

REPORT NUMBER: NCAPSIDE-MGA-2009-017

**NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST**

**GENERAL MOTORS OF CANADA LTD.
2010 CHEVROLET CAMARO 1LT 2-DR COUPE
NHTSA NUMBER: MA0112**

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



Test Date: June 11, 2009

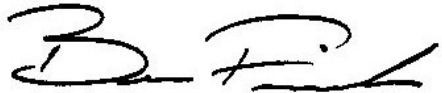
Report Date: July 16, 2009

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**

This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, in response to Contract Number DTNH22-03-D-12005.

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Technical Report Documentation Page

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16. Abstract A 55/28 km/h 90° Moving Deformable Barrier NCAP side impact was conducted on the subject 2010 Chevrolet Camaro 1LT 2-Dr Coupe 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 June 11, 2009. The impact velocity of the Moving Deformable Barrier (MDB) was 62.0 km/h, and the ambient temperature at the struck side (drivers) of the vehicle was 21°C. The target vehicle's maximum post test static crush was 219 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;">27.7</td> <td style="text-align: center;">N/A</td> </tr> <tr> <td>Left Lower Rib (LLR) Accel., g</td> <td style="text-align: center;">36.4</td> <td style="text-align: center;">N/A</td> </tr> <tr> <td>Lower Spine (T₁₂) Accel., g</td> <td style="text-align: center;">41.3</td> <td style="text-align: center;">N/A</td> </tr> <tr> <td>Thoracic Trauma Index (TTI)</td> <td style="text-align: center;">39</td> <td style="text-align: center;">N/A</td> </tr> <tr> <td>Pelvis (PEV) Accel., g</td> <td style="text-align: center;">38.9</td> <td style="text-align: center;">N/A</td> </tr> <tr> <td>HIC</td> <td style="text-align: center;">213</td> <td style="text-align: center;">N/A</td> </tr> </tbody> </table> The door on the struck side of the vehicle did not separate from the body at the hinge or latch and the opposite door did not open during the side impact event.					<u>DRIVER</u>	<u>PASS.</u>	Left Upper Rib (LUR) Accel., g	27.7	N/A	Left Lower Rib (LLR) Accel., g	36.4	N/A	Lower Spine (T ₁₂) Accel., g	41.3	N/A	Thoracic Trauma Index (TTI)	39	N/A	Pelvis (PEV) Accel., g	38.9	N/A	HIC	213	N/A
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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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TABLE OF CONTENTS

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

SECTION 1

PURPOSE AND TEST PROCEDURE

PURPOSE

This side impact test was conducted as part of the test program sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-03-D-12005. The purpose of this test was to evaluate side impact protection in a 2010 Chevrolet Camaro 1LT 2-Dr Coupe manufactured by General Motors of Canada Ltd.

TEST PROCEDURE

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

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

SECTION 2

SUMMARY OF NCAP SIDE IMPACT TEST

A model year 2010 Chevrolet Camaro 1LT 2-Dr Coupe was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 62.0 km/h. The specified impact velocity range is from 61.1 to 62.7 km/h. The test (target) vehicle was stationary and positioned 63° to the line of forward motion. The weight of the vehicle as tested was 1929.1 kg and the test weight of the MDB was 1361.5 kg. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on June 11, 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/HIIIs) can be found in Appendix A. Two 50th percentile adult male SID/HIIIs were placed in the driver and left rear passenger designated seating positions according to instructions specified in the Laboratory Test Procedure for New Car Assessment Program Side Impact Testing dated November 2002. Each SID/HIII was instrumented in the following locations:

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

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

2.2 GENERAL COMMENTS

The test vehicle sustained a maximum static crush of 219 mm at level 3, 1500 mm rearward of the vertical impact point. The driver and passenger SID/HIIIs, Serial Nos. 271 and 272 respectively, were calibrated just prior to this test.

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

The occupant data is summarized below:

ATD position	HIC	T ¹	T ²	TTI (G's)	Peak Pelvis (G's)
Driver	213	37.6	62.3	39	38.9
Passenger					

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:

Floorpan @ Rear Axle X after 60 msec.

Floorpan @ Rear Axle Y after 60 msec.

Floorpan @ Rear Axle Z after 60 msec.

Struck-side curtain airbag deployment was restricted by the driver seat belt D-ring.

Because of head and leg clearance, a ballast dummy with legs removed, was seated in the left rear seating position.

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DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2010 Chevrolet Camaro 1LT 2-Dr Coupe

NHTSA No. MA0112

Test Program: NCAP Side Impact

Test Date: 6/11/2009

TEST VEHICLE INFORMATION

Make	Chevrolet
Model	Camaro
Body Style	Coupe
NHTSA No.	MA0112
VIN	2G1FB1EV6A9104152
Color	Victory Red
Delivery Date	5/28/09
Odometer Reading (mile)	287
Dealer	Boucher Fleet Group
Transmission	Automatic
Final Drive	Rear
Number of Cylinders	6
Engine Displacement (L)	3.6
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	No
Power Steering	Yes
Power Door Locks	Yes
Tilt Wheel	Yes
Anti-lock Brakes	Yes
Traction Control	Yes
All Wheel Drive	No
Power Seats	Yes
Pretensioners	Yes
Load Limiters	Yes
Bucket Seats	Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	General Motors of Canada Ltd.
Date of Manufacture	04/09

GVWR (kg)	2062
GAWR Front (kg)	977
GAWR Rear (kg)	1085

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bucket		
Number Of Occupants	2	2		4
Capacity Wt. (VCW) (kg)				332
Cargo Wt. (RCLW) (kg)				60

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

Test Vehicle: 2010 Chevrolet Camaro 1LT 2-Dr Coupe
 Test Program: NCAP Side Impact

NHTSA No. MA0112
 Test Date: 6/11/2009

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	446.3	413.2		481.7	512.1	
Right	kg	450.0	406.0		457.2	478.1	
Ratio	%	52.2	47.8		48.7	51.3	
Totals	kg	896.3	819.2	1715.5	938.9	990.2	1929.1

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1715.5
Weight of 2 P572M ATDs	kg	161.5
Rated Cargo/Luggage Weight (RCLW)	kg	60
Calculated Vehicle Target Weight (TVTW)	kg	1937.0

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

Weight of Ballast in Trunk (kg): 15.0

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	766	765	779	785	1362
As Tested	mm	758	765	755	778	1465
Fully Loaded	mm	753	763	751	759	

TEST VEHICLE VERTICAL IMPACT LINE DATA

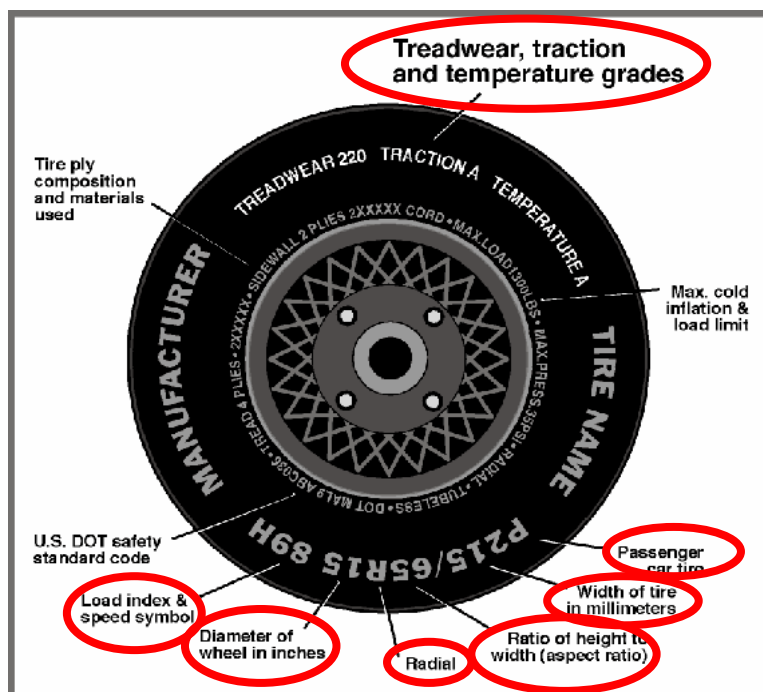
Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2854
Target Impact Point Aft of Front Axle	mm	487
Actual Impact Point Aft of Front Axle	mm	471

DATA SHEET NO. 2

TEST VEHICLE TIRE INFORMATION

Test Vehicle: 2010 Chevrolet Camaro 1LT 2-Dr Coupe
 Test Program: NCAP Side Impact

NHTSA No. MA0112
 Test Date: 6/11/2009



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	340	340
Cold Test Pressure (kPa)	250	250
Recommended Tire Size	245/45ZR20	275/40ZR20
Tire Size on Vehicle	245/45ZR20	275/40ZR20
Tire Manufacturer	Pirelli	Pirelli
Tire Name	P ZERO	P ZERO
Tire Type	Passenger	Passenger
Tire Width (mm)	245	275
Ratio of Height to Width (aspect ratio)	45	40
Radial	R	R
Wheel Diameter	20	20
Load Index & Speed Symbol	103Y	106Y
Treadwear	220	220
Traction Grade	AA	AA
Temperature Grade	A	A

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

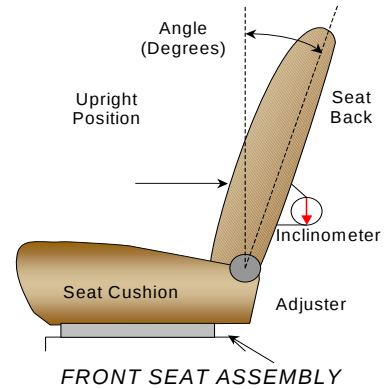
Test Vehicle: 2010 Chevrolet Camaro 1LT 2-Dr Coupe
 Test Program: NCAP Side Impact

NHTSA No. MA0112
 Test Date: 6/11/2009

NORMAL DESIGN RIDING POSITION

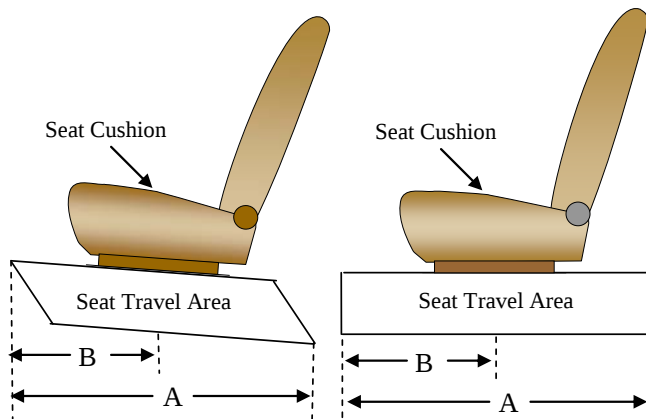
The driver and passenger seat back is positioned to the manufacturer's designated angle. The procedure is as follows: For the driver seat, the seat back angle at test position is 7 degrees at headrest post relative to the door sill. The second row seat backs are not adjustable.

Driver seat back angle: 7.0 degrees at the headrest post
 Passenger seat back angle: Fixed



SEAT FORE/AFT POSITIONS

	Total Fore/Aft Travel	Placed in position #
Driver Seat	277.8 mm	138.9 mm
Rear Seat	Fixed	Fixed



DATA SHEET NO. 3 (CONTINUED)

TEST VEHICLE INFORMATION

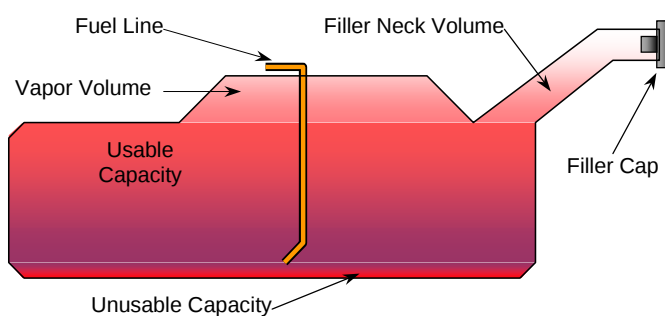
Test Vehicle: 2010 Chevrolet Camaro 1LT 2-Dr Coupe
 Test Program: NCAP Side Impact

NHTSA No. MA0112
 Test Date: 6/11/2009

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	72.0
Usable Capacity of "Optional" Tank	
92-94% of Usable Capacity	66.2 to 67.7
Actual Amount of Solvent used	66.6
1/3 of Usable Capacity	24.0

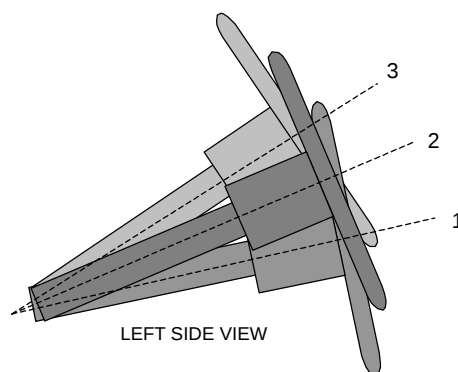
The test vehicle is equipped with an electric fuel pump. The fuel pump will pump fuel when the ignition switch is on. Fuel pump will shut down as soon as system is pressurized. The fuel filler neck is on the right side.



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	132	69.2
Geometric center position No. 2	152	71.5
Uppermost position No. 3	172	73.8

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

Test Vehicle: 2010 Chevrolet Camaro 1LT 2-Dr Coupe
Test Program: NCAP Side Impact

NHTSA No. MA0112
Test Date: 6/11/2009

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	62.0
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.8
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	16 forward
Vertical Offset	mm	+/-20	4 down

DATA SHEET NO. 5**POST TEST OBSERVATIONS**Test Vehicle: 2010 Chevrolet Camaro 1LT 2-Dr CoupeNHTSA No. MA0112Test Program: NCAP Side ImpactTest Date: 6/11/2009**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	Headliner, Headrest	
Upper Torso Contact	Side Airbag, Door Panel	
Lower Torso Contact	Side Airbag, Door Panel	
Left Knee Contact	Door Panel	
Right Knee Contact	Left Knee	

POST TEST DOOR OPENING AND SEAT TRACK INFORMATION

Description	Front	Rear
Locked/Unlocked Doors	Struck side door was locked; Non-struck side door was unlocked	
Left Side Door Opening	Door remained closed and latched	
Right Side Door Opening	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	Windshield was cracked.
Window Damage	Left Front and Left Rear Windows were broken.
Other Notable Effects	Struck-side curtain airbag deployment was restricted by the driver seat belt D-ring.

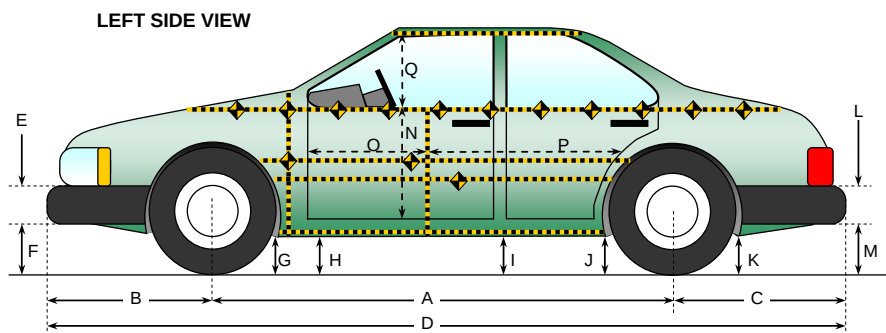
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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: 2010 Chevrolet Camaro 1LT 2-Dr Coupe
 Test Program: NCAP Side Impact

NHTSA No. MA0112
 Test Date: 6/11/2009



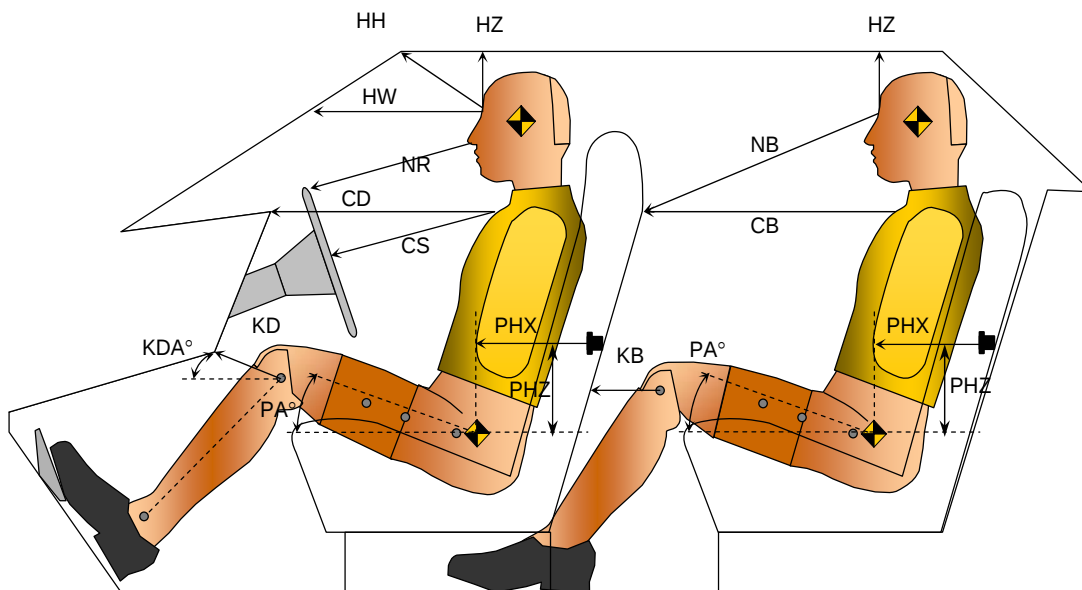
All Measurements in mm

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2854	2823	31
B	Front Axle to FSOV	916	927	-11
C	Rear Axle to RSOV	1066	1073	-7
D	Total Length at Centerline	4836	4823	13
E	Front Bumper Thickness	154	154	0
F	Front Bumper Bottom to Ground	255	265	-10
G	Sill Height at Front Wheel Well	165	180	-15
H	Sill Height at Front Door Leading Edge	164	178	-14
I	Sill Height at "B" Pillar	173	165	8
J1	Sill Height at Rear Wheel Well	172	170	2
J2	Pinch Weld Height at Rear Wheel Well	168	168	0
K	Sill Height Aft of Rear Wheel Well	210	188	22
L	Rear Bumper Thickness	152	152	0
M	Rear Bumper Bottom to Ground	530	533	-3
N	Sill Height to Window Bottom Sill	720	685	35
O	Front Door Leading Edge to Impact CL	586	583	3
P	Rear Door Trailing Edge to Impact CL	830	820	10
Q	Front Window Opening	289	300	-11
R	Right Side Length	4040	4047	-7
S	Left Side Length	4040	4002	38
T	Vehicle Width at "B" Post	1836	1687	149

DATA SHEET NO. 7
SID/HII LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2010 Chevrolet Camaro 1LT 2-Dr Coupe
 Test Program: NCAP Side Impact

NHTSA No. MA0112
 Test Date: 6/11/2009

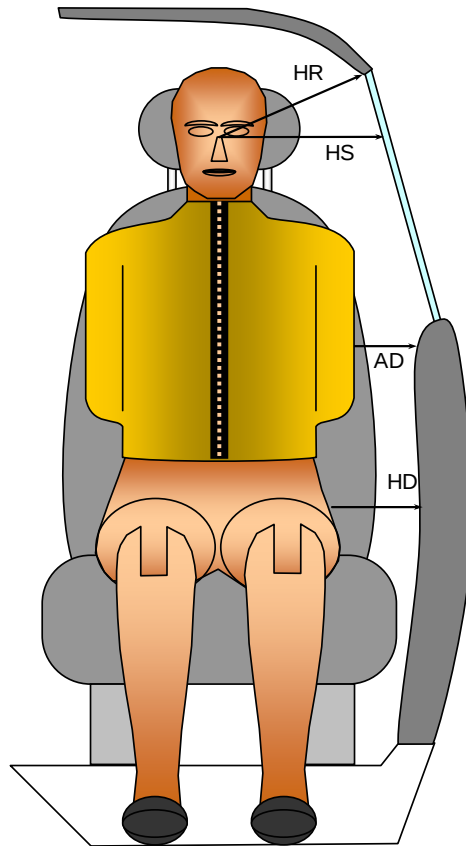


Driver Code	Pass. Code	Measurement Description	Driver S/N 271		Passenger S/N 272	
			Length(mm)	Angle(°)	Length(mm)	Angle(°)
HH		Head to Header	476			
HW		Head to Windshield	662			
HZ	HZ	Head to Roof	133			
NR	NB	Nose to Rim/Nose to Seatback	420			
CD	CB	Chest to Dash or Seatback	547			
CS		Chest to Steering Wheel	333			
KDL	KBL	Left Knee to Dash or Seatback	172	25.0		
KDR	KBR	Right Knee to Dash or Seatback	170	26.3		
PA	PA	Pelvic Angle		24.4		
PHX	PHX	H-Point to Striker (X-Axis)	539			
PHZ	PHZ	H-Point to Striker (Z-Axis)	228			

DATA SHEET NO. 8
SID/HIII LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2010 Chevrolet Camaro 1LT 2-Dr Coupe
 Test Program: NCAP Side Impact

