REPORT NUMBER: SINCAP-KAR-13-032

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

DAIMLER AG STUTTGART
2013 MERCEDES-BENZ C250 4-DOOR SEDAN

NHTSA No: MD0508

PREPARED BY:

KARCO ENGINEERING, LLC.

9270 HOLLY ROAD

ADELANTO, CA 92301

DECEMBER 27, 2012

FINAL REPORT

PREPARED FOR:

U.S. DEPARTMENT OF TRANSPORTATION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

OFFICE OF CRASHWORTHINESS STANDARDS

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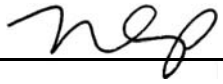
Reviewed By: 

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Approval Date: December 27, 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 Mercedes-Benz C250 4-Door Sedan NHTSA No. MD0508	December 27, 2012
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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 Mercedes-Benz C250 4-door sedan 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 December 13, 2012.

The impact velocity of the Moving Deformable Barrier was 62.03 km/h and the outside ambient temperature at the struck (driver's) side of the vehicle was 11.7 deg. C. The target vehicle's maximum post-test static crush was 167 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	143.7
Maximum Thorax Rib Deflection	mm	44	15
Total Abdominal Force	N	2500	390
Pubic Symphysis Force	N	6000	1632

Measurement Description	Passenger ATD (SID-IIs)		
	Units	IARV	Result
Head Injury Criteria (HIC_{36})		1000	319.8
Resultant Lower Spine Acceleration	g	82	54
Total Pelvic Force (Sum of Acetubular and Iliac Forces)	N	5525	3701
Maximum Thoracic Rib Deflection	mm	38*	10
Maximum Abdominal Rib Deflection	mm	45*	5

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 Washington, DC 20590 e-mail: tis@nhtsa.dot.gov FAX 202-493-2833	
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 Mercedes-Benz C250 4-door sedan. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated September 2012.

SECTION 2
SUMMARY OF TEST RESULTS

A 2013 Mercedes-Benz C250 4-door sedan 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 62.03 km/h (38.54 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 December 13, 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 September 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. Appendix D of this report contains the test equipment and instrumentation calibration data.

Dummy injury readings were recorded as follows:

Measurement Description	Units	Driver ATD (ES-2re)	
		Threshold	Result
Head Injury Criteria (HIC_{36})		1000	143.7
Maximum Thorax Rib Deflection	mm	44	15
Combined Abdominal Force	N	2500	390
Pubic Symphysis Force	N	6000	1632

Measurement Description	Units	Passenger ATD (SID-IIs)	
		Threshold	Result
Head Injury Criteria (HIC_{36})		1000	319.8
Lower Spine (T12) Resultant Acceleration	g	82	54
Total Pelvic Force (sum of acetabular and iliac forces	N	5525	3701
Maximum Thoracic Rib Deflection	mm	38*	10
Maximum Abdominal Rib Deflection	mm	45*	5

**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)	Yes	Yes	No	
Side Airbag 3 (Pelvis)	Yes	Yes	No	
Seat Belt Pretensioner	Yes	Yes	No	
Seat Belt Load Limiter	Yes	Yes	No	

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 Mercedes-Benz C250 4-Door Sedan NHTSA No. MD0508

Test Program: NCAP MDB Side Impact Test Test Date: 12/13/12

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 Mercedes-Benz C250 4-Door Sedan NHTSA No. MD0508

Test Program: NCAP MDB Side Impact Test Test Date: 12/13/12

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	MD0508
Model Year	2013
Make	Mercedes-Benz
Model	C250
Body Style	4-Door Sedan
VIN	WDDGF4HB2DR255783
Body Color	Mars Red
Odometer Reading (km / mi)	51 / 32
Engine Displacement (L)	1.8
Type / No. of Cylinders	Inline 4
Engine Placement	Longitudinal
Transmission Type	Automatic
Transmission Speeds	7
Overdrive	Yes
Final Drive	Rear
Roof Rack	No
Sunroof / T-Top	Yes
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes
Anti-Lock Brakes (ABS)	Yes

Traction Control System (TCS)	Yes
Auto-Leveling System	No
Automatic Door Locks	Yes
Power Window Auto-Reverse	Yes
Other Optional Feature	No
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	Yes
Driver Torso/Pelvis Airbag	No
Driver Pelvis Airbag	Yes
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	No

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

DATA FROM CERTIFICATION LABEL

Manufactured By	Daimler AG Stuttgart
Date of Manufacture	Aug-12
Vehicle Type	Passenger Car

GVWR (kg)	2020
GAWR Front (kg)	955
GAWR Rear (kg)	1095

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity	2	3		5	
Capacity Weight (VCW) (kg)				380.0	*A*
DSC x 68.04 (kg)				340.2	*B*
Cargo Weight (RCLW) (kg)				39.8	*A-B*

VEHICLE SEAT TYPE

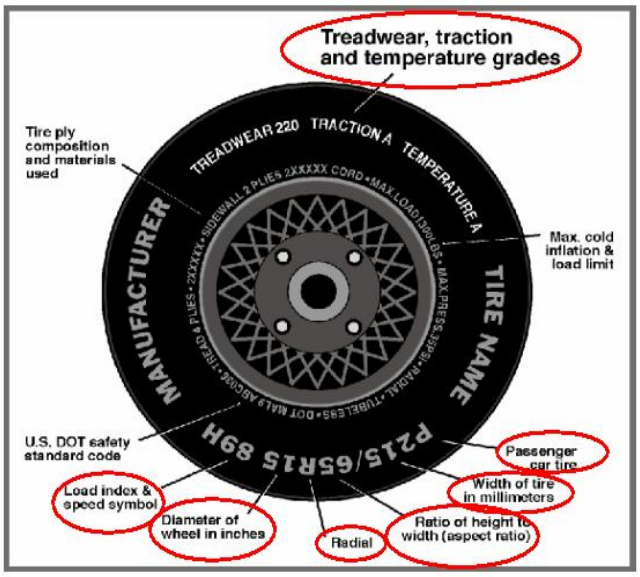
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable w/ Lever	Adjustable w/ Knob
Front Seat	Yes					Yes	
Rear or Second Row Seat		Yes			Yes		
Third Row Seat							

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2013 Mercedes-Benz C250 4-Door Sedan NHTSA No. MD0508

Test Program: NCAP MDB Side Impact Test Test Date: 12/13/12



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kpa)	350	350
Cold Pressure (kPa)	230	280
Recommended Tire Size	P225/45R17	P245/45R17
Tire Size on Vehicle	P225/45R17	P245/45R17
Tire Manufacturer	Continental	Continental
Tire Model	Conti Pro Contact	Conti Pro Contact
Treadware	500	500
Traction Grade	AA	AA
Temperature Grade	A	A
Tire Plies Sidewall	1 Polyamide	1 Rayon
Tire Plies Body	1 Polyamide, 2 Steel, 1 Nylon	1 Rayon, 2 Steel, 1 Polyamide
Load Index/Speed Symbol	91H	91H
Tire Material	Polyamide, Steel, Nylon	Polyamide, Steel, Rayon
DOT Safety Code Left	1L7R PXH6 3012	1L8N PXH6 3212
DOT Safety Code Right	1L7R PXH6 3012	1L8N PXH6 3212

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2013 Mercedes-Benz C250 4-Door Sedan NHTSA No. MD0508

Test Program: NCAP MDB Side Impact Test Test Date: 12/13/12

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	205	255	210	255
Tire Placard	kPa	230	230	280	280
Owner's Manual	kPa	230	230	280	280
As Tested	kPa	230	230	280	280

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	415.0	369.0		455.0	442.5		453.5	445.5	
Right	kg	406.0	365.5		408.0	409.5		406.5	416.0	
Ratio	%	52.8%	47.2%	100.0%	50.3%	49.7%	100.0%	50.0%	50.0%	100.0%
Total	kg	821.0	734.5	1555.5	863.0	852.0	1715.0	860.0	861.5	1721.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1555.5	A
Actual Weight of 2 P572 ATDs Used	kg	125.0	B
Rated Cargo/Luggage Wt (RCLW)	kg	39.8	C
Calculated Vehicle Target Wt (TVTW)	kg	1720.3	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**

TEST VEHICLE ATTITUDE AND CG

Measurement Description	Units	Fully Loaded	As Tested	Meets Requirement***
LF	mm	643	644	Yes
RF	mm	654	649	Yes
RR	mm	647	643	Yes
LR	mm	650	650	Yes
Vehicle CG (Aft of Front Axle)	mm	1384	1374	
Vehicle CG (Left (+)/Right (-) from Longitudinal Centerline)	mm	34	36	

***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. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2013 Mercedes-Benz C250 4-Door Sedan NHTSA No. MD0508

Test Program: NCAP MDB Side Impact Test Test Date: 12/13/12

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Non-Struck Side Door Panels	8.0
Trunk Trim	5.5
Spare Tire and Tools	14.5
Non-Struck Side Outboard Mirror	1.5
Non-Struck Side Windows	8.0
Taillights	3.0
Rear Bumper Cover	4.5
Plastic Trim	2.0
Ballast / Equipment Added	95.0

DATA SHEET NO. 2

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

Test Vehicle: 2013 Mercedes-Benz C250 4-Door Sedan NHTSA No. MD0508

Test Program: NCAP MDB Side Impact Test Test Date: 12/13/12

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	11.7	0.0	5.9
Front Passenger Seat	11.6	0.0	5.8
Front Center Seat			
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed

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	5.9	457	Max	487	501	517
			Mid	465	497	495
			Min	443	457	472
Front Passenger Seat	5.8	466	Max	498	514	529
			Mid	474	490	505
			Min	450	466	481
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	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed

DATA SHEET NO. 2 … (CONTINUED)

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

Test Vehicle: 2013 Mercedes-Benz C250 4-Door Sedan NHTSA No. MD0508

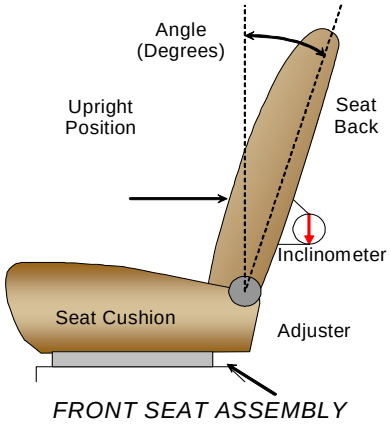
Test Program: NCAP MDB Side Impact Test Test Date: 12/13/12

SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position From Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	222		111	
Front Passenger Seat	224		112	
Front Center Seat				
Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed	Fixed

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 seat back.



FRONT SEAT ASSEMBLY

SEAT BACK POSITION

Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degree	Detent*
Driver Seat w/Seated Dummy	70.0		21.0	
Front Passenger Seat	79.7		21.0	
Front Center Seat				
Struck Side Rear Seat w/Seated Dummy	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed	Fixed

DATA SHEET NO. 2 … (CONTINUED)

SEAT ADJUSTMENT, FUEL SYSTEMS, AND STEERING WHEEL DATA

Test Vehicle: 2013 Mercedes-Benz C250 4-Door Sedan NHTSA No. MD0508

Test Program: NCAP MDB Side Impact Test Test Date: 12/13/12

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	5	H
Rear Seat	Fixed	Fixed

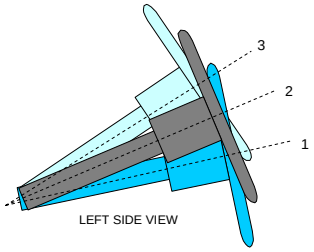
HEAD RESTRAINT ADJUSTMENT

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	6	Full Up, Full Forward
Rear Seat	4	Full Down

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.

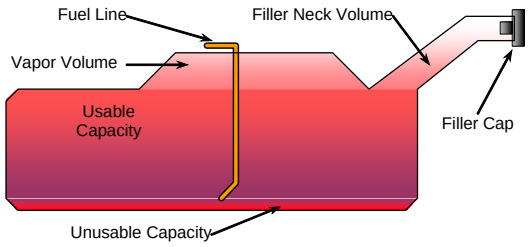


STEERING COLUMN ASSEMBLY

	Degrees	Fore-Aft Position (mm)
Lowermost - Position 1	19.8	80
Geometric Center - Position 2	22.1	109
Uppermost - Position 3	24.4	137
Telescoping Steering Wheel Travel		57
Test Position	22.1	109

FUEL PUMP

The vehicle is equipped with an electric fuel pump. The fuel pump operates when the ignition is switched to the "ON" position. After about 15 seconds the pump switches to standby mode if the engine is not started.



VEHICLE FUEL TANK ASSEMBLY

DATA SHEET NO. 2 … (CONTINUED)

SEAT ADJUSTMENT, FUEL SYSTEMS, AND STEERING WHEEL DATA

Test Vehicle: 2013 Mercedes-Benz C250 4-Door Sedan NHTSA No. MD0508

Test Program: NCAP MDB Side Impact Test Test Date: 12/13/12

FUEL TANK CAPACITY

Description	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	66.24
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	61.60
Actual amount of Solvent Used in Test	61.60
1/3 of Usable Capacity	22.08

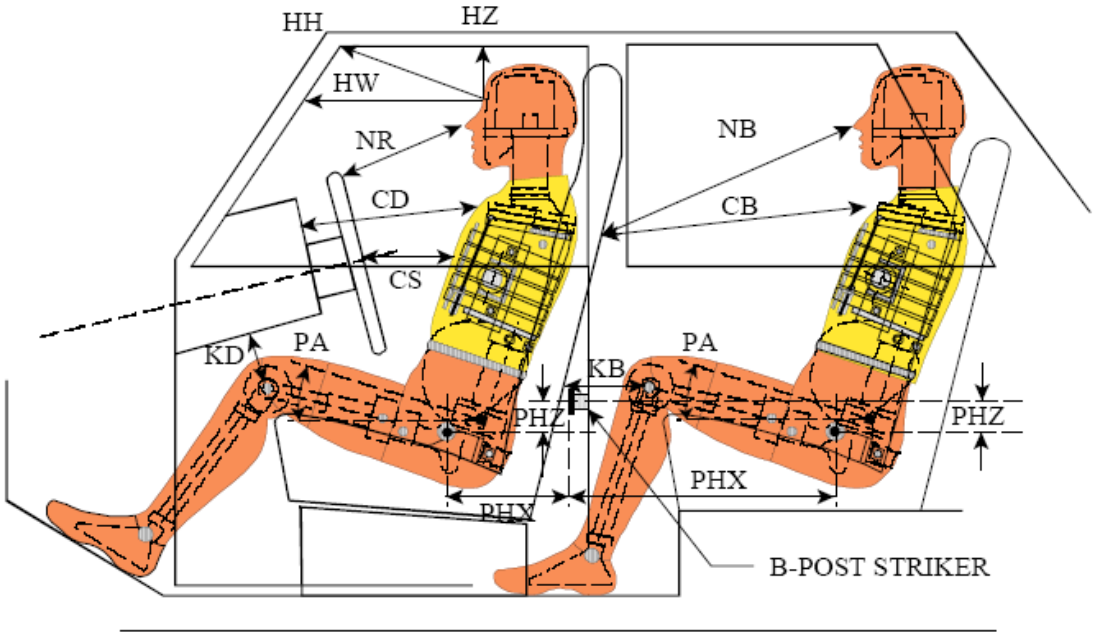
Is the Actual Amount of Solvent Used in the test equal to 93% ± 1% of the Usable Capacity stated in the Form No. 1? ☒ **Yes** ☐ **No**

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2013 Mercedes-Benz C250 4-Door Sedan NHTSA No. MD0508

Test Program: NCAP MDB Side Impact Test Test Date: 12/13/12



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

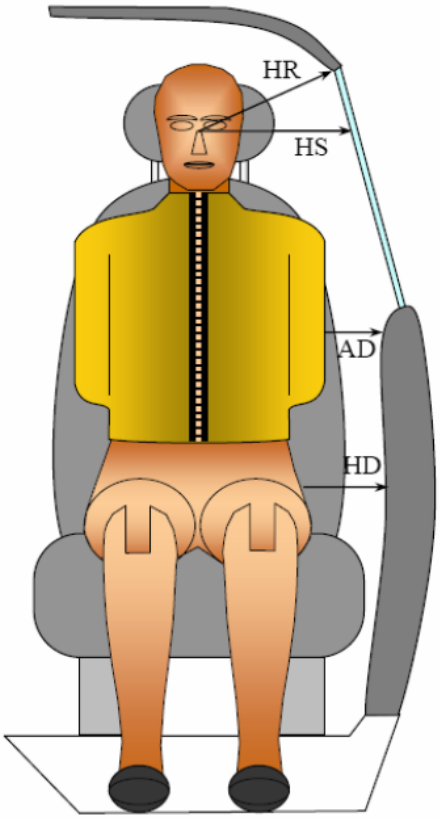
Driver Code	Pass. Code	Description	Driver		Passenger	
			Length (mm)	Angle (º)	Length (mm)	Angle (º)
HH		Head to Header	330			
HW		Head to Windshield	519			
HZ	HZ	Head to Roof	146		234	
NR	NB	Nose to Rim/Seat Back	432		520	
CD	CB	Chest to Dash/Seat Back	572		496	
CS		Chest to Steering Wheel	311			
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	171	24.3	208	13.9
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	155	44.2	233	9.7
PAX°	PAX°	Pelvic Tilt Angle X		13.3		22.1
	PAY°	Pelvic Tilt Angle Y				0.3
PHX	PHX	Hip Point to Striker (x-axis)	144		199	
PHZ	PHZ	Hip Point to Striker (z-axis)	228		274	

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2013 Mercedes-Benz C250 4-Door Sedan NHTSA No. MD0508

Test Program: NCAP MDB Side Impact Test Test Date: 12/13/12



FRONT VIEW OF DUMMY

DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

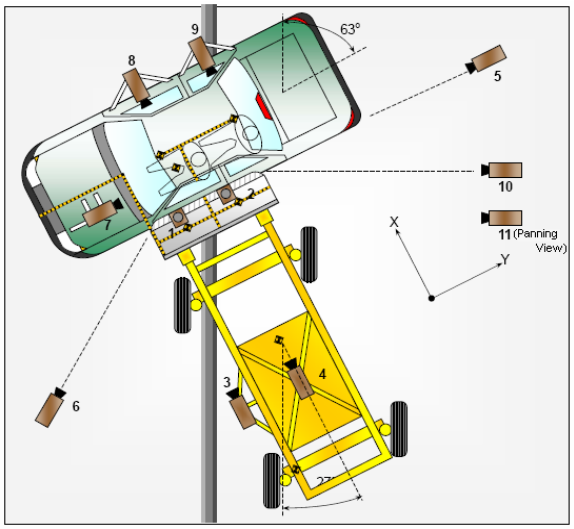
Code	Measurement Description	Units	Driver	Passenger
HR	Head to Side Header	mm	196	231
HS	Head to Side Window	mm	297	362
AD	Arm to Door	mm	75	168
HD	H-Point to Door	mm	139	204

DATA SHEET NO. 5

CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2013 Mercedes-Benz C250 4-Door Sedan NHTSA No. MD0508

Test Program: NCAP MDB Side Impact Test Test Date: 12/13/12



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	-385	-713	24	1000
8	Driver Side (On-Board)	1602	844	-441	14	1000
9	Passenger Side (On-Board)	1530	1691	-473	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

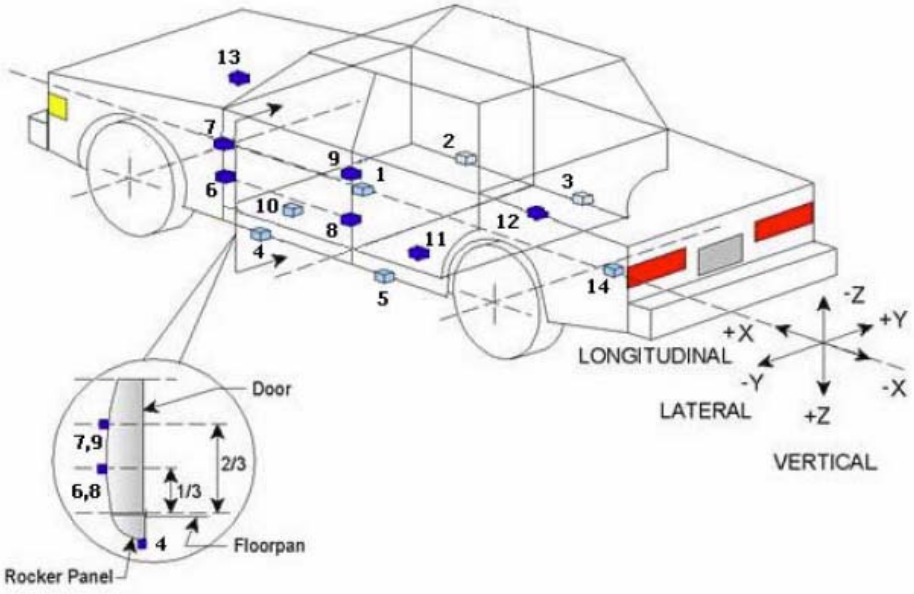
Driver Dummy Channels	16
Passenger Dummy Channels	16
Vehicle Structure Accelerometers	23
MDB Accelerometers	5
Total	60

DATA SHEET NO. 6

TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2013 Mercedes-Benz C250 4-Door Sedan NHTSA No. MD0508

Test Program: NCAP MDB Side Impact Test Test Date: 12/13/12



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

Loc. No.	Sensor Description	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	1925	0	-410
2	Right Sill at Front Seat	2640	710	-355
3	Right Sill at Rear Seat	1830	710	-355
4	Left Sill at Front Door	2820	-420	-155
5	Left Sill at Rear Door	1860	-420	-155
6	A-Pillar Lower	3060	-770	-380
7	A-Pillar Middle	3060	-770	-675
8	B-Pillar Lower	2050	-720	-600
9	B-Pillar Middle	2050	-720	-740
10	Front Seat Track	2240	-570	-315
11	Rear Seat Structure			
12	Right Rear Occupant Compartment	1900	405	-205
13	Engine Block	3725	-240	-615
14	Rear Floorpan Above Axle	980	0	-500

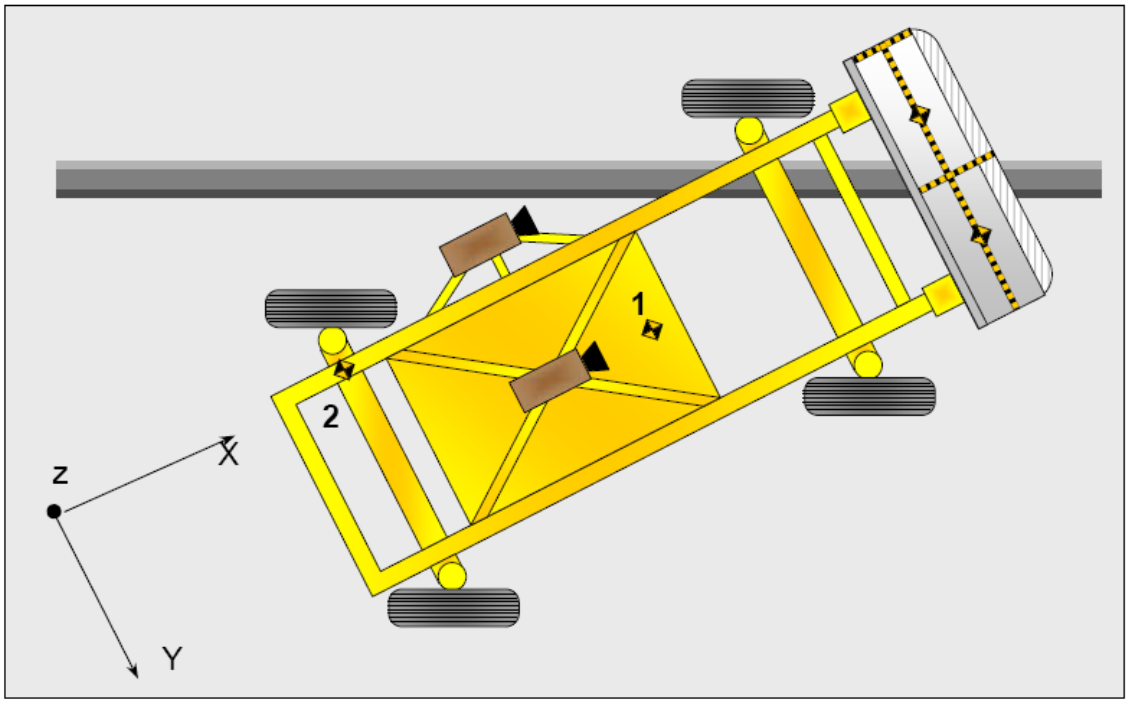
Reference: X – Rear surface of vehicle (+ forward)
Y – Vehicle centerline (+ to right)
Z – Ground plane (+ down)

DATA SHEET NO. 7

MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2013 Mercedes-Benz C250 4-Door Sedan NHTSA No. MD0508

Test Program: NCAP MDB Side Impact Test Test Date: 12/13/12



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 Mercedes-Benz C250 4-Door Sedan NHTSA No. MD0508

Test Program: NCAP MDB Side Impact Test Test Date: 12/13/12

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Front Seat Dummy (ES-2re)	Rear Seat Dummy (SID-IIs)
Face	Curtain Airbag	Curtain Airbag
Top of Head	Side Header, Curtain Airbag	Side Header, Curtain Airbag
Left Side of Head	Curtain Airbag	Curtain Airbag
Back of Head	Curtain Airbag	Curtain Airbag, Side Header, Rear Center Seat Back
Left Shoulder	Curtain Airbag, Door Panel	Door Panel
Upper Torso	Torso Airbag	Seat Back
Lower Torso	Torso Airbag	Seat Back, Door Panel
Left Hip	Pelvis Airbag	Seat Cushion, Seat Back
Left Knee	Door Panel, Right Knee	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	Left front and left rear side windows broken
Other Notable Effects	None

DATA SHEET NO. 8 … (CONTINUED)

POST-TEST OBSERVATIONS

Test Vehicle: 2013 Mercedes-Benz C250 4-Door Sedan NHTSA No. MD0508

Test Program: NCAP MDB Side Impact Test Test Date: 12/13/12

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)	Yes	Yes	No	
Side Airbag 3 (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		2765
Vertical Impact Reference Line (Aft of Front Axle)(Intended Impact Point)	mm		443
Actual Impact Point (Aft of Front Axle)	mm		451
Horizontal Offset (+ forward / - rearward)	mm	± 50 of Intended Impact Point	-8
Vertical Offset (+ down / - up)	mm	± 20 of Intended Impact Point	5

DATA SHEET NO. 9

MDB SUMMARY OF RESULTS

Test Vehicle: 2013 Mercedes-Benz C250 4-Door Sedan NHTSA No. MD0508

Test Program: NCAP MDB Side Impact Test Test Date: 12/13/12

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%	100.0%
Totals	kg	779	590	1368

SPEED AND IMPACT DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.03
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.03
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	62.9
MDB Crabbed Angle to MDB Forward Line of Motion	degrees	26.0 to 28.0	27.2

MAXIMUM STATIC CRUSH OF HONEYCOMB FACE

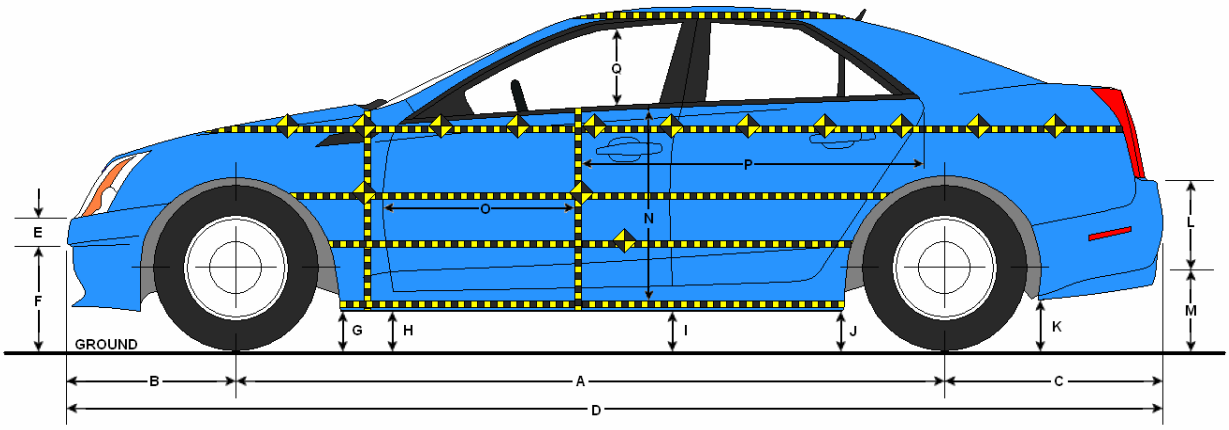
Vertical Location			From Centerline		Max. Crush (mm)
Row	Description	Height (mm)	Distance (mm)	Direction	
A	Center of Bumper	432	800	Left	264
B	Top of Bumper	533	800	Left	212
C	Mid Level	686	800	Left	230
D	Top of Stack	813	800	Left	212

DATA SHEET NO. 10

TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2013 Mercedes-Benz C250 4-Door Sedan NHTSA No. MD0508

Test Program: NCAP MDB Side Impact Test Test Date: 12/13/12



LEFT SIDE VIEW

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2765	2751	-14
B	Front Axle to FSOV	781	787	6
C	Rear Axle to RSOV	1067	1070	3
D	Total Length at Centerline	4613	4608	-5
E	Front Bumper Thickness	111	111	0
F	Fromt Bumper Bottom to Ground	388	407	19
G	Sill Height at Front Wheel Well	160	187	27
H	Sill Height at Front Door Leading Edge	166	194	28
I	Sill Height at B-Pillar	202	228	26
J1	Sill Height at Rear Wheel Well	159	179	20
J2	Pinch Weld Height at Rear Wheel Well	134	146	12
K	Sill Height Aft of Rear Wheel Well	463	481	18
L	Rear Bumper Thickness	131	134	3
M	Rear Bumper Bottom to Ground	356	371	15
N	Sill Height to Bottom of Front Window Sill	548	585	37
O	Front Door Leading Edge to Impact CL	676	665	-11
P	Rear Door Trailing Edge to Impact CL	1510	1486	-24
Q	Front Window Opening	441	456	15
R	Right Side Length	3094	3095	1
S	Left Side Length	3093	3080	-13
T	Vehicle Width at B-Pillar	1765	1684	-81

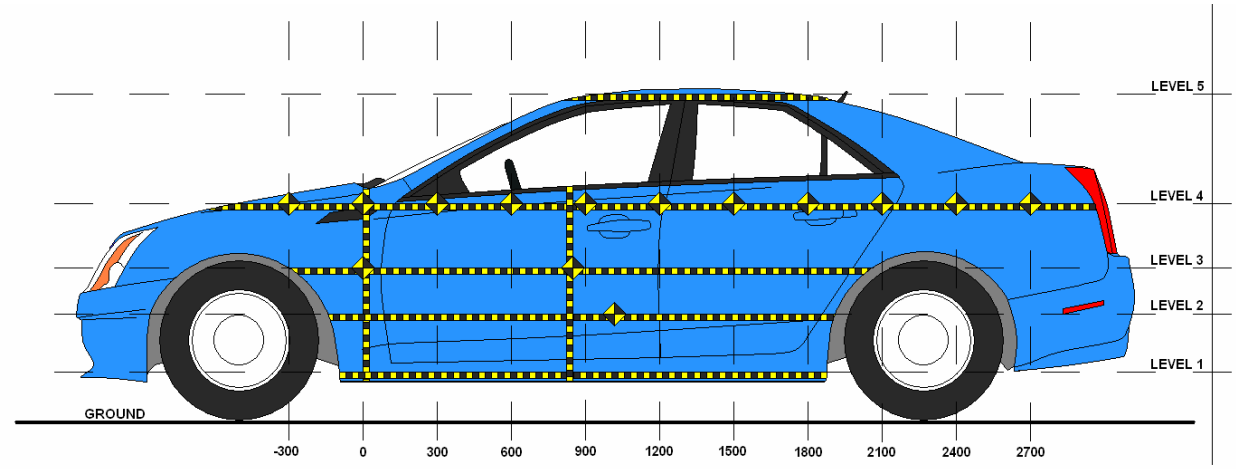
All measurements in mm with tolerance of ± 3mm

DATA SHEET NO. 11

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2013 Mercedes-Benz C250 4-Door Sedan NHTSA No. MD0508

Test Program: NCAP MDB Side Impact Test Test Date: 12/13/12



LEFT SIDE VIEW

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Description	Height Above Ground (mm)	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	229	44	1350
2	Occupant H-Point	497	141	1650
3	Mid-Door	606	167	1650
4	Window Sill	837	162	1650
5	Window Top	1361	19	1350

DATA SHEET NO. 11 … (CONTINUED)

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2013 Mercedes-Benz C250 4-Door Sedan NHTSA No. MD0508

