REPORT NUMBER: SINCAP-KAR-13-007

NEW CAR ASSESSMENT PROGRAM (NCAP)
MOVING DEFORMABLE BARRIER SIDE IMPACT TEST

FORD MOTOR CO.

2013 FORD ESCAPE S 5-DOOR MPV

NHTSA No: MD0201

PREPARED BY:

KARCO ENGINEERING, LLC.

9270 HOLLY ROAD

ADELANTO, CA 92301

JULY 31, 2012

FINAL REPORT

PREPARED FOR:

U.S. DEPARTMENT OF TRANSPORTATION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

OFFICE OF CRASHWORTHINESS STANDARDS

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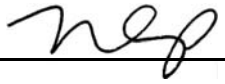
Reviewed By: 

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Approval Date: July 31, 2012

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date:

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

Date:

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Final Report of New Car Assessment Program Side Impact MDB Testing of a 2013 Ford Escape S 5-Door MPV NHTSA No. MD0201	July 31, 2012
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9. Performing Organization Name and Address KARCO Engineering, LLC. 9270 Holly Rd. Adelanto, CA 92301	**10. Work Unit No.**
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15. Supplementary Notes

16. Abstract

A 55/28 km/h 90 deg. Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2013 Ford Escape S 5-door MPV in accordance with the specifications of the Office of Crash Worthiness Standards Test Procedure for the generation of consumer information on vehicle side crash protection. The test was conducted at the KARCO Engineering, LLC. facility in Adelanto, California on July 17, 2012.

The impact velocity of the Moving Deformable Barrier was 62.42 km/h and the outside ambient temperature at the struck (driver's) side of the vehicle was 32.0 deg. C. The target vehicle's maximum post-test static crush was 193 mm located at level 3. The test vehicle's occupant performance data is as follows:

Measurement Description	Driver ATD (ES-2re)		
	Units	IARV	Result
Head Injury Criteria (HIC_{36})		1000	110.0
Maximum Thorax Rib Deflection	mm	44	10
Total Abdominal Force	N	2500	429
Pubic Symphysis Force	N	6000	1560

Measurement Description	Passenger ATD (SID-IIs)		
	Units	IARV	Result
Head Injury Criteria (HIC_{36})		1000	290.1
Resultant Lower Spine Acceleration	g	82	54
Total Pelvic Force (Sum of Acetubular and Iliac Forces)	N	5525	2888
Maximum Thoracic Rib Deflection	mm	38*	9
Maximum Abdominal Rib Deflection	mm	45*	10

The doors on the struck side of the vehicle did not separate from the body at the hinges or latches, and the opposite side doors did not open during the side impact event.

** Proposed IARV*

17. Key Words		18. Distribution Statement	
New Car Assessment Program (NCAP) Side Impact Moving Deformable Barrier (MDB) ES-2re SID-IIs		Copies of this report are available from: National Highway Traffic Safety Admin. Technical Information Services Division, NPO-411 1200 New Jersey Ave., SE, Room E12-100 Washington, DC 20590	
19. Security Classification of this report	**20. Security Classification of this page**	**21. No. of Pages**	**22. Price**
UNCLASSIFIED	UNCLASSIFIED	155	

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SECTION 1
TEST PURPOSE AND PROCEDURE

This moving deformable barrier side impact test is part of the MY 2013 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract number DTNH22-09-D-00122. The purpose of this test is to generate comparative side impact performance in a 2013 Ford Escape S 5-door MPV. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated May 2012.

SECTION 2
SUMMARY OF TEST RESULTS

A 2013 Ford Escape S 5-door MPV was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 62.42 km/h (38.8 mph). The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by KARCO Engineering, LLC. in Adelanto, California, on July 17, 2012. Pre- and post-test photographs of the test vehicle, the MDB and the dummies (ES-2re and SID-IIs) are included in Appendix A of this report.

Dummies were placed in the driver and left rear designated seating positions according to instructions specified in the OCWS Side Impact Laboratory Test Procedure, dated May 2012. The side impact event was documented by 11 cameras. Camera locations are included in Data Sheet No. 5 of this report.

The dummies were instrumented in the following manner:

DRIVER ATD (ES-2re)
Primary and redundant head CG tri-axial accelerometers
Chest upper rib, middle rib and lower rib y-axis displacement potentiometers
Abdomen forward, middle, and rear y-axis load cells
Lower spine (12) tri-axial accelerometers
Pubic symphysis y-axis load cell

PASSENGER ATD (SID-IIs)
Primary and redundant head CG tri-axial accelerometers
Chest upper rib, middle rib and lower rib y-axis displacement potentiometers
Abdomen upper rib and lower rib y-axis displacement potentiometers
Lower spine (12) tri-axial accelerometers
Acetabulum and iliac wing y-axis load cells

Appendix B contains the vehicle and dummy response data. Dummy configuration and performance verification data can be found in Appendix C of this report.

Dummy injury readings were recorded as follows:

Measurement Description	Units	Driver ATD (ES-2re)	
		Threshold	Result
Head Injury Criteria (HIC_{36})		1000	110.0
Maximum Thorax Rib Deflection	mm	44	10
Combined Abdominal Force	N	2500	429
Pubic Symphysis Force	N	6000	1560

Measurement Description	Units	Passenger ATD (SID-IIs)	
		Threshold	Result
Head Injury Criteria (HIC_{36})		1000	290.1
Lower Spine (T12) Resultant Acceleration	g	82	54
Total Pelvic Force (sum of acetabular and iliac forces	N	5525	2888
Maximum Thoracic Rib Deflection	mm	38*	9
Maximum Abdominal Rib Deflection	mm	45*	10

**Proposed IARV*

Supplemental restraint information is given below:

Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No	No	
Knee Airbag	Yes	No	No	
Side Airbag 1 (Curtain)	Yes	Yes	Yes	Yes
Side Airbag 2 (Torso/Pelvis)	Yes	Yes	No	
Seat Belt Pretensioner	Yes	Yes	No	
Seat Belt Load Limiter	Yes	Yes	No	
Other				

GENERAL COMMENTS

The doors on the struck side of the vehicle remained closed and latched. There was no separation at the hinges or latches. The doors on the non-struck side remained closed and latched. There were no ATD values that exceeded limits.

SECTION 3

OCCUPANT AND VEHICLE INFORMATION/DATA SHEETS

Test Vehicle: 2013 Ford Escape S 5-Door MPV NHTSA No. MD0201

Test Program: NCAP MDB Side Impact Test Test Date: 7/17/12

CONVERSION FACTORS

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

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2013 Ford Escape S 5-Door MPV NHTSA No. MD0201

Test Program: NCAP MDB Side Impact Test Test Date: 7/17/12

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	MD0201
Model Year	2013
Make	Ford
Model	Escape S
Body Style	5-Door MPV
VIN	1FMCU0F77DUA20309
Body Color	Ginger Ale Metalic
Odometer Reading (km / mi)	35.4 / 22.0
Engine Displacement (L)	2.5
Type / No. of Cylinders	Inline 4
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	6
Overdrive	Yes
Final Drive	Front
Roof Rack	No
Sunroof / T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes
All Wheel Drive (AWD)	No

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

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

DATA FROM CERTIFICATION LABEL

Manufactured By	Ford Motor Co.
Date of Manufacture	May-12
Vehicle Type	MPV

GVWR (kg)	2096
GAWR Front (kg)	1098
GAWR Rear (kg)	1006

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity	2	3		5	
Capacity Weight (VCW) (kg)				375.0	*A*
DSC x 68.04 (kg)				340.2	*B*
Cargo Weight (RCLW) (kg)				34.8	*A-B*

VEHICLE SEAT TYPE

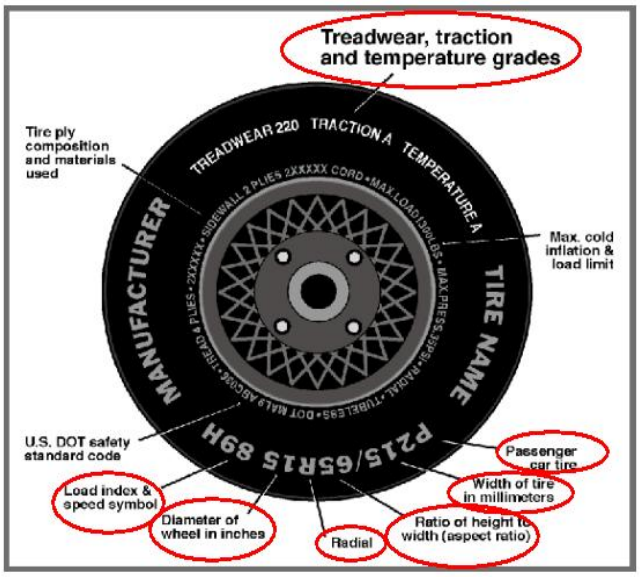
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable w/ Lever	Adjustable w/ Knob
Front Seat	Yes					Yes	
Rear or Second Row Seat			Yes			Yes	
Third Row Seat							

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2013 Ford Escape S 5-Door MPV NHTSA No. MD0201

Test Program: NCAP MDB Side Impact Test Test Date: 7/17/12



TIRE PLACARD INFORMATION

Measured Parameter	Front	Rear
Recommended Cold Tire Pressure (kPa)	240	240
Recommended Tire Size	235/55R17 99H	P255/70R18

VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kpa)	350	350
Tire Size on Vehicle	235/55R17	235/55R17
Tire Manufacturer	Continental	Continental
Tire Name	Conti Pro Contact	Conti Pro Contact
Tire Type	Pass Car Tire M 5	Pass Car Tire M 5
Tire Width	235	235
Aspect Ratio	55	55
Radial	Yes	Yes
Wheel Diameter	17	17
Load Index/Speed Symbol	99H	99H
Treadware	500	500
Traction Grade	AA	AA
Temperature Grade	A	A
Tire Material	Polyester, Steel, Polyamide	Polyester, Steel, Polyamide

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2013 Ford Escape S 5-Door MPV NHTSA No. MD0201

Test Program: NCAP MDB Side Impact Test Test Date: 7/17/12

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	360	365	360	350
Tire Placard	kPa	240	240	240	240
Owner's Manual	kPa	240	240	240	240
As Tested	kPa	240	240	240	240

MDB TIRE SPECIFICATIONS

	Units	Requirement	LF	RF	LR	RR
Tire Size		P205/75R15	P205/75R15	P205/75R15	P205/75R15	P205/75R15
Tire Pressure	kPa	200 ± 21	200	200	200	200

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	463.5	318.0		520.5	392.5		509.5	390.0	
Right	kg	470.0	338.0		467.0	364.0		472.0	380.0	
Ratio	%	58.7%	41.3%	100.0%	56.6%	43.4%	100.0%	56.0%	44.0%	100.0%
Total	kg	933.5	656.0	1589.5	987.5	756.5	1744.0	981.5	770.0	1751.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1589.5	A
Actual Weight of 2 P572 ATDs Used	kg	125.0	B
Rated Cargo/Luggage Wt (RCLW)	kg	34.8	C
Calculated Vehicle Target Wt (TVTW)	kg	1749.3	A+B+C

Does the measured As Tested Vehicle Weight lie within the required weight range (i.e. Calculated Test Vehicle Target Weight -4.5 kg to -9.0 kg)? ☒ **Yes** ☐ **No**

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Tail Lights	2.0
Non-Struck Side Outboard Mirror	1.5
Non-Struck Side Door Panels and Glass	17.0
Spare Tire and Tools	19.0
Trunk Soft Trim	7.5
Rear Speakers	1.5
Ballast / Equipment Added	71.3

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2013 Ford Escape S 5-Door MPV NHTSA No. MD0201

Test Program: NCAP MDB Side Impact Test Test Date: 7/17/12

TEST VEHICLE ATTITUDE AND CG

Measurement Description	Units	Fully Loaded	As Tested	Meets Requirement***
LF	mm	801	802	Yes
RF	mm	808	810	Yes
RR	mm	826	823	Yes
LR	mm	830	827	Yes
Vehicle CG (Aft of Front Axle)	mm	1183	1167	
Vehicle CG (Left (+)/Right (-) from Longitudinal Centerline)	mm	21	37	

***The “As Tested” vehicle attitude measurements must be equal to or within ±10 mm of the “Fully Loaded” vehicle attitude measurements at each wheel well. Indicate “Yes” or “No” for “Meets Requirement”

DATA SHEET NO. 2

SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEM DATA

Test Vehicle: 2013 Ford Escape S 5-Door MPV NHTSA No. MD0201

Test Program: NCAP MDB Side Impact Test Test Date: 7/17/12

SEAT POSITIONING

The driver's seat, front center seat (if applicable), and right front passenger's seat should be set to the mid-track, lowest, mid-angle position. The struck side rear passenger's seat, rear center seat, and non-struck side rear passenger's seats should be set to the rear-most, lowest, mid-angle position.

SCRL ANGLE RANGE

Seat	SCRL (°)		
	Max	Min	Mid
Driver Seat	14.4	9.0	11.7
Front Passenger Seat	Fixed	Fixed	Fixed
Front Center Seat			
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat	Fixed to LR	Fixed to LR	Fixed to LR

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle	As Tested SCRP Height	SCRP Height Position	SCRP Height (mm)		
				Rearmost	Mid Fore/Aft	Forwardmost
Driver Seat	11.7	665	Max	660	665	668
			Mid	660	665	668
			Min	660	665	668
Front Passenger Seat	Fixed	655	Max	651	655	659
			Mid	651	655	659
			Min	651	655	659
Front Center Seat			Max			
			Mid			
			Min			
Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Max	Fixed to LR	Fixed to LR	Fixed to LR
			Mid	Fixed to LR	Fixed to LR	Fixed to LR
			Min	Fixed to LR	Fixed to LR	Fixed to LR

DATA SHEET NO. 2 … (CONTINUED)

SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEM DATA

Test Vehicle: 2013 Ford Escape S 5-Door MPV NHTSA No. MD0201

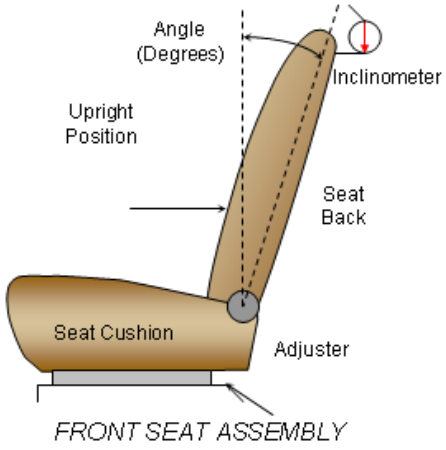
Test Program: NCAP MDB Side Impact Test Test Date: 7/17/12

SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position From Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	254	38	127	18
Front Passenger Seat	268	38	134	18
Front Center Seat				
Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Rear Center Seat	Fixed to LR	Fixed to LR	Fixed to LR	Fixed to LR

SEAT BACK ADJUSTMENT

The driver's seat back is positioned to the manufacturer's designated design angle. The right front passenger's seat back is positioned in a similar manner as the driver's seat back. The struck side rear seat back is positioned such that the dummy's head is level. The rear center and non-struck side rear outboard seat backs are positioned in a similar manner as the struck side rear seat back. Seat Back angle is measured at the headrest post.



SEAT BACK POSITION

Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degree	Detent*
Driver Seat w/Seated Dummy	50.4	28	3.2	10
Front Passenger Seat	50.3	28	3.2	10
Front Center Seat				
Struck Side Rear Seat w/Seated Dummy	7.8	6	2.0	0
Non-Struck Side Rear Seat	7.2	6	2.0	0
Rear Center Seat	Fixed to LR	Fixed to LR	Fixed to LR	Fixed to LR

DATA SHEET NO. 2 … (CONTINUED)

SEAT ADJUSTMENT, FUEL SYSTEMS, AND STEERING WHEEL DATA

Test Vehicle: 2013 Ford Escape S 5-Door MPV NHTSA No. MD0201

Test Program: NCAP MDB Side Impact Test Test Date: 7/17/12

SEAT BELT ANCHORAGE ADJUSTMENT

Seat belt anchorages are adjusted in accordance with the information provided by the manufacturer on Form No. 1. The positions are marked H, M1,…, L from top to bottom.

	Total No. of Positions	Placed in Position
Driver Seat	4	H
Rear Seat	Fixed	Fixed

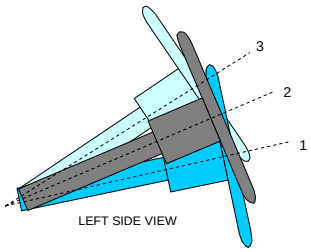
HEAD RESTRAINT ADJUSTMENT

The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

	Total No. of Positions	Placed in Position
Driver Seat	4 Vertical; 11 Rotate	Full Up, Full Forward
Rear Seat	Fixed	Fixed

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the center of the geometric locus it describes when it moves through its full range of motion.



STEERING COLUMN ASSEMBLY

	Degrees	Fore-Aft Position (mm)
Lowermost - Position 1	23.9	110
Geometric Center - Position 2	27.0	135
Uppermost - Position 3	30.0	160
Telescoping Steering Wheel Travel		50
Test Position	27.0	135

DATA SHEET NO. 2 … (CONTINUED)

SEAT ADJUSTMENT, FUEL SYSTEMS, AND STEERING WHEEL DATA

Test Vehicle: 2013 Ford Escape S 5-Door MPV NHTSA No. MD0201

Test Program: NCAP MDB Side Impact Test Test Date: 7/17/12

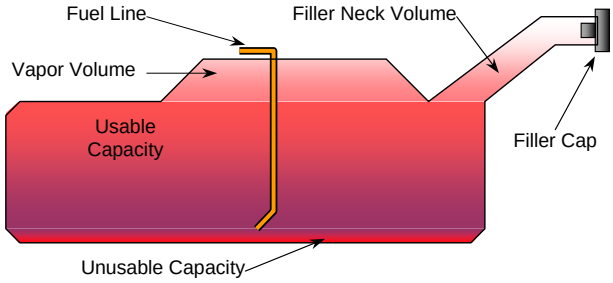
FUEL TANK CAPACITY

Description	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	57.00
Usable Capacity of "Optional Tank" (see Form No. 1)	
Usable Capacity of "Standard Tank" (see Owner's Manual)	
Usable Capacity of "Optional Tank" (see Owner's Manual)	
93% of Usable Capacity	53.01
Actual amount of Solvent Used in Test	53.01
1/3 of Usable Capacity	19.00

Is the Actual Amount of Solvent Used in the test equal to 93% ± 1% of the Usable Capacity stated in the Form No. 1? ☒ **Yes** ☐ **No**

FUEL PUMP

The vehicle is equipped with an electric fuel pump. The electronic fuel pump operates for a prescribed amount of time to pressurize the fuel system following the actuation of the ignition. If no attempt has been made to start the engine within 450 ms following ignition operation, the fuel pump will shut off. The fuel pump operates continuously while the engine is running. If the engine stalls, the fuel pump is deactivated. Also, fuel pump shut-off is provided, which is designed to stop the fuel flow to the engine if the vehicle sustains an impact above a certain magnitude.



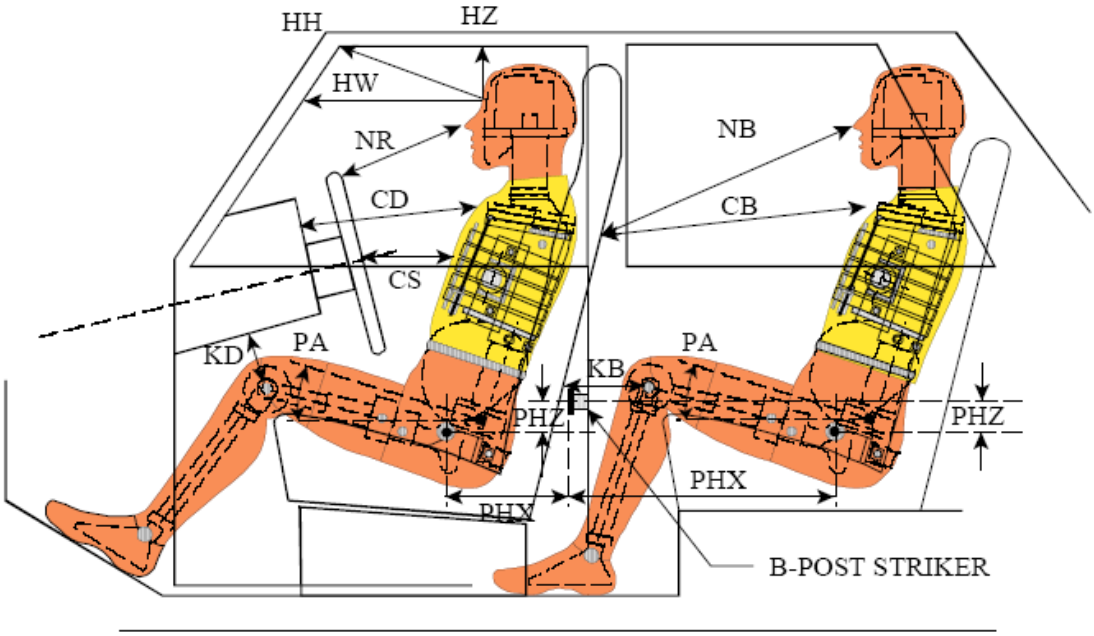
VEHICLE FUEL TANK ASSEMBLY

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2013 Ford Escape S 5-Door MPV NHTSA No. MD0201

Test Program: NCAP MDB Side Impact Test Test Date: 7/17/12



LEFT SIDE VIEW

NOTE: 2-DOOR VEHICLE SHOWN. REAR DUMMY PHX & PHZ MEASUREMENTS FOR A 4-DOOR VEHICLE WOULD USE THE C-POST STRIKER AS A REFERENCE POINT

DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

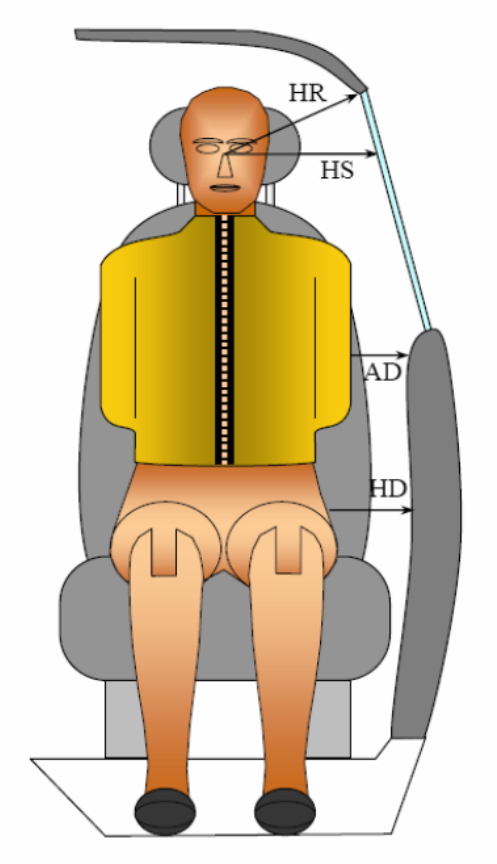
Driver Code	Pass. Code	Description	Driver		Passenger	
			Length (mm)	Angle (º)	Length (mm)	Angle (º)
HH		Head to Header	476			
HW		Head to Windshield	720			
HZ	HZ	Head to Roof	211		296	
NR	NB	Nose to Rim/Seat Back	495		506	
CD	CB	Chest to Dash/Seat Back	625		521	
CS		Chest to Steering Wheel	335			
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	158	35.9	281	8.8
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	179	30.0	268	4.0
PAX°	PAX°	Pelvic Tilt Angle X		17.1		18.5
	PAY°	Pelvic Tilt Angle Y				0.3
PHX	PHX	Hip Point to Striker (x-axis)	172		241	
PHZ	PHZ	Hip Point to Striker (z-axis)	79		240	

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2013 Ford Escape S 5-Door MPV NHTSA No. MD0201

Test Program: NCAP MDB Side Impact Test Test Date: 7/17/12



FRONT VIEW OF DUMMY

DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

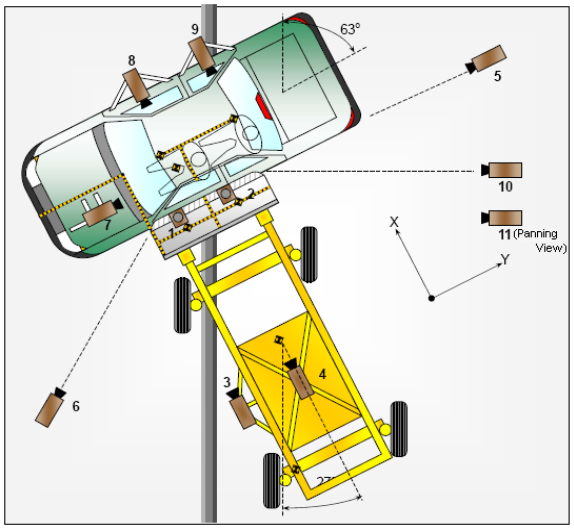
Code	Measurement Description	Units	Driver	Passenger
HR	Head to Side Header	mm	230	261
HS	Head to Side Window	mm	358	358
AD	Arm to Door	mm	95	154
HD	H-Point to Door	mm	157	148

DATA SHEET NO. 5

CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2013 Ford Escape S 5-Door MPV NHTSA No. MD0201

Test Program: NCAP MDB Side Impact Test Test Date: 7/17/12



CAMERA LOCATIONS AND DATA

No.	View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	1220	2287	-5486	14	1000
2	Overhead Close-Up	609	2287	-5102	35	1000
3	Left Impact Point (MDB)	-2134	0	-1143	25	1000
4	Side Overall (MDB)	-3912	838	-1829	12.5	1000
5	Rear	-64	2485	-1348	85	1000
6	Left Front	-2266	-3564	-1475	24	1000
7	Driver Front (On-Board)	491	-691	769	35	1000
8	Driver Side (On-Board)	1717	706	546	14	1000
9	Passenger Side (On-Board)	1639	1513	612	14	1000
10	Real Time Overall				Zoom	30
11	Real Time Inrun				Zoom	30

Reference: Impact Point Projected to Ground; +X = To Front of MDB, +Y = To Right of MDB, +Z = Down

*All measurements accurate to ±6 mm

INSTRUMENTATION

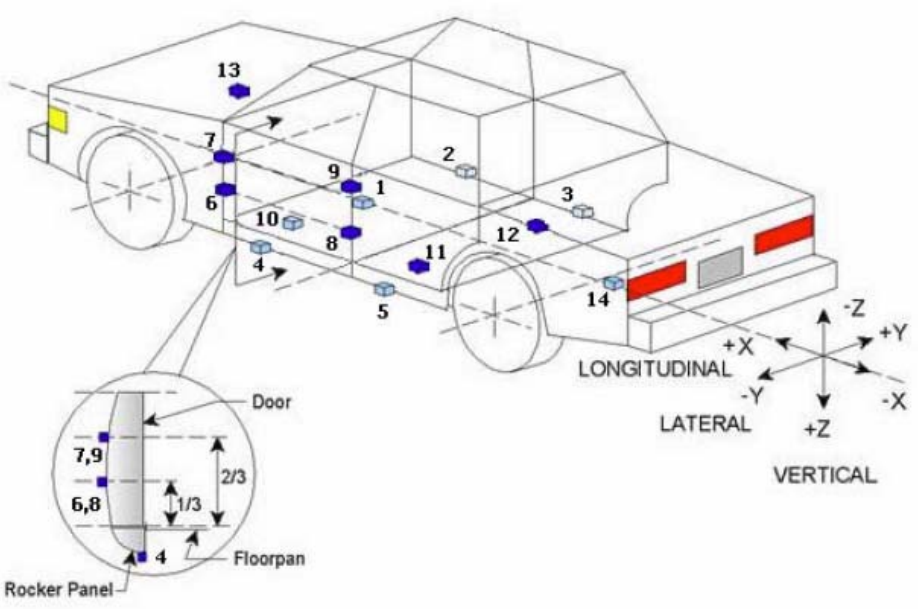
Driver Dummy Channels	16
Passenger Dummy Channels	16
Vehicle Structure Accelerometers	23
MDB Accelerometers	5
Total	60

DATA SHEET NO. 6

TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2013 Ford Escape S 5-Door MPV NHTSA No. MD0201

Test Program: NCAP MDB Side Impact Test Test Date: 7/17/12



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

Loc. No.	Sensor Description	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	1895	0	-440
2	Right Sill at Front Seat	2510	678	-440
3	Right Sill at Rear Seat	1695	695	-460
4	Left Sill at Front Door	2430	-700	-278
5	Left Sill at Rear Door	1695	-685	-270
6	A-Pillar Lower	3050	-825	-618
7	A-Pillar Middle	3080	-815	-860
8	B-Pillar Lower	1975	-740	-745
9	B-Pillar Middle	1975	-740	-935
10	Front Seat Track	2250	-580	-495
11	Rear Seat Structure	1600	-540	-615
12	Right Rear Occupant Compartment	1910	490	-300
13	Engine Block	3730	65	-865
14	Rear Floorpan Above Axle	755	340	-495

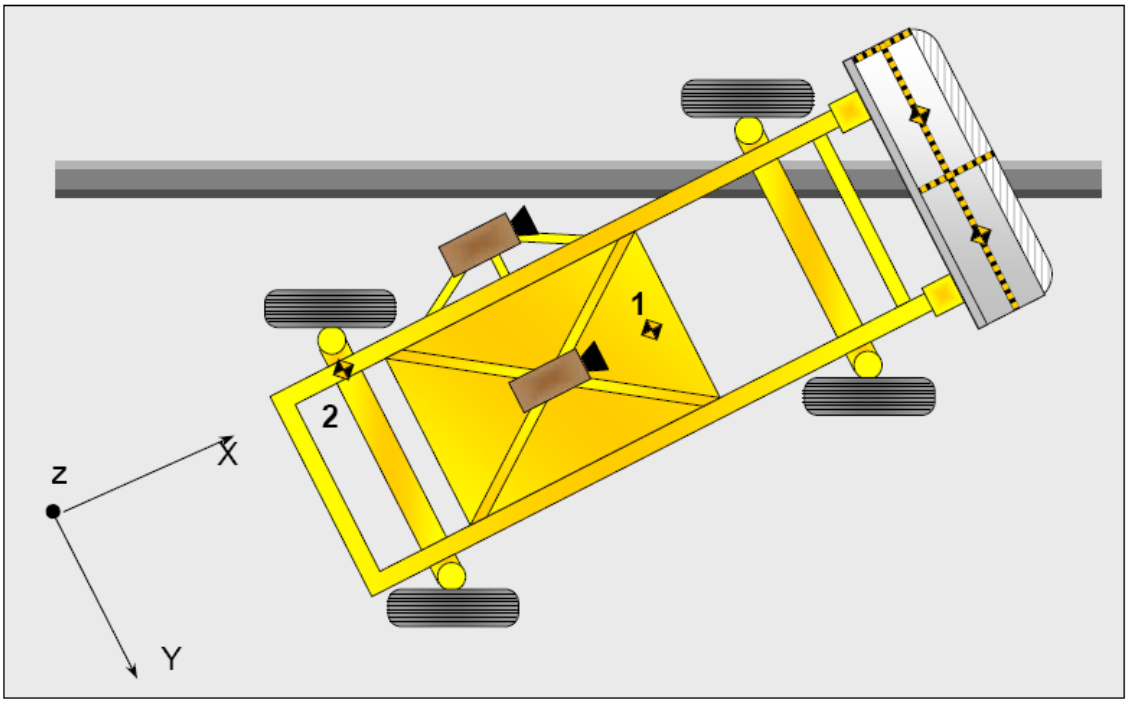
Reference: X – Rear surface of vehicle (+ forward)
Y – Vehicle centerline (+ to right)
Z – Ground plane (+ down)

DATA SHEET NO. 7

MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2013 Ford Escape S 5-Door MPV NHTSA No. MD0201

Test Program: NCAP MDB Side Impact Test Test Date: 7/17/12



MDB ACCELEROMETER LOCATIONS

Loc. No.	Accelerometer Location	Measurement		
		X	Y	Z
1	MDB CG	-1195	0	-430
2	MDB Rear	-2642	-593	-608

Reference: X – Face of MDB (+ forward)
Y – MDB centerline (+ to right)
Z – Ground plane (+ down)

DATA SHEET NO. 8

POST-TEST OBSERVATIONS

Test Vehicle: 2013 Ford Escape S 5-Door MPV NHTSA No. MD0201

Test Program: NCAP MDB Side Impact Test Test Date: 7/17/12

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Front Seat Dummy (ES-2re)	Rear Seat Dummy (SID-IIs)
Face	Curtain Airbag	None
Top of Head	Curtain Airbag	Curtain Airbag
Left Side of Head	Curtain Airbag	Curtain Airbag
Back of Head	Headrest	None
Left Shoulder	Torso/Pelvis Airbag, Door Panel	Door Panel
Upper Torso	Torso/Pelvis Airbag	None
Lower Torso	Torso/Pelvis Airbag	Door Panel
Left Hip	Torso/Pelvis Airbag	Door Panel
Left Knee	None	Door Panel, Right Knee

POST-TEST DOOR PERFORMANCE

Description	Struck Side		Non-Struck Side		Rear Hatch/Oth
	Front	Rear	Front	Rear	
Remained Closed and Operational	No	No	Yes	Yes	Yes
Total Separation from Vehicle at Hinges or Latches	No	No	No	No	No
Latch or Hinge System Pulled Out of Their Anchorages	No	No	No	No	No
Disengaged from Latched Position	No	No	No	No	No
Latch Separated from Striker	No	No	No	No	No
Jammed Shut	Yes	Yes	No	No	No
If Door Opened at Striker, Record Width of Opening at Striker (mm)					

POST-TEST SEAT PERFORMANCE

Description	Struck Side		Non-Struck Side	
	Front	Rear	Front	Rear
Seat Movement Along Seat Track	No	No	No	No
Seat Disengagement from Floor Pan	No	No	No	No
Seat Back Movement from Initial Position	No	No	No	No
Seat Back Collapse	No	No	No	No

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	No Separation
Sill Separation	No Separation
Windshield Damage	None
Side Window Damage	None
Other Notable Effects	None

DATA SHEET NO. 8 … (CONTINUED)

POST-TEST OBSERVATIONS

Test Vehicle: 2013 Ford Escape S 5-Door MPV NHTSA No. MD0201

Test Program: NCAP MDB Side Impact Test Test Date: 7/17/12

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No	No	
Knee Airbag	Yes	No	No	
Side Airbag 1 (Curtain)	Yes	Yes	Yes	Yes
Side Airbag 2 (Torso/Pelvis)	Yes	Yes	No	
Seat Belt Pretensioner	Yes	Yes	No	
Seat Belt Load Limiter	Yes	Yes	No	
Other				

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		2690
Vertical Impact Reference Line (Aft of Front Axle)(Intended Impact Point)	mm		405
Actual Impact Point (Aft of Front Axle)	mm		406
Horizontal Offset (+ forward / - rearward)	mm	± 50 of Intended Impact Point	-1
Vertical Offset (+ down / - up)	mm	± 20 of Intended Impact Point	-11

DATA SHEET NO. 9

MDB SUMMARY OF RESULTS

Test Vehicle: 2013 Ford Escape S 5-Door MPV NHTSA No. MD0201

Test Program: NCAP MDB Side Impact Test Test Date: 7/17/12

MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1251
Overall Length including Honeycomb Face	4023
Wheel Base of Framework Carriage	2595
CG location aft of Front Axle	1118

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	402	298	700
Right	kg	377	292	669
Ratio	%	56.9%	43.1%	99.9%
Totals	kg	779	590	1369

SPEED AND IMPACT DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.42
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.34
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90.1
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	63.5
MDB Crabbed Angle to MDB Forward Line of Motion	degrees	26.0 to 28.0	26.5

MAXIMUM STATIC CRUSH OF HONEYCOMB FACE

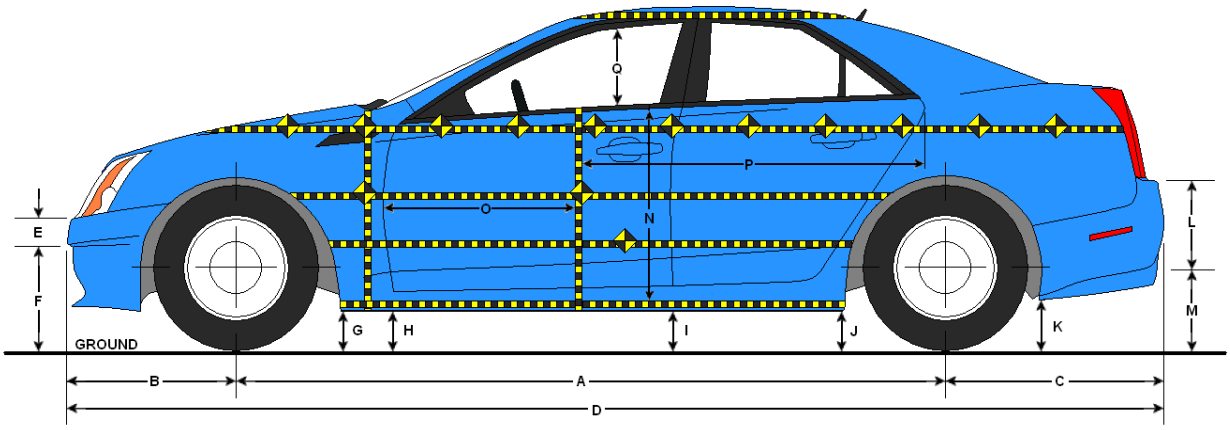
Vertical Location			From Centerline		Max. Crush (mm)
Row	Description	Height (mm)	Distance (mm)	Direction	
A	Center of Bumper	432	800	Right	250
B	Top of Bumper	533	800	Left	180
C	Mid Level	686	800	Left	164
D	Top of Stack	813	800	Left	209

