

**NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST**

**HYUNDAI MOTOR COMPANY
2009 HYUNDAI GENESIS
NHTSA NUMBER: U90501**

**PREPARED BY:
MGA RESEARCH CORPORATION
5000 WARREN ROAD
BURLINGTON, WI 53105**



Test Date: August 13, 2008

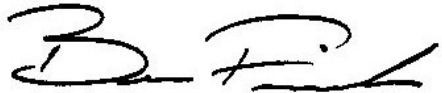
Report Date: October 10, 2008

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**

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Date: 10/10/08

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David Winkelbauer, Facility Director

Date: 10/10/08

Technical Report Documentation Page

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		6. Performing Organization Code MGA																						
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16. Abstract A 55/28 km/h 90° Moving Deformable Barrier NCAP side impact was conducted on the subject 2009 Hyundai Genesis 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 August 13, 2008. The impact velocity of the Moving Deformable Barrier (MDB) was 62.6 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 267 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>PASS.</u></th> </tr> </thead> <tbody> <tr> <td>Left Upper Rib (LUR) Accel., g</td> <td style="text-align: center;">47.8</td> <td style="text-align: center;">26.6</td> </tr> <tr> <td>Left Lower Rib (LLR) Accel., g</td> <td style="text-align: center;">43.5</td> <td style="text-align: center;">31.7</td> </tr> <tr> <td>Lower Spine (T₁₂) Accel., g</td> <td style="text-align: center;">36.0</td> <td style="text-align: center;">38.0</td> </tr> <tr> <td>Thoracic Trauma Index (TTI)</td> <td style="text-align: center;">42</td> <td style="text-align: center;">35</td> </tr> <tr> <td>Pelvis (PEV) Accel., g</td> <td style="text-align: center;">57.6</td> <td style="text-align: center;">55.1</td> </tr> <tr> <td>HIC</td> <td style="text-align: center;">110</td> <td style="text-align: center;">113</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>PASS.</u>	Left Upper Rib (LUR) Accel., g	47.8	26.6	Left Lower Rib (LLR) Accel., g	43.5	31.7	Lower Spine (T ₁₂) Accel., g	36.0	38.0	Thoracic Trauma Index (TTI)	42	35	Pelvis (PEV) Accel., g	57.6	55.1	HIC	110	113
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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																						
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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. DTNH22-03-D-12005. The purpose of this test was to evaluate side impact protection in a 2009 Hyundai Genesis manufactured by Hyundai Motor Company.

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 2009 Hyundai Genesis 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 62.6 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 1959.6 kg and the test weight of the MDB was 1360.8 kg. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on August 13, 2008.

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/HIIs) can be found in Appendix A. Two 50th percentile adult male SID/HIIs 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/HII 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 267 mm at level 3, 1650 mm rearward of the vertical impact point. The driver and passenger SID/HIIs, 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/HII 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	110	32.6	66.7	42	57.6
Passenger	113	38.1	73.8	35	55.1

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Information	Left Front (Driver)		Left Rear (Passenger)	
	Installed	Deployed	Installed	Deployed
Front Airbag	Yes	No	No	
Side Torso Airbag	Yes	Yes	Yes	Yes
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:
Driver Neck Moment Z after 20 msec.

DATA SHEET NO. 1**GENERAL TEST AND VEHICLE PARAMETER DATA**Test Vehicle: 2009 Hyundai GenesisNHTSA No. U90501Test Program: NCAP Side ImpactTest Date: 8/13/2008**TEST VEHICLE INFORMATION**

Make	Hyundai
Model	Genesis
Body Style	Sedan
NHTSA No.	U90501
VIN	KMHGC46EX9U021522
Color	Cabernet Red Pearl
Delivery Date	7/31/2008
Odometer Reading (mile)	185
Dealer	Boucher
Transmission	Automatic
Final Drive	Rear
Number of Cylinders	6
Engine Displacement (L)	3.8
Engine Placement	Longitudinal
Automatic Door Locks (ADL)	Yes
Owner's Manual Details Instructions on Disabling ADLs	No

TEST VEHICLE OPTIONS

Driver Front Airbag	Yes
Driver Side Curtain Airbag	Yes
Driver Side Torso Airbag	Yes
Rear Passenger Side Curtain Airbag	Yes
Rear Passenger Side Torso Airbag	Yes
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	Hyundai Motor Company
Date of Manufacture	MAY/29/08

GVWR (kg)	2200
GAWR Front (kg)	1200
GAWR Rear (kg)	1250

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench		
Number Of Occupants	2	3		5
Capacity Wt. (VCW) (kg)				390
Cargo Wt. (RCLW) (kg)				50

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

Test Vehicle: 2009 Hyundai Genesis
 Test Program: NCAP Side Impact

NHTSA No. U90501
 Test Date: 8/13/2008

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	453.1	428.7		499.4	517.6	
Right	kg	457.7	413.7		475.8	466.8	
Ratio	%	52.0	48.0		49.8	50.2	
Totals	kg	910.8	842.4	1753.2	975.2	984.4	1959.6

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1753.2
Weight of 2 P572M ATDs	kg	161.5
Rated Cargo/Luggage Weight (RCLW)	kg	50
Calculated Vehicle Target Weight (TVTW)	kg	1964.7

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

Weight of Ballast in Cargo Area: 0 kg

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	711	710	709	719	1414
As Tested	mm	693	710	690	700	1478
Fully Loaded	mm	692	703	689	691	

TEST VEHICLE VERTICAL IMPACT LINE DATA

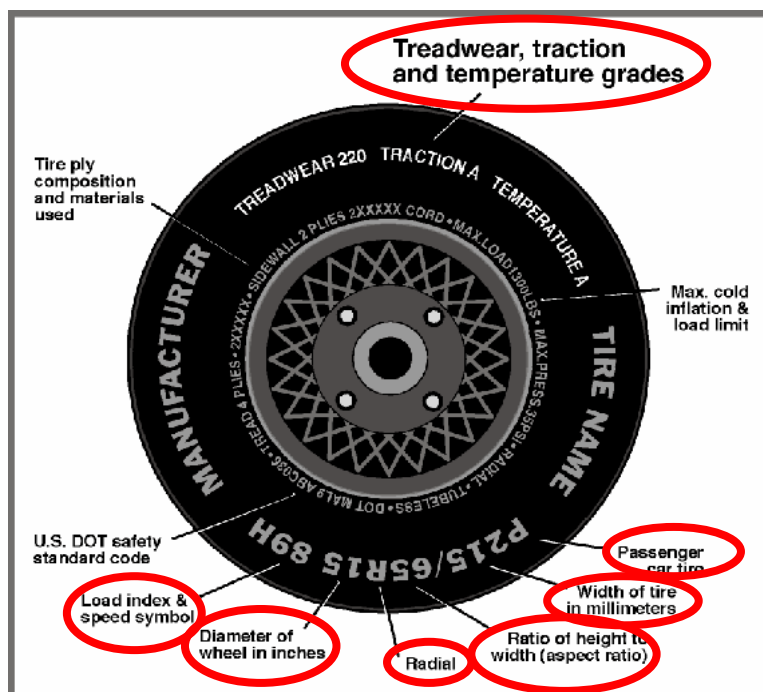
Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2943
Target Impact Point Aft of Front Axle	mm	531
Actual Impact Point Aft of Front Axle	mm	534

DATA SHEET NO. 2

TEST VEHICLE TIRE INFORMATION

Test Vehicle: 2009 Hyundai Genesis
 Test Program: NCAP Side Impact

NHTSA No. U90501
 Test Date: 8/13/2008



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold / Test Pressure (kPa)	230	230
Recommended Tire Size	P235/50R18	P235/50R18
Tire Size on Vehicle	P235/50R18	P235/50R18
Tire Manufacturer	Dunlop	Dunlop
Tire Name	SP Sport	SP Sport
Tire Type	Passenger	Passenger
Tire Width (mm)	235	235
Ratio of Height to Width (aspect ratio)	50	50
Radial	R	R
Wheel Diameter	18	18
Load Index & Speed Symbol	97V	97V
Treadwear	340	340
Traction Grade	A	A
Temperature Grade	A	A

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

Test Vehicle: 2009 Hyundai Genesis
 Test Program: NCAP Side Impact

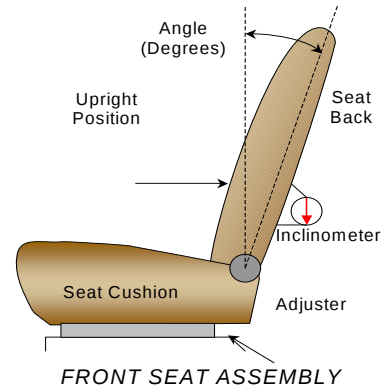
NHTSA No. U90501
 Test Date: 8/13/2008

NORMAL DESIGN RIDING POSITION

The driver and passenger seat back is positioned to the manufacturer's designated angle. The procedure is as follows:
 Set at 25 degrees measured from upright position (11.5° on headrest post).

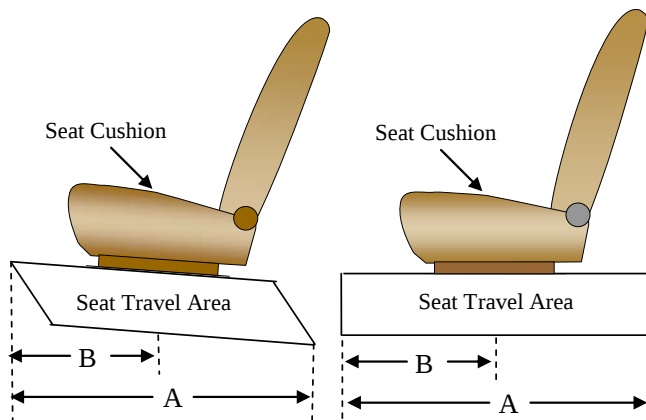
Driver seat back angle: 11.5 degrees from headrest post

Passenger seat back angle: Fixed



SEAT FORE/AFT POSITIONS

	Total Fore/Aft Travel	Placed in position #
Driver Seat	266 mm	133 mm
Rear Seat	Fixed	Fixed



DATA SHEET NO. 3 (CONTINUED)

TEST VEHICLE INFORMATION

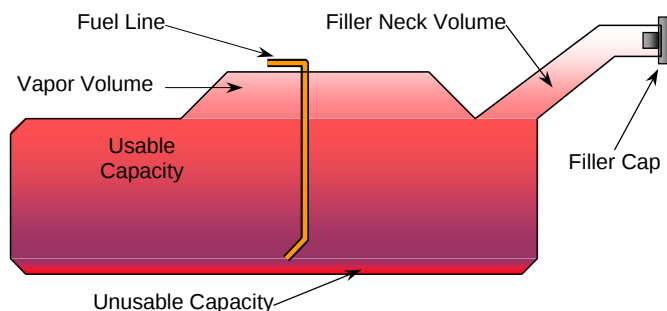
Test Vehicle: 2009 Hyundai Genesis
 Test Program: NCAP Side Impact

NHTSA No. U90501
 Test Date: 8/13/2008

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	73.0
Usable Capacity of "Optional" Tank	
92-94% of Usable Capacity	67.2 to 68.6
Actual Amount of Solvent used	67.9
1/3 of Usable Capacity	24.3

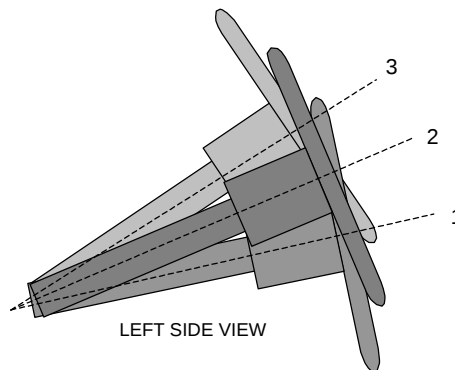
The test vehicle is equipped with an electric fuel pump. Fuel pump will operate when engine system is normally operating.



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	0	16.4
Geometric center position No. 2	15	24.0
Uppermost position No. 3	30	31.5

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

Test Vehicle: 2009 Hyundai Genesis
Test Program: NCAP Side Impact

NHTSA No. U90501
Test Date: 8/13/2008

MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1252
Overall Length Including Honeycomb Face	4115
Wheel base of Framework Carriage	2588
C.G. Location aft of Front Axle	1101

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	473.5	219.5	
Right	kg	308.3	359.5	
Ratio	%	57.5	42.5	
Totals	kg	781.8	579.0	1360.8

SPEED AND IMPACT ANGLE DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.6
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.6
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	89.8

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

Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 50	3 rearward
Vertical Offset	mm	+/-20	9 up

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

Test Vehicle: 2009 Hyundai Genesis
 Test Program: NCAP Side Impact

NHTSA No. U90501
 Test Date: 8/13/2008

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	Headliner, Curtain Airbag, Headrest
Upper Torso Contact	Side Airbag	Side Airbag
Lower Torso Contact	Door Panel	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 doors were locked	Struck side doors were locked
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 and Left Rear Window Broke
Other Notable Effects	None

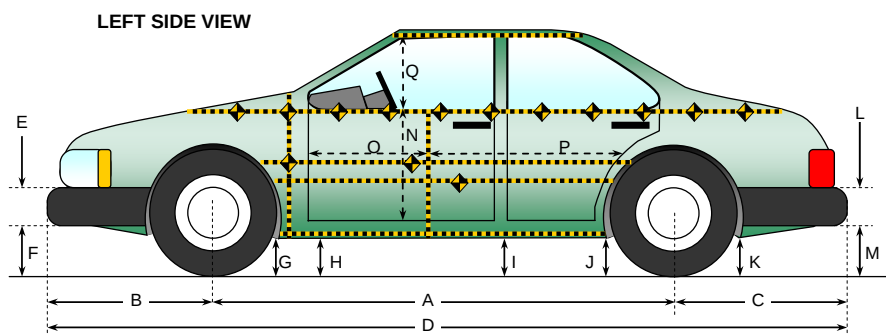
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

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

Test Vehicle: 2009 Hyundai Genesis
 Test Program: NCAP Side Impact

NHTSA No. U90501
 Test Date: 8/13/2008



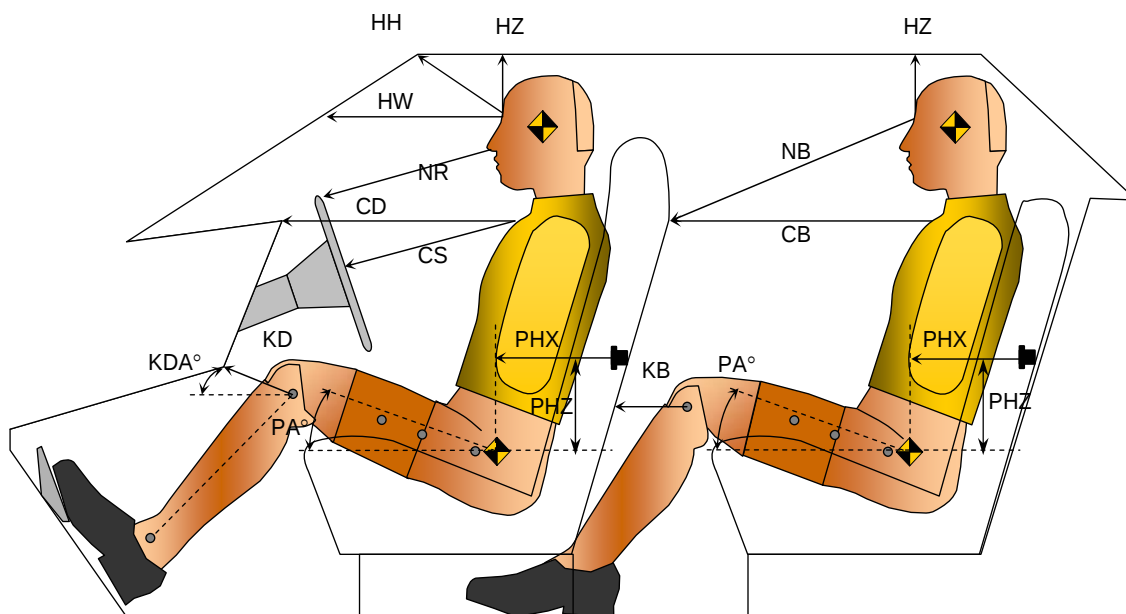
All Measurements in mm

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2943	2926	17
B	Front Axle to FSOV	871	883	-12
C	Rear Axle to RSOV	1127	1123	4
D	Total Length at Centerline	4941	4932	9
E	Front Bumper Thickness	128	128	0
F	Front Bumper Bottom to Ground	175	173	2
G	Sill Height at Front Wheel Well	154	154	0
H	Sill Height at Front Door Leading Edge	145	145	0
I	Sill Height at "B" Pillar	160	145	15
J1	Sill Height at Rear Wheel Well	150	142	8
J2	Pinch Weld Height at Rear Wheel Well	149	137	12
K	Sill Height Aft of Rear Wheel Well	210	200	10
L	Rear Bumper Thickness	140	140	0
M	Rear Bumper Bottom to Ground	310	315	-5
N	Sill Height to Window Bottom Sill	730	626	104
O	Front Door Leading Edge to Impact CL	792	765	27
P	Rear Door Trailing Edge to Impact CL	1302	1231	71
Q	Front Window Opening	395	380	15
R	Right Side Length	3758	3761	-3
S	Left Side Length	3750	3724	26
T	Vehicle Width at "B" Post	1858	1639	219

DATA SHEET NO. 7
SID/HII LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2009 Hyundai Genesis
 Test Program: NCAP Side Impact

NHTSA No. U90501
 Test Date: 8/13/2008

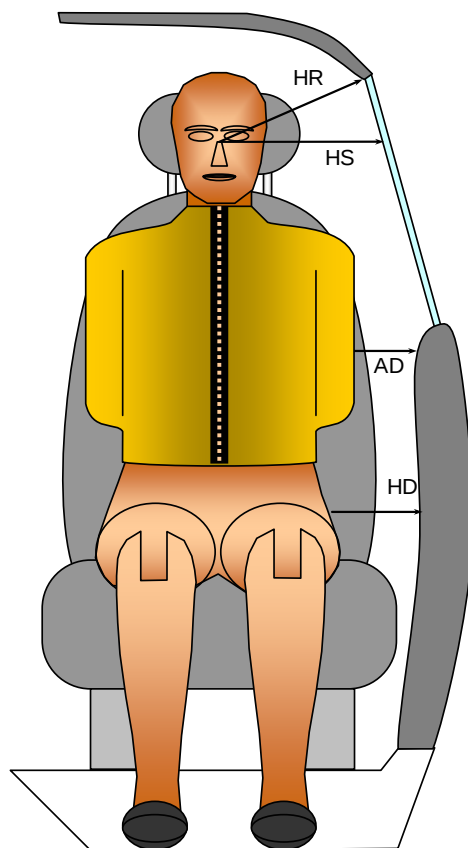


Driver Code	Pass. Code	Measurement Description	Driver S/N 271		Passenger S/N 272	
			Length(mm)	Angle(°)	Length(mm)	Angle(°)
HH		Head to Header	405			
HW		Head to Windshield	657			
HZ	HZ	Head to Roof	165		131	
NR	NB	Nose to Rim/Nose to Seatback	468		693	
CD	CB	Chest to Dash or Seatback	543		602	
CS		Chest to Steering Wheel	330			
KDL	KBL	Left Knee to Dash or Seatback	152	19.3	254	40.2
KDR	KBR	Right Knee to Dash or Seatback	125	26.3	258	38.5
PA	PA	Pelvic Angle		23.8		23.3
PHX	PHX	H-Point to Striker (X-Axis)	246		221	
PHZ	PHZ	H-Point to Striker (Z-Axis)	257		225	

DATA SHEET NO. 8
SID/HIII LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2009 Hyundai Genesis
 Test Program: NCAP Side Impact

NHTSA No. U90501
 Test Date: 8/13/2008



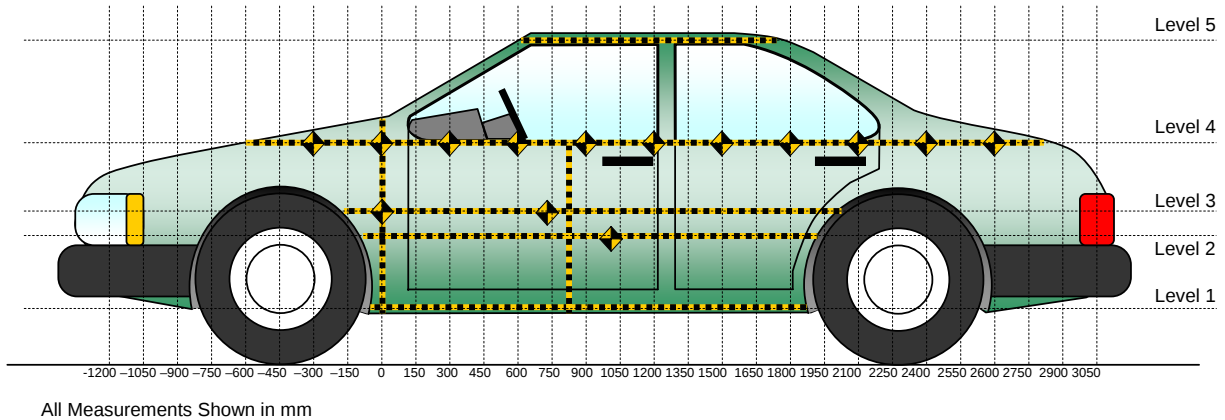
FRONT VIEW OF DUMMY

Code	Measurement Description	Units	Driver S/N 271	Passenger S/N 272
HR	Head to Side Header	mm	205	178
HS	Head to Side Window	mm	310	296
AD	Arm to Door	mm	110	131
HD	H-Point to Door	mm	145	176

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

Test Vehicle: 2009 Hyundai Genesis
 Test Program: NCAP Side Impact

NHTSA No. U90501
 Test Date: 8/13/2008



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	4	1350	1410
4	Window Sill	159	1800	964
3	Mid Door	267	1650	625
2	Occupant H-Point	264	1650	580
1	Sill Top	91	900	260
	Maximum Penetration	267		

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2009 Hyundai Genesis
 Test Program: NCAP Side Impact

NHTSA No. U90501
 Test Date: 8/13/2008

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-600				298					297					-1	
-450				290					292					2	
-300				283					287					4	
-150		176	178	276			191	195	284			15	17	8	
0	224	190	187	271		280	217	216	282		56	27	29	11	
150	236	189	186	265		296	320	305	266		60	131	119	1	
300	236	187	184	265		304	378	360	280		68	191	176	15	
450	236	186	182	262		310	401	384	301		74	215	202	39	
600	236	184	181	262		318	412	401	323		82	228	220	61	
750	236	182	178	261		327	414	406	346		91	232	228	85	
900	236	181	178	261	498	327	421	414	366	499	91	240	236	105	1
1050	235	180	176	261	496	324	418	429	369	497	89	238	253	108	1
1200	236	178	176	262	497	323	423	415	379	501	87	245	239	117	4
1350	236	178	176	264	498	322	429	420	394	502	86	251	244	130	4
1500	236	178	176	266	498	320	436	433	402	500	84	258	257	136	2
1650	236	179	178	269	496	320	443	445	417	498	84	264	267	148	2
1800	234	182	179	272	495	318	445	445	431	495	84	263	266	159	0
1950	216	182	181	276	497	278	357	356	377	494	62	175	175	101	-3
2100		172	175	282	506		249	324	329	504		77	149	47	-2
2250			168	290				193	284				25	-6	
2400				300					309					9	
2550				311					318					7	
2700				324					327					3	
2850				341					342					1	

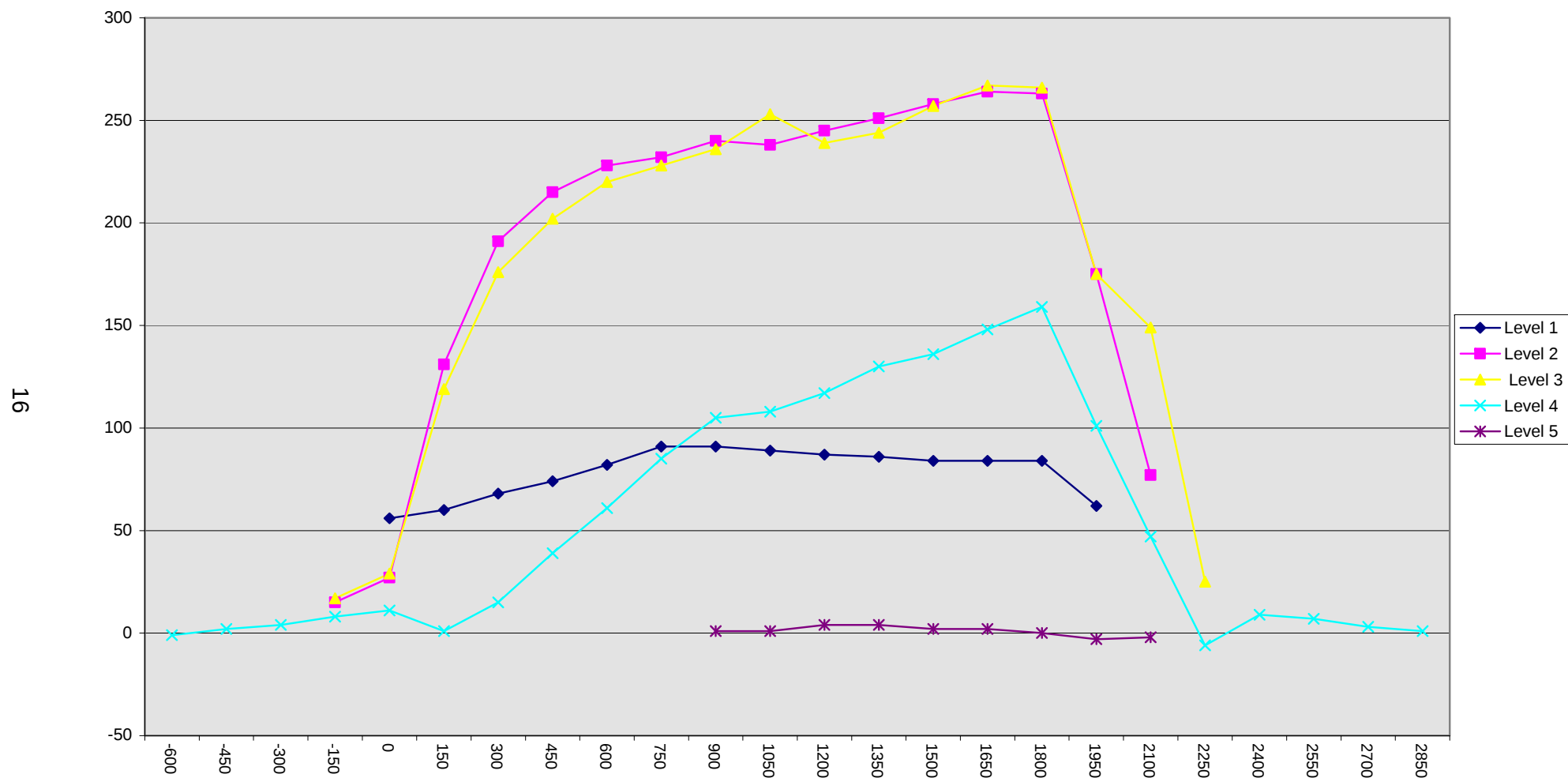
Reference plane is parallel to test vehicle longitudinal centerline.

Given dimensions = Reference plane to car body

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

Test Vehicle: 2009 Hyundai Genesis
Test Program: NCAP Side Impact

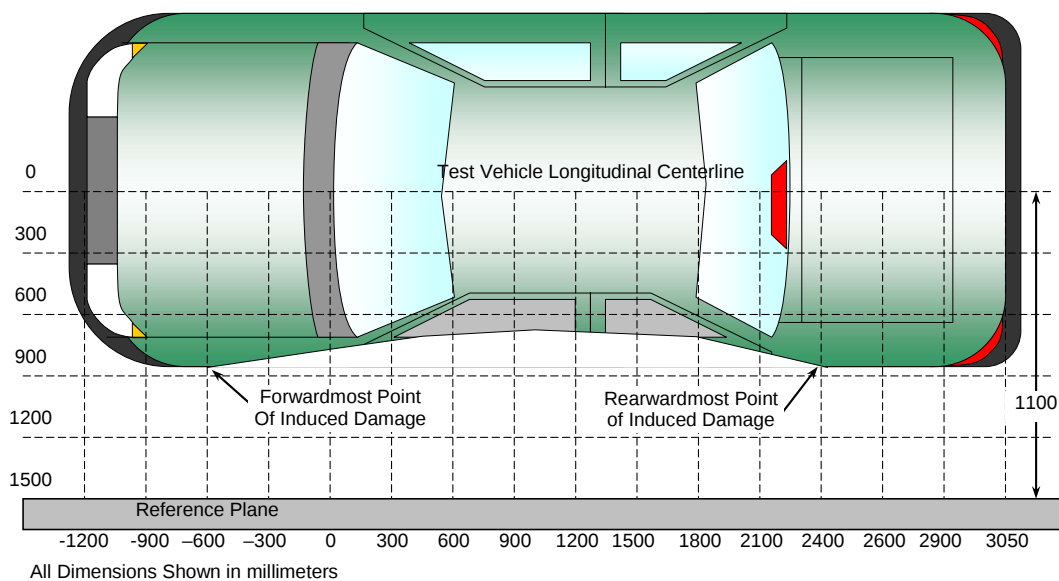
NHTSA No. U90501
Test Date: 8/13/2008



DATA SHEET NO. 11 **VEHICLE DAMAGE PROFILE DISTANCES**

Test Vehicle: 2009 Hyundai Genesis
 Test Program: NCAP Side Impact

NHTSA No. U90501
 Test Date: 8/13/2008



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	341	342	1
2	2170	4	284	308	24
3	1438	2	178	444	266
4	750	2	182	435	253
5	84	2	190	295	105
6	-600	4	298	297	-1

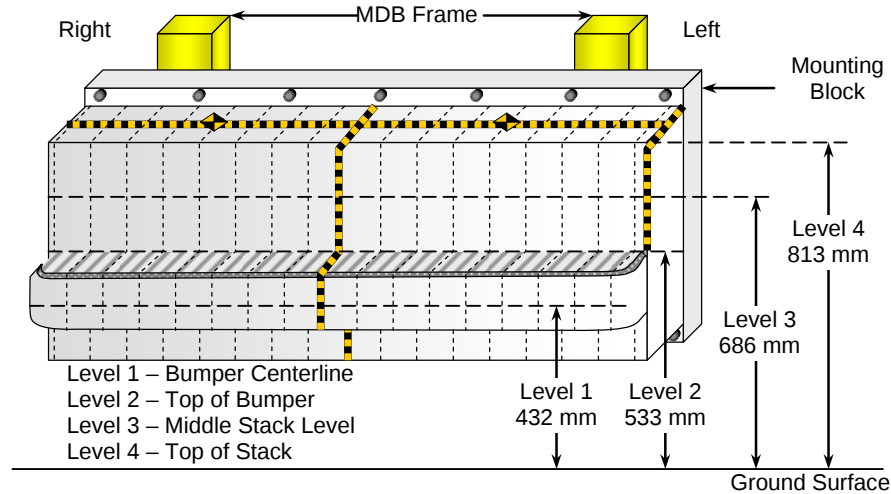
Reference plane is parallel to test vehicle longitudinal centerline.
 Given dimensions = Reference plane to car body.

