

REPORT NUMBER: NCAPSIDE-MGA-2009-003

**NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST**

**CHRYSLER LLC
2009 DODGE AVENGER SXT 4-DOOR SEDAN
NHTSA NUMBER: L90300**

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



Test Date: January 22, 2009

Report Date: March 3, 2009

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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16. <i>Abstract</i> A 55/28 km/h 90° Moving Deformable Barrier NCAP side impact was conducted on the subject 2009 Dodge Avenger 4-Door 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 January 22, 2009. The impact velocity of the Moving Deformable Barrier (MDB) was 62.3 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 265 mm at level 2. 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;">36.8</td> <td style="text-align: center;">69.8</td> </tr> <tr> <td>Left Lower Rib (LLR) Accel., g</td> <td style="text-align: center;">31.3</td> <td style="text-align: center;">73.8</td> </tr> <tr> <td>Lower Spine (T₁₂) Accel., g</td> <td style="text-align: center;">46.7</td> <td style="text-align: center;">68.4</td> </tr> <tr> <td>Thoracic Trauma Index (TTI)</td> <td style="text-align: center;">42</td> <td style="text-align: center;">71</td> </tr> <tr> <td>Pelvis (PEV) Accel., g</td> <td style="text-align: center;">59.4</td> <td style="text-align: center;">73.4</td> </tr> <tr> <td>HIC</td> <td style="text-align: center;">134</td> <td style="text-align: center;">464</td> </tr> </tbody> </table> Driver door became unlatched and opened 14" from door latch to striker. The rear door 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	36.8	69.8	Left Lower Rib (LLR) Accel., g	31.3	73.8	Lower Spine (T ₁₂) Accel., g	46.7	68.4	Thoracic Trauma Index (TTI)	42	71	Pelvis (PEV) Accel., g	59.4	73.4	HIC	134	464
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17. <i>Key Words</i> New Car Assessment Program (NCAP) Side Impact Side Impact Hybrid III Dummy (SID/HIII) Occupant Side Impact Protection		18. <i>Distribution Statement</i> 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 Dodge Avenger 4-Door Sedan manufactured by Chrysler LLC.

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 Dodge Avenger 4-Door Sedan was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 62.3 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 1717.4 kg and the test weight of the MDB was 1361.5 kg. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on January 22, 2009.

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 265 mm at level 2, 1350 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	134	37.8	64.7	42	59.4
Passenger	464	48.3	67.7	71	73.4

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	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:
Right Front Sill Y after 180 msec.
Left Mid A-Post Y after 10 msec.
Vehicle CG Y after 180 msec.

Driver door became unlatched and opened 14" from door latch to striker.

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2009 Dodge Avenger 4-Door Sedan
 Test Program: NCAP Side Impact

NHTSA No. L90300
 Test Date: 1/22/2009

TEST VEHICLE INFORMATION

Make	Dodge
Model	Avenger
Body Style	Sedan
NHTSA No.	L90300
VIN	1B3LC56B29N523158
Color	Brilliant Black Crystal
Delivery Date	1/06/2009
Odometer Reading (mile)	10
Dealer	Miller Motors
Transmission	Automatic Overdrive
Final Drive	Front
Number of Cylinders	4
Engine Displacement (L)	2.4
Engine Placement	Lateral
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	No
Power Steering	Yes
Power Door Locks	Yes
Tilt Wheel	Yes
Anti-lock Brakes	Yes
Traction Control	No
All Wheel Drive	No
Power Seats (driver only)	Yes
Pretensioners	Yes
Load Limiters	Yes
Bucket Seats	Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Chrysler LLC
Date of Manufacture	9-08

GVWR (kg)	1951
GAWR Front (kg)	1180
GAWR Rear (kg)	1007

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench		
Number Of Occupants	2	3		5
Capacity Wt. (VCW) (kg)				392
Cargo Wt. (RCLW) (kg)				52

DATA SHEET NO. 1 (continued)**GENERAL TEST AND VEHICLE PARAMETER DATA**Test Vehicle: 2009 Dodge Avenger 4-Door SedanNHTSA No. L90300Test Program: NCAP Side ImpactTest Date: 1/22/2009**TEST VEHICLE WEIGHTS**

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	465.0	303.1		527.1	383.3	
Right	kg	301.3	439.6		445.0	362.0	
Ratio	%	50.8	49.2		56.6	43.4	
Totals	kg	766.3	742.7	1509.0	972.1	745.3	1717.4

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1509.0
Weight of 2 P572M ATDs	kg	161.5
Rated Cargo/Luggage Weight (RCLW)	kg	52
Calculated Vehicle Target Weight (TVTW)	kg	1722.5

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

Weight of Ballast (kg): 0**TEST VEHICLE ATTITUDES AND CG**

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	741	745	733	738	1365
As Tested	mm	729	741	704	712	1204
Fully Loaded	mm	695	740	693	708	

TEST VEHICLE VERTICAL IMPACT LINE DATA

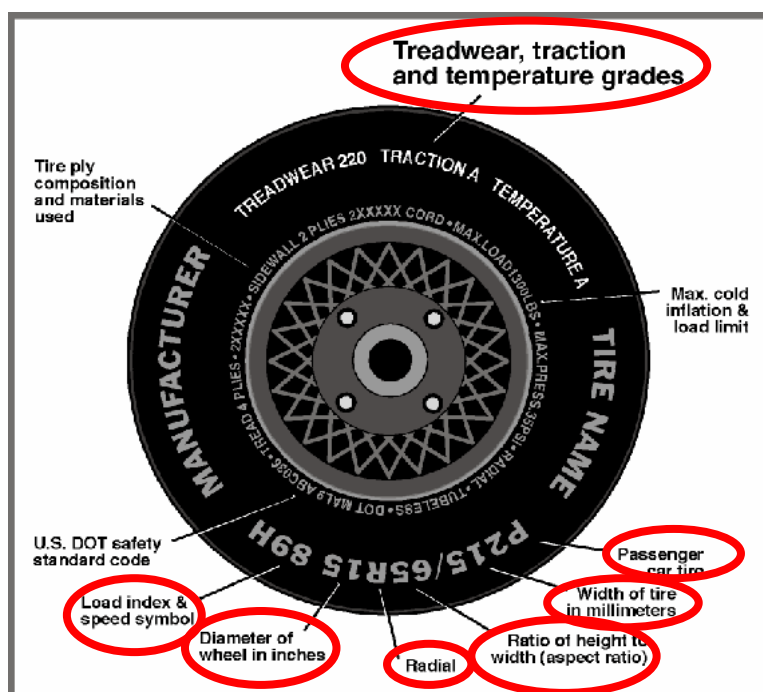
Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2774
Target Impact Point Aft of Front Axle	mm	447
Actual Impact Point Aft of Front Axle	mm	441

DATA SHEET NO. 2

TEST VEHICLE TIRE INFORMATION

Test Vehicle: 2009 Dodge Avenger 4-Door Sedan
 Test Program: NCAP Side Impact

NHTSA No. L90300
 Test Date: 1/22/2009



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Test Pressure (kPa)	220	220
Recommended Tire Size	P215/60R17	P215/60R17
Tire Size on Vehicle	P215/60R17	P215/60R17
Tire Manufacturer	Bridgestone	Bridgestone
Tire Name	Turanza	Turanza
Tire Type	Passenger	Passenger
Tire Width (mm)	215	215
Ratio of Height to Width (aspect ratio)	60	60
Radial	R	R
Wheel Diameter	17	17
Load Index & Speed Symbol	95T	95T
Treadwear	400	400
Traction Grade	B	B
Temperature Grade	B	B

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

Test Vehicle: 2009 Dodge Avenger 4-Door Sedan
 Test Program: NCAP Side Impact

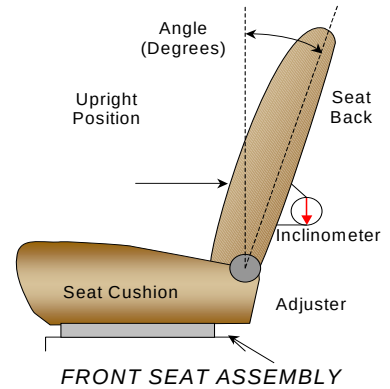
NHTSA No. L90300
 Test Date: 1/22/2009

NORMAL DESIGN RIDING POSITION

The driver seat back is positioned to the manufacturer's designated angle. The procedure is as follows: Set seat back angle to 22 degrees (This is 12.7 degrees from vertical as measured on the headrest posts.)

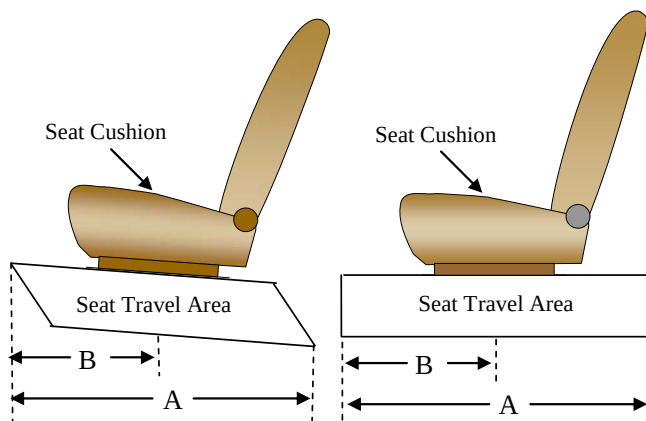
Driver seat back angle: 12.7 degrees (headrest post)

Passenger seat back angle: Fixed



SEAT FORE/AFT POSITIONS

	Total Fore/Aft Travel	Placed in position #
Driver Seat	285 mm	142 mm
Rear Seat	Fixed	Fixed



DATA SHEET NO. 3 (CONTINUED)

TEST VEHICLE INFORMATION

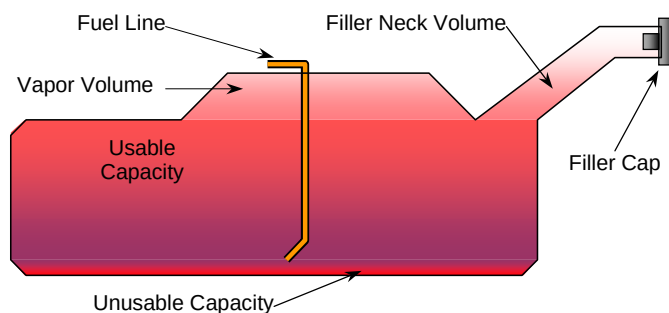
Test Vehicle: 2009 Dodge Avenger 4-Door Sedan
Test Program: NCAP Side Impact

NHTSA No. L90300
Test Date: 1/22/2009

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	64.0
Usable Capacity of "Optional" Tank	
92-94% of Usable Capacity	58.9 to 60.2
Actual Amount of Solvent used	59.2
1/3 of Usable Capacity	21.3

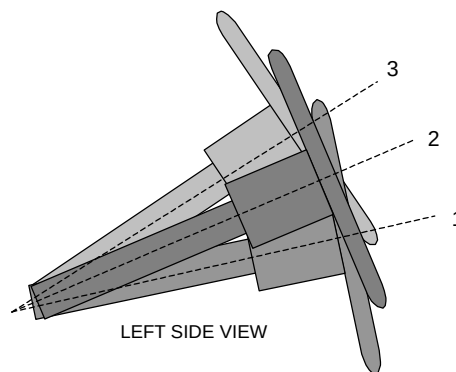
The test vehicle is equipped with an electric fuel pump. Fuel pump is operational with ignition key on and engine running. Engine stall will disable fuel pump.



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	165	68.7
Geometric center position No. 2	188	71.6
Uppermost position No. 3	211	74.4

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

Test Vehicle: 2009 Dodge Avenger 4-Door Sedan
 Test Program: NCAP Side Impact

NHTSA No. L90300
 Test Date: 1/22/2009

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	62.3
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.4
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	89.9

POST TEST OBSERVATIONS
MDB LEFT EDGE IMPACT POINT DATA

Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 50	6 forward
Vertical Offset	mm	+/-20	1 down

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

Test Vehicle: 2009 Dodge Avenger 4-Door Sedan
 Test Program: NCAP Side Impact

NHTSA No. L90300
 Test Date: 1/22/2009

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, Headliner
Upper Torso Contact	Side Airbag	Door Panel
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; Non-struck side doors were locked	Struck side doors were locked; Non-struck side doors were locked
Left Side Door Opening	Driver Door opened upon impact	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	None
Other Notable Effects	None

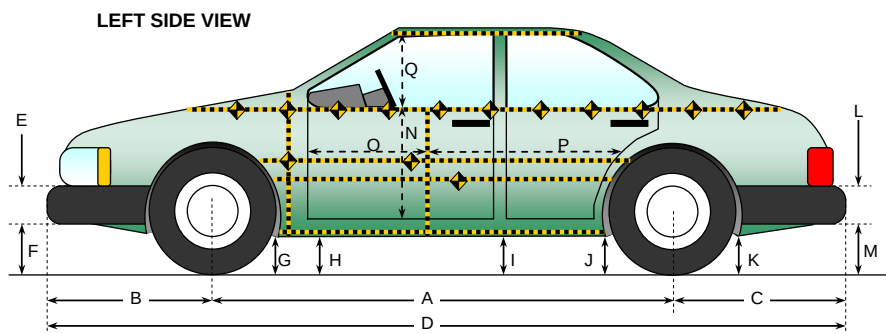
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

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

Test Vehicle: 2009 Dodge Avenger 4-Door Sedan
 Test Program: NCAP Side Impact

NHTSA No. L90300
 Test Date: 1/22/2009



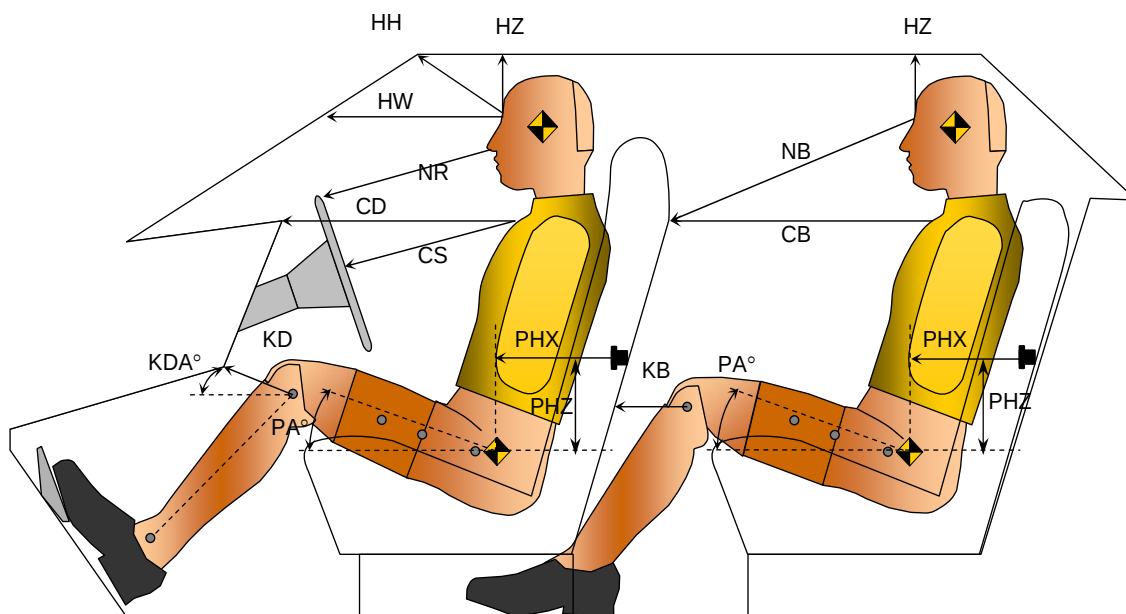
All Measurements in mm

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2774	2761	13
B	Front Axle to FSOV	1011	1019	-8
C	Rear Axle to RSOV	1065	1054	11
D	Total Length at Centerline	4851	4835	16
E	Front Bumper Thickness	154	154	0
F	Front Bumper Bottom to Ground	233	242	-9
G	Sill Height at Front Wheel Well	152	158	-6
H	Sill Height at Front Door Leading Edge	155	160	-5
I	Sill Height at "B" Pillar	153	146	7
J1	Sill Height at Rear Wheel Well	141	151	-10
J2	Pinch Weld Height at Rear Wheel Well	143	133	10
K	Sill Height Aft of Rear Wheel Well	211	197	14
L	Rear Bumper Thickness	200	200	0
M	Rear Bumper Bottom to Ground	295	322	-27
N	Sill Height to Window Bottom Sill	725	639	86
O	Front Door Leading Edge to Impact CL	806	737	69
P	Rear Door Trailing Edge to Impact CL	1284	1125	159
Q	Front Window Opening	393	390	3
R	Right Side Length	3894	3898	-4
S	Left Side Length	3894	3861	33
T	Vehicle Width at "B" Post	1823	1635	188

DATA SHEET NO. 7
SID/HII LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2009 Dodge Avenger 4-Door Sedan
 Test Program: NCAP Side Impact

NHTSA No. L90300
 Test Date: 1/22/2009

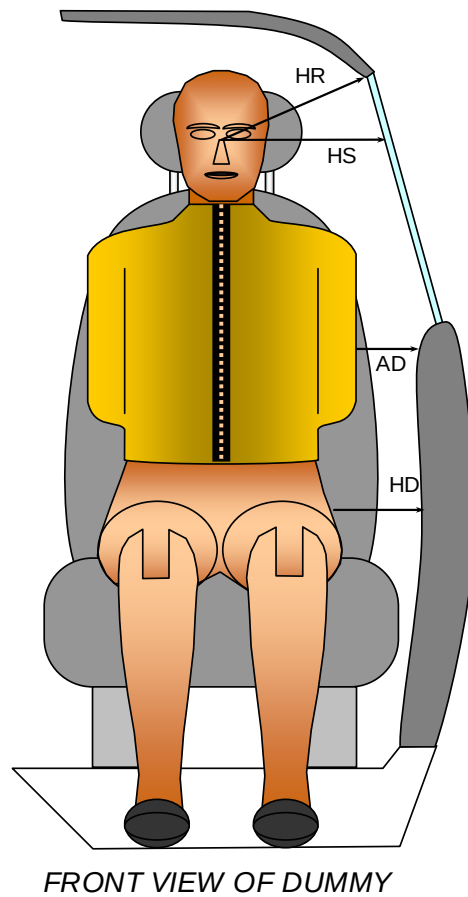


Driver Code	Pass. Code	Measurement Description	Driver S/N 271		Passenger S/N 272	
			Length(mm)	Angle(°)	Length(mm)	Angle(°)
HH		Head to Header	462			
HW		Head to Windshield	704			
HZ	HZ	Head to Roof	198		156	
NR	NB	Nose to Rim/Nose to Seatback	427		605	
CD	CB	Chest to Dash or Seatback	547		537	
CS		Chest to Steering Wheel	353			
KDL	KBL	Left Knee to Dash or Seatback	181	23.0	217	20.6
KDR	KBR	Right Knee to Dash or Seatback	173	25.3	213	21.3
PA	PA	Pelvic Angle		23.9		23.7
PHX	PHX	H-Point to Striker (X-Axis)	192		179	
PHZ	PHZ	H-Point to Striker (Z-Axis)	196		283	

DATA SHEET NO. 8
SID/HIII LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2009 Dodge Avenger 4-Door Sedan
 Test Program: NCAP Side Impact

NHTSA No. L90300
 Test Date: 1/22/2009

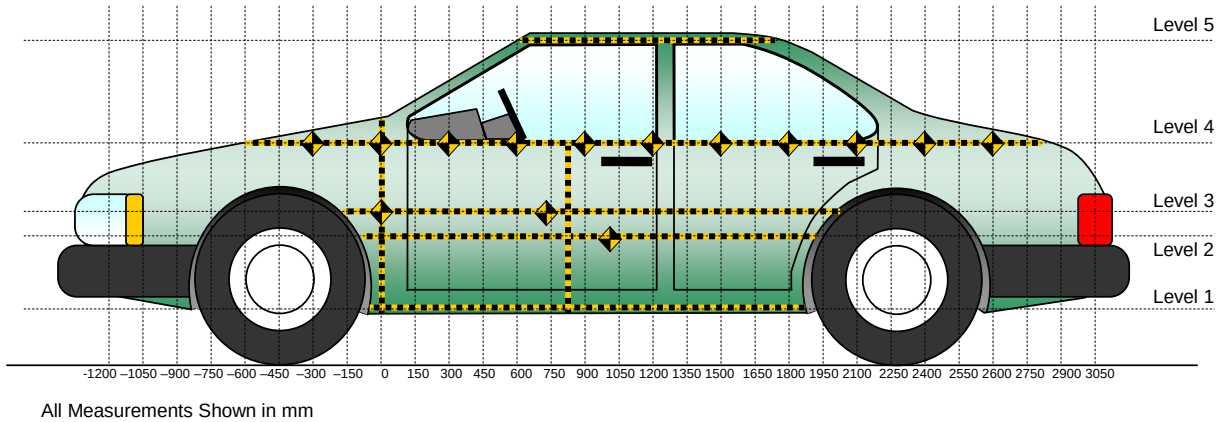


Code	Measurement Description	Units	Driver S/N 271	Passenger S/N 272
HR	Head to Side Header	mm	180	213
HS	Head to Side Window	mm	312	217
AD	Arm to Door	mm	97	141
HD	H-Point to Door	mm	145	190

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

Test Vehicle: 2009 Dodge Avenger 4-Door Sedan
 Test Program: NCAP Side Impact

NHTSA No. L90300
 Test Date: 1/22/2009



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	60	1350	1394
4	Window Sill	132	1200	962
3	Mid Door	252	1650	636
2	Occupant H-Point	265	1350	475
1	Sill Top	112	1200	249
	Maximum Penetration	265		

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2009 Dodge Avenger 4-Door Sedan
 Test Program: NCAP Side Impact

NHTSA No. L90300
 Test Date: 1/22/2009

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900				302					300					-2	
-750				286					292					6	
-600				274					285					11	
-450				262					279					17	
-300				255					283					28	
-150			181	251				197	290				16	39	
0	223	189	195	249		233	248	242	278		10	59	47	29	
150	243	195	192	250		305	382	339	312		62	187	147	62	
300	240	195	190	255		306	416	398	304		66	221	208	49	
450	237	195	190	254		307	416	403	304		70	221	213	50	
600	237	194	190	256	484	313	404	390	302	497	76	210	200	46	13
750	237	194	189	258	475	317	383	374	302	494	80	189	185	44	19
900	240	194	189	254	476	322	369	362	300	502	82	175	173	46	26
1050	241	195	189	258	478	332	370	362	302	512	91	175	173	44	34
1200	242	197	191	258	476	354	447	398	390	521	112	250	207	132	45
1350	245	200	194	263	474	357	465	427	386	534	112	265	233	123	60
1500	250	202	196	267	471	334	460	445	362	522	84	258	249	95	51
1650	255	206	200	271	470	311	445	452	341	508	56	239	252	70	38
1800	245	210	205	271	472	275	408	420	308	496	30	198	215	37	24
1950		182	200	269	478		304	342	255	491		122	142	-14	13
2100			177	276	488			200	225	501			23	-51	13
2250				284	494				300	507				16	13
2400				293					304					11	
2550				302					314					12	
2700				317					324					7	
2850				335					340					5	
3000				355					356					1	

Reference plane is parallel to test vehicle longitudinal centerline.

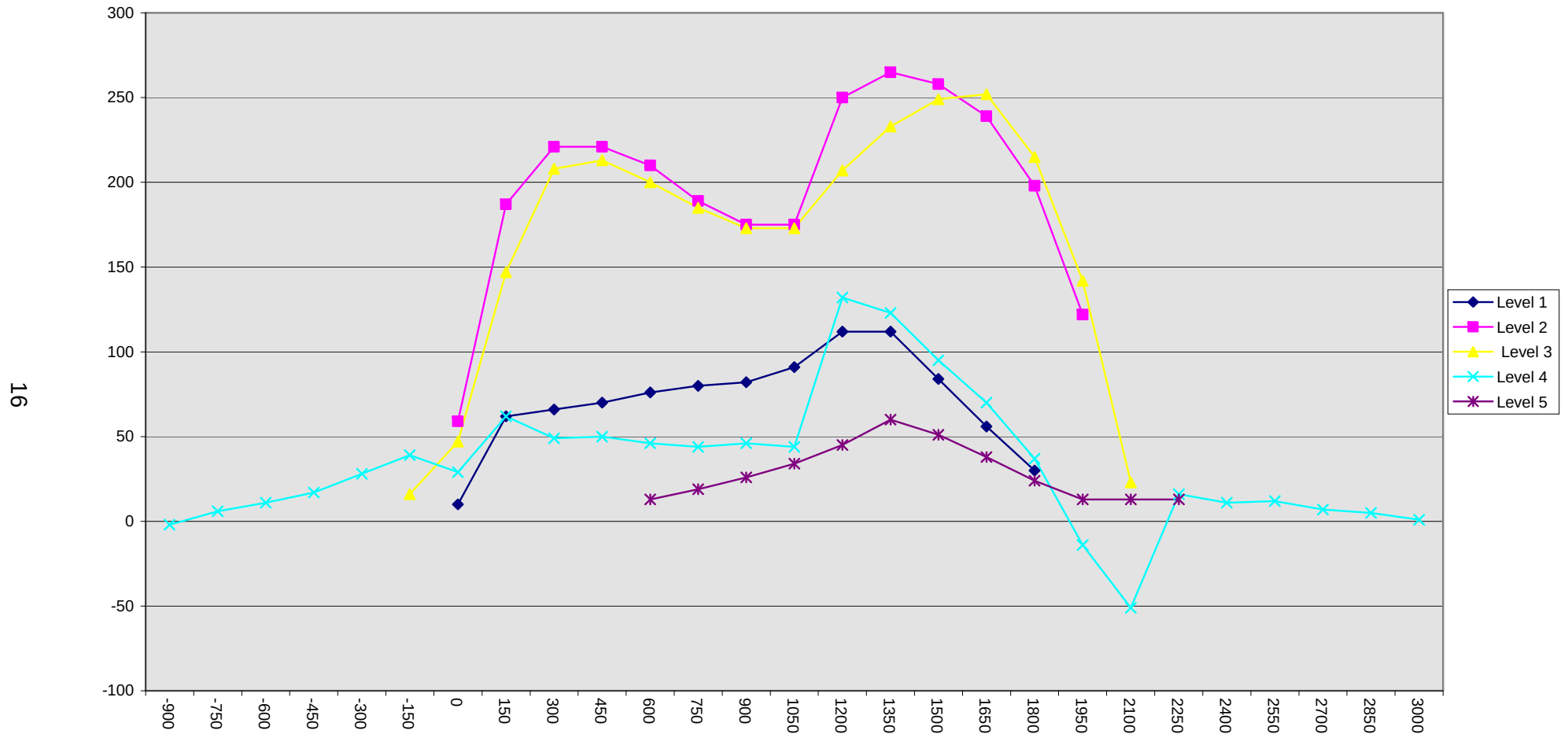
Given dimensions = Reference plane to car body

DATA SHEET NO. 10... (continued)

VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2009 Dodge Avenger 4-Door Sedan
Test Program: NCAP Side Impact

NHTSA No. L90300
Test Date: 1/22/2009

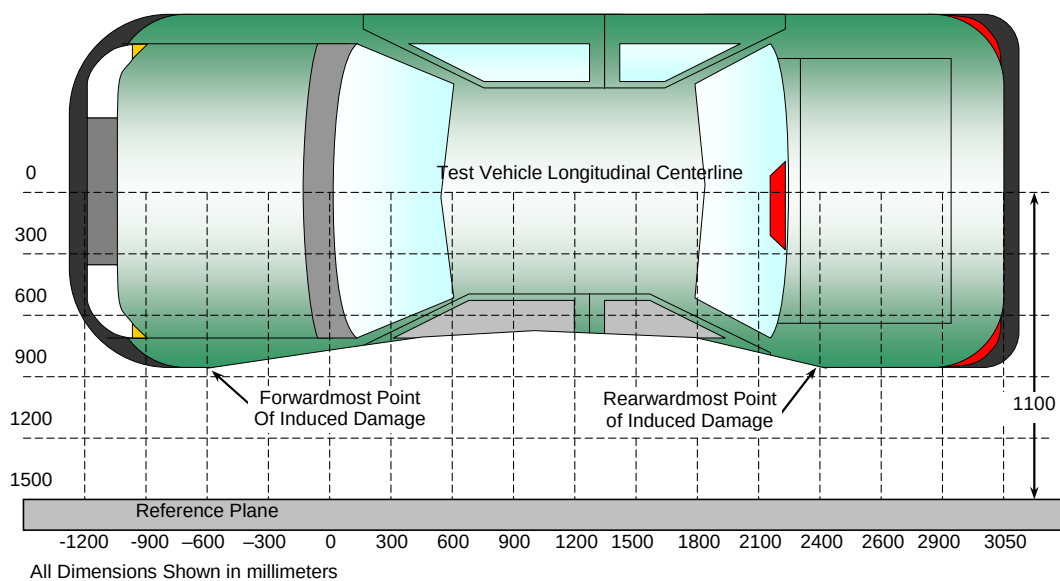


Measurements were taken with the driver door held in the closed position.

DATA SHEET NO. 11
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2009 Dodge Avenger 4-Door Sedan
 Test Program: NCAP Side Impact

NHTSA No. L90300
 Test Date: 1/22/2009



TOP VIEW

DAMAGE PROFILE DISTANCES

DPD	Distance from Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max Static Crush (mm)
1	3000	4	355	356	1
2	2208	4	280	298	18
3	1442	2	200	466	266
4	648	2	194	400	206
5	-117	4	250	283	33
6	-900	4	302	300	-2

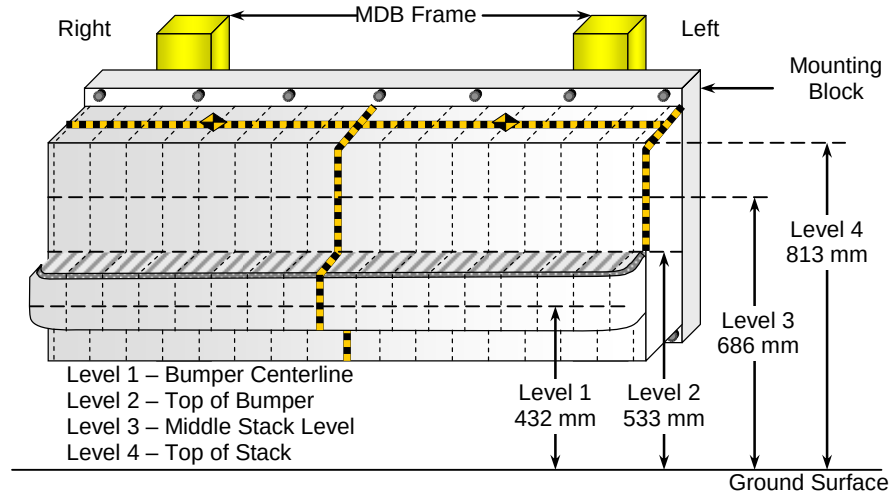
Reference plane is parallel to test vehicle longitudinal centerline.
 Given dimensions = Reference plane to car body.