DATA SHEET NO. 10

TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2013 Ford Escape S 5-Door MPV NHTSA No. MD0201

Test Program: NCAP MDB Side Impact Test Test Date: 7/17/12



LEFT SIDE VIEW

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2690	2681	-9
B	Front Axle to FSOV	929	917	-12
C	Rear Axle to RSOV	907	921	14
D	Total Length at Centerline	4526	4519	-7
E	Front Bumper Thickness	443	442	-1
F	Fromt Bumper Bottom to Ground	344	358	14
G	Sill Height at Front Wheel Well	271	290	19
H	Sill Height at Front Door Leading Edge	278	361	83
I	Sill Height at B-Pillar	278	312	34
J1	Sill Height at Rear Wheel Well	277	292	15
J2	Pinch Weld Height at Rear Wheel Well	255	259	4
K	Sill Height Aft of Rear Wheel Well	408	426	18
L	Rear Bumper Thickness	233	236	3
M	Rear Bumper Bottom to Ground	396	386	-10
N	Sill Height to Bottom of Front Window Sill	664	767	103
O	Front Door Leading Edge to Impact CL	780	757	-23
P	Rear Door Trailing Edge to Impact CL	1311	1287	-24
Q	Front Window Opening	470	492	22
R	Right Side Length	3251	3260	9
S	Left Side Length	3249	3227	-22
T	Vehicle Width at B-Pillar	1808	1711	-97

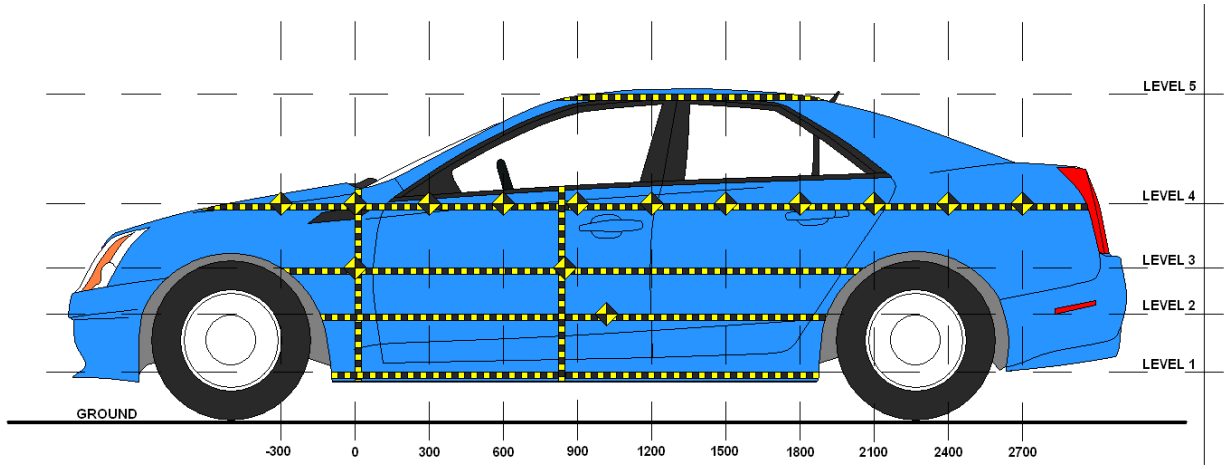
All measurements in mm with tolerance of ± 3mm

DATA SHEET NO. 11

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2013 Ford Escape S 5-Door MPV NHTSA No. MD0201

Test Program: NCAP MDB Side Impact Test Test Date: 7/17/12



LEFT SIDE VIEW

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Description	Height Above Ground (mm)	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	342	96	1050
2	Occupant H-Point	673	192	1650
3	Mid-Door	708	193	1650
4	Window Sill	1027	104	1350
5	Window Top	1601	43	2400

DATA SHEET NO. 11 … (CONTINUED)

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2013 Ford Escape S 5-Door MPV NHTSA No. MD0201

Test Program: NCAP MDB Side Impact Test Test Date: 7/17/12

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

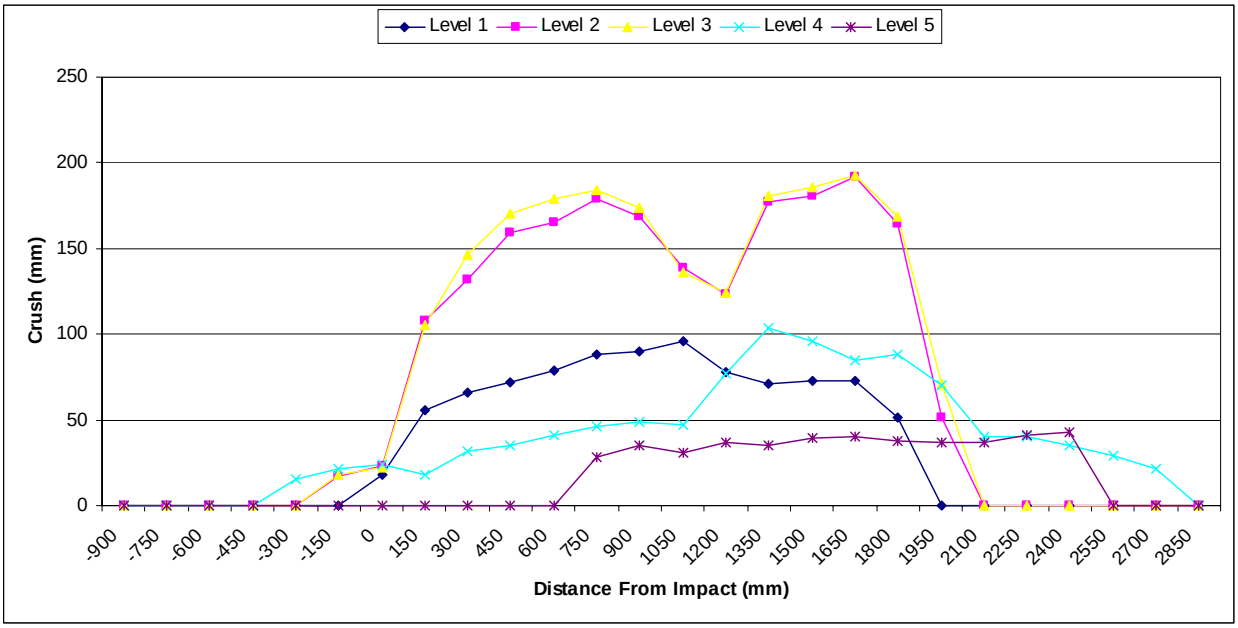
	Pre-Test (mm)					Post-Test (mm)					Difference (mm)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900															
-750															
-600															
-450															
-300				712					727					15	
-150		581	582	685			598	600	706			17	18	21	
0	624	592	595	670		642	615	617	694		18	23	22	24	
150	627	605	605	660		683	713	710	678		56	108	105	18	
300	627	606	605	649		693	738	751	681		66	132	146	32	
450	631	607	605	642		703	766	775	677		72	159	170	35	
600	636	607	606	636		715	772	785	677	874	79	165	179	41	
750	635	608	607	631	845	723	787	791	677	873	88	179	184	46	28
900	642	610	608	627	844	732	779	782	676	879	90	169	174	49	35
1050	644	612	610	625	850	740	751	746	672	881	96	139	136	47	31
1200	646	614	612	623	852	724	737	736	700	889	78	123	124	77	37
1350	655	616	614	622	854	726	793	795	726	889	71	177	181	104	35
1500	654	618	617	619	855	727	799	803	715	894	73	181	186	96	39
1650	637	620	620	620	860	710	812	813	705	900	73	192	193	85	40
1800	631	613	616	627	866	682	777	785	715	904	51	164	169	88	38
1950		592	591	631	873		643	662	701	910		51	71	70	37
2100				638	880				678	917				40	37
2250				645	885				685	926				40	41
2400				652	894				687	937				35	43
2550				662					691					29	
2700				674					695					21	
2850															

DATA SHEET NO. 11 … (CONTINUED)

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2013 Ford Escape S 5-Door MPV NHTSA No. MD0201

Test Program: NCAP MDB Side Impact Test Test Date: 7/17/12

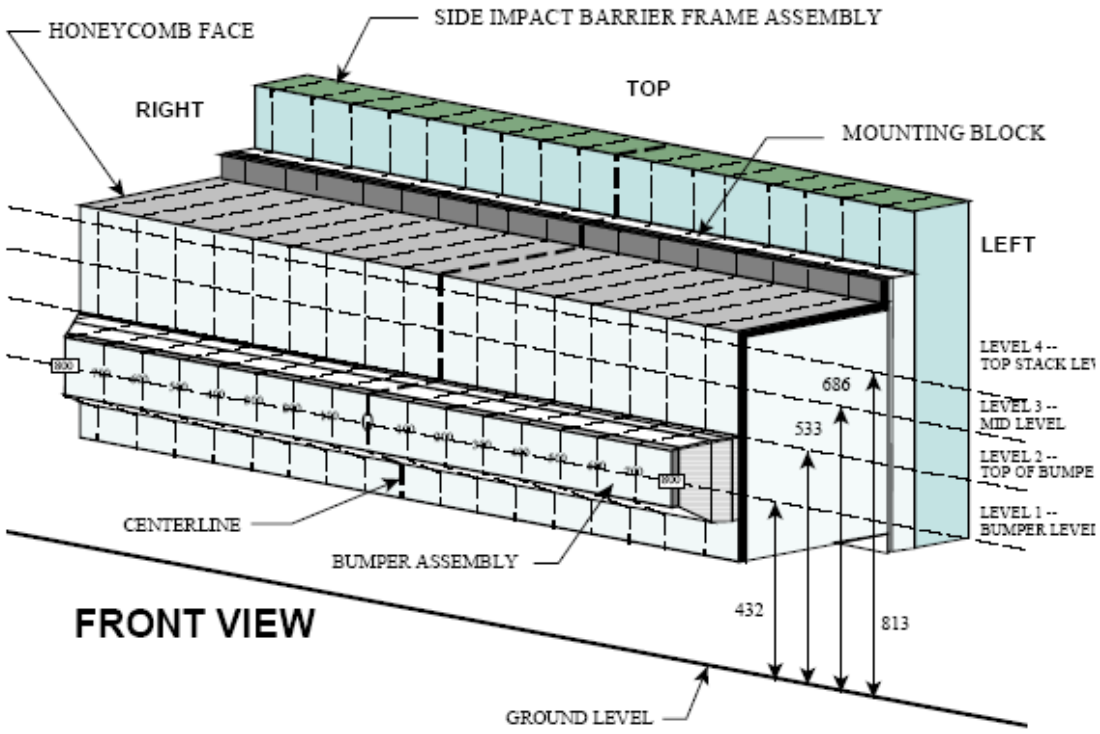


DATA SHEET NO. 12

MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2013 Ford Escape S 5-Door MPV NHTSA No. MD0201

Test Program: NCAP MDB Side Impact Test Test Date: 7/17/12



NOTE: Dimensions are shown in millimeters, mm

DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800
1	250	227	211	201	201	203	204	205	209	206	206	206	204	206	210	216	241
2	169	151	138	126	120	118	123	122	118	124	136	140	143	146	148	154	180
3	106	86	85	88	95	114	144	134	107	87	78	76	80	93	110	141	164
4	96	90	85	80	84	115	154	143	112	90	88	94	104	111	117	155	209

All dimensions in millimeters.

DATA SHEET NO. 13

FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2013 Ford Escape S 5-Door MPV NHTSA No. MD0201

Test Program: NCAP MDB Side Impact Test Test Date: 7/17/12

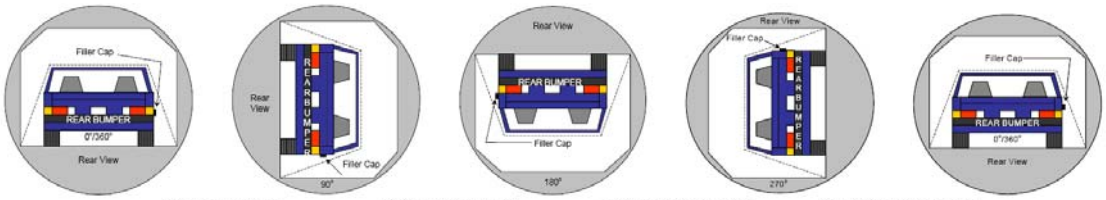
Temperature at Time of Impact: 32.0° C Test Time: 2:33 PM

A. From impact until vehicle motion ceases: 0 oz.
(Maximum allowable = 1 oz.)

B. For the 5 minute period after motion ceases: 0 oz.
(Maximum allowable = 5 oz.)

C. For the following 25 minutes: 0 oz.
(Maximum allowable = 1 oz./minute)

D. Spillage Details: No spillage occurred



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

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° To 90°	82	300	382
90° To 180°	80	300	380
180° To 270°	79	300	379
270° To 360°	81	300	381

FMVSS 301 SPILLAGE TABLE

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

SOLVENT SPILLAGE LOCATION TABLE

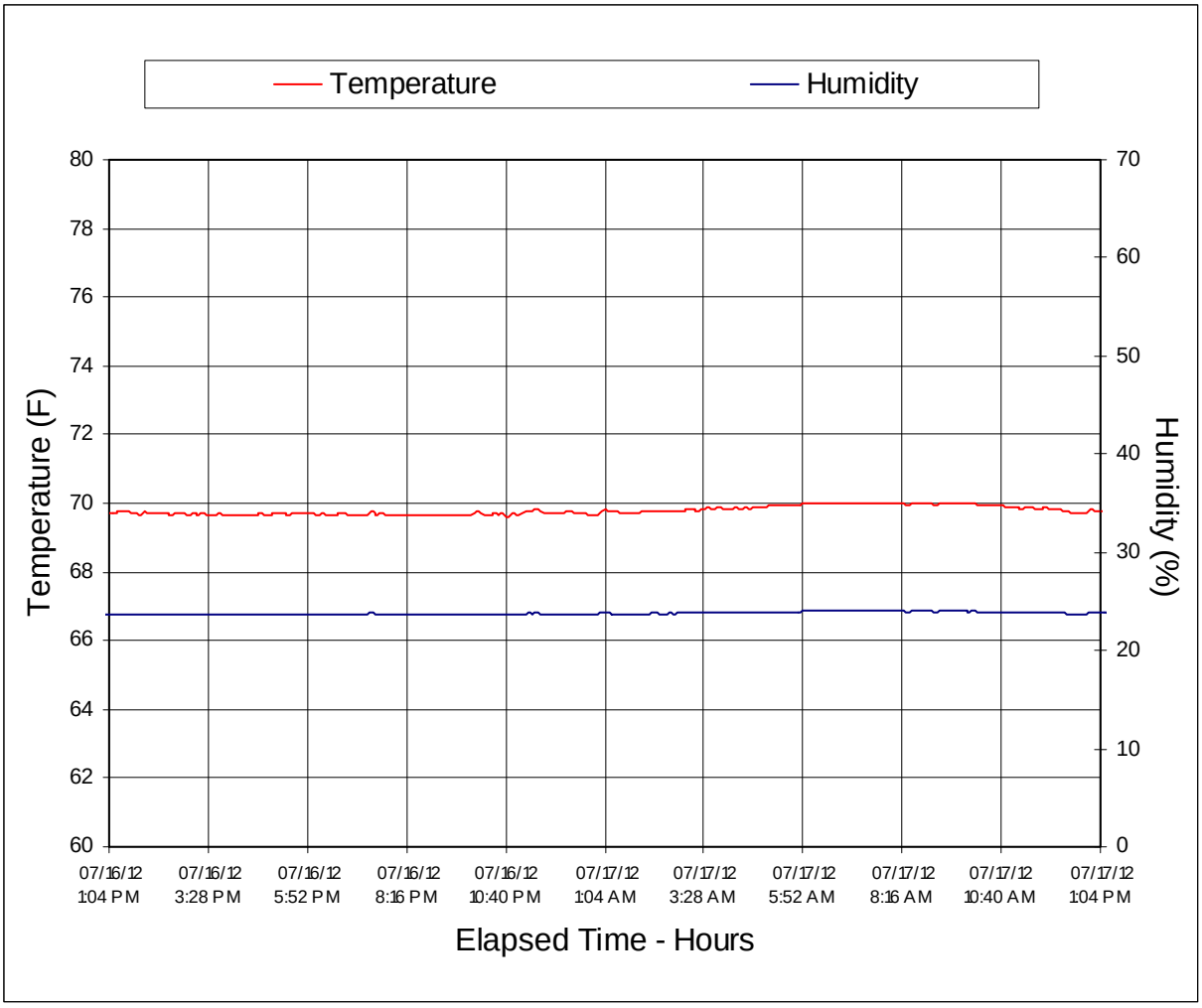
Test Phase	Spillage Location
0° To 90°	No Spillage Occurred
90° To 180°	No Spillage Occurred
180° To 270°	No Spillage Occurred
270° To 360°	No Spillage Occurred

DATA SHEET NO. 14

DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION

Test Vehicle: 2013 Ford Escape S 5-Door MPV NHTSA No. MD0201

Test Program: NCAP MDB Side Impact Test Test Date: 7/17/12



APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

TABLE OF PHOTOGRAPHS … (CONTINUED)

TABLE OF PHOTOGRAPHS … (CONTINUED)

FIGURE 1. As-Delivered Right Front ¾ View of Test Vehicle

FIGURE 2. As-Delivered Left Rear ¾ View of Test Vehicle

FIGURE 3. Pre-Test Frontal View of Test Vehicle

FIGURE 4. Post-Test Frontal View of Test Vehicle

FIGURE 5. Pre-Test Left Front ¾ View of the Test Vehicle

FIGURE 6. Post-Test Left Front ¾ View of the Test Vehicle

FIGURE 7. Pre-Test Left Side View of Test Vehicle

FIGURE 8. Post-Test Left Side View of Test Vehicle

FIGURE 9. Pre-Test Left Rear ¾ View of Test Vehicle

FIGURE 10. Post-Test Left Rear ¾ View of Impact Zone

FIGURE 11. Pre-Test Rear View of Test Vehicle

FIGURE 12. Post-Test Rear View of Test Vehicle

FIGURE 13. Pre-Test Right Side View of Test Vehicle

FIGURE 14. Post-Test Right Side View of Test Vehicle

FIGURE 15. Pre-Test Overhead View of Test Area

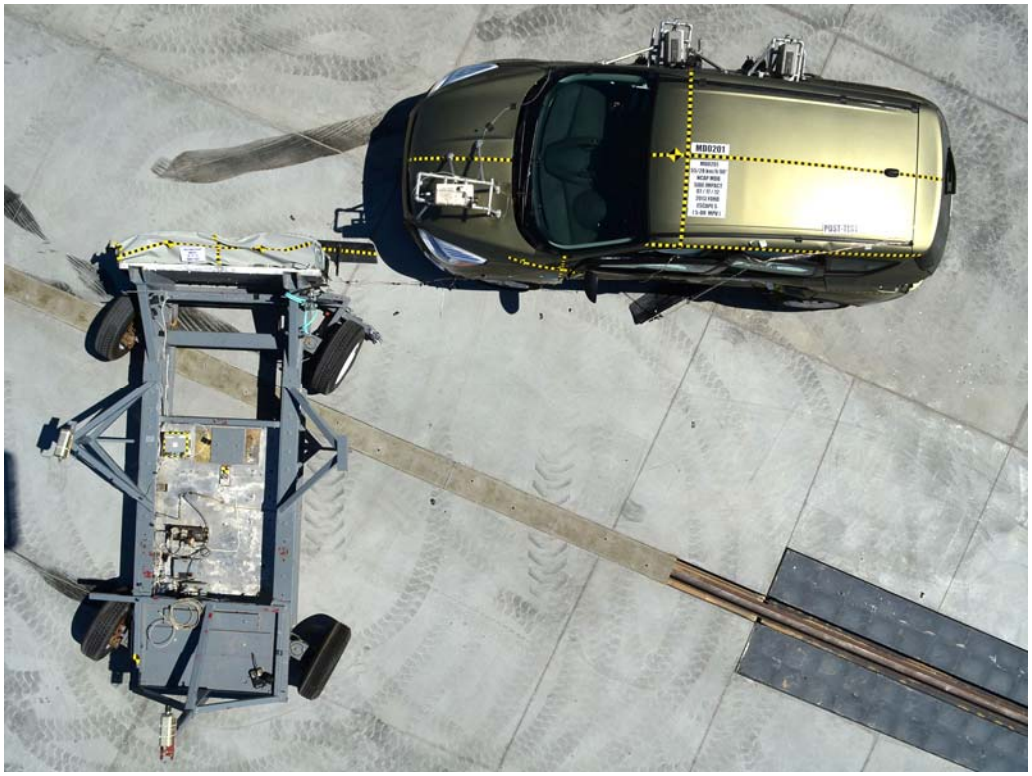


FIGURE 16. Post-Test Overhead View of Test Area

FIGURE 17. Pre-Test Left Side View of MDB Positioned Against Side of Test Vehicle

FIGURE 18. Pre-Test Right Side View of MDB Positioned Against Side of Test Vehicle

FIGURE 19. Pre-Test Close-Up View of Impact Point Target

FIGURE 20. Post-Test Close-Up View of Impact Point Target
Showing Impact Point Location

FIGURE 21. Pre-Test Left Front Door Latch Close-Up

FIGURE 22. Post-Test Left Front Door Latch Close-Up

FIGURE 23. Pre-Test Left Rear Door Latch Close-Up

FIGURE 24. Post-Test Left Rear Door Latch Close-Up

FIGURE 25. Pre-Test Front Close-Up View of Driver Dummy

FIGURE 26. Post-Test Front Close-Up View of Driver Dummy

FIGURE 27. Pre-Test Left Side View of Driver Dummy
Showing Belt and Chalking

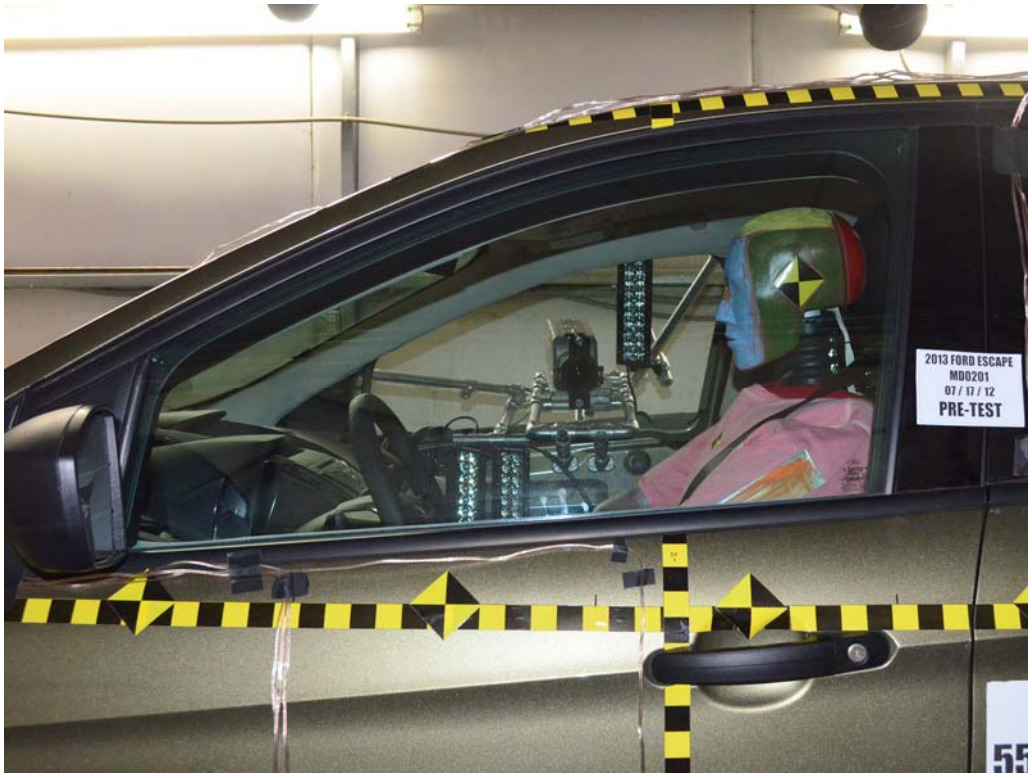


FIGURE 28. Pre-Test Left Side View of Driver Dummy Shoulder and Door Top View

FIGURE 29. Post-Test Left Side View of Driver Dummy Shoulder and Door Top View

FIGURE 30. Pre-Test Frontal View of Driver Seat Back Prior to Dummy Positioning

FIGURE 31. Pre-Test Frontal View of Driver Dummy Head and Shoulders in Relation to Head Restraint

FIGURE 32. Pre-Test Frontal View of Driver Seat Pan Prior to Dummy Positioning

FIGURE 33. Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan

FIGURE 34. Pre-Test Placement of Driver Dummy's Feet

FIGURE 35. Pre-Test View of Belt Anchorage for Driver Dummy

FIGURE 36. Pre-Test Left Side View of Steering Wheel

FIGURE 37. View of Disengaged Parking Brake

FIGURE 38. Pre-Test View of Parking Brake

FIGURE 39. Pre-Test Close-Up Left Side View of Driver Seat Track

FIGURE 40. Pre-Test Close-Up Left Side View of Driver Seat Back

FIGURE 41. Pre-Test Close-Up View of Driver Seat Back or Head Restraint

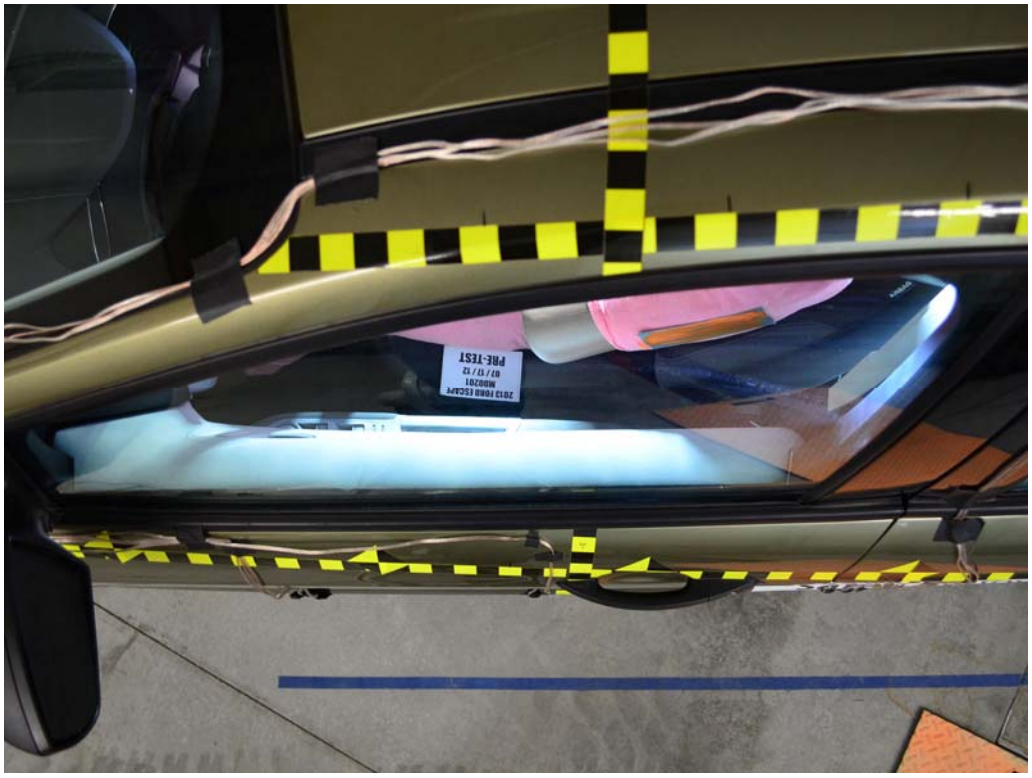


FIGURE 42. Pre-Test Driver Dummy and Door Clearance View

FIGURE 43. Post-Test Driver Dummy and Door Clearance View

FIGURE 44. Pre-Test Right Side View of Driver Dummy
and Front Seat Occupant Compartment

FIGURE 45. Post-Test Right Side View of Driver Dummy
and Front Seat Occupant Compartment

FIGURE 46. Pre-Test Driver Inner Door Panel View

FIGURE 47. Post-Test Driver Inner Door Panel View
Showing Driver Dummy Contact Locations

FIGURE 48. Post-Test Driver Dummy Close-Up Head Contact with Vehicle Interior View

FIGURE 49. Post-Test Driver Dummy Close-Up Head Contact with Side Airbag View

FIGURE 50. Post-Test Driver Dummy Close-Up Torso Contact with Vehicle Interior View

FIGURE 51. Post-Test Driver Dummy Close-Up Torso Contact with Side Airbag View

FIGURE 52. Post-Test Driver Dummy Close-Up Pelvis Contact with Vehicle Interior View

FIGURE 53. Post-Test Driver Dummy Close-Up Pelvis Contact with Side Airbag View

FIGURE 54. Post-Test Driver Dummy Close-Up Knee Contact View

FIGURE 55. Pre-Test Left Side View of Rear Passenger Dummy Showing Belt and Chalking

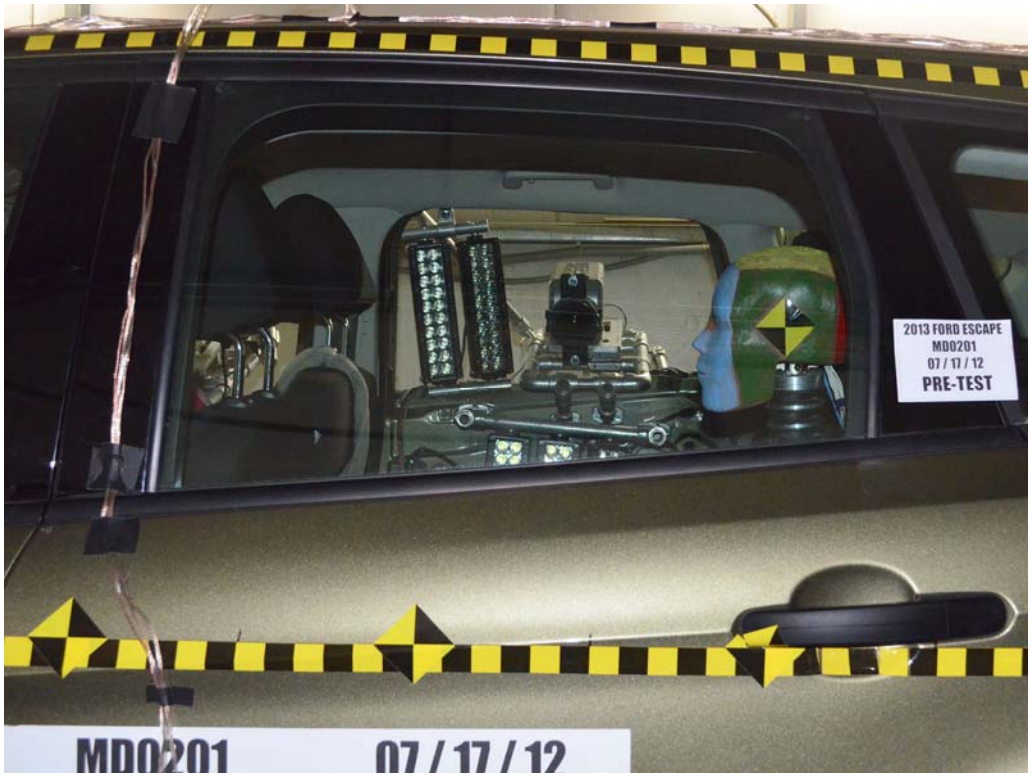


FIGURE 56. Pre-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View

FIGURE 57. Post-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View

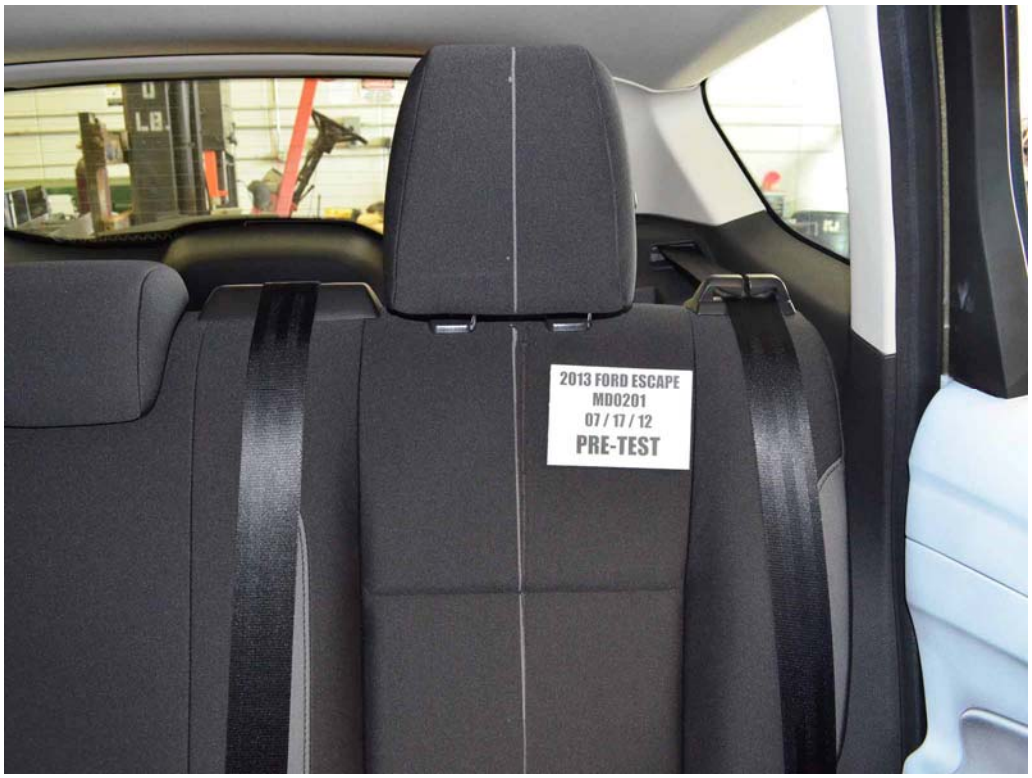


FIGURE 58. Pre-Test Frontal View of Rear Passenger Seat Back Prior to Dummy Positioning

FIGURE 59. Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint

FIGURE 60. Pre-Test Overhead View of Rear Passenger Seat Pan Prior to Dummy Positioning

FIGURE 61. Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan

FIGURE 62. Pre-Test View of Rear Passenger Dummy's Neck
Showing Position of Adjustable Neck Bracket

FIGURE 63. Pre-Test View of Rear Passenger Dummy's Head
Showing Dummy's Head is Level

FIGURE 64. Pre-Test Placement of Rear Passenger Dummy's Feet

FIGURE 65. Pre-Test View of Belt Anchorage for Rear Passenger Dummy

FIGURE 66. Pre-Test Close-Up Left Side View of Rear Passenger Seat Track

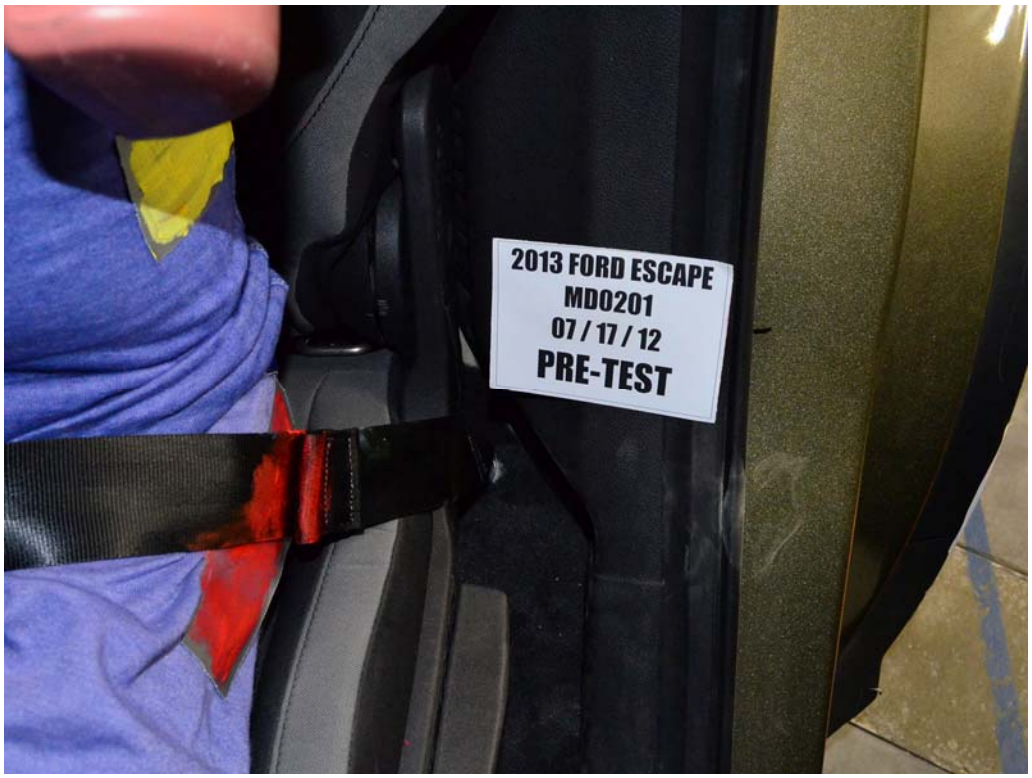


FIGURE 67. Pre-Test Close-Up Left Side View of Rear Passenger Seat Back

FIGURE 68. Pre-Test Close-Up View of Rear Passenger Seat Back or Head Restraint

FIGURE 69. Pre-Test Rear Passenger Dummy and Door Clearance View

FIGURE 70. Post-Test Rear Passenger Dummy and Door Clearance View

FIGURE 71. Pre-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment

FIGURE 72. Post-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment

FIGURE 73. Pre-Test Rear Passenger Inner Door Panel View

FIGURE 74. Post-Test Rear Passenger Inner Door Panel View
Showing Rear Passenger Dummy Contact Locations