Test Program: NCAP MDB Side Impact Test Test Date: 12/13/12

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

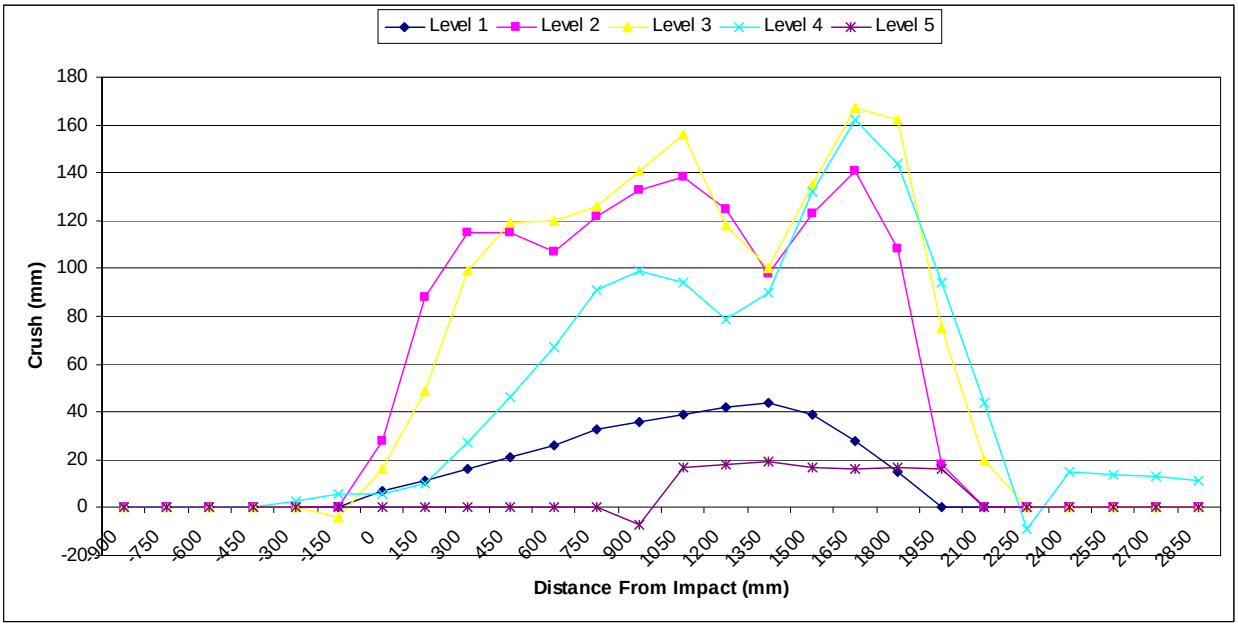
	Pre-Test (mm)					Post-Test (mm)					Difference (mm)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900															
-750															
-600															
-450															
-300				735					738					3	
-150			627	714				623	720				-4	6	
0	662	634	632	703		669	662	648	709		7	28	16	6	
150	659	632	628	698		670	720	677	708		11	88	49	10	
300	657	630	624	682		673	745	723	709		16	115	99	27	
450	654	628	621	672		675	743	740	718		21	115	119	46	
600	652	628	618	662		678	735	738	729		26	107	120	67	
750	651	628	616	655		684	750	742	746		33	122	126	91	
900	650	628	615	647	922	686	761	756	746	915	36	133	141	99	-7
1050	650	628	613	619	924	689	766	769	713	941	39	138	156	94	17
1200	651	629	612	636	929	693	754	730	715	947	42	125	118	79	18
1350	653	629	612	634	933	697	727	712	724	952	44	98	100	90	19
1500	652	630	612	631	936	691	753	747	763	953	39	123	135	132	17
1650	650	631	613	631	937	678	772	780	793	953	28	141	167	162	16
1800	649	633	615	631	937	664	741	777	775	954	15	108	162	144	17
1950		623	618	633	941		641	693	727	957		18	75	94	16
2100			612	636				632	680				20	44	
2250				642					633					-9	
2400				649					664					15	
2550				659					673					14	
2700				671					684					13	
2850				687					698					11	

DATA SHEET NO. 11 … (CONTINUED)

TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2013 Mercedes-Benz C250 4-Door Sedan NHTSA No. MD0508

Test Program: NCAP MDB Side Impact Test Test Date: 12/13/12

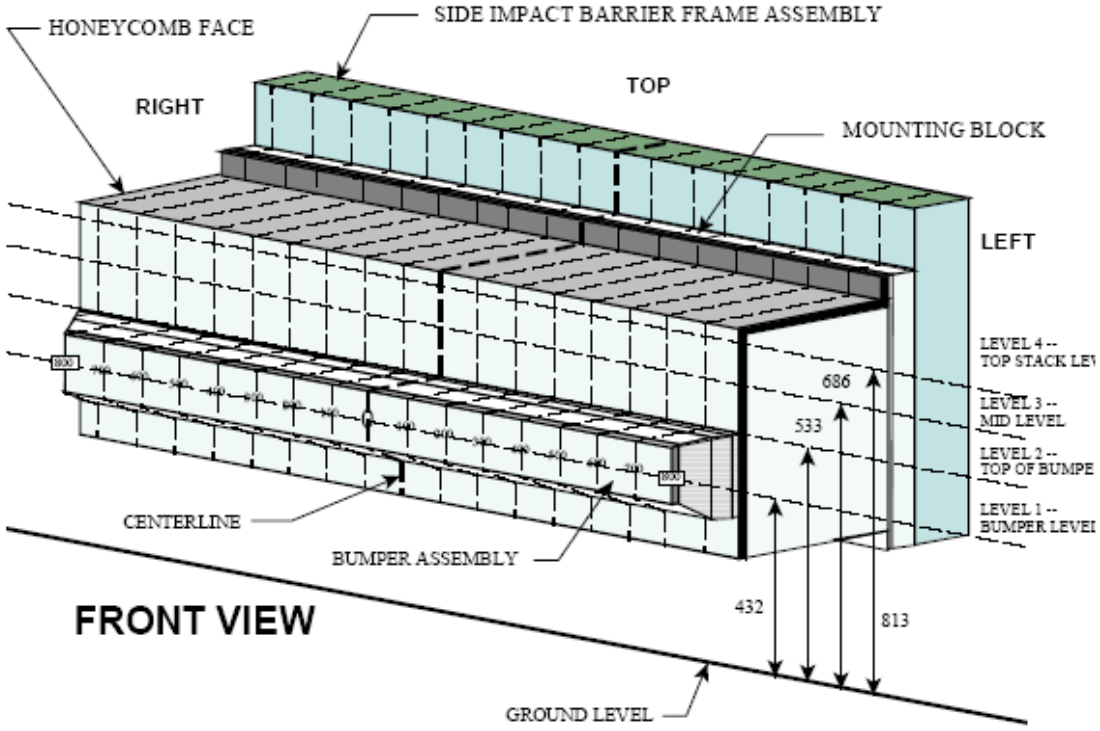


DATA SHEET NO. 12

MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2013 Mercedes-Benz C250 4-Door Sedan NHTSA No. MD0508

Test Program: NCAP MDB Side Impact Test Test Date: 12/13/12



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	232	220	227	236	250	233	225	212	205	200	202	210	217	223	234	262	264
2	172	176	191	202	210	190	156	146	140	149	158	168	176	184	190	201	212
3	81	87	103	123	157	147	114	90	81	81	81	84	95	114	144	201	230
4	64	67	84	119	161	144	120	113	85	79	77	87	102	-473	148	186	212

All dimensions in millimeters.

DATA SHEET NO. 13

FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2013 Mercedes-Benz C250 4-Door Sedan NHTSA No. MD0508

Test Program: NCAP MDB Side Impact Test Test Date: 12/13/12

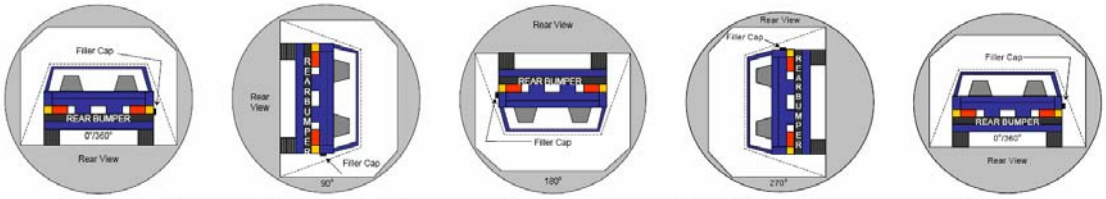
Temperature at Time of Impact: 11.7° C Test Time: 12:57 PM

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°	83	300	383
90° To 180°	80	300	380
180° To 270°	82	300	382
270° To 360°	82	300	382

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

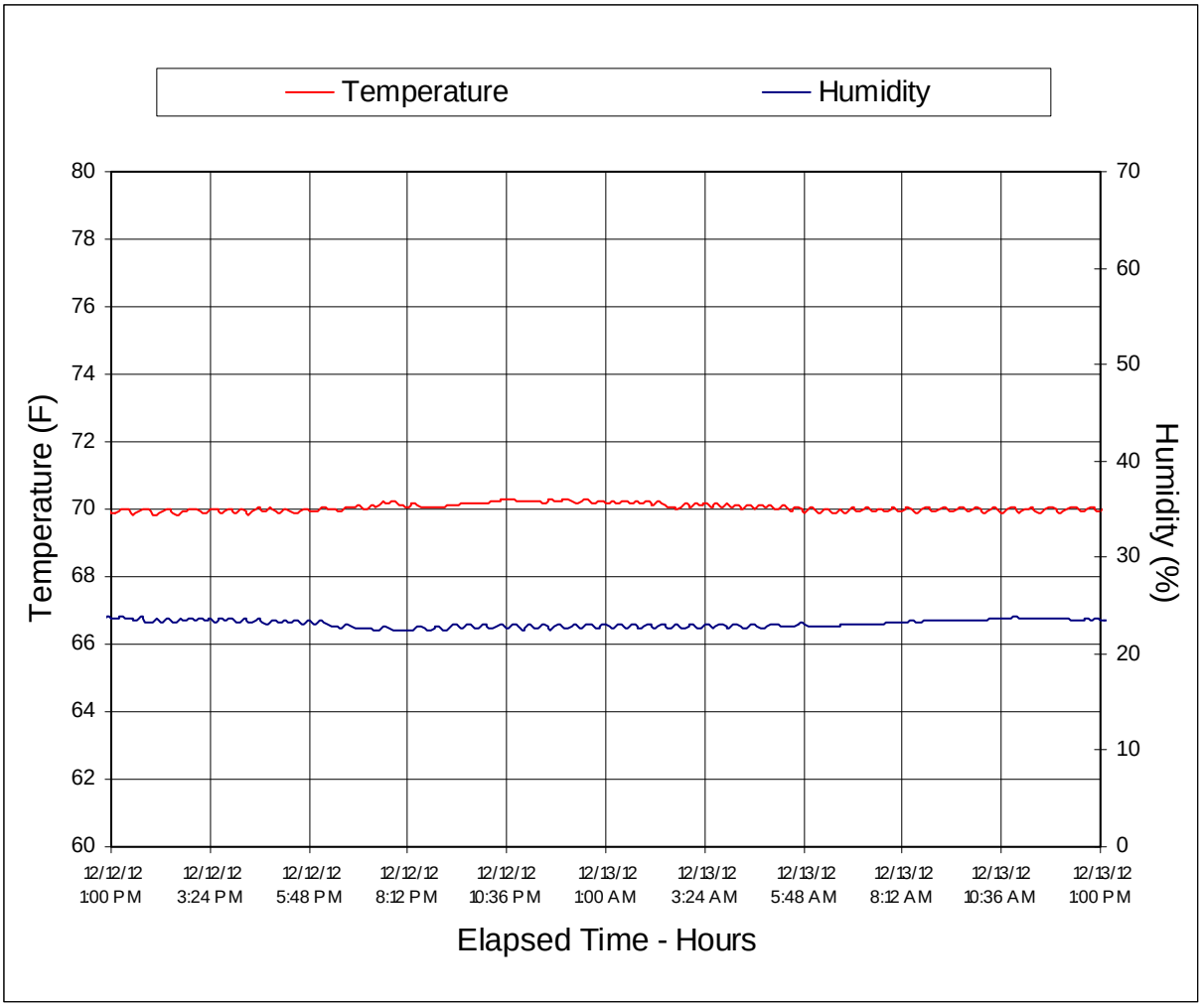
Test Phase	Spillage Location
0° To 90°	No Spillage Occurred
90° To 180°	No Spillage Occurred
180° To 270°	No Spillage Occurred
270° To 360°	No Spillage Occurred

DATA SHEET NO. 14

DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION

Test Vehicle: 2013 Mercedes-Benz C250 4-Door Sedan NHTSA No. MD0508

Test Program: NCAP MDB Side Impact Test Test Date: 12/13/12



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 Test Vehicle

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

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 Overhead 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

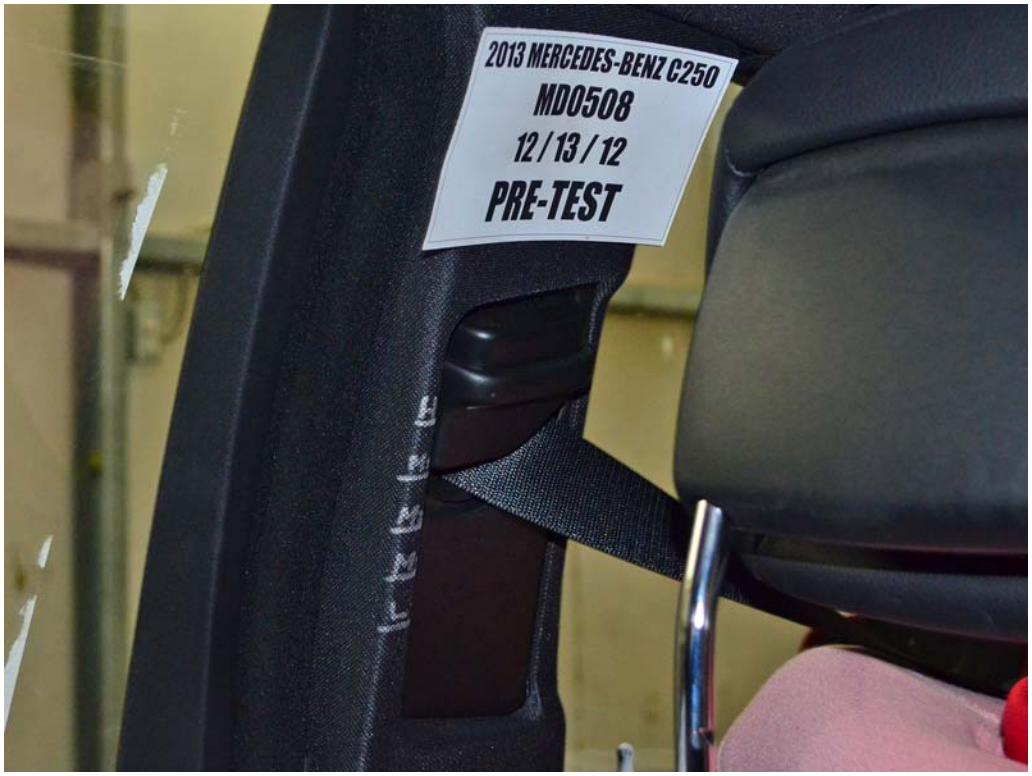


FIGURE 35. Pre-Test View of Belt Anchorage for Driver Dummy

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 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

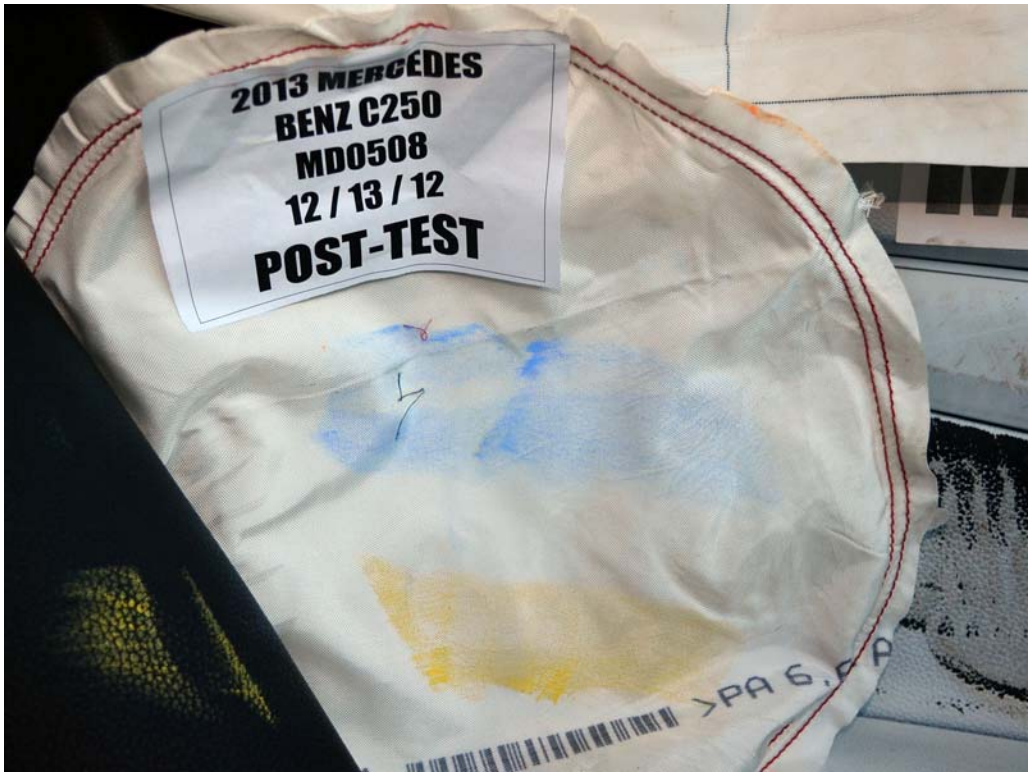


FIGURE 51. Post-Test Driver Dummy Close-Up Torso Contact with Side Airbag View

Photograph Not Applicable

No Driver Pelvis Contact
with Vehicle Interior

FIGURE 52. Post-Test Driver Dummy Close-Up Pelvis Contact 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

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

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

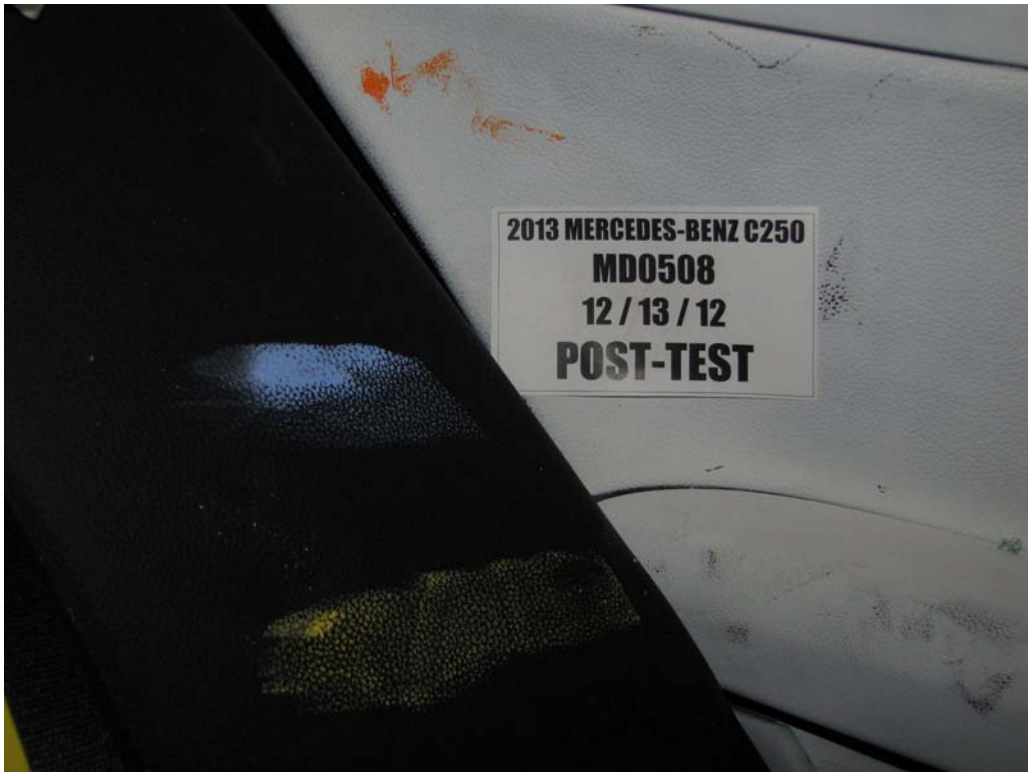


FIGURE 77. Post-Test Rear Passenger Dummy Close-Up
Torso Contact with Vehicle Interior View

Photograph Not Applicable

Vehicle Not Equipped with
Rear Passenger Side Airbags

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 View

Photograph Not Applicable

Vehicle Not Equipped with
Rear Passenger Side Airbags

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

FIGURE 81. Post-Test Rear Passenger DummyClose-Up 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

