point height	mm	84 to 89	85	Pass
D - H point location from backline	mm	135 to 140	138	Pass
E - Shoulder pivot from backline	mm	84 to 94	85	Pass
F - Thigh clearance	mm	140 to 155	147	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	334	Pass
J - Elbow rest height	mm	190 to 211	206	Pass
K - Buttock to knee length	mm	579 to 604	589	Pass
L - Popliteal length	mm	429 to 455	437	Pass
M - Knee pivot height	mm	485 to 500	488	Pass
N - Buttock popliteal length	mm	452 to 477	472	Pass
O - Chest depth without jacket	mm	213 to 229	226	Pass
P - Foot length	mm	251 to 267	260	Pass
V - Shoulder breadth	mm	422 to 437	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	864	Pass
AA - Location for chest circumference	mm	429 to 434	433	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

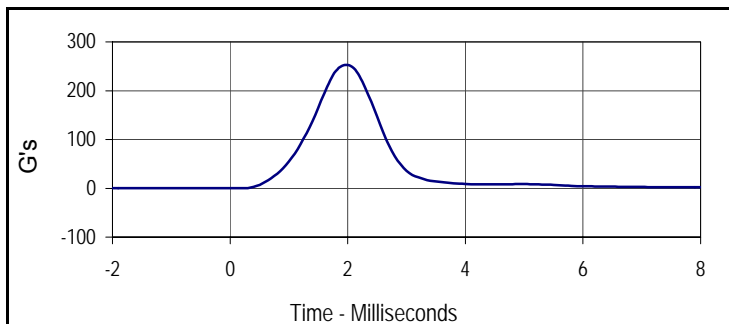
Test Date: 10/13/11



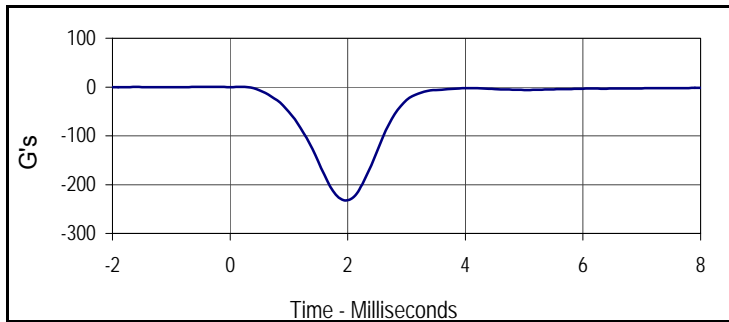
ATD Serial No.: 035

Test I.D.: M035HD022

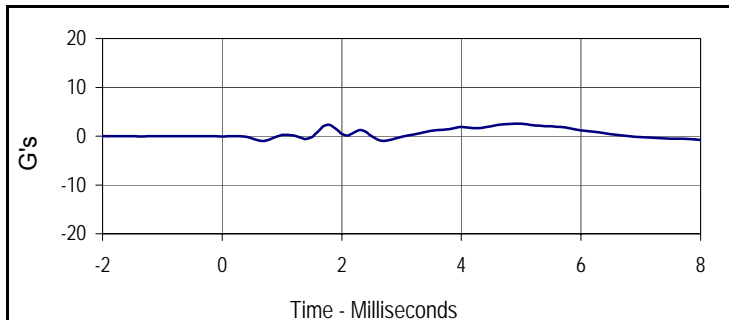
Tested Parameter	Units	Specification	Result	Pass/Fail
Head Assembly Soak Time	Minutes	≥240	240	Pass
Temperature During Soak	Max	18.9 to 25.6	21.4	Pass
	Min		21.1	Pass
Humidity During Soak	Max	10.0 to 70.0	30.0	Pass
	Min		29.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.6	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	29.9	Pass
Peak Resultant Acceleration	G's	225.0 to 275.0	253.1	Pass
Peak Lateral Acceleration	G's	≤15.0	2.5	Pass
Oscillations After Main Pulse	%	<10% of peak Res. Acceleration	3.6	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass



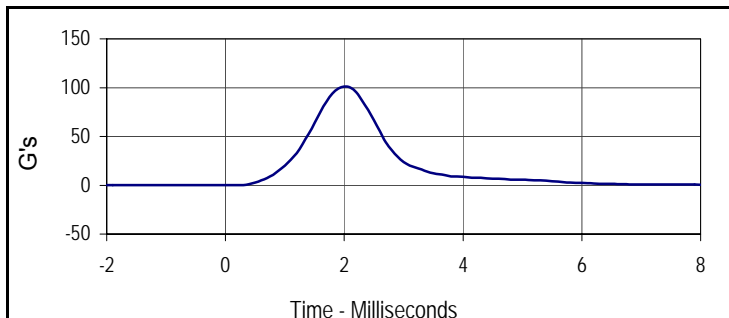
Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
253.1	2.0	0.1	-1.5



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.1	0.2	-232.1	2.0



Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
2.5	4.9	-1.0	2.7



Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
101.0	2.0	0.0	0.2

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

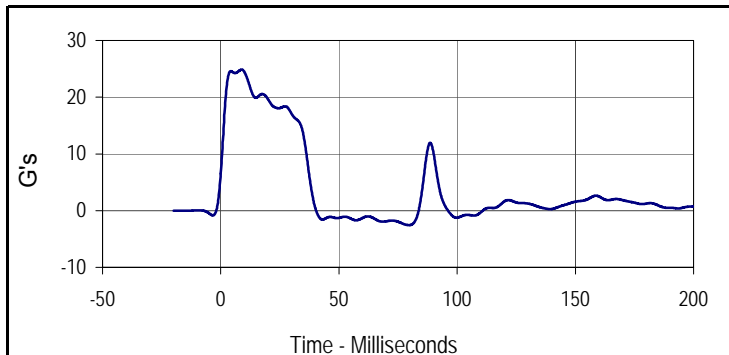
Test Date: 10/13/11

ATD Serial No.: 035

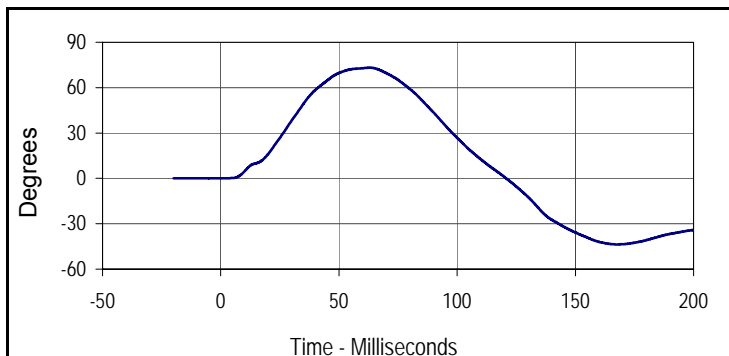
Test I.D.: M035NF022



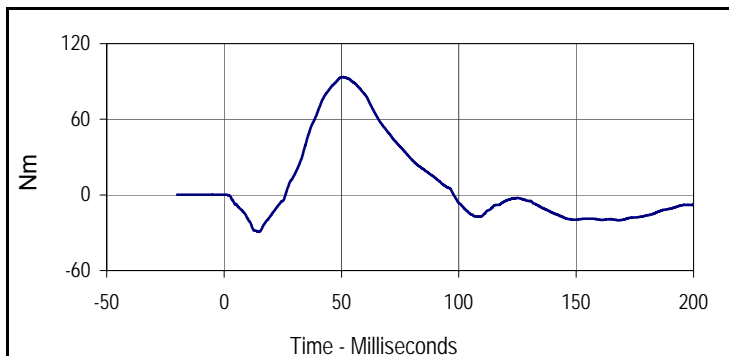
Tested Parameter	Units	Specification	Result	Pass/Fail	
Neck Assembly Soak Time	Minutes	≥240	285	Pass	
Temperature During Soak	Max	20.6 to 22.2	21.4	Pass	
	Min		21.1	Pass	
Humidity During Soak	Max	10.0 to 70.0	30.0	Pass	
	Min		29.0	Pass	
Laboratory Temperature During Test	°C	20.6 to 22.2	21.3	Pass	
Laboratory Humidity During Test	%	10.0 to 70.0	26.5	Pass	
Pendulum Velocity	m/s	6.89 to 7.13	7.02	Pass	
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	24.4	Pass
	20 Msec.	G's	17.6 to 22.6	19.6	Pass
	30 Msec.	G's	12.5 to 18.5	17.1	Pass
Peak Pendulum Decel. after 30 Msec.	G's	≤ 29.0	17.1	Pass	
Deceleration Decay, Time to Cross 5 G's	Msec.	34.0 to 42.0	37.9	Pass	
Maximum "D" Plane Rotation	Max	Degrees	64.0 to 78.0	73.2	Pass
	Time	Msec.	57.0 to 64.0	63.1	Pass
"D" Plane Rotation Decay, Time To Zero Crossing	Msec.	113.0 to 128.0	120.8	Pass	
Moment About Occ. Condyle	Max	Nm	84.1 to 108.5	93.5	Pass
	Time	Msec.	47.0 to 58.0	50.9	Pass
Positive Moment Decay, Time To Zero Crossing	Msec.	97.0 to 107.0	97.8	Pass	
Overall Test Results				Pass	



Curve Description			
Pendulum Deceleration			
Plot No.	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
24.9	8.8	-2.6	79.6



Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
73.2	63.1	-43.6	167.7



Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
93.5	50.9	-29.3	14.5

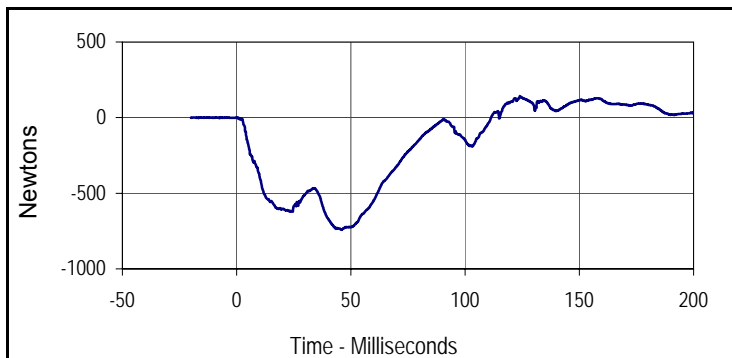
Test Program: Hybrid III 50th Percentile Male Neck Flexion Test

Test Date: 10/13/11

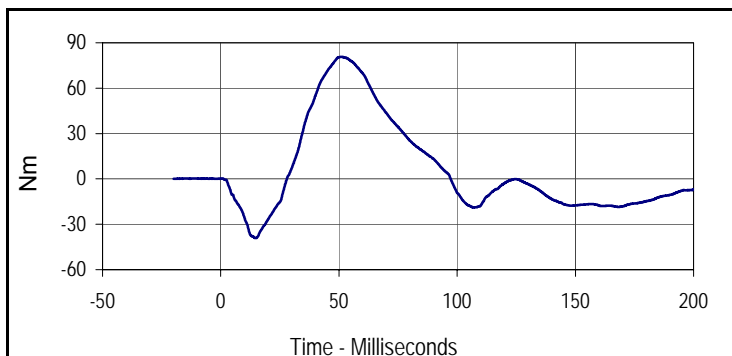


ATD Serial No.: 035

Test I.D.: M035NF022



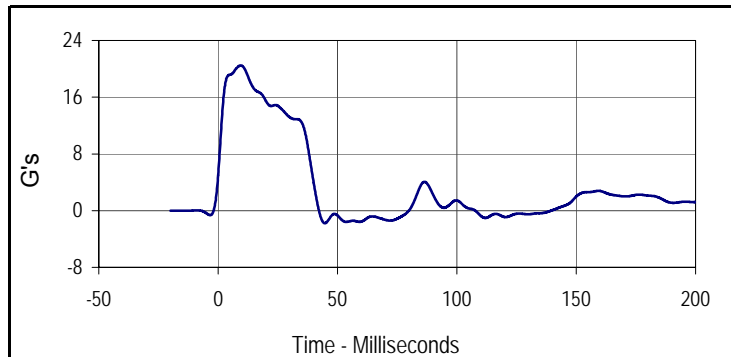
Curve Description			
Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	600	Newtons
Max	Time	Min	Time
142.8	124.0	-741.2	45.9



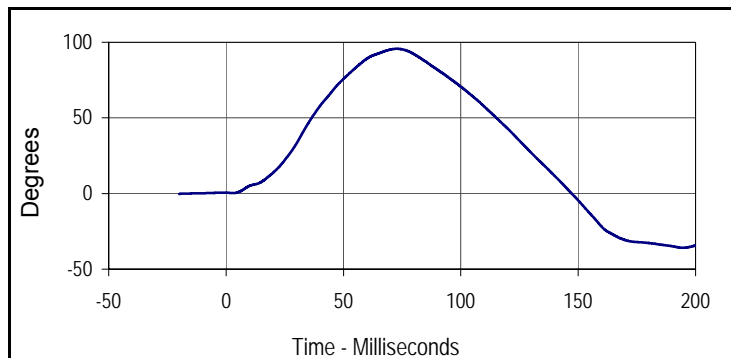
Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
80.7	51.1	-39.1	14.5