DATA SHEET NO. 12

DEFORMABLE BARRIER HONEYCOMB FACE STATIC CRUSH

Test Vehicle: 2009 Hyundai Genesis
 Test Program: NCAP Side Impact

NHTSA No. U90501
 Test Date: 8/13/2008



DEFORMABLE BARRIER STATIC CRUSH

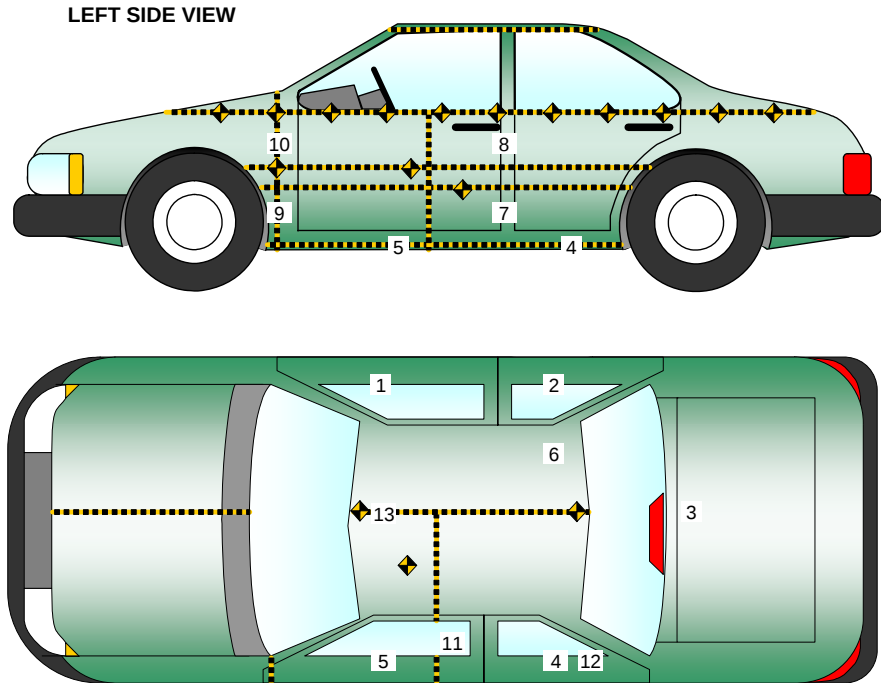
Stack Level	Distance Right of Center								C _L	Distance Left of Center							
	800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
1	158	134	118	117	119	117	119	123	127	140	141	138	142	140	147	153	156
2	93	78	60	56	51	50	50	50	51	57	55	60	66	79	92	96	98
3	127	86	81	29	20	17	17	18	25	40	61	39	25	20	16	15	32
4	154	113	86	59	39	29	41	45	84	81	82	69	35	20	14	14	27

All Dimensions in mm

DATA SHEET NO. 13
VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2009 Hyundai Genesis
 Test Program: NCAP Side Impact

NHTSA No. U90501
 Test Date: 8/13/2008



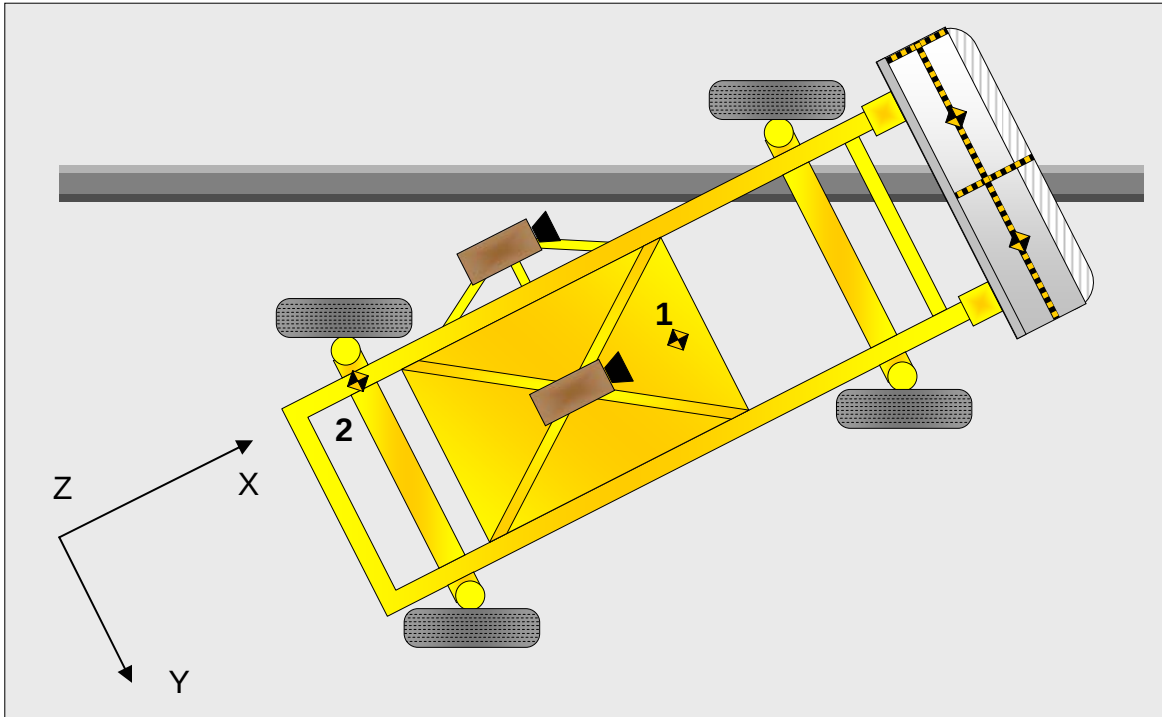
Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Right Sill at Front Seat	2563	712	-185
2	Right Sill at Rear Seat	1834	718	-192
3	Rear Floorpan Above Axle	934	20	-518
4	Left Sill at Rear Door	1834	-718	-188
5	Left Sill at Front Door	2557	-712	-180
6	Rear Occupant Compartment	1978	-389	-368
7	Left Lower B-Post	2295	-751	-465
8	Left Middle B-Post	2275	-755	-744
9	Left Lower A-Post	3380	-743	-460
10	Left Middle A-Post	3438	-815	-715
11	Front Seat Track	2380	-660	-454
12	Rear Seat Track or Structure			
13	Vehicle CG	2998	0	-442

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: 2009 Hyundai Genesis
 Test Program: NCAP Side Impact

NHTSA No. U90501
 Test Date: 8/13/2008



Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	MDB CG	-1092	0	-483
2	MDB Rear	-2591	-625	-622

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: 2009 Hyundai Genesis
Test Program: NCAP Side Impact

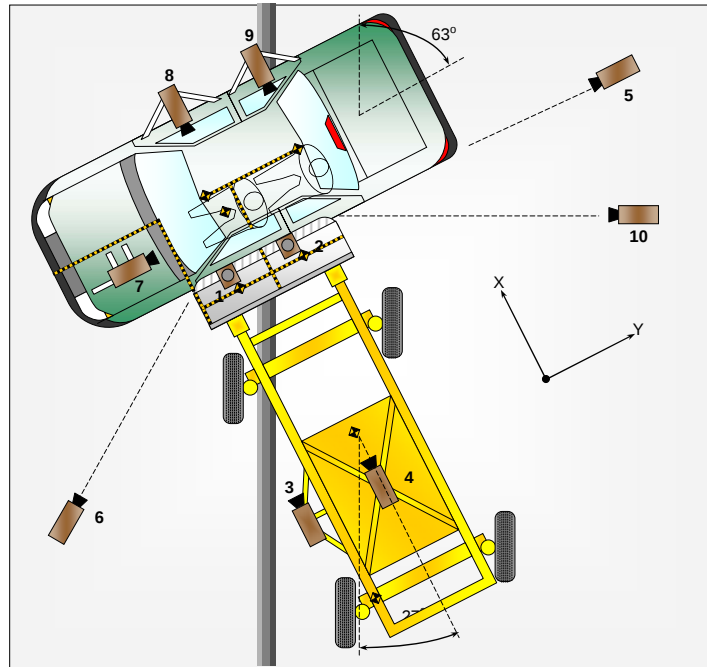
NHTSA No. U90501
Test Date: 8/13/2008

	Elements	Pre-Test (mm)
1	Total Length	4941
2	Total Width	1858
3	Bumper Top Height	530
4	Bumper Bottom Height	405
5	Longitudinal Member Top Height	495
6	Distance between Longitudinal Members	935
7	Longitudinal Member Width	69
8	Engine Top Height	865
9	Engine Bottom Height	169
10	Engine and gearbox width	692
11	Front bumper-engine distance	556
12	Front shock absorber fixing height	836
13	Bonnet leading edge height	752
14	Front shock absorber fixing width	1298
15	Front bumper – front axle distance	875
16	Front axle – a pillar distance	573
17	A-pillar – B-pillar distance	1165
18	B-Pillar – rear axle distance	1186
19	B-pillar – C-pillar distance	1015
20	Roof sill bottom height	1421
21	Roof sill top height	1462
22	Floor sill bottom height	197
23	Floor sill top height	346

DATA SHEET NO. 16
HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2009 Hyundai Genesis
 Test Program: NCAP Side Impact

NHTSA No. U90501
 Test Date: 8/13/2008



No.	Camera View	Location (mm)			Lens (mm)	Film Speed (fps)
		X	Y	Z		
1	Overhead Close-up	100	0	5050	50	1000
2	Overhead Overall	-375	0	5050	14	1000
3	MDB Onboard, Impact Point Close-up				50	1000
4	MDB Onboard, Centerline of Impact				16	1000
5	Right Side, Ground Level, Overall	-1040	5010	1220	24	1000
6	Left Side, Ground Level, Overall	2625	-4830	1260	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				13	24

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: 2009 Hyundai Genesis
 Test Program: NCAP Side Impact

NHTSA No. U90501
 Test Date: 8/13/2008

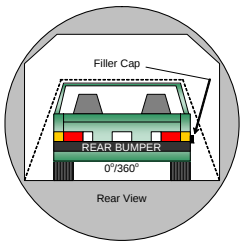
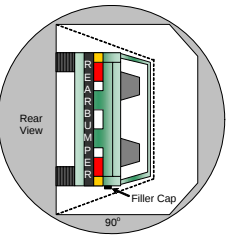
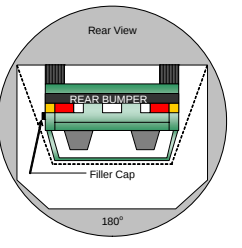
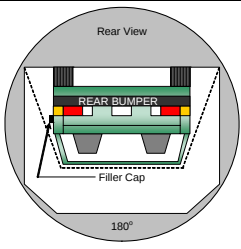
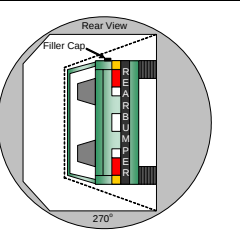
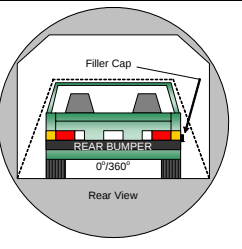
FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 21° C Test Time: 10:32 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°	124	300	First 5	0
90° to 180°	115	300	First 5	0
180° to 270°	110	300	First 5	0
270° to 360°	112	300	First 5	0

APPENDIX A
PHOTOGRAPHS

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Left Front ¾ View, As Received



Right Rear ¾ 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



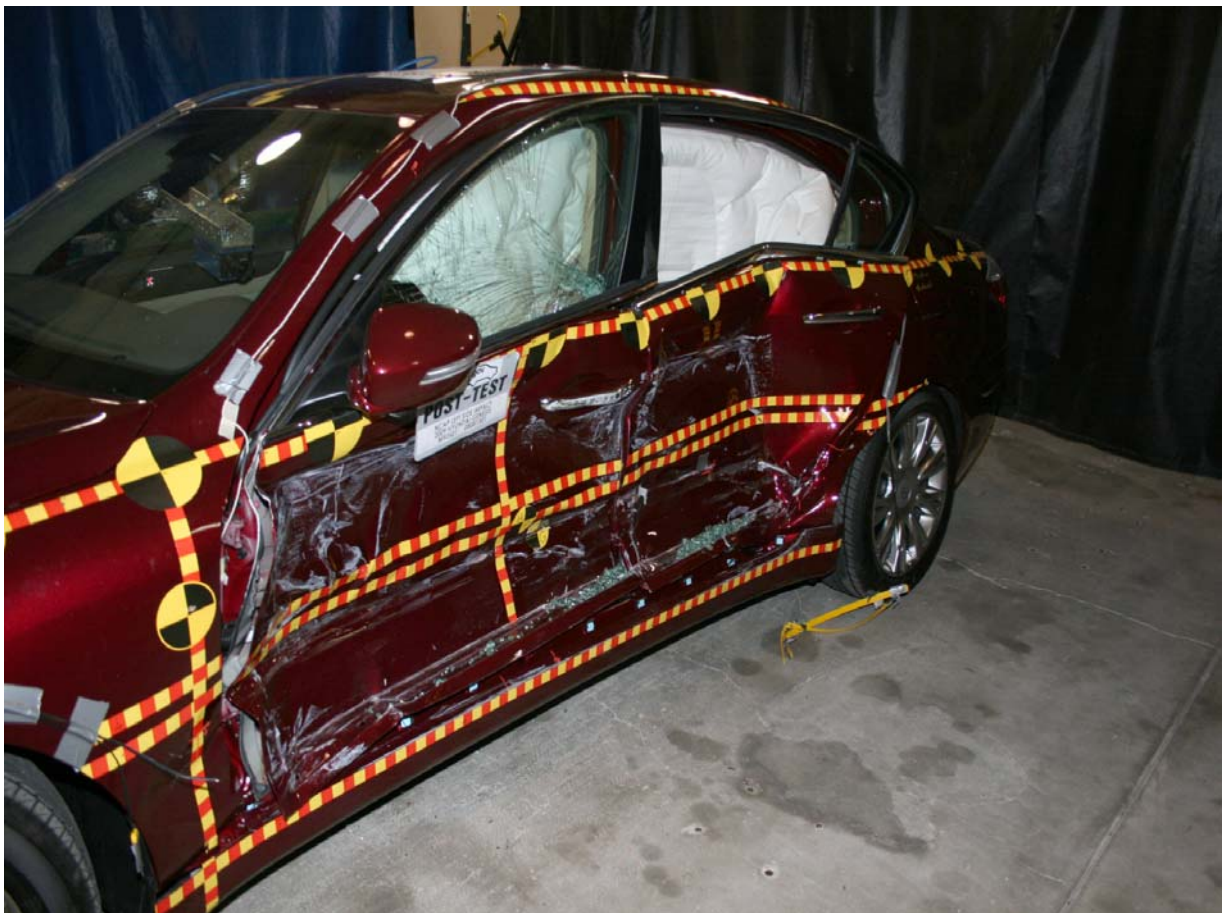
Pre-Test Left Impact Point



Post-Test Left Impact Point



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



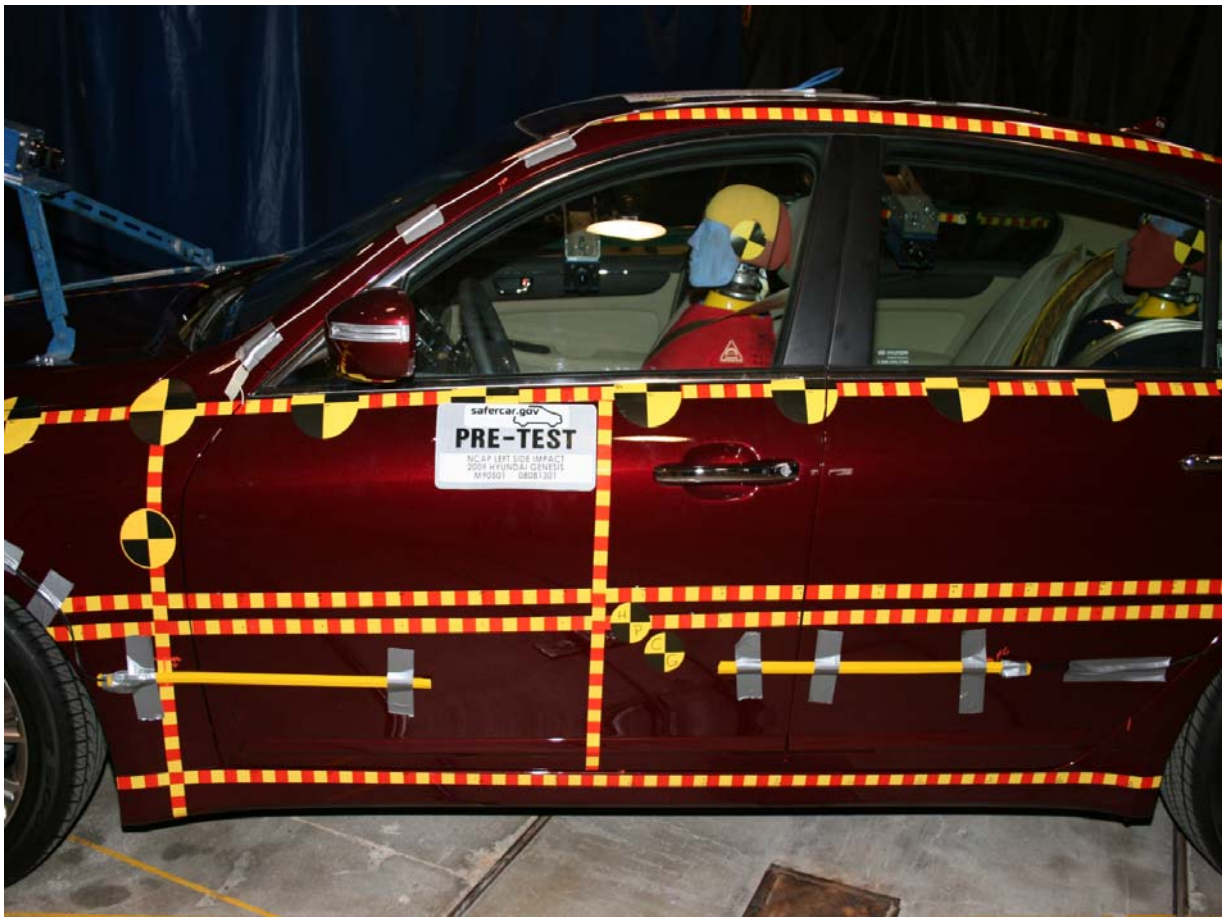
Post-Test Front $\frac{3}{4}$ View of Left Side Doors



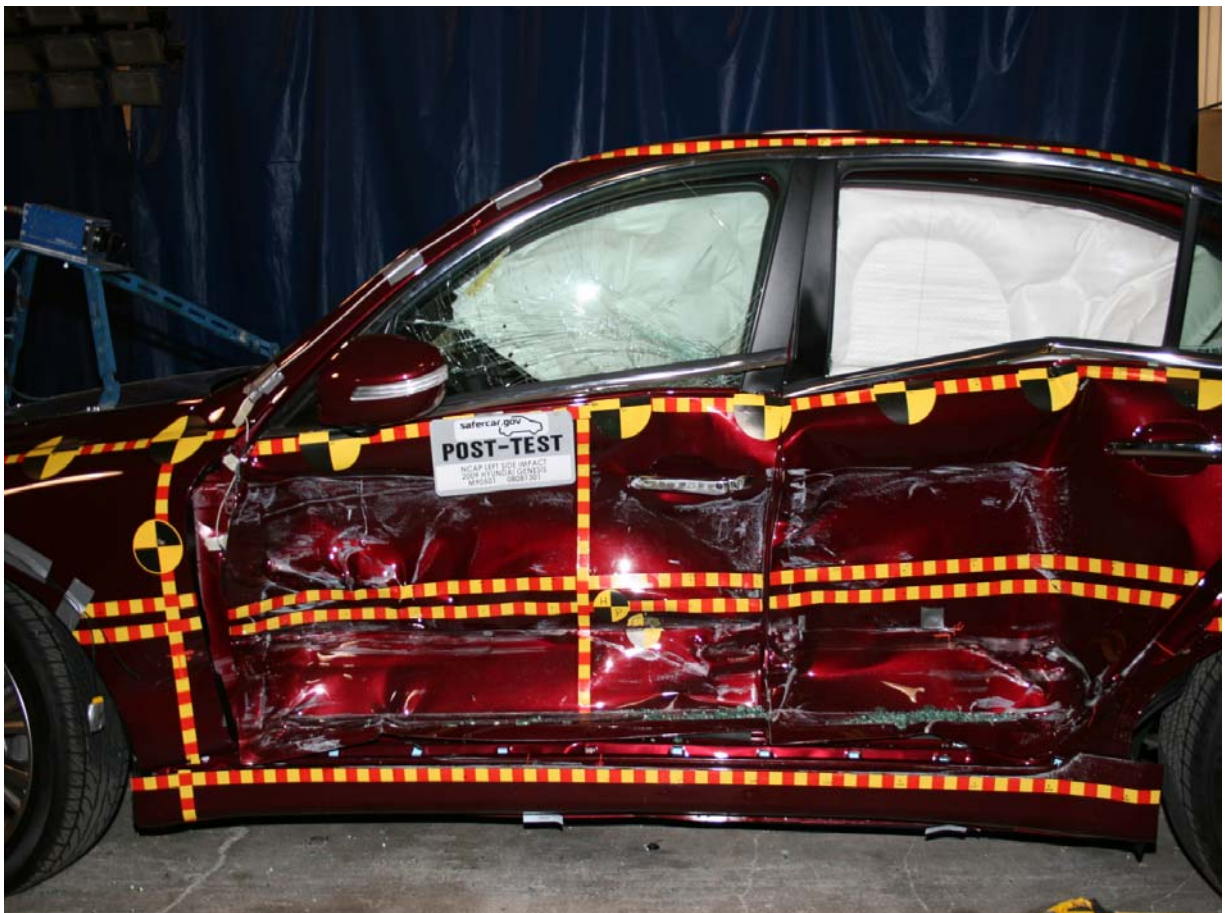
Pre-Test Rear $\frac{3}{4}$ View of Left Side Doors



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



Pre-Test Left Side Impact Close-up



Post-Test Left Side Impact Close-up



Pre-Test Overhead View



Post-Test Overhead View



Pre-Test Overhead Close-up View



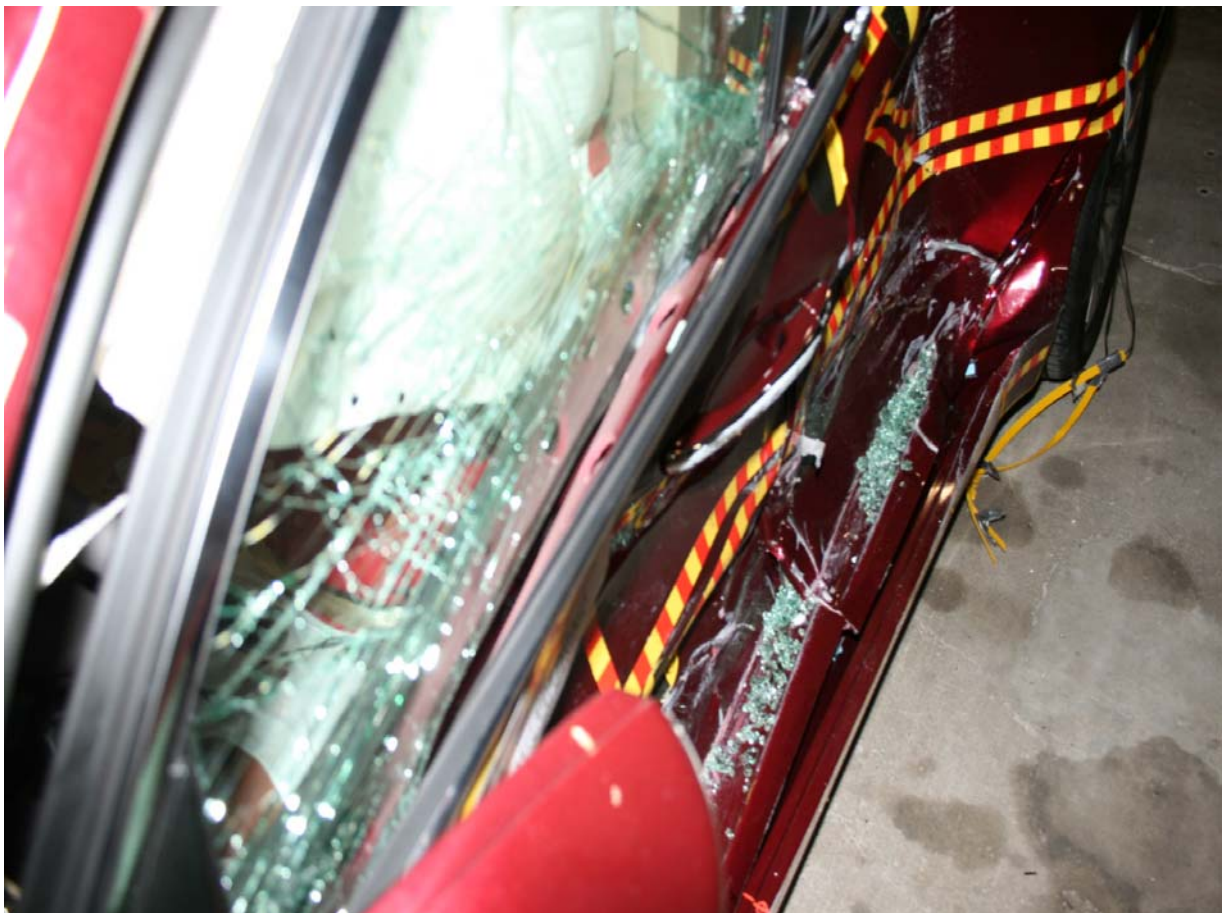
Post-Test Overhead Close-up View



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)



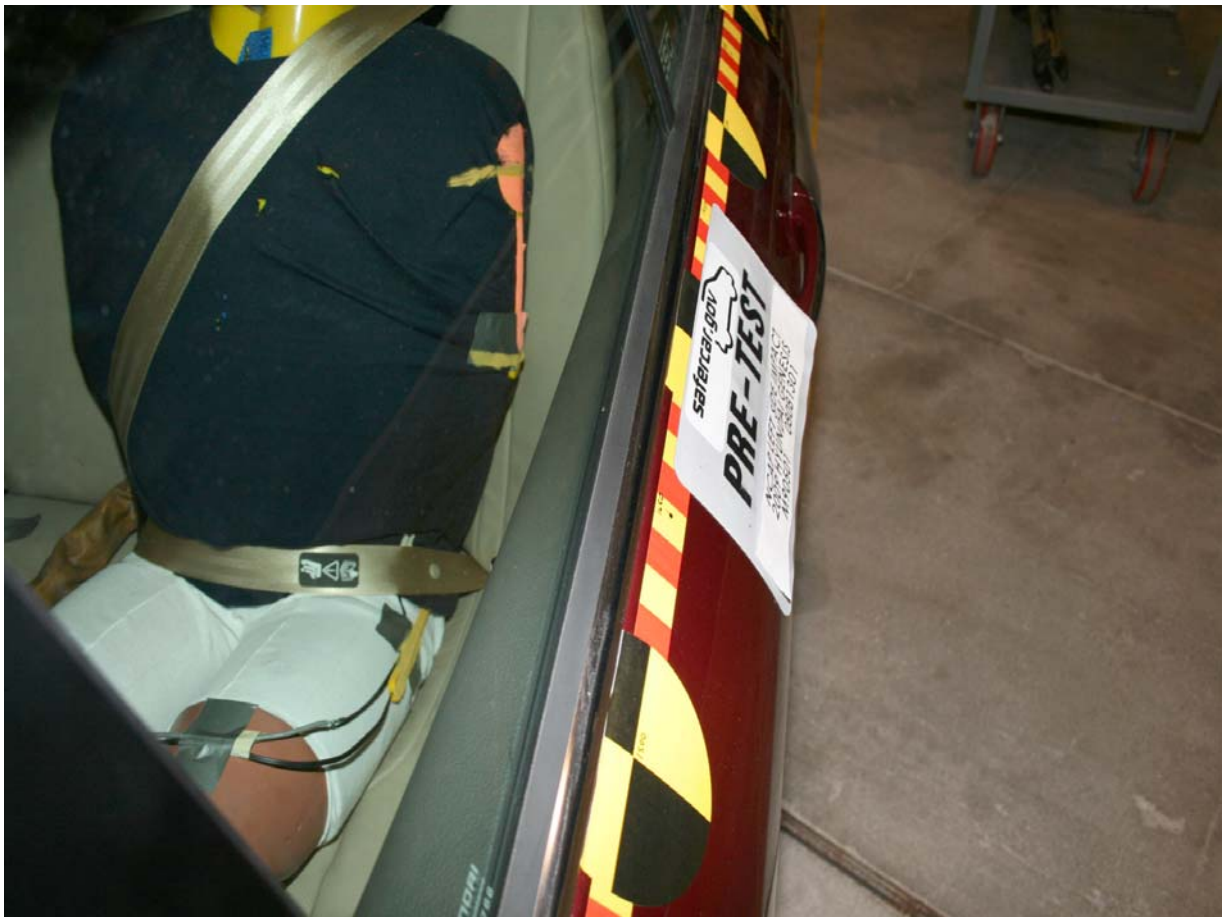
Pre-Test Driver Dummy Right Side View



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



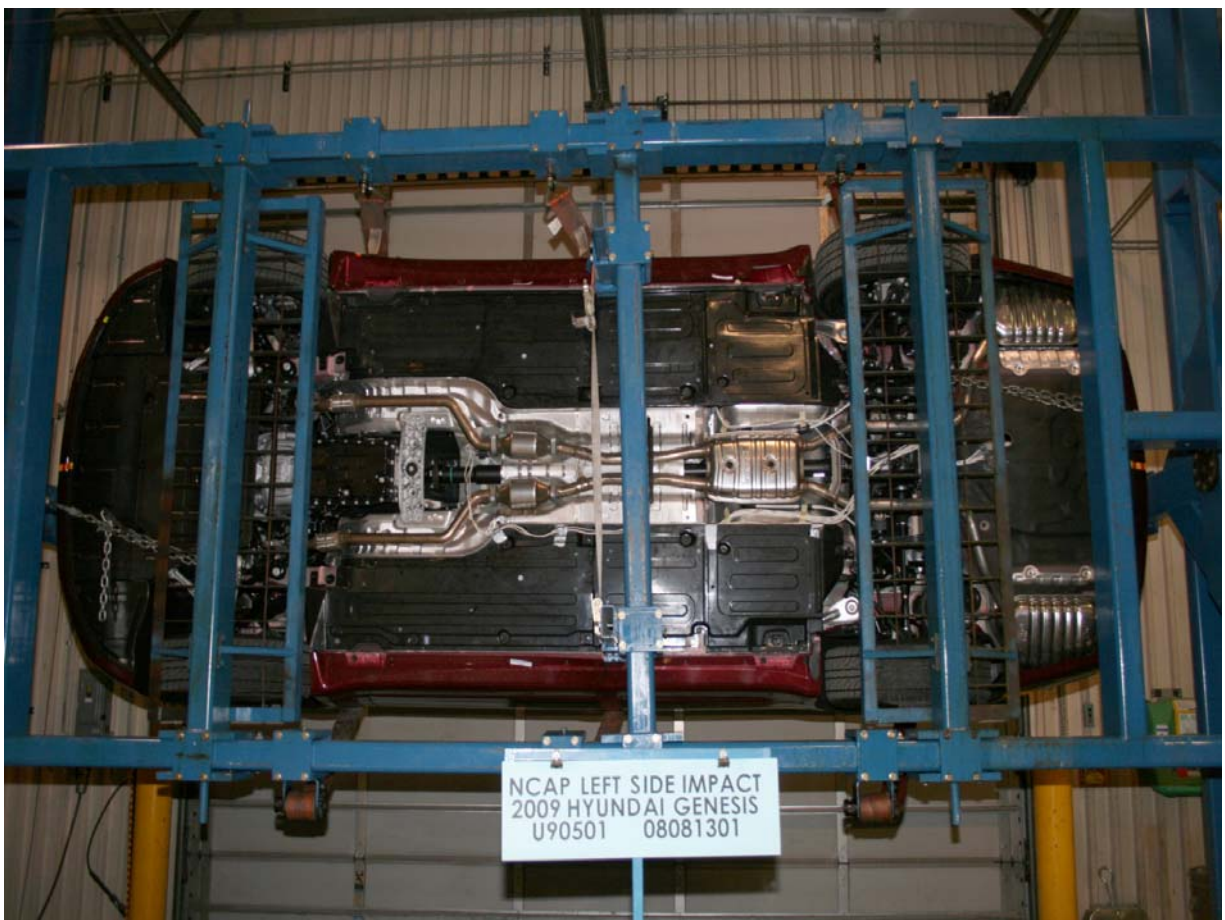
Post-Test Left Side View of Deformable Barrier



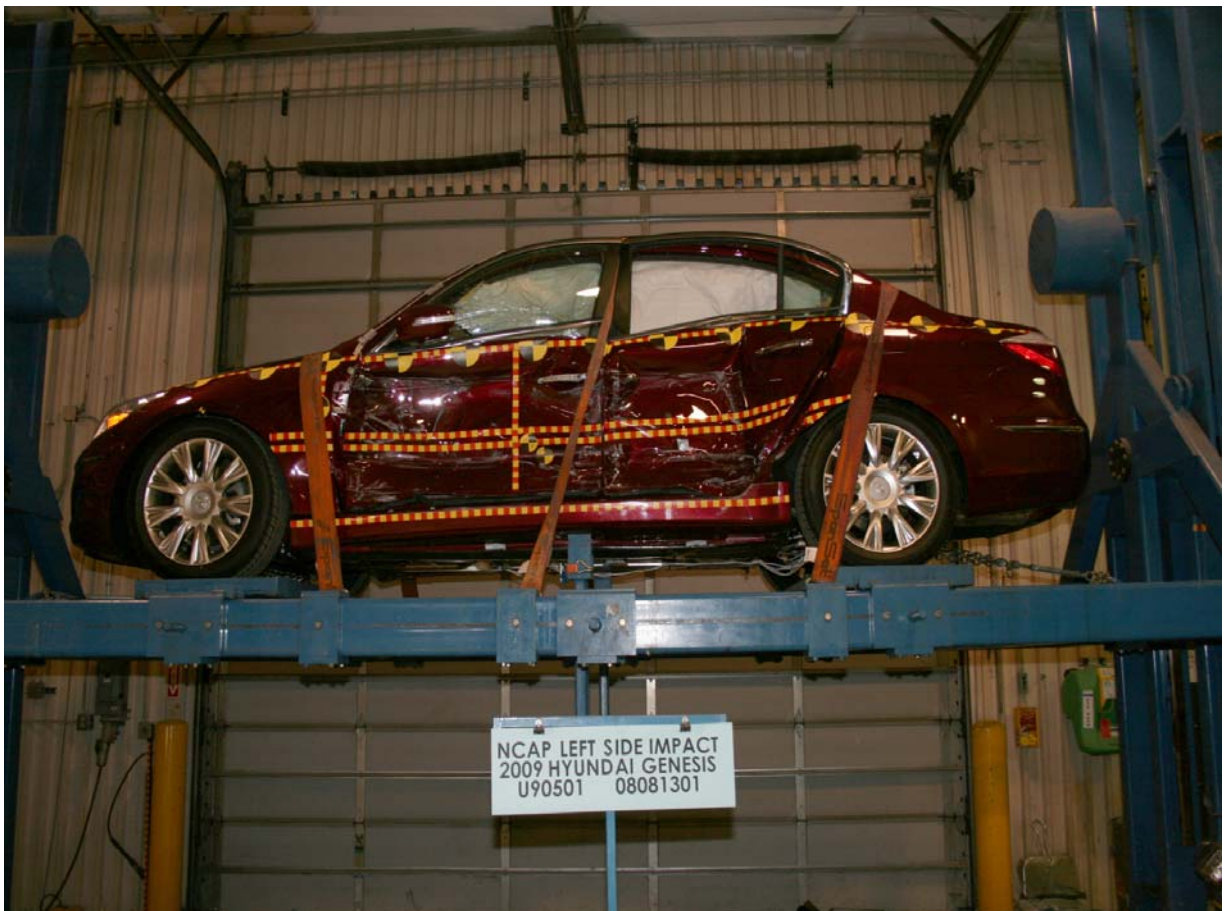
Vehicle on Rollover Device (90 Degrees)