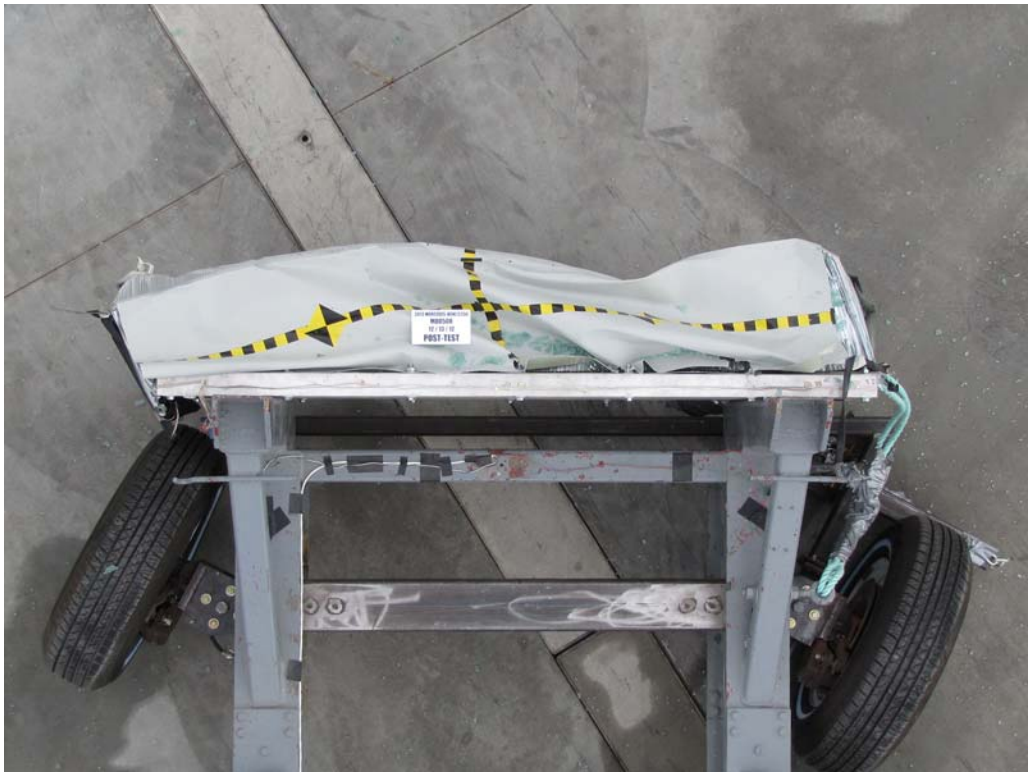


FIGURE 87. Post-Test Top View of MDB Impactor Face

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

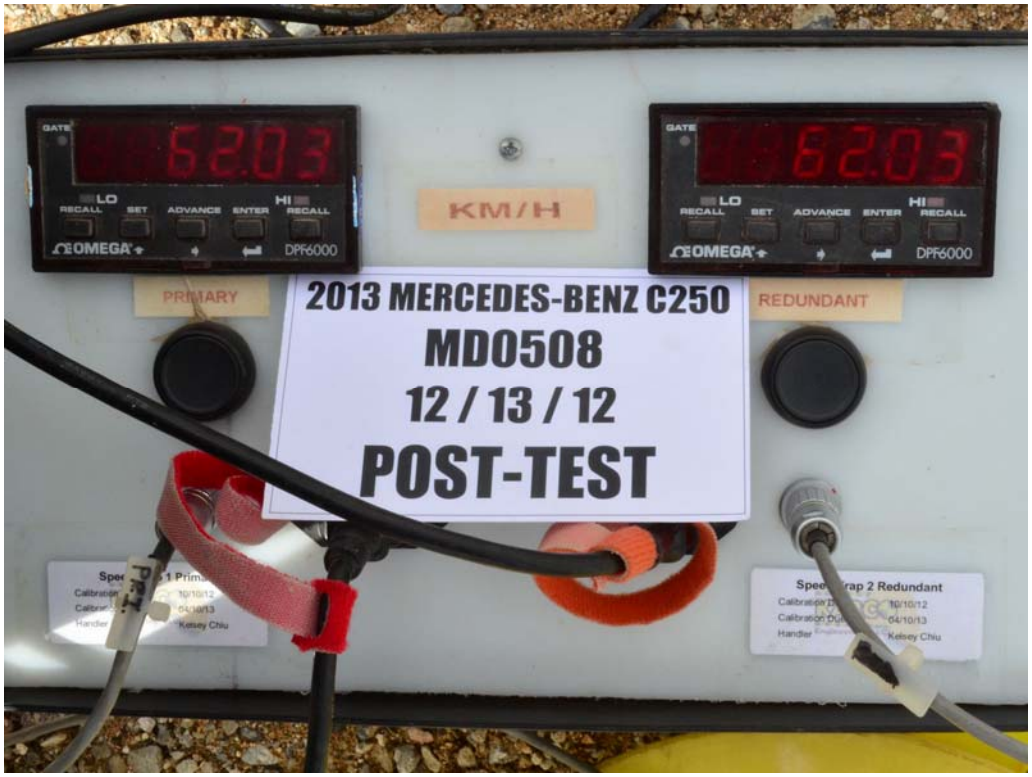


FIGURE 95. Post-Test Primary and Redundant Speed Trap Read-Out

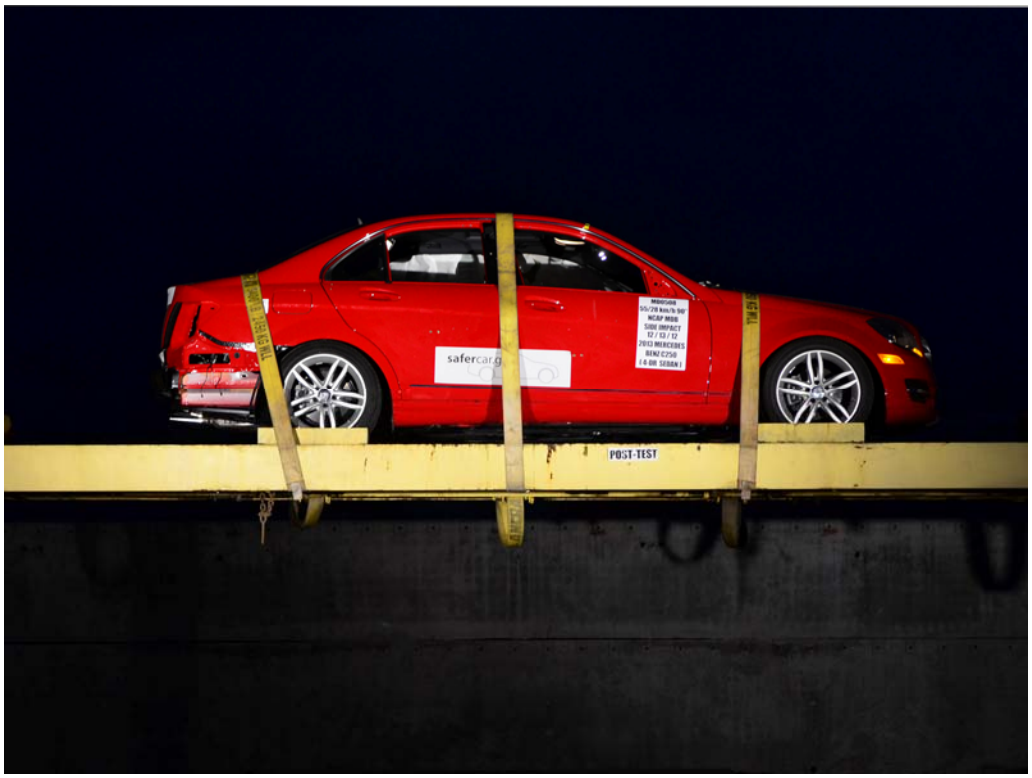


FIGURE 96. FMVSS No. 301 Static Rollover 0 Degrees

FIGURE 97. FMVSS No. 301 Static Rollover 90 Degrees

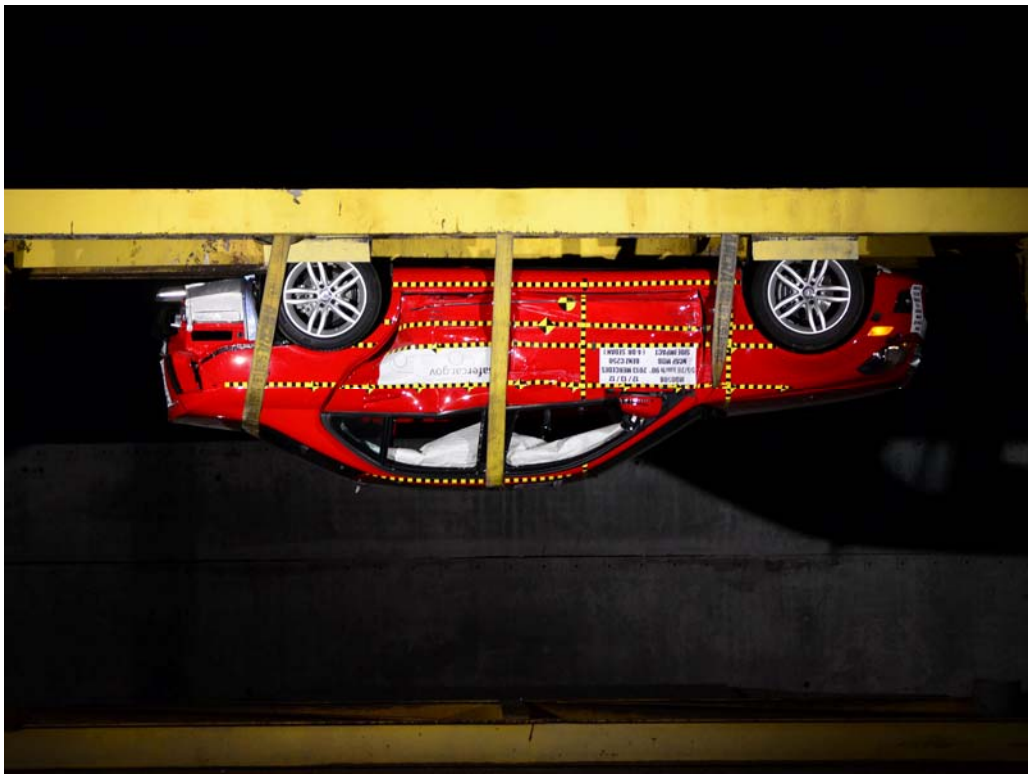


FIGURE 98. FMVSS No. 301 Static Rollover 180 Degrees

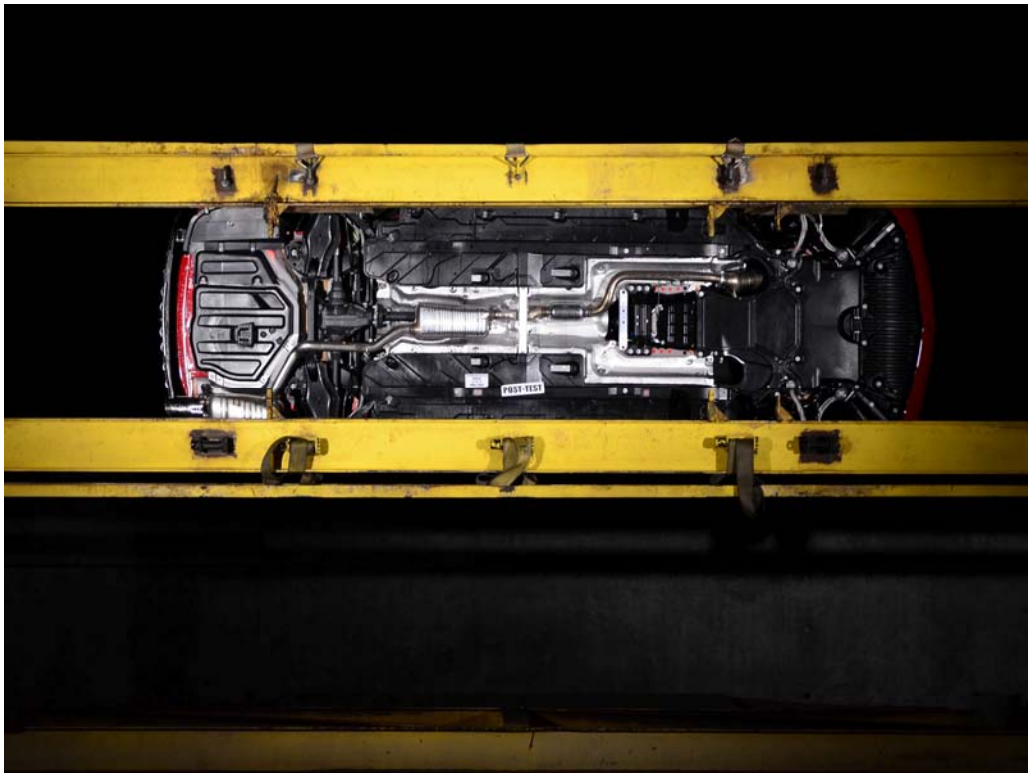


FIGURE 99. FMVSS No. 301 Static Rollover 270 Degrees

FIGURE 100. FMVSS No. 301 Static Rollover 360 Degrees

FIGURE 101. Impact Event

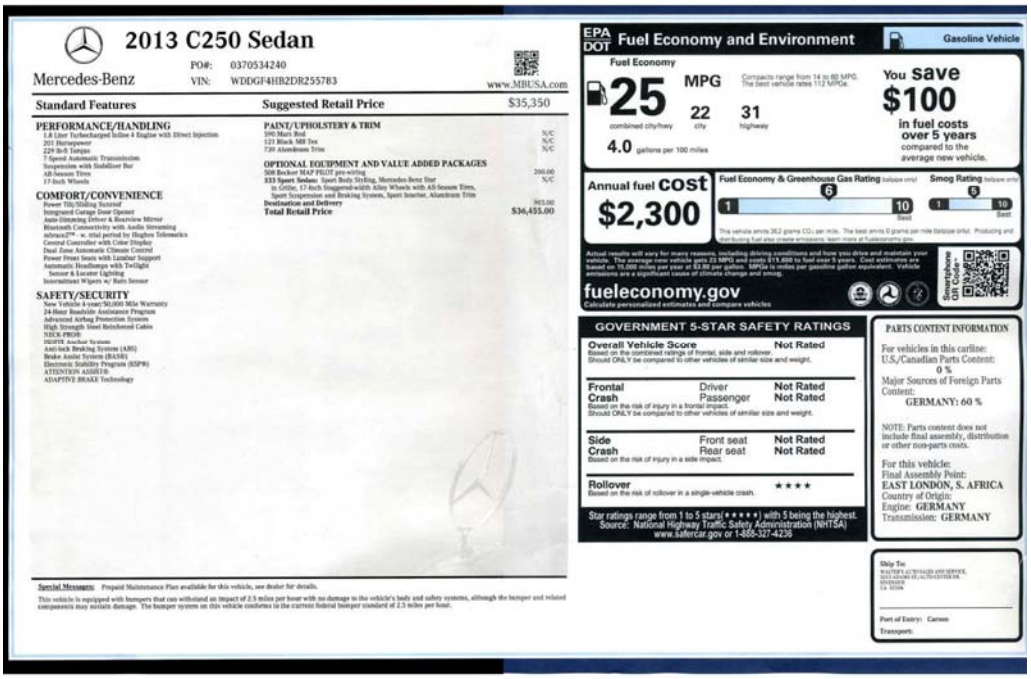


FIGURE 102. Monroney Label

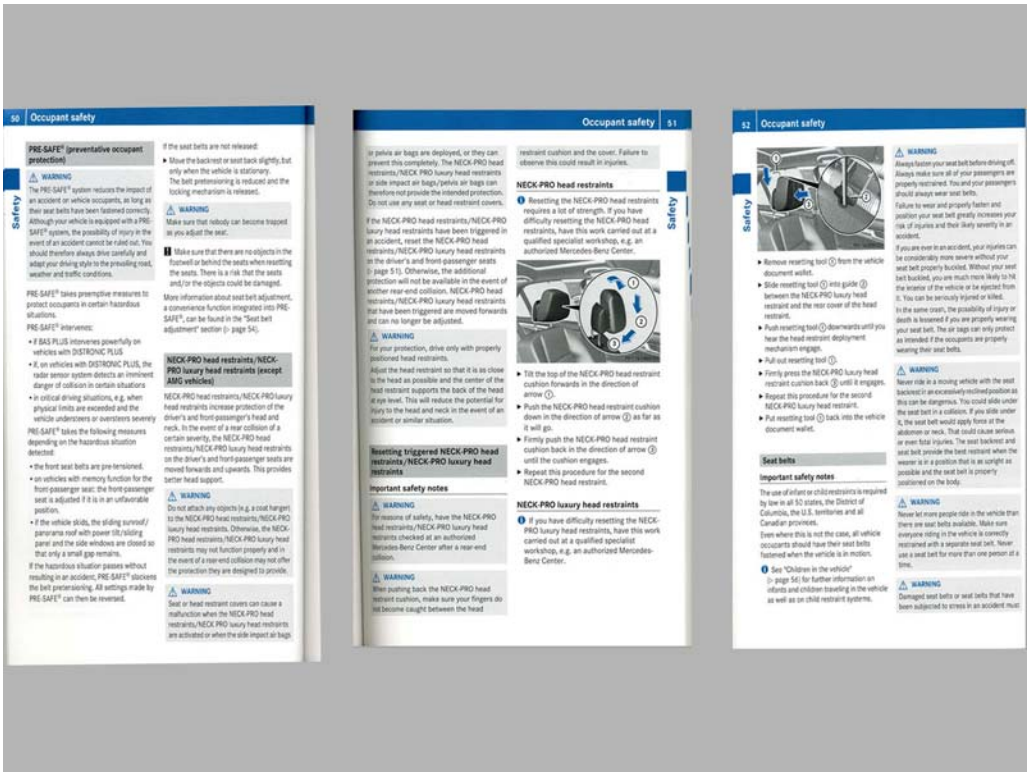


FIGURE 103. Driver Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

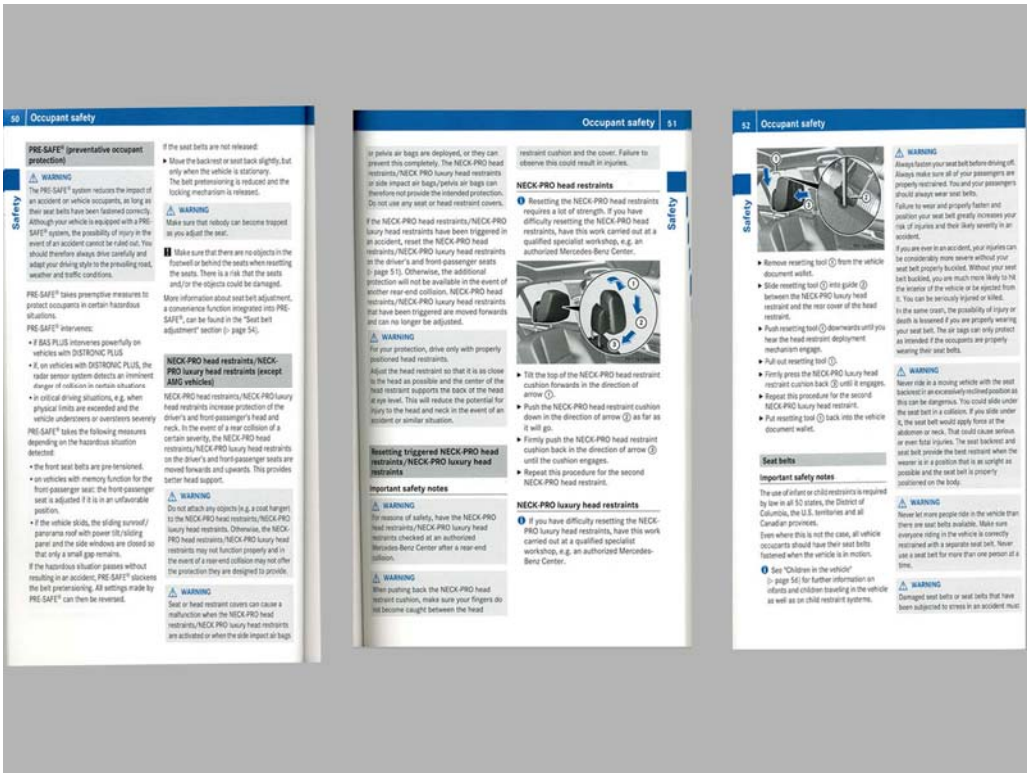


FIGURE 104. Left Rear Passenger Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

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)

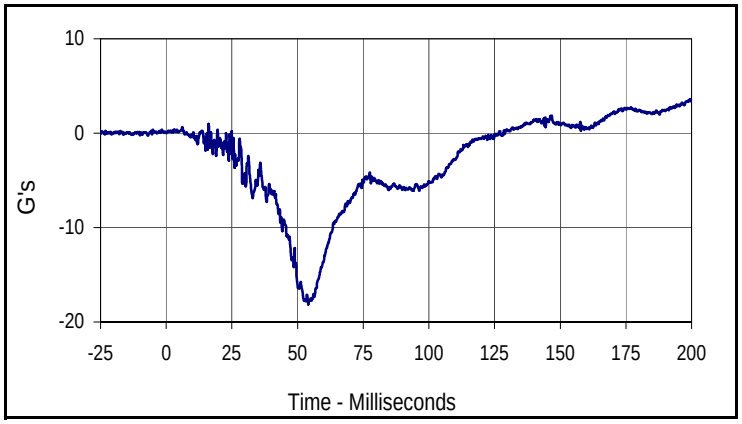
MDB Rear Acceleration (X)

MDB Rear Acceleration (Y)

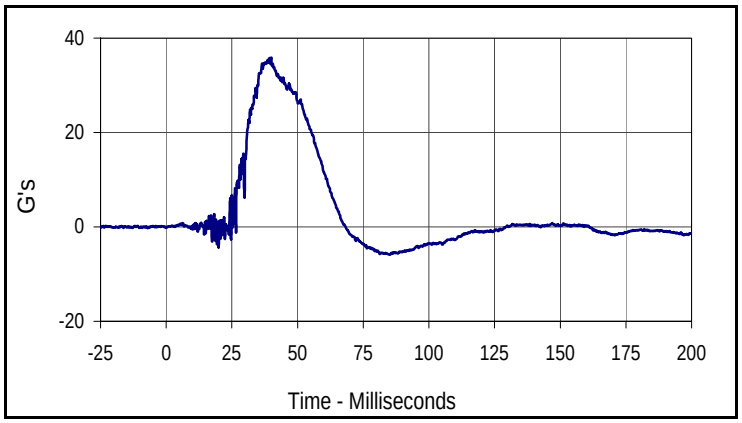
Left MDB Contact Switch

Right MDB Contact Switch

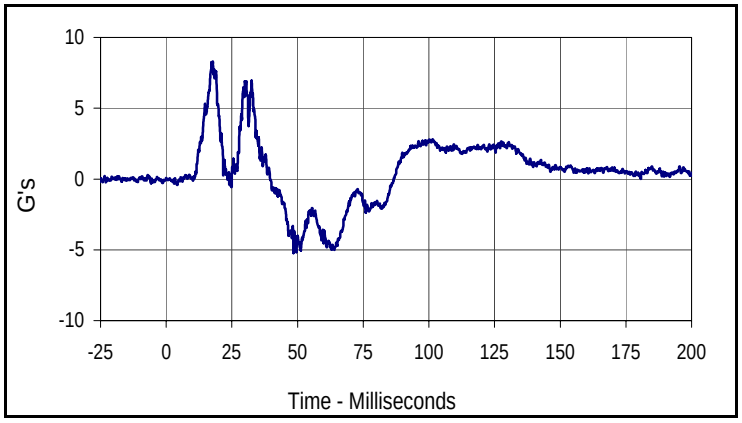
Test Vehicle:	2013 Mercedes-Benz C250 4-Door Sedan	NHTSA No.:	MD0508
Test Program:	61 km/h (38 mph) Side Impact NCAP 27° Moving Deformable Barrier Test	Test Date:	12/13/12



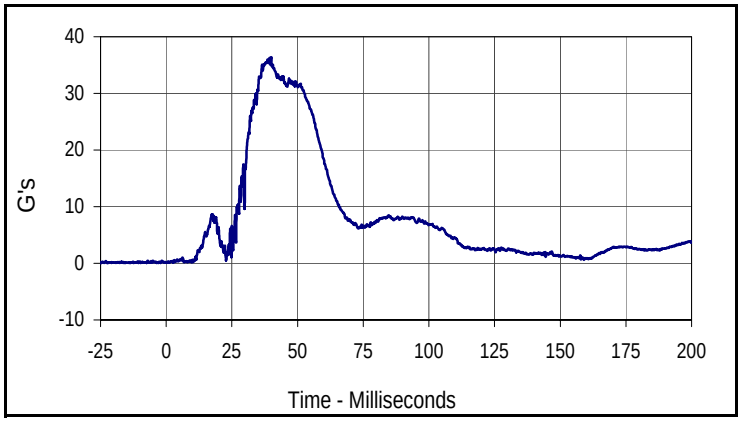
Curve Description			
Driver Head Acceleration X Primary			
Plot No.	Type	SAE Class	Units
001	FIL	1000	G's
Max	Time	Min	Time
3.6	199.6	-18.1	54.1



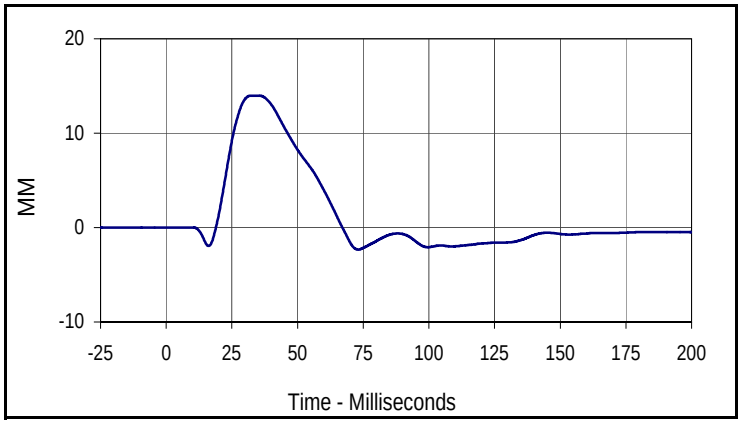
Curve Description			
Driver Head Acceleration Y Primary			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
35.9	39.9	-5.9	84.5



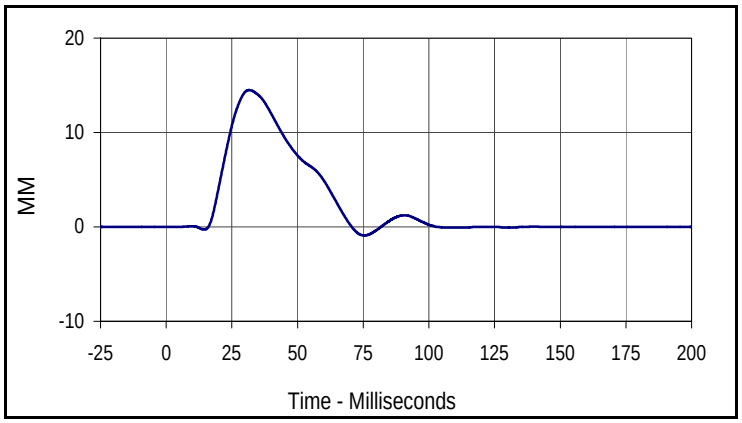
Curve Description			
Driver Head Acceleration Z Primary			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
8.3	17.7	-5.2	48.5



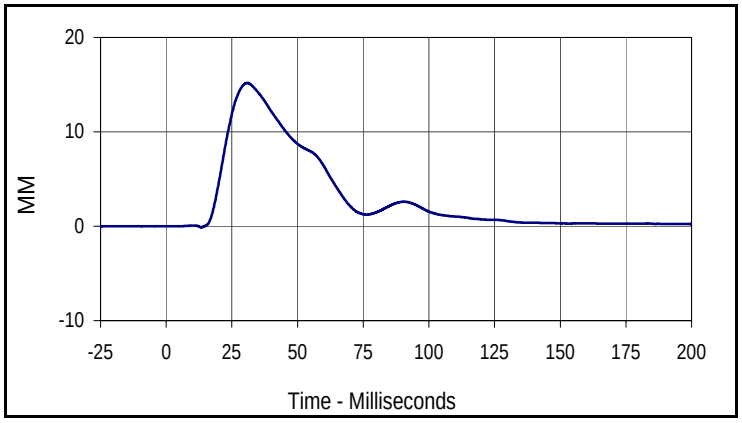
Curve Description			
Driver Head Resultant Acceleration Primary			
Plot No.	Type	SAE Class	Units
004	RES	1000	G's
Max	Time	Min	Time
36.4	39.9	0.1	0.5



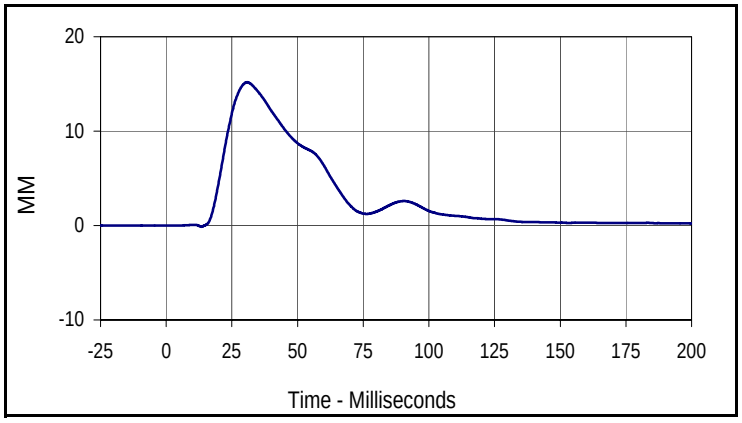
Curve Description			
Driver Upper Thorax Rib Deflection Y			
Plot No.	Type	SAE Class	Units
005	FIL	180	MM
Max	Time	Min	Time
14.0	32.3	-2.3	73.1



Curve Description			
Driver Middle Thorax Rib Deflection Y			
Plot No.	Type	SAE Class	Units
006	FIL	180	MM
Max	Time	Min	Time
14.5	31.6	-0.9	75.4

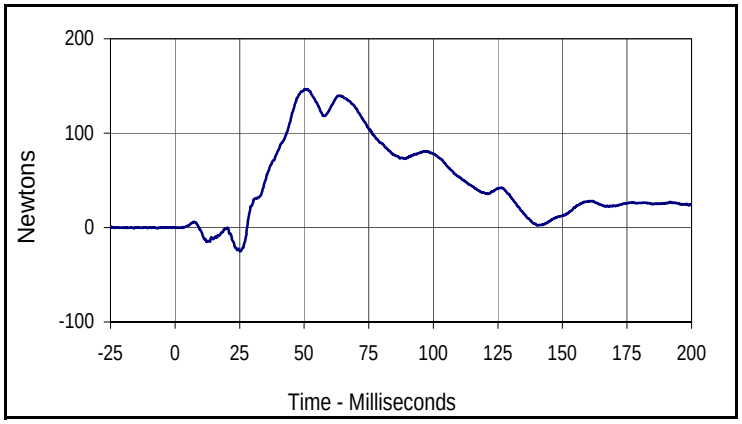


Curve Description			
Driver Lower Thorax Rib Deflection Y			
Plot No.	Type	SAE Class	Units
007	FIL	180	MM
Max	Time	Min	Time
15.2	30.8	-0.1	13.3

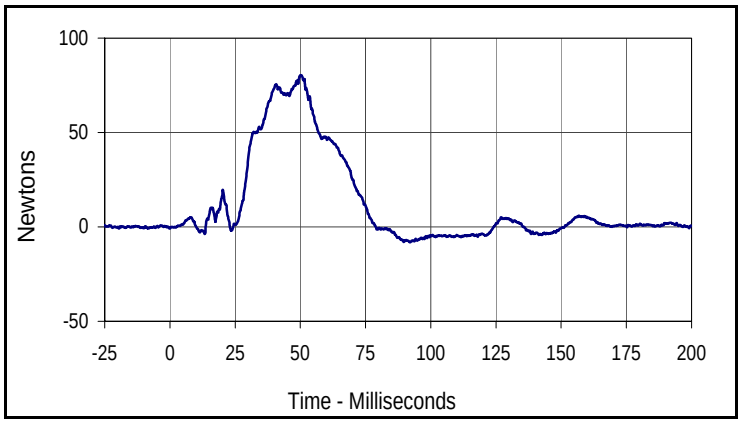


Curve Description			
Driver Thorax Rib Deflection Maximum			
Plot No.	Type	SAE Class	Units
010	FIL	180	MM
Max	Time	Min	Time
15.2	30.8	-0.1	13.3

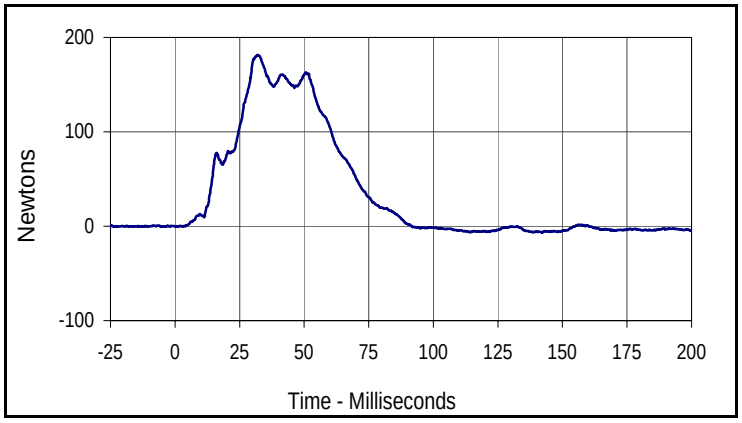
Test Vehicle:	2013 Mercedes-Benz C250 4-Door Sedan	NHTSA No.:	MD0508
Test Program:	61 km/h (38 mph) Side Impact NCAP 27° Moving Deformable Barrier Test	Test Date:	12/13/12



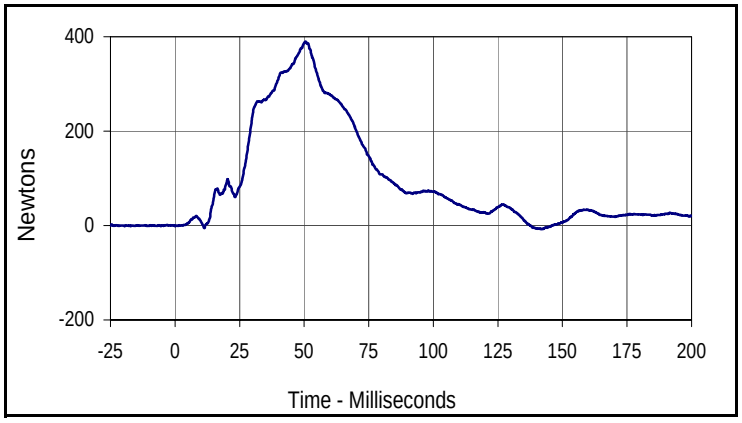
Curve Description			
Driver Anterior Abdominal Force Y			
Plot No.	Type	SAE Class	Units
008	FIL	600	Newtons
Max	Time	Min	Time
146.7	51.4	-25.3	25.2



Curve Description			
Driver Middle Abdominal Force Y			
Plot No.	Type	SAE Class	Units
009	FIL	600	Newtons
Max	Time	Min	Time
80.3	50.3	-8.2	92.0

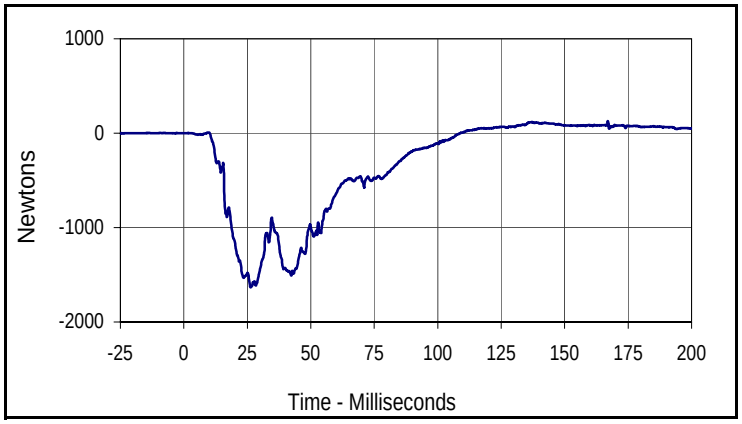


Curve Description			
Driver Posterior Abdominal Force Y			
Plot No.	Type	SAE Class	Units
011	FIL	600	Newtons
Max	Time	Min	Time
181.5	32.0	-6.7	142.2



Curve Description			
Driver Total Abdominal Force			
Plot No.	Type	SAE Class	Units
012	SUM	600	Newtons
Max	Time	Min	Time
389.6	50.6	-7.6	142.3

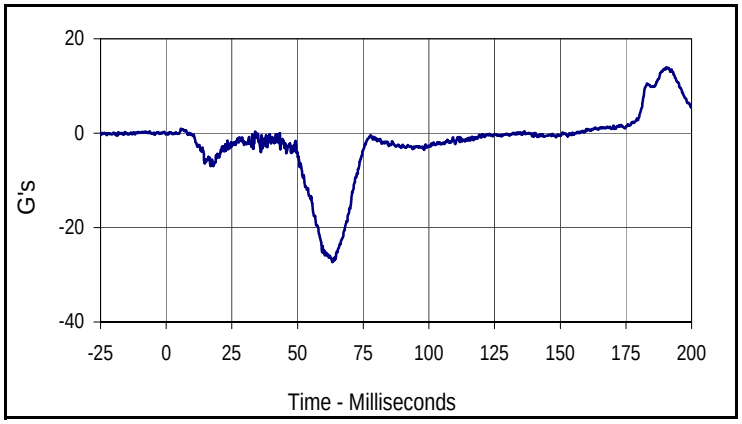
Test Vehicle:	2013 Mercedes-Benz C250 4-Door Sedan	NHTSA No.:	MD0508
Test Program:	61 km/h (38 mph) Side Impact NCAP 27° Moving Deformable Barrier Test	Test Date:	12/13/12



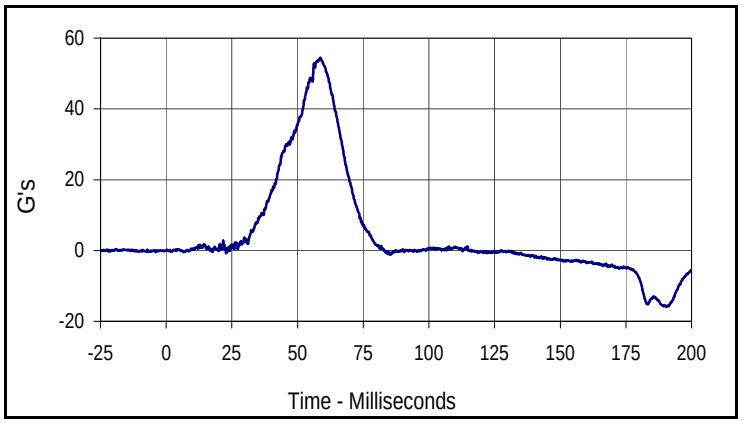
Curve Description			
Driver Pubic Symphysis Force Y			
Plot No.	Type	SAE Class	Units
013	FIL	600	Newtons
Max	Time	Min	Time
127.3	167.0	-1632.4	26.3

Test Vehicle: 2013 Mercedes-Benz C250 4-Door Sedan NHTSA No.: MD0508

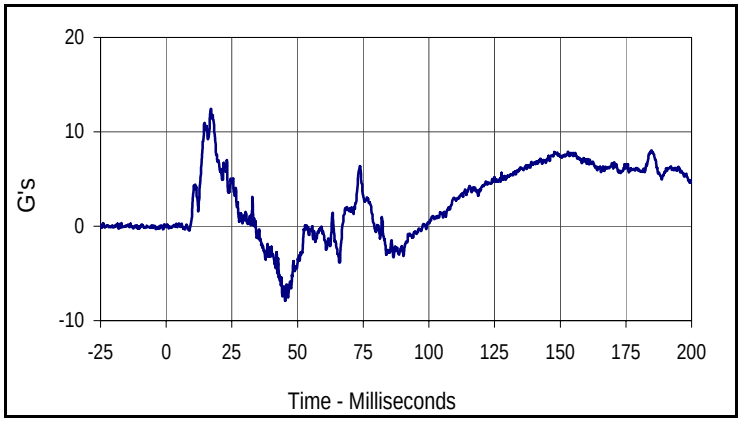
Test Program: 61 km/h (38 mph) Side Impact NCAP 27° Moving Deformable Barrier Test Test Date: 12/13/12



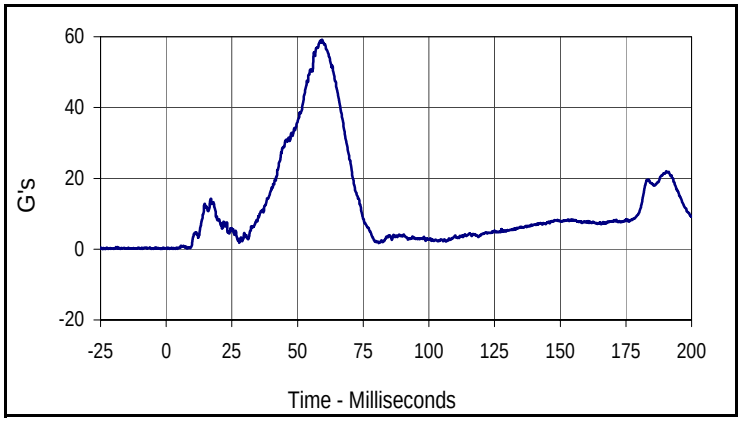
Curve Description			
Passenger Head Acceleration X Primary			
Plot No.	Type	SAE Class	Units
014	FIL	1000	G's
Max	Time	Min	Time
14.0	190.4	-27.3	63.3



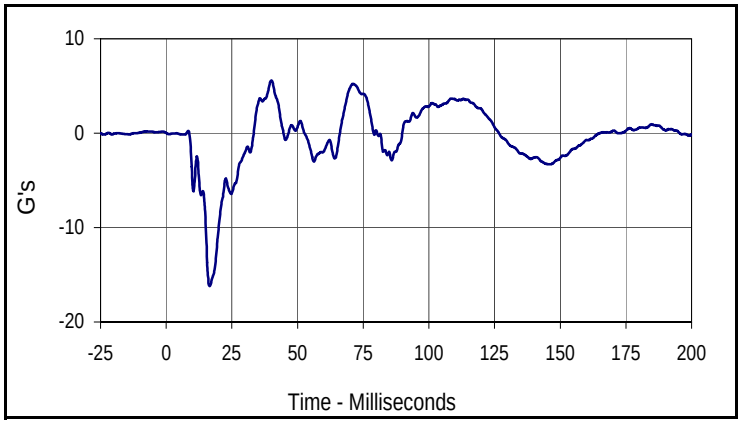
Curve Description			
Passenger Head Acceleration Y Primary			
Plot No.	Type	SAE Class	Units
015	FIL	1000	G's
Max	Time	Min	Time
54.5	58.7	-15.9	190.5



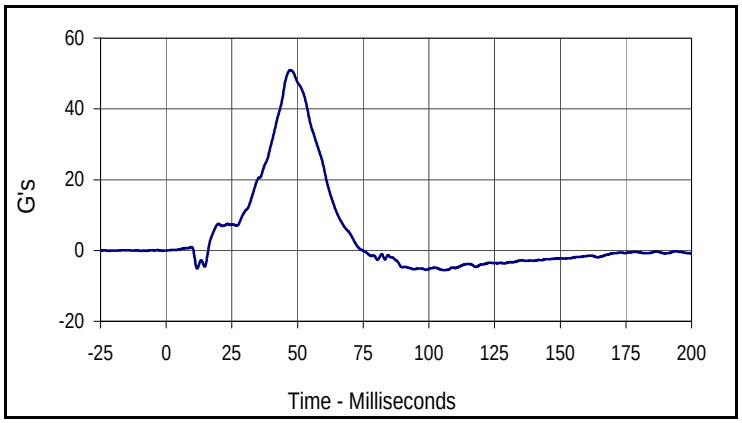
Curve Description			
Passenger Head Acceleration Z Primary			
Plot No.	Type	SAE Class	Units
016	FIL	1000	G's
Max	Time	Min	Time
12.5	17.0	-7.9	45.3



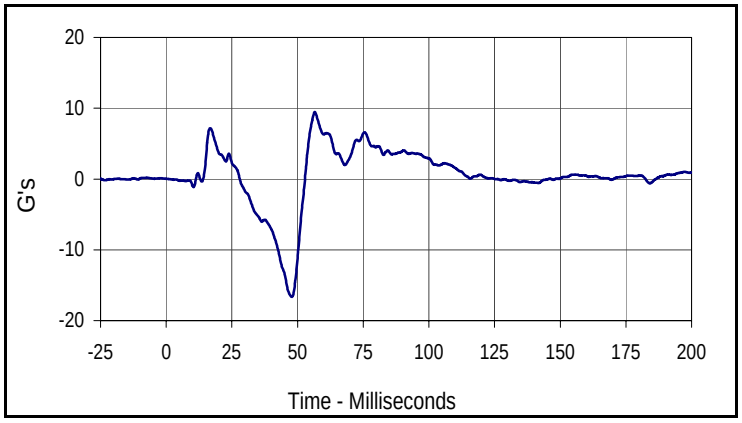
Curve Description			
Passenger Head Acceleration Resultant Primary			
Plot No.	Type	SAE Class	Units
017	RES	1000	G's
Max	Time	Min	Time
59.1	59.3	0.0	3.4



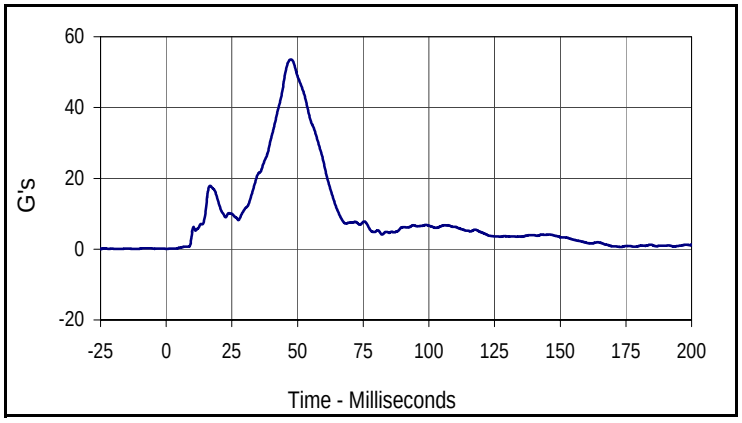
Curve Description			
Passenger Lower Spine T12 Acceleration X			
Plot No.	Type	SAE Class	Units
019	FIL	180	G's
Max	Time	Min	Time
5.6	40.0	-16.2	16.5



Curve Description			
Passenger Lower Spine T12 Acceleration Y			
Plot No.	Type	SAE Class	Units
020	FIL	180	G's
Max	Time	Min	Time
51.0	47.3	-5.6	106.0



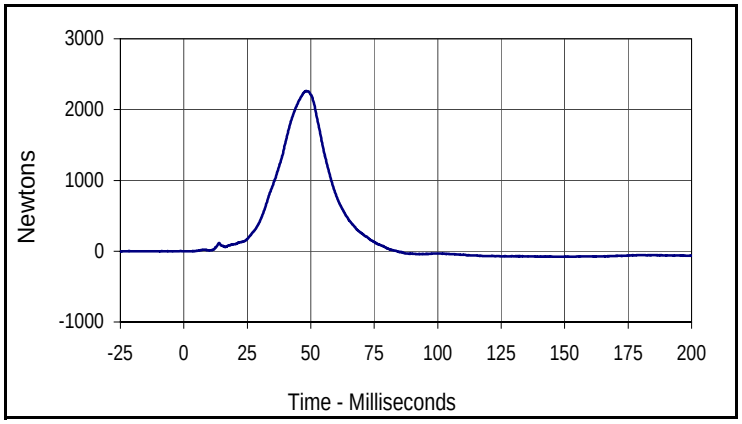
Curve Description			
Passenger Lower Spine T12 Acceleration Z			
Plot No.	Type	SAE Class	Units
021	FIL	180	G's
Max	Time	Min	Time
9.5	56.6	-16.6	47.8