Photograph Not Applicable

No Passenger Dummy Head Contact with Vehicle Interior

FIGURE 75. Post-Test Rear Passenger Dummy Close-Up
Head Contact with Vehicle Interior View

FIGURE 76. Post-Test Rear Passenger Dummy Close-Up
Head Contact with Side Airbag View

FIGURE 77. Post-Test Rear Passenger Dummy Close-Up
Torso Contact with Vehicle Interior View

FIGURE 78. Post-Test Rear Passenger Dummy Close-Up
Torso Contact with Side Airbag View

FIGURE 79. Post-Test Rear Passenger Dummy Close-Up
Pelvis Contact with Vehicle Interior View

Photograph Not Applicable

Vehicle Not Equipped With Rear Passenger Side Airbag

FIGURE 80. Post-Test Rear Passenger Dummy Close-Up
Pelvis Contact with Side Airbag View

Photograph Not Applicable

No Rear Passenger
Dummy Knee Contact

FIGURE 81. Post-Test Rear Passenger Dummy Knee Close-Up View

FIGURE 82. Pre-Test View of Fuel Filler Cap or Fuel Filler Neck

FIGURE 83. Post-Test View of Fuel Filler Cap or Fuel Filler Neck

FIGURE 84. Pre-Test Front View of MDB Impactor Face

FIGURE 85. Post-Test Front View of MDB Impactor Face

FIGURE 86. Pre-Test Top View of MDB Impactor Face

FIGURE 87. Post-Test Top View of MDB Impactor Face

FIGURE 88. Pre-Test Left Side View of MDB Impactor Face

FIGURE 89. Post-Test Left Side View of MDB Impactor Face

FIGURE 90. Pre-Test Right Side View of MDB Impactor Face

FIGURE 91. Post-Test Right Side View of MDB Impactor Face

FIGURE 92. Close-Up View of Vehicle's Certification Label

FIGURE 93. Close-Up View of Vehicle's Tire Information Placard or Label

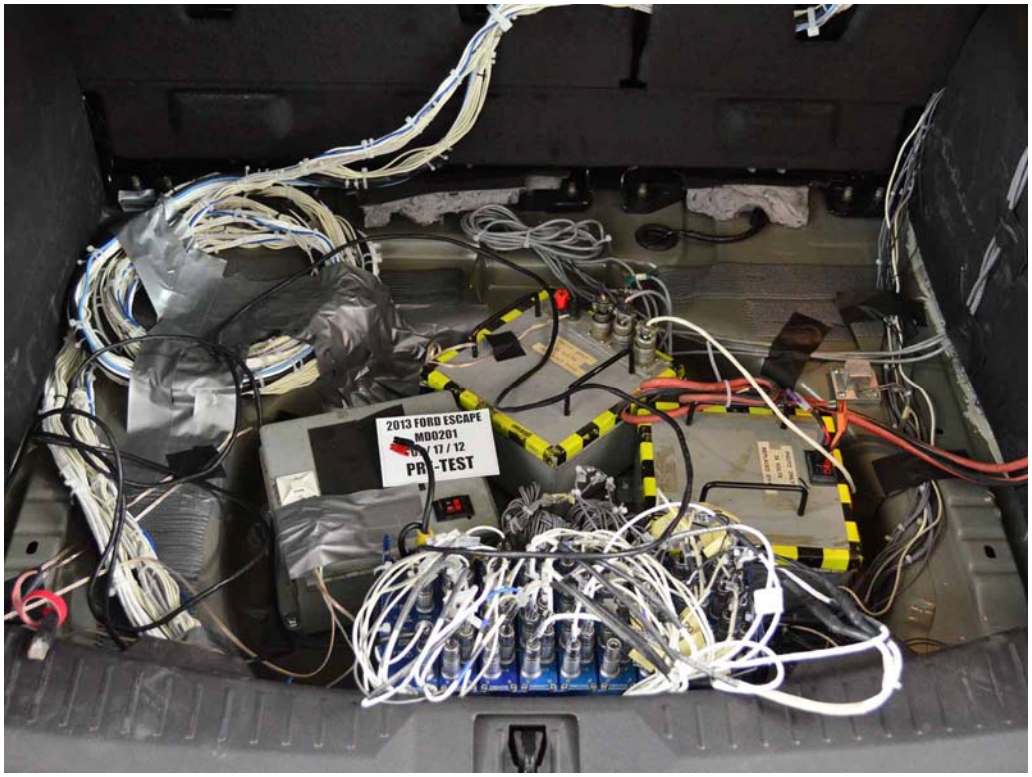


FIGURE 94. Pre-Test Ballast View

FIGURE 95. Post-Test Primary and Redundant Speed Trap Read-Out

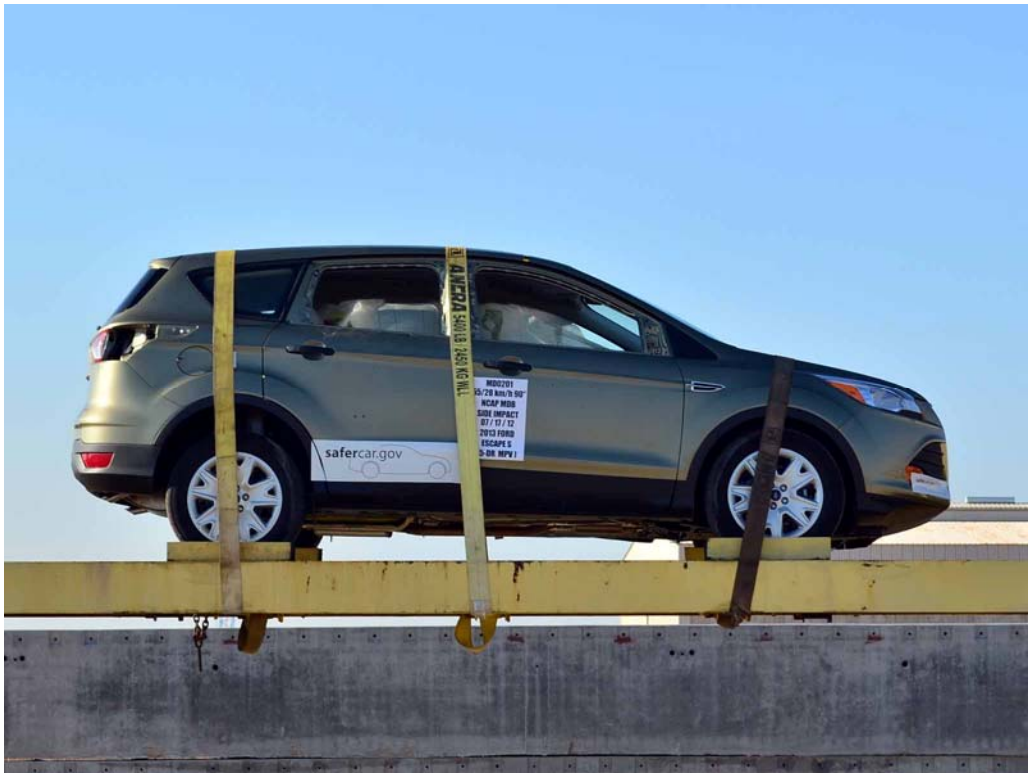


FIGURE 96. FMVSS No. 301 Static Rollover 0 Degrees

FIGURE 97. FMVSS No. 301 Static Rollover 90 Degrees

FIGURE 98. FMVSS No. 301 Static Rollover 180 Degrees

FIGURE 99. FMVSS No. 301 Static Rollover 270 Degrees

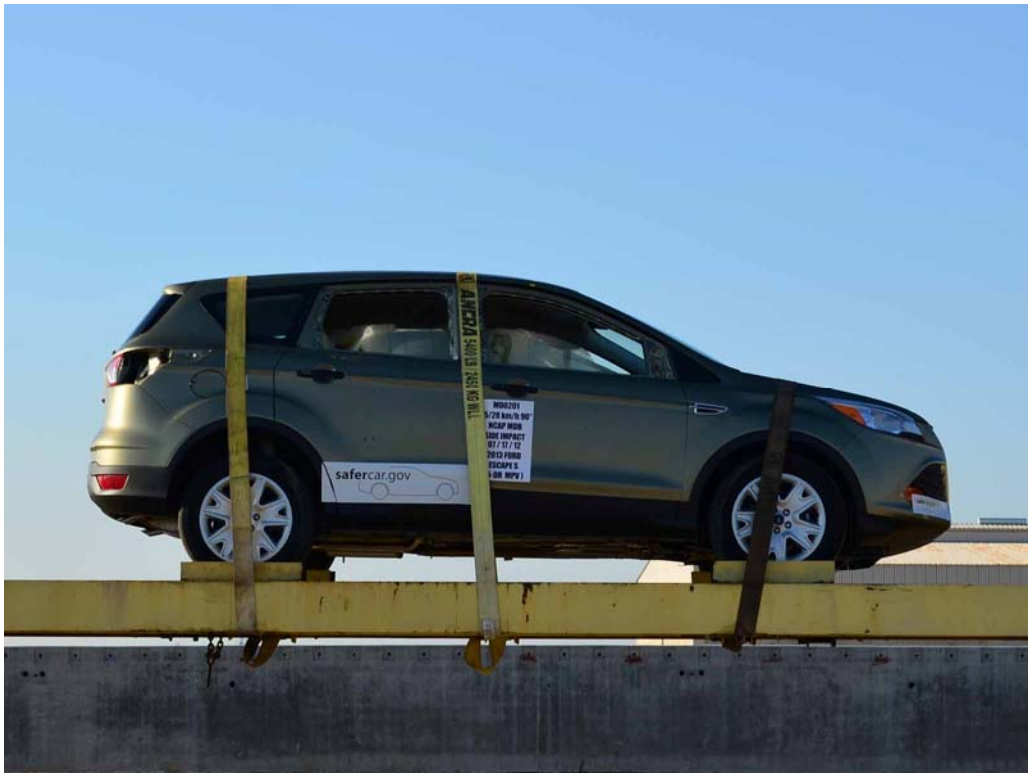


FIGURE 100. FMVSS No. 301 Static Rollover 360 Degrees

FIGURE 101. Impact Event

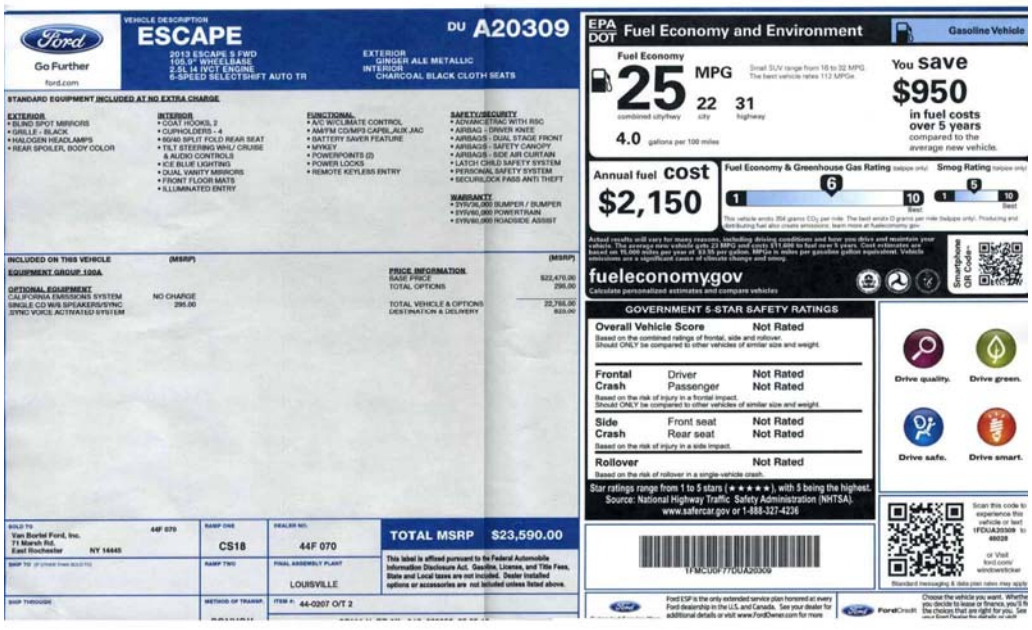
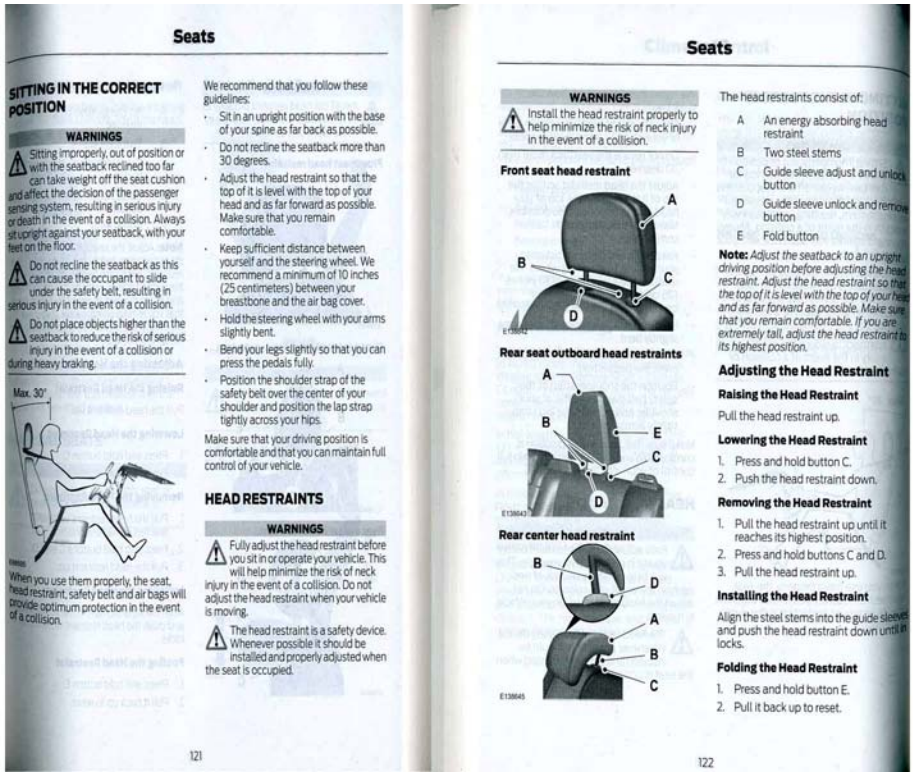


FIGURE 102. Monroney Label



Seats

SITTING IN THE CORRECT POSITION

WARNINGS

Sitting improperly, out of position or with the seatback reclined too far can take weight off the seat cushion and affect the decision of the passenger sensing system, resulting in serious injury or death in the event of a collision. Always sit upright against your seatback, with your feet on the floor.

Do not recline the seatback as this can cause the occupant to slide under the safety belt, resulting in serious injury in the event of a collision.

Do not place objects higher than the seatback to reduce the risk of serious injury in the event of a collision or during heavy braking.

When you use them properly, the seat, head restraint, safety belt and air bags will provide optimum protection in the event of a collision.

We recommend that you follow these guidelines:

- Sit in an upright position with the base of your spine as far back as possible.
- Do not recline the seatback more than 30 degrees.
- Adjust the head restraint so that the top of it is level with the top of your head and as far forward as possible. Make sure that you remain comfortable.
- Keep sufficient distance between yourself and the steering wheel. We recommend a minimum of 10 inches (25 centimeters) between your breastbone and the air bag cover.
- Hold the steering wheel with your arms slightly bent.
- Bend your legs slightly so that you can press the pedals fully.
- Position the shoulder strap of the safety belt over the center of your shoulder and position the lap strap tightly across your hips.

Make sure that your driving position is comfortable and that you can maintain full control of your vehicle.

HEAD RESTRAINTS

WARNINGS

Fully adjust the head restraint before you sit in or operate your vehicle. This will help minimize the risk of neck injury in the event of a collision. Do not adjust the head restraint when your vehicle is moving.

The head restraint is a safety device. Whenever possible it should be installed and properly adjusted when the seat is occupied.

Seats

WARNINGS

Install the head restraint properly to help minimize the risk of neck injury in the event of a collision.

Front seat head restraint

Rear seat outboard head restraints

Rear center head restraint

The head restraints consist of:

A An energy absorbing head restraint
B Two steel stems
C Guide sleeve adjust and unlock button
D Guide sleeve unlock and remove button
E Fold button

Note: *Adjust the seatback to an upright driving position before adjusting the head restraint. Adjust the head restraint so that the top of it is level with the top of your head and as far forward as possible. Make sure that you remain comfortable. If you are extremely tall, adjust the head restraint to its highest position.*

Adjusting the Head Restraint

Raising the Head Restraint

Pull the head restraint up.

Lowering the Head Restraint

1. Press and hold button C.
2. Push the head restraint down.

Removing the Head Restraint

1. Pull the head restraint up until it reaches its highest position.
2. Press and hold buttons C and D.
3. Pull the head restraint up.

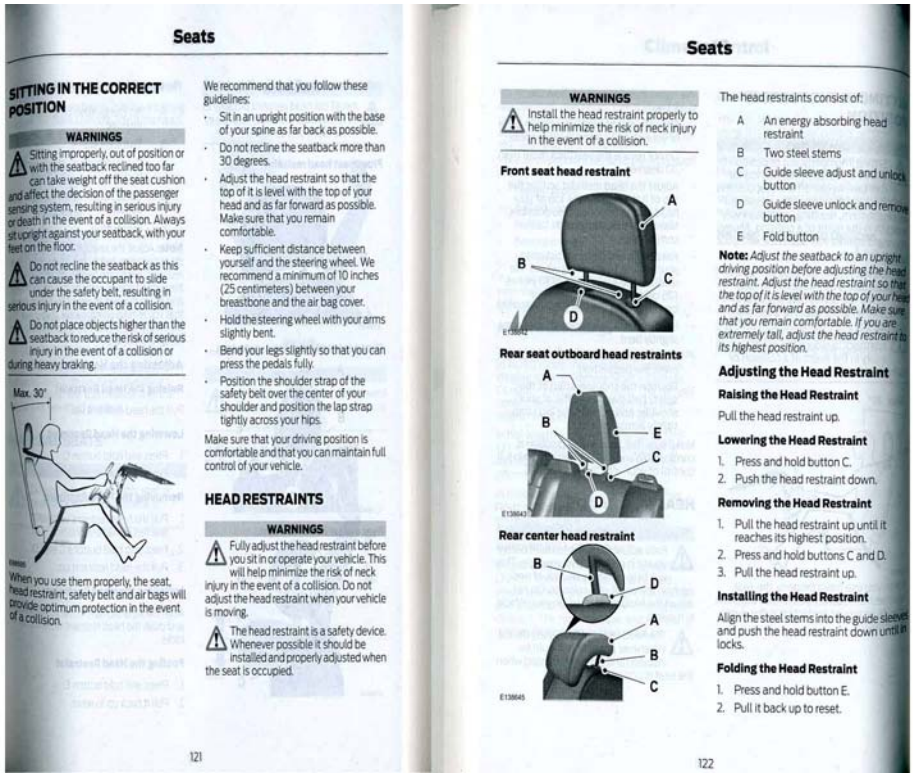
Installing the Head Restraint

Align the steel stems into the guide sleeves and push the head restraint down until it locks.

Folding the Head Restraint

1. Press and hold button E.
2. Pull it back up to reset.

FIGURE 103. Driver Head Restraint Use and Adjustment Information from Vehicle Owner's Manual



Seats

SITTING IN THE CORRECT POSITION

WARNINGS

Sitting improperly, out of position or with the seatback reclined too far can take weight off the seat cushion and affect the decision of the passenger sensing system, resulting in serious injury or death in the event of a collision. Always sit upright against your seatback, with your feet on the floor.

Do not recline the seatback as this can cause the occupant to slide under the safety belt, resulting in serious injury in the event of a collision.

Do not place objects higher than the seatback to reduce the risk of serious injury in the event of a collision or during heavy braking.

Max. 30°

When you use them properly, the seat, head restraint, safety belt and air bags will provide optimum protection in the event of a collision.

We recommend that you follow these guidelines:

- Sit in an upright position with the base of your spine as far back as possible.
- Do not recline the seatback more than 30 degrees.
- Adjust the head restraint so that the top of it is level with the top of your head and as far forward as possible. Make sure that you remain comfortable.
- Keep sufficient distance between yourself and the steering wheel. We recommend a minimum of 10 inches (25 centimeters) between your breastbone and the air bag cover.
- Hold the steering wheel with your arms slightly bent.
- Bend your legs slightly so that you can press the pedals fully.
- Position the shoulder strap of the safety belt over the center of your shoulder and position the lap strap tightly across your hips.

Make sure that your driving position is comfortable and that you can maintain full control of your vehicle.

HEAD RESTRAINTS

WARNINGS

Fully adjust the head restraint before you sit in or operate your vehicle. This will help minimize the risk of neck injury in the event of a collision. Do not adjust the head restraint when your vehicle is moving.

The head restraint is a safety device. Whenever possible it should be installed and properly adjusted when the seat is occupied.

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Seats

WARNINGS

Install the head restraint properly to help minimize the risk of neck injury in the event of a collision.

Front seat head restraint

Rear seat outboard head restraints

Rear center head restraint

The head restraints consist of:

A An energy absorbing head restraint
B Two steel stems
C Guide sleeve adjust and unlock button
D Guide sleeve unlock and remove button
E Fold button

Note: *Adjust the seatback to an upright driving position before adjusting the head restraint. Adjust the head restraint so that the top of it is level with the top of your head and as far forward as possible. Make sure that you remain comfortable. If you are extremely tall, adjust the head restraint to its highest position.*

Adjusting the Head Restraint

Raising the Head Restraint

Pull the head restraint up.

Lowering the Head Restraint

1. Press and hold button C.
2. Push the head restraint down.

Removing the Head Restraint

1. Pull the head restraint up until it reaches its highest position.
2. Press and hold buttons C and D.
3. Pull the head restraint up.

Installing the Head Restraint

Align the steel stems into the guide sleeves and push the head restraint down until it locks.

Folding the Head Restraint

1. Press and hold button E.
2. Pull it back up to reset.

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FIGURE 104. Left Rear Passenger Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

APPENDIX B
DUMMY RESPONSE DATA

TABLE OF DATA PLOTS

The following additional data for this test can be obtained from the Research and Development section of the NHTSA website (www.NHTSA.dot.gov)

Additional Driver & Passenger Dummy Instrumentation Data

Driver Lower Spine T12 Acceleration (X)

Driver Lower Spine T12 Acceleration (Y)

Driver Lower Spine T12 Acceleration (Z)

Passenger Upper Thorax Rib Deflection (Y)

Passenger Middle Thorax Rib Deflection (Y)

Passenger Lower Thorax Rib Deflection (Y)

Passenger Upper Abdomen Rib Deflection (Y)
Passenger Lower Abdomen Rib Deflection (Y)
Driver Head Acceleration Redundant (X)
Driver Head Acceleration Redundant (Y)
Driver Head Acceleration Redundant (Z)
Passenger Head Acceleration Redundant (X)
Passenger Head Acceleration Redundant (Y)
Passenger Head Acceleration Redundant (Z)

Vehicle Instrumentation Data

Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Right Side Sill at Front Seat Acceleration (X)
Right Side Sill at Front Seat Acceleration (Y)
Right Side Sill at Front Seat Acceleration (Z)
Right Side Sill at Rear Seat Acceleration (X)
Right Side Sill at Rear Seat Acceleration (Y)
Right Side Sill at Rear Seat Acceleration (Z)
Left Side Sill at Front Seat Acceleration (Y)
Left Side Sill at Rear Seat Acceleration (Y)
Lower A-Post Acceleration (Y)
Middle A-Post Acceleration (Y)
Lower B-Post Acceleration (Y)
Middle B-Post Acceleration (Y)
Front Seat Track Acceleration (Y)
Rear Seat Structure Acceleration (Y)
Right Rear Occupant Compartment Acceleration (Y)
Engine Block (X)
Engine Block (Y)
Rear Floorpan Above Axle Acceleration (X)
Rear Floorpan Above Axle Acceleration (Y)
Rear Floorpan Above Axle Acceleration (Z)

MDB Instrumentation Data

MDB Center of Gravity Acceleration (X)

MDB Center of Gravity Acceleration (Y)

MDB Center of Gravity Acceleration (Z)

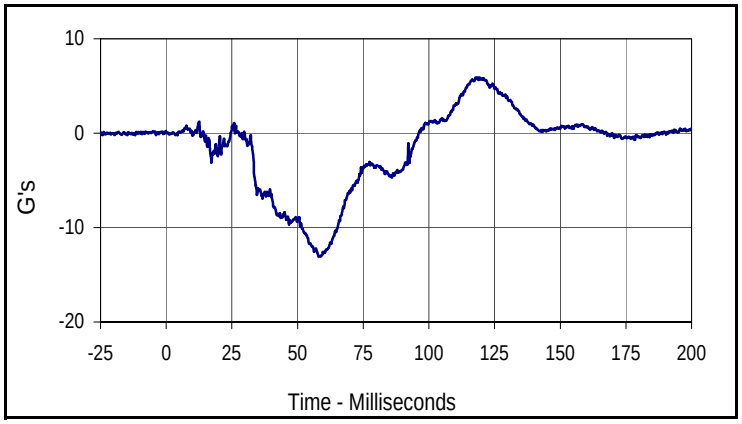
MDB Rear Acceleration (X)

MDB Rear Acceleration (Y)

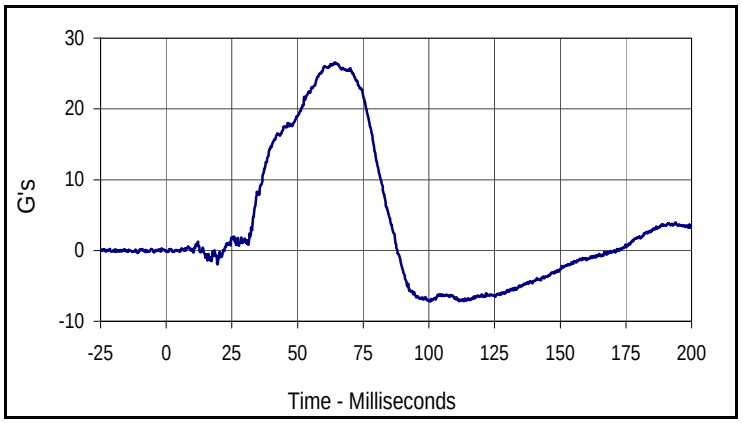
Left MDB Contact Switch

Right MDB Contact Switch

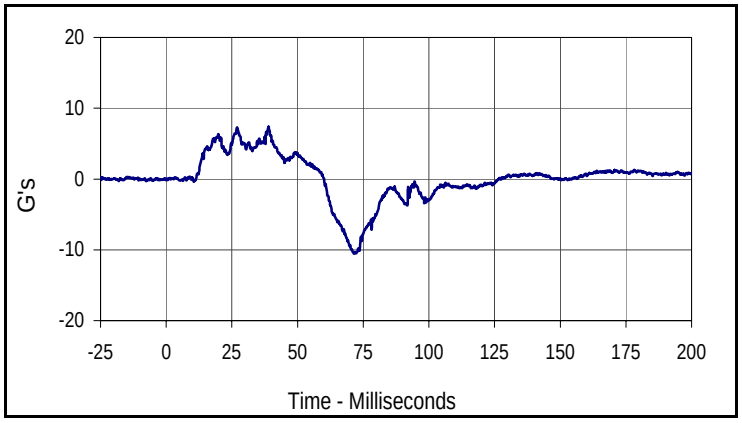
Test Vehicle:	2013 Ford Escape S 5-Door MPV	NHTSA No.:	MD0201
Test Program:	61 km/h (38 mph) Side Impact NCAP 27° Moving Deformable Barrier Test	Test Date:	7/17/12



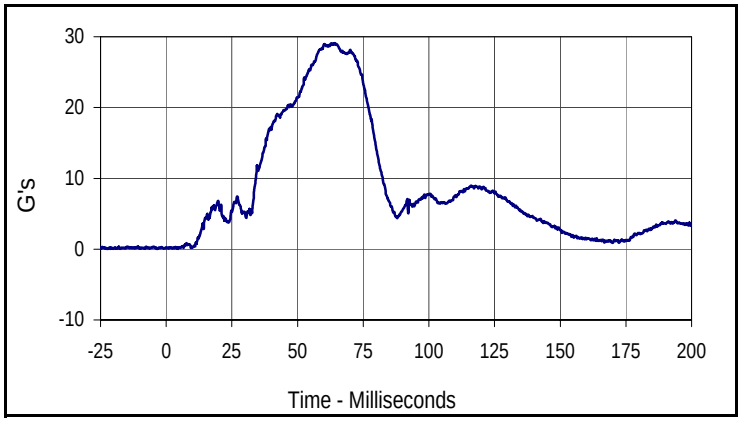
Curve Description			
Driver Head Acceleration X Primary			
Plot No.	Type	SAE Class	Units
001	FIL	1000	G's
Max	Time	Min	Time
5.9	119.2	-13.1	58.0



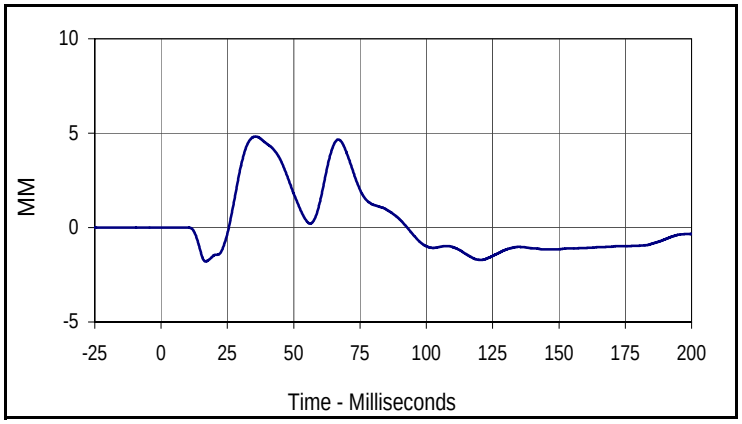
Curve Description			
Driver Head Acceleration Y Primary			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
26.6	64.2	-7.2	100.6



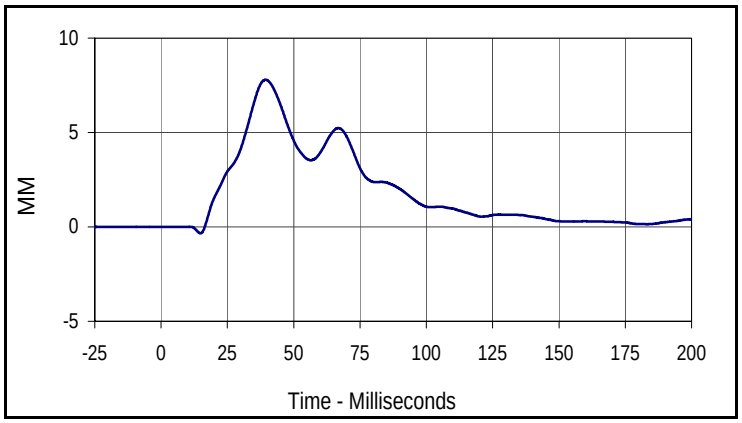
Curve Description			
Driver Head Acceleration Z Primary			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
7.4	39.0	-10.5	71.5



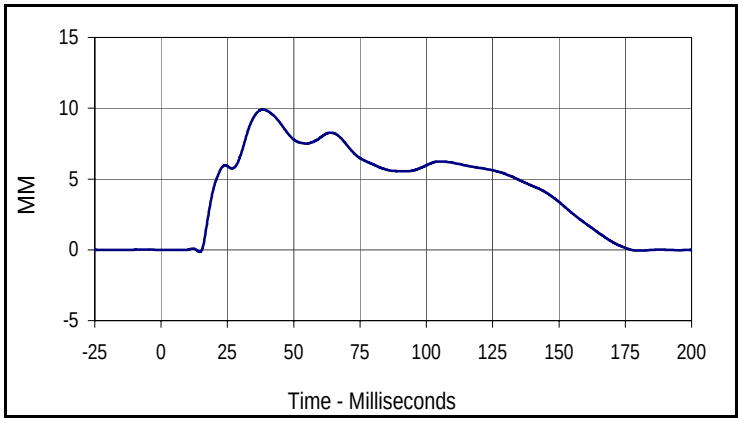
Curve Description			
Driver Head Resultant Acceleration Primary			
Plot No.	Type	SAE Class	Units
004	RES	1000	G's
Max	Time	Min	Time
29.1	64.2	0.0	4.5



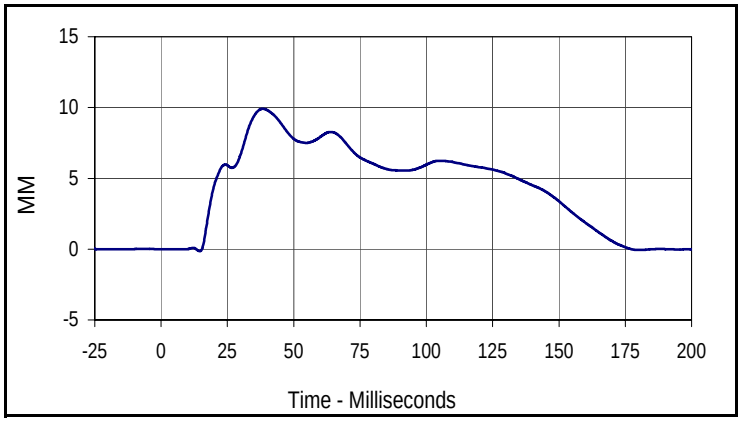
Curve Description			
Driver Upper Thorax Rib Deflection Y			
Plot No.	Type	SAE Class	Units
005	FIL	180	MM
Max	Time	Min	Time
4.8	35.6	-1.8	16.8



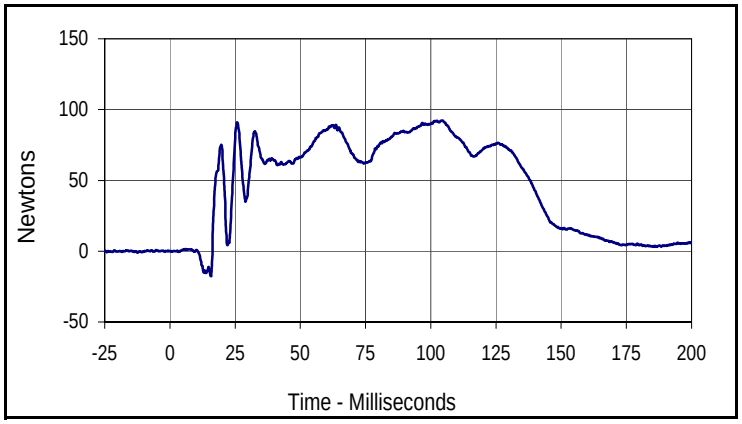
Curve Description			
Driver Middle Thorax Rib Deflection Y			
Plot No.	Type	SAE Class	Units
006	FIL	180	MM
Max	Time	Min	Time
7.8	39.4	-0.3	14.9



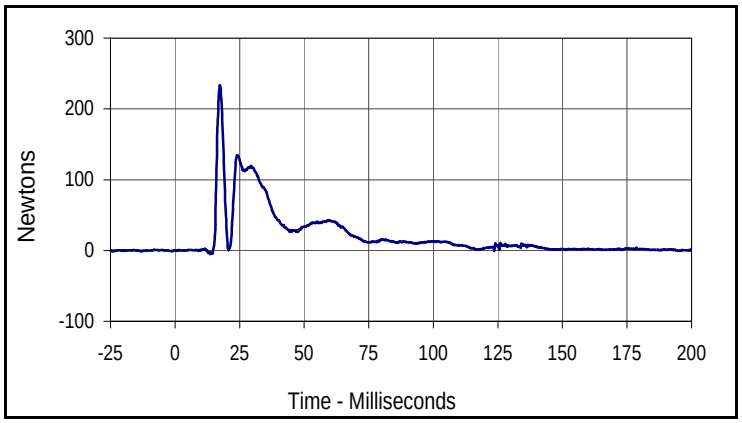
Curve Description			
Driver Lower Thorax Rib Deflection Y			
Plot No.	Type	SAE Class	Units
007	FIL	180	MM
Max	Time	Min	Time
9.9	38.4	-0.1	14.6