DATA SHEET NO. 12

DEFORMABLE BARRIER HONEYCOMB FACE STATIC CRUSH

Test Vehicle: 2009 Dodge Avenger 4-Door Sedan
 Test Program: NCAP Side Impact

NHTSA No. L90300
 Test Date: 1/22/2009



DEFORMABLE BARRIER STATIC CRUSH

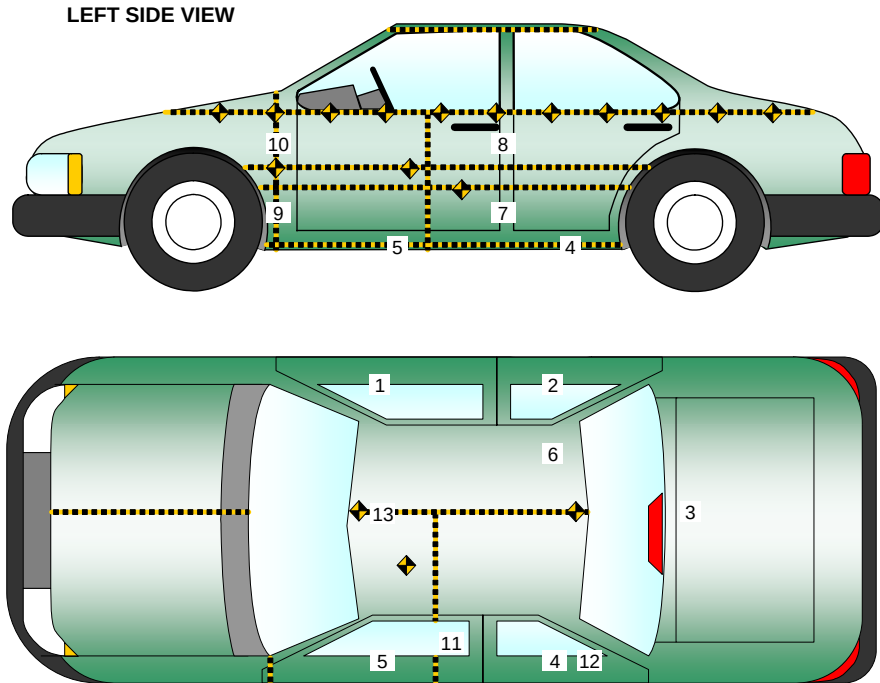
Stack Level	Distance Right of Center								C _L	Distance Left of Center							
	800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
1	194	182	163	156	152	151	147	146	143	137	142	141	141	141	146	156	174
2	96	80	77	76	75	64	64	70	76	80	84	85	88	91	96	103	111
3	39	23	23	30	40	56	69	55	33	25	22	25	30	39	50	74	135
4	68	43	27	28	43	69	90	60	55	56	55	66	76	89	96	105	139

All Dimensions in mm

DATA SHEET NO. 13
VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2009 Dodge Avenger 4-Door Sedan
 Test Program: NCAP Side Impact

NHTSA No. L90300
 Test Date: 1/22/2009



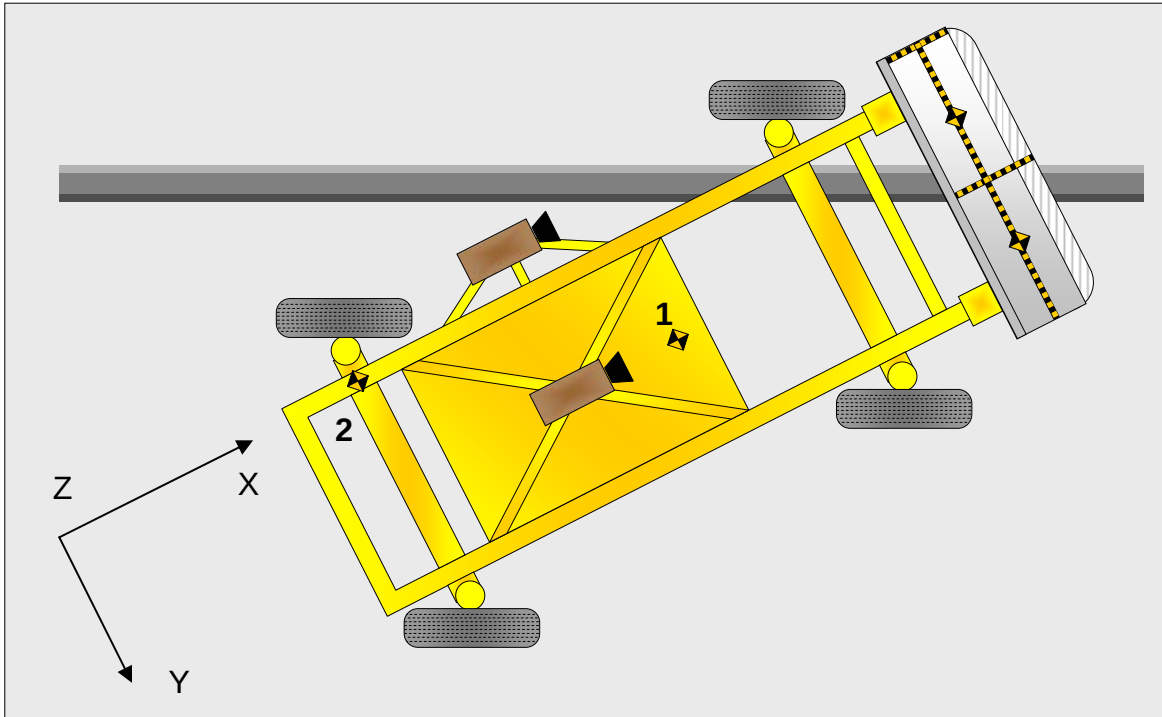
Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Right Sill at Front Seat	2747	750	-202
2	Right Sill at Rear Seat	1690	757	-210
3	Rear Floorpan Above Axle	937	0	-537
4	Left Sill at Rear Door	1780	-757	-196
5	Left Sill at Front Door	2738	-750	-202
6	Rear Occupant Compartment	1882	-333	-365
7	Left Lower B-Post	2128	-753	-414
8	Left Middle B-Post	2154	-718	-726
9	Left Lower A-Post	3209	-663	-410
10	Left Middle A-Post	3227	-791	-803
11	Front Seat Track	2301	-560	-668
12	Rear Seat Track or Structure			
13	Vehicle CG	2529	0	-367

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 Dodge Avenger 4-Door Sedan
 Test Program: NCAP Side Impact

NHTSA No. L90300
 Test Date: 1/22/2009



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: 2009 Dodge Avenger 4-Door Sedan
Test Program: NCAP Side Impact

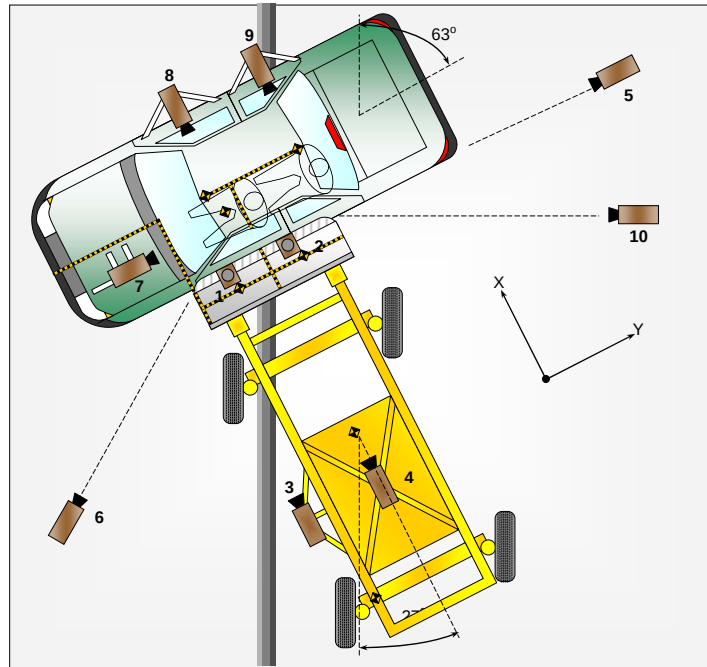
NHTSA No. L90300
Test Date: 1/22/2009

	Elements	Pre-Test (mm)
1	Total Length	4851
2	Total Width	1823
3	Bumper Top Height	558
4	Bumper Bottom Height	402
5	Longitudinal Member Top Height	596
6	Distance between Longitudinal Members	1045
7	Longitudinal Member Width	63
8	Engine Top Height	885
9	Engine Bottom Height	226
10	Engine and gearbox width	675
11	Front bumper-engine distance	534
12	Front shock absorber fixing height	902
13	Bonnet leading edge height	824
14	Front shock absorber fixing width	1124
15	Front bumper – front axle distance	1011
16	Front axle – a pillar distance	477
17	A-pillar – B-pillar distance	1120
18	B-Pillar – rear axle distance	1174
19	B-pillar – C-pillar distance	973
20	Roof sill bottom height	1258
21	Roof sill top height	1426
22	Floor sill bottom height	208
23	Floor sill top height	378

DATA SHEET NO. 16
HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2009 Dodge Avenger 4-Door Sedan
 Test Program: NCAP Side Impact

NHTSA No. L90300
 Test Date: 1/22/2009



No.	Camera View	Location (mm)			Lens (mm)	Film Speed (fps)
		X	Y	Z		
1	Overhead Close-up	-525	-205	-5080	50	1000
2	Overhead Overall	145	1390	-5055	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	25	6675	-1160	24	1000
6	Left Side, Ground Level, Overall	-3350	-4860	-1100	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 Dodge Avenger 4-Door Sedan
 Test Program: NCAP Side Impact

NHTSA No. L90300
 Test Date: 1/22/2009

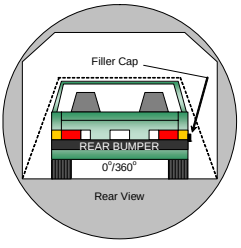
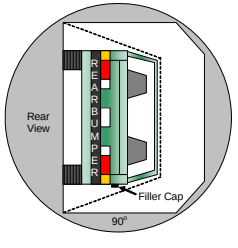
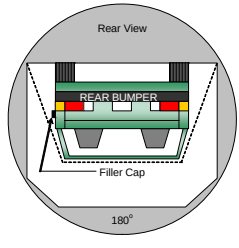
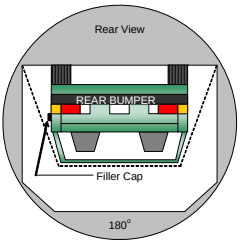
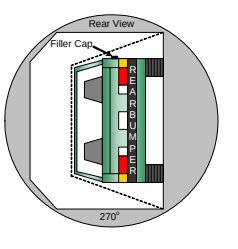
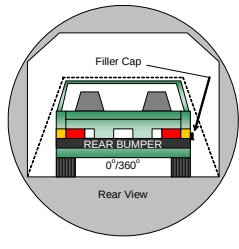
FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 21° C Test Time: 9:56 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°	118	300	First 5	0
90° to 180°	117	300	First 5	0
180° to 270°	116	300	First 5	0
270° to 360°	118	300	First 5	0

APPENDIX A
PHOTOGRAPHS

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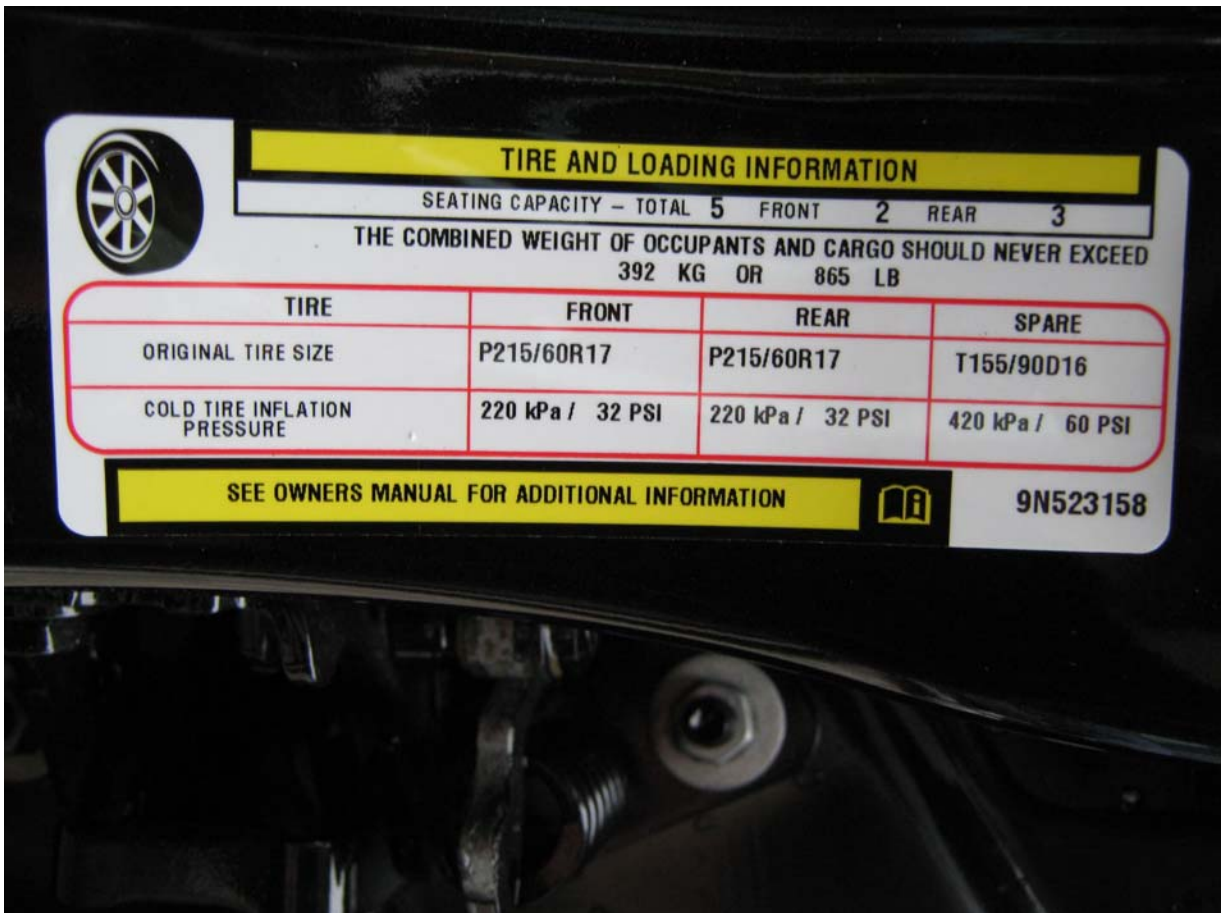
Left Front $\frac{3}{4}$ View, As Received



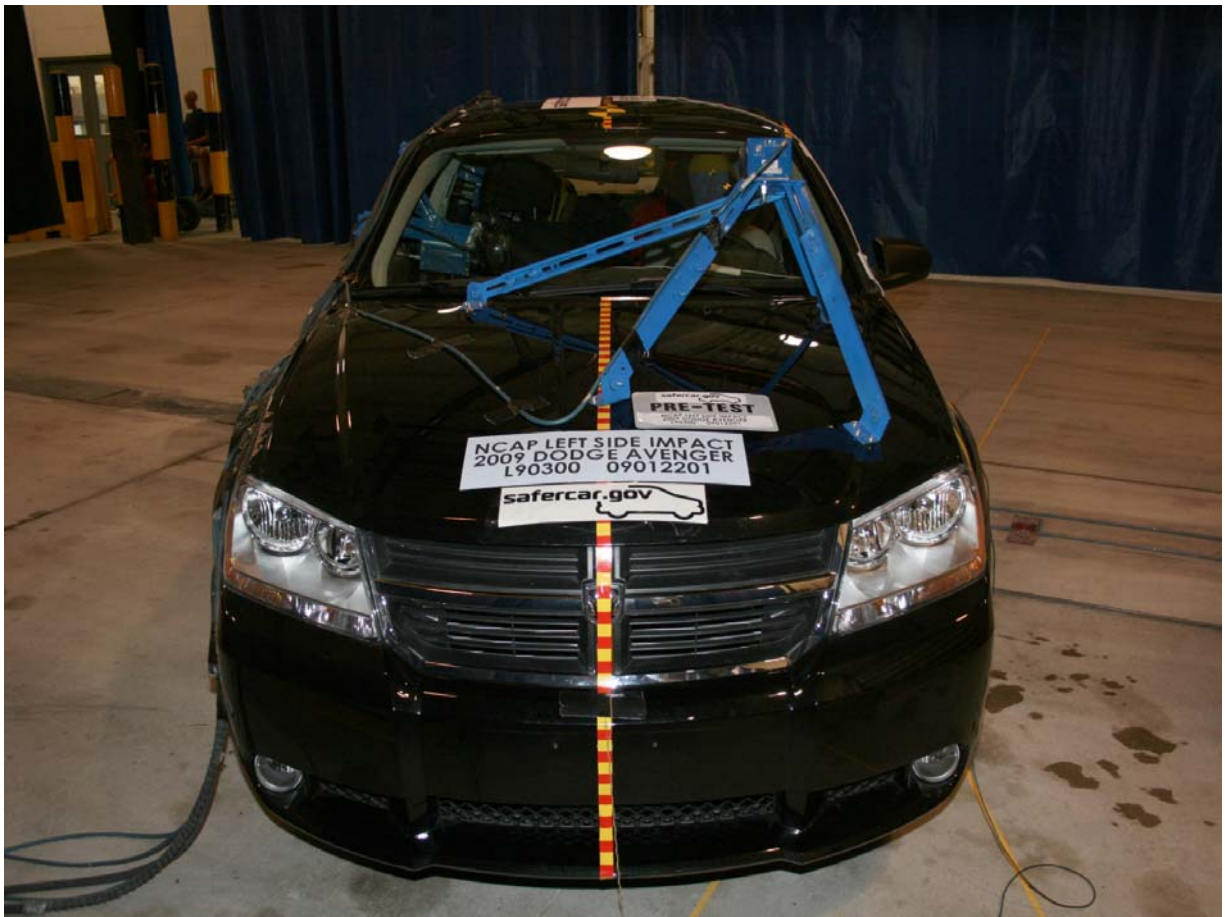
Right Rear $\frac{3}{4}$ View, As Received



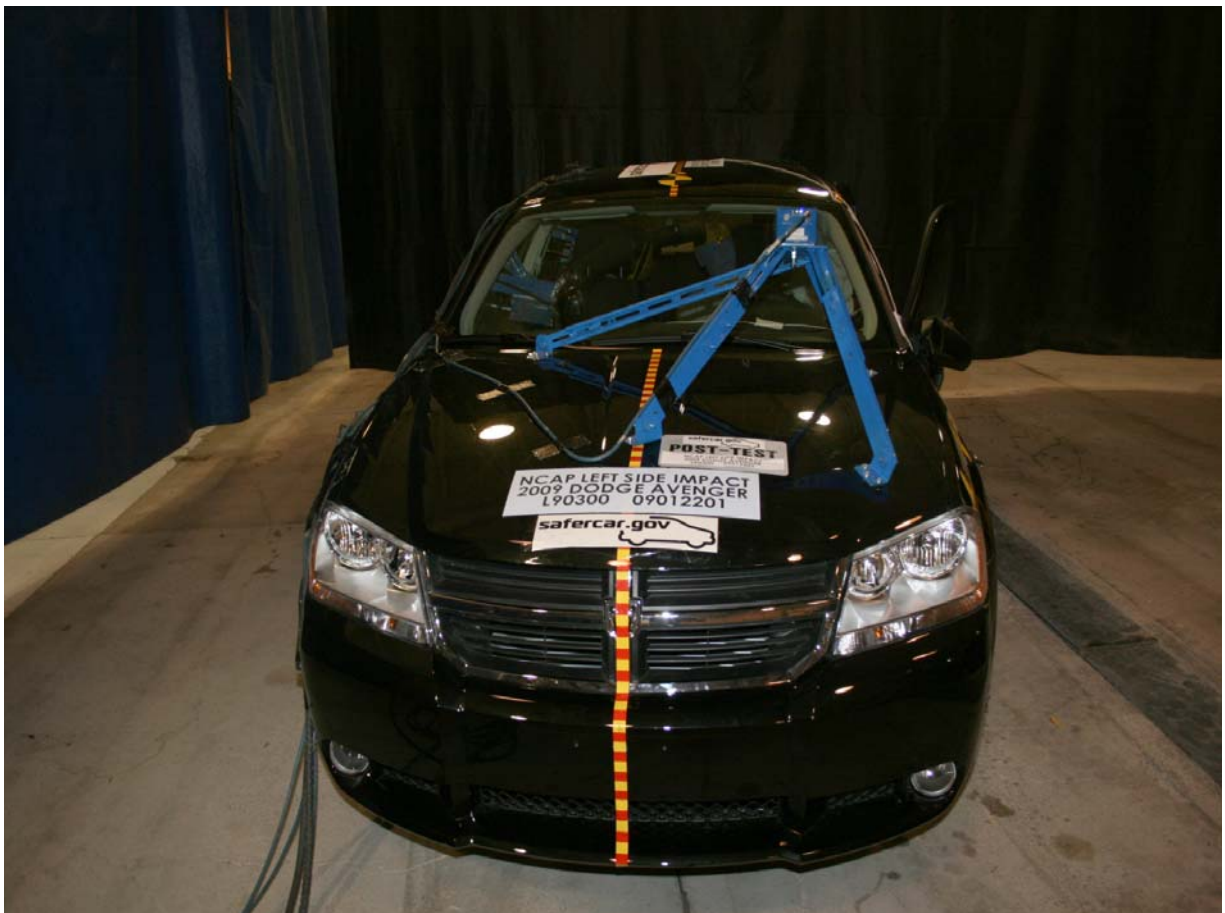
Manufacturer's Label



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



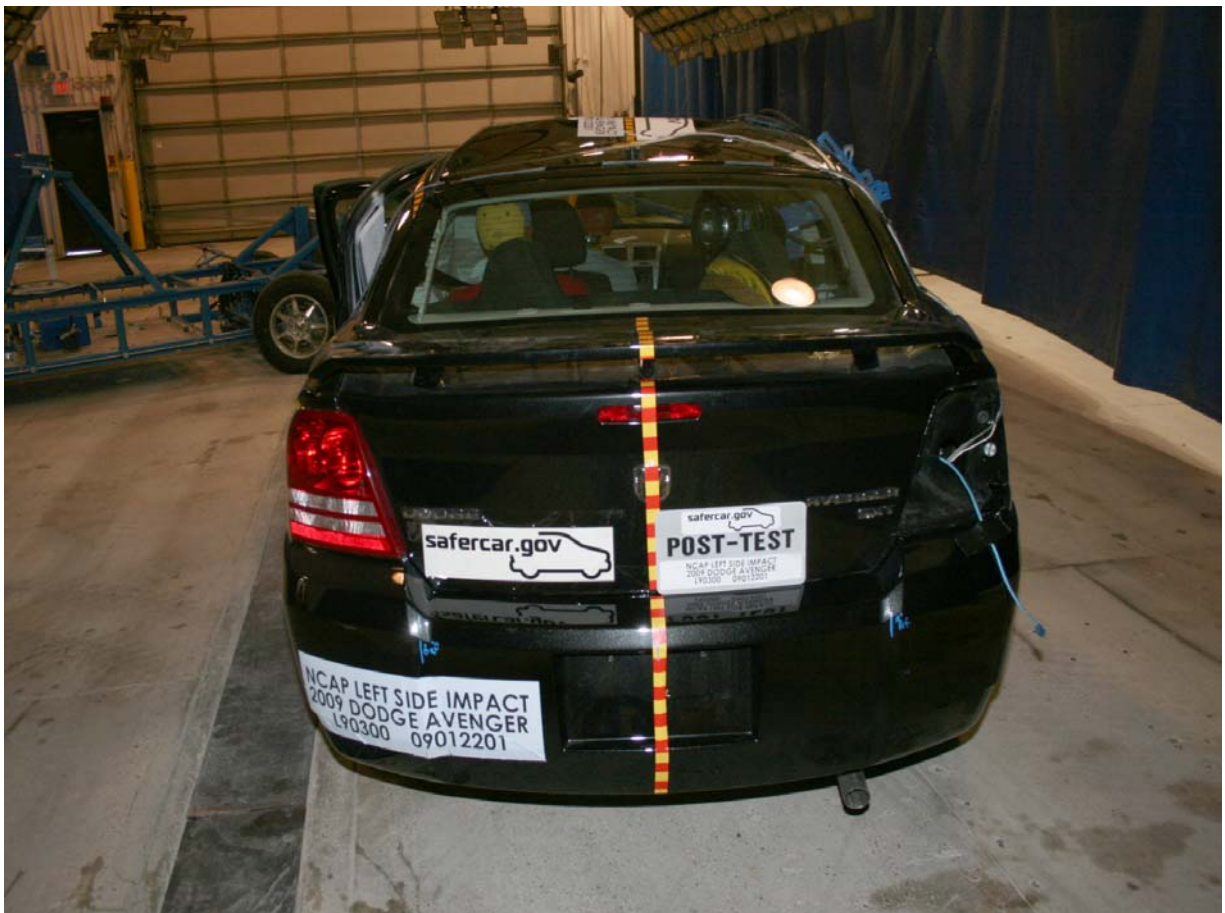
Pre-Test Left Rear $\frac{3}{4}$ View



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



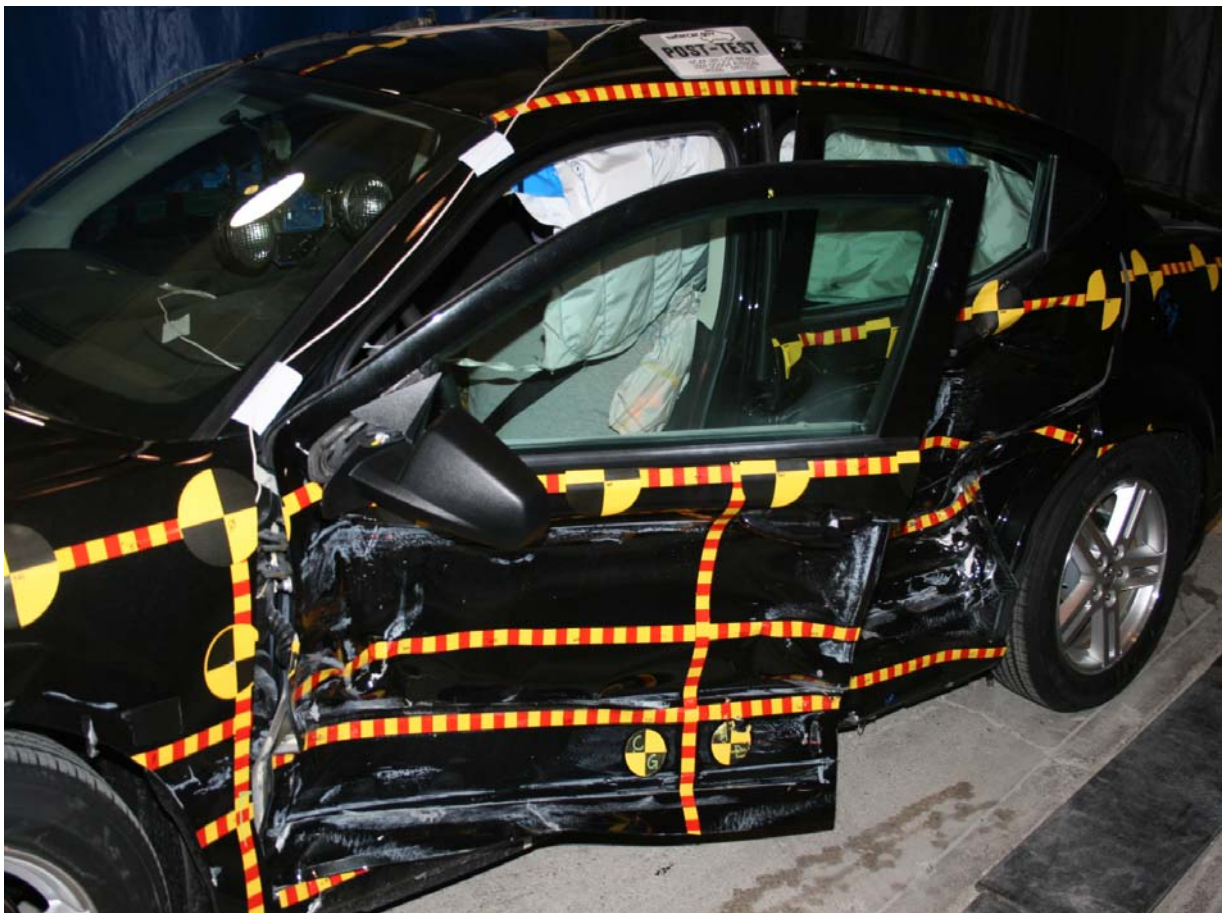
Pre-Test Left Impact Point



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



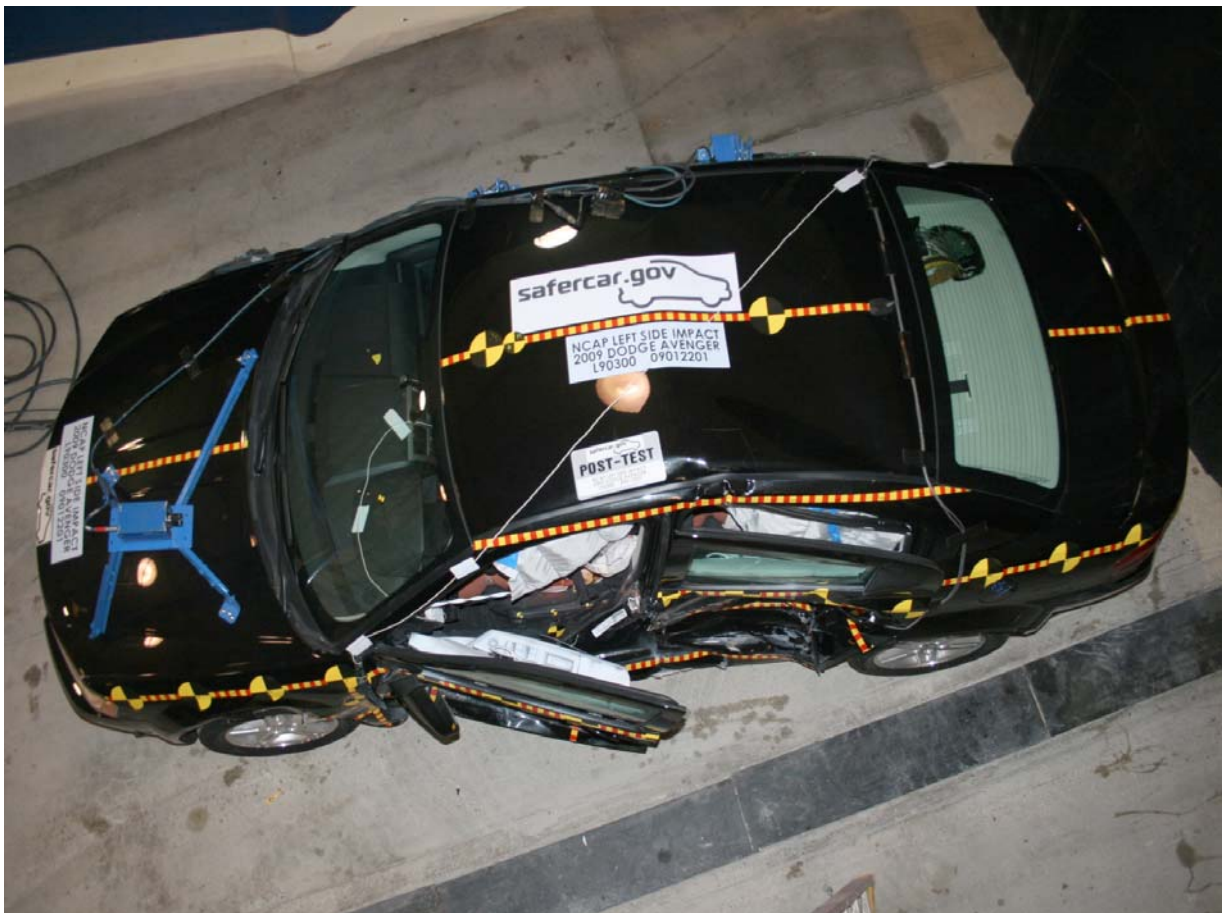
Pre-Test Left Side Impact Close-up



Post-Test Left Side Impact Close-up



Pre-Test Overhead View



Post-Test Overhead View



Pre-Test Overhead Close-up View



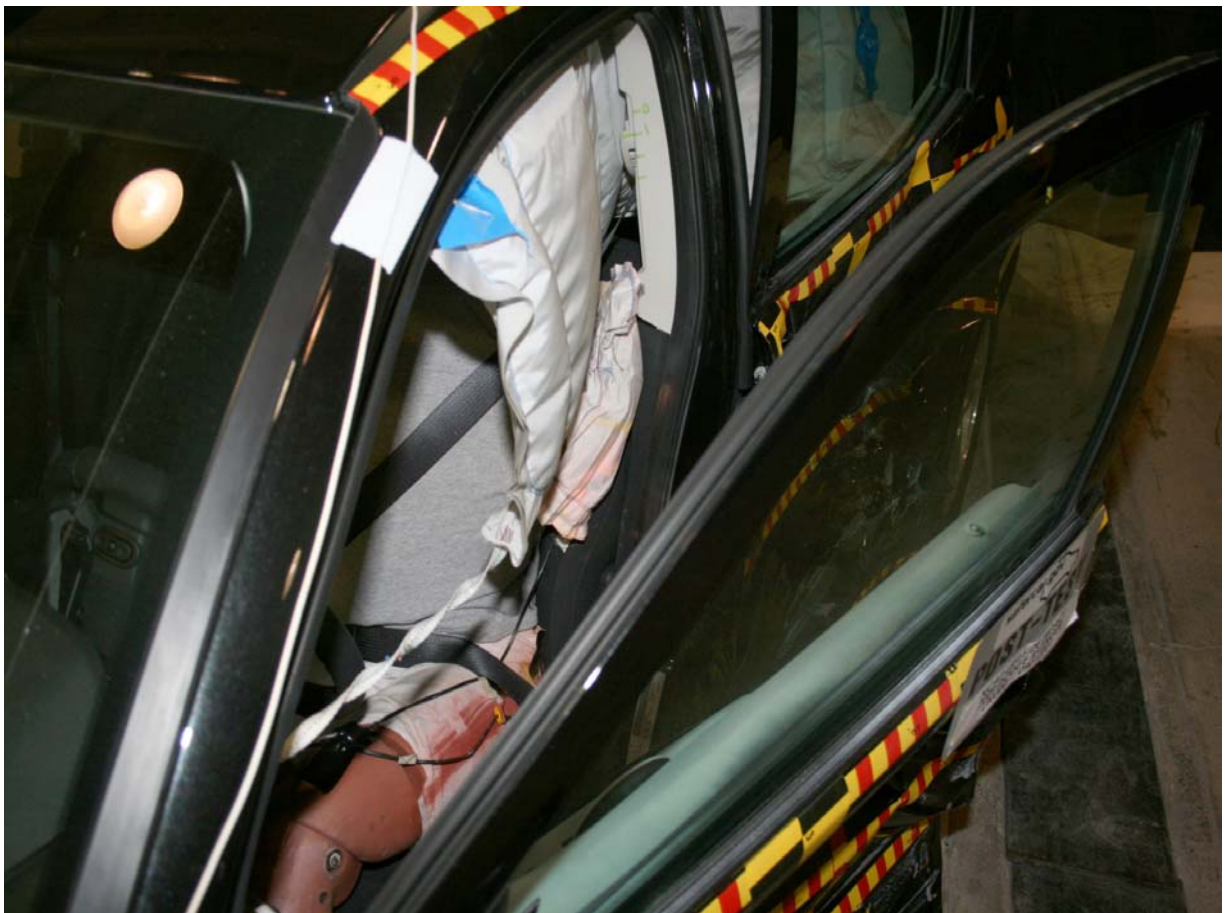
Post-Test Overhead Close-up View



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



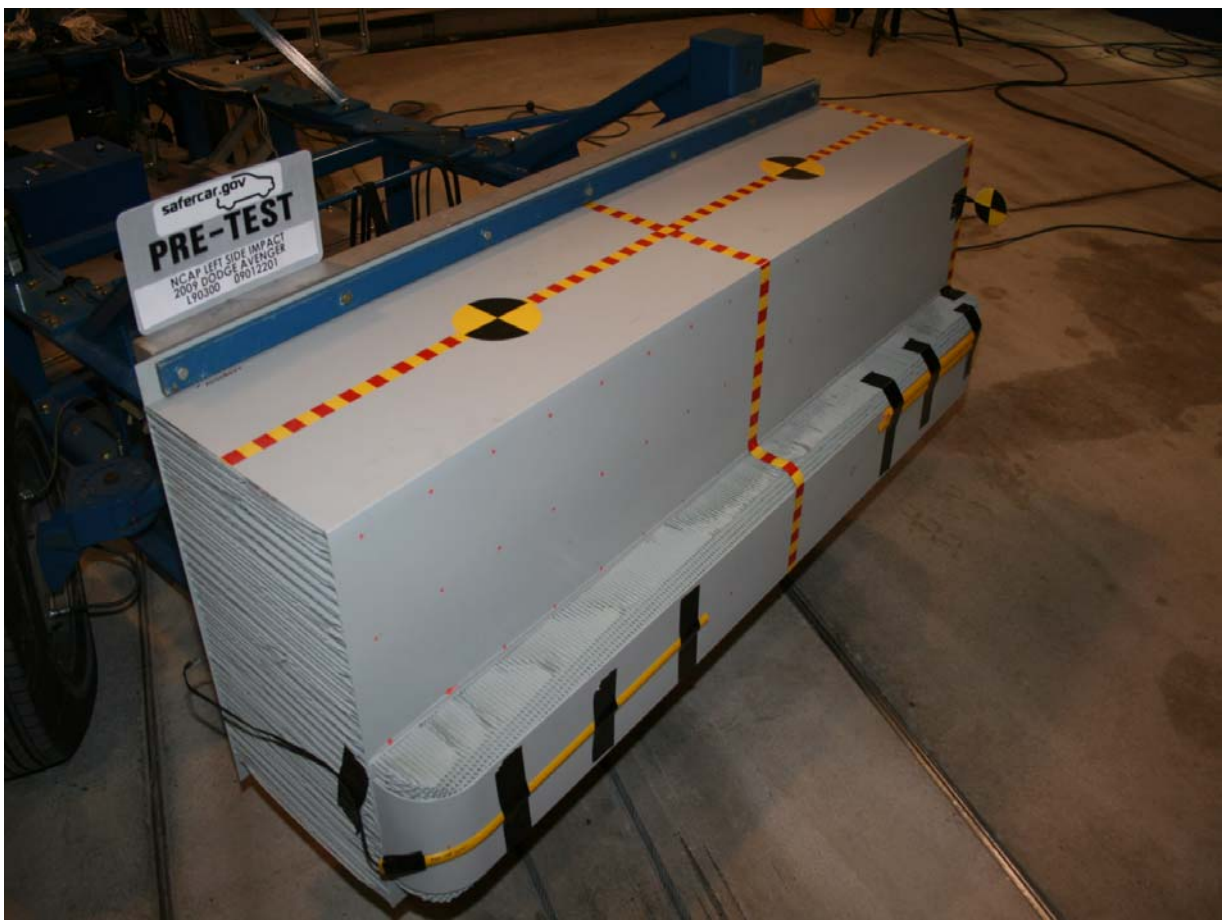
Post-Test Front View of Deformable Barrier