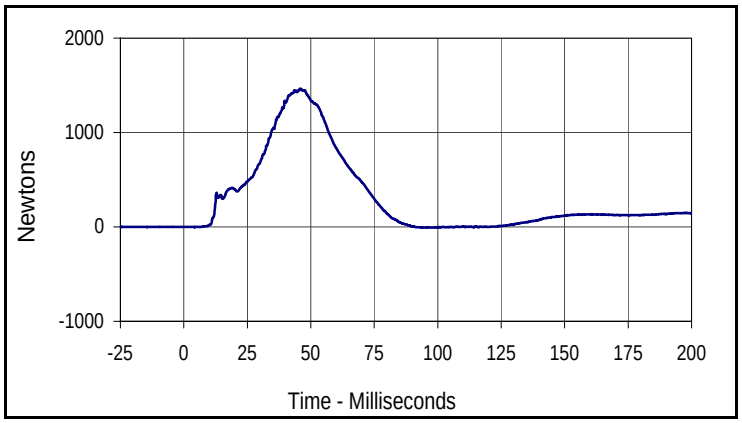
Curve Description			
Passenger Lower Spine T12 Acceleration Res.			
Plot No.	Type	SAE Class	Units
022	RES	180	G's
Max	Time	Min	Time
53.6	47.4	0.0	0.2

Test Vehicle: 2013 Mercedes-Benz C250 4-Door Sedan NHTSA No.: MD0508

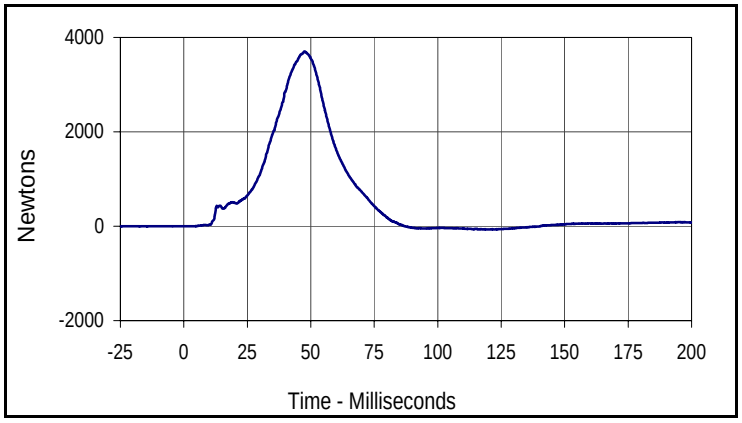
Test Program: 61 km/h (38 mph) Side Impact NCAP 27° Moving Deformable Barrier Test Test Date: 12/13/12



Curve Description			
Passenger Iliac Force on Impact Side Y			
Plot No.	Type	SAE Class	Units
023	FIL	600	Newtons
Max	Time	Min	Time
2263.0	48.2	-80.1	148.9



Curve Description			
Passenger Acetabulum Force on Impact Side Y			
Plot No.	Type	SAE Class	Units
024	FIL	600	Newtons
Max	Time	Min	Time
1465.7	45.8	-8.1	97.2



Curve Description			
Passenger Total Pelvic Force			
Plot No.	Type	SAE Class	Units
018	SUM	600	Newtons
Max	Time	Min	Time
3701.1	47.6	-70.8	116.1

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: 12/6/12

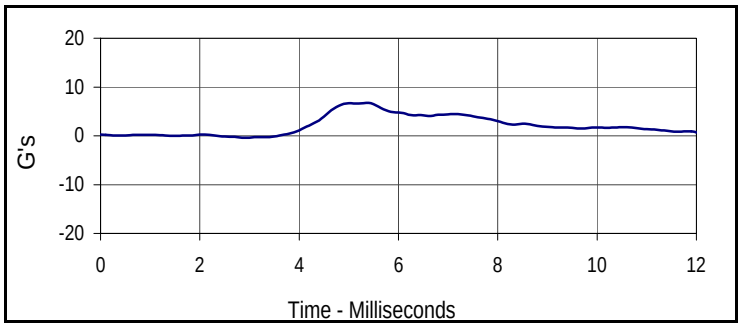
ATD Serial No.: F035 Test I.D.: N/A

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30.2	Pass
1	Sitting Height	mm	900 - 918	907	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	389	Pass
6	Head Width	mm	152 - 158	155	Pass
7	Shoulder / Arm Width	mm	461 - 479	470	Pass
8	Thorax Width	mm	322 - 332	324	Pass
9	Abdomen Width	mm	273 - 287	280	Pass
10	Pelvis Lap Width	mm	359 - 373	365	Pass
11	Head Depth	mm	196 - 206	202	Pass
12	Thorax Depth	mm	262 - 272	269	Pass
13	Abdomen Width	mm	194 - 204	198	Pass
14	Pelvis Depth	mm	235 - 245	239	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	611	Pass
			Overall Test Results		Pass

Test Program:	ES2re Head Drop Test	Test Date:	12/6/12
ATD Serial No.:	F035	Test I.D.:	F035HD040

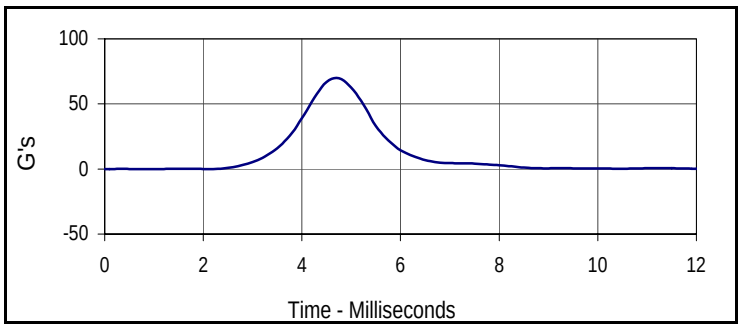
Tested Parameter		Units	Specification	Result	Pass/Fail
Head Assembly Soak Time		Minutes	≥240	265	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.9	Pass
	Min	%		28.9	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.1	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.3	Pass
Peak Head Resultant Acceleration		G's	125 to 155	137.5	Pass
Peak Head X Acceleration		G's	≤15	6.7	Pass
Is Acceleration Unimodal?		Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse		%	<15	6.2	Pass
			Overall Test Results		Pass

Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
137.5	4.7	0.1	0.5



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
6.7	5.4	-0.4	2.9

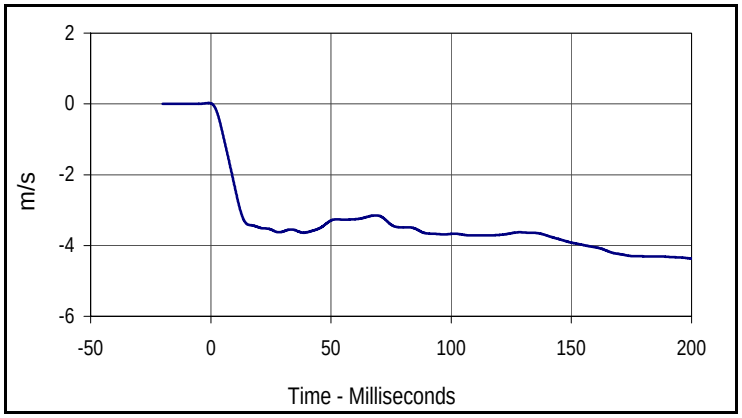
Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
118.3	4.7	-7.6	8.2



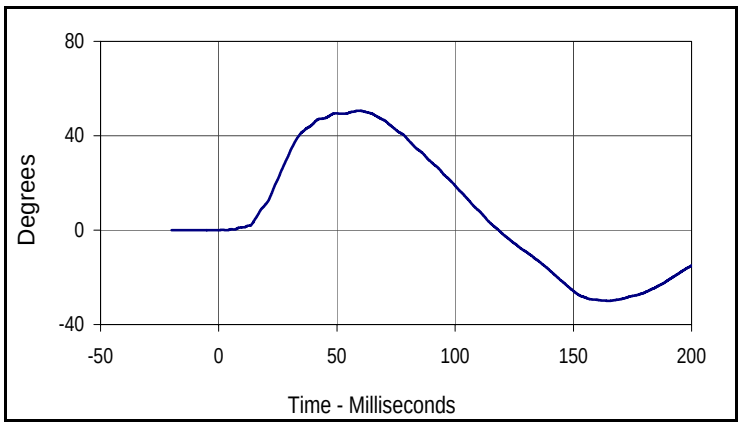
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
69.9	4.7	-0.2	2.1

Test Program:	ES2re Neck Flexion Test	Test Date:	12/6/12
ATD Serial No.:	F035	Test I.D.:	F035NB040

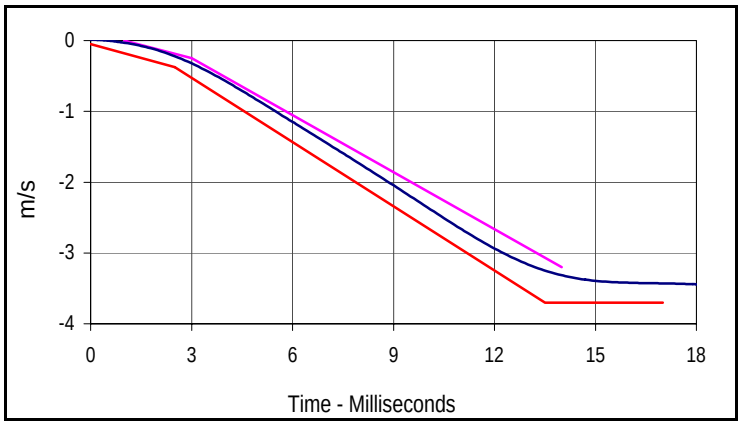
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	305	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.9	Pass
	Min	%		28.9	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.1	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.4	Pass
Pendulum Velocity		m/s	3.3 to 3.5	3.45	Pass
Headform Flexion	Max	Degrees	49 to 59	50.6	Pass
	Time	msec	54 to 66	59.2	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	-0.9	-4.4	200.0



Curve Description			
Headform Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	180	Degrees
Max	Time	Min	Time
50.6	59.2	-30.0	165.1

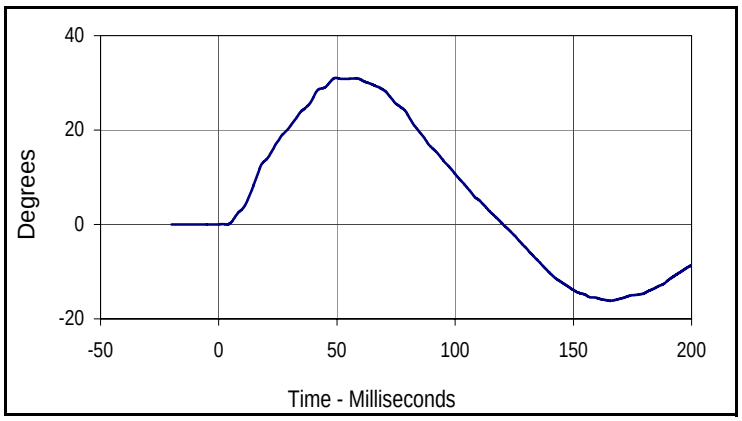


Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-0.9	-4.4	200.0

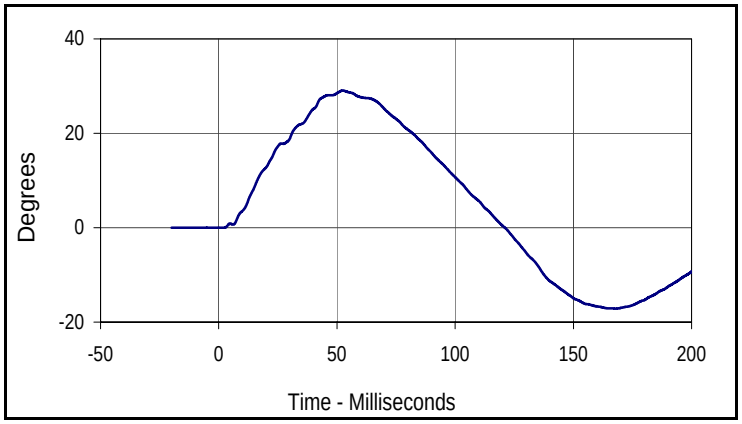
Velocity Corridors

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

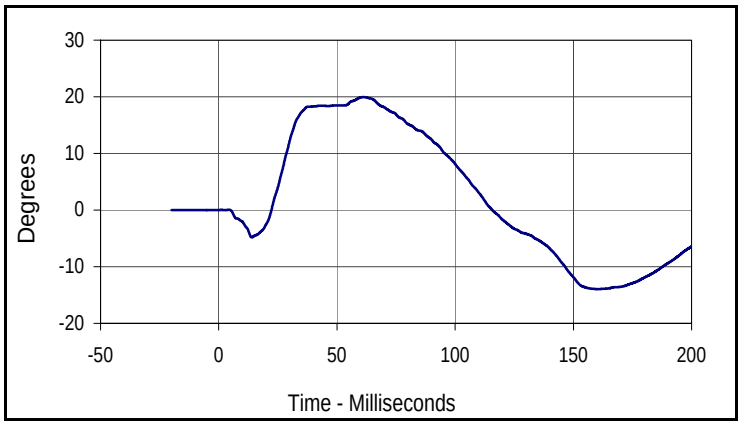
Test Program:	ES2re Neck Flexion Test	Test Date:	12/6/12
ATD Serial No.:	F035	Test I.D.:	F035NB040



Curve Description			
Potentiometer A			
Plot No.	Type	SAE Class	Units
003	FIL	180	Degrees
Max	Time	Min	Time
31.1	49.5	-16.2	165.5



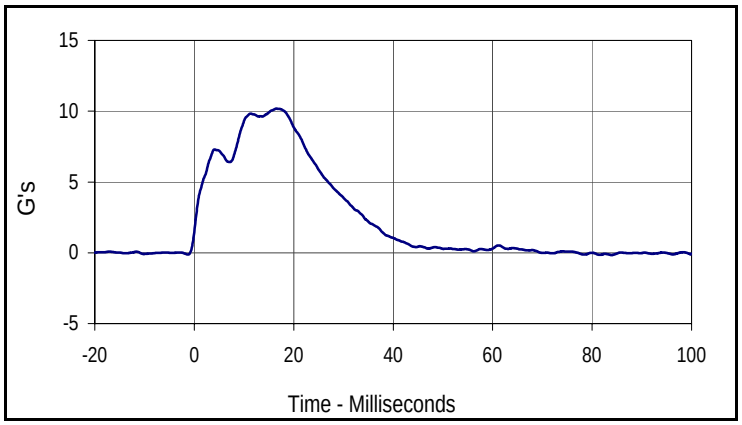
Curve Description			
Potentiometer B			
Plot No.	Type	SAE Class	Units
004	FIL	180	Degrees
Max	Time	Min	Time
29.1	52.5	-17.1	168.0



Curve Description			
Potentiometer C			
Plot No.	Type	SAE Class	Units
005	FIL	180	Degrees
Max	Time	Min	Time
20.0	61.1	-13.9	161.2

Test Program:	ES2re Shoulder Impact Test	Test Date:	12/6/12
ATD Serial No.:	F035	Test I.D.:	F035SH040

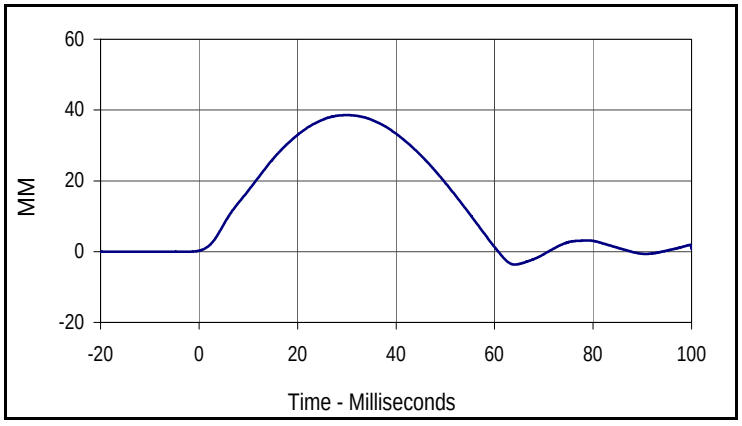
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	340	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.9	Pass
	Min	%		28.9	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.1	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.3	Pass
Pendulum Speed		m/s	4.2 to 4.4	4.32	Pass
Peak Impactor Acceleration		G's	7.5 to 10.5	10.2	Pass
			Overall Test Results		Pass



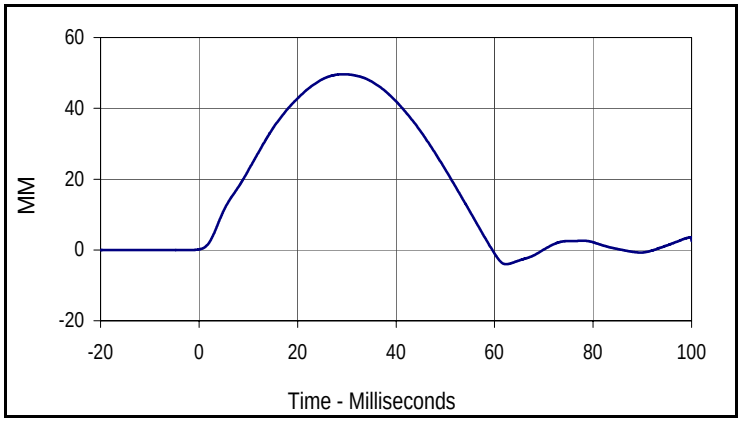
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
001	FIL	180	G's
Max	Time	Min	Time
10.2	16.5	-0.2	83.9

Test Program:	ES2re Thorax - Rib Drop Test	Test Date:	12/6/12
ATD Serial No.:	F035 Rib # 1	Test I.D.:	F035RB1040

Tested Parameter		Units	Specification	Result	Pass/Fail
Rib Module Soak Time		Minutes	≥240	365	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	30.9	Pass
	Min	%		28.9	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 Rib Deflection at 459 +/- 5 mm Drop Height		mm	36 to 40	38.6	Pass
Peak Rib Deflection at 815 +/- 8 mm Drop Height		mm	46 to 51	49.6	Pass
			Overall Test Results		Pass



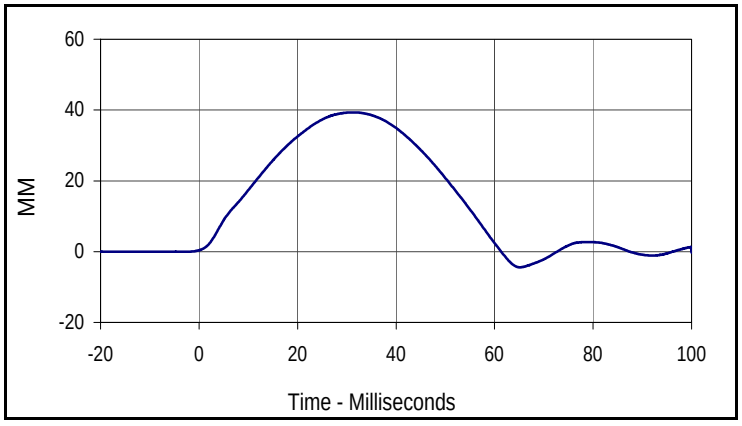
Curve Description			
Upper Rib Deflection (459 mm Drop Height)			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
38.6	30.0	-3.6	64.1



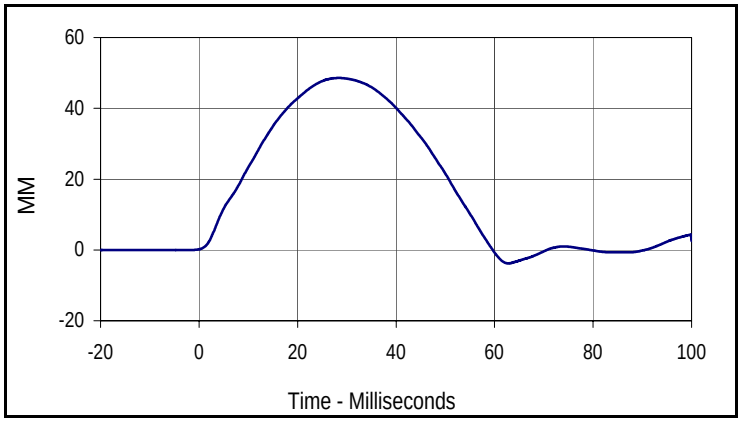
Curve Description			
Upper Rib Deflection (815 mm Drop Height)			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max	Time	Min	Time
49.6	29.4	-4.0	62.4

Test Program:	ES2re Thorax - Rib Drop Test	Test Date:	12/6/12
ATD Serial No.:	F035 Rib # 2	Test I.D.:	F035RB2040

Tested Parameter		Units	Specification	Result	Pass/Fail
Rib Module Soak Time		Minutes	≥240	380	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	30.9	Pass
	Min	%		28.9	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 Rib Deflection at 459 +/- 5 mm Drop Height		mm	36 to 40	39.3	Pass
Peak Rib Deflection at 815 +/- 8 mm Drop Height		mm	46 to 51	48.6	Pass
			Overall Test Results		Pass



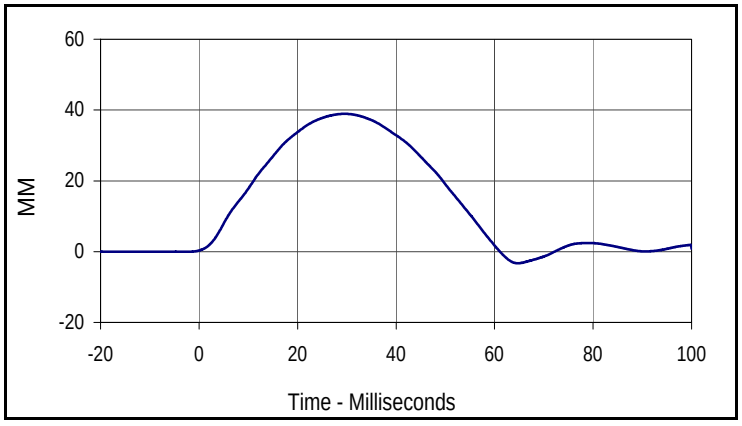
Curve Description			
Middle Rib Deflection (459 mm Drop Height)			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
39.3	31.3	-4.4	65.2



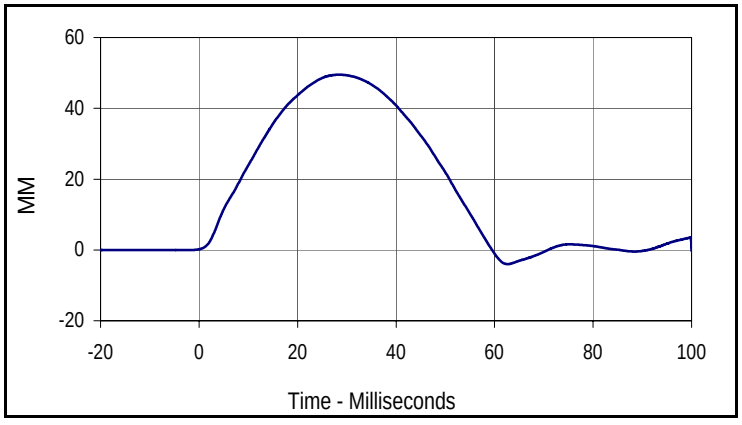
Curve Description			
Middle Rib Deflection (815 mm Drop Height)			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max	Time	Min	Time
48.6	28.4	-3.8	62.8

Test Program:	ES2re Thorax - Rib Drop Test	Test Date:	12/6/12
ATD Serial No.:	F035 Rib # 3	Test I.D.:	F035RB3040

Tested Parameter		Units	Specification	Result	Pass/Fail
Rib Module 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	30.9	Pass
	Min	%		28.9	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.3	Pass
Peak Rib Deflection at 459 +/- 5 mm Drop Height		mm	36 to 40	38.9	Pass
Peak Rib Deflection at 815 +/- 8 mm Drop Height		mm	46 to 51	49.5	Pass
			Overall Test Results		Pass



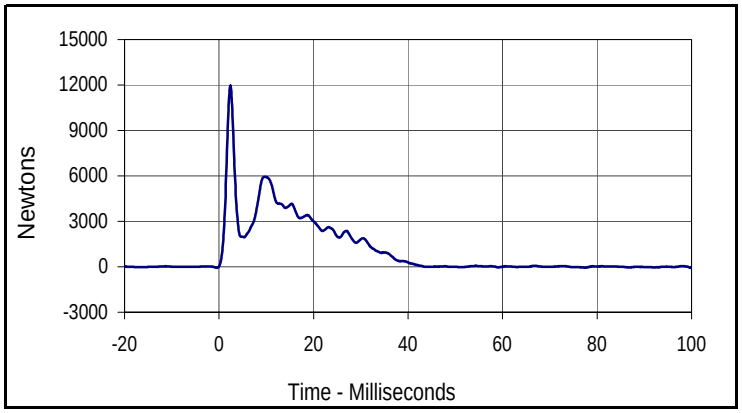
Curve Description			
Lower Rib Deflection (459 mm Drop Height)			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
38.9	29.6	-3.3	64.8



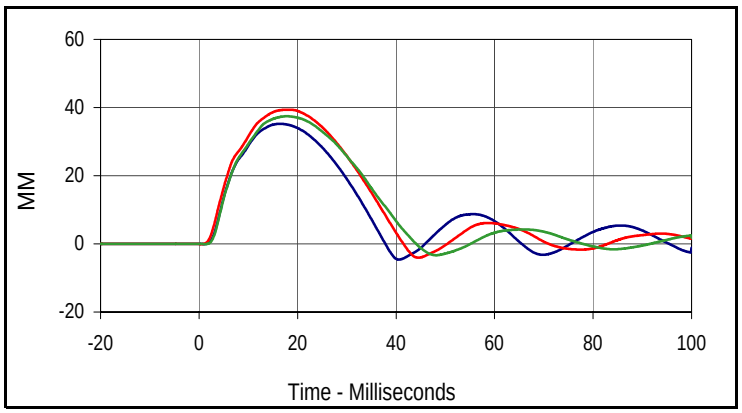
Curve Description			
Lower Rib Deflection (815 mm Drop Height)			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max	Time	Min	Time
49.5	28.4	-4.0	62.6

Test Program:	ES2re Thorax - Full Body Impact Test	Test Date:	12/6/12
ATD Serial No.:	F035	Test I.D.:	F035TH040

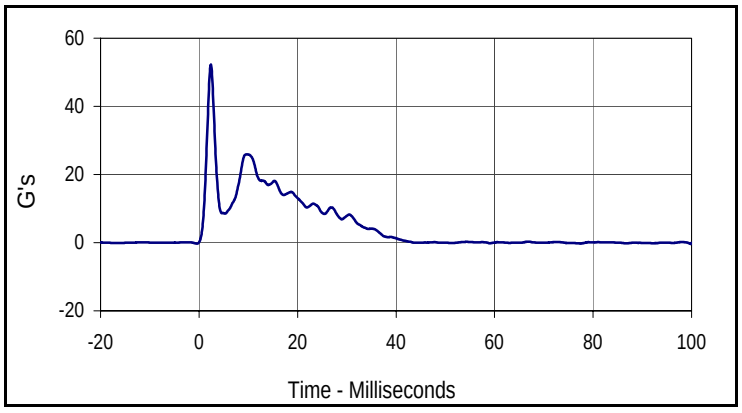
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	435	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.9	Pass
	Min	%		28.9	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.2	Pass
Peak Impactor Velocity		m/s	5.4 to 5.6	5.57	Pass
Peak Impactor Force		N	5100 to 6200	5938.6	Pass
		msec	> 6.0 msec	9.6	Pass
Peak Upper Rib Deflection		mm	34 to 41	35.2	Pass
Peak Middle Rib Deflection		mm	37 to 45	39.4	Pass
Peak Lower Rib Deflection		mm	37 to 44	37.4	Pass
			Overall Test Results		Pass



Curve Description			
Impactor Force			
Plot No.	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
11950.8	2.4	-80.3	99.9



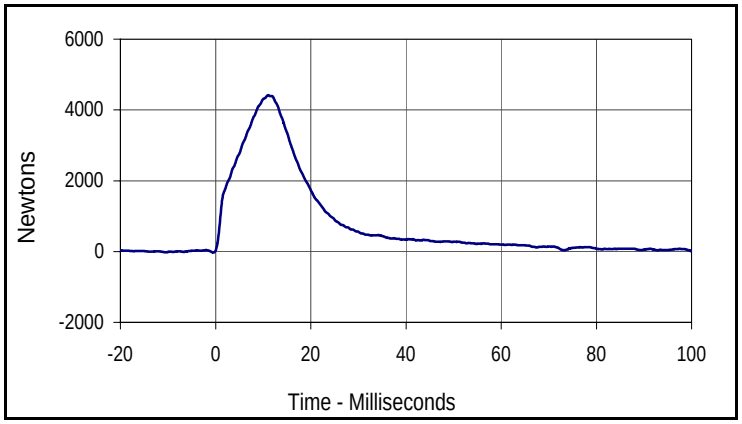
Curve Description			
Upper, Middle, Lower Rib Deflections			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max (Upper)	Time	Min (Upper)	Time
35.2	16.4	-4.6	40.6
Max (Middle)	Time	Min (Middle)	Time
39.4	18.3	-4.1	44.5
Max (Lower)	Time	Min (Lower)	Time
37.4	17.8	-3.3	48.1



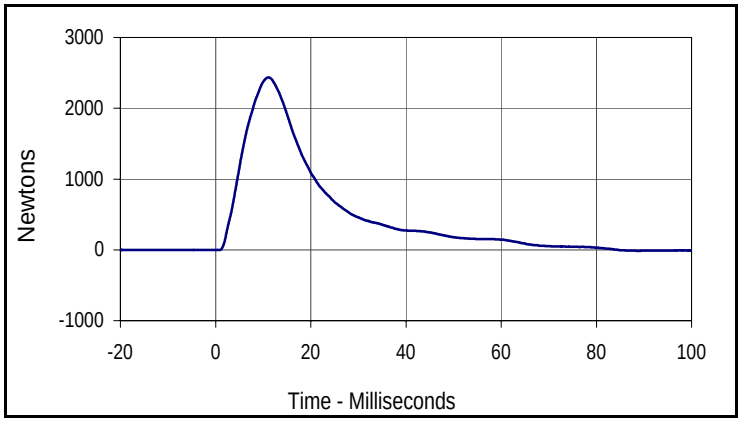
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
52.2	2.4	-0.4	99.9

Test Program:	ES2re Abdomen Impact Test	Test Date:	12/6/12
ATD Serial No.:	F035	Test I.D.:	F035ABD040

Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	455	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	30.9	Pass
	Min	%		28.9	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.3	Pass
Probe Velocity		m/s	3.9 to 4.1	4.03	Pass
Peak Impactor Force		N	4000 to 4800	4420.1	Pass
		msec	10.6 to 13.0	11.0	Pass
Sum of Abdominal Forces		N	2200 to 2700	2435.9	Pass
		msec	10.0 to 12.3	11.0	Pass
			Overall Test Results		Pass

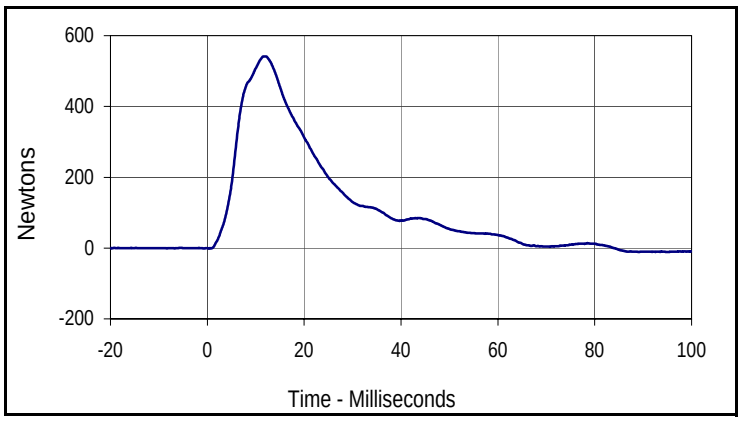


Curve Description			
Impactor Force			
Plot No.	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
4420.1	11.0	-25.4	-0.5

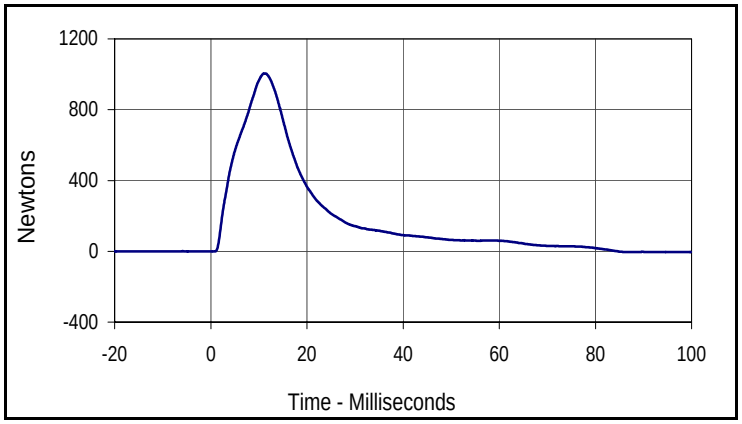


Curve Description			
Abdomen Sum Resultant			
Plot No.	Type	SAE Class	Units
002	RES	600	Newtons
Max	Time	Min	Time
2435.9	11.0	-13.1	88.6

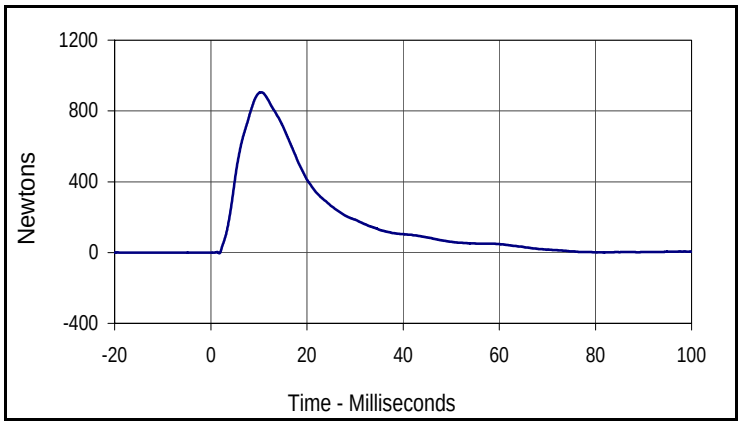
Test Program:	ES2re Abdomen Impact Test	Test Date:	12/6/12
ATD Serial No.:	F035	Test I.D.:	F035ABD040