NHTSA No. MA0112
 Test Date: 6/11/2009



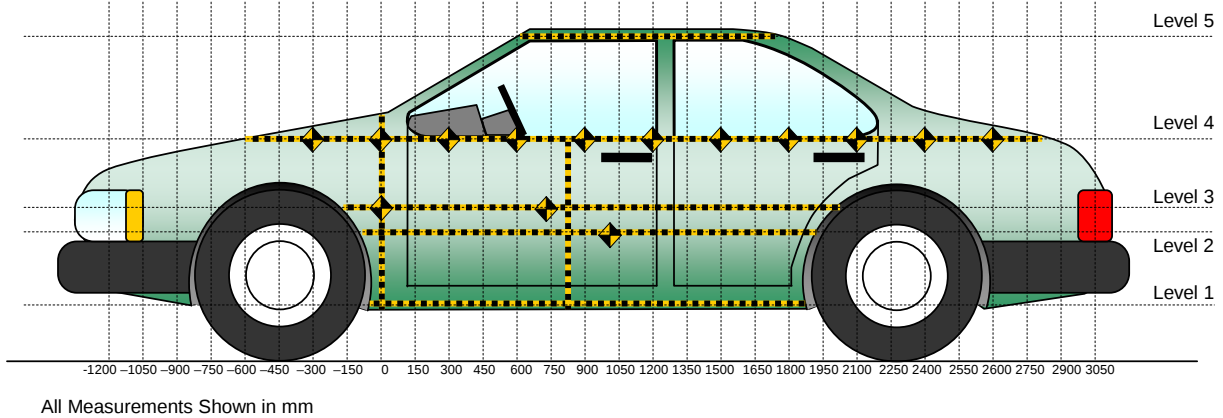
FRONT VIEW OF DUMMY

Code	Measurement Description	Units	Driver S/N 271	Passenger S/N 272
HR	Head to Side Header	mm	160	
HS	Head to Side Window	mm	303	
AD	Arm to Door	mm	115	
HD	H-Point to Door	mm	159	

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

Test Vehicle: 2010 Chevrolet Camaro 1LT 2-Dr Coupe
 Test Program: NCAP Side Impact

NHTSA No. MA0112
 Test Date: 6/11/2009



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	32	1500	1265
4	Window Sill	115	1350	960
3	Mid Door	219	1500	640
2	Occupant H-Point	196	600	440
1	Sill Top	85	1350	260
	Maximum Penetration	219		

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2010 Chevrolet Camaro 1LT 2-Dr Coupe
 Test Program: NCAP Side Impact

NHTSA No. MA0112
 Test Date: 6/11/2009

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900				314					317					3	
-750				300					305					5	
-600				288					294					6	
-450				278					284					6	
-300				274					285					11	
-150			142	273				208	287				66	14	
0	203	162	147	272		227	274	256	287		74	112	109	15	
150	204	168	151	270		255	356	294	292		51	188	143	22	
300	204	174	155	271		279	352	343	294		75	178	188	23	
450	205	178	159	269		285	370	365	304		80	192	206	35	
600	205	180	164	268		284	376	373	316		79	196	209	48	
750	207	185	168	270	438	283	375	378	330	463	76	190	210	60	25
900	210	190	173	273	432	286	374	381	341	451	76	184	208	68	19
1050	212	194	177	274	437	286	377	391	351	464	74	183	214	77	27
1200	214	198	181	276	440	290	375	398	372	470	76	177	217	96	30
1350	215	204	186	279	445	300	382	404	394	474	85	178	218	115	29
1500	220	208	190	285	449	303	378	409	380	481	83	170	219	95	32
1650	220	204	195	290	454	285	377	387	378	483	65	173	192	88	29
1800	213	182	176	296	462	254	346	384	370	484	41	164	208	74	22
1950	203	157	165	295	482	226	327	309	355	503	23	170	155	60	21
2100			141	295	513			215	340	531			74	45	18
2250				297	550				324	566				27	16
2400				299					326					27	
2550				303					322					19	
2700				306					320					14	
2850				313					321					8	
3000				326					331					5	

Reference plane is parallel to test vehicle longitudinal centerline.

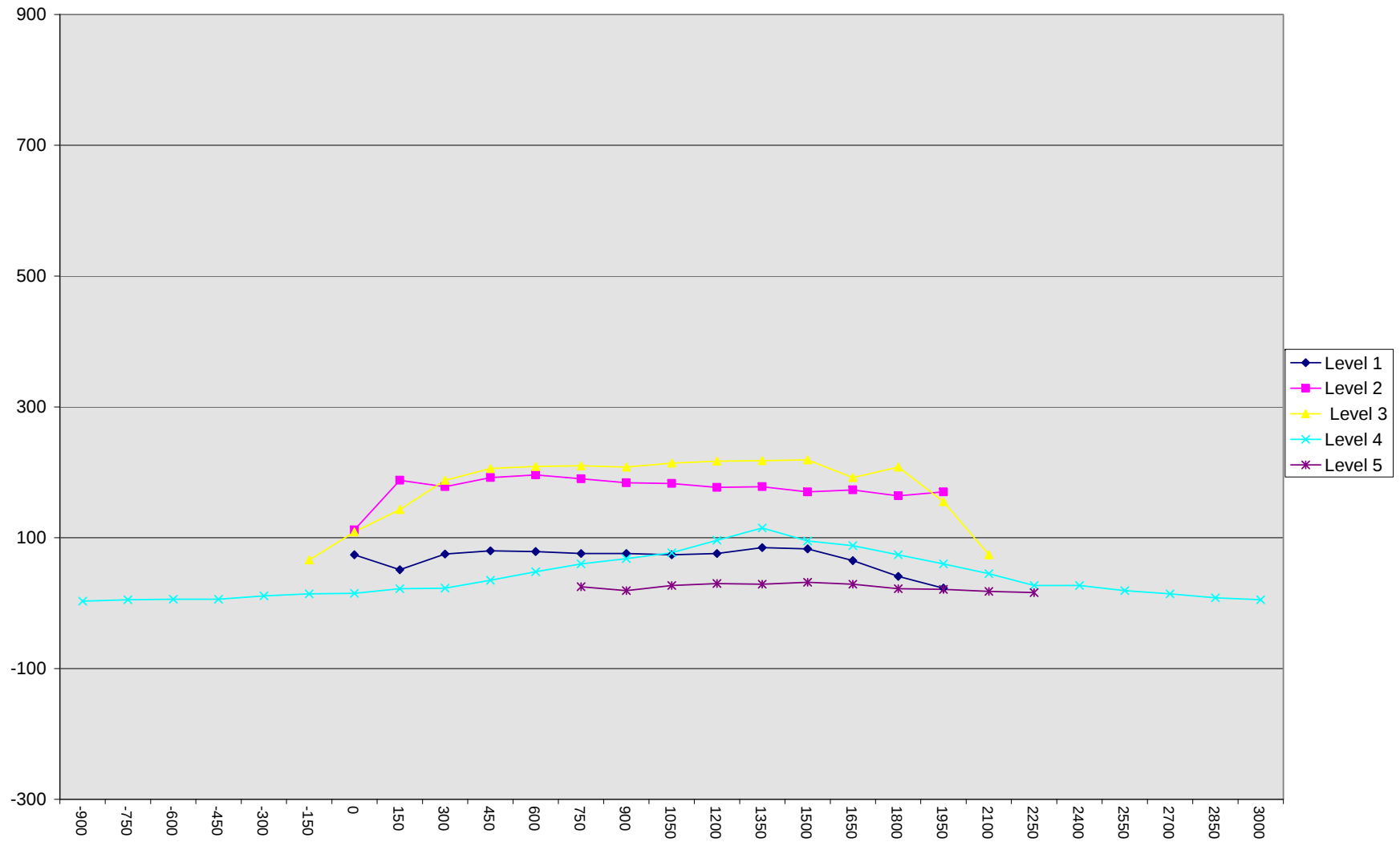
Given dimensions = Reference plane to car body

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

Test Vehicle: 2010 Chevrolet Camaro 1LT 2-Dr Coupe
Test Program: NCAP Side Impact

NHTSA No. MA0112
Test Date: 6/11/2009

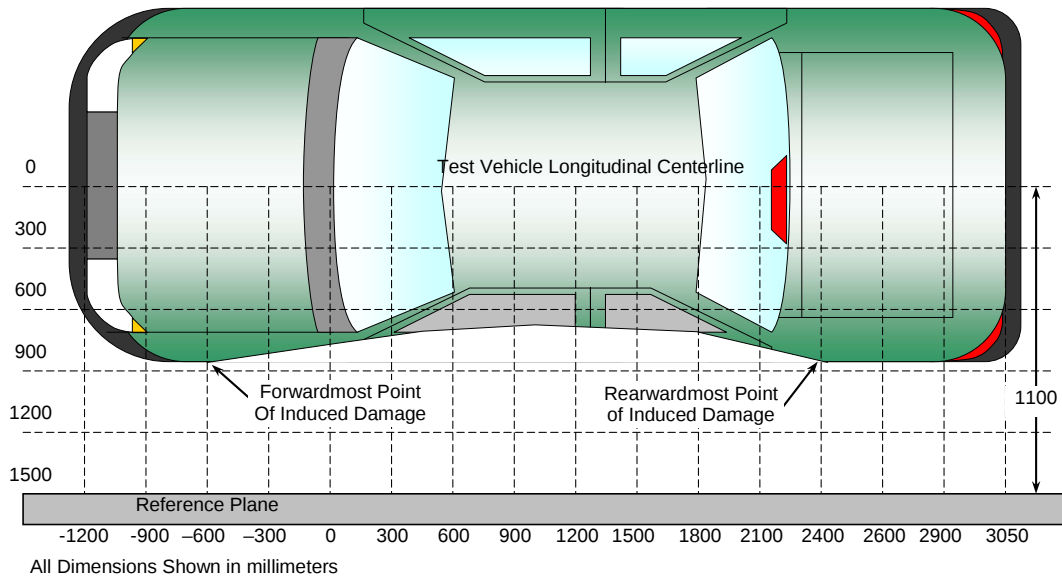
16



DATA SHEET NO. 11
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2010 Chevrolet Camaro 1LT 2-Dr Coupe
 Test Program: NCAP Side Impact

NHTSA No. MA0112
 Test Date: 6/11/2009



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	326	331	5
2	2230	4	296	326	30
3	1400	3	232	432	200
4	575	3	215	390	175
5	-130	4	273	287	14
6	-900	4	314	317	3

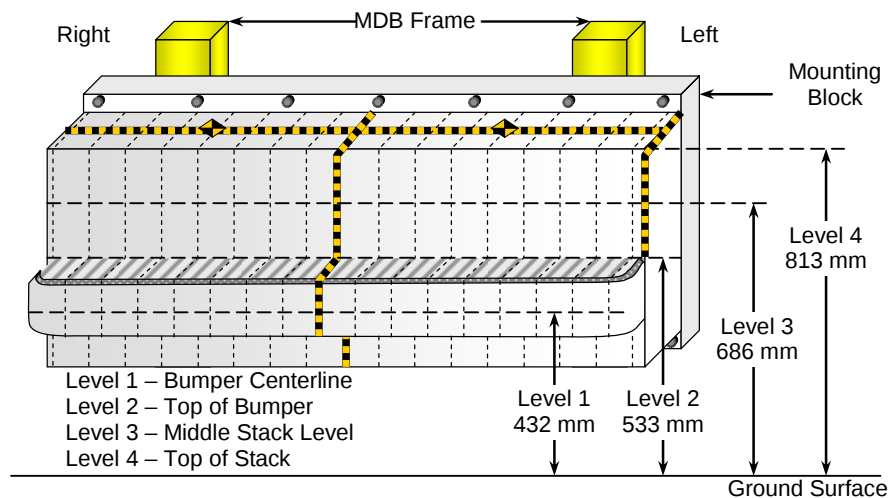
Reference plane is parallel to test vehicle longitudinal centerline.
 Given dimensions = Reference plane to car body.

DATA SHEET NO. 12

DEFORMABLE BARRIER HONEYCOMB FACE STATIC CRUSH

Test Vehicle: 2010 Chevrolet Camaro 1LT 2-Dr Coupe
 Test Program: NCAP Side Impact

NHTSA No. MA0112
 Test Date: 6/11/2009



DEFORMABLE BARRIER STATIC CRUSH

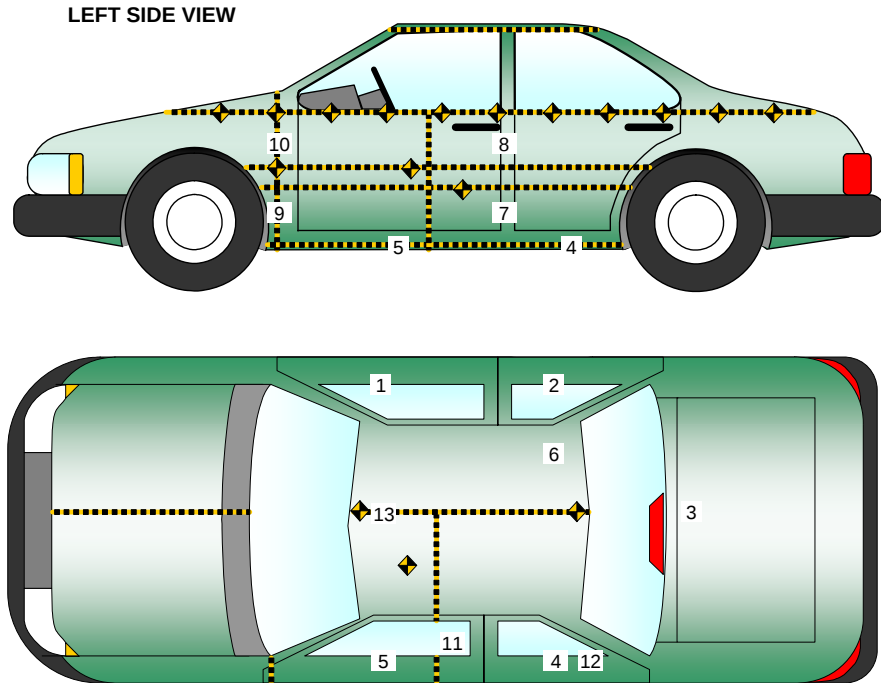
Stack Level	Distance Right of Center								C _L	Distance Left of Center							
	800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
1	227	217	208	197	187	179	177	172	170	168	167	167	167	173	185	175	170
2	124	114	121	117	108	108	109	109	106	108	109	110	115	118	120	130	131
3	105	106	75	42	32	28	27	26	28	28	34	43	53	67	103	148	151
4	106	111	91	60	17	18	26	31	45	57	69	78	94	115	153	180	190

All Dimensions in mm

DATA SHEET NO. 13
VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2010 Chevrolet Camaro 1LT 2-Dr Coupe
 Test Program: NCAP Side Impact

NHTSA No. MA0112
 Test Date: 6/11/2009



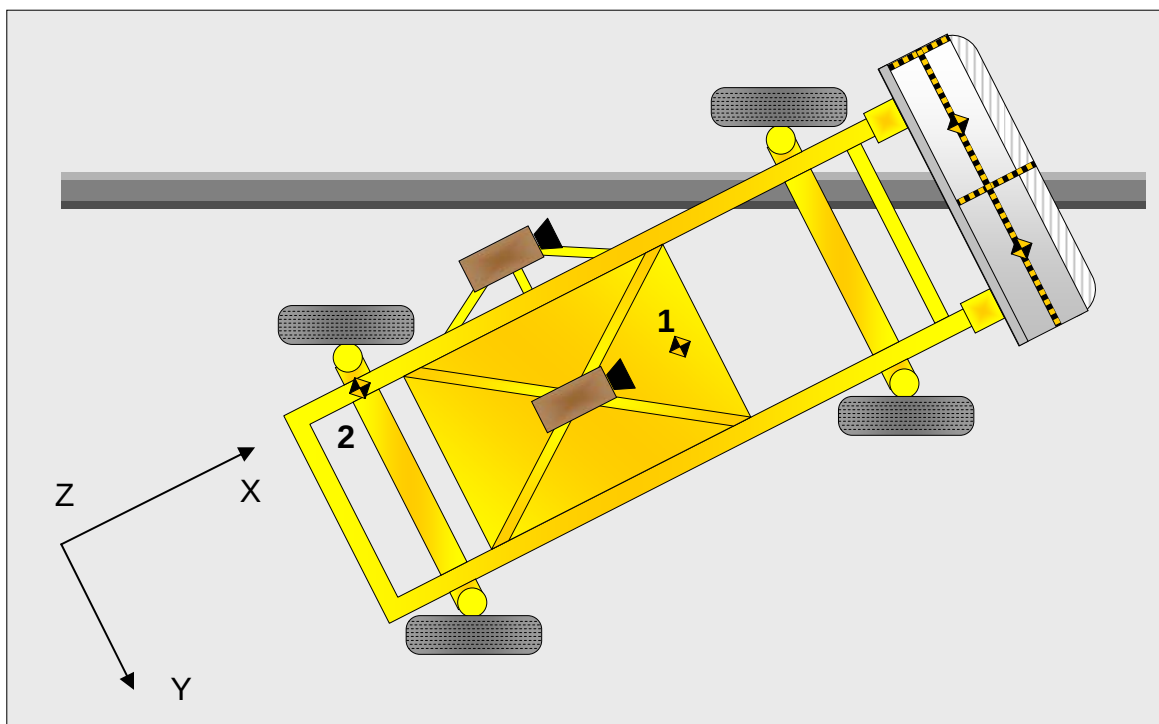
Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Right Sill at Front Seat	2439	770	-206
2	Right Sill at Rear Seat	1439	768	-206
3	Rear Floorpan Above Axle	971	0	-607
4	Left Sill at Rear Door	1480	-768	-202
5	Left Sill at Front Door	2438	-770	-200
6	Rear Occupant Compartment	1846	336	-383
7	Left Lower B-Post	1853	-748	-521
8	Left Middle B-Post	1794	-750	-684
9	Left Lower A-Post	3079	-744	-508
10	Left Middle A-Post	3092	-828	-798
11	Front Seat Track	2181	-616	-295
12	Rear Seat Track or Structure			
13	Vehicle CG	2485	0	-562

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

DATA SHEET NO. 14
MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2010 Chevrolet Camaro 1LT 2-Dr Coupe
 Test Program: NCAP Side Impact

NHTSA No. MA0112
 Test Date: 6/11/2009



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: 2010 Chevrolet Camaro 1LT 2-Dr Coupe
 Test Program: NCAP Side Impact

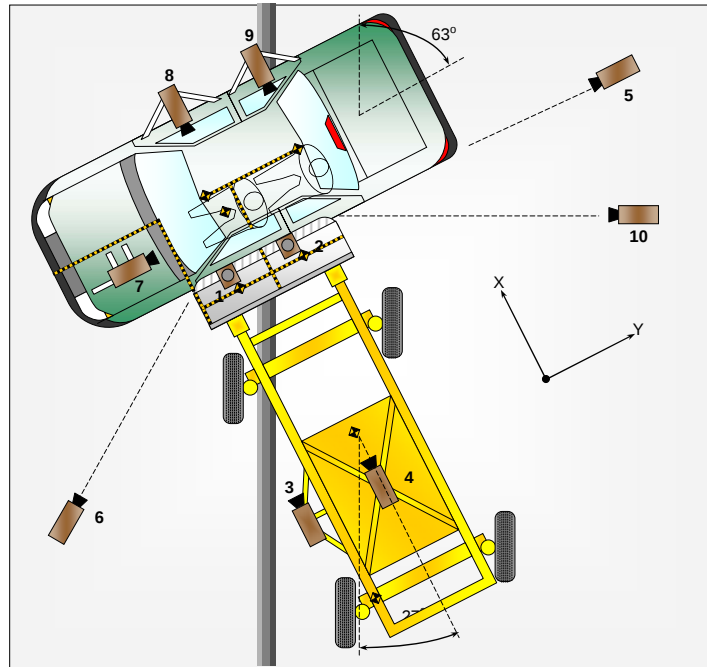
NHTSA No. MA0112
 Test Date: 6/11/2009

	Elements	Pre-Test (mm)
1	Total Length	4836
2	Total Width	1836
3	Bumper Top Height	529
4	Bumper Bottom Height	375
5	Longitudinal Member Top Height	516
6	Distance between Longitudinal Members	816
7	Longitudinal Member Width	96
8	Engine Top Height	927
9	Engine Bottom Height	219
10	Engine and gearbox width	1106
11	Front bumper-engine distance	766
12	Front shock absorber fixing height	932
13	Bonnet leading edge height	831
14	Front shock absorber fixing width	1225
15	Front bumper – front axle distance	916
16	Front axle – a pillar distance	412
17	A-pillar – B-pillar distance	1603
18	B-Pillar – rear axle distance	835
19	B-pillar – C-pillar distance	415
20	Roof sill bottom height	1253
21	Roof sill top height	1365
22	Floor sill bottom height	196
23	Floor sill top height	442

DATA SHEET NO. 16
HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2010 Chevrolet Camaro 1LT 2-Dr Coupe
 Test Program: NCAP Side Impact

NHTSA No. MA0112
 Test Date: 6/11/2009



No.	Camera View	Location (mm)			Lens (mm)	Film Speed (fps)
		X	Y	Z		
1	Overhead Close-up	-530	-240	-5055	50	1000
2	Overhead Overall	650	1300	-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	30	7250	-1100	24	1000
6	Left Side, Ground Level, Overall	-3170	-4840	-1250	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: 2010 Chevrolet Camaro 1LT 2-Dr Coupe
 Test Program: NCAP Side Impact