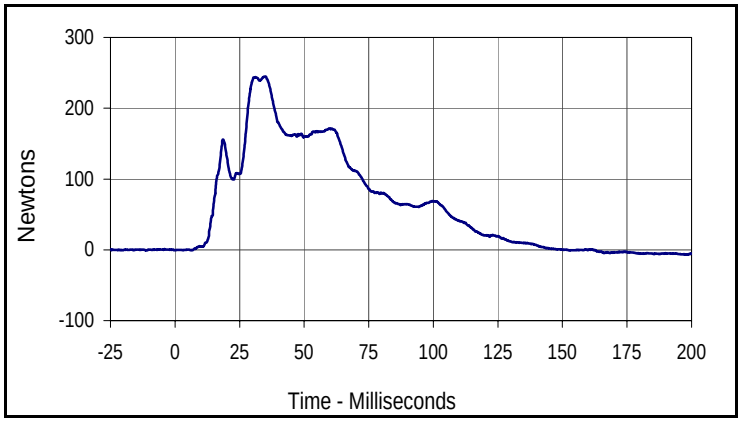
Curve Description			
Driver Thorax Rib Deflection Maximum			
Plot No.	Type	SAE Class	Units
010	FIL	180	MM
Max	Time	Min	Time
9.9	38.4	-0.1	14.6



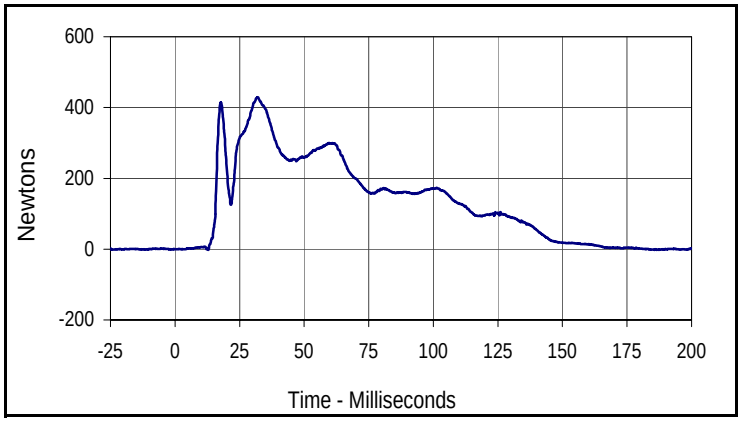
Curve Description			
Driver Anterior Abdominal Force Y			
Plot No.	Type	SAE Class	Units
008	FIL	600	Newtons
Max	Time	Min	Time
92.3	104.6	-17.6	15.8



Curve Description			
Driver Middle Abdominal Force Y			
Plot No.	Type	SAE Class	Units
009	FIL	600	Newtons
Max	Time	Min	Time
233.4	17.4	-5.2	13.8

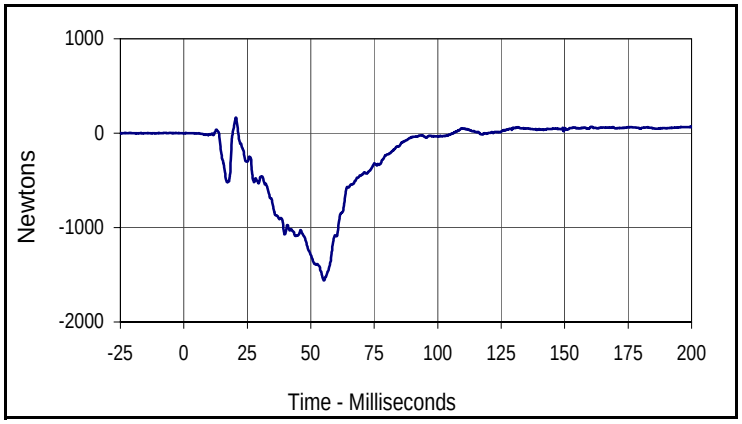


Curve Description			
Driver Posterior Abdominal Force Y			
Plot No.	Type	SAE Class	Units
011	FIL	600	Newtons
Max	Time	Min	Time
245.0	35.0	-7.0	197.7

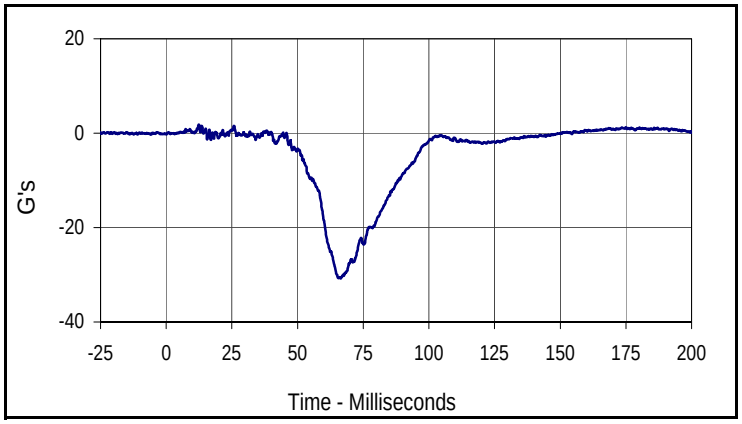


Curve Description			
Driver Total Abdominal Force			
Plot No.	Type	SAE Class	Units
012	SUM	600	Newtons
Max	Time	Min	Time
428.9	32.1	-2.0	12.9

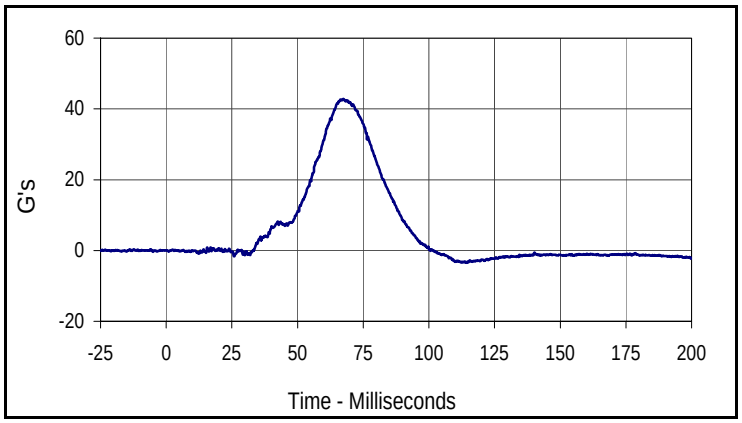
Test Vehicle:	2013 Ford Escape S 5-Door MPV	NHTSA No.:	MD0201
Test Program:	61 km/h (38 mph) Side Impact NCAP 27° Moving Deformable Barrier Test	Test Date:	7/17/12



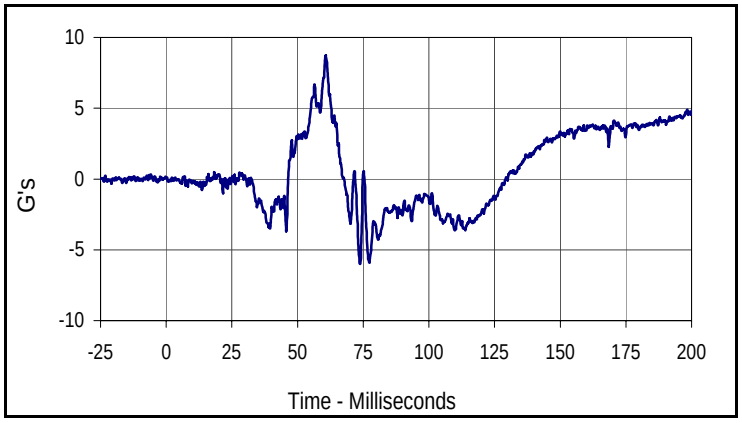
Curve Description			
Driver Pubic Symphysis Force Y			
Plot No.	Type	SAE Class	Units
013	FIL	600	Newtons
Max	Time	Min	Time
165.8	20.5	-1559.6	55.2



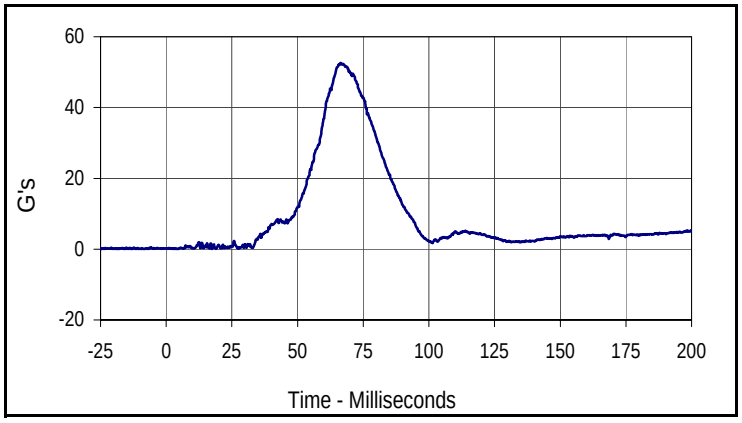
Curve Description			
Passenger Head Acceleration X Primary			
Plot No.	Type	SAE Class	Units
014	FIL	1000	G's
Max	Time	Min	Time
1.8	12.4	-30.8	66.5



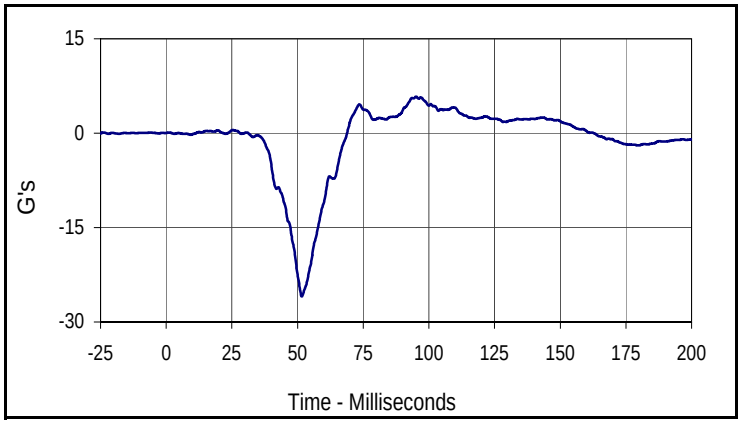
Curve Description			
Passenger Head Acceleration Y Primary			
Plot No.	Type	SAE Class	Units
015	FIL	1000	G's
Max	Time	Min	Time
42.8	67.3	-3.5	114.4



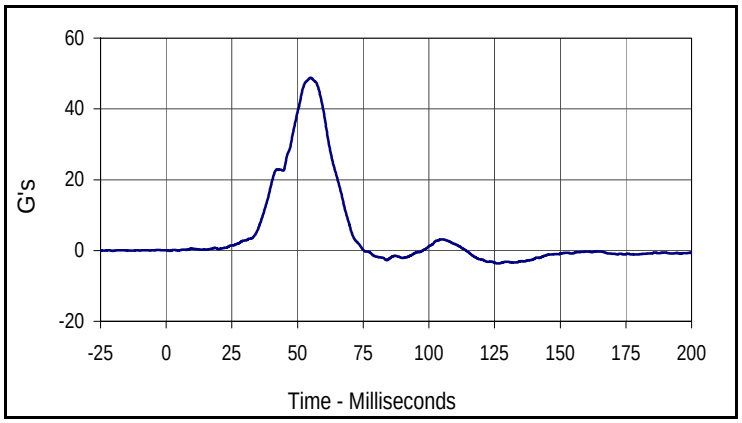
Curve Description			
Passenger Head Acceleration Z Primary			
Plot No.	Type	SAE Class	Units
016	FIL	1000	G's
Max	Time	Min	Time
8.7	60.7	-6.0	73.8



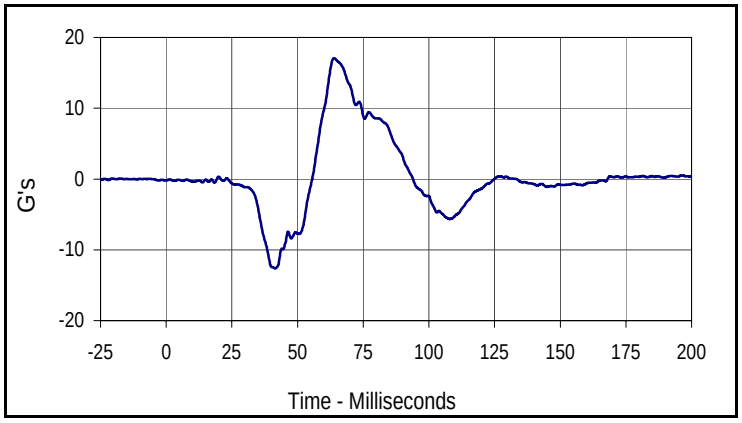
Curve Description			
Passenger Head Acceleration Resultant Primary			
Plot No.	Type	SAE Class	Units
017	RES	1000	G's
Max	Time	Min	Time
52.6	66.4	0.0	3.7



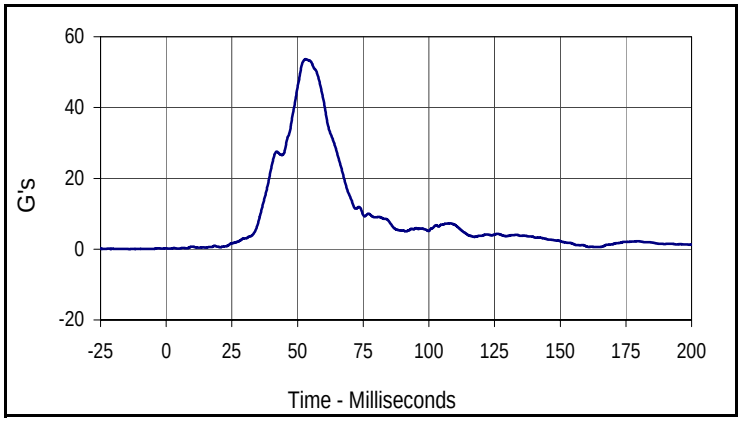
Curve Description			
Passenger Lower Spine T12 Acceleration X			
Plot No.	Type	SAE Class	Units
019	FIL	180	G's
Max	Time	Min	Time
5.8	95.2	-25.9	51.6



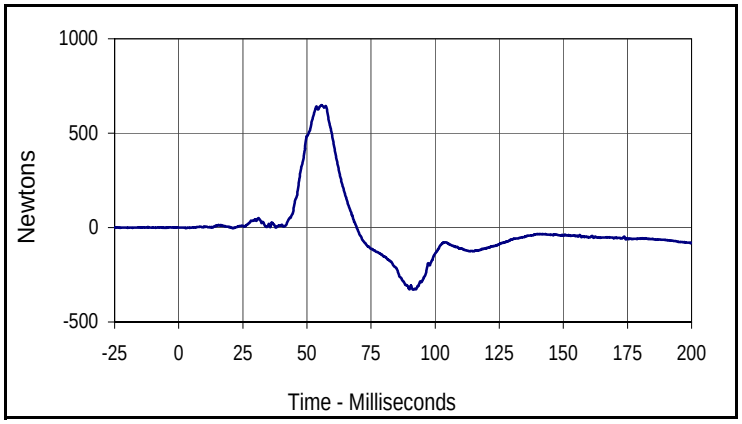
Curve Description			
Passenger Lower Spine T12 Acceleration Y			
Plot No.	Type	SAE Class	Units
020	FIL	180	G's
Max	Time	Min	Time
48.8	55.1	-3.7	126.3



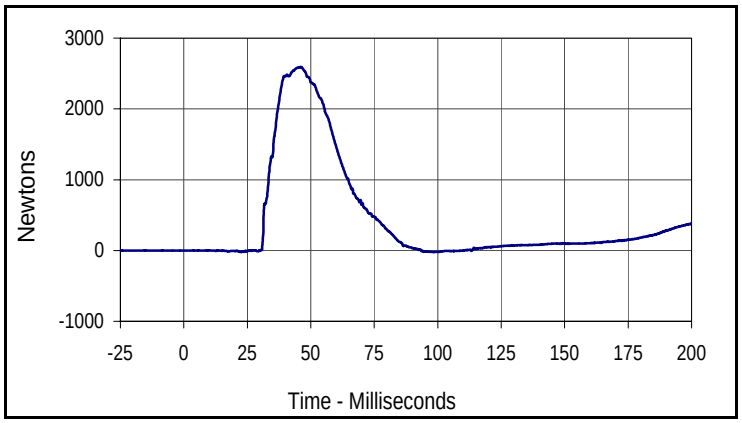
Curve Description			
Passenger Lower Spine T12 Acceleration Z			
Plot No.	Type	SAE Class	Units
021	FIL	180	G's
Max	Time	Min	Time
17.1	63.9	-12.6	41.4



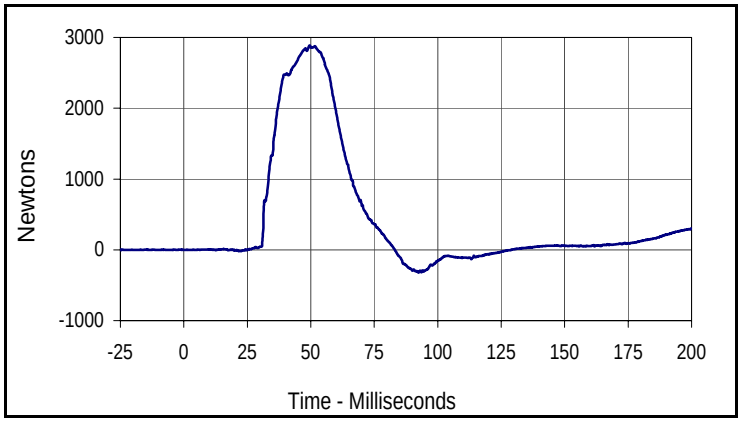
Curve Description			
Passenger Lower Spine T12 Acceleration Res.			
Plot No.	Type	SAE Class	Units
022	RES	180	G's
Max	Time	Min	Time
53.6	53.1	0.1	4.6



Curve Description			
Passenger Iliac Force on Impact Side Y			
Plot No.	Type	SAE Class	Units
023	FIL	600	Newtons
Max	Time	Min	Time
648.3	55.7	-329.6	91.4



Curve Description			
Passenger Acetabulum Force on Impact Side Y			
Plot No.	Type	SAE Class	Units
024	FIL	600	Newtons
Max	Time	Min	Time
2592.6	46.1	-22.2	22.6



Curve Description			
Passenger Total Pelvic Force			
Plot No.	Type	SAE Class	Units
018	SUM	600	Newtons
Max	Time	Min	Time
2888.0	49.6	-320.3	92.5

APPENDIX C
DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

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

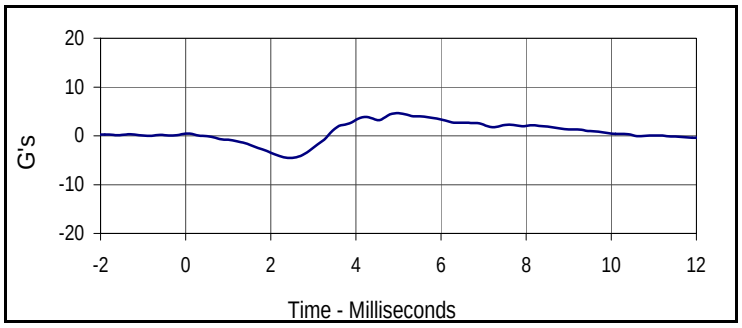
Test Program:	ES2re External Measurements	Test Date:	7/10/12
ATD Serial No.:	F035	Test I.D.:	N/A

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	20.8	Pass
Laboratory Relative Humidity		%	10 to 70	29	Pass
1	Sitting Height	mm	900 - 918	909	Pass
2	Seat to Shoulder Joint	mm	558 - 572	564	Pass
3	Seat to Lower Face of Thoracic Spine Box	mm	346 - 356	350	Pass
4	Seat to Hip Joint (Center of Bolt)	mm	97 - 103	100	Pass
5	Sole to Seat, Sitting	mm	333 - 451	390	Pass
6	Head Width	mm	152 - 158	156	Pass
7	Shoulder / Arm Width	mm	461 - 479	470	Pass
8	Thorax Width	mm	322 - 332	327	Pass
9	Abdomen Width	mm	273 - 287	280	Pass
10	Pelvis Lap Width	mm	359 - 373	363	Pass
11	Head Depth	mm	196 - 206	201	Pass
12	Thorax Depth	mm	262 - 272	270	Pass
13	Abdomen Width	mm	194 - 204	199	Pass
14	Pelvis Depth	mm	235 - 245	240	Pass
15	Back of Buttocks to Hip Joint (Center of Bolt)	mm	150 - 160	155	Pass
16	Back of Buttocks to Front Knee	mm	597 - 615	609	Pass
			Overall Test Results		Pass

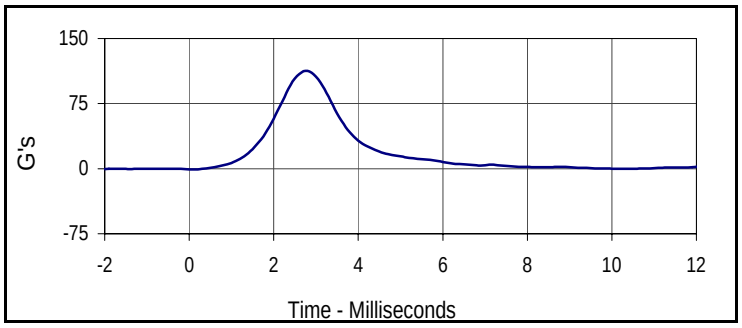
Test Program:	ES2re Head Drop Test	Test Date:	7/10/12
ATD Serial No.:	F035	Test I.D.:	F035HD032

Tested Parameter		Units	Specification	Result	Pass/Fail
Head Assembly Soak Time		Minutes	≥240	250	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	20.9	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.5	Pass
Peak Head Resultant Acceleration		G's	125 to 155	141.8	Pass
Peak Head X Acceleration		G's	≤15	4.6	Pass
Is Acceleration Unimodal?		Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse		%	<15	10.5	Pass
			Overall Test Results		Pass

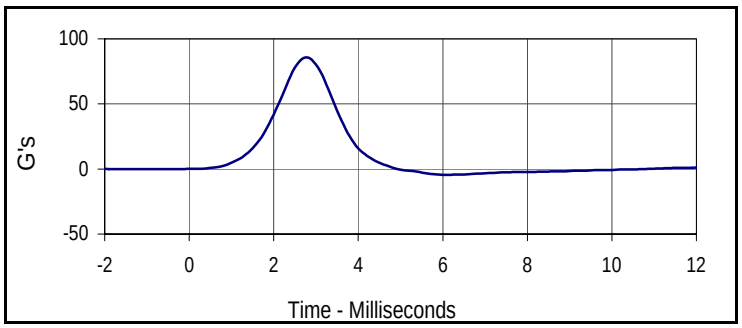
Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
141.8	2.8	0.1	-1.0



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
4.6	5.0	-4.5	2.5



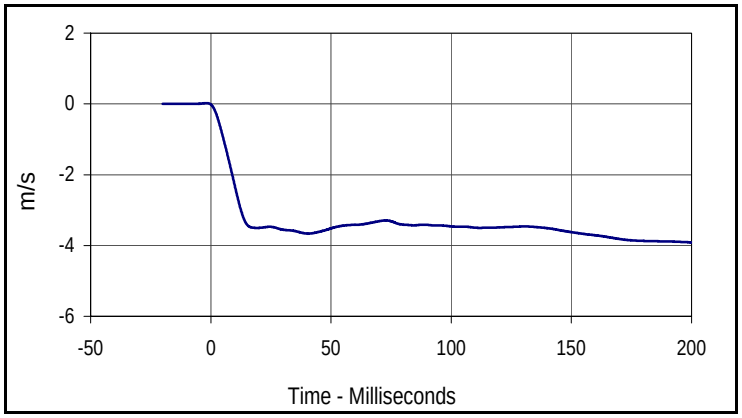
Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
112.9	2.8	-0.9	0.1



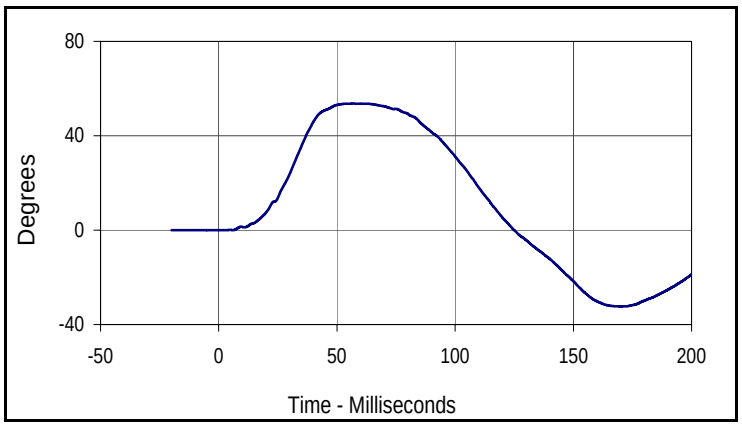
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
85.7	2.8	-4.5	6.1

Test Program:	ES2re Neck Flexion Test	Test Date:	7/10/12
ATD Serial No.:	F035	Test I.D.:	F035NB032

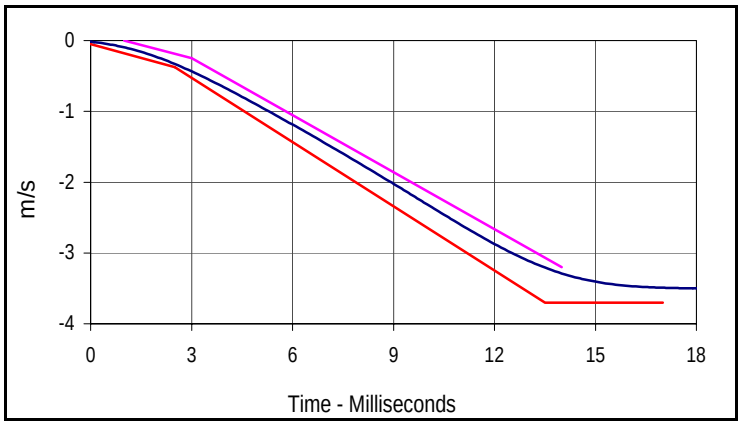
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	275	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.1	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.0	Pass
Pendulum Velocity		m/s	3.3 to 3.5	3.36	Pass
Headform Flexion	Max	Degrees	49 to 59	53.6	Pass
	Time	msec	54 to 66	56.9	Pass
Headform Flexion Decay (Peak to Zero)		msec	53 to 88	68.1	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.8	-3.9	200.0



Curve Description			
Headform Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	180	Degrees
Max	Time	Min	Time
53.6	56.9	-32.3	170.0

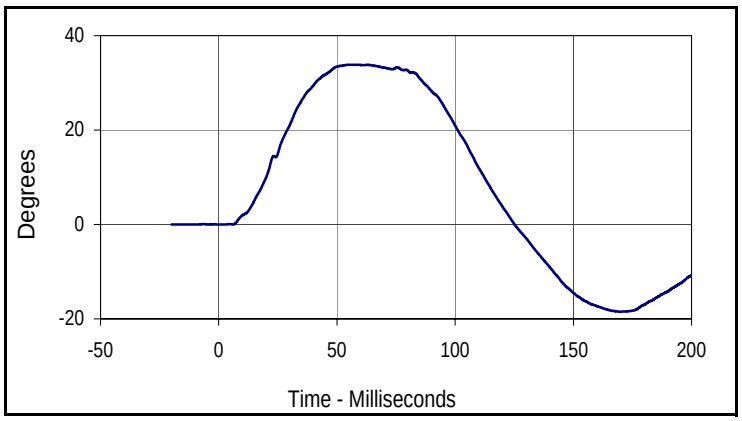


Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.8	-3.9	200.0

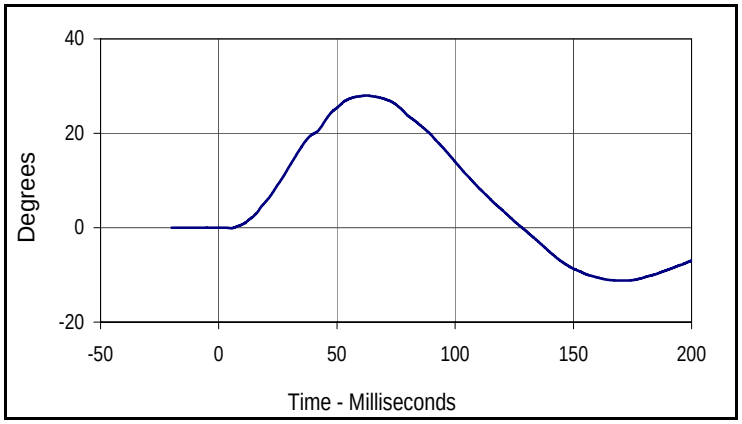
Velocity Corridors

Upper Boundary		Lower Boundary	
Time (msec)	Velocity (m/s)	Time (msec)	Velocity (m/s)
1.0	0.00	0.0	-0.05
3.0	-0.03	2.5	-0.375
14.0	-3.20	13.5	-3.70
		17.0	-3.70

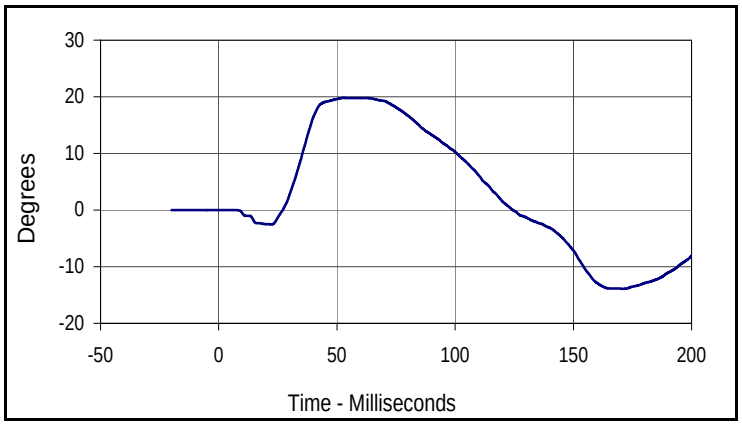
Test Program:	ES2re Neck Flexion Test	Test Date:	7/10/12
ATD Serial No.:	F035	Test I.D.:	F035NB032



Curve Description			
Potentiometer A			
Plot No.	Type	SAE Class	Units
003	FIL	180	Degrees
Max	Time	Min	Time
33.9	56.8	-18.5	169.8



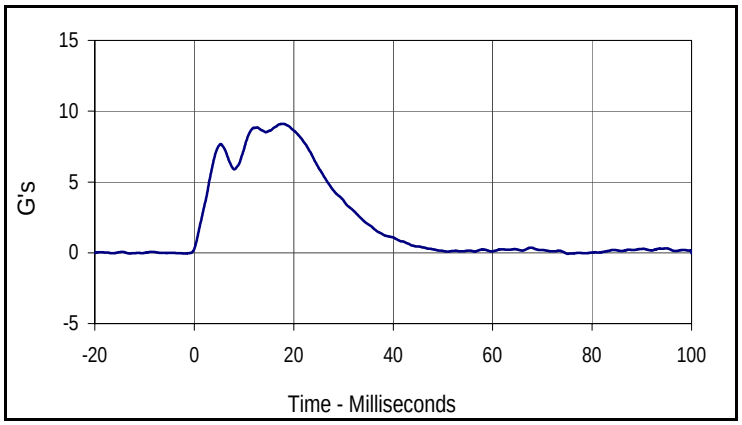
Curve Description			
Potentiometer B			
Plot No.	Type	SAE Class	Units
004	FIL	180	Degrees
Max	Time	Min	Time
28.0	62.5	-11.2	171.1



Curve Description			
Potentiometer C			
Plot No.	Type	SAE Class	Units
005	FIL	180	Degrees
Max	Time	Min	Time
19.8	52.7	-13.9	170.7

Test Program:	ES2re Shoulder Impact Test	Test Date:	7/10/12
ATD Serial No.:	F035	Test I.D.:	F035SH032

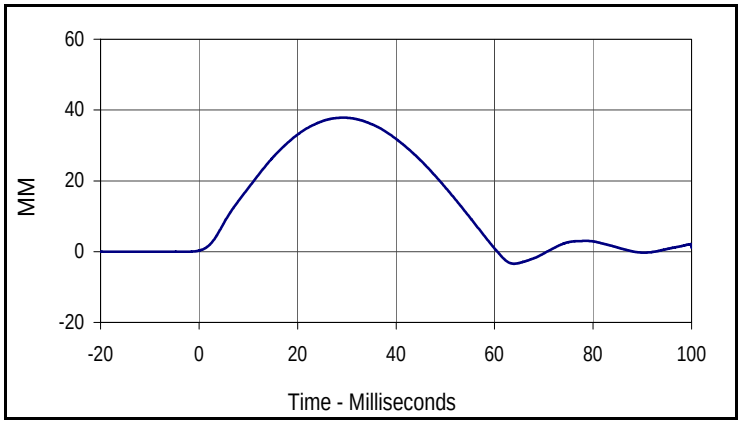
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	300	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.1	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.1	Pass
Pendulum Speed		m/s	4.2 to 4.4	4.25	Pass
Peak Impactor Acceleration		G's	7.5 to 10.5	9.1	Pass
			Overall Test Results		Pass



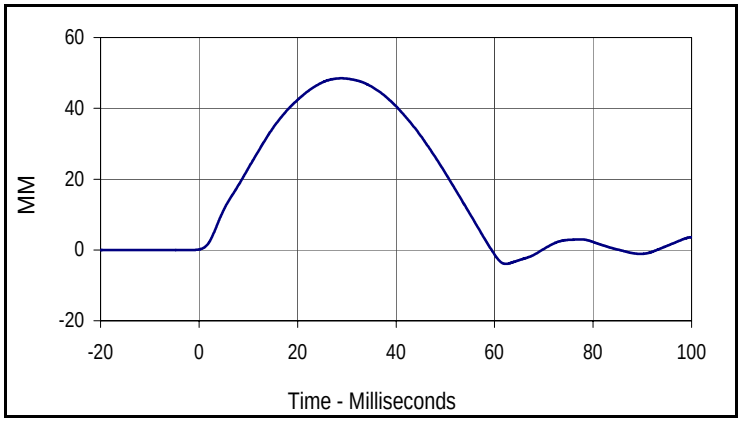
Curve Description			
Probe Impactor Acceleration			
Plot No.	Type	SAE Class	Units
001	FIL	180	G's
Max	Time	Min	Time
9.1	17.9	-0.1	75.2

Test Program:	ES2re Thorax - Rib Drop Test	Test Date:	7/10/12
ATD Serial No.:	F035 Rib #1	Test I.D.:	F035RB1032

Tested Parameter		Units	Specification	Result	Pass/Fail
Rib Module Soak Time		Minutes	≥240	330	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.9	Pass
Peak Rib Deflection at 459 +/- 5 mm Drop Height		mm	36 to 40	37.8	Pass
Peak Rib Deflection at 815 +/- 8 mm Drop Height		mm	46 to 51	48.5	Pass
			Overall Test Results		Pass



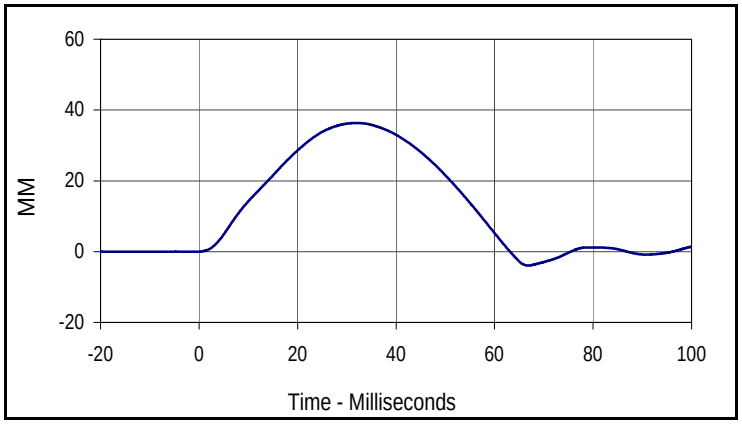
Curve Description			
Middle Rib Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
37.8	29.4	-3.4	64.0



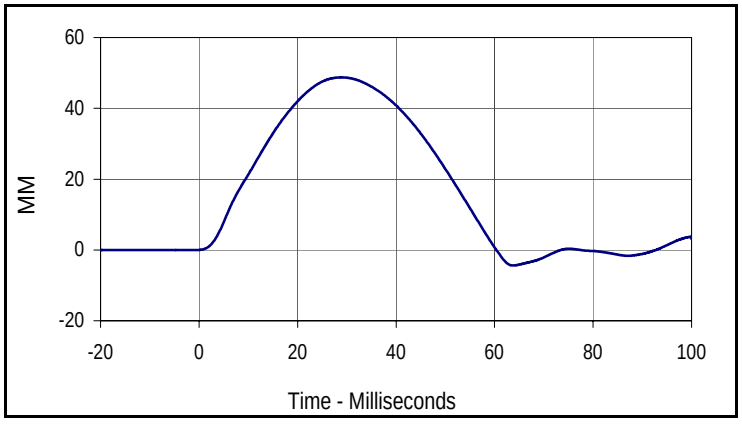
Curve Description			
Middle Rib Deflection			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max	Time	Min	Time
48.5	28.9	-4.0	62.3