Curve Description			
Front Abdomen Force			
Plot No.	Type	SAE Class	Units
003	FIL	600	Newtons
Max	Time	Min	Time
541.3	12.1	-10.9	95.3



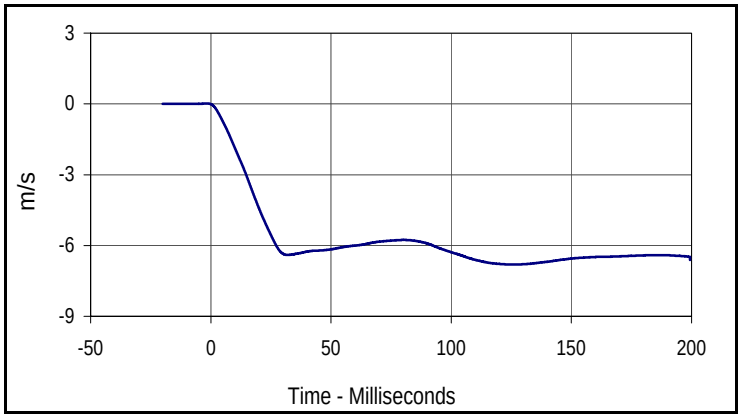
Curve Description			
Middle Abdomen Force			
Plot No.	Type	SAE Class	Units
004	FIL	600	Newtons
Max	Time	Min	Time
1005.0	11.3	-4.6	88.6



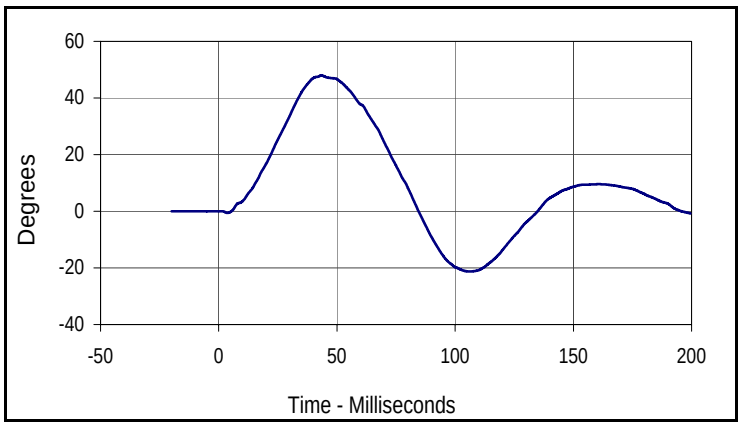
Curve Description			
Rear Abdomen Force			
Plot No.	Type	SAE Class	Units
005	FIL	600	Newtons
Max	Time	Min	Time
905.1	10.4	-4.4	1.8

Test Program:	ES2re Lumbar Flexion Test	Test Date:	12/6/12
ATD Serial No.:	F035	Test I.D.:	F035LB040

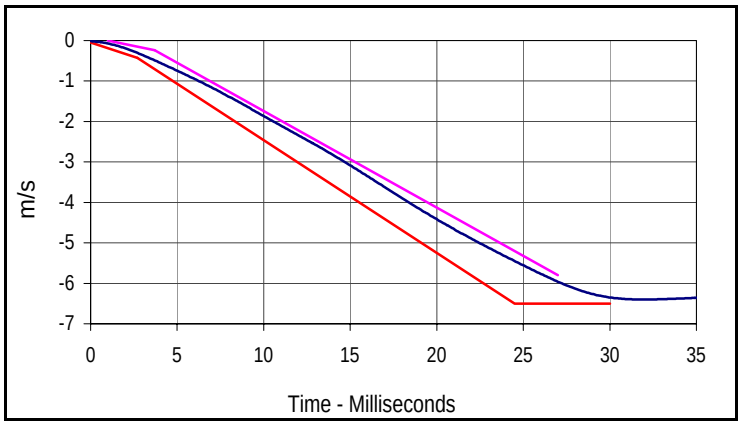
Tested Parameter		Units	Specification	Result	Pass/Fail
Lumbar Spine Assembly Soak Time		Minutes	≥240	510	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.9	Pass
	Min	%		28.9	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.2	Pass
Pendulum Velocity		m/s	5.95 to 6.15	6.06	Pass
Headform Rotation	Max	Degrees	45 to 55	48.0	Pass
	Time	msec	39 to 53	44.0	Pass
Time of Decay to Zero Angle from Peak		msec	37 to 57	42.3	Pass
			Overall Test Results		Pass



Curve Description			
Plot No.	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.0	-6.8	126.3



Curve Description			
Headform Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	180	Degrees
Max	Time	Min	Time
48.0	44.0	-21.3	106.7

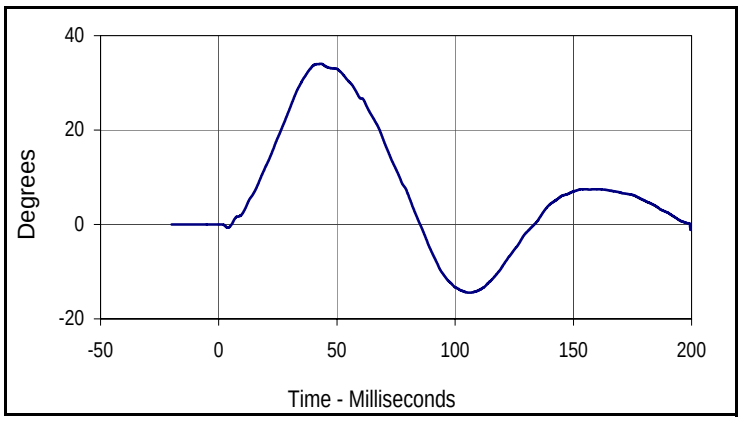


Curve Description			
Plot No.	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.0	-6.8	126.3

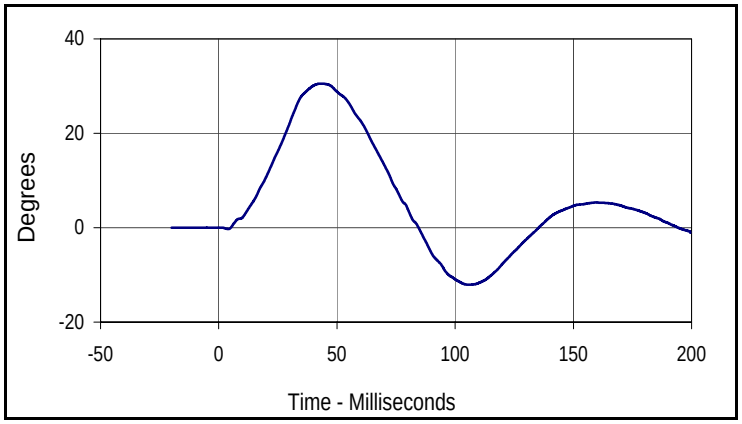
Velocity Corridors

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

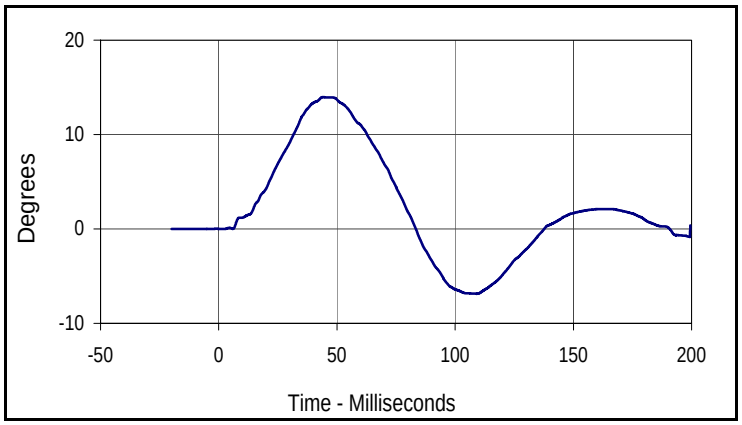
Test Program:	ES2re Lumbar Flexion Test	Test Date:	12/6/12
ATD Serial No.:	F035	Test I.D.:	F035LB040



Curve Description			
Potentiometer A			
Plot No.	Type	SAE Class	Units
003	FIL	180	Degrees
Max	Time	Min	Time
34.1	43.8	-14.5	106.6



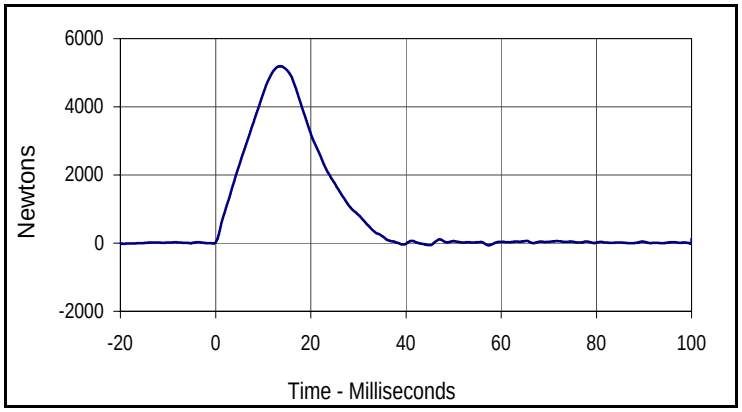
Curve Description			
Potentiometer B			
Plot No.	Type	SAE Class	Units
004	FIL	180	Degrees
Max	Time	Min	Time
30.5	43.6	-12.1	106.4



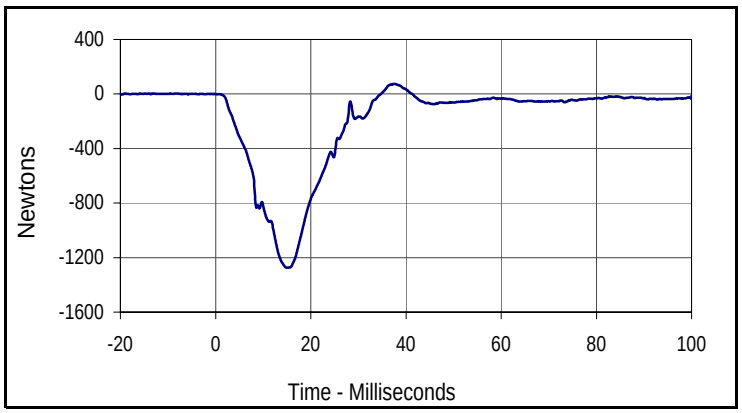
Curve Description			
Potentiometer C			
Plot No.	Type	SAE Class	Units
005	FIL	180	Degrees
Max	Time	Min	Time
14.0	44.7	-6.9	109.8

Test Program:	ES2re Pelvis Impact Test	Test Date:	12/6/12
ATD Serial No.:	F035	Test I.D.:	F035PL040

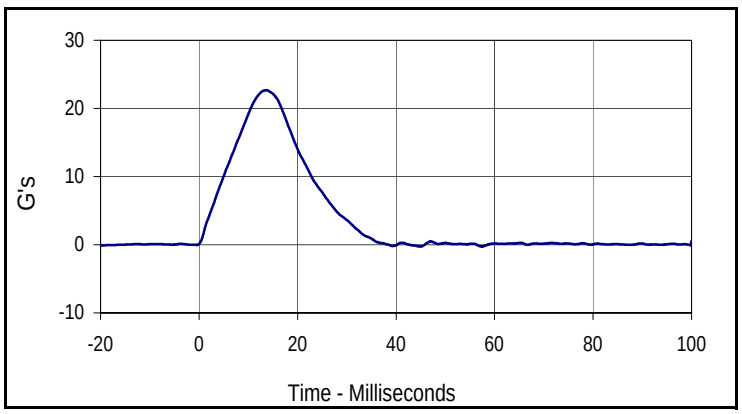
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	570	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.9	Pass
	Min	%		28.9	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.2	Pass
Pendulum Velocity		m/s	4.2 to 4.4	4.28	Pass
Peak Impactor Force		N	4700 to 5400	5191.8	Pass
		msec	11.8 to 16.1	13.7	Pass
Peak Pubic Symphysis Load		N	-1230 to -1590	-1274.5	Pass
		msec	12.2 to 17.0	14.9	Pass
			Overall Test Results		Pass



Curve Description			
Impactor Force			
Plot No.	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
5191.8	13.7	-61.9	57.4



Curve Description			
Pubic Symphysis Force Y			
Plot No.	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
73.9	37.5	-1274.5	14.9



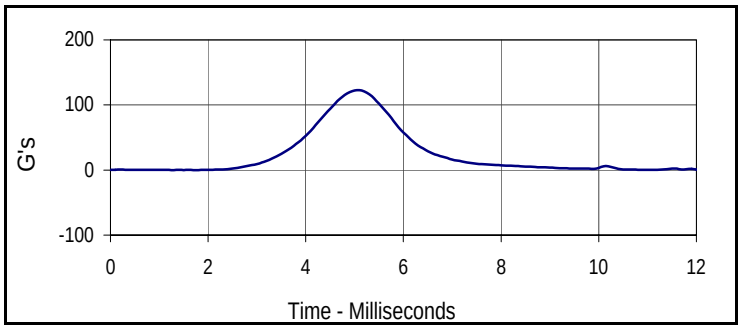
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
22.7	13.7	-0.3	57.4

Test Program:	SID IIs External Measurements	Test Date:	12/7/12
ATD Serial No.:	307	Test I.D.:	N/A

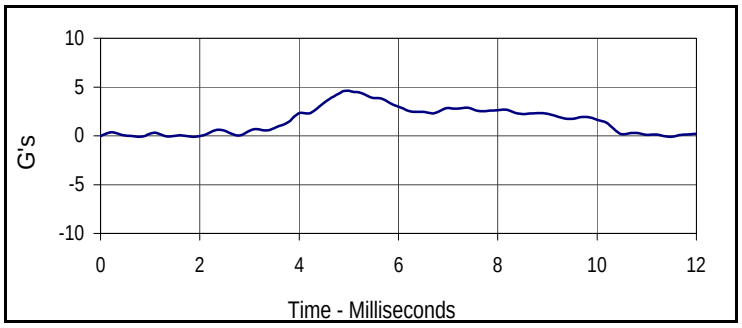
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
A	Sitting Height	mm	772 - 788	778	Pass
B	Shoulder Pivot Height	mm	437 - 453	443	Pass
C	H-Point Height	mm	79 - 89	85	Pass
D	H-Point from Seatback	mm	141 - 151	144	Pass
E	Shoulder Pivot from Backline	mm	97 - 107	102	Pass
F	Thigh Clearance	mm	119 - 135	128	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	185	Pass
J	Head Circumference	mm	541 - 551	546	Pass
K	Buttock to Knee Length	mm	514 - 540	525	Pass
L	Popliteal Height	mm	343 - 369	351	Pass
M	Knee Pivot to Floor Height	mm	392 - 409	400	Pass
N	Buttock Popliteal Length	mm	416 - 442	432	Pass
O	Chest Depth w/o Jacket	mm	195 - 211	205	Pass
P	Foot Length	mm	216 - 232	223	Pass
Q	Hip Breadth with Pelvic Plug	mm	313 -323	319	Pass
R	Arm Length	mm	249 - 259	254	Pass
S	Knee Joint to Seatback	mm	477 - 493	483	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	872	Pass
Z	Waist Circumference	mm	760 - 791	774	Pass
			Overall Test Results		Pass

Test Program:	SID IIs Head Drop Test	Test Date:	12/7/12	
ATD Serial No.:	307	Test I.D.:	307HD047	

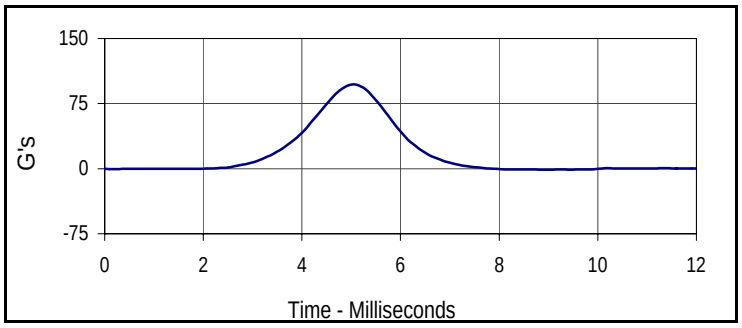
Tested Parameter		Units	Specification	Result	Pass/Fail
Head Assembly Soak Time		Minutes	≥240	240	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.9	Pass
	Min	%		28.9	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.2	Pass
Peak Head Resultant Acceleration		G's	115 to 137	122.7	Pass
Peak Head X Acceleration		G's	<15	4.6	Pass
Is Acceleration Unimodal?		Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse		%	<15	4.8	Pass
			Overall Test Results		Pass



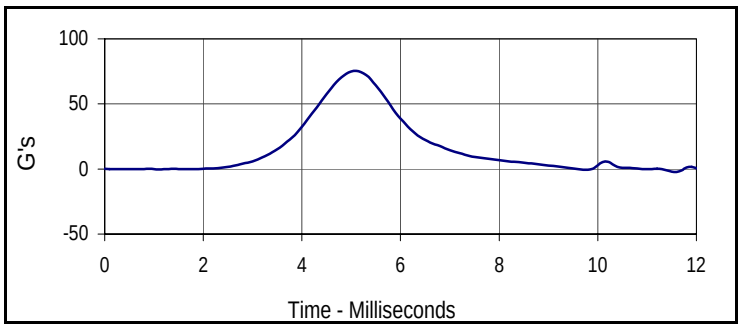
Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
122.7	5.1	0.0	1.3



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
4.6	5.0	-0.1	0.8



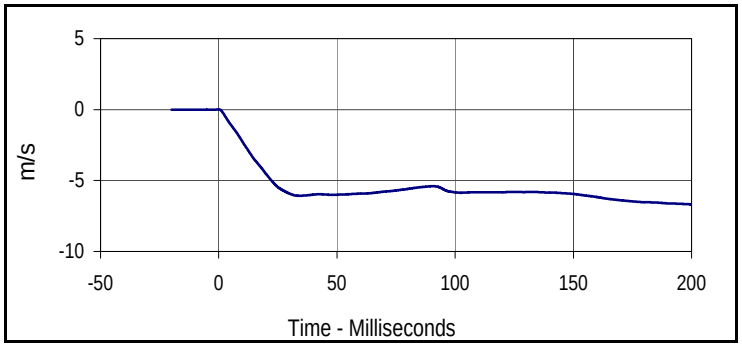
Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
96.7	5.1	-1.2	8.9



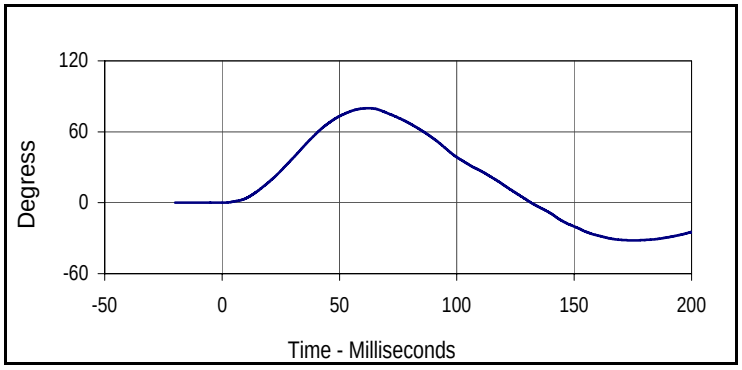
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
75.4	5.1	-2.3	11.6

Test Program:	SID IIs Neck Flexion Test	Test Date:	12/7/12
ATD Serial No.:	307	Test I.D.:	307NB047

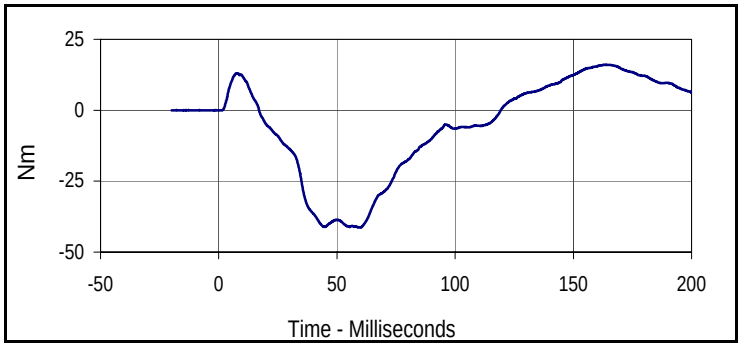
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	295	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.9	Pass
	Min	%		28.9	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.4	Pass
Pendulum Velocity		m/s	5.51 to 5.63	5.56	Pass
Pendulum Deceleration	10 msec	m/s	-2.20 to -2.80	-2.26	Pass
	15 msec	m/s	-3.30 to -4.10	-3.50	Pass
	20 msec	m/s	-4.40 to -5.40	-4.53	Pass
	25 msec	m/s	-5.40 to -6.10	-5.47	Pass
	25-100 msec	m/s	-5.50 to -6.20	-6.08	Pass
D-Plane Rotation	Max	Degrees	71 to 81	79.9	Pass
	Time	msec	50 to 70	62.4	Pass
Peak Occipital Condyle Moment		Nm	-36 to -44	-41.3	Pass
Decaying Moment Time to Cross 0 Nm		msec	102 to 126	119.3	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
0.0	-0.3	-6.7	200.0



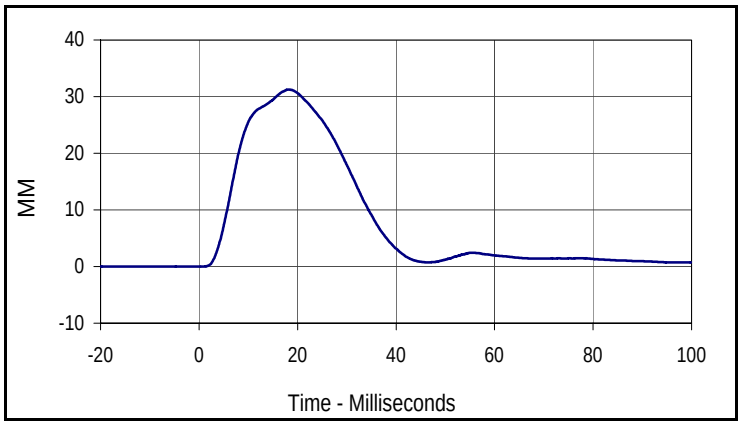
Curve Description			
Maximum Translation Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degress
Max	Time	Min	Time
79.9	62.4	-31.9	175.1



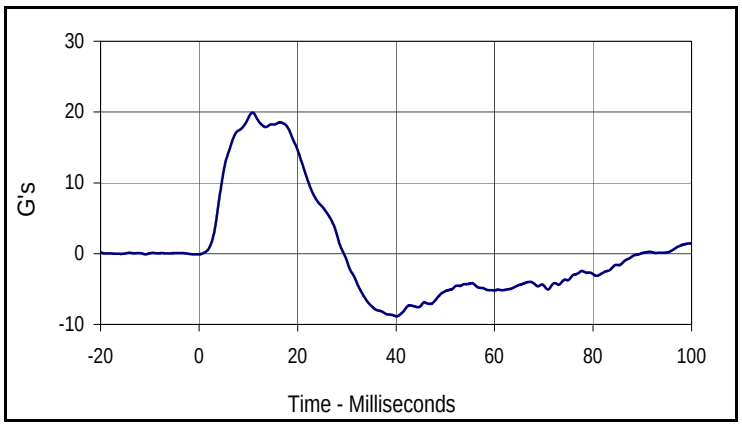
Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
16.0	163.0	-41.3	59.3

Test Program:	SID IIs Shoulder Impact Test	Test Date:	12/7/12
ATD Serial No.:	307	Test I.D.:	307SH047

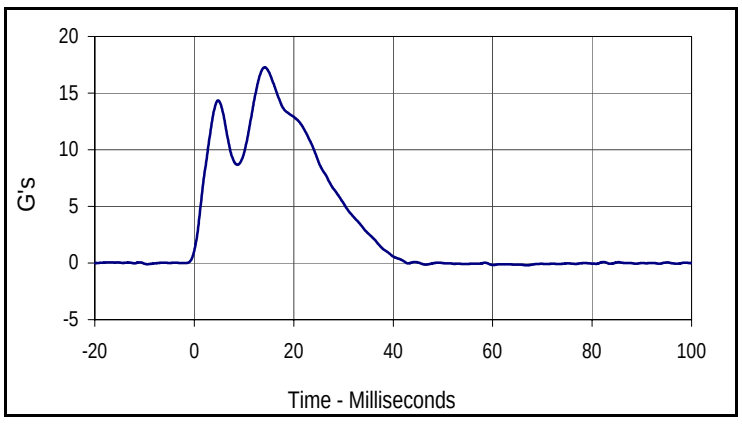
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	330	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.9	Pass
	Min	%		28.9	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.3	Pass
Impactor Velocity		m/s	4.20 to 4.40	4.35	Pass
Peak Shoulder Deflection		mm	28 to 37	31.3	Pass
Peak Lateral Spine Acceleratrion Y		G's	17 to 22	19.9	Pass
Peak Impactor Acceleration		G's	13 to 18	17.3	Pass
			Overall Test Results		Pass



Curve Description			
Shoulder Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
31.3	18.2	0.0	-8.6



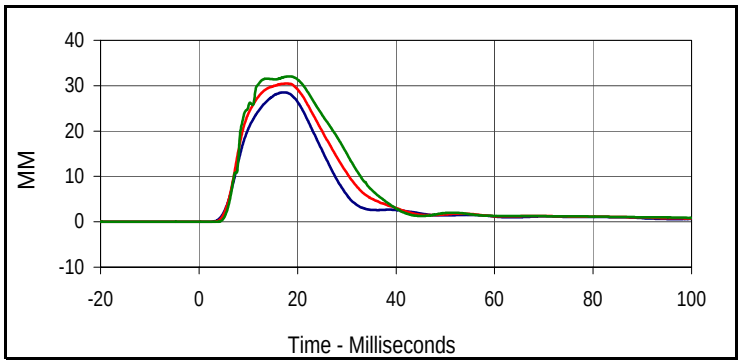
Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
19.9	10.9	-8.9	40.1



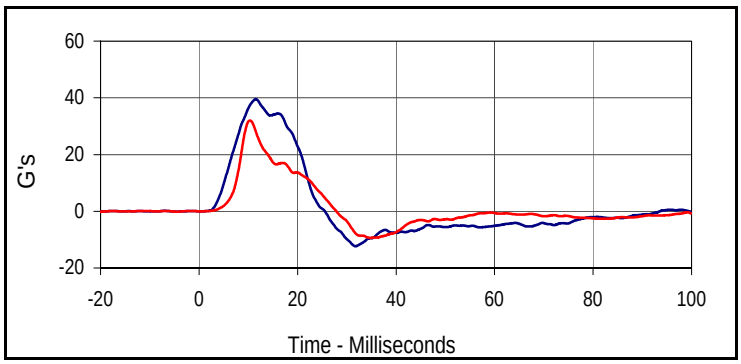
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
17.3	14.2	-0.2	66.9

Test Program:	SID IIs Thorax with Arm Impact Test	Test Date:	12/7/12
ATD Serial No.:	307	Test I.D.:	307TWA047

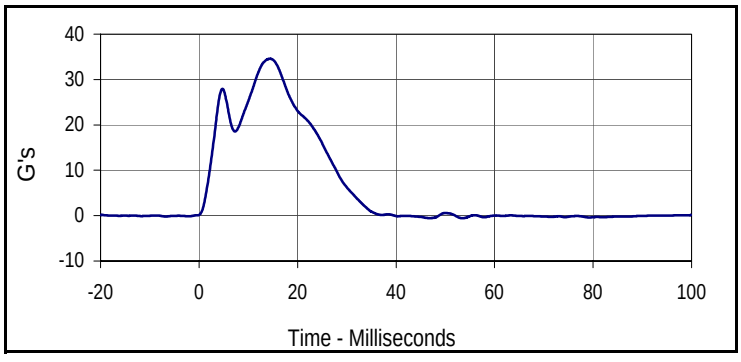
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	350	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.9	Pass
	Min	%		28.9	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.2	Pass
Impactor Velocity		m/s	6.6 to 6.8	6.63	Pass
Peak Shoulder Deflection		mm	31 to 40	36.9	Pass
Peak Upper Thorax Rib Deflection		mm	25 to 32	28.5	Pass
Peak Middle Thorax Rib Deflection		mm	30 to 36	30.5	Pass
Peak Lower Thorax Rib Deflection		mm	32 to 38	32.0	Pass
Peak Upper Spine Y Acceleration		G's	34 to 43	39.5	Pass
Peak Lower Spine Y Acceleration		G's	29 to 37	32.0	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	17.4	0.0	-1.3
Middle Thorax Deflection			
Max	Time	Min	Time
30.5	17.7	0.0	2.6
Lower Thorax Deflection			
Max	Time	Min	Time
32.0	18.3	0.0	-9.4

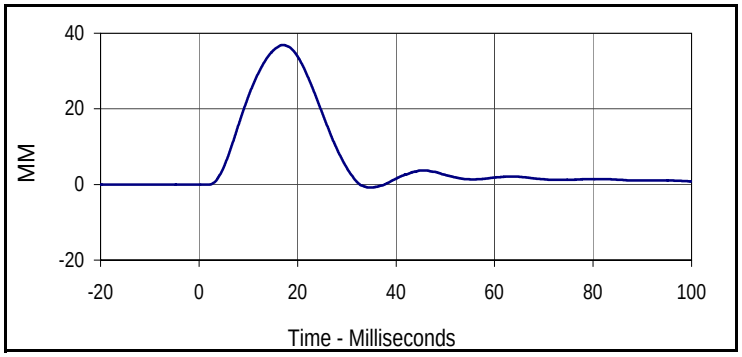


Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
39.5	11.5	-12.3	31.7
Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
32.0	10.3	-9.4	34.7



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
34.6	14.4	-0.6	53.6

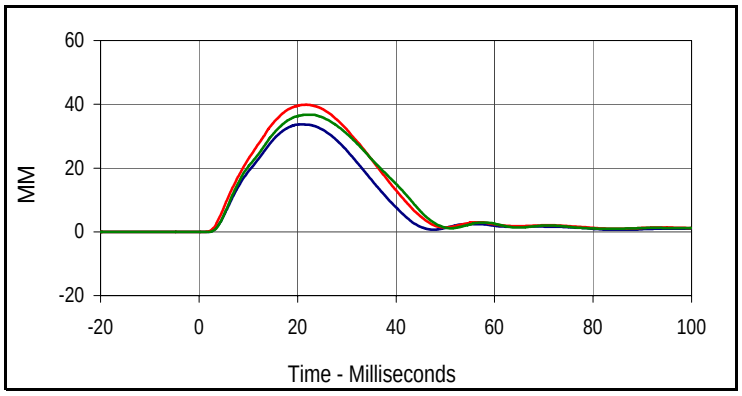
Test Program:	SID IIs Thorax with Arm Impact Test	Test Date:	12/7/12
ATD Serial No.:	307	Test I.D.:	307TWA047



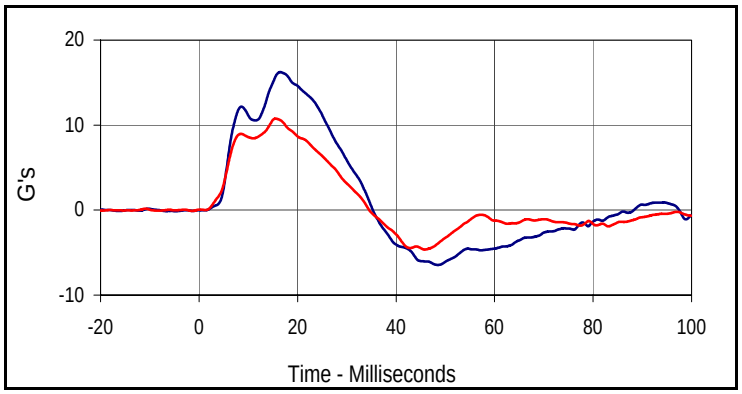
Curve Description			
Shoulder Deflection			
Plot No.	Type	SAE Class	Units
007	FIL	600	MM
Max	Time	Min	Time
36.9	17.1	-0.8	34.8

Test Program:	SID IIs Thorax without Arm Impact Test	Test Date:	12/7/12
ATD Serial No.:	307	Test I.D.:	307TWOA047

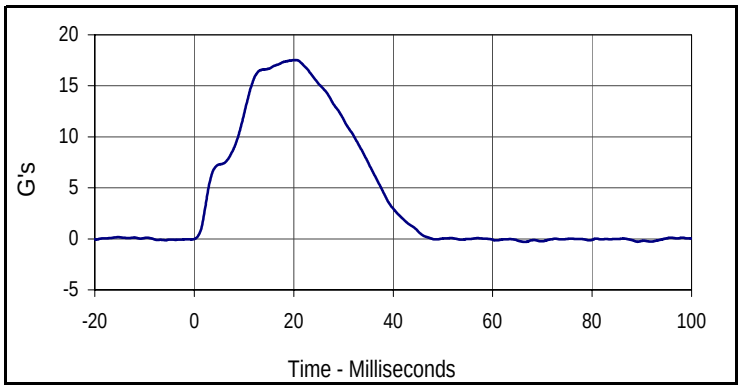
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	375	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.9	Pass
	Min	%		28.9	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.3	Pass
Impactor Velocity		m/s	4.2 to 4.4	4.35	Pass
Peak Upper Thorax Rib Deflection		mm	32 to 40	33.7	Pass
Peak Middle Thorax Rib Deflection		mm	39 to 45	39.9	Pass
Peak Lower Thorax Rib Deflection		mm	35 to 43	36.8	Pass
Peak Upper Spine Y Acceleration		G's	13 to 17	16.2	Pass
Peak Lower Spine Y Acceleration		G's	7 to 11	10.8	Pass
Peak Impactor Acceleration		G's	14 to 18	17.5	Pass
			Overall Test Results		Pass