NHTSA No. MA0112
 Test Date: 6/11/2009

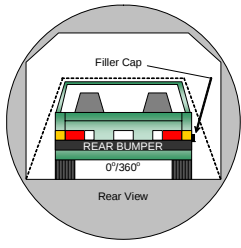
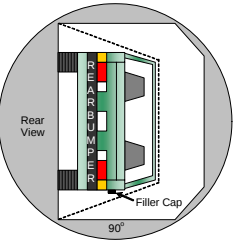
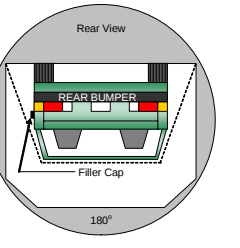
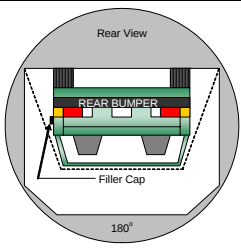
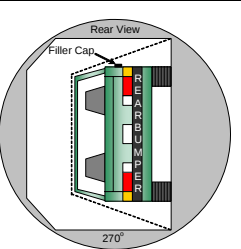
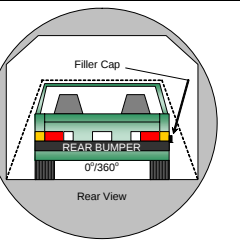
FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 21° C Test Time: 11:05 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°	115	300	First 5	0
90° to 180°	119	300	First 5	0
180° to 270°	116	300	First 5	0
270° to 360°	122	300	First 5	0

APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

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

	<u>Page No.</u>
Photo No. 31. Pre-Test Overhead Close-up View	A-16
Photo No. 32. Post-Test Overhead Close-up View	A-16
Photo No. 33. Pre-Test Driver Dummy (Door Open)	A-17
Photo No. 34. Pre-Test Driver Dummy Clearance From Door	A-18
Photo No. 35. Post-Test Driver Dummy Clearance From Door	A-18
Photo No. 36. Pre-Test Driver Dummy (Through Window)	A-19
Photo No. 37. Post-Test Driver Dummy (Through Window)	A-19
Photo No. 38. Pre-Test Driver Dummy Right Side View	A-20
Photo No. 39. Post-Test Driver Dummy Right Side View	A-20
Photo No. 40. Pre-Test Passenger Dummy (Through Window)	A-21
Photo No. 41. Post-Test Passenger Dummy (Through Window)	A-21
Photo No. 42. Pre-Test Passenger Dummy Right Side View	A-22
Photo No. 43. Post-Test Passenger Dummy Right Side View	A-22
Photo No. 44. Pre-Test Front View of Deformable Barrier	A-23
Photo No. 45. Post-Test Front View of Deformable Barrier	A-23
Photo No. 46. Pre-Test Top View of Deformable Barrier	A-24
Photo No. 47. Post-Test Top View of Deformable Barrier	A-24
Photo No. 48. Pre-Test Right Side View of Deformable Barrier	A-25
Photo No. 49. Post-Test Right Side View of Deformable Barrier	A-25
Photo No. 50. Pre-Test Left Side View of Deformable Barrier	A-26
Photo No. 51. Post-Test Left Side View of Deformable Barrier	A-26
Photo No. 52. Vehicle on Rollover Device (90 Degrees)	A-27
Photo No. 53. Vehicle on Rollover Device (180 Degrees)	A-27
Photo No. 54. Vehicle on Rollover Device (270 Degrees)	A-28
Photo No. 55. Vehicle on Rollover Device (360 Degrees)	A-28
Photo No. 56. Vehicle Impact	A-29
Photo No. 57. Post-Test Driver Dummy Head Contact View	A-30
Photo No. 58. Post-Test Driver Dummy Upper Torso Contact	A-30
Photo No. 59. Post-Test Driver Dummy Lower Torso Contact	A-31
Photo No. 60. Post-Test Driver Dummy Contact	A-31
Photo No. 61. Post-Test Passenger Dummy Contact	A-32



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



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



Manufacturer's Label



Tire Placard



Pre-Test Front View



Post-Test Front View



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



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



Pre-Test Left Side View



Post-Test Left Side View



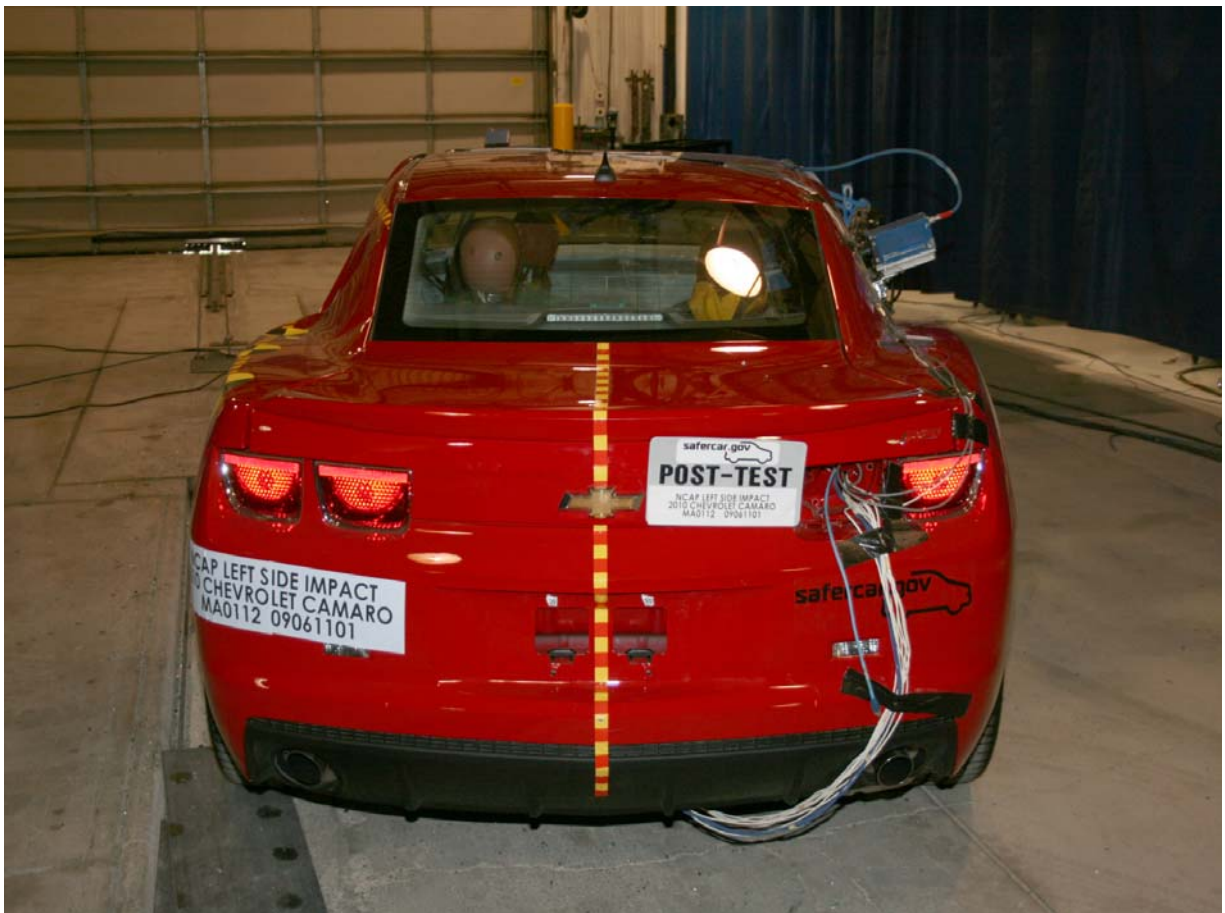
Pre-Test Left Rear 3/4 View



Post-Test Left Rear 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 ¾ View



Post-Test Right Front ¾ View



Pre-Test Left Impact Point



Post-Test Left Impact Point



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



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



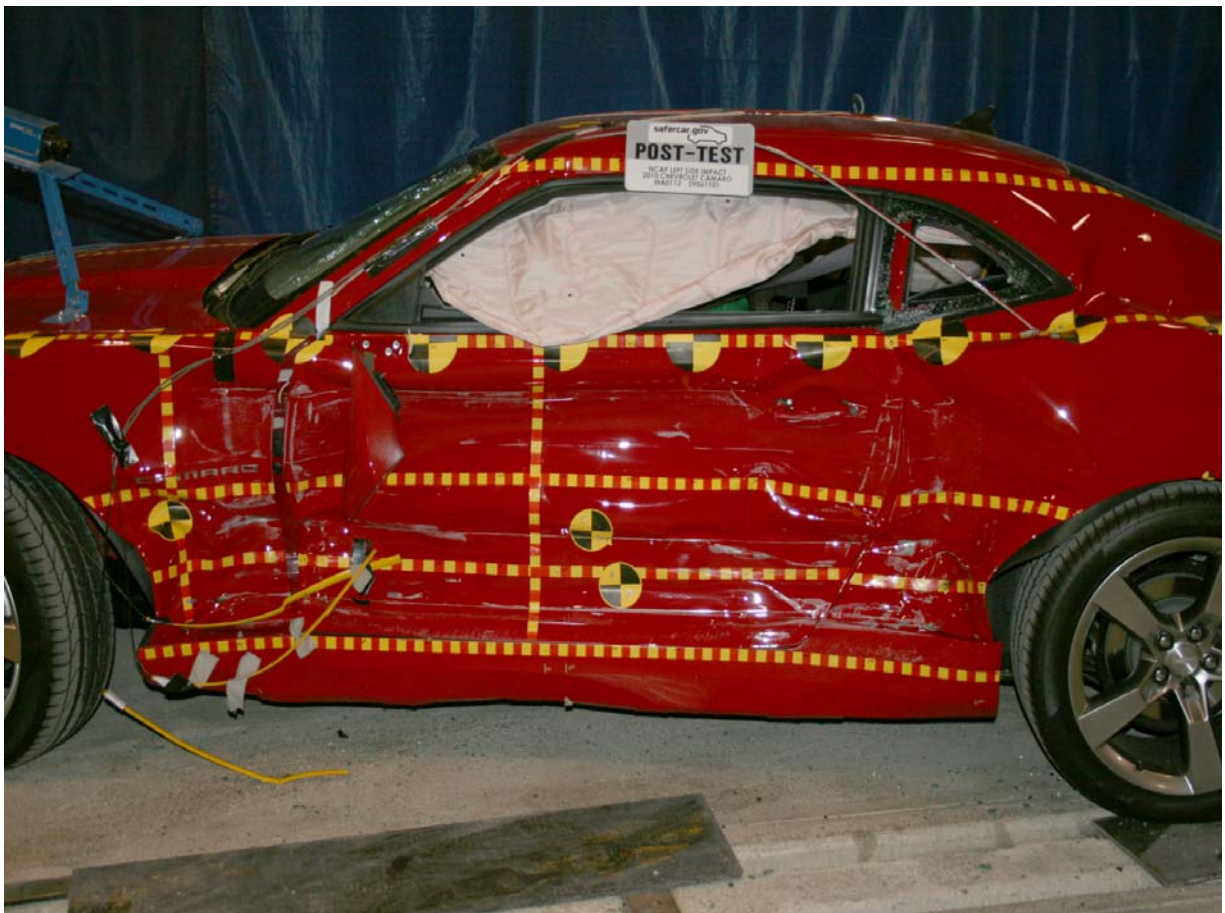
Pre-Test Rear $\frac{3}{4}$ View of Left Side Door



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



Pre-Test Left Side Impact Close-up



Post-Test Left Side Impact Close-up



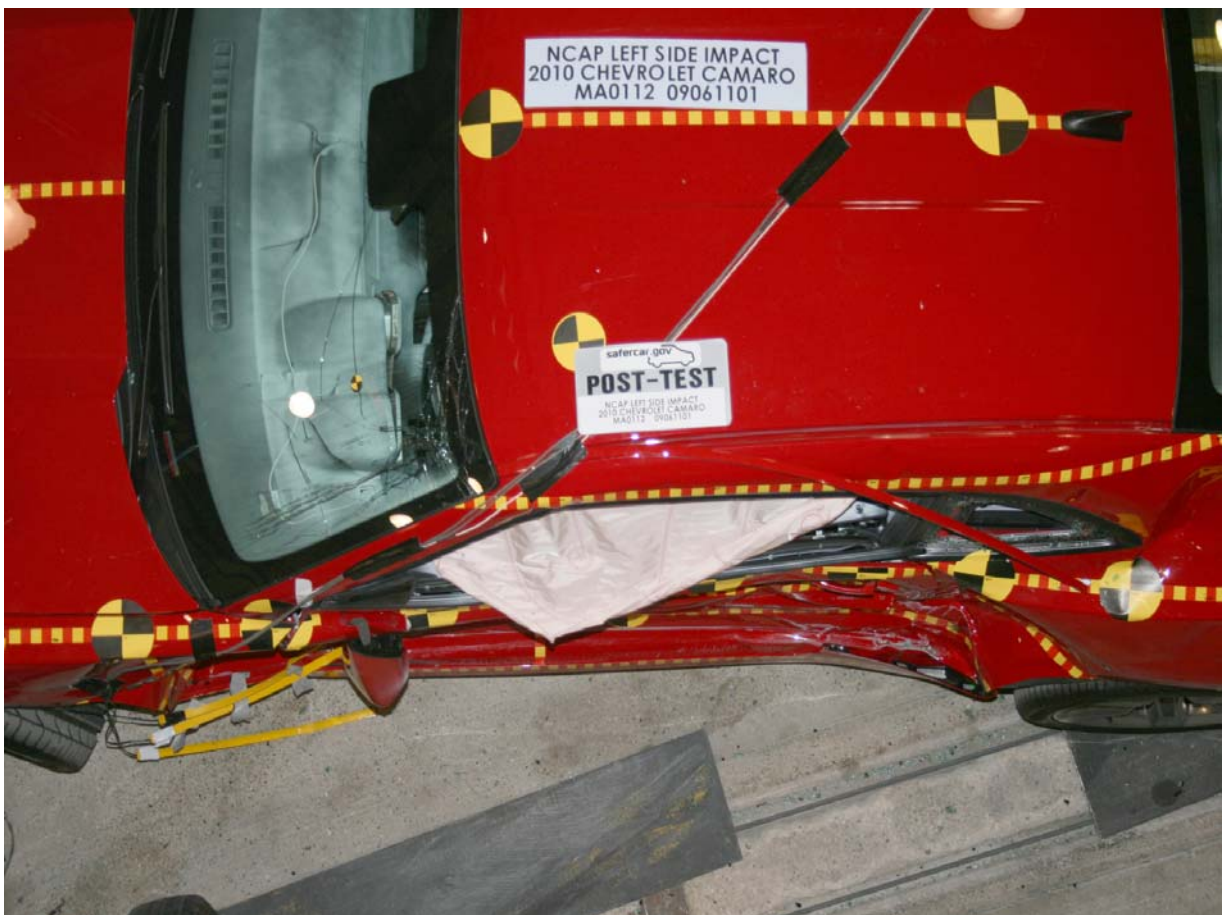
Pre-Test Overhead View



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



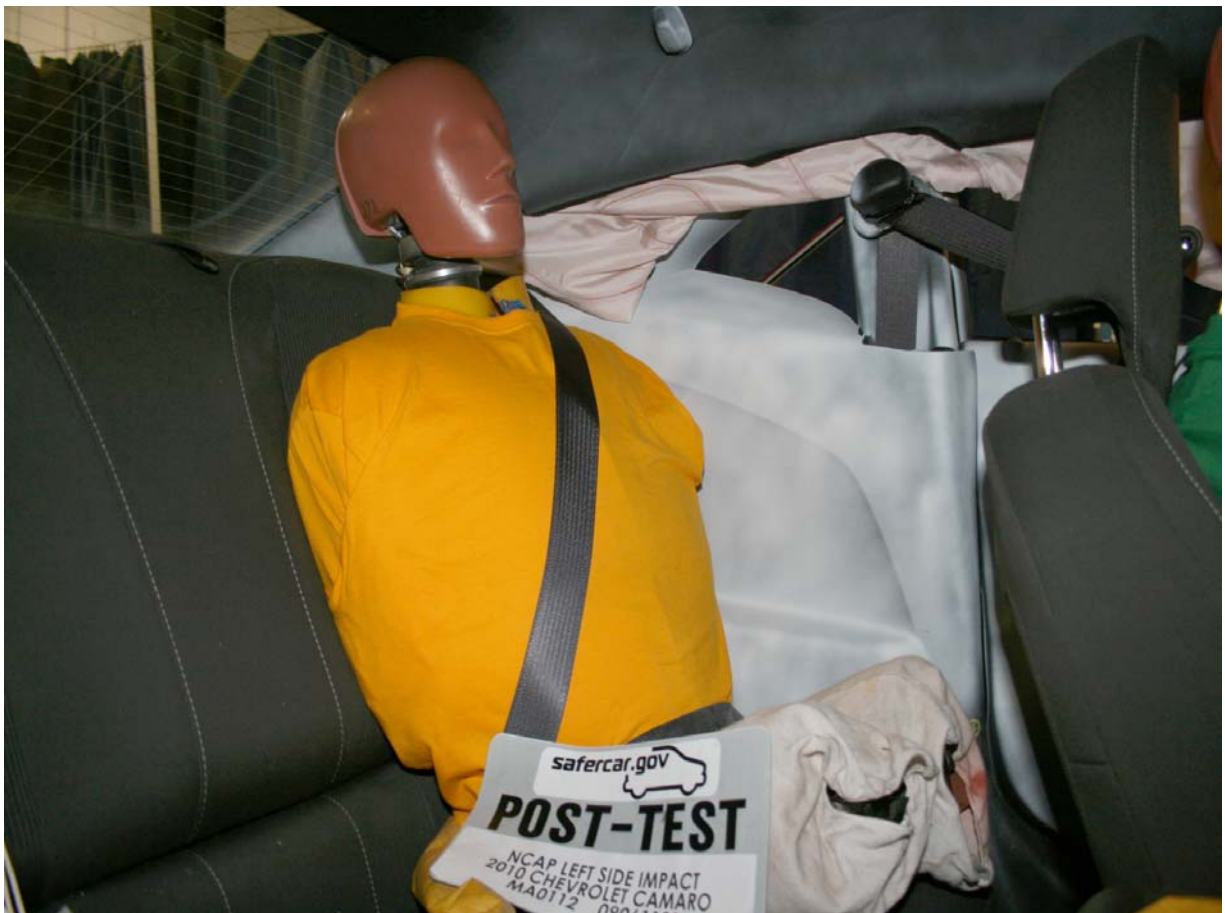
Pre-Test Passenger Dummy (Through Window)



Post-Test Passenger Dummy (Through Window)



Pre-Test Passenger Dummy Right Side View



Post-Test Passenger Dummy Right Side View



Pre-Test Front View of Deformable Barrier



Post-Test Front View of Deformable Barrier



Pre-Test Top View of Deformable Barrier



Post-Test Top View of Deformable Barrier



Pre-Test Right Side View of Deformable Barrier



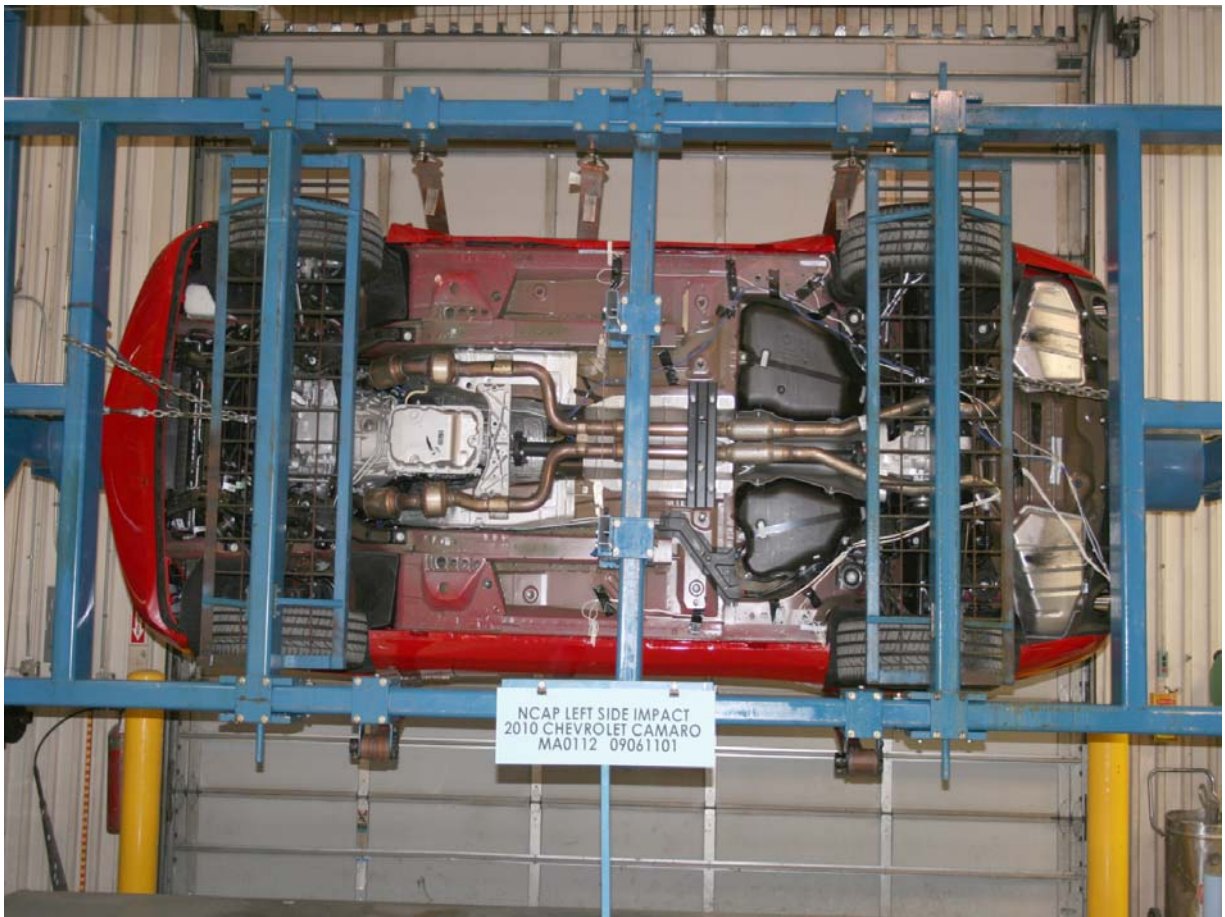
Post-Test Right Side View of Deformable Barrier