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



Post-Test Driver Dummy Torso Contact



Post-Test Driver Dummy Contact



Post-Test Passenger Dummy Head Contact



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

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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

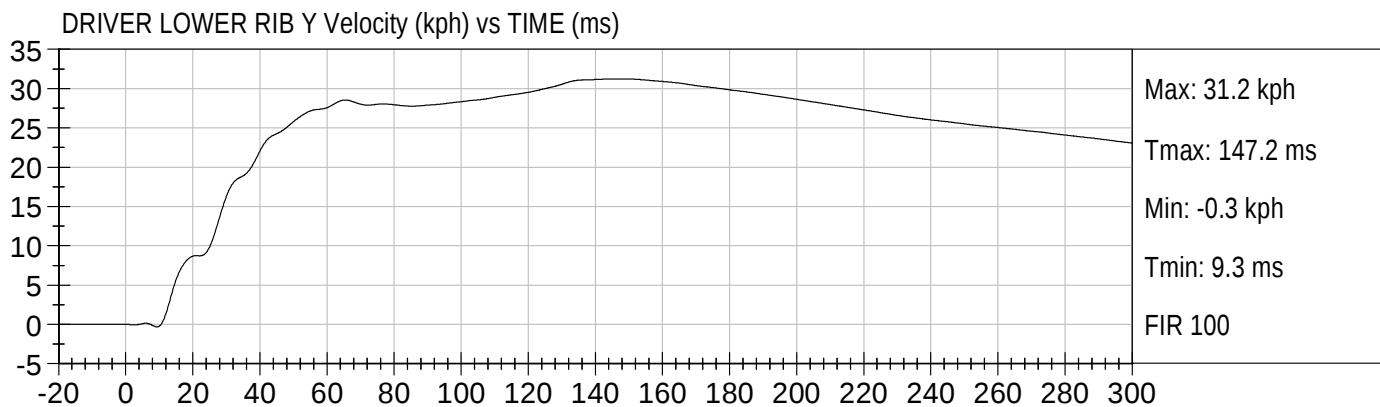
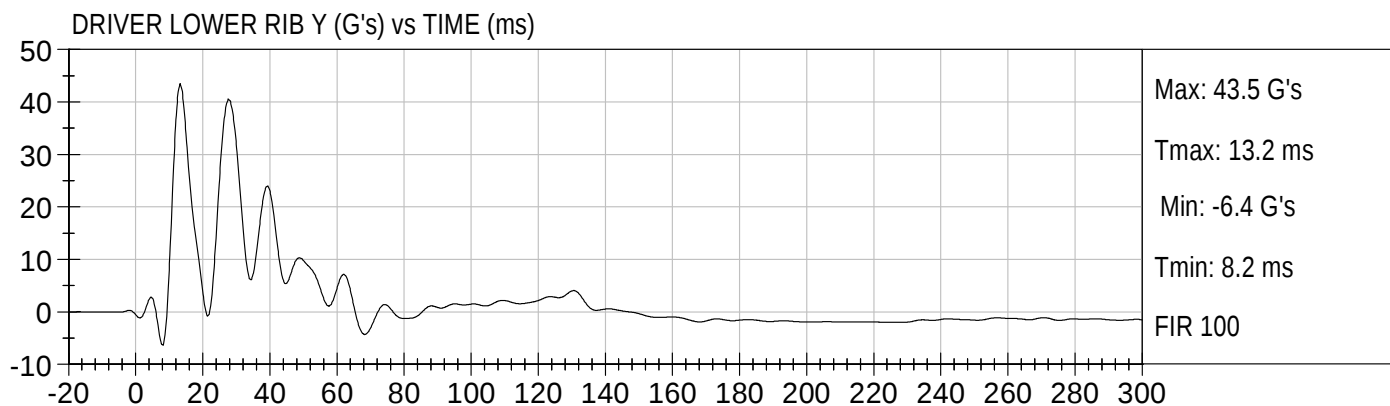
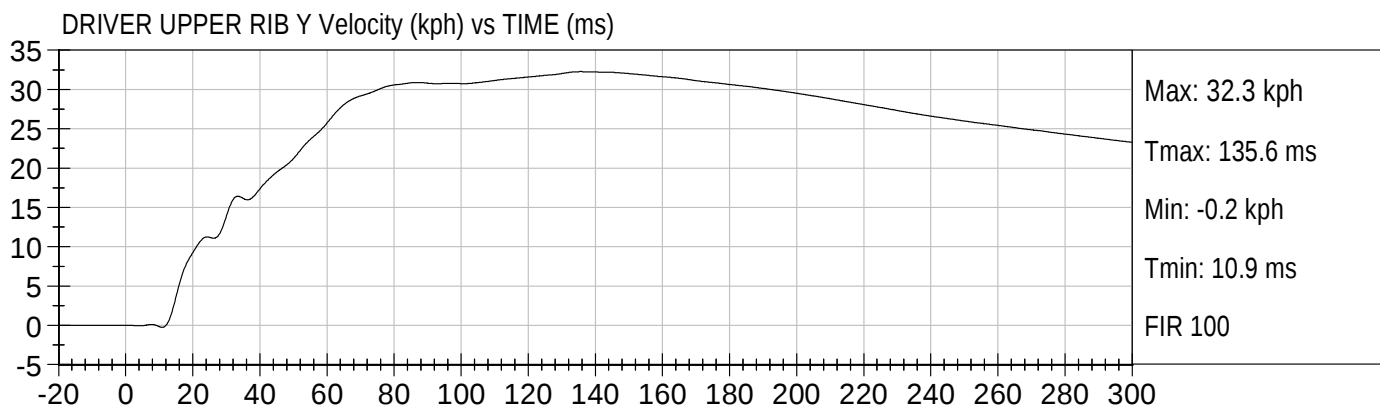
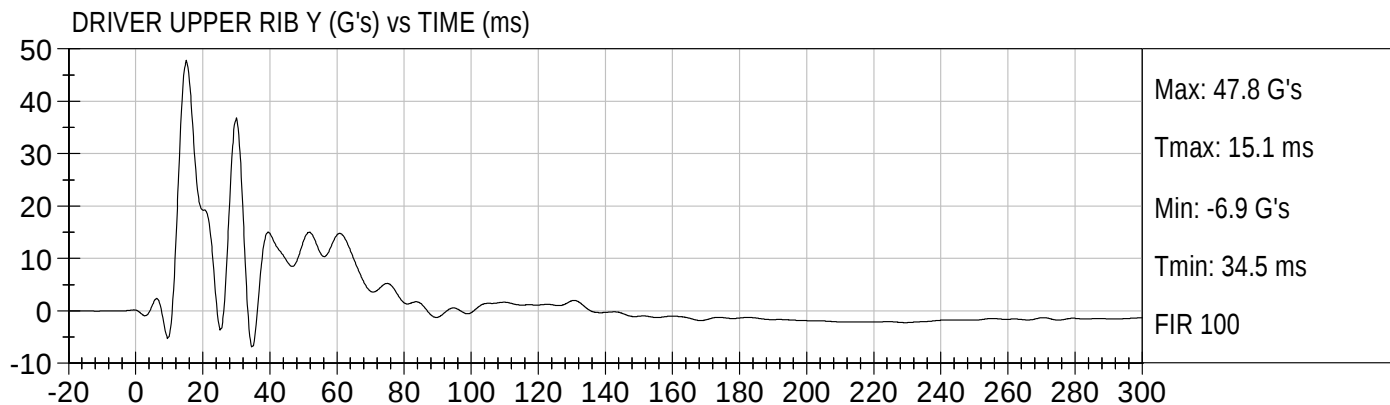
Driver Upper Neck Force Y

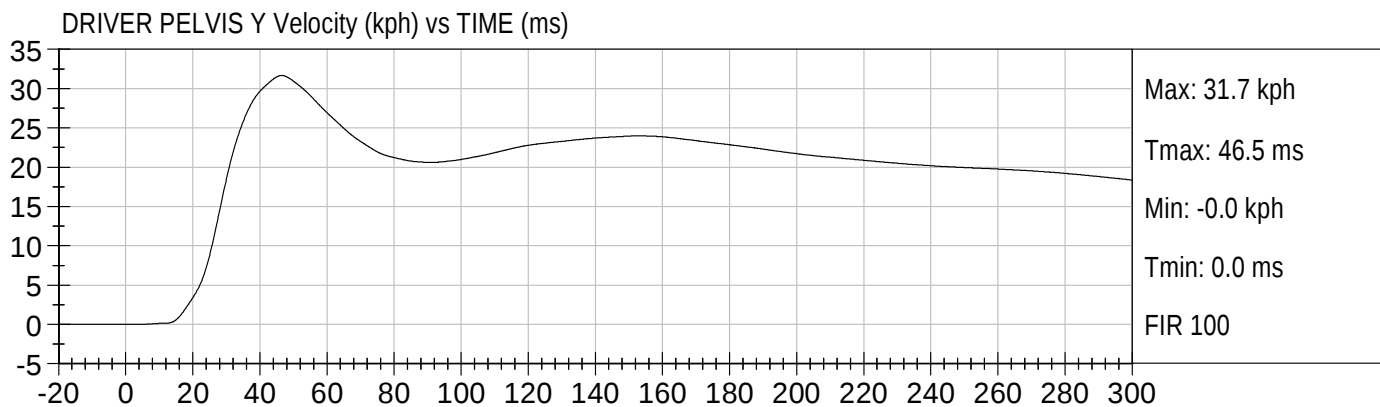
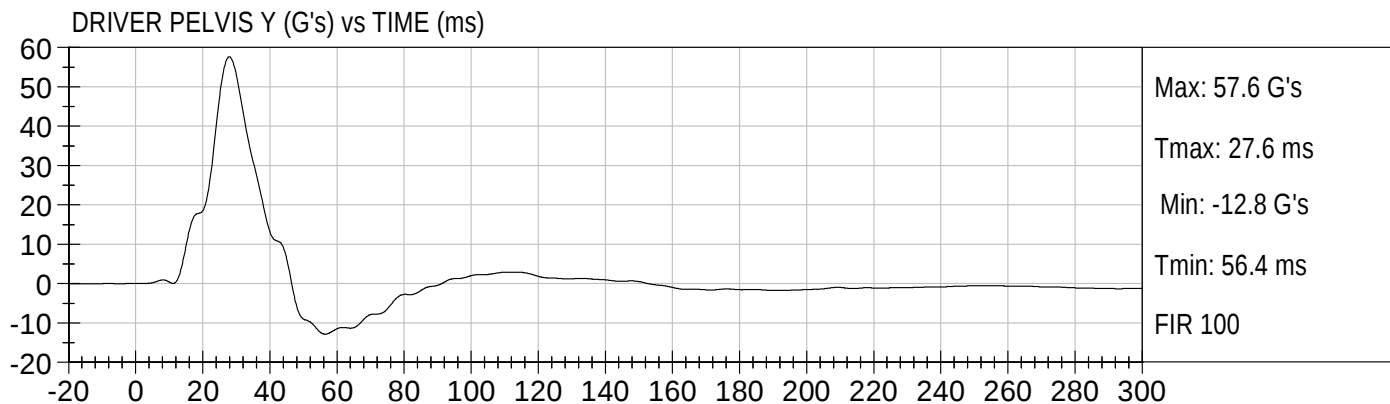
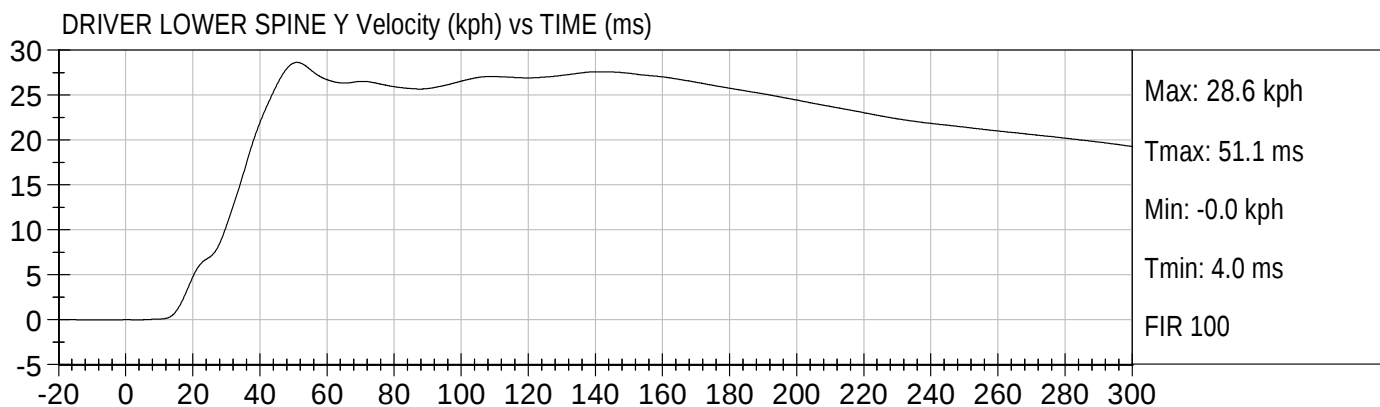
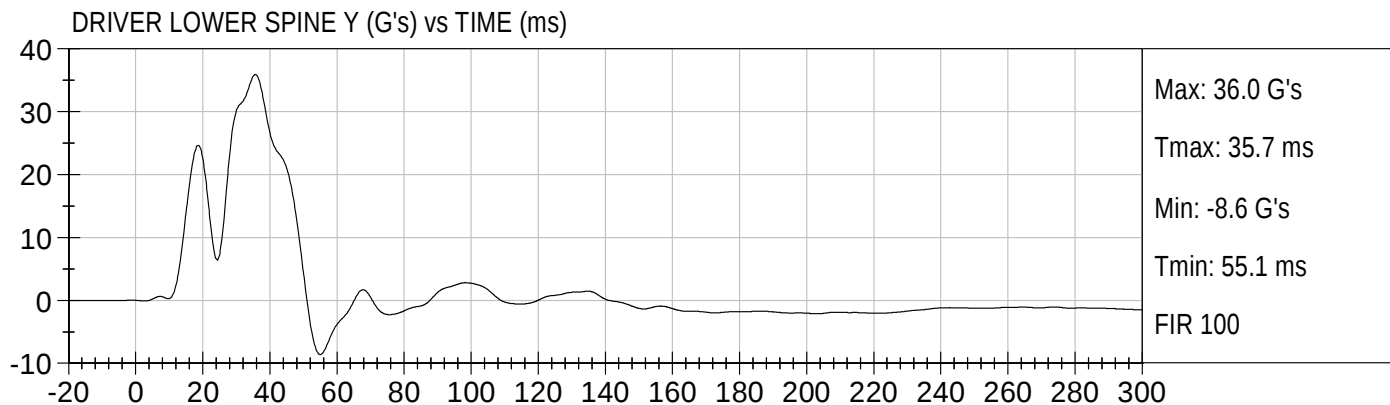
Driver Upper Neck Force Z

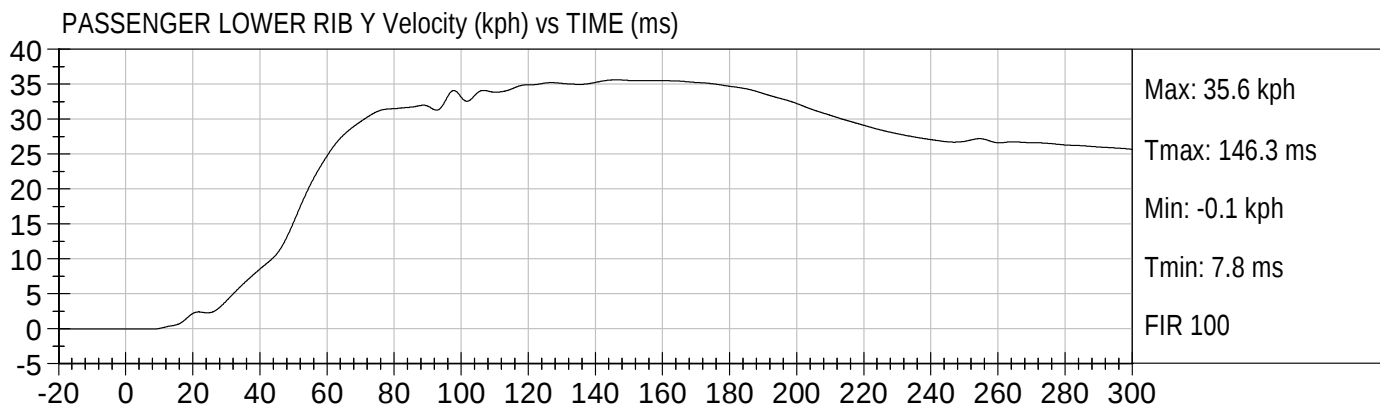
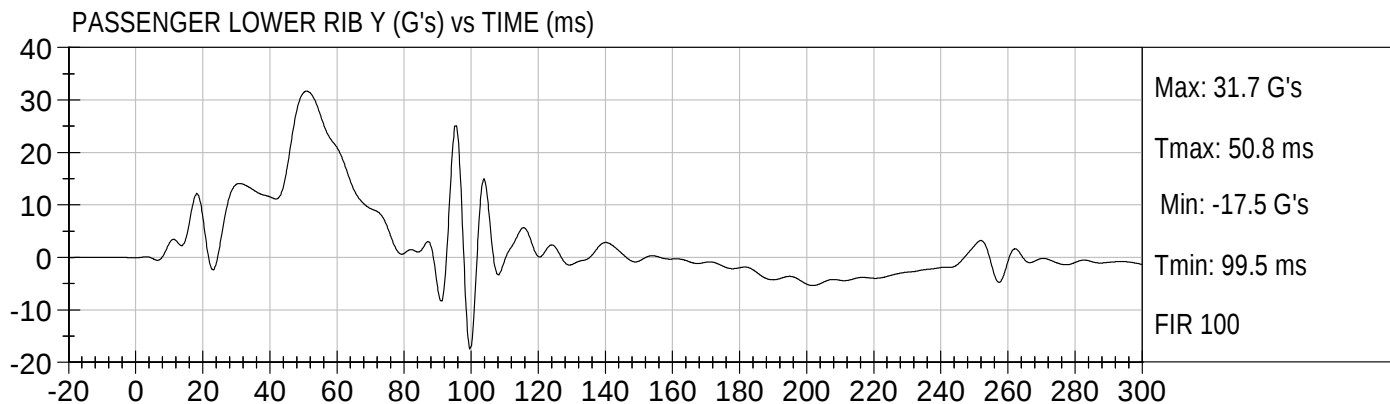
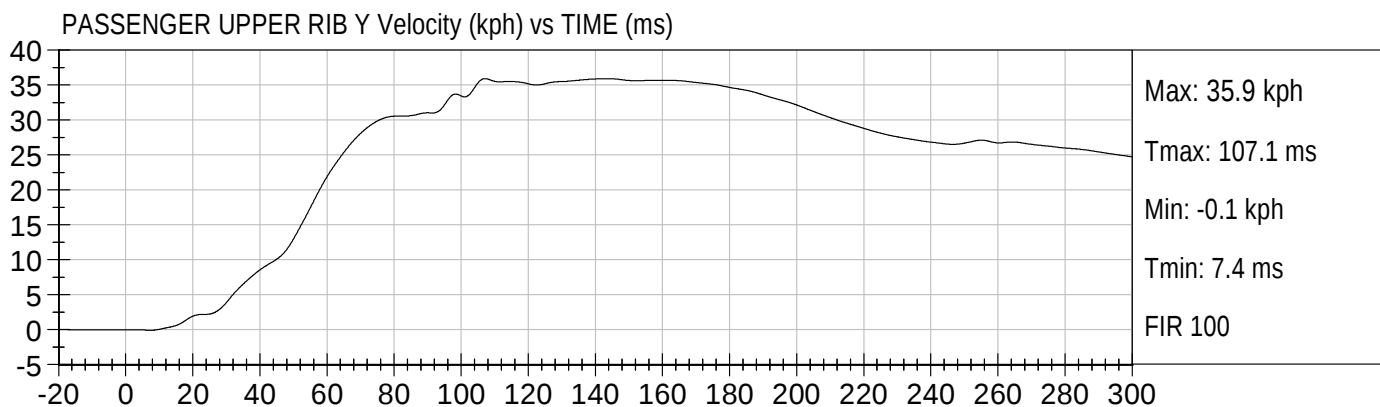
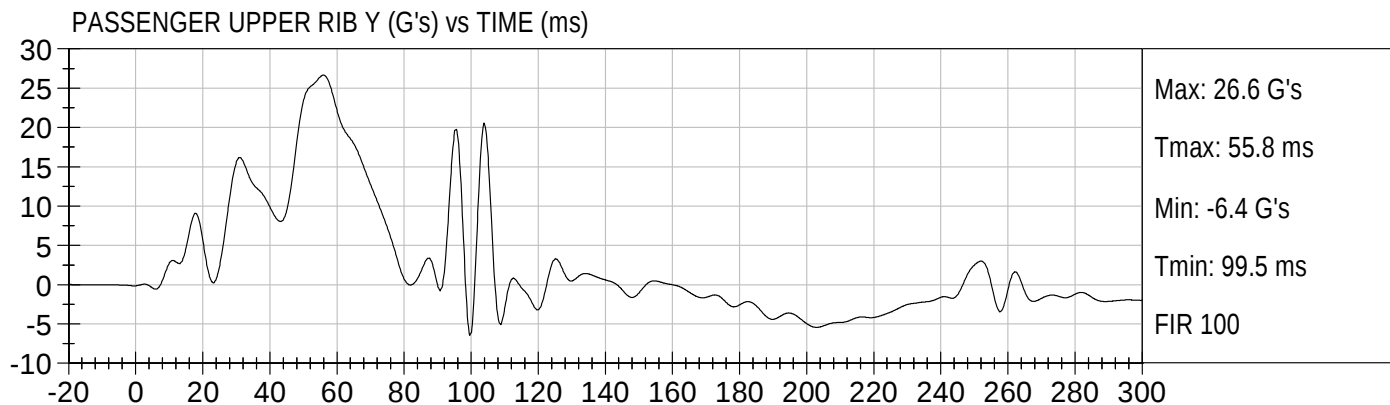
Driver Upper Neck Moment X

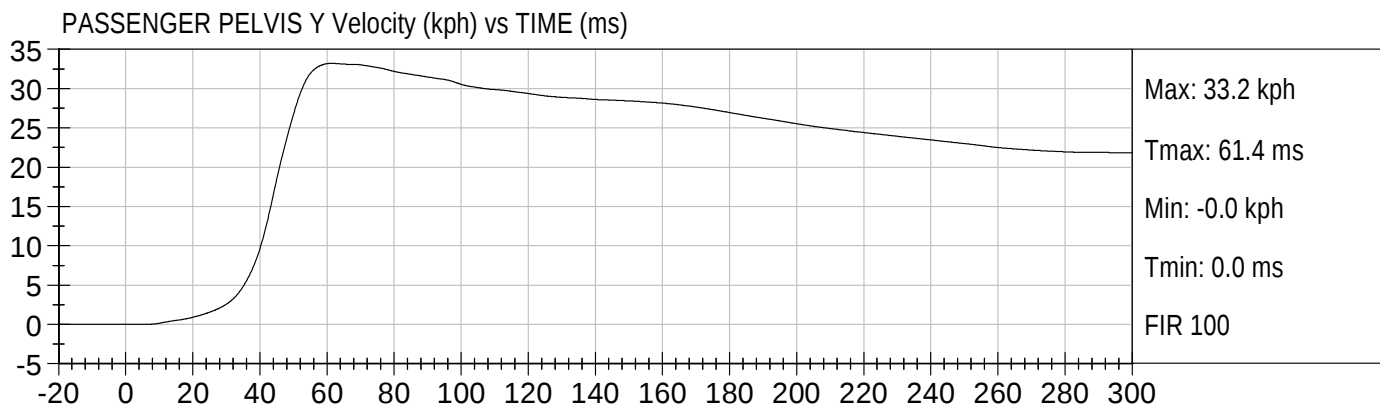
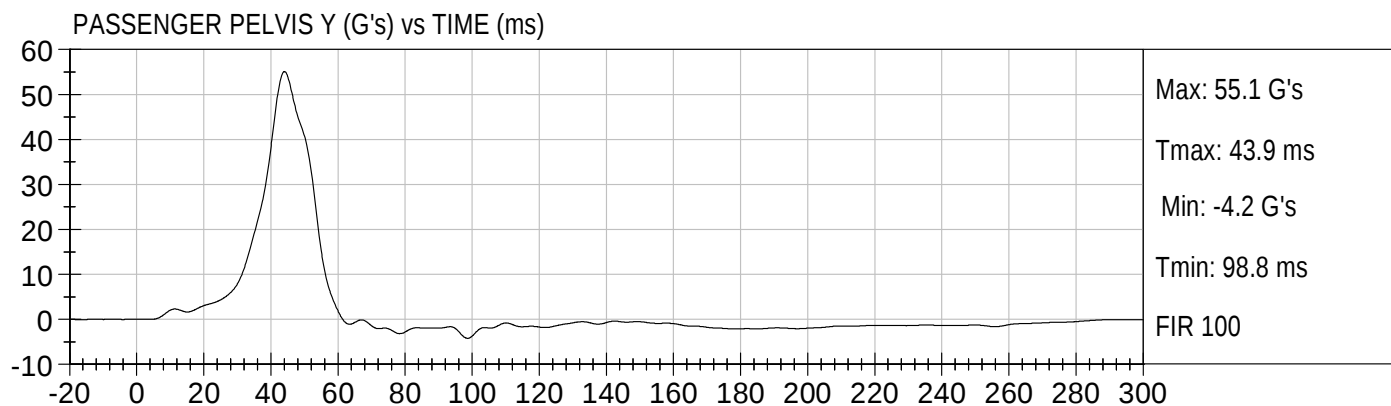
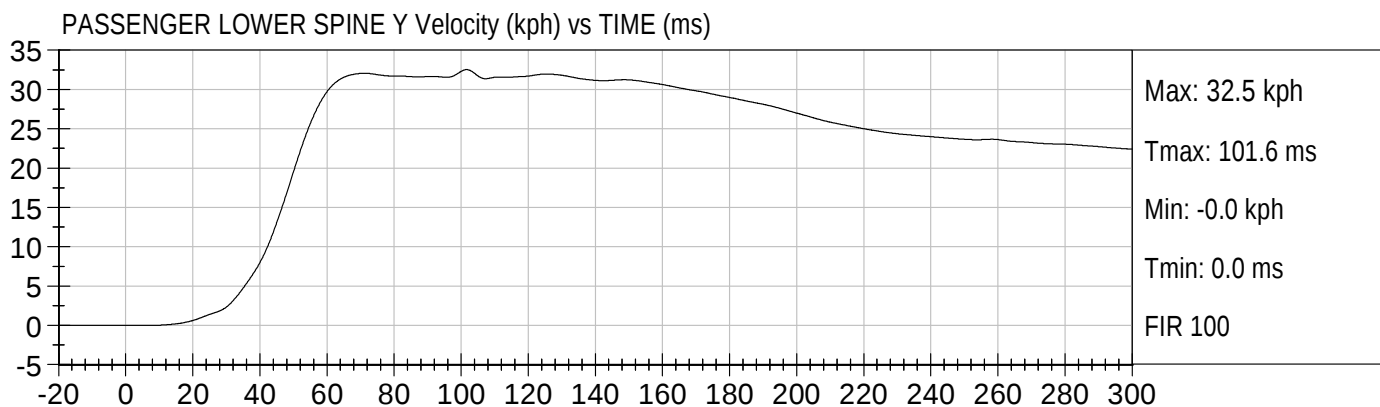
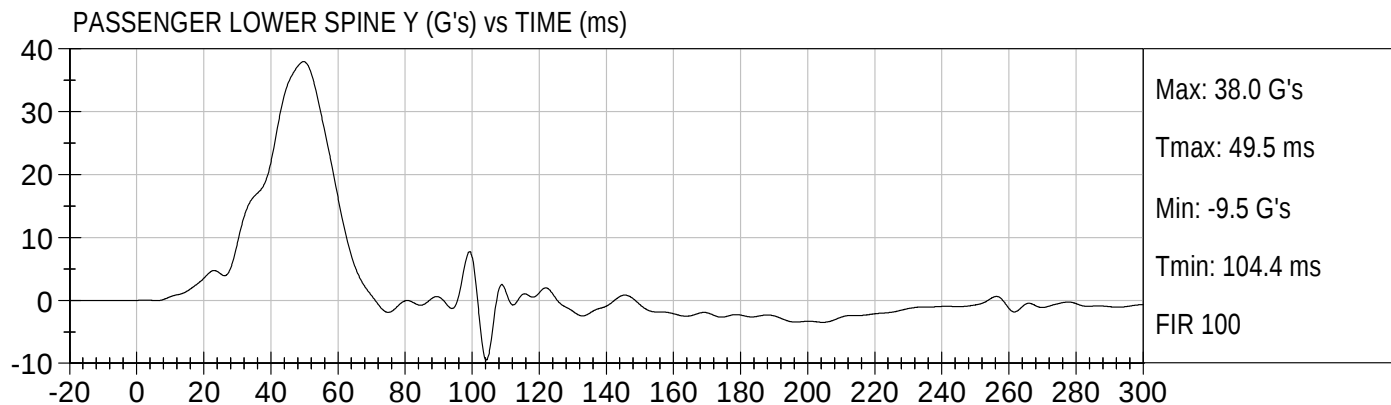
Driver Upper Neck Moment Y
Driver Upper Neck Moment Z
Driver Upper Rib Redundant Y
Driver Lower Rib Redundant Y
Driver Lower Spine Redundant Y
Driver Pelvis Redundant Y
Driver Thorax Contact
Driver Pelvis Contact
Passenger Head X Primary
Passenger Head Y Primary
Passenger Head Z Primary
Passenger Head 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 Calibration Data Sheet
Side Impact Dummy
External Measurements

ATD Serial No: 271

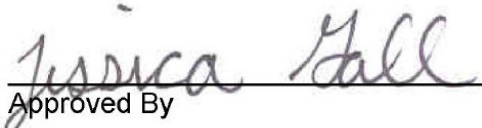
Test I.D: D08224

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	


Laboratory Technician

8/8/08

Test Date

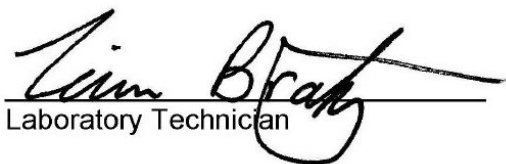

Approved By

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

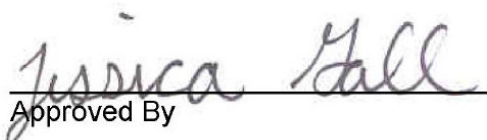
ATD Serial No: 271

Test I.D: D082241

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	37	Pass
Peak Resultant Acceleration	G's	120 to 150	122	Pass
Is Resultant Curve Unimodal?	N/A	15% of peak	Yes	Pass
Peak Longitudinal Acceleration	G's	+/- 15	-14.8	Pass
Overall Test Results				Pass


