

REPORT NUMBER: SINCAP-MGA-2011-004

**NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST**

**DAIMLER AG STUTTGART
2010 MERCEDES-BENZ E350 4-DR SEDAN
NHTSA NUMBER: EA0500**

**PREPARED BY:
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Test Date: July 21, 2010

Report Date: August 10, 2010

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
RULEMAKING
OFFICE OF CRASHWORTHINESS STANDARDS
1200 NEW JERSEY AVENUE, SE, ROOM W43-410
WASHINGTON, D.C. 20590**

This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, in response to Contract Number DTNH22-09-D-00124.

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Technical Report Documentation Page

1. Report No. SINCAP-MGA-2011-004	2. Government Accession No.	3. Recipient's Catalog No.																						
4. Title and Subtitle Final Report of New Car Assessment Program Side Impact Testing of 2010 Mercedes-Benz E350 4-Dr Sedan; NHTSA No.: EA0500		5. Report Date August 10, 2010																						
		6. Performing Organization Code MGA																						
7. Author(s) Donna Janovicz, Project Manager Ben Fischer, Project Engineer		8. Performing Organization Report No. SINCAP-MGA-2011-004																						
9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105		10. Work Unit No.																						
		11. Contract or Grant No. DTNH22-09-D-00124																						
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Rulemaking, Office of Crashworthiness Standards 1200 New Jersey Ave, SE, Room W43-410, NVS-111 Washington, D.C. 20590		13. Type of Report and Period Covered: <i>Final Report</i> 7/21/2010 to 8/10/2010																						
		14. Sponsoring Agency Code NVS-111																						
15. Supplementary Notes																								
16. Abstract A 55/28 km/h 90° Moving Deformable Barrier NCAP side impact was conducted on the subject 2010 Mercedes-Benz E350 4-Dr Sedan to obtain new car assessment and research data indicant of FMVSS No. 214D performance. The test was conducted at MGA Research Corporation, in Burlington, Wisconsin, on July 21, 2010. The impact velocity of the Moving Deformable Barrier (MDB) was 62.0 km/h, and the ambient temperature at the struck side (drivers) of the vehicle was 21°C. The target vehicle's maximum post test static crush was 167 mm at level 3. The test vehicle's occupant performance is as follows: <table style="margin-left: auto; margin-right: auto; border: none;"> <thead> <tr> <th></th> <th style="text-align: center;"><u>DRIVER</u></th> <th style="text-align: center;"><u>PASSENGER</u></th> </tr> </thead> <tbody> <tr> <td>Left Upper Rib (LUR) Accel., g</td> <td style="text-align: center;">36.8</td> <td style="text-align: center;">31.4</td> </tr> <tr> <td>Left Lower Rib (LLR) Accel., g</td> <td style="text-align: center;">33.0</td> <td style="text-align: center;">34.8</td> </tr> <tr> <td>Lower Spine (T₁₂) Accel., g</td> <td style="text-align: center;">31.2</td> <td style="text-align: center;">35.8</td> </tr> <tr> <td>Thoracic Trauma Index (TTI)</td> <td style="text-align: center;">34</td> <td style="text-align: center;">35</td> </tr> <tr> <td>Pelvis (PEV) Accel., g</td> <td style="text-align: center;">31.3</td> <td style="text-align: center;">42.8</td> </tr> <tr> <td>HIC</td> <td style="text-align: center;">123</td> <td style="text-align: center;">172</td> </tr> </tbody> </table> The doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.					<u>DRIVER</u>	<u>PASSENGER</u>	Left Upper Rib (LUR) Accel., g	36.8	31.4	Left Lower Rib (LLR) Accel., g	33.0	34.8	Lower Spine (T ₁₂) Accel., g	31.2	35.8	Thoracic Trauma Index (TTI)	34	35	Pelvis (PEV) Accel., g	31.3	42.8	HIC	123	172
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17. Key Words New Car Assessment Program (NCAP) Side Impact Side Impact Hybrid III Dummy (SID/HIII) Occupant Side Impact Protection		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Adm. Technical Ref. Division, 1200 New Jersey Ave, SE Washington, D.C. 20590																						
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 139	22. Price																					

TABLE OF CONTENTS

<u>Section</u>		<u>Page No.</u>
1	Purpose and Test Procedure	1
2	Summary of NCAP Side Impact Test	2
<u>Data Sheet No.</u>		<u>Page No.</u>
1	General Test and Vehicle Parameter Data	4
2	Test Vehicle Tire Information	6
3	Test Vehicle Information	7
4	Moving Deformable Barrier (MDB) Summary of Results	9
5	Post Test Observations	10
6	Vehicle Pre-Test and Post Test Measurements	11
7	SID/HIII Longitudinal Clearance Dimensions	12
8	SID/HIII Lateral Clearance Dimensions	13
9	Vehicle Side Measurements	14
10	Vehicle Exterior Crush Profiles	15
11	Vehicle Damage Profile Distances	17
12	Deformable Barrier Honeycomb Face Static Crush	18
13	Vehicle Accelerometer Locations	19
14	MDB Accelerometer Locations	20
15	Vehicle Structural Measurements	21
16	High Speed Camera Locations and Data	22
17	Summary of FMVSS 301 Data	23
<u>Appendix</u>		
A	Photographs	A
B	SID/HIII Response Data Traces	B
C	Dummy Calibration Data	C

SECTION 1

PURPOSE AND TEST PROCEDURE

PURPOSE

This side impact test was conducted as part of the test program sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-09-D-00124. The purpose of this test was to evaluate side impact protection in a 2010 Mercedes-Benz E350 4-Dr Sedan manufactured by Daimler AG Stuttgart.

TEST PROCEDURE

The side impact test was conducted in accordance with the Laboratory Test Procedure for New Car Assessment Program Side Impact Testing dated November 2002 and the corresponding MGA Research Corporation Test Procedure MGA-NHTSA5. The procedures for receiving, inspection, testing, and reporting of test results are described in the test procedures and are not repeated in this report.

MGA does not endorse or certify products. The manufacturer's name appears solely for identification purposes.

SECTION 2

SUMMARY OF NCAP SIDE IMPACT TEST

A model year 2010 Mercedes-Benz E350 4-Dr 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 62.0 km/h. The specified impact velocity range is from 61.1 to 62.7 km/h. The test (target) vehicle was stationary and positioned 63° to the line of forward motion. The weight of the vehicle as tested was 1956.9 kg and the test weight of the MDB was 1361.5 kg. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on July 21, 2010.

One (1) real-time motion picture camera and nine (9) high-speed motion picture cameras were used to document the impact event. The pre-test and post-test conditions were recorded by one (1) real-time motion picture camera. Camera locations and pertinent camera information are documented in the data sheets. Pre- and post-test photographs of the vehicle and Side Impact Dummies (SID/HIIIs) can be found in Appendix A. Two 50th percentile adult male SID/HIIIs were placed in the driver and left rear passenger designated seating positions according to instructions specified in the Laboratory Test Procedure for New Car Assessment Program Side Impact Testing dated November 2002. Each SID/HIII was instrumented in the following locations:

- Left Upper Rib (LUR) uni-axial accelerometer (Y-axis primary and redundant)
- Left Lower Rib (LLR) uni-axial accelerometer (Y-axis primary and redundant)
- Lower Thoracic Spine (T12) uni-axial accelerometer (Y-axis primary and redundant)
- Pelvic (PEV) section uni-axial accelerometer (Y-axis primary and redundant)
- Head Center of Gravity (CG) tri-axial accelerometers (X, Y and Z axes primary and redundant)
- Upper Neck load cell (Fx, Fy, Fz, Mx, My, Mz)

The test vehicle was instrumented with twenty (20) structural accelerometers and the MDB was instrumented with five (5) accelerometers and two (2) contact switches on the bumper to compare left side to right side bumper impact timing. All data channels were recorded with a fully self contained on-board DTS TDAS Pro Data Acquisition System. The data was digitally sampled at 10,000 samples per second and processed per Appendix V of the Test Procedure.

2.2 GENERAL COMMENTS

The test vehicle sustained a maximum static crush of 167 mm at level 3, 1650 mm rearward of the vertical impact point. The driver and passenger SID/HIIIs, Serial Nos. 271 and 272 respectively, were calibrated just prior to this test.

Appendix A contains the still photograph prints. Appendix B contains the SID/HIII response data traces. Appendix C contains the dummy calibration data.

The occupant data is summarized below:

ATD position	HIC	T ¹	T ²	TTI (G's)	Peak Pelvis (G's)
Driver	123	40.5	70.9	34	31.3
Passenger	172	48.7	74.3	35	42.8

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Information	Left Front (Driver)		Left Rear (Passenger)	
	Installed	Deployed	Installed	Deployed
Front Airbag	Yes	No	No	
Torso Side Airbag	Yes	Yes	No	
Pelvic Airbag	Yes	Yes	No	
Curtain Airbag	Yes	Yes	Yes	Yes

The test data can be found on the NHTSA website at www.nhtsa.dot.gov.

TEST NOTES

There was no valid data collected for:

Left Mid B-Post Y

Driver Seat Track Y after 20 msec.

MGA does not endorse or certify products. The manufacturer's name appears solely for identification purposes.

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2010 Mercedes-Benz E350 4-Dr Sedan
 Test Program: NCAP Side Impact

NHTSA No. EA0500
 Test Date: 7/21/2010

TEST VEHICLE INFORMATION

Make	Mercedes-Benz
Model	E350
Body Style	Sedan
NHTSA No.	EA0500
VIN	WDDHF5GB8AA239254
Color	Steel Grey
Delivery Date	7/7/2010
Odometer Reading (mile)	11 miles
Dealer	Loeber Motors
Transmission	Automatic
Final Drive	Front
Number of Cylinders	6
Engine Displacement (L)	3.5
Engine Placement	Lateral
Automatic Door Locks (ADL)	Yes
Owner's Manual Details Instructions on Disabling ADLs	Yes

TEST VEHICLE OPTIONS

Driver Front Airbag	Yes
Driver Side Curtain Airbag	Yes
Driver Side Torso Airbag	Yes
Driver Side Pelvis Airbag	Yes
Rear Passenger Side Curtain Airbag	Yes
Rear Passenger Side Torso Airbag	No
Power Steering	Yes
Power Door Locks	Yes
Tilt Wheel	Yes
Anti-lock Brakes	Yes
Traction Control	Yes
All Wheel Drive	No
Power Seats	Yes
Pretensioners	Yes
Load Limiters	Yes
Bucket Seats	Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Daimler AG Stuttgart
Date of Manufacture	04/10

GVWR (kg)	2260
GAWR Front (kg)	1105
GAWR Rear (kg)	1200

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench		
Number Of Occupants	2	3		5
Capacity Wt. (VCW) (kg)				360
Cargo Wt. (RCLW) (kg)				20

DATA SHEET NO. 1 (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle:	<u>2010 Mercedes-Benz E350 4-Dr Sedan</u>	NHTSA No.:	<u>EA0500</u>
Test Program:	<u>NCAP Side Impact</u>	Test Date:	<u>7/21/2010</u>

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	453.1	431.8		479.5	510.8	
Right	kg	465.4	431.8		473.1	493.5	
Ratio	%	51.5	48.5		48.7	51.3	
Totals	kg	918.5	863.6	1782.1	952.6	1004.3	1956.9

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1782.1
Weight of 2 P572M ATDs	kg	161.5
Rated Cargo/Luggage Weight (RCLW)	kg	20
Calculated Vehicle Target Weight (TVTW)	kg	1963.6

* Actual As Tested Weight (ATW) will be TVTW -5/-10 kg

Weight of Ballast in Trunk (kg): 45.4

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	698	699	703	707	1393
As Tested	mm	686	694	680	697	1475
Fully Loaded	mm	676	689	677	690	

TEST VEHICLE VERTICAL IMPACT LINE DATA

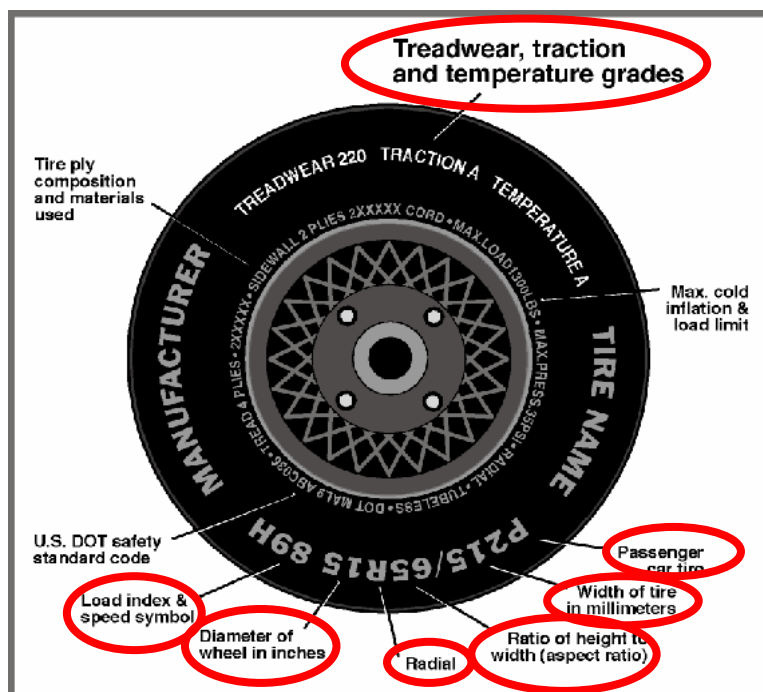
Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2874
Target Impact Point Aft of Front Axle	mm	497
Actual Impact Point Aft of Front Axle	mm	474

DATA SHEET NO. 2

TEST VEHICLE TIRE INFORMATION

Test Vehicle: 2010 Mercedes-Benz E350 4-Dr Sedan
 Test Program: NCAP Side Impact

NHTSA No. EA0500
 Test Date: 7/21/2010



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	340	340
Cold Test Pressure (kPa)	230	290
Recommended Tire Size	245/45R17	245/45R17
Tire Size on Vehicle	245/45R17	245/45R17
Tire Manufacturer	Michelin	Michelin
Tire Name	Primacy MXM	Primary MXM
Tire Type	Passenger	Passenger
Tire Width (mm)	245	245
Ratio of Height to Width (aspect ratio)	45	45
Radial	R	R
Wheel Diameter	17	17
Load Index & Speed Symbol	99H	99H
Treadwear	500	500
Traction Grade	A	A
Temperature Grade	A	A

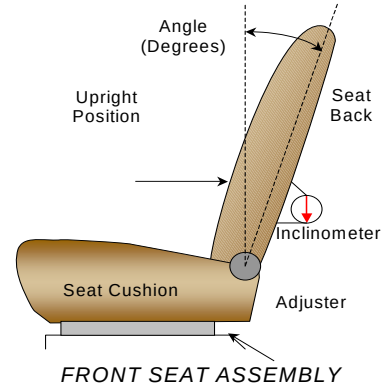
DATA SHEET NO. 3 **TEST VEHICLE INFORMATION**

Test Vehicle: 2010 Mercedes-Benz E350 4-Dr Sedan
 Test Program: NCAP Side Impact

NHTSA No. EA0500
 Test Date: 7/21/2010

NOMINAL DESIGN RIDING POSITION

The driver and passenger seat back is positioned to the manufacturer's designated angle. The procedure is as follows: The seat back angle for driver seat is 21 degrees measured at the top backside of the backrest at the seat centerline. The passenger seat back is fixed at 26 degrees.

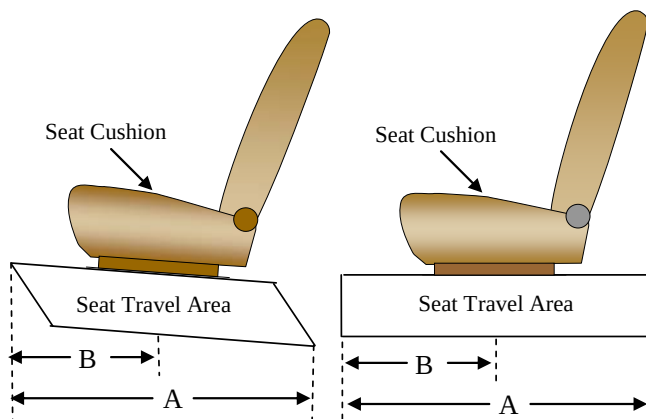


Driver seat back angle: 21.0 degrees at the seat back

Passenger seat back angle: fixed

SEAT FORE/AFT POSITIONS

	Total Fore/Aft Travel	Placed in position #
Driver Seat	320 mm	160 mm
Rear Seat	Fixed	Fixed



DATA SHEET NO. 3 (CONTINUED)

TEST VEHICLE INFORMATION

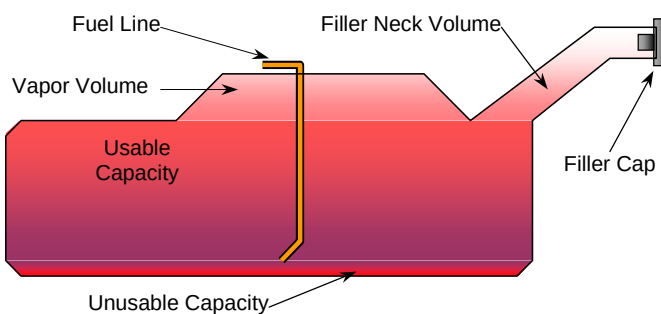
Test Vehicle: 2010 Mercedes-Benz E350 4-Dr Sedan
 Test Program: NCAP Side Impact

NHTSA No. EA0500
 Test Date: 7/21/2010

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	80.0
Usable Capacity of "Optional" Tank	
92-94% of Usable Capacity	73.6 to 75.2
Actual Amount of Solvent used	74.2
1/3 of Usable Capacity	26.7

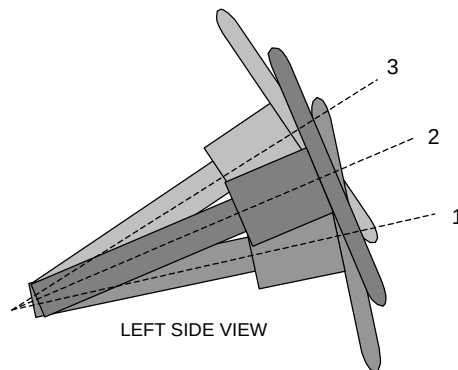
The test vehicle is equipped with an electric fuel pump. The fuel pump is in operation if the ignition is switched to the "ON" position. After about 15 seconds, the pump switches back to standby mode, if the engine is not started.



VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when moved through its full range of motion. An aluminum plate is placed across the rim of the steering wheel, an inclinometer is placed on the plate and the angle is measured.



STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITION

	Fore/Aft (mm)	Degrees
Lowermost position No. 1	195	69.0
Geometric center position No. 2	165	67.0
Uppermost position No. 3	135	65.0

DATA SHEET NO. 4**MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS**

Test Vehicle: 2010 Mercedes-Benz E350 4-Dr Sedan
Test Program: NCAP Side Impact

NHTSA No. EA0500
Test Date: 7/21/2010

MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1252
Overall Length Including Honeycomb Face	4115
Wheel base of Framework Carriage	2592
C.G. Location aft of Front Axle	1129

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	411.8	281.6	
Right	kg	356.8	311.3	
Ratio	%	56.5	43.5	
Totals	kg	768.6	592.9	1361.5

SPEED AND IMPACT ANGLE DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.0
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.0
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	89.7

**POST TEST OBSERVATIONS
MDB LEFT EDGE IMPACT POINT DATA**

Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 50	23 forward
Vertical Offset	mm	+/-20	2 up

DATA SHEET NO. 5**POST TEST OBSERVATIONS**

Test Vehicle: 2010 Mercedes-Benz E350 4-Dr Sedan
 Test Program: NCAP Side Impact

NHTSA No. EA0500
 Test Date: 7/21/2010

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Front Seat SID/HIII	Rear Seat SID/HIII
Dummy Type / Serial No.	SID HIII / 271	SID HIII / 272
Head Contact	Curtain Airbag, Headrest	Curtain Airbag, Side Header, Headrest
Upper Torso Contact	Side Torso Airbag, Door Panel	Door Panel
Lower Torso Contact	Side Pelvis Airbag	Door Panel
Left Knee Contact	Door Panel	Door Panel
Right Knee Contact	Left Knee	Left Knee

POST TEST DOOR OPENING AND SEAT TRACK INFORMATION

Description	Front	Rear
Locked/Unlocked Doors	Struck side door was unlocked; Non-struck side door was unlocked	Struck side door was unlocked; Non-struck side door was unlocked
Left Side Door Opening	Door remained closed and latched	Door remained closed and latched
Right Side Door Opening	Door remained closed and latched; Door opened without tools	Door remained closed and latched; Door opened without tools
Seat Movement	0	0
Seat Back Failure	None	None

POST TEST STRUCTURAL OBSERVATIONS

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

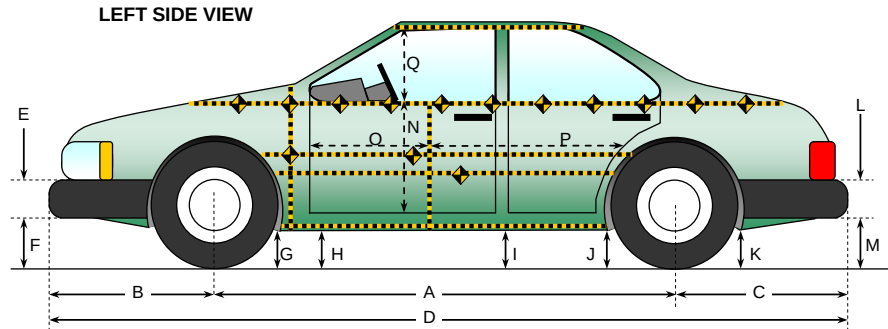
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Information	Left Front (Driver)		Left Rear (Passenger)	
	Installed	Deployed	Installed	Deployed
Front Airbag	Yes	No	No	
Torso Side Airbag	Yes	Yes	No	
Pelvic Airbag	Yes	Yes	No	
Curtain Airbag	Yes	Yes	Yes	Yes

DATA SHEET NO. 6
VEHICLE PRE-TEST AND POST-TEST MEASUREMENTS

Test Vehicle: 2010 Mercedes-Benz E350 4-Dr Sedan
 Test Program: NCAP Side Impact

NHTSA No. EA0500
 Test Date: 7/21/2010



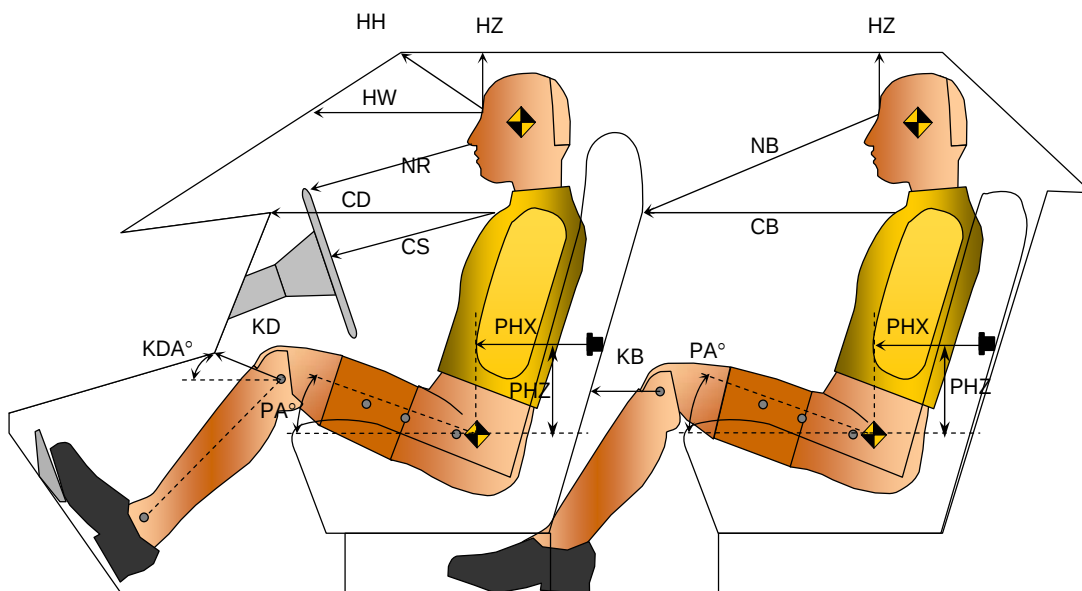
All Measurements in mm

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2874	2870	4
B	Front Axle to FSOV	830	851	-21
C	Rear Axle to RSOV	1170	1148	22
D	Total Length at Centerline	4874	4869	5
E	Front Bumper Thickness	115	115	0
F	Front Bumper Bottom to Ground	256	294	-38
G	Sill Height at Front Wheel Well	163	183	-20
H	Sill Height at Front Door Leading Edge	163	183	-20
I	Sill Height at "B" Pillar	185	185	0
J1	Sill Height at Rear Wheel Well	152	148	4
J2	Pinch Weld Height at Rear Wheel Well	153	150	3
K	Sill Height Aft of Rear Wheel Well	200	200	0
L	Rear Bumper Thickness	127	127	0
M	Rear Bumper Bottom to Ground	412	411	1
N	Sill Height to Window Bottom Sill	712	665	47
O	Front Door Leading Edge to Impact CL	732	722	10
P	Rear Door Trailing Edge to Impact CL	1246	1221	25
Q	Front Window Opening	412	420	-8
R	Right Side Length	3935	3942	-7
S	Left Side Length	3935	3923	12
T	Vehicle Width at "B" Post	1835	1730	105

DATA SHEET NO. 7
SID/HII LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2010 Mercedes-Benz E350 4-Dr Sedan
 Test Program: NCAP Side Impact

NHTSA No. EA0500
 Test Date: 7/21/2010

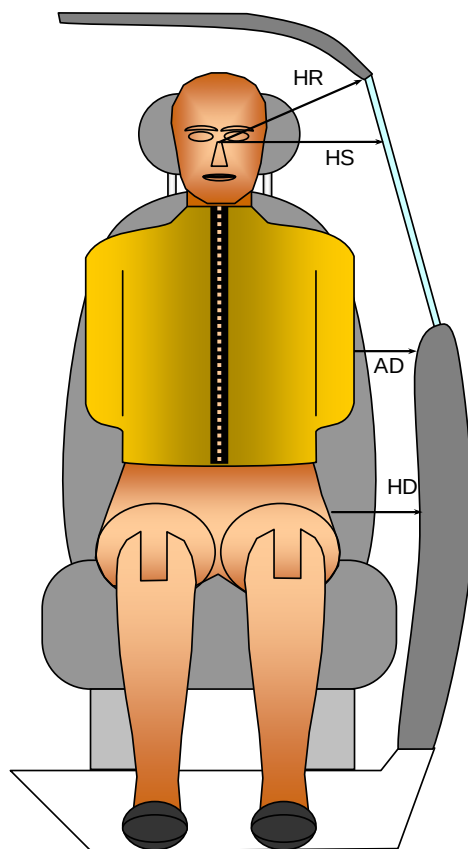


Driver Code	Pass. Code	Measurement Description	Driver S/N 271		Passenger S/N 272	
			Length(mm)	Angle(°)	Length(mm)	Angle(°)
HH		Head to Header	322			
HW		Head to Windshield	558			
HZ	HZ	Head to Roof	156		165	
NR	NB	Nose to Rim/Nose to Seatback	436		631	
CD	CB	Chest to Dash or Seatback	526		532	
CS		Chest to Steering Wheel	325			
KDL	KBL	Left Knee to Dash or Seatback	169	42.6	220	30.3
KDR	KBR	Right Knee to Dash or Seatback	145	37.4	223	26.8
PA	PA	Pelvic Angle		24.2		23.6
PHX	PHX	H-Point to Striker (X-Axis)	190		242	
PHZ	PHZ	H-Point to Striker (Z-Axis)	217		283	

DATA SHEET NO. 8
SID/HIII LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2010 Mercedes-Benz E350 4-Dr Sedan
 Test Program: NCAP Side Impact

NHTSA No. EA0500
 Test Date: 7/21/2010



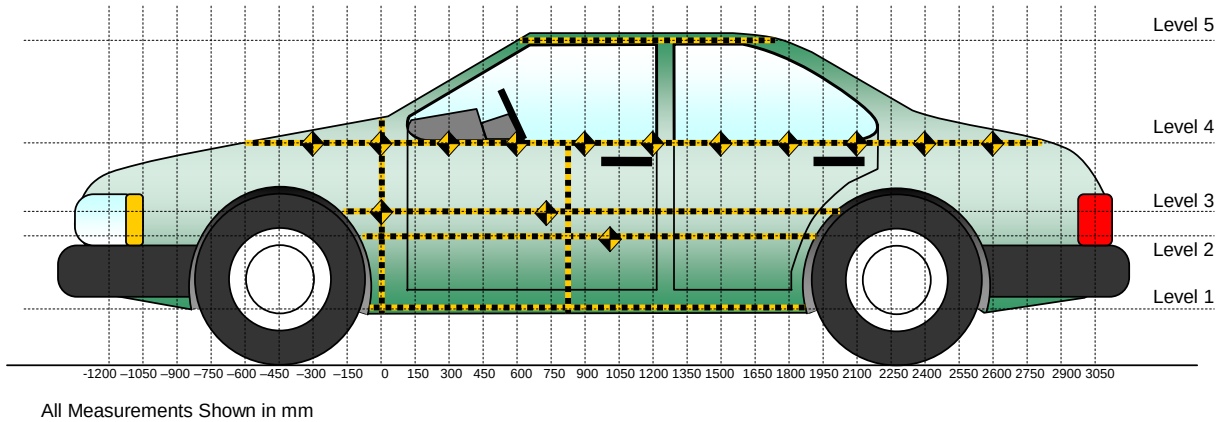
FRONT VIEW OF DUMMY

Code	Measurement Description	Units	Driver S/N 271	Passenger S/N 272
HR	Head to Side Header	mm	196	209
HS	Head to Side Window / C-Post Trim	mm	310	315
AD	Arm to Door	mm	124	157
HD	H-Point to Door	mm	155	169

DATA SHEET NO. 9 **VEHICLE SIDE MEASUREMENTS**

Test Vehicle: 2010 Mercedes-Benz E350 4-Dr Sedan
 Test Program: NCAP Side Impact

NHTSA No. EA0500
 Test Date: 7/21/2010



LEFT SIDE VIEW

Measurements are taken with vehicle in the as tested condition.
 Measurements along the vertical 800 mm.
 All measurements below in mm.

Level	Measurement Description	Maximum Exterior Static Crush	Distance From Impact	Height Above Ground
5	Window	19	1350	1355
4	Window Sill	121	1650	890
3	Mid Door	167	1650	622
2	Occupant H-Point	163	900	550
1	Sill Top	17	900	225
	Maximum Penetration	225		

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2010 Mercedes-Benz E350 4-Dr Sedan
 Test Program: NCAP Side Impact

NHTSA No. EA0500
 Test Date: 7/21/2010

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900				337					345					8	
-750				312					320					8	
-600				292					300					8	
-450				278					288					10	
-300				272					280					8	
-150		179	184	265			215	194	275			36	10	10	
0	219	184	185	258		225	270	225	274		6	86	40	16	
150	225	186	184	253		231	320	288	279		6	134	104	26	
300	226	185	183	247		235	321	312	268		9	136	129	21	
450	235	184	180	238		244	313	324	277		9	129	144	39	
600	240	184	179	229		251	315	324	289		11	131	145	60	
750	243	183	178	222		259	330	344	299		16	147	166	77	
900	245	184	178	212	478	262	347	340	296	493	17	163	162	84	15
1050	249	186	179	210	483	265	342	328	280	500	16	156	149	70	17
1200	249	189	182	208	493	264	304	293	263	509	15	115	111	55	16
1350	250	192	185	205	499	265	324	325	315	518	14	132	140	110	19
1500	253	194	187	202	503	266	338	341	320	521	13	144	154	118	18
1650	249	196	190	202	503	262	341	357	323	520	13	145	167	121	17
1800	244	198	194	205	503	254	310	320	308	519	10	112	126	103	16
1950	230	194	193	211	504	238	230	250	283	519	8	36	57	72	15
2100			177	219	511			192	256	521			15	37	10
2250				221					245					24	
2400				219					236					17	
2550				224					238					14	
2700				232					242					10	
2850				246					254					8	

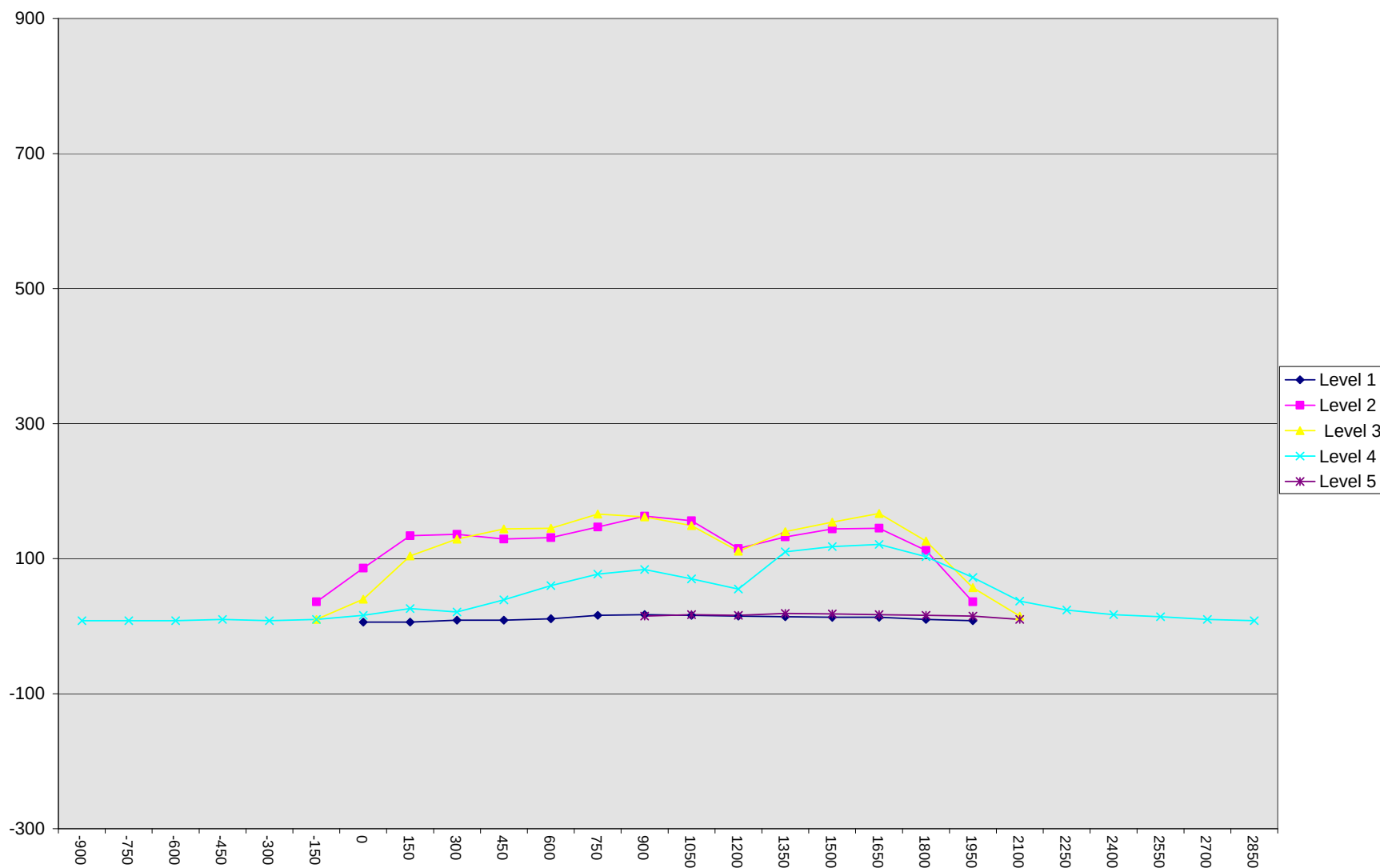
Reference plane is parallel to test vehicle longitudinal centerline.