Curve Description			
Upper Thorax Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
33.7	21.0	0.0	1.5
Middle Thorax Deflection			
Max	Time	Min	Time
39.9	21.7	0.0	-6.3
Lower Thorax Deflection			
Max	Time	Min	Time
36.8	22.2	0.0	-9.5



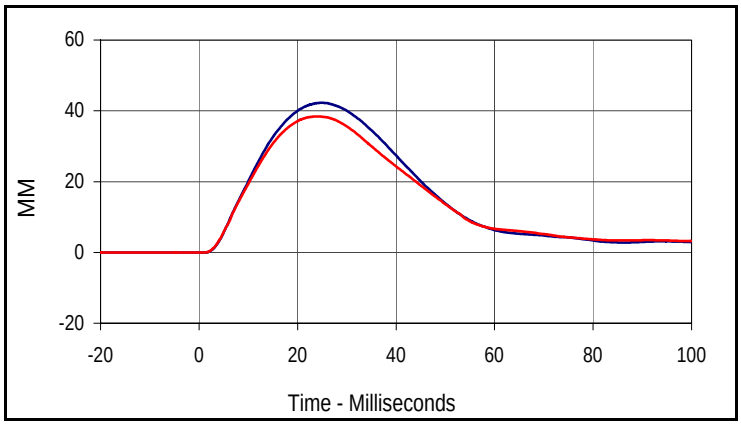
Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
16.2	16.5	-6.4	48.5
Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
10.8	15.5	-4.6	45.8



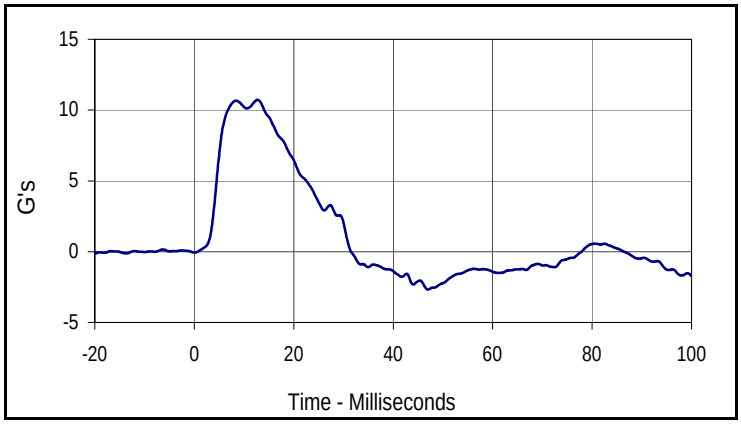
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
17.5	20.4	-0.3	66.4

Test Program:	SID IIs Abdomen Impact Test	Test Date:	12/7/12
ATD Serial No.:	307	Test I.D.:	307ABD047

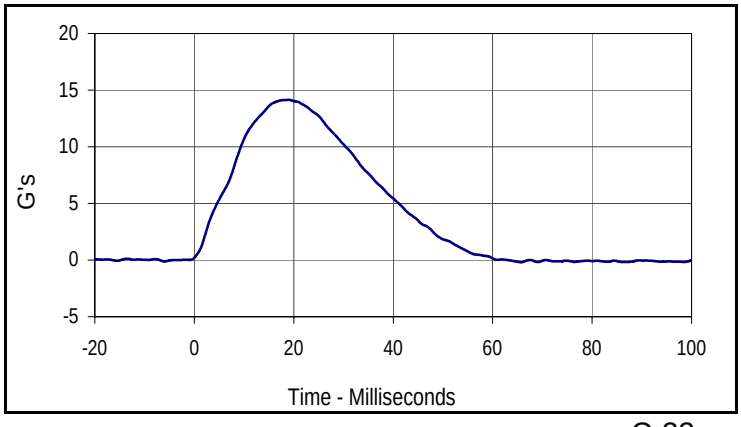
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	395	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.9	Pass
	Min	%		28.9	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.2	Pass
Impactor Velocity		m/s	4.2 to 4.4	4.28	Pass
Peak Upper Abdominal Rib Deflection		mm	36 to 47	42.2	Pass
Peak Lower Abdominal Rib Deflection		mm	33 to 44	38.4	Pass
Peak Lower Spine Y Acceleration		G's	9 to 14	10.7	Pass
Peak Impactor Acceleration		G's	12 to 16	14.1	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
42.2	24.9	0.0	-2.8
Curve Description			
Lower Abdominal Rib Deflection			
Plot No.	Type	SAE Class	Units
002	FIL	600	MM
Max	Time	Min	Time
38.4	23.9	0.0	-11.8



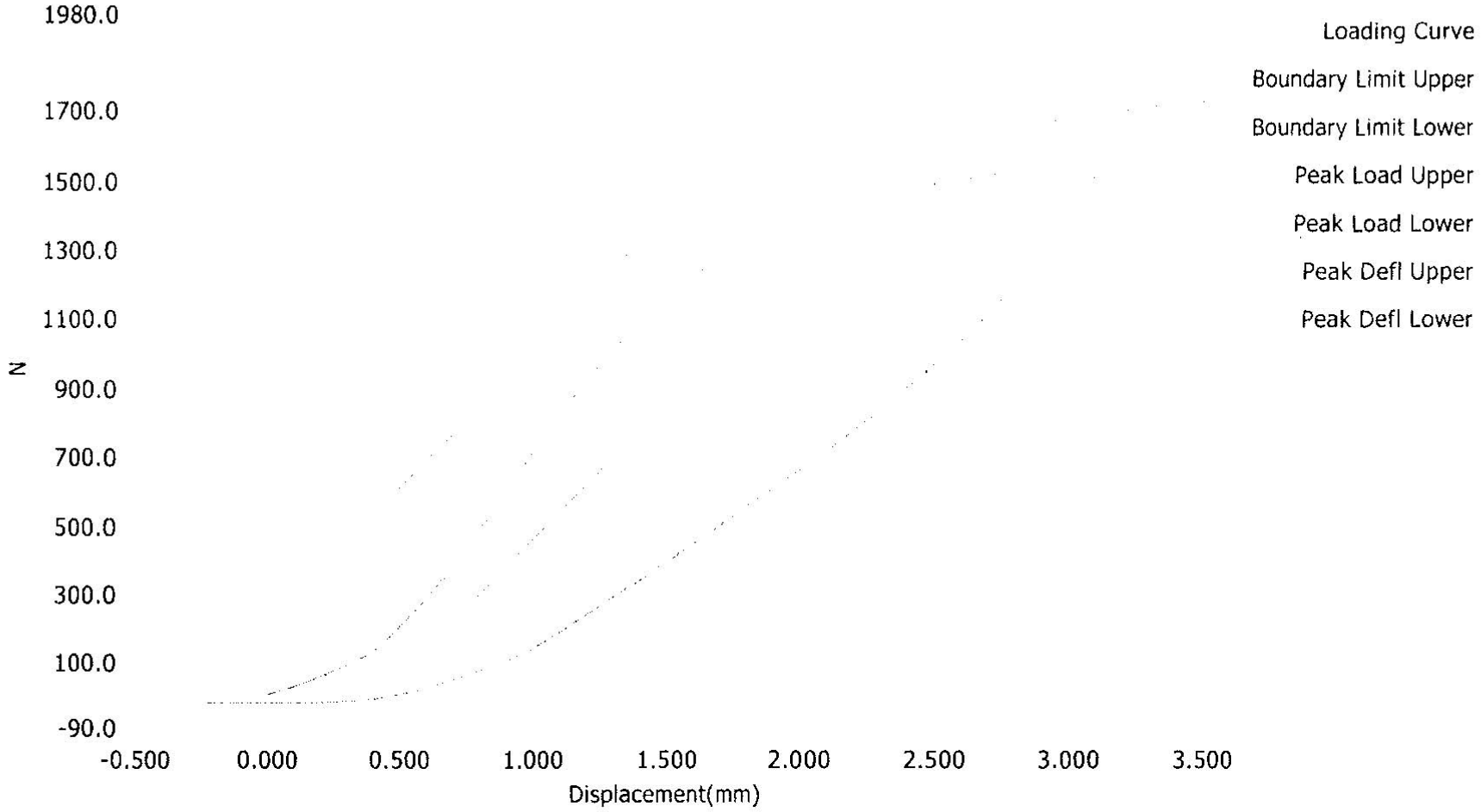
Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
10.7	12.7	-2.7	46.9



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
14.1	19.0	-0.2	65.7

MD0508 PRE TEST

Resultant Data - SIDIIs Plug Compression



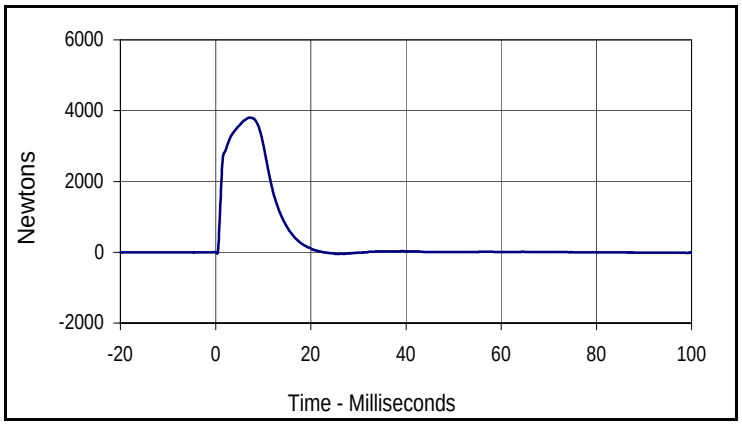
ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
	45942	9/20/2011	7:58 PM
Cert ID	ATD Serial Number	ATD Type	
	N/A	SIDIIs	

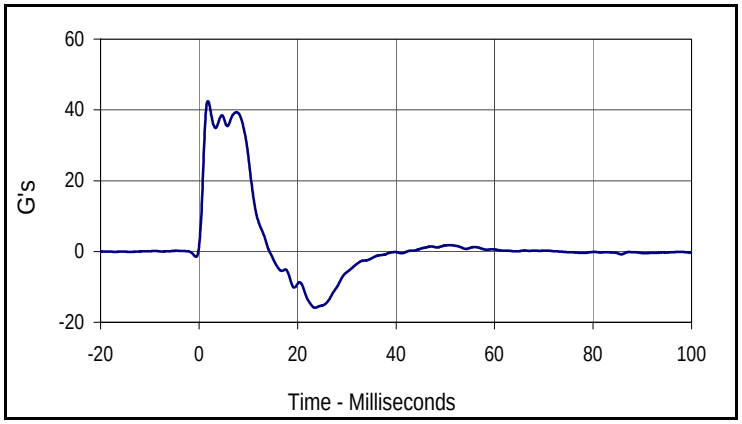
Current Date : 9/20/2011 Current Time : 19:58:50

Test Program:	SID IIs Pelvis Acetabulum Impact Test	Test Date:	12/7/12
ATD Serial No.:	307	Test I.D.:	307ACET047

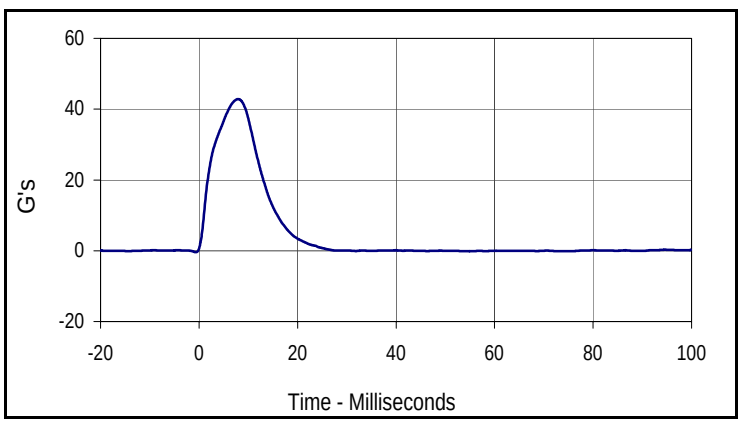
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	430	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.9	Pass
	Min	%		28.9	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.1	Pass
Impactor Velocity		m/s	6.6 to 6.8	6.72	Pass
Peak Acetabulum Force Y		Newtons	3600 to 4300	3804.6	Pass
Peak Pelvis Y Acceleration After 6 msec.		G's	34 to 42	39.4	Pass
Peak Impactor Acceleration		G's	38 to 47	42.9	Pass
			Overall Test Results		Pass



Curve Description			
Pelvis Acetabulum Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
3804.6	7.2	-47.4	26.9



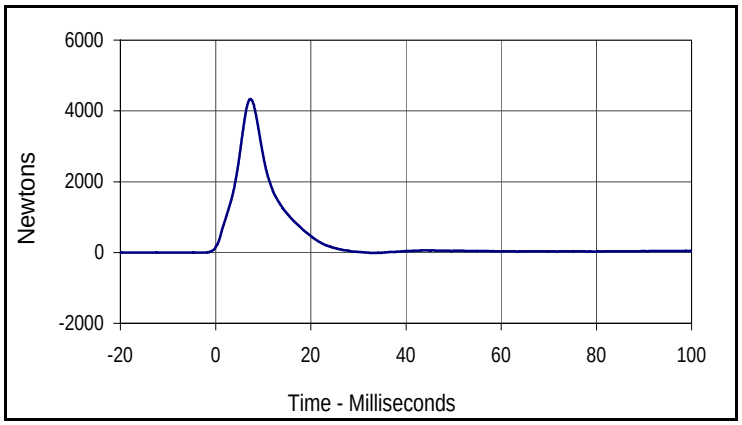
Curve Description			
Pelvis Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
42.5	1.8	-15.9	23.5



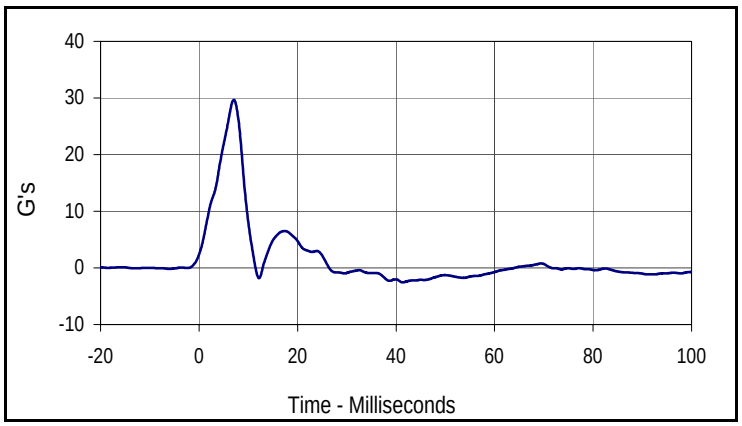
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
42.9	7.9	-0.4	-0.6

Test Program:	SID IIs Pelvis Iliac Calibration	Test Date:	12/7/12
ATD Serial No.:	307	Test I.D.:	307PL047

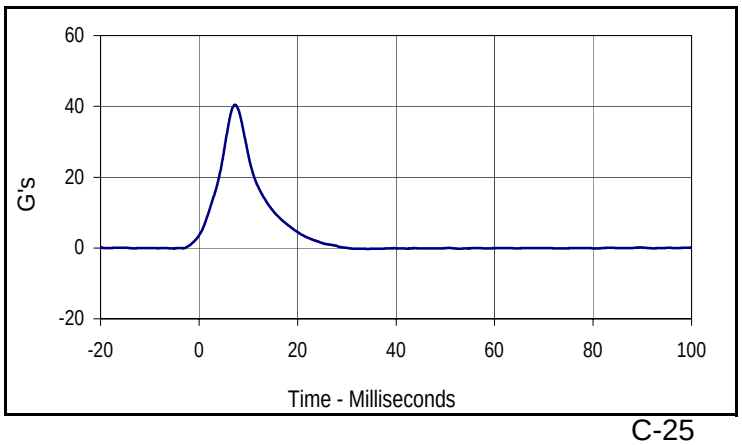
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	485	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	30.9	Pass
	Min	%		28.9	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.1	Pass
Impactor Velocity		m/s	4.2 to 4.4	4.30	Pass
Peak Illiac Force		Newtons	4100 to 5100	4334.3	Pass
Peak Pelvis Y Acceleration		G's	28 to 39	29.7	Pass
Peak Impactor Acceleration		G's	36 to 45	40.4	Pass
			Overall Test Results		Pass



Curve Description			
Pelvis Iliac Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4334.3	7.3	-13.5	33.7



Curve Description			
Pelvis Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
29.7	7.1	-2.5	41.4



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
40.4	7.3	-0.3	34.2

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

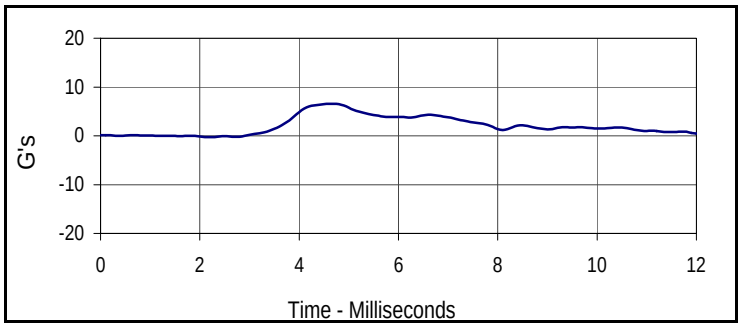
Test Program:	ES2re External Measurements	Test Date:	12/14/12
ATD Serial No.:	F035	Test I.D.:	N/A

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity		%	10 to 70	30.3	Pass
1	Sitting Height	mm	900 - 918	907	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	389	Pass
6	Head Width	mm	152 - 158	155	Pass
7	Shoulder / Arm Width	mm	461 - 479	470	Pass
8	Thorax Width	mm	322 - 332	324	Pass
9	Abdomen Width	mm	273 - 287	280	Pass
10	Pelvis Lap Width	mm	359 - 373	365	Pass
11	Head Depth	mm	196 - 206	202	Pass
12	Thorax Depth	mm	262 - 272	269	Pass
13	Abdomen Width	mm	194 - 204	198	Pass
14	Pelvis Depth	mm	235 - 245	239	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	611	Pass
			Overall Test Results		Pass

Test Program:	ES2re Head Drop Test	Test Date:	12/14/12
ATD Serial No.:	F035	Test I.D.:	F035HD041

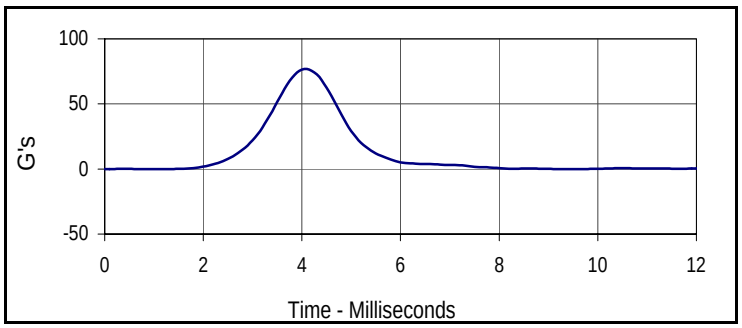
Tested Parameter		Units	Specification	Result	Pass/Fail
Head Assembly Soak Time		Minutes	≥240	240	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		28.9	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.4	Pass
Peak Head Resultant Acceleration		G's	125 to 155	139.1	Pass
Peak Head X Acceleration		G's	≤15	6.6	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
139.1	4.1	0.1	1.0



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
6.6	4.7	-0.3	2.2

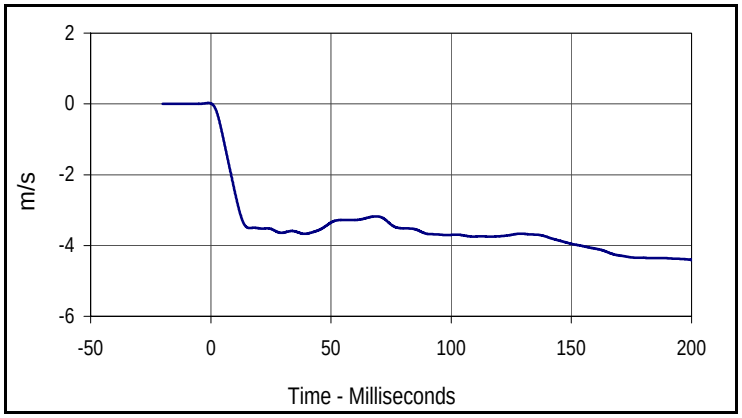
Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
115.8	4.1	-7.5	7.4



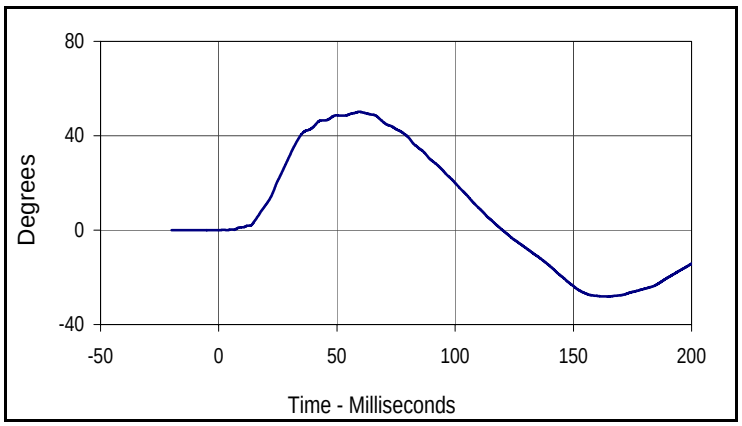
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
76.8	4.1	-0.1	9.4

Test Program:	ES2re Neck Flexion Test	Test Date:	12/14/12
ATD Serial No.:	F035	Test I.D.:	F035NB041

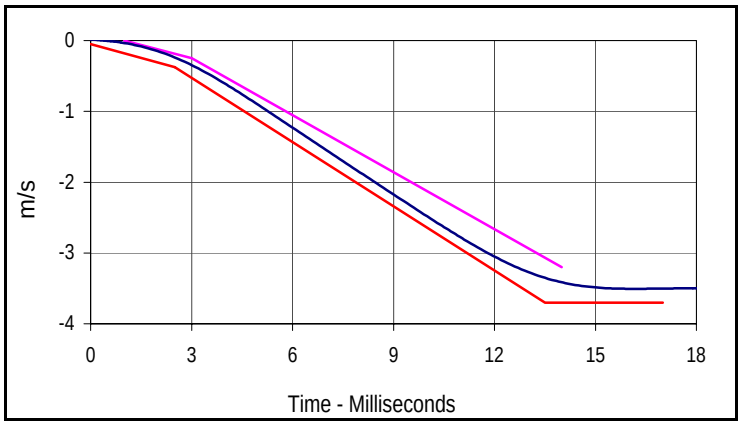
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	280	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		28.9	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.3	Pass
Pendulum Velocity		m/s	3.3 to 3.5	3.43	Pass
Headform Flexion	Max	Degrees	49 to 59	50.1	Pass
	Time	msec	54 to 66	59.5	Pass
Headform Flexion Decay (Peak to Zero)		msec	53 to 88	60.6	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	-1.0	-4.4	200.0



Curve Description			
Headform Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	180	Degrees
Max	Time	Min	Time
50.1	59.5	-28.1	165.0

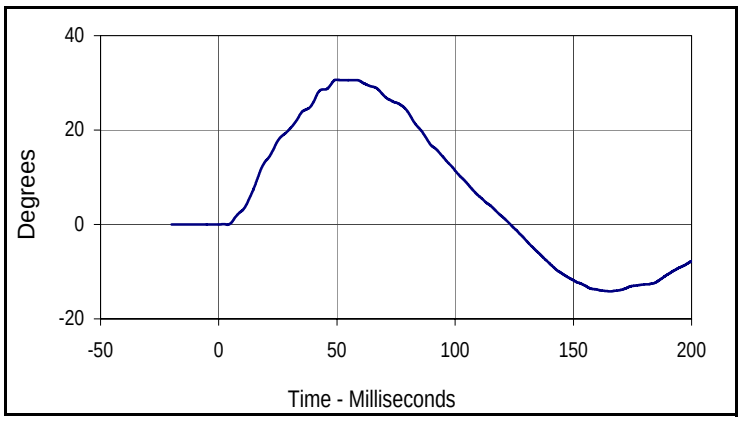


Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.0	-4.4	200.0

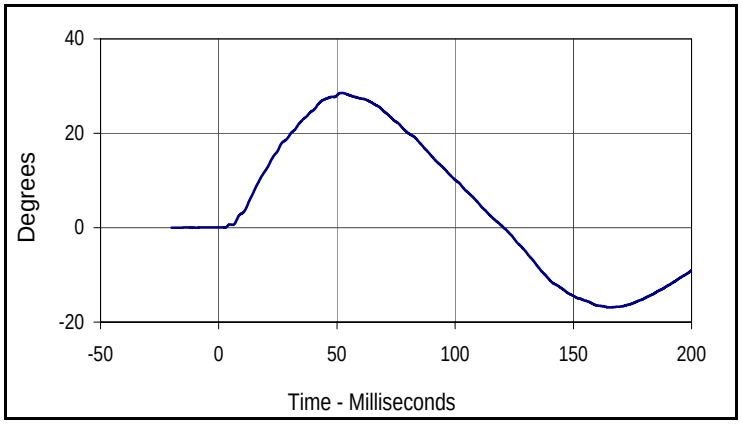
Velocity Corridors

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

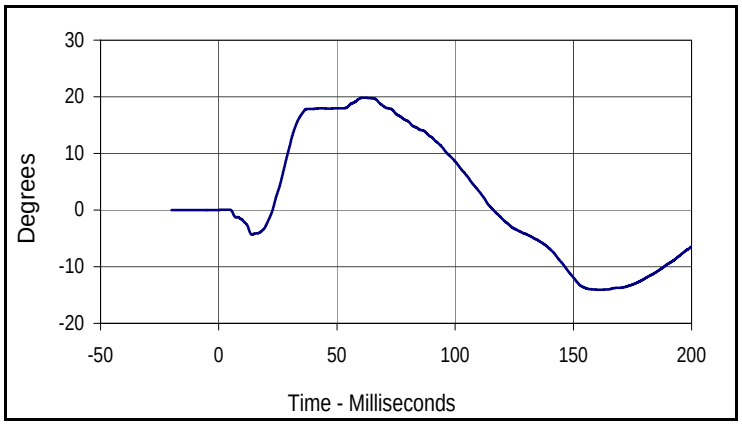
Test Program:	ES2re Neck Flexion Test	Test Date:	12/14/12
ATD Serial No.:	F035	Test I.D.:	F035NB041



Curve Description			
Potentiometer A			
Plot No.	Type	SAE Class	Units
003	FIL	180	Degrees
Max	Time	Min	Time
30.7	49.7	-14.2	165.5



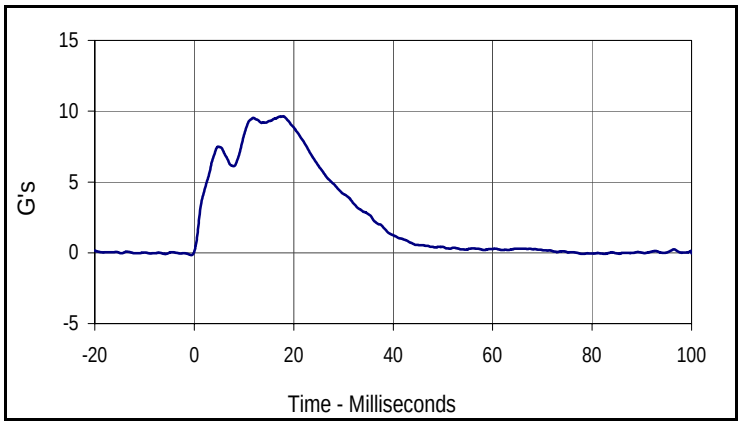
Curve Description			
Potentiometer B			
Plot No.	Type	SAE Class	Units
004	FIL	180	Degrees
Max	Time	Min	Time
28.6	51.9	-16.9	165.0



Curve Description			
Potentiometer C			
Plot No.	Type	SAE Class	Units
005	FIL	180	Degrees
Max	Time	Min	Time
19.8	61.4	-14.1	161.6

Test Program:	ES2re Shoulder Impact Test	Test Date:	12/14/12
ATD Serial No.:	F035	Test I.D.:	F035SH041

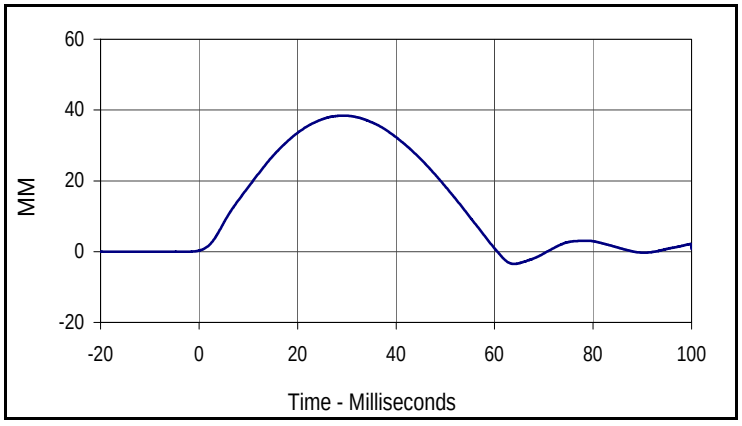
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	315	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		28.9	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.4	Pass
Pendulum Speed		m/s	4.2 to 4.4	4.29	Pass
Peak Impactor Acceleration		G's	7.5 to 10.5	9.6	Pass
			Overall Test Results		Pass



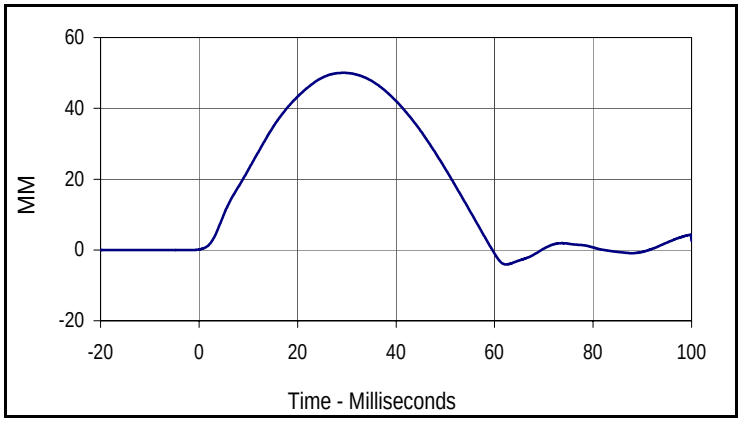
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
001	FIL	180	G's
Max	Time	Min	Time
9.6	17.9	-0.2	-0.6

Test Program:	ES2re Thorax - Rib Drop Test	Test Date:	12/14/12
ATD Serial No.:	F035 Rib # 1	Test I.D.:	F035RB1041

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	%		28.9	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.5	Pass
Peak Rib Deflection at 459 +/- 5 mm Drop Height		mm	36 to 40	38.4	Pass
Peak Rib Deflection at 815 +/- 8 mm Drop Height		mm	46 to 51	50.0	Pass
			Overall Test Results		Pass



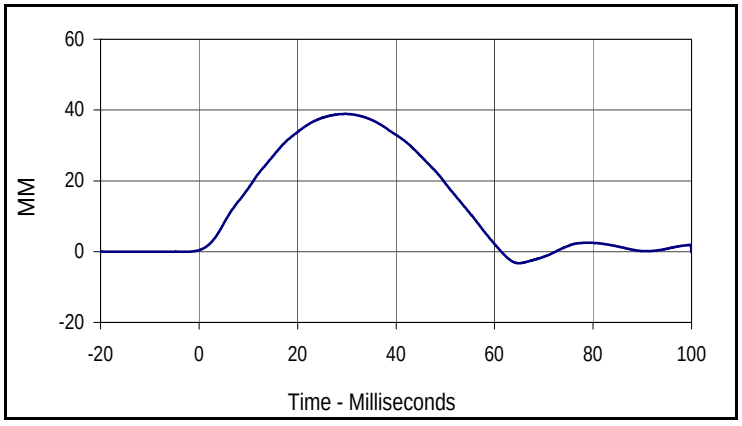
Curve Description			
Upper Rib Deflection (459 mm Drop Height)			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
38.4	29.4	-3.5	64.0



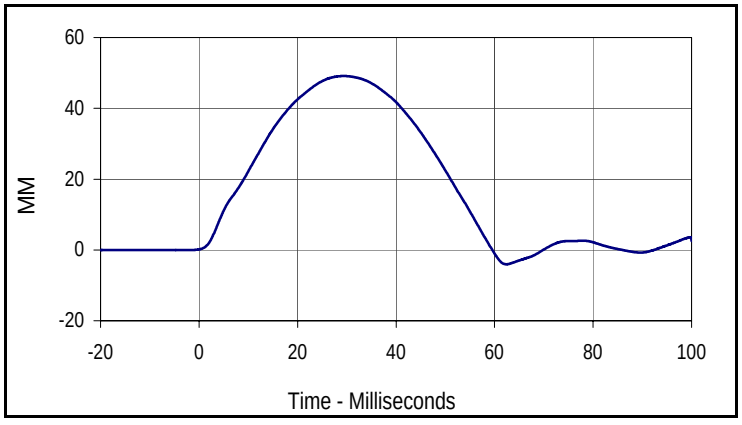
Curve Description			
Upper Rib Deflection (815 mm Drop Height)			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max	Time	Min	Time
50.0	29.3	-4.1	62.4

Test Program:	ES2re Thorax - Rib Drop Test	Test Date:	12/14/12
ATD Serial No.:	F035 Rib # 2	Test I.D.:	F035RB2041

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	%		28.9	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.4	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.6	Pass
Peak Rib Deflection at 459 +/- 5 mm Drop Height		mm	36 to 40	38.9	Pass
Peak Rib Deflection at 815 +/- 8 mm Drop Height		mm	46 to 51	49.1	Pass
			Overall Test Results		Pass