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



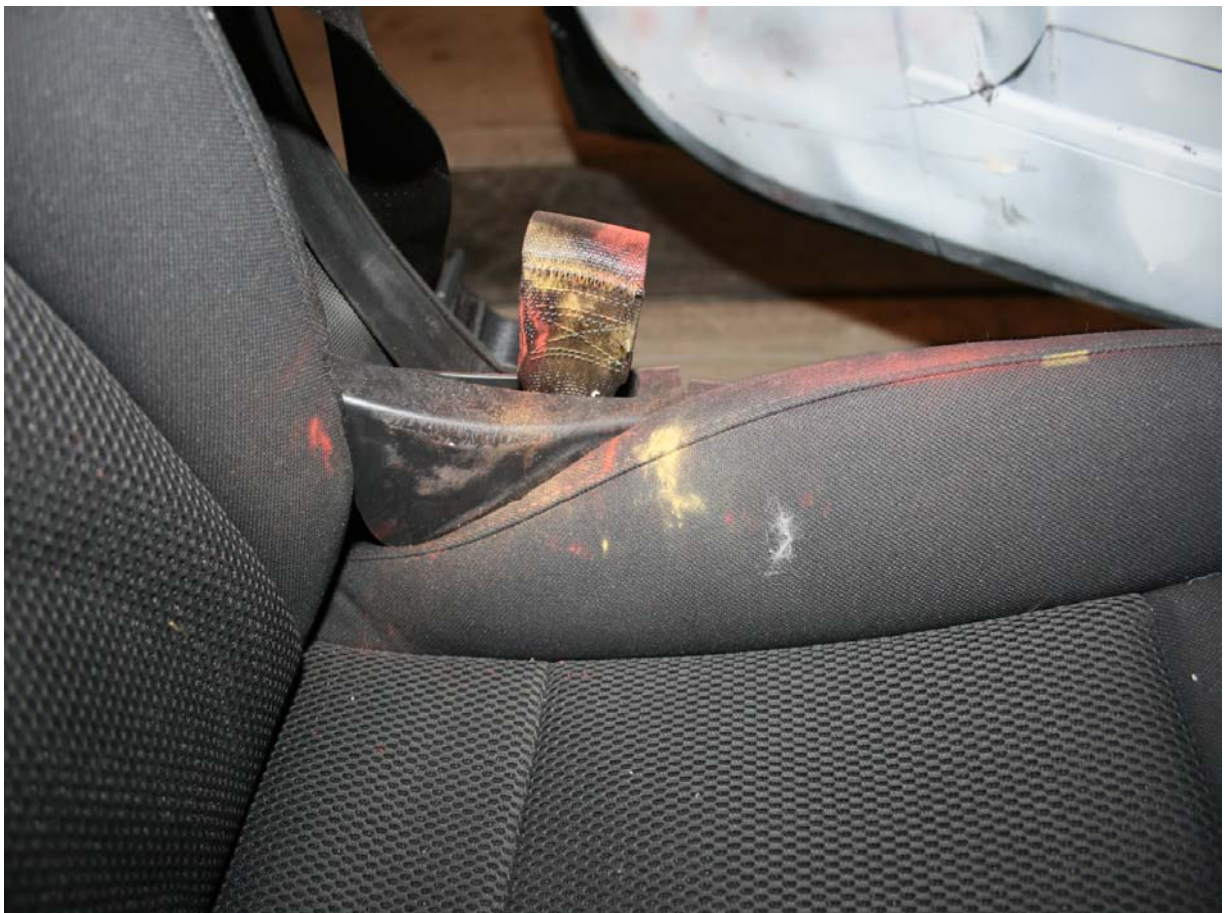
Post-Test Driver Dummy Head Contact View 1



Post-Test Driver Dummy Head Contact View 2



Post-Test Driver Dummy Upper Torso Contact



Post-Test Driver Dummy Lower Torso Contact



Post-Test Driver Dummy Contact



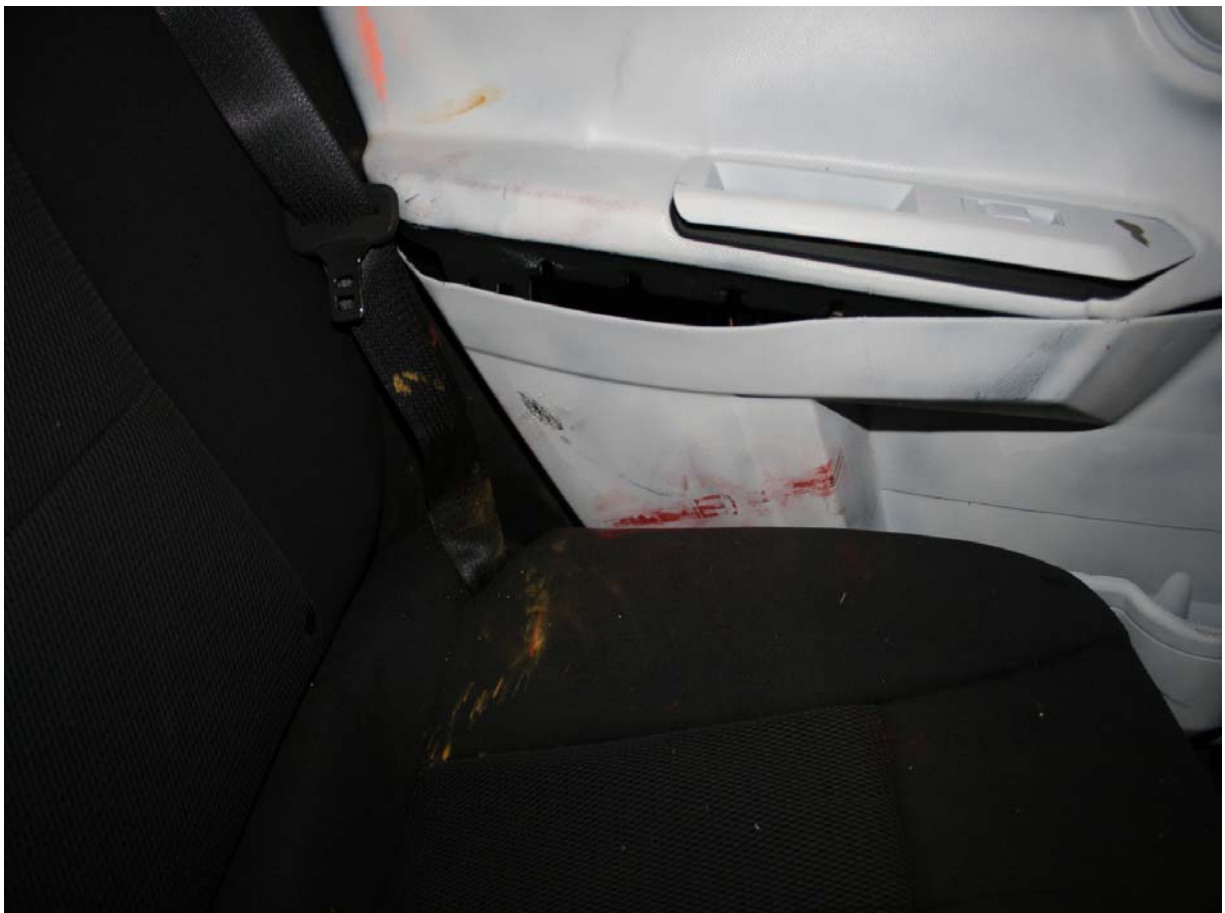
Post-Test Passenger Dummy Head Contact View 1



Post-Test Passenger Dummy Head Contact View 2



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

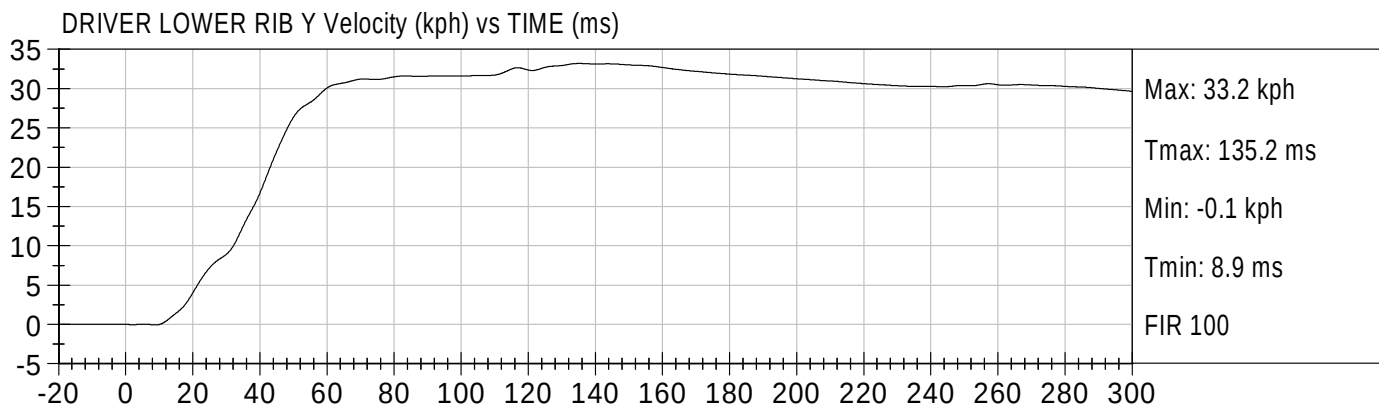
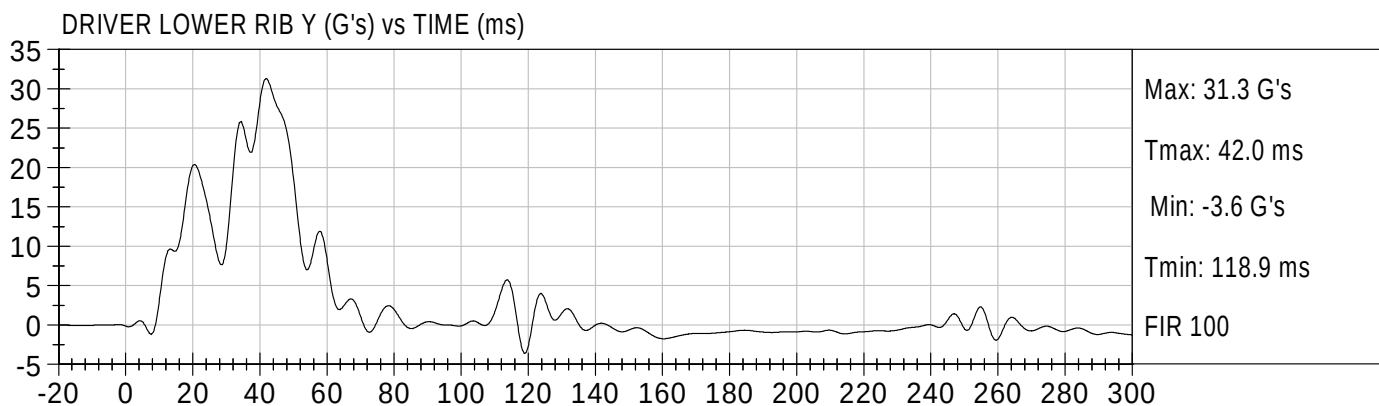
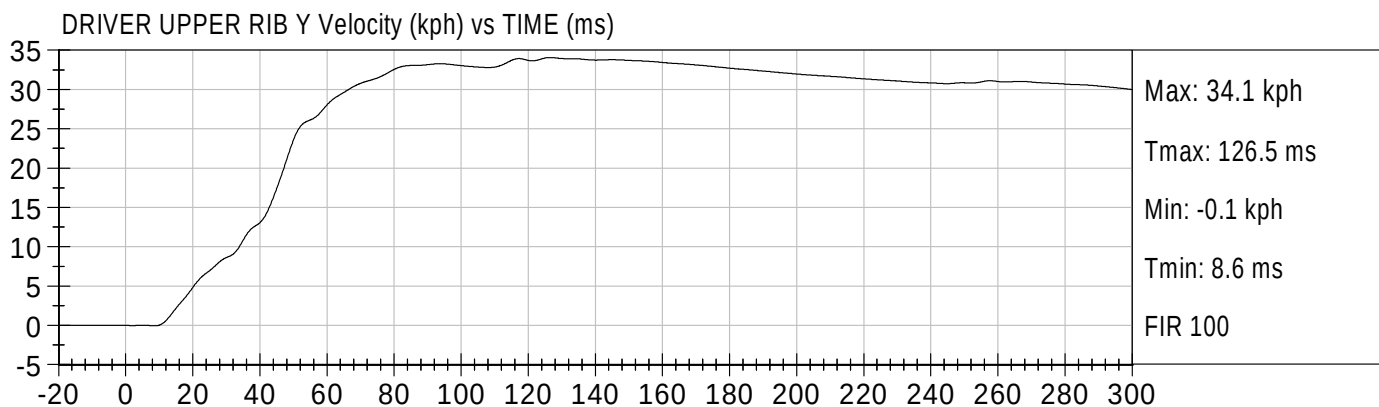
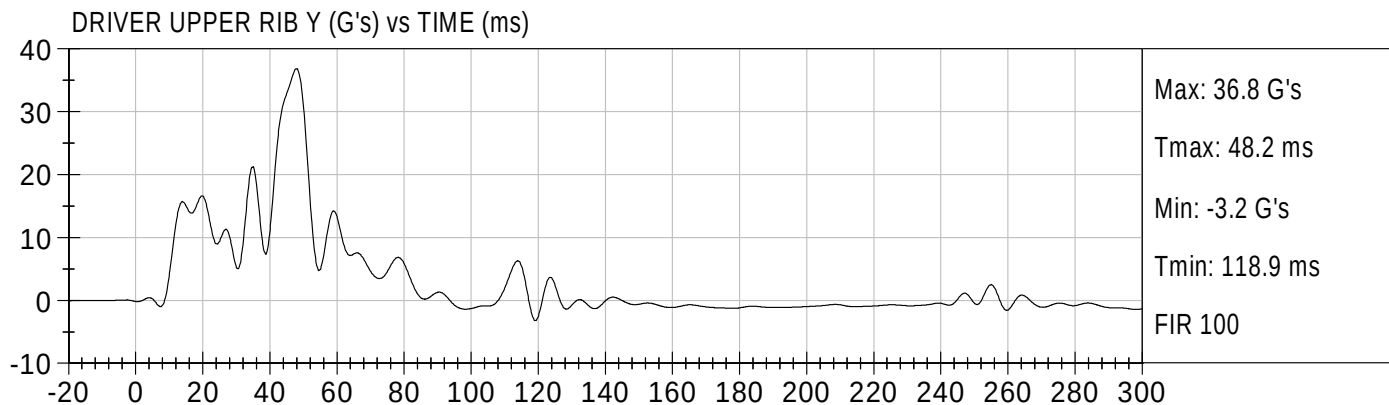
Driver Upper Neck Force Y

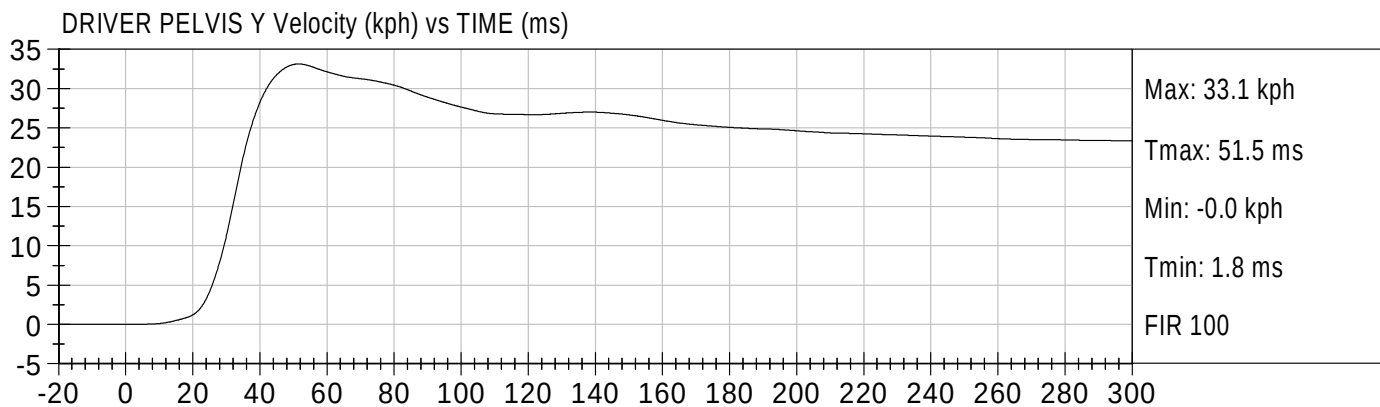
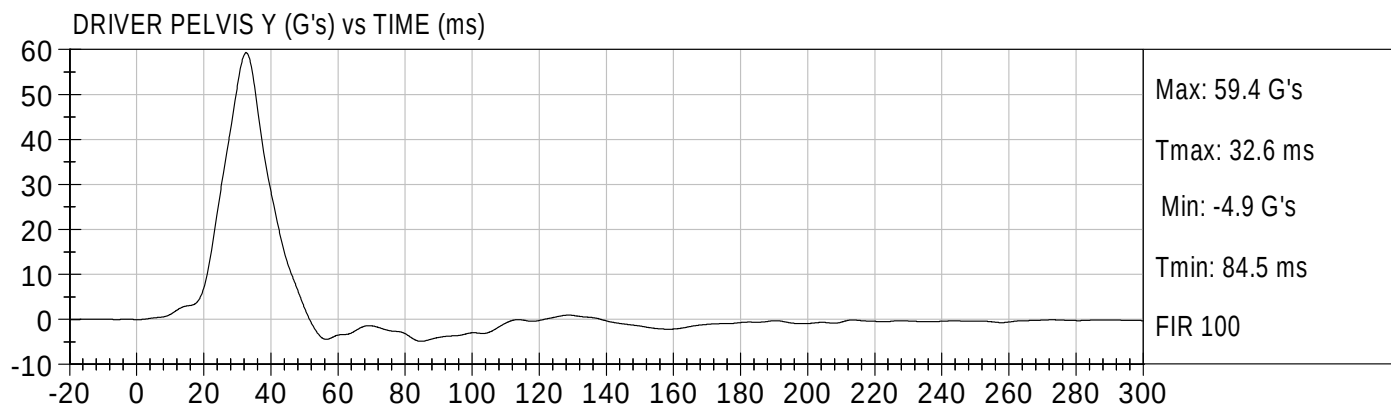
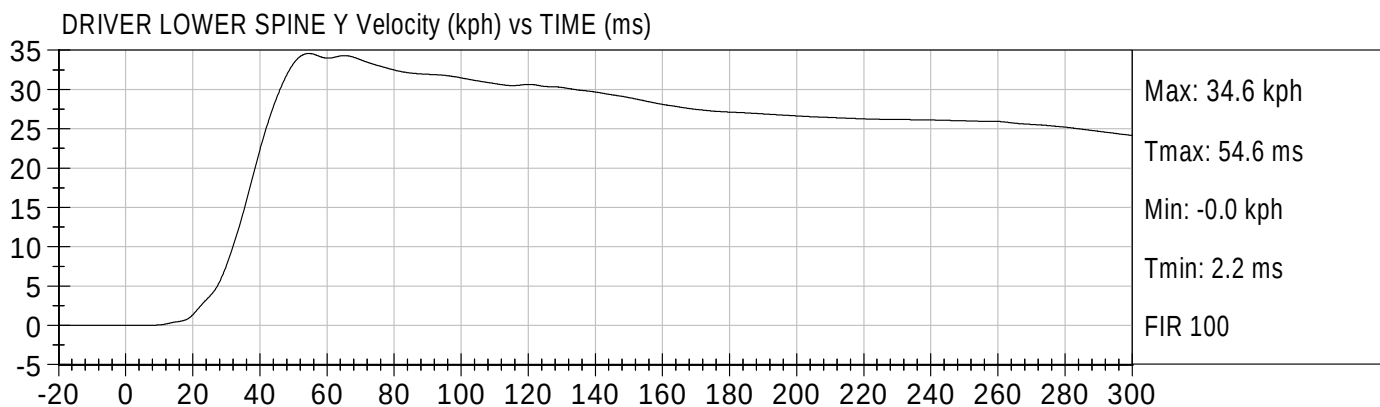
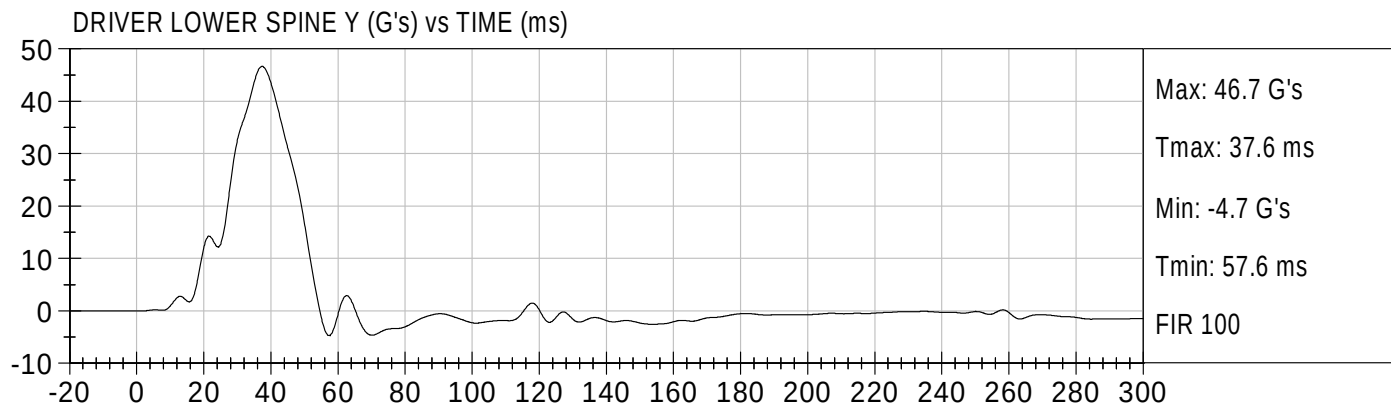
Driver Upper Neck Force Z

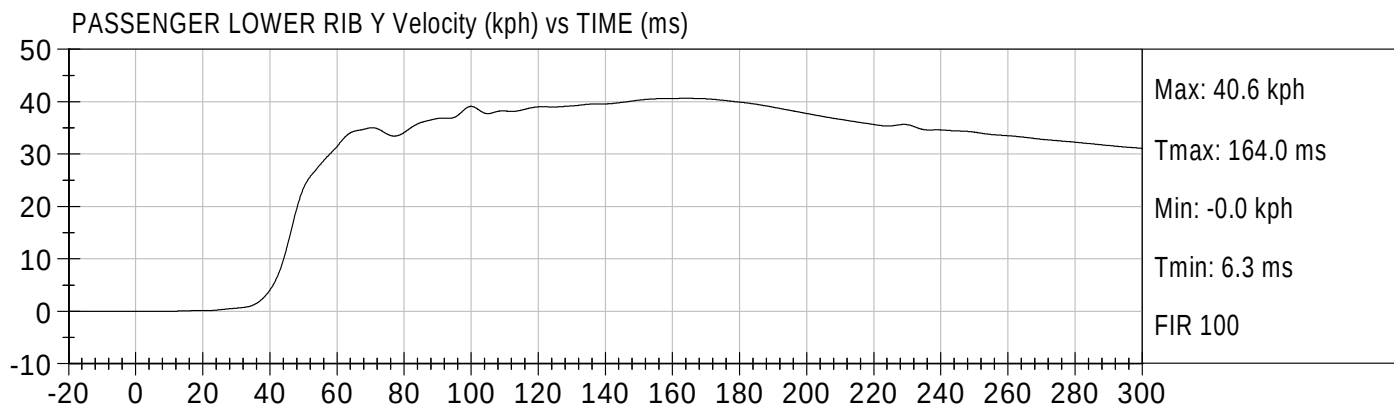
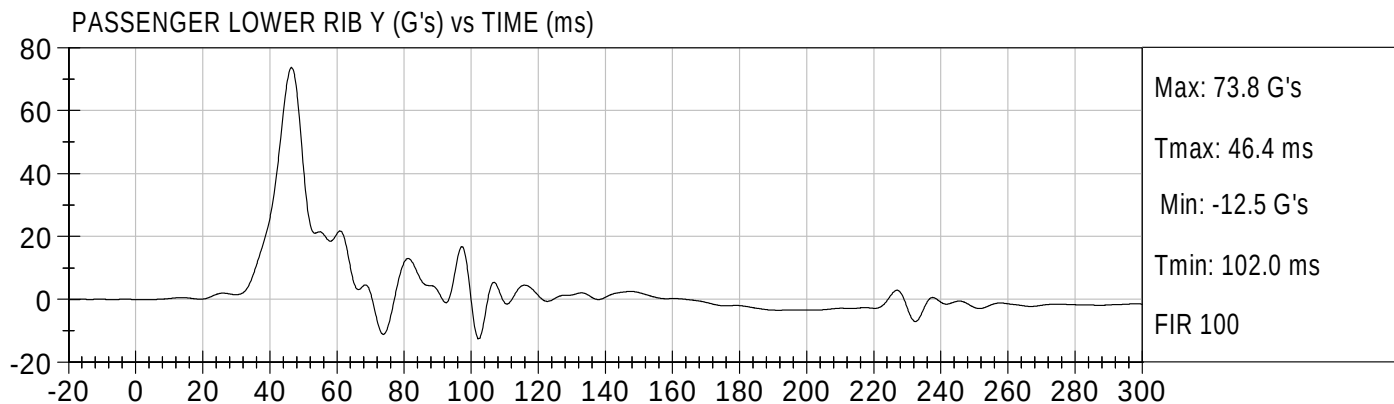
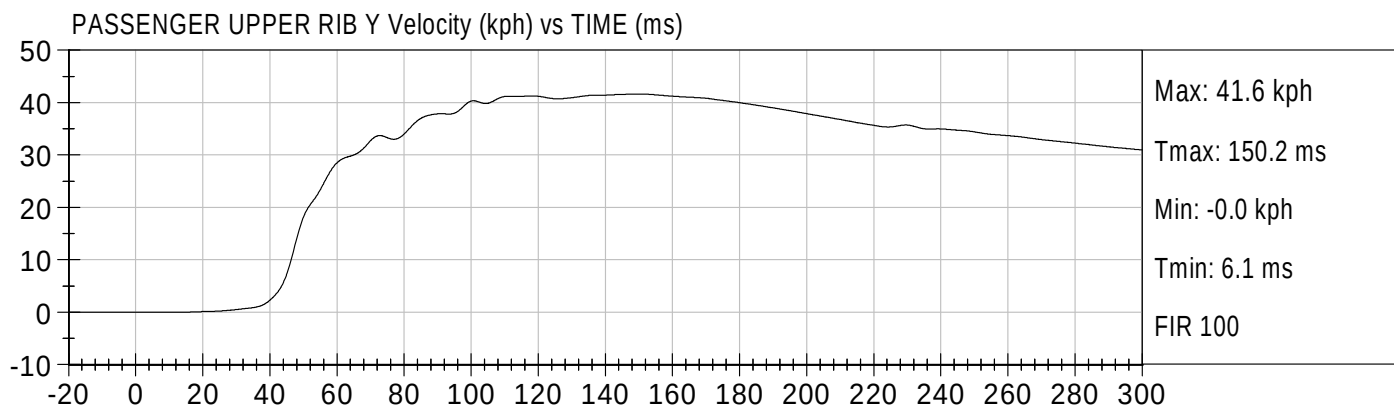
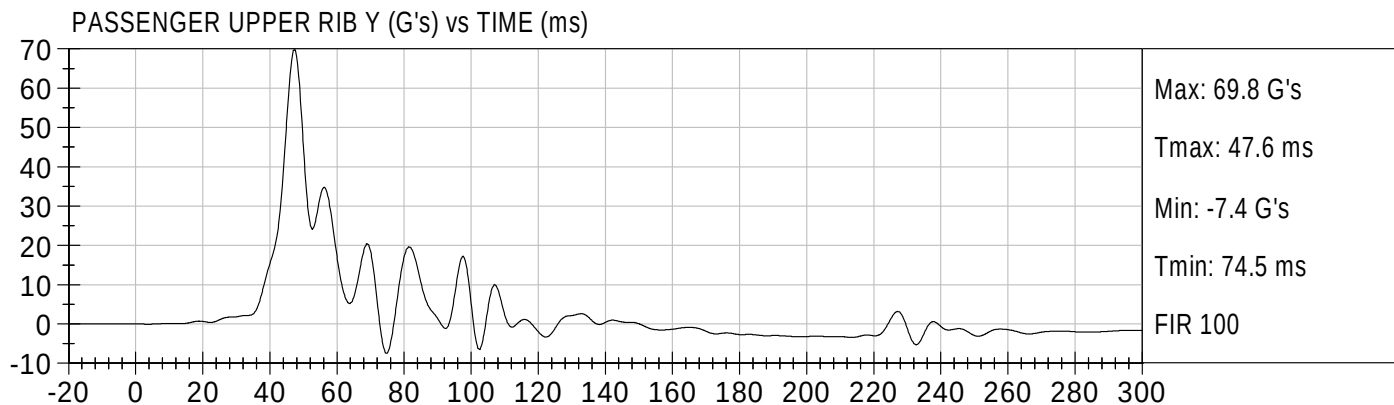
Driver Upper Neck Moment X