Given dimensions = Reference plane to car body

DATA SHEET NO. 10... (continued)
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2010 Mercedes-Benz E350 4-Dr Sedan
Test Program: NCAP Side Impact

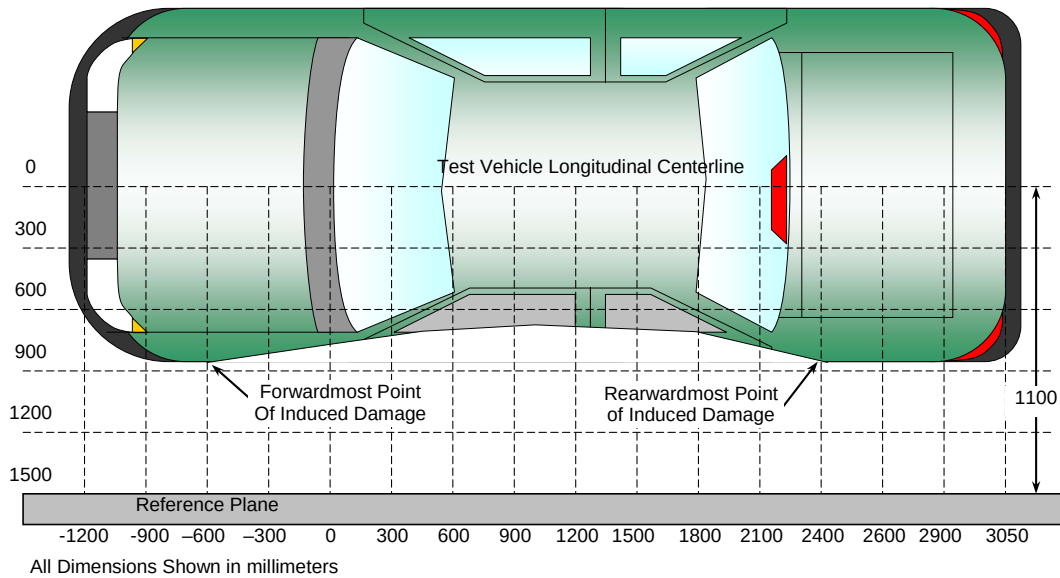
NHTSA No. EA0500
Test Date: 7/21/2010



DATA SHEET NO. 11
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2010 Mercedes-Benz E350 4-Dr Sedan
 Test Program: NCAP Side Impact

NHTSA No. EA0500
 Test Date: 7/21/2010



TOP VIEW

DAMAGE PROFILE DISTANCES

DPD	Distance from Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max Static Crush (mm)
1	2850	4	246	254	8
2	2120	4	219	255	36
3	1380	3	185	328	143
4	600	3	179	324	145
5	-140	2	180	218	38
6	-900	4	337	345	8

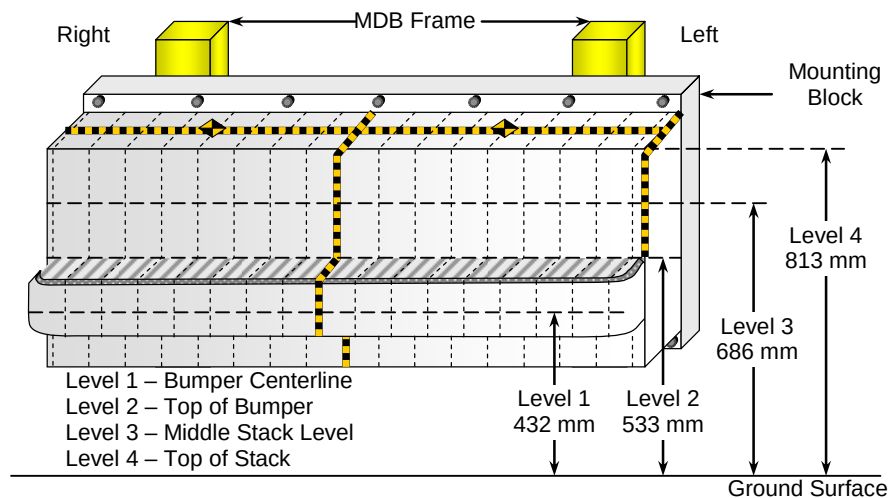
Reference plane is parallel to test vehicle longitudinal centerline.
 Given dimensions = Reference plane to car body.

DATA SHEET NO. 12

DEFORMABLE BARRIER HONEYCOMB FACE STATIC CRUSH

Test Vehicle: 2010 Mercedes-Benz E350 4-Dr Sedan
 Test Program: NCAP Side Impact

NHTSA No. EA0500
 Test Date: 7/21/2010



DEFORMABLE BARRIER STATIC CRUSH

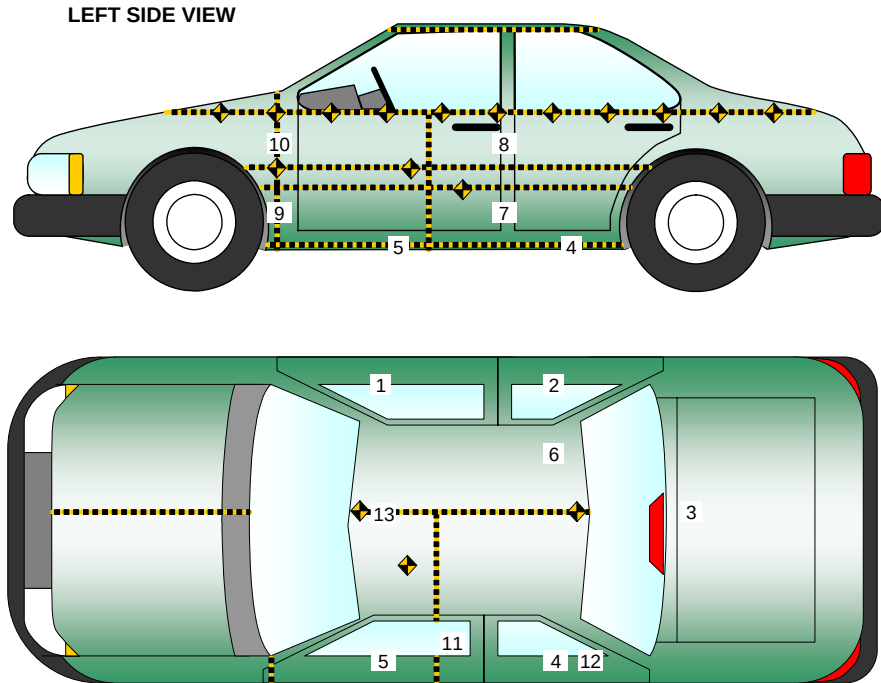
Stack Level	Distance Right of Center								C _L	Distance Left of Center							
	800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
1	252	240	236	250	257	240	225	209	197	193	197	198	201	203	214	237	219
2	194	188	185	191	188	181	175	174	152	148	148	155	154	159	163	178	188
3	116	108	109	123	161	152	113	91	81	73	72	76	85	99	131	171	213
4	111	106	107	128	169	139	115	104	87	82	86	100	111	130	147	180	221

All Dimensions in mm

DATA SHEET NO. 13
VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2010 Mercedes-Benz E350 4-Dr Sedan
 Test Program: NCAP Side Impact

NHTSA No. EA0500
 Test Date: 7/21/2010



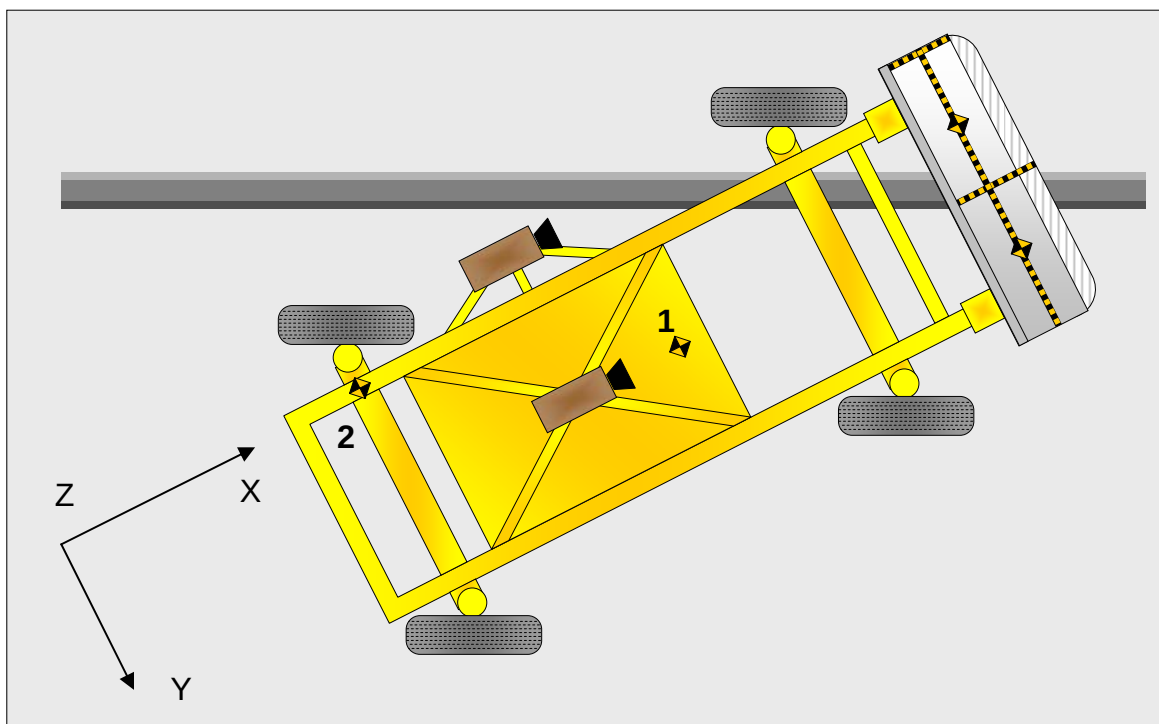
Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Right Sill at Front Seat	2808	690	-204
2	Right Sill at Rear Seat	1610	690	-200
3	Rear Floorpan Above Axle	978	0	-546
4	Left Sill at Rear Door	1681	-690	-200
5	Left Sill at Front Door	2835	-690	-204
6	Rear Occupant Compartment	1925	403	-237
7	Left Lower B-Post	2222	-762	-510
8	Left Middle B-Post	2222	-762	-788
9	Left Lower A-Post	3273	-754	-533
10	Left Middle A-Post	3346	-817	-746
11	Front Seat Track	2345	-565	-277
12	Rear Seat Track or Structure			
13	Vehicle CG	2570	-252	-212

Reference Points X - Test Vehicle Rear Bumper (+ forward)
 Y - Test Vehicle Centerline (+ to right)
 Z - Ground Plane (+ down)

DATA SHEET NO. 14
MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2010 Mercedes-Benz E350 4-Dr Sedan
 Test Program: NCAP Side Impact

NHTSA No. EA0500
 Test Date: 7/21/2010



Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	MDB CG	-1105	0	-330
2	MDB Rear	-2580	-650	-625

Reference Points X - MDB Front Axle (+ forward)
 Y - MDB Centerline (+ to right)
 Z - Ground Plane (+ down)

DATA SHEET NO. 15
VEHICLE STRUCTURAL MEASUREMENTS

Test Vehicle: 2010 Mercedes-Benz E350 4-Dr Sedan
Test Program: NCAP Side Impact

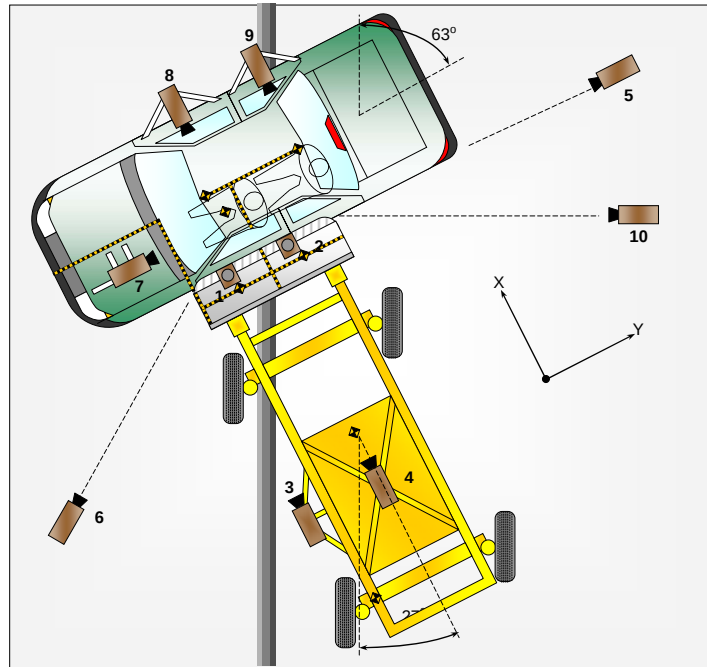
NHTSA No. EA0500
Test Date: 7/21/2010

	Elements	Pre-Test (mm)
1	Total Length	4874
2	Total Width	1835
3	Bumper Top Height	531
4	Bumper Bottom Height	403
5	Longitudinal Member Top Height	534
6	Distance between Longitudinal Members	780
7	Longitudinal Member Width	122
8	Engine Top Height	855
9	Engine Bottom Height	199
10	Engine and gearbox width	1248
11	Front bumper-engine distance	583
12	Front shock absorber fixing height	883
13	Bonnet leading edge height	777
14	Front shock absorber fixing width	1183
15	Front bumper – front axle distance	830
16	Front axle – a pillar distance	610
17	A-pillar – B-pillar distance	1161
18	B-Pillar – rear axle distance	1122
19	B-pillar – C-pillar distance	720
20	Roof sill bottom height	1311
21	Roof sill top height	1433
22	Floor sill bottom height	188
23	Floor sill top height	386

DATA SHEET NO. 16
HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2010 Mercedes-Benz E350 4-Dr Sedan
 Test Program: NCAP Side Impact

NHTSA No. EA0500
 Test Date: 7/21/2010



No.	Camera View	Location (mm)			Lens (mm)	Film Speed (fps)
		X	Y	Z		
1	Overhead Close-up	645	1110	-5050	50	1000
2	Overhead Overall	-870	0	-5050	14	1000
3	MDB Onboard, Impact Point Close-up				50	
4	MDB Onboard, Centerline of Impact				16	
5	Right Side, Ground Level, Overall	-3460	5295	-1250	24	1000
6	Left Side, Ground Level, Overall	3490	-4270	-1230	24	1000
7	Vehicle Onboard Front SID/HIII, Front				12.5	1000
8	Vehicle Onboard Front SID/HIII, Side				8	1000
9	Vehicle Onboard Rear SID/HIII, Side				8	1000
10	Real Time Coverage					30

Reference Points
 X - Impact Line
 Y - MDB Left Edge Impact Point
 Z - Ground Plane

DATA SHEET NO. 17
SUMMARY OF FMVSS 301 DATA

Test Vehicle: 2010 Mercedes-Benz E350 4-Dr Sedan
 Test Program: NCAP Side Impact

NHTSA No. EA0500
 Test Date: 7/21/2010

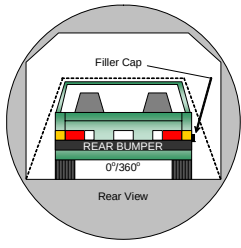
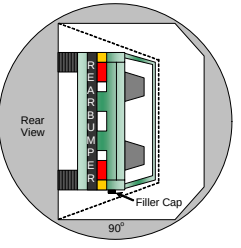
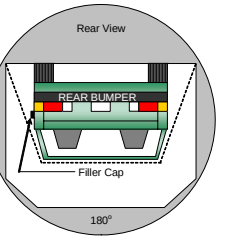
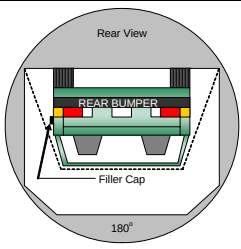
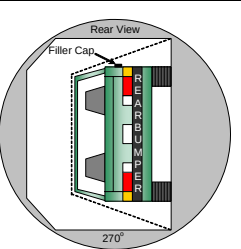
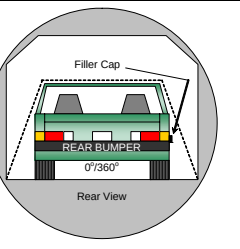
FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 21° C Test Time: 11:41 am

Stoddard Solvent Spillage Measurements

- A. From impact until vehicle motion ceases: 0 oz.
 (Maximum Allowable = 1 ounce)
- B. For the 5 minute period after motion ceases: None
 (Maximum allowable = 5 ounces)
- C. For the following 25 minutes: None
 (Maximum allowable = 1 oz./minute)
- D. Spillage Details: None

FMVSS 301 STATIC ROLLOVER DATA

			1. The specified fixture rollover rate for each 90° of rotation is 60 to 180 seconds. 2. The position hold time at each position is 300 seconds (minimum). 3. Details of Stoddard Solvent spillage locations: None
0° to 90°		90° to 180°	
			
180° to 270°		270° to 360°	

Test Phase	Rotation Time (sec.)	Hold Time (sec.)	Spillage Collection Time (min)	Spillage (oz.)
0° to 90°	127	300	First 5	0
90° to 180°	116	300	First 5	0
180° to 270°	113	300	First 5	0
270° to 360°	122	300	First 5	0

APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

	<u>Page No.</u>
Photo No. 1. Right Front $\frac{3}{4}$ View, As Received	A-1
Photo No. 2. Left Rear $\frac{3}{4}$ View, As Received	A-1
Photo No. 3. Manufacturer's Label	A-2
Photo No. 4. Tire Placard	A-2
Photo No. 5. Pre-Test Front View	A-3
Photo No. 6. Post-Test Front View	A-3
Photo No. 7. Pre-Test Left Front $\frac{3}{4}$ View	A-4
Photo No. 8. Post-Test Left Front $\frac{3}{4}$ View	A-4
Photo No. 9. Pre-Test Left Side View	A-5
Photo No. 10. Post-Test Left Side View	A-5
Photo No. 11. Pre-Test Left Rear $\frac{3}{4}$ View	A-6
Photo No. 12. Post-Test Left Rear $\frac{3}{4}$ View	A-6
Photo No. 13. Pre-Test Rear View	A-7
Photo No. 14. Post-Test Rear View	A-7
Photo No. 15. Pre-Test Right Rear $\frac{3}{4}$ View	A-8
Photo No. 16. Post-Test Right Rear $\frac{3}{4}$ View	A-8
Photo No. 17. Pre-Test Right Side View	A-9
Photo No. 18. Post-Test Right Side View	A-9
Photo No. 19. Pre-Test Right Front $\frac{3}{4}$ View	A-10
Photo No. 20. Post-Test Right Front $\frac{3}{4}$ View	A-10
Photo No. 21. Pre-Test Left Impact Point	A-11
Photo No. 22. Post-Test Left Impact Point	A-11
Photo No. 23. Pre-Test Front $\frac{3}{4}$ View of Left Side Doors	A-12
Photo No. 24. Post-Test Front $\frac{3}{4}$ View of Left Side Doors	A-12
Photo No. 25. Pre-Test Rear $\frac{3}{4}$ View of Left Side Doors	A-13
Photo No. 26. Post-Test Rear $\frac{3}{4}$ View of Left Side Doors	A-13
Photo No. 27. Pre-Test Overhead View	A-14
Photo No. 28. Post-Test Overhead View	A-14
Photo No. 29. Pre-Test Overhead Close-up View	A-15
Photo No. 30. Post-Test Overhead Close-up View	A-15
Photo No. 31. Pre-Test Driver Dummy (Door Open)	A-16
Photo No. 32. Pre-Test Driver Dummy Clearance From Door	A-17

	<u>Page No.</u>
Photo No. 33. Post-Test Driver Dummy Clearance From Door	A-17
Photo No. 34. Pre-Test Driver Dummy (Through Window)	A-18
Photo No. 35. Post-Test Driver Dummy (Through Window)	A-18
Photo No. 36. Pre-Test Driver Dummy Right Side View	A-19
Photo No. 37. Post-Test Driver Dummy Right Side View	A-19
Photo No. 38. Pre-Test Passenger Dummy (Door Open)	A-20
Photo No. 39. Pre-Test Passenger Dummy Clearance From Door	A-21
Photo No. 40. Post-Test Passenger Dummy Clearance From Door	A-21
Photo No. 41. Pre-Test Passenger Dummy (Through Window)	A-22
Photo No. 42. Post-Test Passenger Dummy (Through Window)	A-22
Photo No. 43. Pre-Test Passenger Dummy Right Side View	A-23
Photo No. 44. Post-Test Passenger Dummy Right Side View	A-23
Photo No. 45. Pre-Test Front View of Deformable Barrier	A-24
Photo No. 46. Post-Test Front View of Deformable Barrier	A-24
Photo No. 47. Pre-Test Top View of Deformable Barrier	A-25
Photo No. 48. Post-Test Top View of Deformable Barrier	A-25
Photo No. 49. Pre-Test Right Side View of Deformable Barrier	A-26
Photo No. 50. Post-Test Right Side View of Deformable Barrier	A-26
Photo No. 51. Pre-Test Left Side View of Deformable Barrier	A-27
Photo No. 52. Post-Test Left Side View of Deformable Barrier	A-27
Photo No. 53. Vehicle on Rollover Device (90 Degrees)	A-28
Photo No. 54. Vehicle on Rollover Device (180 Degrees)	A-28
Photo No. 55. Vehicle on Rollover Device (270 Degrees)	A-29
Photo No. 56. Vehicle on Rollover Device (360 Degrees)	A-29
Photo No. 57. Vehicle Impact	A-30
Photo No. 58. Post-Test Driver Dummy Head Contact View	A-31
Photo No. 59. Post-Test Driver Dummy Upper Torso Contact	A-31
Photo No. 60. Post-Test Driver Dummy Lower Torso Contact	A-32
Photo No. 61. Post-Test Driver Dummy Contact	A-32
Photo No. 62. Post-Test Passenger Dummy Head Contact View	A-33
Photo No. 63. Post-Test Passenger Dummy Upper Torso Contact	A-33
Photo No. 64. Post-Test Passenger Dummy Lower Torso Contact	A-34
Photo No. 65. Post-Test Passenger Dummy Contact	A-34



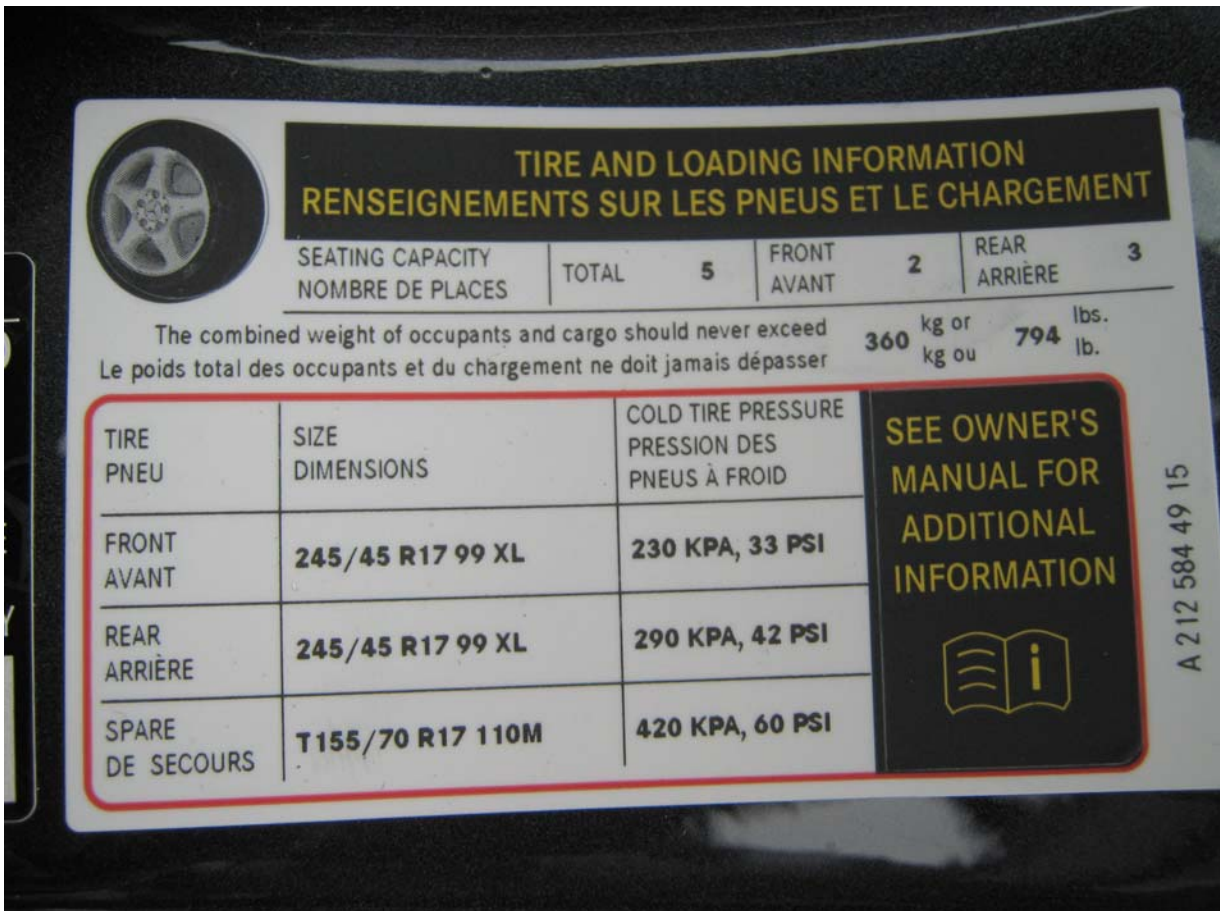
Right Front $\frac{3}{4}$ View, As Received



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



Manufacturer's Label



Tire Placard



Pre-Test Front View



Post-Test Front View



Pre-Test Left Front $\frac{3}{4}$ View



Post-Test Left Front $\frac{3}{4}$ View



Pre-Test Left Side View



Post-Test Left Side View



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



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



Pre-Test Rear View



Post-Test Rear View



Pre-Test Right Rear $\frac{3}{4}$ View



Post-Test Right Rear $\frac{3}{4}$ View



Pre-Test Right Side View



Post-Test Right Side View



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



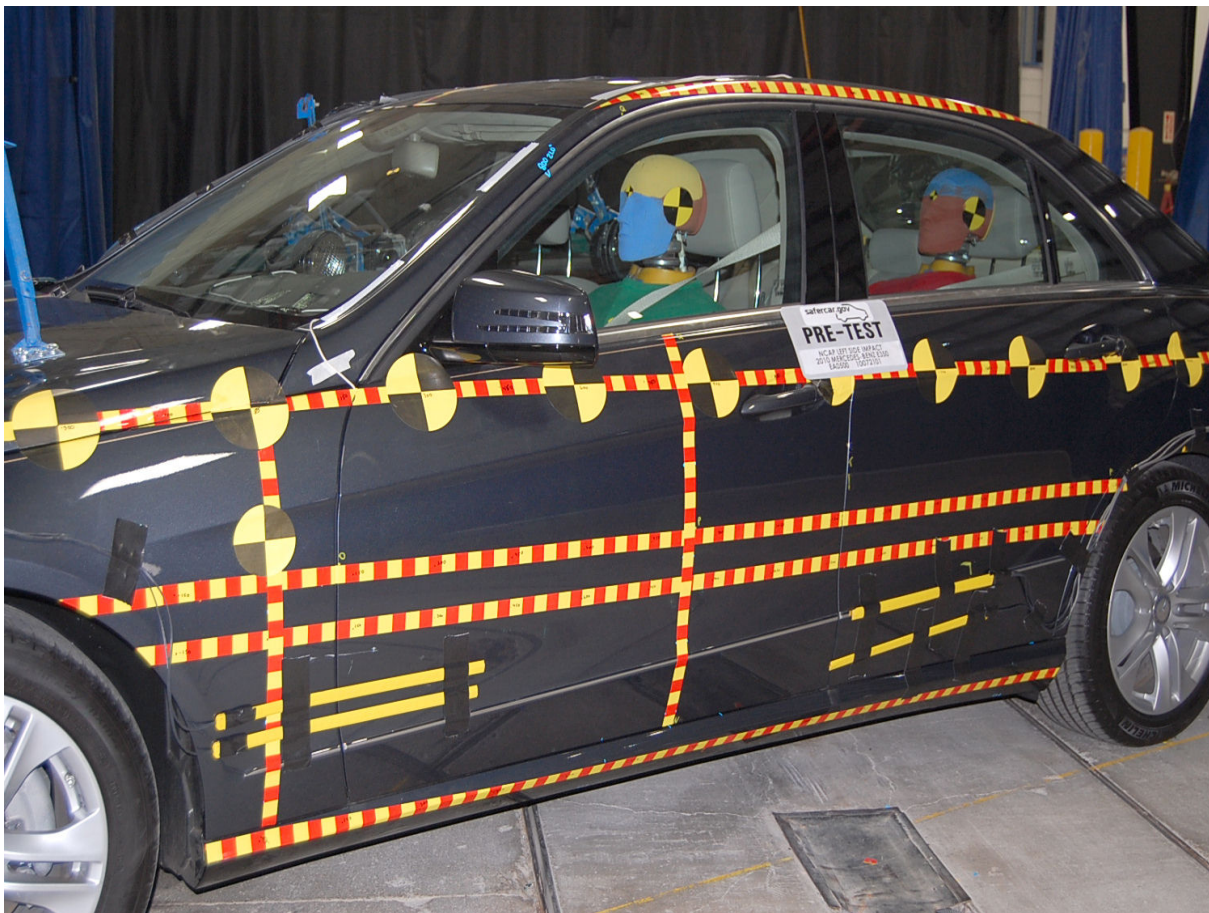
Post-Test Right Front $\frac{3}{4}$ View



Pre-Test Left Impact Point



Post-Test Left Impact Point



Pre-Test Front $\frac{3}{4}$ View of Left Side Doors



Post-Test Front $\frac{3}{4}$ View of Left Side Doors



Pre-Test Rear $\frac{3}{4}$ View of Left Side Doors



Post-Test Rear $\frac{3}{4}$ View of Left Side Doors



Pre-Test Overhead View



Post-Test Overhead View



Pre-Test Overhead Close-up View



Post-Test Overhead Close-up View



Pre-Test Driver Dummy (Door Open)



Pre-Test Driver Dummy Clearance From Door



Post-Test Driver Dummy Clearance From Door



Pre-Test Driver Dummy (Through Window)



Post-Test Driver Dummy (Through Window)



Pre-Test Driver Dummy Right Side View



Post-Test Driver Dummy Right Side View



Pre-Test Passenger Dummy (Door Open)



Pre-Test Passenger Dummy Clearance From Door



Post-Test Passenger Dummy Clearance From Door



Pre-Test Passenger Dummy (Through Window)



Post-Test Passenger Dummy (Through Window)



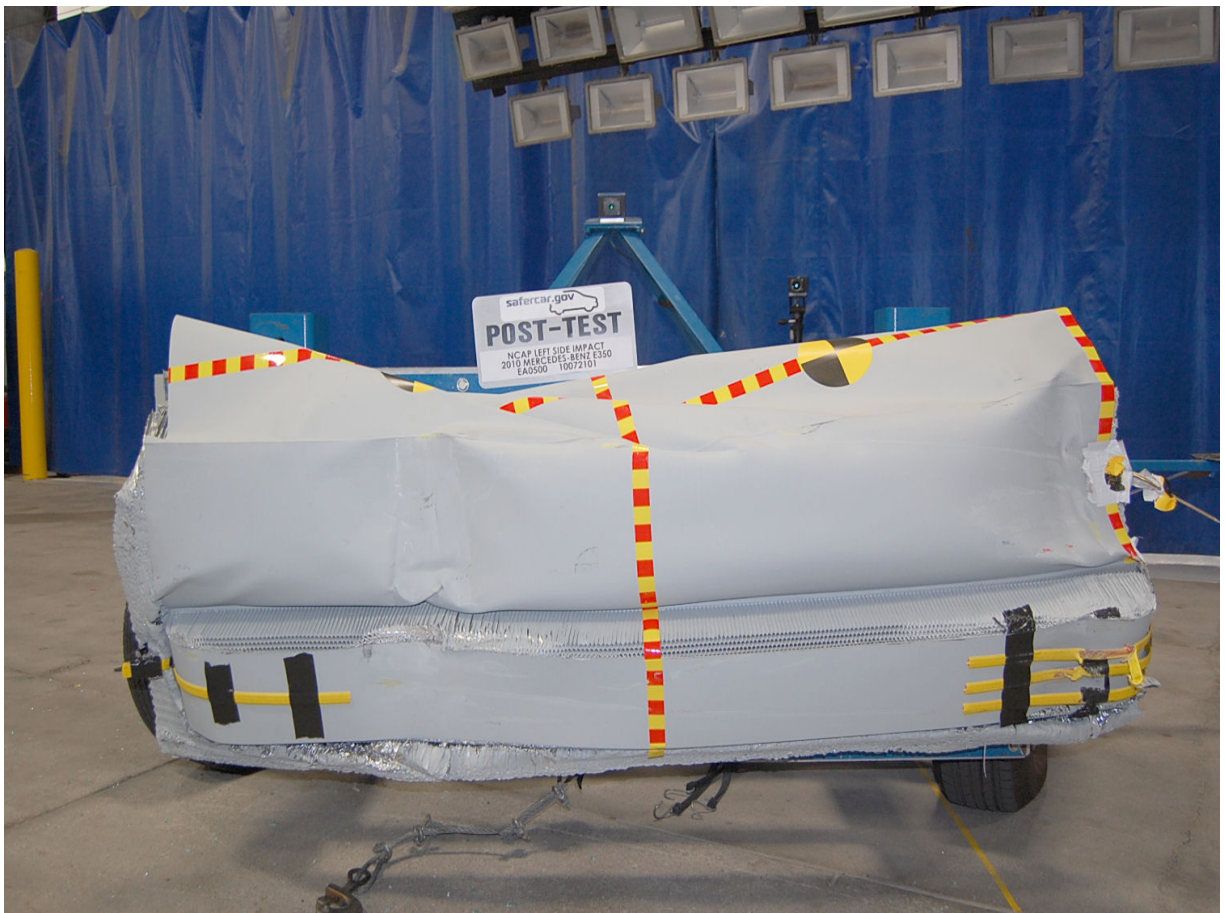
Pre-Test Passenger Dummy Right Side View



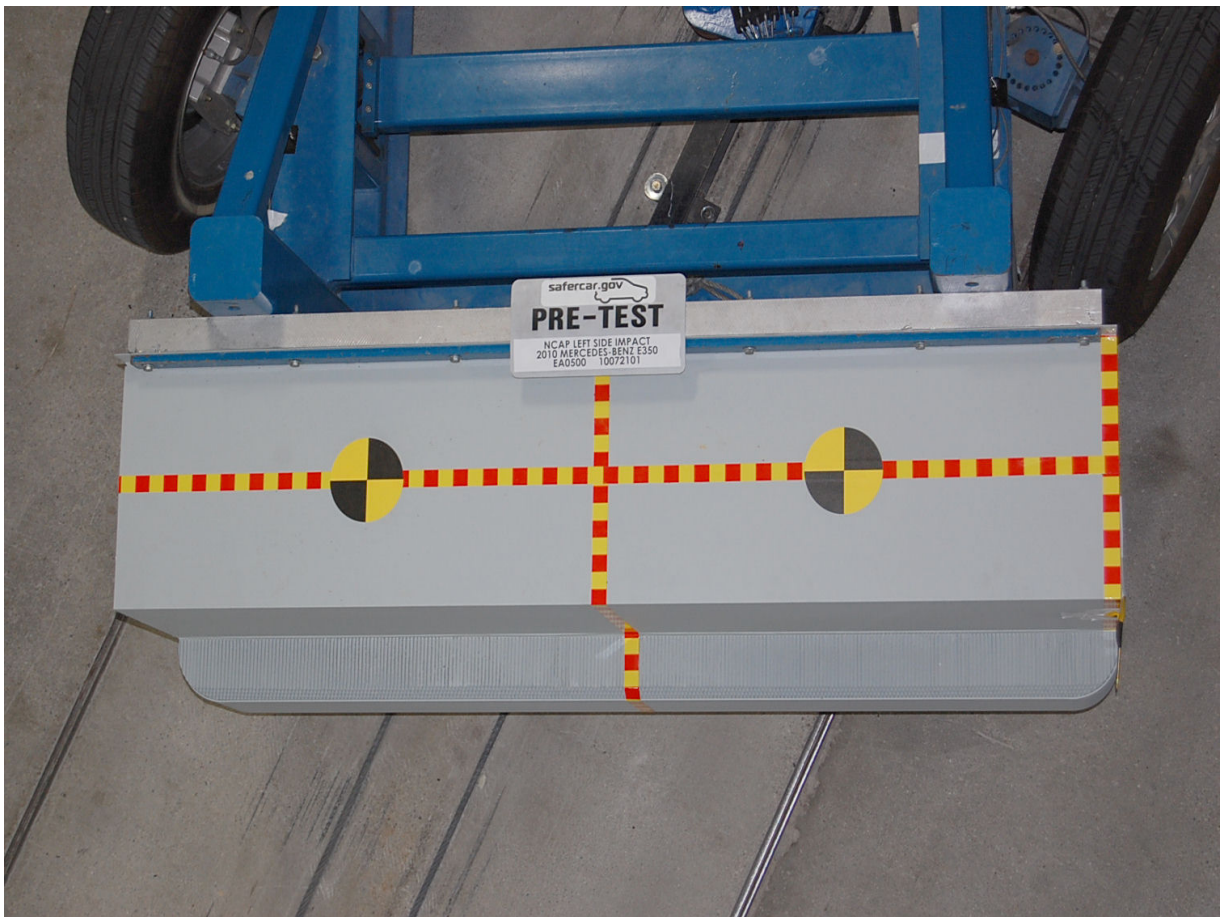
Post-Test Passenger Dummy Right Side View