 Laboratory Technician

8/8/08
 Test Date


 Approved By



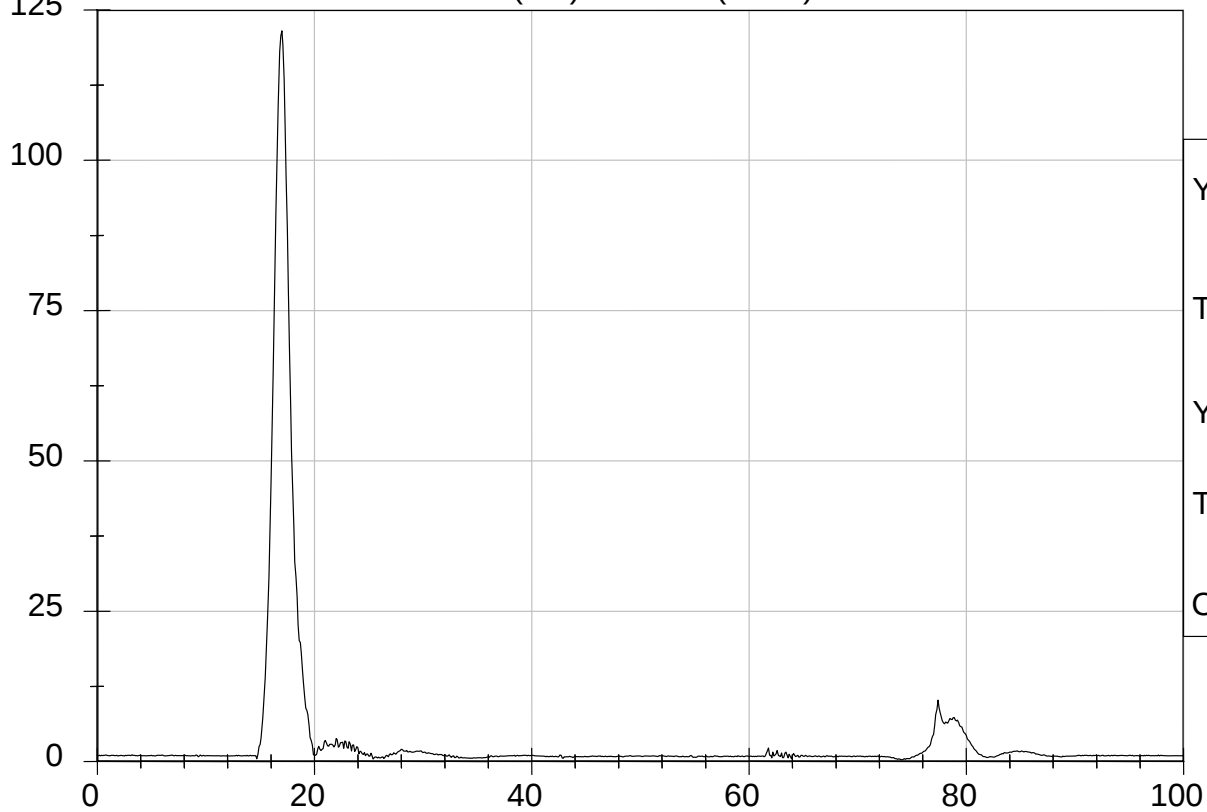
Test Description: Head Drop

Test Date: 8/8/08

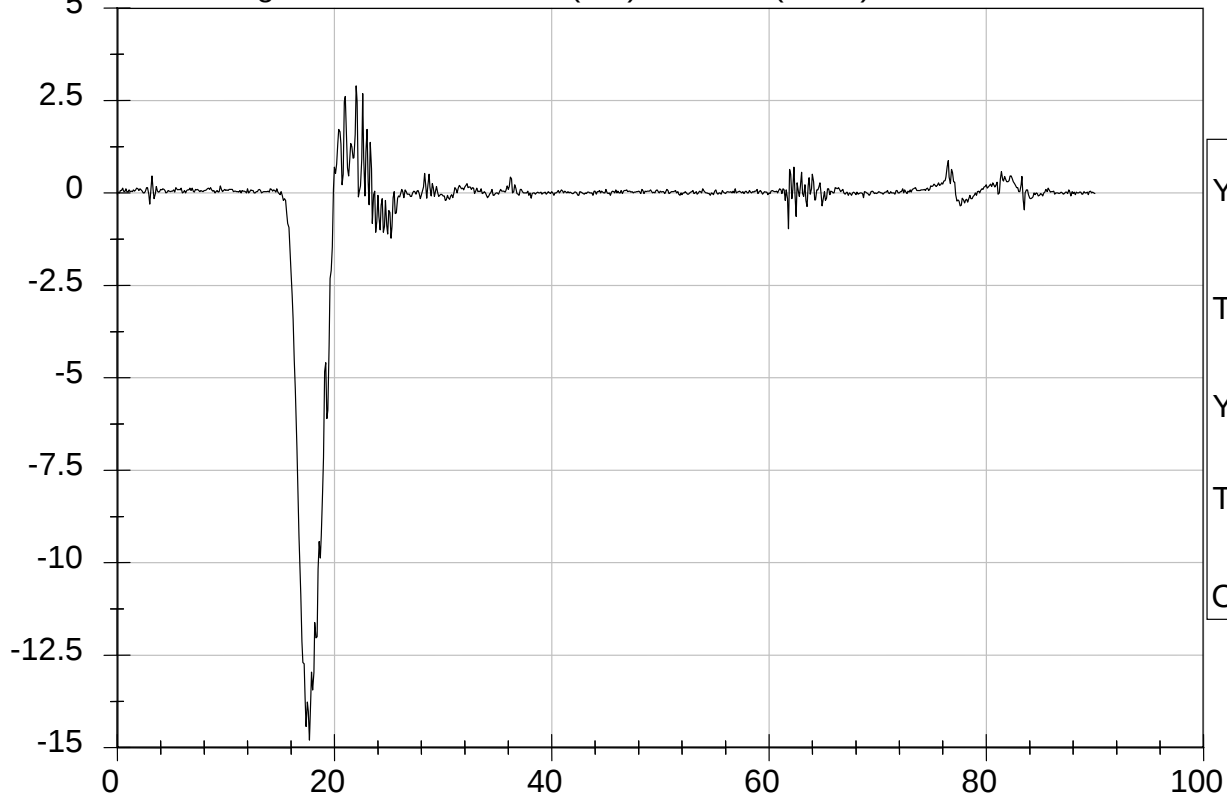
Component: D082241

Speed: 0 ft/s, 0 m/s

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



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

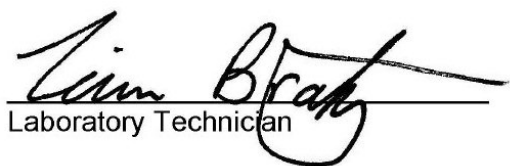


SID/HIII Calibration Data Sheet
Side Impact Dummy
Thorax Impact Test

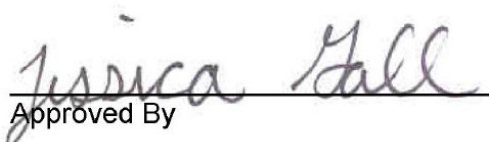
ATD Serial No: 271

Test I.D: D082242

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	35	Pass
Probe Velocity	m/s	4.22 - 4.31	4.27	Pass
Upper Rib	G's	37 - 46	37	Pass
Lower Rib	G's	37 - 46	37	Pass
Lower Spine	G's	15 - 22	17	Pass
Overall Test Results				Pass


 Laboratory Technician

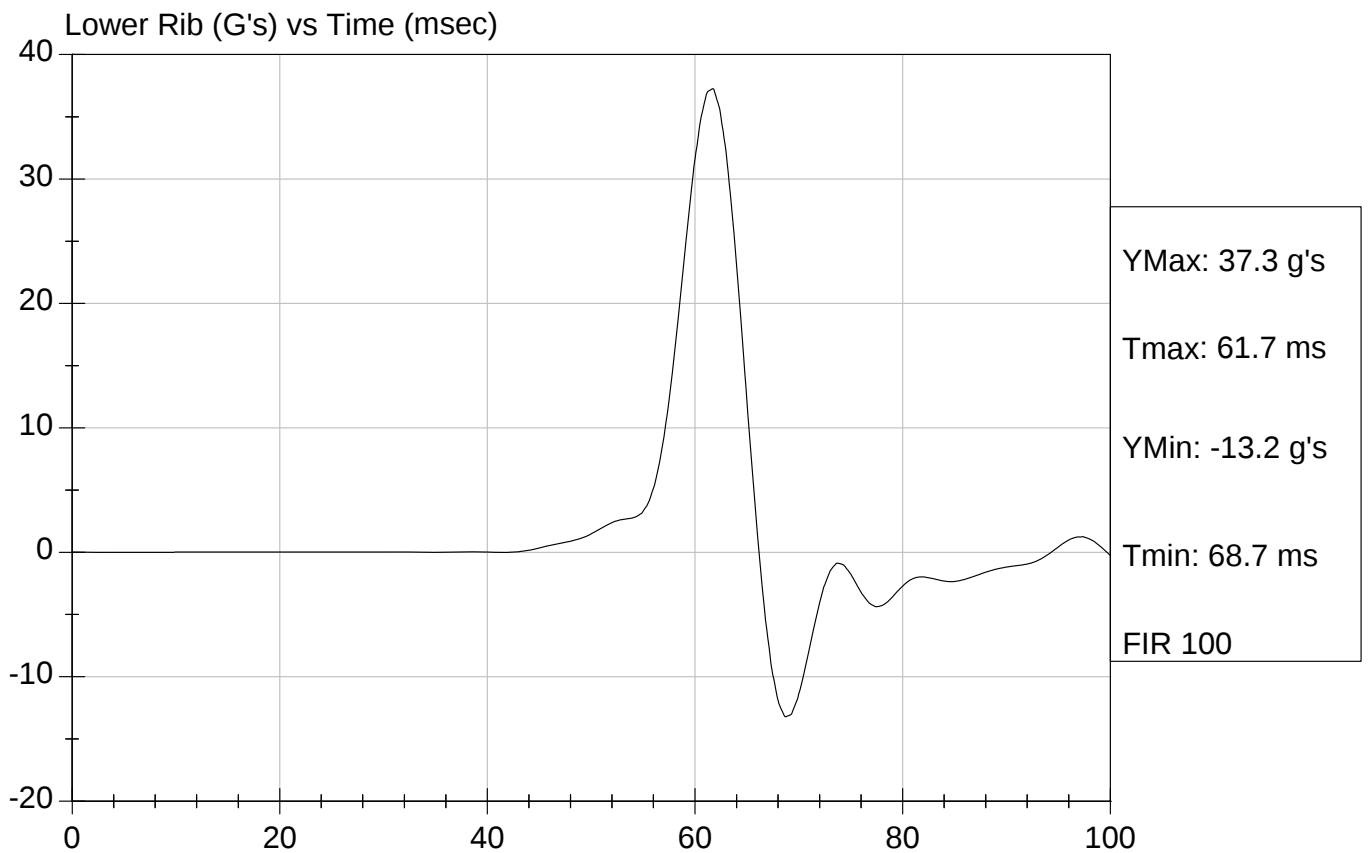
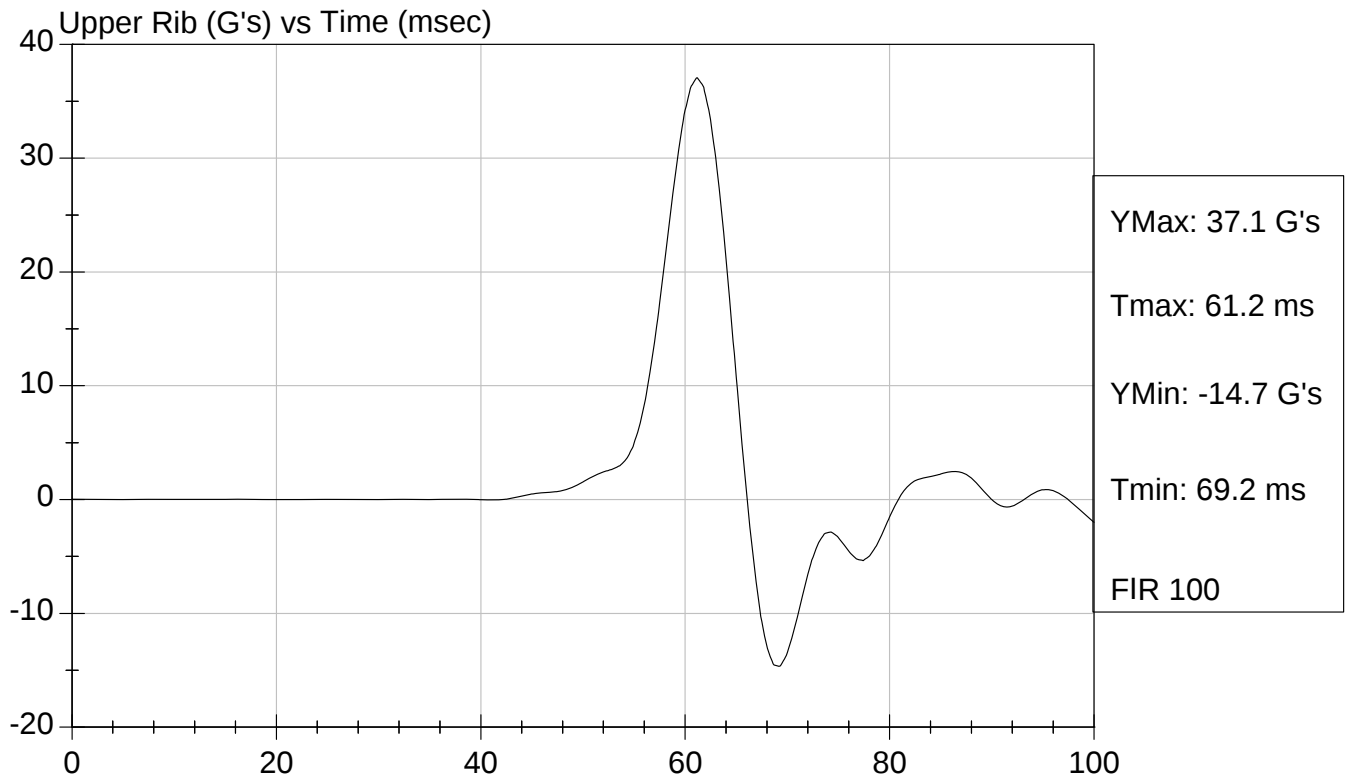
8/8/08
 Test Date


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Test Desc: Thorax Impact
Component ID: D082242

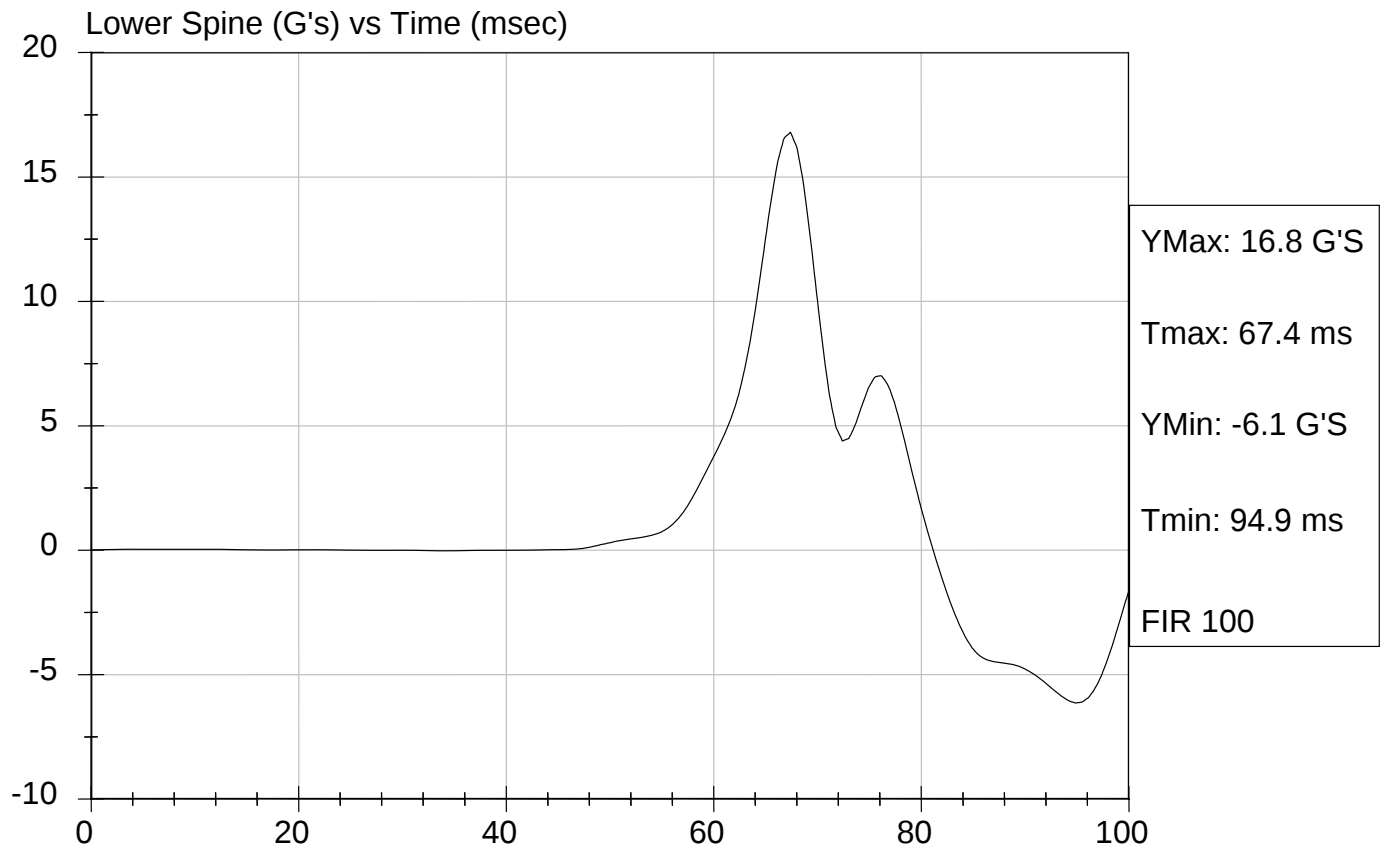
Test Date: 8/8/08
Speed: 14.01 ft/sec, 4.27 m/sec





Test Desc: Thorax Impact
Component ID: D082242

Test Date: 8/8/08
Speed: 14.01 ft/sec, 4.27 m/sec



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

ATD Serial No: 271

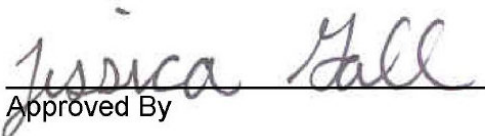
Test I.D: D082243

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	35	Pass
Probe Velocity	m/s	4.27 - 4.33	4.30	Pass
Pelvis Acceleration	G's	40 - 60	44	Pass
Overall Test Results				Pass


Laboratory Technician

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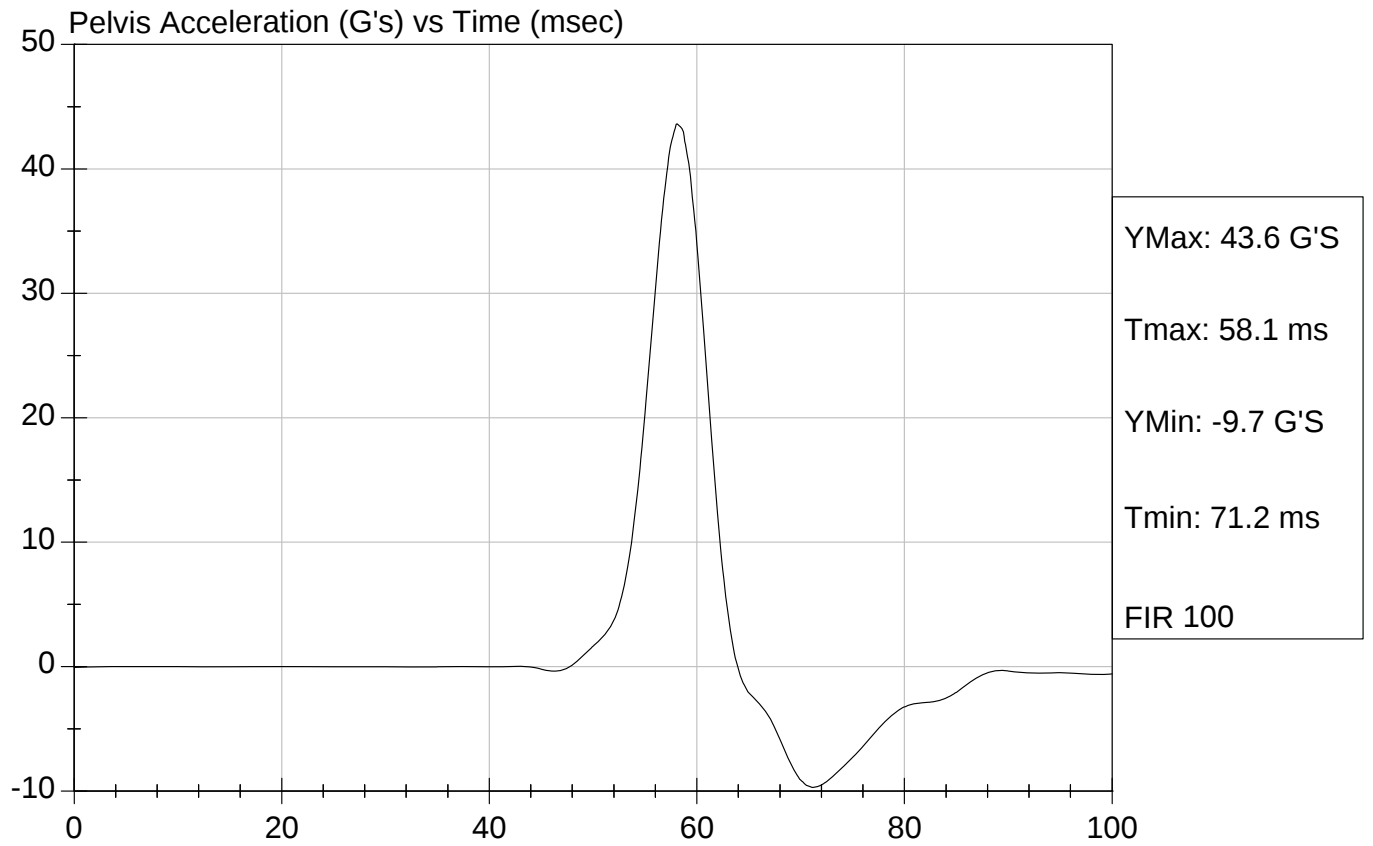
Test Date


Approved By



Test Desc: Pelvis Impact
Component ID: D082243

Test Date: 8/8/08
Speed: 14.12 ft/sec, 4.30 m/sec

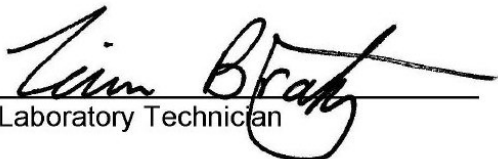


SID/HIII Calibration Data Sheet
Side Impact Dummy
Abdominal Compression Calibration (Pre-Load = 10 lbs)

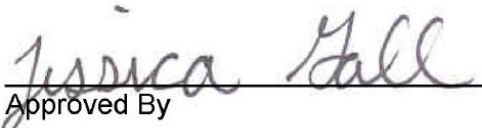
ATD Serial No: 271

Test I.D: D082244

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	42	Pass
Force At 12.7 mm	N	104 -162	138	Pass
Force At 19 mm	N	163 - 222	199	Pass
Force At 25.4 mm	N	222 - 280	276	Pass
Force At 33 mm	N	325 - 391	389	Pass
Overall Test Results				Pass


 Laboratory Technician

8/8/08
 Test Date

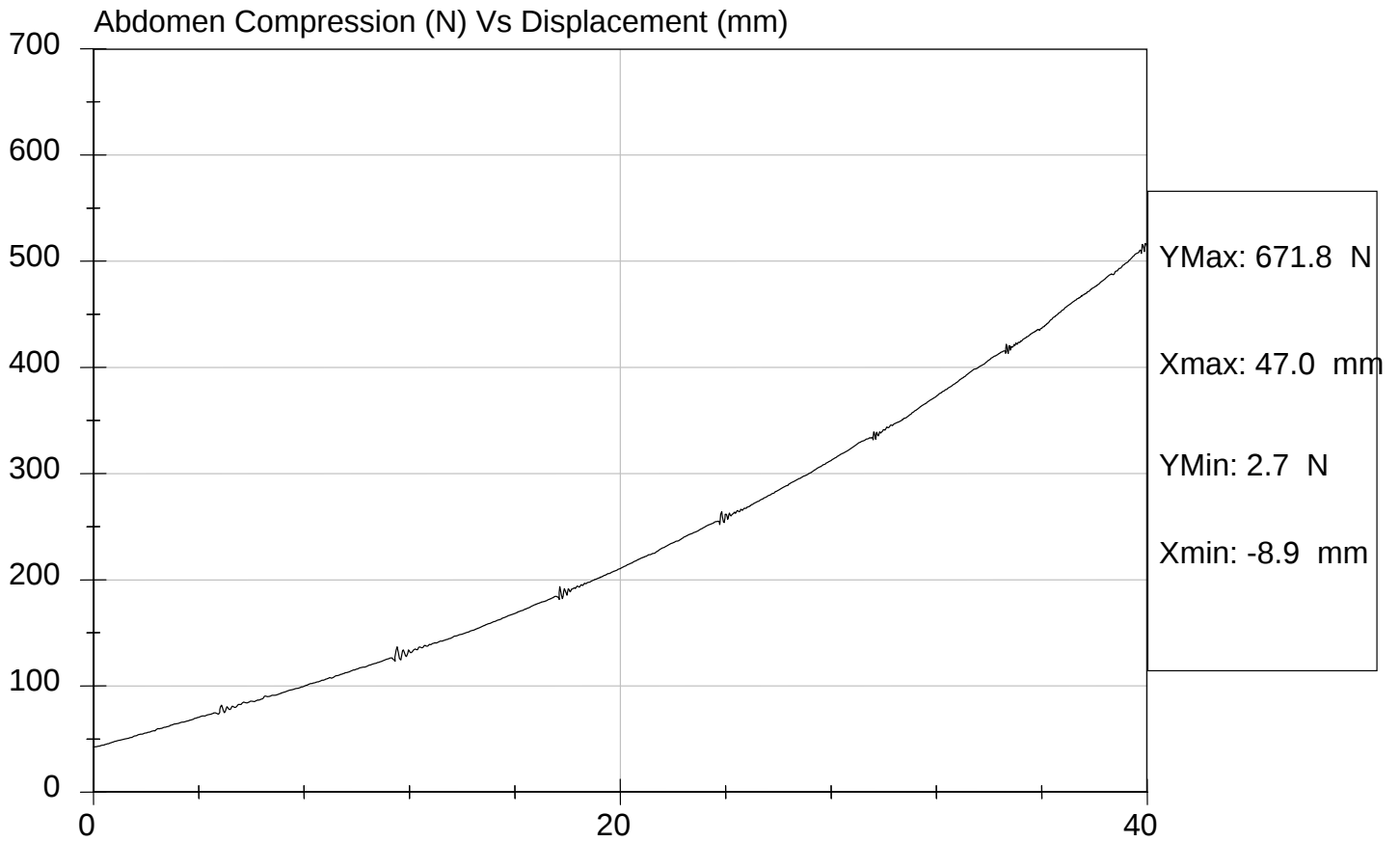

 Approved By



Test Description: Abdomen Compression Test Date: 8/8/08

Component: D082244

Speed: 0 ft/sec, 0 m/sec



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

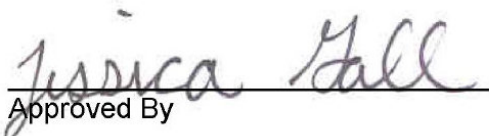
ATD Serial No: 271

Test I.D: D082245

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	38	Pass
Force At 0 deg	N	0 - 26.7	0	Pass
Force At 20 deg	N	97.9 - 151.2	122.4	Pass
Force At 30 deg	N	151.2 - 204.6	160.7	Pass
Force At 40 deg	N	204.6 - 258.0	217.8	Pass
Return Angle	Deg	12 Maximum	5	Pass
Overall Test Results				Pass


 Laboratory Technician

8/8/08
 Test Date


 Approved By

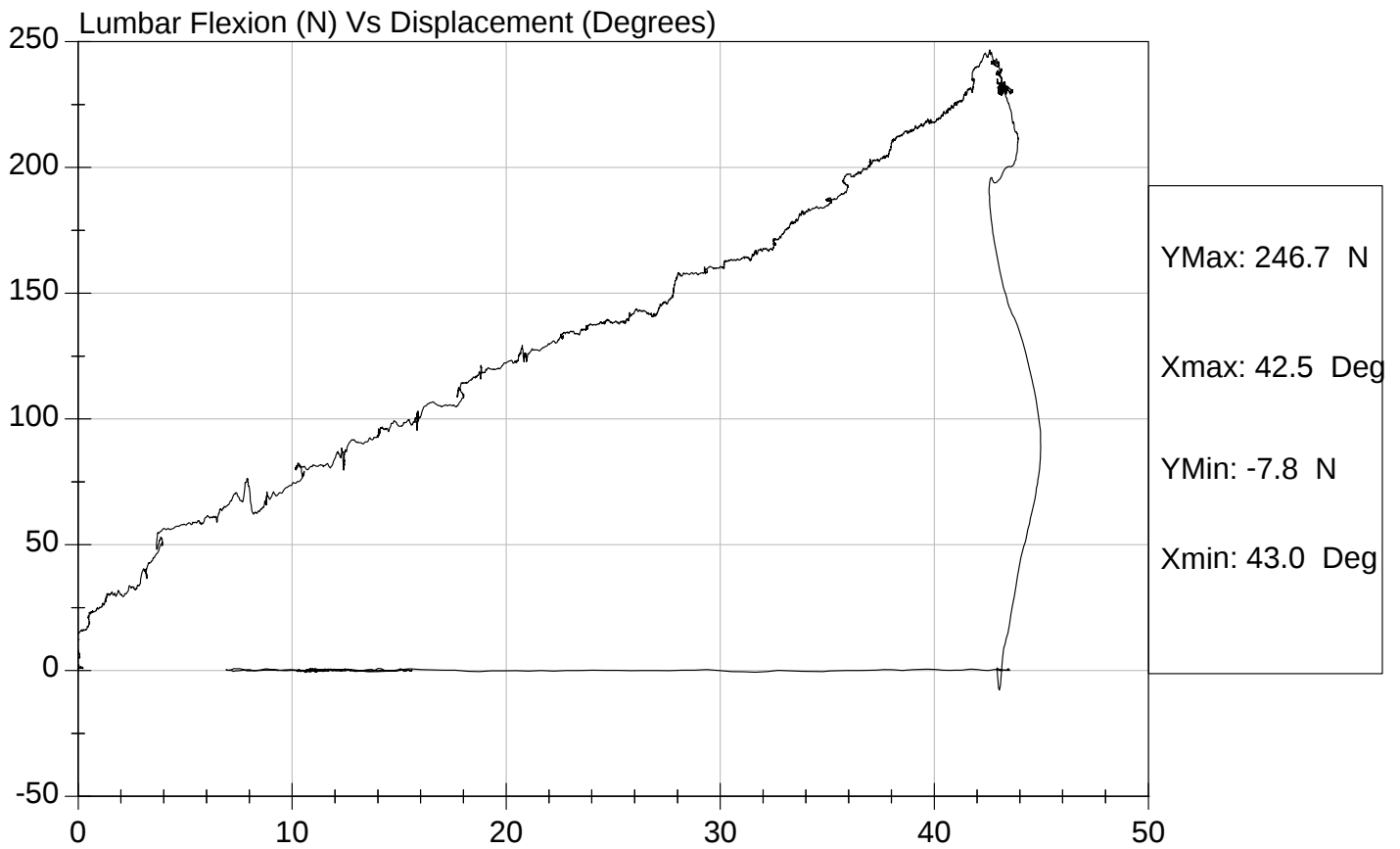


Test Description: Lumbar Flexion

Test Date: 8/8/08

Component: D082245

Speed: 0 ft/sec, 0 m/sec

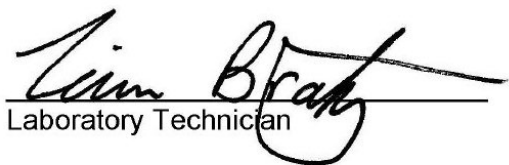


SID/HIII Calibration Data Sheet
Side Impact Dummy
Neck Pendulum Test

ATD Serial No: 271

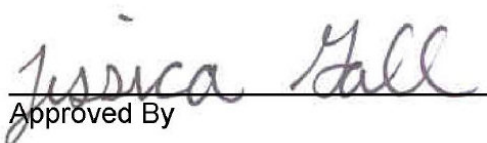
Test I.D: D082248

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity		%	10 to 70	36	Pass
Impact Velocity		m/s	6.89 to 7.13	7.05	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.46	Pass
	20 msec	m/s	4.12 to 5.10	4.71	Pass
	30 msec	m/s	5.73 to 7.01	6.41	Pass
	40 to 70 msec	m/s	6.27 to 7.64	6.57	Pass
Midsagittal Plane Max Rotation		deg	66 to 82	72	Pass
Head Rotation Peak to Zero - Decay Time		msec	58 to 67	61	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	75	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	61	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	13	Pass