Pre-Test Left Side View of Deformable Barrier



Post-Test Left Side View of Deformable Barrier



Vehicle on Rollover Device (90 Degrees)



Vehicle on Rollover Device (180 Degrees)



Vehicle on Rollover Device (270 Degrees)



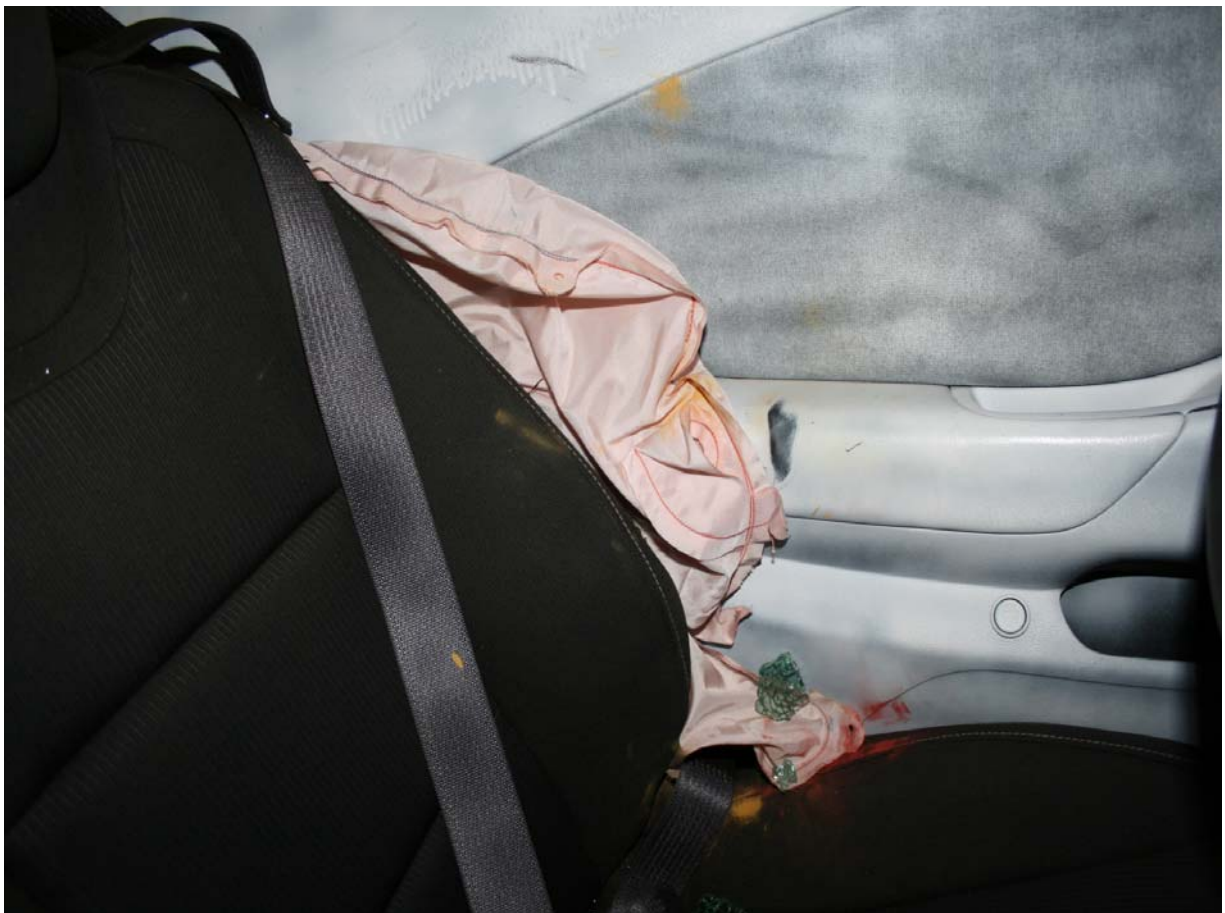
Vehicle on Rollover Device (360 Degrees)



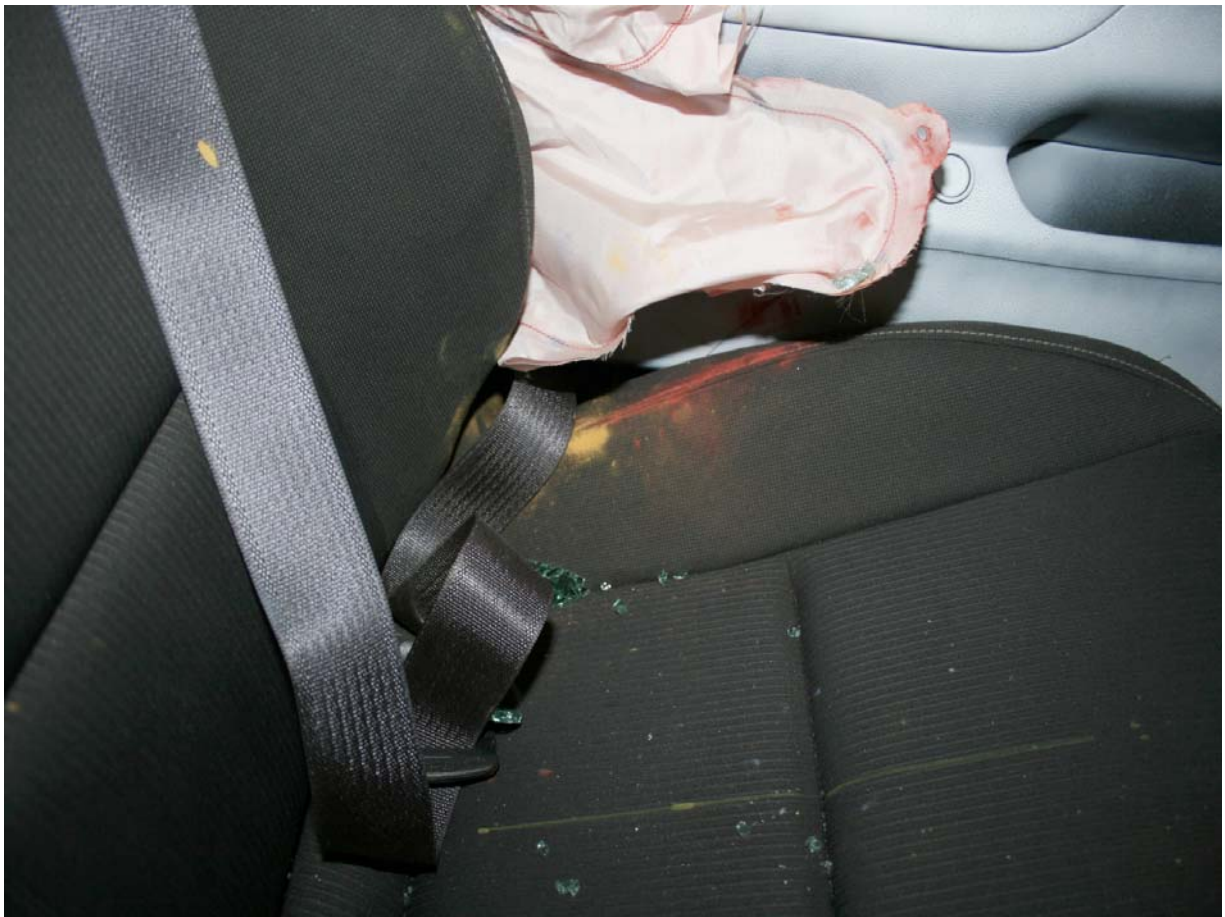
Vehicle Impact



Post-Test Driver Dummy Head Contact View



Post-Test Driver Dummy Upper Torso Contact



Post-Test Driver Dummy Lower Torso Contact



Post-Test Driver Dummy Contact



Post-Test Passenger Dummy Contact

APPENDIX B
SID/HIII RESPONSE DATA TRACES

TABLE OF DATA PLOTS

Page No.

List of Data Plots Provided in the Test Report

Figure No. 1.	Driver Upper Rib Y Acceleration vs. Time	B-1
Figure No. 2.	Driver Upper Rib Y Velocity vs. Time	B-1
Figure No. 3.	Driver Lower Rib Y Acceleration vs. Time	B-1
Figure No. 4.	Driver Lower Rib Y Velocity vs. Time	B-1
Figure No. 5.	Driver Lower Spine Y Acceleration vs. Time	B-2
Figure No. 6.	Driver Lower Spine Y Velocity vs. Time	B-2
Figure No. 7.	Driver Pelvis Y Acceleration vs. Time	B-2
Figure No. 8.	Driver Pelvis Y Velocity vs. Time	B-2

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

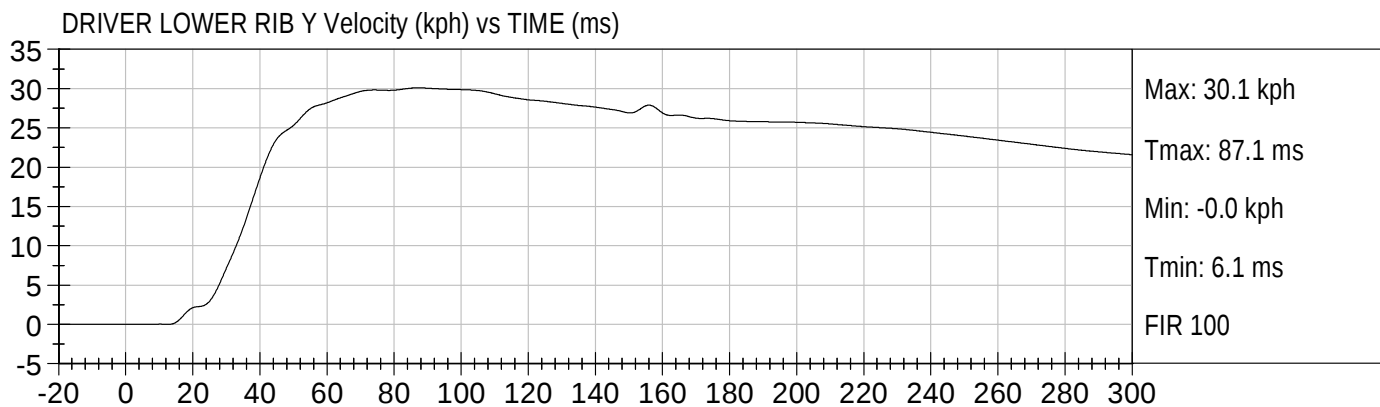
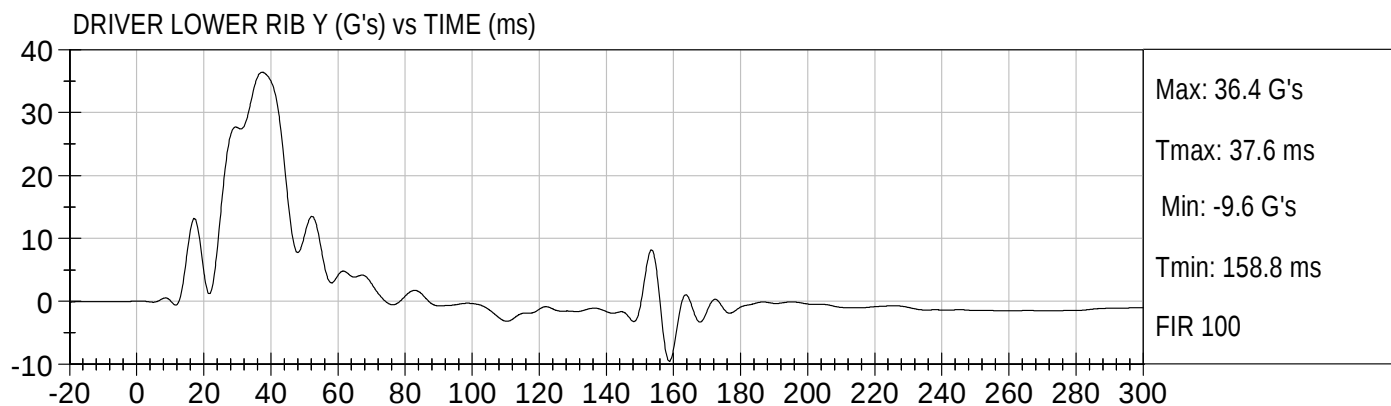
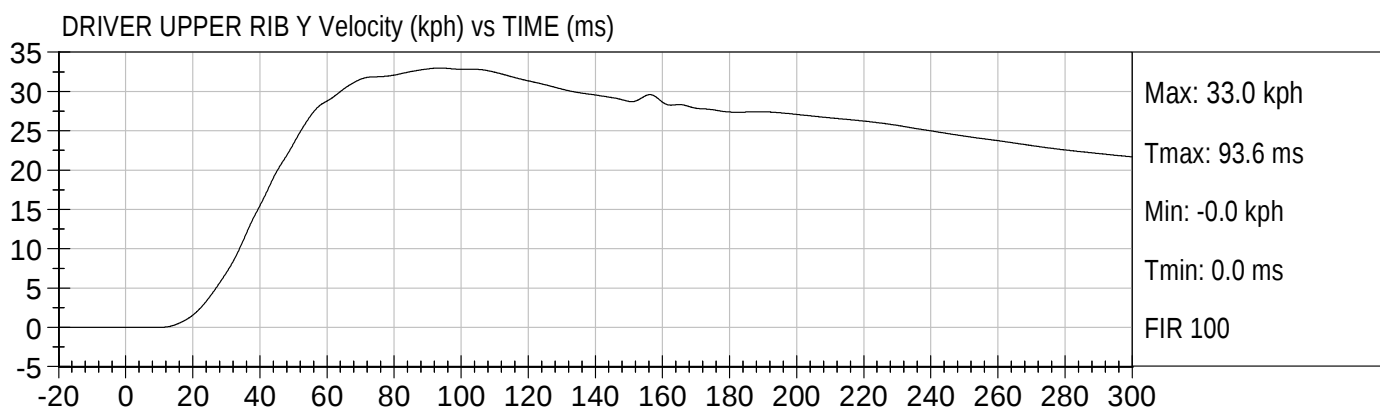
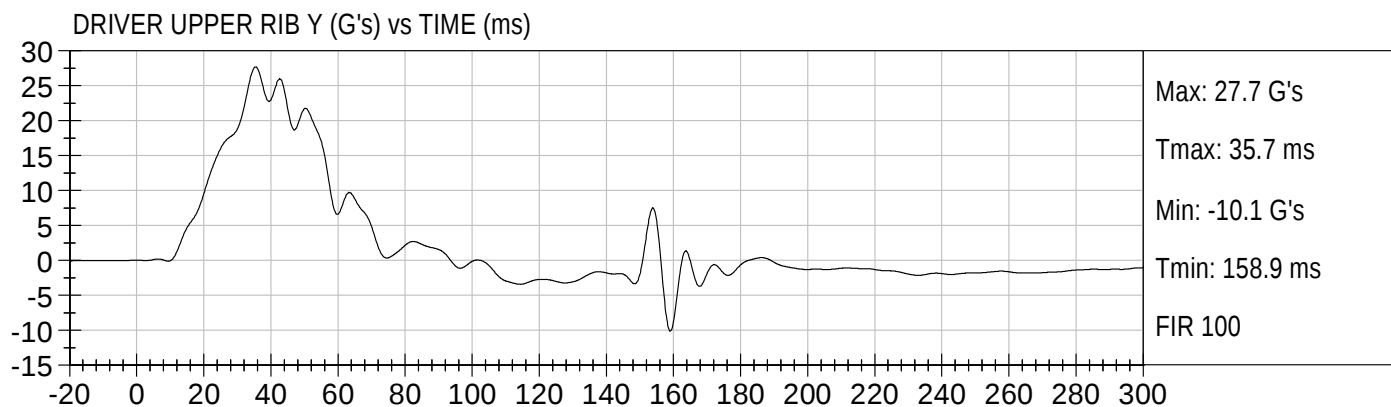
Driver Lower Spine Redundant Y

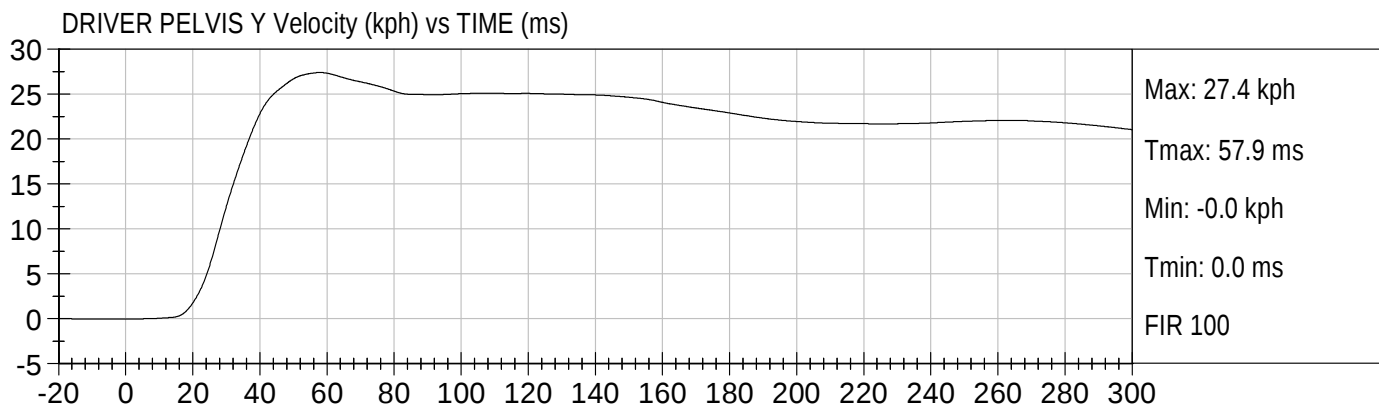
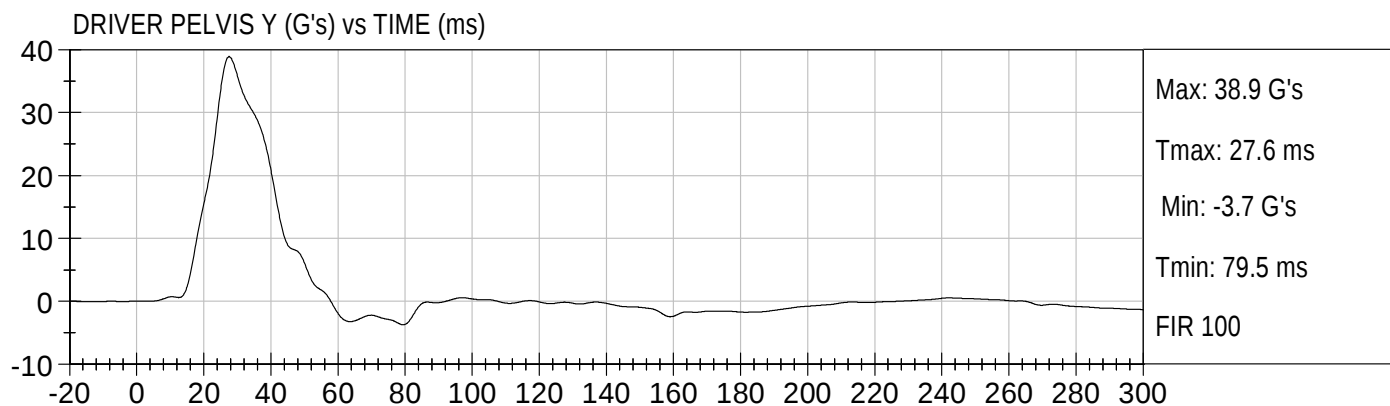
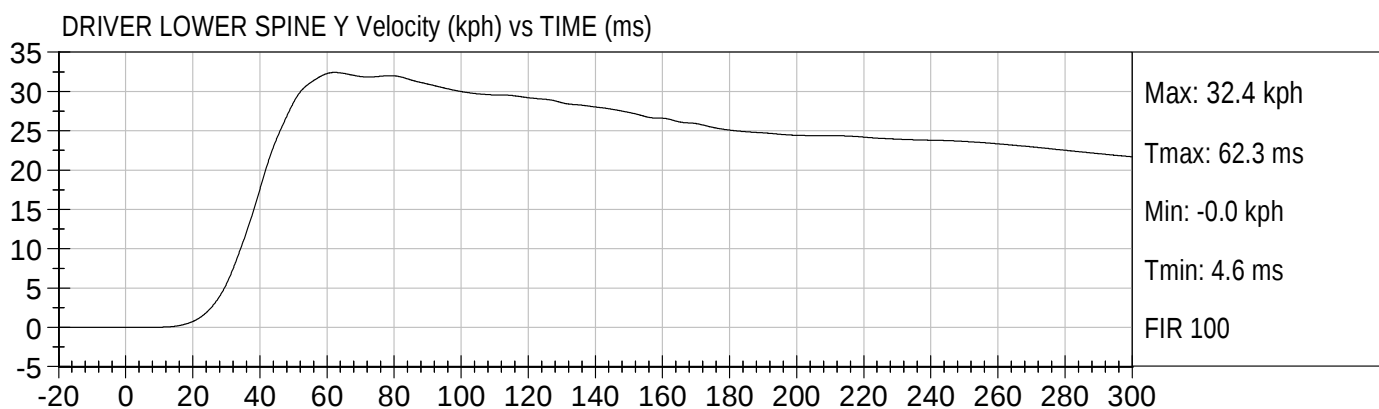
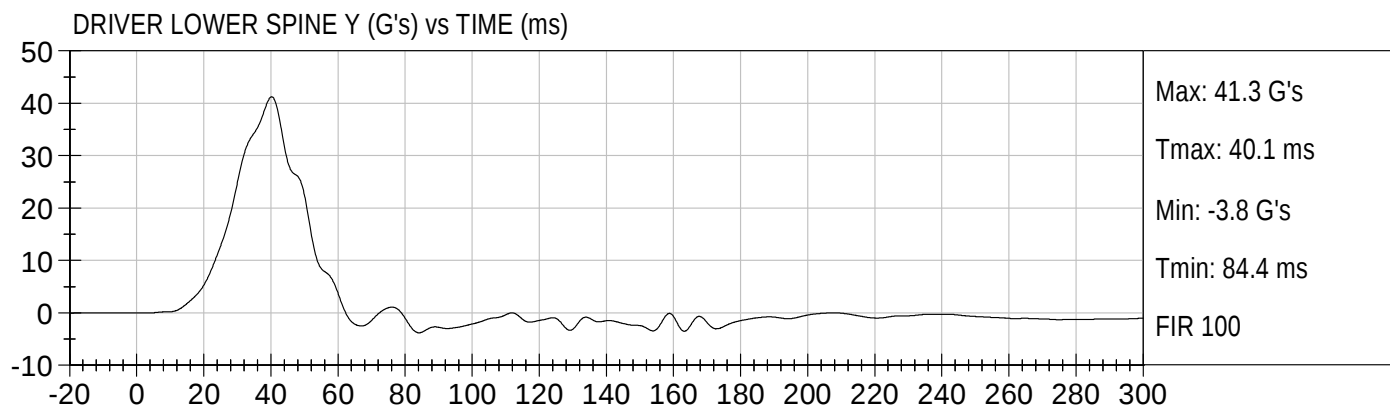
Driver Pelvis Redundant Y