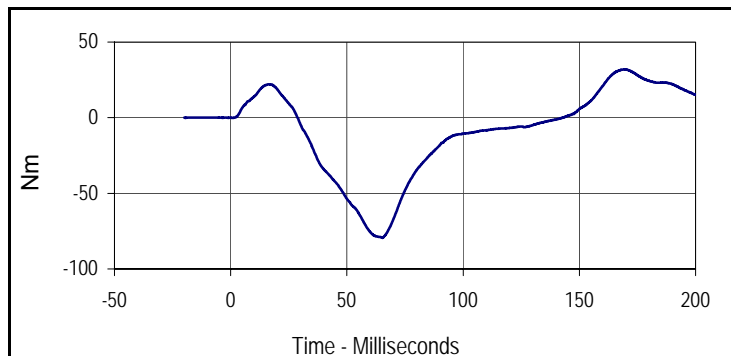
Tested Parameter	Units	Specification	Result	Pass/Fail	
Neck Assembly Soak Time	Minutes	≥240	315	Pass	
Temperature During Soak	Max	20.6 to 22.2	21.4	Pass	
	Min		21.1	Pass	
Humidity During Soak	Max	10.0 to 70.0	30.0	Pass	
	Min		29.0	Pass	
Laboratory Temperature During Test	°C	20.6 to 22.2	21.4	Pass	
Laboratory Humidity During Test	%	10.0 to 70.0	28.9	Pass	
Pendulum Velocity	m/s	5.94 to 6.19	6.06	Pass	
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	20.4	Pass
	20 Msec.	G's	14.0 to 19.0	15.5	Pass
	30 Msec.	G's	11.0 to 16.0	13.2	Pass
Peak Pendulum Decel. after 30 Msec.	G's	≤ 22.0	13.2	Pass	
Deceleration Decay, Time to Cross 5 G's	Msec.	38.0 to 46.0	39.6	Pass	
Maximum "D" Plane Rotation	Max	Degrees	81.0 to 106.0	95.7	Pass
	Time	Msec.	72.0 to 82.0	72.6	Pass
"D" Plane Rotation Decay, Time To Zero Crossing	Msec.	147.0 to 174.0	147.3	Pass	
Moment About Occ. Condyle	Max	Nm	-52.9 to -79.9	-79.4	Pass
	Time	Msec.	65.0 to 79.0	65.3	Pass
Positive Moment Decay, Time To Zero Crossing	Msec.	120.0 to 148.0	142.9	Pass	
Overall Test Results				Pass	



Curve Description			
Pendulum Deceleration			
Plot No.	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
20.5	9.5	-1.8	44.7



Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
95.7	72.6	-35.9	194.5



Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
31.9	169.6	-79.4	65.3

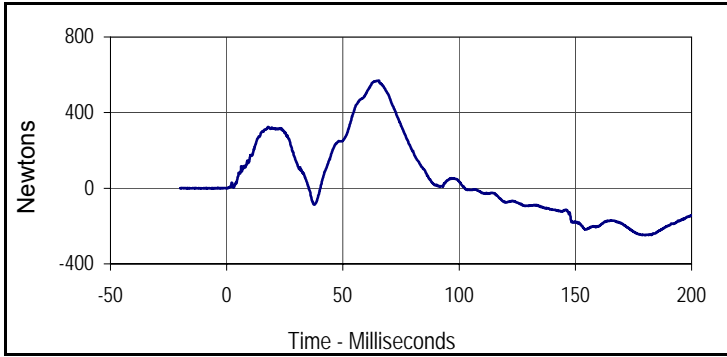
Test Program: Hybrid III 50th Percentile Male Neck Extension Test

Test Date: 10/13/11

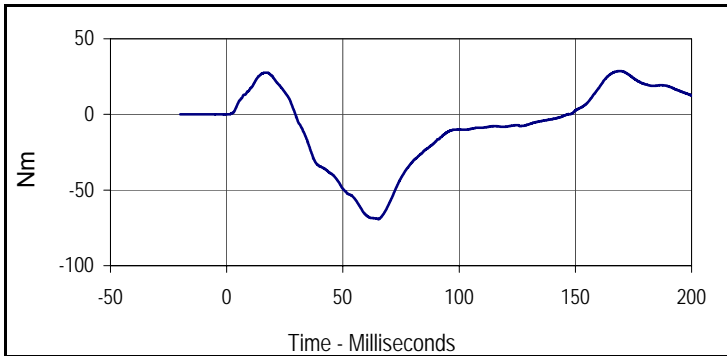


ATD Serial No.: 035

Test I.D.: M035NE022



Curve Description			
Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
569.8	65.4	-248.4	178.7



Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
28.6	169.6	-69.3	65.3

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

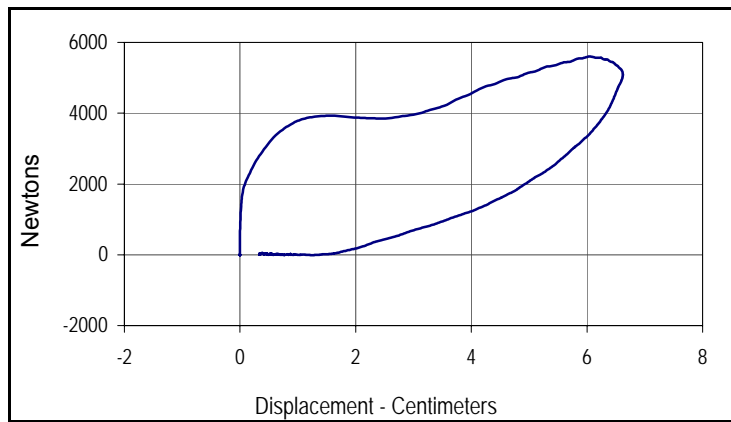
Test Date: 10/13/11

ATD Serial No.: 035

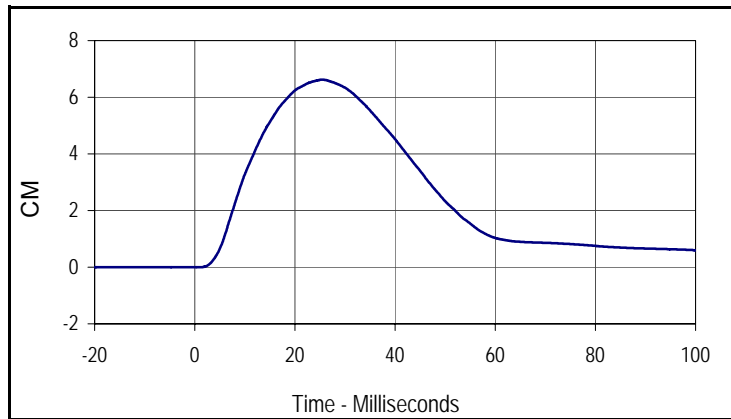
Test I.D.: M035CH022



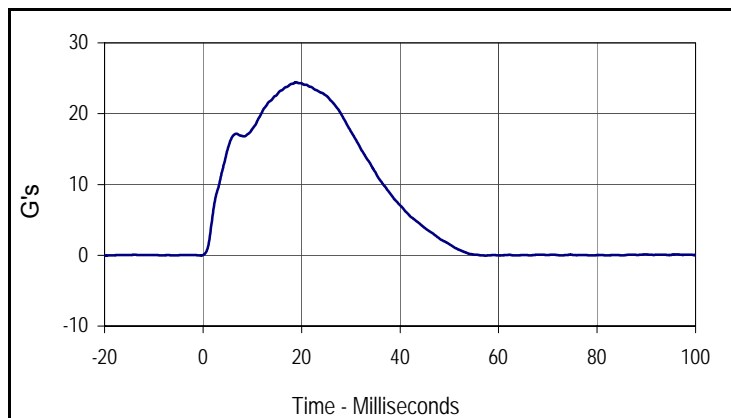
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥240	360	Pass
Temperature During Soak	Max	20.6 to 22.2	21.4	Pass
	Min		21.1	Pass
Humidity During Soak	Max	10.0 to 70.0	30.0	Pass
	Min		29.0	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.5	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	26.3	Pass
Probe Velocity	m/s	6.58 to 6.82	6.61	Pass
Peak Probe Force	Newtons	5159 to 5893	5600	Pass
Peak Sternum Deflection	CM	6.35 to 7.26	6.62	Pass
Internal Hysteresis	%	69 to 85	71.3	Pass
Overall Test Results				Pass



Curve Description			
Probe Force vs. Chest Deflection			
Plot No.	Type	SAE Class	Hysteresis
001	FIL	180	71.3
Peak Probe Force		Peak Chest Deflection	
5600		6.62	



Curve Description			
Chest Deflection			
Plot No.	Type	SAE Class	Units
002	FIL	180	CM
Max	Time	Min	Time
6.6	25.5	0.0	1.0



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
24.4	18.9	0.0	57.3

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

Test Date: 10/13/11

ATD Serial No.: 035

Test I.D.: M035LK022, M035RK022



Left Knee

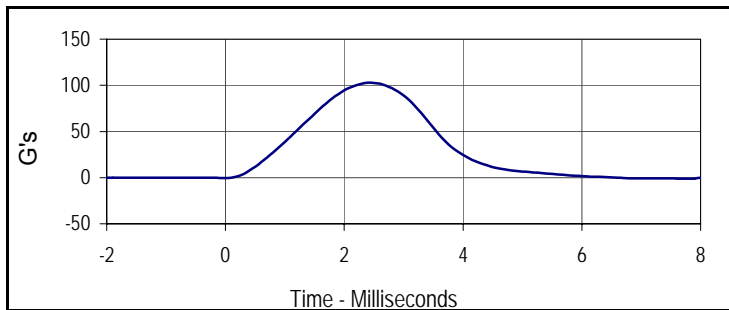
Tested Parameter	Units	Specification	Result	Pass/Fail
Knee Assembly Soak Time	Minutes	≥240	385	Pass
Temperature During Soak	Max	18.9 to 25.6	21.7	Pass
	Min		20.6	Pass
Humidity During Soak	Max	10.0 to 70.0	30.0	Pass
	Min		29.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.4	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	29.9	Pass
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.08	Pass
Peak Probe Force	Newtons	4715 to 5782	5027	Pass
Overall Test Results				Pass

Right Knee

Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.08	Pass
Peak Probe Force	Newtons	4715 to 5782	5000	Pass
Overall Test Results				Pass



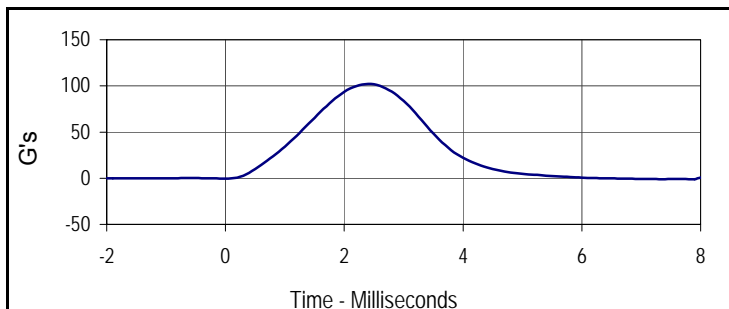
Curve Description			
Left Knee Probe Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
5027.1	2.4	-48.3	7.8



Curve Description			
Left Knee Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	600	G's
Max	Time	Min	Time
102.7	2.4	-1.0	7.8



Curve Description			
Right Knee Probe Force			
Plot No.	Type	SAE Class	Units
003	FIL	600	Newtons
Max	Time	Min	Time
5000.5	2.4	-49.0	7.9



Curve Description			
Right Knee Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	600	G's
Max	Time	Min	Time
102.2	2.4	-1.0	7.9

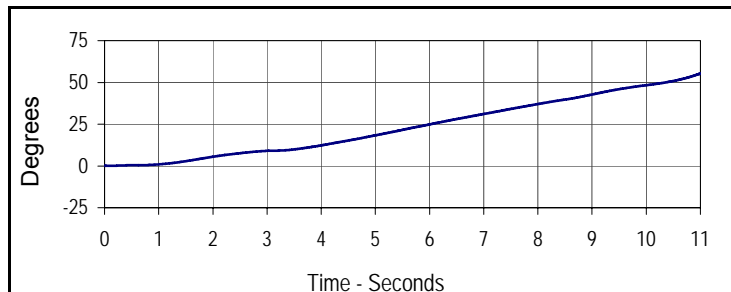


Left Hip Joint-Femur Results

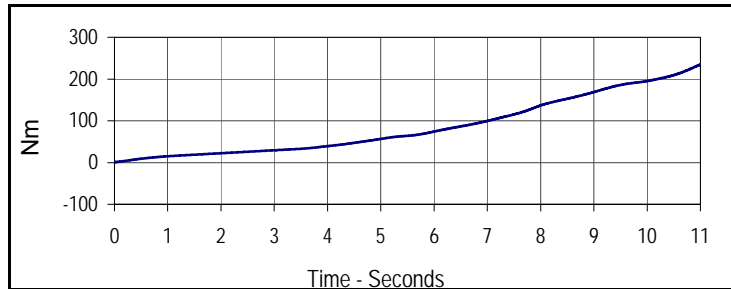
Tested Parameter	Units	Specification	Result	Pass/Fail
Hip Joint-Femur Assembly Soak Time	Minutes	≥240	475	Pass
Temperature During Soak	Max	18.9 to 25.6	21.4	Pass
	Min		21.1	Pass
Humidity During Soak	Max	10.0 to 70.0	30.0	Pass
	Min		29.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	26.8	Pass
Rotation Rate	deg/sec	5 to 10	5.0	Pass
Femur Torque at 30°	Nm	≤ 95	94.4	Pass
Rotation at 203 Nm	Degrees	40.0 to 50.0	49.7	Pass
Overall Test Results				Pass

Right Hip Joint-Femur Results

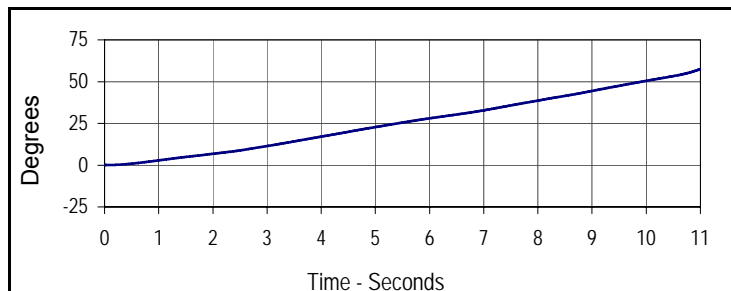
Rotation Rate	deg/sec	5 to 10	5.2	Pass
Femur Torque at 30°	Nm	≤ 95	93.7	Pass
Rotation at 203 Nm	Degrees	40.0 to 50.0	49.5	Pass
Overall Test Results				Pass