Pre-Test Front View of Deformable Barrier



Post-Test Front View of Deformable Barrier



Pre-Test Top View of Deformable Barrier



Post-Test Top View of Deformable Barrier



Pre-Test Right Side View of Deformable Barrier



Post-Test Right Side View of Deformable Barrier



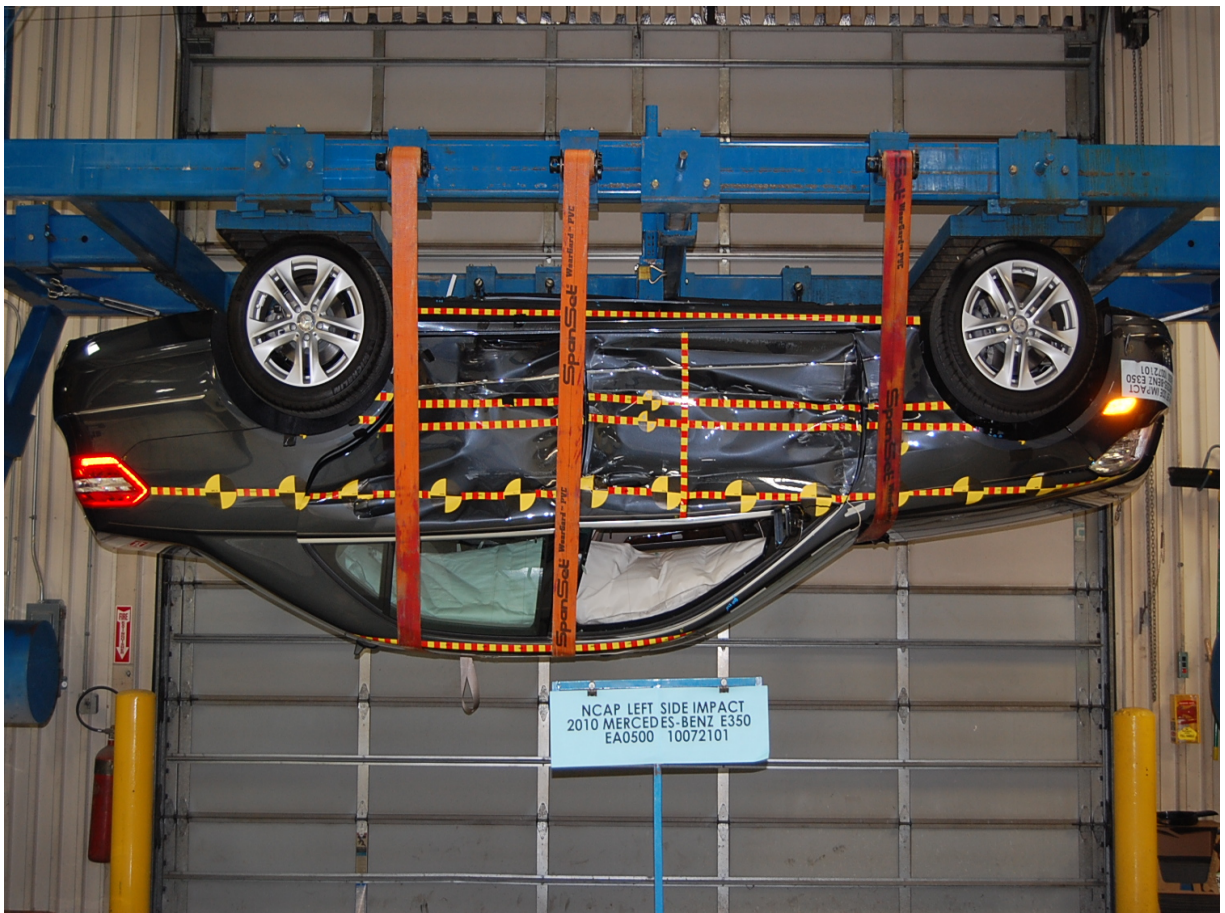
Pre-Test Left Side View of Deformable Barrier



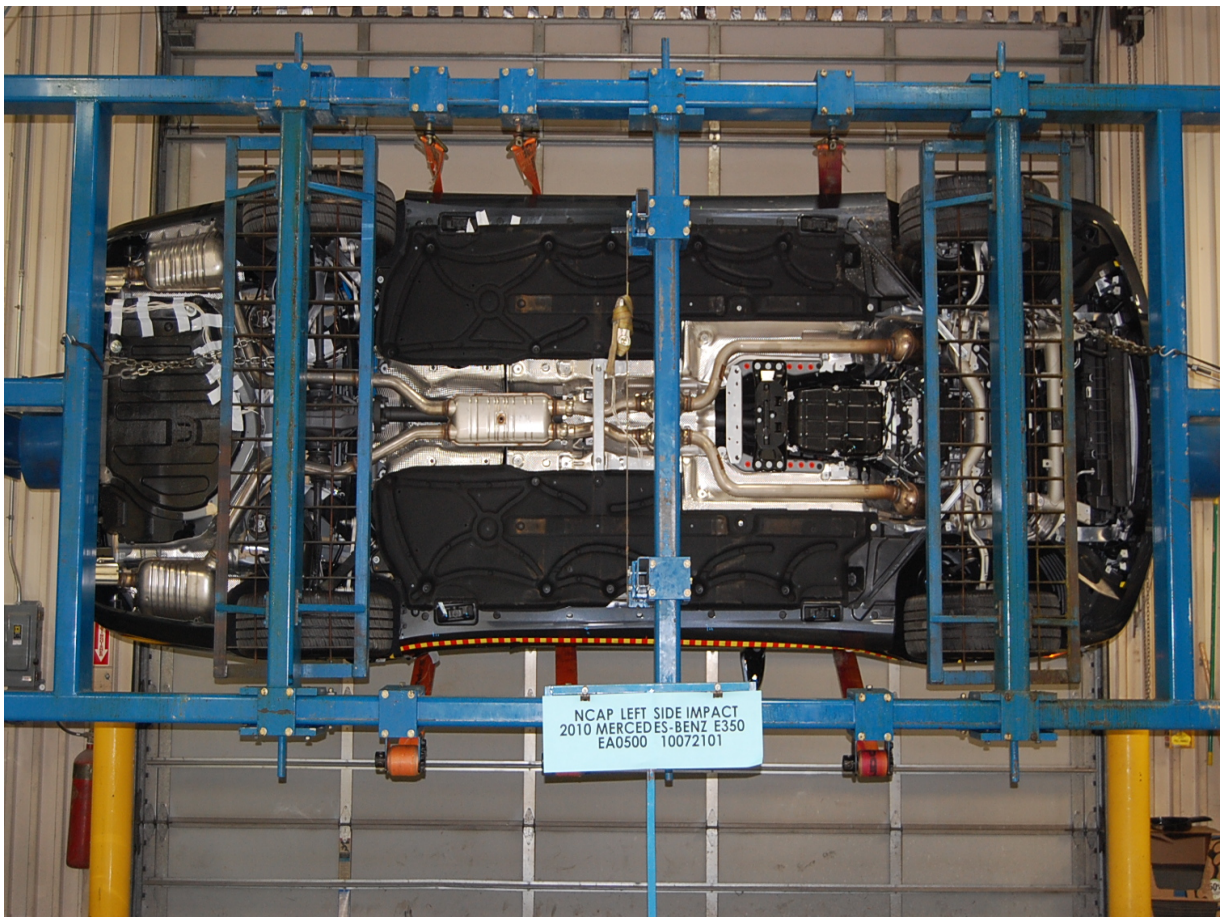
Post-Test Left Side View of Deformable Barrier



Vehicle on Rollover Device (90 Degrees)



Vehicle on Rollover Device (180 Degrees)



Vehicle on Rollover Device (270 Degrees)



Vehicle on Rollover Device (360 Degrees)



Vehicle Impact



Post-Test Driver Dummy Head Contact View



Post-Test Driver Dummy Upper Torso Contact



Post-Test Driver Dummy Lower Torso Contact



Post-Test Driver Dummy Contact



Post-Test Passenger Dummy Head Contact View



Post-Test Passenger Dummy Upper Torso Contact



Post-Test Passenger Dummy Lower Torso Contact



Post-Test Passenger Dummy Contact

APPENDIX B
SID/HIII RESPONSE DATA TRACES

TABLE OF DATA PLOTS

Page No.

List of Data Plots Provided in the Test Report

Figure No. 1.	Driver Upper Rib Y Acceleration vs. Time	B-1
Figure No. 2.	Driver Upper Rib Y Velocity vs. Time	B-1
Figure No. 3.	Driver Lower Rib Y Acceleration vs. Time	B-1
Figure No. 4.	Driver Lower Rib Y Velocity vs. Time	B-1
Figure No. 5.	Driver Lower Spine Y Acceleration vs. Time	B-2
Figure No. 6.	Driver Lower Spine Y Velocity vs. Time	B-2
Figure No. 7.	Driver Pelvis Y Acceleration vs. Time	B-2
Figure No. 8.	Driver Pelvis Y Velocity vs. Time	B-2
Figure No. 9.	Passenger Upper Rib Y Acceleration vs. Time	B-3
Figure No. 10.	Passenger Upper Rib Y Velocity vs. Time	B-3
Figure No. 11.	Passenger Lower Rib Y Acceleration vs. Time	B-3
Figure No. 12.	Passenger Lower Rib Y Velocity vs. Time	B-3
Figure No. 13.	Passenger Lower Spine Y Acceleration vs. Time	B-4
Figure No. 14.	Passenger Lower Spine Y Velocity vs. Time	B-4
Figure No. 15.	Passenger Pelvis Y Acceleration vs. Time	B-4
Figure No. 16.	Passenger Pelvis Y Velocity vs. Time	B-4

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

Driver Head X Primary

Driver Head Y Primary

Driver Head Z Primary

Driver Head X Redundant

Driver Head Y Redundant

Driver Head Z Redundant

Driver Upper Neck Force X

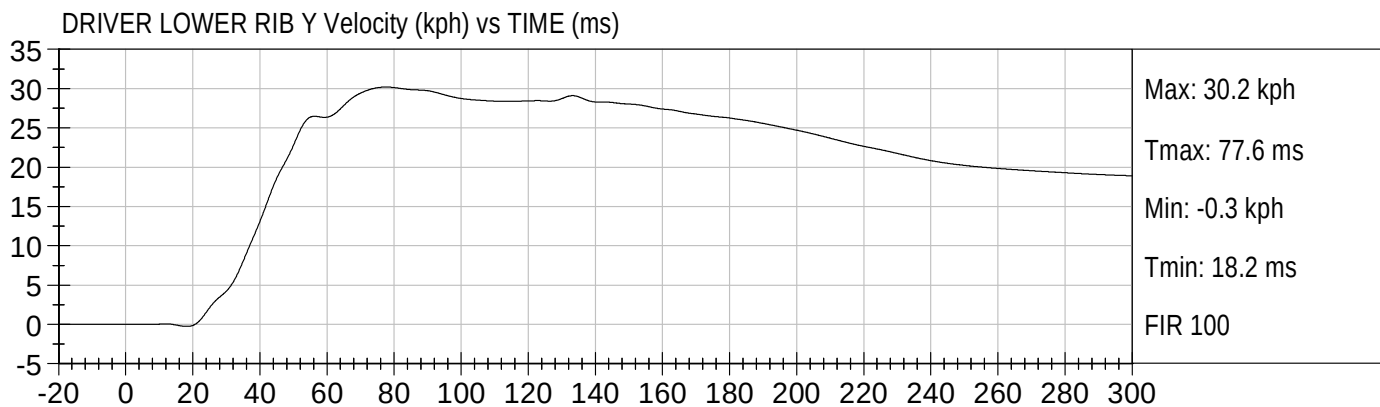
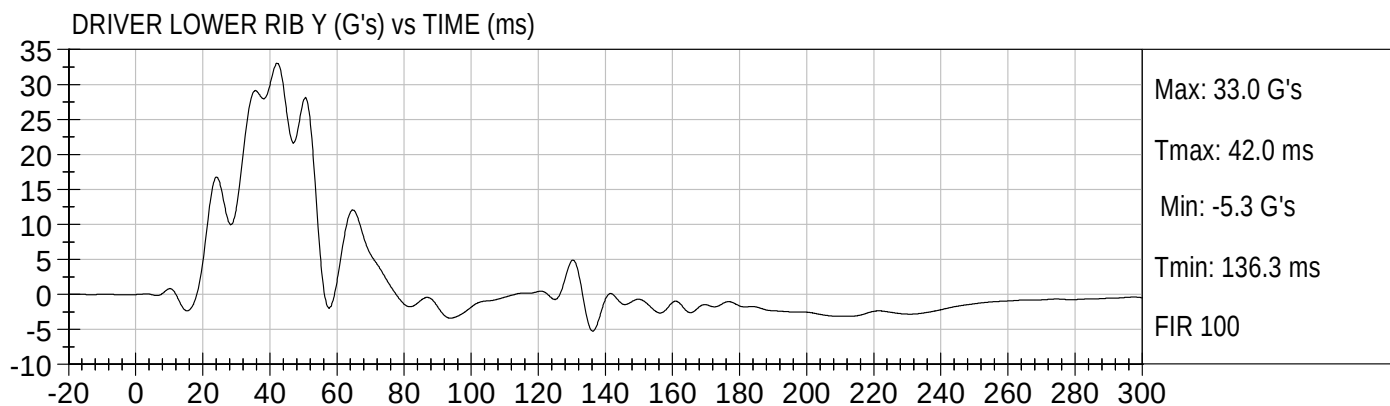
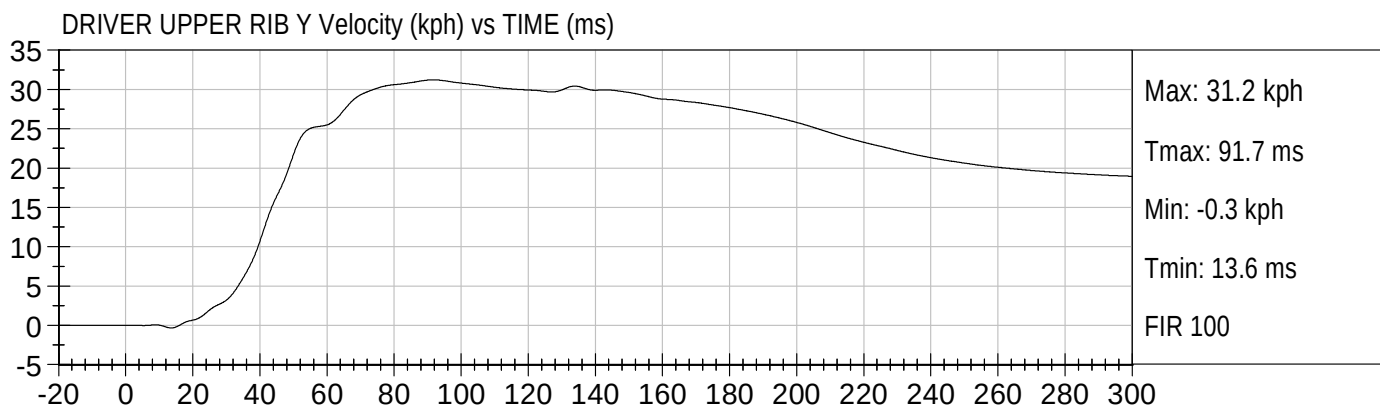
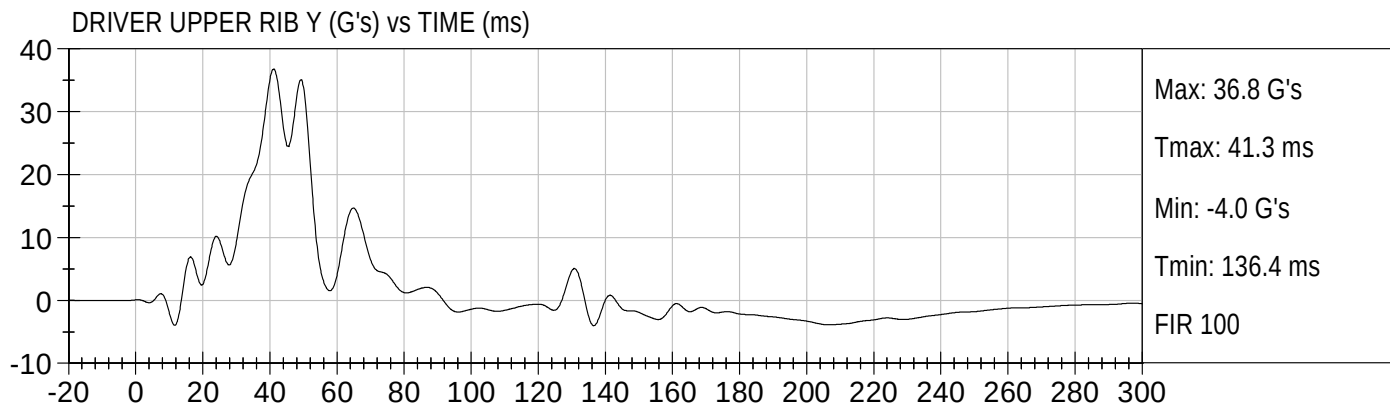
Driver Upper Neck Force Y

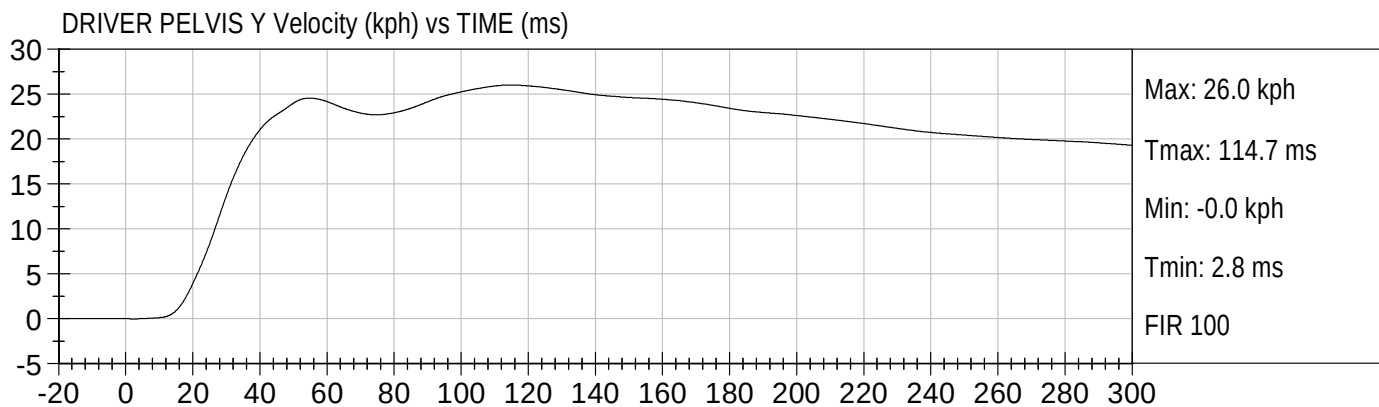
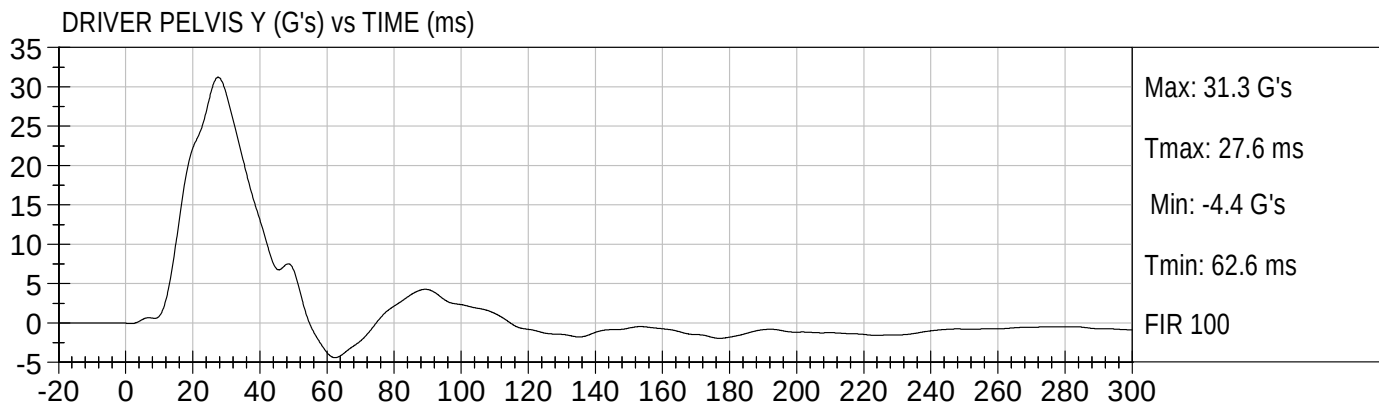
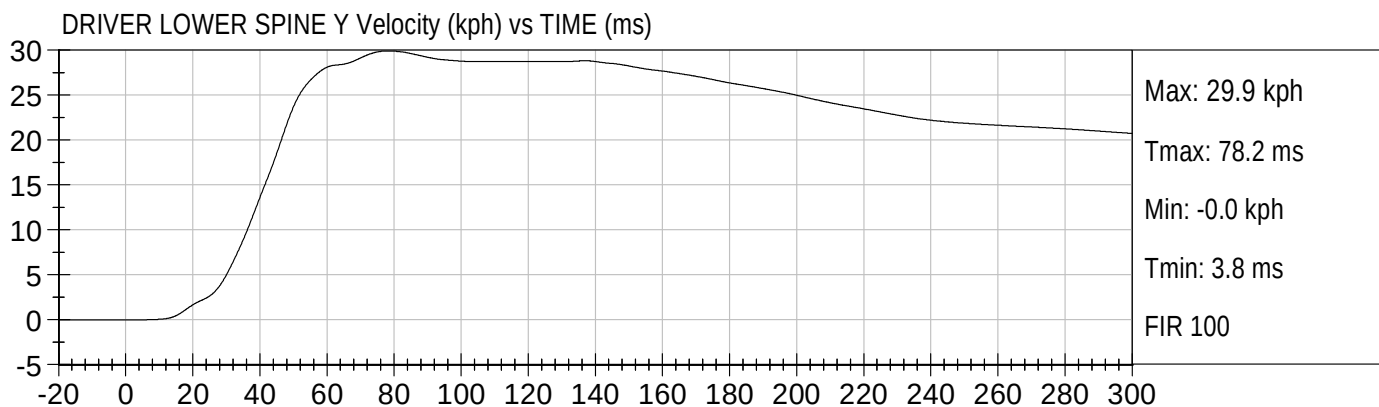
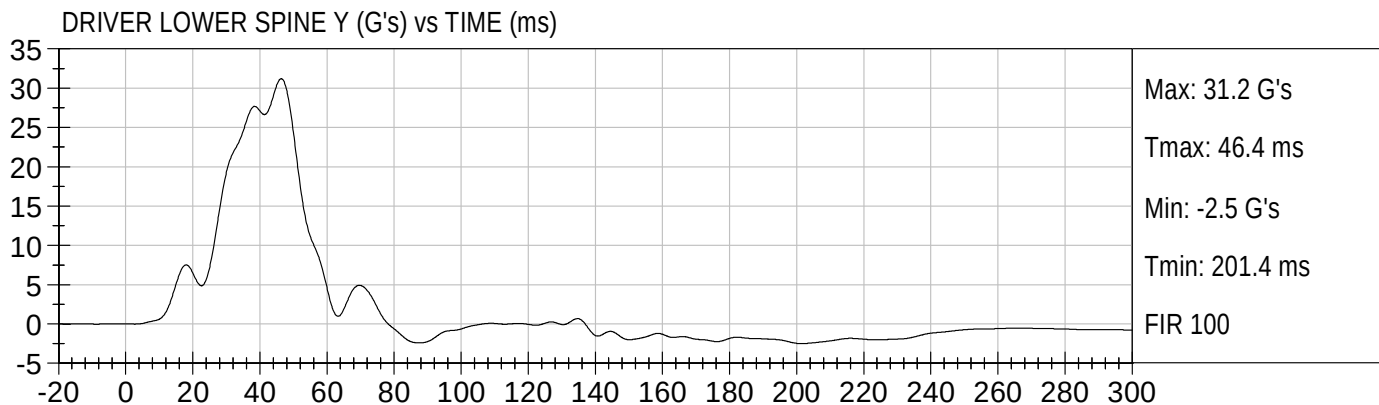
Driver Upper Neck Force Z

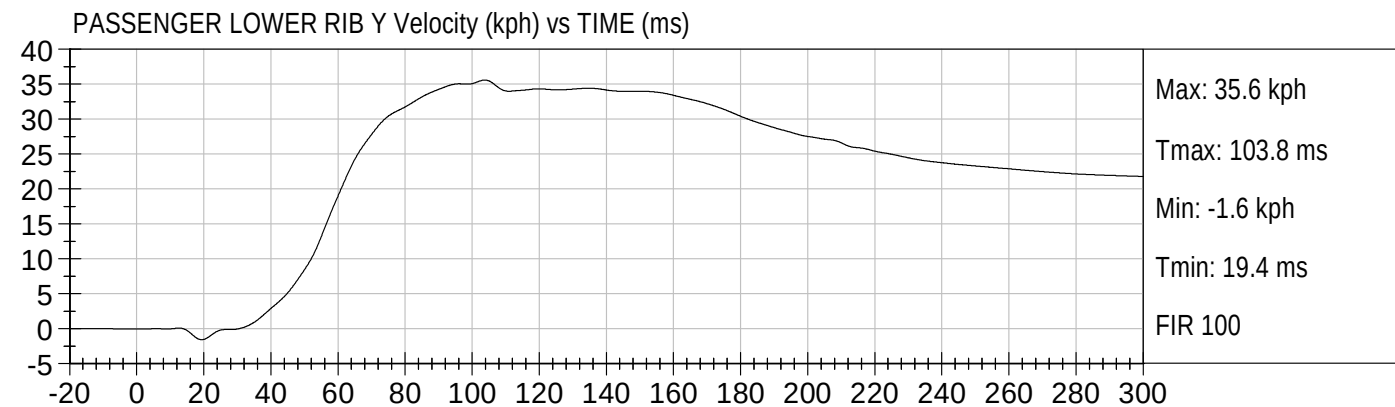
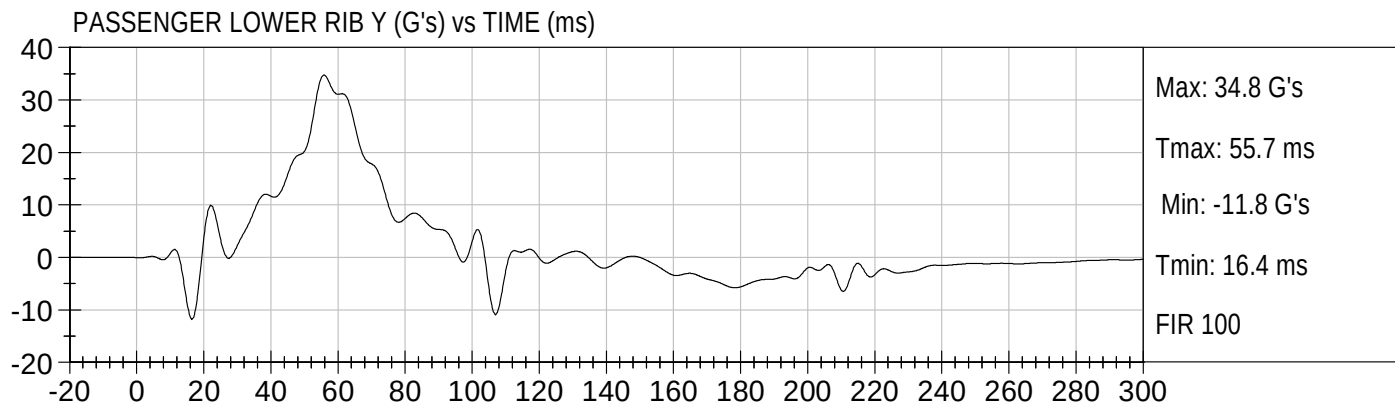
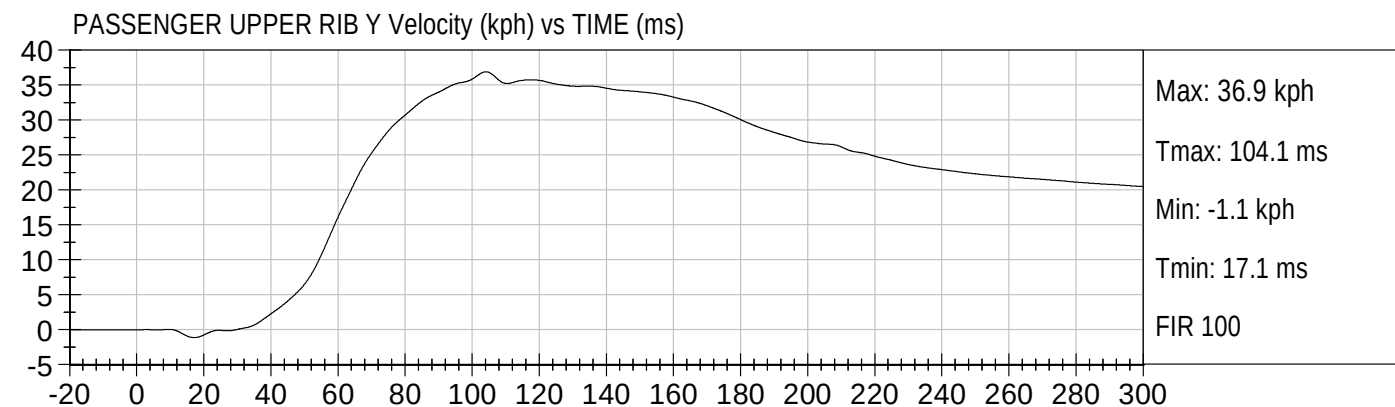
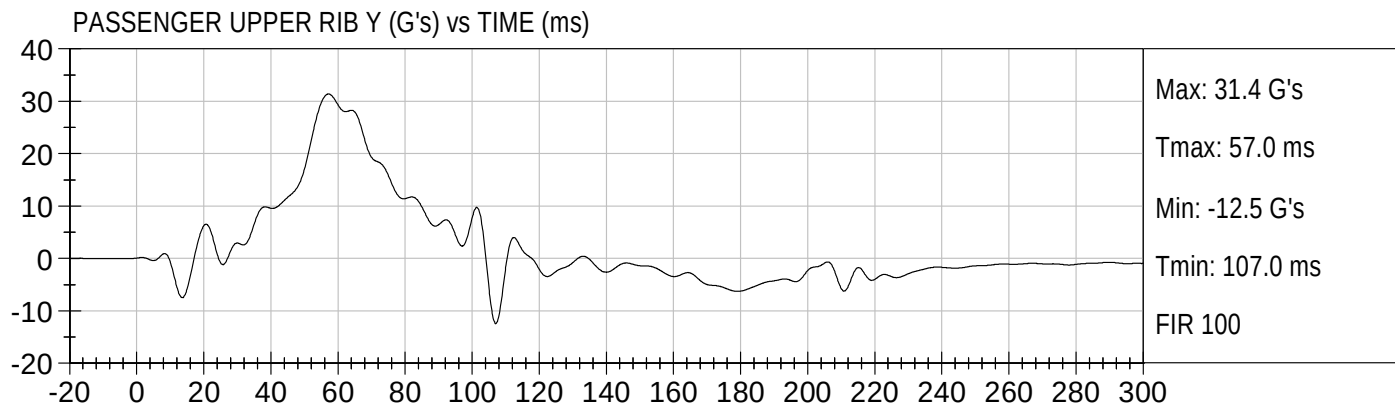
Driver Upper Neck Moment X