Laboratory Technician

8/8/08

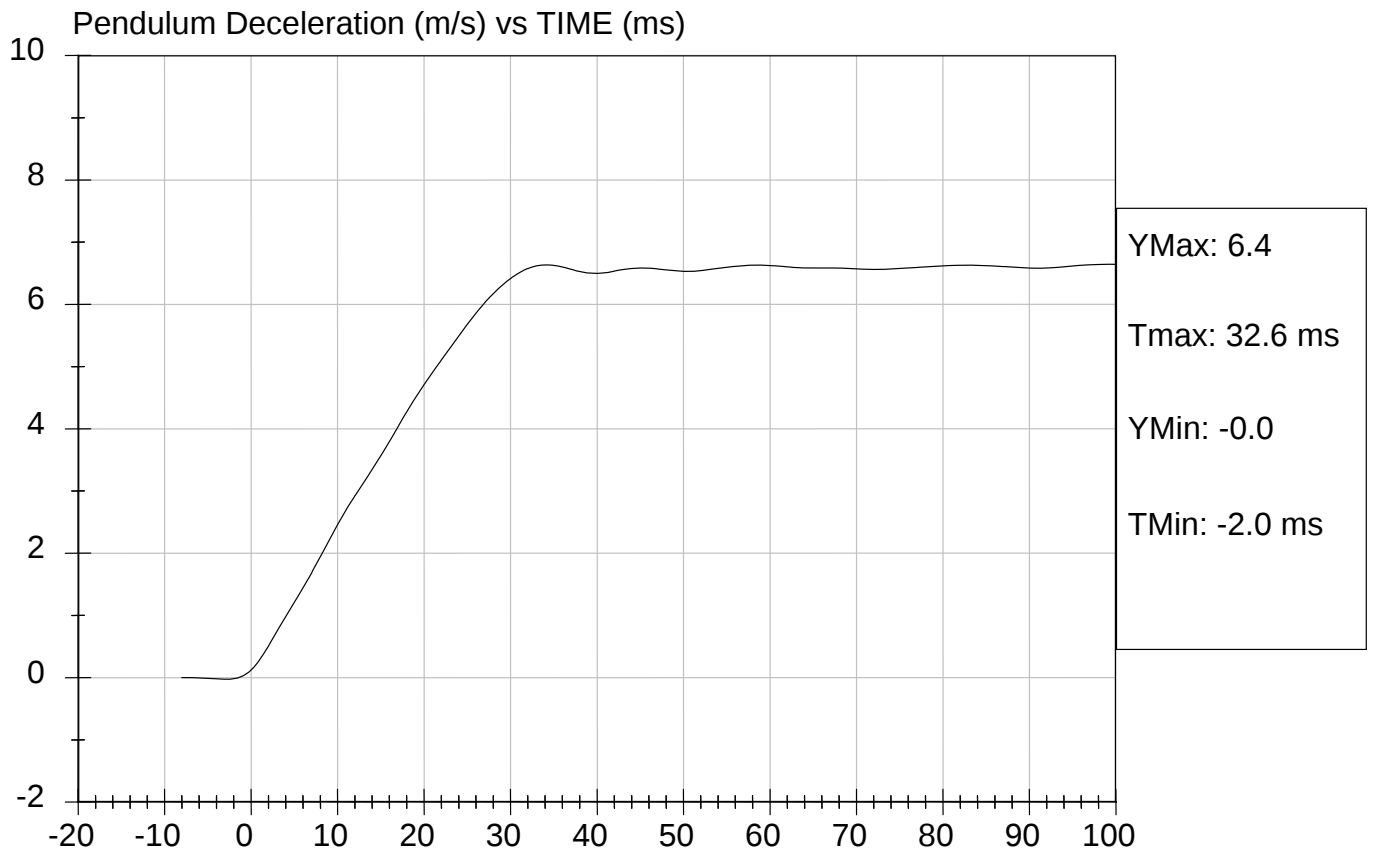
Test Date


Approved By



Test Desc: Neck Bending
Component ID: D082248

Test Date: 8/8/08
Speed: 23.14 ft/sec, 7.05 m/sec

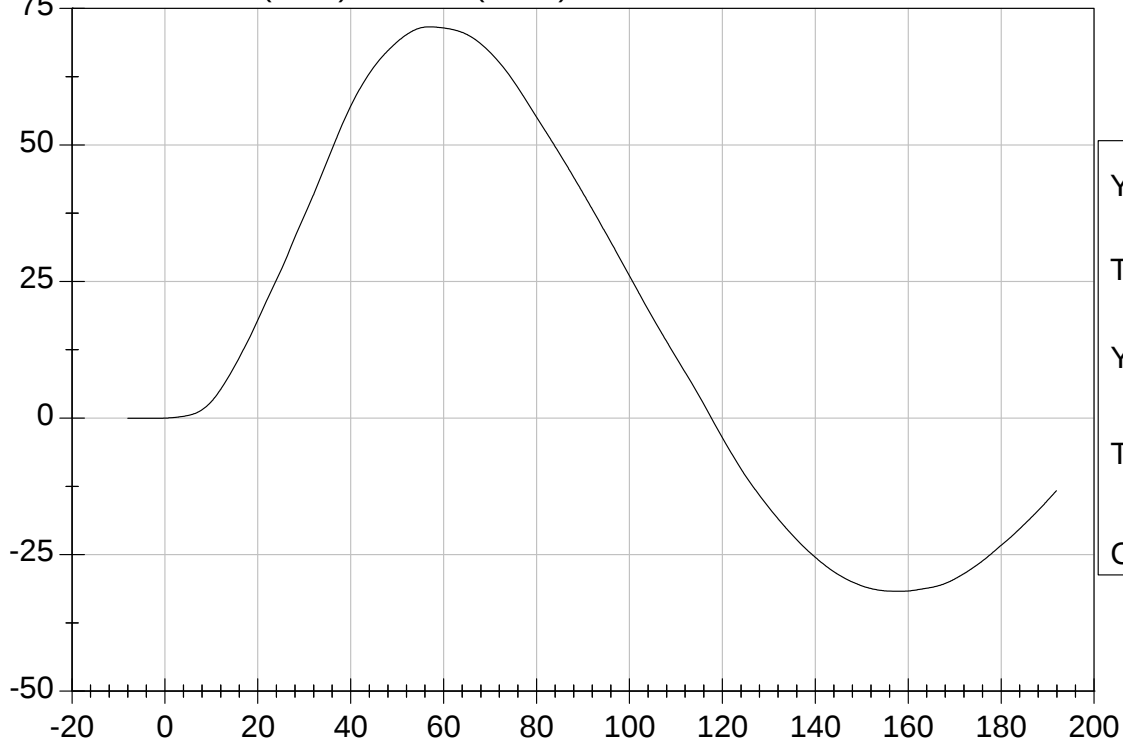




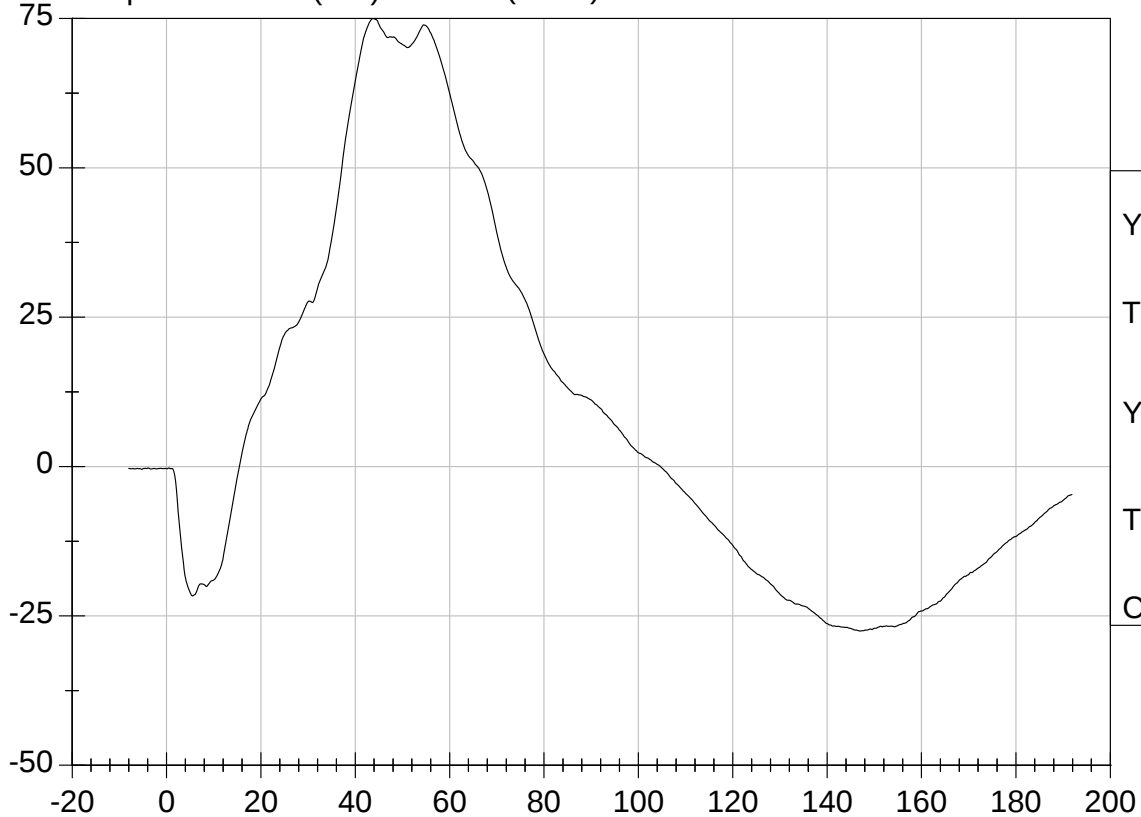
Test Desc: Neck Bending
Component ID: D082248

Test Date: 8/8/08
Speed: 23.14 ft/sec, 7.05 m/sec

Neck Rotation (DEG) vs Time (msec)



Occipital Moment (Nm) vs Time (msec)



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)

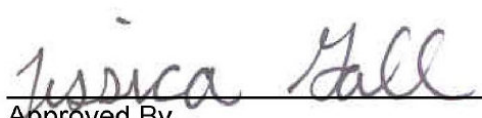
ATD Serial No: 271

Test I.D: D082331

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	42	Pass
Peak Resultant Acceleration	G's	120 to 150	132	Pass
Is Resultant Curve Unimodal?	N/A	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-8.6	Pass
Overall Test Results				Pass


 Laboratory Technician

8/15/08
 Test Date


 Approved By



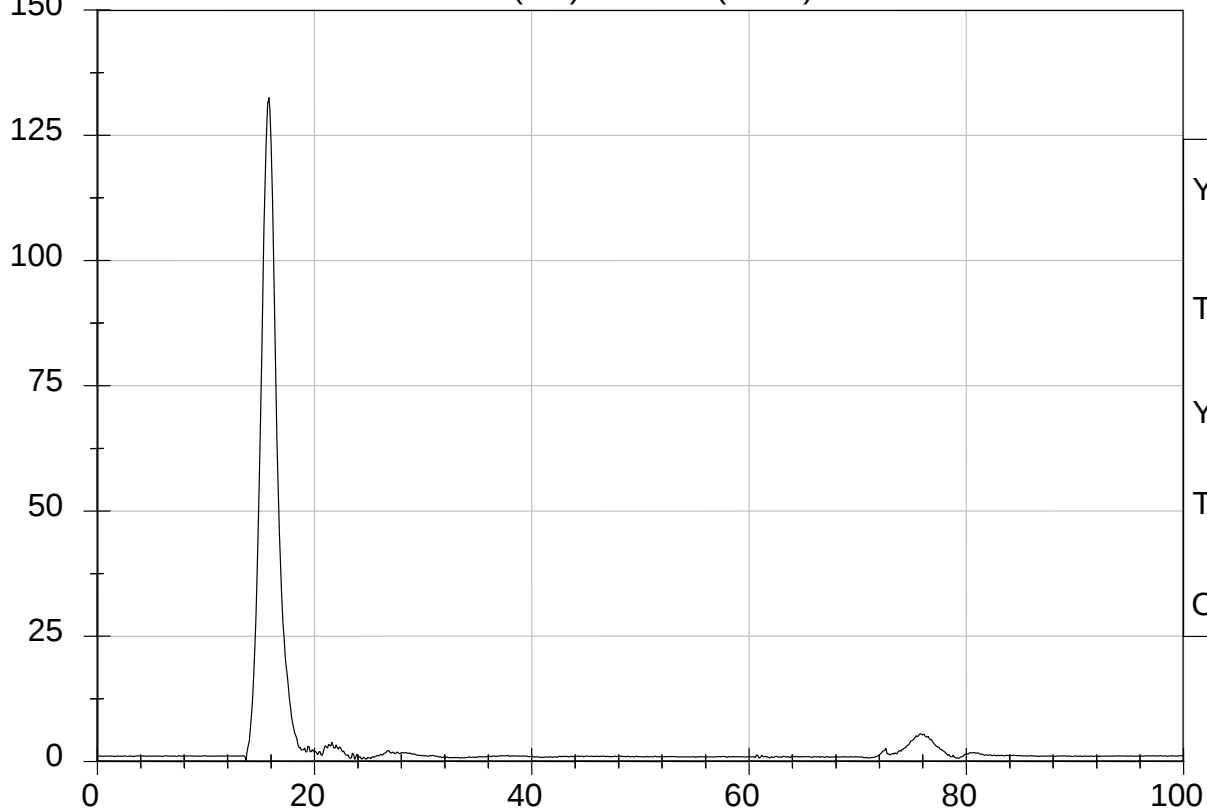
Test Description: Head Drop

Test Date: 8/15/08

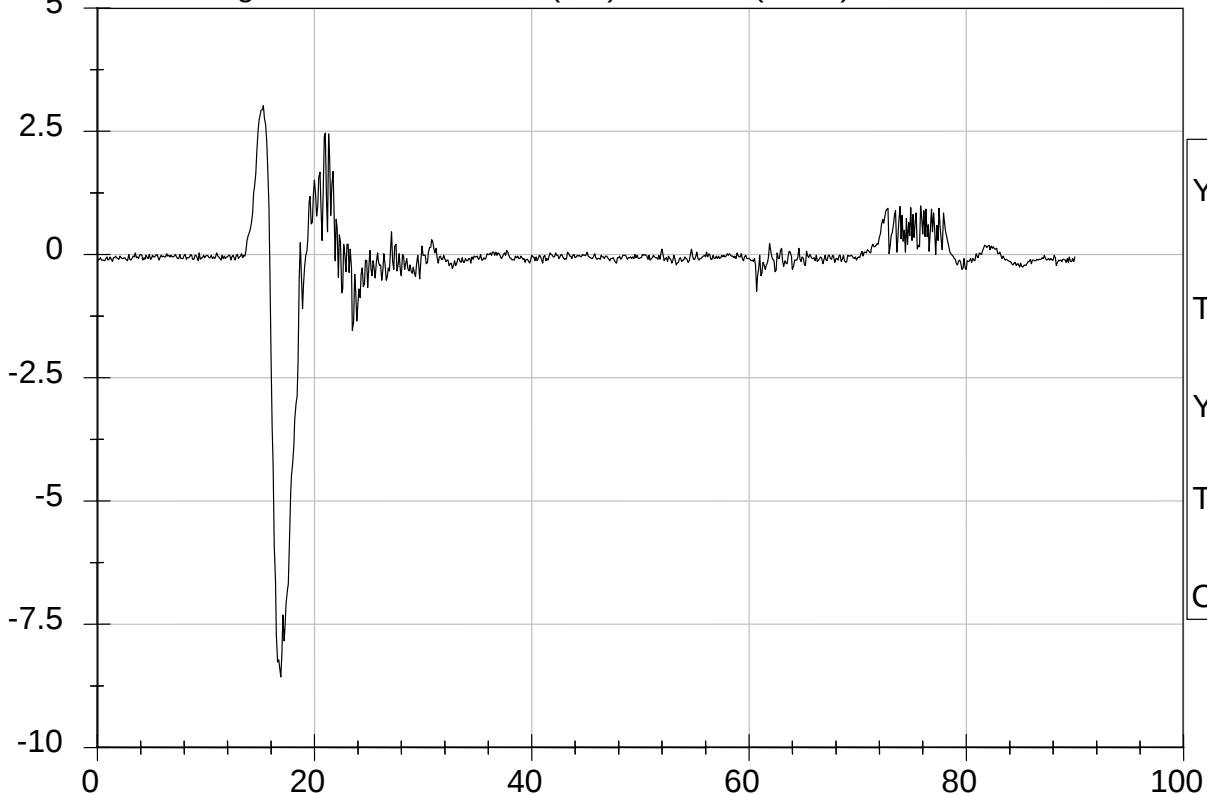
Component: D082331

Speed: 0 ft/s, 0 m/s

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



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

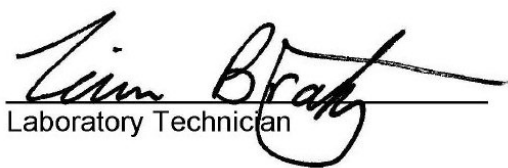


SID/HIII Calibration Data Sheet
Side Impact Dummy
Thorax Impact Test

ATD Serial No: 271

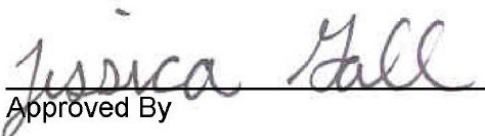
Test I.D: D082332

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	36	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	37	Pass
Lower Spine	G's	15 - 22	17	Pass
Overall Test Results				Pass


 Laboratory Technician

8/14/08

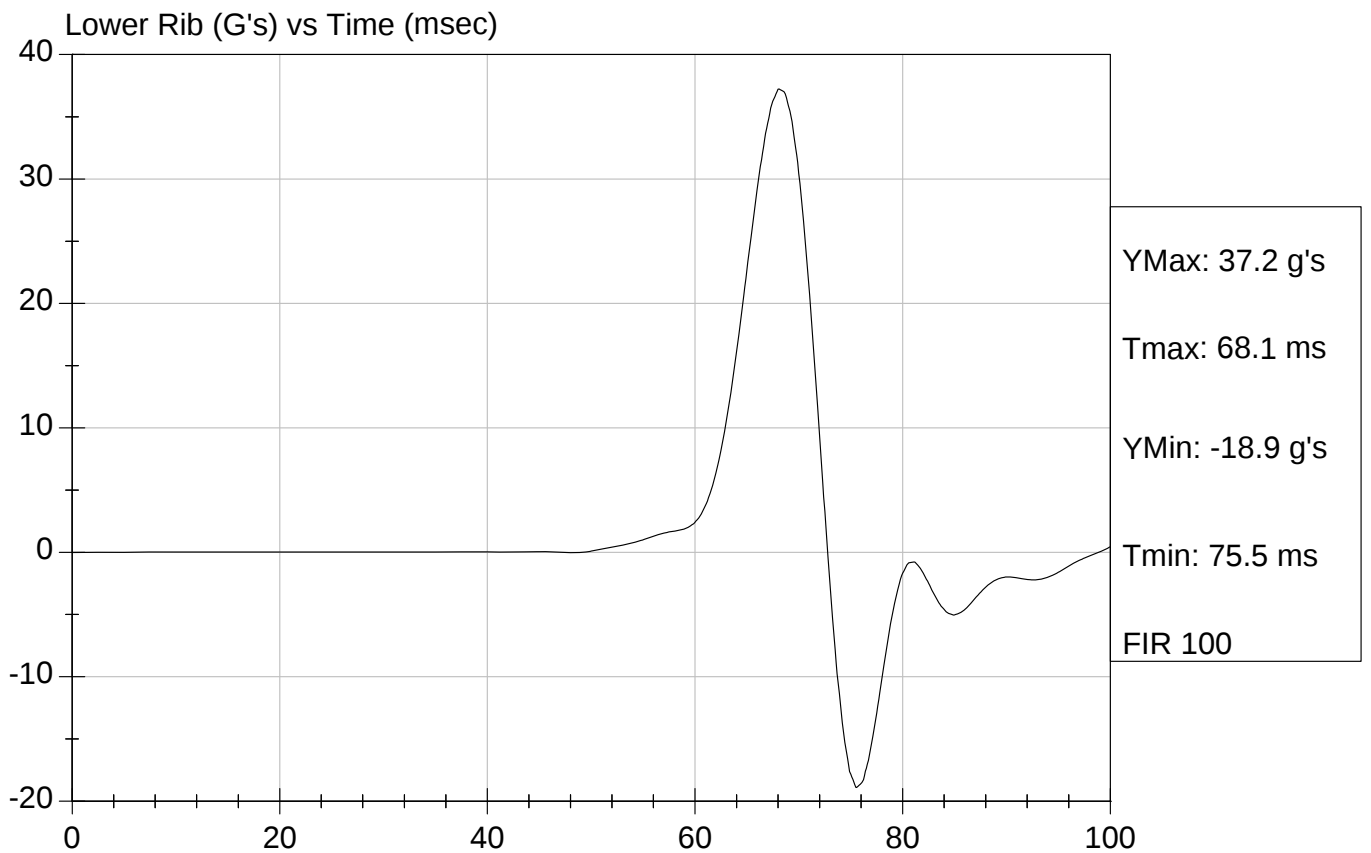
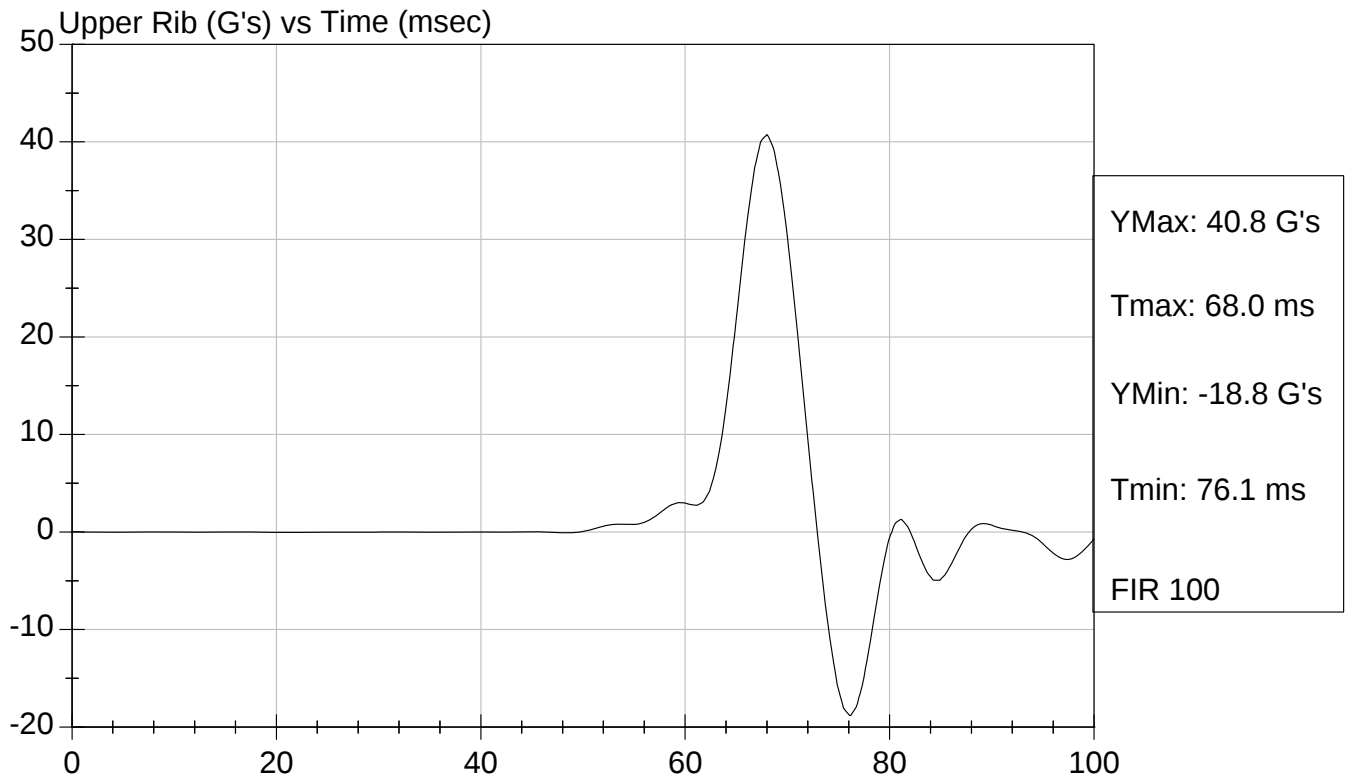
Test Date


 Approved By



Test Desc: Thorax Impact
Component ID: D082332

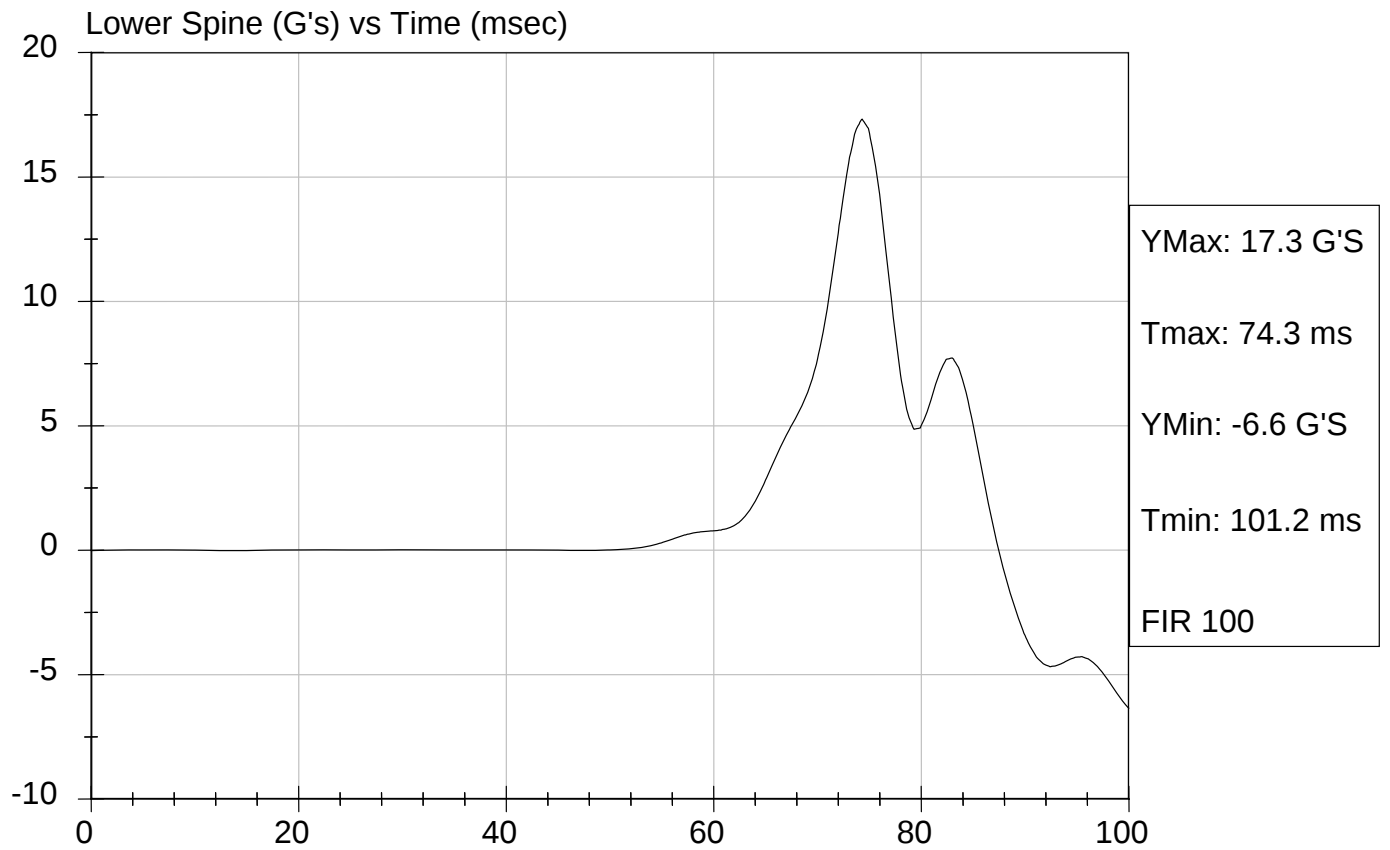
Test Date: 8/14/08
Speed: 14.12 ft/sec, 4.30 m/sec





Test Desc: Thorax Impact
Component ID: D082332

Test Date: 8/14/08
Speed: 14.12 ft/sec, 4.30 m/sec



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

ATD Serial No: 271

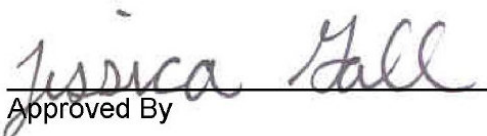
Test I.D: D082333

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	36	Pass
Probe Velocity	m/s	4.27 - 4.33	4.30	Pass
Pelvis Acceleration	G's	40 - 60	44	Pass
Overall Test Results				Pass


Laboratory Technician

8/14/08

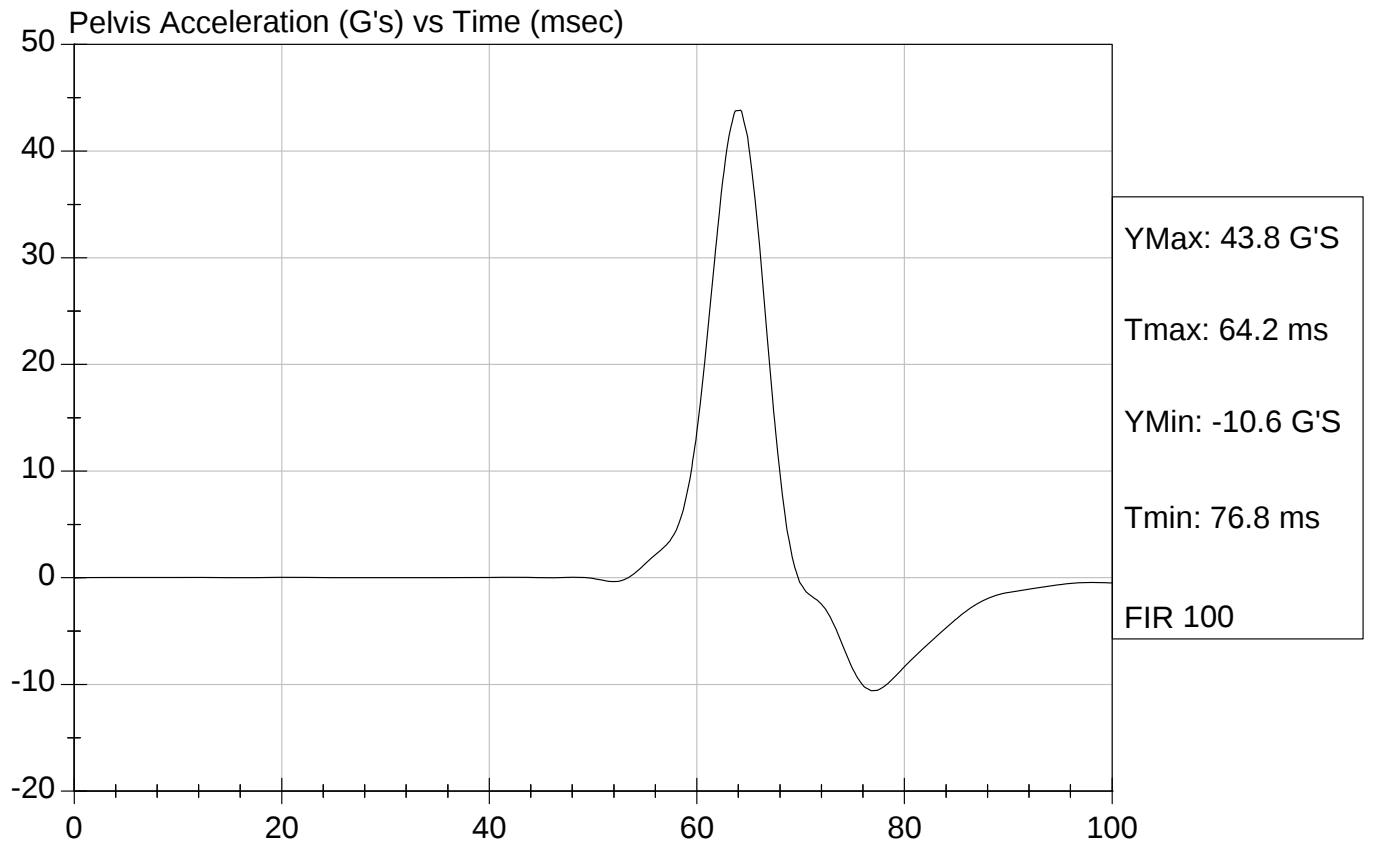
Test Date


Approved By



Test Desc: Pelvis Impact
Component ID: D082333

Test Date: 8/14/08
Speed: 14.12 ft/sec, 4.30 m/sec



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

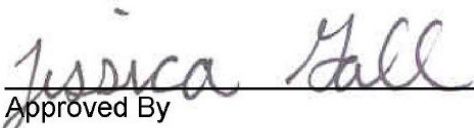
ATD Serial No: 271

Test I.D: D082334

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	40	Pass
Force At 12.7 mm	N	104 -162	134	Pass
Force At 19 mm	N	163 - 222	204	Pass
Force At 25.4 mm	N	222 - 280	267	Pass
Force At 33 mm	N	325 - 391	372	Pass
Overall Test Results				Pass