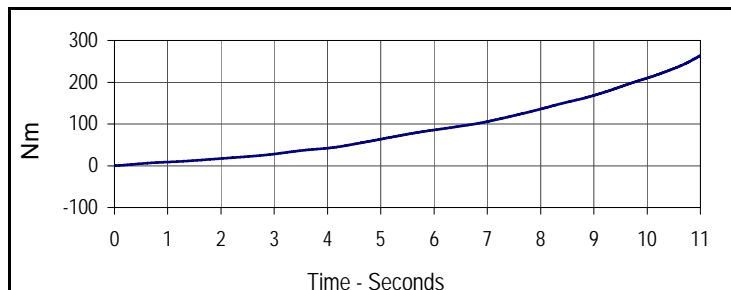
Curve Description			
Hip Rotation			
Plot No.	Type	SAE Class	Units
001	FIL	60	Degrees
Max	Time	Min	Time
55.3	11.0	0.0	0.0



Curve Description			
Right Femur Force Z			
Plot No.	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
234.3	11.0	0.9	0.0



Curve Description			
Hip Rotation			
Plot No.	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
57.4	11.0	0.0	0.0



Curve Description			
Right Femur Force Z			
Plot No.	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
263.5	11.0	0.2	0.0

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

Test Date: 10/13/11

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: 10/13/11

ATD Serial No.: 141

Test I.D.: N/A



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.67	Pass
Laboratory Relative Humidity	%	10 to 70	29.9	Pass
A - Total sitting height	mm	774.7 to 800.1	775	Pass
B - Shoulder pivot height	mm	431.8 to 457.2	450	Pass
C - H point height	mm	81.3 to 86.3	85	Pass
D - H point location from backline	mm	144.8 to 149.8	145	Pass
E - Shoulder pivot from backline	mm	68.6 to 83.8	80	Pass
F - Thigh clearance	mm	119.4 to 134.6	125	Pass
G - Back of elbow to wrist pivot	mm	243.9 to 259.1	250	Pass
H - Head back to backline	mm	40.7 to 45.7	44	Pass
I - Shoulder to elbow length	mm	276.8 to 297.2	285	Pass
J - Elbow rest height	mm	182.8 to 203.2	200	Pass
K - Buttock to knee length	mm	520.7 to 546.1	530	Pass
L - Popliteal length	mm	355.6 to 376.0	375	Pass
M - Knee pivot height	mm	393.7 to 419.1	400	Pass
N - Buttock popliteal length	mm	414.0 to 439.4	420	Pass
O - Chest depth without jacket	mm	175.3 to 190.5	185	Pass
P - Foot length	mm	218.5 to 233.7	220	Pass
R - Buttock to Knee Pivot Length	mm	457.2 to 482.6	475	Pass
S - Head Breadth	mm	137.1 to 147.3	145	Pass
T - Head Depth	mm	177.8 to 188.0	180	Pass
U - Hip Breadth	mm	299.7 to 314.9	300	Pass
V - Shoulder breadth	mm	350.5 to 365.7	360	Pass
W - Foot breadth	mm	78.8 to 94.0	90	Pass
X - Head circumference	mm	528.3 to 548.7	540	Pass
Y - Chest circumference (with chest jacket)	mm	850.8 to 881.3	860	Pass
Z - Waist circumference	mm	759.5 to 789.9	765	Pass
AA - Location for chest circumference	mm	299.7 to 309.9	300	Pass
BB - Location for waist circumference	mm	160.1 to 170.2	165	Pass
Overall Test Results				Pass

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

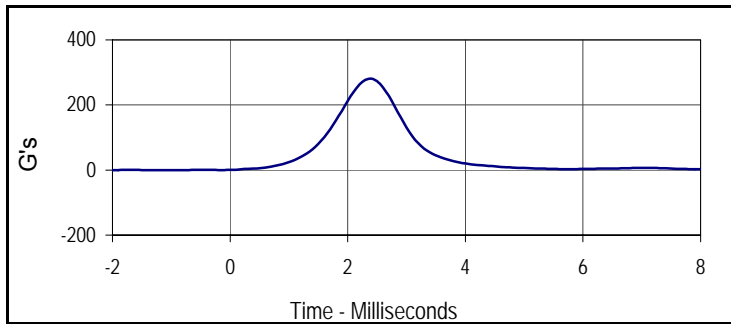
Test Date: 10/13/11

ATD Serial No.: 141

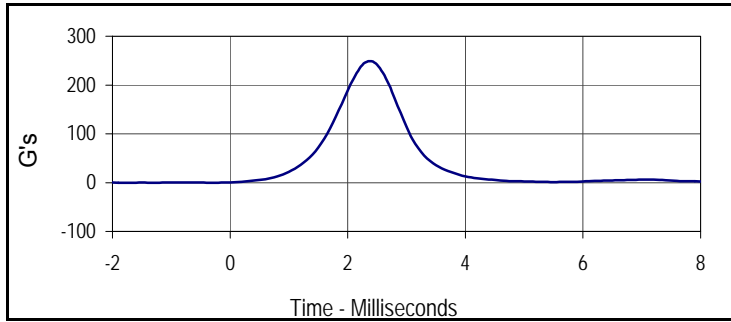
Test I.D.: F141HD022



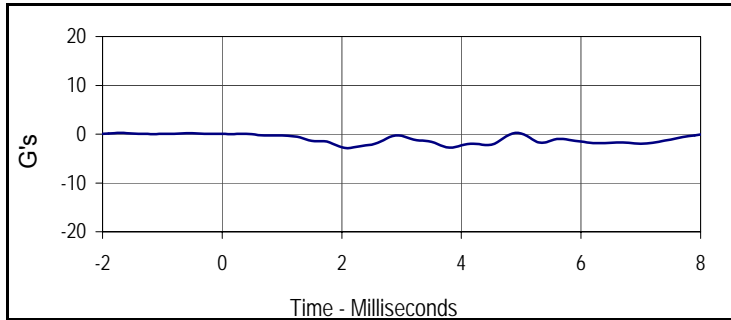
Tested Parameter	Units	Specification	Result	Pass/Fail
Head Assembly Soak Time	Minutes	≥240	260	Pass
Temperature During Soak	Max	18.9 to 25.6	21.7	Pass
	Min		20.6	Pass
Humidity During Soak	Max	10.0 to 70.0	30.0	Pass
	Min		29.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.4	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	29.9	Pass
Peak Resultant Acceleration	G's	250.0 to 300.0	280.7	Pass
Peak Lateral Acceleration	G's	≤15.0	2.9	Pass
Oscillations After Main Pulse	%	<10% of peak Res. Acceleration	2.3	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass



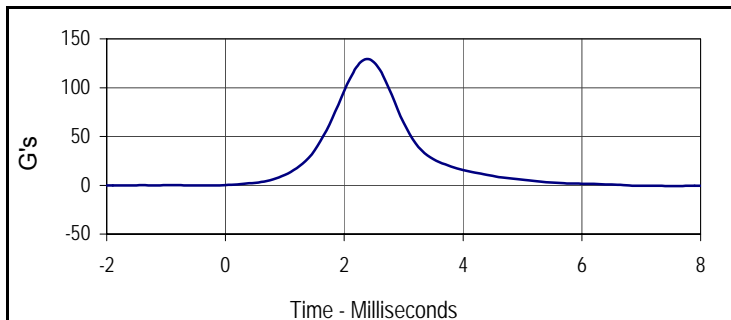
Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
280.7	2.4	0.1	-1.1



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
249.0	2.4	-0.1	-0.3



Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
0.2	-1.7	-2.9	2.1



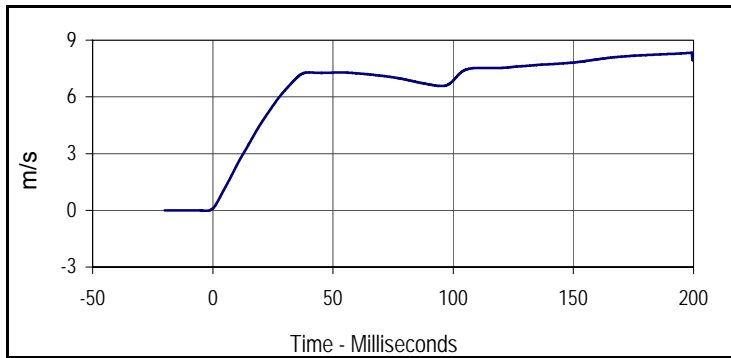
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
129.4	2.4	-0.1	-1.7

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

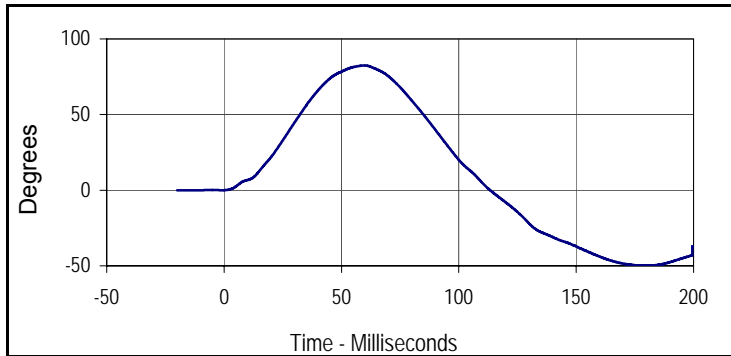
Test Date: 10/13/11
 Test I.D.: F141NF022



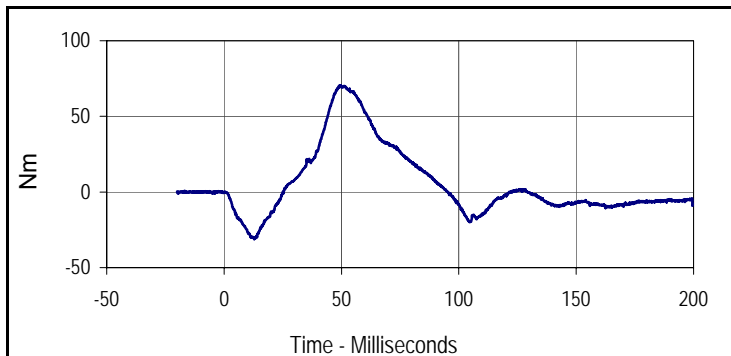
Tested Parameter	Units	Specification	Result	Pass/Fail	
Neck Assembly Soak Time	Minutes	≥240	420	Pass	
Temperature During Soak	Max	20.6 to 22.2	21.7	Pass	
	Min		21.1	Pass	
Humidity During Soak	Max	10.0 to 70.0	30.0	Pass	
	Min		29.0	Pass	
Laboratory Temperature During Test	°C	20.6 to 22.2	21.2	Pass	
Laboratory Humidity During Test	%	10.0 to 70.0	27.5	Pass	
Pendulum Velocity	m/s	6.89 to 7.13	6.98	Pass	
Pendulum Deceleration	10 Msec.	m/s	2.1 to 2.5	2.4	Pass
	20 Msec.	m/s	4.0 to 5.0	4.6	Pass
	30 Msec.	m/s	5.8 to 7.0	6.3	Pass
"D" Plane Rotation	Max	Degrees	77.0 to 91.0	82.5	Pass
Peak Moment in Rotation	Max	Nm	69.0 to 83.0	70.6	Pass
Positive Moment Decay, Time To 10 Nm	Msec.	80.0 to 100.0	84.7	Pass	
Overall Test Results				Pass	



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
8.3	199.4	0.0	-2.7



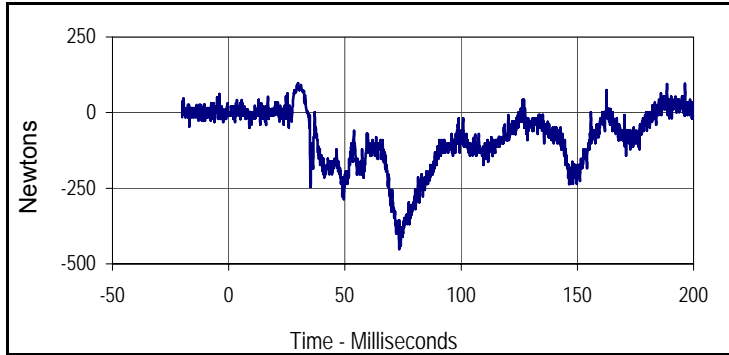
Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
82.5	59.7	-49.9	178.9



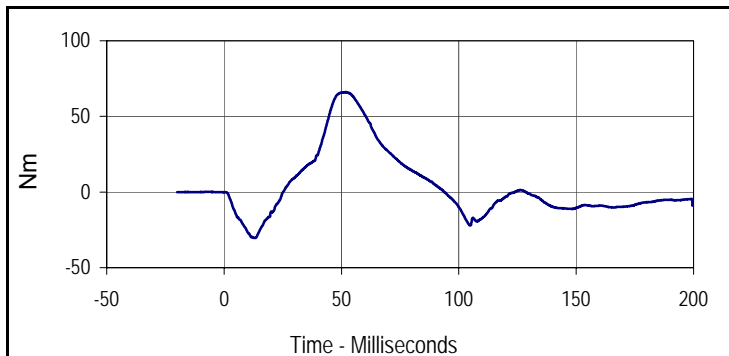
Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
70.6	49.6	-31.1	12.9

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

Test Date: 10/13/11
 Test I.D.: F141NF022



Curve Description			
Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
97.2	29.8	-451.4	73.3



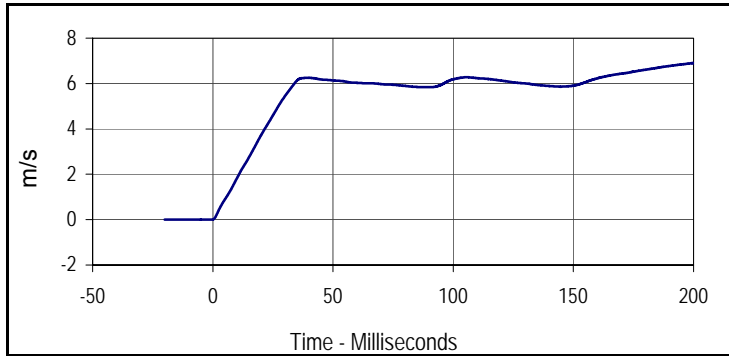
Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
66.2	51.7	-30.4	13.1