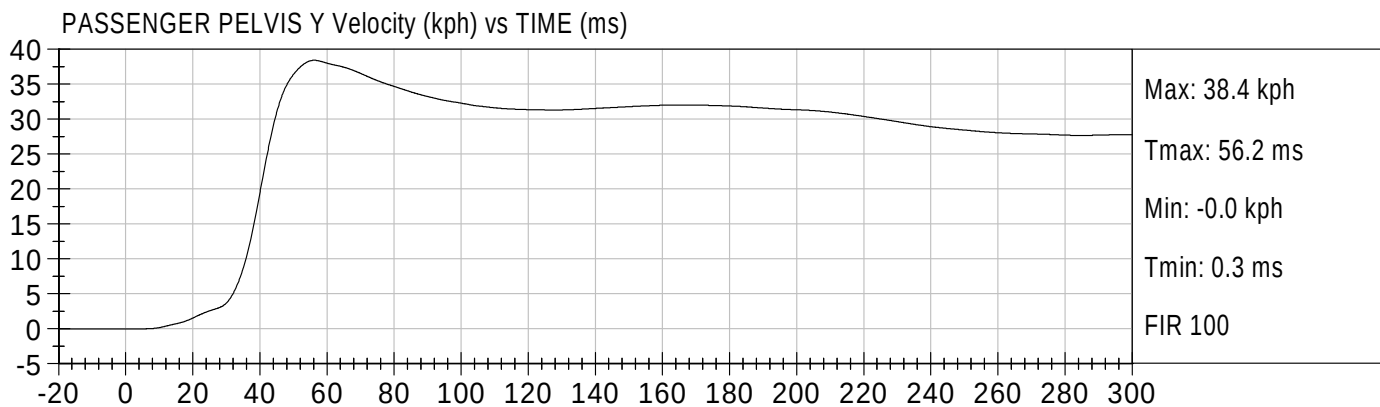
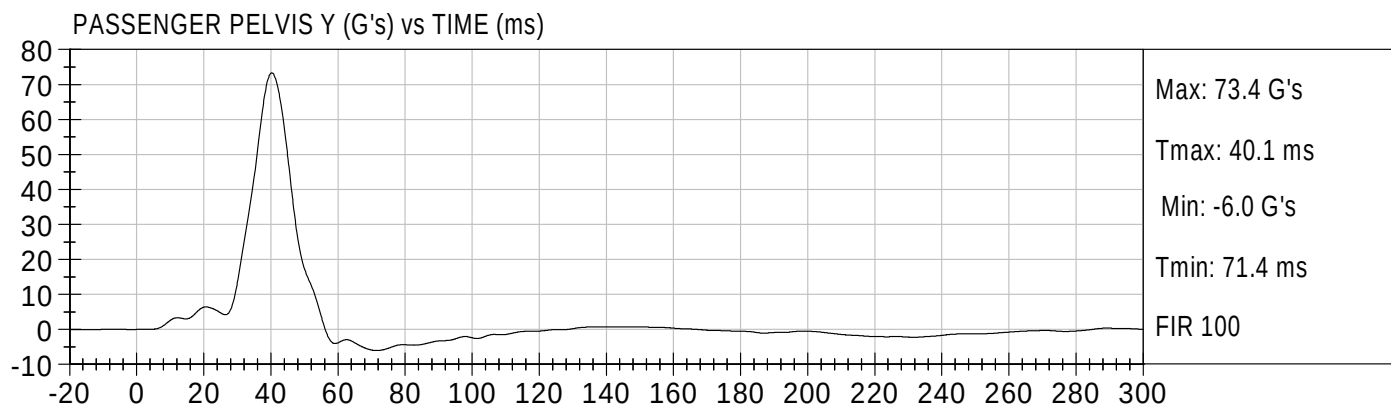
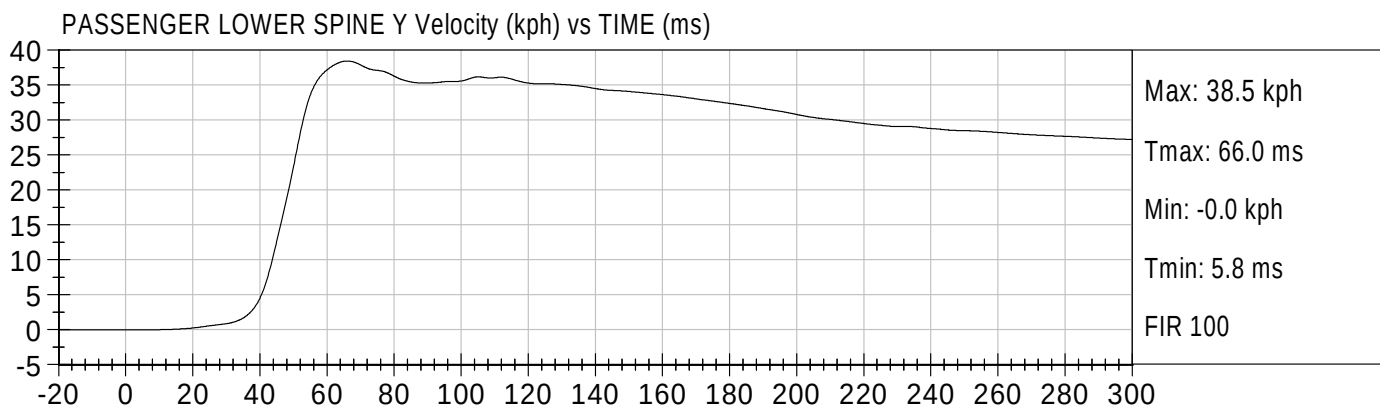
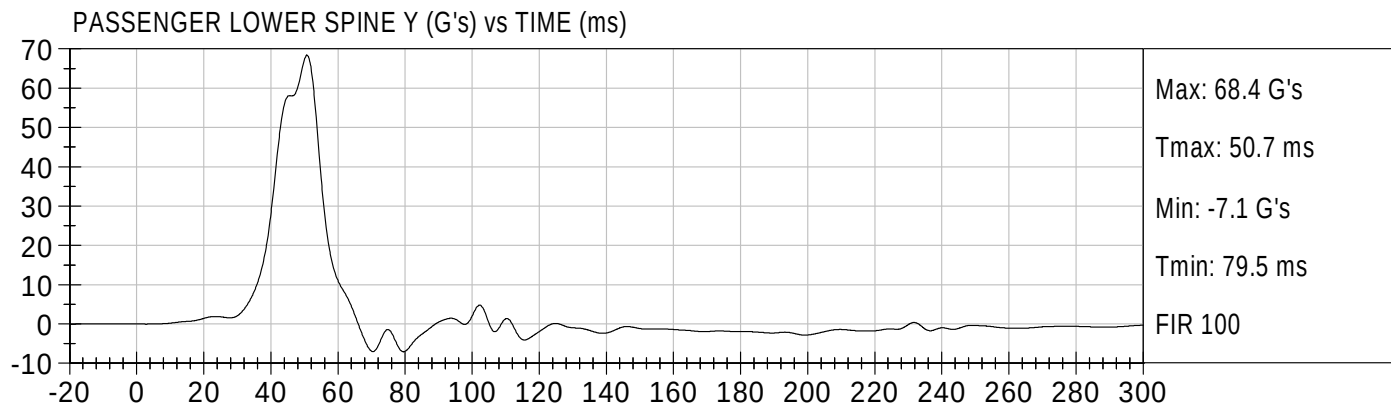
Driver Upper Neck Moment Y
Driver Upper Neck Moment Z
Driver Upper Rib Redundant Y
Driver Lower Rib Redundant Y
Driver Lower Spine Redundant Y
Driver Pelvis Redundant Y
Driver Thorax Contact
Driver Pelvis Contact
Passenger Head X Primary
Passenger Head Y Primary
Passenger Head Z Primary
Passenger Head 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: D08251

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


Approved By

8/29/08

Test Date

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

ATD Serial No: 271

Test I.D: D083011

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	20	Pass
Peak Resultant Acceleration	G's	120 to 150	135	Pass
Is Resultant Curve Unimodal?	N/A	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-8.1	Pass
Overall Test Results				Pass

Jessica Gall
Laboratory Technician

11/17/08
Test Date

David Winkelbauer
Approved By



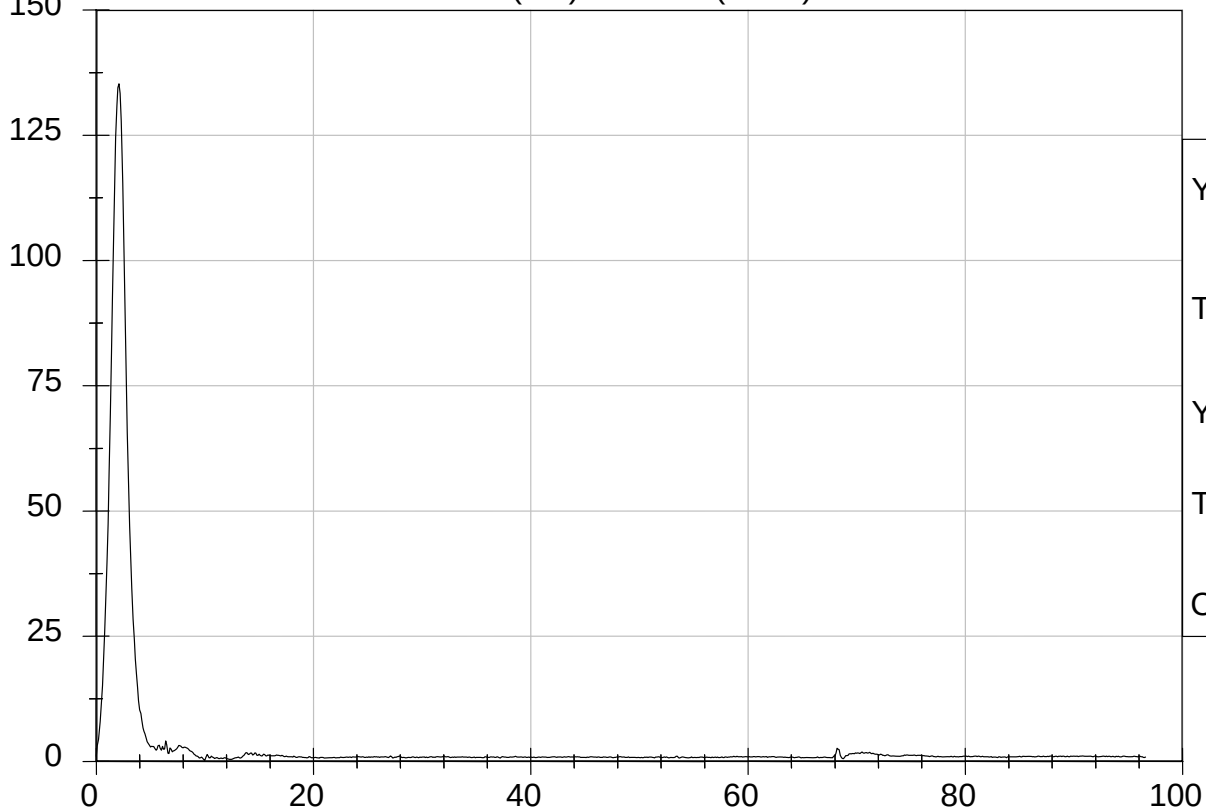
Test Description: Head Drop

Test Date: 11/17/08

Component: D083011

Speed: 0 ft/s, 0 m/s

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



YMax: 135.3 G

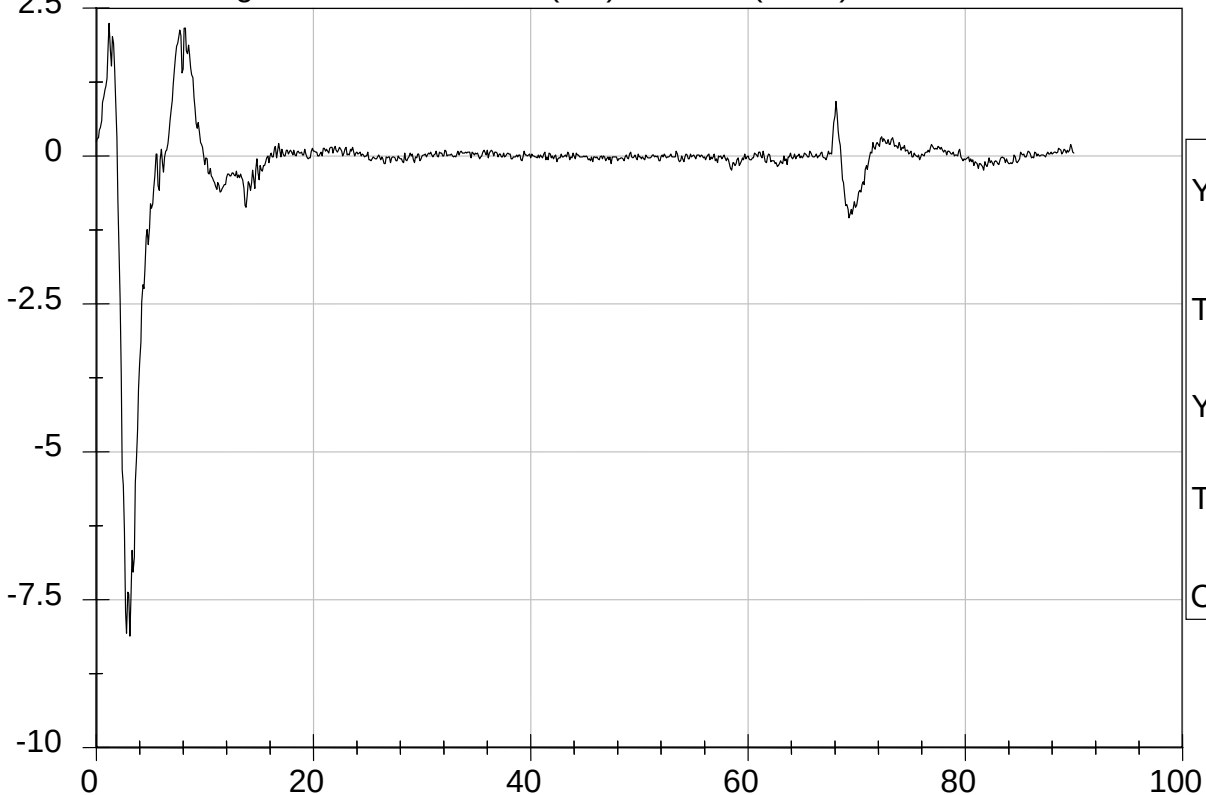
Tmax: 2.1 ms

YMin: 0.2 G

Tmin: 10.0 ms

CFC 1000

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



YMax: 2.2 G

Tmax: 1.2 ms

YMin: -8.1 G

Tmin: 3.1 ms

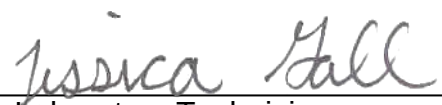
CFC 1000

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

ATD Serial No: 271

Test I.D: D083012

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Probe Velocity	m/s	4.22 - 4.31	4.27	Pass
Upper Rib	G's	37 - 46	39	Pass
Lower Rib	G's	37 - 46	38	Pass
Lower Spine	G's	15 - 22	19	Pass
Overall Test Results				Pass


Laboratory Technician

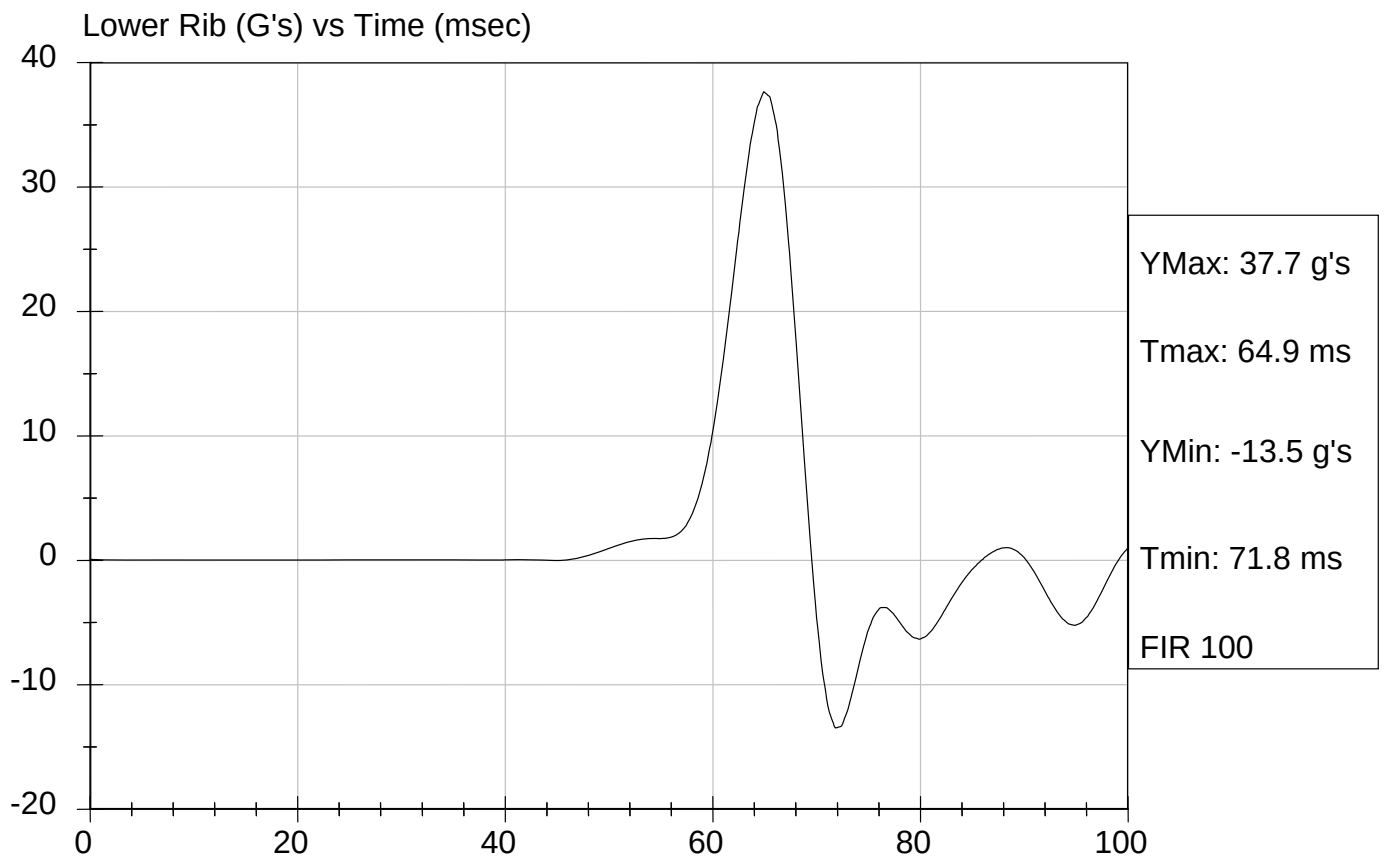
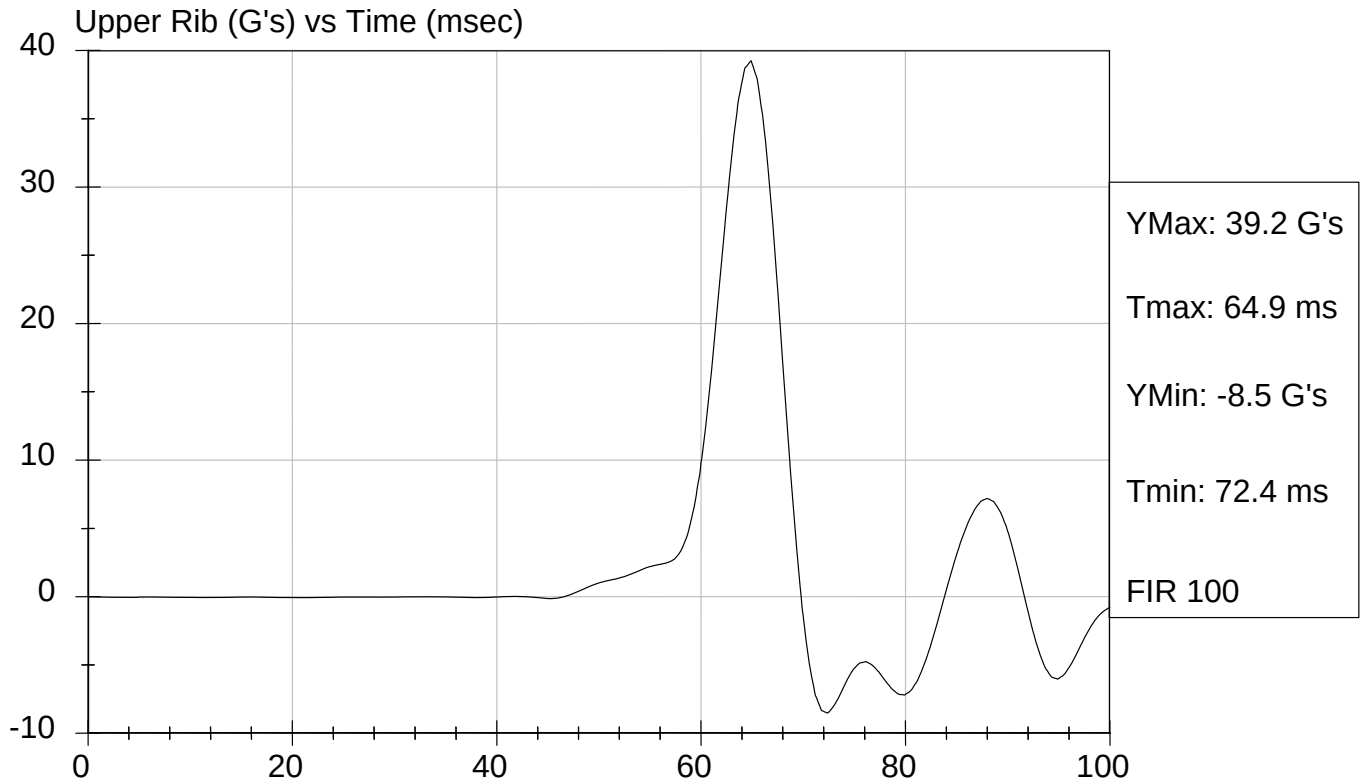

Approved By

11/17/08
Test Date



Test Desc: Thorax Impact
Component ID: D083012

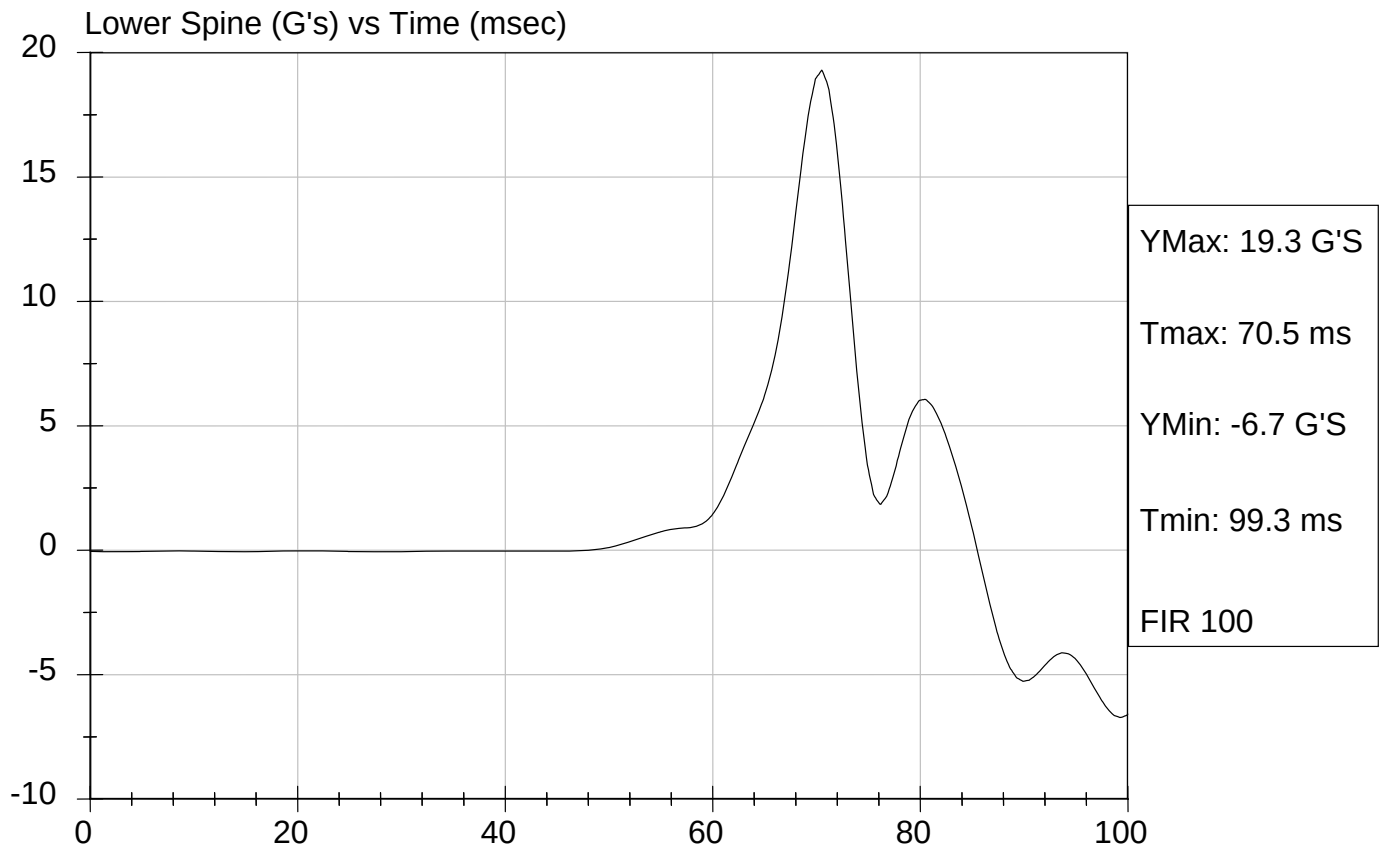
Test Date: 11/17/08
Speed: 14.01 ft/sec, 4.27 m/sec





Test Desc: Thorax Impact
Component ID: D083012

Test Date: 11/17/08
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: D083013

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	20	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

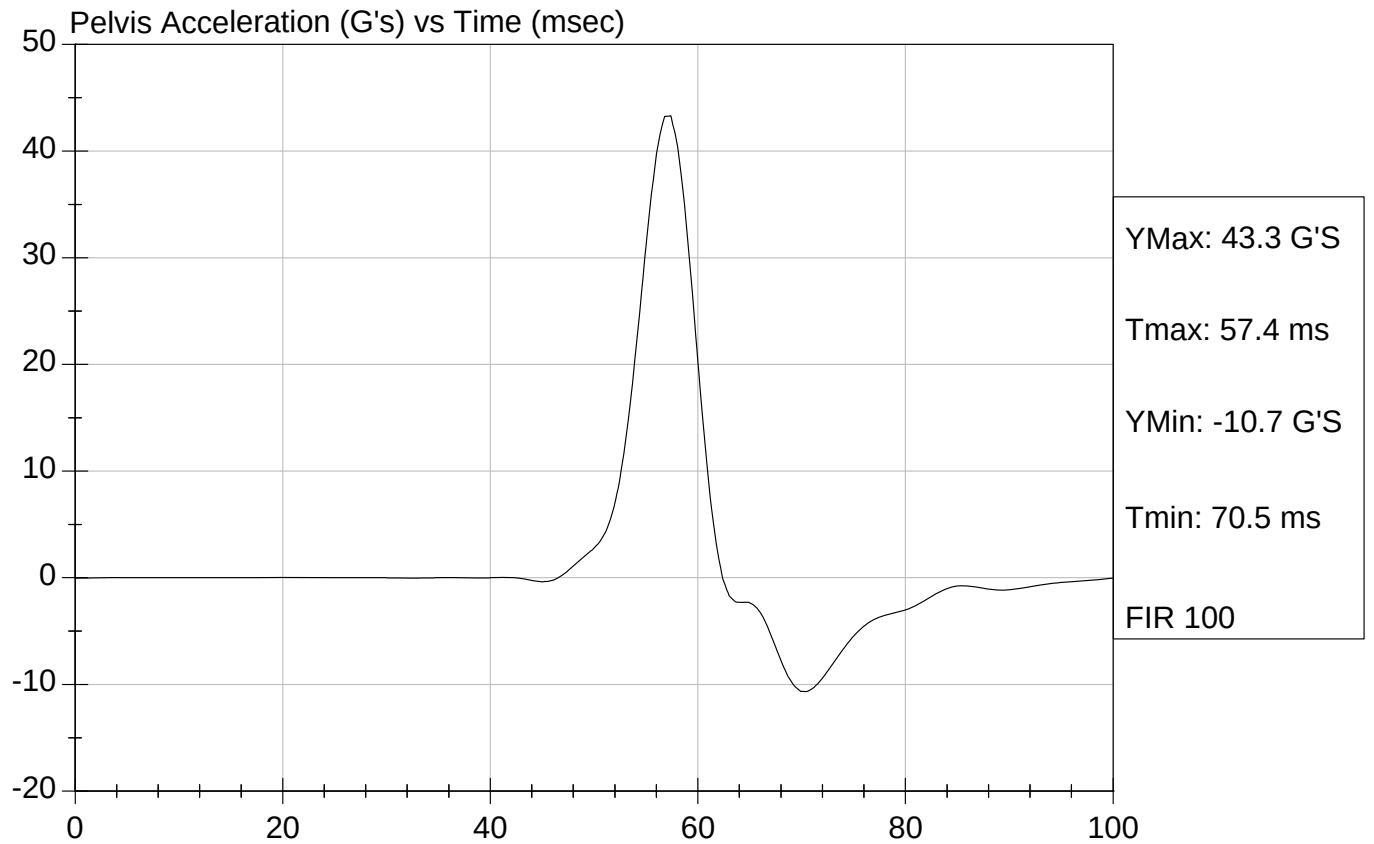
11/17/08
Test Date

David Winkelbauer
Approved By



Test Desc: Pelvis Impact
Component ID: D083013

Test Date: 11/17/08
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: D083014

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Force At 12.7 mm	N	104 -162	143	Pass
Force At 19 mm	N	163 - 222	201	Pass
Force At 25.4 mm	N	222 - 280	268	Pass
Force At 33 mm	N	325 - 391	368	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

11/17/08
Test Date

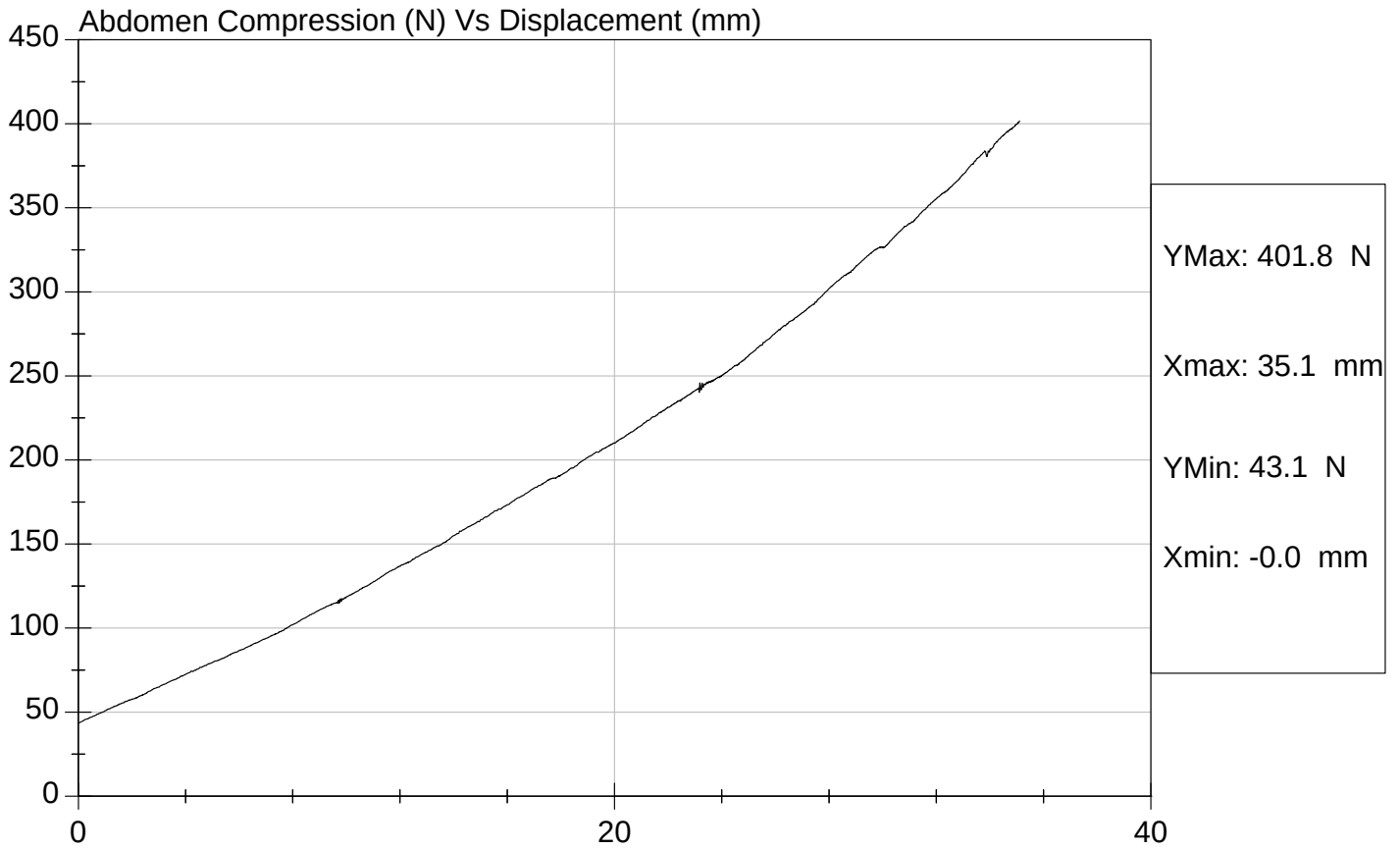
David Winkelbauer
Approved By



Test Description: Abdomen Compression Test Date: 11/17/08

Component: D083014

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: D083015

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	16.96	Pass
Force At 0 deg	N	0 - 26.7	0	Pass
Force At 20 deg	N	97.9 - 151.2	115.0	Pass
Force At 30 deg	N	151.2 - 204.6	154.8	Pass
Force At 40 deg	N	204.6 - 258.0	232.4	Pass
Return Angle	Deg	12 Maximum	6	Pass
			Overall Test Results	Pass