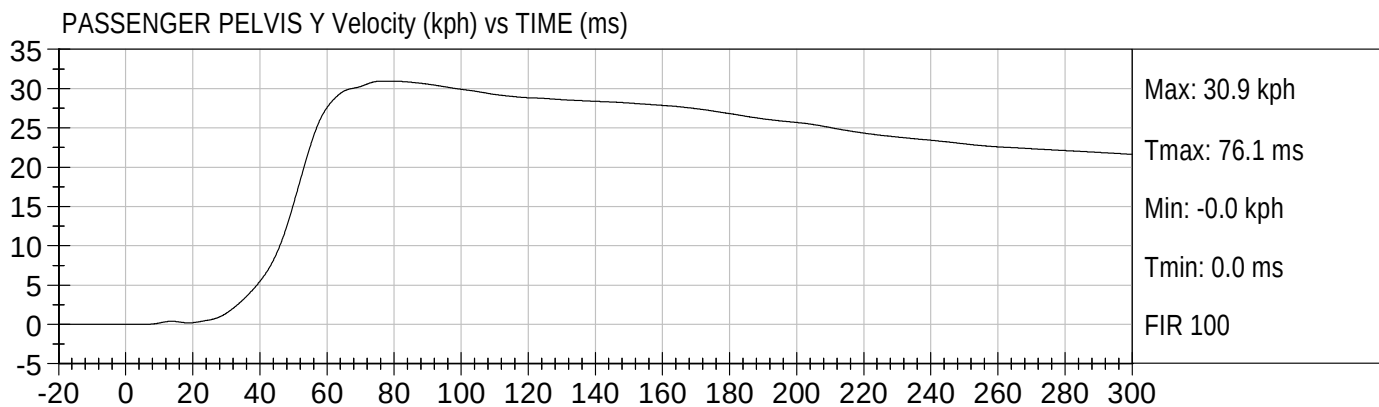
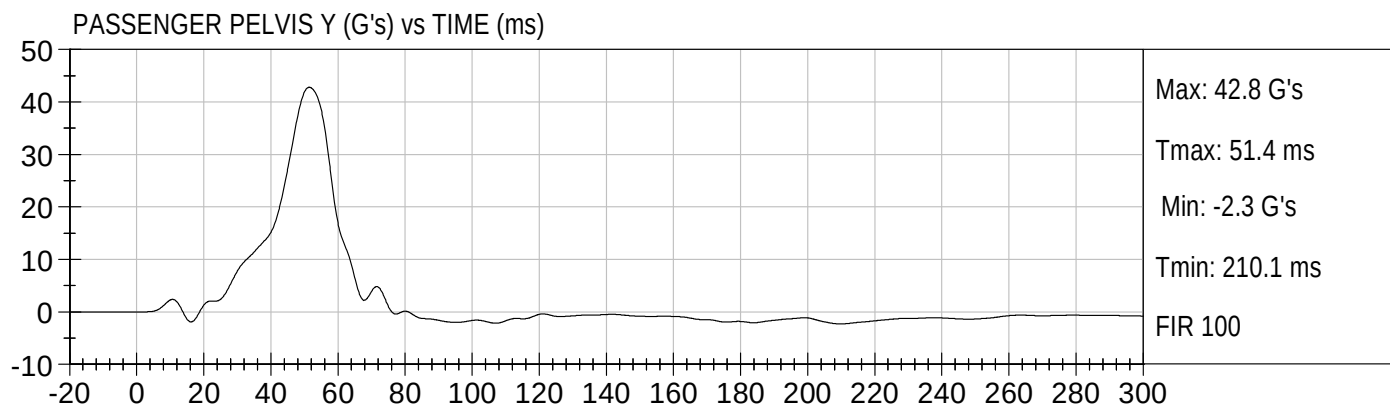
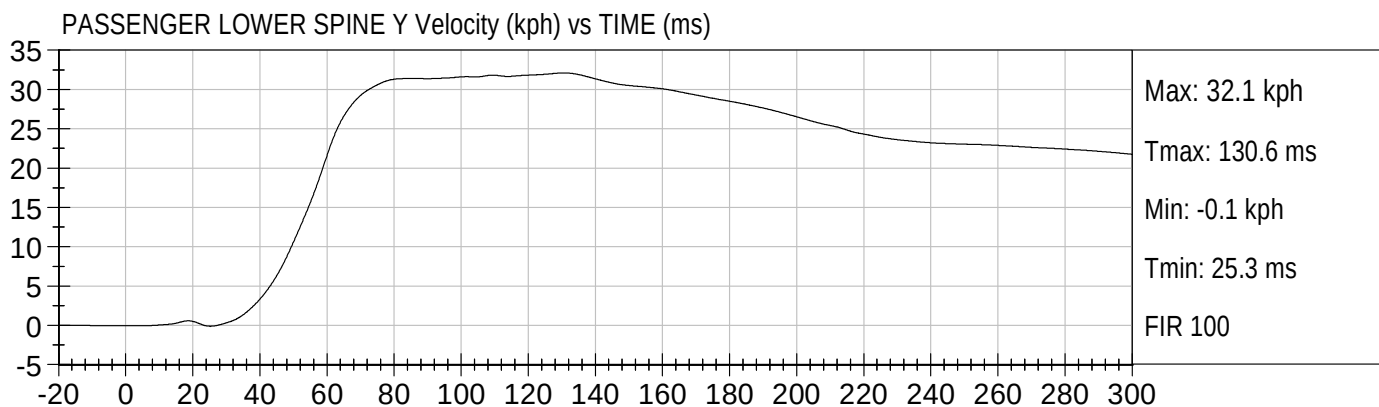
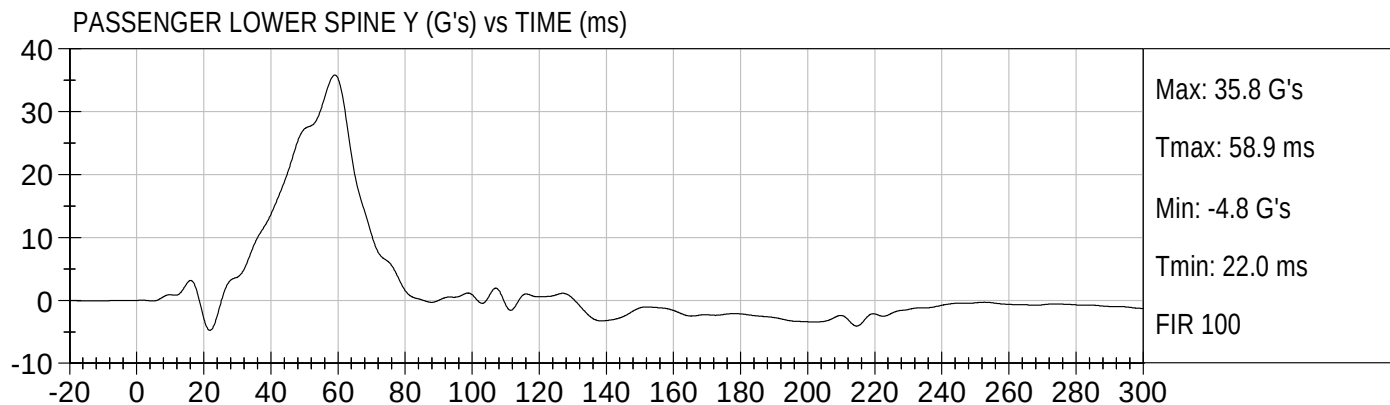
Driver Upper Neck Moment Y
Driver Upper Neck Moment Z
Driver Upper Rib Redundant Y
Driver Lower Rib Redundant Y
Driver Lower Spine Redundant Y
Driver Pelvis Redundant Y
Driver Thorax Contact
Driver Pelvis Contact
Passenger Head X Primary
Passenger Head Y Primary
Passenger Head Z Primary
Passenger Head X Redundant
Passenger Head Y Redundant
Passenger Head Z Redundant
Passenger Upper Neck Force X
Passenger Upper Neck Force Y
Passenger Upper Neck Force Z
Passenger Upper Neck Moment X
Passenger Upper Neck Moment Y
Passenger Upper Neck Moment Z
Passenger Upper Rib Redundant Y
Passenger Lower Rib Redundant Y
Passenger Lower Spine Redundant Y
Passenger Pelvis Redundant Y
Passenger Thorax Contact
Passenger Pelvis Contact
Vehicle Right Sill at Front Seat X
Vehicle Right Sill at Front Seat Y
Vehicle Right Sill at Front Seat Z
Vehicle Right Sill at Rear Seat X
Vehicle Right Sill at Rear Seat Y
Vehicle Right Sill at Rear Seat Z

Vehicle Rear Floor Above Axle X
Vehicle Rear Floor Above Axle Y
Vehicle Rear Floor Above Axle Z
Vehicle Left Sill at Rear Door Y
Vehicle Left Sill at Front Door Y
Vehicle Right Rear Occupant Compartment
Vehicle B-Post Lower Y
Vehicle B-Post Middle Y
Vehicle A-Post Lower Y
Vehicle A-Post Middle Y
Vehicle Left Front Seat Track
Vehicle CG X
Vehicle CG Y
Vehicle CG Z
MDB CG X
MDB CG Y
MDB CG Z
MDB Rear X
MDB Rear Y
MDB Left Bumper Contact
MDB Right Bumper Contact









APPENDIX C
DUMMY CALIBRATION DATA

CERTIFICATION DATA

Dummy Serial Number: 271

Calibration Test Results Summary

Dummy Serial Number: 271

Pre-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Head Drop Test:	The head passed all drop test requirements.
Neck Pendulum Test:	The neck passed all pendulum test requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

SID/HIII Calibration Data Sheet
Side Impact Dummy
External Measurements

ATD Serial No: 271

Test I.D: D10227

Tested Parameter	Units	Specification	Result	Pass/Fail
SH - Seated Height	mm	889 - 909	905	Pass
RH - Rib Height	mm	501 - 521	502	Pass
HP - Hip Pivot Height	mm	99 ref.	99	Pass
RD - Rib from Back Line	mm	229 - 241	239	Pass
KV - Knee Pivot to Back Line	mm	511 - 526	526	Pass
SW - Knee Pivot to Floor	mm	490 - 505	497	Pass
HW - Hip Width	mm	356 - 391	371	Pass
Overall Test Results			Pass	

Jessica Hall
Laboratory Technician

David Winkelbauer
Approved By

7/19/2010
Test Date

SID/HIII Calibration Data Sheet
Side Impact Dummy
Head Drop Calibration (Lateral)

ATD Serial No: 271

Test I.D: D102271

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	53	Pass
Peak Resultant Acceleration	G's	120 to 150	145	Pass
Is Resultant Curve Unimodal?	N/A	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-7.7	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

7/16/10
Test Date

David Winkelbauer
Approved By



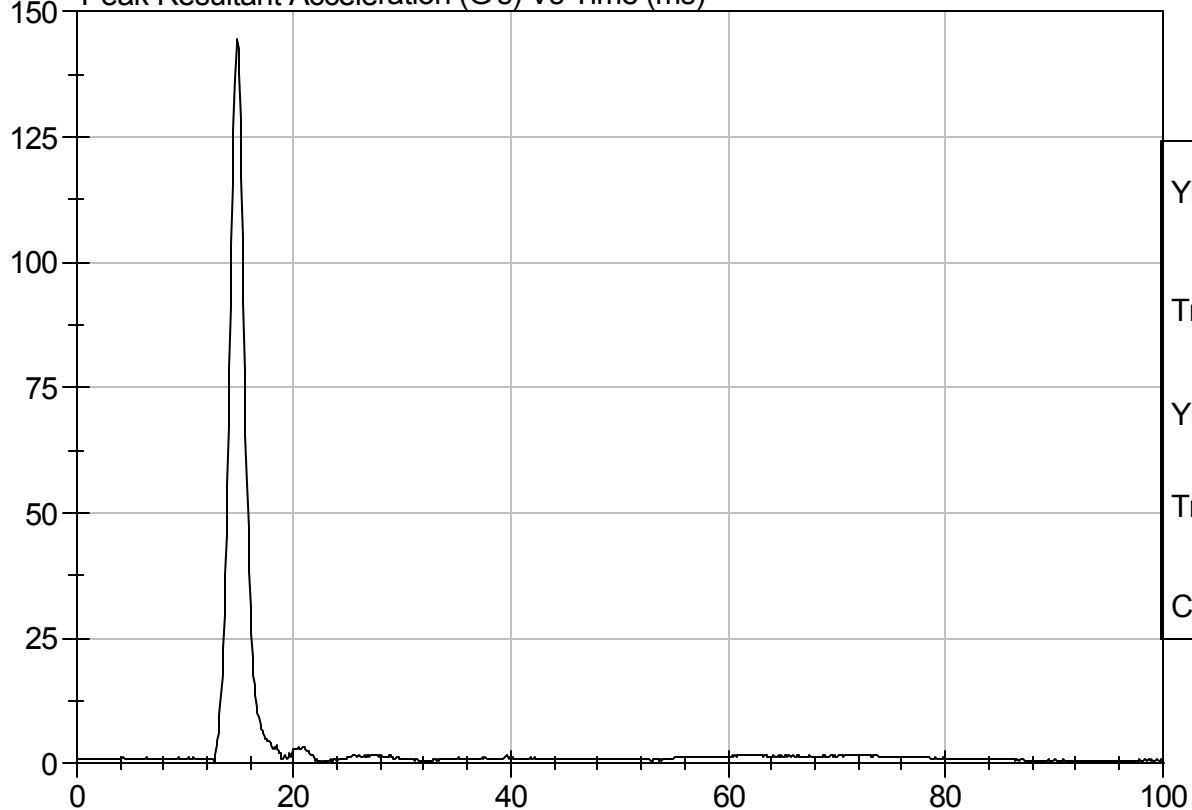
Test Description: Head Drop

Test Date: 7/16/10

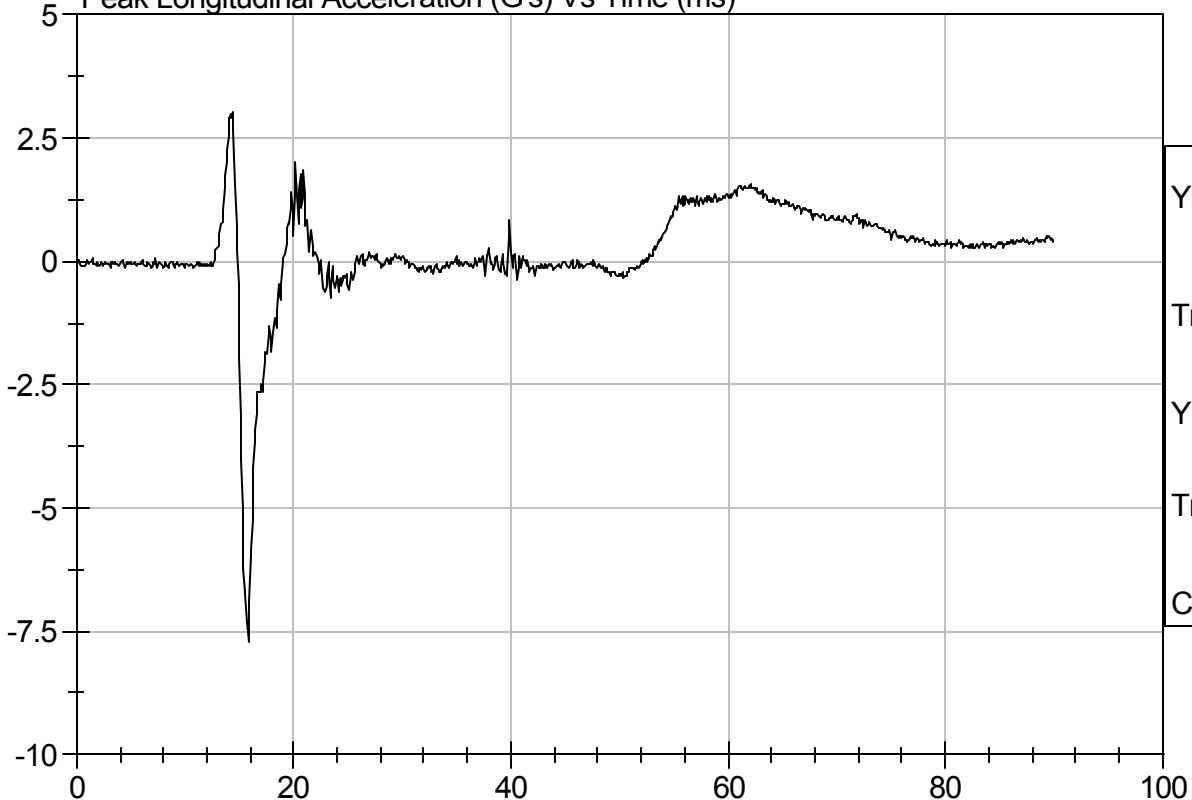
Component: D102271

Speed: 0 ft/s, 0 m/s

Peak Resultant Acceleration (G's) Vs Time (ms)



Peak Longitudinal Acceleration (G's) Vs Time (ms)



SID/HIII Calibration Data Sheet
Side Impact Dummy
Thorax Impact Test

ATD Serial No: 271

Test I.D: D102272

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	48	Pass
Probe Velocity	m/s	4.22 - 4.31	4.27	Pass
Upper Rib	G's	37 - 46	38	Pass
Lower Rib	G's	37 - 46	39	Pass
Lower Spine	G's	15 - 22	18	Pass
Overall Test Results				Pass

Jessica Gall
Laboratory Technician

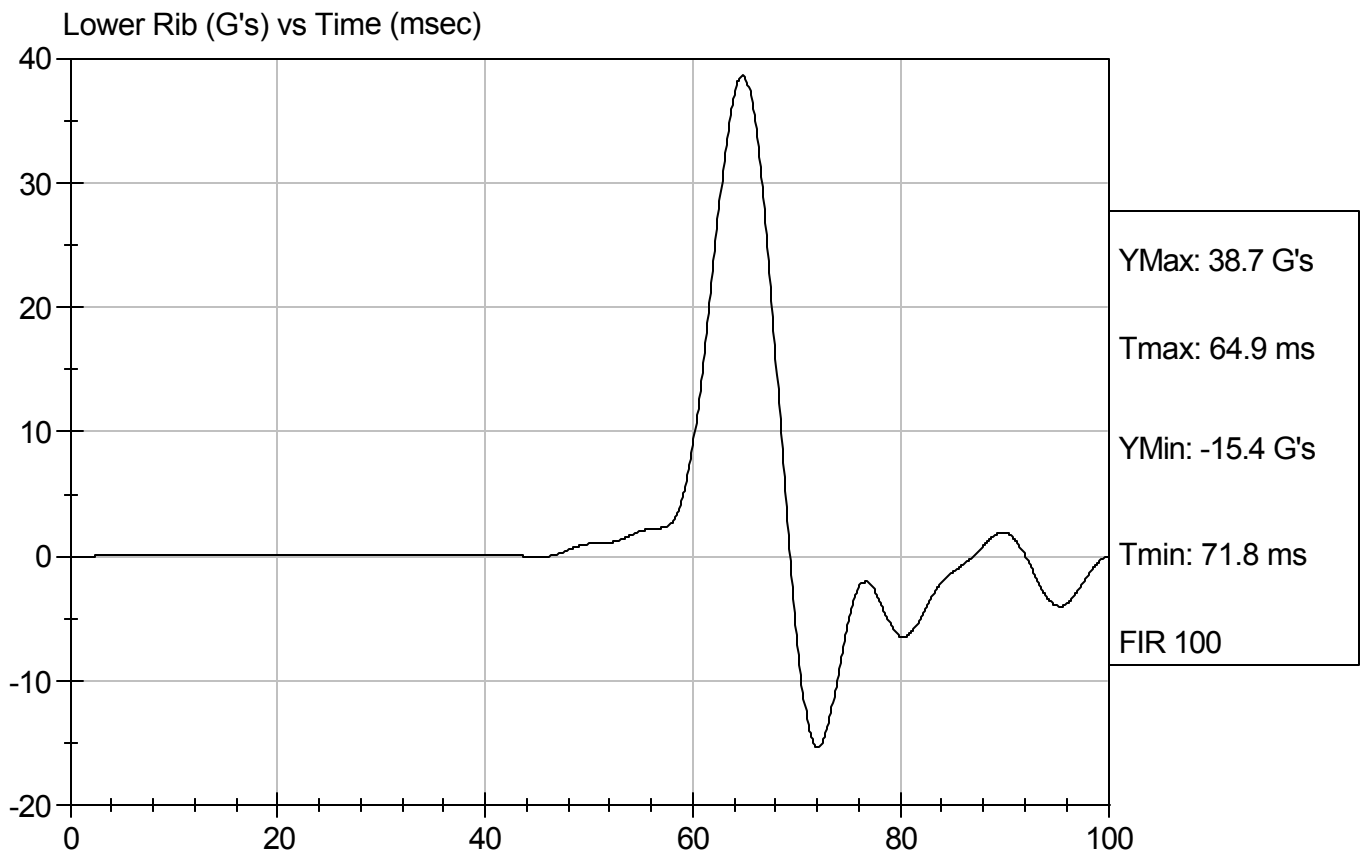
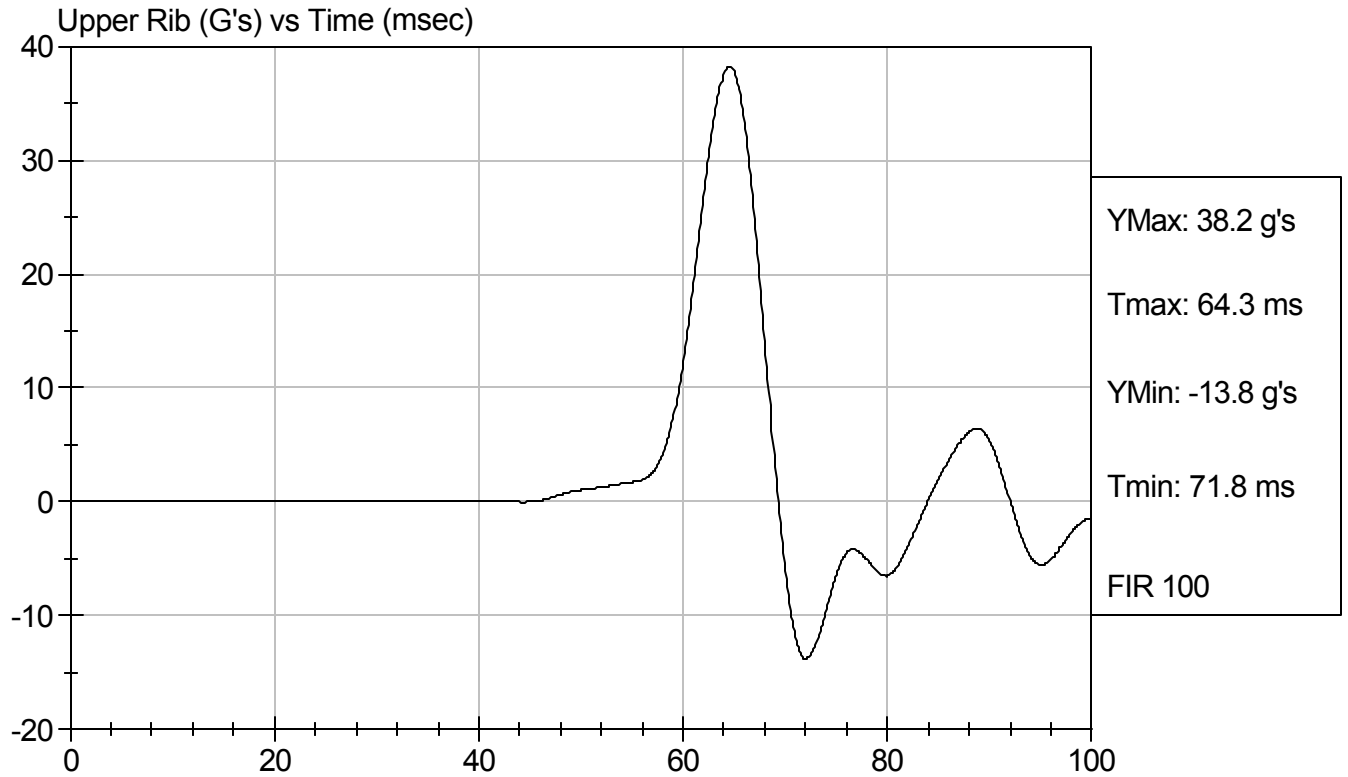
David Winkelbauer
Approved By

7/19/2010
Test Date



Test Desc: Thorax Impact
Component ID: D102272

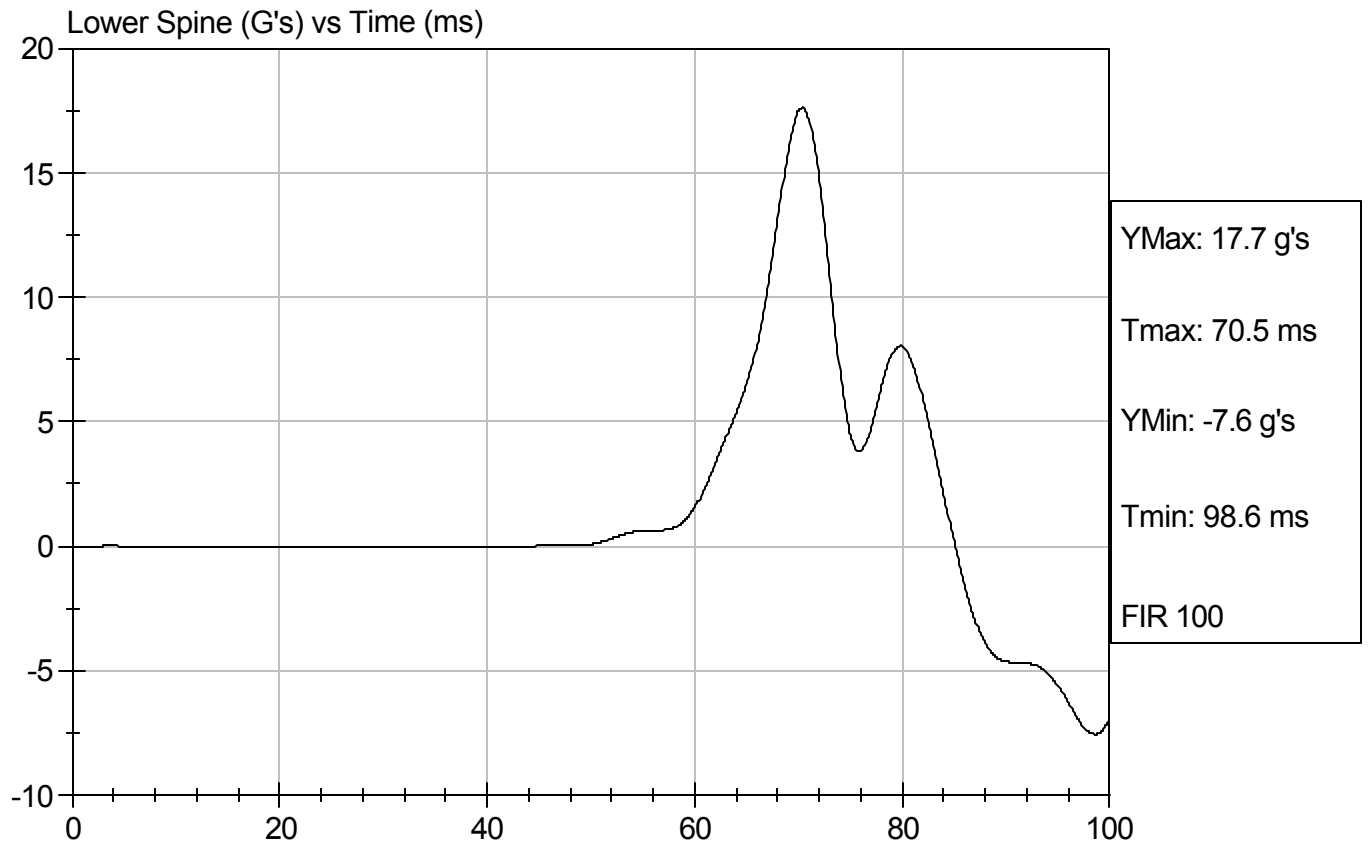
Test Date: 7/19/2010
Speed: 14.00 ft/s, 4.27 m/s





Test Desc: Thorax Impact
Component ID: D102272

Test Date: 7/19/2010
Speed: 14.00 ft/s, 4.27 m/s



SID/HIII Calibration Data Sheet
Side Impact Dummy
Pelvis Impact Test

ATD Serial No: 271

Test I.D: D102273

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	48	Pass
Probe Velocity	m/s	4.27 - 4.33	4.30	Pass
Pelvis Acceleration	G's	40 - 60	45	Pass
			Overall Test Results	Pass

Jessica Gall
Laboratory Technician

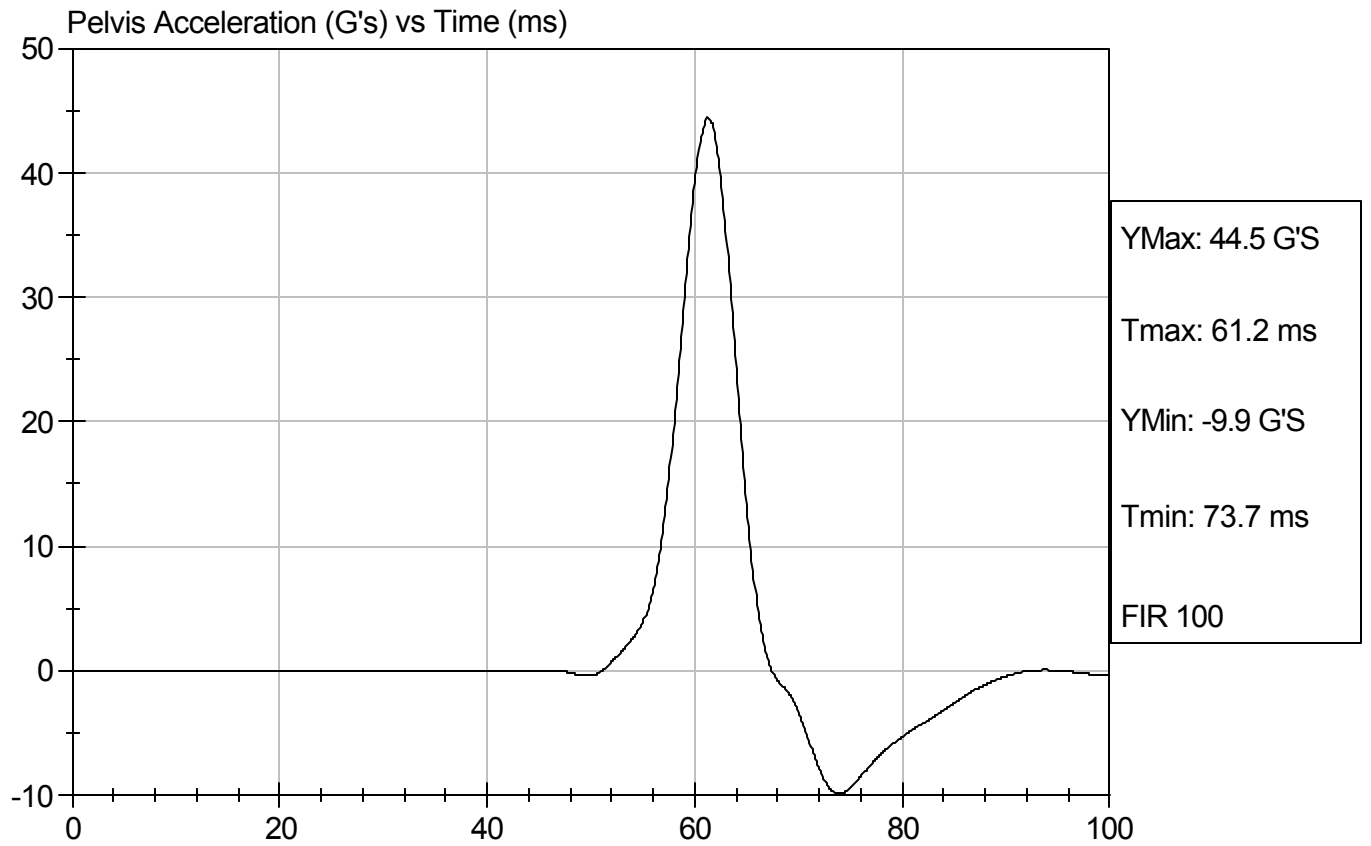
David Winkelbauer
Approved By

7/19/2010
Test Date



Test Desc: Pelvis Impact
Component ID: D102273

Test Date: 7/19/2010
Speed: 14.12 ft/s, 4.30 m/s



SID/HIII Calibration Data Sheet
Side Impact Dummy
Abdominal Compression Calibration (Pre-Load = 10 lbs)

ATD Serial No: 271

Test I.D: D102274

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	54	Pass
Force At 12.7 mm	N	104 -162	138	Pass
Force At 19 mm	N	163 - 222	195	Pass
Force At 25.4 mm	N	222 - 280	266	Pass
Force At 33 mm	N	325 - 391	363	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

David Winkelbauer
Approved By

07/16/2010
Test Date

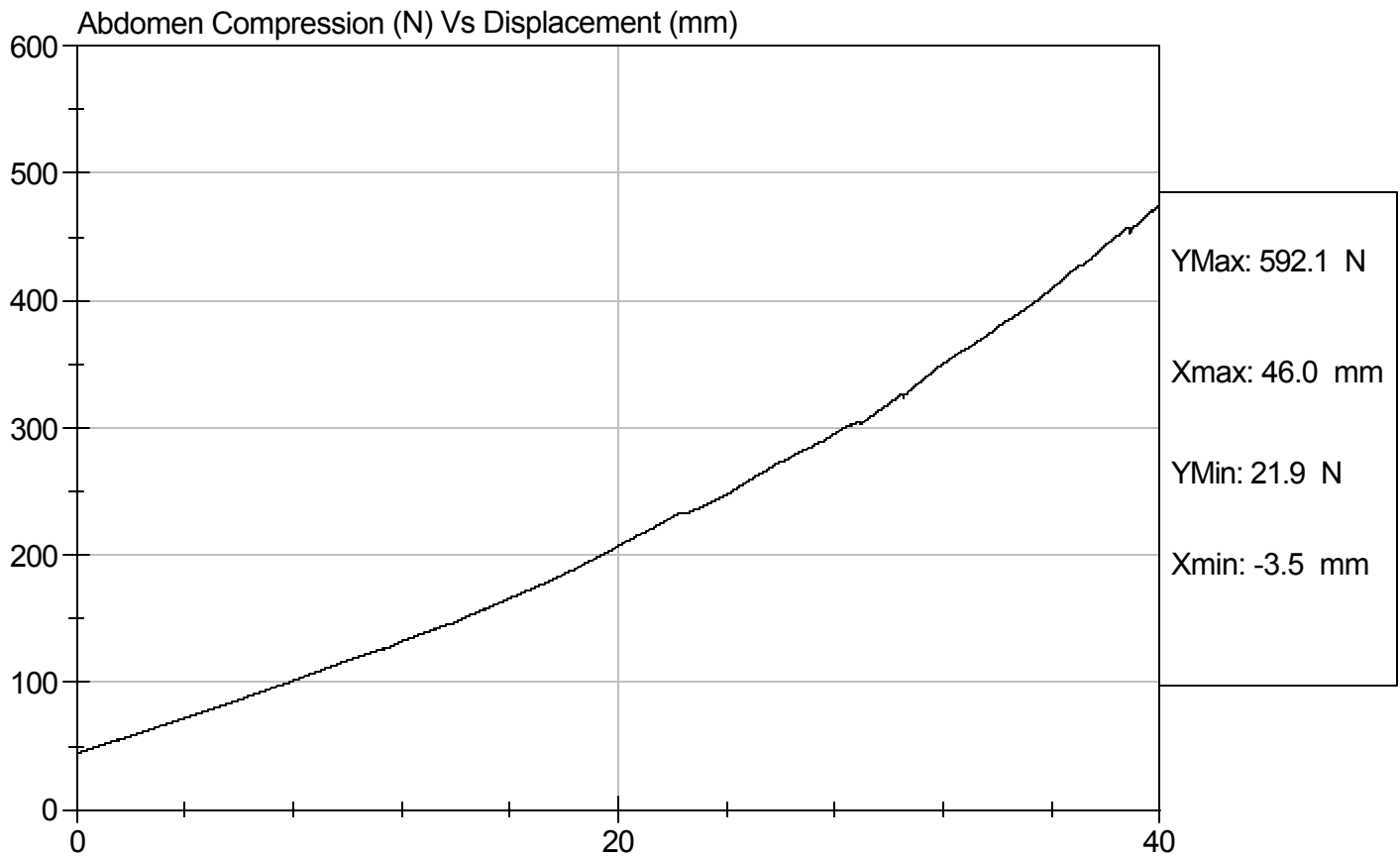


Test Description: Abdomen Compression

Test Date: 07/16/2010

Component: D102274

Speed: 0 ft/s, 0 m/s



SID/HIII Calibration Data Sheet
Side Impact Dummy
Lumbar Flexion Calibration

ATD Serial No: 271

Test I.D: D102275

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	56	Pass
Force At 0 deg	N	0 - 26.7	0	Pass
Force At 20 deg	N	97.9 - 151.2	99.9	Pass
Force At 30 deg	N	151.2 - 204.6	153.7	Pass
Force At 40 deg	N	204.6 - 258.0	209.6	Pass
Return Angle	Deg	12 Maximum	6	Pass
Overall Test Results			Pass	

Jessica Hall
Laboratory Technician

David Winkelbauer
Approved By

07/16/2010
Test Date

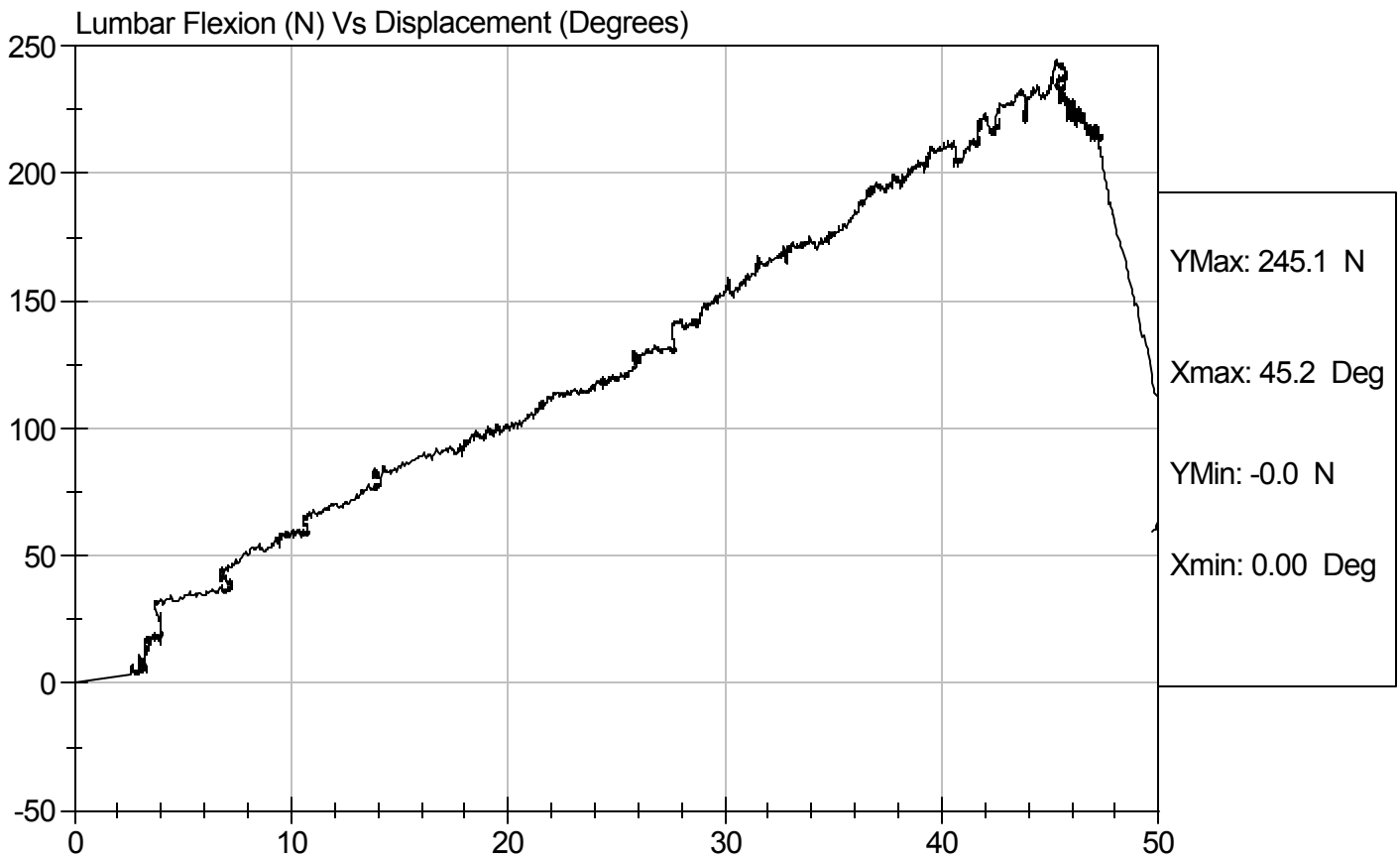


Test Description: Lumbar Flexion

Test Date: 07/16/2010

Component: D102275

Speed: 0 ft/s, 6.00 m/s

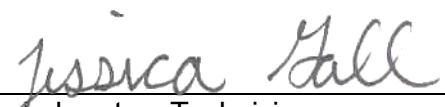


SID/HIII Calibration Data Sheet
Side Impact Dummy
Neck Pendulum Test

ATD Serial No: 271

Test I.D: D102279

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity		%	10 to 70	53	Pass
Impact Velocity		m/s	6.89 to 7.13	7.06	Pass
Pendulum Deceleration	10 ms	m/s	1.96 to 2.55	2.39	Pass
	20 ms	m/s	4.12 to 5.10	4.63	Pass
	30 ms	m/s	5.73 to 7.01	6.41	Pass
	40 to 70 ms	m/s	6.27 to 7.64	6.65	Pass
Midsagittal Plane Max Rotation		deg	66 to 82	72	Pass
Head Rotation Peak to Zero - Decay Time		ms	58 to 67	63	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	81	Pass
Mx Peak To Zero - Decay Time		ms	49 to 64	57	Pass
Mx Peak to Max. Head Rotation		ms	2 to 16	7	Pass