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

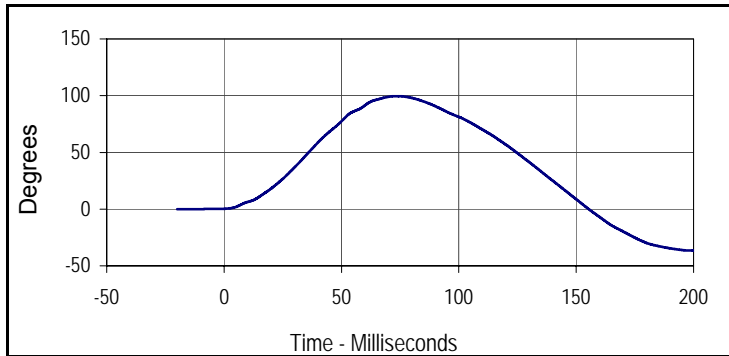
Test Date: 10/13/11
 Test I.D.: F141NE022



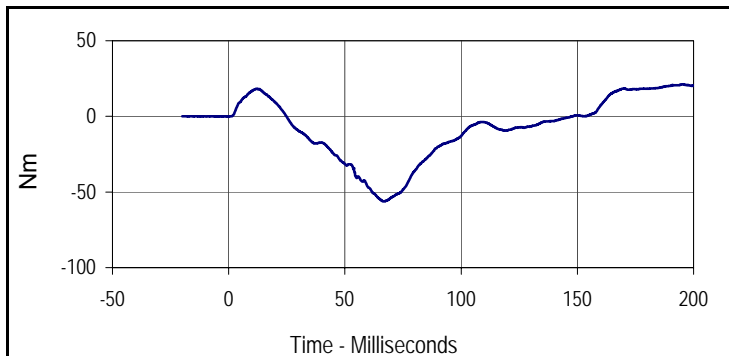
Tested Parameter	Units	Specification	Result	Pass/Fail	
Neck Assembly Soak Time	Minutes	≥240	450	Pass	
Temperature During Soak	Max	20.6 to 22.2	21.4	Pass	
	Min		21.1	Pass	
Humidity During Soak	Max	10.0 to 70.0	30.0	Pass	
	Min		29.0	Pass	
Laboratory Temperature During Test	°C	20.6 to 22.2	21.6	Pass	
Laboratory Humidity During Test	%	10.0 to 70.0	29.9	Pass	
Pendulum Velocity	m/s	5.95 to 6.19	6.14	Pass	
Pendulum Deceleration	10 Msec.	m/s	1.5 to 1.9	1.8	Pass
	20 Msec.	m/s	3.1 to 3.9	3.7	Pass
	30 Msec.	m/s	4.6 to 5.6	5.4	Pass
"D" Plane Rotation	Max	Degrees	99.0 to 114.0	99.5	Pass
Peak Moment in Rotation	Max	Nm	-53.0 to -65.0	-53.7	Pass
Positive Moment Decay, Time To -10 Nm	Msec.	94.0 to 114.0	101.7	Pass	
Overall Test Results				Pass	



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
6.9	200.0	0.0	-0.6



Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
99.5	73.6	-36.6	199.5



Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
21.2	194.9	-56.3	66.7

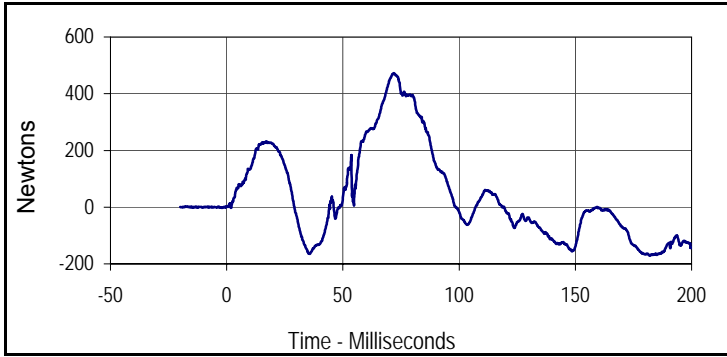
Test Program: Hybrid III 5th Percentile Female Neck Extension Test

Test Date: 10/13/11

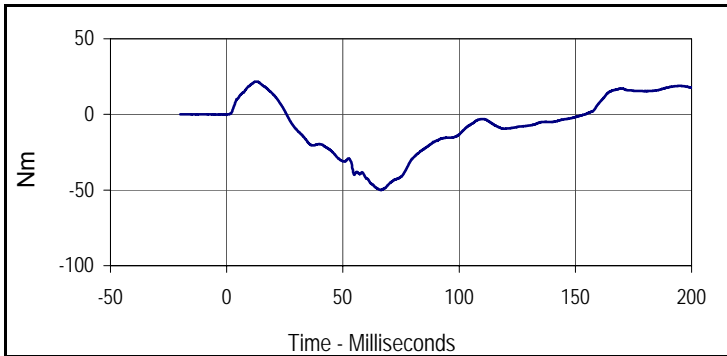


ATD Serial No.: 141

Test I.D.: F141NE022



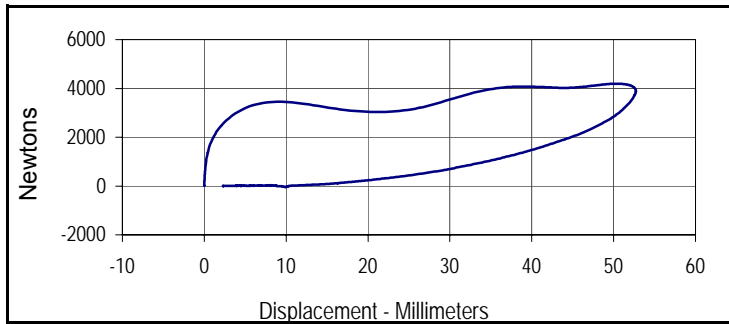
Curve Description			
Upper Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
472.6	72.0	-170.9	182.0



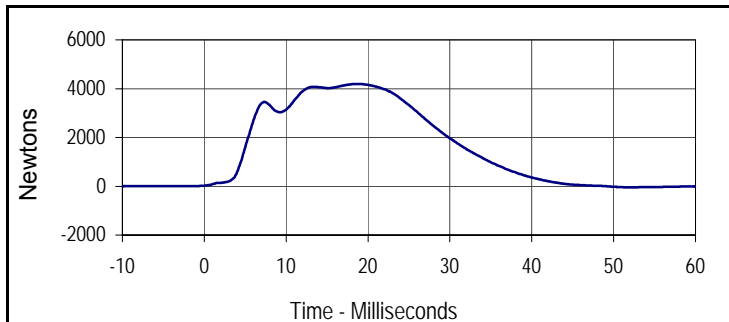
Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
21.7	13.0	-50.0	66.4



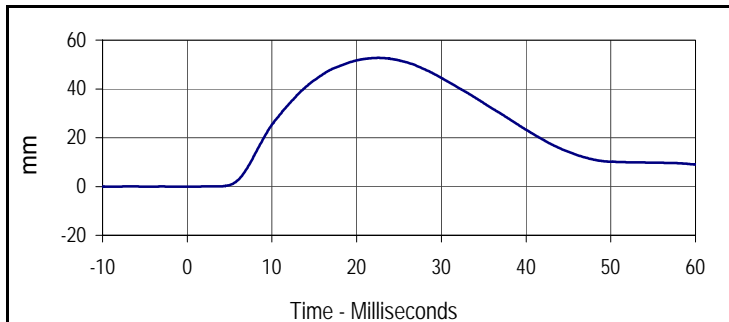
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥240	400	Pass
Temperature During Soak	Max	20.6 to 22.2	21.4	Pass
	Min		21.1	Pass
Humidity During Soak	Max	10.0 to 70.0	30.0	Pass
	Min		29.0	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	29.9	Pass
Probe Velocity	m/s	6.59 to 6.83	6.64	Pass
Peak Chest Deflection	mm	50.0 to 58.0	52.7	Pass
Peak Force Between 50 and 58 MM	Newtons	3900 to 4400	4194	Pass
Peak Force Between 18 and 50 MM	Newtons	≥4600	4194	Pass
Internal Hysteresis	%	69 to 85	75.2	Pass
Overall Test Results				Pass



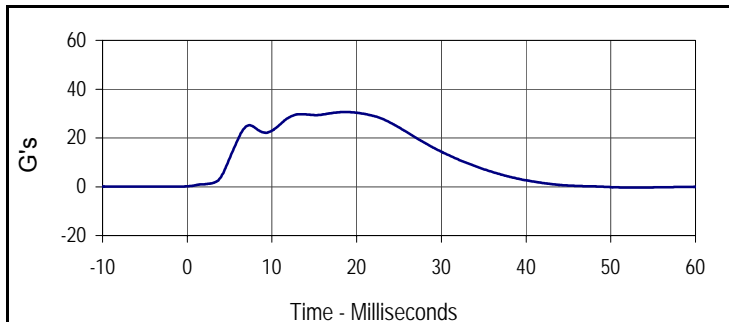
Curve Description			
Probe Force vs. Chest Deflection			
Plot No.	Type	SAE Class	Hysteresis
001	FIL	180	75.2
Peak Probe Force		Peak Chest Deflection	
4194.5		52.7	



Curve Description			
Probe Force			
Plot No.	Type	SAE Class	Units
002	FIL	180	Newtons
Max	Time	Min	Time
4194.5	18.6	-46.3	52.1



Curve Description			
Chest Deflection			
Plot No.	Type	SAE Class	Units
003	FIL	600	mm
Max	Time	Min	Time
52.7	22.6	0.0	-1.2



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
30.6	18.6	-0.3	52.1



Left Knee

Tested Parameter	Units	Specification	Result	Pass/Fail
Knee Assembly Soak Time	Minutes	≥240	425	Pass
Temperature During Soak	Max	18.9 to 25.6	21.4	Pass
	Min		21.1	Pass
Humidity During Soak	Max	10.0 to 70.0	30.0	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	30.0	Pass
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.08	Pass
Peak Probe Force	Newtons	3450 to 4060	3735	Pass
Overall Test Results				Pass

Right Knee

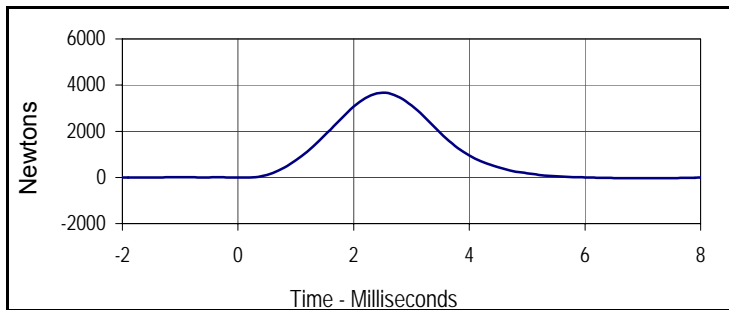
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.078	Pass
Peak Probe Force	Newtons	3450 to 4060	3671	Pass
Overall Test Results				Pass



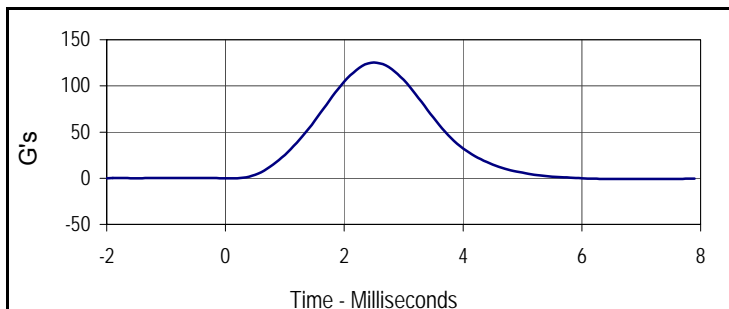
Curve Description			
Left Knee Probe Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
3734.8	2.3	-36.2	7.9



Curve Description			
Left Knee Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	600	G's
Max	Time	Min	Time
127.4	2.3	-1.2	7.9



Curve Description			
Right Knee Probe Force			
Plot No.	Type	SAE Class	Units
003	FIL	600	Newtons
Max	Time	Min	Time
3671.0	2.5	-27.2	7.1



Curve Description			
Right Knee Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	600	G's
Max	Time	Min	Time
125.2	2.5	-0.9	7.1

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

Test Date: 10/13/11

ATD Serial No.: 141

Test I.D.: F141TF022



Left Hip Joint-Femur Results

Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	460	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		21.1	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	26.8	Pass
Initial Reference Plane Angle		Degrees	≤ 20	9.5	Pass
Peak Force at 45° +/-0.5°		Newtons	320.0 to 390.0	335.0	Pass
Torso Rotation Rate		deg/sec	0.5 to 1.5	0.7	Pass
Final Reference Plane Angle		Degrees	+/-8	4.8	Pass
Overall Test Results					Pass

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

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

Test Date: 10/17/11

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: 10/17/11

ATD Serial No.: 035

Test I.D.: N/A



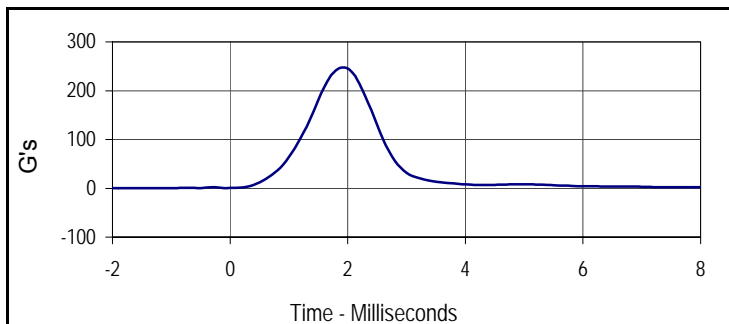
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.25	Pass
Laboratory Relative Humidity	%	10 to 70	29.5	Pass
A - Total sitting height	mm	879 to 889	881	Pass
B - Shoulder pivot height	mm	505 to 521	515	Pass
C - H point height	mm	84 to 89	85	Pass
D - H point location from backline	mm	135 to 140	137	Pass
E - Shoulder pivot from backline	mm	84 to 94	86	Pass
F - Thigh clearance	mm	140 to 155	148	Pass
G - Back of elbow to wrist pivot	mm	290 to 305	297	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	206	Pass
K - Buttock to knee length	mm	579 to 604	589	Pass
L - Popliteal length	mm	429 to 455	436	Pass
M - Knee pivot height	mm	485 to 500	488	Pass
N - Buttock popliteal length	mm	452 to 477	472	Pass
O - Chest depth without jacket	mm	213 to 229	225	Pass
P - Foot length	mm	251 to 267	260	Pass
V - Shoulder breadth	mm	422 to 437	432	Pass
W - Foot breadth	mm	91 to 107	99	Pass
Y - Chest circumference (with chest jacket)	mm	970 to 1001	986	Pass
Z - Waist circumference	mm	836 to 866	864	Pass
AA - Location for chest circumference	mm	429 to 434	433	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
 ATD Serial No.: 035