Test Program:	ES2re Thorax - Rib Drop Test	Test Date:	7/10/12
ATD Serial No.:	F035 Rib #2	Test I.D.:	F035RB2032

Tested Parameter		Units	Specification	Result	Pass/Fail
Rib Module Soak Time		Minutes	≥240	340	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.7	Pass
Peak Rib Deflection at 459 +/- 5 mm Drop Height		mm	36 to 40	36.3	Pass
Peak Rib Deflection at 815 +/- 8 mm Drop Height		mm	46 to 51	48.7	Pass
			Overall Test Results		Pass



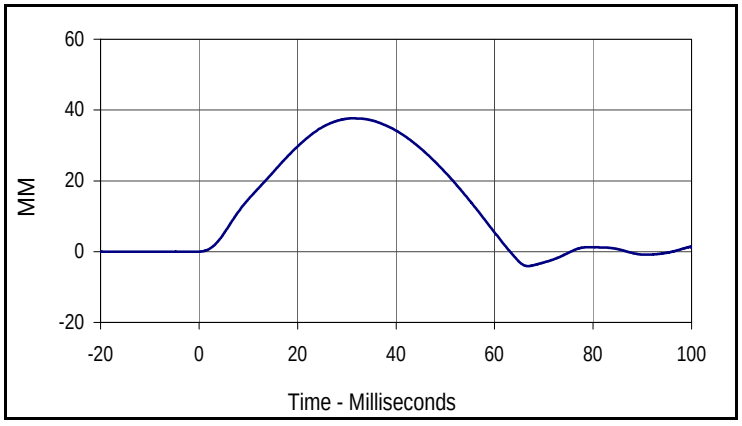
Curve Description			
Upper Rib Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
36.3	32.0	-3.9	66.8



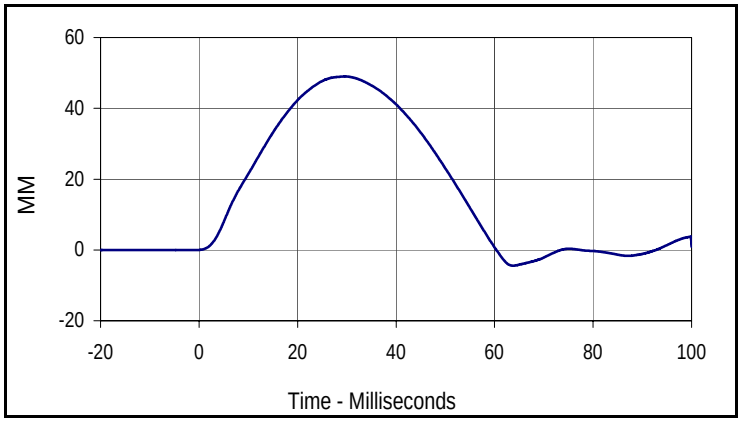
Curve Description			
Upper Rib Deflection			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max	Time	Min	Time
48.7	28.9	-4.4	63.8

Test Program:	ES2re Thorax - Rib Drop Test	Test Date:	7/10/12
ATD Serial No.:	F035 Rib #3	Test I.D.:	F035RB3032

Tested Parameter		Units	Specification	Result	Pass/Fail
Rib Module Soak Time		Minutes	≥240	355	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.1	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.5	Pass
Peak Rib Deflection at 459 +/- 5 mm Drop Height		mm	36 to 40	37.7	Pass
Peak Rib Deflection at 815 +/- 8 mm Drop Height		mm	46 to 51	49.0	Pass
			Overall Test Results		Pass



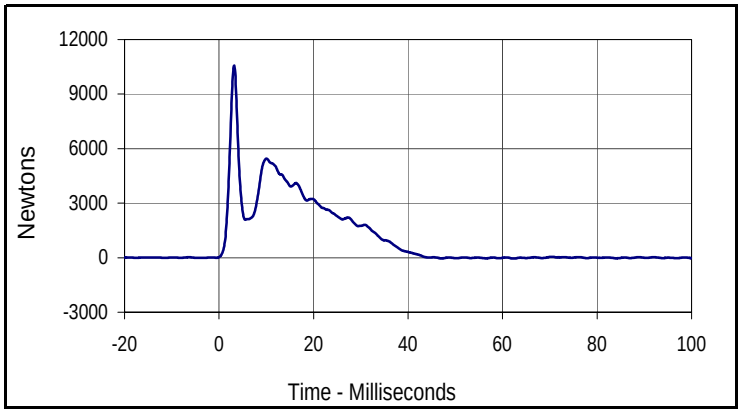
Curve Description			
Upper Rib Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
37.7	31.0	-4.1	66.8



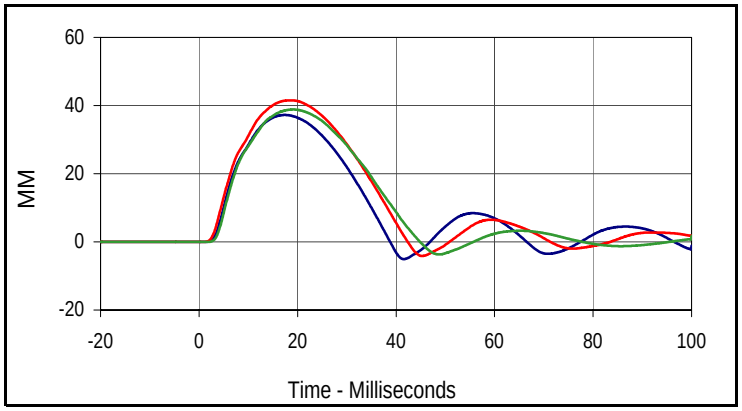
Curve Description			
Upper Rib Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
49.0	29.7	-4.4	63.7

Test Program:	ES2re Thorax - Full Body Impact Test	Test Date:	7/10/12
ATD Serial No.:	F035	Test I.D.:	F035TH032

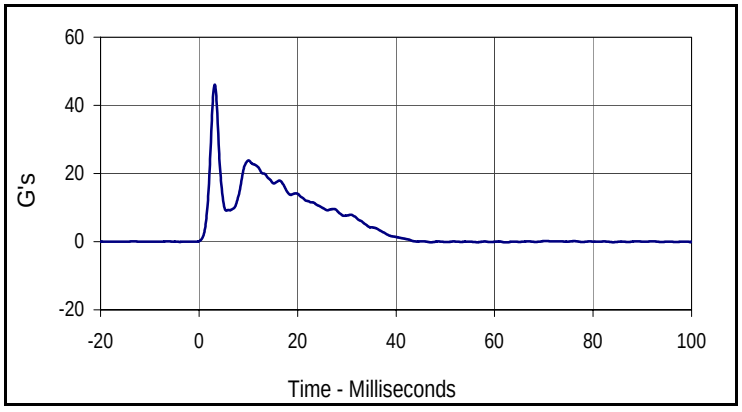
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	370	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	20.8	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.1	Pass
Peak Impactor Velocity		m/s	5.4 to 5.6	5.48	Pass
Peak Impactor Force		N	5100 to 6200	5458.4	Pass
		msec	> 6.0 msec	10	Pass
Peak Upper Rib Deflection		mm	34 to 41	37.2	Pass
Peak Middle Rib Deflection		mm	37 to 45	41.5	Pass
Peak Lower Rib Deflection		mm	37 to 44	38.8	Pass
			Overall Test Results		Pass



Curve Description			
Impactor Force			
Plot No.	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
10569.3	3.2	-47.1	62.5



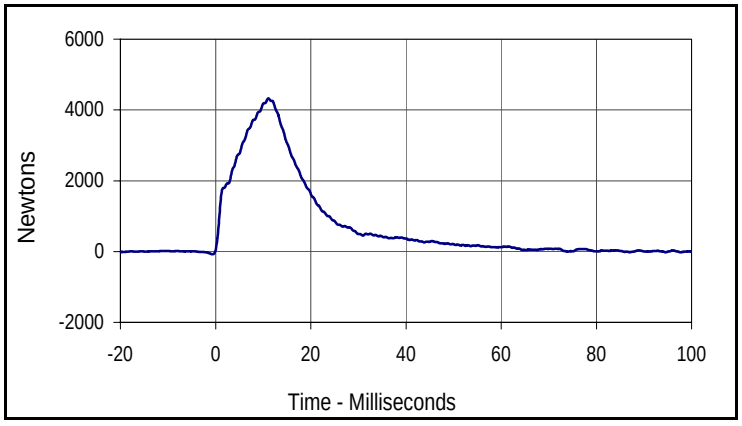
Curve Description			
Upper, Middle, Lower Rib Deflections			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max (Upper)	Time	Min (Upper)	Time
37.2	17.4	-5.1	41.6
Max (Middle)	Time	Min (Middle)	Time
41.5	18.6	-4.1	45.3
Max (Lower)	Time	Min (Lower)	Time
38.8	19.1	-3.7	48.7



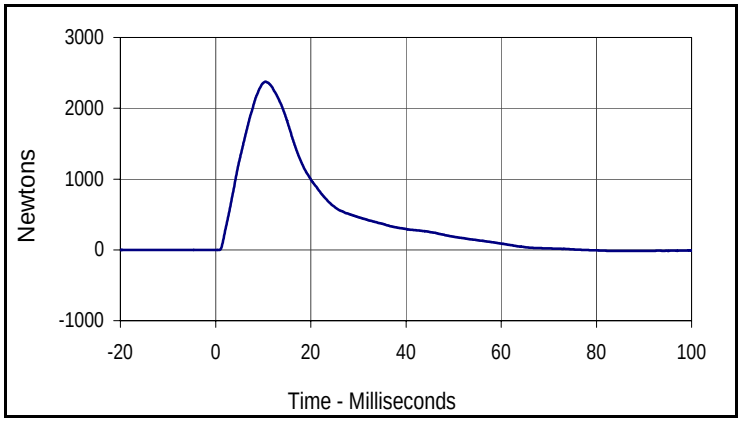
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
46.1	3.2	-0.2	62.5

Test Program:	ES2re Abdomen Impact Test	Test Date:	7/10/12
ATD Serial No.:	F035	Test I.D.:	F035ABD032

Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	395	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	20.9	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.1	Pass
Probe Velocity		m/s	3.9 to 4.1	4.0	Pass
Peak Impactor Force		N	4000 to 4800	4325.8	Pass
		msec	10.6 to 13.0	11.1	Pass
Sum of Abdominal Forces		N	2200 to 2700	2374.9	Pass
		msec	10.0 to 12.3	10.5	Pass
			Overall Test Results		Pass

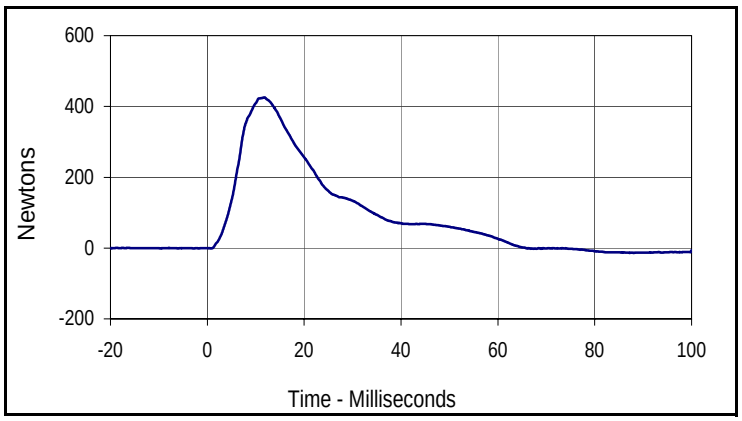


Curve Description			
Impactor Force			
Plot No.	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
4325.8	11.1	-78.3	-0.6

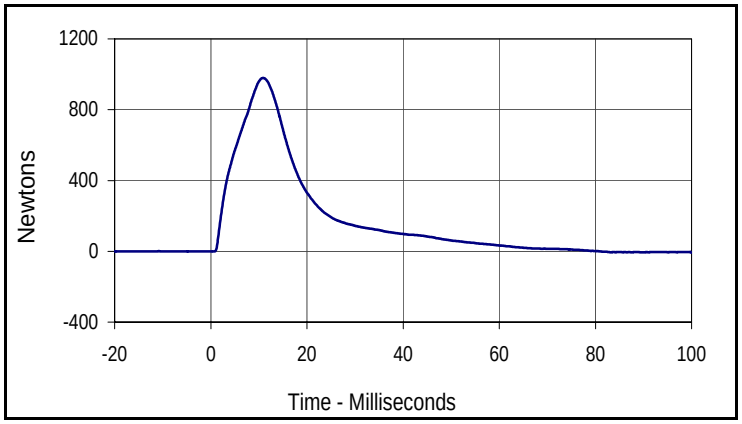


Curve Description			
Abdomen Sum Resultant			
Plot No.	Type	SAE Class	Units
002	RES	600	Newtons
Max	Time	Min	Time
2374.9	10.5	-16.8	88.0

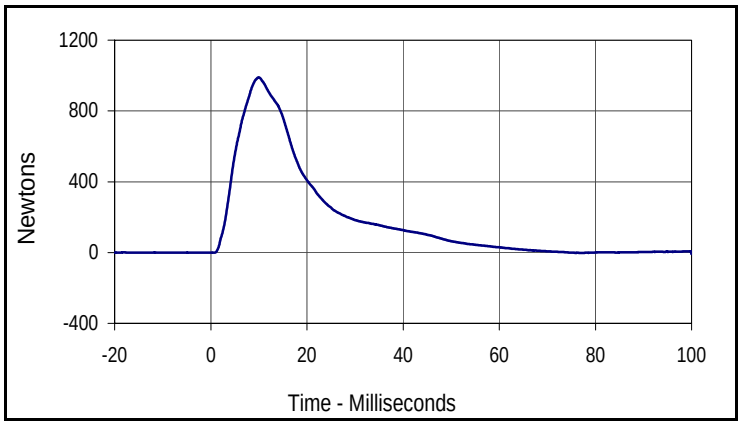
Test Program:	ES2re Abdomen Impact Test	Test Date:	7/10/12
ATD Serial No.:	F035	Test I.D.:	F035ABD032



Curve Description			
Front Abdomen Force			
Plot No.	Type	SAE Class	Units
003	FIL	600	Newtons
Max	Time	Min	Time
425.5	11.8	-13.7	88.0



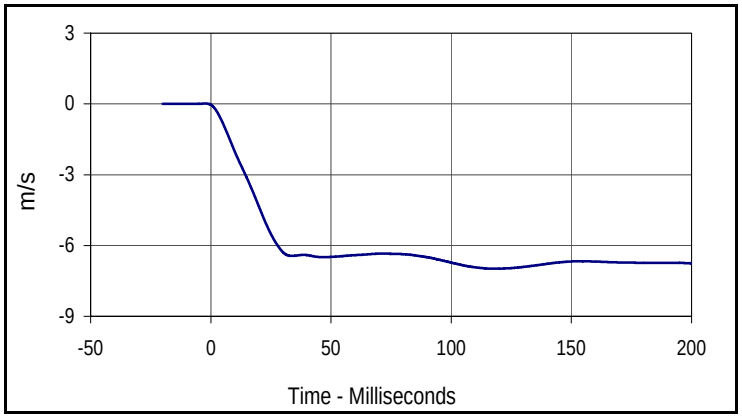
Curve Description			
Middle Abdomen Force			
Plot No.	Type	SAE Class	Units
004	FIL	600	Newtons
Max	Time	Min	Time
979.2	10.9	-8.5	101.2



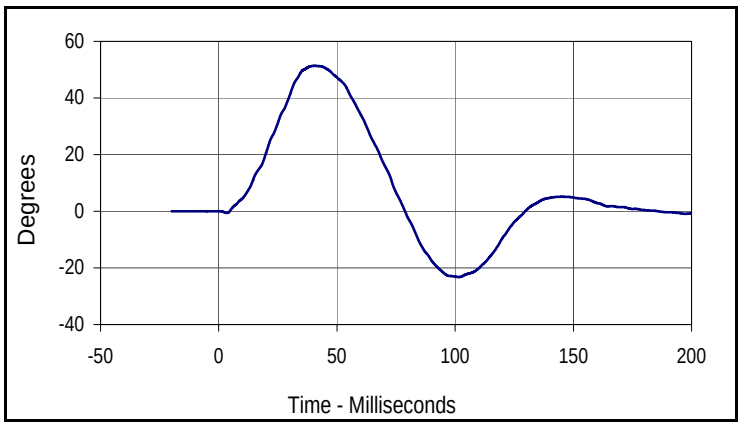
Curve Description			
Rear Abdomen Force			
Plot No.	Type	SAE Class	Units
005	FIL	600	Newtons
Max	Time	Min	Time
989.6	10.0	-8.5	101.2

Test Program:	ES2re Lumbar Flexion Test	Test Date:	7/10/12
ATD Serial No.:	F035	Test I.D.:	F035LB032

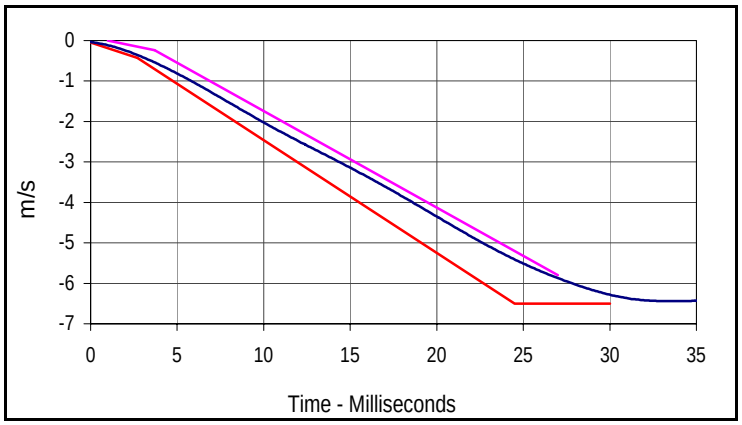
Tested Parameter		Units	Specification	Result	Pass/Fail
Lumbar Spine Assembly Soak Time		Minutes	≥240	415	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.0	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.0	Pass
Pendulum Velocity		m/s	5.95 to 6.15	6.07	Pass
Headform Rotation	Max	Degrees	45 to 55	51.4	Pass
	Time	msec	39 to 53	40.5	Pass
Time of Decay to Zero Angle from Peak		msec	37 to 57	38.3	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-2.2	-7.0	117.6



Curve Description			
Headform Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	180	Degrees
Max	Time	Min	Time
51.4	40.5	-23.2	101.5

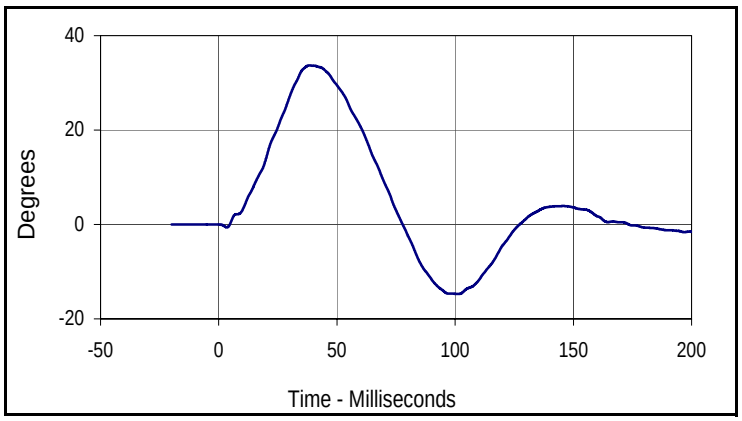


Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-2.2	-7.0	117.6

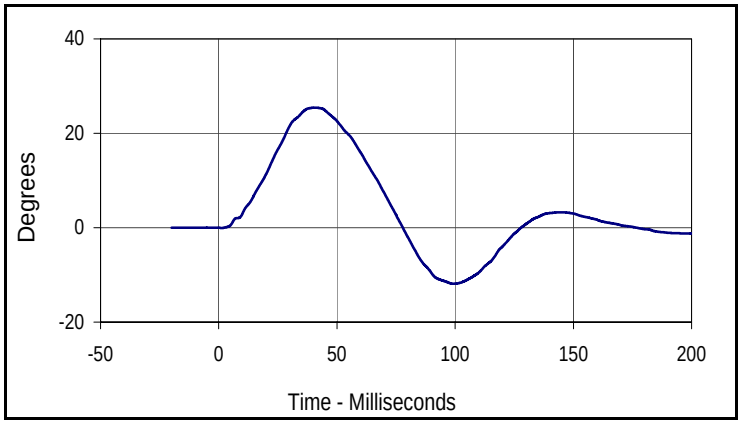
Velocity Corridors

Upper Boundary		Lower Boundary	
Time (msec)	Velocity (m/s)	Time (msec)	Velocity (m/s)
1.0	0.00	0.0	-0.05
3.7	-0.24	2.7	-0.425
27.0	-5.80	24.5	-6.50
		30.0	-6.50

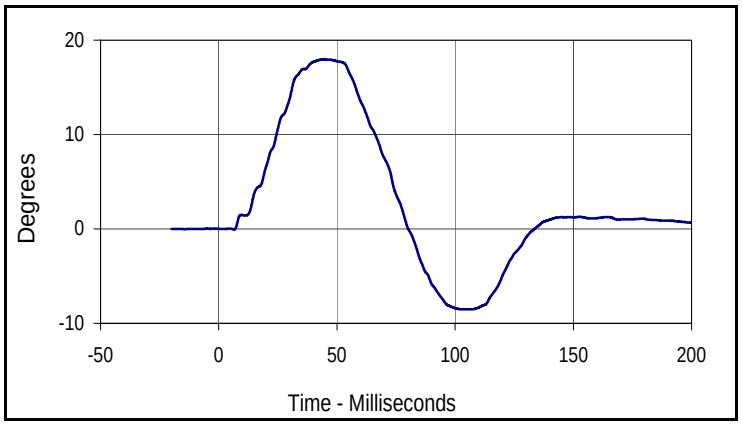
Test Program:	ES2re Lumbar Flexion Test	Test Date:	7/10/12
ATD Serial No.:	F035	Test I.D.:	F035LB032



Curve Description			
Potentiometer A			
Plot No.	Type	SAE Class	Units
003	FIL	180	Degrees
Max	Time	Min	Time
33.7	38.3	-14.7	101.3



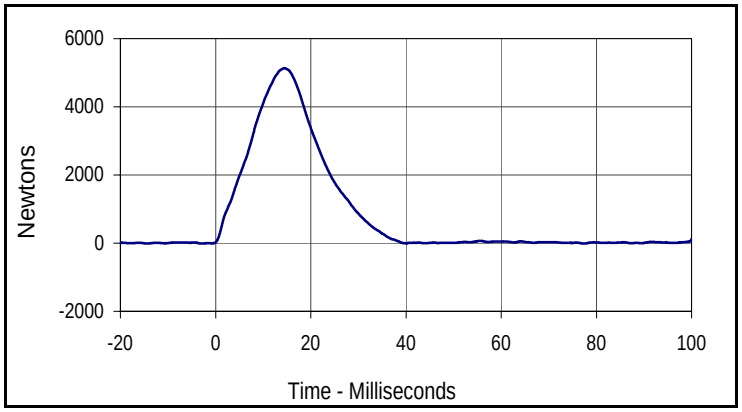
Curve Description			
Potentiometer B			
Plot No.	Type	SAE Class	Units
004	FIL	180	Degrees
Max	Time	Min	Time
25.5	40.4	-11.9	99.6



Curve Description			
Potentiometer C			
Plot No.	Type	SAE Class	Units
005	FIL	180	Degrees
Max	Time	Min	Time
18.0	44.3	-8.5	106.7

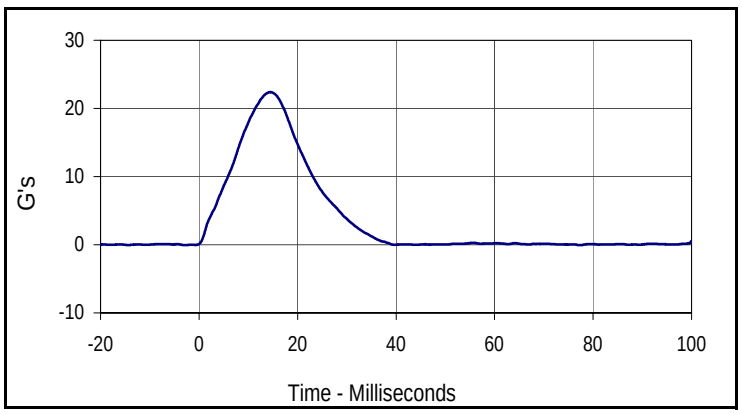
Test Program:	ES2re Pelvis Impact Test	Test Date:	7/10/12
ATD Serial No.:	F035	Test I.D.:	F035PL032

Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	435	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.1	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.9	Pass
Pendulum Velocity		m/s	4.2 to 4.4	4.3	Pass
Peak Impactor Force		N	4700 to 5400	5132.3	Pass
		msec	11.8 to 16.1	14.5	Pass
Peak Pubic Symphysis Load		N	-1230 to -1590	-1385.4	Pass
		msec	12.2 to 17.0	15.9	Pass
			Overall Test Results		Pass



Curve Description			
Impactor Force			
Plot No.	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
5132.3	14.5	-10.9	77.1

Curve Description			
Pubic Symphysis Force Y			
Plot No.	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
104.9	39.0	-1385.4	15.9



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
22.4	14.5	0.0	77.1

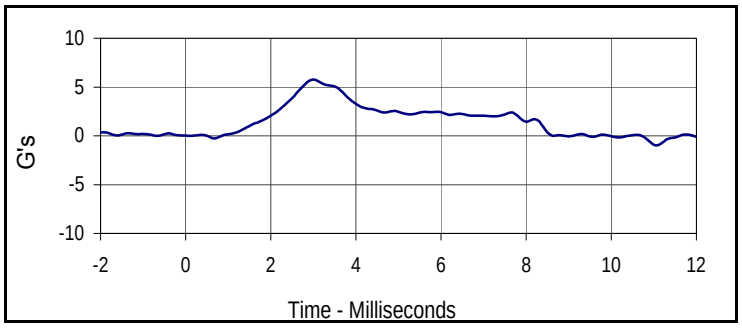
Test Program:	SID IIs External Measurements	Test Date:	6/19/12
ATD Serial No.:	299	Test I.D.:	N/A

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
A	Sitting Height	mm	772 - 788	781	Pass
B	Shoulder Pivot Height	mm	437 - 453	444	Pass
C	H-Point Height	mm	79 - 89	84	Pass
D	H-Point from Seatback	mm	141 - 151	148	Pass
E	Shoulder Pivot from Backline	mm	97 - 107	102	Pass
F	Thigh Clearance	mm	119 - 135	127	Pass
G	Head Breadth	mm	140 - 148	145	Pass
H	Head Back from Backline	mm	40 - 46	43	Pass
I	Head Depth	mm	178 - 188	182	Pass
J	Head Circumference	mm	541 - 551	546	Pass
K	Buttock to Knee Length	mm	514 - 540	528	Pass
L	Popliteal Height	mm	343 - 369	354	Pass
M	Knee Pivot to Floor Height	mm	392 - 409	400	Pass
N	Buttock Popliteal Length	mm	416 - 442	429	Pass
O	Chest Depth w/o Jacket	mm	195 - 211	202	Pass
P	Foot Length	mm	216 - 232	219	Pass
Q	Hip Breadth with Pelvic Plug	mm	313 -323	318	Pass
R	Arm Length	mm	249 - 259	256	Pass
S	Knee Joint to Seatback	mm	477 - 493	484	Pass
V	Shoulder Width	mm	341 - 357	350	Pass
W	Foot Width	mm	78 - 94	92	Pass
Y	Chest Circumference with Jacket	mm	851 - 881	875	Pass
Z	Waist Circumference	mm	760 - 791	773	Pass
			Overall Test Results		Pass

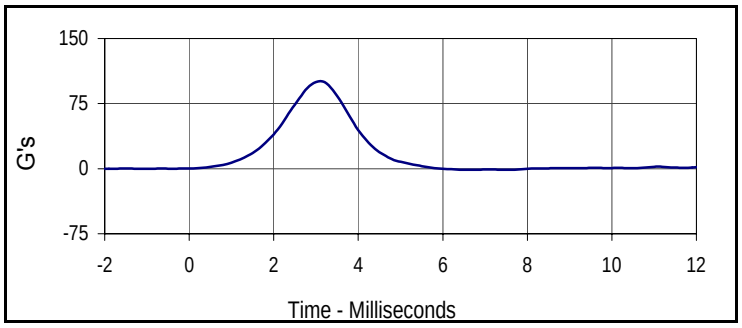
Test Program:	SID IIs Head Drop Test	Test Date:	6/19/12
ATD Serial No.:	299	Test I.D.:	299HD042

Tested Parameter		Units	Specification	Result	Pass/Fail
Head Assembly Soak Time		Minutes	≥240	245	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.1	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.1	Pass
Peak Head Resultant Acceleration		G's	115 to 137	128.7	Pass
Peak Head X Acceleration		G's	<15	5.8	Pass
Is Acceleration Unimodal?		Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse		%	<15	3.0	Pass
			Overall Test Results		Pass

Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
128.7	3.1	0.1	-0.8



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
5.8	3.0	-0.3	0.7

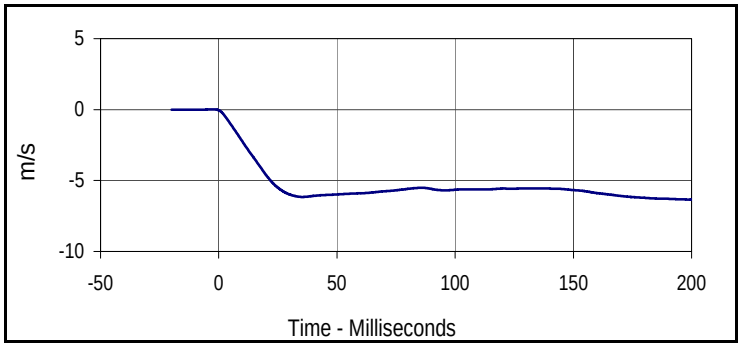


Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
101.1	3.1	-1.4	6.5

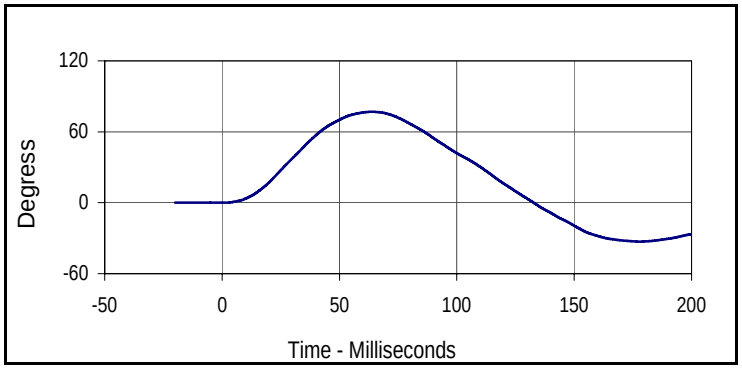
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
79.4	3.1	-0.4	-1.8

Test Program:	SID IIs Neck Flexion Test	Test Date:	6/19/12
ATD Serial No.:	299	Test I.D.:	299NB042

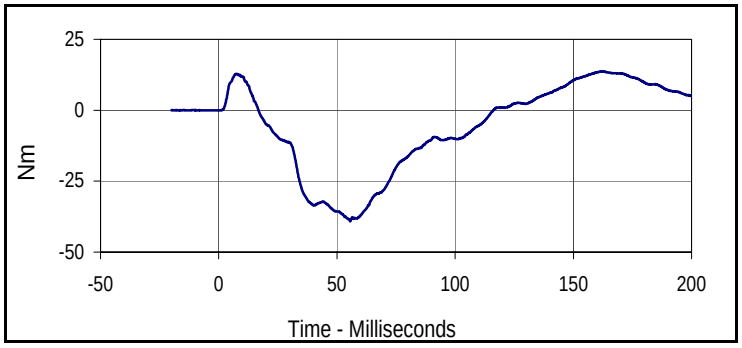
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	260	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.8	Pass
Pendulum Velocity		m/s	5.51 to 5.63	5.61	Pass
Pendulum Deceleration	10 msec	m/s	-2.20 to -2.80	-2.25	Pass
	15 msec	m/s	-3.30 to -4.10	-3.44	Pass
	20 msec	m/s	-4.40 to -5.40	-4.61	Pass
	25 msec	m/s	-5.40 to -6.10	-5.50	Pass
	25-100 msec	m/s	-5.50 to -6.20	-6.16	Pass
D-Plane Rotation	Max	Degrees	71 to 81	76.9	Pass
	Time	msec	50 to 70	63.7	Pass
Peak Occipital Condyle Moment		Nm	-36 to -44	-39.1	Pass
Decaying Moment Time to Cross 0 Nm		msec	102 to 126	116.2	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
0.0	-2.2	-6.4	200.0



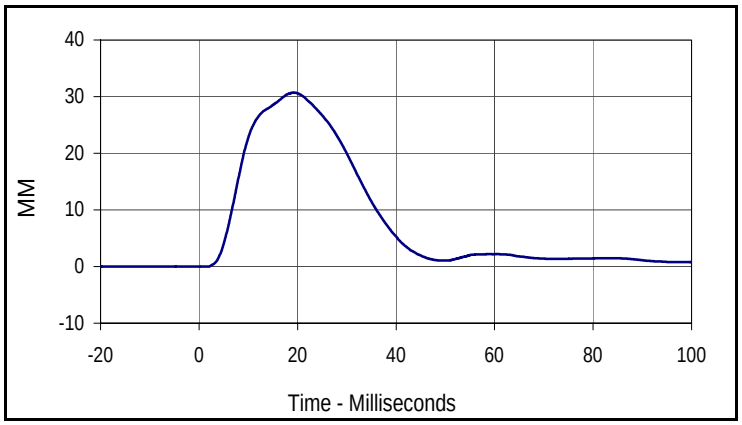
Curve Description			
Maximum Translation Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degress
Max	Time	Min	Time
76.9	63.7	-32.8	177.7



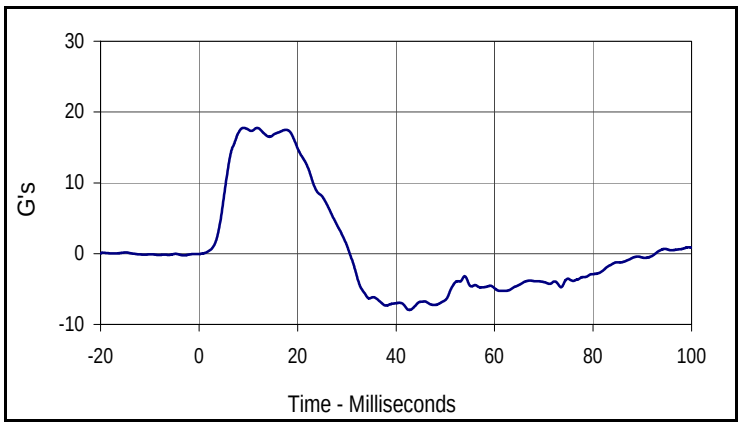
Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
13.7	162.3	-39.1	55.6

Test Program:	SID IIs Shoulder Impact Test	Test Date:	6/19/12
ATD Serial No.:	299	Test I.D.:	299SH042

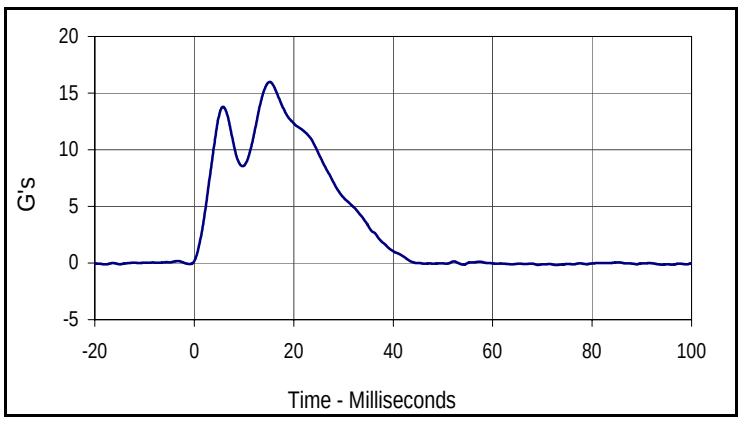
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	285	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.0	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.6	Pass
Impactor Velocity		m/s	4.20 to 4.40	4.30	Pass
Peak Shoulder Deflection		mm	28 to 37	30.7	Pass
Peak Lateral Spine Acceleratrion Y		G's	17 to 22	17.8	Pass
Peak Impactor Acceleration		G's	13 to 18	16.0	Pass
			Overall Test Results		Pass



Curve Description			
Shoulder Acceleration			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
30.7	19.2	0.0	-0.5



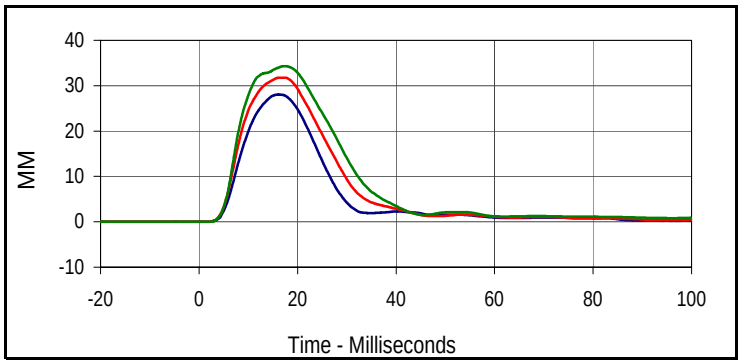
Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
17.8	9.0	-8.0	42.7