Driver Thorax Contact

Driver Pelvis Contact

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

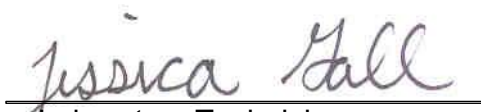
External Dimensions:	The dummy passed all external dimension requirements.
Head Drop Test:	The head passed all drop test requirements.
Neck Pendulum Test:	The neck passed all pendulum test requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis 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

5/4/09

Test Date

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

ATD Serial No: 271

Test I.D: D091161

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	41	Pass
Peak Resultant Acceleration	G's	120 to 150	143	Pass
Is Resultant Curve Unimodal?	N/A	15% of peak	Yes	Pass
Peak Longitudinal Acceleration	G's	+/- 15	-9.5	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

5/14/09
Test Date

David Winkelbauer
Approved By



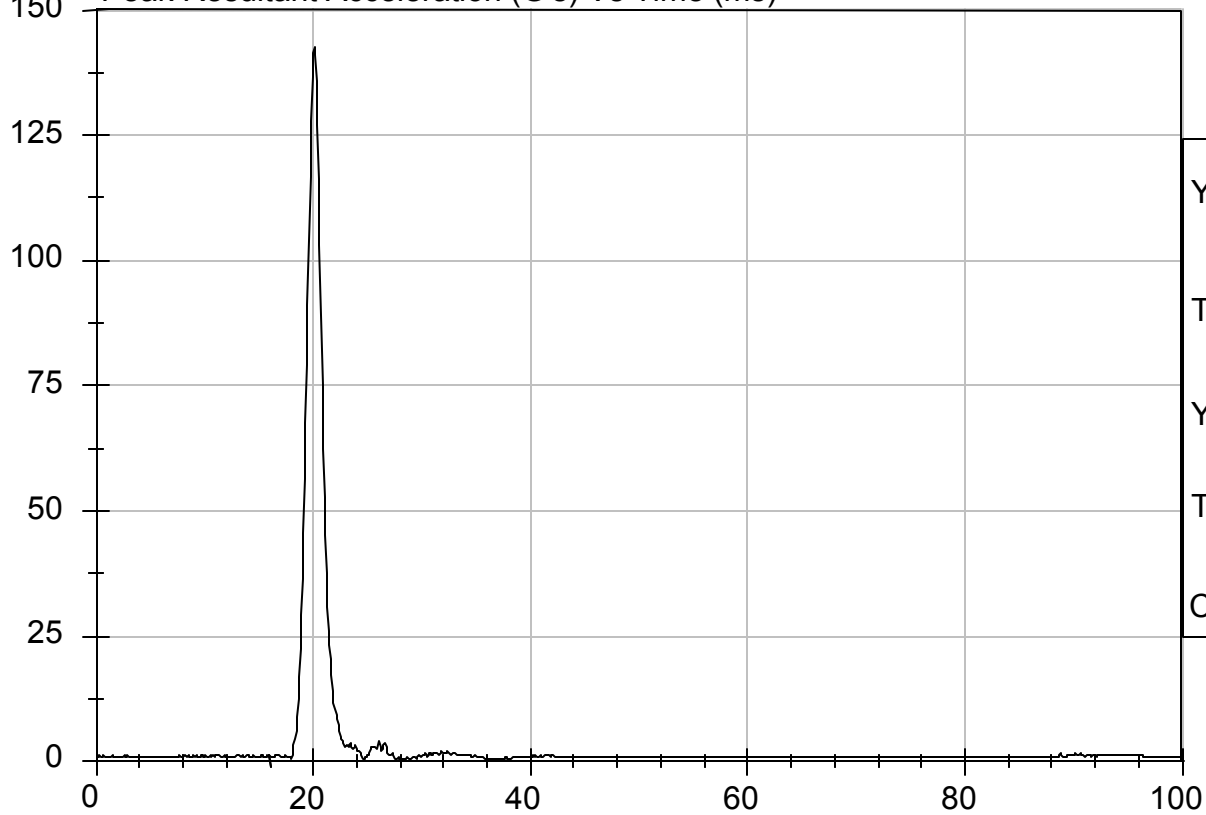
Test Description: Head Drop

Test Date: 5/14/09

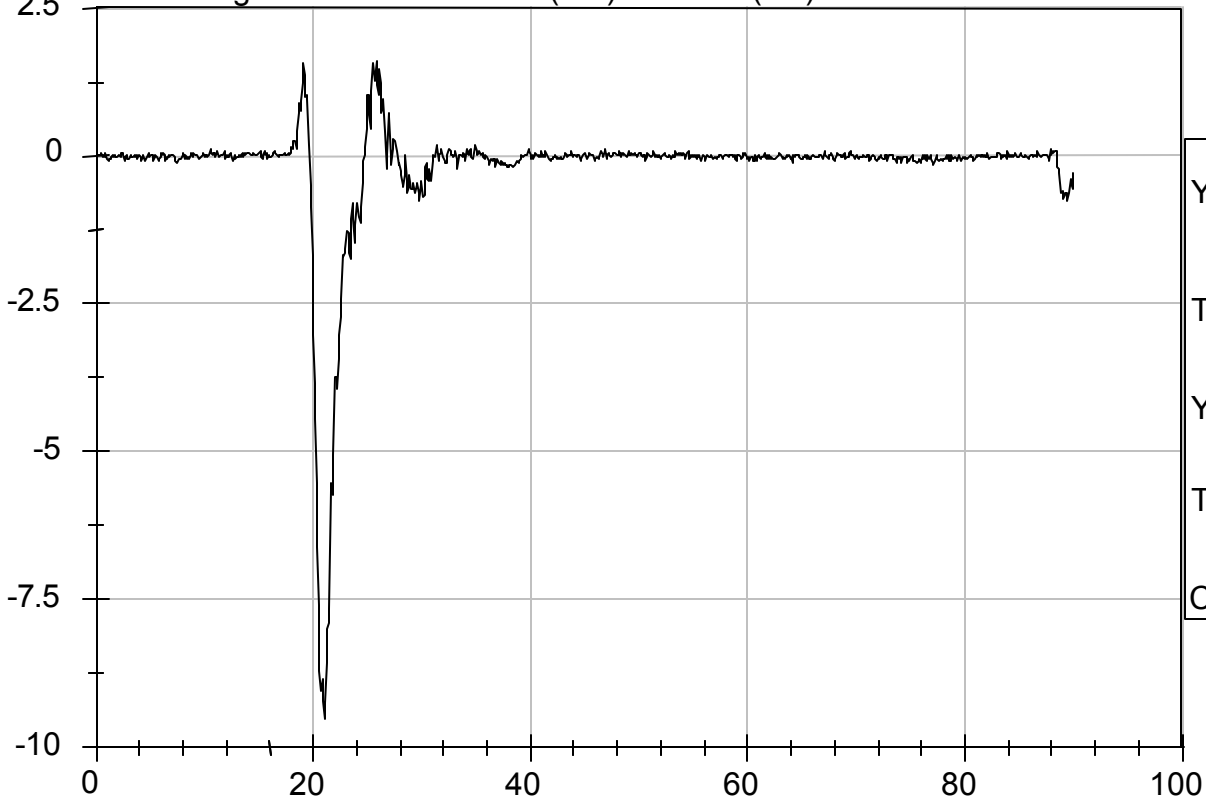
Component: D091161

Speed: 0 ft/s, 0 m/s

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



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



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

ATD Serial No: 271

Test I.D: D091162

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	49	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	39	Pass
Lower Spine	G's	15 - 22	17	Pass
			Overall Test Results	Pass

Jessica Hall
Laboratory Technician

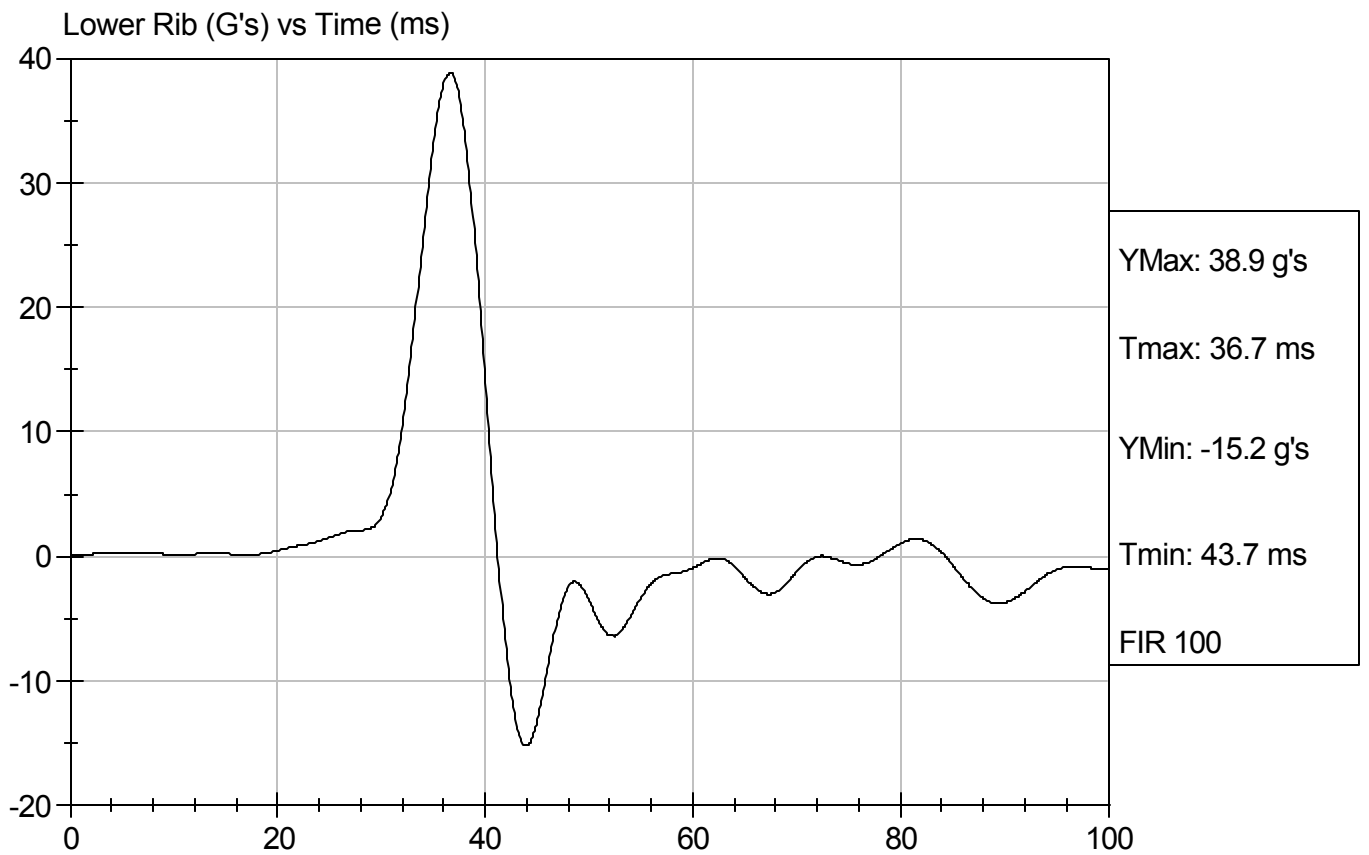
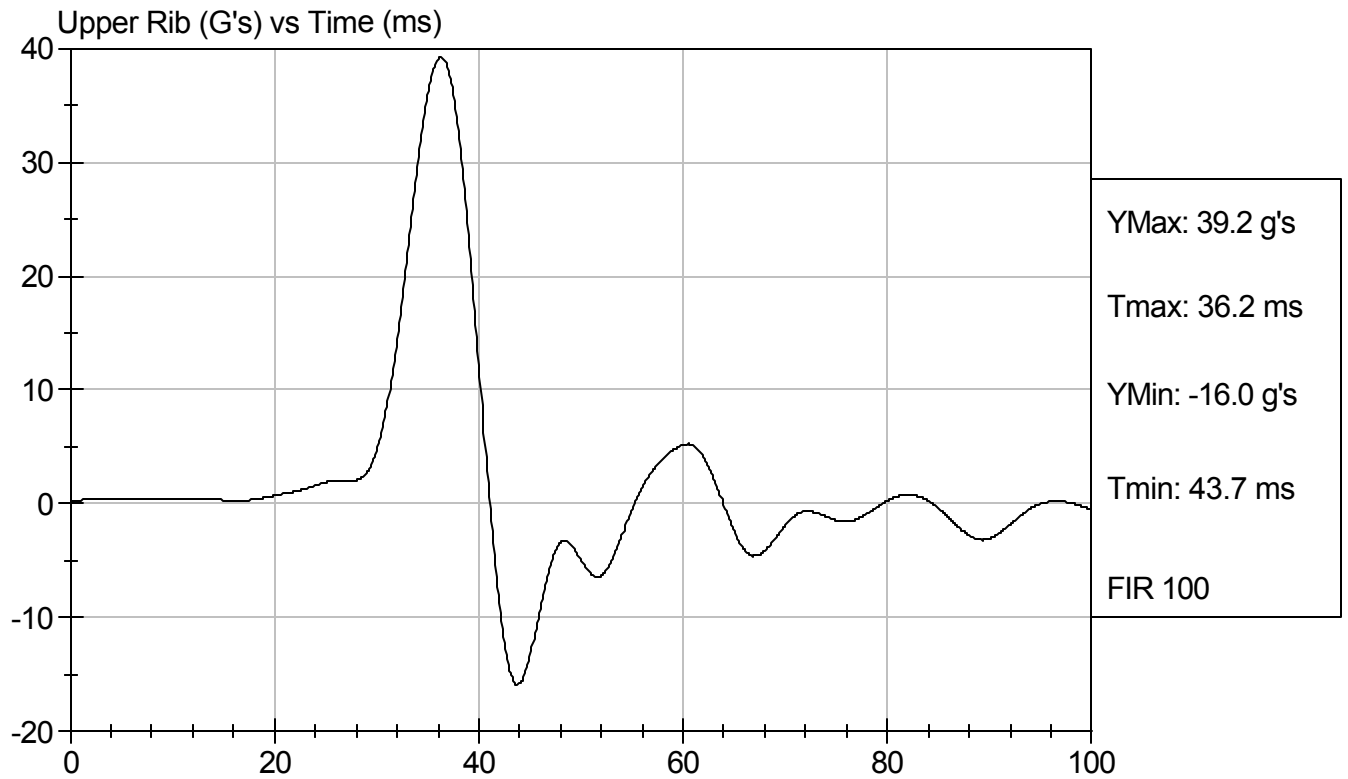
David Winkelbauer
Approved By

5/13/09
Test Date



Test Desc: Thorax Impact
Component ID: D091162

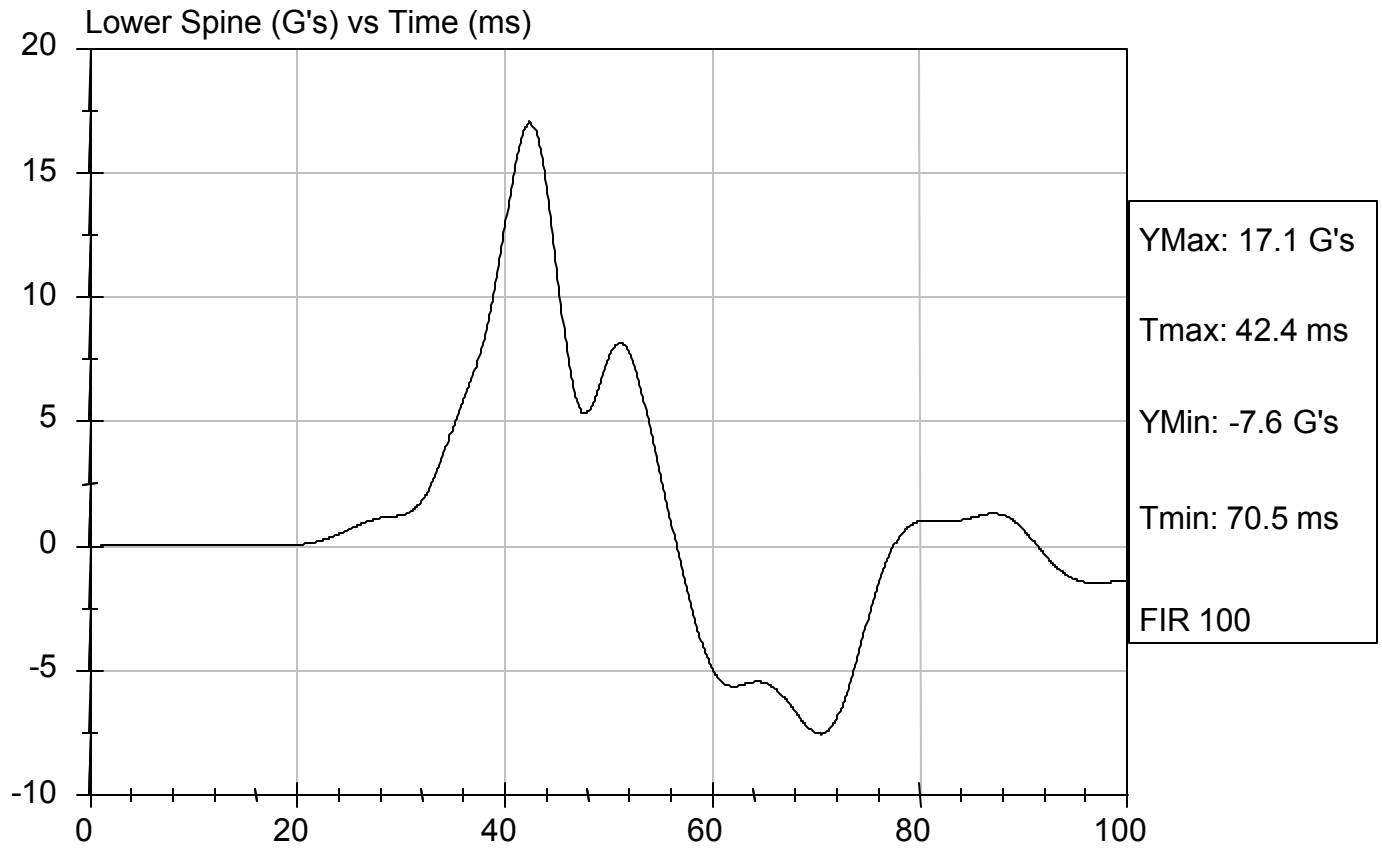
Test Date: 5/13/09
Speed: 14.1 ft/sec, 4.30 m/sec