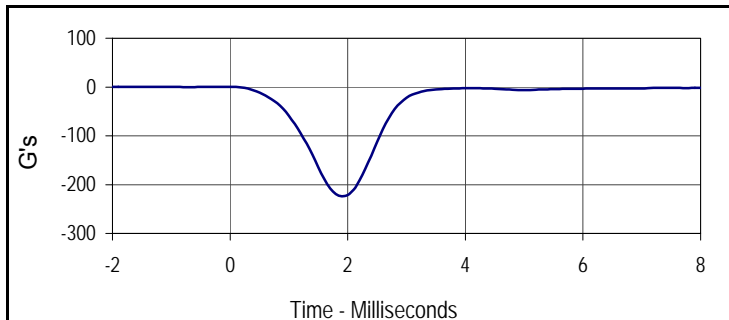
Test Date: 10/17/11
 Test I.D.: M035HD023



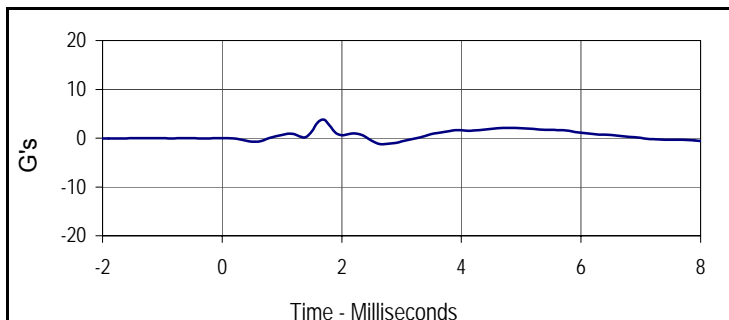
Tested Parameter	Units	Specification	Result	Pass/Fail
Head Assembly Soak Time	Minutes	≥240	245	Pass
Temperature During Soak	Max	18.9 to 25.6	21.4	Pass
	Min		21.1	Pass
Humidity During Soak	Max	10.0 to 70.0	30.0	Pass
	Min		29.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.6	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	30.0	Pass
Peak Resultant Acceleration	G's	225.0 to 275.0	247.7	Pass
Peak Lateral Acceleration	G's	≤15.0	3.8	Pass
Oscillations After Main Pulse	%	<10% of peak Res. Acceleration	3.4	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass



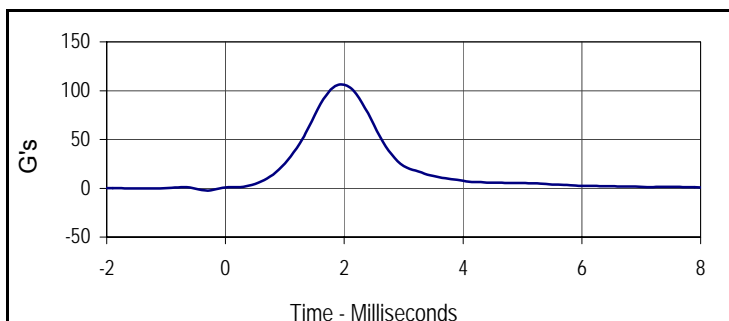
Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
247.7	1.9	0.1	-2.0



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.2	0.0	-223.9	1.9



Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
3.8	1.7	-1.2	2.7



Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
106.2	2.0	-2.3	-0.3

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

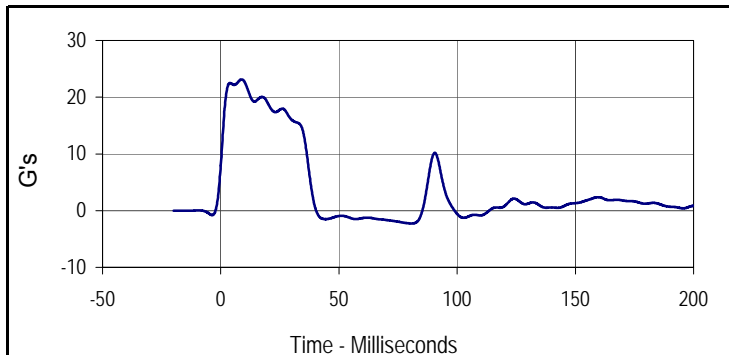
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ATD Serial No.: 035

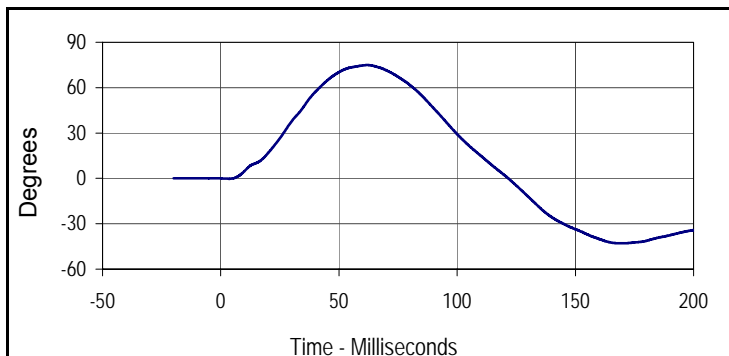
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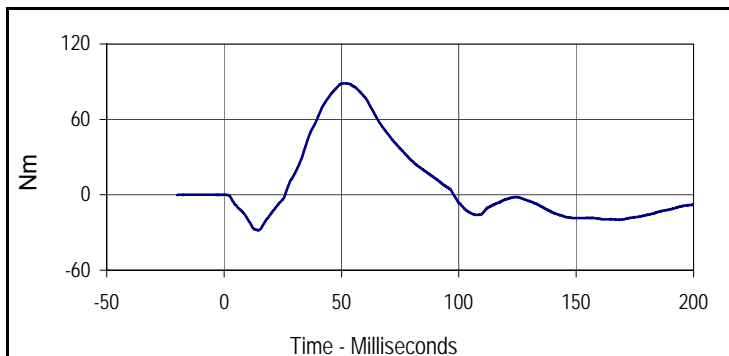
Tested Parameter	Units	Specification	Result	Pass/Fail	
Neck Assembly Soak Time	Minutes	≥240	265	Pass	
Temperature During Soak	Max	20.6 to 22.2	21.4	Pass	
	Min		21.1	Pass	
Humidity During Soak	Max	10.0 to 70.0	30.0	Pass	
	Min		29.0	Pass	
Laboratory Temperature During Test	°C	20.6 to 22.2	21.3	Pass	
Laboratory Humidity During Test	%	10.0 to 70.0	28.6	Pass	
Pendulum Velocity	m/s	6.89 to 7.13	7.02	Pass	
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	22.7	Pass
	20 Msec.	G's	17.6 to 22.6	18.9	Pass
	30 Msec.	G's	12.5 to 18.5	16.0	Pass
Peak Pendulum Decel. after 30 Msec.	G's	≤ 29.0	16.0	Pass	
Deceleration Decay, Time to Cross 5 G's	Msec.	34.0 to 42.0	38	Pass	
Maximum "D" Plane Rotation	Max	Degrees	64.0 to 78.0	74.9	Pass
	Time	Msec.	57.0 to 64.0	62.0	Pass
"D" Plane Rotation Decay, Time To Zero Crossing	Msec.	113.0 to 128.0	121.7	Pass	
Moment About Occ. Condyle	Max	Nm	84.1 to 108.5	88.8	Pass
	Time	Msec.	47.0 to 58.0	51.5	Pass
Positive Moment Decay, Time To Zero Crossing	Msec.	97.0 to 107.0	97.9	Pass	
Overall Test Results				Pass	



Curve Description			
Pendulum Deceleration			
Plot No.	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
23.1	8.8	-2.3	80.8



Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
74.9	62.0	-42.9	169.4



Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
88.8	51.5	-28.2	14.4

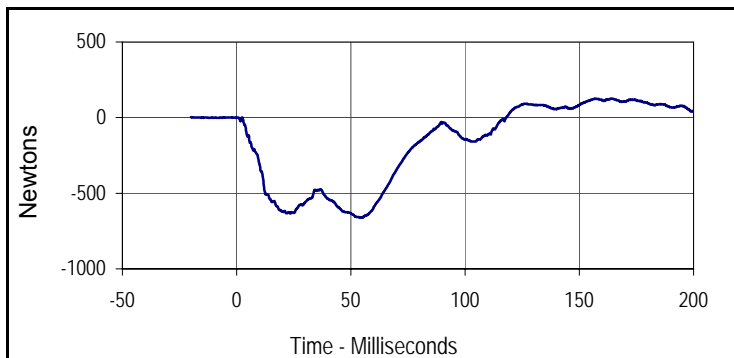
Test Program: Hybrid III 50th Percentile Male Neck Flexion Test

Test Date: 10/17/11

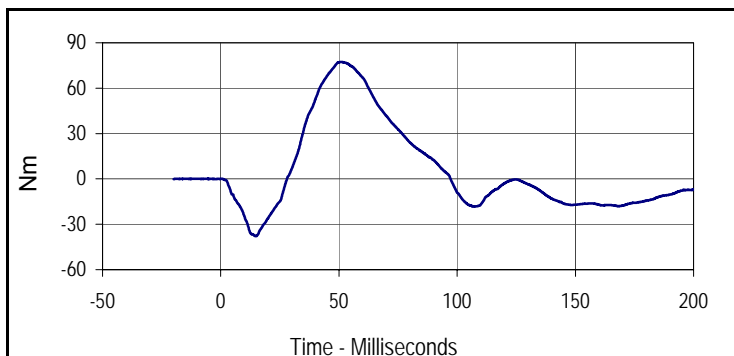


ATD Serial No.: 035

Test I.D.: M035NF023



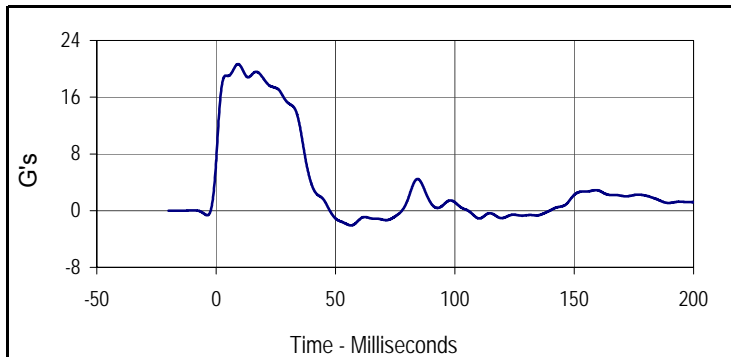
Curve Description			
Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	600	Newtons
Max	Time	Min	Time
126.5	164.2	-660.6	54.9



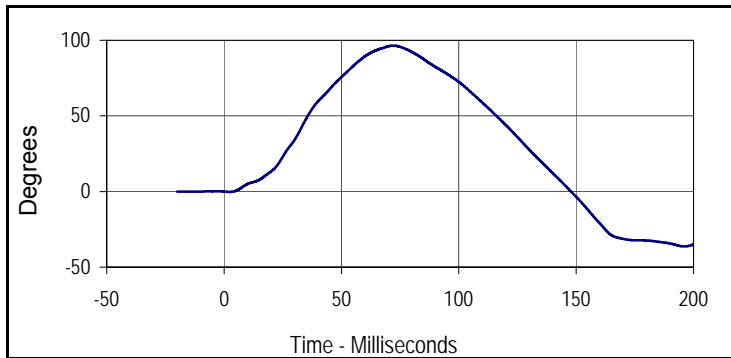
Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
77.3	51.1	-37.8	14.5



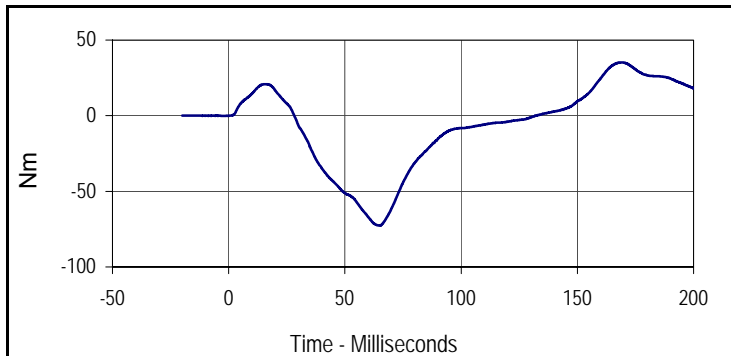
Tested Parameter	Units	Specification	Result	Pass/Fail	
Neck Assembly Soak Time	Minutes	≥240	285	Pass	
Temperature During Soak	Max	20.6 to 22.2	21.7	Pass	
	Min		21.1	Pass	
Humidity During Soak	Max	10.0 to 70.0	30.0	Pass	
	Min		29.0	Pass	
Laboratory Temperature During Test	°C	20.6 to 22.2	21.5	Pass	
Laboratory Humidity During Test	%	10.0 to 70.0	30.0	Pass	
Pendulum Velocity	m/s	5.94 to 6.19	6.08	Pass	
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	20.5	Pass
	20 Msec.	G's	14.0 to 19.0	18.6	Pass
	30 Msec.	G's	11.0 to 16.0	15.2	Pass
Peak Pendulum Decel. after 30 Msec.	G's	≤ 22.0	15.2	Pass	
Deceleration Decay, Time to Cross 5 G's	Msec.	38.0 to 46.0	38.9	Pass	
Maximum "D" Plane Rotation	Max	Degrees	81.0 to 106.0	96.5	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	147.8	Pass	
Moment About Occ. Condyle	Max	Nm	-52.9 to -79.9	-72.7	Pass
	Time	Msec.	65.0 to 79.0	65.1	Pass
Positive Moment Decay, Time To Zero Crossing	Msec.	120.0 to 148.0	132.0	Pass	
Overall Test Results				Pass	