 Laboratory Technician

7/16/10

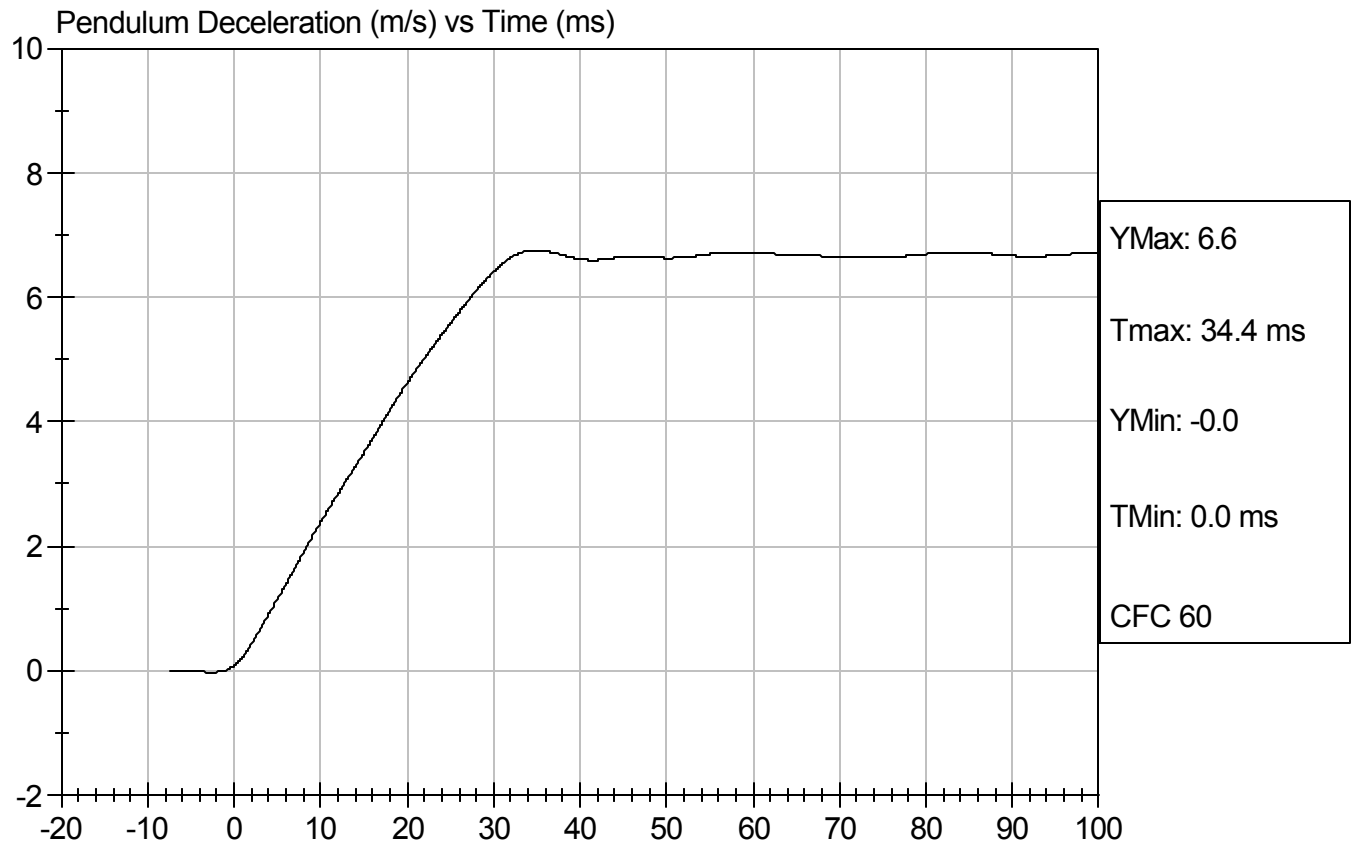
Test Date


 Approved By



Test Desc: Neck Bending
Component ID: D102279

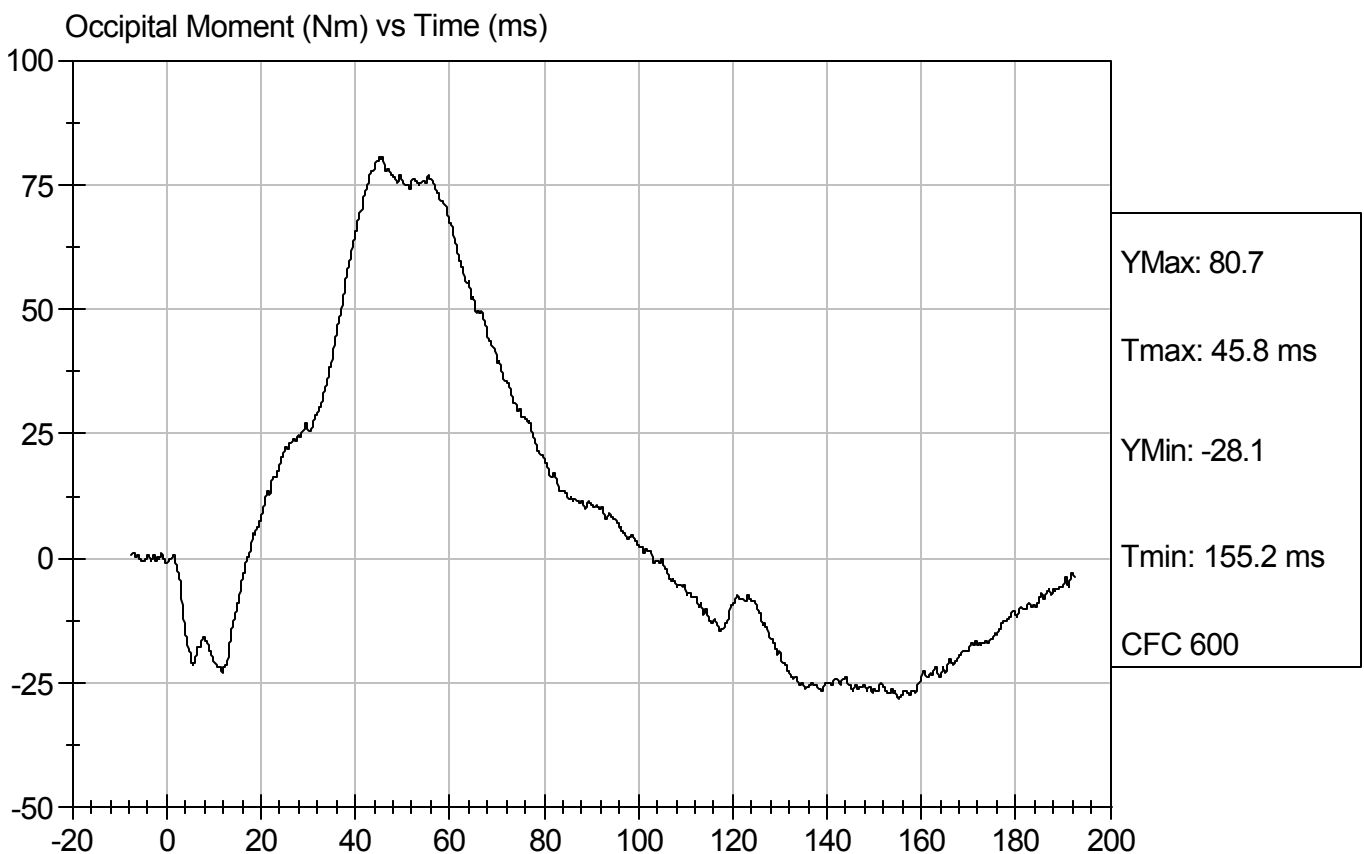
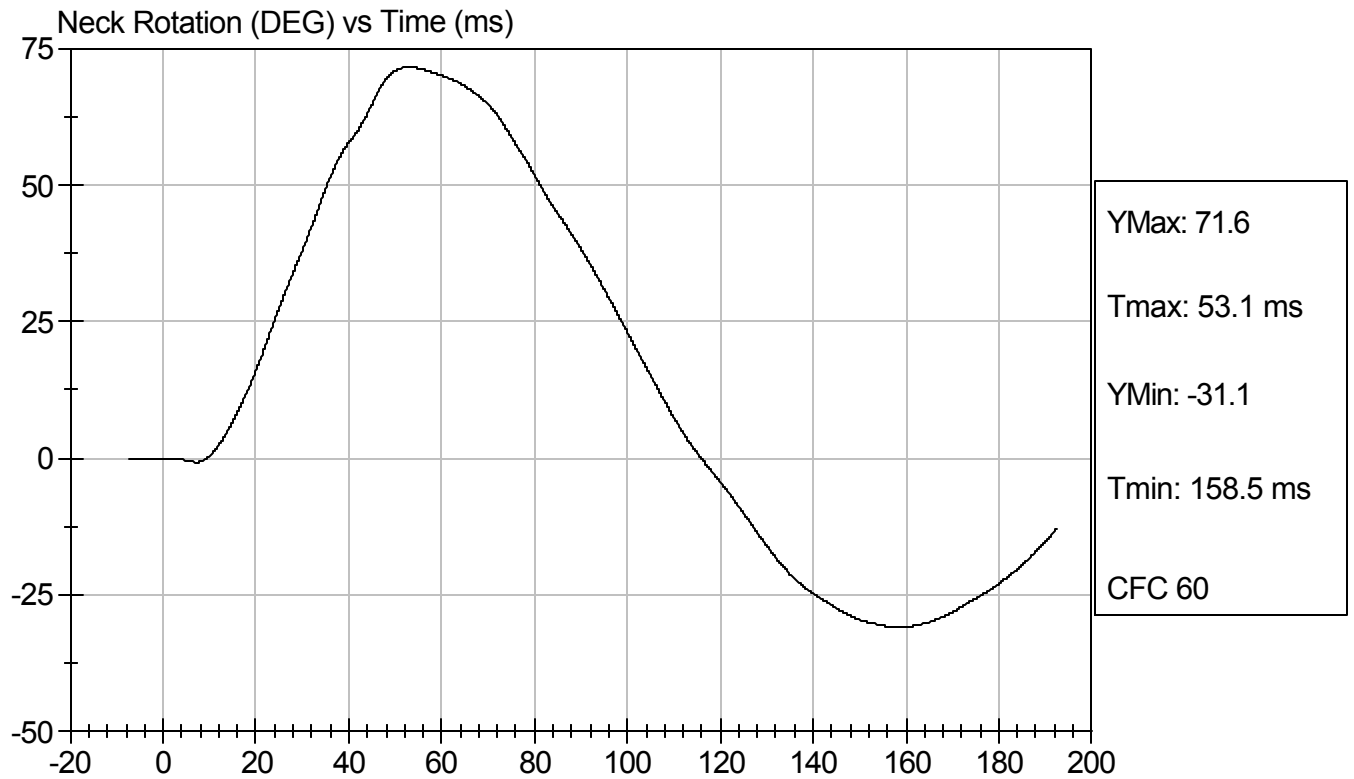
Test Date: 7/16/10
Speed: 23.15 ft/s, 7.06 m/s





Test Desc: Neck Bending
Component ID: D102279

Test Date: 7/16/10
Speed: 23.15 ft/s, 7.06 m/s



Calibration Test Results Summary

Dummy Serial Number: 271

Post-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Head Drop Test:	The head passed all drop test requirements.
Neck Pendulum Test:	The neck passed all pendulum test requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

SID/HIII Calibration Data Sheet
Side Impact Dummy
Head Drop Calibration (Lateral)

ATD Serial No: 271

Test I.D: D102331

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	46	Pass
Peak Resultant Acceleration	G's	120 to 150	143	Pass
Is Resultant Curve Unimodal?	N/A	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	6.3	Pass
			Overall Test Results	Pass


Laboratory Technician


Approved By

7/21/10
Test Date



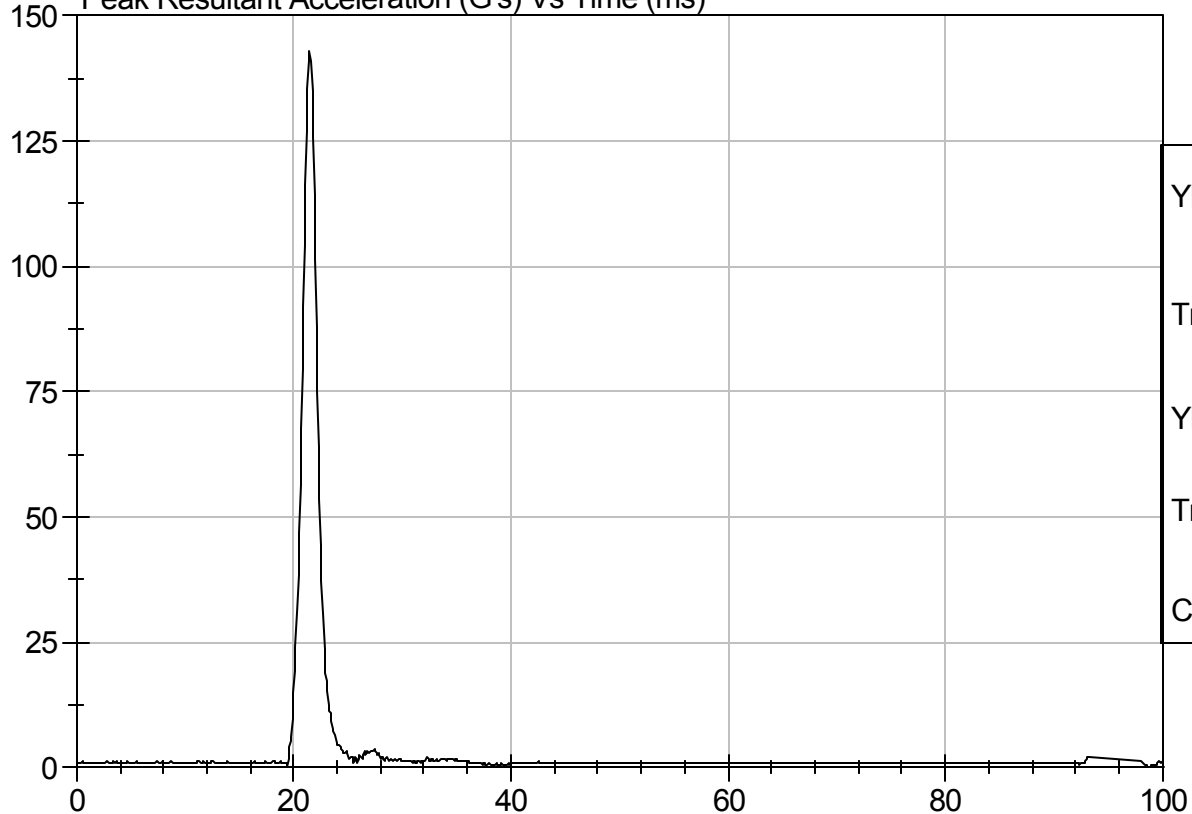
Test Description: Head Drop

Test Date: 7/21/10

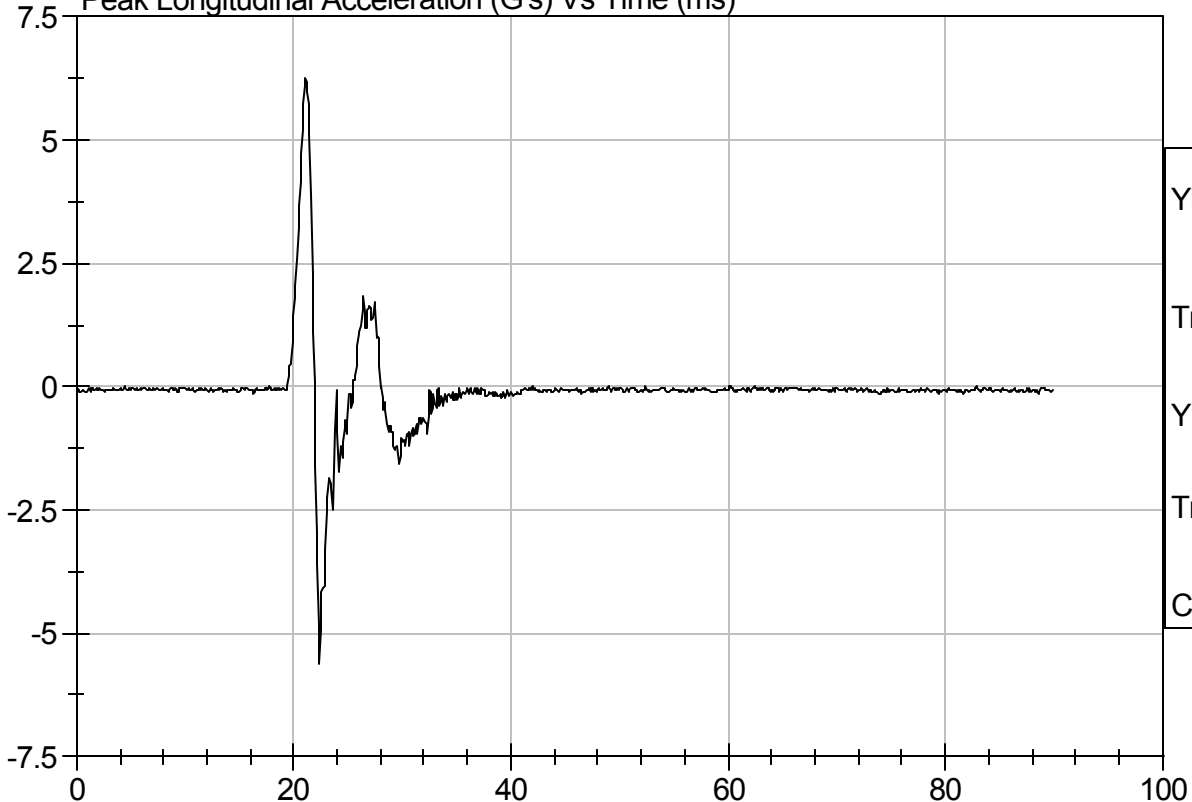
Component: D102331

Speed: 0 ft/s, 0 m/s

Peak Resultant Acceleration (G's) Vs Time (ms)



Peak Longitudinal Acceleration (G's) Vs Time (ms)



SID/HIII Calibration Data Sheet
Side Impact Dummy
Thorax Impact Test

ATD Serial No: 271

Test I.D: D102332

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	46	Pass
Probe Velocity	m/s	4.22 - 4.31	4.27	Pass
Upper Rib	G's	37 - 46	40	Pass
Lower Rib	G's	37 - 46	39	Pass
Lower Spine	G's	15 - 22	18	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

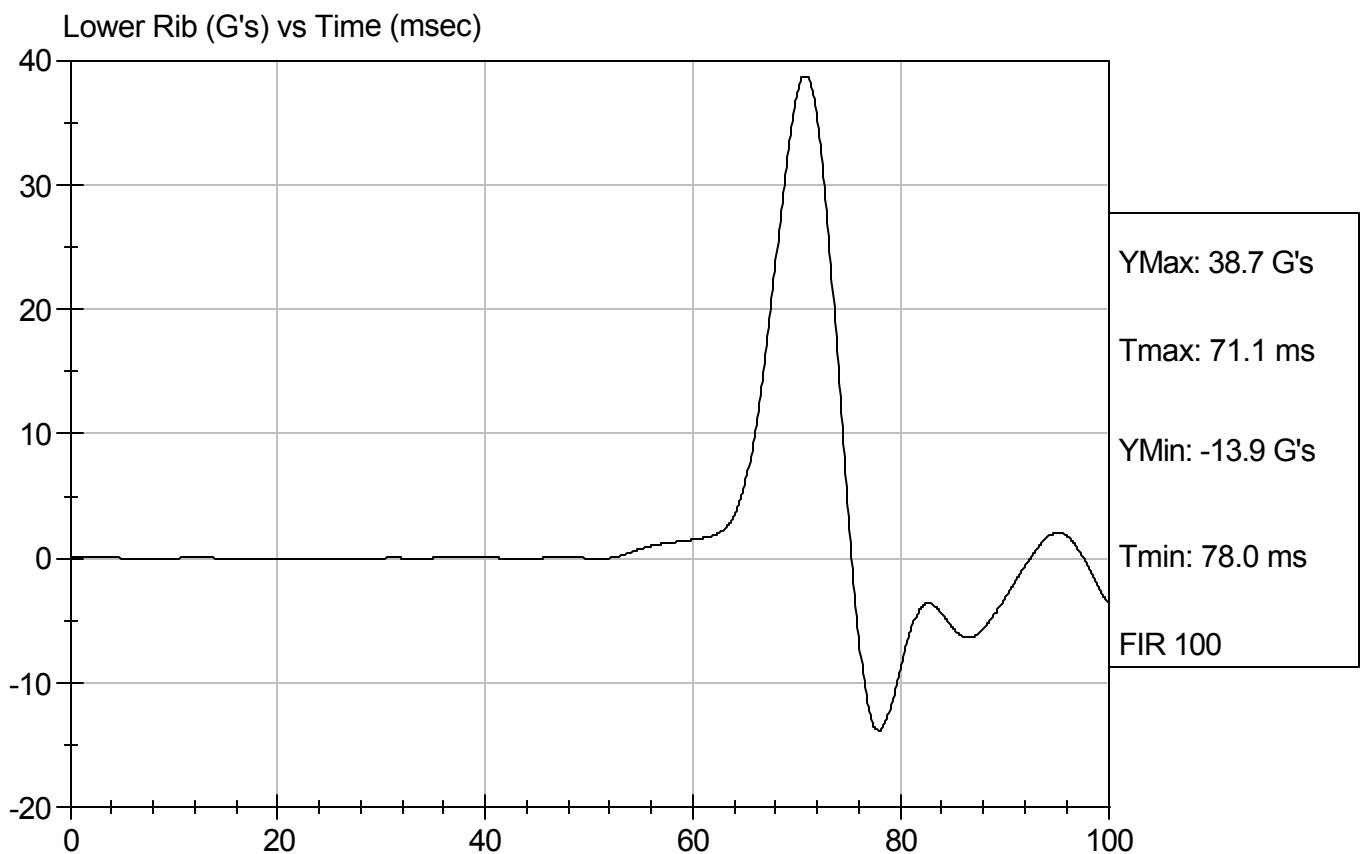
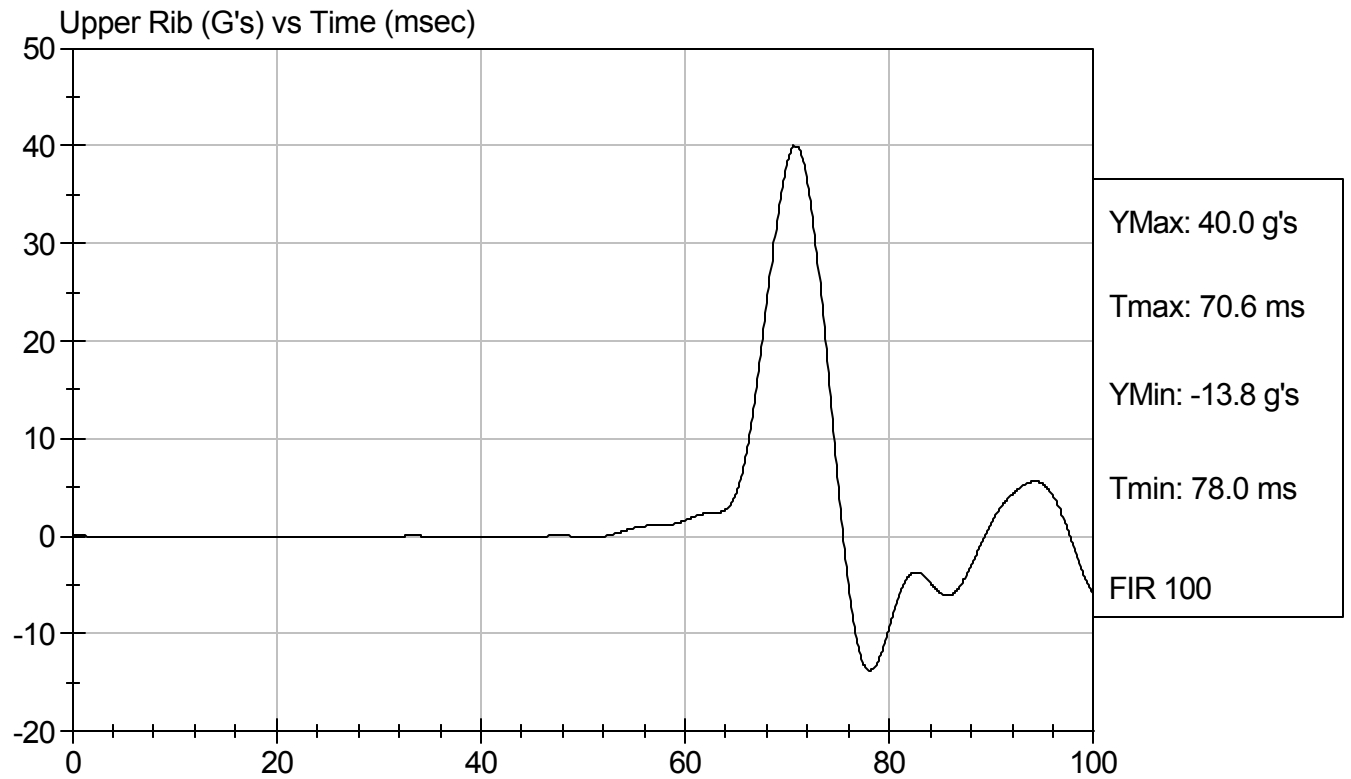
David Winkelbauer
Approved By

7/21/10
Test Date



Test Desc: Thorax Impact
Component ID: D102332

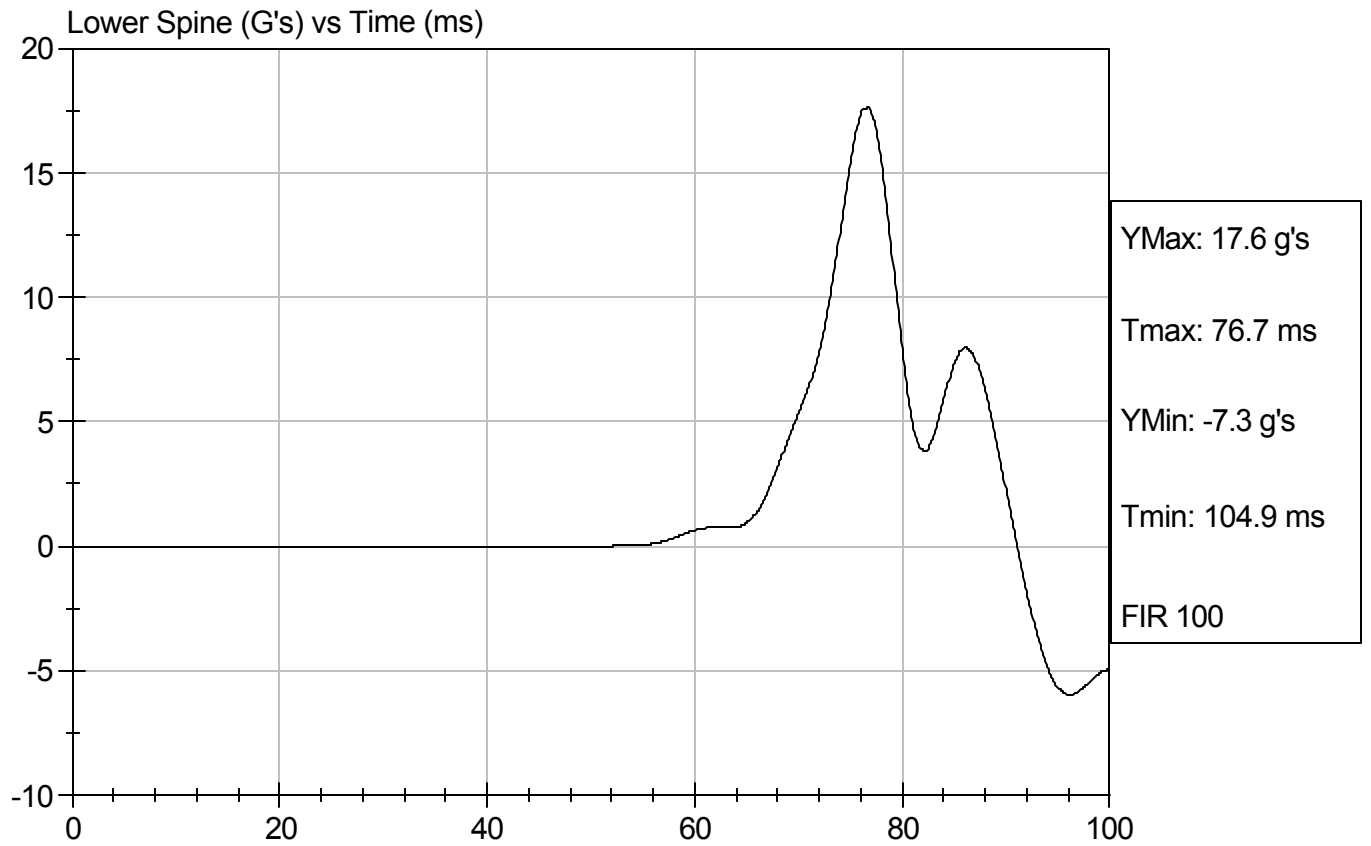
Test Date: 7/21/10
Speed: 14.00 ft/s, 4.27 m/s





Test Desc: Thorax Impact
Component ID: D102332

Test Date: 7/21/10
Speed: 14.00 ft/s, 4.27 m/s



SID/HIII Calibration Data Sheet

Side Impact Dummy

Pelvis Impact Test

ATD Serial No: 271

Test I.D: D102333

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	46	Pass
Probe Velocity	m/s	4.27 - 4.33	4.30	Pass
Pelvis Acceleration	G's	40 - 60	42	Pass
Overall Test Results			Pass	

Jessica Hall
Laboratory Technician

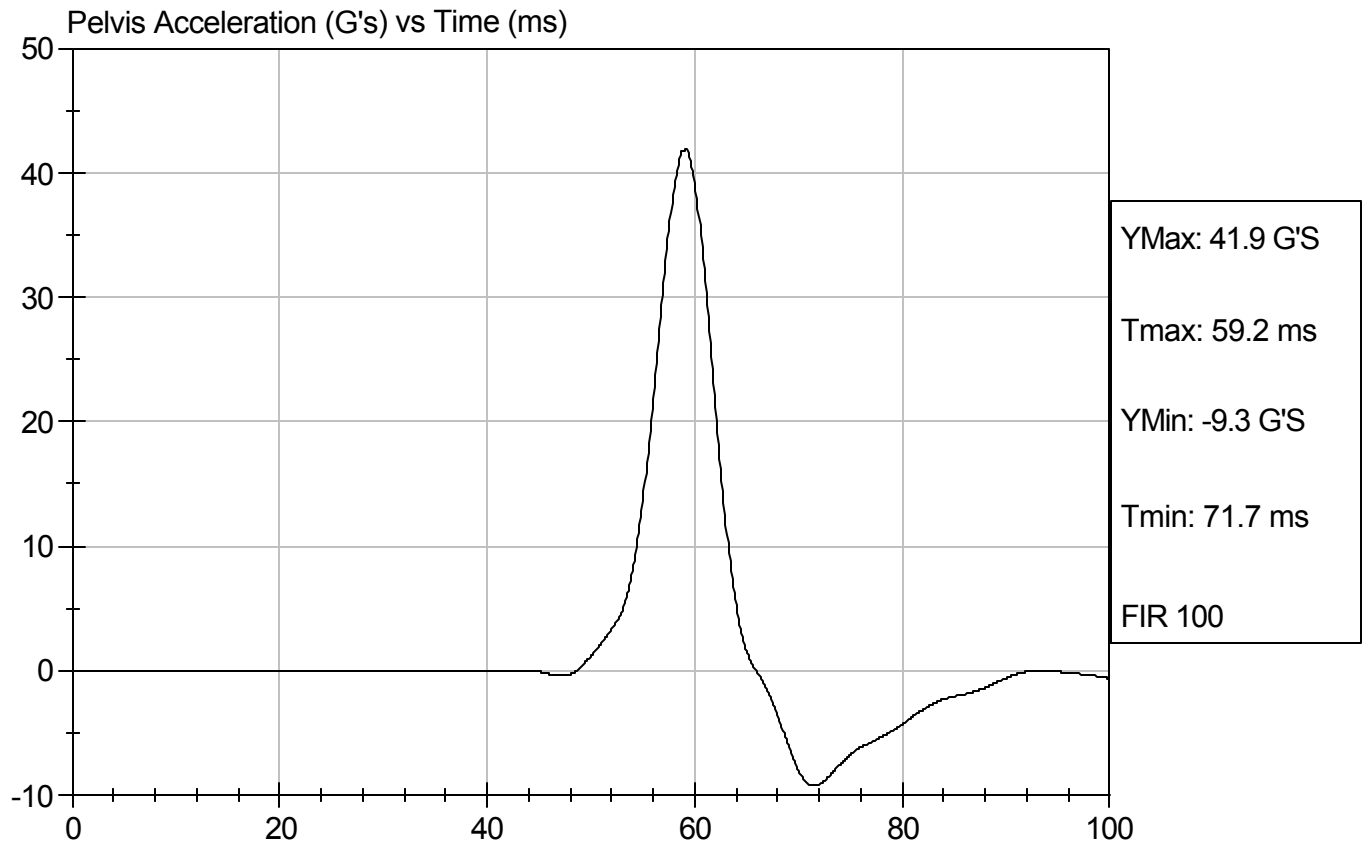
David Winkelbauer
Approved By

7/21/10
Test Date



Test Desc: Pelvis Impact
Component ID: D102333

Test Date: 7/21/10
Speed: 14.1 ft/s, 4.30 m/s



SID\HIII Calibration Data Sheet
Side Impact Dummy
Abdominal Compression Calibration (Pre-Load = 10 lbs)

ATD Serial No: 271

Test I.D: D102334

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	22.4	Pass
Laboratory Relative Humidity	%	10 to 70	54	Pass
Force At 12.7 mm	N	104 -162	142	Pass
Force At 19 mm	N	163 - 222	200	Pass
Force At 25.4 mm	N	222 - 280	274	Pass
Force At 33 mm	N	325 - 391	382	Pass
Overall Test Results			Pass	