Jessica Hall
Laboratory Technician

11/17/08
Test Date

David Winkelbauer
Approved By

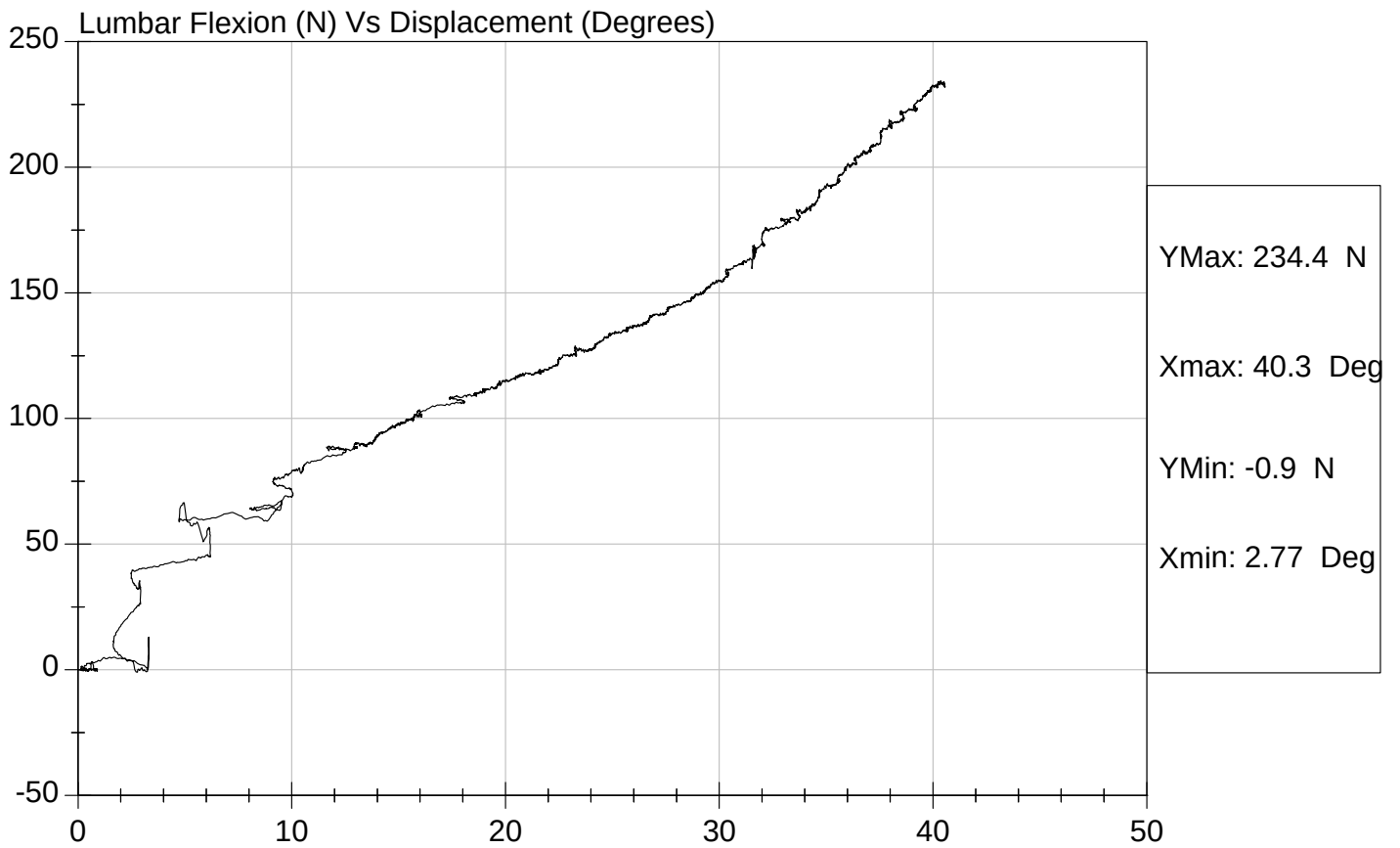


Test Description: Lumbar Flexion

Test Date: 11/17/08

Component: D083015

Speed: 0 ft/sec, 0 m/sec

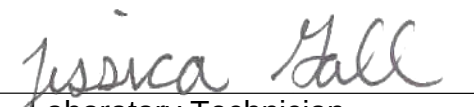


SID/HIII Calibration Data Sheet
Side Impact Dummy
Neck Pendulum Test

ATD Serial No: 271

Test I.D: D083019

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	22	Pass
Impact Velocity		m/s	6.89 to 7.13	7.06	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.45	Pass
	20 msec	m/s	4.12 to 5.10	4.85	Pass
	30 msec	m/s	5.73 to 7.01	6.61	Pass
	40 to 70 msec	m/s	6.27 to 7.64	6.81	Pass
Midsaggital Plane Max Rotation		deg	66 to 82	74	Pass
Head Rotation Peak to Zero - Decay Time		msec	58 to 67	59	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	78	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

11/17/08

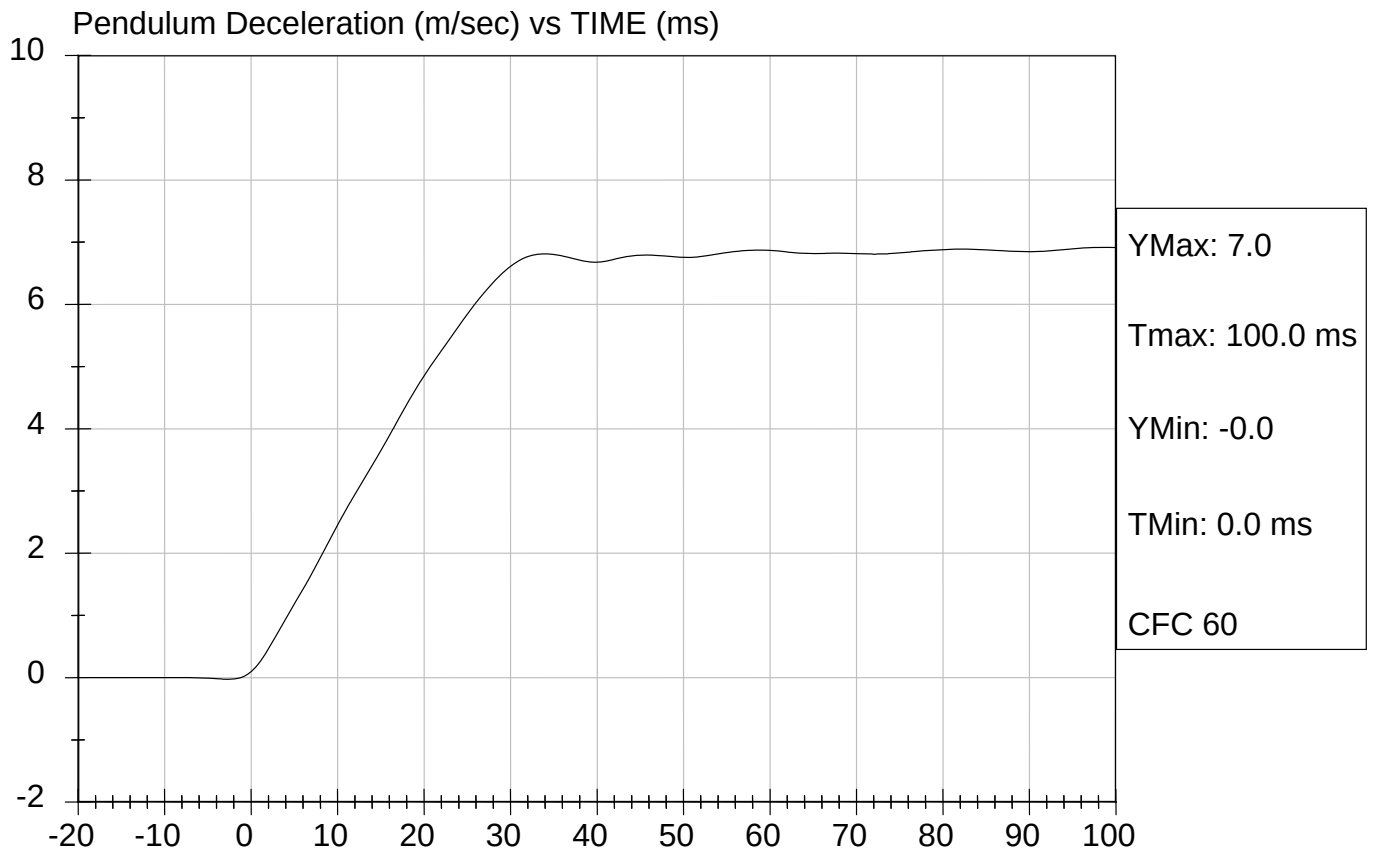
Test Date


 Approved By



Test Desc: Neck Bending
Component ID: D083019

Test Date: 11/17/08
Speed: 23.15 ft/sec, 7.06 m/sec

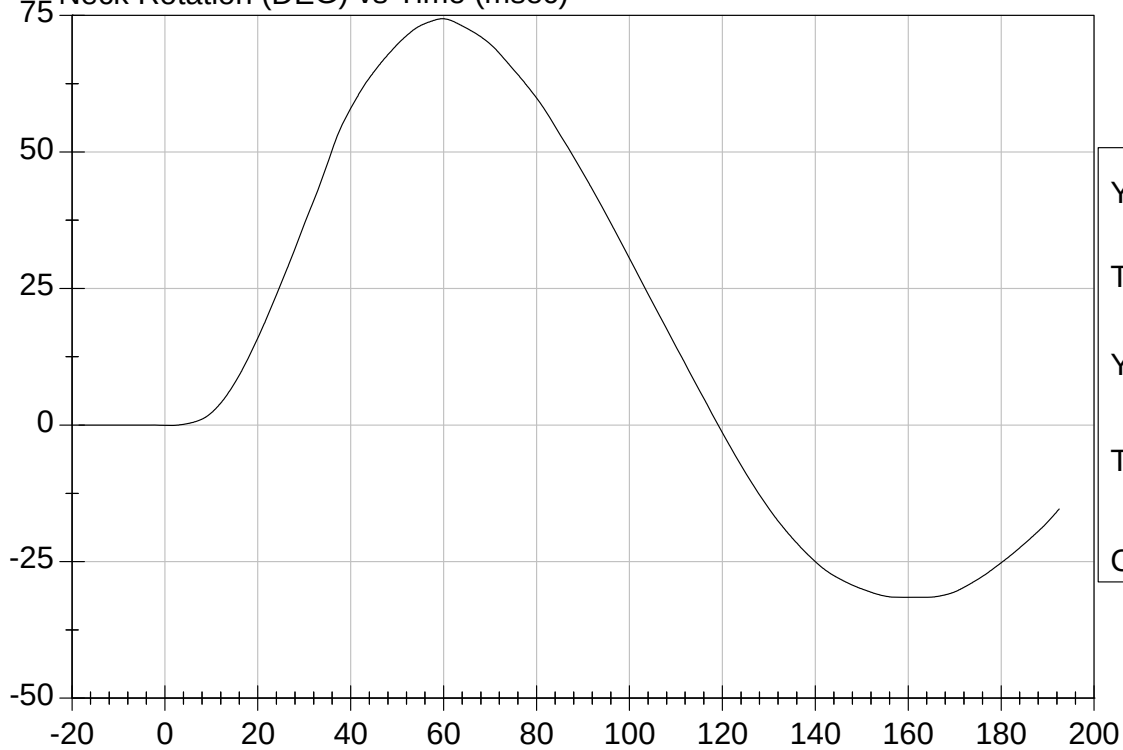




Test Desc: Neck Bending
Component ID: D083019

Test Date: 11/17/08
Speed: 23.15 ft/sec, 7.06 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: D09121

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	19	Pass
Peak Resultant Acceleration	G's	120 to 150	139	Pass
Is Resultant Curve Unimodal?	N/A	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-9.2	Pass
Overall Test Results				Pass

Jessica Gall
Laboratory Technician

David Winkelbauer
Approved By

1/23/09
Test Date



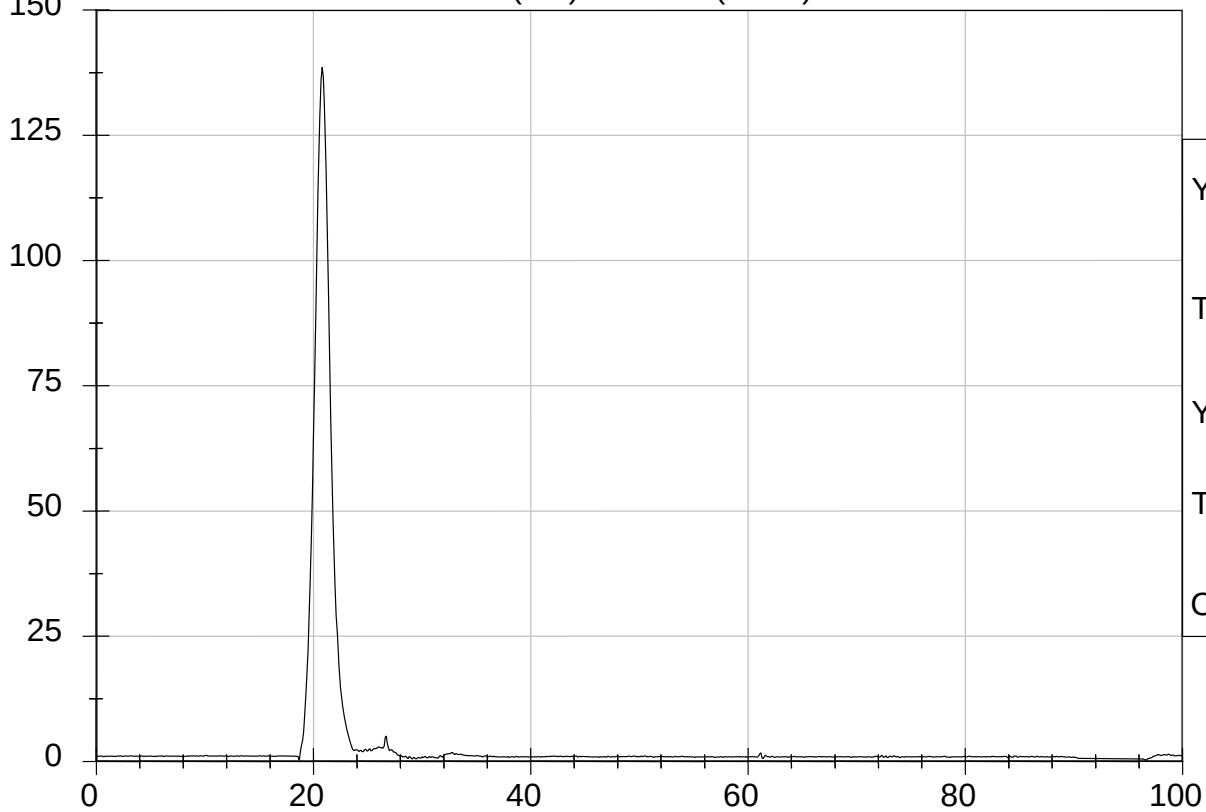
Test Description: Head Drop

Test Date: 1/23/09

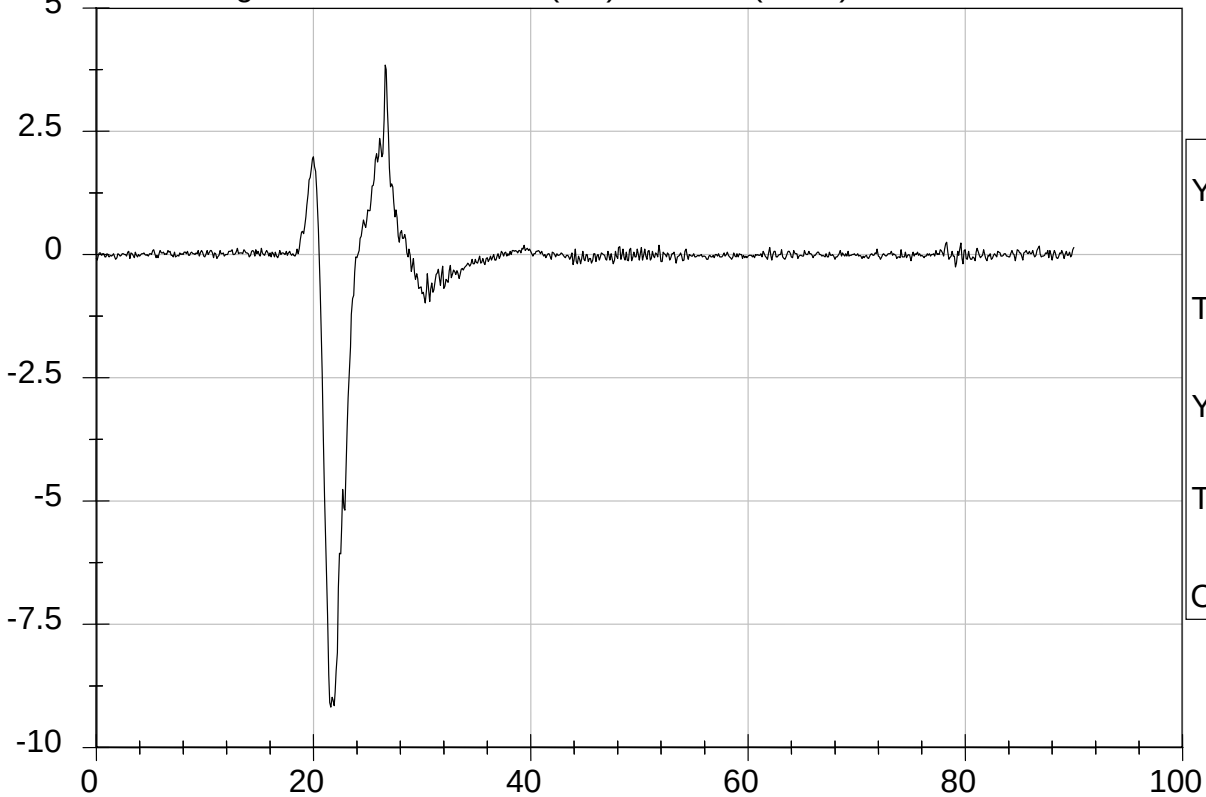
Component: D09121

Speed: 0 ft/s, 0 m/s

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



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

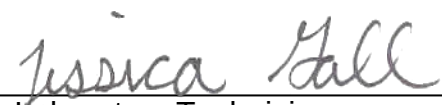


SID/HIII Calibration Data Sheet
Side Impact Dummy
Thorax Impact Test

ATD Serial No: 271

Test I.D: D09122

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	20.3	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Probe Velocity	m/s	4.22 - 4.31	4.30	Pass
Upper Rib	G's	37 - 46	38	Pass
Lower Rib	G's	37 - 46	38	Pass
Lower Spine	G's	15 - 22	18	Pass
Overall Test Results				Pass


Laboratory Technician


Approved By

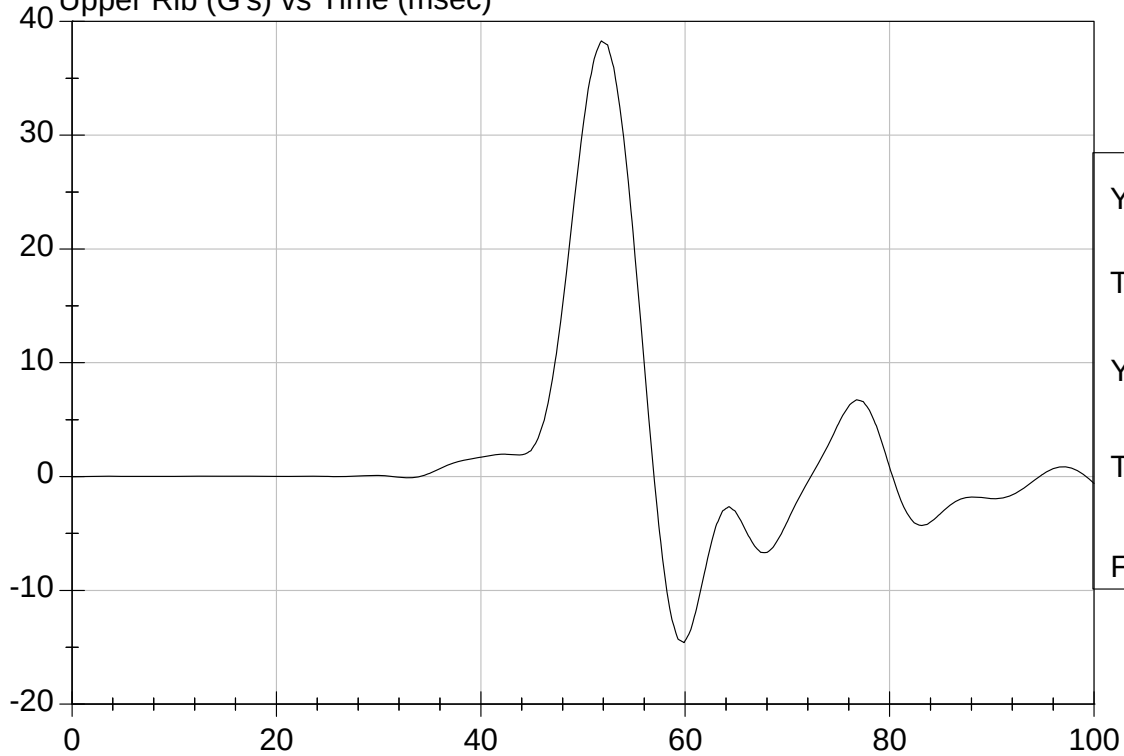
1/23/09
Test Date



Test Desc: Thorax Impact
Component ID: D09122

Test Date: 1/23/09
Speed: 14.12 ft/sec, 4.30 m/sec

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



YMax: 38.3 G's

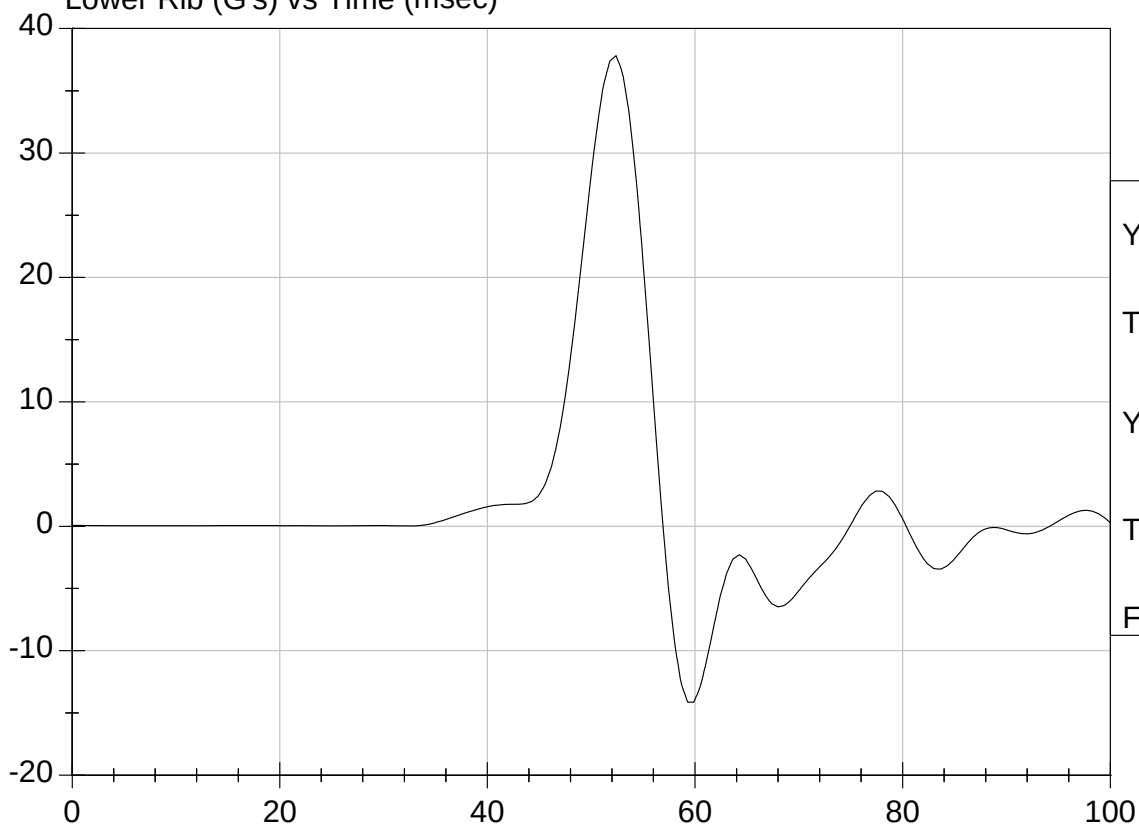
Tmax: 51.8 ms

YMin: -14.6 G's

Tmin: 59.9 ms

FIR 100

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



YMax: 37.8 g's

Tmax: 52.4 ms

YMin: -14.1 g's

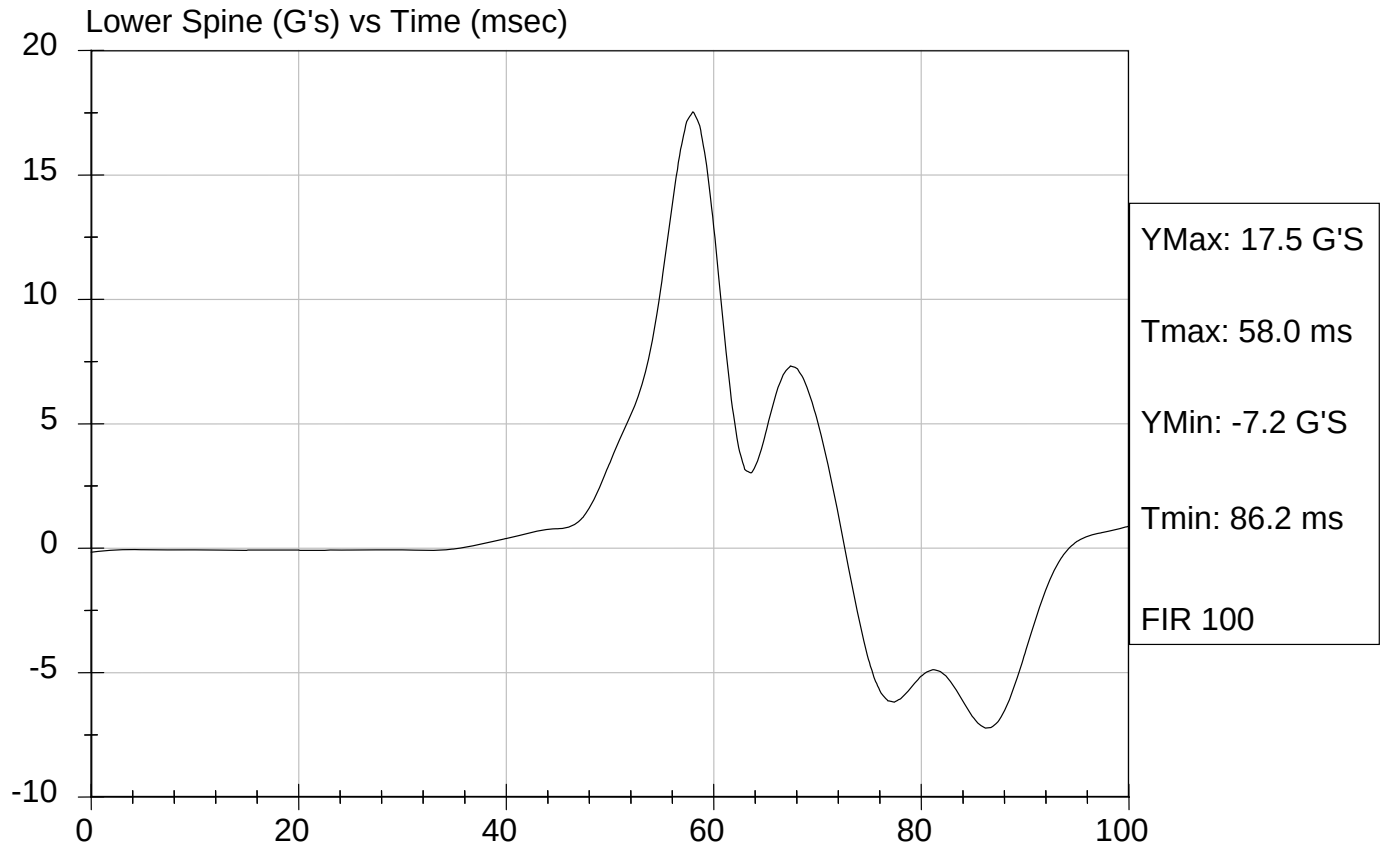
Tmin: 59.9 ms

FIR 100



Test Desc: Thorax Impact
Component ID: D09122

Test Date: 1/23/09
Speed: 14.12 ft/sec, 4.30 m/sec

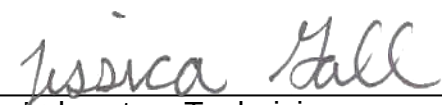


SID/HIII Calibration Data Sheet
Side Impact Dummy
Abdominal Compression Calibration (Pre-Load = 10 lbs)

ATD Serial No: 271

Test I.D: D09124

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Force At 12.7 mm	N	104 -162	135	Pass
Force At 19 mm	N	163 - 222	193	Pass
Force At 25.4 mm	N	222 - 280	267	Pass
Force At 33 mm	N	325 - 391	370	Pass
Overall Test Results			Pass	