Curve Description			
Pendulum Deceleration			
Plot No.	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
20.7	9.2	-2.1	56.5



Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
96.5	72.1	-36.3	195.9



Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
35.1	168.6	-72.7	65.1

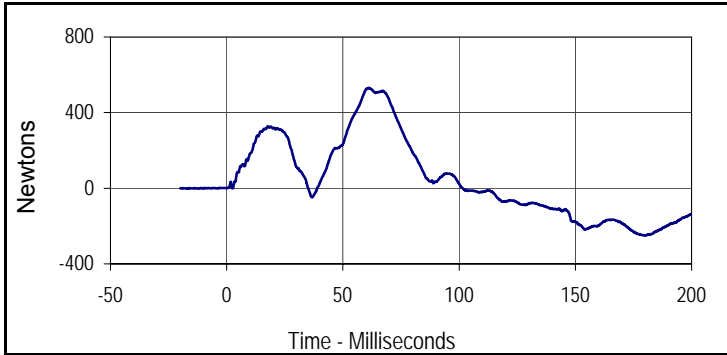
Test Program: Hybrid III 50th Percentile Male Neck Extension Test

Test Date: 10/17/11

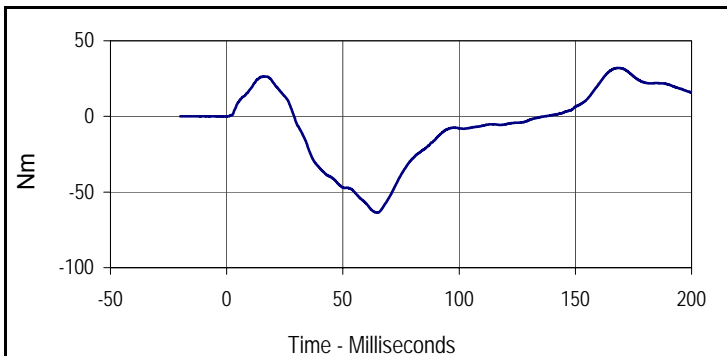


ATD Serial No.: 035

Test I.D.: M035NE023



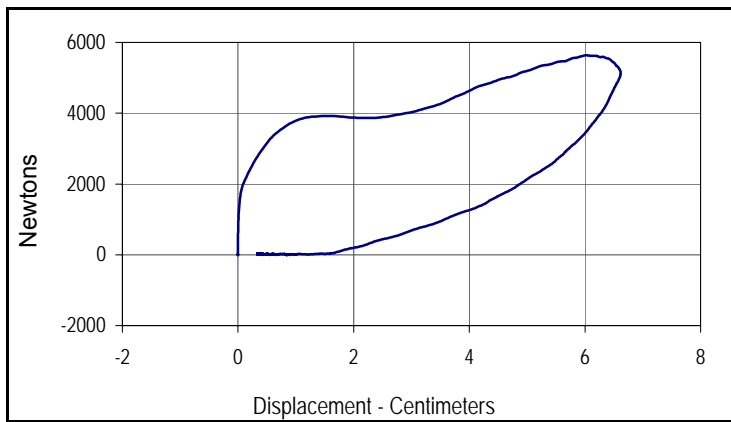
Curve Description			
Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
530.2	61.0	-250.1	179.7



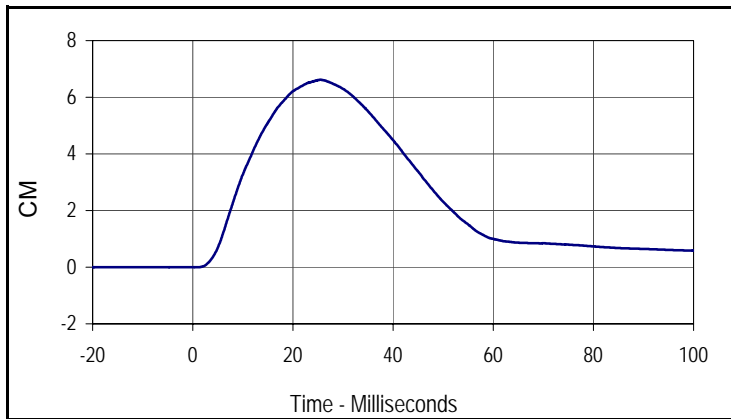
Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
32.0	168.1	-63.7	65.1



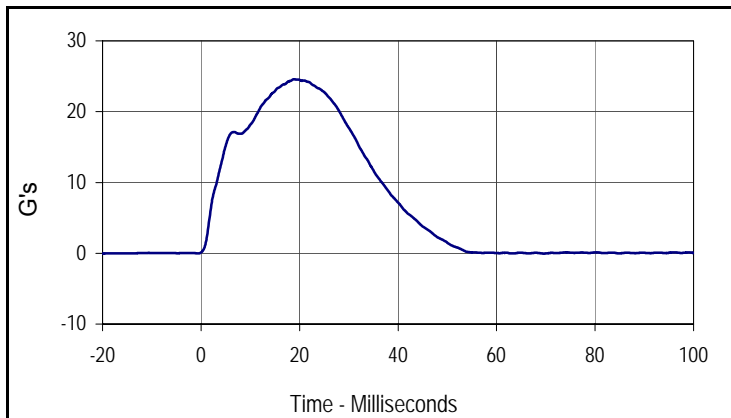
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥240	305	Pass
Temperature During Soak	Max	20.6 to 22.2	21.4	Pass
	Min		21.1	Pass
Humidity During Soak	Max	10.0 to 70.0	30.0	Pass
	Min		29.0	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.4	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	29.0	Pass
Probe Velocity	m/s	6.58 to 6.82	6.62	Pass
Peak Probe Force	Newtons	5159 to 5893	5635	Pass
Peak Sternum Deflection	CM	6.35 to 7.26	6.62	Pass
Internal Hysteresis	%	69 to 85	70.9	Pass
Overall Test Results				Pass



Curve Description			
Probe Force vs. Chest Deflection			
Plot No.	Type	SAE Class	Hysteresis
001	FIL	180	70.9
Peak Probe Force		Peak Chest Deflection	
5635		6.62	



Curve Description			
Chest Deflection			
Plot No.	Type	SAE Class	Units
002	FIL	180	CM
Max	Time	Min	Time
6.6	25.5	0.0	0.8



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
24.6	18.8	-0.1	-20.0

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

Test Date: 10/17/11

ATD Serial No.: 035

Test I.D.: M035LK023, M035RK023

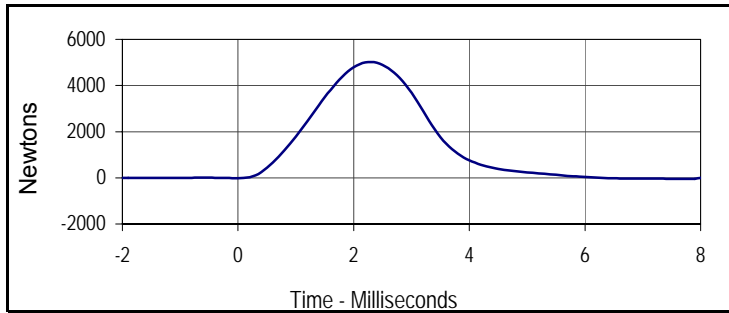


Left Knee

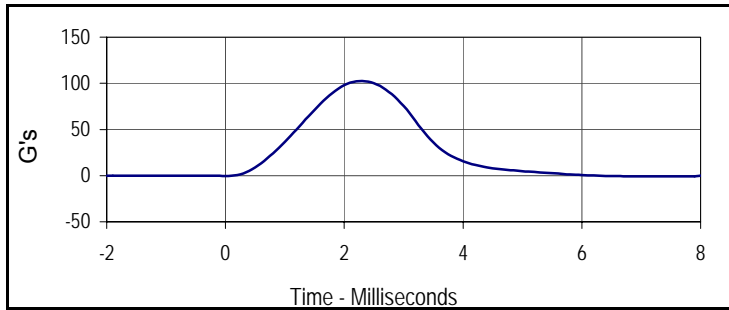
Tested Parameter	Units	Specification	Result	Pass/Fail
Knee Assembly Soak Time	Minutes	≥240	345	Pass
Temperature During Soak	Max	18.9 to 25.6	21.7	Pass
	Min		20.6	Pass
Humidity During Soak	Max	10.0 to 70.0	30.0	Pass
	Min		29.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.5	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	29.7	Pass
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.08	Pass
Peak Probe Force	Newtons	4715 to 5782	5021	Pass
Overall Test Results				Pass

Right Knee

Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.08	Pass
Peak Probe Force	Newtons	4715 to 5782	5013	Pass
Overall Test Results				Pass



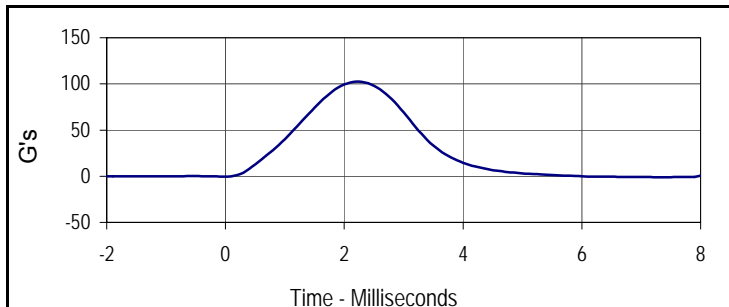
Curve Description			
Left Knee Probe Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
5021.0	2.3	-42.0	7.6



Curve Description			
Left Knee Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	600	G's
Max	Time	Min	Time
102.6	2.3	-0.9	7.6



Curve Description			
Right Knee Probe Force			
Plot No.	Type	SAE Class	Units
003	FIL	600	Newtons
Max	Time	Min	Time
5012.9	2.2	-50.6	7.4



Curve Description			
Right Knee Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	600	G's
Max	Time	Min	Time
102.5	2.2	-1.0	7.4

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

Test Date: 10/17/11
 Test I.D.: M035LF023, M035RF023

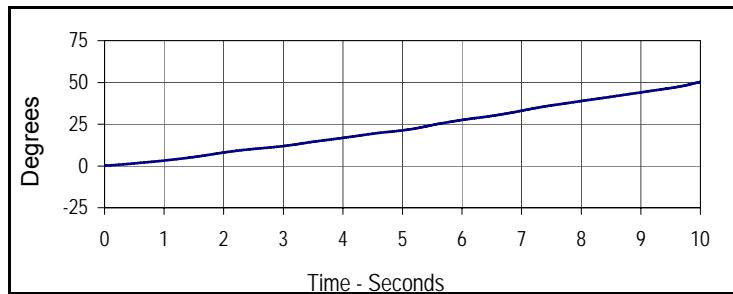


Left Hip Joint-Femur Results

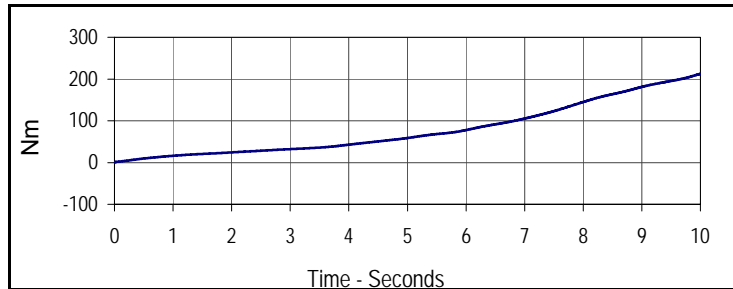
Tested Parameter	Units	Specification	Result	Pass/Fail
Hip Joint-Femur Assembly Soak Time	Minutes	≥240	550	Pass
Temperature During Soak	Max	18.9 to 25.6	21.4	Pass
	Min		21.1	Pass
Humidity During Soak	Max	10.0 to 70.0	30.0	Pass
	Min		29.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	29.7	Pass
Rotation Rate	deg/sec	5 to 10	5.0	Pass
Femur Torque at 30°	Nm	≤ 95	91.8	Pass
Rotation at 203 Nm	Degrees	40.0 to 50.0	48.3	Pass
Overall Test Results				Pass

Right Hip Joint-Femur Results

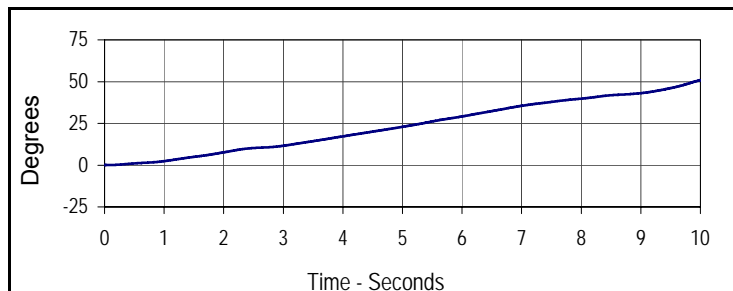
Rotation Rate	deg/sec	5 to 10	5.1	Pass
Femur Torque at 30°	Nm	≤ 95	86.6	Pass
Rotation at 203 Nm	Degrees	40.0 to 50.0	48.4	Pass
Overall Test Results				Pass



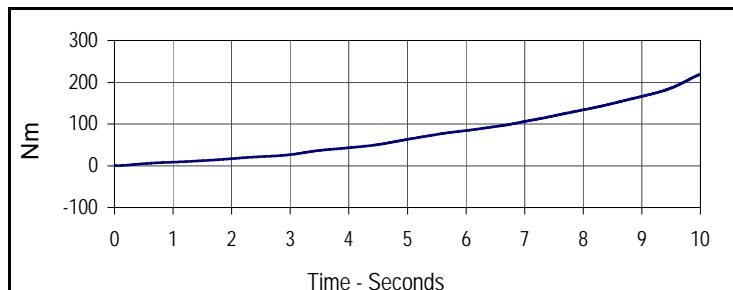
Curve Description			
Hip Rotation			
Plot No.	Type	SAE Class	Units
001	FIL	60	Degrees
Max	Time	Min	Time
50.2	10.0	0.2	0.0



Curve Description			
Right Femur Force Z			
Plot No.	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
212.3	10.0	1.2	0.0