 Laboratory Technician

8/15/08
 Test Date

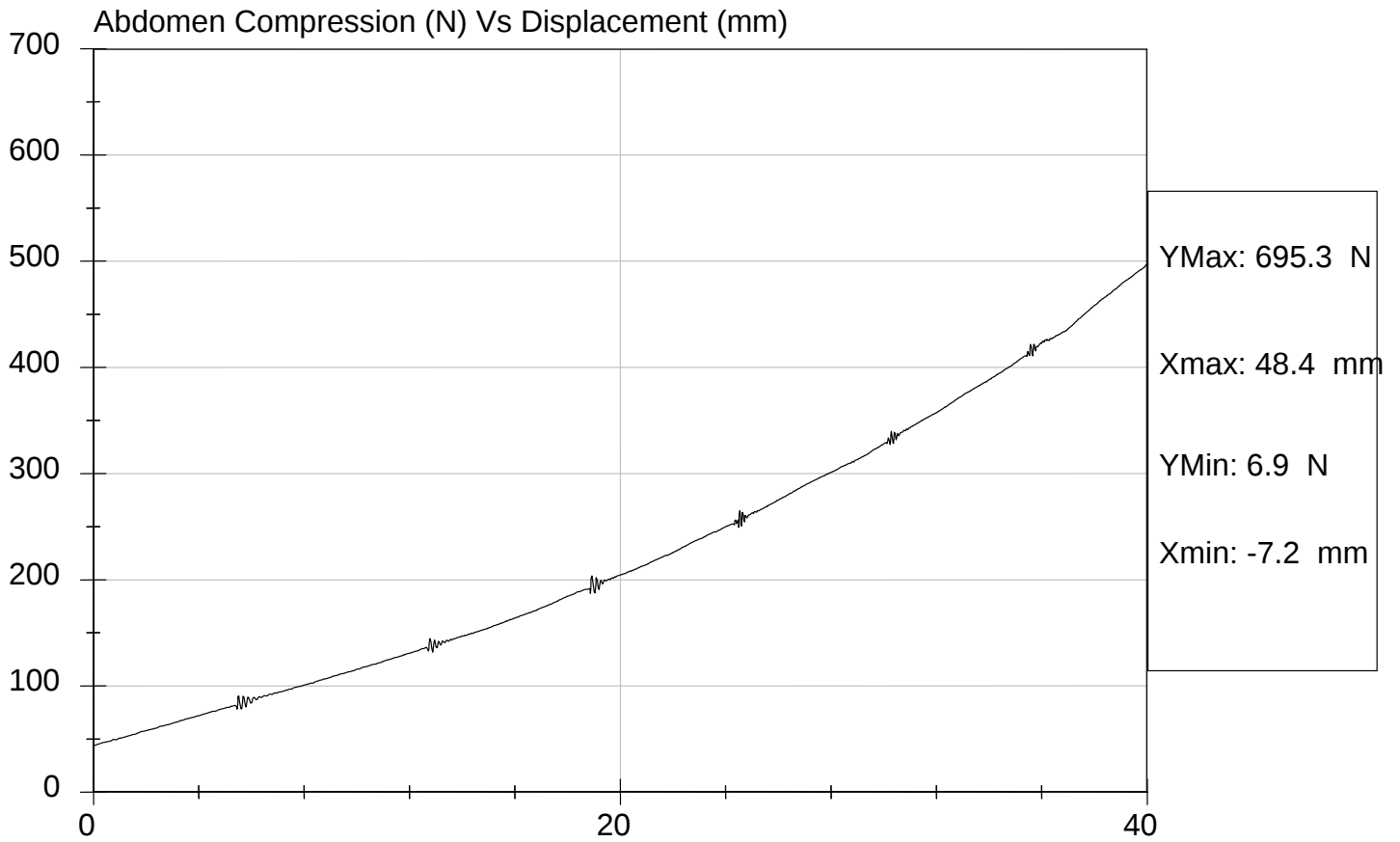

 Approved By



Test Description: Abdomen Compression Test Date: 8/15/08

Component: D082334

Speed: 0 ft/sec, 0 m/sec



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

ATD Serial No: 271

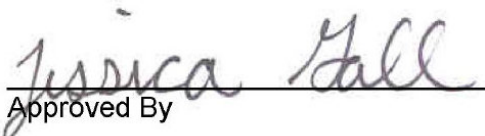
Test I.D: D082335

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	40	Pass
Force At 0 deg	N	0 - 26.7	0	Pass
Force At 20 deg	N	97.9 - 151.2	102.1	Pass
Force At 30 deg	N	151.2 - 204.6	154.0	Pass
Force At 40 deg	N	204.6 - 258.0	217.3	Pass
Return Angle	Deg	12 Maximum	4	Pass
Overall Test Results			Pass	


 Laboratory Technician

8/15/08

Test Date


 Approved By

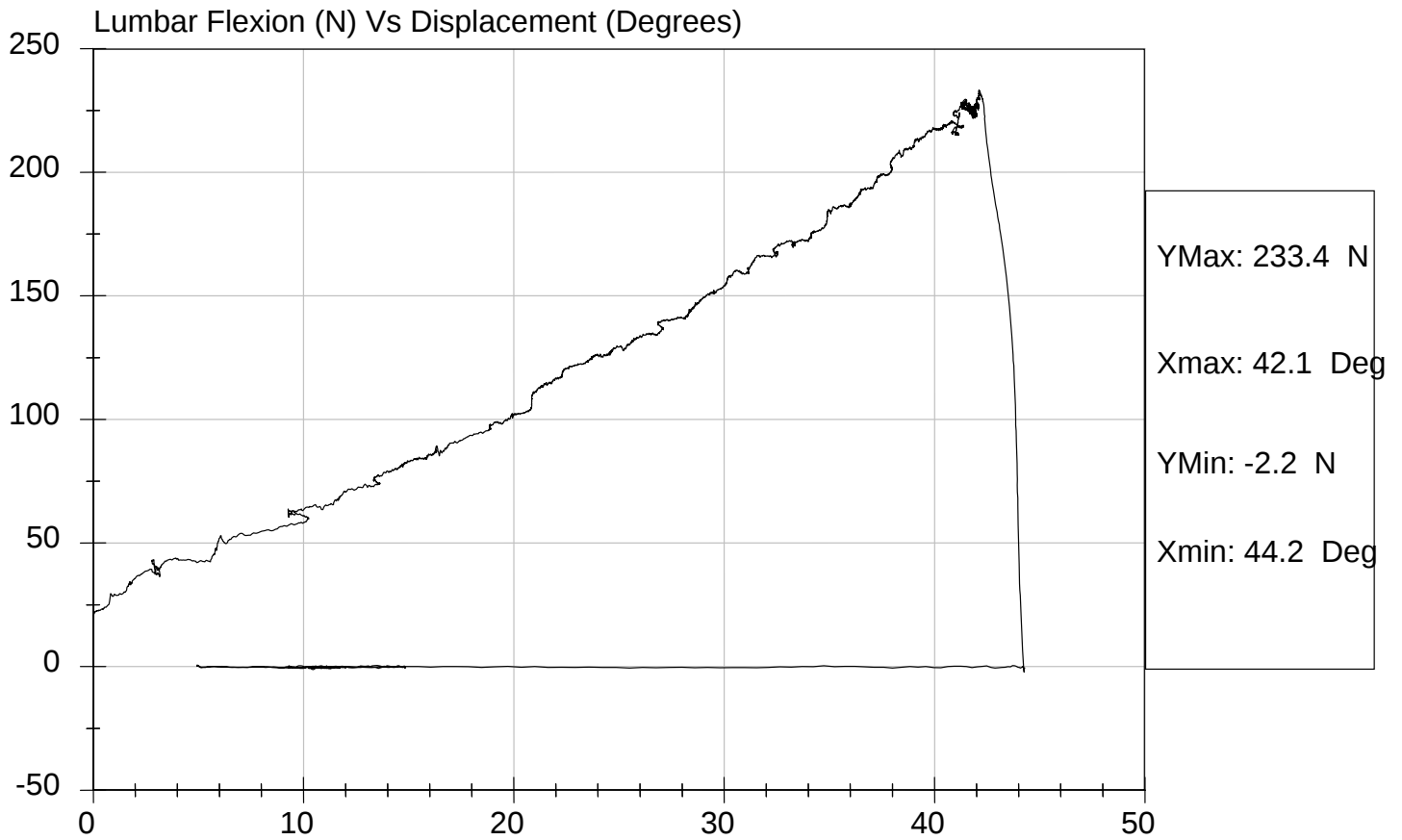


Test Description: Lumbar Flexion

Test Date: 8/15/08

Component: D082335

Speed: 0 ft/sec, 0 m/sec



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

ATD Serial No: 271

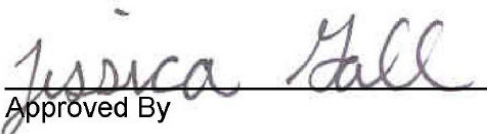
Test I.D: D082339

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.6	Pass
Laboratory Relative Humidity		%	10 to 70	40	Pass
Impact Velocity		m/s	6.89 to 7.13	7.05	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.48	Pass
	20 msec	m/s	4.12 to 5.10	4.72	Pass
	30 msec	m/s	5.73 to 7.01	6.36	Pass
	40 to 70 msec	m/s	6.27 to 7.64	6.60	Pass
Midsagittal Plane Max Rotation		deg	66 to 82	73	Pass
Head Rotation Peak to Zero - Decay Time		msec	58 to 67	60	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	75	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	60	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	13	Pass


 Laboratory Technician

8/15/08

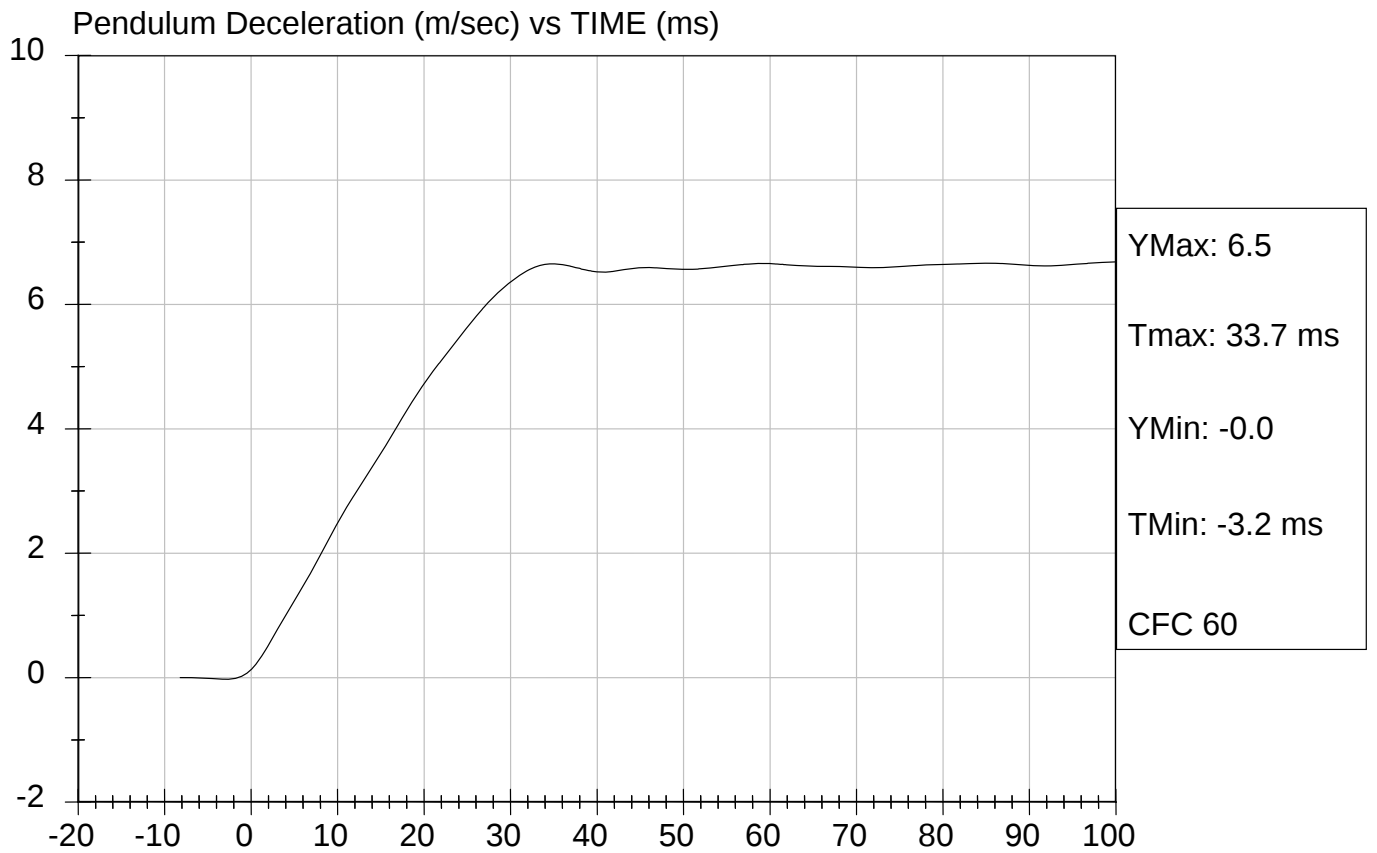
Test Date


 Approved By



Test Desc: Neck Bending
Component ID: D082339

Test Date: 8/15/08
Speed: 23.14 ft/sec, 7.05 m/sec

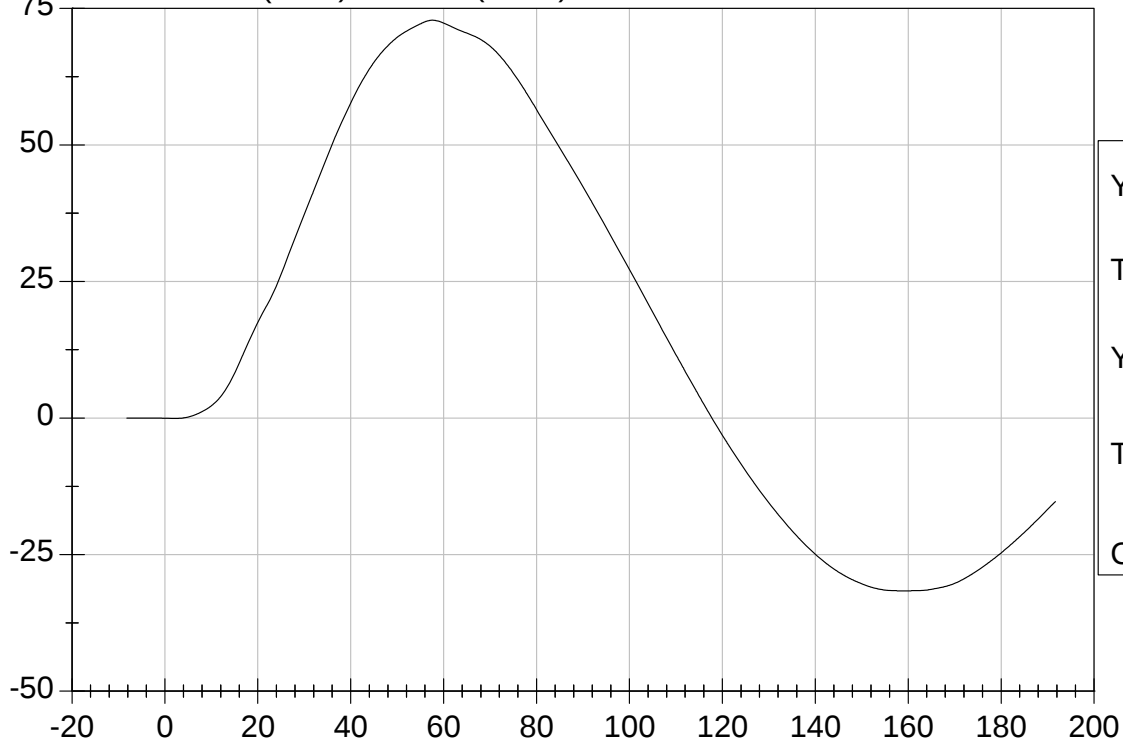




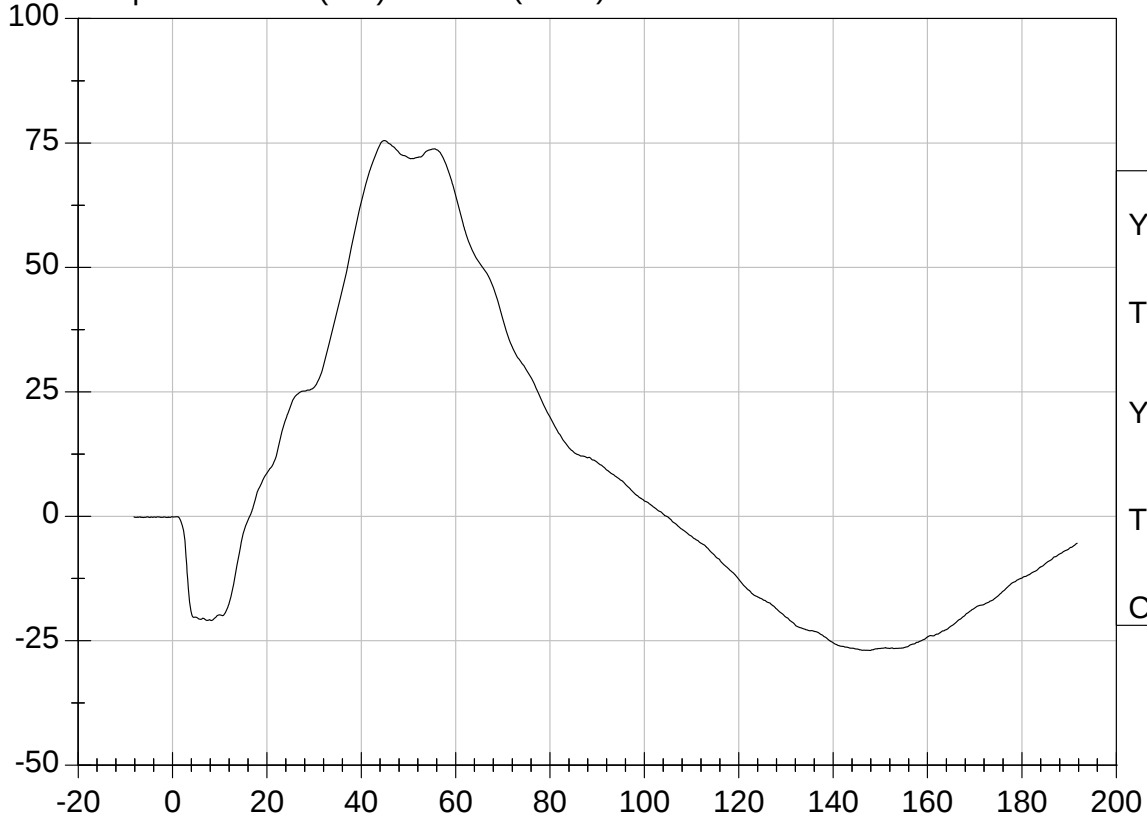
Test Desc: Neck Bending
Component ID: D082339

Test Date: 8/15/08
Speed: 23.14 ft/sec, 7.05 m/sec

Neck Rotation (DEG) vs Time (msec)



Occipital Moment (Nm) vs Time (msec)



SID 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

8/15/08
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 Calibration Data Sheet
Side Impact Dummy
External Measurements

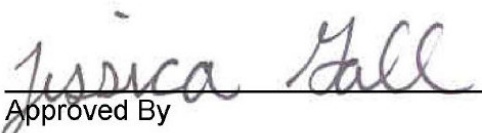
ATD Serial No: 272

Test I.D: D08225

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	


 Laboratory Technician

8/8/08
 Test Date


 Approved By

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

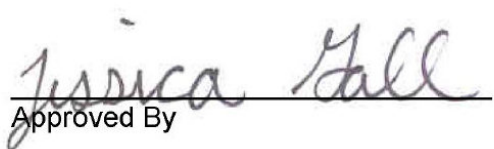
ATD Serial No: 272

Test I.D: D082251

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	35	Pass
Peak Resultant Acceleration	G's	120 to 150	136	Pass
Is Resultant Curve Unimodal?	N/A	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-13.5	Pass
Overall Test Results				Pass


 Laboratory Technician

8/8/08
 Test Date


 Approved By



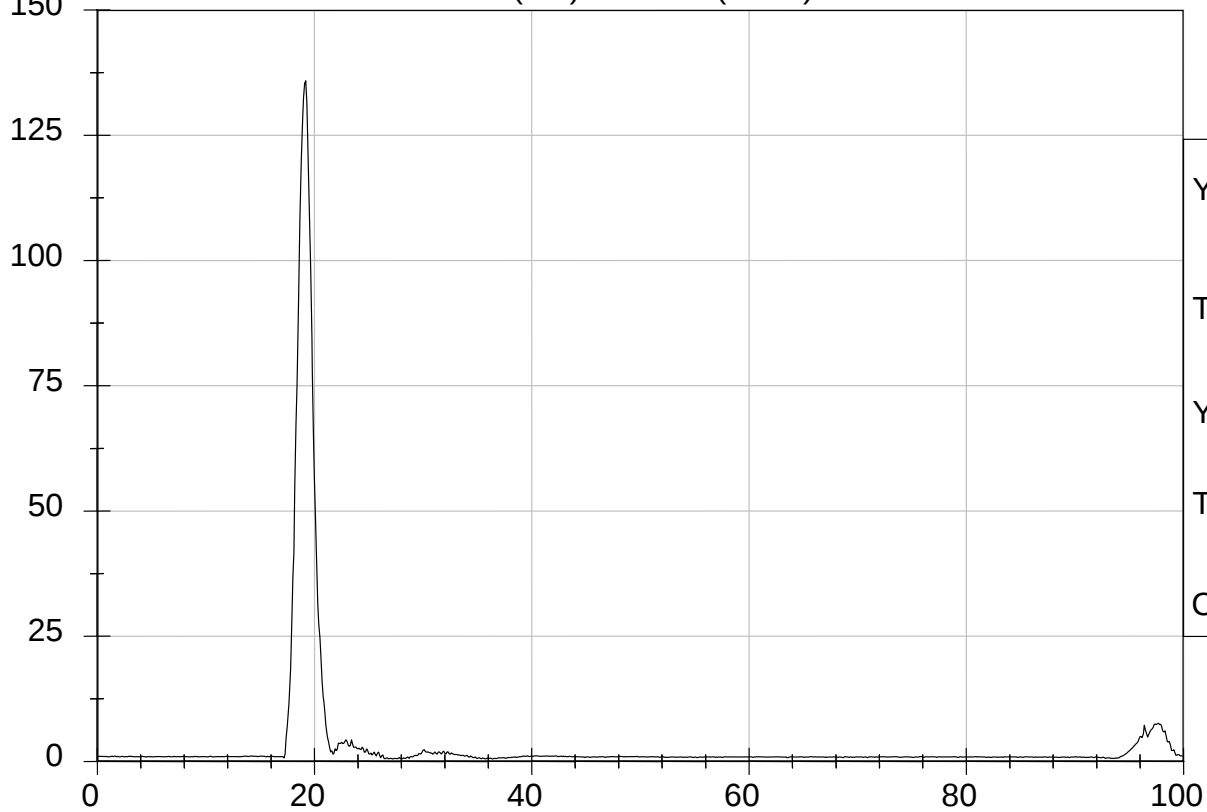
Test Description: Head Drop

Test Date: 8/8/08

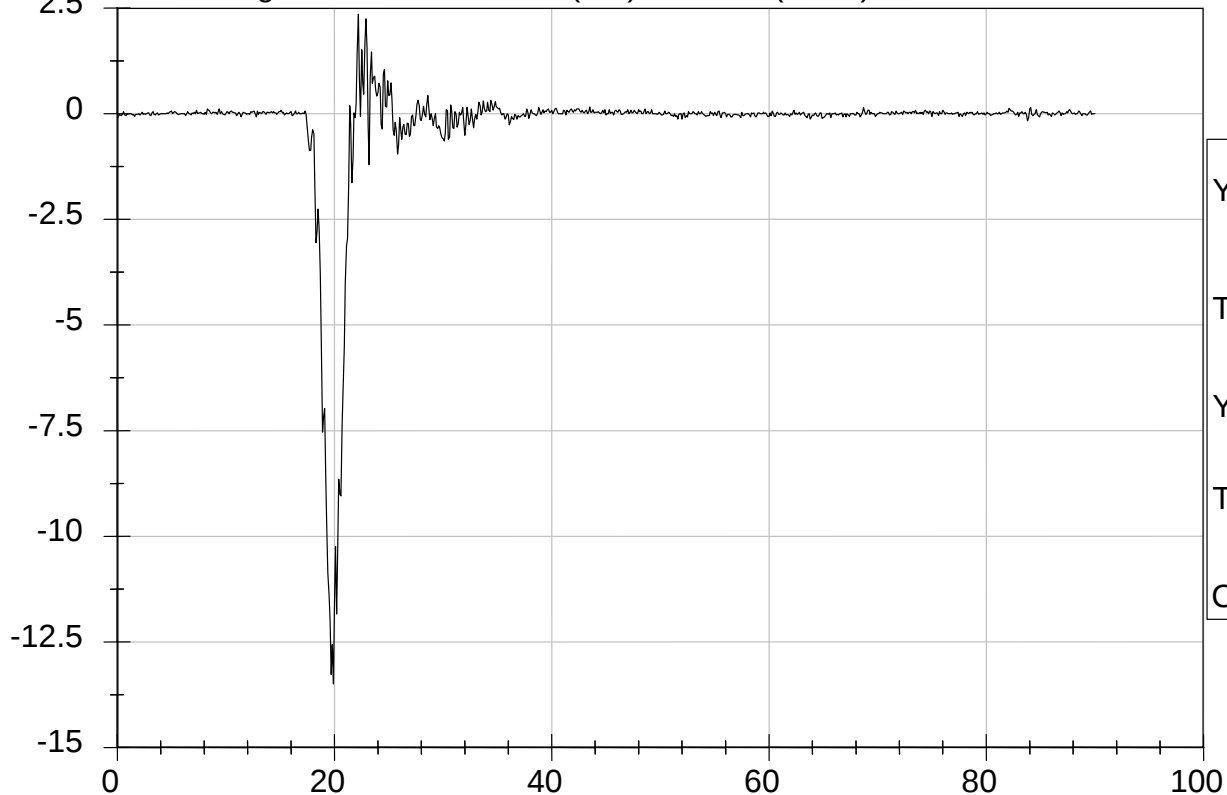
Component: D082251

Speed: 0 ft/s, 0 m/s

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



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



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

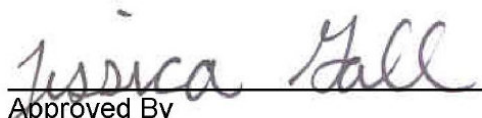
ATD Serial No: 272

Test I.D: D082252

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	35	Pass
Probe Velocity	m/s	4.22 - 4.31	4.30	Pass
Upper Rib	G's	37 - 46	39	Pass
Lower Rib	G's	37 - 46	37	Pass
Lower Spine	G's	15 - 22	18	Pass
Overall Test Results				Pass


 Laboratory Technician

8/8/08
 Test Date

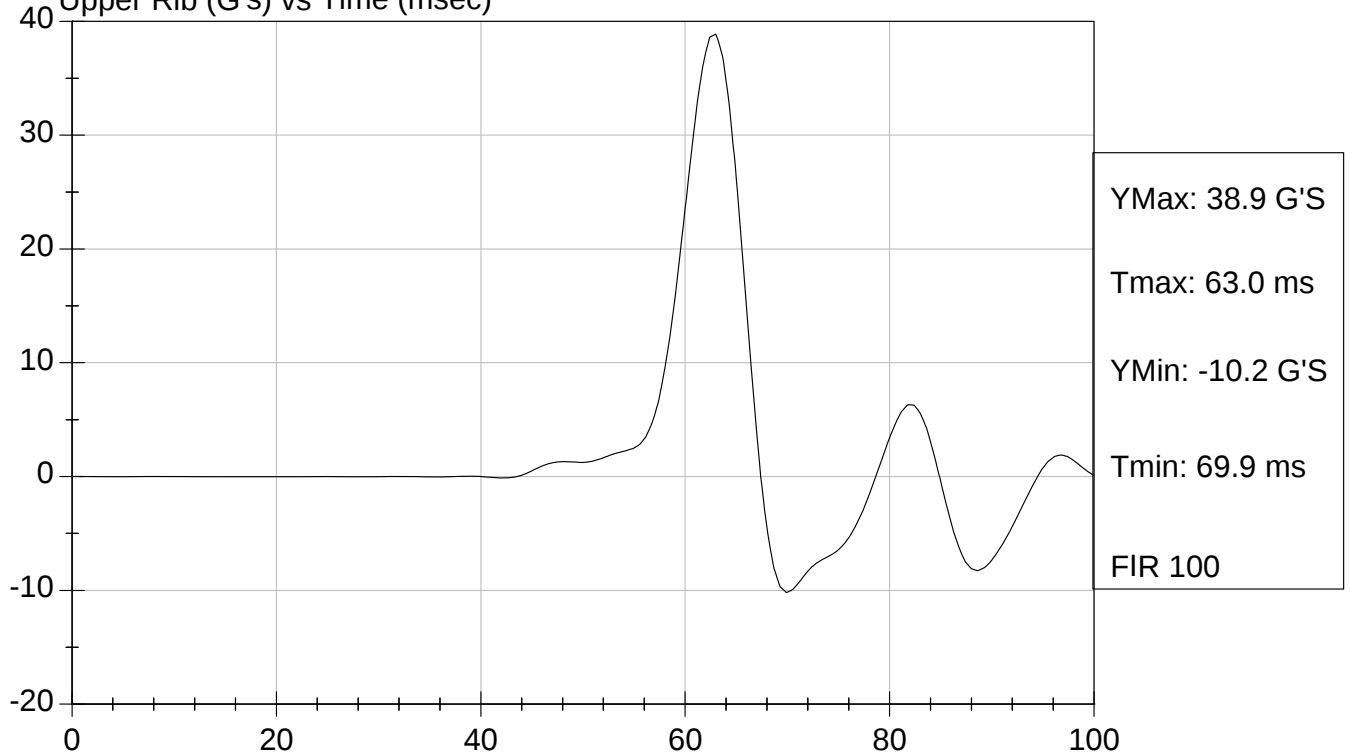

 Approved By



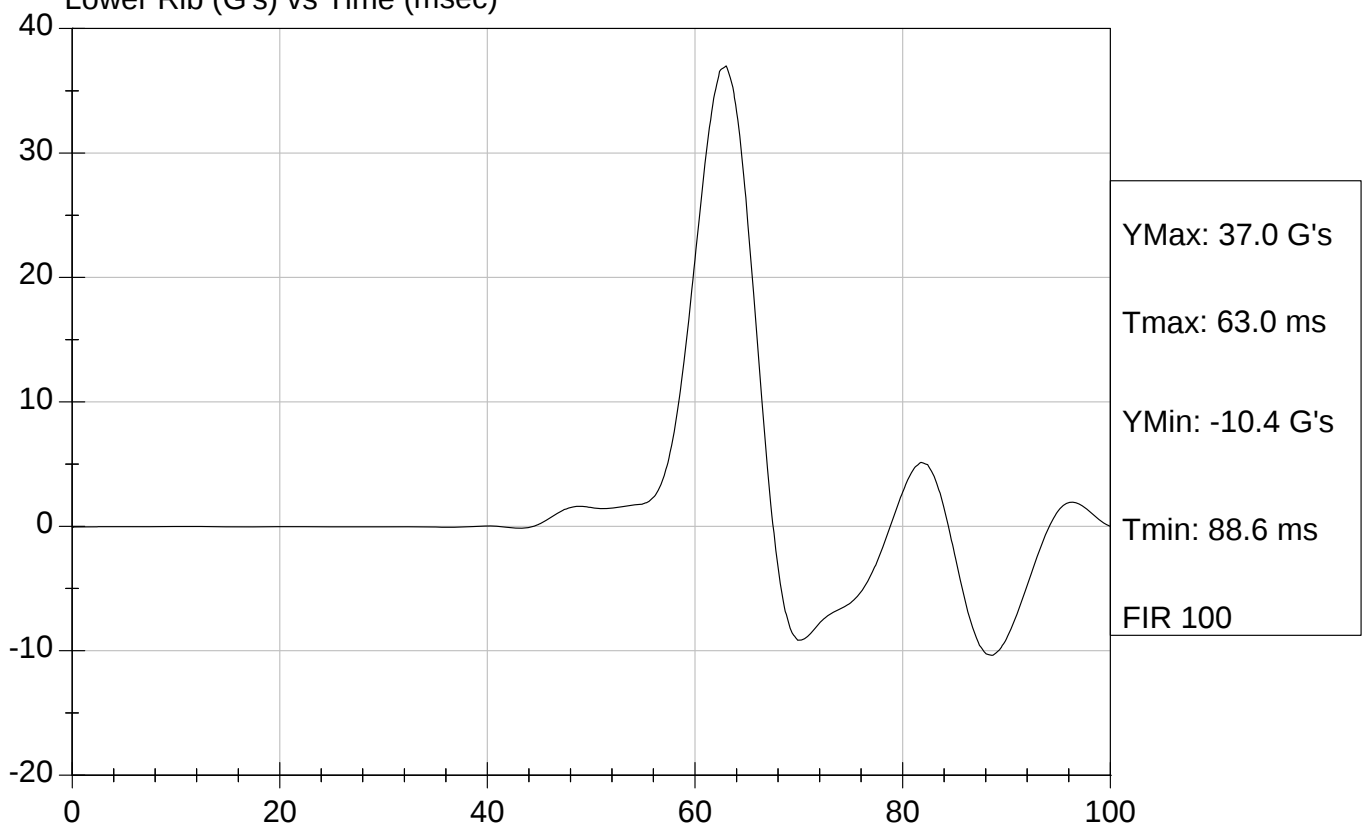
Test Desc: Thorax Impact
Component ID: D082252

Test Date: 8/8/08
Speed: 14.12 ft/sec, 4.30 m/sec

Upper Rib (G's) vs Time (msec)



Lower Rib (G's) vs Time (msec)