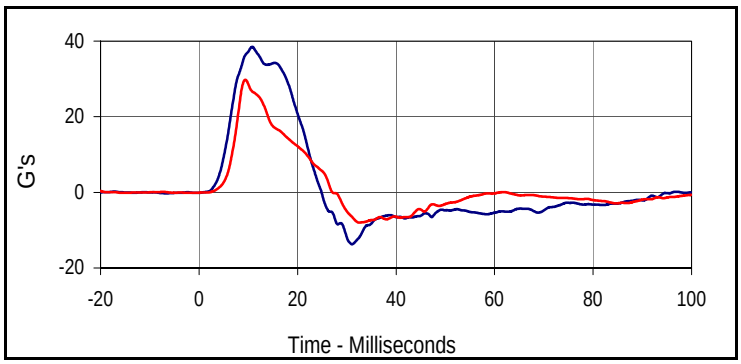
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
16.0	15.2	-0.2	0.0

Test Program:	SID IIs Thorax with Arm Impact Test	Test Date:	6/19/12
ATD Serial No.:	299	Test I.D.:	299TWA042

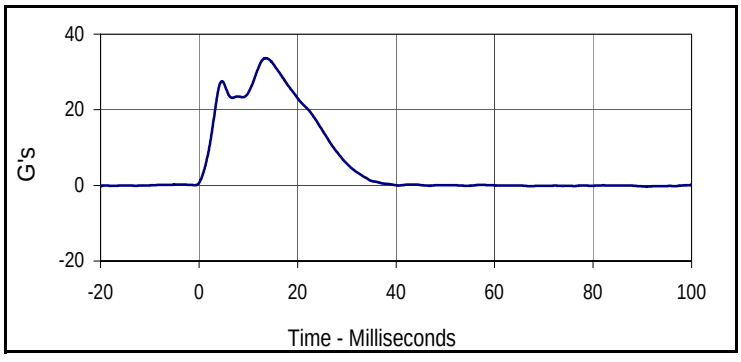
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	300	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	20.8	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.0	Pass
Impactor Velocity		m/s	6.6 to 6.8	6.7	Pass
Peak Shoulder Deflection		mm	31 to 40	35.2	Pass
Peak Upper Thorax Rib Deflection		mm	25 to 32	28.0	Pass
Peak Middle Thorax Rib Deflection		mm	30 to 36	31.8	Pass
Peak Lower Thorax Rib Deflection		mm	32 to 38	34.3	Pass
Peak Upper Spine Y Acceleration		G's	34 to 43	38.5	Pass
Peak Lower Spine Y Acceleration		G's	29 to 37	29.8	Pass
Peak Impactor Acceleration		G's	30 to 36	33.7	Pass
			Overall Test Results		Pass



Curve Description			
Upper Thorax Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
28.0	16.2	0.0	-18.2
Middle Thorax Deflection			
Max	Time	Min	Time
31.8	16.8	0.0	-17.7
Lower Thorax Deflection			
Max	Time	Min	Time
34.3	17.4	0.0	-19.0

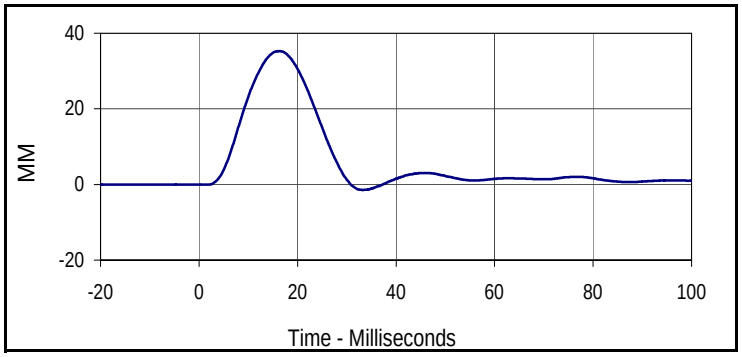


Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
38.5	10.8	-13.7	31.1
Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
29.8	9.4	-8.0	32.5



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
33.7	13.5	-0.4	0.0

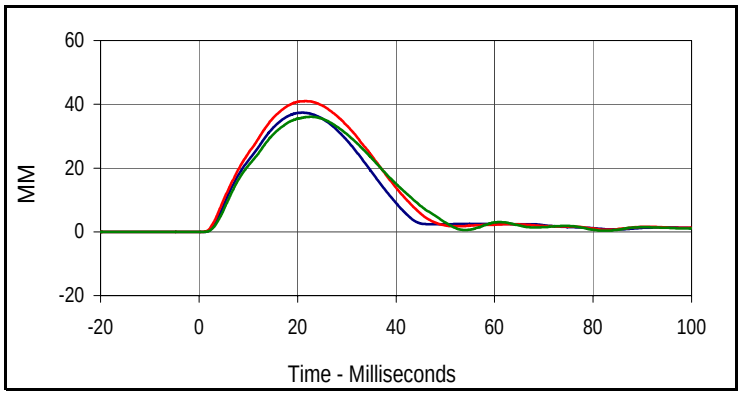
Test Program:	SID IIs Thorax with Arm Impact Test	Test Date:	6/19/12
ATD Serial No.:	299	Test I.D.:	299TWA042



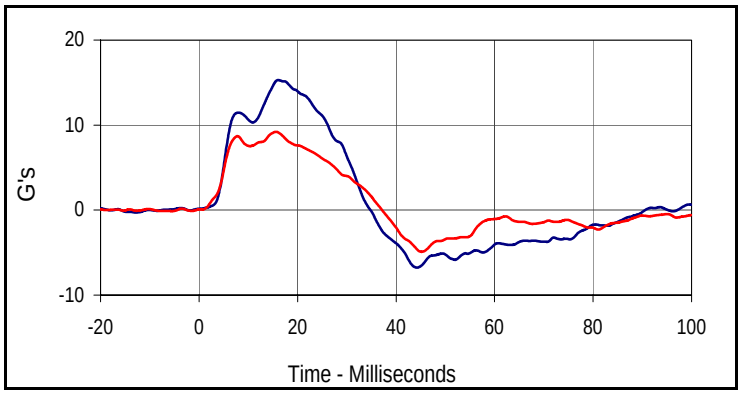
Curve Description			
Shoulder Deflection			
Plot No.	Type	SAE Class	Units
007	FIL	600	MM
Max	Time	Min	Time
35.2	16.2	-1.4	33.3

Test Program:	SID IIs Thorax without Arm Impact Test	Test Date:	6/19/12
ATD Serial No.:	299	Test I.D.:	299TWOA042

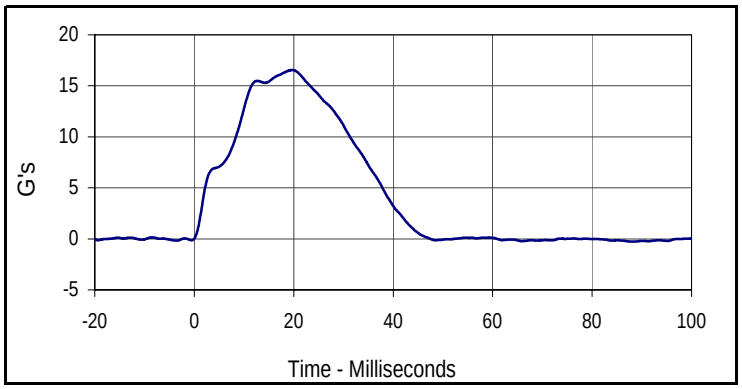
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	320	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.2	Pass
Impactor Velocity		m/s	4.2 to 4.4	4.33	Pass
Peak Upper Thorax Rib Deflection		mm	32 to 40	37.4	Pass
Peak Middle Thorax Rib Deflection		mm	39 to 45	41.0	Pass
Peak Lower Thorax Rib Deflection		mm	35 to 43	36.1	Pass
Peak Upper Spine Y Acceleration		G's	13 to 17	15.3	Pass
Peak Lower Spine Y Acceleration		G's	7 to 11	9.2	Pass
Peak Impactor Acceleration		G's	14 to 18	16.6	Pass
			Overall Test Results		Pass



Curve Description			
Upper Thorax Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
37.4	21.0	0.0	-18.9
Middle Thorax Deflection			
Max	Time	Min	Time
41.0	21.6	0.0	-0.3
Lower Thorax Deflection			
Max	Time	Min	Time
36.1	22.7	0.0	0.8



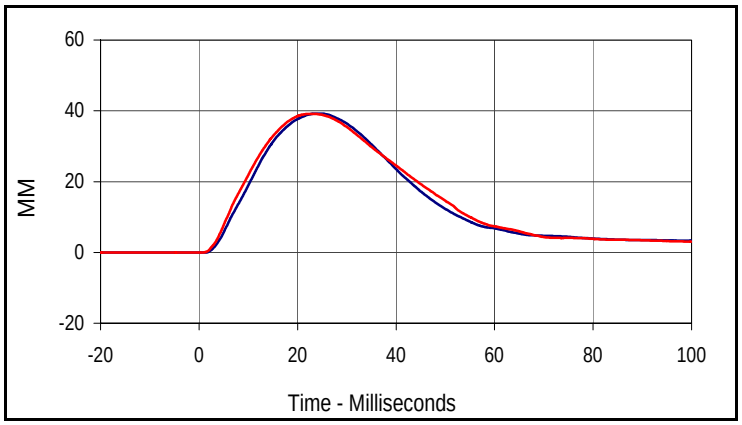
Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
15.3	16.1	-6.8	44.2
Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
9.2	15.7	-4.9	45.2



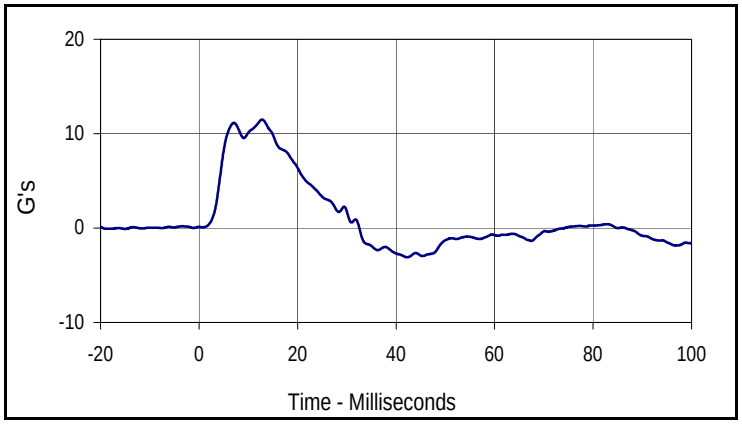
Curve Description			
Impactor Accleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
16.6	19.7	-0.3	88.4

Test Program:	SID IIs Abdomen Impact Test	Test Date:	6/19/12
ATD Serial No.:	299	Test I.D.:	299ABD042

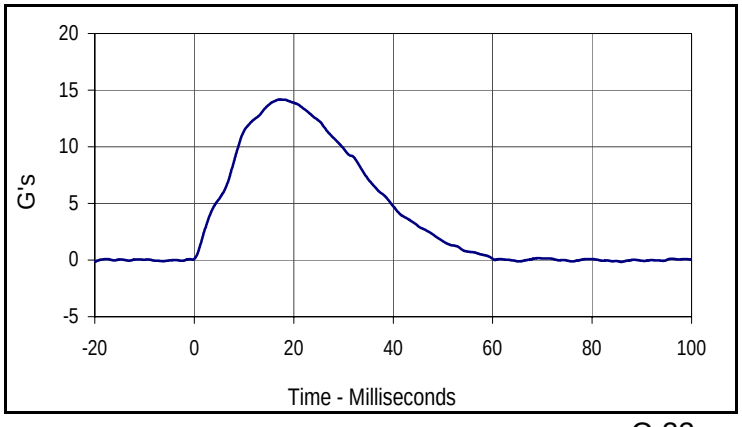
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	315	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.0	Pass
Impactor Velocity		m/s	4.2 to 4.4	4.3	Pass
Peak Upper Abdominal Rib Deflection		mm	36 to 47	39.2	Pass
Peak Lower Abdominal Rib Deflection		mm	33 to 44	39.2	Pass
Peak Lower Spine Y Acceleration		G's	9 to 14	11.5	Pass
Peak Impactor Acceleration		G's	12 to 16	14.2	Pass
			Overall Test Results		Pass



Curve Description			
Upper Abdominal Rib Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
39.2	24.6	0.0	-0.3
Curve Description			
Lower Abdominal Rib Deflection			
Plot No.	Type	SAE Class	Units
002	FIL	600	MM
Max	Time	Min	Time
39.2	22.9	0.0	-3.6



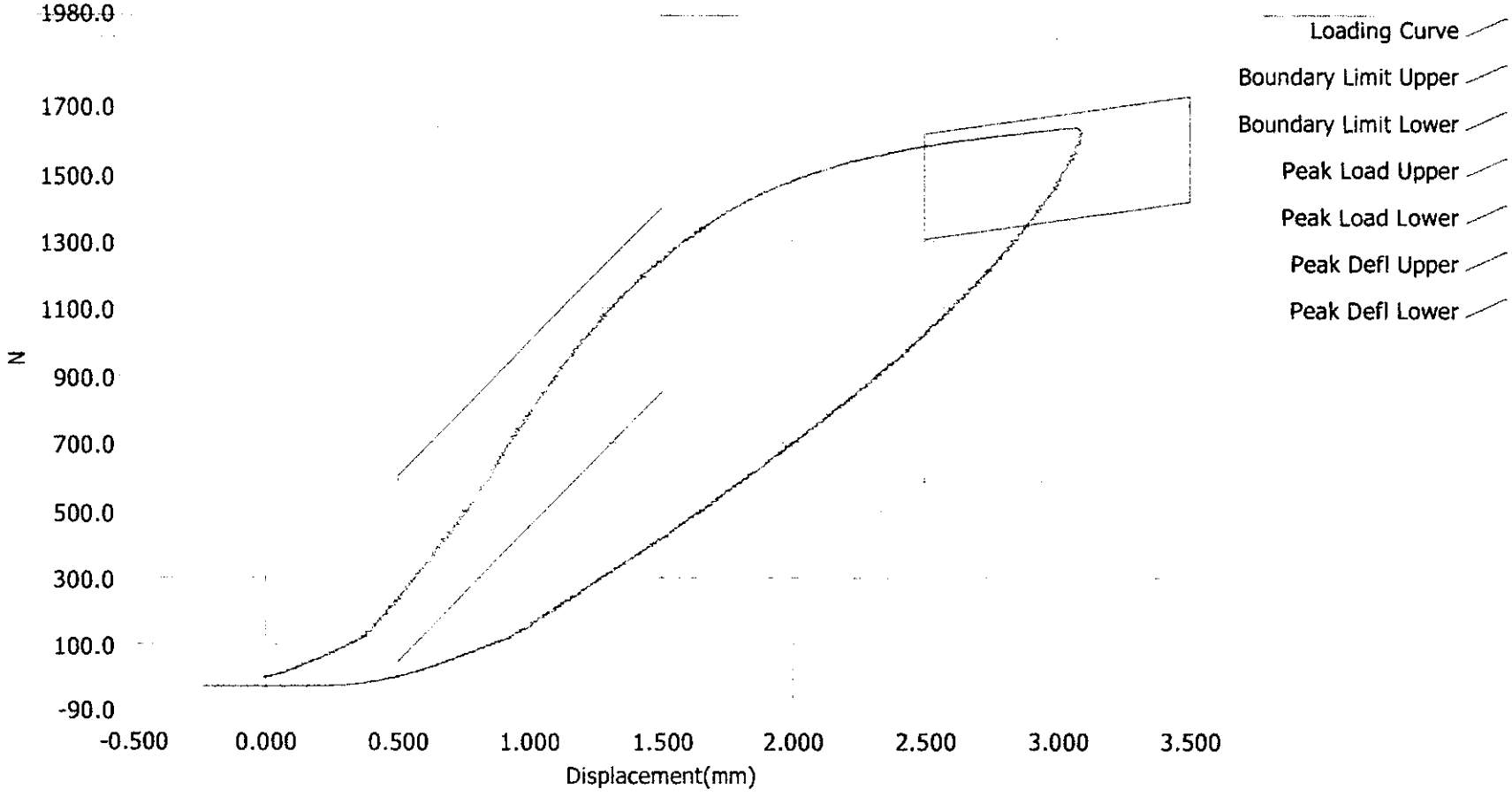
Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
11.5	12.8	-3.1	42.3



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
14.2	17.4	-0.2	85.9

MD0201 PRE TEST

Resultant Data - SIDIIs Plug Compression



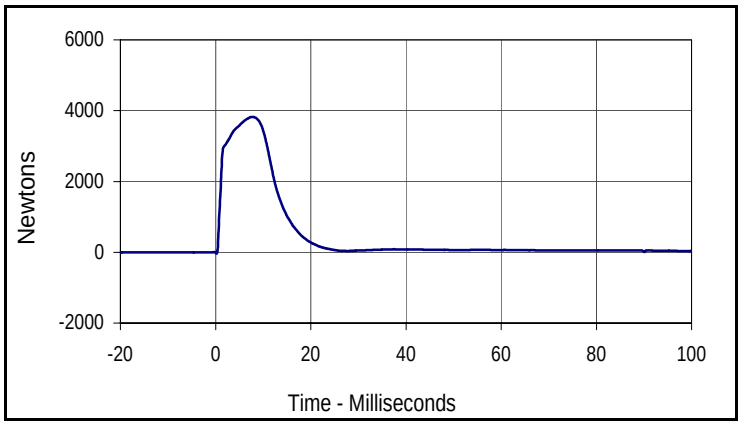
ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
	46877	10/5/2011	11:46 PM
Cert ID	ATD Serial Number	ATD Type	
	N/A	SIDIIs	

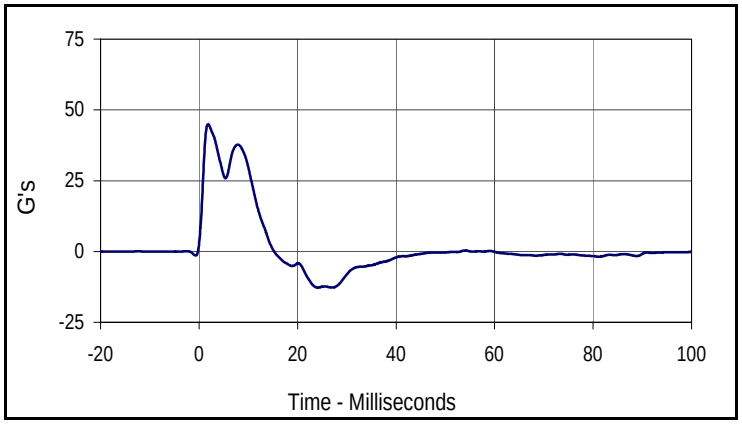
Current Date : 10/5/2011 Current Time : 23:47:14

Test Program:	SID IIs Pelvis Acetabulum Impact Test	Test Date:	6/19/12
ATD Serial No.:	299	Test I.D.:	299ACET042

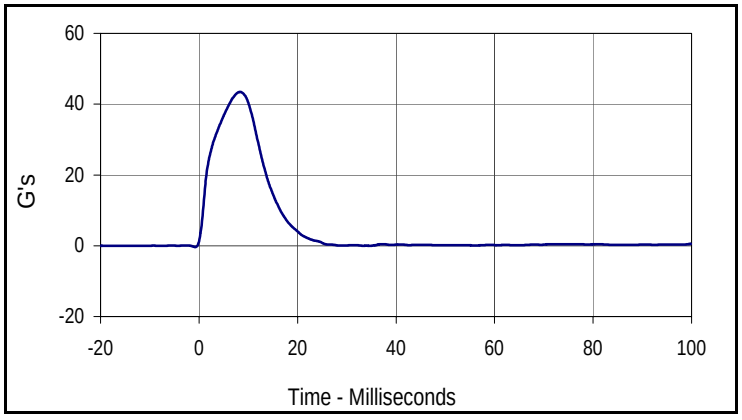
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	340	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.5	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.6	Pass
Impactor Velocity		m/s	6.6 to 6.8	6.7	Pass
Peak Acetabulum Force Y		Newtons	3600 to 4300	3825.9	Pass
Peak Pelvis Y Acceleration After 6 msec.		G's	34 to 42	37.7	Pass
Peak Impactor Acceleration		G's	38 to 47	43.5	Pass
			Overall Test Results		Pass



Curve Description			
Pelvis Acetabulum Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
3825.9	7.8	-38.4	0.2



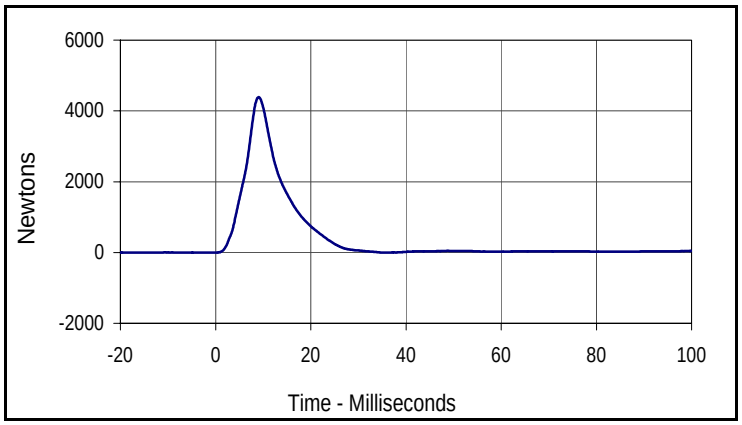
Curve Description			
Pelvis Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
45.0	1.8	-12.8	24.1



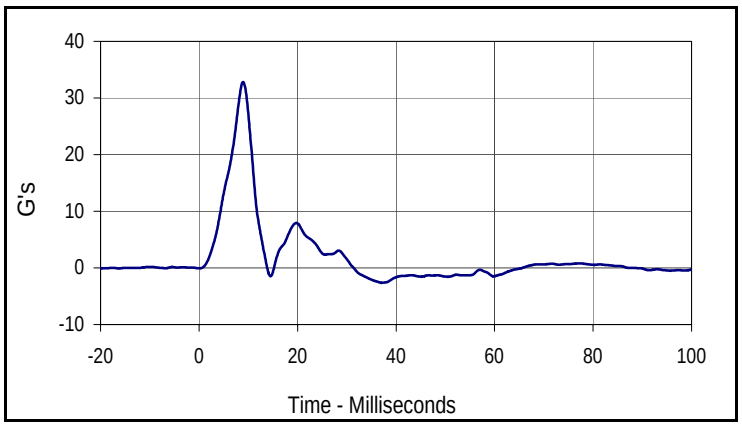
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
43.5	8.3	-0.4	-0.8

Test Program:	SID IIs Pelvis Iliac Calibration	Test Date:	6/19/12
ATD Serial No.:	299	Test I.D.:	299PL042

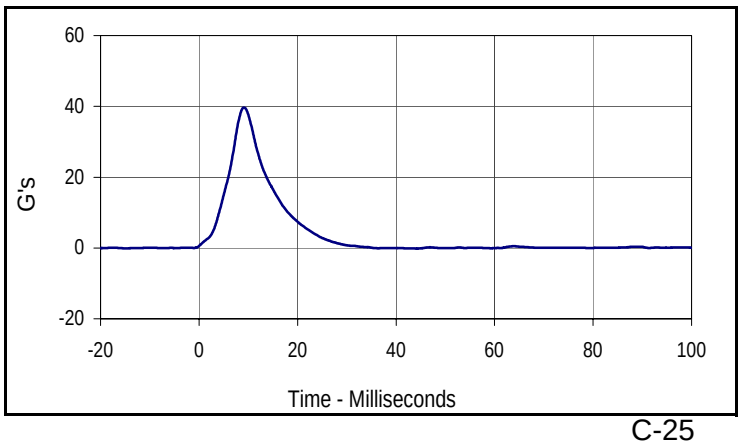
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	360	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.6	Pass
Impactor Velocity		m/s	4.2 to 4.4	4.3	Pass
Peak Illiac Force		Newtons	4100 to 5100	4386.7	Pass
Peak Pelvis Y Acceleration		G's	28 to 39	32.8	Pass
Peak Impactor Acceleration		G's	36 to 45	39.7	Pass
			Overall Test Results		Pass



Curve Description			
Pelvis Iliac Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4386.7	9.1	-3.0	-19.6



Curve Description			
Pelvis Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
32.8	8.9	-2.6	37.1



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
39.7	9.1	-0.2	44.2

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

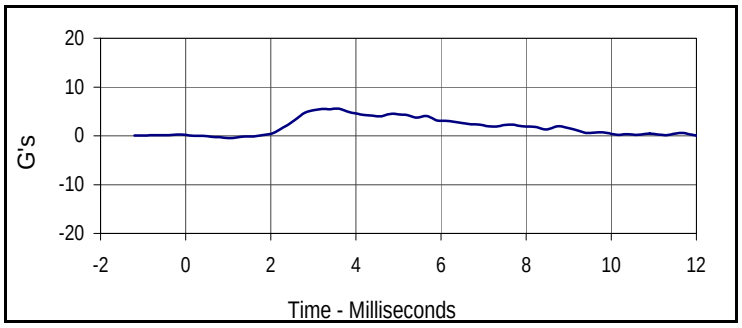
Test Program:	ES2re External Measurements	Test Date:	7/20/12
ATD Serial No.:	F035	Test I.D.:	N/A

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	20.8	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
1	Sitting Height	mm	900 - 918	910	Pass
2	Seat to Shoulder Joint	mm	558 - 572	566	Pass
3	Seat to Lower Face of Thoracic Spine Box	mm	346 - 356	351	Pass
4	Seat to Hip Joint (Center of Bolt)	mm	97 - 103	99	Pass
5	Sole to Seat, Sitting	mm	333 - 451	389	Pass
6	Head Width	mm	152 - 158	156	Pass
7	Shoulder / Arm Width	mm	461 - 479	470	Pass
8	Thorax Width	mm	322 - 332	327	Pass
9	Abdomen Width	mm	273 - 287	281	Pass
10	Pelvis Lap Width	mm	359 - 373	363	Pass
11	Head Depth	mm	196 - 206	201	Pass
12	Thorax Depth	mm	262 - 272	270	Pass
13	Abdomen Width	mm	194 - 204	199	Pass
14	Pelvis Depth	mm	235 - 245	240	Pass
15	Back of Buttocks to Hip Joint (Center of Bolt)	mm	150 - 160	155	Pass
16	Back of Buttocks to Front Knee	mm	597 - 615	609	Pass
			Overall Test Results		Pass

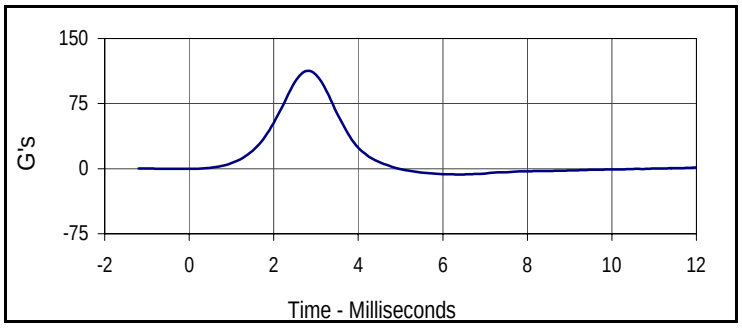
Test Program:	ES2re Head Drop Test	Test Date:	7/20/12
ATD Serial No.:	F035	Test I.D.:	F035HD033

Tested Parameter		Units	Specification	Result	Pass/Fail
Head Assembly Soak Time		Minutes	≥240	240	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.0	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.5	Pass
Peak Head Resultant Acceleration		G's	125 to 155	129.2	Pass
Peak Head X Acceleration		G's	≤15	5.6	Pass
Is Acceleration Unimodal?		Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse		%	<15	6.0	Pass
			Overall Test Results		Pass

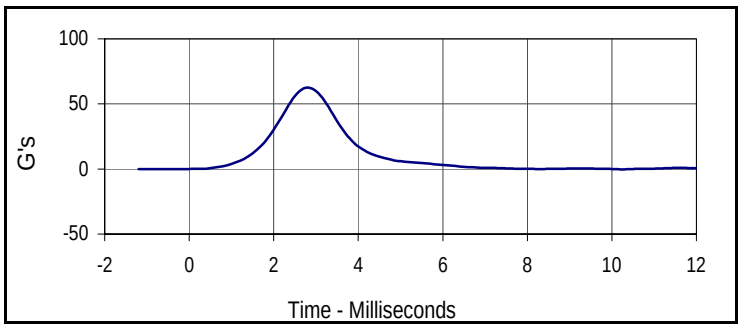
Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
129.2	2.8	0.1	-1.0



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
5.6	3.6	-0.5	1.0



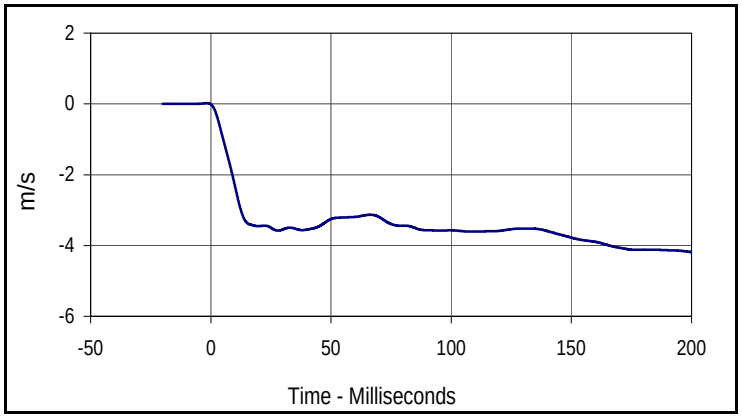
Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
112.9	2.8	-6.7	6.4



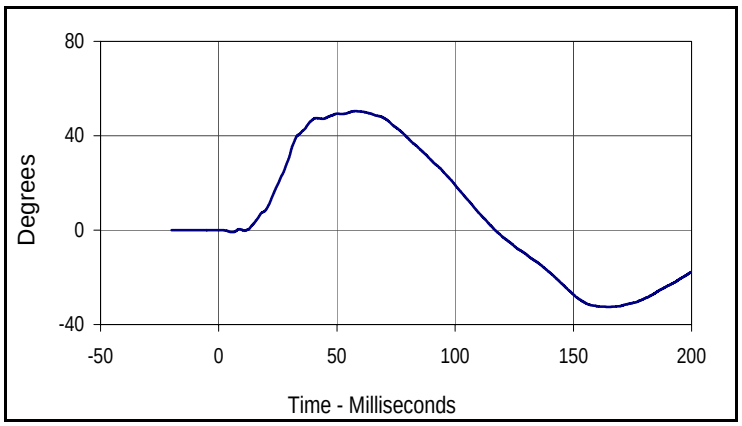
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
62.7	2.8	-0.2	10.2

Test Program:	ES2re Neck Flexion Test	Test Date:	7/20/12
ATD Serial No.:	F035	Test I.D.:	F035NB033

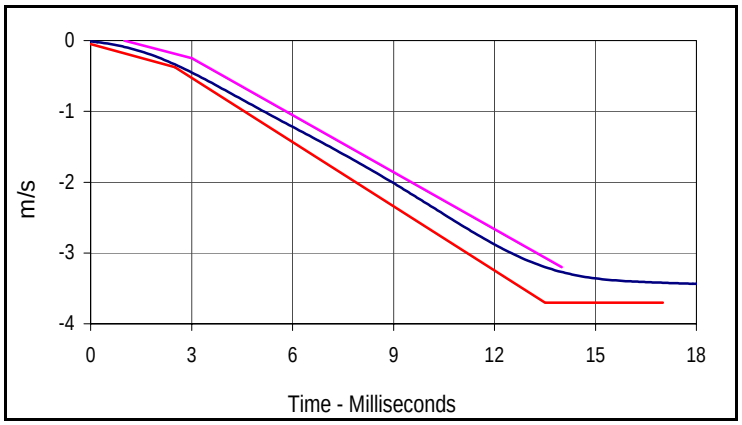
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	265	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	20.9	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.8	Pass
Pendulum Velocity		m/s	3.3 to 3.5	3.39	Pass
Headform Flexion	Max	Degrees	49 to 59	50.4	Pass
	Time	msec	54 to 66	57.8	Pass
Headform Flexion Decay (Peak to Zero)		msec	53 to 88	59.2	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.6	-4.2	200.0



Curve Description			
Headform Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	180	Degrees
Max	Time	Min	Time
50.4	57.8	-32.5	164.8

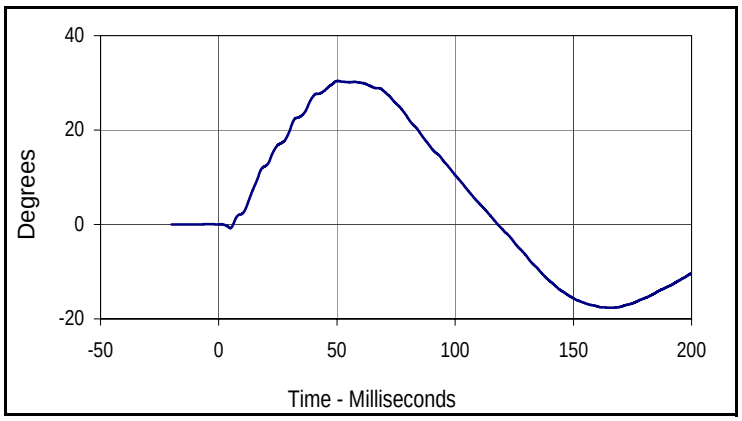


Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.6	-4.2	200.0

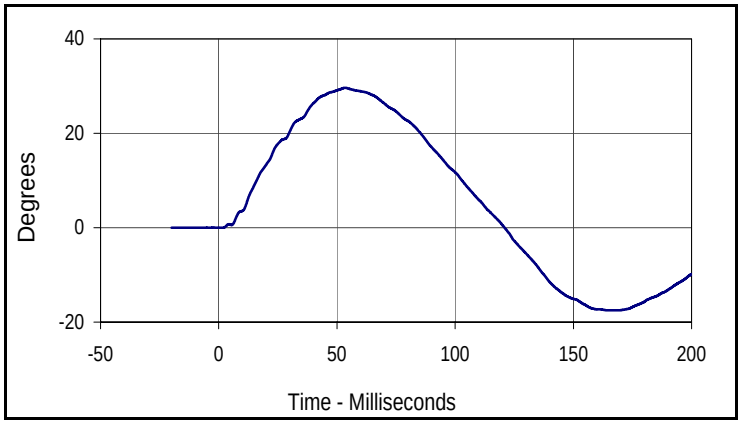
Velocity Corridors

Upper Boundary		Lower Boundary	
Time (msec)	Velocity (m/s)	Time (msec)	Velocity (m/s)
1.0	0.00	0.0	-0.05
3.0	-0.03	2.5	-0.375
14.0	-3.20	13.5	-3.70
		17.0	-3.70

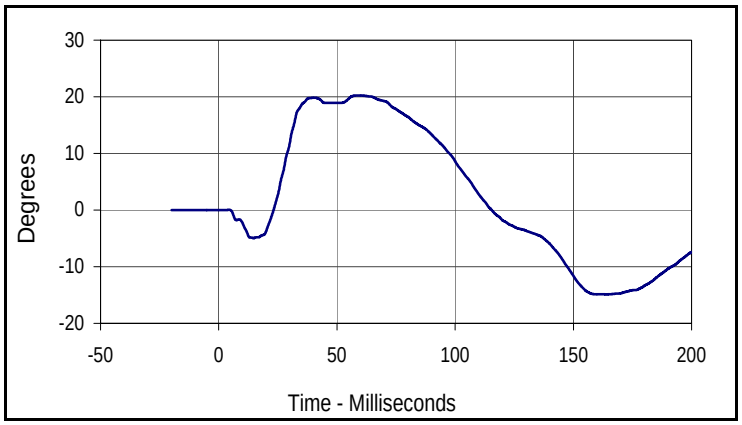
Test Program:	ES2re Neck Flexion Test	Test Date:	7/20/12
ATD Serial No.:	F035	Test I.D.:	F035NB033



Curve Description			
Potentiometer A			
Plot No.	Type	SAE Class	Units
003	FIL	180	Degrees
Max	Time	Min	Time
30.4	50.2	-17.6	166.0



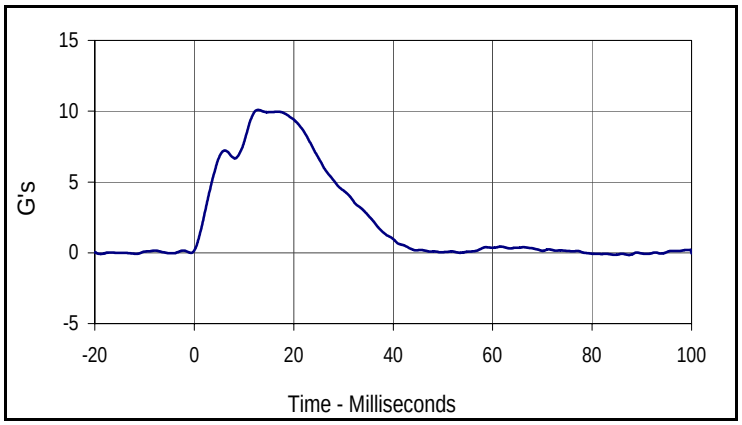
Curve Description			
Potentiometer B			
Plot No.	Type	SAE Class	Units
004	FIL	180	Degrees
Max	Time	Min	Time
29.6	53.5	-17.5	167.2