Laboratory Technician

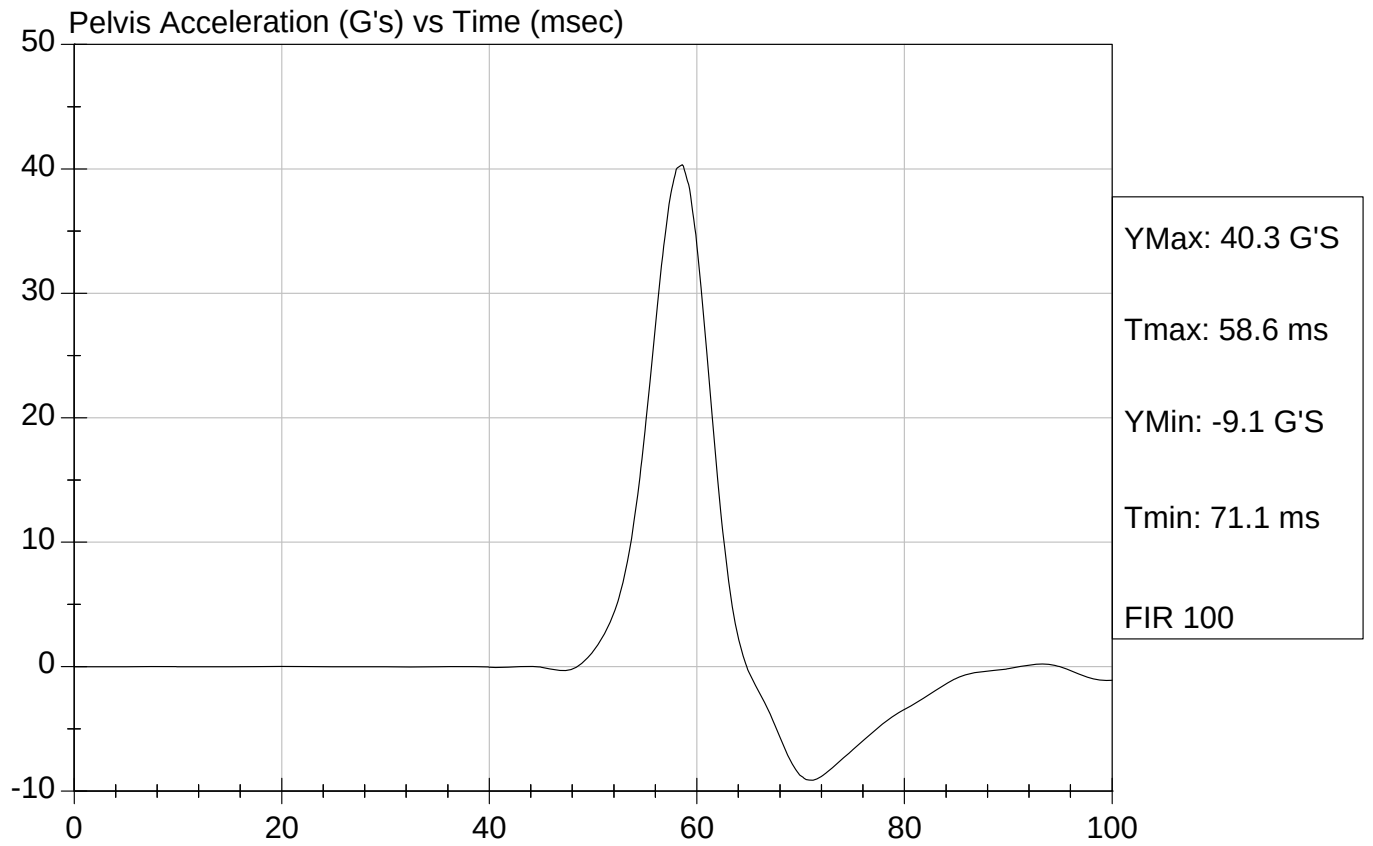

Approved By

1/23/09
Test Date



Test Desc: Pelvis Impact
Component ID: D09123

Test Date: 1/23/09
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: D09124

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Force At 12.7 mm	N	104 -162	135	Pass
Force At 19 mm	N	163 - 222	193	Pass
Force At 25.4 mm	N	222 - 280	267	Pass
Force At 33 mm	N	325 - 391	370	Pass
Overall Test Results			Pass	

Jessica Hall
Laboratory Technician

1/23/09
Test Date

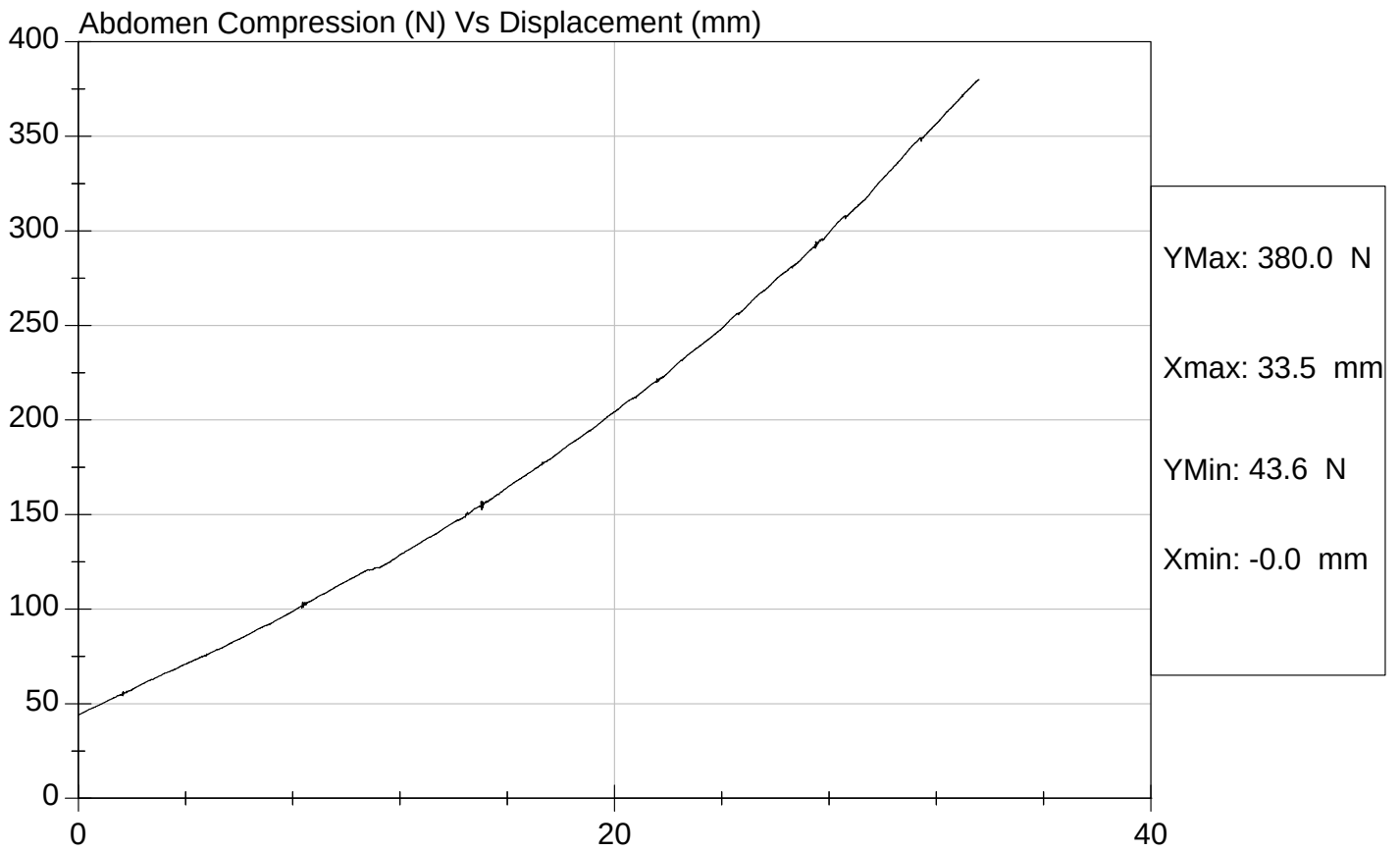
David Winkelbauer
Approved By



Test Description: Abdomen Compression Test Date: 1/23/09

Component: D09124

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: D09125

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Force At 0 deg	N	0 - 26.7	0	Pass
Force At 20 deg	N	97.9 - 151.2	119.4	Pass
Force At 30 deg	N	151.2 - 204.6	171.2	Pass
Force At 40 deg	N	204.6 - 258.0	216.3	Pass
Return Angle	Deg	12 Maximum	4	Pass
Overall Test Results			Pass	

Jessica Hall
Laboratory Technician

1/23/09
Test Date

David Winkelbauer
Approved By

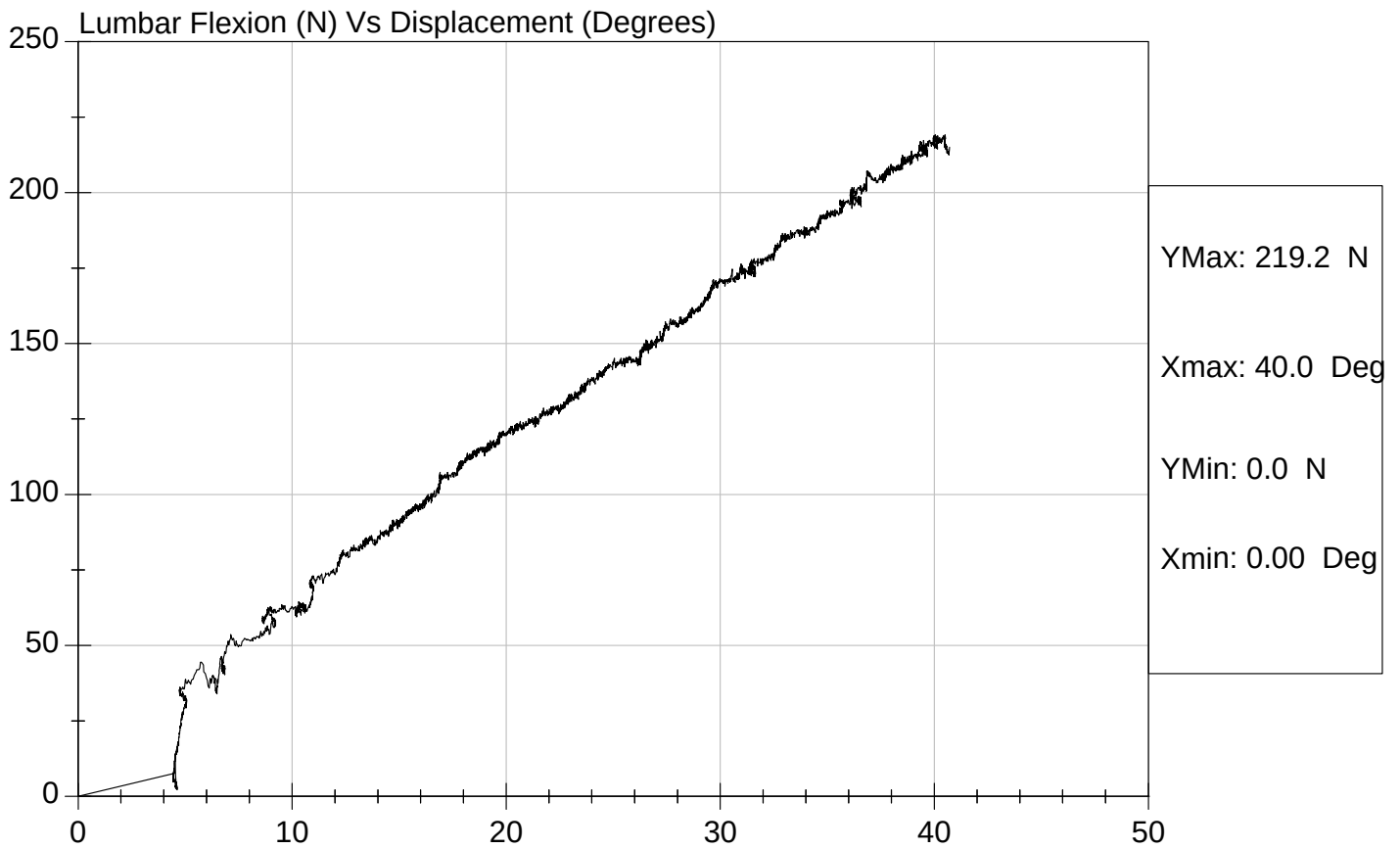


Test Description: Lumbar Flexion

Test Date: 1/23/09

Component: D09125

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: D09129

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	20.7	Pass
Laboratory Relative Humidity		%	10 to 70	14	Pass
Impact Velocity		m/s	6.89 to 7.13	7.05	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.07	Pass
	20 msec	m/s	4.12 to 5.10	4.26	Pass
	30 msec	m/s	5.73 to 7.01	5.99	Pass
	40 to 70 msec	m/s	6.27 to 7.64	6.49	Pass
Midsaggital Plane Max Rotation		deg	66 to 82	72	Pass
Head Rotation Peak to Zero - Decay Time		msec	58 to 67	60	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	74	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	60	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	15	Pass


 Laboratory Technician


 Approved By

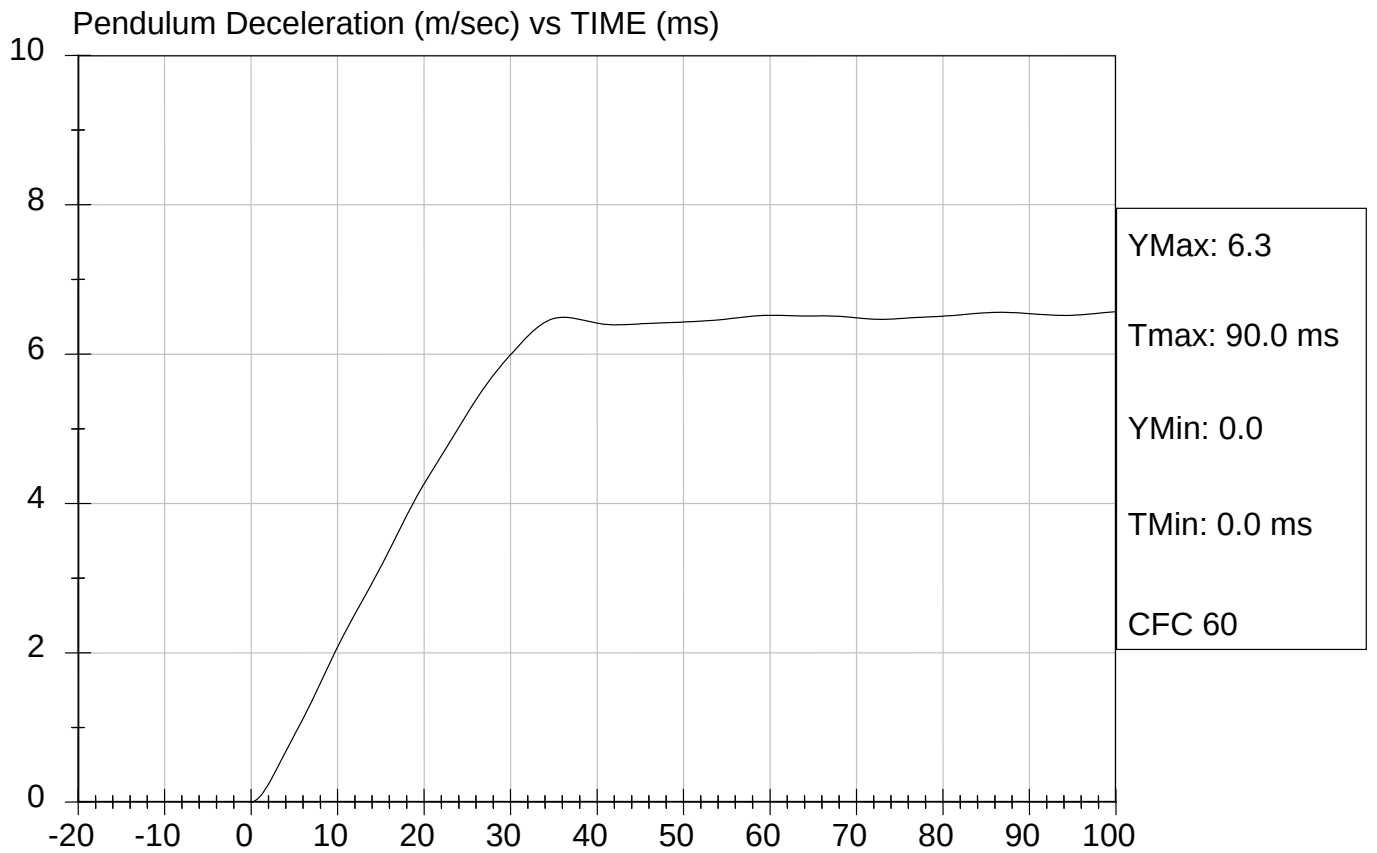
1/26/09

Test Date



Test Desc: Neck Bending
Component ID: D09129

Test Date: 1/26/09
Speed: 23.14 ft/sec, 7.05 m/sec

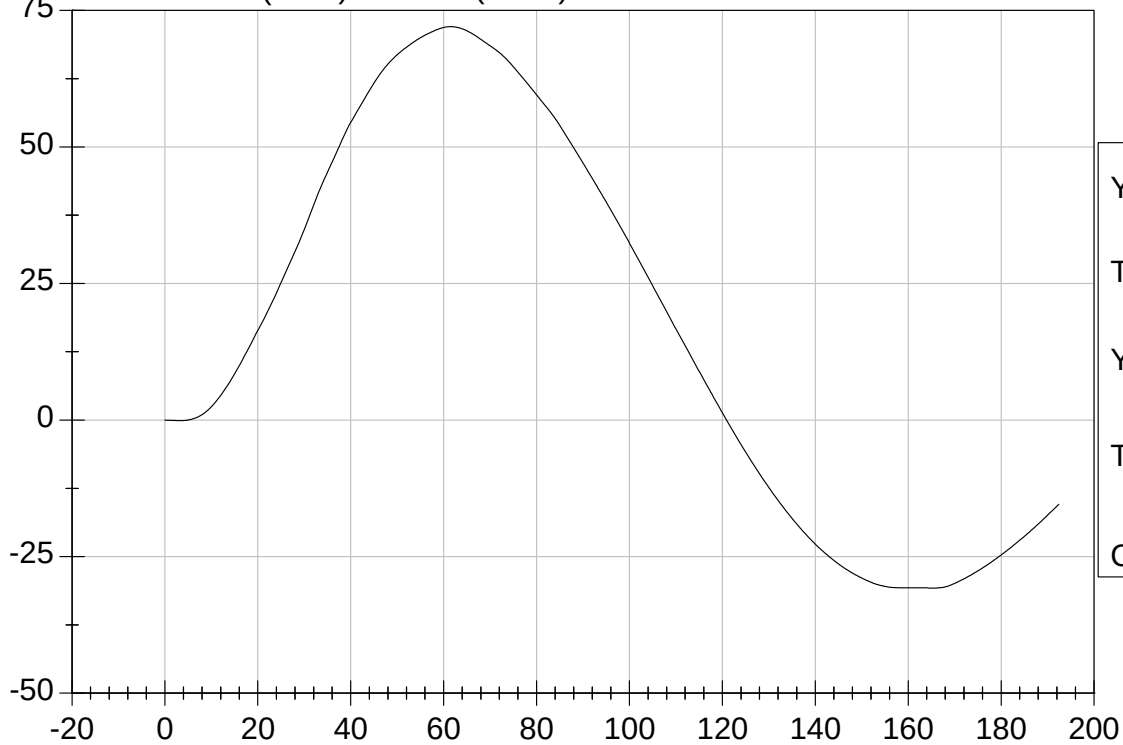




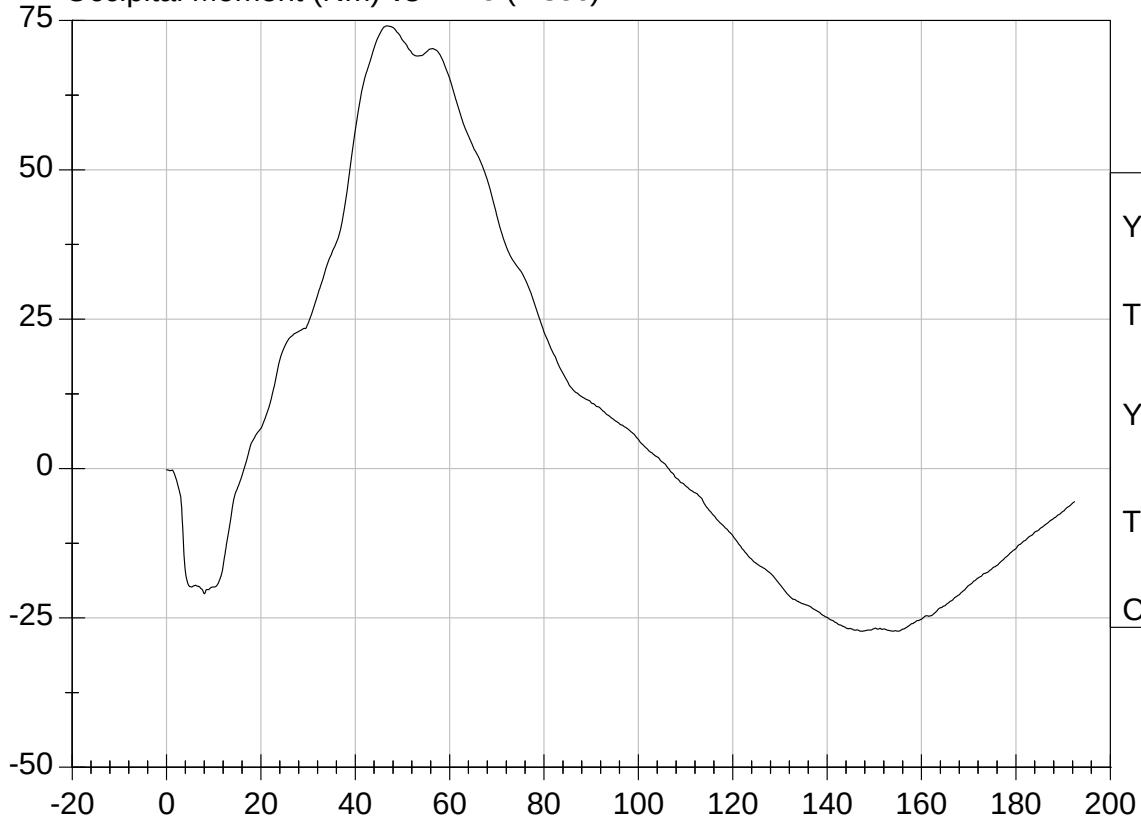
Test Desc: Neck Bending
Component ID: D09129

Test Date: 1/26/09
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

9/24/08

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: D08252

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


Approved By

8/29/08

Test Date

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

ATD Serial No: 272

Test I.D: D083021

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	20	Pass
Peak Resultant Acceleration	G's	120 to 150	139	Pass
Is Resultant Curve Unimodal?	N/A	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-12.8	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

11/17/08
Test Date

David Winkelbauer
Approved By



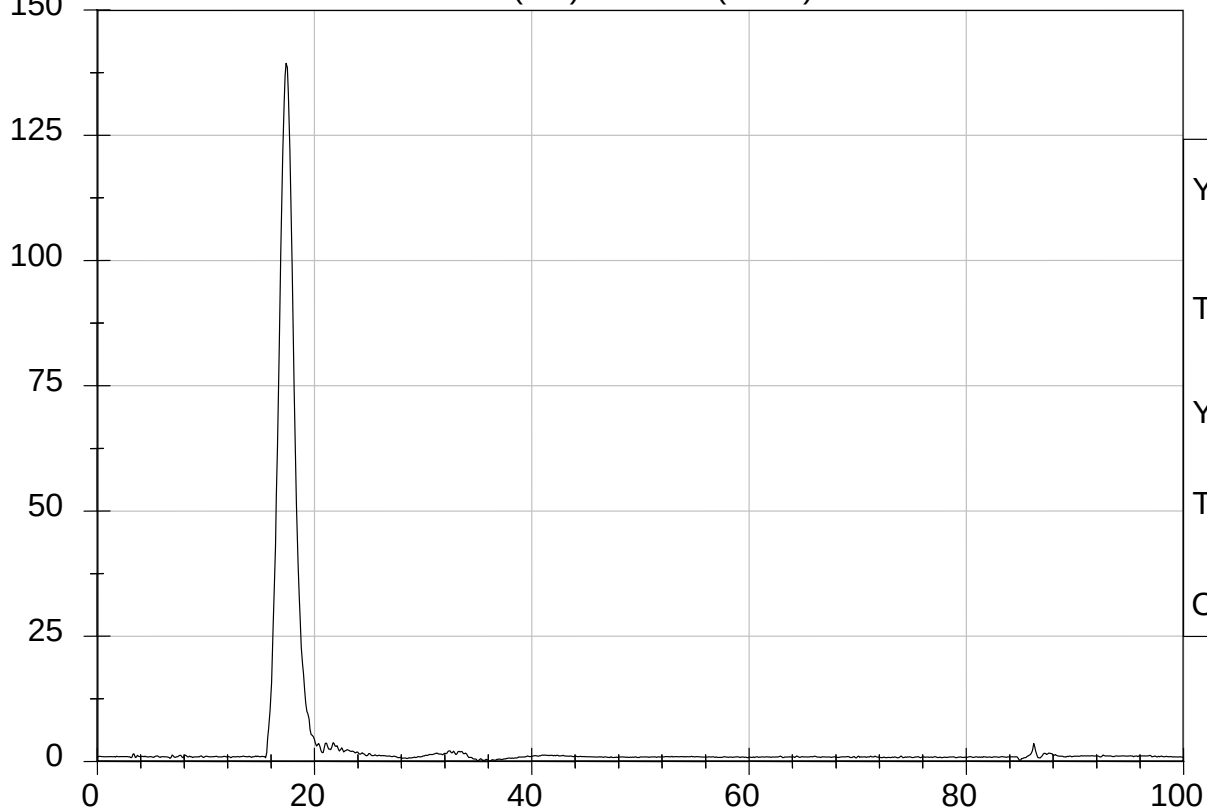
Test Description: Head Drop

Test Date: 11/17/08

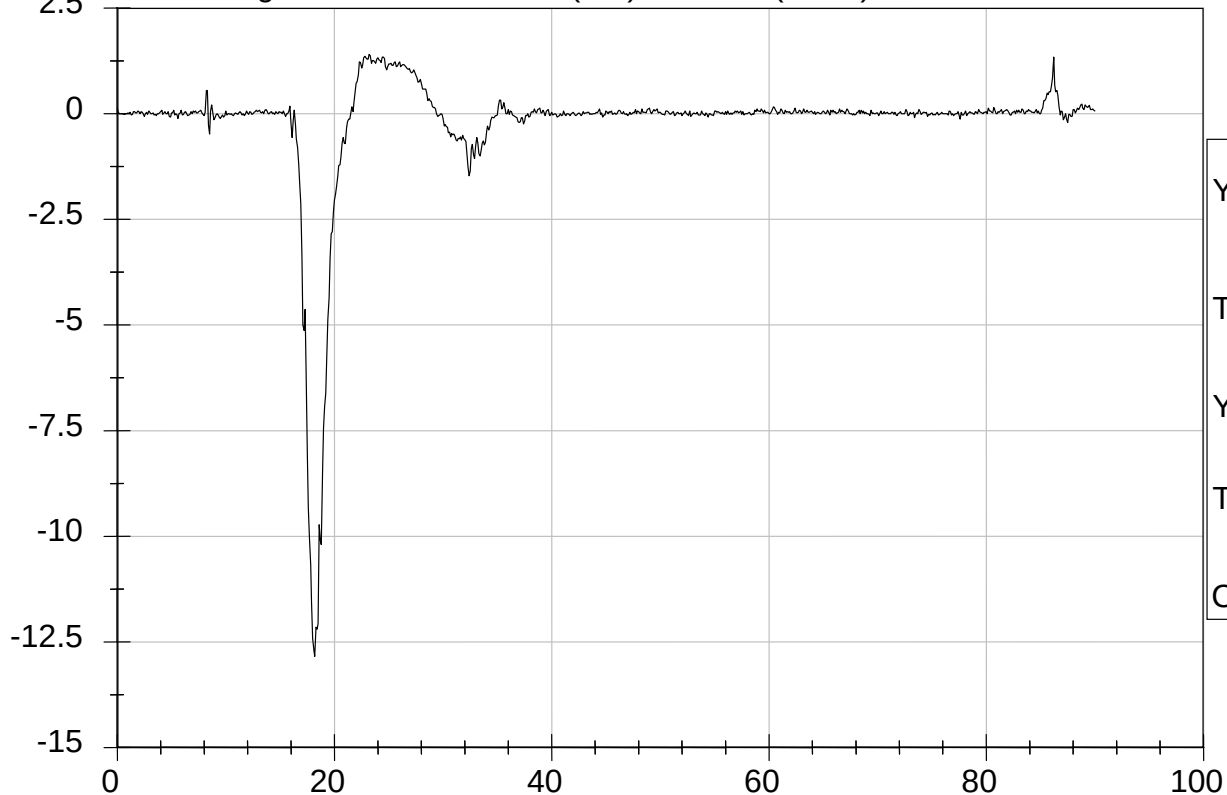
Component: D083021

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: D083022

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	20	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	37	Pass
Lower Spine	G's	15 - 22	20	Pass
Overall Test Results				Pass


Laboratory Technician

11/17/08

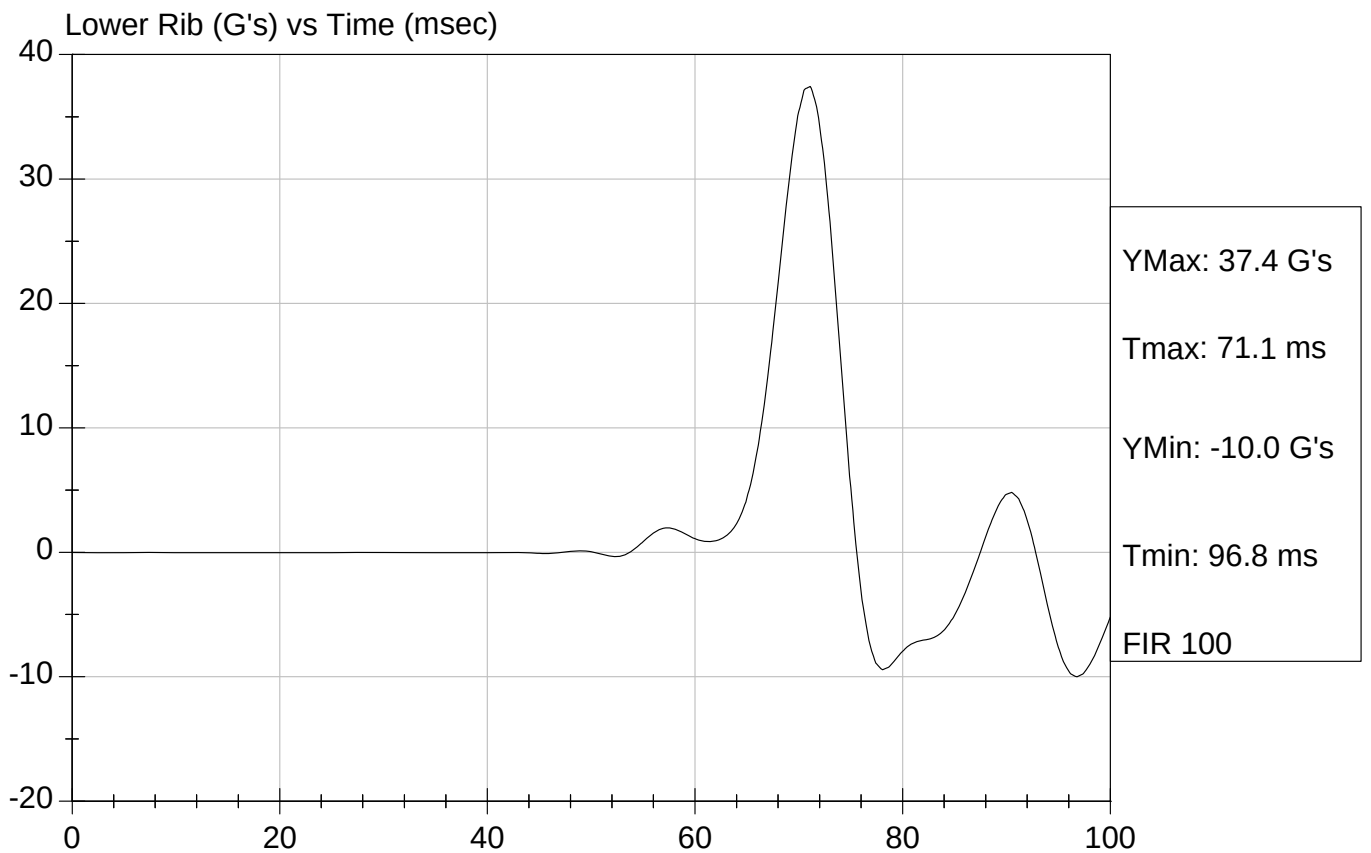
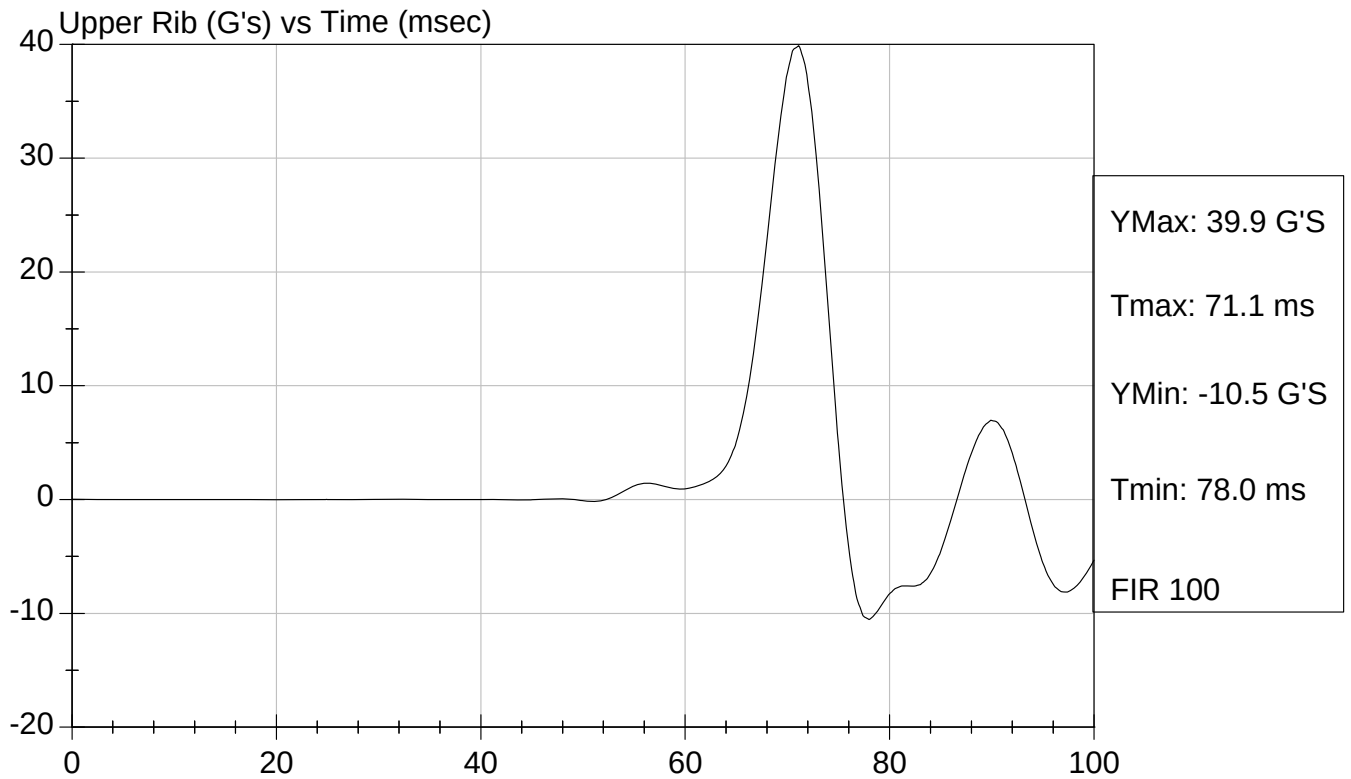
Test Date