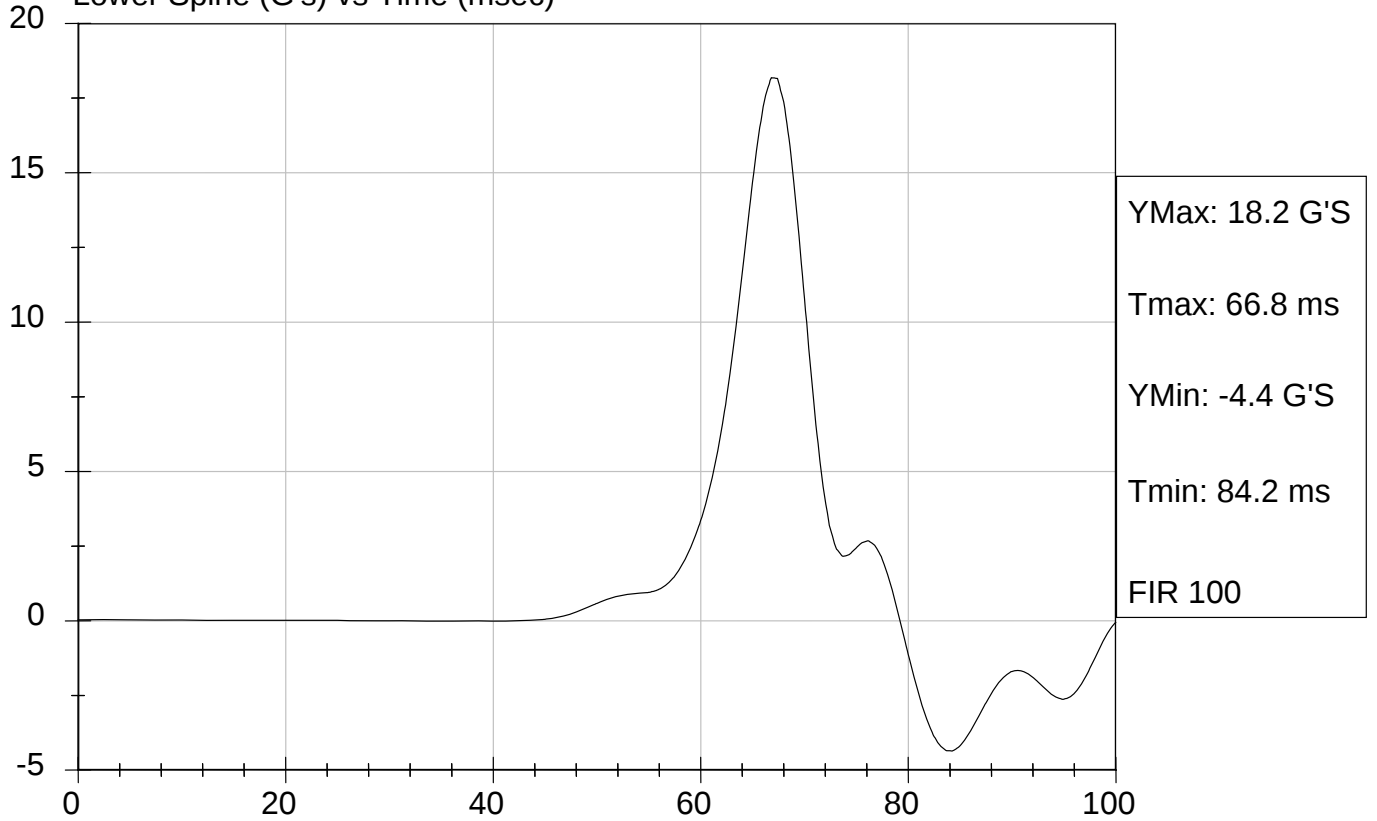




Test Desc: Thorax Impact
Component ID: D082252

Test Date: 8/8/08
Speed: 14.12 ft/sec, 4.30 m/sec

Lower Spine (G's) vs Time (msec)

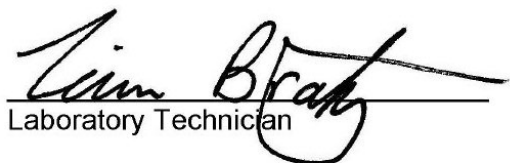


SID/HIII Calibration Data Sheet
Side Impact Dummy
Pelvis Impact Test

ATD Serial No: 272

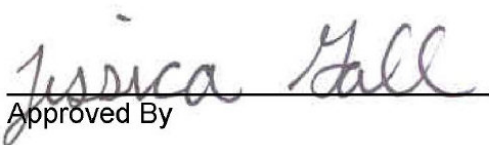
Test I.D: D082253

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	34	Pass
Probe Velocity	m/s	4.27 - 4.33	4.30	Pass
Pelvis Acceleration	G's	40 - 60	42	Pass
Overall Test Results				Pass


Laboratory Technician

8/8/08

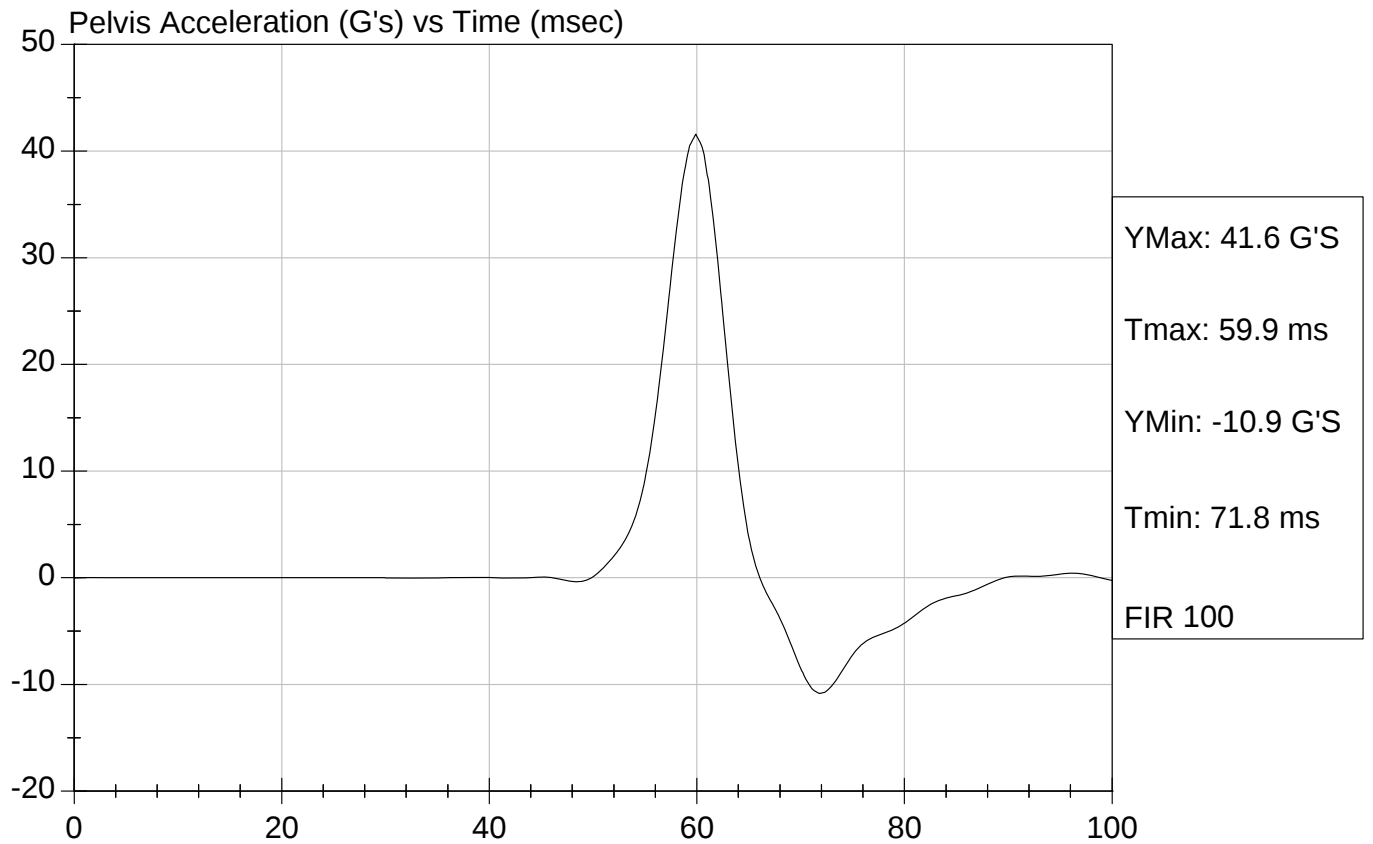
Test Date


Approved By



Test Desc: Pelvis Impact
Component ID: D082253

Test Date: 8/8/08
Speed: 14.12 ft/sec, 4.30 m/sec



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

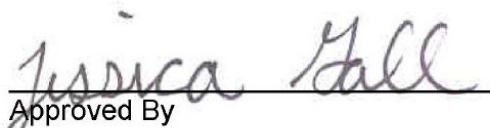
ATD Serial No: 272

Test I.D: D082254

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	39	Pass
Force At 12.7 mm	N	104 -162	133	Pass
Force At 19 mm	N	163 - 222	184	Pass
Force At 25.4 mm	N	222 - 280	250	Pass
Force At 33 mm	N	325 - 391	347	Pass
Overall Test Results				Pass


 Laboratory Technician

8/8/08
 Test Date


 Approved By



Test Description: Abdomen Compression Test Date: 8/8/08

Component: D082254

Speed: 0 ft/sec, 0 m/sec



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

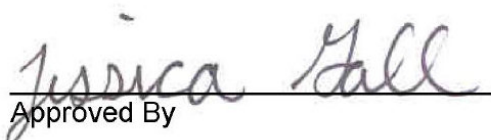
ATD Serial No: 272

Test I.D: D082255

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	37	Pass
Force At 0 deg	N	0 - 26.7	0	Pass
Force At 20 deg	N	97.9 - 151.2	116.9	Pass
Force At 30 deg	N	151.2 - 204.6	154.2	Pass
Force At 40 deg	N	204.6 - 258.0	224.7	Pass
Return Angle	Deg	12 Maximum	3	Pass
Overall Test Results				Pass


 Laboratory Technician

8/8/08
 Test Date


 Approved By

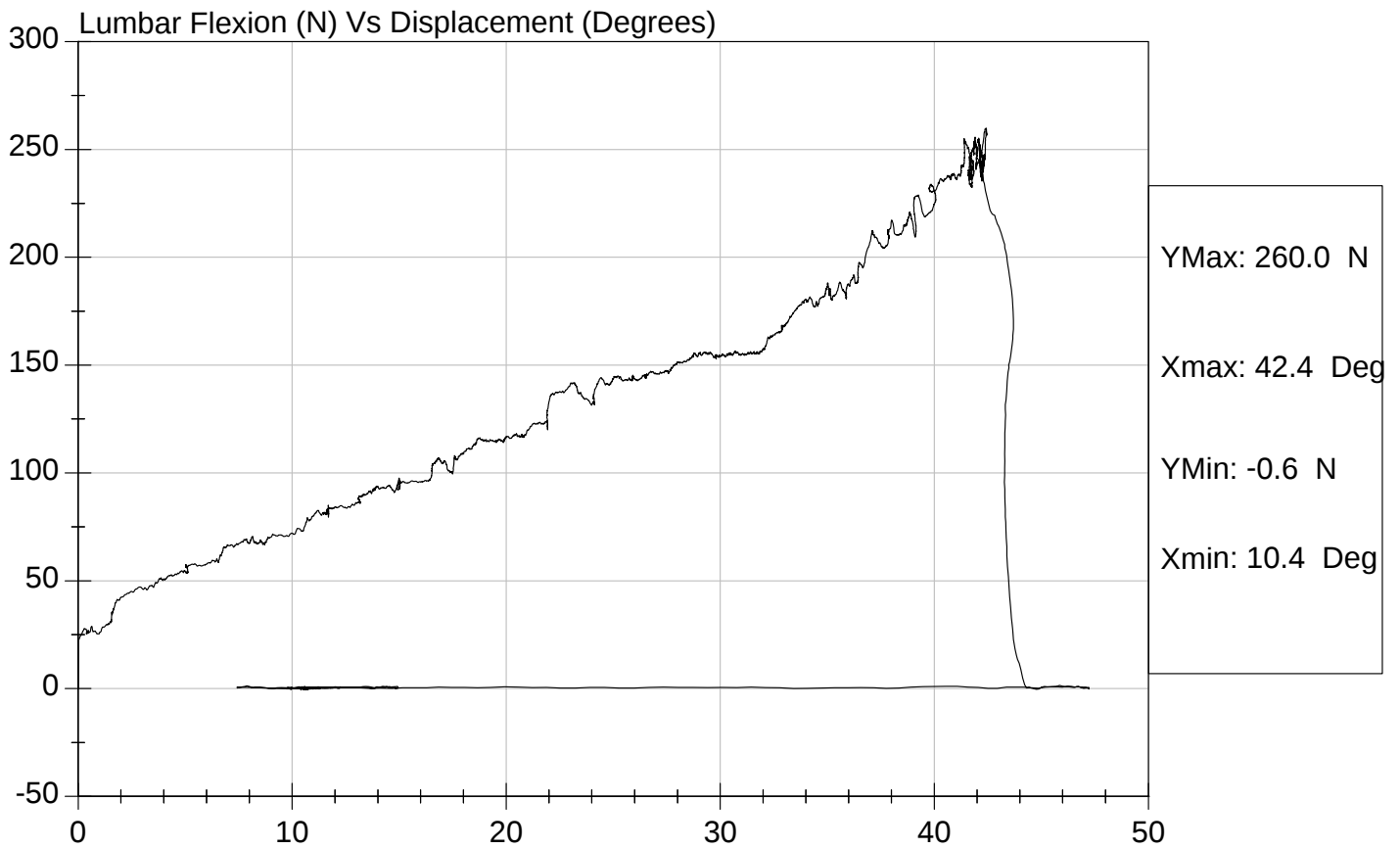


Test Description: Lumbar Flexion

Test Date: 8/8/08

Component: D082255

Speed: 0 ft/sec, 0 m/sec

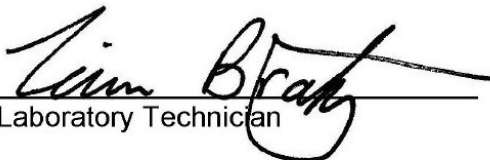


SID/HIII Calibration Data Sheet
Side Impact Dummy
Neck Pendulum Test

ATD Serial No: 272

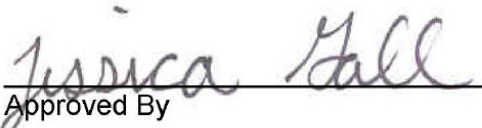
Test I.D: D082258

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.0	Pass
Laboratory Relative Humidity		%	10 to 70	34	Pass
Impact Velocity		m/s	6.89 to 7.13	7.05	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.40	Pass
	20 msec	m/s	4.12 to 5.10	4.69	Pass
	30 msec	m/s	5.73 to 7.01	6.27	Pass
	40 to 70 msec	m/s	6.27 to 7.64	6.59	Pass
Midsagittal Plane Max Rotation		deg	66 to 82	69	Pass
Head Rotation Peak to Zero - Decay Time		msec	58 to 67	59	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	75	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	58	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	14	Pass


 Laboratory Technician

8/8/08

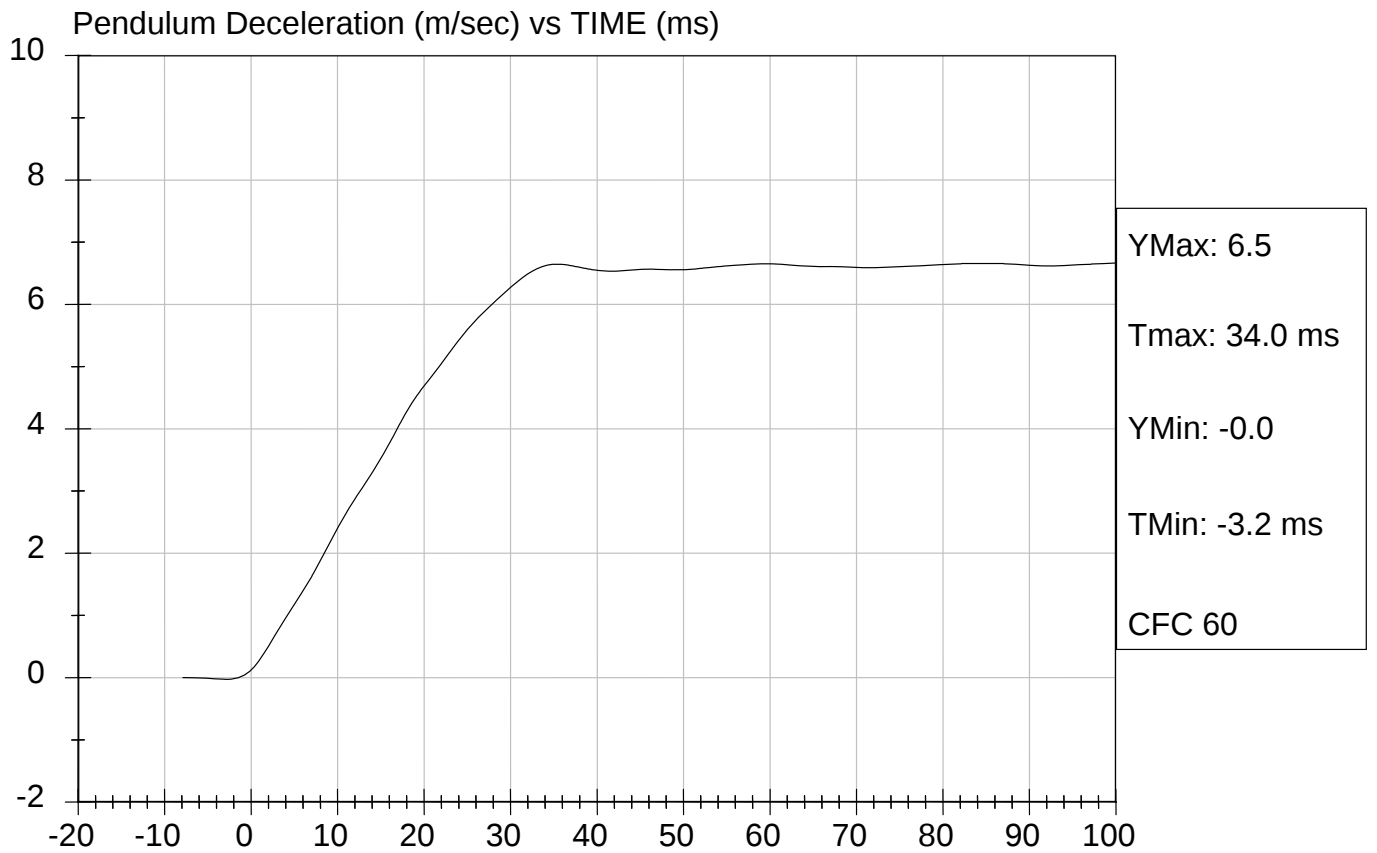
Test Date


 Approved By



Test Desc: Neck Bending
Component ID: D082258

Test Date: 8/8/08
Speed: 23.14 ft/sec, 7.05 m/sec

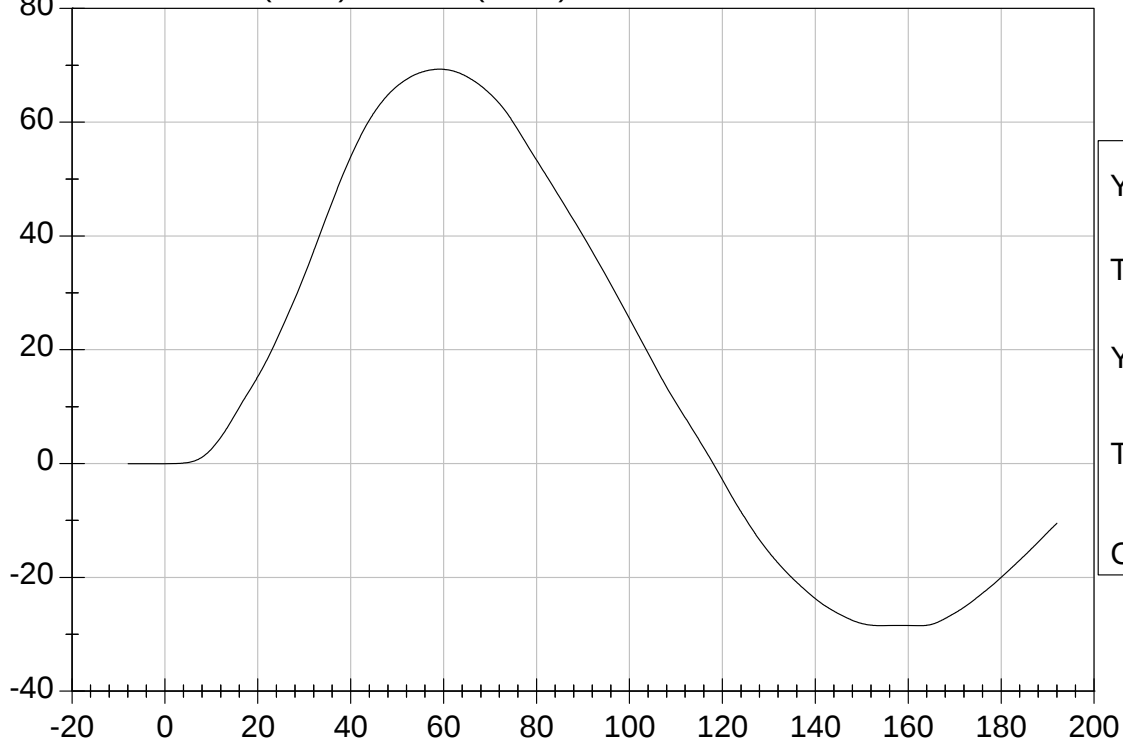




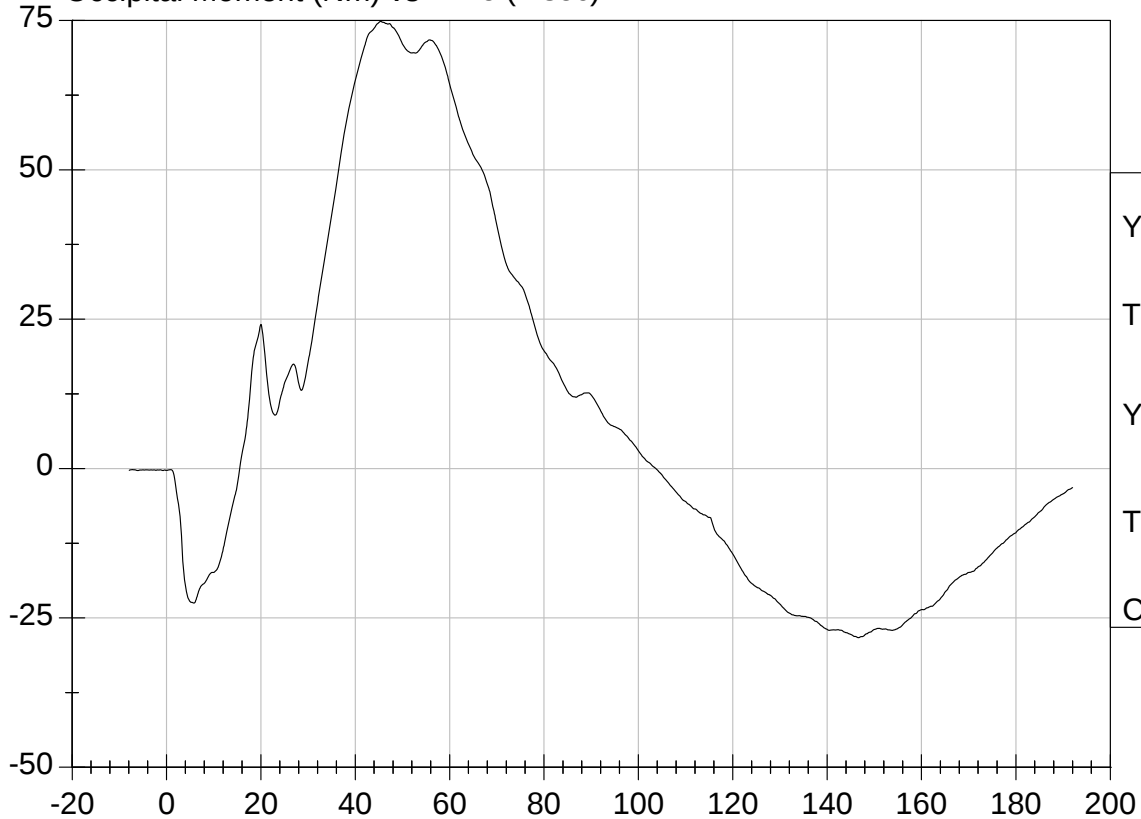
Test Desc: Neck Bending
Component ID: D082258

Test Date: 8/8/08
Speed: 23.14 ft/sec, 7.05 m/sec

Neck Rotation (DEG) vs Time (msec)



Occipital Moment (Nm) vs Time (msec)



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)

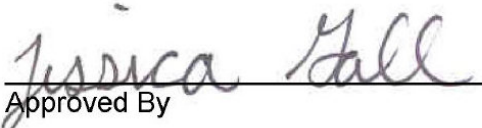
ATD Serial No: 272

Test I.D: D082341

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	38	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	8.3	Pass
			Overall Test Results	Pass


Laboratory Technician

8/15/08
Test Date


Approved By



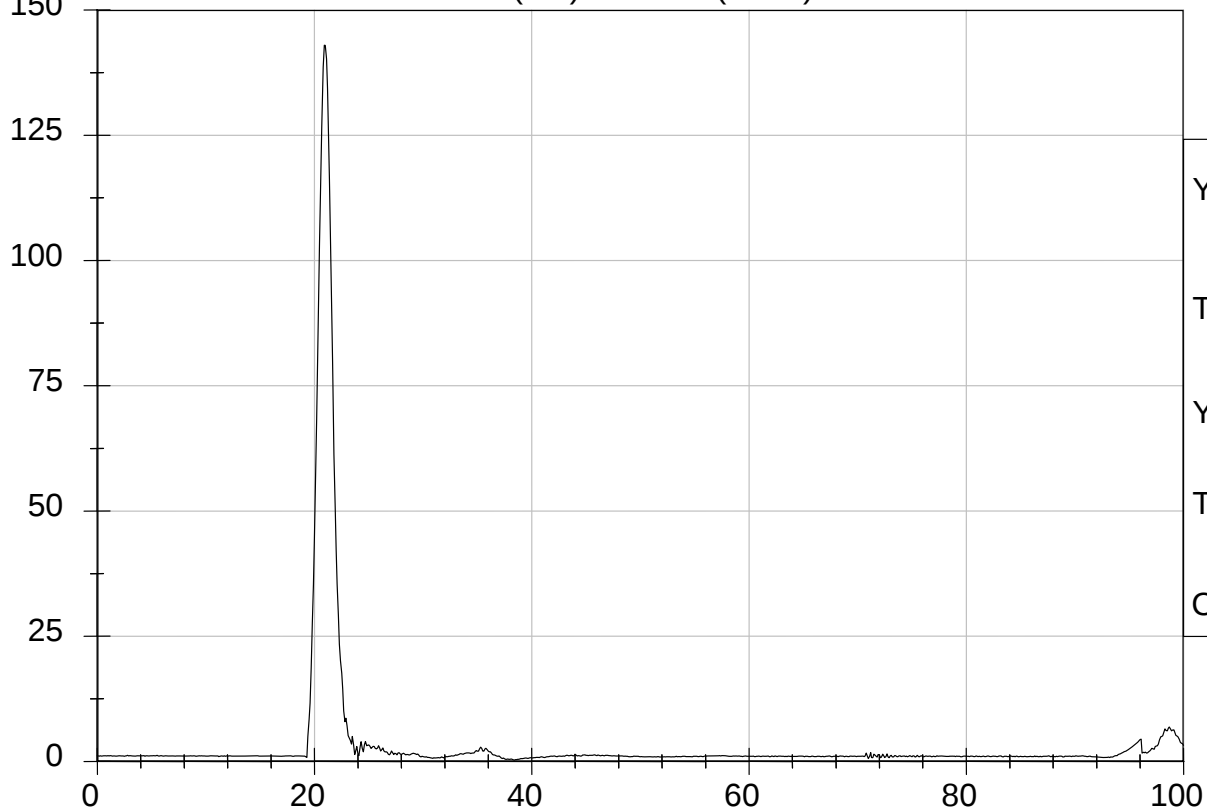
Test Description: Head Drop

Test Date: 8/15/08

Component: D082341

Speed: 0 ft/s, 0 m/s

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



YMax: 143.0 G

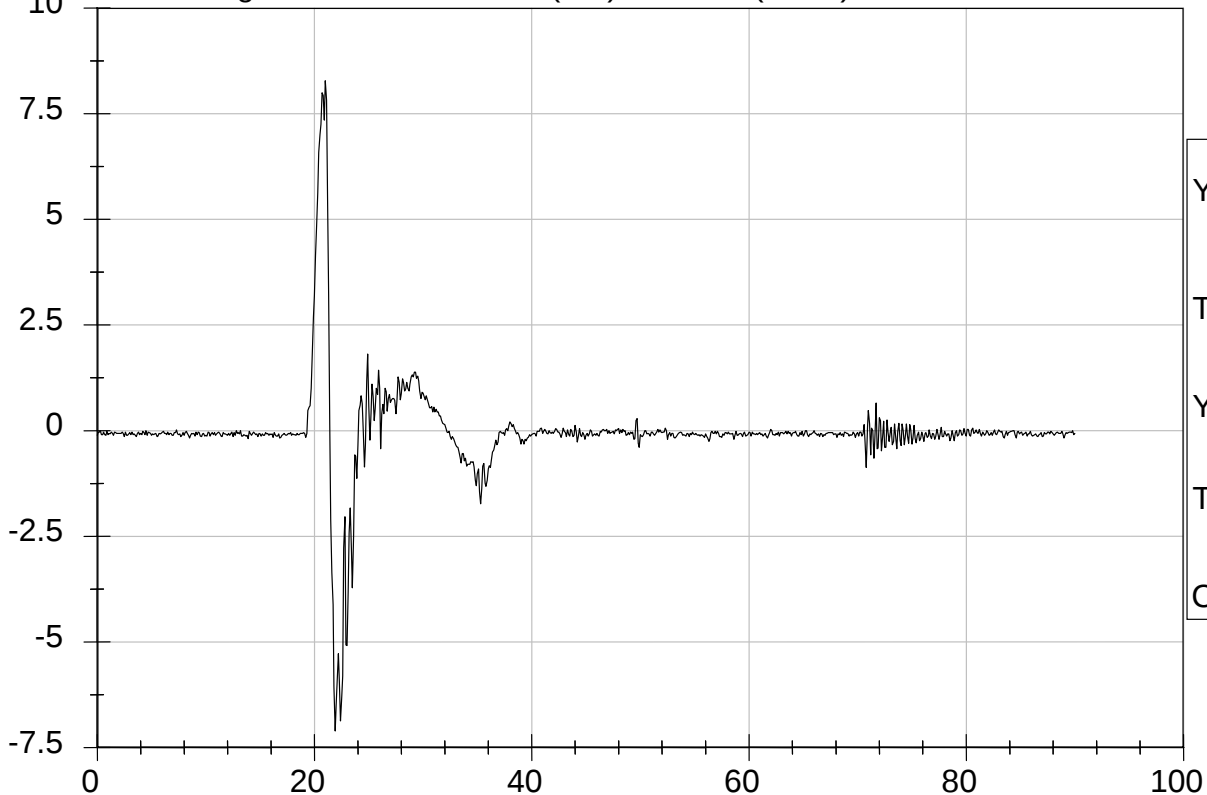
Tmax: 20.9 ms

YMin: 0.3 G

Tmin: 38.4 ms

CFC 1000

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



YMax: 8.3 G

Tmax: 21.0 ms

YMin: -7.1 G

Tmin: 21.9 ms

CFC 1000

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

ATD Serial No: 272

Test I.D: D082342

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	36	Pass
Probe Velocity	m/s	4.22 - 4.31	4.30	Pass
Upper Rib	G's	37 - 46	40	Pass
Lower Rib	G's	37 - 46	38	Pass
Lower Spine	G's	15 - 22	19	Pass
Overall Test Results				Pass