Jessica Hall
Laboratory Technician

7/22/10
Test Date

David Winkelbauer
Approved By

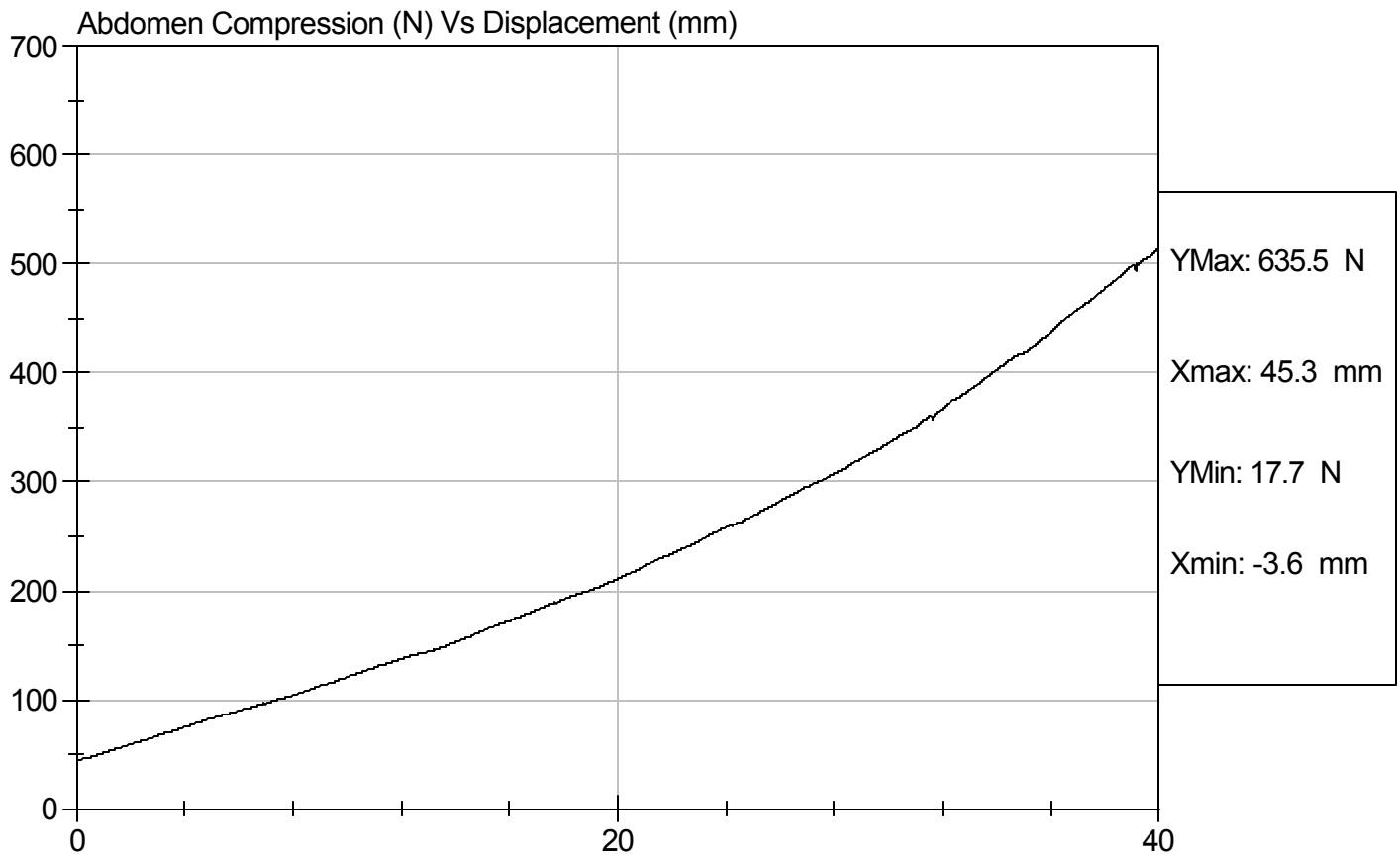


Test Description: Abdomen Compression

Test Date: 7/22/10

Component: D102334

Speed: 0 ft/s, 0 m/s



SID/HIII Calibration Data Sheet
Side Impact Dummy
Lumbar Flexion Calibration

ATD Serial No: 271

Test I.D: D102335

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	53	Pass
Force At 0 deg	N	0 - 26.7	0	Pass
Force At 20 deg	N	97.9 - 151.2	112.4	Pass
Force At 30 deg	N	151.2 - 204.6	168.5	Pass
Force At 40 deg	N	204.6 - 258.0	248.0	Pass
Return Angle	Deg	12 Maximum	12	Pass
Overall Test Results			Pass	

Jessica Gall
Laboratory Technician

7/22/10
Test Date

David Winkelbauer
Approved By

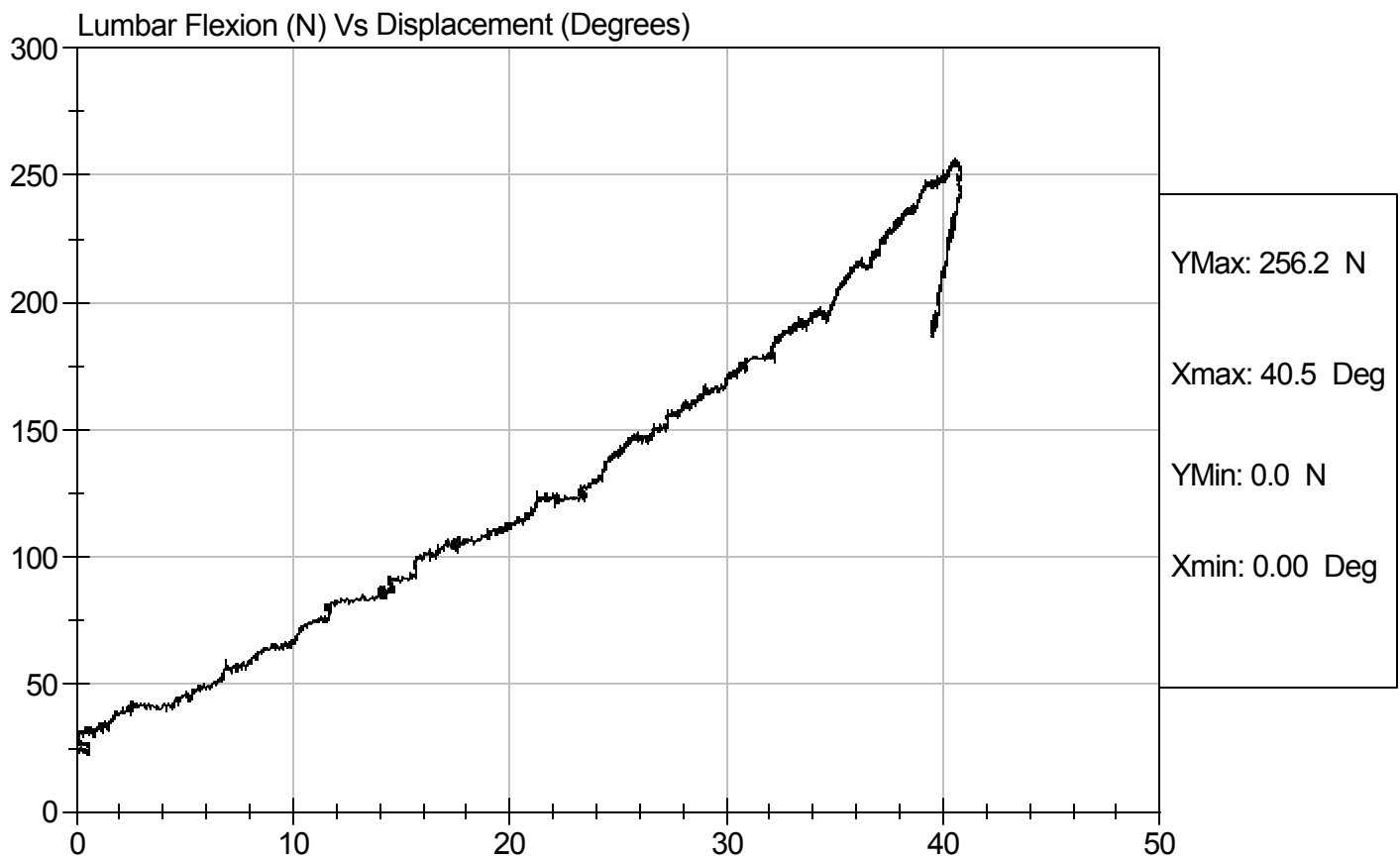


Test Description: Lumbar Flexion

Test Date: 7/22/10

Component: D102335

Speed: 0 ft/s, 0 m/s



SID/HIII Calibration Data Sheet
Side Impact Dummy
Neck Pendulum Test

ATD Serial No: 271

Test I.D: D102339

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	22.1	Pass
Laboratory Relative Humidity		%	10 to 70	56	Pass
Impact Velocity		m/s	6.89 to 7.13	7.06	Pass
Pendulum Deceleration	10 ms	m/s	1.96 to 2.55	2.54	Pass
	20 ms	m/s	4.12 to 5.10	4.81	Pass
	30 ms	m/s	5.73 to 7.01	6.57	Pass
	40 to 70 ms	m/s	6.27 to 7.64	6.55	Pass
Midsagittal Plane Max Rotation		deg	66 to 82	76	Pass
Head Rotation Peak to Zero - Decay Time		ms	58 to 67	61	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	80	Pass
Mx Peak To Zero - Decay Time		ms	49 to 64	50	Pass
Mx Peak to Max. Head Rotation		ms	2 to 16	4	Pass


 Laboratory Technician

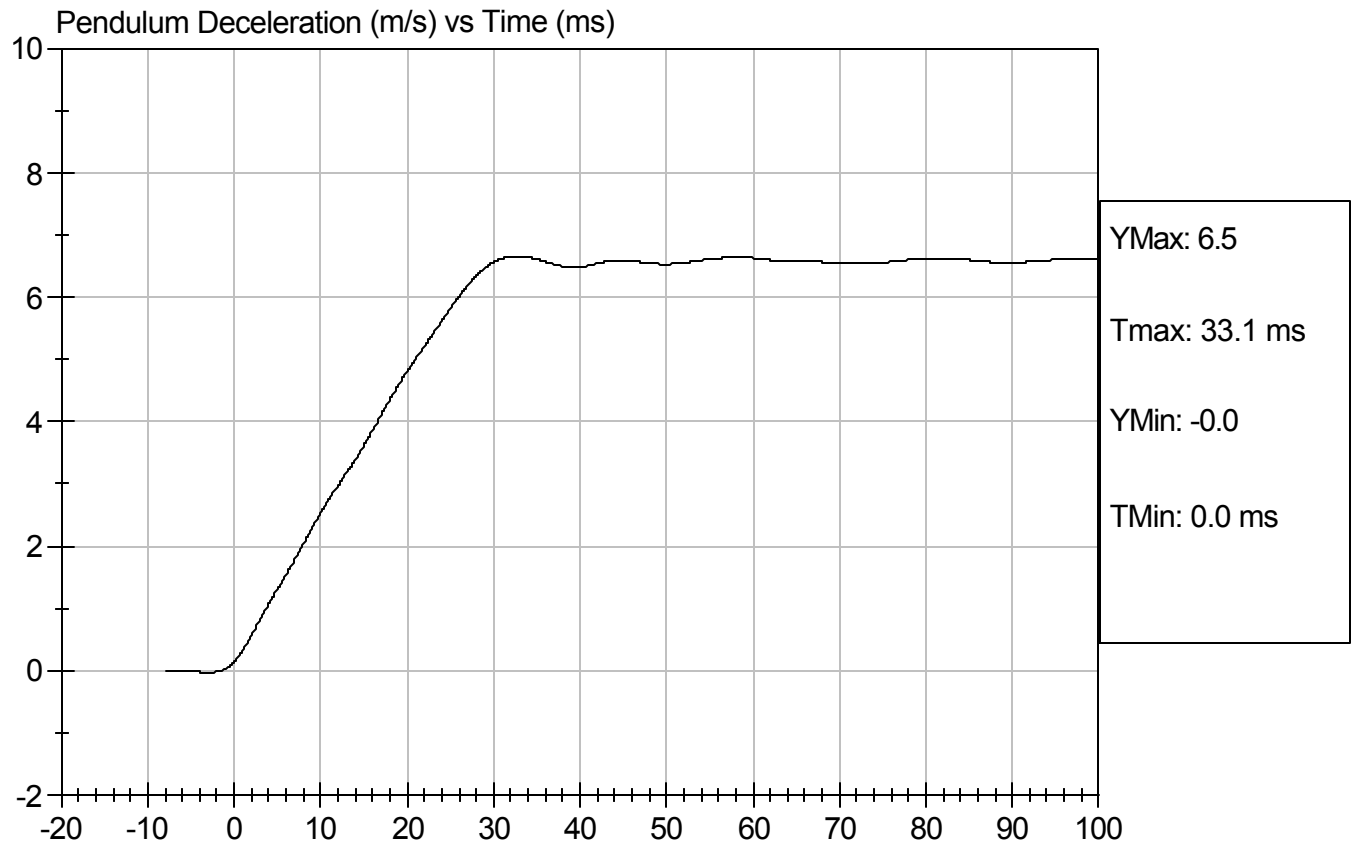

 Approved By

7/22/10
 Test Date



Test Desc: Neck Bending
Component ID: D102339

Test Date: 7/22/10
Speed: 23.15 ft/s, 7.06 m/s

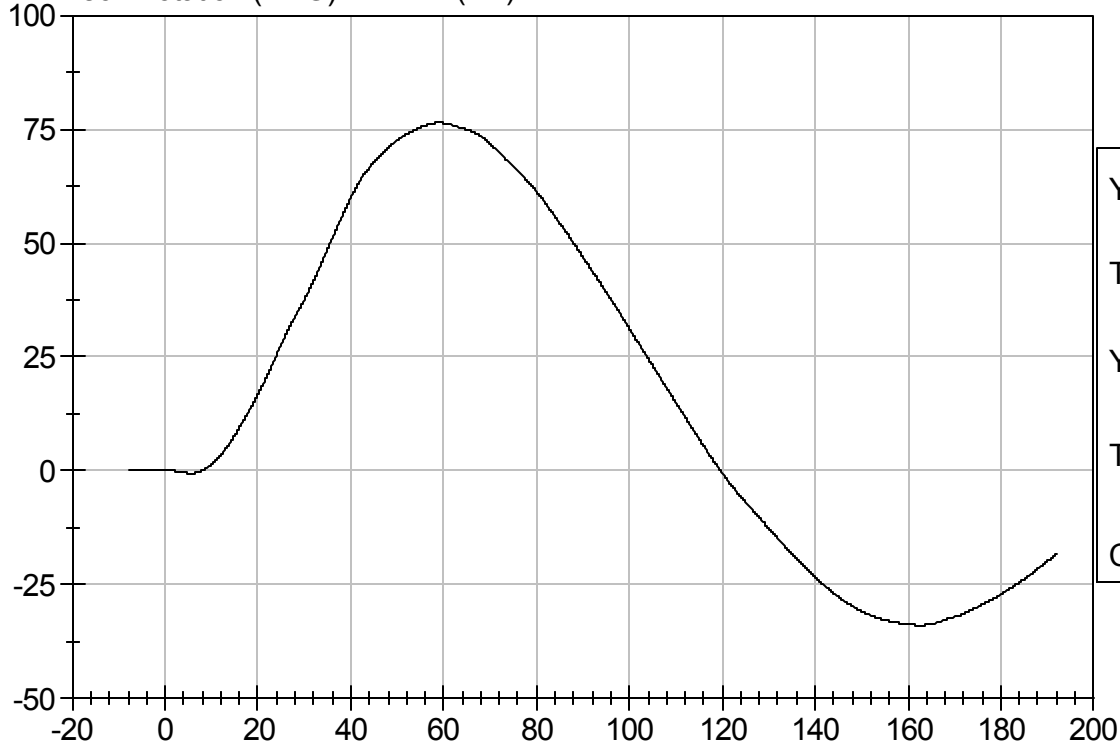




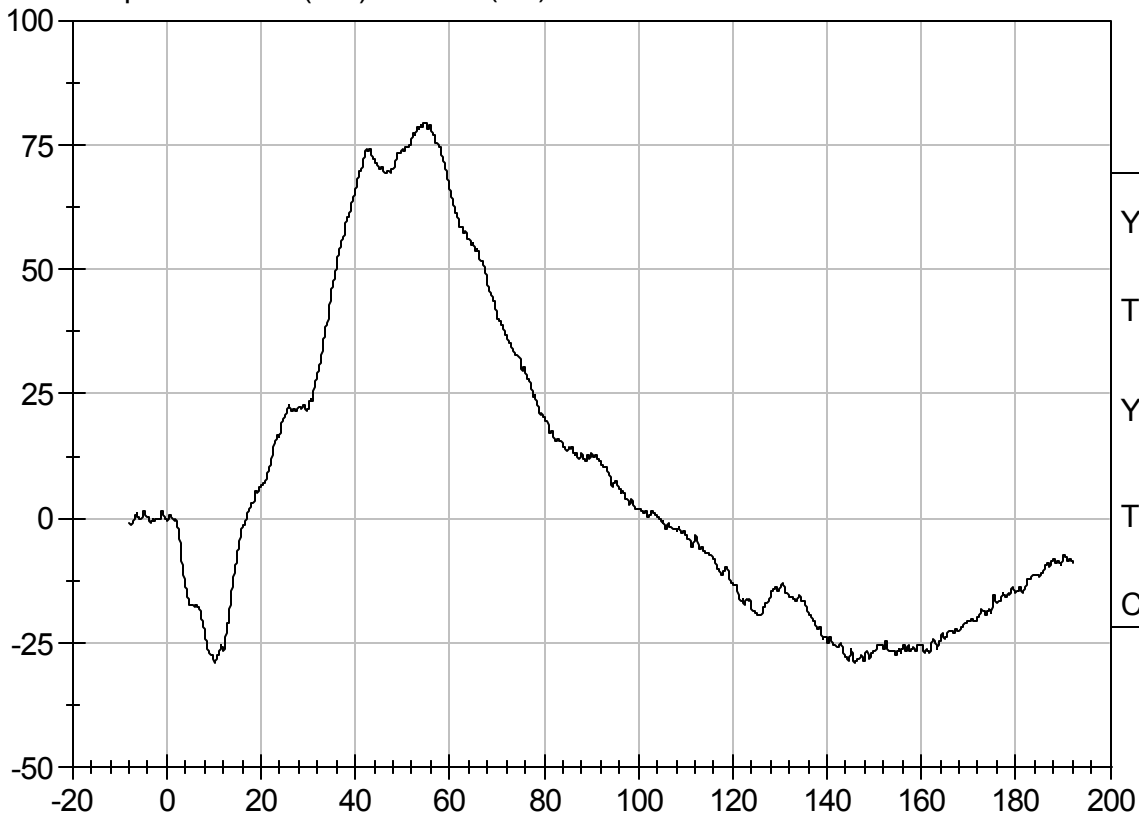
Test Desc: Neck Bending
Component ID: D102339

Test Date: 7/22/10
Speed: 23.15 ft/s, 7.06 m/s

Neck Rotation (DEG) vs Time (ms)



Occipital Moment (Nm) vs Time (ms)



SID/HIII Calibration Data Sheet
Side Impact Dummy
Inspection Checklist

ATD Serial No: 271

Test Part	Items Checked	Result
Skin	Visual inspection	Pass
Head	Visual, ballast, accelerometer mount	Pass
Neck	Visual	Pass
Spine Box	Visual, ballast, accelerometer mount	Pass
Rib Cage	Visual, measure	Pass
Sternum	Visual	Pass
Lumbar Spine	Visual	Pass
Abdomen	Visual	Pass
Pelvis	Visual, palpate, accelerometer mount	Pass
Upper Legs	Visual	Pass
Knees	Visual	Pass
Lower Legs	Visual, range of motion	Pass
Ankles	Visual, range of motion	Pass
Feet	Visual, range of motion	Pass
Joints	1 to 2 g range	Pass
Other		Pass

Jessica Hall
Laboratory Technician
David Winkelbauer
Approved By

7/22/2010
Test Date

CERTIFICATION DATA

Dummy Serial Number: 272

Calibration Test Results Summary

Dummy Serial Number: 272

Pre-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Head Drop Test:	The head passed all drop test requirements.
Neck Pendulum Test:	The neck passed all pendulum test requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

SID/HIII Calibration Data Sheet
Side Impact Dummy
External Measurements

ATD Serial No: 272

Test I.D: D10228

Tested Parameter	Units	Specification	Result	Pass/Fail
SH - Seated Height	mm	889 - 909	907	Pass
RH - Rib Height	mm	501 - 521	520	Pass
HP - Hip Pivot Height	mm	99 ref.	99	Pass
RD - Rib from Back Line	mm	229 - 241	230	Pass
KV - Knee Pivot to Back Line	mm	511 - 526	525	Pass
SW - Knee Pivot to Floor	mm	490 - 505	495	Pass
HW - Hip Width	mm	356 - 391	358	Pass
Overall Test Results			Pass	

Jessica Hall
Laboratory Technician

David Winkelbauer
Approved By

7/19/2010
Test Date

SID/HIII Calibration Data Sheet
Side Impact Dummy
Head Drop Calibration (Lateral)

ATD Serial No: 272

Test I.D: D102281

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	51	Pass
Peak Resultant Acceleration	G's	120 to 150	141	Pass
Is Resultant Curve Unimodal?	N/A	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-10.5	Pass
			Overall Test Results	Pass



Laboratory Technician

7/16/10
Test Date



Approved By



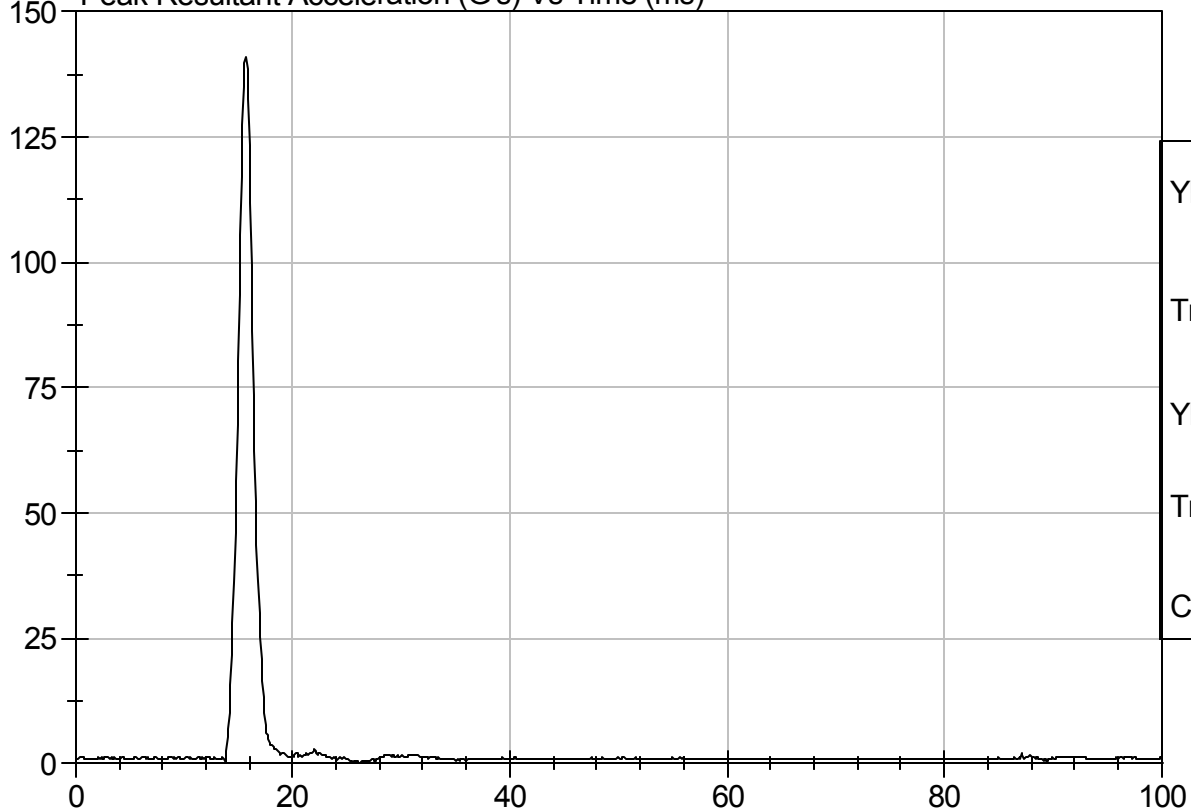
Test Description: Head Drop

Test Date: 7/16/10

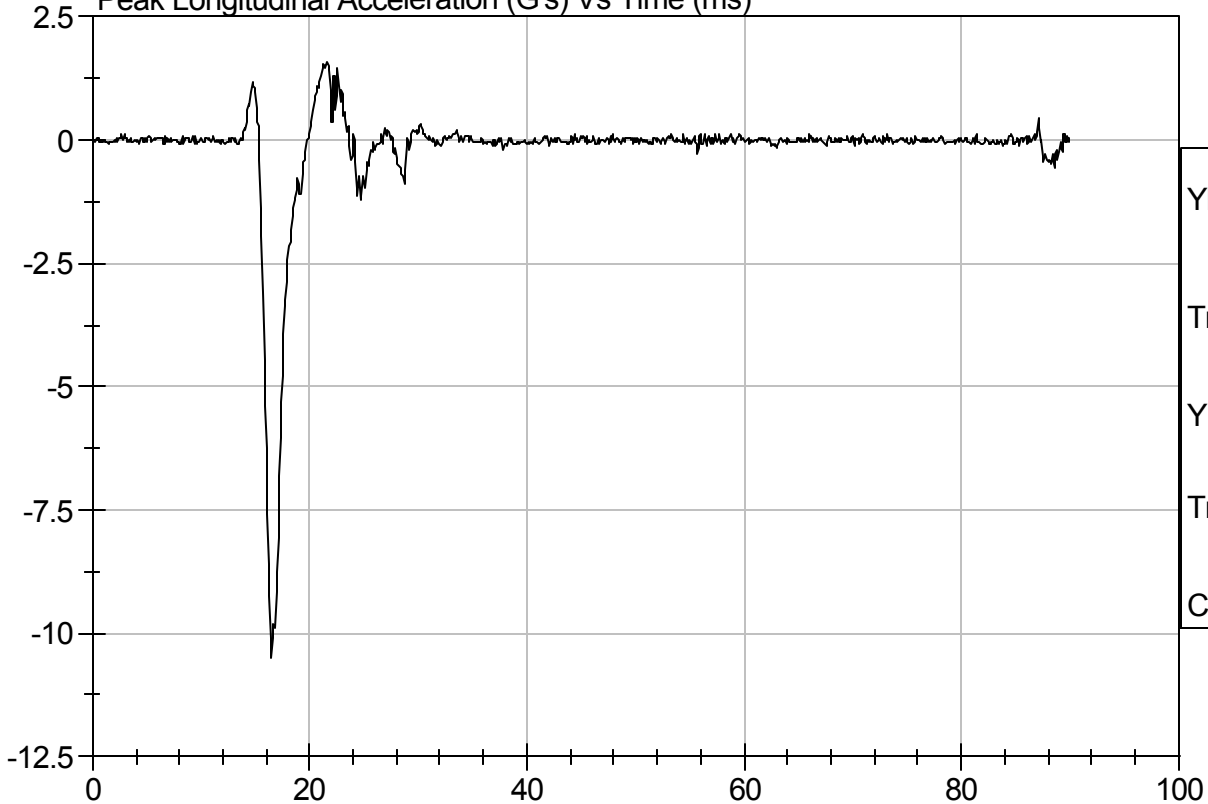
Component: D102281

Speed: 0 ft/s, 0 m/s

Peak Resultant Acceleration (G's) Vs Time (ms)



Peak Longitudinal Acceleration (G's) Vs Time (ms)

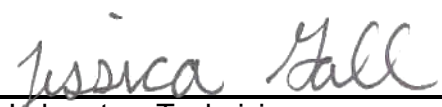


SID/HIII Calibration Data Sheet
Side Impact Dummy
Thorax Impact Test

ATD Serial No: 272

Test I.D: D102282

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	48	Pass
Probe Velocity	m/s	4.22 - 4.31	4.27	Pass
Upper Rib	G's	37 - 46	40	Pass
Lower Rib	G's	37 - 46	38	Pass
Lower Spine	G's	15 - 22	20	Pass
Overall Test Results				Pass


Laboratory Technician

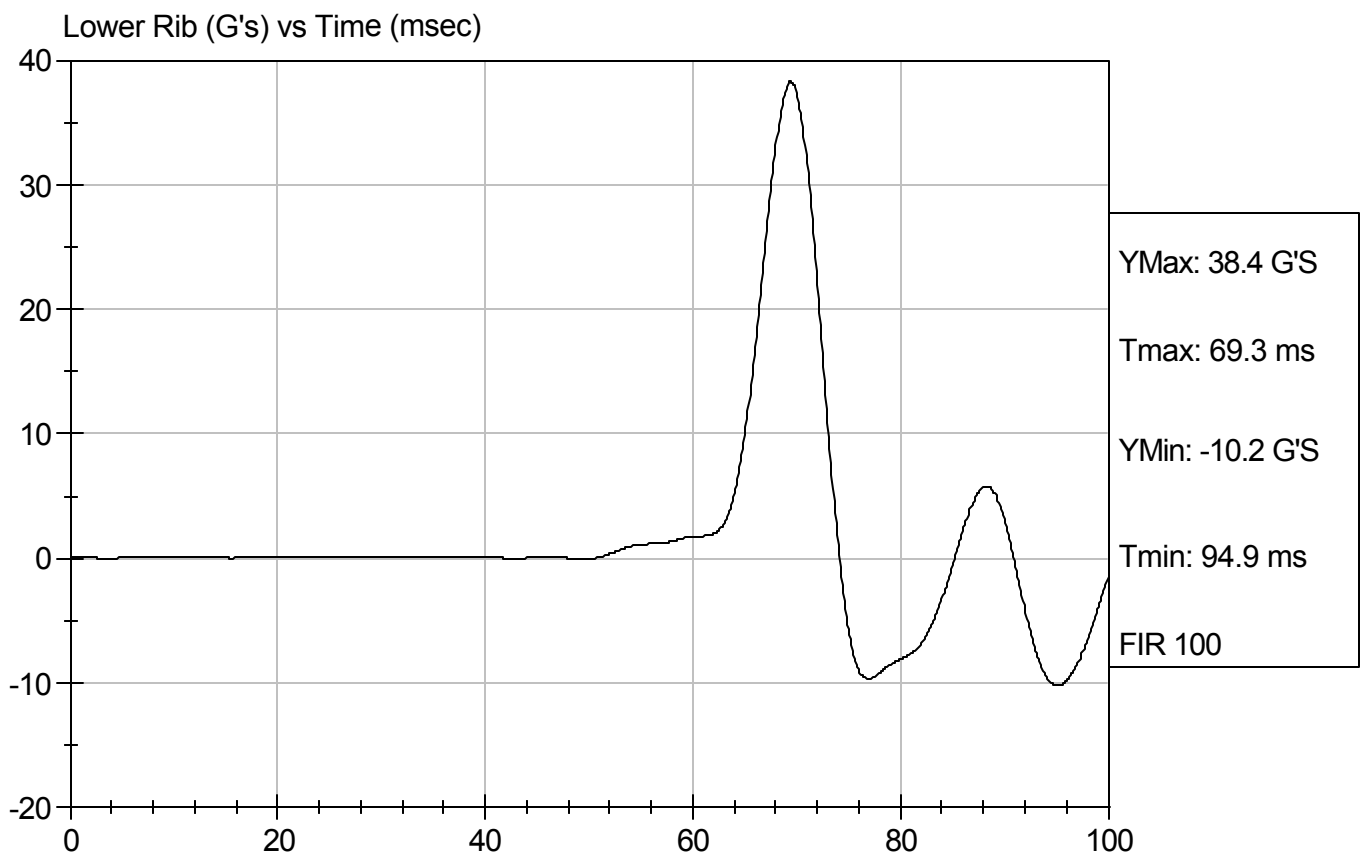
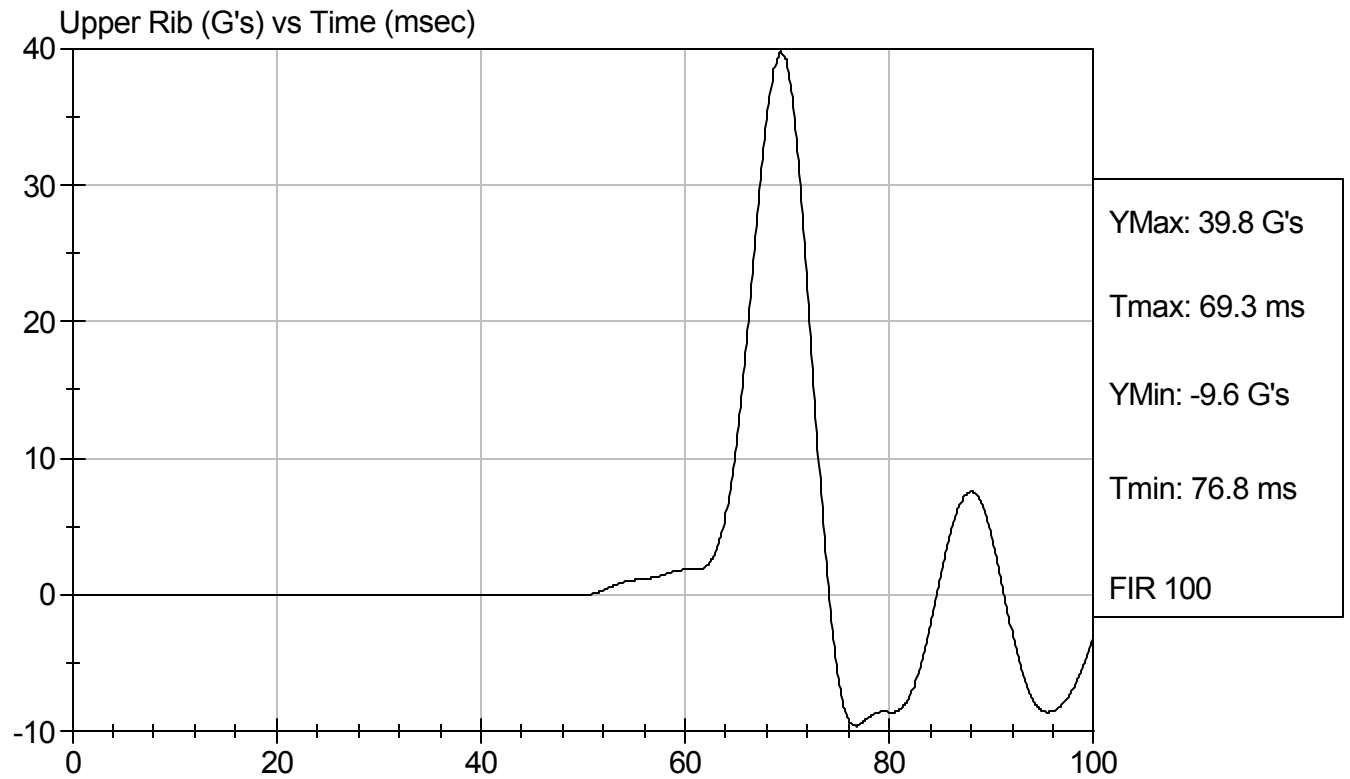