Approved By



Test Desc: Thorax Impact
Component ID: D083022

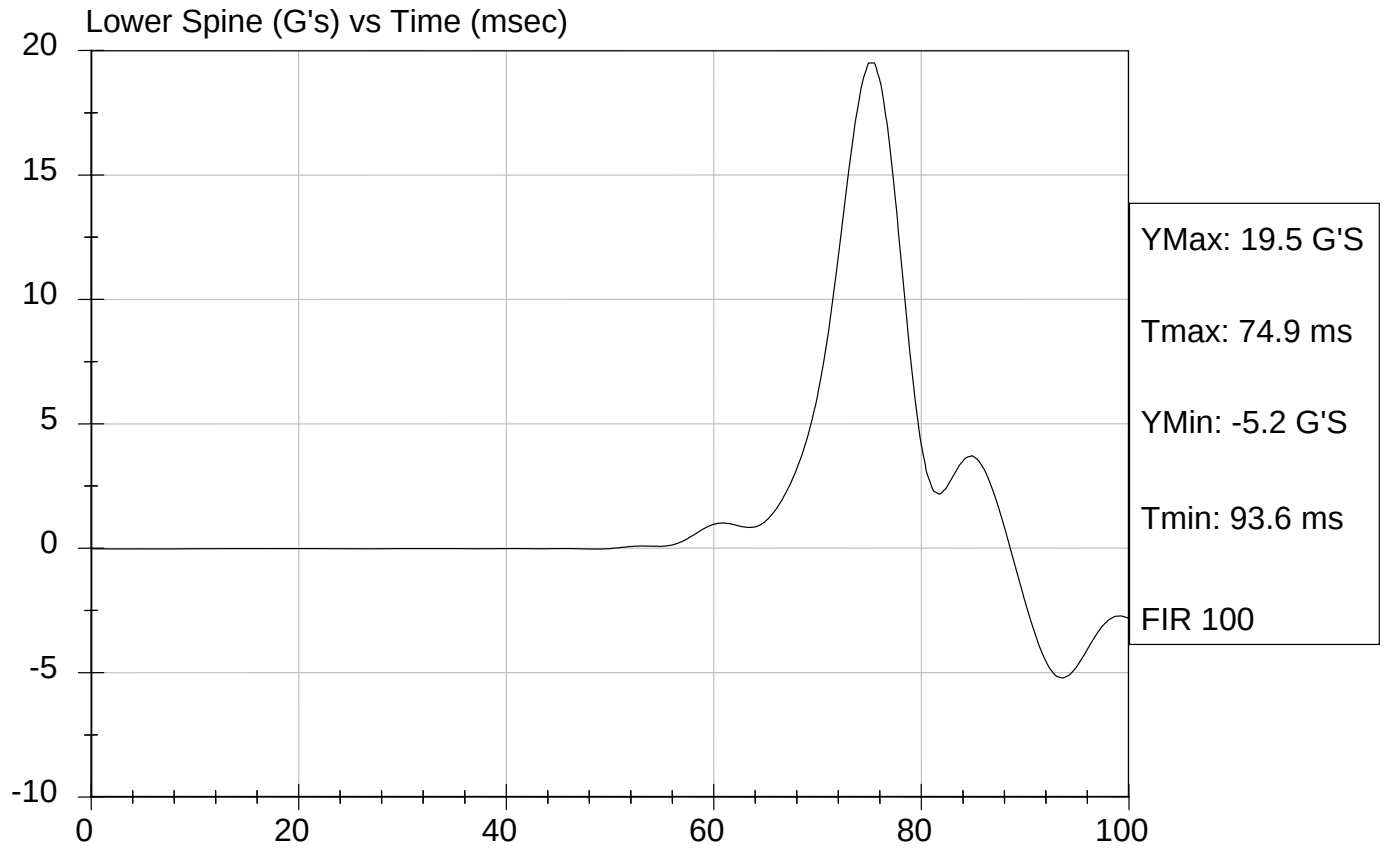
Test Date: 11/17/08
Speed: 14.12 ft/sec, 4.30 m/sec





Test Desc: Thorax Impact
Component ID: D083022

Test Date: 11/17/08
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: D083023

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Probe Velocity	m/s	4.27 - 4.33	4.30	Pass
Pelvis Acceleration	G's	40 - 60	44	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

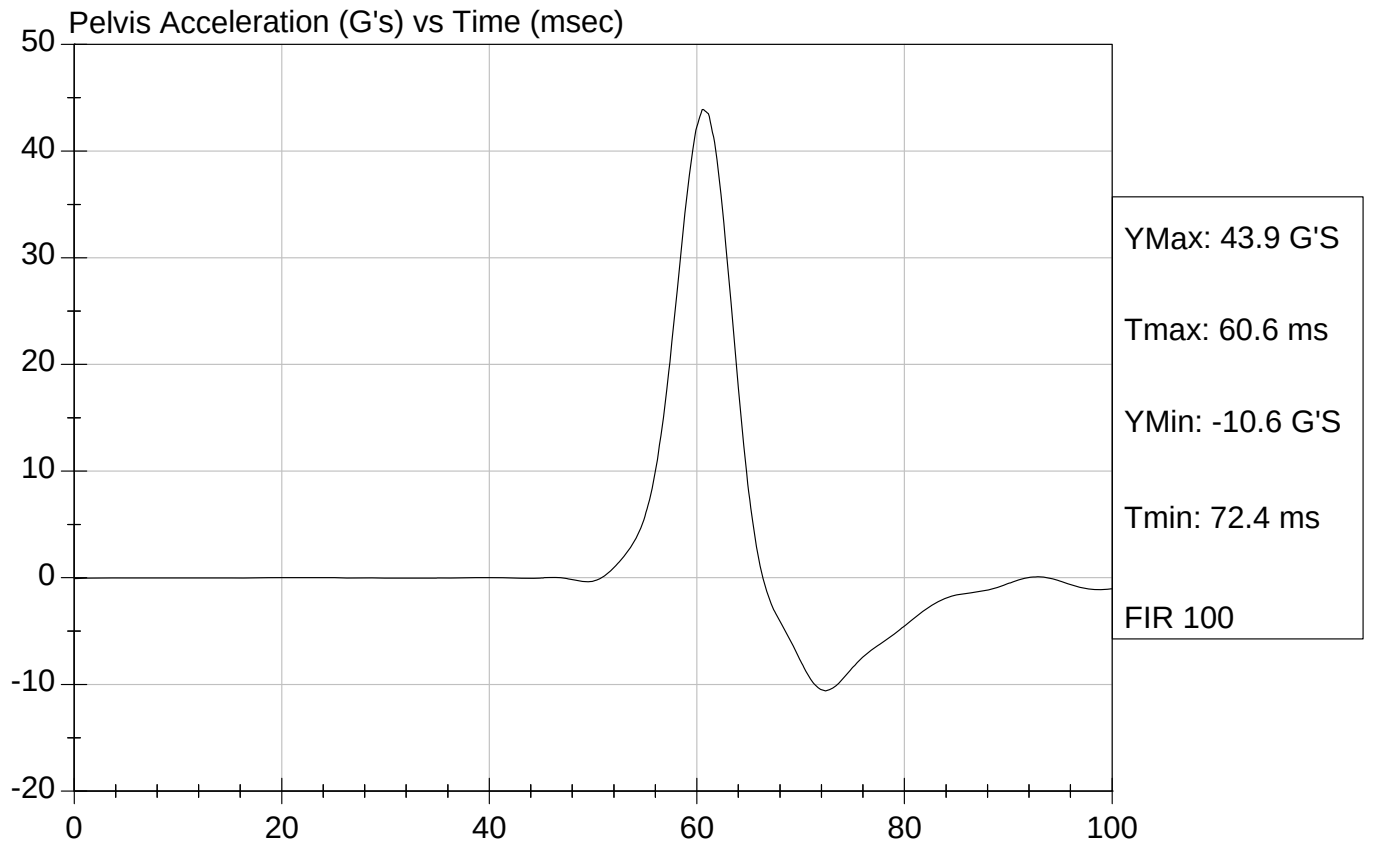
11/17/08
Test Date

David Winkelbauer
Approved By



Test Desc: Pelvis Impact
Component ID: D083023

Test Date: 11/17/08
Speed: 14.12 ft/sec, 4.30 m/sec

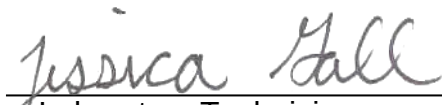


SID/HIII Calibration Data Sheet
Side Impact Dummy
Abdominal Compression Calibration (Pre-Load = 10 lbs)

ATD Serial No: 272

Test I.D: D083024

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Force At 12.7 mm	N	104 -162	131	Pass
Force At 19 mm	N	163 - 222	179	Pass
Force At 25.4 mm	N	222 - 280	245	Pass
Force At 33 mm	N	325 - 391	336	Pass
Overall Test Results				Pass


Laboratory Technician

11/17/08

Test Date

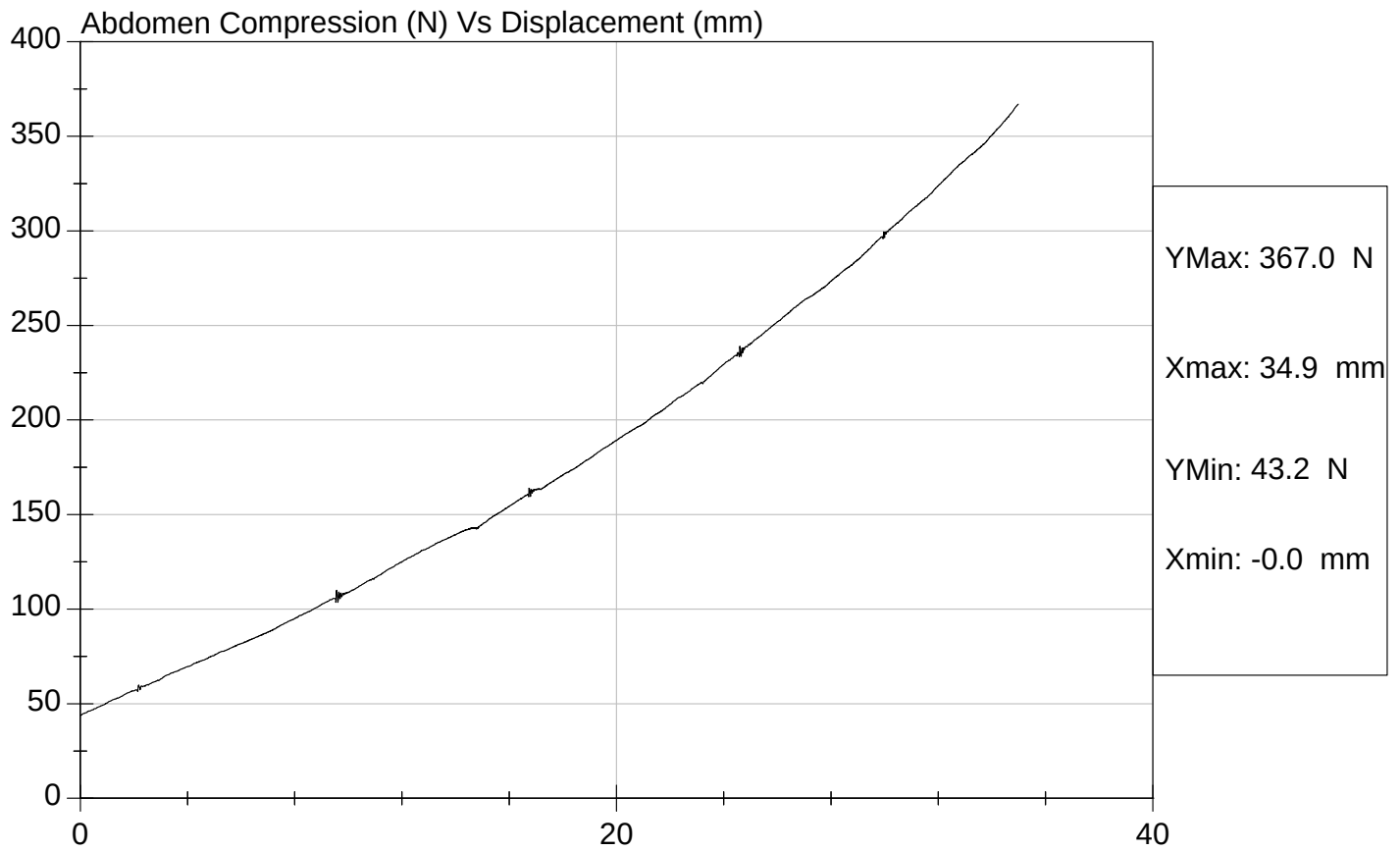

Approved By



Test Description: Abdomen Compression Test Date: 11/17/08

Component: D083024

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: D083025

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Force At 0 deg	N	0 - 26.7	0	Pass
Force At 20 deg	N	97.9 - 151.2	131.6	Pass
Force At 30 deg	N	151.2 - 204.6	176.7	Pass
Force At 40 deg	N	204.6 - 258.0	244.4	Pass
Return Angle	Deg	12 Maximum	5	Pass
			Overall Test Results	Pass

Jessica Hall
Laboratory Technician

David Winkelbauer
Approved By

11/17/08
Test Date

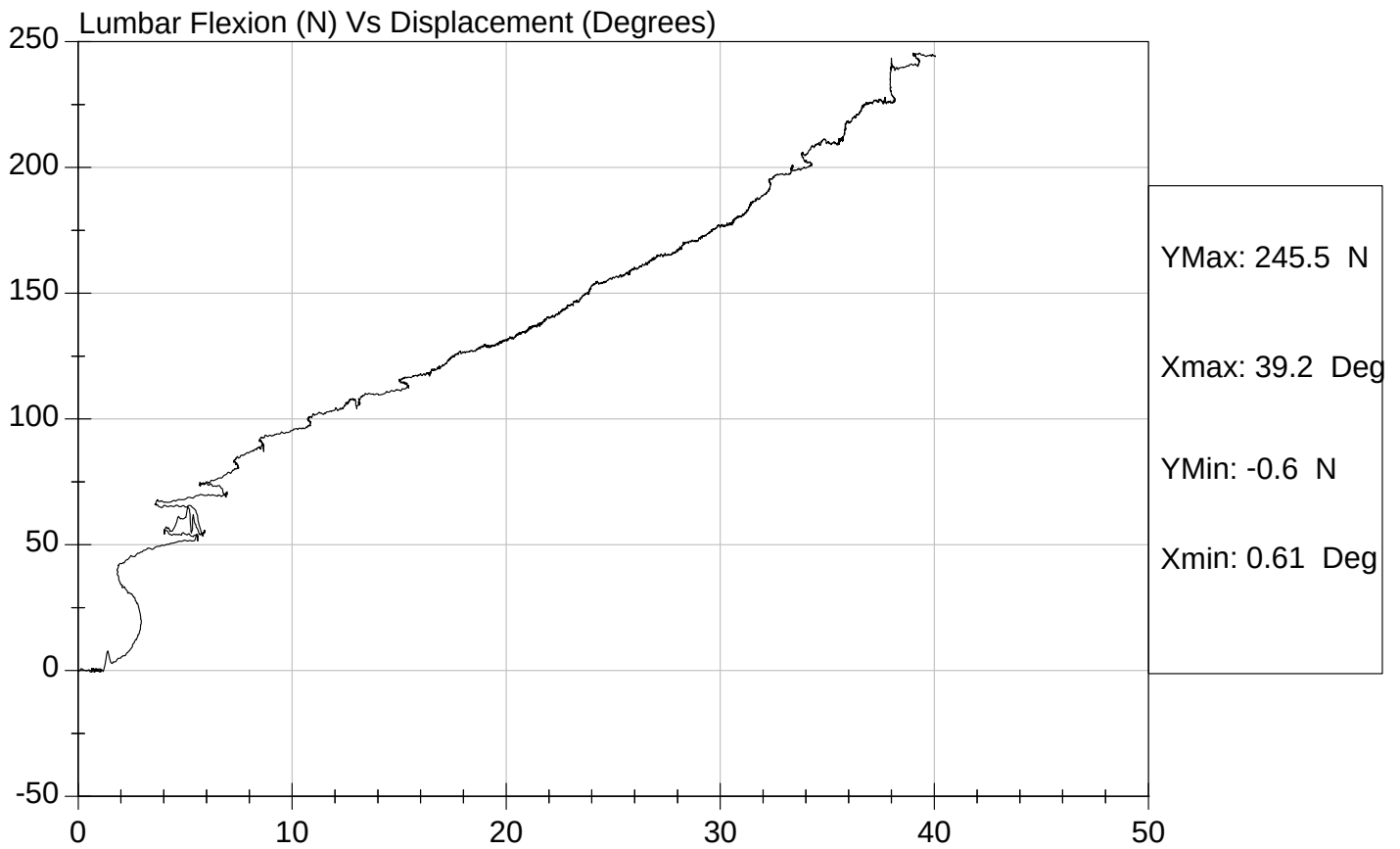


Test Description: Lumbar Flexion

Test Date: 11/17/08

Component: D083025

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: D083029

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.9	Pass
Laboratory Relative Humidity		%	10 to 70	20	Pass
Impact Velocity		m/s	6.89 to 7.13	7.06	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.44	Pass
	20 msec	m/s	4.12 to 5.10	4.71	Pass
	30 msec	m/s	5.73 to 7.01	6.45	Pass
	40 to 70 msec	m/s	6.27 to 7.64	6.82	Pass
Midsagittal Plane Max Rotation		deg	66 to 82	72	Pass
Head Rotation Peak to Zero - Decay Time		msec	58 to 67	59	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	76	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	58	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	13	Pass


 Laboratory Technician

11/17/08

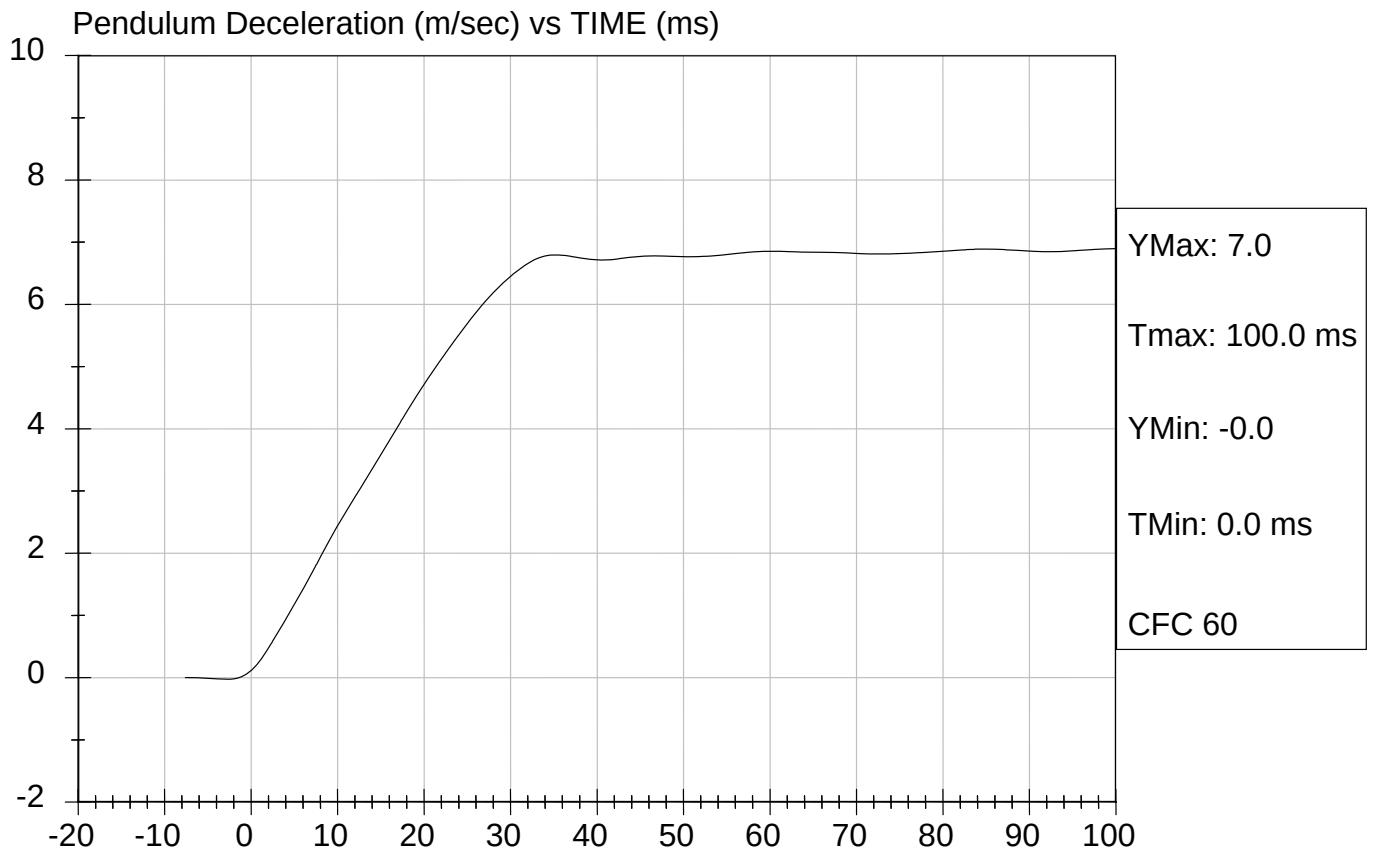
Test Date


 Approved By



Test Desc: Neck Bending
Component ID: D083029

Test Date: 11/17/08
Speed: 23.15 ft/sec, 7.06 m/sec

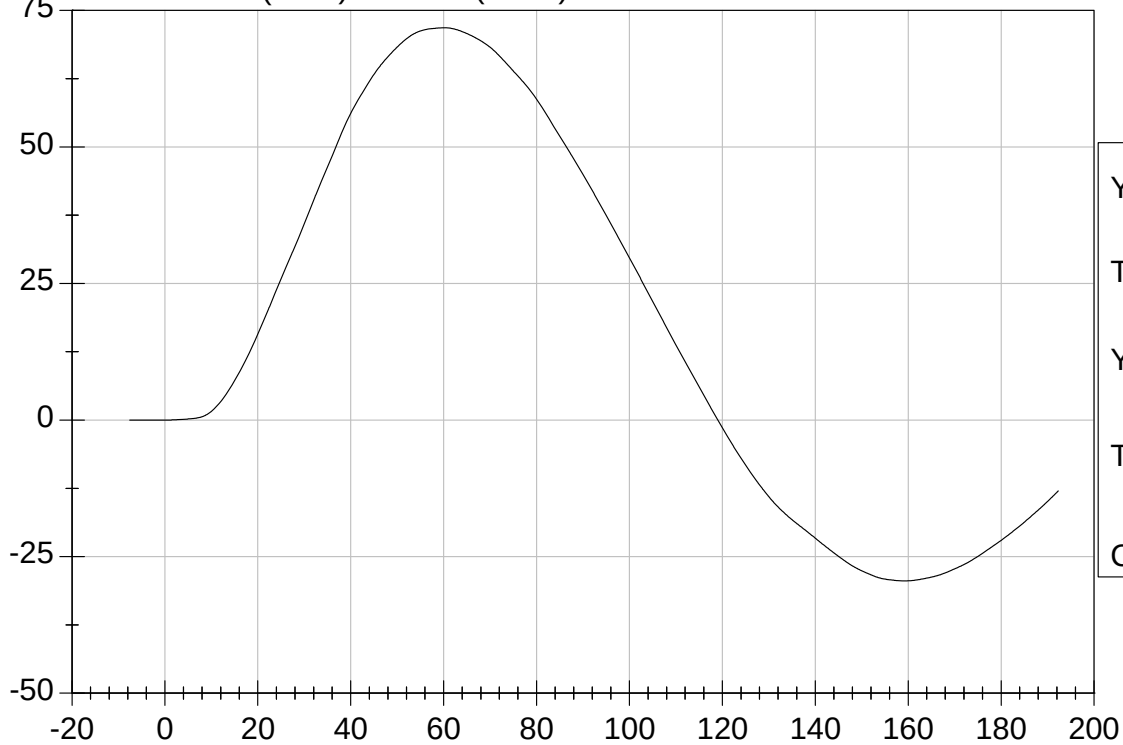




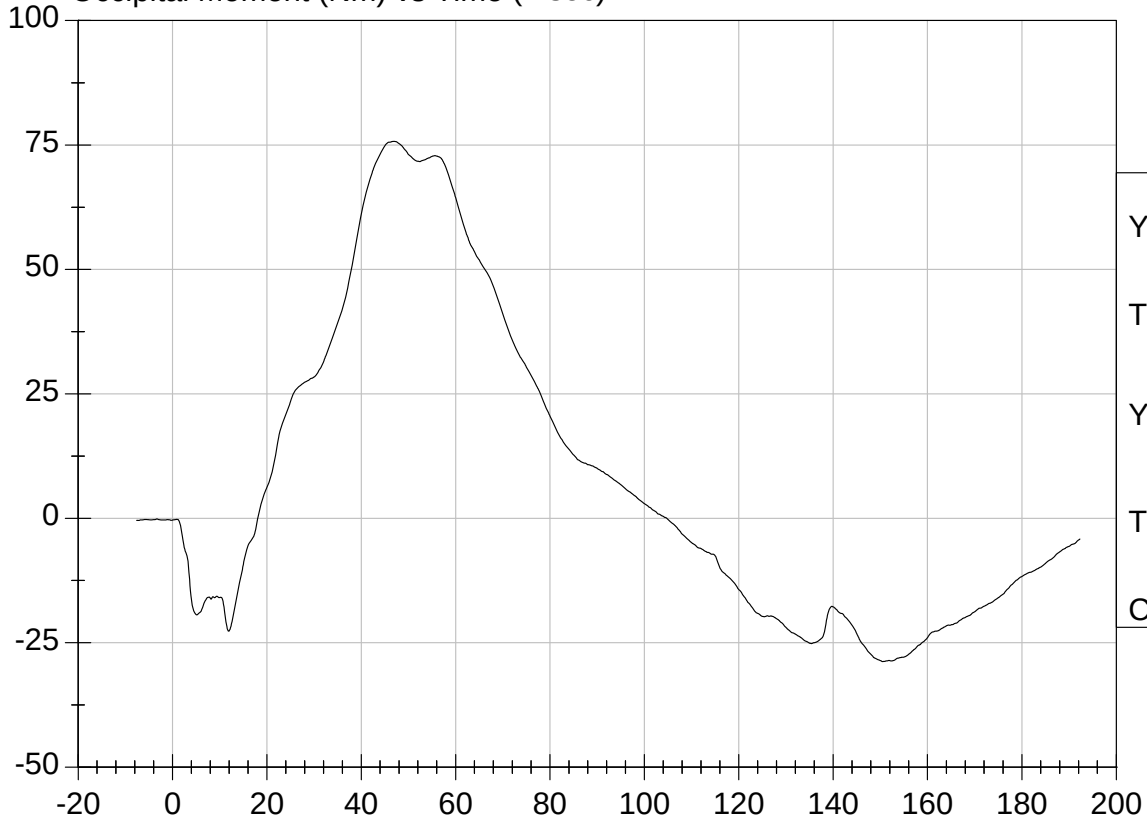
Test Desc: Neck Bending
Component ID: D083029

Test Date: 11/17/08
Speed: 23.15 ft/sec, 7.06 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: D09131

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	19	Pass
Peak Resultant Acceleration	G's	120 to 150	138	Pass
Is Resultant Curve Unimodal?	N/A	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-12.0	Pass
Overall Test Results				Pass


Laboratory Technician

1/23/09
Test Date


Approved By



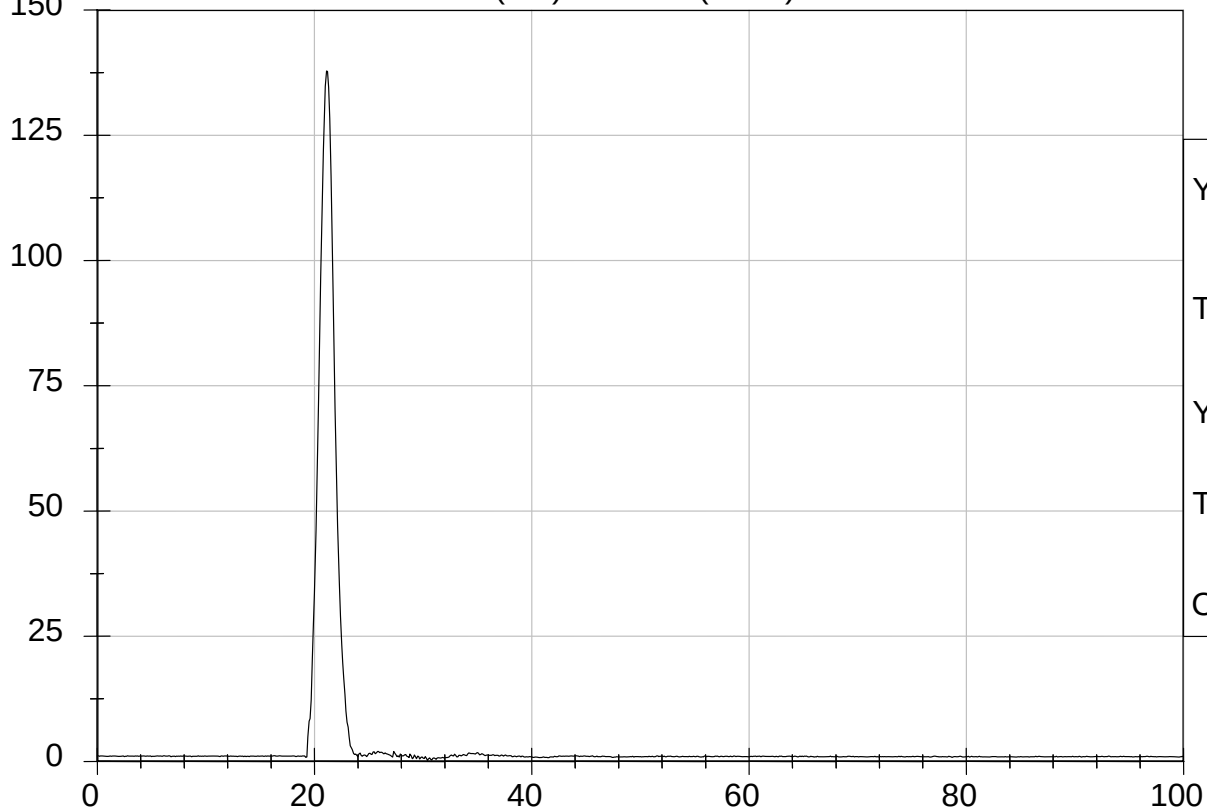
Test Description: Head Drop

Test Date: 1/23/09

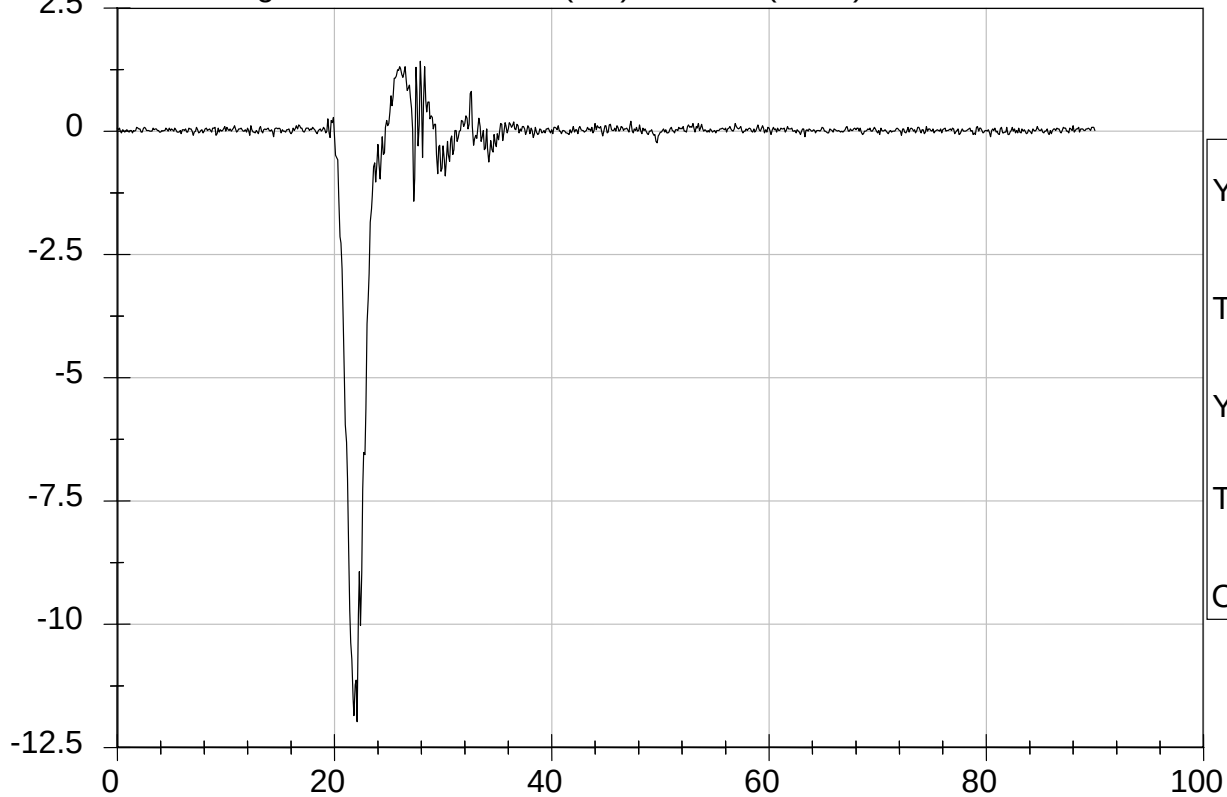
Component: D09131

Speed: 0 ft/s, 0 m/s

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



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



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

ATD Serial No: 272

Test I.D: D09132

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	19	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	19	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