Curve Description			
Hip Rotation			
Plot No.	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
50.9	10.0	0.0	0.0



Curve Description			
Right Femur Force Z			
Plot No.	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
218.8	10.0	0.1	0.0

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

Test Date: 10/17/11

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: 10/17/11

ATD Serial No.: 141

Test I.D.: N/A



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.42	Pass
Laboratory Relative Humidity	%	10 to 70	30.0	Pass
A - Total sitting height	mm	774.7 to 800.1	775	Pass
B - Shoulder pivot height	mm	431.8 to 457.2	451	Pass
C - H point height	mm	81.3 to 86.3	85	Pass
D - H point location from backline	mm	144.8 to 149.8	146	Pass
E - Shoulder pivot from backline	mm	68.6 to 83.8	80	Pass
F - Thigh clearance	mm	119.4 to 134.6	125	Pass
G - Back of elbow to wrist pivot	mm	243.9 to 259.1	250	Pass
H - Head back to backline	mm	40.7 to 45.7	45	Pass
I - Shoulder to elbow length	mm	276.8 to 297.2	285	Pass
J - Elbow rest height	mm	182.8 to 203.2	201	Pass
K - Buttock to knee length	mm	520.7 to 546.1	530	Pass
L - Popliteal length	mm	355.6 to 376.0	375	Pass
M - Knee pivot height	mm	393.7 to 419.1	401	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	220	Pass
R - Buttock to Knee Pivot Length	mm	457.2 to 482.6	475	Pass
S - Head Breadth	mm	137.1 to 147.3	144	Pass
T - Head Depth	mm	177.8 to 188.0	180	Pass
U - Hip Breadth	mm	299.7 to 314.9	300	Pass
V - Shoulder breadth	mm	350.5 to 365.7	359	Pass
W - Foot breadth	mm	78.8 to 94.0	90	Pass
X - Head circumference	mm	528.3 to 548.7	540	Pass
Y - Chest circumference (with chest jacket)	mm	850.8 to 881.3	860	Pass
Z - Waist circumference	mm	759.5 to 789.9	766	Pass
AA - Location for chest circumference	mm	299.7 to 309.9	300	Pass
BB - Location for waist circumference	mm	160.1 to 170.2	164	Pass
Overall Test Results				Pass

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

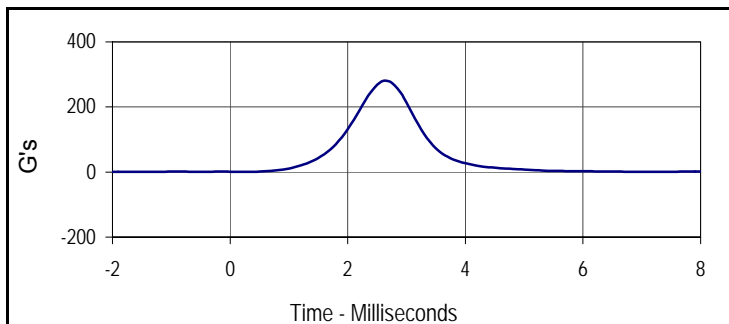
Test Date: 10/17/11



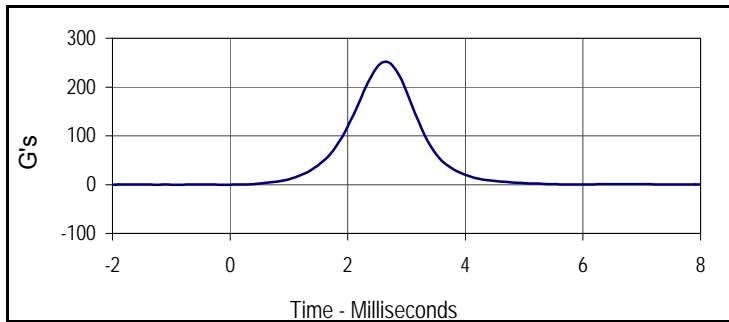
ATD Serial No.: 141

Test I.D.: F141HD023

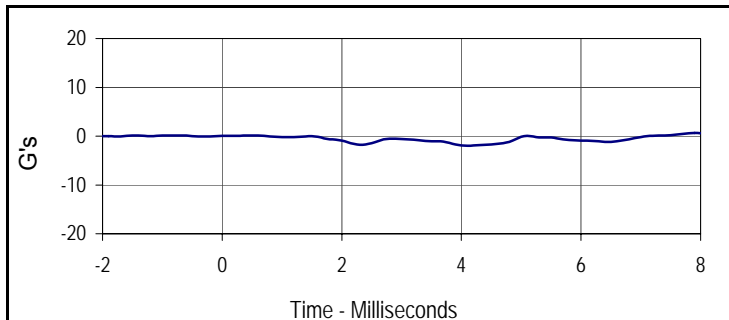
Tested Parameter	Units	Specification	Result	Pass/Fail
Head Assembly Soak Time	Minutes	≥240	265	Pass
Temperature During Soak	Max	18.9 to 25.6	21.7	Pass
	Min		20.6	Pass
Humidity During Soak	Max	10.0 to 70.0	30.0	Pass
	Min		29.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.4	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	29.9	Pass
Peak Resultant Acceleration	G's	250.0 to 300.0	279.7	Pass
Peak Lateral Acceleration	G's	≤15.0	1.9	Pass
Oscillations After Main Pulse	%	<10% of peak Res. Acceleration	0.8	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass



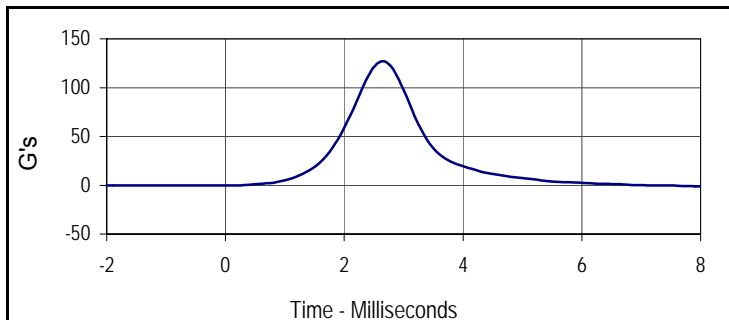
Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
279.7	2.6	0.4	0.4



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
250.7	2.6	-0.1	-0.1



Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
0.2	-0.8	-1.9	4.1



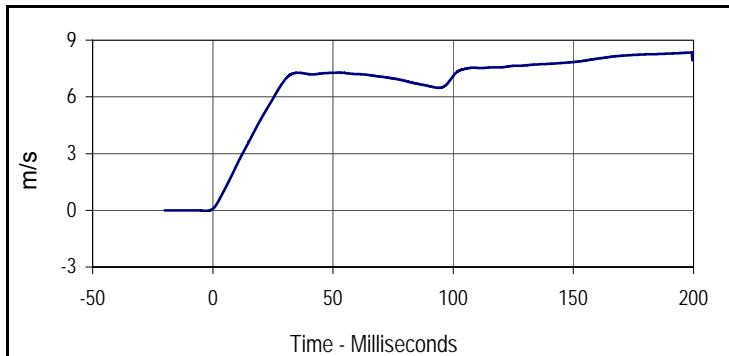
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
126.4	2.6	-0.2	-1.0

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

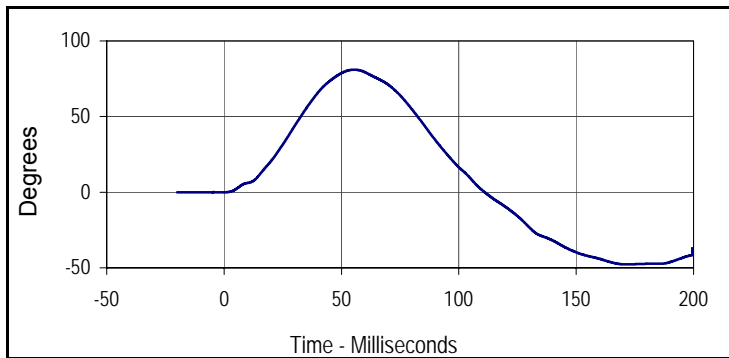
Test Date: 10/17/11
 Test I.D.: F141NF023



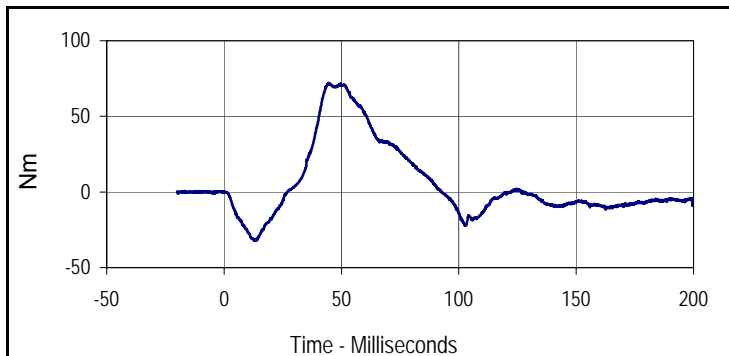
Tested Parameter	Units	Specification	Result	Pass/Fail	
Neck Assembly Soak Time	Minutes	≥240	310	Pass	
Temperature During Soak	Max	20.6 to 22.2	21.7	Pass	
	Min		20.8	Pass	
Humidity During Soak	Max	10.0 to 70.0	30.0	Pass	
	Min		29.0	Pass	
Laboratory Temperature During Test	°C	20.6 to 22.2	21.3	Pass	
Laboratory Humidity During Test	%	10.0 to 70.0	29.8	Pass	
Pendulum Velocity	m/s	6.89 to 7.13	7.00	Pass	
Pendulum Deceleration	10 Msec.	m/s	2.1 to 2.5	2.4	Pass
	20 Msec.	m/s	4.0 to 5.0	4.8	Pass
	30 Msec.	m/s	5.8 to 7.0	6.9	Pass
"D" Plane Rotation	Max	Degrees	77.0 to 91.0	81.0	Pass
Peak Moment in Rotation	Max	Nm	69.0 to 83.0	71.6	Pass
Positive Moment Decay, Time To 10 Nm	Msec.	80.0 to 100.0	83.2	Pass	
Overall Test Results				Pass	



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
8.4	199.4	0.0	-2.5



Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
81.0	55.3	-47.8	171.4



Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
72.2	44.4	-32.2	12.9

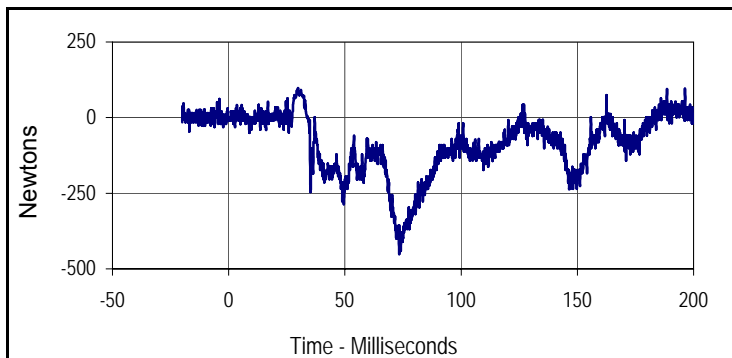
Test Program: Hybrid III 5th Percentile Female Neck Flexion Test

Test Date: 10/17/11

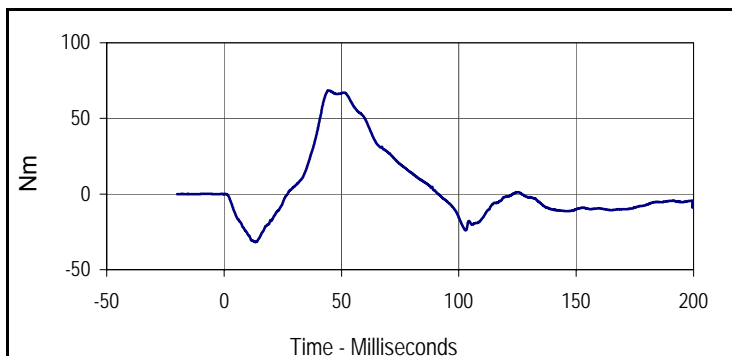


ATD Serial No.: 141

Test I.D.: F141NF023



Curve Description			
Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
97.2	29.8	-451.4	73.3



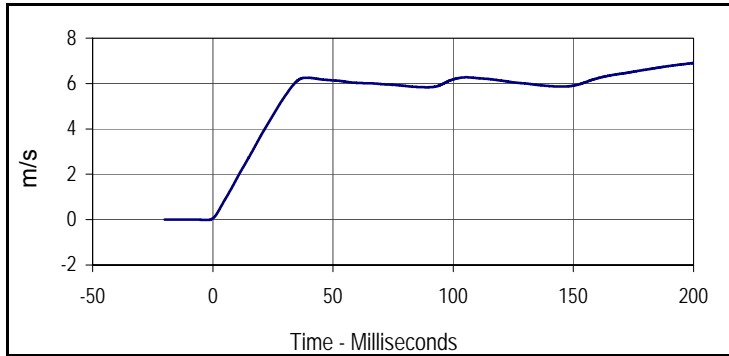
Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
68.6	44.5	-31.8	13.3

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

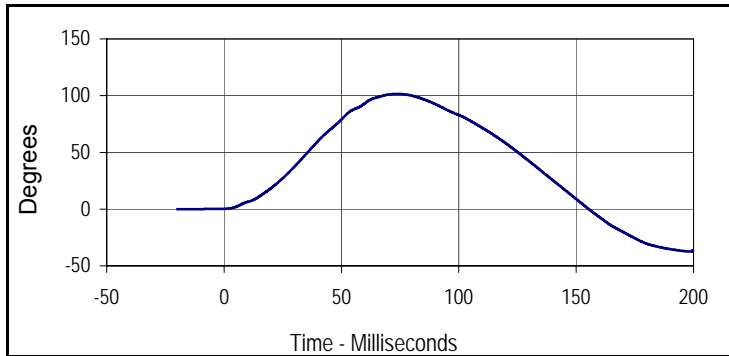
Test Date: 10/17/11
 Test I.D.: F141NE023