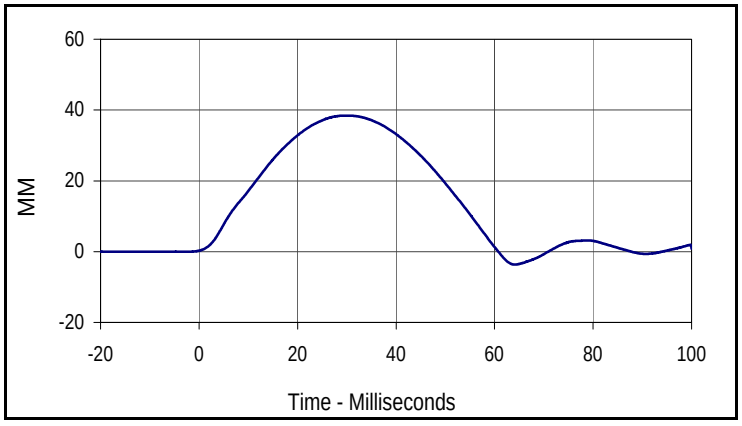
Curve Description			
Middle Rib Deflection (459 mm Drop Height)			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
38.9	29.7	-3.3	65.0



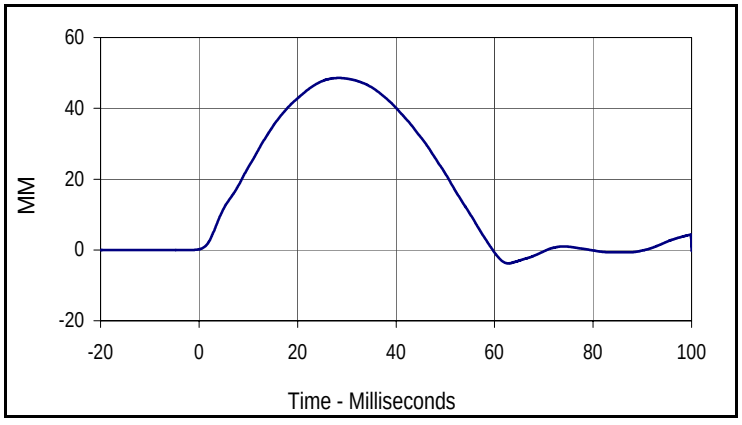
Curve Description			
Middle Rib Deflection (815 mm Drop Height)			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max	Time	Min	Time
49.1	29.4	-4.1	62.4

Test Program:	ES2re Thorax - Rib Drop Test	Test Date:	12/14/12
ATD Serial No.:	F035 Rib # 3	Test I.D.:	F035RB3041

Tested Parameter		Units	Specification	Result	Pass/Fail
Rib Module 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	%		28.9	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.4	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.5	Pass
Peak Rib Deflection at 459 +/- 5 mm Drop Height		mm	36 to 40	38.4	Pass
Peak Rib Deflection at 815 +/- 8 mm Drop Height		mm	46 to 51	48.6	Pass
			Overall Test Results		Pass



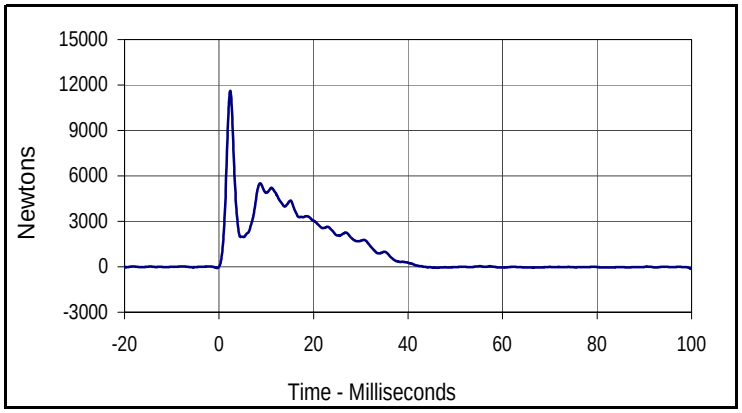
Curve Description			
Lower Rib Deflection (459 mm Drop Height)			
Plot No.	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
38.4	30.0	-3.6	64.1



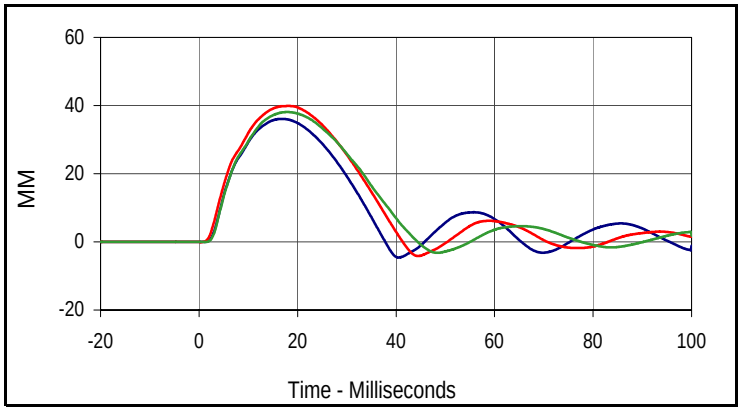
Curve Description			
Lower Rib Deflection (815 mm Drop Height)			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max	Time	Min	Time
48.6	28.4	-3.8	62.8

Test Program:	ES2re Thorax - Full Body Impact Test	Test Date:	12/14/12
ATD Serial No.:	F035	Test I.D.:	F035TH041

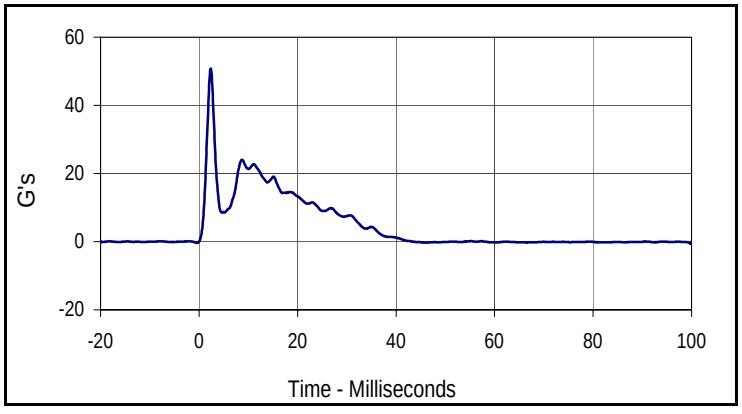
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	410	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		28.9	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.5	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.4	Pass
Peak Impactor Velocity		m/s	5.4 to 5.6	5.54	Pass
Peak Impactor Force		N	5100 to 6200	5505.6	Pass
		msec	> 6.0 msec	8.7	Pass
Peak Upper Rib Deflection		mm	34 to 41	36.1	Pass
Peak Middle Rib Deflection		mm	37 to 45	39.9	Pass
Peak Lower Rib Deflection		mm	37 to 44	38.1	Pass
			Overall Test Results		Pass



Curve Description			
Impactor Force			
Plot No.	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
11628.9	2.4	-133.5	99.9



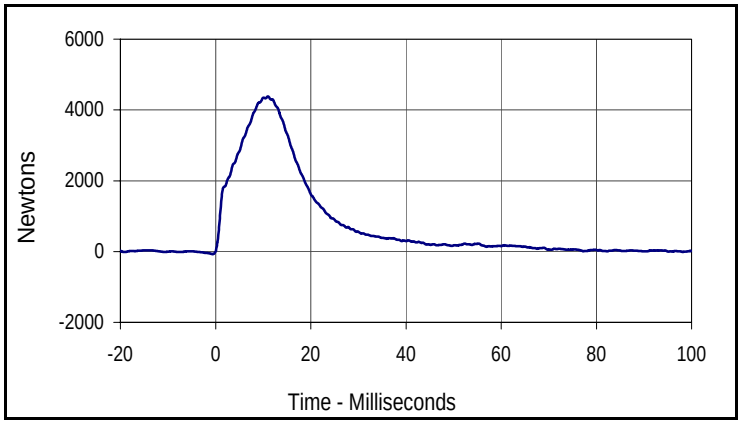
Curve Description			
Upper, Middle, Lower Rib Deflections			
Plot No.	Type	SAE Class	Units
002	FIL	180	MM
Max (Upper)	Time	Min (Upper)	Time
36.1	16.8	-4.6	40.6
Max (Middle)	Time	Min (Middle)	Time
39.9	18.3	-4.2	44.5
Max (Lower)	Time	Min (Lower)	Time
38.1	17.9	-3.2	48.4



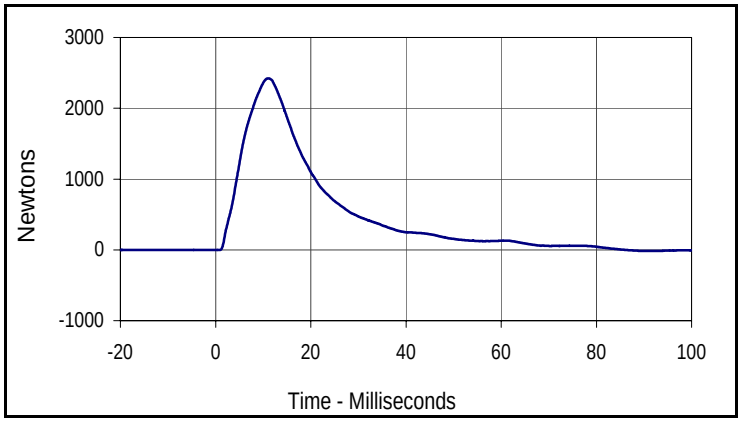
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
50.8	2.4	-0.6	99.9

Test Program:	ES2re Abdomen Impact Test	Test Date:	12/14/12
ATD Serial No.:	F035	Test I.D.:	F035ABD041

Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	430	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	%		28.9	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.4	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.3	Pass
Probe Velocity		m/s	3.9 to 4.1	3.98	Pass
Peak Impactor Force		N	4000 to 4800	4381.2	Pass
		msec	10.6 to 13.0	11.0	Pass
Sum of Abdominal Forces		N	2200 to 2700	2422.2	Pass
		msec	10.0 to 12.3	11.1	Pass
			Overall Test Results		Pass

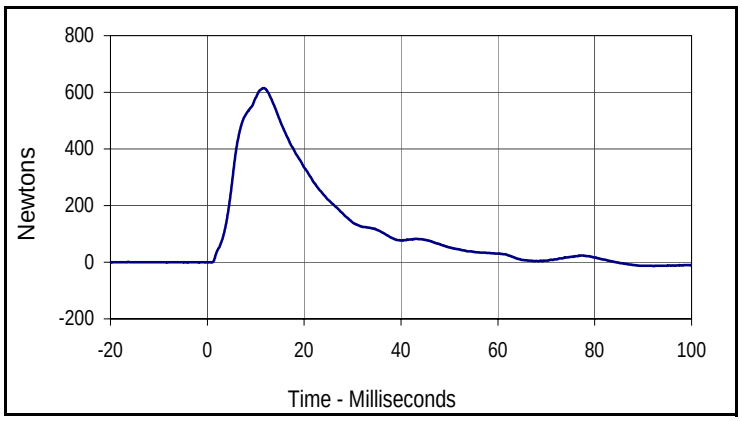


Curve Description			
Impactor Force			
Plot No.	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
4381.2	11.0	-71.1	-0.6

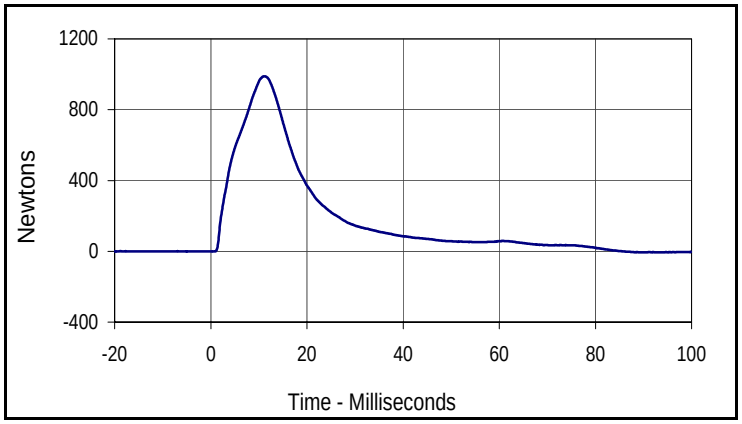


Curve Description			
Abdomen Sum Resultant			
Plot No.	Type	SAE Class	Units
002	RES	600	Newtons
Max	Time	Min	Time
2422.2	11.1	-15.3	90.0

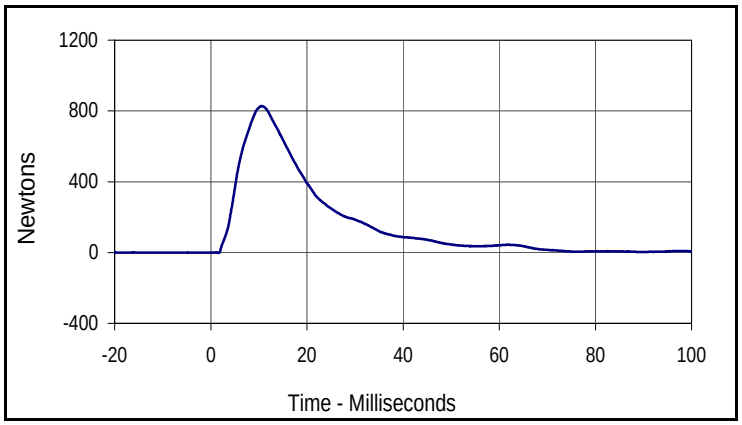
Test Program:	ES2re Abdomen Impact Test	Test Date:	12/14/12
ATD Serial No.:	F035	Test I.D.:	F035ABD041



Curve Description			
Front Abdomen Force			
Plot No.	Type	SAE Class	Units
003	FIL	600	Newtons
Max	Time	Min	Time
615.2	11.7	-13.5	92.2



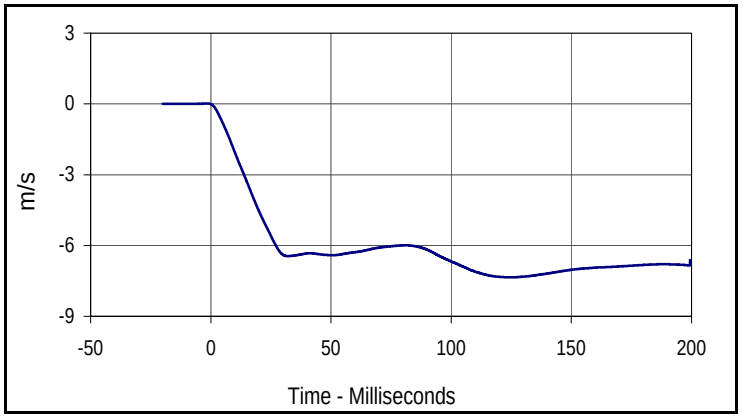
Curve Description			
Middle Abdomen Force			
Plot No.	Type	SAE Class	Units
004	FIL	600	Newtons
Max	Time	Min	Time
989.1	11.2	-5.8	93.0



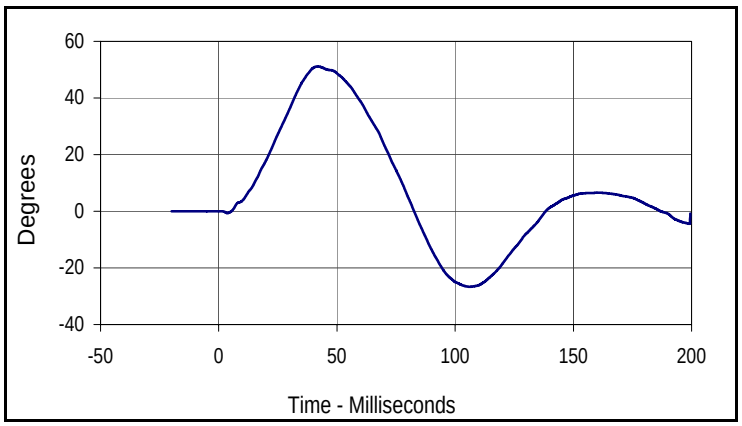
Curve Description			
Rear Abdomen Force			
Plot No.	Type	SAE Class	Units
005	FIL	600	Newtons
Max	Time	Min	Time
827.3	10.6	-3.0	1.6

Test Program:	ES2re Lumbar Flexion Test	Test Date:	12/14/12
ATD Serial No.:	F035	Test I.D.:	F035LB041

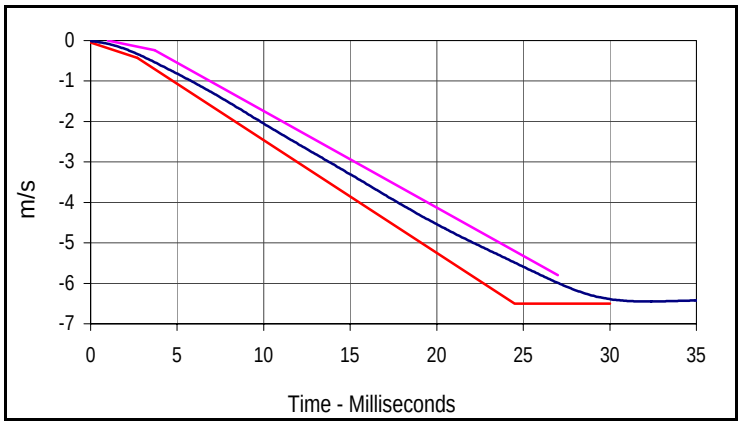
Tested Parameter		Units	Specification	Result	Pass/Fail
Lumbar Spine Assembly Soak Time		Minutes	≥240	485	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		28.9	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.4	Pass
Pendulum Velocity		m/s	5.95 to 6.15	6.09	Pass
Headform Rotation	Max	Degrees	45 to 55	51.1	Pass
	Time	msec	39 to 53	42.3	Pass
Time of Decay to Zero Angle from Peak		msec	37 to 57	44.0	Pass
			Overall Test Results		Pass



Curve Description			
Plot No.	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.0	-7.3	125.4



Curve Description			
Headform Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	180	Degrees
Max	Time	Min	Time
51.1	42.3	-26.6	106.8

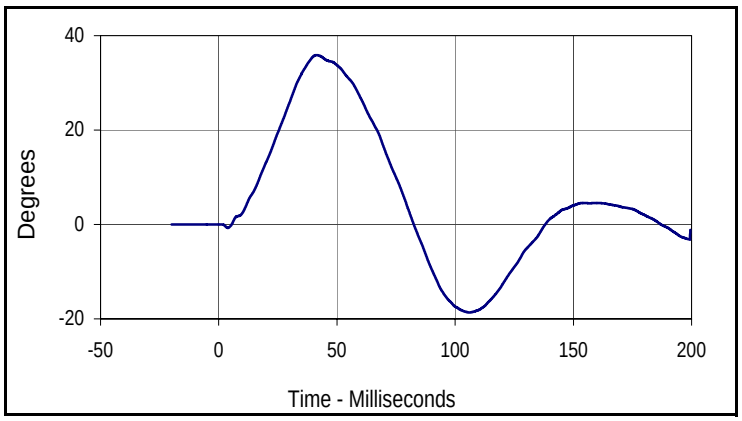


Curve Description			
Plot No.	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.0	-7.3	125.4

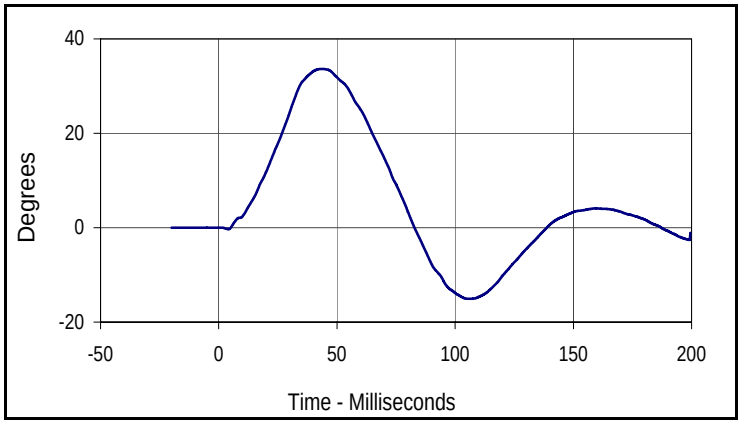
Velocity Corridors

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

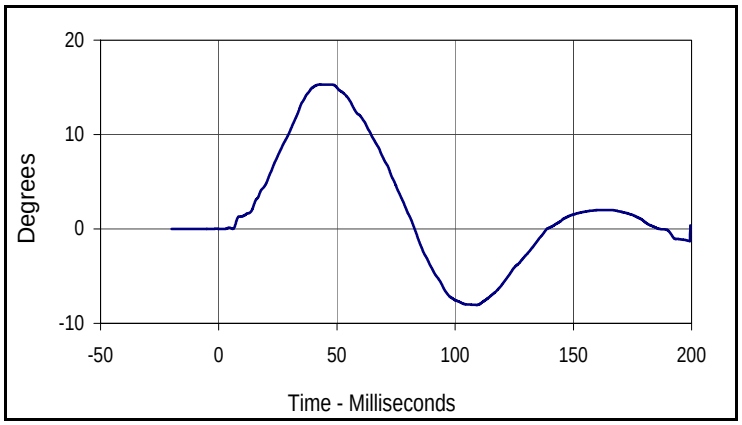
Test Program:	ES2re Lumbar Flexion Test	Test Date:	12/14/12
ATD Serial No.:	F035	Test I.D.:	F035LB041



Curve Description			
Potentiometer A			
Plot No.	Type	SAE Class	Units
003	FIL	180	Degrees
Max	Time	Min	Time
35.9	42.0	-18.6	106.6



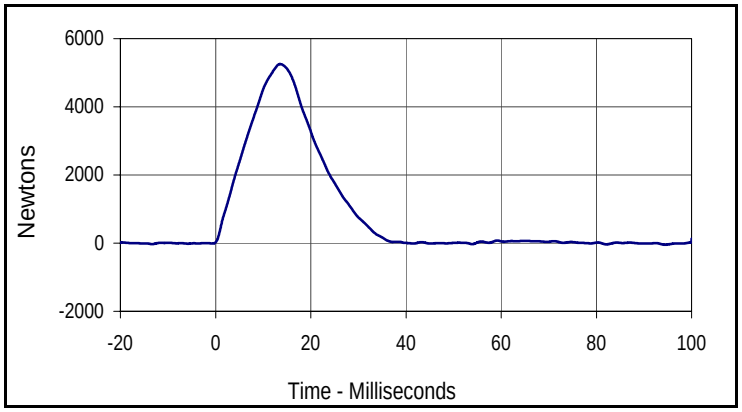
Curve Description			
Potentiometer B			
Plot No.	Type	SAE Class	Units
004	FIL	180	Degrees
Max	Time	Min	Time
33.6	44.3	-15.1	106.4



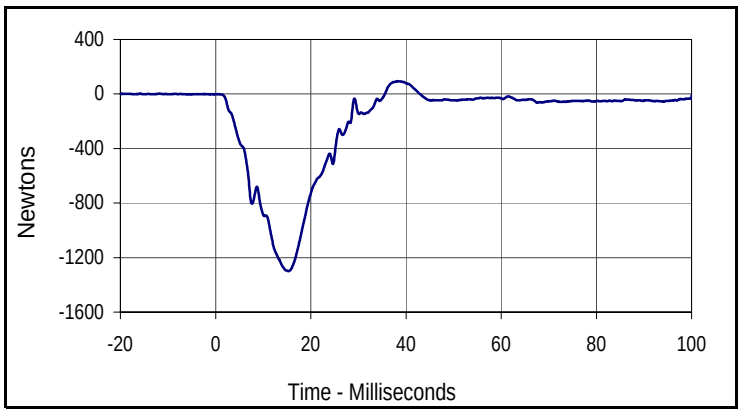
Curve Description			
Potentiometer C			
Plot No.	Type	SAE Class	Units
005	FIL	180	Degrees
Max	Time	Min	Time
15.3	43.7	-8.1	109.7

Test Program:	ES2re Pelvis Impact Test	Test Date:	12/14/12
ATD Serial No.:	F035	Test I.D.:	F035PL041

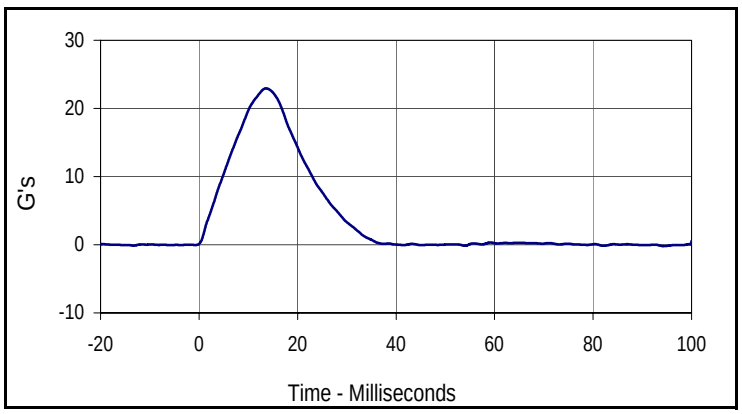
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥240	545	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.7	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		28.9	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.5	Pass
Pendulum Velocity		m/s	4.2 to 4.4	4.30	Pass
Peak Impactor Force		N	4700 to 5400	5253.8	Pass
		msec	11.8 to 16.1	13.6	Pass
Peak Pubic Symphysis Load		N	-1230 to -1590	-1299.6	Pass
		msec	12.2 to 17.0	15.3	Pass
			Overall Test Results		Pass



Curve Description			
Impactor Force			
Plot No.	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
5253.8	13.6	-47.0	94.5



Curve Description			
Pubic Symphysis Force Y			
Plot No.	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
93.7	38.2	-1299.6	15.3



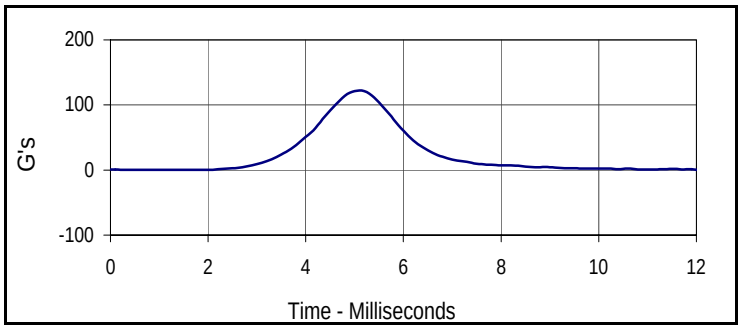
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
22.9	13.6	-0.2	94.5

Test Program:	SID IIs External Measurements	Test Date:	12/15/12
ATD Serial No.:	307	Test I.D.:	N/A

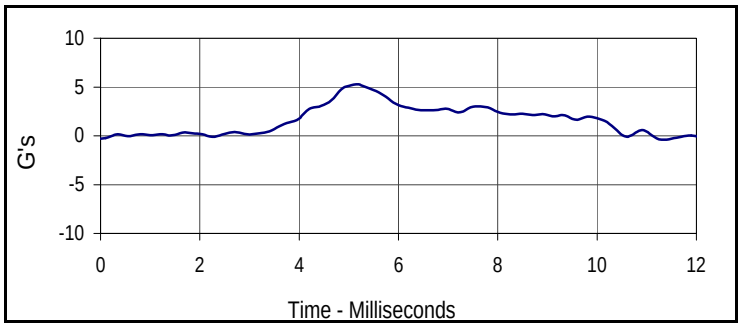
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
A	Sitting Height	mm	772 - 788	778	Pass
B	Shoulder Pivot Height	mm	437 - 453	443	Pass
C	H-Point Height	mm	79 - 89	85	Pass
D	H-Point from Seatback	mm	141 - 151	144	Pass
E	Shoulder Pivot from Backline	mm	97 - 107	102	Pass
F	Thigh Clearance	mm	119 - 135	128	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	185	Pass
J	Head Circumference	mm	541 - 551	546	Pass
K	Buttock to Knee Length	mm	514 - 540	525	Pass
L	Popliteal Height	mm	343 - 369	351	Pass
M	Knee Pivot to Floor Height	mm	392 - 409	400	Pass
N	Buttock Popliteal Length	mm	416 - 442	432	Pass
O	Chest Depth w/o Jacket	mm	195 - 211	205	Pass
P	Foot Length	mm	216 - 232	223	Pass
Q	Hip Breadth with Pelvic Plug	mm	313 -323	319	Pass
R	Arm Length	mm	249 - 259	254	Pass
S	Knee Joint to Seatback	mm	477 - 493	483	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	872	Pass
Z	Waist Circumference	mm	760 - 791	774	Pass
			Overall Test Results		Pass

Test Program:	SID IIs Head Drop Test	Test Date:	12/15/12
ATD Serial No.:	307	Test I.D.:	307HD048

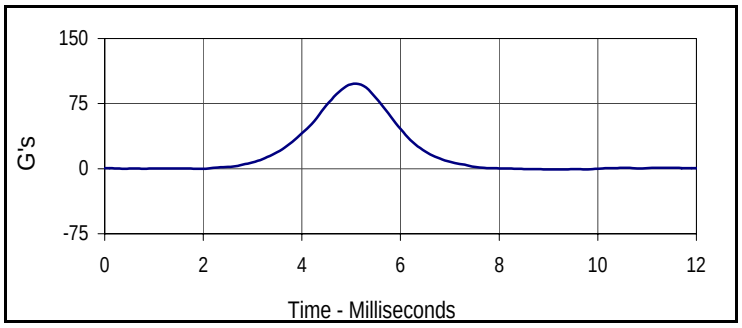
Tested Parameter		Units	Specification	Result	Pass/Fail
Head Assembly Soak Time		Minutes	≥240	345	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		20.8	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.2	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.5	Pass
Peak Head Resultant Acceleration		G's	115 to 137	122.4	Pass
Peak Head X Acceleration		G's	<15	5.3	Pass
Is Acceleration Unimodal?		Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse		%	<15	3.7	Pass
			Overall Test Results		Pass



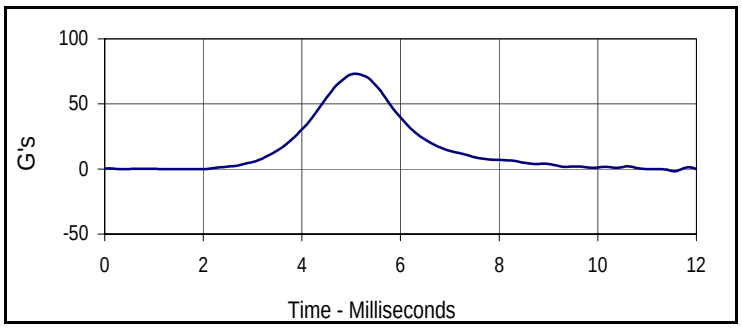
Curve Description			
Head Resultant			
Plot No.	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
122.4	5.1	0.1	0.5



Curve Description			
Head X			
Plot No.	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
5.3	5.2	-0.3	0.0



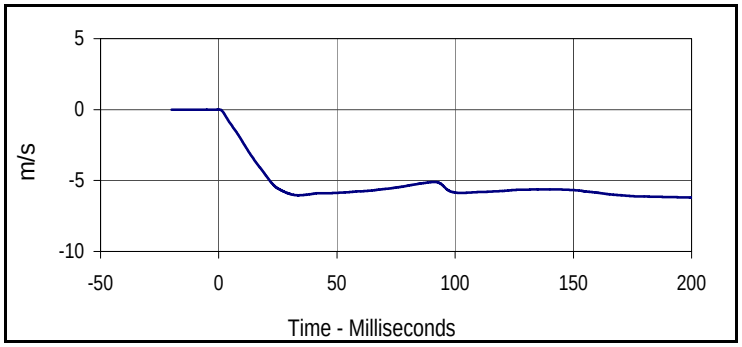
Curve Description			
Head Y			
Plot No.	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
97.9	5.1	-0.8	9.3



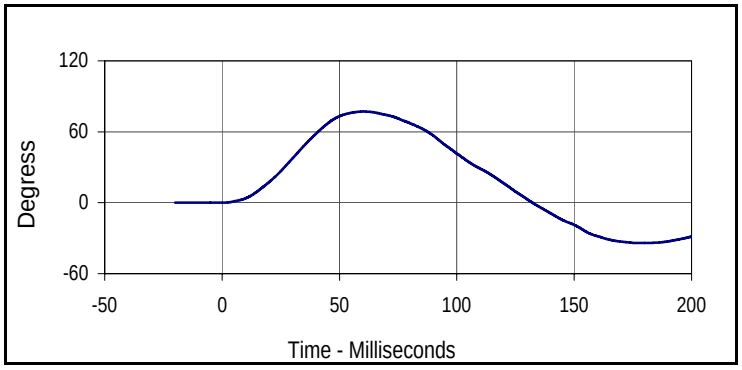
Curve Description			
Head Z			
Plot No.	Type	SAE Class	Units
004	FIL	1000	G's
Max	Time	Min	Time
73.2	5.1	-1.6	11.6

Test Program:	SID IIs Neck Flexion Test	Test Date:	12/15/12
ATD Serial No.:	307	Test I.D.:	307NB048

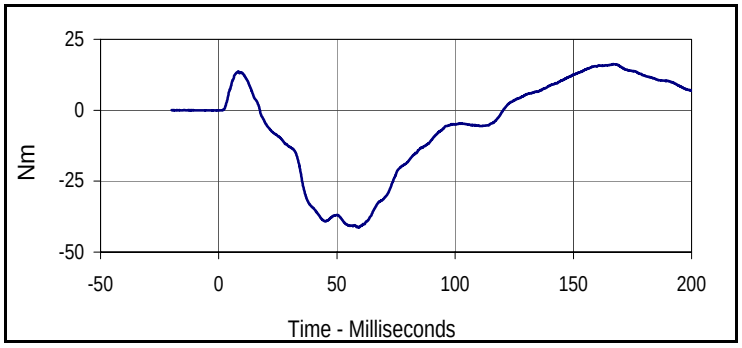
Tested Parameter		Units	Specification	Result	Pass/Fail
Neck Assembly Soak Time		Minutes	≥240	400	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.8	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.2	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.6	Pass
Pendulum Velocity		m/s	5.51 to 5.63	5.55	Pass
Pendulum Deceleration	10 msec	m/s	-2.20 to -2.80	-2.25	Pass
	15 msec	m/s	-3.30 to -4.10	-3.54	Pass
	20 msec	m/s	-4.40 to -5.40	-4.66	Pass
	25 msec	m/s	-5.40 to -6.10	-5.56	Pass
	25-100 msec	m/s	-5.50 to -6.20	-6.04	Pass
D-Plane Rotation	Max	Degrees	71 to 81	77.1	Pass
	Time	msec	50 to 70	60.1	Pass
Peak Occipital Condyle Moment		Nm	-36 to -44	-41.3	Pass
Decaying Moment Time to Cross 0 Nm		msec	102 to 126	120.3	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
Plot No.	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
0.0	-0.1	-6.2	200.0