 Laboratory Technician

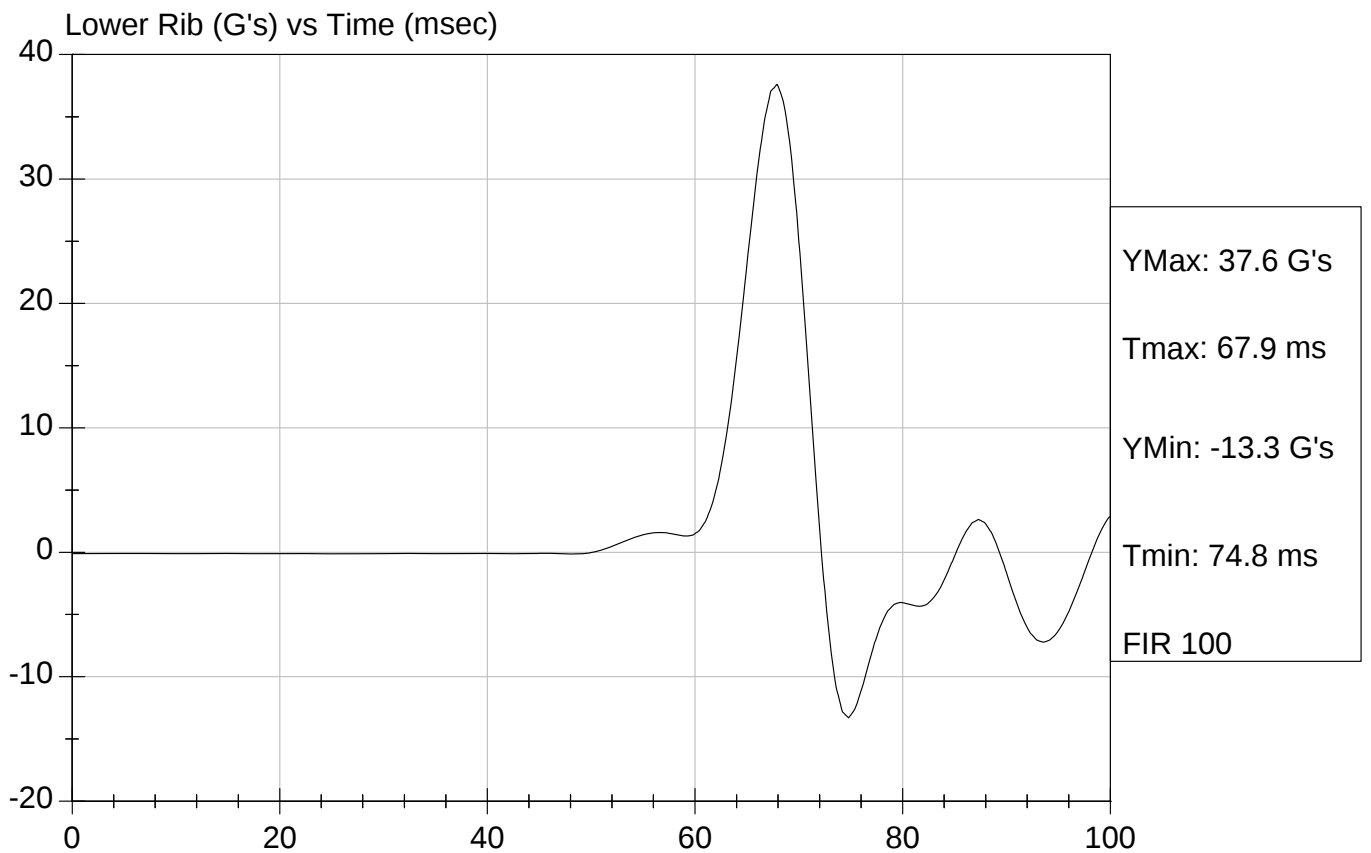
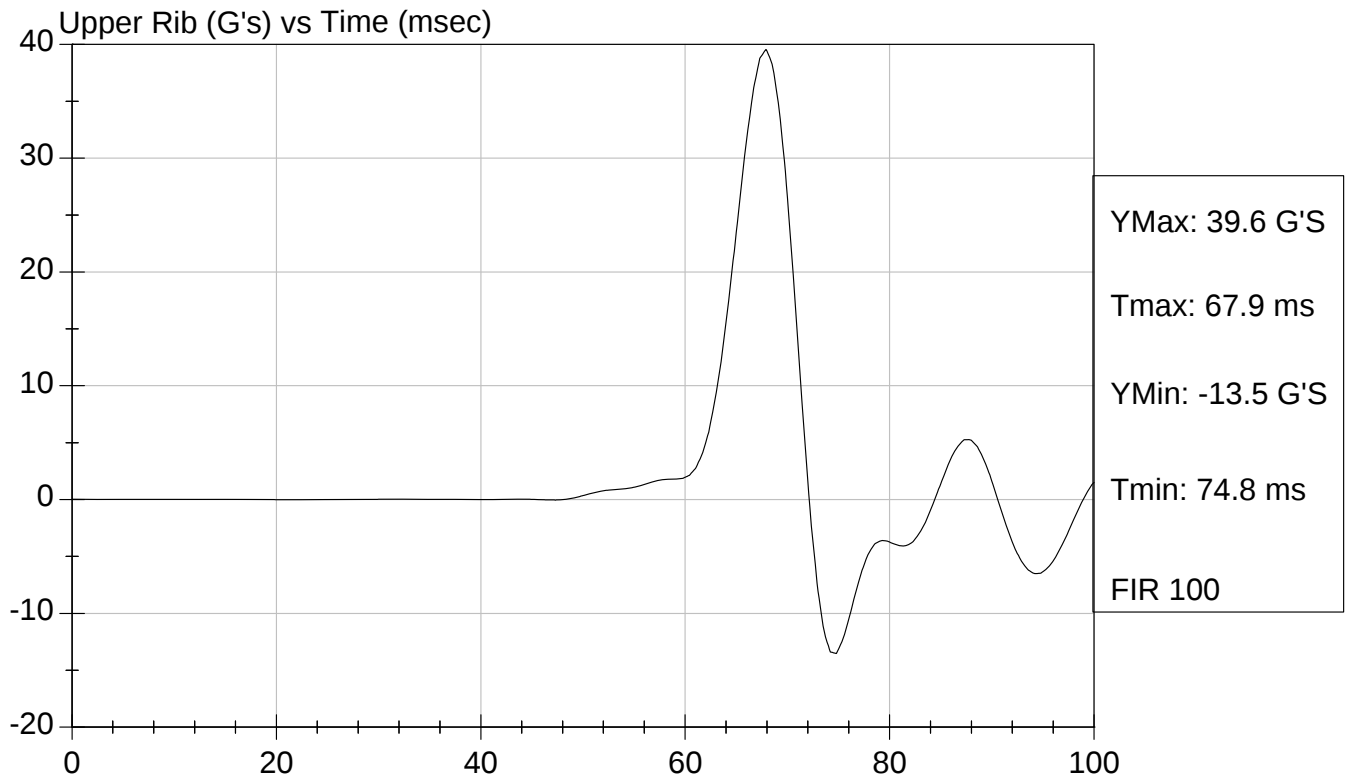
8/14/08
 Test Date


 Approved By



Test Desc: Thorax Impact
Component ID: D082342

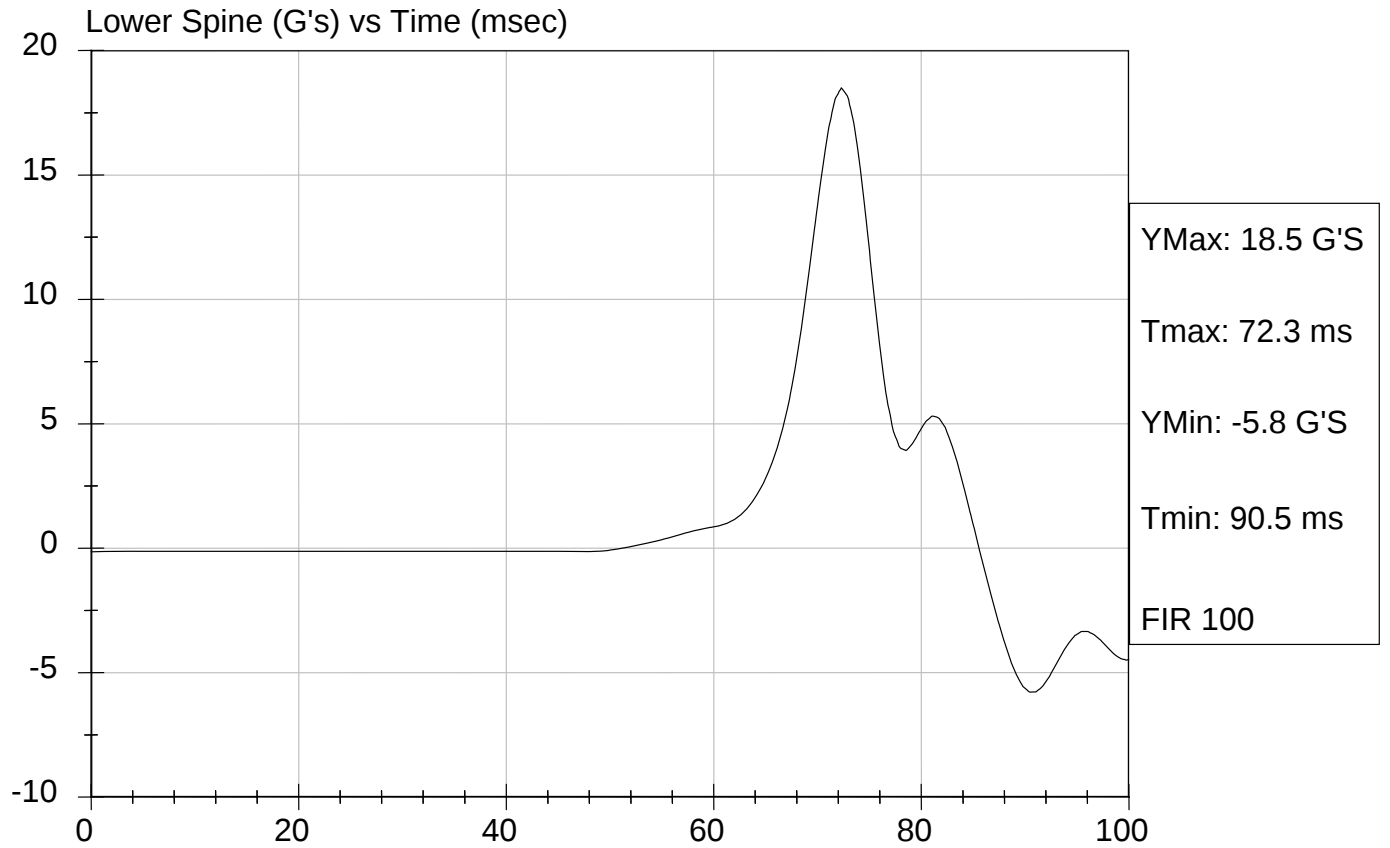
Test Date: 8/14/08
Speed: 14.12 ft/sec, 4.30 m/sec





Test Desc: Thorax Impact
Component ID: D082342

Test Date: 8/14/08
Speed: 14.12 ft/sec, 4.30 m/sec



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

ATD Serial No: 272

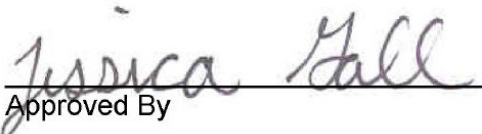
Test I.D: D082343

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	36	Pass
Probe Velocity	m/s	4.27 - 4.33	4.30	Pass
Pelvis Acceleration	G's	40 - 60	41	Pass
Overall Test Results				Pass


Laboratory Technician

8/14/08

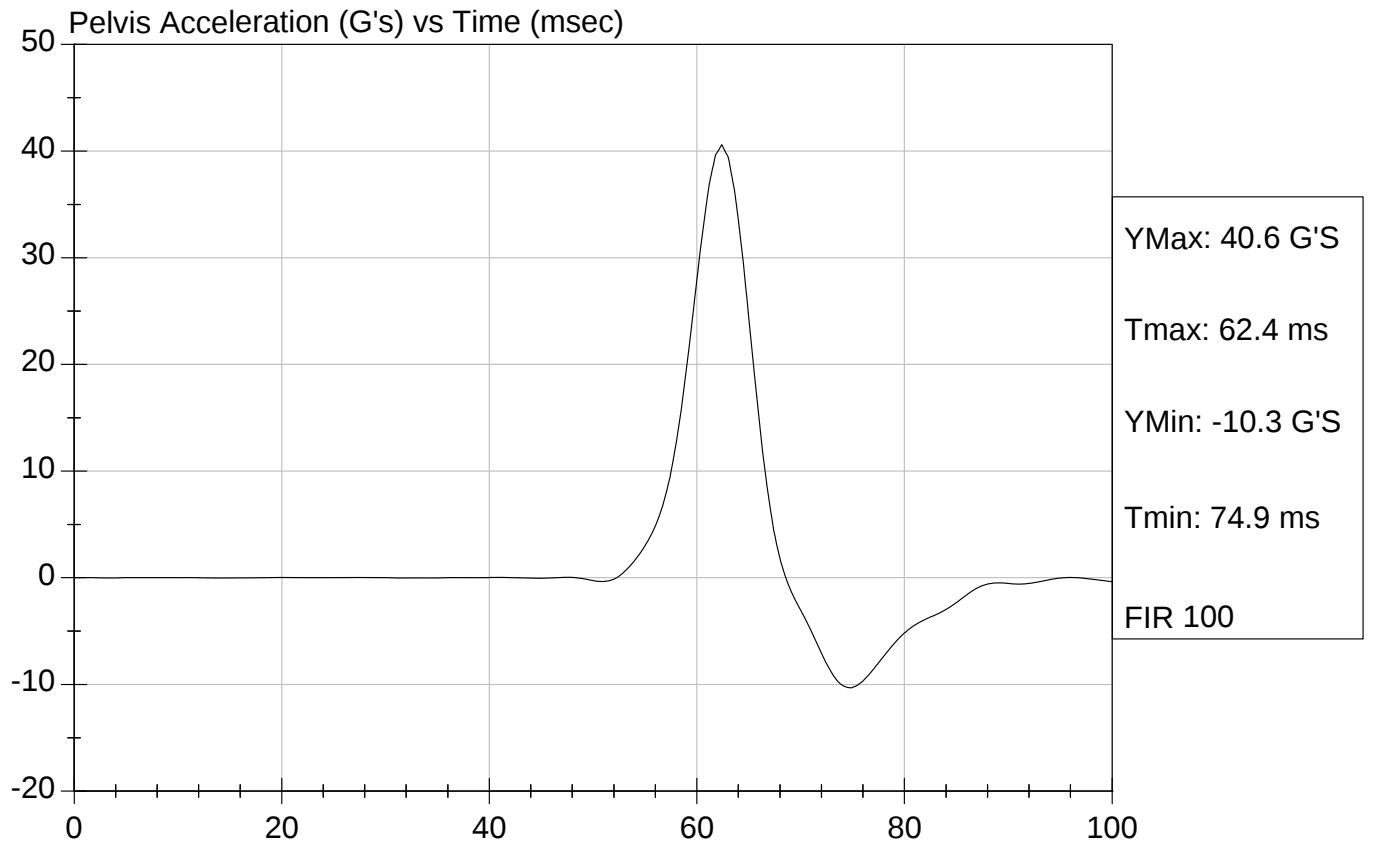
Test Date


Approved By



Test Desc: Pelvis Impact
Component ID: D082343

Test Date: 8/14/08
Speed: 14.12 ft/sec, 4.30 m/sec



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

ATD Serial No: 272

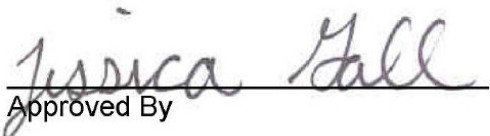
Test I.D: D082344

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	42	Pass
Force At 12.7 mm	N	104 -162	135	Pass
Force At 19 mm	N	163 - 222	190	Pass
Force At 25.4 mm	N	222 - 280	256	Pass
Force At 33 mm	N	325 - 391	360	Pass
Overall Test Results				Pass


 Laboratory Technician

8/15/08

Test Date

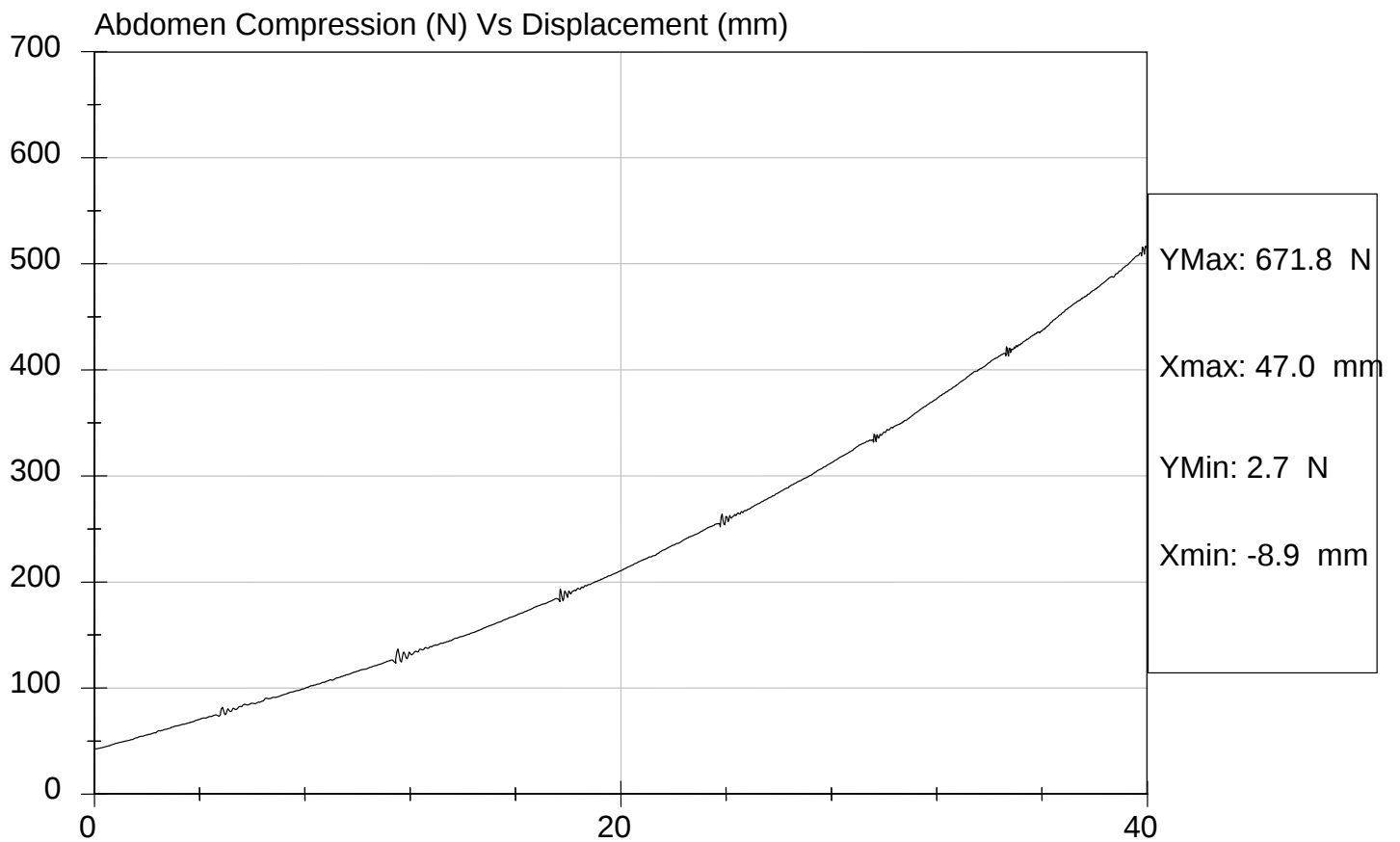

 Approved By



Test Description: Abdomen Compression Test Date: 8/8/08

Component: D082244

Speed: 0 ft/sec, 0m/sec



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

ATD Serial No: 272

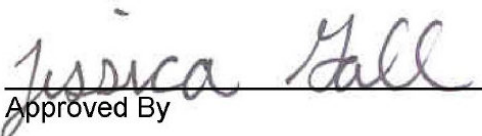
Test I.D: D082345

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	41	Pass
Force At 0 deg	N	0 - 26.7	0	Pass
Force At 20 deg	N	97.9 - 151.2	111.7	Pass
Force At 30 deg	N	151.2 - 204.6	159.3	Pass
Force At 40 deg	N	204.6 - 258.0	207.8	Pass
Return Angle	Deg	12 Maximum	6	Pass
Overall Test Results			Pass	


 Laboratory Technician

8/15/08

Test Date


 Approved By

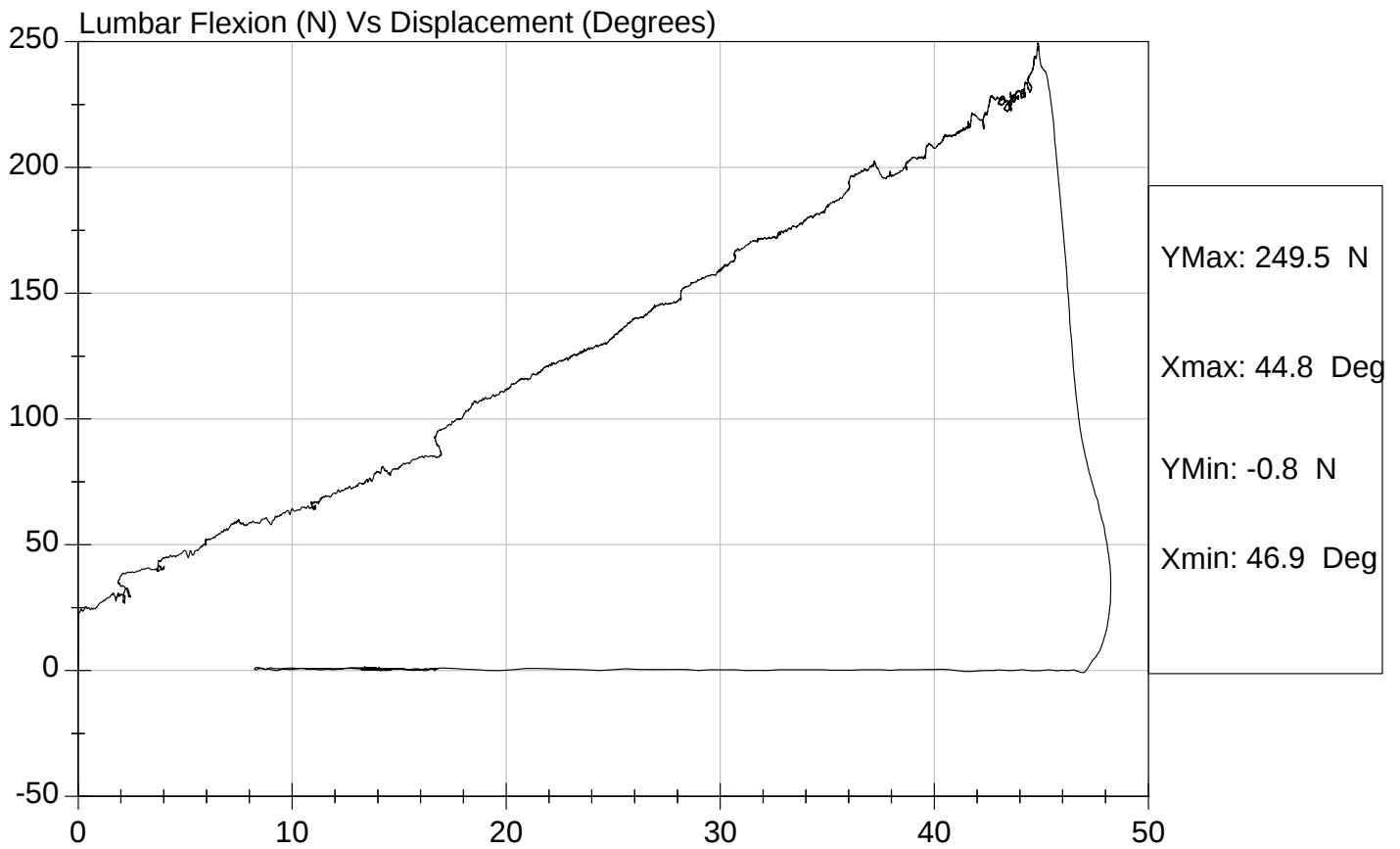


Test Description: Lumbar Flexion

Test Date: 8/15/08

Component: D082345

Speed: 0 ft/sec, m/sec



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

ATD Serial No: 272

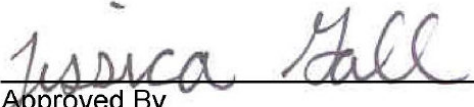
Test I.D: D082349

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity		%	10 to 70	39	Pass
Impact Velocity		m/s	6.89 to 7.13	7.05	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.47	Pass
	20 msec	m/s	4.12 to 5.10	4.85	Pass
	30 msec	m/s	5.73 to 7.01	6.55	Pass
	40 to 70 msec	m/s	6.27 to 7.64	6.55	Pass
Midsaggital Plane Max Rotation		deg	66 to 82	69	Pass
Head Rotation Peak to Zero - Decay Time		msec	58 to 67	59	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	75	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	50	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	5	Pass


 Laboratory Technician

8/15/08

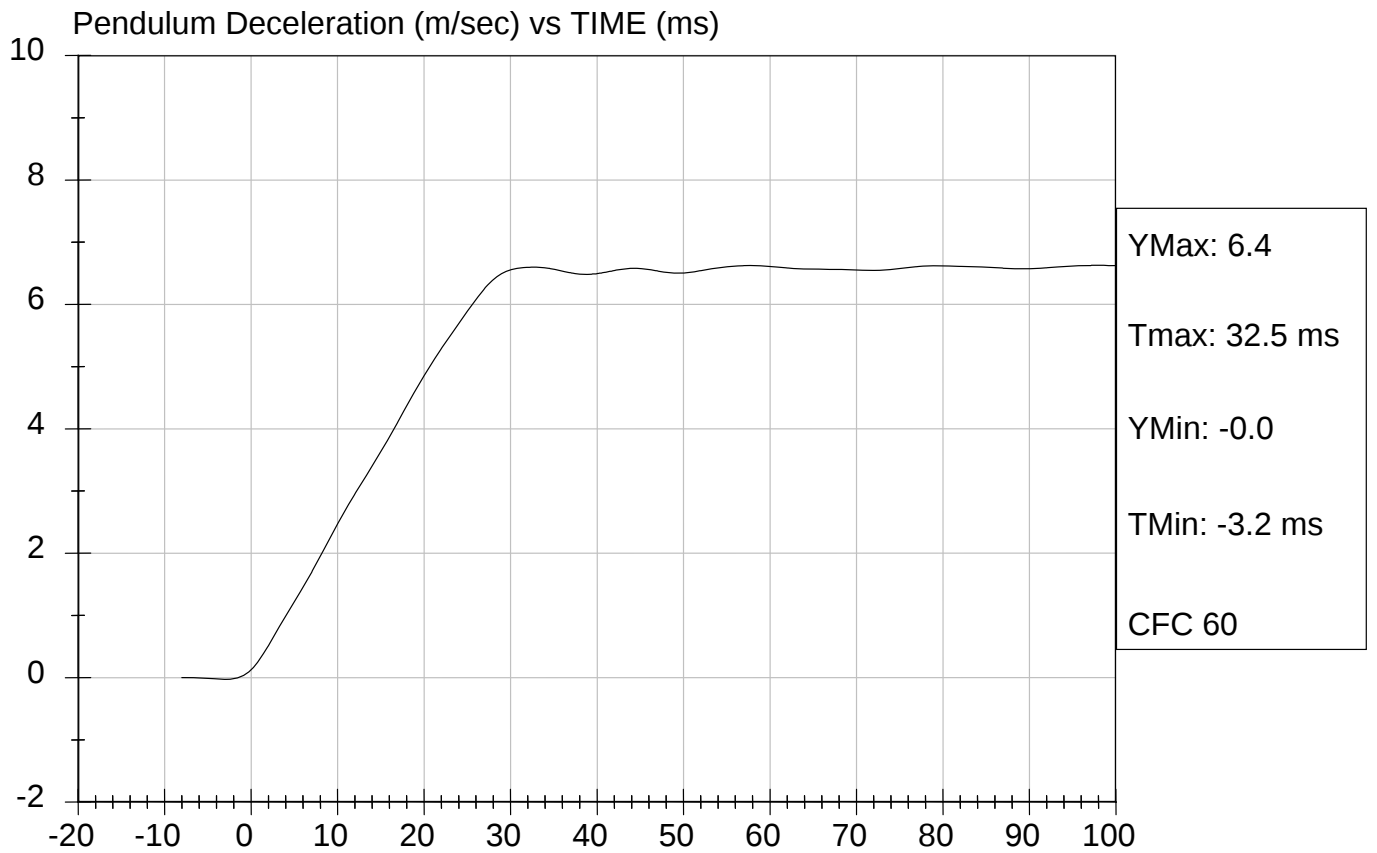
Test Date


 Approved By



Test Desc: Neck Bending
Component ID: D082349

Test Date: 8/15/08
Speed: 23.14 ft/sec, 7.05 m/sec

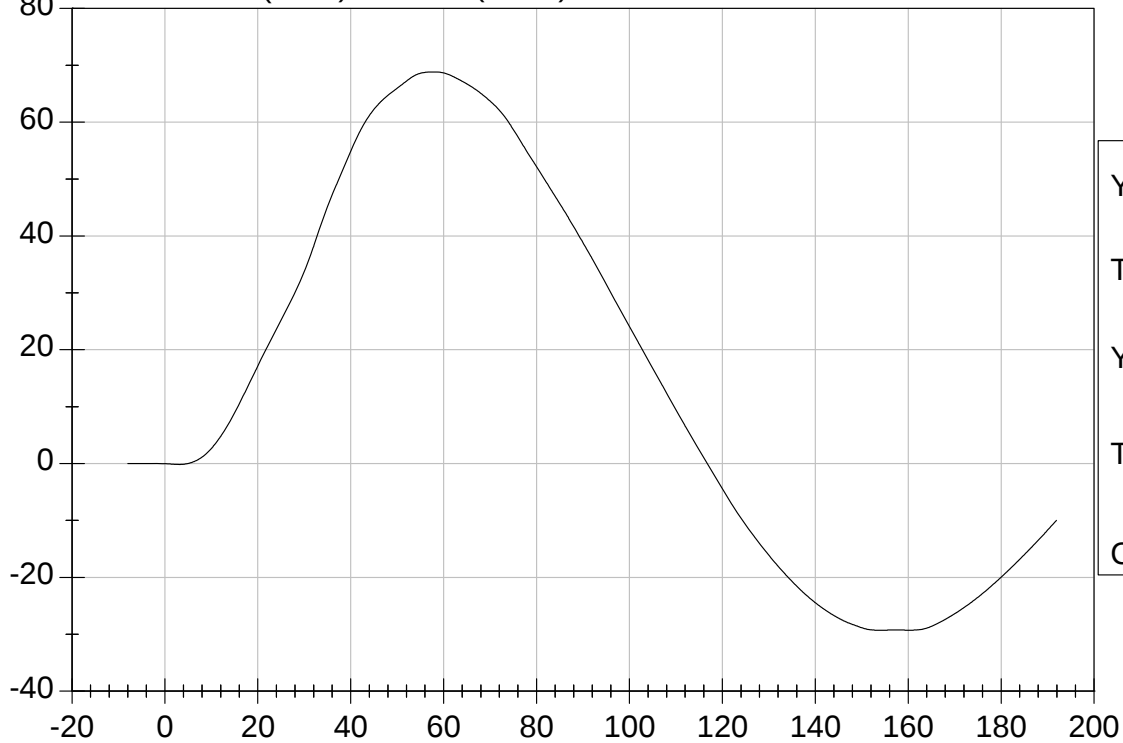




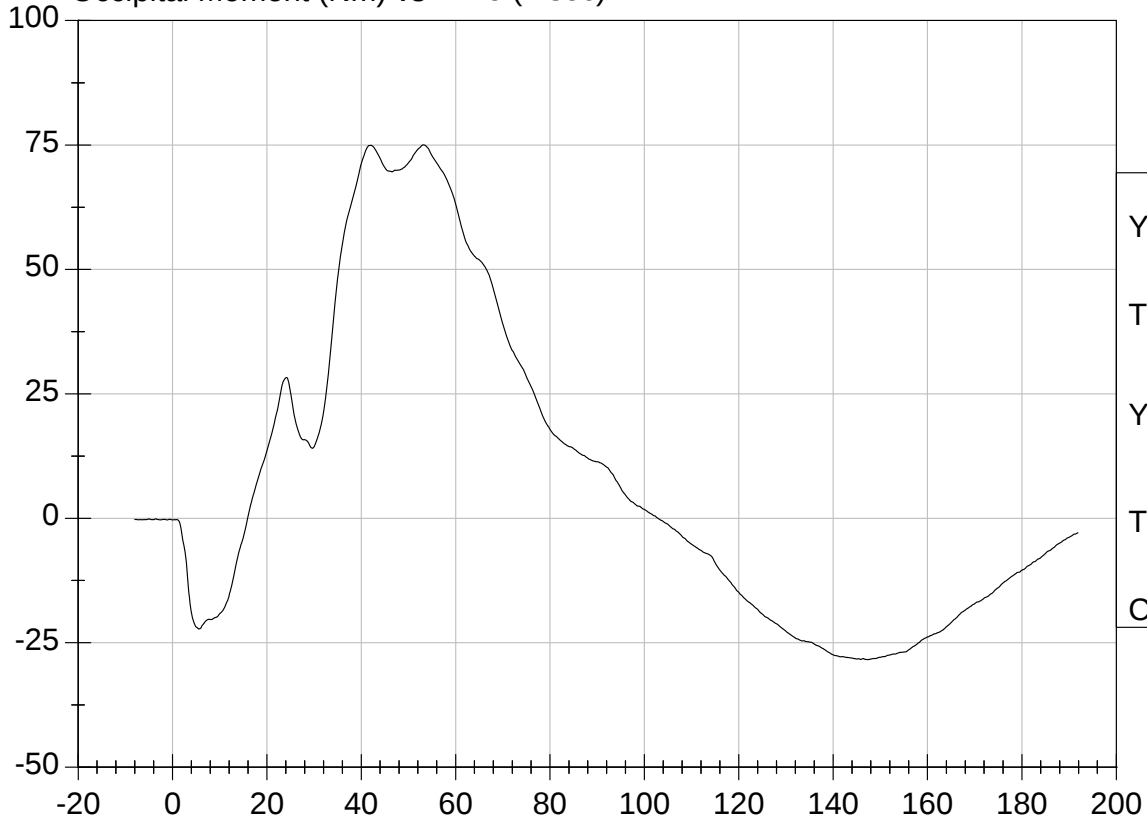
Test Desc: Neck Bending
Component ID: D082349

Test Date: 8/15/08
Speed: 23.14 ft/sec, 7.05 m/sec

Neck Rotation (DEG) vs Time (msec)



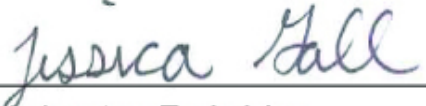
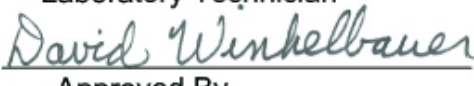
Occipital Moment (Nm) vs Time (msec)



SID 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

8/15/08
 Test Date