Test Desc: Thorax Impact
Component ID: D091162

Test Date: 5/13/09
Speed: 14.1 ft/sec, 4.30 m/sec



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

ATD Serial No: 271

Test I.D: D091163

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	49	Pass
Probe Velocity	m/s	4.27 - 4.33	4.30	Pass
Pelvis Acceleration	G's	40 - 60	45	Pass
			Overall Test Results	Pass

Jessica Hall
Laboratory Technician

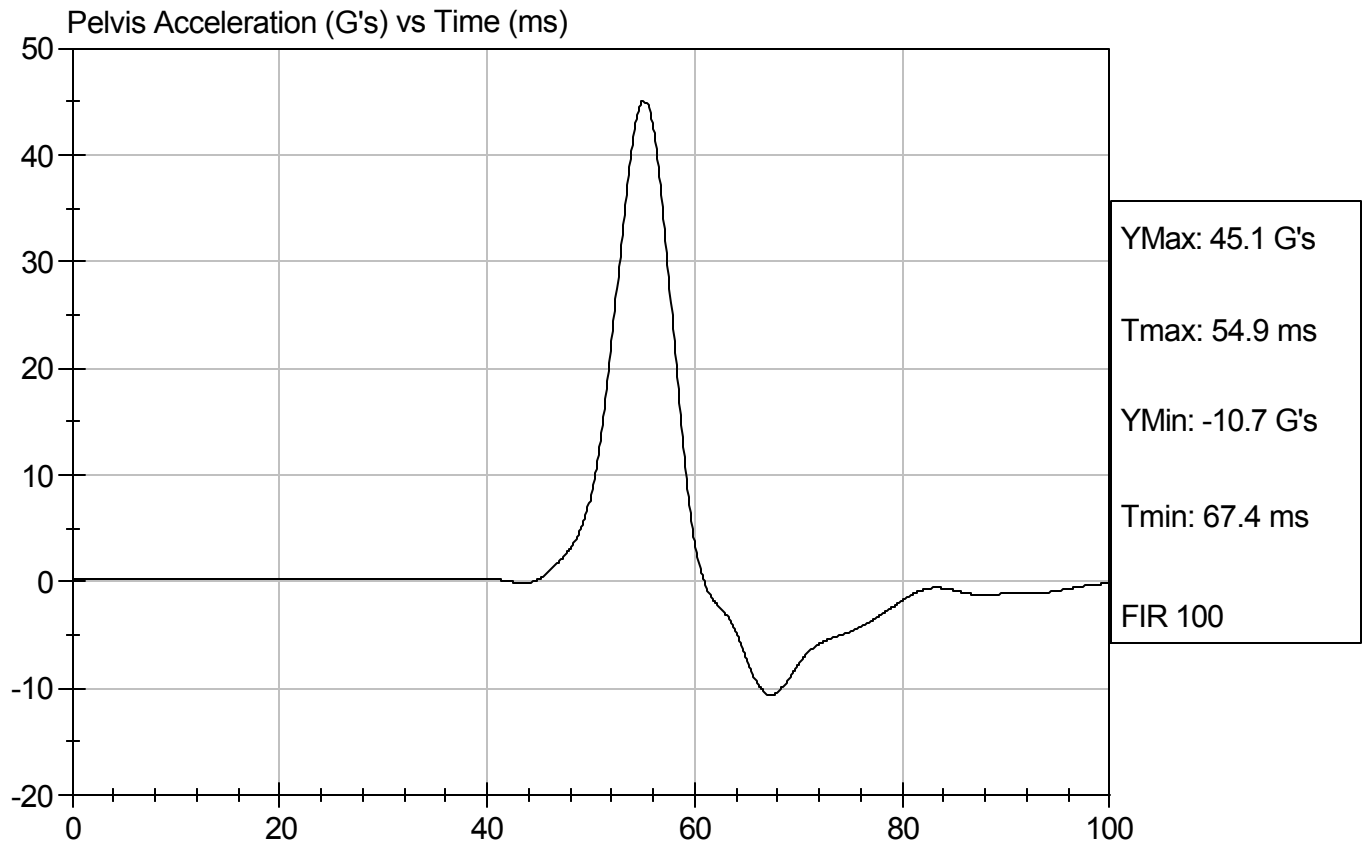
David Winkelbauer
Approved By

5/13/09
Test Date



Test Desc: Pelvis Impact
Component ID: D091163

Test Date: 5/13/09
Speed: 14.1 ft/sec, 4.30 m/sec

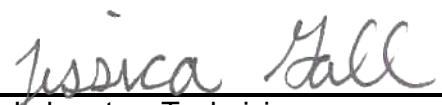


SID/HIII Calibration Data Sheet
Side Impact Dummy
Abdominal Compression Calibration (Pre-Load = 10 lbs)

ATD Serial No: 271

Test I.D: D091164

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	40	Pass
Force At 12.7 mm	N	104 -162	143	Pass
Force At 19 mm	N	163 - 222	195	Pass
Force At 25.4 mm	N	222 - 280	267	Pass
Force At 33 mm	N	325 - 391	361	Pass
Overall Test Results				Pass


Laboratory Technician

5/14/09
Test Date


Approved By

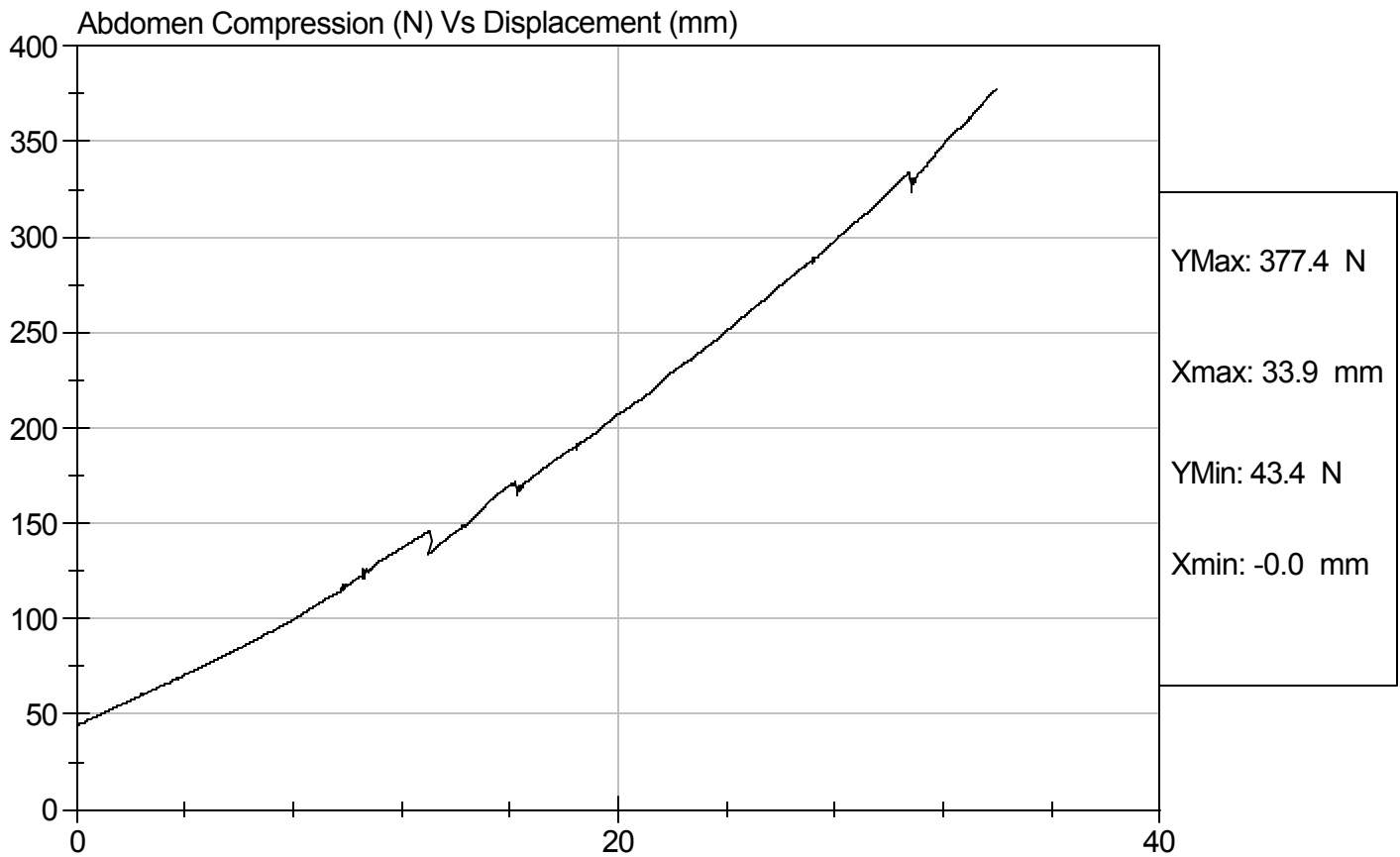


Test Description: Abdomen Compression

Test Date: 5/14/09

Component: D091164

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: D091165

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.9	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	129.4	Pass
Force At 30 deg	N	151.2 - 204.6	182.3	Pass
Force At 40 deg	N	204.6 - 258.0	249.8	Pass
Return Angle	Deg	12 Maximum	7	Pass
Overall Test Results			Pass	

Jessica Hall
Laboratory Technician

David Winkelbauer
Approved By

5/14/09
Test Date

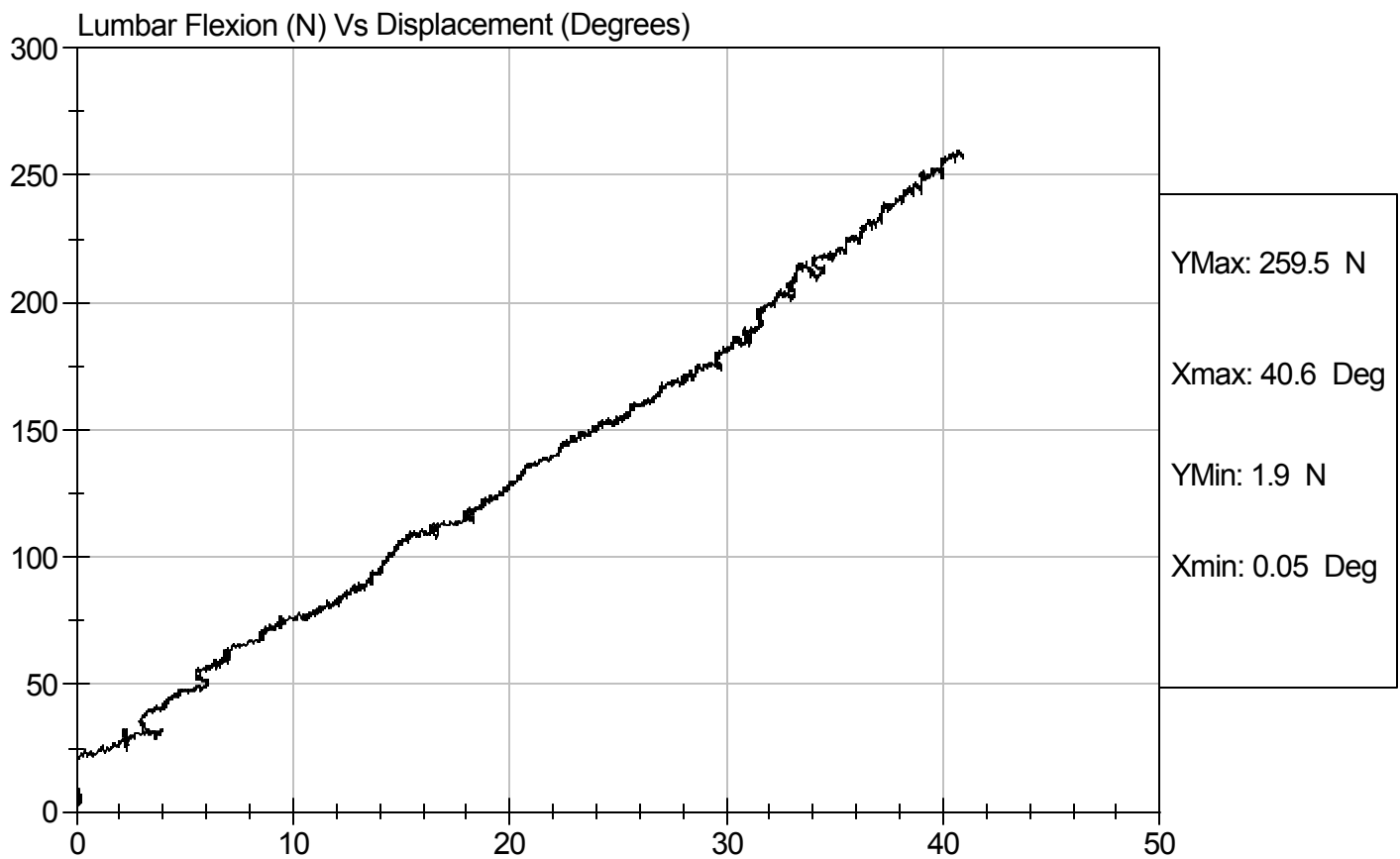


Test Description: Lumbar Flexion

Test Date: 5/14/09

Component: D091165

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: D091169

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	40	Pass
Impact Velocity		m/s	6.89 to 7.13	6.96	Pass
Pendulum Deceleration	10 ms	m/s	1.96 to 2.55	2.39	Pass
	20 ms	m/s	4.12 to 5.10	4.64	Pass
	30 ms	m/s	5.73 to 7.01	6.45	Pass
	40 to 70 ms	m/s	6.27 to 7.64	6.73	Pass
Midsaggital Plane Max Rotation		deg	66 to 82	72	Pass
Head Rotation Peak to Zero - Decay Time		ms	58 to 67	58	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	75	Pass
Mx Peak To Zero - Decay Time		ms	49 to 64	58	Pass
Mx Peak to Max. Head Rotation		ms	2 to 16	12	Pass