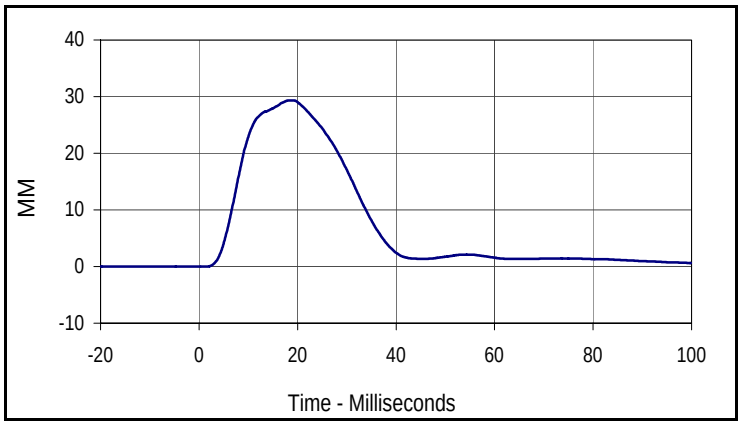
Curve Description			
Maximum Translation Rotation			
Plot No.	Type	SAE Class	Units
002	FIL	60	Degress
Max	Time	Min	Time
77.1	60.1	-34.1	177.0



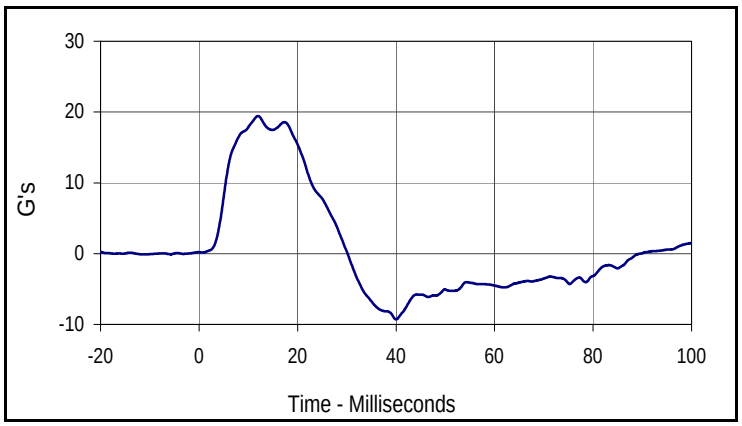
Curve Description			
Moment About Occipital Condyle			
Plot No.	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
16.3	166.8	-41.3	59.0

Test Program:	SID IIs Shoulder Impact Test	Test Date:	12/15/12
ATD Serial No.:	307	Test I.D.:	307SH048

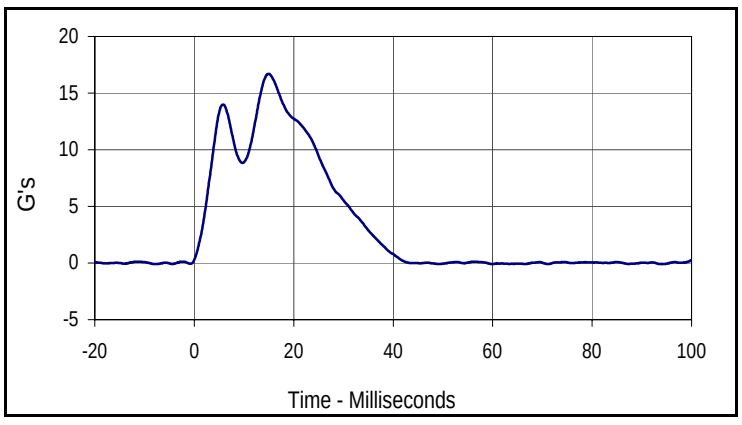
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	435	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.8	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.2	Pass
Laboratory Temperature During Test		°C	20.6 to 22.2	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.5	Pass
Impactor Velocity		m/s	4.20 to 4.40	4.31	Pass
Peak Shoulder Deflection		mm	28 to 37	29.3	Pass
Peak Lateral Spine Acceleratrion Y		G's	17 to 22	19.4	Pass
Peak Impactor Acceleration		G's	13 to 18	16.7	Pass
			Overall Test Results		Pass



Curve Description			
Shoulder Acceleration			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
29.3	18.6	0.0	-20.0



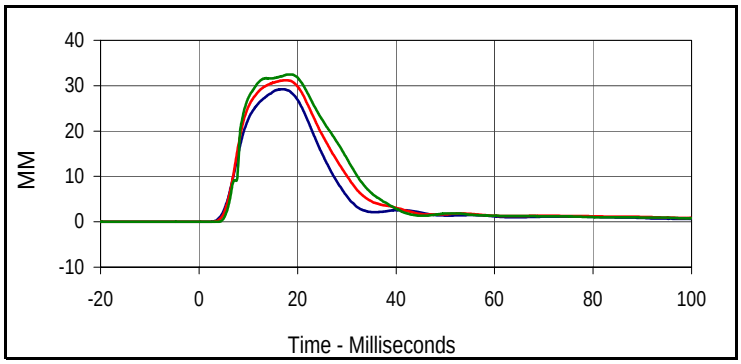
Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
19.4	12.0	-9.3	40.0



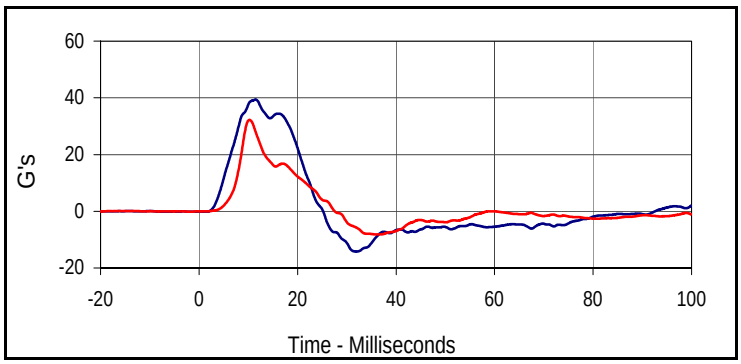
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
16.7	14.9	-0.1	-7.4

Test Program:	SID IIs Thorax with Arm Impact Test	Test Date:	12/15/12
ATD Serial No.:	307	Test I.D.:	307TWA048

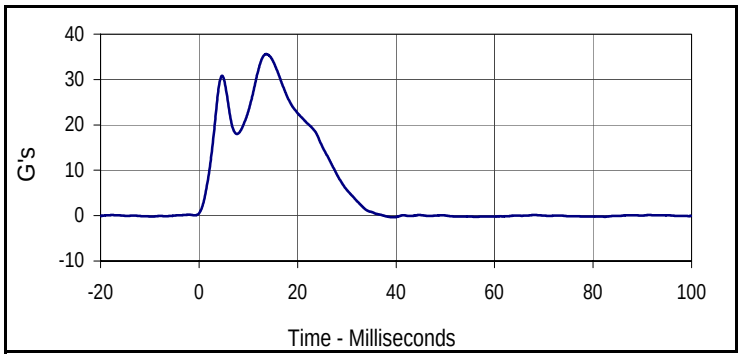
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	455	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.8	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.2	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.4	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.4	Pass
Impactor Velocity		m/s	6.6 to 6.8	6.65	Pass
Peak Shoulder Deflection		mm	31 to 40	37.9	Pass
Peak Upper Thorax Rib Deflection		mm	25 to 32	29.2	Pass
Peak Middle Thorax Rib Deflection		mm	30 to 36	31.2	Pass
Peak Lower Thorax Rib Deflection		mm	32 to 38	32.5	Pass
Peak Upper Spine Y Acceleration		G's	34 to 43	39.4	Pass
Peak Lower Spine Y Acceleration		G's	29 to 37	32.2	Pass
Peak Impactor Acceleration		G's	30 to 36	35.6	Pass
			Overall Test Results		Pass



Curve Description			
Upper Thorax Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
29.2	17.0	0.0	-9.2
Middle Thorax Deflection			
Max	Time	Min	Time
31.2	17.5	0.0	-6.8
Lower Thorax Deflection			
Max	Time	Min	Time
32.5	18.7	0.0	-7.1

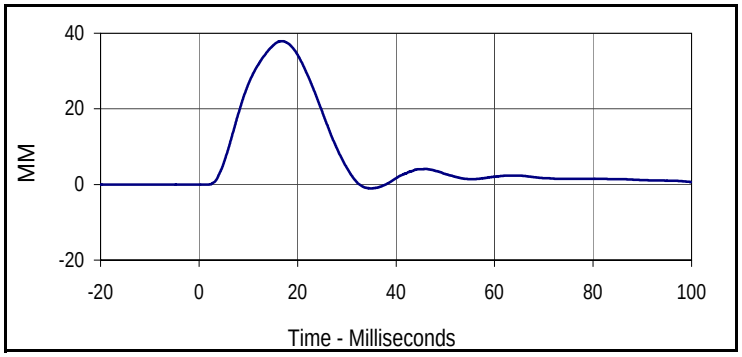


Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
39.4	11.5	-14.2	31.7
Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
32.2	10.2	-8.2	36.7



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
35.6	13.6	-0.4	39.5

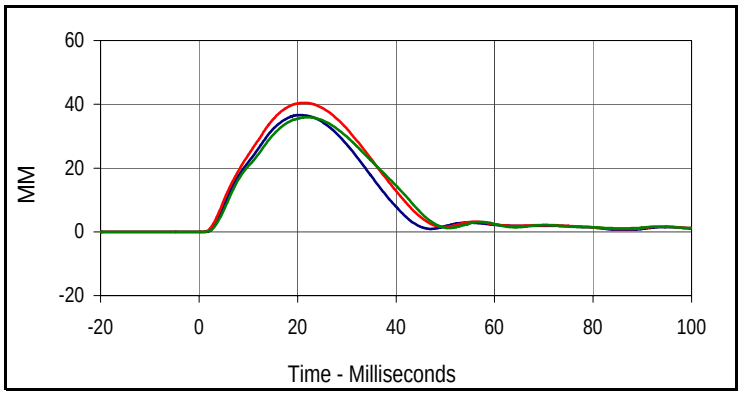
Test Program:	SID IIs Thorax with Arm Impact Test	Test Date:	12/15/12
ATD Serial No.:	307	Test I.D.:	307TWA048



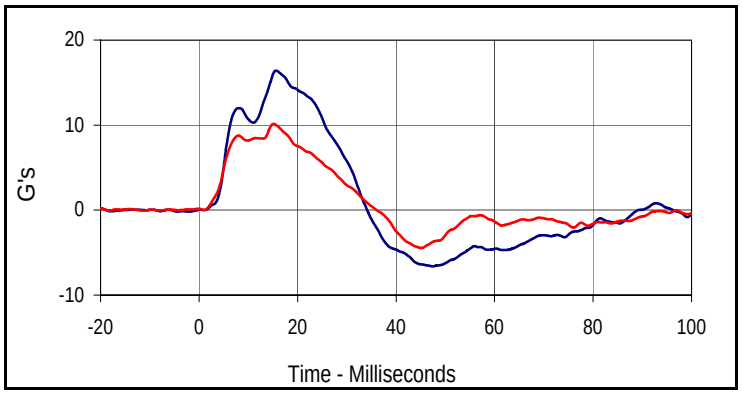
Curve Description			
Shoulder Deflection			
Plot No.	Type	SAE Class	Units
007	FIL	600	MM
Max	Time	Min	Time
37.9	16.9	-1.0	35.0

Test Program:	SID IIs Thorax without Arm Impact Test	Test Date:	12/15/12
ATD Serial No.:	307	Test I.D.:	307TWOA048

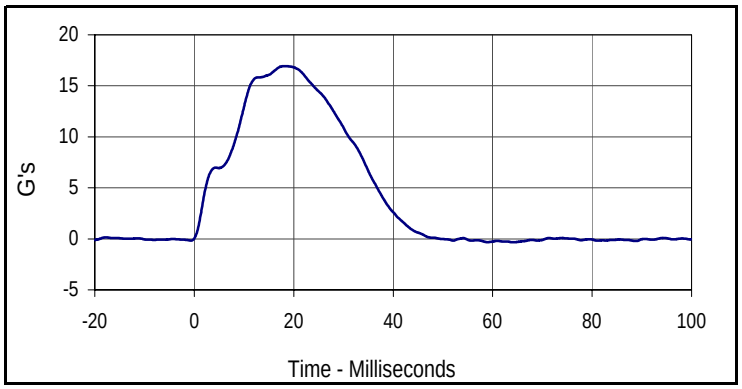
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	480	Pass
Temperature During Soak	Max	°C	18.9 to 25.6	21.7	Pass
	Min	°C		20.8	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.2	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.3	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.7	Pass
Impactor Velocity		m/s	4.2 to 4.4	4.31	Pass
Peak Upper Thorax Rib Deflection		mm	32 to 40	36.6	Pass
Peak Middle Thorax Rib Deflection		mm	39 to 45	40.4	Pass
Peak Lower Thorax Rib Deflection		mm	35 to 43	35.9	Pass
Peak Upper Spine Y Acceleration		G's	13 to 17	16.4	Pass
Peak Lower Spine Y Acceleration		G's	7 to 11	10.1	Pass
Peak Impactor Acceleration		G's	14 to 18	16.9	Pass
			Overall Test Results		Pass



Curve Description			
Upper Thorax Deflection			
Plot No.	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
36.6	20.5	0.0	-5.8
Middle Thorax Deflection			
Max	Time	Min	Time
40.4	21.4	0.0	0.8
Lower Thorax Deflection			
Max	Time	Min	Time
35.9	21.7	0.0	-1.9



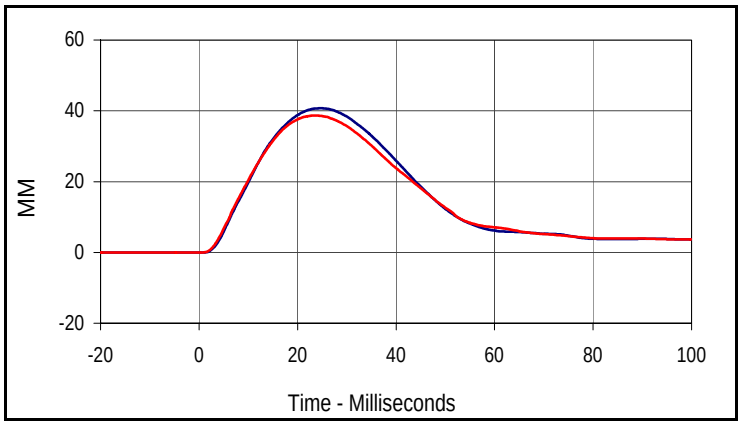
Curve Description			
Upper Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
16.4	15.6	-6.6	47.4
Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
10.1	15.1	-4.5	45.1



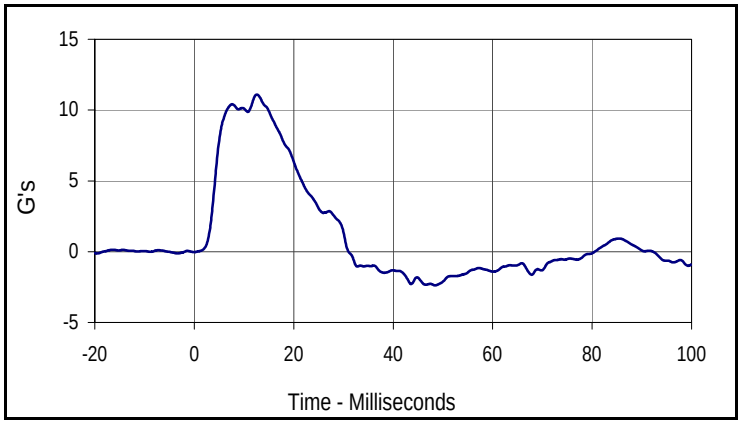
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
16.9	18.4	-0.3	64.0

Test Program:	SID IIs Abdomen Impact Test	Test Date:	12/15/12
ATD Serial No.:	307	Test I.D.:	307ABD048

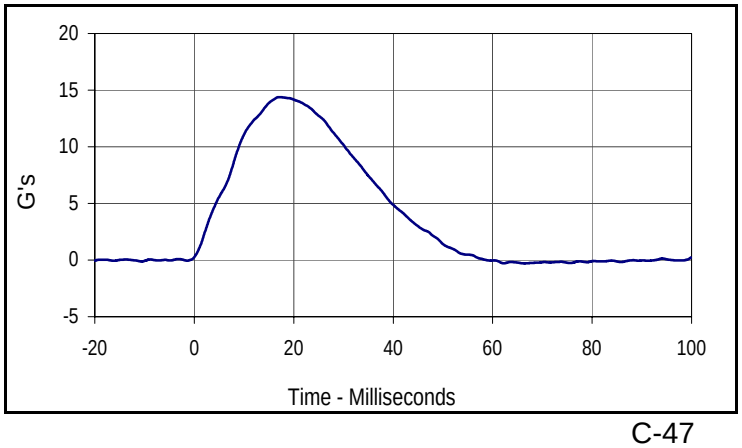
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	500	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.8	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.2	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.5	Pass
Impactor Velocity		m/s	4.2 to 4.4	4.27	Pass
Peak Upper Abdominal Rib Deflection		mm	36 to 47	40.7	Pass
Peak Lower Abdominal Rib Deflection		mm	33 to 44	38.7	Pass
Peak Lower Spine Y Acceleration		G's	9 to 14	11.1	Pass
Peak Impactor Acceleration		G's	12 to 16	14.4	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
40.7	24.7	0.0	-12.5
Curve Description			
Lower Abdominal Rib Deflection			
Plot No.	Type	SAE Class	Units
002	FIL	600	MM
Max	Time	Min	Time
38.7	23.5	0.0	-6.1



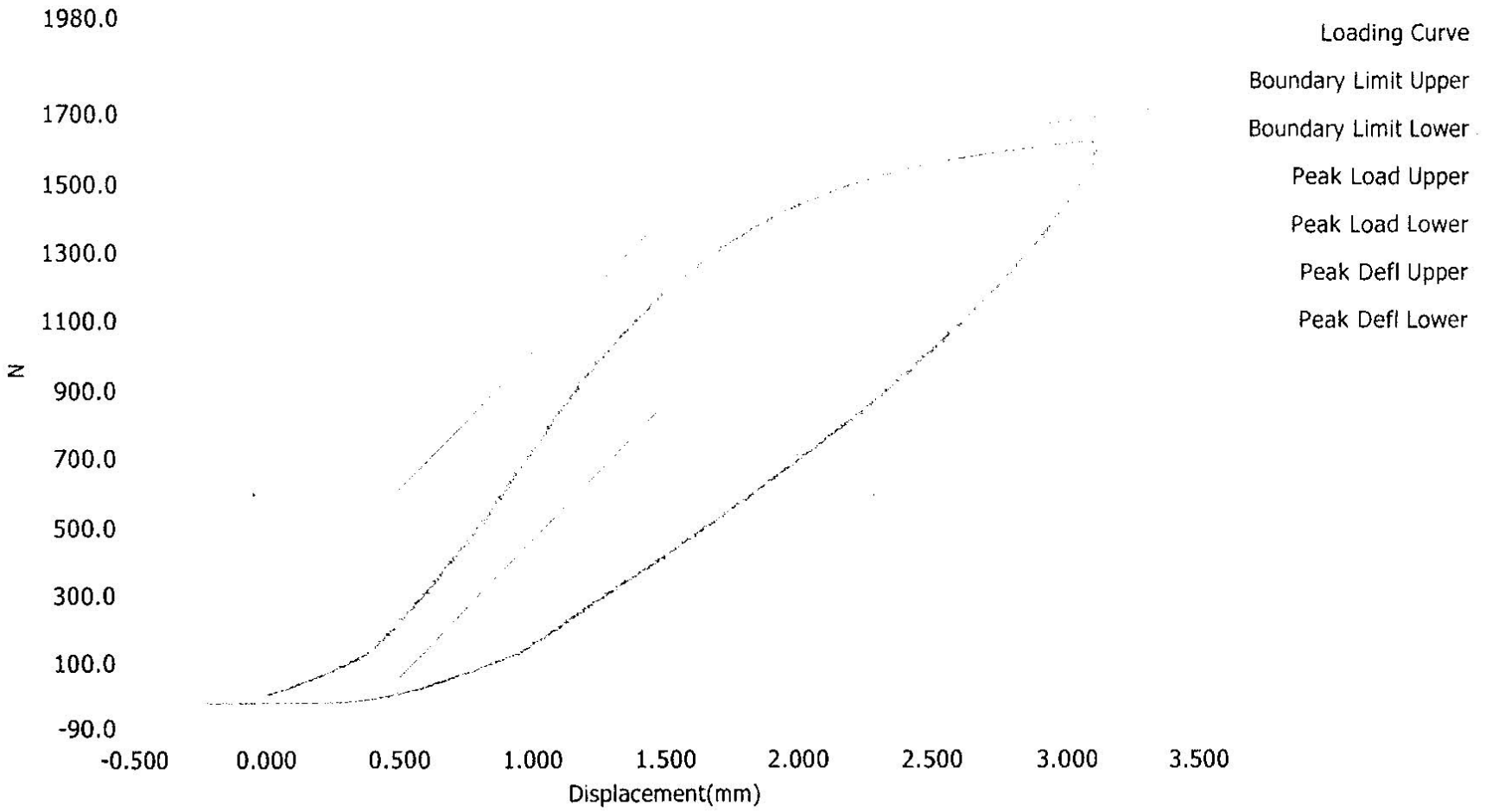
Curve Description			
Lower Spine Y Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
11.1	12.6	-2.4	48.5



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
14.4	17.2	-0.3	66.3

MD0508 POST TEST

Resultant Data - SIDIIs Plug Compression



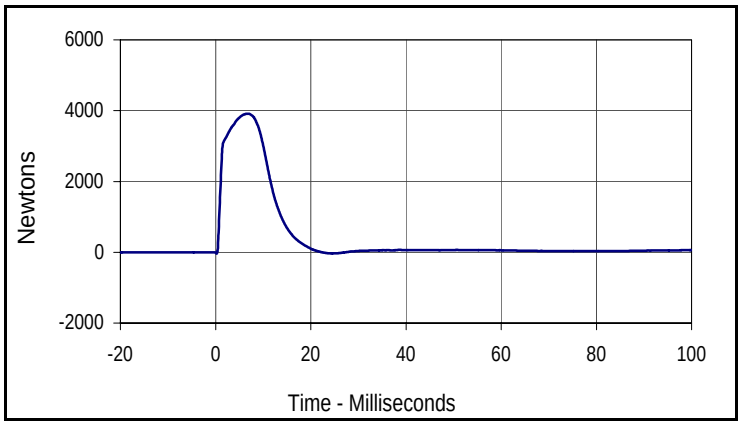
ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
	46867	10/5/2011	11:28 PM
Cert ID	ATD Serial Number	ATD Type	
	N/A	SIDIIs	

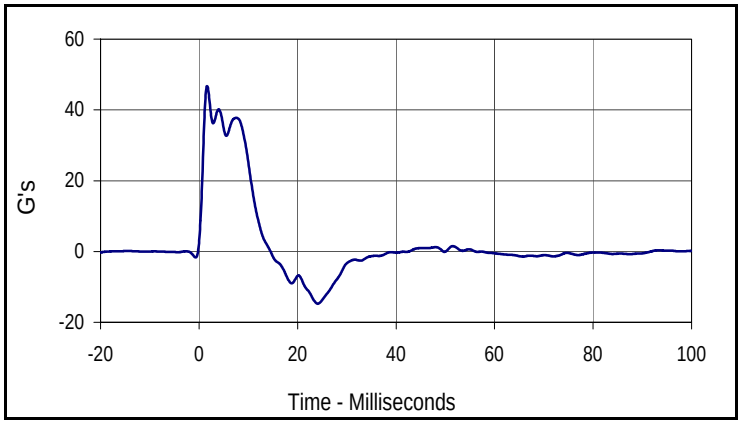
Current Date : 10/5/2011 Current Time : 23:28:35

Test Program:	SID IIs Pelvis Acetabulum Impact Test	Test Date:	12/15/12
ATD Serial No.:	307	Test I.D.:	307ACET048

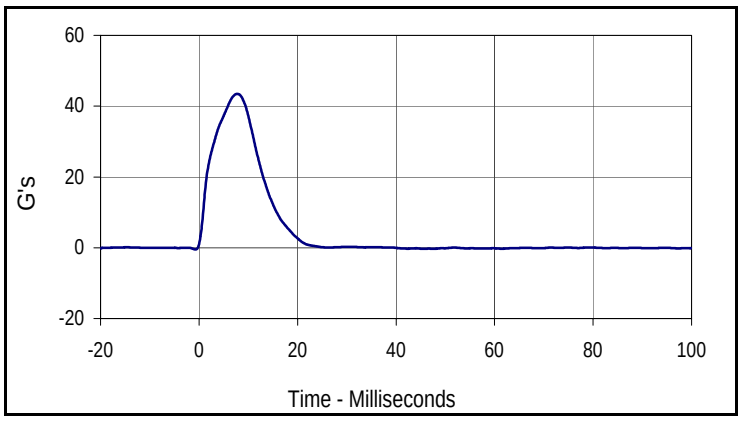
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	535	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.8	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.2	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.3	Pass
Impactor Velocity		m/s	6.6 to 6.8	6.69	Pass
Peak Acetabulum Force Y		Newtons	3600 to 4300	3914.6	Pass
Peak Pelvis Y Acceleration After 6 msec.		G's	34 to 42	37.8	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
3914.6	6.9	-35.7	0.2



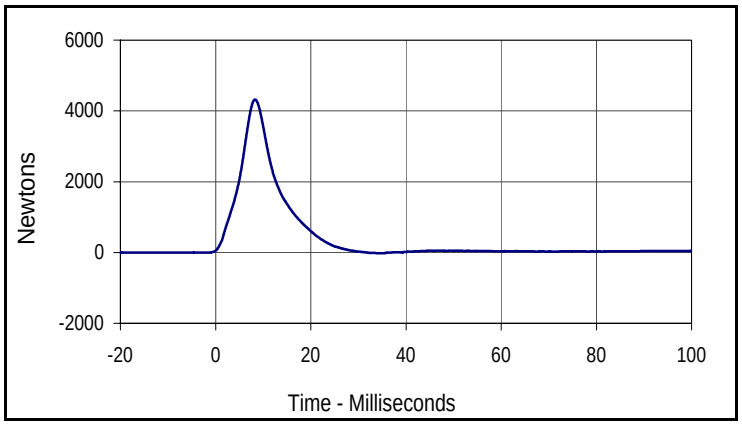
Curve Description			
Pelvis Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
46.7	1.6	-14.8	24.1



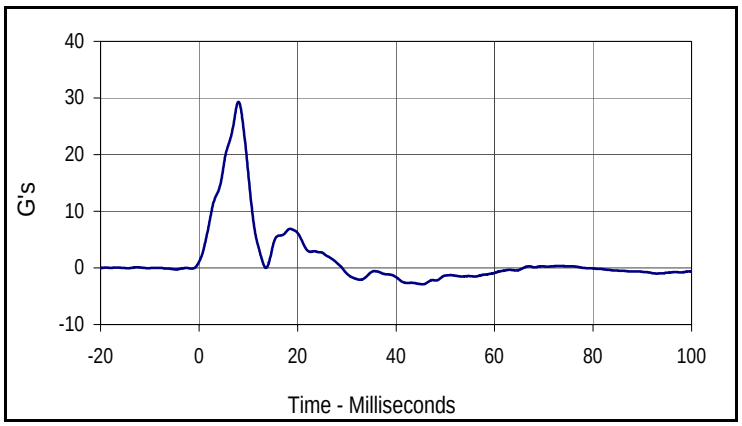
Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
43.5	7.7	-0.5	-0.7

Test Program:	SID IIs Pelvis Iliac Calibration	Test Date:	12/15/12
ATD Serial No.:	307	Test I.D.:	307PL048

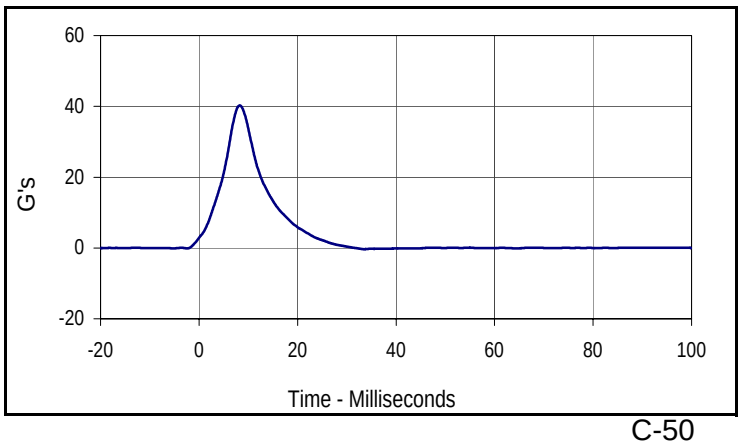
Tested Parameter		Units	Specification	Result	Pass/Fail
Dummy Soak Time		Minutes	≥180	590	Pass
Temperature During Soak	Max	°C	20.6 to 22.2	21.7	Pass
	Min	°C		20.8	Pass
Humidity During Soak	Max	%	10.0 to 70.0	31.0	Pass
	Min	%		29.2	Pass
Laboratory Temperature During Test		°C	18.9 to 25.6	21.2	Pass
Laboratory Humidity During Test		%	10.0 to 70.0	30.4	Pass
Impactor Velocity		m/s	4.2 to 4.4	4.29	Pass
Peak Illiac Force		Newtons	4100 to 5100	4321.3	Pass
Peak Pelvis Y Acceleration		G's	28 to 39	29.3	Pass
Peak Impactor Acceleration		G's	36 to 45	40.3	Pass
			Overall Test Results		Pass



Curve Description			
Pelvis Iliac Force			
Plot No.	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4321.3	8.3	-20.4	34.8



Curve Description			
Pelvis Y Acceleration			
Plot No.	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
29.3	8.0	-2.9	45.5



Curve Description			
Impactor Acceleration			
Plot No.	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
40.3	8.3	-0.3	33.5

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	8/30/12
		Y	P58763	Endevco	8/31/12
		Z	P52093	Endevco	8/31/12
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	6/21/12

TABLE 2 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N 307		
				Serial Number	Manufacturer	Calibration
Head Accelerometers			X	P58900	Endevco	8/15/12
			Y	P58902	Endevco	8/15/12
			Z	P58983	Endevco	8/15/12
Displacement Potentiometers	Shoulder		Y	1244	FTSS	8/17/12
	Thoracic Rib	Upper	Y	1249	FTSS	8/17/12
		Middle	Y	1265	FTSS	8/17/12
		Lower	Y	1277	FTSS	8/17/12
	Abdominal Rib	Upper	Y	1286	FTSS	8/17/12
		Lower	Y	1290	FTSS	8/17/12
Lower Spine Accelerometers (T12)			X	P59007	Endevco	8/16/12
			Y	P59015	Endevco	8/16/12
			Z	P59016	Endevco	8/16/12
Acetabulum Load Cell			Y	277	Denton	5/24/12
Iliac Wing Load Cell			Y	289	Denton	5/24/12
Pelvis Plug (Struck Side)				46076	FTSS	9/21/11
Pelvis Plug (Non-Struck Side)				48930	FTSS	12/5/11

TABLE 3 – Vehicle Instrumentation

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	Ketx11a	ICSensor	8/17/12
	Vehicle Center of Gravity	Y	Ketx11b	ICSensor	8/17/12
	Vehicle Center of Gravity	Z	Ketx11c	ICSensor	8/17/12
2	Right Sill at Front Seat	X	13331	Endevco	6/18/12
	Right Sill at Front Seat	Y	13346	Endevco	6/18/12
	Right Sill at Front Seat	Z	13319	Endevco	6/18/12
3	Right Sill at Rear Seat	X	13665	Endevco	10/20/12
	Right Sill at Rear Seat	Y	13673	Endevco	10/20/12
	Right Sill at Rear Seat	Z	13676	Endevco	10/20/12
4	Left Sill at Front Door	Y	13680	Endevco	10/20/12
5	Left Sill at Rear Door	Y	13713	Endevco	10/22/12
6	Left A-Post Lower	Y	13714	Endevco	10/22/12
7	Left A-Post Middle	Y	13716	Endevco	10/22/12
8	Left B-Post Lower	Y	13667	Endevco	10/20/12
9	Left B-Post Middle	Y	13330	Endevco	6/18/12
10	Front Seat Track	Y	13354	Endevco	6/18/12
11	Rear Seat Structure	Y	N/A	N/A	N/A
12	Right Rear Occ. Compartment	Y	13717	Endevco	10/22/12
13	Engine Block	X	13718	Endevco	10/22/12
	Engine Block	Y	13663	Endevco	10/20/12
14	Rear Floorpan Above Axle	X	13348	Endevco	6/18/12
	Rear Floorpan Above Axle	Y	12865	Endevco	1/11/12
	Rear Floorpan Above Axle	Z	12903	Endevco	1/11/12

TABLE 4 – MDB Instrumentation

		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	13682	Endevco	11/14/12
MDB Center of Gravity	Y	13706	Endevco	11/14/12
MDB Center of Gravity	Z	13715	Endevco	11/14/12
Left Frame at Rear Axle Centerline	X	13705	Endevco	11/14/12
Left Frame at Rear Axle Centerline	Y	13711	Endevco	11/14/12