Curve Description			
Potentiometer C			
Plot No.	Type	SAE Class	Units
005	FIL	180	Degrees
Max	Time	Min	Time
20.2	59.0	-14.9	164.3

Test Program:	ES2re Shoulder Impact Test	Test Date:	7/20/12
ATD Serial No.:	F035	Test I.D.:	F035SH033

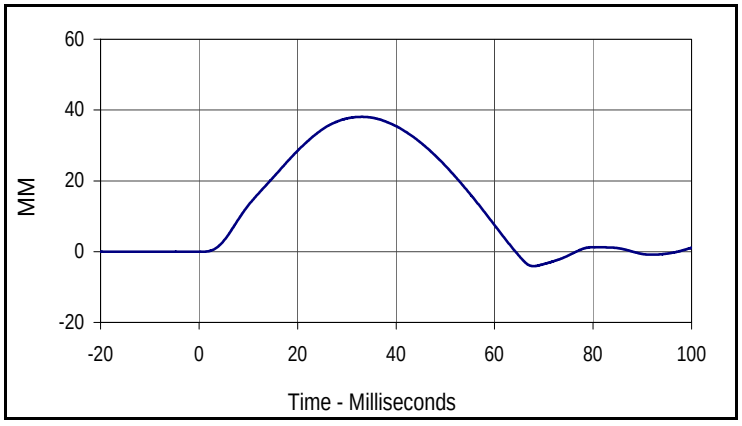
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	290	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.1	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.0	Pass
Pendulum Speed		m/s	4.2 to 4.4	4.26	Pass
Peak Impactor Acceleration		G's	7.5 to 10.5	10.1	Pass
			Overall Test Results		Pass



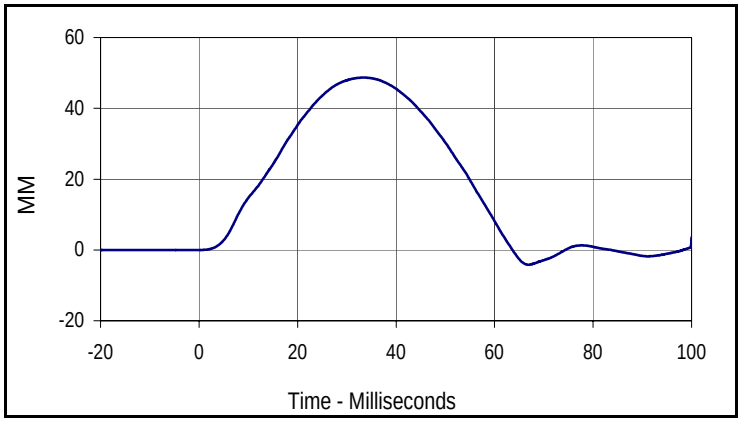
Curve Description			
Probe Impactor Acceleration			
Plot No.	Type	SAE Class	Units
001	FIL	180	G's
Max	Time	Min	Time
10.1	12.9	-0.2	87.4

Test Program:	ES2re Thorax - Rib Drop Test	Test Date:	7/20/12
ATD Serial No.:	F035 Rib #1	Test I.D.:	F035RB1033

Tested Parameter		Units	Specification	Result	Pass/Fail
Rib Module Soak Time		Minutes	≥240	315	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	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	30.1	Pass
Peak Rib Deflection at 459 +/- 5 mm Drop Height		mm	36 to 40	38.1	Pass
Peak Rib Deflection at 815 +/- 8 mm Drop Height		mm	46 to 51	48.7	Pass
			Overall Test Results		Pass



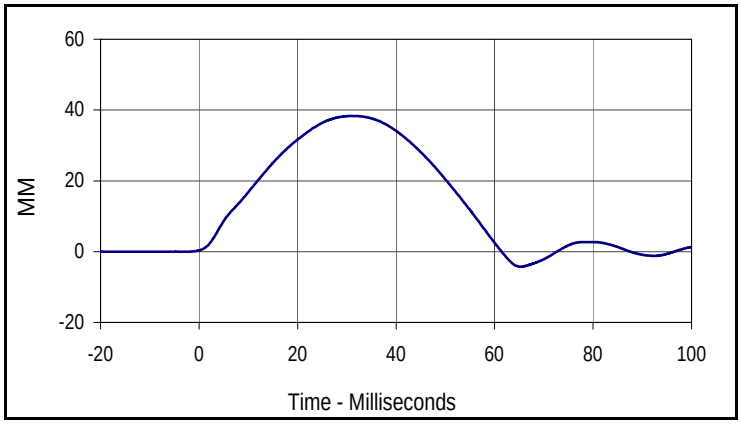
Curve Description			
Upper Rib Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
38.1	33.1	-4.1	67.9



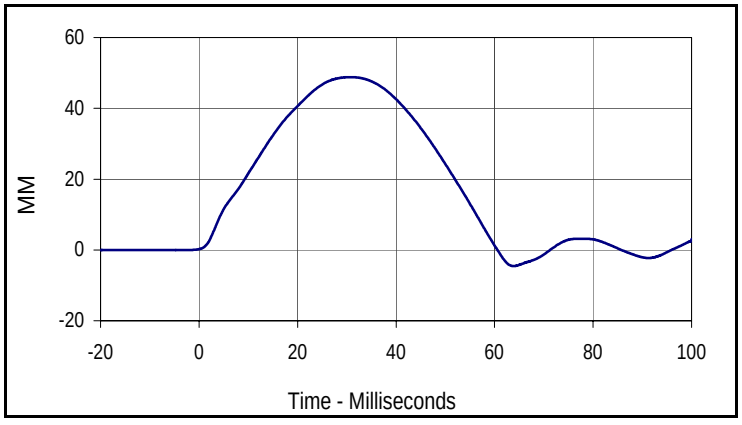
Curve Description			
Lower Rib Deflection			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max	Time	Min	Time
48.7	33.4	-4.2	66.9

Test Program:	ES2re Thorax - Rib Drop Test	Test Date:	7/20/12
ATD Serial No.:	F035 Rib #2	Test I.D.:	F035RB2033

Tested Parameter		Units	Specification	Result	Pass/Fail
Rib Module Soak Time		Minutes	≥240	330	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.1	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.9	Pass
Peak Rib Deflection at 459 +/- 5 mm Drop Height		mm	36 to 40	38.3	Pass
Peak Rib Deflection at 815 +/- 8 mm Drop Height		mm	46 to 51	48.8	Pass
			Overall Test Results		Pass



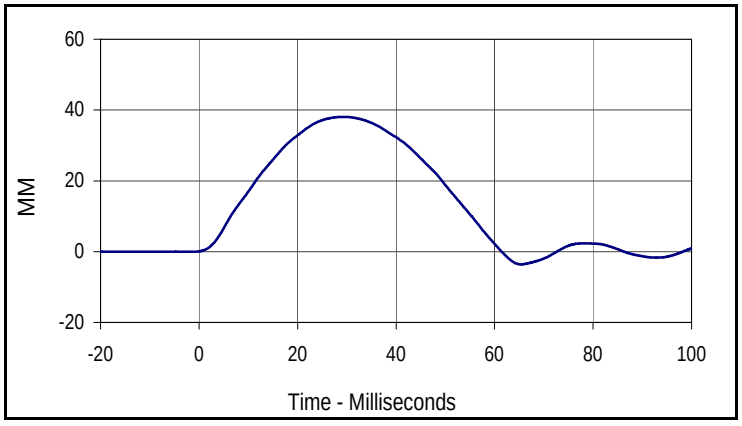
Curve Description			
Middle Rib Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
38.3	31.3	-4.3	65.3



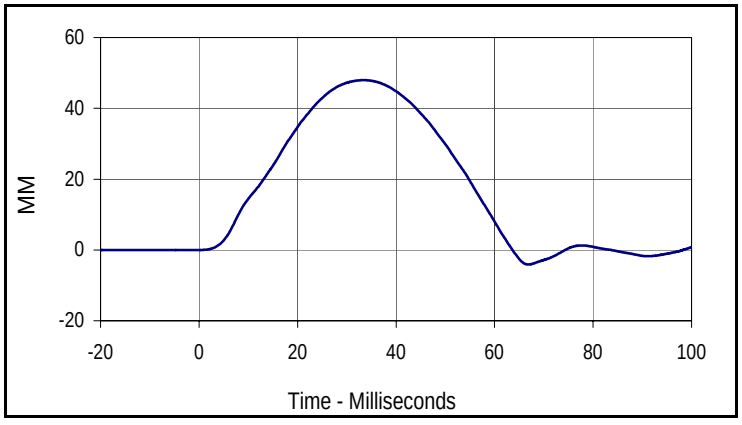
Curve Description			
Middle Rib Deflection			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max	Time	Min	Time
48.8	30.8	-4.6	63.9

Test Program:	ES2re Thorax - Rib Drop Test	Test Date:	7/20/12
ATD Serial No.:	F035 Rib #3	Test I.D.:	F035RB3033

Tested Parameter		Units	Specification	Result	Pass/Fail
Rib Module Soak Time		Minutes	≥240	350	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.5	Pass
Peak Rib Deflection at 459 +/- 5 mm Drop Height		mm	36 to 40	38.1	Pass
Peak Rib Deflection at 815 +/- 8 mm Drop Height		mm	46 to 51	48.0	Pass
			Overall Test Results		Pass



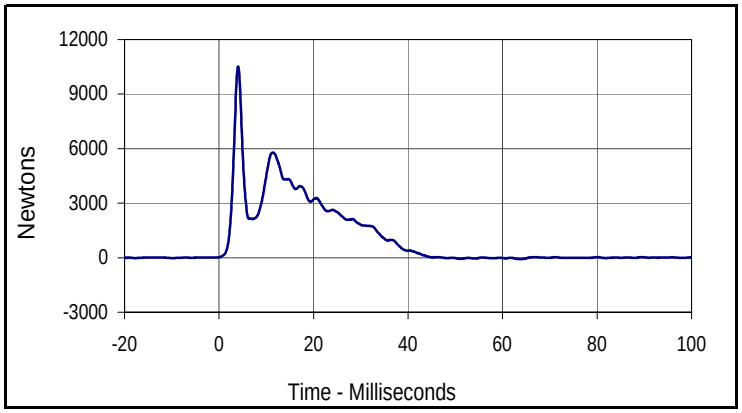
Curve Description			
Lower Rib Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
38.1	29.3	-3.6	65.4



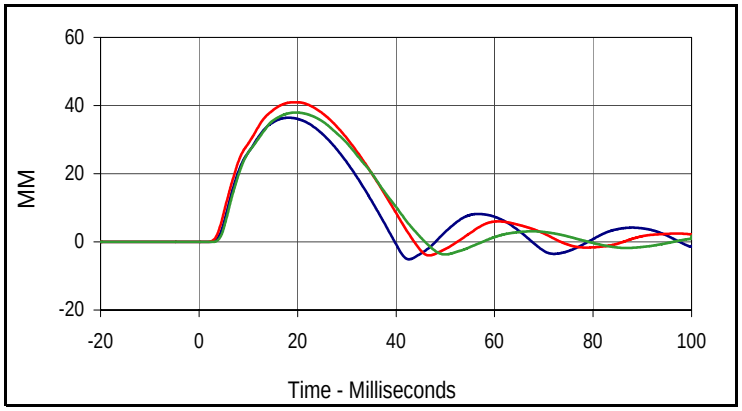
Curve Description			
Lower Rib Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
48.0	33.4	-4.1	66.9

Test Program:	ES2re Thorax - Full Body Impact Test	Test Date:	7/20/12
ATD Serial No.:	F035	Test I.D.:	F035TH033

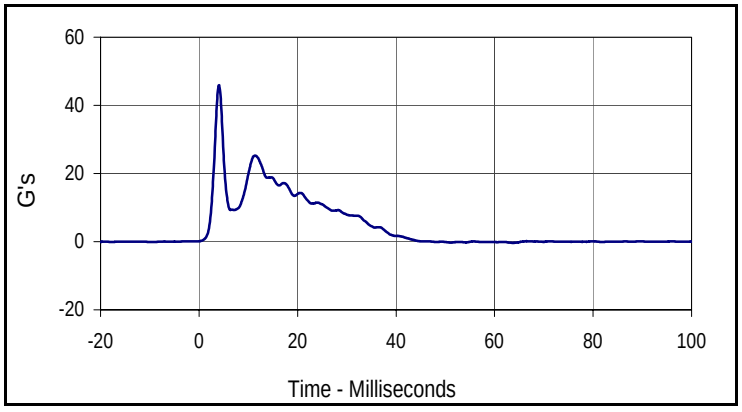
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	370	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.2	Pass
Peak Impactor Velocity		m/s	5.4 to 5.6	5.50	Pass
Peak Impactor Force		N	5100 to 6200	5780.0	Pass
		msec	> 6.0 msec	11.3	Pass
Peak Upper Rib Deflection		mm	34 to 41	36.4	Pass
Peak Middle Rib Deflection		mm	37 to 45	41.0	Pass
Peak Lower Rib Deflection		mm	37 to 44	38.0	Pass
			Overall Test Results		Pass



Curve Description			
Impactor Force			
Plot No.	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
10507.2	4.1	-82.4	63.7



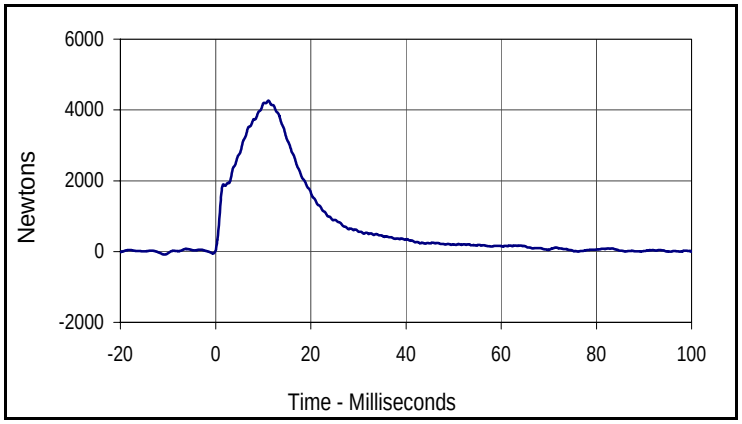
Curve Description			
Upper, Middle, Lower Rib Deflections			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max (Upper)	Time	Min (Upper)	Time
36.4	18.2	-5.1	42.6
Max (Middle)	Time	Min (Middle)	Time
41.0	19.6	-4.0	46.7
Max (Lower)	Time	Min (Lower)	Time
38.0	19.6	-3.7	50.0



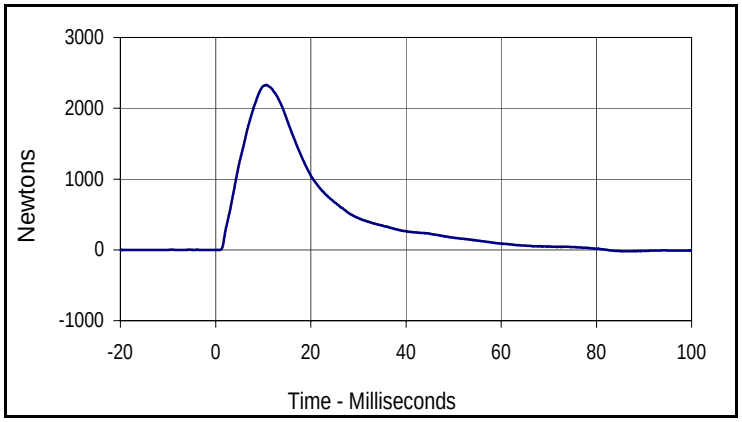
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
45.9	4.1	-0.4	63.7

Test Program:	ES2re Abdomen Impact Test	Test Date:	7/20/12
ATD Serial No.:	F035	Test I.D.:	F035ABD033

Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	400	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	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	30.2	Pass
Probe Velocity		m/s	3.9 to 4.1	4.0	Pass
Peak Impactor Force		N	4000 to 4800	4265.0	Pass
		msec	10.6 to 13.0	11.1	Pass
Sum of Abdominal Forces		N	2200 to 2700	2329.4	Pass
		msec	10.0 to 12.3	10.7	Pass
			Overall Test Results		Pass

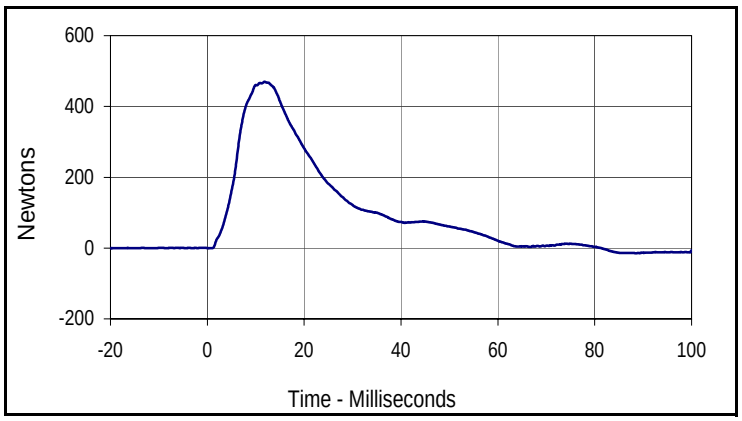


Curve Description			
Impactor Force			
Plot No.	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
4265.0	11.1	-86.2	-10.7

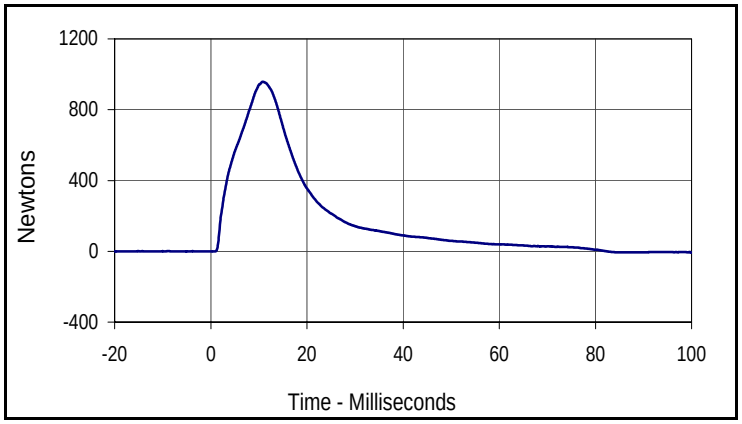


Curve Description			
Abdomen Sum Resultant			
Plot No.	Type	SAE Class	Units
002	RES	600	Newtons
Max	Time	Min	Time
2329.4	10.7	-18.4	85.7

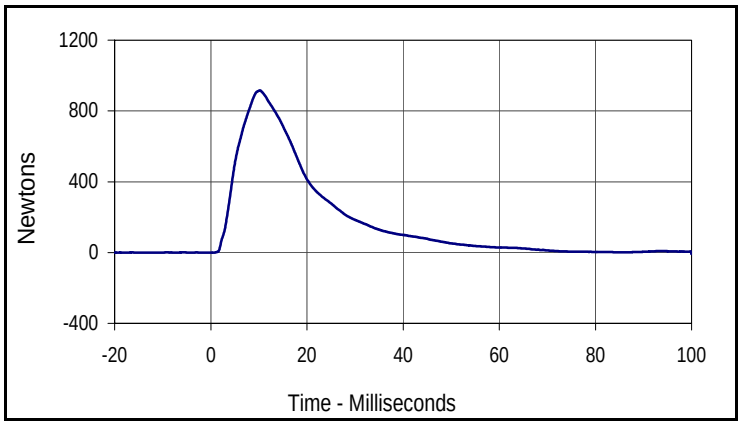
Test Program:	ES2re Abdomen Impact Test	Test Date:	7/20/12
ATD Serial No.:	F035	Test I.D.:	F035ABD033



Curve Description			
Front Abdomen Force			
Plot No.	Type	SAE Class	Units
003	FIL	600	Newtons
Max	Time	Min	Time
469.9	11.8	-14.6	88.5



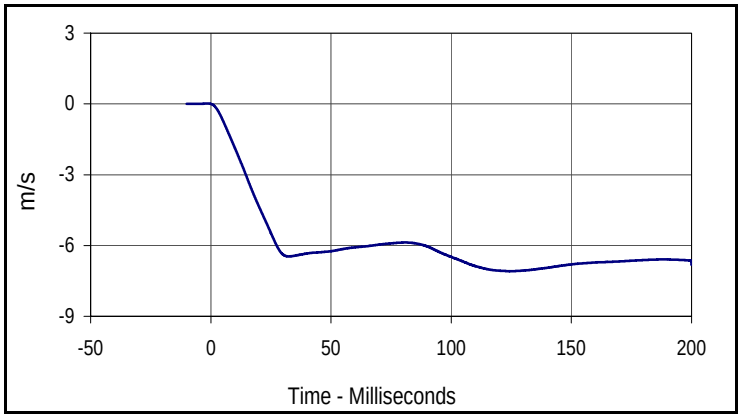
Curve Description			
Middle Abdomen Force			
Plot No.	Type	SAE Class	Units
004	FIL	600	Newtons
Max	Time	Min	Time
958.0	10.8	-8.5	101.2



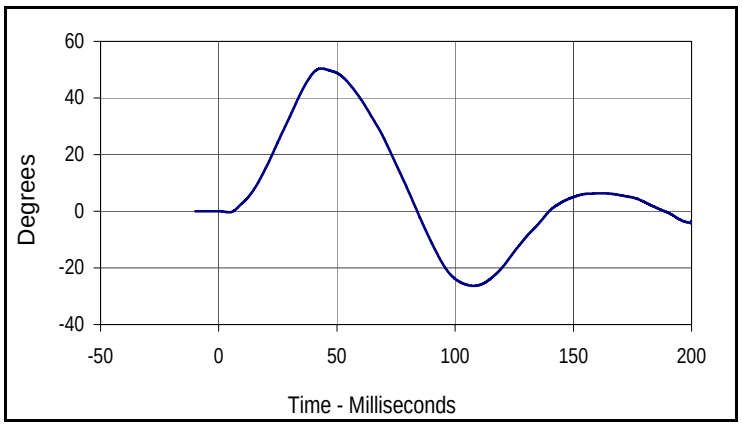
Curve Description			
Rear Abdomen Force			
Plot No.	Type	SAE Class	Units
005	FIL	600	Newtons
Max	Time	Min	Time
916.2	10.2	-8.5	101.2

Test Program:	ES2re Lumbar Flexion Test	Test Date:	7/20/12
ATD Serial No.:	F035	Test I.D.:	F035LB033

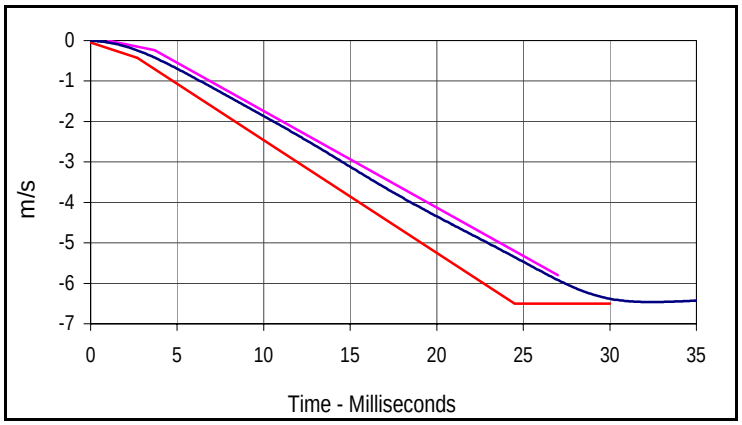
Tested Parameter		Units	Specification	Result	Pass/Fail
Lumbar Spine Assembly Soak Time		Minutes	≥240	425	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.4	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.1	Pass
Pendulum Velocity		m/s	5.95 to 6.15	6.01	Pass
Headform Rotation	Max	Degrees	45 to 55	50.4	Pass
	Time	msec	39 to 53	43.3	Pass
Time of Decay to Zero Angle from Peak		msec	37 to 57	40.7	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.3	-7.1	124.8



Curve Description			
Headform Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	180	Degrees
Max	Time	Min	Time
50.4	43.3	-26.3	107.7

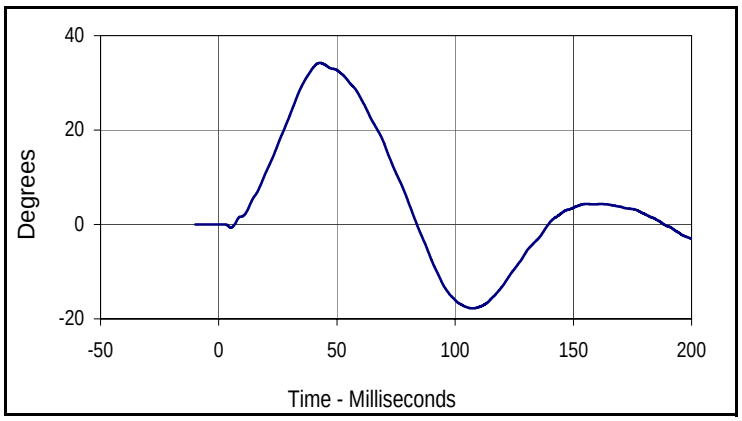


Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.3	-7.1	124.8

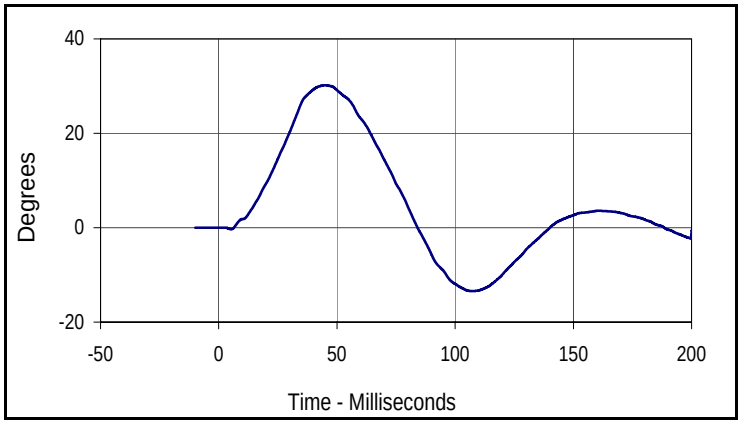
Velocity Corridors

Upper Boundary		Lower Boundary	
Time (msec)	Velocity (m/s)	Time (msec)	Velocity (m/s)
1.0	0.00	0.0	-0.05
3.7	-0.24	2.7	-0.425
27.0	-5.80	24.5	-6.50
		30.0	-6.50

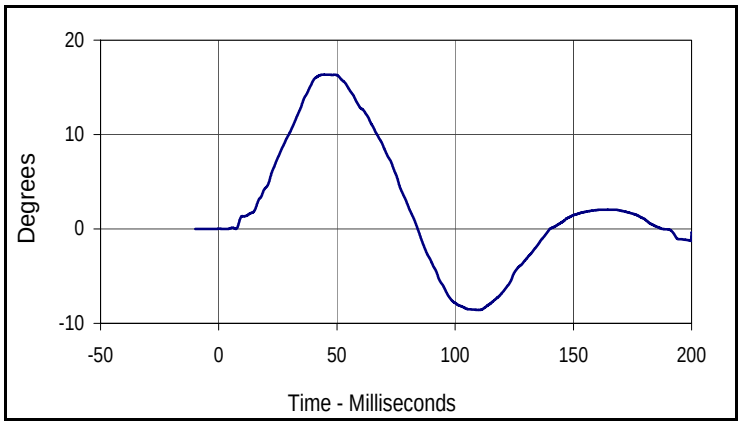
Test Program:	ES2re Lumbar Flexion Test	Test Date:	7/20/12
ATD Serial No.:	F035	Test I.D.:	F035LB033



Curve Description			
Potentiometer A			
Plot No.	Type	SAE Class	Units
003	FIL	180	Degrees
Max	Time	Min	Time
34.2	42.7	-17.8	107.3



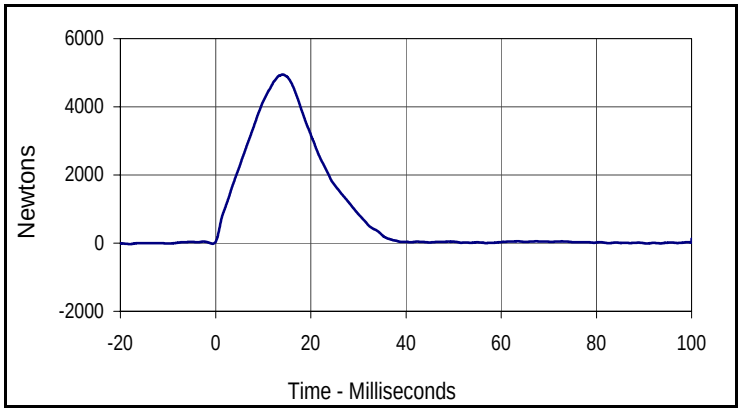
Curve Description			
Potentiometer B			
Plot No.	Type	SAE Class	Units
004	FIL	180	Degrees
Max	Time	Min	Time
30.2	45.0	-13.4	107.1



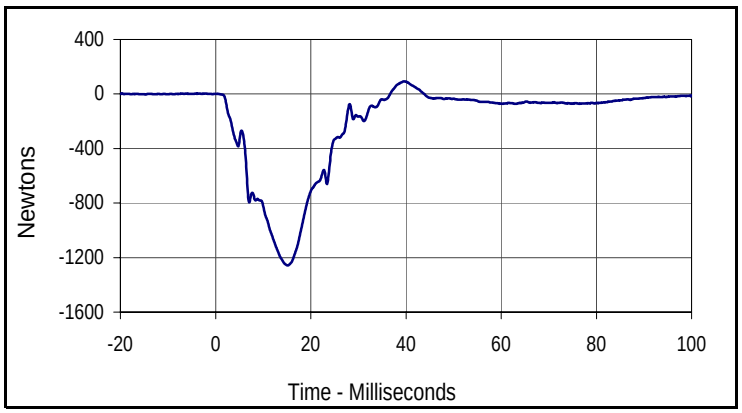
Curve Description			
Potentiometer C			
Plot No.	Type	SAE Class	Units
005	FIL	180	Degrees
Max	Time	Min	Time
16.4	44.4	-8.6	110.4

Test Program:	ES2re Pelvis Impact Test	Test Date:	7/20/12
ATD Serial No.:	F035	Test I.D.:	F035PL033

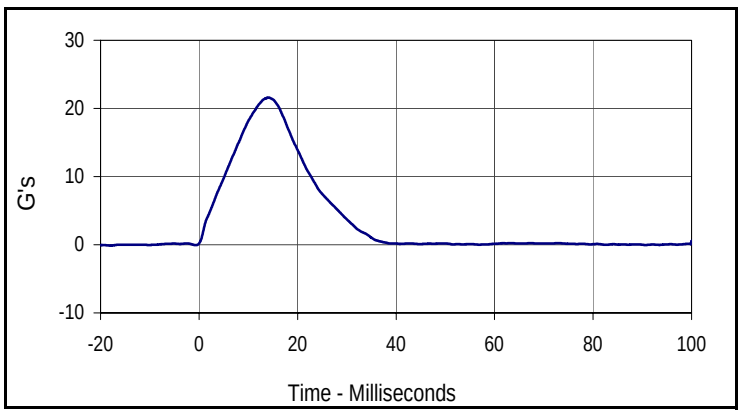
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	440	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.1	Pass
Pendulum Velocity		m/s	4.2 to 4.4	4.3	Pass
Peak Impactor Force		N	4700 to 5400	4947.4	Pass
		msec	11.8 to 16.1	14.1	Pass
Peak Pubic Symphysis Load		N	-1230 to -1590	-1258.2	Pass
		msec	12.2 to 17.0	15.1	Pass
			Overall Test Results		Pass



Curve Description			
Impactor Force			
Plot No.	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
4947.4	14.1	-28.6	-18.0



Curve Description			
Pubic Symphysis Force Y			
Plot No.	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
92.9	39.6	-1258.2	15.1



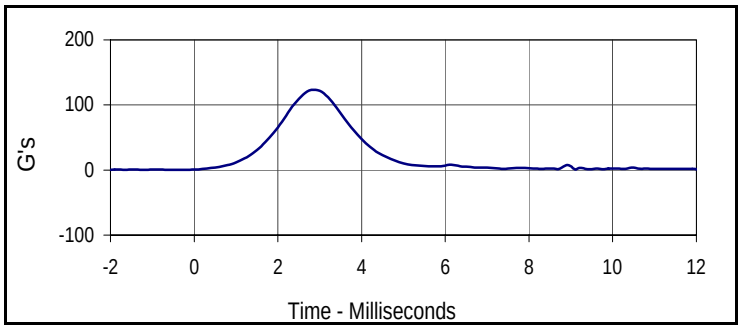
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
21.6	14.1	-0.1	-18.0

Test Program:	SID IIs External Measurements	Test Date:	7/20/12
ATD Serial No.:	299	Test I.D.:	N/A

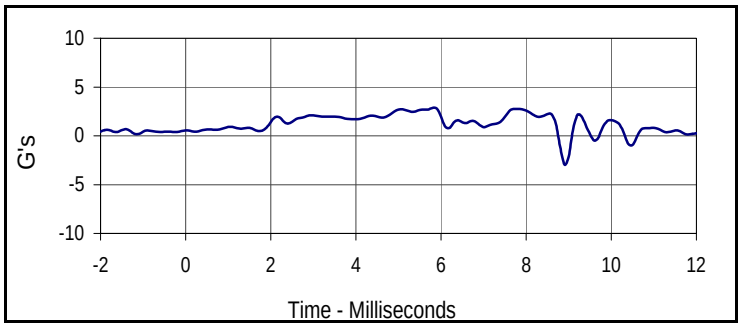
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	20.8	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
A	Sitting Height	mm	772 - 788	780	Pass
B	Shoulder Pivot Height	mm	437 - 453	445	Pass
C	H-Point Height	mm	79 - 89	84	Pass
D	H-Point from Seatback	mm	141 - 151	145	Pass
E	Shoulder Pivot from Backline	mm	97 - 107	103	Pass
F	Thigh Clearance	mm	119 - 135	125	Pass
G	Head Breadth	mm	140 - 148	145	Pass
H	Head Back from Backline	mm	40 - 46	43	Pass
I	Head Depth	mm	178 - 188	183	Pass
J	Head Circumference	mm	541 - 551	546	Pass
K	Buttock to Knee Length	mm	514 - 540	530	Pass
L	Popliteal Height	mm	343 - 369	350	Pass
M	Knee Pivot to Floor Height	mm	392 - 409	400	Pass
N	Buttock Popliteal Length	mm	416 - 442	430	Pass
O	Chest Depth w/o Jacket	mm	195 - 211	204	Pass
P	Foot Length	mm	216 - 232	221	Pass
Q	Hip Breadth with Pelvic Plug	mm	313 -323	318	Pass
R	Arm Length	mm	249 - 259	252	Pass
S	Knee Joint to Seatback	mm	477 - 493	484	Pass
V	Shoulder Width	mm	341 - 357	351	Pass
W	Foot Width	mm	78 - 94	89	Pass
Y	Chest Circumference with Jacket	mm	851 - 881	873	Pass
Z	Waist Circumference	mm	760 - 791	775	Pass
			Overall Test Results		Pass

Test Program:	SID IIs Head Drop Test	Test Date:	7/20/12
ATD Serial No.:	299	Test I.D.:	299HD043

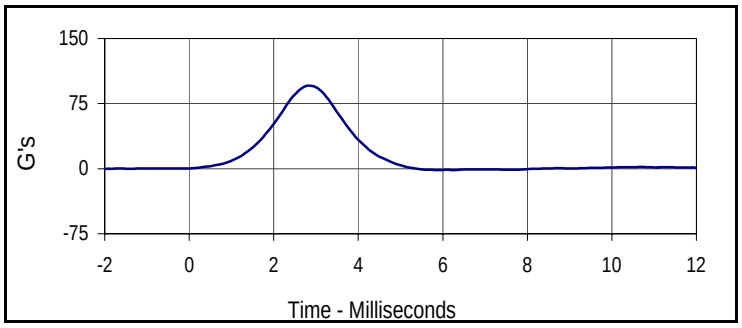
Tested Parameter		Units	Specification	Result	Pass/Fail
Head Assembly Soak Time		Minutes	≥240	270	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	20.7	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.0	Pass
Peak Head Resultant Acceleration		G's	115 to 137	123.4	Pass
Peak Head X Acceleration		G's	<15	2.9	Pass
Is Acceleration Unimodal?		Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse		%	<15	6.1	Pass
			Overall Test Results		Pass



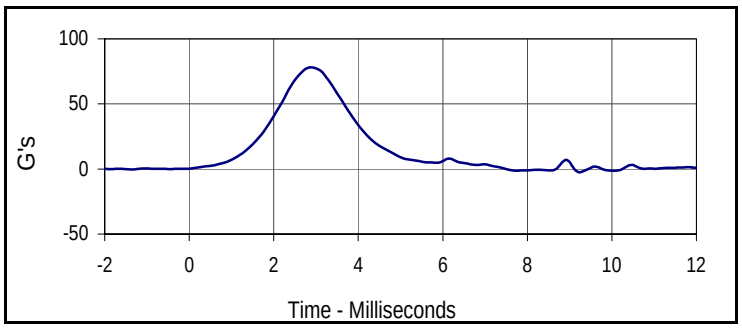
Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
123.4	2.9	0.4	-1.2