Jessica Hall
Laboratory Technician

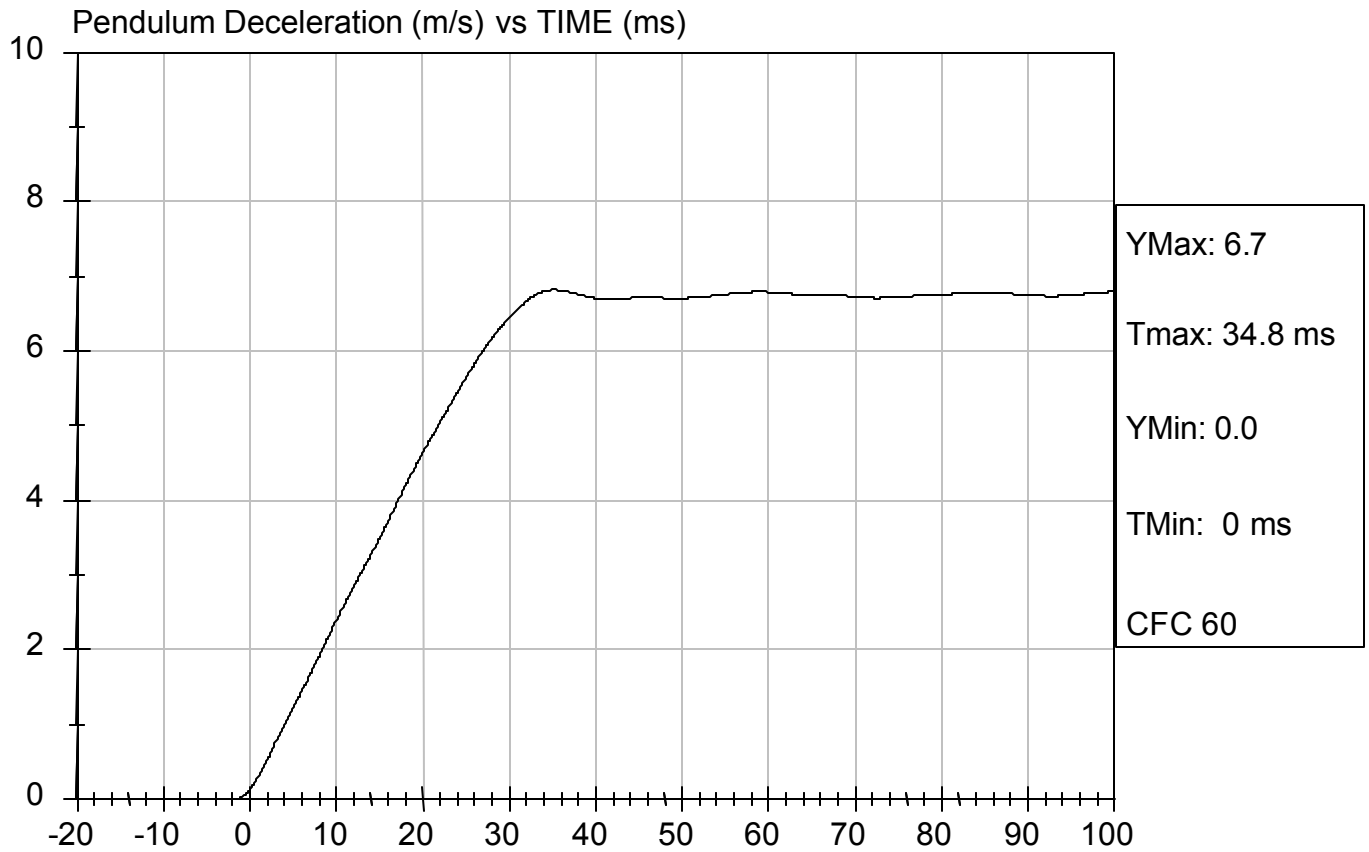
David Winkelbauer
Approved By

5/14/09
Test Date



Test Desc: Neck Bending
Component ID: D091169

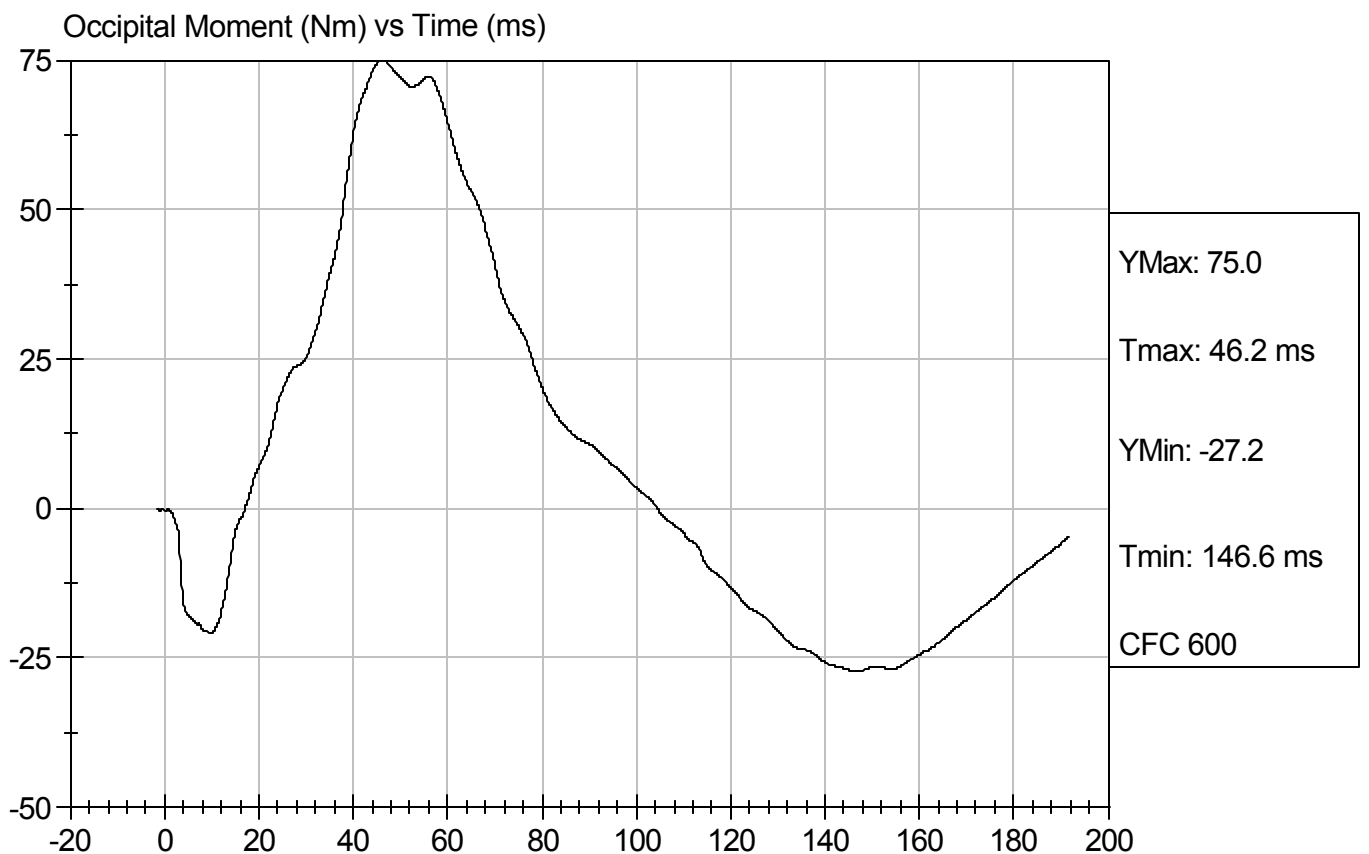
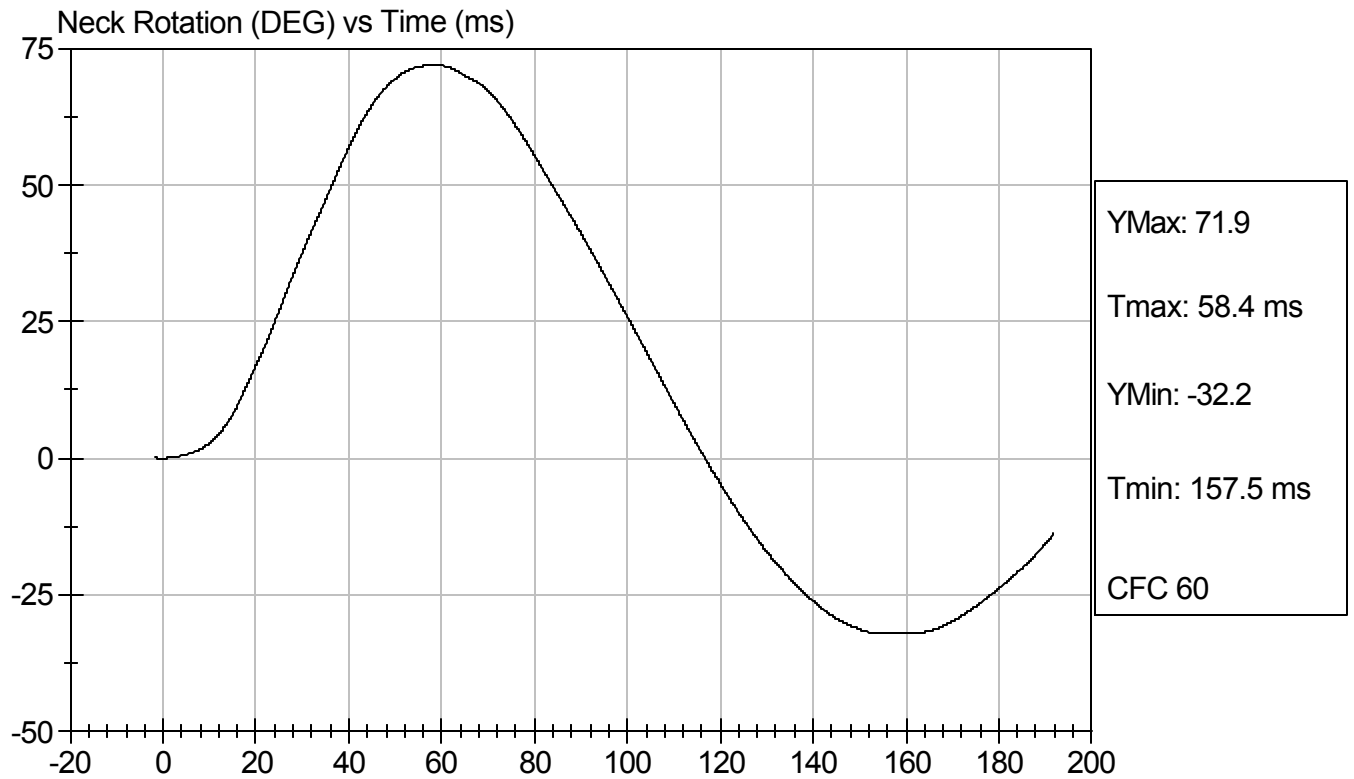
Test Date: 5/14/09
Speed: 22.83 ft/sec, 6.96 m/sec





Test Desc: Neck Bending
Component ID: D091169

Test Date: 5/14/09
Speed: 22.83 ft/sec, 6.96 m/sec



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: D091461

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	44	Pass
Peak Resultant Acceleration	G's	120 to 150	140	Pass
Is Resultant Curve Unimodal?	N/A	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-6.4	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

6/11/09
Test Date

David Winkelbauer
Approved By



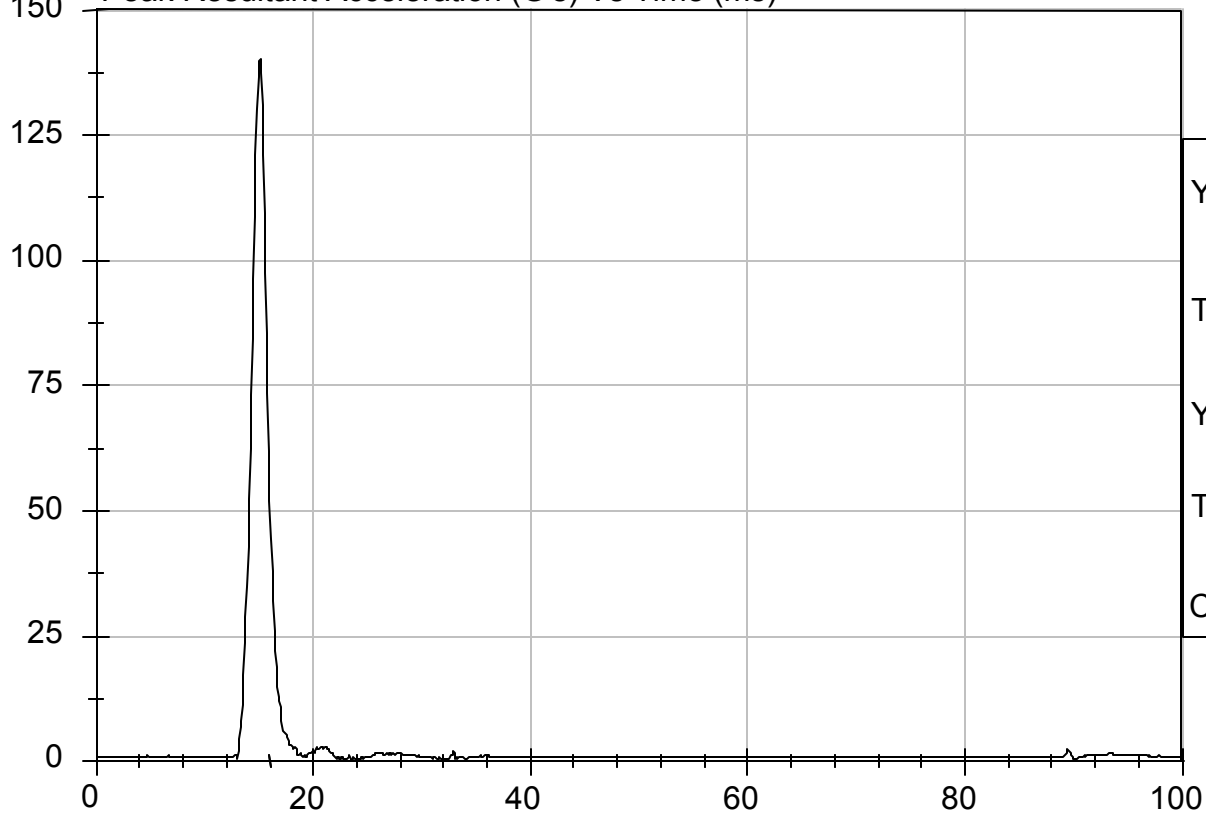
Test Description: Head Drop

Test Date: 6/11/09

Component: D091461

Speed: 0 ft/s, 0 m/s

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



YMax: 140.3 G

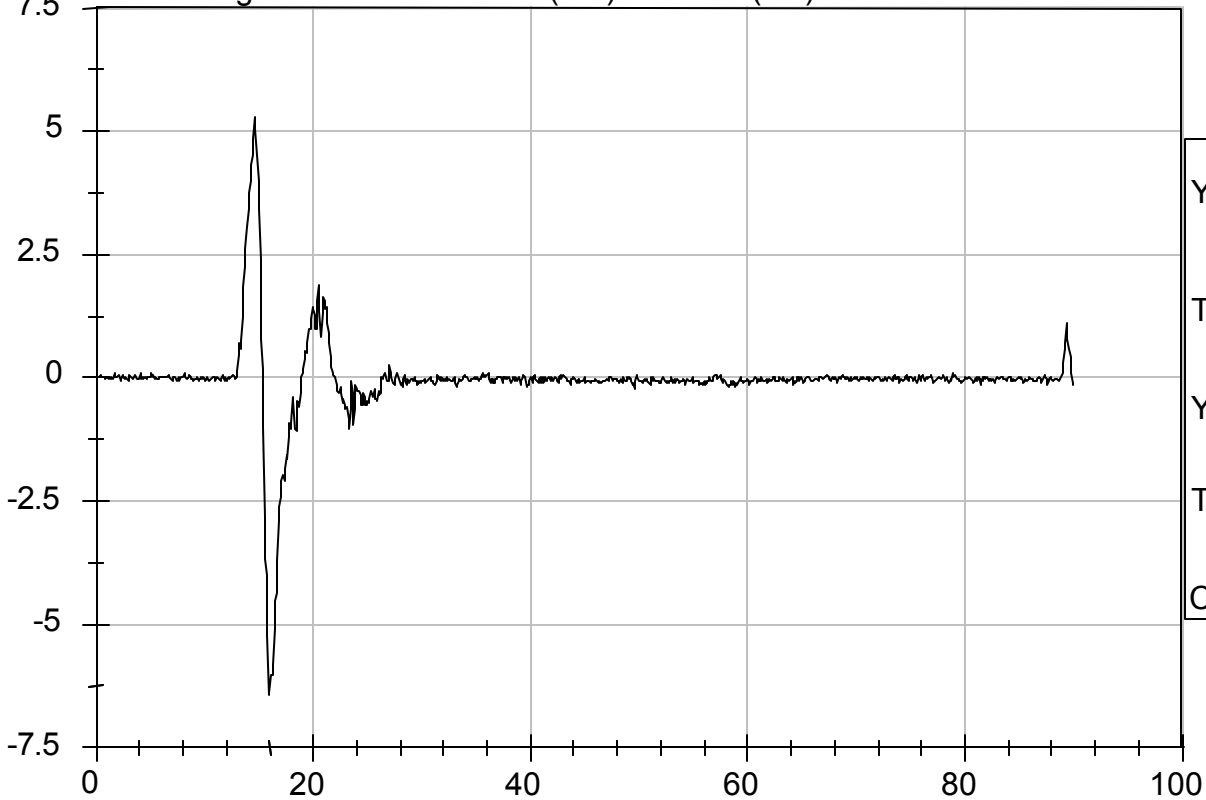
Tmax: 15.1 ms

YMin: 0.3 G

Tmin: 23.5 ms

CFC 1000

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



YMax: 5.3 G

Tmax: 14.6 ms

YMin: -6.4 G

Tmin: 15.9 ms

CFC 1000

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

ATD Serial No: 271

Test I.D: D091462

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	45	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	38	Pass
Lower Spine	G's	15 - 22	18	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

David Winkelbauer
Approved By

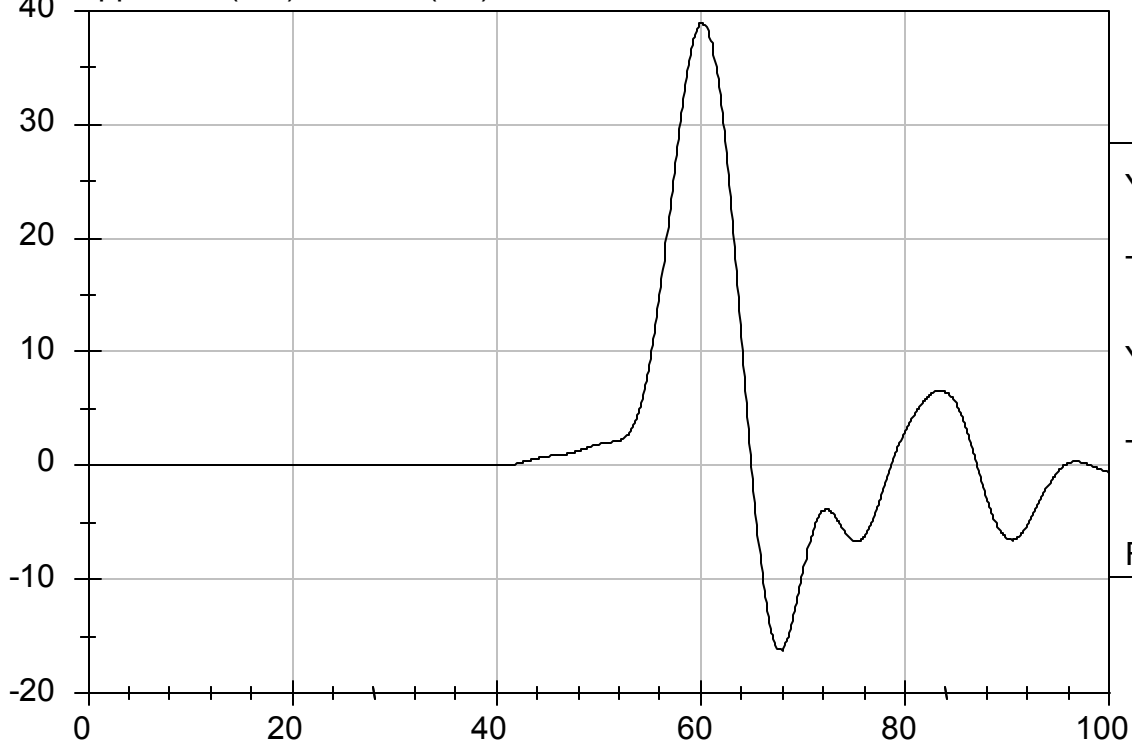
6/11/09
Test Date



Test Desc: Thorax Impact
Component ID: D091462

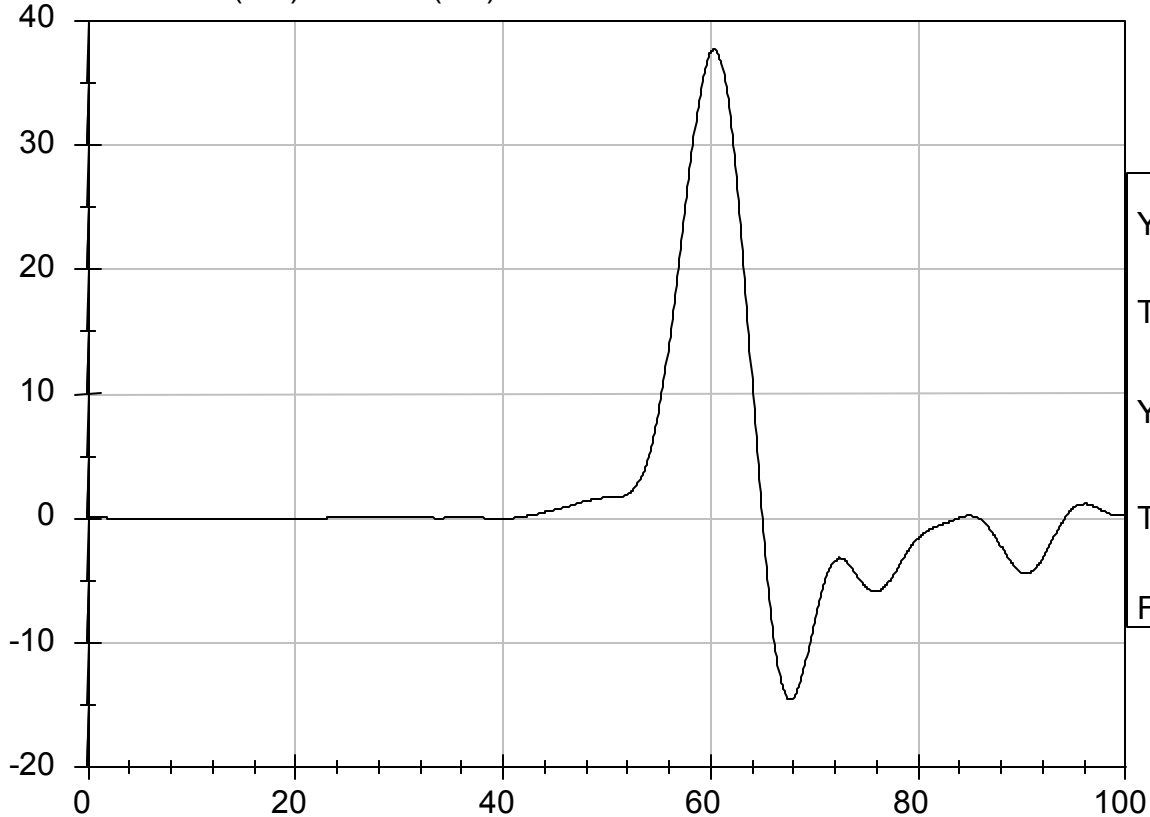
Test Date: 6/11/09
Speed: 14.1 ft/sec, 4.30 m/sec

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



YMax: 38.9 g's
Tmax: 59.9 ms
YMin: -16.2 g's
Tmin: 68.0 ms
FIR 100

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

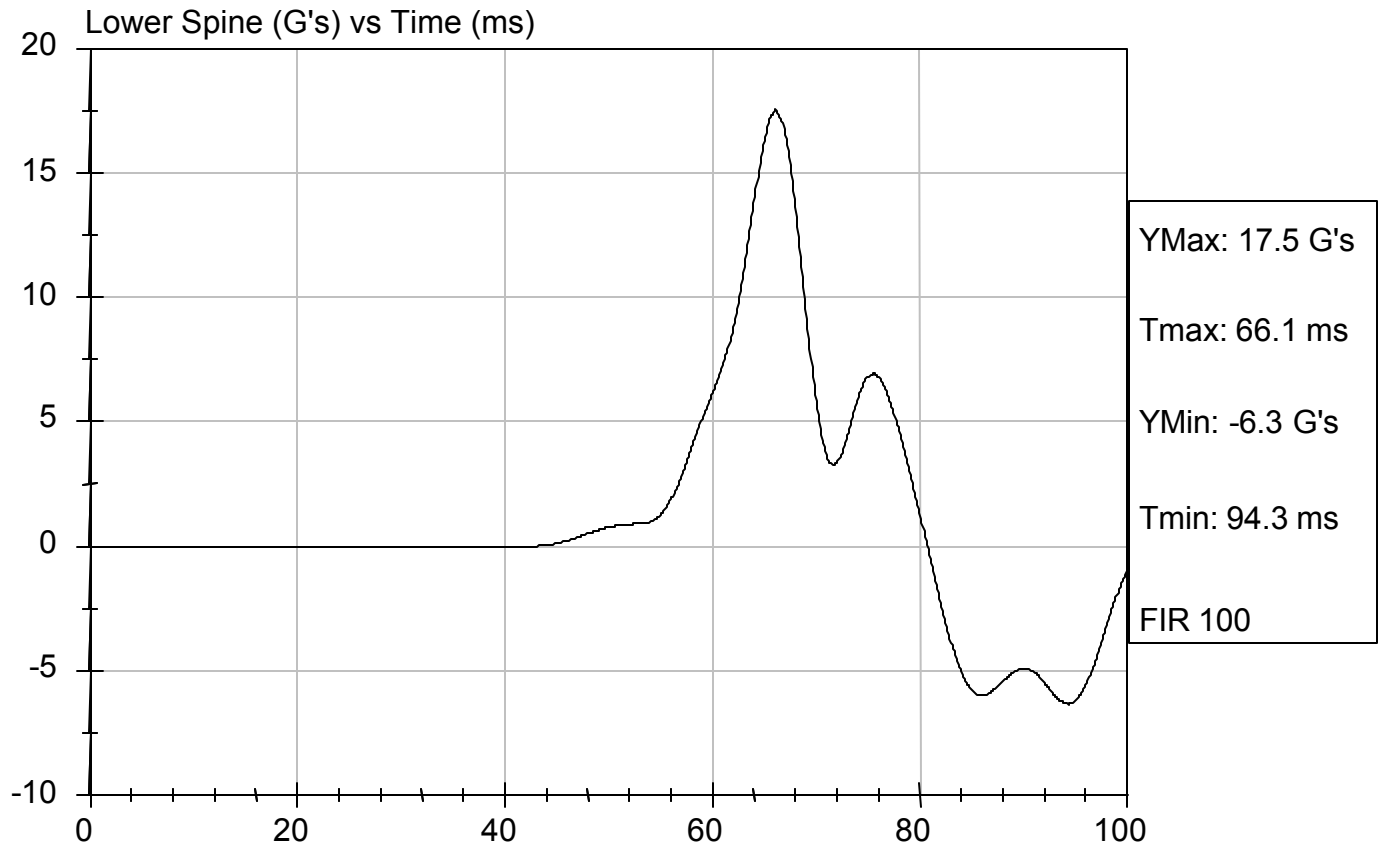


YMax: 37.8 g's
Tmax: 60.5 ms
YMin: -14.6 g's
Tmin: 67.4 ms
FIR 100



Test Desc: Thorax Impact
Component ID: D091462

Test Date: 6/11/09
Speed: 14.1 ft/sec, 4.30 m/sec



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

ATD Serial No: 271

Test I.D: D091463

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	45	Pass
Probe Velocity	m/s	4.27 - 4.33	4.30	Pass
Pelvis Acceleration	G's	40 - 60	46	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