Approved By

7/19/2010
Test Date



Test Desc: Thorax Impact
Component ID: D102282

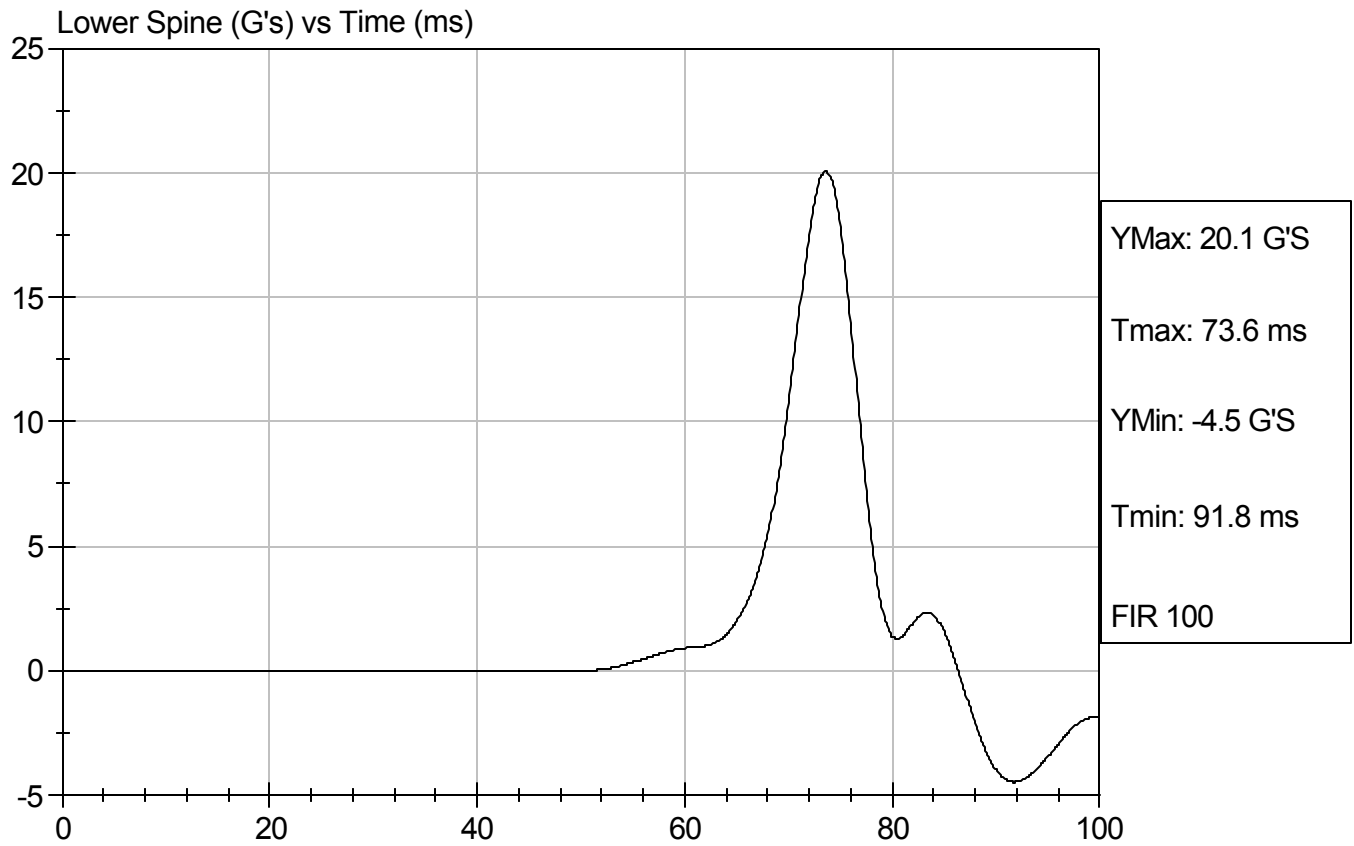
Test Date: 7/19/2010
Speed: 14.00 ft/s, 4.27 m/s





Test Desc: Thorax Impact
Component ID: D102282

Test Date: 7/19/2010
Speed: 14.00 ft/s, 4.27 m/s



SID/HIII Calibration Data Sheet
Side Impact Dummy
Pelvis Impact Test

ATD Serial No: 272

Test I.D: D102283

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	51	Pass
Probe Velocity	m/s	4.27 - 4.33	4.30	Pass
Pelvis Acceleration	G's	40 - 60	43	Pass
Overall Test Results			Pass	

Jessica Hall
Laboratory Technician

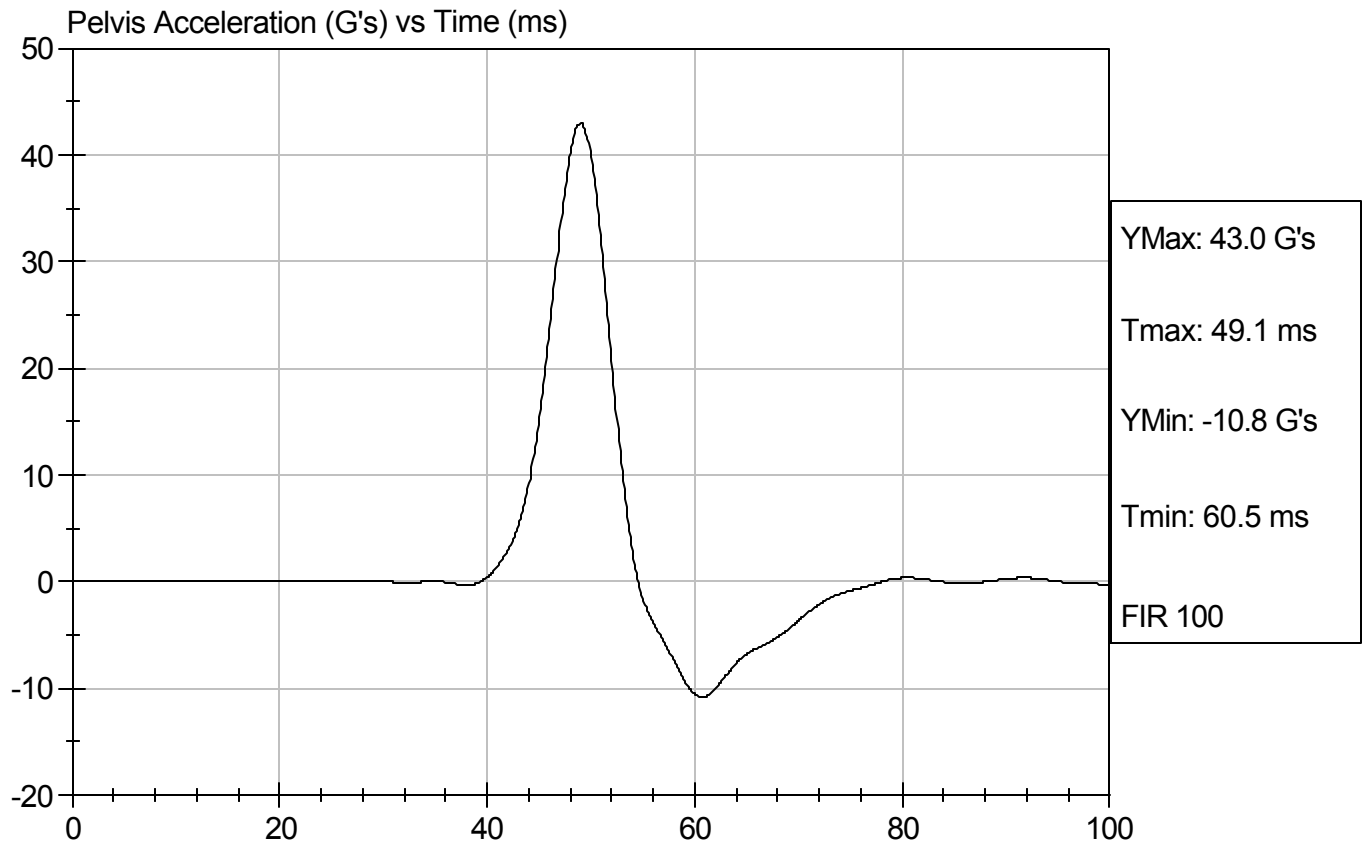
7/19/10
Test Date

David Winkelbauer
Approved By



Test Desc: Pelvis Impact
Component ID: D102283

Test Date: 7/19/10
Speed: 14.12 ft/s, 4.30 m/s



SID/HIII Calibration Data Sheet
Side Impact Dummy
Abdominal Compression Calibration (Pre-Load = 10 lbs)

ATD Serial No: 272

Test I.D: D102284

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	54	Pass
Force At 12.7 mm	N	104 -162	138	Pass
Force At 19 mm	N	163 - 222	188	Pass
Force At 25.4 mm	N	222 - 280	254	Pass
Force At 33 mm	N	325 - 391	344	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

David Winkelbauer
Approved By

07/16/2010
Test Date

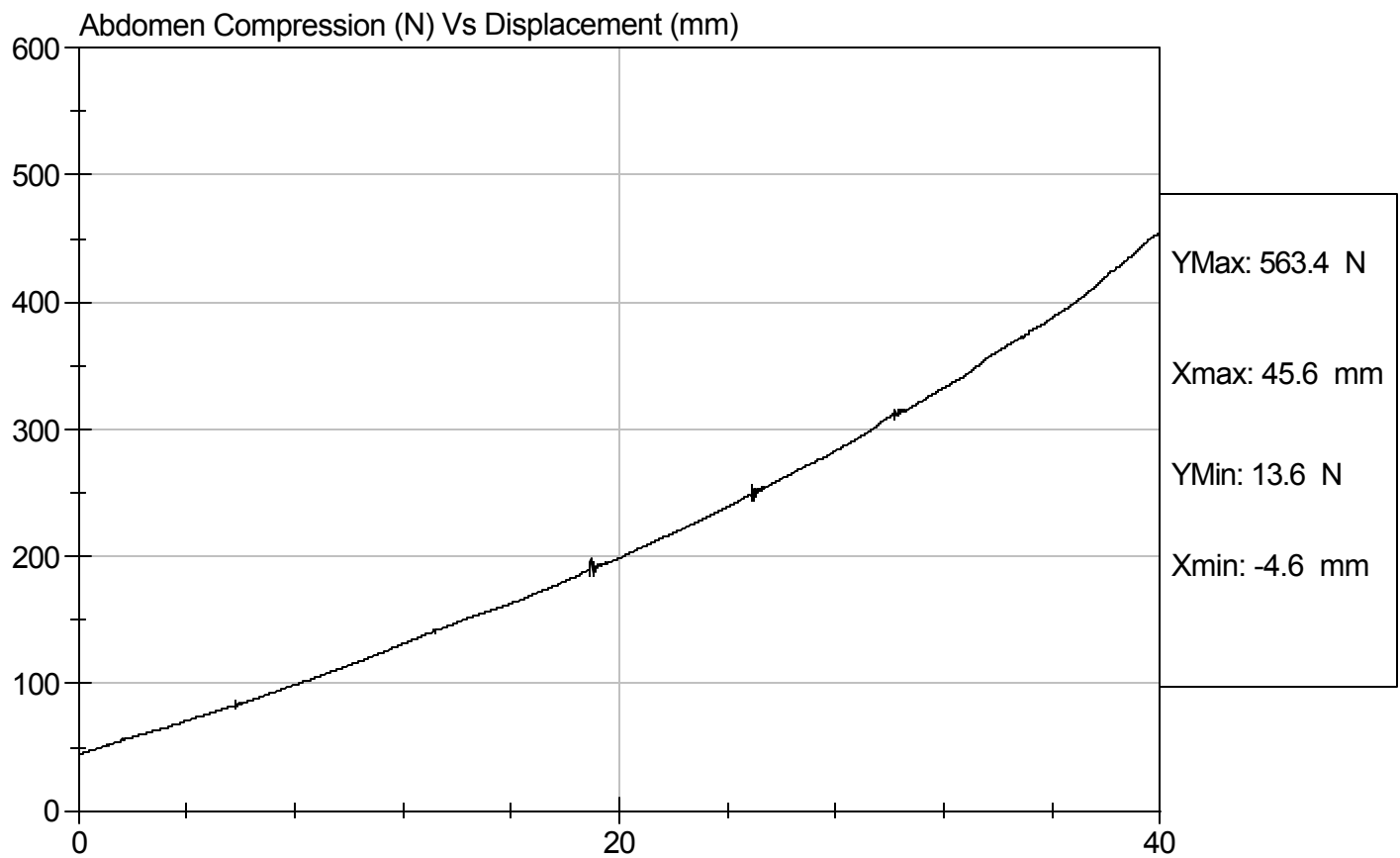


Test Description: Abdomen Compression

Test Date: 07/16/2010

Component: D102284

Speed: 0 ft/s, 0 m/s

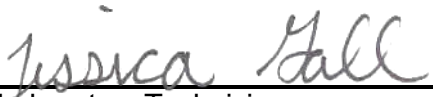


SID/HIII Calibration Data Sheet
Side Impact Dummy
Lumbar Flexion Calibration

ATD Serial No: 272

Test I.D: D102285

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	56	Pass
Force At 0 deg	N	0 - 26.7	0	Pass
Force At 20 deg	N	97.9 - 151.2	116.6	Pass
Force At 30 deg	N	151.2 - 204.6	180.7	Pass
Force At 40 deg	N	204.6 - 258.0	233.9	Pass
Return Angle	Deg	12 Maximum	4	Pass
Overall Test Results			Pass	


Laboratory Technician


Approved By

07/16/2010
Test Date

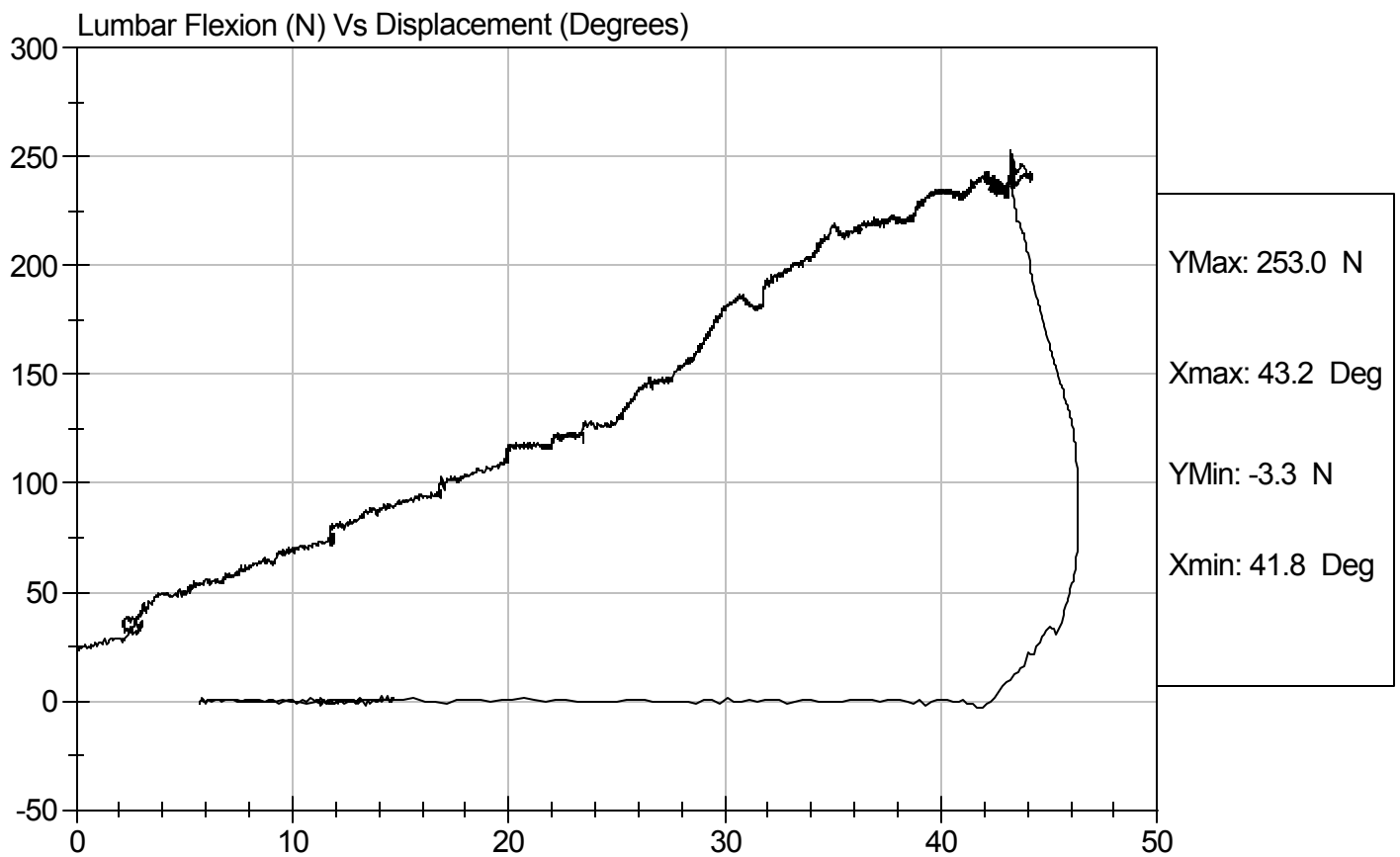


Test Description: Lumbar Flexion

Test Date: 07/16/2010

Component: D102285

Speed: 0 ft/s, 0 m/s



SID/HIII Calibration Data Sheet
Side Impact Dummy
Neck Pendulum Test

ATD Serial No: 272

Test I.D: D102289

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity		%	10 to 70	53	Pass
Impact Velocity		m/s	6.89 to 7.13	7.06	Pass
Pendulum Deceleration	10 ms	m/s	1.96 to 2.55	2.47	Pass
	20 ms	m/s	4.12 to 5.10	4.79	Pass
	30 ms	m/s	5.73 to 7.01	6.60	Pass
	40 to 70 ms	m/s	6.27 to 7.64	6.56	Pass
Midsagittal Plane Max Rotation		deg	66 to 82	72	Pass
Head Rotation Peak to Zero - Decay Time		ms	58 to 67	59	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	81	Pass
Mx Peak To Zero - Decay Time		ms	49 to 64	49	Pass
Mx Peak to Max. Head Rotation		ms	2 to 16	3	Pass


 Laboratory Technician

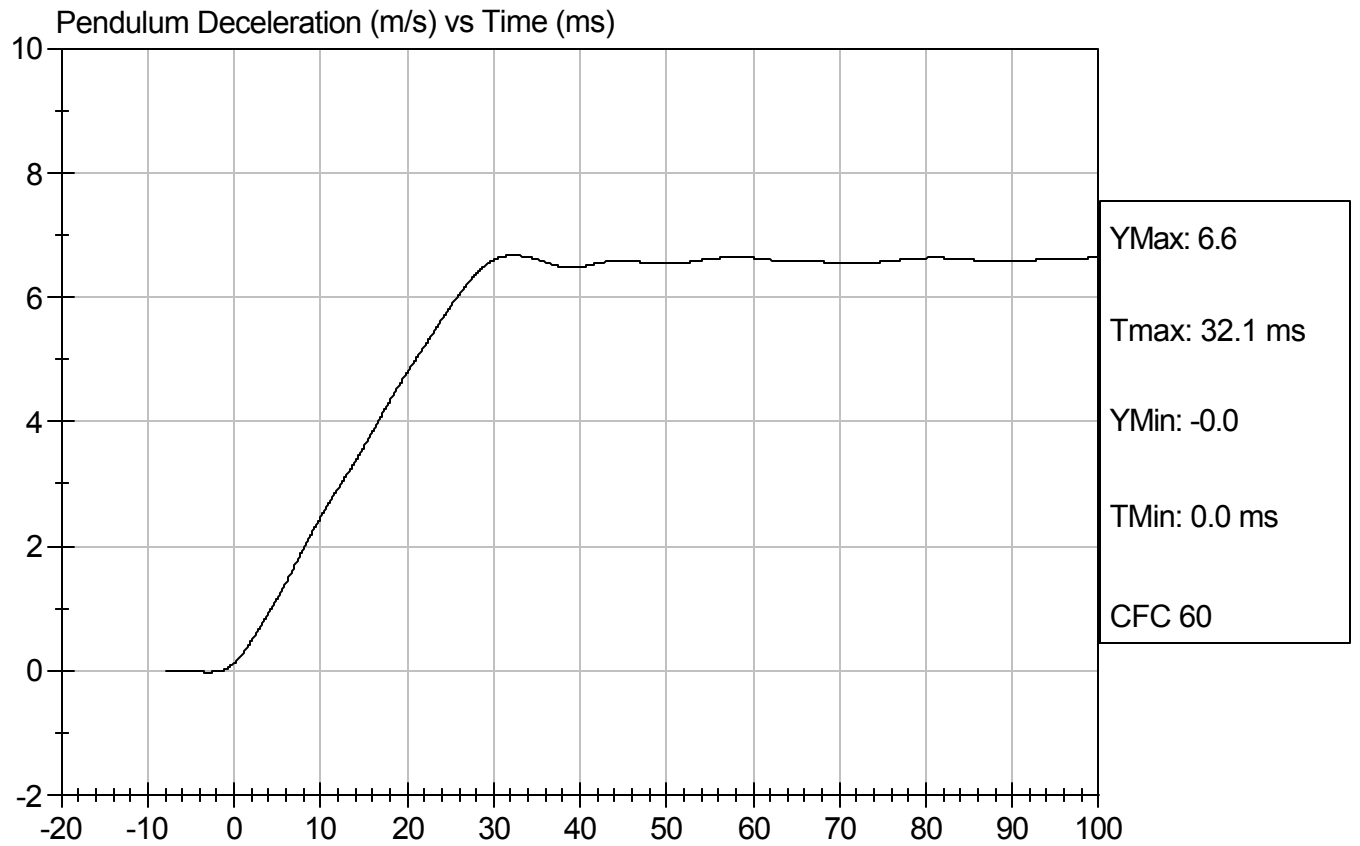

 Approved By

7/16/10
 Test Date



Test Desc: Neck Bending
Component ID: D102289

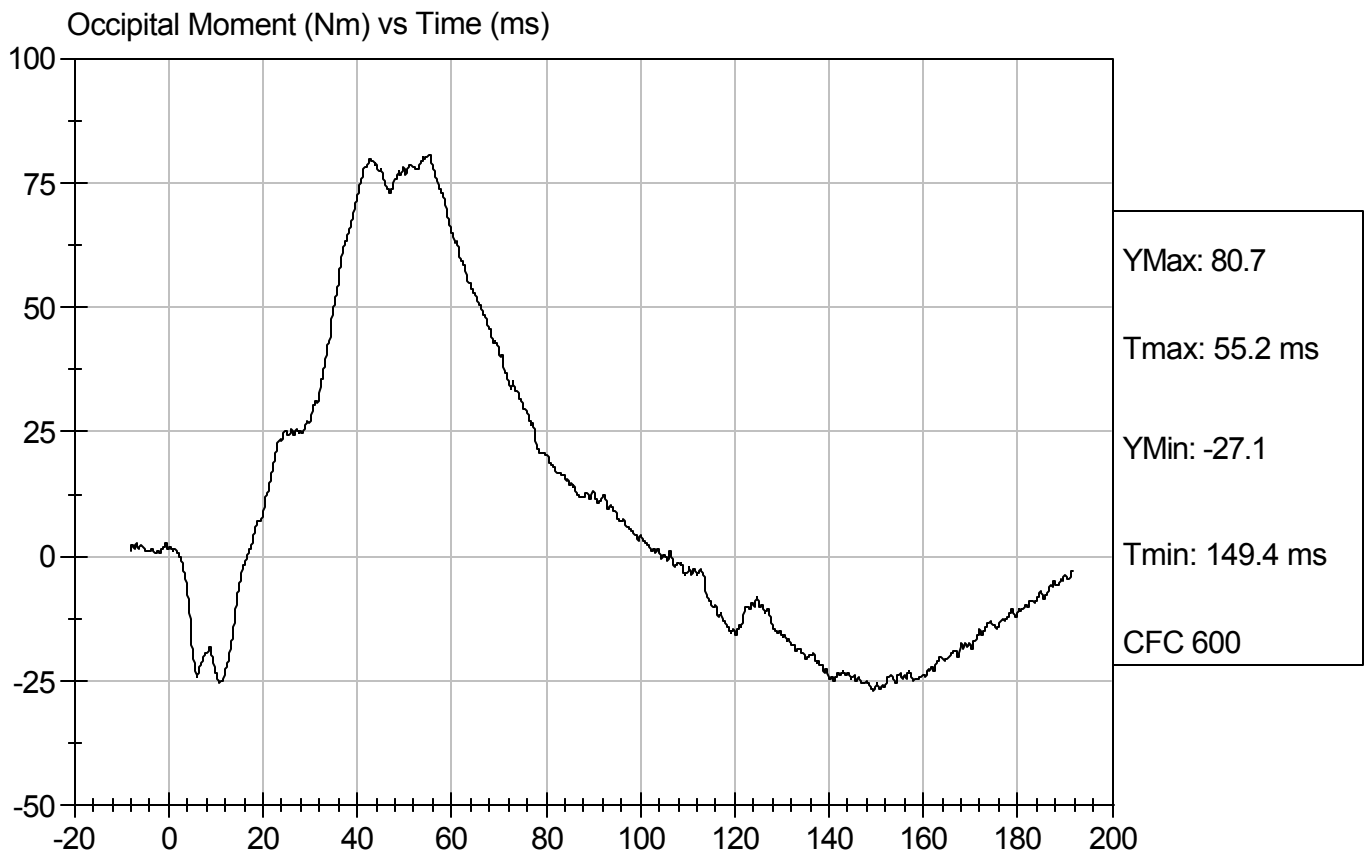
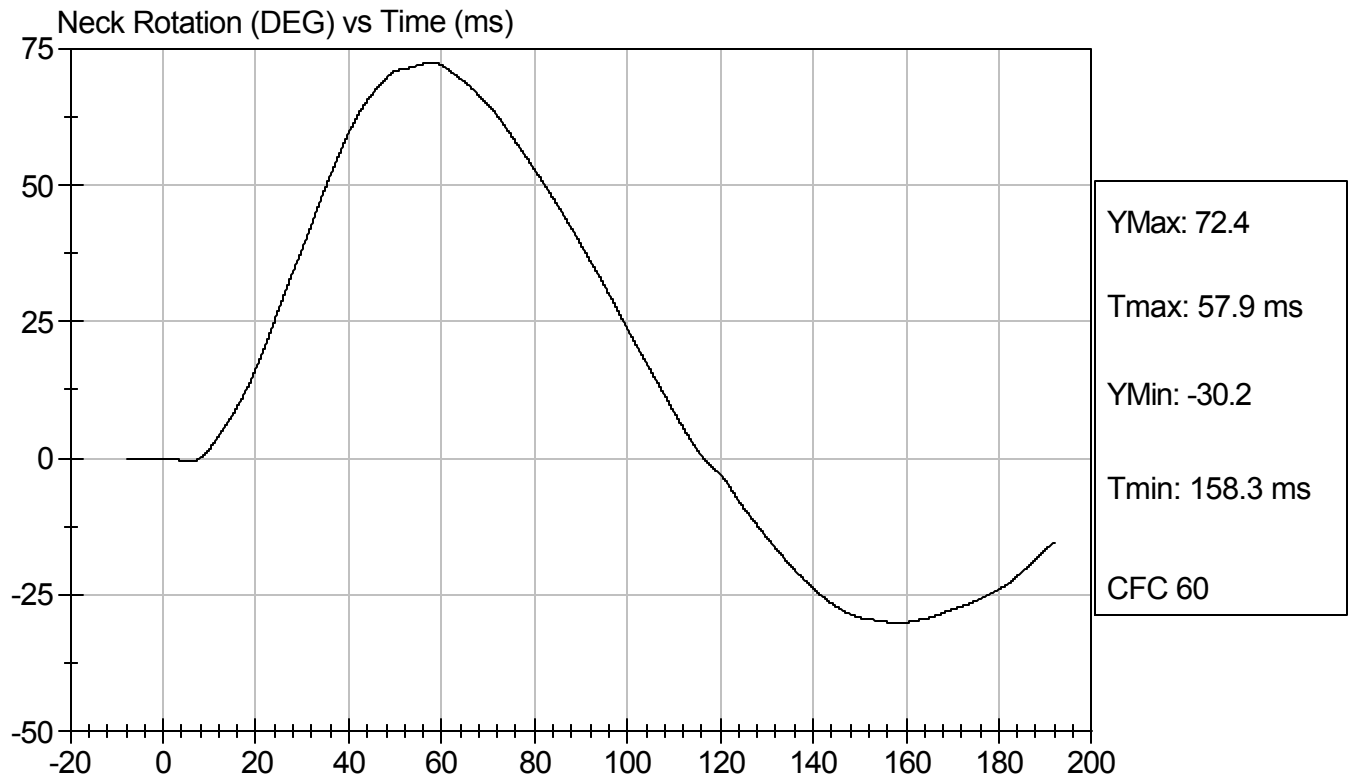
Test Date: 7/16/10
Speed: 23.15 ft/s, 7.06 m/s





Test Desc: Neck Bending
Component ID: D102289

Test Date: 7/16/10
Speed: 23.15 ft/s, 7.06 m/s



Calibration Test Results Summary

Dummy Serial Number: 272

Post-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Head Drop Test:	The head passed all drop test requirements.
Neck Pendulum Test:	The neck passed all pendulum test requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

SID/HIII Calibration Data Sheet
Side Impact Dummy
Head Drop Calibration (Lateral)

ATD Serial No: 272

Test I.D: D102341

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	46	Pass
Peak Resultant Acceleration	G's	120 to 150	143	Pass
Is Resultant Curve Unimodal?	N/A	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	7.0	Pass
			Overall Test Results	Pass

Jessica Hall
Laboratory Technician

David Winkelbauer
Approved By

7/21/10
Test Date



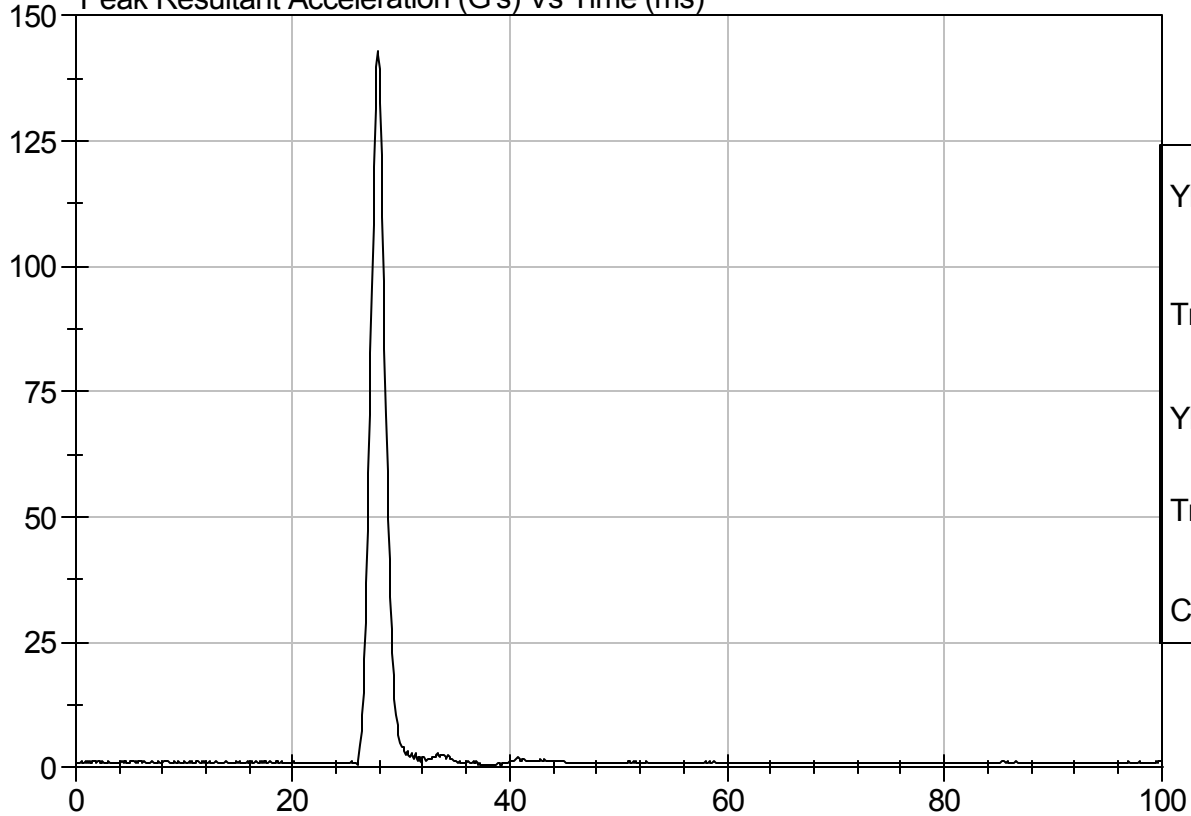
Test Description: Head Drop

Test Date: 7/21/10

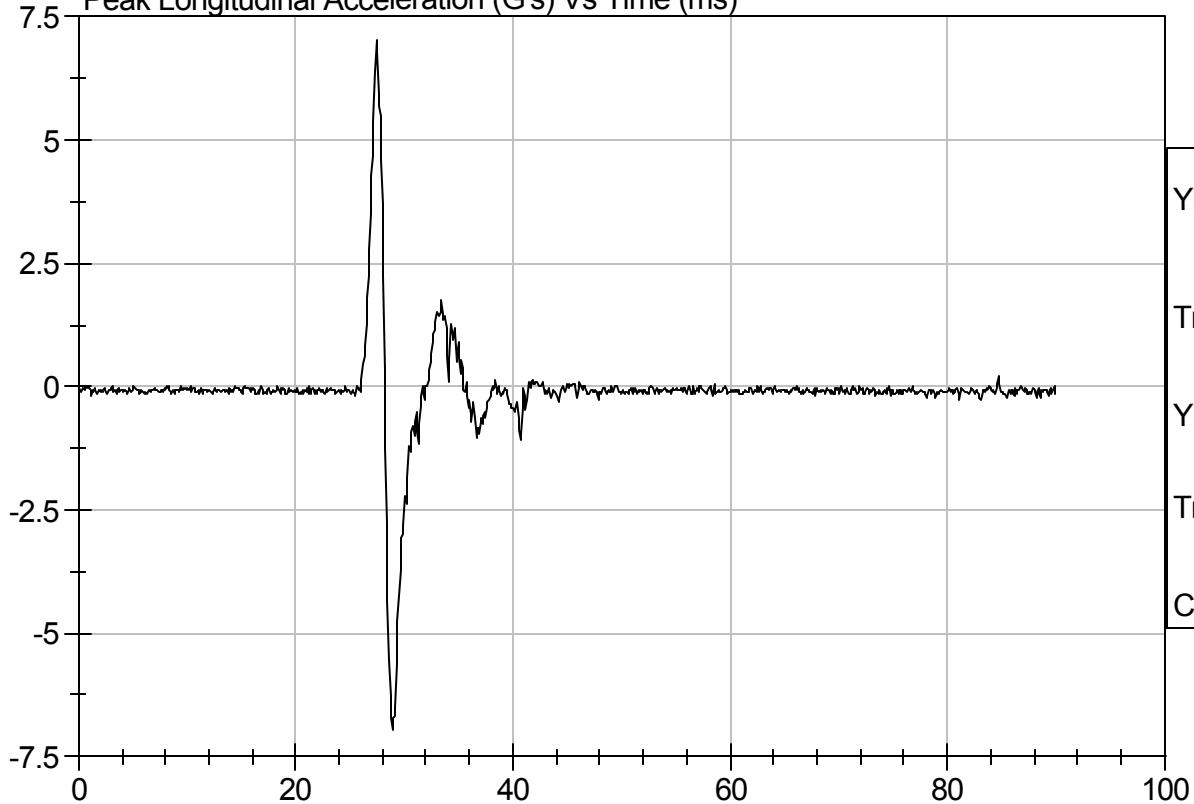
Component: D102341

Speed: 0 ft/s, 0 m/s

Peak Resultant Acceleration (G's) Vs Time (ms)



Peak Longitudinal Acceleration (G's) Vs Time (ms)



SID/HIII Calibration Data Sheet**Side Impact Dummy****Thorax Impact Test**ATD Serial No: 272Test I.D: D102342

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	46	Pass
Probe Velocity	m/s	4.22 - 4.31	4.30	Pass
Upper Rib	G's	37 - 46	41	Pass
Lower Rib	G's	37 - 46	39	Pass
Lower Spine	G's	15 - 22	21	Pass
Overall Test Results				Pass