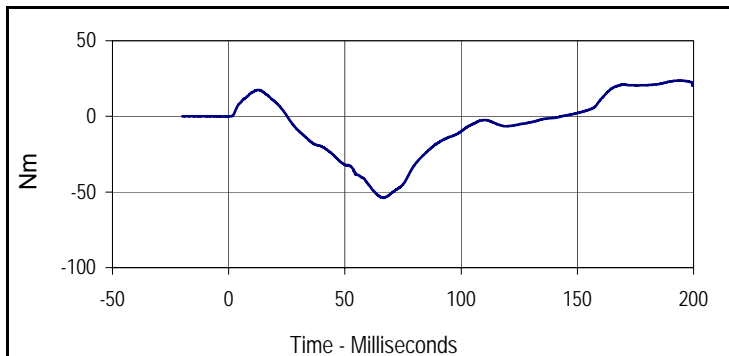
Tested Parameter	Units	Specification	Result	Pass/Fail	
Neck Assembly Soak Time	Minutes	≥240	325	Pass	
Temperature During Soak	Max	20.6 to 22.2	21.4	Pass	
	Min		21.1	Pass	
Humidity During Soak	Max	10.0 to 70.0	30.0	Pass	
	Min		29.0	Pass	
Laboratory Temperature During Test	°C	20.6 to 22.2	21.6	Pass	
Laboratory Humidity During Test	%	10.0 to 70.0	29.9	Pass	
Pendulum Velocity	m/s	5.95 to 6.19	6.14	Pass	
Pendulum Deceleration	10 Msec.	m/s	1.5 to 1.9	1.8	Pass
	20 Msec.	m/s	3.1 to 3.9	3.7	Pass
	30 Msec.	m/s	4.6 to 5.6	5.4	Pass
"D" Plane Rotation	Max	Degrees	99.0 to 114.0	101.5	Pass
Peak Moment in Rotation	Max	Nm	-53.0 to -65.0	-53.8	Pass
Positive Moment Decay, Time To -10 Nm	Msec.	94.0 to 114.0	100.0	Pass	
Overall Test Results				Pass	



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
6.9	200.0	0.0	-2.4



Curve Description			
"D" Plane Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degrees
Max	Time	Min	Time
101.5	73.6	-37.3	199.2



Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
23.7	194.6	-53.8	66.5

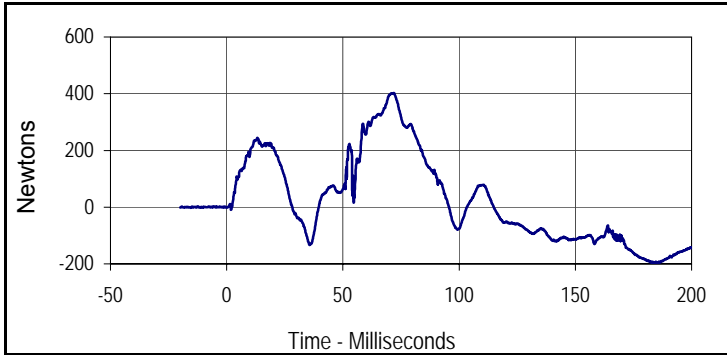
Test Program: Hybrid III 5th Percentile Female Neck Extension Test

Test Date: 10/17/11

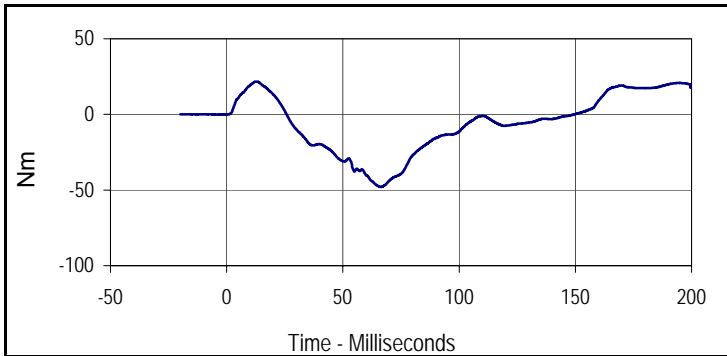


ATD Serial No.: 141

Test I.D.: F141NE023



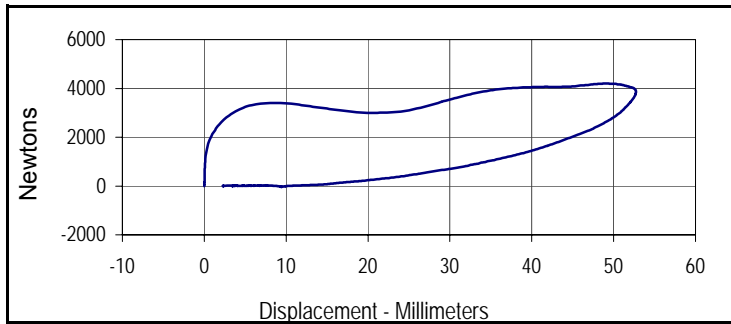
Curve Description			
Upper Neck Force X			
Plot No.	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
402.8	71.9	-196.7	185.1



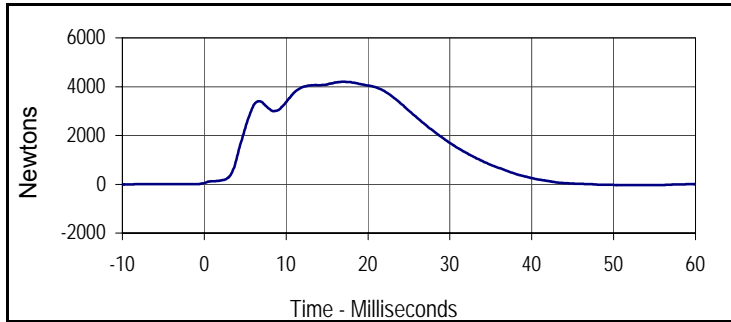
Curve Description			
Neck Moment Y			
Plot No.	Type	SAE Class	Units
005	FIL	600	Nm
Max	Time	Min	Time
21.7	13.0	-48.0	66.4



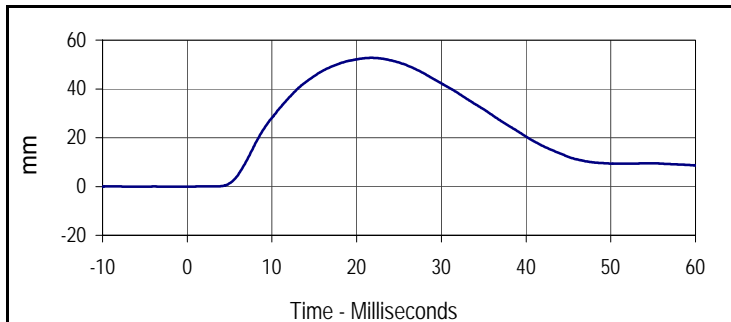
Tested Parameter	Units	Specification	Result	Pass/Fail
Dummy Soak Time	Minutes	≥240	350	Pass
Temperature During Soak	Max	20.6 to 22.2	21.4	Pass
	Min		21.1	Pass
Humidity During Soak	Max	10.0 to 70.0	30.0	Pass
	Min		29.0	Pass
Laboratory Temperature During Test	°C	20.6 to 22.2	21.4	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	30.0	Pass
Probe Velocity	m/s	6.59 to 6.83	6.65	Pass
Peak Chest Deflection	mm	50.0 to 58.0	52.7	Pass
Peak Force Between 50 and 58 MM	Newtons	3900 to 4400	4201	Pass
Peak Force Between 18 and 50 MM	Newtons	≥4600	4191	Pass
Internal Hysteresis	%	69 to 85	75.4	Pass
Overall Test Results				Pass



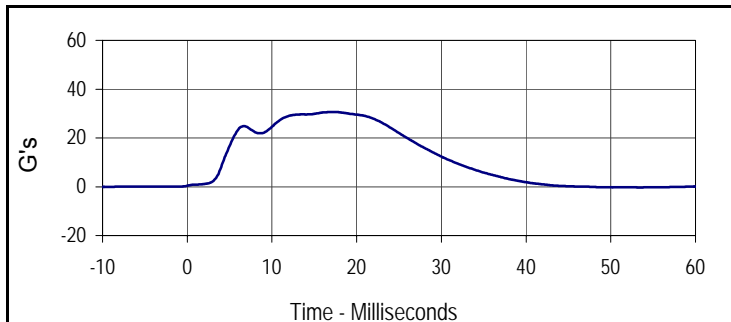
Curve Description			
Probe Force vs. Chest Deflection			
Plot No.	Type	SAE Class	Hysteresis
001	FIL	180	75.4
Peak Probe Force		Peak Chest Deflection	
4201.4		52.7	



Curve Description			
Probe Force			
Plot No.	Type	SAE Class	Units
002	FIL	180	Newtons
Max	Time	Min	Time
4201.4	17.0	-37.9	53.4



Curve Description			
Chest Deflection			
Plot No.	Type	SAE Class	Units
003	FIL	600	mm
Max	Time	Min	Time
52.7	21.8	0.0	-5.8



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
30.7	17.0	-0.3	53.4

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

Test Date: 10/17/11

ATD Serial No.: 141

Test I.D.: F141LK023, F141LK023

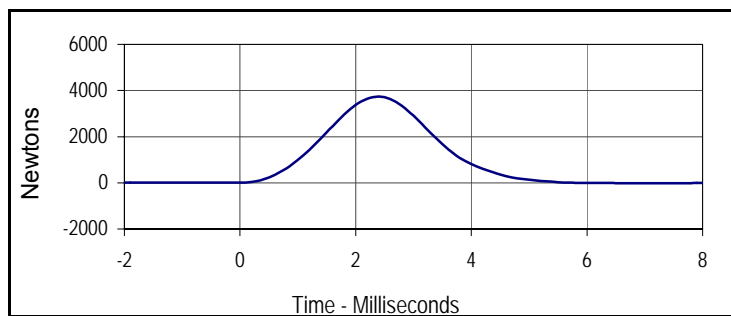


Left Knee

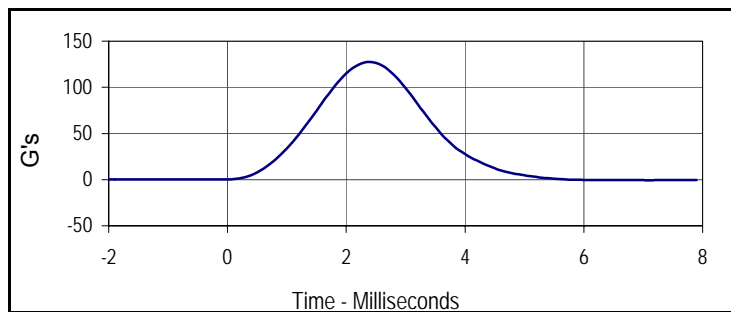
Tested Parameter	Units	Specification	Result	Pass/Fail
Knee Assembly Soak Time	Minutes	≥240	495	Pass
Temperature During Soak	Max	18.9 to 25.6	21.4	Pass
	Min		21.1	Pass
Humidity During Soak	Max	10.0 to 70.0	30.0	Pass
	Min		29.0	Pass
Laboratory Temperature During Test	°C	18.9 to 25.6	21.5	Pass
Laboratory Humidity During Test	%	10.0 to 70.0	30.0	Pass
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.08	Pass
Peak Probe Force	Newtons	3450 to 4060	3737	Pass
Overall Test Results				Pass

Right Knee

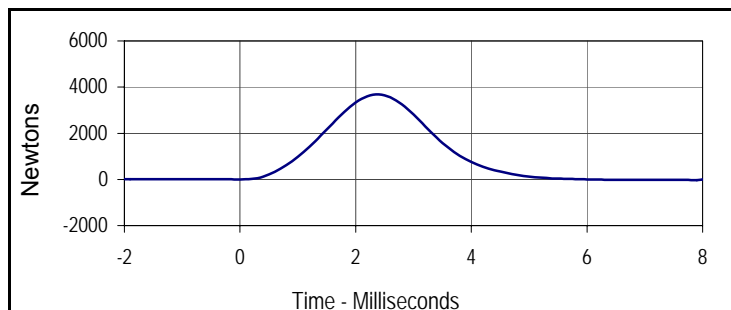
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.082	Pass
Peak Probe Force	Newtons	3450 to 4060	3684	Pass
Overall Test Results				Pass



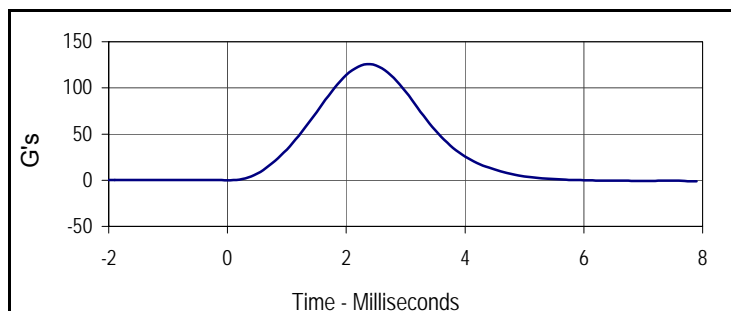
Curve Description			
Left Knee Probe Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
3737.4	2.4	-17.8	7.1



Curve Description			
Left Knee Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	600	G's
Max	Time	Min	Time
127.5	2.4	-0.6	7.1



Curve Description			
Right Knee Probe Force			
Plot No.	Type	SAE Class	Units
003	FIL	600	Newtons
Max	Time	Min	Time
3683.9	2.4	-33.7	7.9



Curve Description			
Right Knee Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	600	G's
Max	Time	Min	Time
125.7	2.4	-1.2	7.9

Test Program: Hybrid III 5th Percentile Female Torso Flexion Test Test Date: 10/17/11
 ATD Serial No.: 141 Test I.D.: F141TF023



Left Hip Joint-Femur Results

Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	520	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		21.1	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.0	Pass
Initial Reference Plane Angle		Degrees	≤ 20	9.8	Pass
Peak Force at 45° +/-0.5°		Newtons	320.0 to 390.0	342.8	Pass
Torso Rotation Rate		deg/sec	0.5 to 1.5	0.7	Pass
Final Reference Plane Angle		Degrees	+/-8	5.1	Pass
Overall Test Results					Pass