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
2.9	5.8	0.2	-1.2



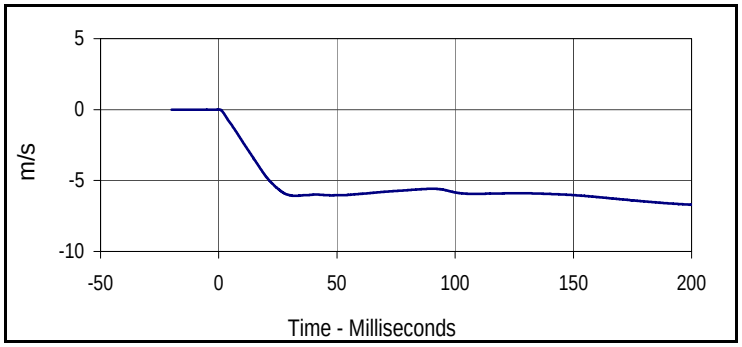
Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
95.7	2.8	-1.7	5.9



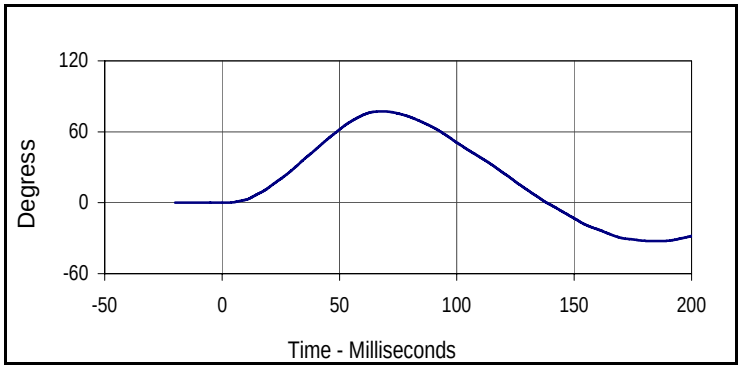
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
78.2	2.9	-2.3	9.2

Test Program:	SID IIs Neck Flexion Test	Test Date:	7/20/12
ATD Serial No.:	299	Test I.D.:	299NB043

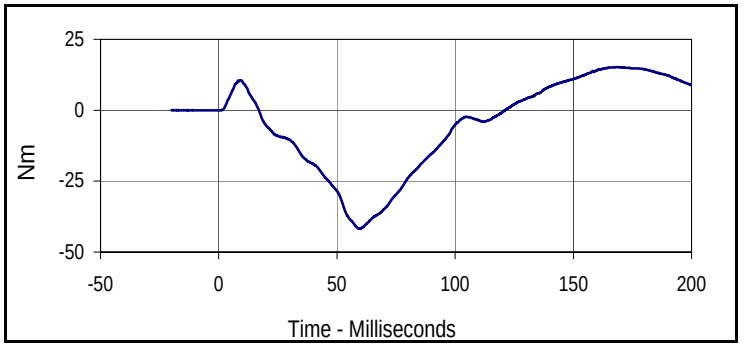
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	300	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	20.9	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.1	Pass
Pendulum Velocity		m/s	5.51 to 5.63	5.54	Pass
Pendulum Deceleration	10 msec	m/s	-2.20 to -2.80	-2.24	Pass
	15 msec	m/s	-3.30 to -4.10	-3.50	Pass
	20 msec	m/s	-4.40 to -5.40	-4.72	Pass
	25 msec	m/s	-5.40 to -6.10	-5.58	Pass
	25-100 msec	m/s	-5.50 to -6.20	-6.08	Pass
D-Plane Rotation	Max	Degrees	71 to 81	77.3	Pass
	Time	msec	50 to 70	68.2	Pass
Peak Occipital Condyle Moment		Nm	-36 to -44	-41.7	Pass
Decaying Moment Time to Cross 0 Nm		msec	102 to 126	121.2	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
0.0	-0.2	-6.7	200.0



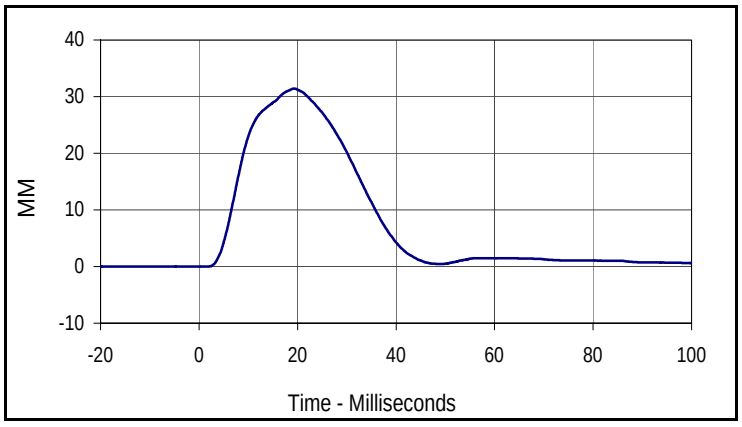
Curve Description			
Maximum Translation Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degress
Max	Time	Min	Time
77.3	68.2	-32.3	182.6



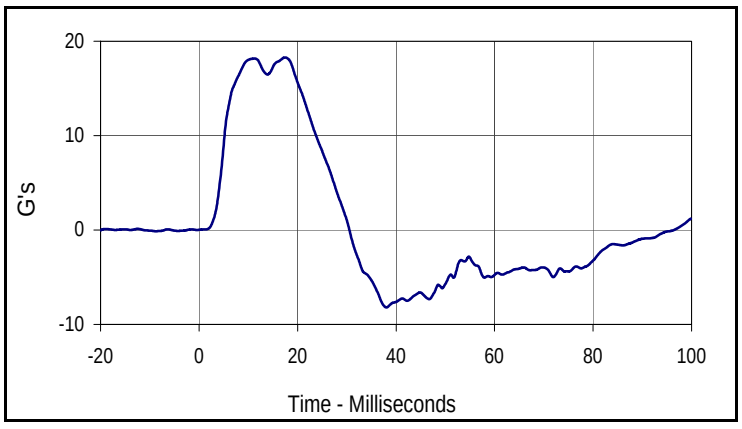
Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
15.2	168.2	-41.7	59.8

Test Program:	SID IIs Shoulder Impact Test	Test Date:	7/20/12
ATD Serial No.:	299	Test I.D.:	299SH043

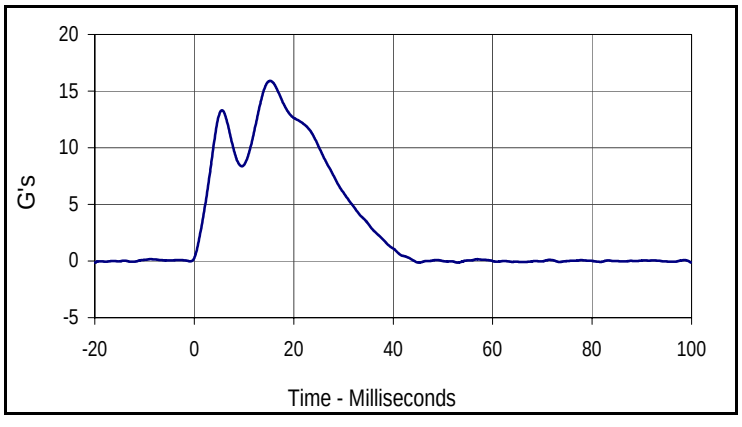
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	325	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.9	Pass
Impactor Velocity		m/s	4.20 to 4.40	4.35	Pass
Peak Shoulder Deflection		mm	28 to 37	31.4	Pass
Peak Lateral Spine Acceleratrion Y		G's	17 to 22	18.3	Pass
Peak Impactor Acceleration		G's	13 to 18	15.9	Pass
			Overall Test Results		Pass



Curve Description			
Shoulder Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
31.4	19.2	0.0	1.5



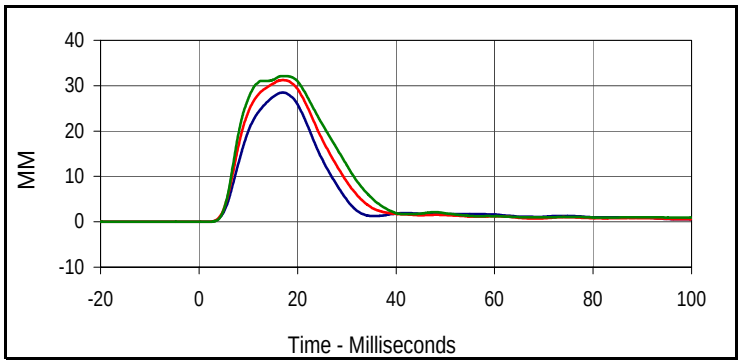
Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
18.3	17.5	-8.2	38.0



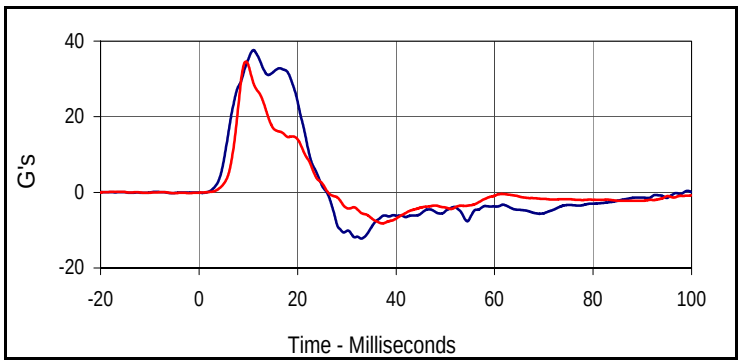
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
15.9	15.3	-0.1	-20.0

Test Program:	SID IIs Thorax with Arm Impact Test	Test Date:	7/20/12
ATD Serial No.:	299	Test I.D.:	299TWA043

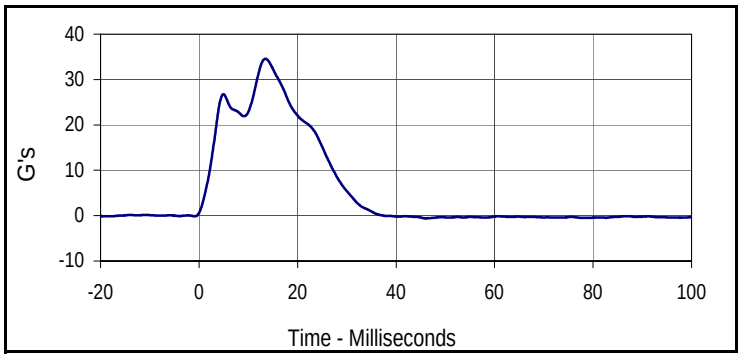
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	345	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.7	Pass
Impactor Velocity		m/s	6.6 to 6.8	6.7	Pass
Peak Shoulder Deflection		mm	31 to 40	38.7	Pass
Peak Upper Thorax Rib Deflection		mm	25 to 32	28.5	Pass
Peak Middle Thorax Rib Deflection		mm	30 to 36	31.2	Pass
Peak Lower Thorax Rib Deflection		mm	32 to 38	32.1	Pass
Peak Upper Spine Y Acceleration		G's	34 to 43	37.7	Pass
Peak Lower Spine Y Acceleration		G's	29 to 37	34.6	Pass
Peak Impactor Acceleration		G's	30 to 36	34.6	Pass
			Overall Test Results		Pass



Curve Description			
Upper Thorax Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
28.5	17.0	0.0	-1.5
Middle Thorax Deflection			
Max	Time	Min	Time
31.2	17.1	0.0	-19.4
Lower Thorax Deflection			
Max	Time	Min	Time
32.1	16.8	0.0	-18.6

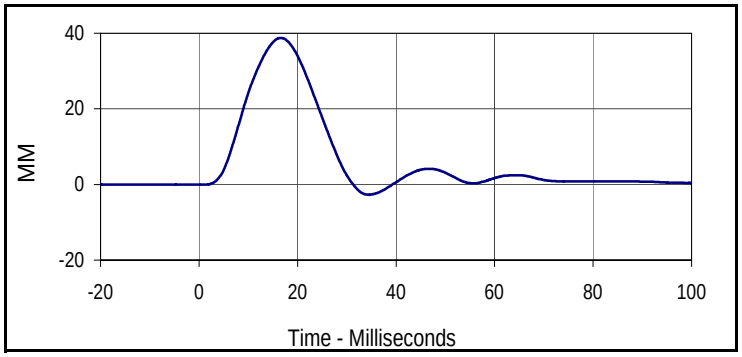


Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
37.7	11.0	-12.2	32.9
Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
34.6	9.5	-8.2	37.2



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
34.6	13.5	-0.6	46.0

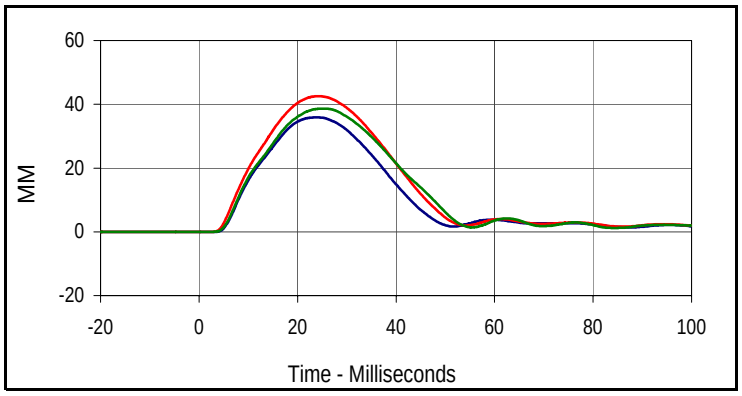
Test Program:	SID IIs Thorax with Arm Impact Test	Test Date:	7/20/12
ATD Serial No.:	299	Test I.D.:	299TWA043



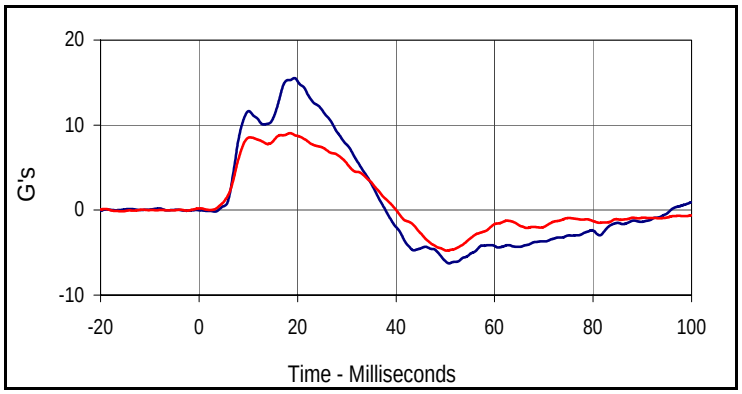
Curve Description			
Shoulder Deflection			
Plot No.	Type	SAE Class	Units
007	FIL	600	MM
Max	Time	Min	Time
38.7	16.5	-2.7	34.5

Test Program:	SID IIs Thorax without Arm Impact Test	Test Date:	7/20/12
ATD Serial No.:	299	Test I.D.:	299TWOA043

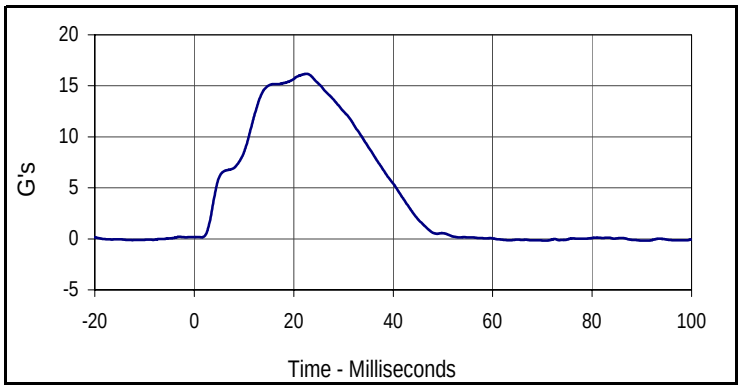
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	370	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.0	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.2	Pass
Impactor Velocity		m/s	4.2 to 4.4	4.4	Pass
Peak Upper Thorax Rib Deflection		mm	32 to 40	35.9	Pass
Peak Middle Thorax Rib Deflection		mm	39 to 45	42.6	Pass
Peak Lower Thorax Rib Deflection		mm	35 to 43	38.7	Pass
Peak Upper Spine Y Acceleration		G's	13 to 17	15.5	Pass
Peak Lower Spine Y Acceleration		G's	7 to 11	9.1	Pass
Peak Impactor Acceleration		G's	14 to 18	16.2	Pass
			Overall Test Results		Pass



Curve Description			
Upper Thorax Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
35.9	23.9	0.0	-10.5
Middle Thorax Deflection			
Max	Time	Min	Time
42.6	24.4	0.0	-6.1
Lower Thorax Deflection			
Max	Time	Min	Time
38.7	25.3	0.0	-10.6



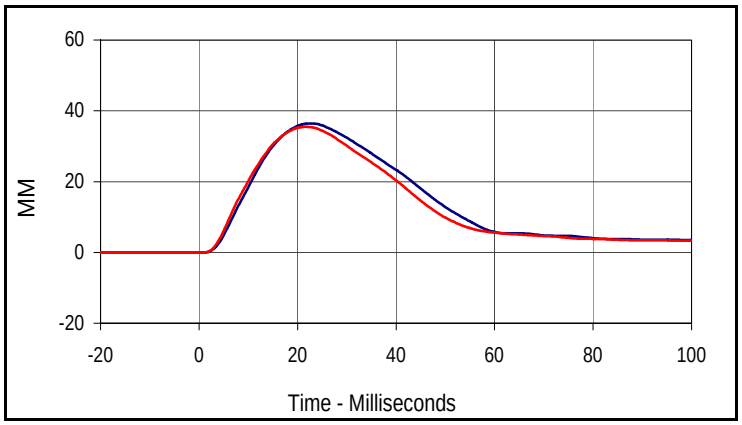
Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
15.5	19.4	-6.3	50.8
Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
9.1	18.5	-4.8	50.3



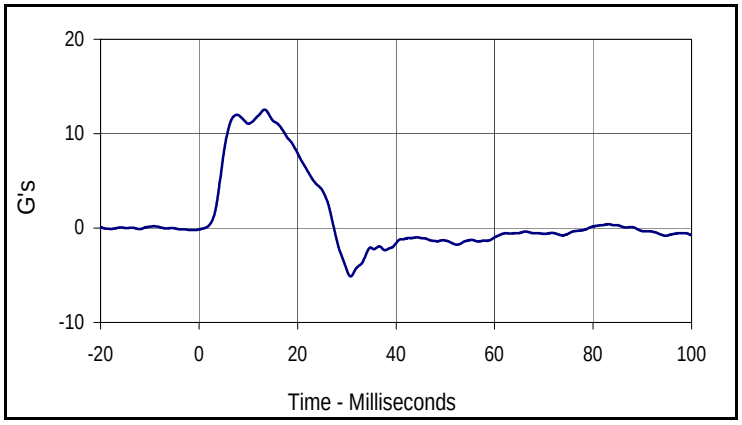
Curve Description			
Impactor Accleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
16.2	22.6	-0.2	90.1

Test Program:	SID IIs Abdomen Impact Test	Test Date:	7/20/12
ATD Serial No.:	299	Test I.D.:	299ABD043

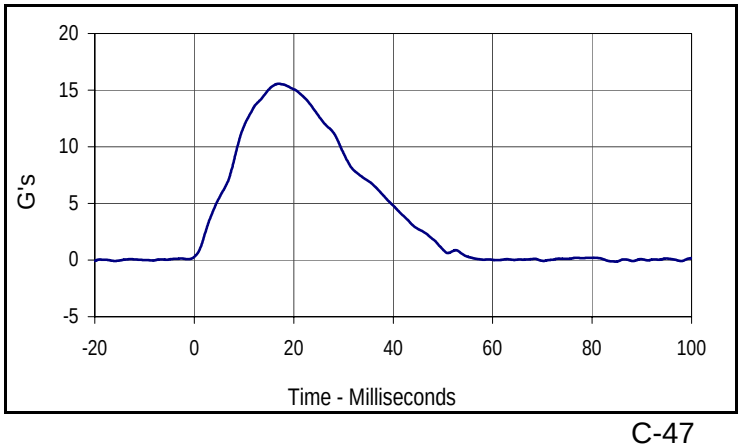
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	395	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	20.8	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.8	Pass
Impactor Velocity		m/s	4.2 to 4.4	4.3	Pass
Peak Upper Abdominal Rib Deflection		mm	36 to 47	36.4	Pass
Peak Lower Abdominal Rib Deflection		mm	33 to 44	35.5	Pass
Peak Lower Spine Y Acceleration		G's	9 to 14	12.5	Pass
Peak Impactor Acceleration		G's	12 to 16	15.6	Pass
			Overall Test Results		Pass



Curve Description			
Upper Abdominal Rib Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
36.4	22.6	0.0	-14.4
Curve Description			
Lower Abdominal Rib Deflection			
Plot No.	Type	SAE Class	Units
002	FIL	600	MM
Max	Time	Min	Time
35.5	21.8	0.0	-14.7



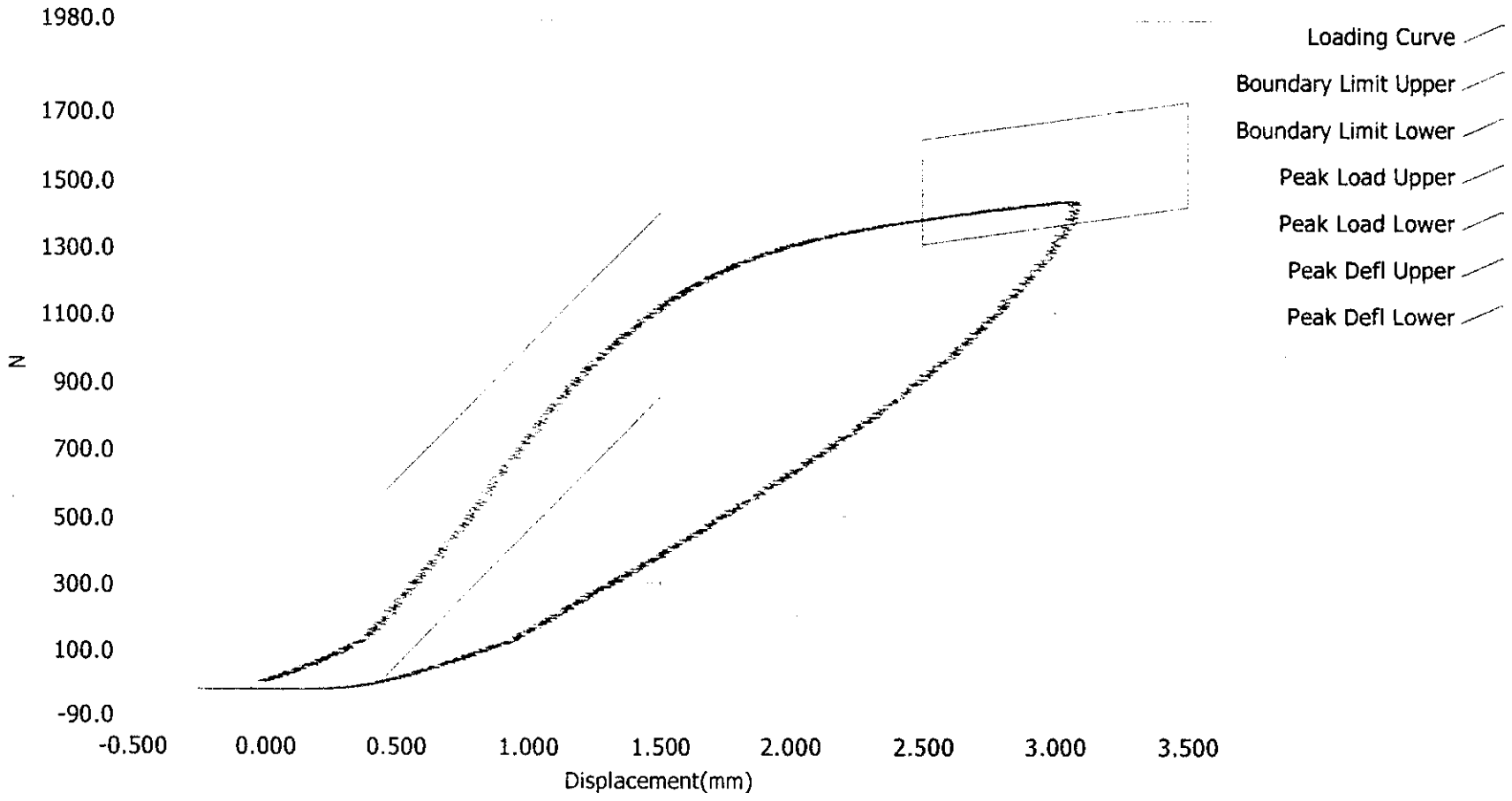
Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
12.5	13.3	-5.1	30.8



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
15.6	17.0	-0.1	84.8

MD0201 POST TEST

Resultant Data - SIDIIs Plug Compression



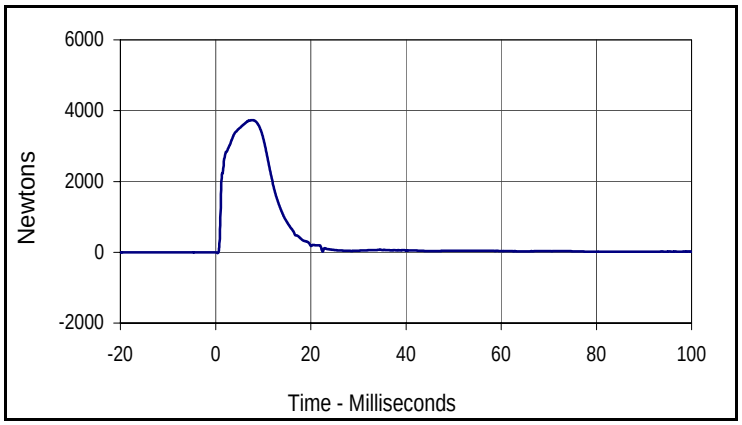
ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
	46780	10/4/2011	5:39 PM
Cert ID	ATD Serial Number	ATD Type	
	N/A	SIDIIs	

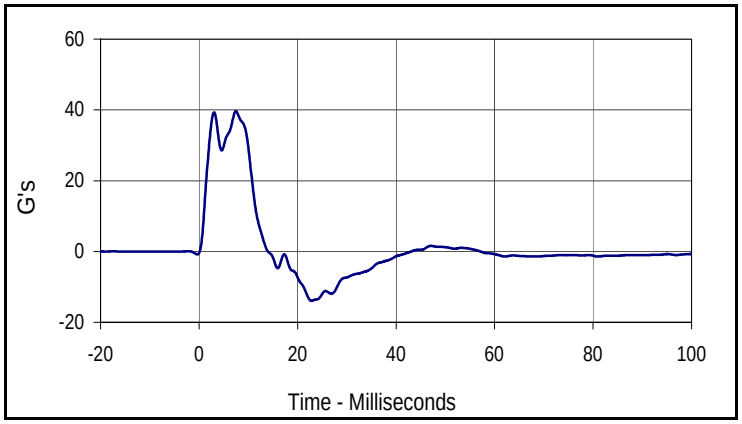
Current Date : 10/4/2011 Current Time : 17:39:45

Test Program:	SID IIs Pelvis Acetabulum Impact Test	Test Date:	7/20/12
ATD Serial No.:	299	Test I.D.:	299ACET043

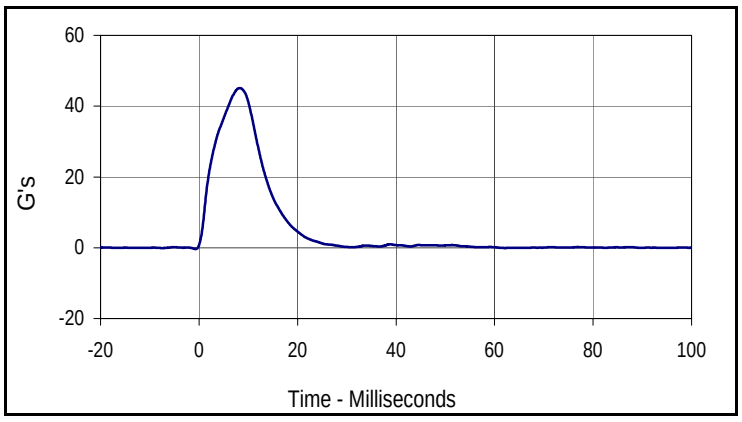
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	415	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	29.7	Pass
Impactor Velocity		m/s	6.6 to 6.8	6.7	Pass
Peak Acetabulum Force Y		Newtons	3600 to 4300	3732.8	Pass
Peak Pelvis Y Acceleration After 6 msec.		G's	34 to 42	39.7	Pass
Peak Impactor Acceleration		G's	38 to 47	45.1	Pass
			Overall Test Results		Pass



Curve Description			
Pelvis Acetabulum Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
3732.8	7.7	-24.7	0.5



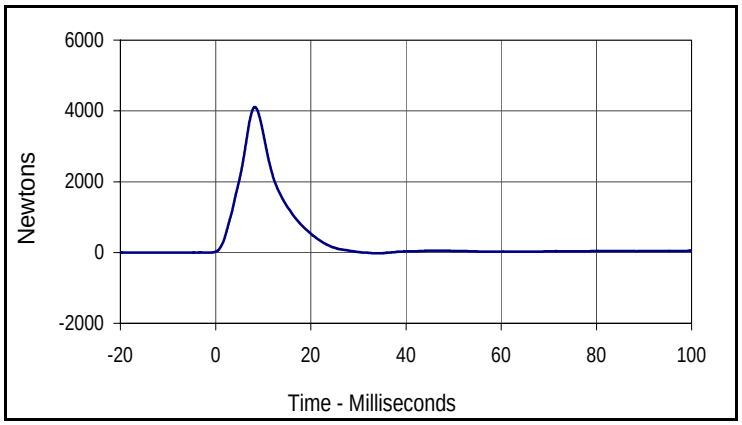
Curve Description			
Pelvis Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
39.7	7.5	-13.9	22.8



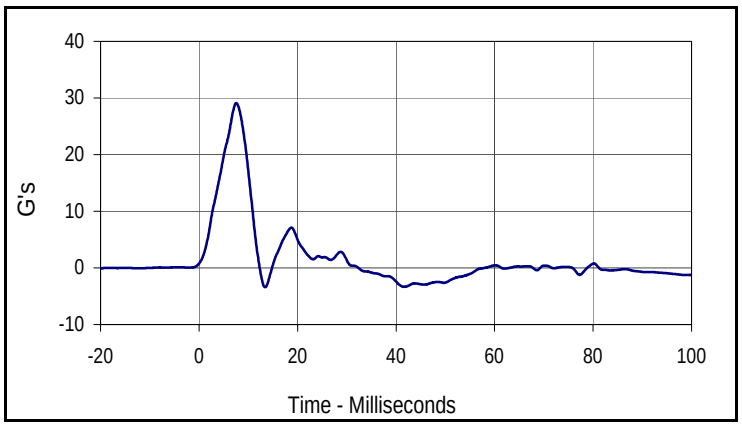
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
45.1	8.2	-0.3	-0.7

Test Program:	SID IIs Pelvis Iliac Calibration	Test Date:	7/20/12
ATD Serial No.:	299	Test I.D.:	299PL043

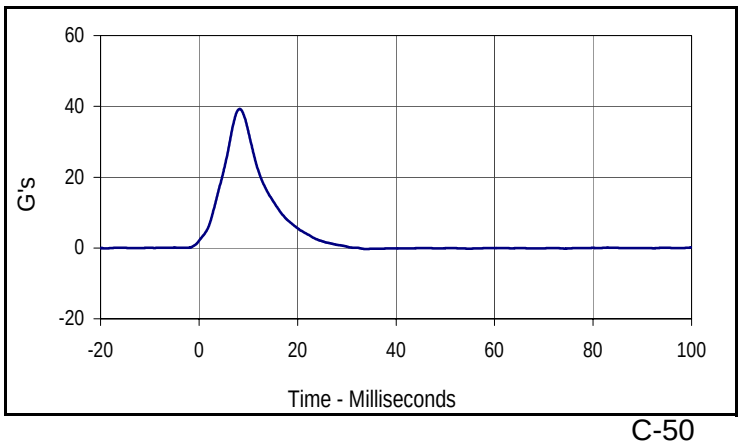
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	440	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.0	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.0	Pass
Impactor Velocity		m/s	4.2 to 4.4	4.3	Pass
Peak Illiac Force		Newtons	4100 to 5100	4113.5	Pass
Peak Pelvis Y Acceleration		G's	28 to 39	29.1	Pass
Peak Impactor Acceleration		G's	36 to 45	39.3	Pass
			Overall Test Results		Pass



Curve Description			
Pelvis Iliac Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4113.5	8.2	-18.6	33.1



Curve Description			
Pelvis Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
29.1	7.5	-3.4	13.4



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
39.3	8.2	-0.3	33.7

APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

TABLE 1 – Dummy Instrumentation (ES-2re)

			ES-2re S/N F035		
			Serial Number	Manufacturer	Calibration
Head Accelerometers		X	P58760	Endevco	6/21/12
		Y	P58763	Endevco	6/21/12
		Z	P52093	Endevco	6/21/12
Thorax Rib Displacement Potentiometers	Upper	Y	180	FTSS	6/22/12
	Middle	Y	177	FTSS	6/22/12
	Lower	Y	186	FTSS	6/22/12
Abdomen Load Cells	Forward	Y	1514	Denton	6/7/12
	Middle	Y	1510	Denton	6/7/12
	Rear	Y	1515	Denton	6/7/12
Lower Spine Accelerometers (T12)		X	P49165	Endevco	6/21/12
		Y	P49212	Endevco	6/21/12
		Z	P52113	Endevco	6/21/12
Pubic Symphysis Load Cell		Y	506	Denton	6/7/12

TABLE 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N 299		
				Serial Number	Manufacturer	Calibration
Head Accelerometers			X	P51926	Endevco	6/25/12
			Y	P51929	Endevco	6/25/12
			Z	P51934	Endevco	6/25/12
Displacement Potentiometers	Shoulder		Y	1074	FTSS	6/26/12
	Thoracic Rib	Upper	Y	1143	FTSS	6/26/12
		Middle	Y	1160	FTSS	6/26/12
		Lower	Y	1213	FTSS	6/26/12
	Abdominal Rib	Upper	Y	1218	FTSS	6/26/12
		Lower	Y	1234	FTSS	6/26/12
Lower Spine Accelerometers (T12)			X	P63999	Endevco	6/25/12
			Y	P58872	Endevco	6/25/12
			Z	P58795	Endevco	6/25/12
Acetabulum Load Cell			Y	272	Denton	5/24/12
Iliac Wing Load Cell			Y	284	Denton	5/24/12
Pelvis Plug (Struck Side)				46795	FTSS	10/4/11
Pelvis Plug (Non-Struck Side)				46790	FTSS	10/4/11

TABLE 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	Ketx5a	ICSensor	6/20/11
	Vehicle Center of Gravity	Y	Ketx5b	ICSensor	6/20/11
	Vehicle Center of Gravity	Z	Ketx5c	ICSensor	6/20/11
2	Right Sill at Front Seat	X	Ketx11X	ICSensor	7/19/11
	Right Sill at Front Seat	Y	Ketx11Y	ICSensor	7/19/11
	Right Sill at Front Seat	Z	Ketx11Z	ICSensor	7/19/11
3	Right Sill at Rear Seat	X	Ketx12a	ICSensor	7/20/11
	Right Sill at Rear Seat	Y	Ketx12Y	ICSensor	7/21/11
	Right Sill at Rear Seat	Z	Ketx12Z	ICSensor	7/21/11
4	Left Sill at Front Door	Y	12891	Endevco	12/17/11
5	Left Sill at Rear Door	Y	12993	Endevco	12/17/11
6	Left A-Post Lower	Y	12916	Entrans	2/29/12
7	Left A-Post Middle	Y	12995	Endevco	12/17/11
8	Left B-Post Lower	Y	12869	Endevco	1/11/12
9	Left B-Post Middle	Y	12996	Endevco	12/17/11
10	Front Seat Track	Y	BY98H	Endevco	4/16/12
11	Rear Seat Structure	Y	J23944	Endevco	4/16/12
12	Right Rear Occ. Compartment	Y	Keva004	ICSensor	5/8/11
13	Engine Block	X	12883	Endevco	1/11/12
	Engine Block	Y	12901	Endevco	1/11/12
14	Rear Floorpan Above Axle	X	Keva202x	ICSensor	11/30/11
	Rear Floorpan Above Axle	Y	Keva202Y	ICSensor	11/30/11
	Rear Floorpan Above Axle	Z	Keva202Z	ICSensor	11/30/11

TABLE 4 – MDB Instrumentation

		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	00L13-F37	Entrans	10/12/11
MDB Center of Gravity	Y	02I10-N16	Entrans	10/14/11
MDB Center of Gravity	Z	03J13_Z09	Entrans	10/14/11
Left Frame at Rear Axle Centerline	X	01J02-F13	Entrans	10/12/11
Left Frame at Rear Axle Centerline	Y	05616-L03	Entrans	10/14/11