Jessica Gall
Laboratory Technician

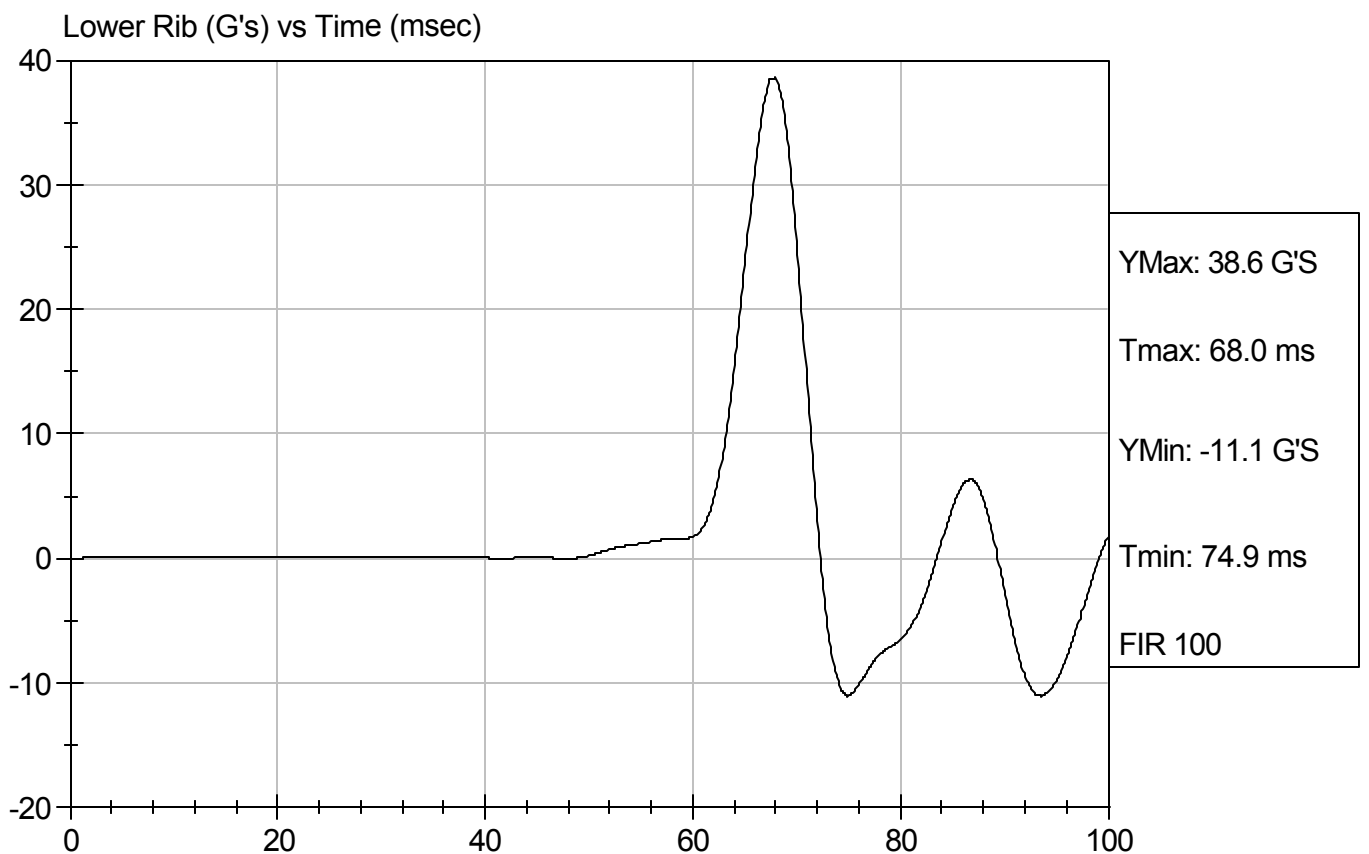
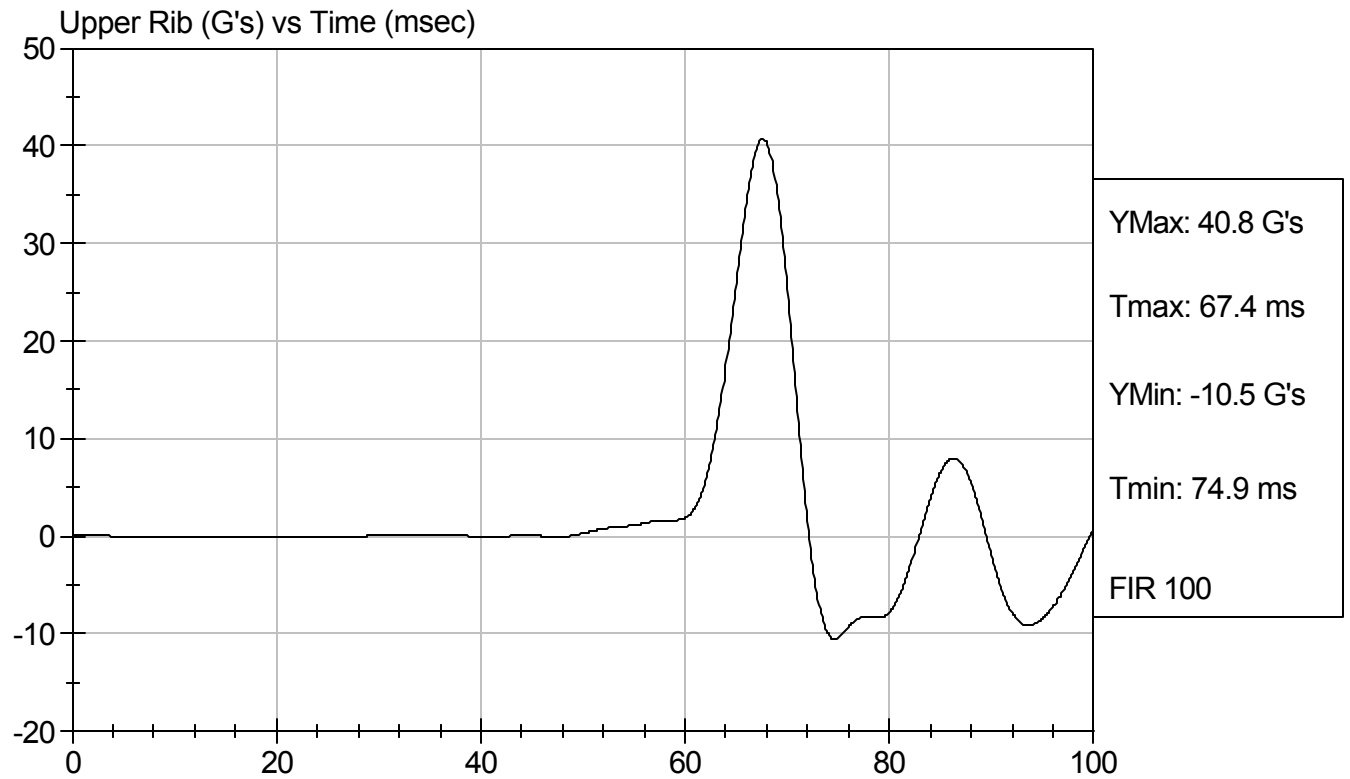
David Winkelbauer
Approved By

7/21/10
Test Date



Test Desc: Thorax Impact
Component ID: D102342

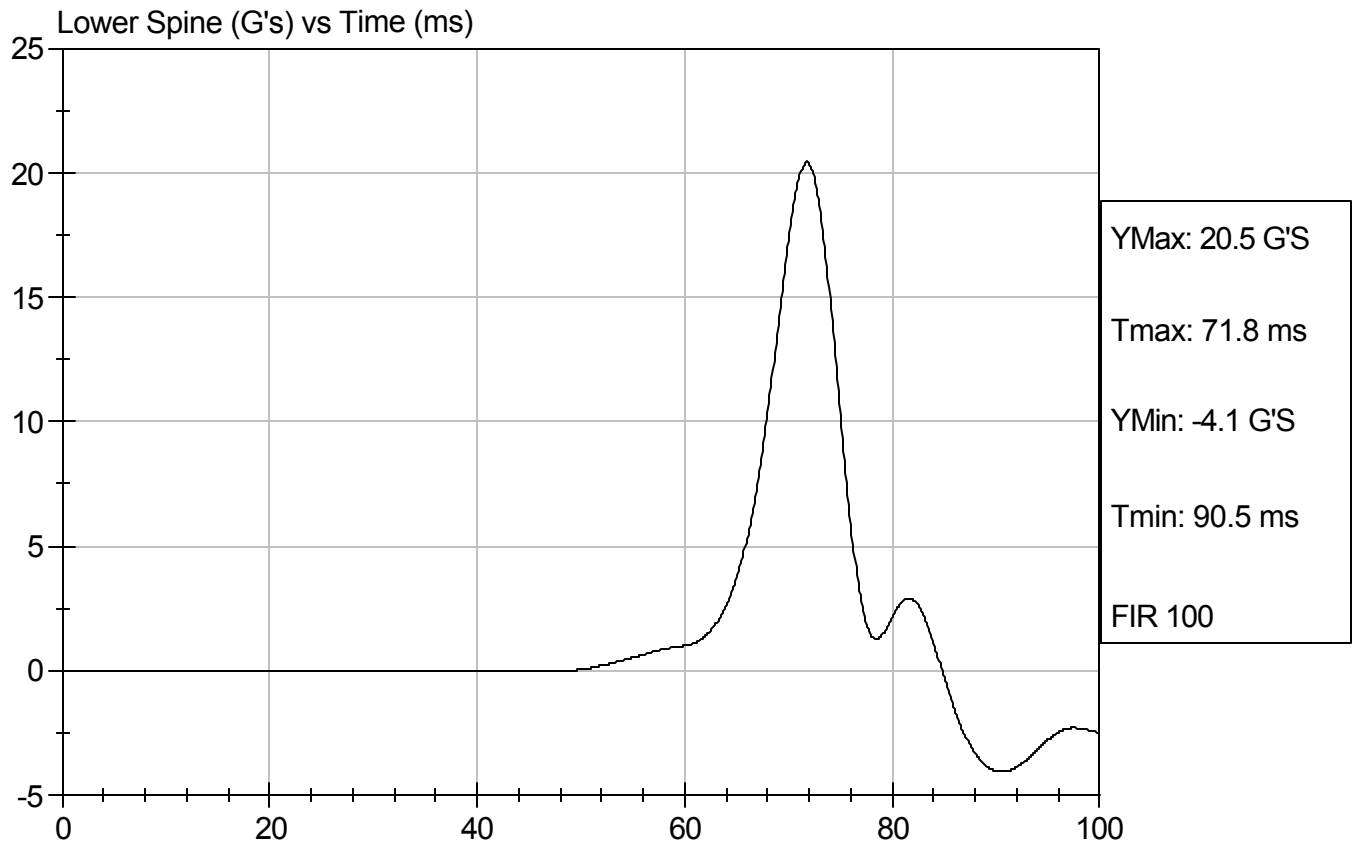
Test Date: 7/21/10
Speed: 14.1 ft/s, 4.30 m/s





Test Desc: Thorax Impact
Component ID: D102342

Test Date: 7/21/10
Speed: 14.1 ft/s, 4.30 m/s



SID/HIII Calibration Data Sheet
Side Impact Dummy
Pelvis Impact Test

ATD Serial No: 272

Test I.D: D102343

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	46	Pass
Probe Velocity	m/s	4.27 - 4.33	4.30	Pass
Pelvis Acceleration	G's	40 - 60	41	Pass
			Overall Test Results	Pass

Jessica Gall
Laboratory Technician

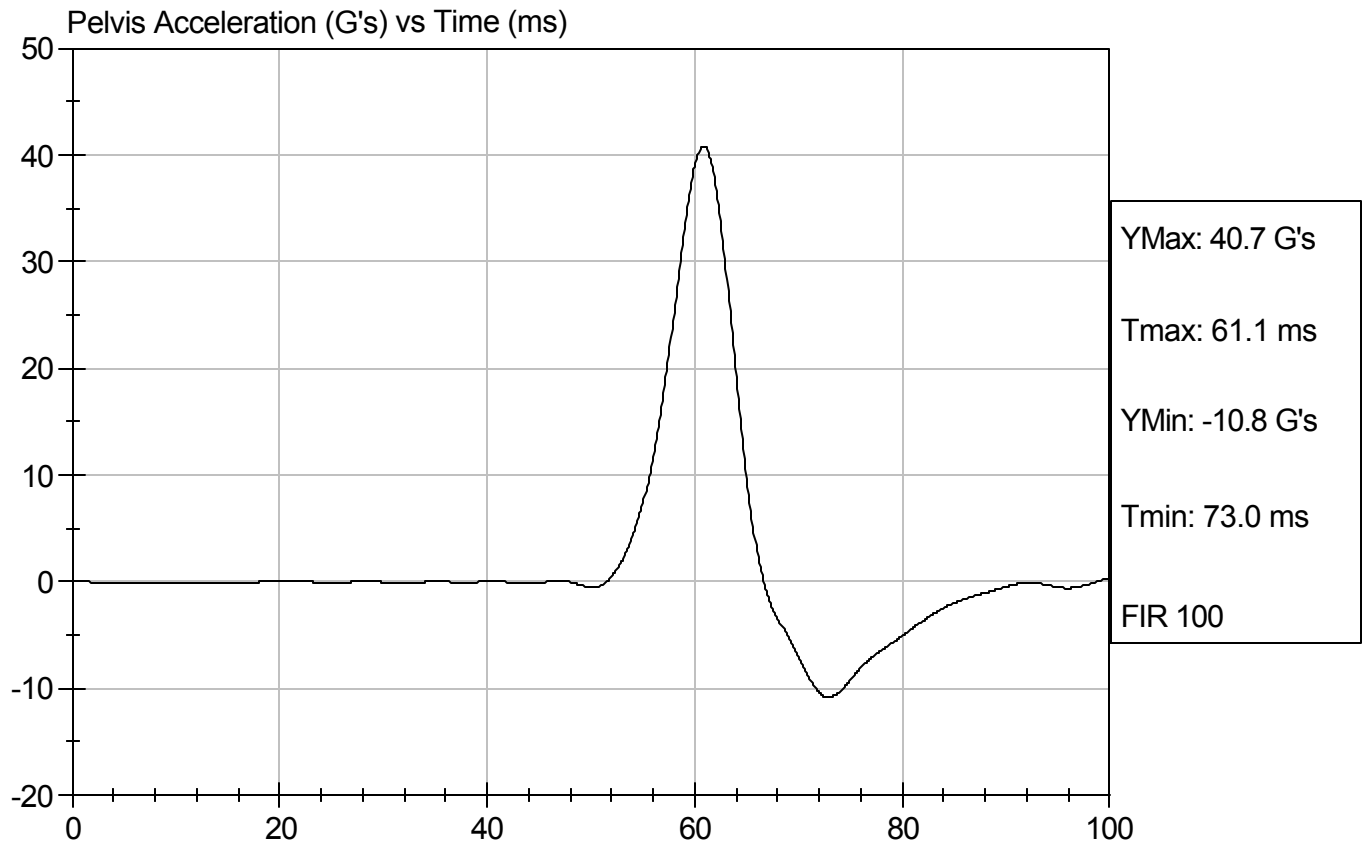
David Winkelbauer
Approved By

7/21/10
Test Date



Test Desc: Pelvis Impact
Component ID: D102343

Test Date: 7/21/10
Speed: 14.1 ft/s, 4.30 m/s



SID\HIII Calibration Data Sheet
Side Impact Dummy
Abdominal Compression Calibration (Pre-Load = 10 lbs)

ATD Serial No: 272

Test I.D: D102344

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	22.4	Pass
Laboratory Relative Humidity	%	10 to 70	54	Pass
Force At 12.7 mm	N	104 -162	138	Pass
Force At 19 mm	N	163 - 222	185	Pass
Force At 25.4 mm	N	222 - 280	242	Pass
Force At 33 mm	N	325 - 391	325	Pass
Overall Test Results			Pass	

Jessica Hall
Laboratory Technician

7/22/10
Test Date

David Winkelbauer
Approved By

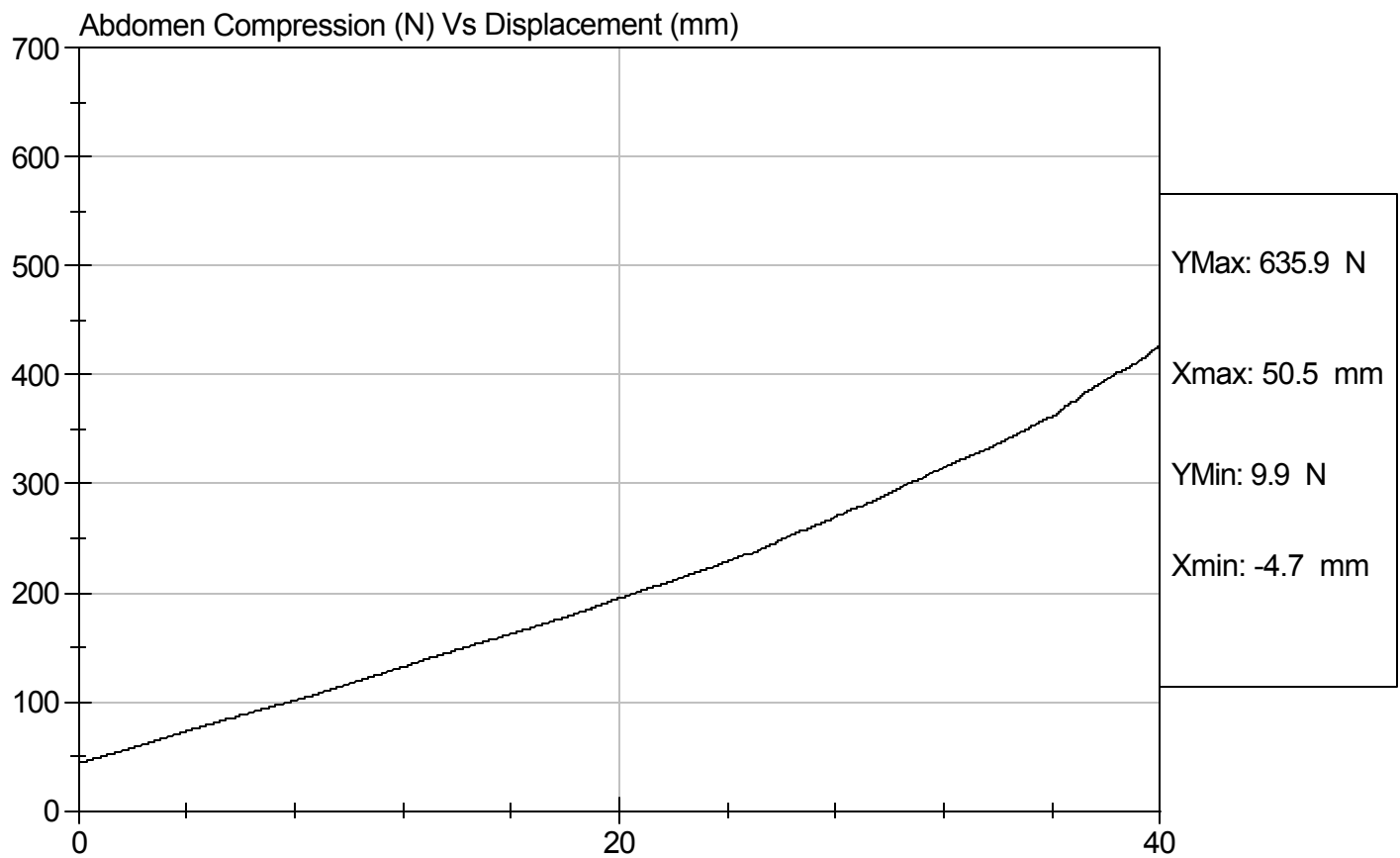


Test Description: Abdomen Compression

Test Date: 7/22/10

Component: D102344

Speed: 0 ft/s, 0 m/s



SID\HIII Calibration Data Sheet
Side Impact Dummy
Lumbar Flexion Calibration

ATD Serial No: 272

Test I.D: D102345

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	53	Pass
Force At 0 deg	N	0 - 26.7	0	Pass
Force At 20 deg	N	97.9 - 151.2	129.1	Pass
Force At 30 deg	N	151.2 - 204.6	179.0	Pass
Force At 40 deg	N	204.6 - 258.0	248.0	Pass
Return Angle	Deg	12 Maximum	12	Pass
Overall Test Results			Pass	

Jessica Hall
Laboratory Technician

7/22/10
Test Date

David Winkelbauer
Approved By

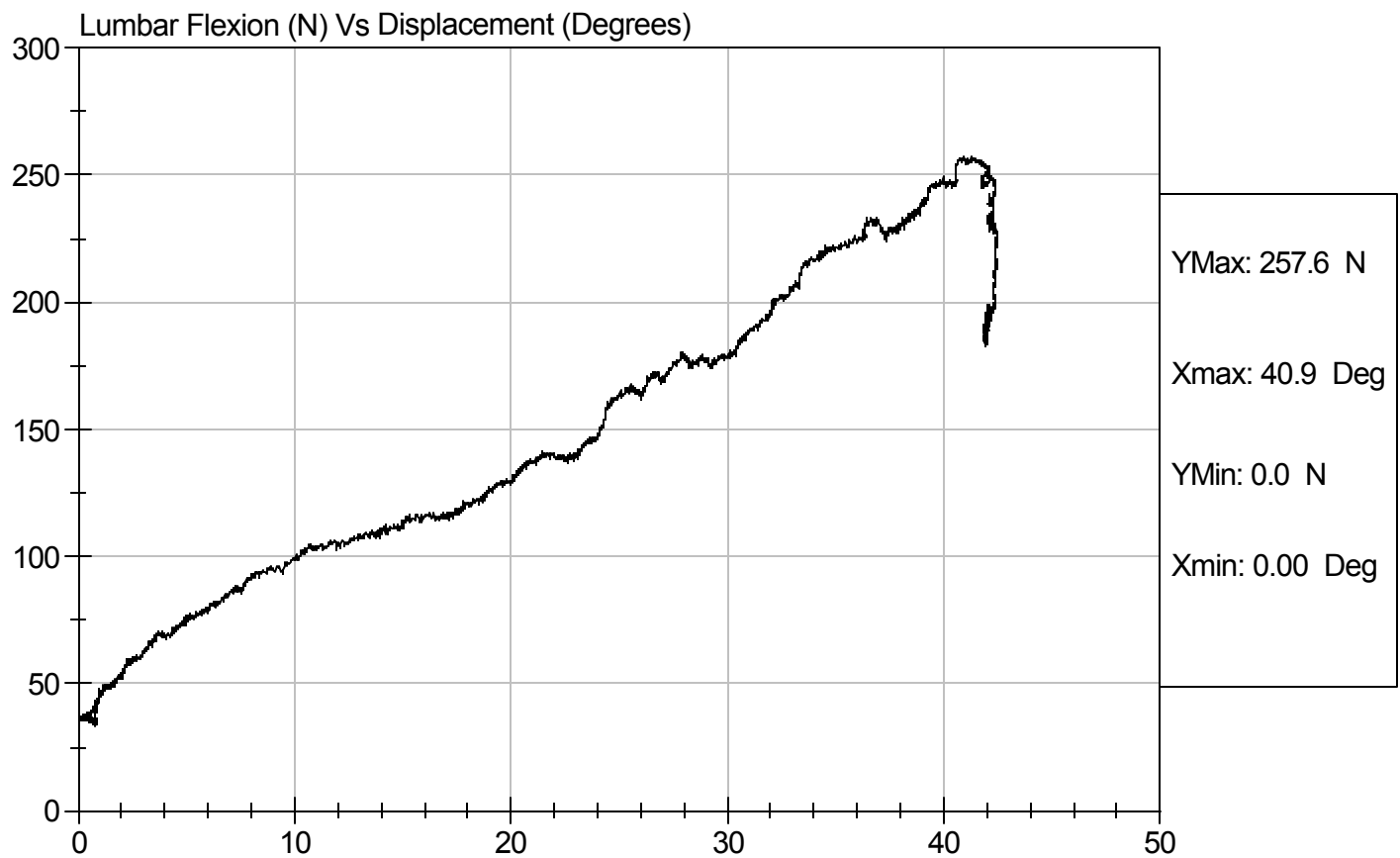


Test Description: Lumbar Flexion

Test Date: 7/22/10

Component: D102345

Speed: 0 ft/s, 0 m/s



SID/HIII Calibration Data Sheet
Side Impact Dummy
Neck Pendulum Test

ATD Serial No: 272

Test I.D: D102349

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	22.1	Pass
Laboratory Relative Humidity		%	10 to 70	56	Pass
Impact Velocity		m/s	6.89 to 7.13	7.06	Pass
Pendulum Deceleration	10 ms	m/s	1.96 to 2.55	2.42	Pass
	20 ms	m/s	4.12 to 5.10	4.69	Pass
	30 ms	m/s	5.73 to 7.01	6.48	Pass
	40 to 70 ms	m/s	6.27 to 7.64	6.53	Pass
Midsagittal Plane Max Rotation		deg	66 to 82	71	Pass
Head Rotation Peak to Zero - Decay Time		ms	58 to 67	59	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	75	Pass
Mx Peak To Zero - Decay Time		ms	49 to 64	59	Pass
Mx Peak to Max. Head Rotation		ms	2 to 16	15	Pass


 Laboratory Technician


 Approved By

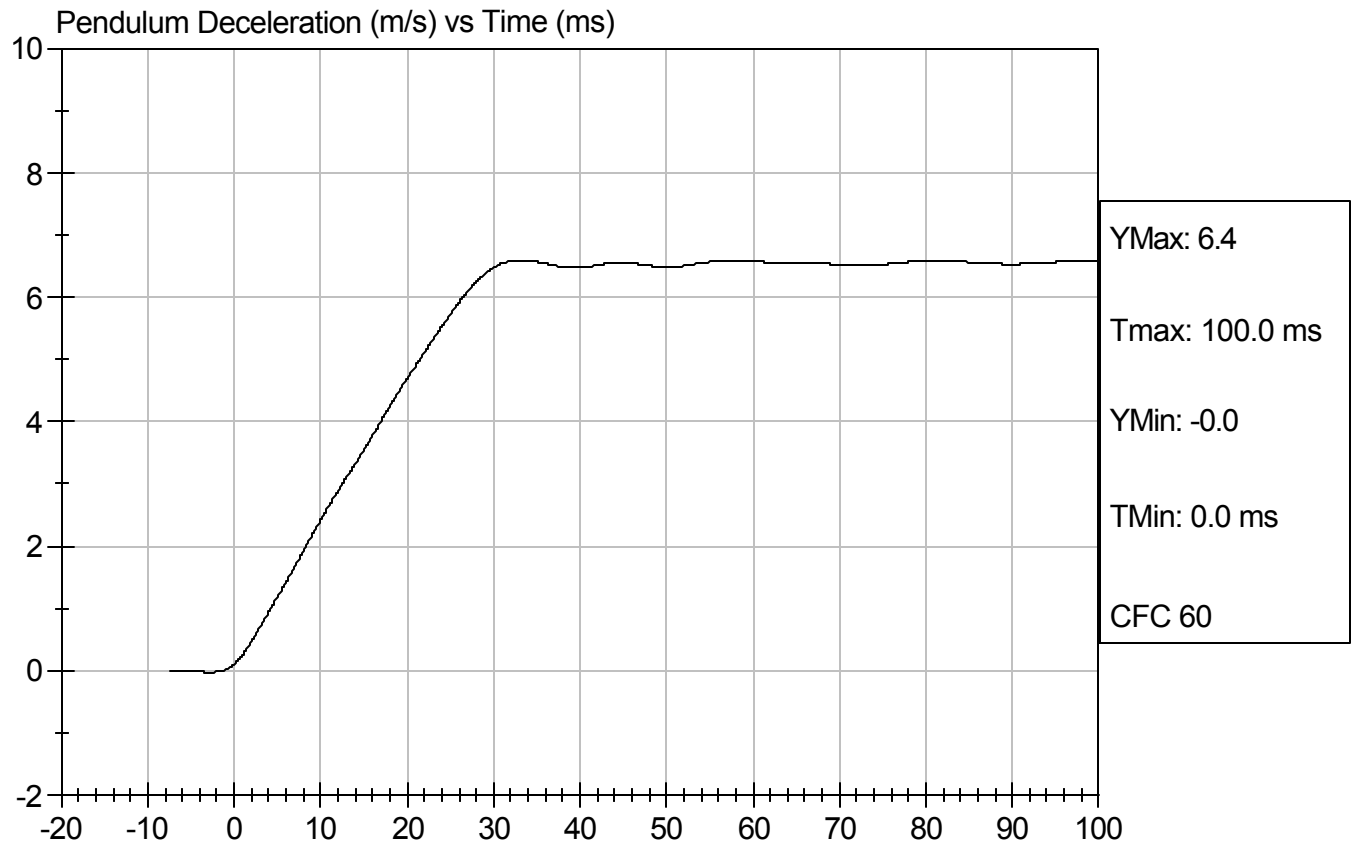
7/22/10

Test Date



Test Desc: Neck Bending
Component ID: D102349

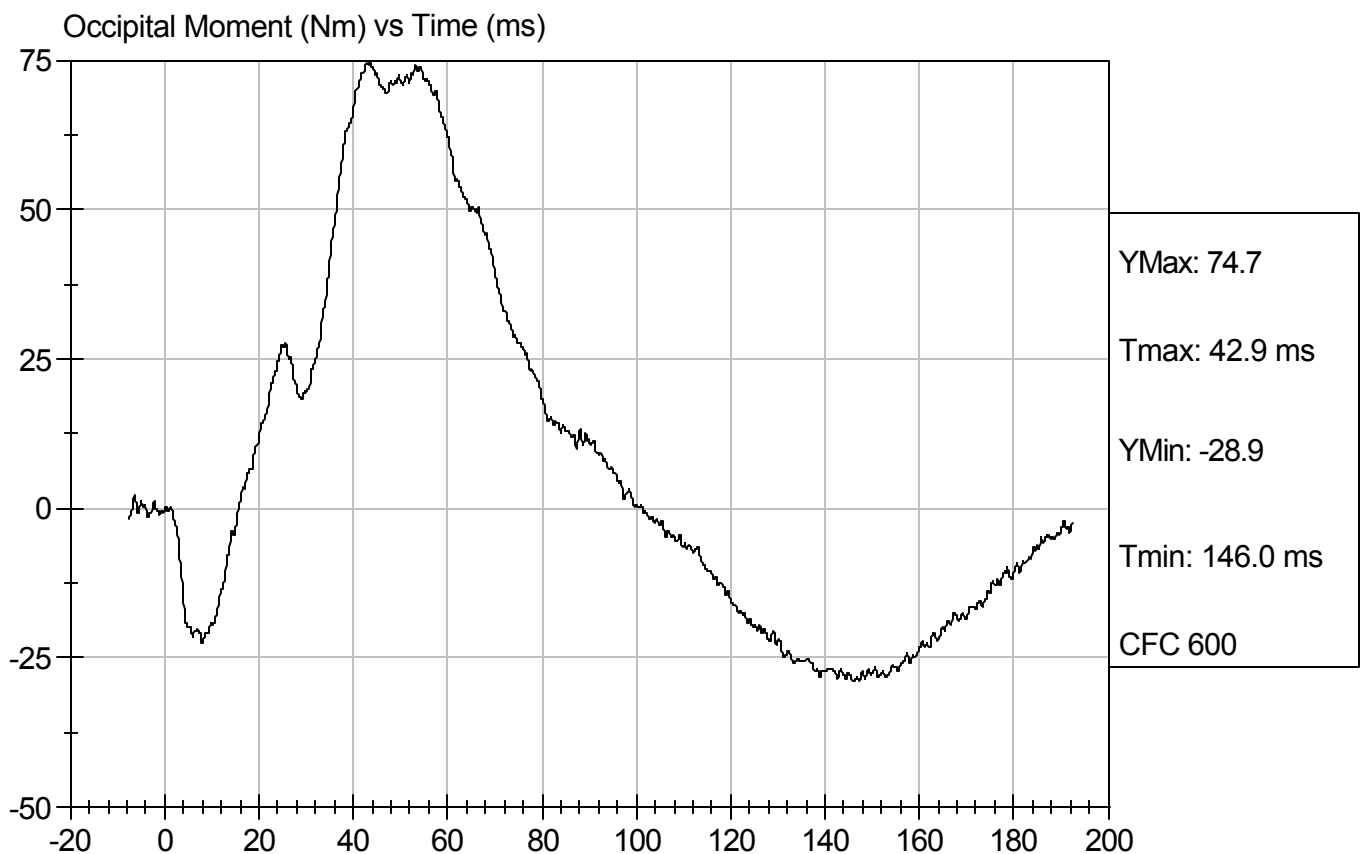
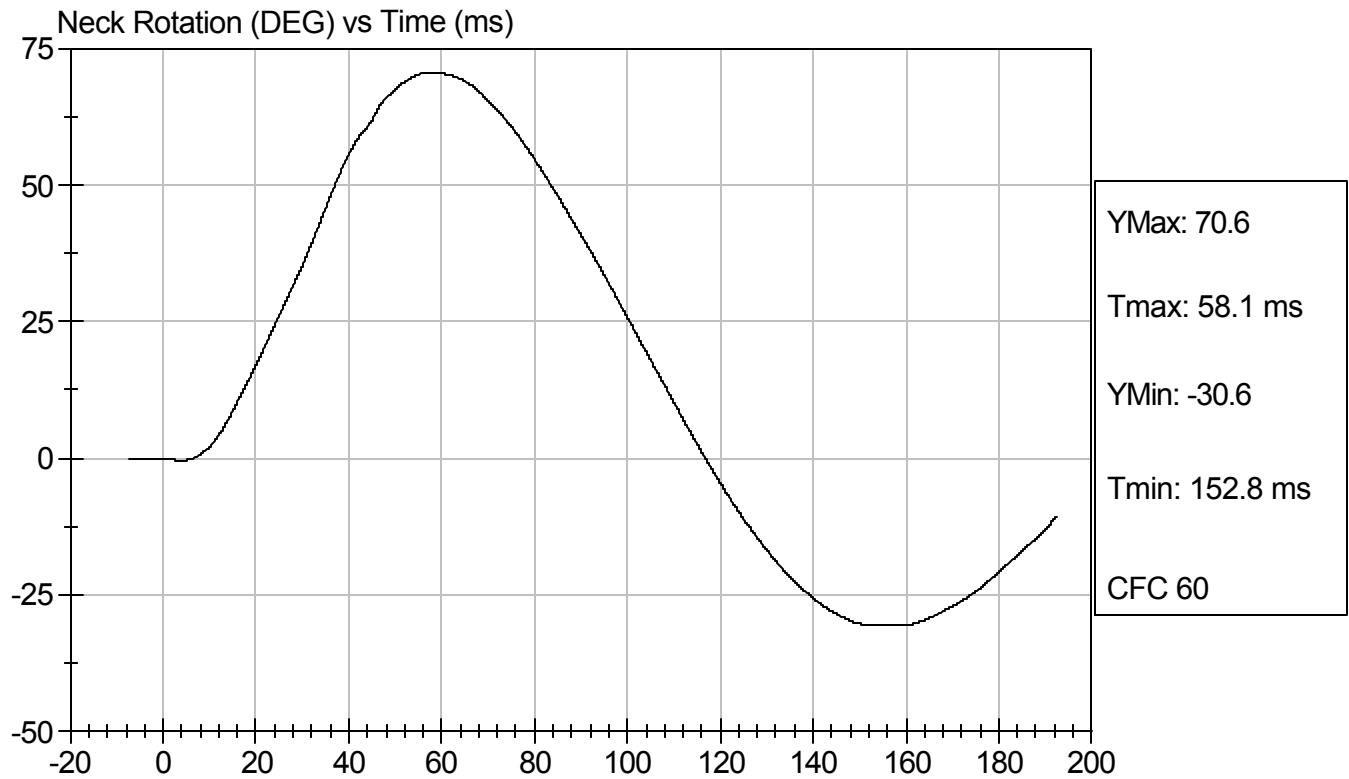
Test Date: 7/22/10
Speed: 23.15 ft/s, 7.06 m/s





Test Desc: Neck Bending
Component ID: D102349

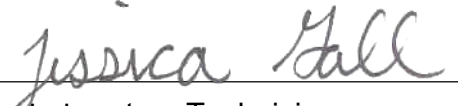
Test Date: 7/22/10
Speed: 23.15 ft/s, 7.06 m/s



SID/HIII Calibration Data Sheet
Side Impact Dummy
Inspection Checklist

ATD Serial No: 272

Test Part	Items Checked	Result
Skin	Visual inspection	Pass
Head	Visual, ballast, accelerometer mount	Pass
Neck	Visual	Pass
Spine Box	Visual, ballast, accelerometer mount	Pass
Rib Cage	Visual, measure	Pass
Sternum	Visual	Pass
Lumbar Spine	Visual	Pass
Abdomen	Visual	Pass
Pelvis	Visual, palpate, accelerometer mount	Pass
Upper Legs	Visual	Pass
Knees	Visual	Pass
Lower Legs	Visual, range of motion	Pass
Ankles	Visual, range of motion	Pass
Feet	Visual, range of motion	Pass
Joints	1 to 2 g range	Pass
Other		Pass


Laboratory Technician

Approved By

7/22/2010
Test Date