1/23/09
Test Date

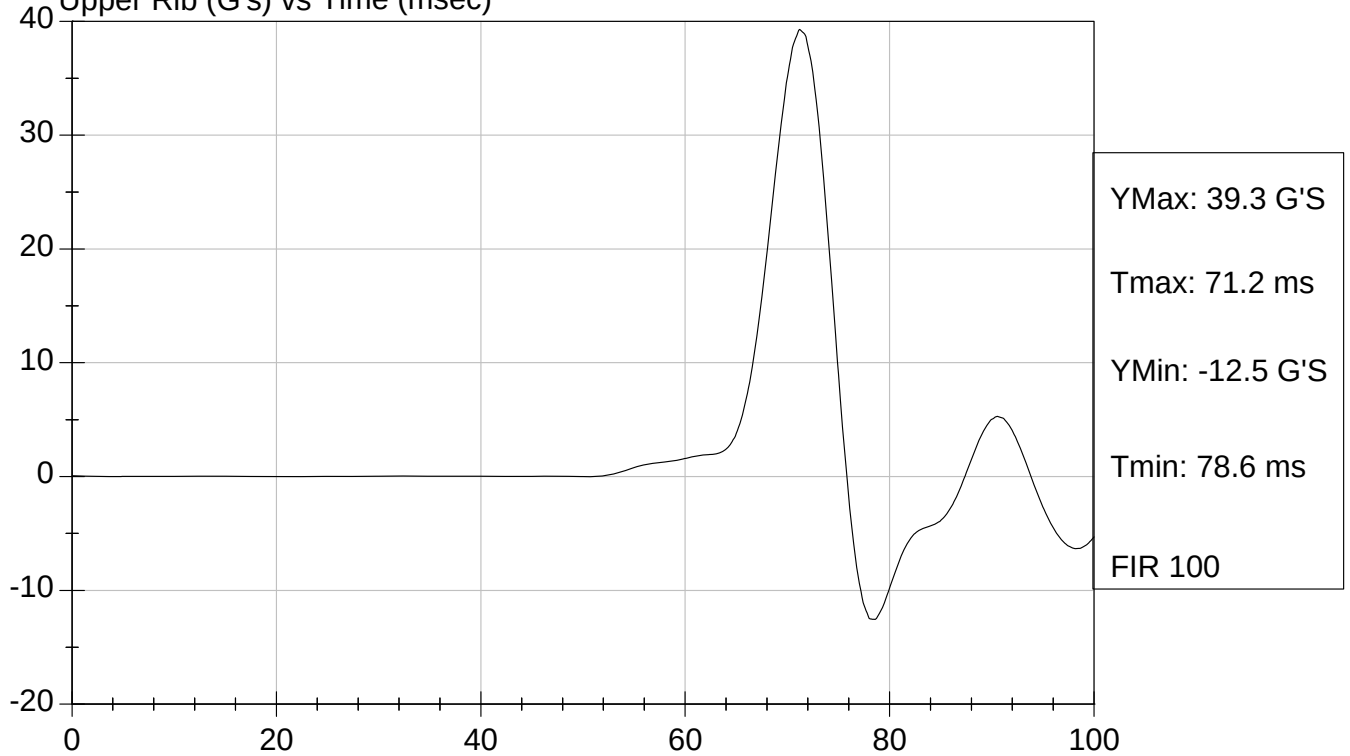
David Winkelbauer
Approved By



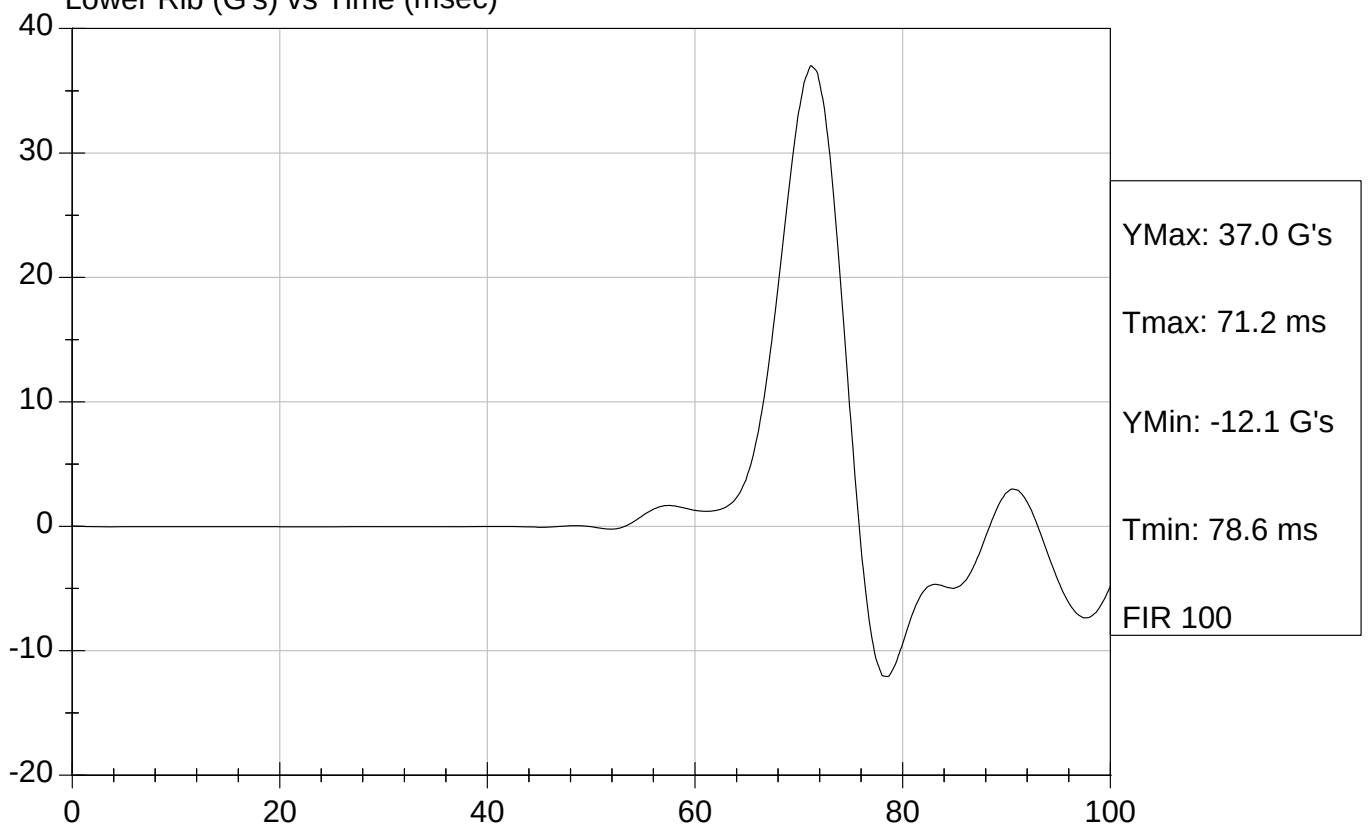
Test Desc: Thorax Impact
Component ID: D09132

Test Date: 1/23/09
Speed: 14.12 ft/sec, 4.30 m/sec

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



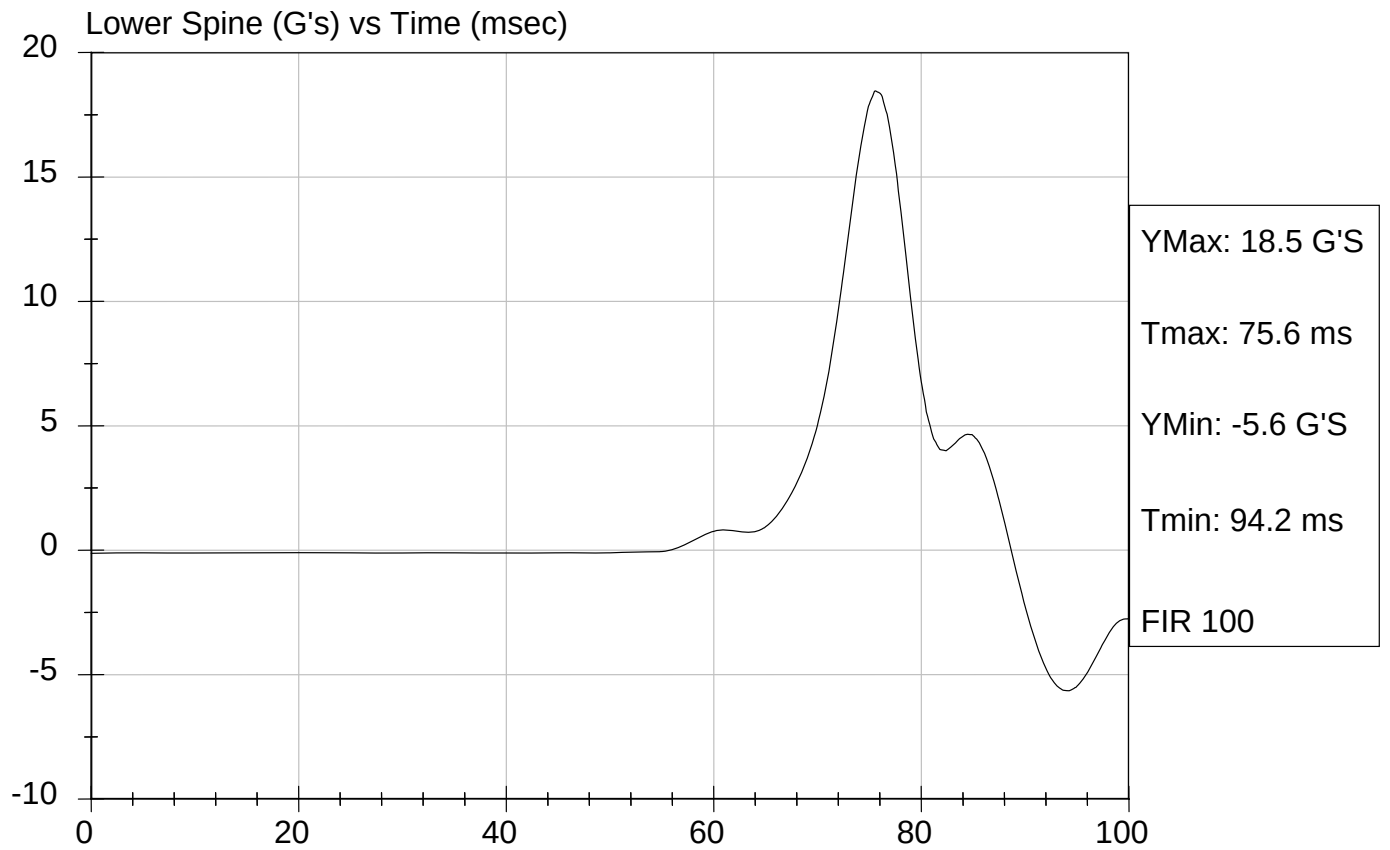
Lower Rib (G's) vs Time (msec)





Test Desc: Thorax Impact
Component ID: D09132

Test Date: 1/23/09
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: D09133

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	19	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

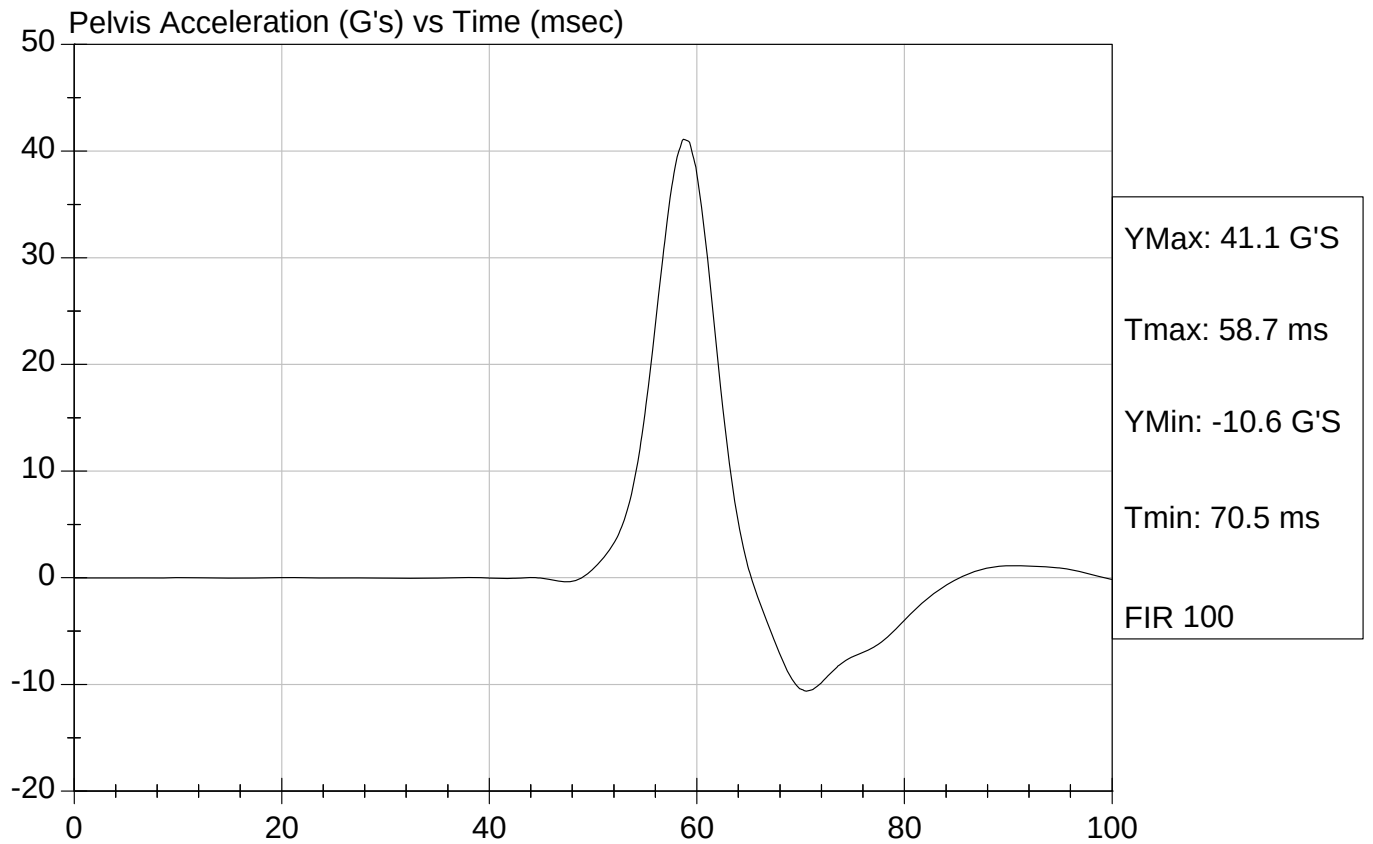
1/23/09
Test Date

David Winkelbauer
Approved By



Test Desc: Pelvis Impact
Component ID: D09133

Test Date: 1/23/09
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: D09134

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Force At 12.7 mm	N	104 -162	126	Pass
Force At 19 mm	N	163 - 222	175	Pass
Force At 25.4 mm	N	222 - 280	243	Pass
Force At 33 mm	N	325 - 391	338	Pass
Overall Test Results			Pass	


Laboratory Technician

1/23/09
Test Date

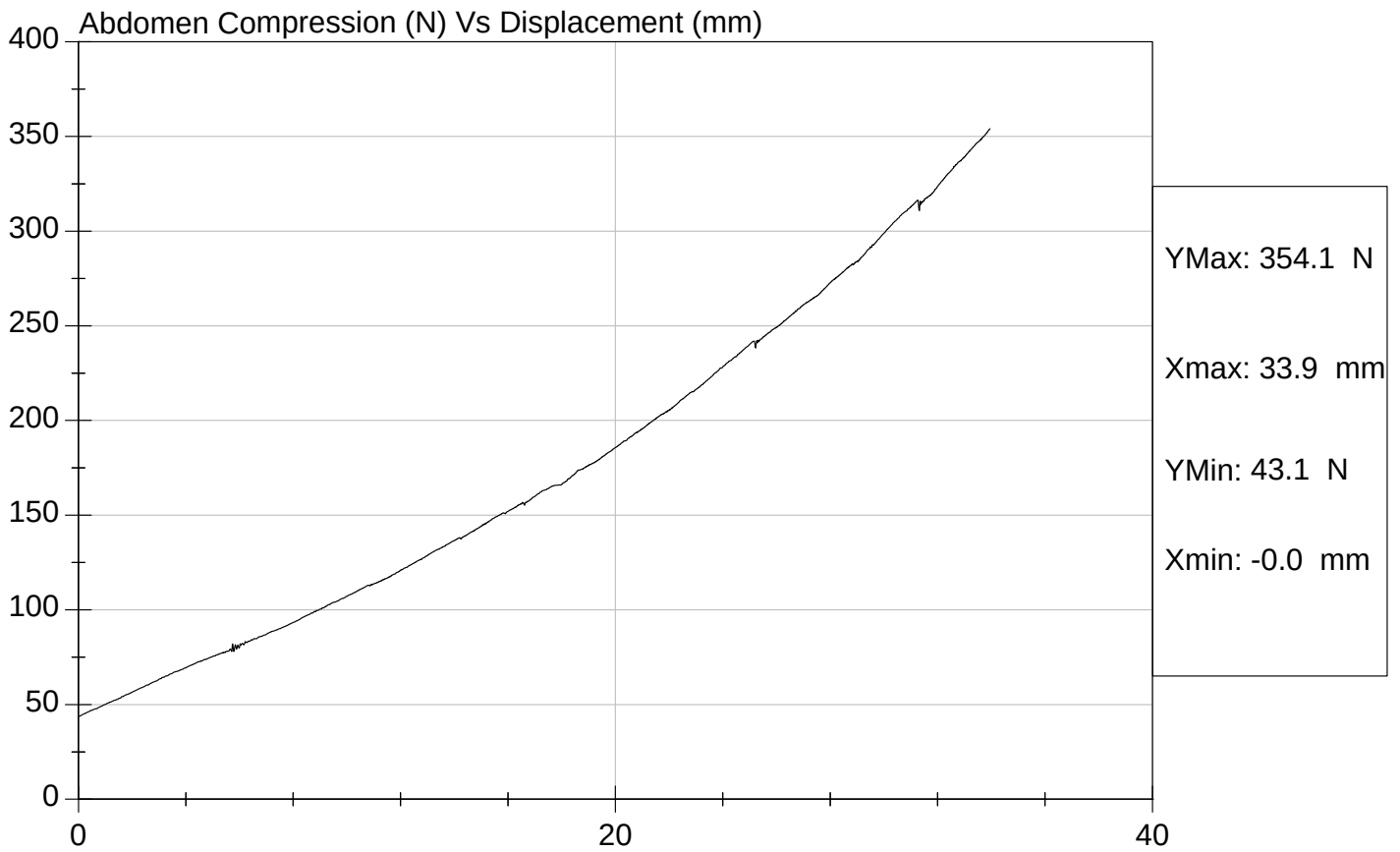

Approved By



Test Description: Abdomen Compression Test Date: 1/23/09

Component: D09134

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: D09135

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Force At 0 deg	N	0 - 26.7	0	Pass
Force At 20 deg	N	97.9 - 151.2	123.2	Pass
Force At 30 deg	N	151.2 - 204.6	165.8	Pass
Force At 40 deg	N	204.6 - 258.0	220.1	Pass
Return Angle	Deg	12 Maximum	3	Pass
Overall Test Results			Pass	

Jessica Hall
Laboratory Technician

1/23/09
Test Date

David Winkelbauer
Approved By

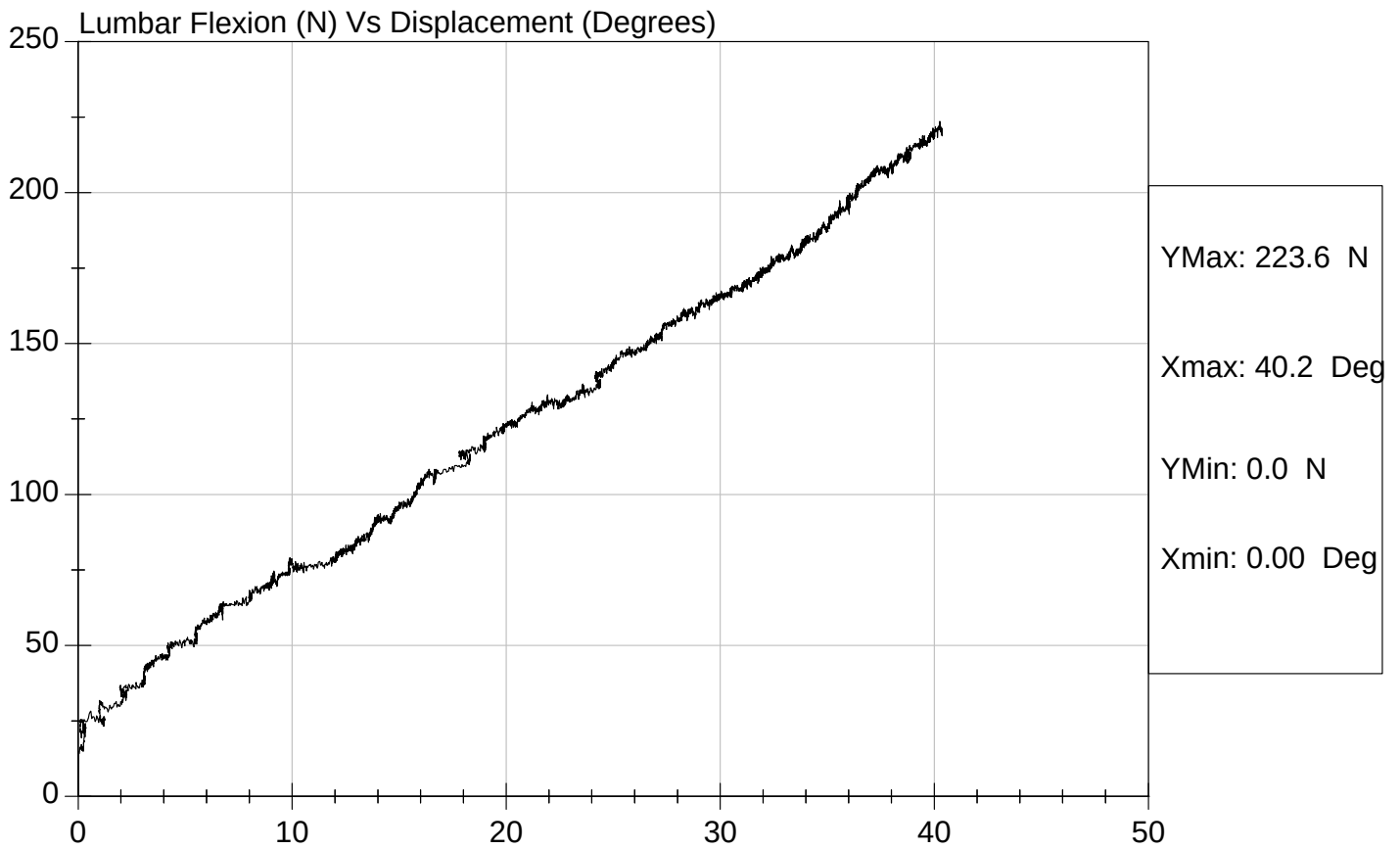


Test Description: Lumbar Flexion

Test Date: 1/23/09

Component: D09135

Speed: 0 ft/sec, 0 m/sec

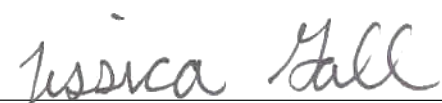


SID/HIII Calibration Data Sheet
Side Impact Dummy
Neck Pendulum Test

ATD Serial No: 272

Test I.D: D09139

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	20.7	Pass
Laboratory Relative Humidity		%	10 to 70	14	Pass
Impact Velocity		m/s	6.89 to 7.13	7.05	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.05	Pass
	20 msec	m/s	4.12 to 5.10	4.23	Pass
	30 msec	m/s	5.73 to 7.01	5.91	Pass
	40 to 70 msec	m/s	6.27 to 7.64	6.51	Pass
Midsaggital Plane Max Rotation		deg	66 to 82	71	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	58	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	12	Pass


 Laboratory Technician

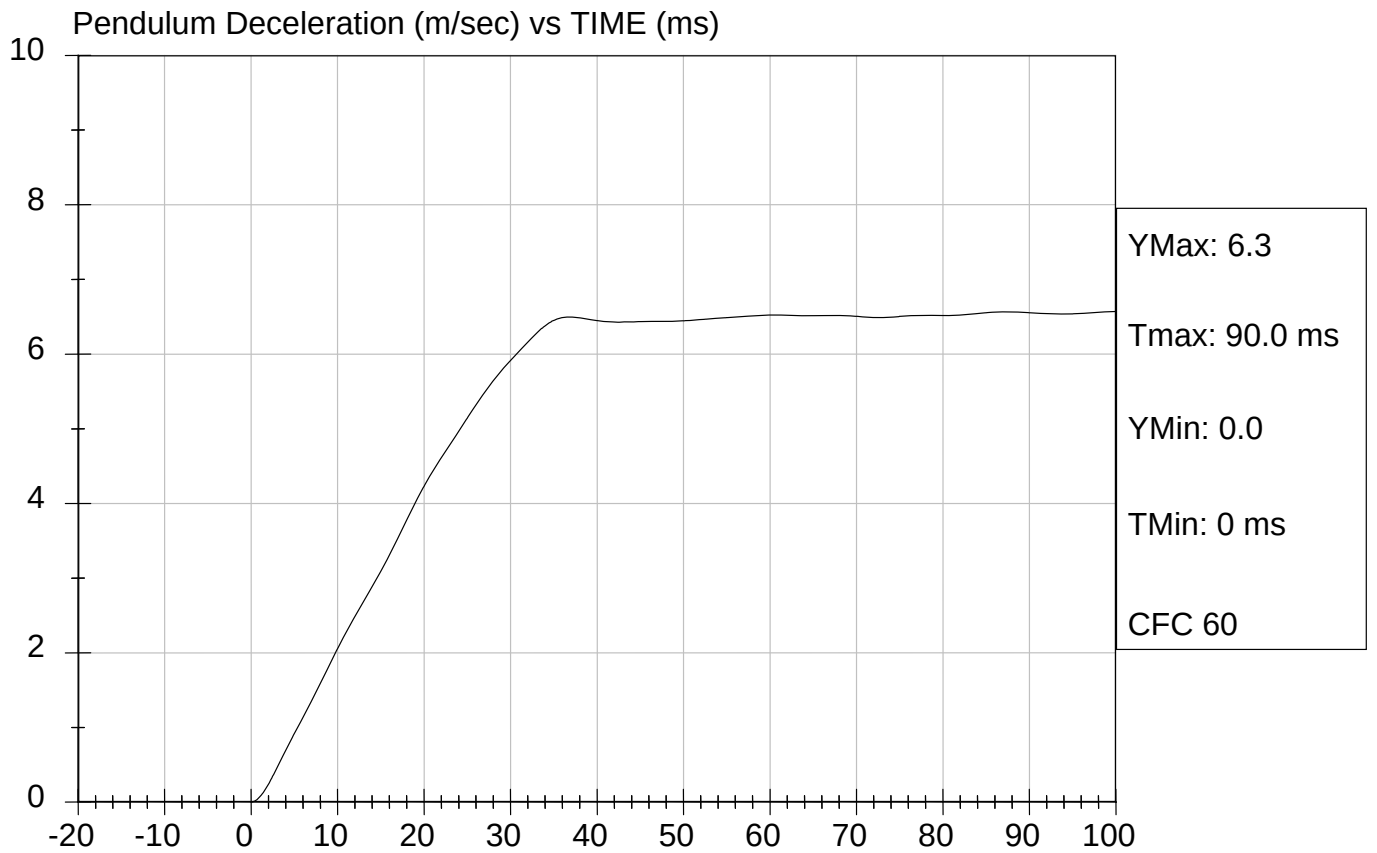

 Approved By

1/26/09
 Test Date



Test Desc: Neck Bending
Component ID: D09139

Test Date: 1/26/09
Speed: 23.14 ft/sec, 7.05 m/sec

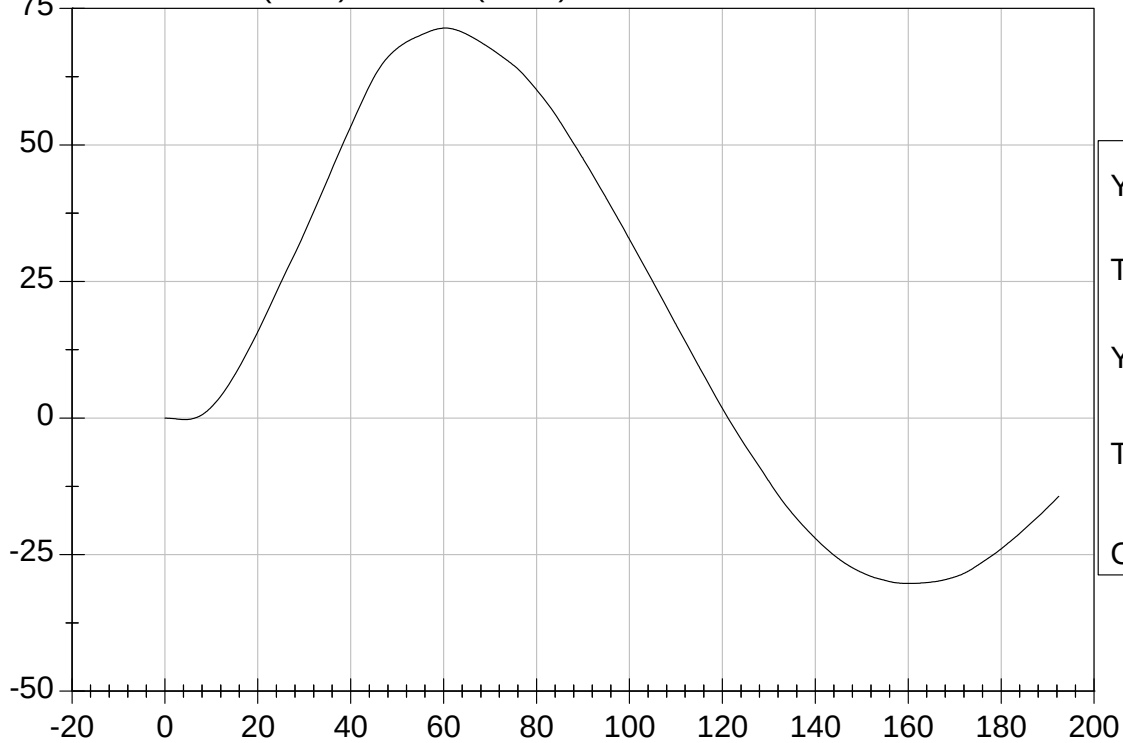




Test Desc: Neck Bending
Component ID: D09139

Test Date: 1/26/09
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

Jessica Hall
 Laboratory Technician
David Winkelbauer
 Approved By

9/24/08

Test Date