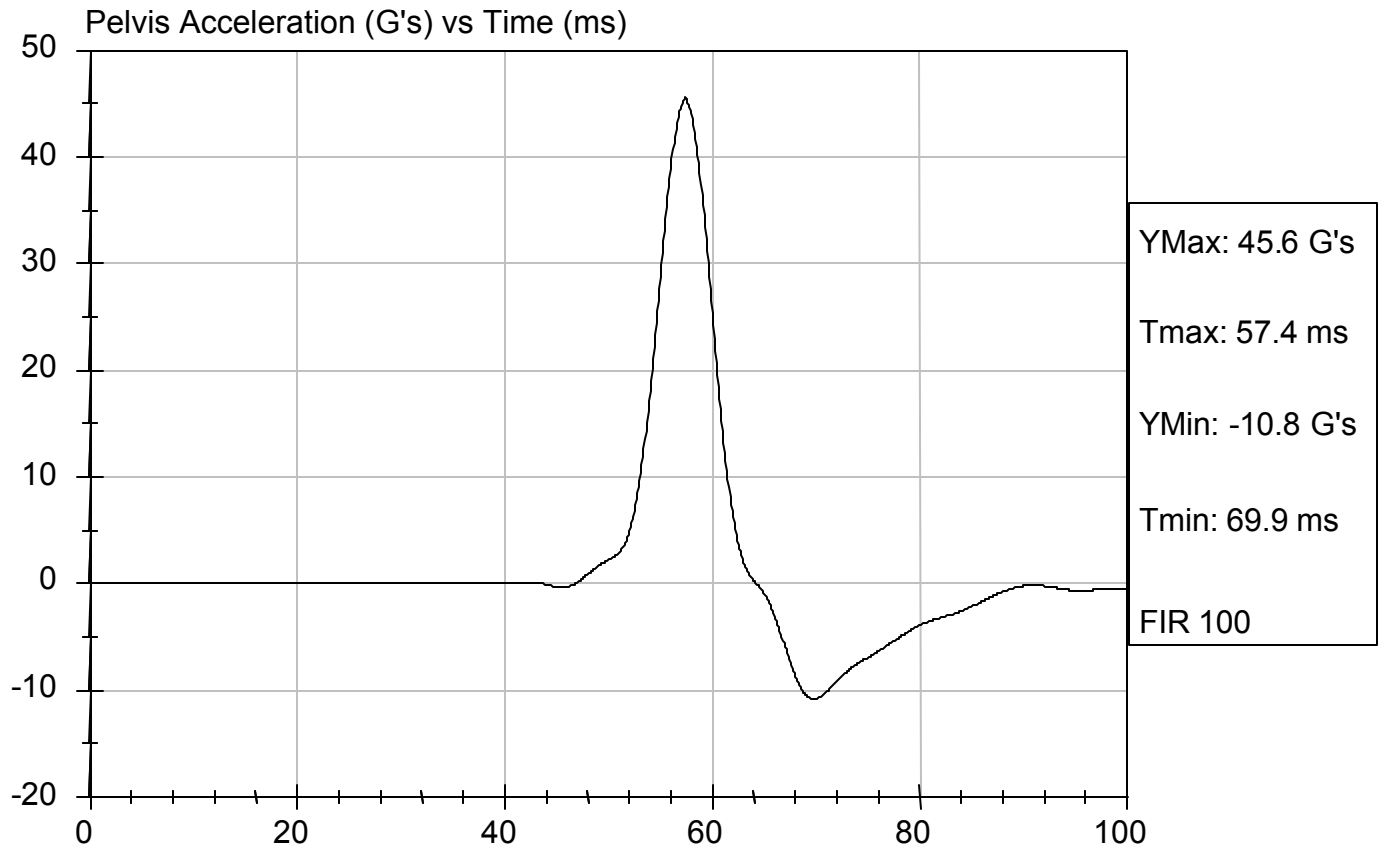
David Winkelbauer
Approved By

6/11/09
Test Date



Test Desc: Pelvis Impact
Component ID: D091463

Test Date: 6/11/09
Speed: 14.1 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: D091464

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	44	Pass
Force At 12.7 mm	N	104 -162	142	Pass
Force At 19 mm	N	163 - 222	197	Pass
Force At 25.4 mm	N	222 - 280	266	Pass
Force At 33 mm	N	325 - 391	365	Pass
			Overall Test Results	Pass

Jessica Hall
Laboratory Technician

David Winkelbauer
Approved By

6/11/09
Test Date

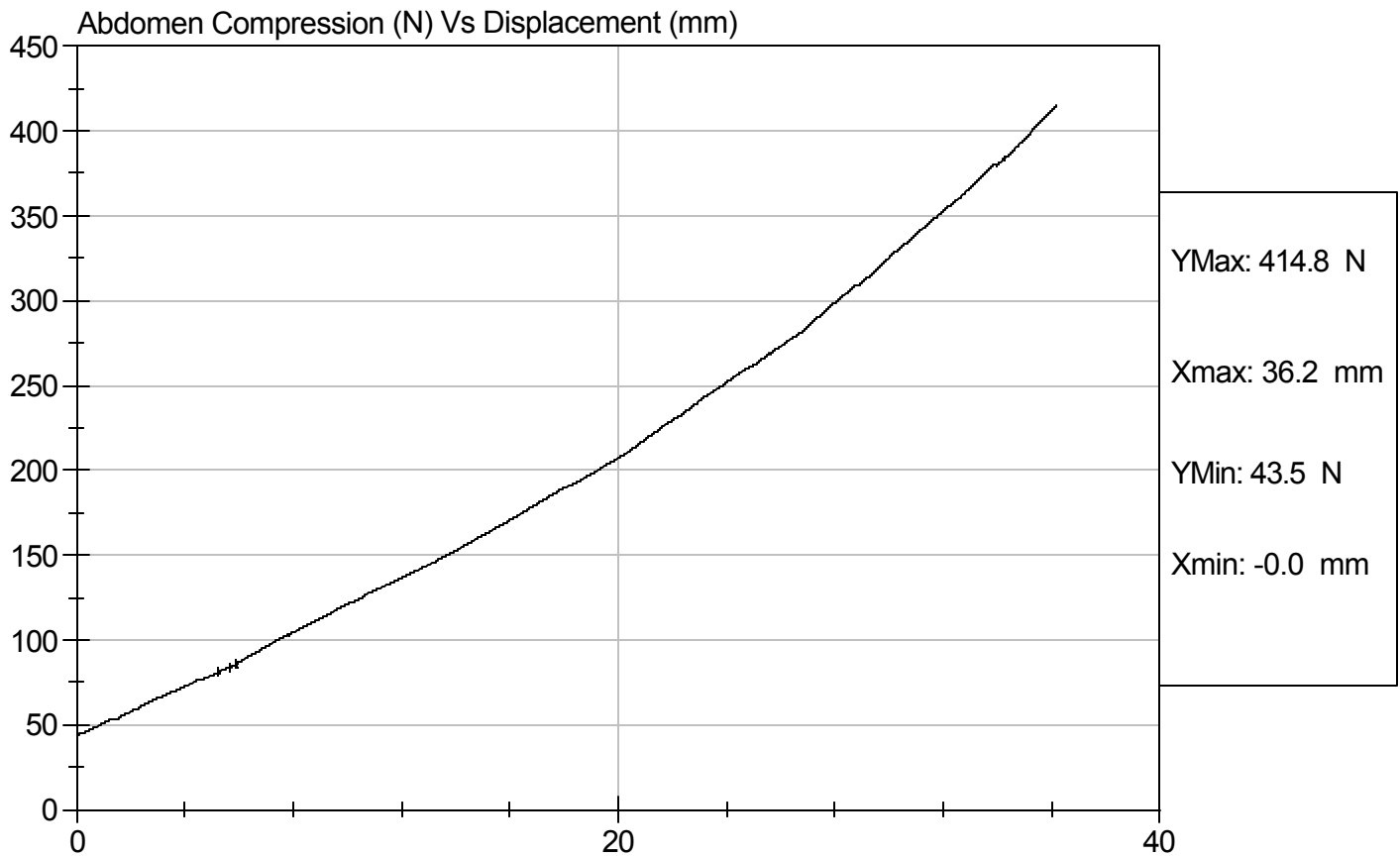


Test Description: Abdomen Compression

Test Date: 6/11/09

Component: D091464

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: D091465

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	44	Pass
Force At 0 deg	N	0 - 26.7	0	Pass
Force At 20 deg	N	97.9 - 151.2	115.2	Pass
Force At 30 deg	N	151.2 - 204.6	174.8	Pass
Force At 40 deg	N	204.6 - 258.0	235.0	Pass
Return Angle	Deg	12 Maximum	7	Pass
Overall Test Results			Pass	

Jessica Hall
Laboratory Technician

David Winkelbauer
Approved By

6/11/09
Test Date

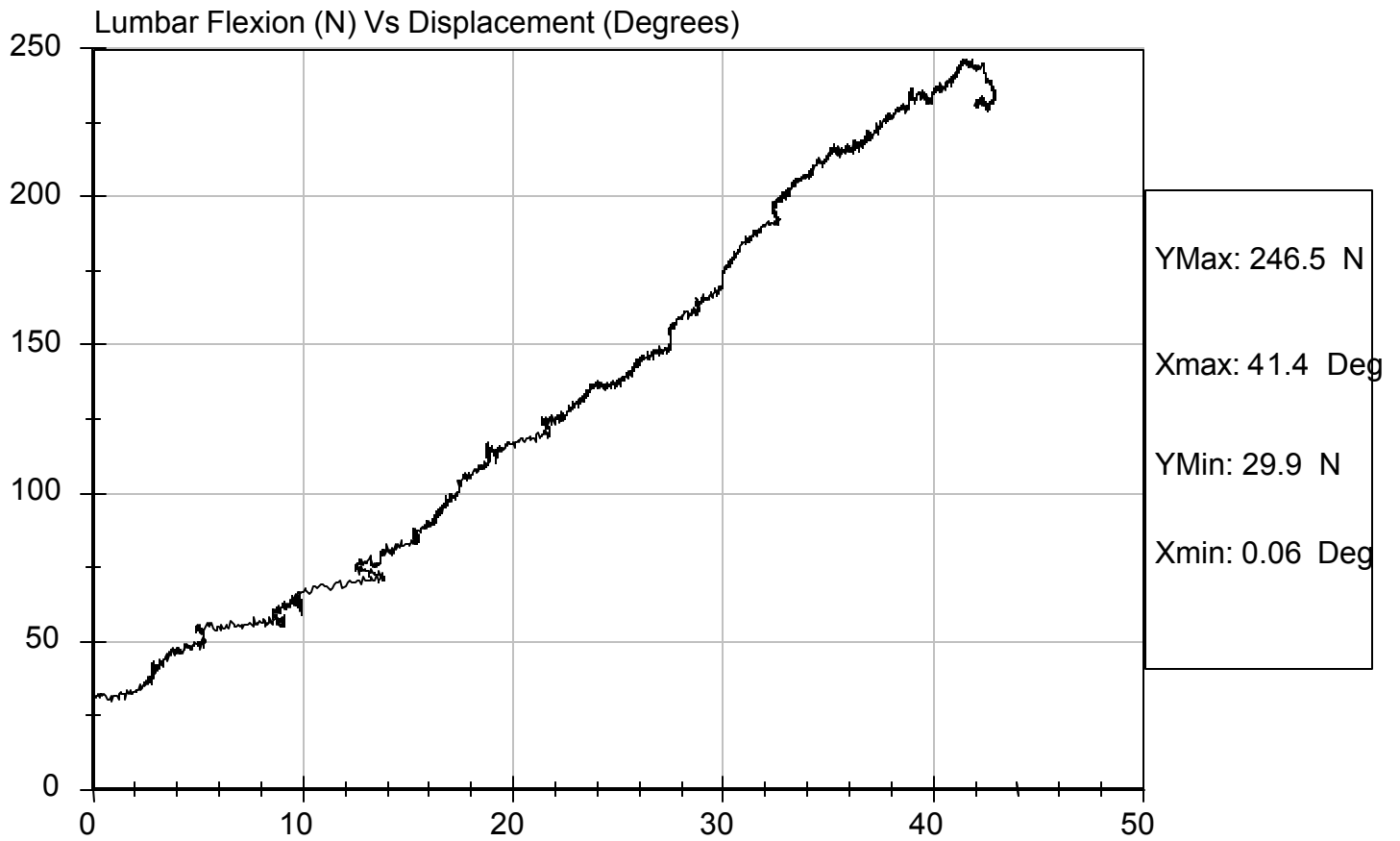


Test Description: Lumbar Flexion

Test Date: 6/11/09

Component: D091465

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: D091469

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.8	Pass
Laboratory Relative Humidity		%	10 to 70	44	Pass
Impact Velocity		m/s	6.89 to 7.13	7.06	Pass
Pendulum Deceleration	10 ms	m/s	1.96 to 2.55	2.38	Pass
	20 ms	m/s	4.12 to 5.10	4.71	Pass
	30 ms	m/s	5.73 to 7.01	6.50	Pass
	40 to 70 ms	m/s	6.27 to 7.64	6.75	Pass
Midsaggital Plane Max Rotation		deg	66 to 82	71	Pass
Head Rotation Peak to Zero - Decay Time		ms	58 to 67	60	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	73	Pass
Mx Peak To Zero - Decay Time		ms	49 to 64	61	Pass
Mx Peak to Max. Head Rotation		ms	2 to 16	13	Pass

Jessica Hall
Laboratory Technician

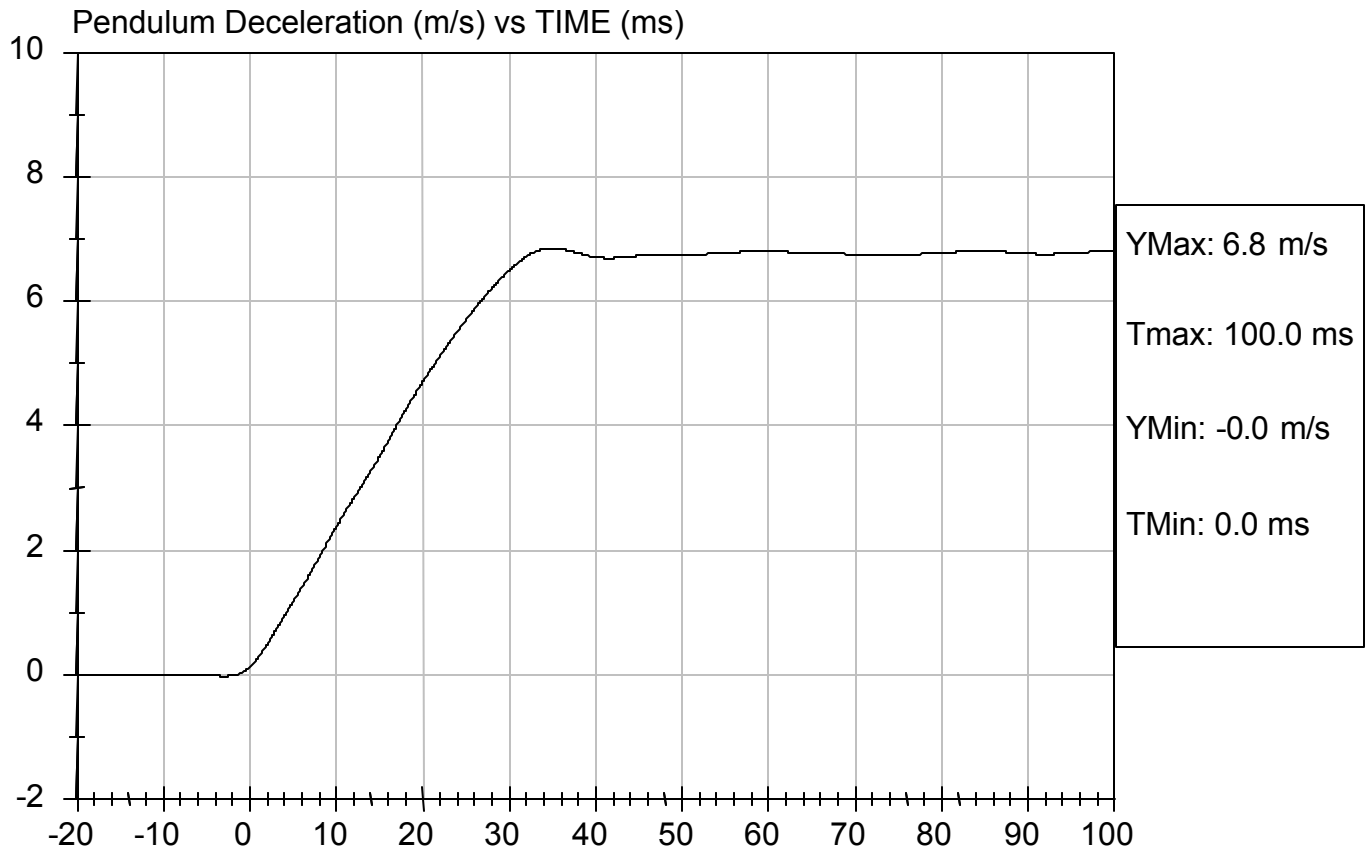
David Winkelbauer
Approved By

6/11/09
Test Date



Test Desc: Neck Bending
Component ID: D091469

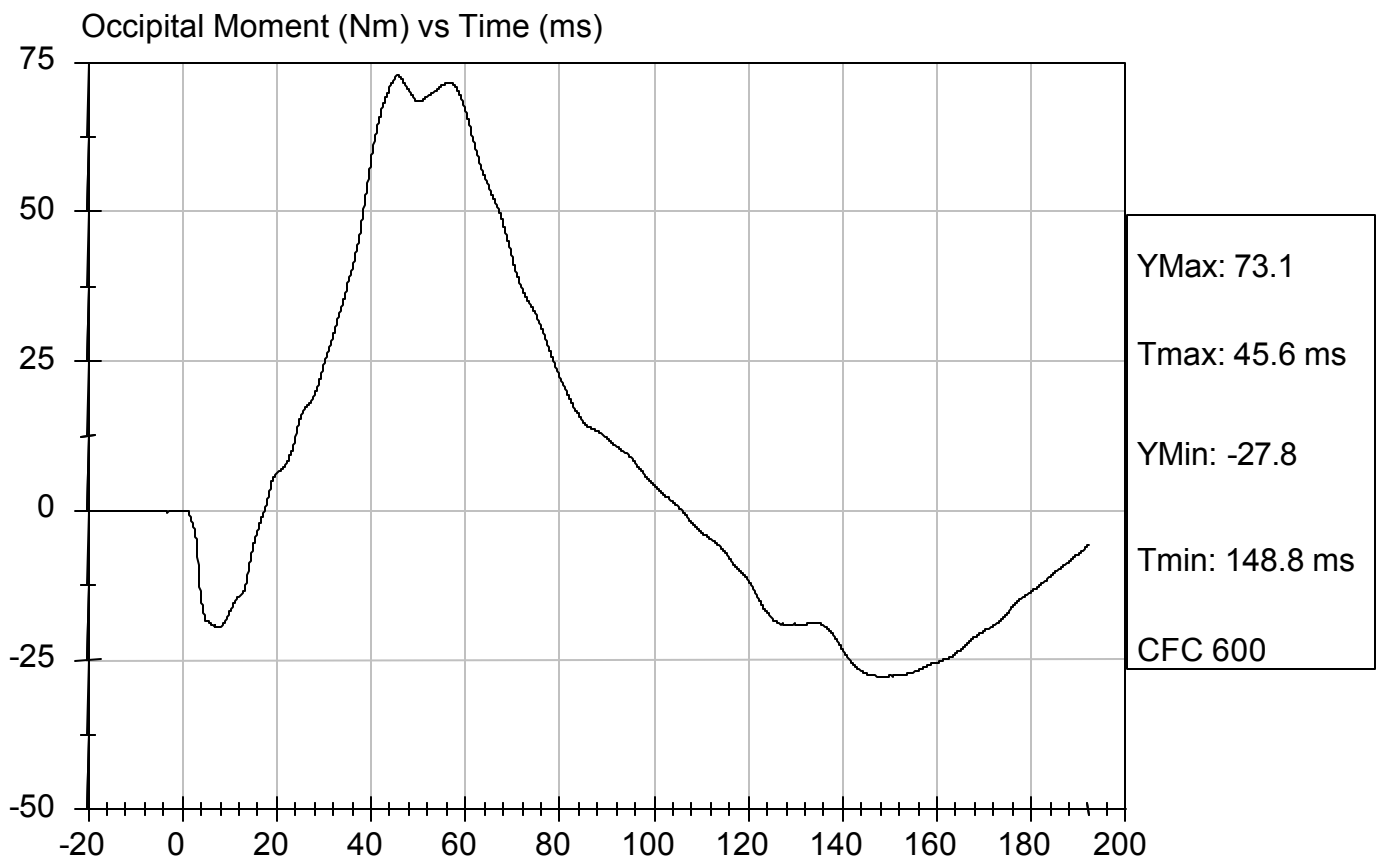
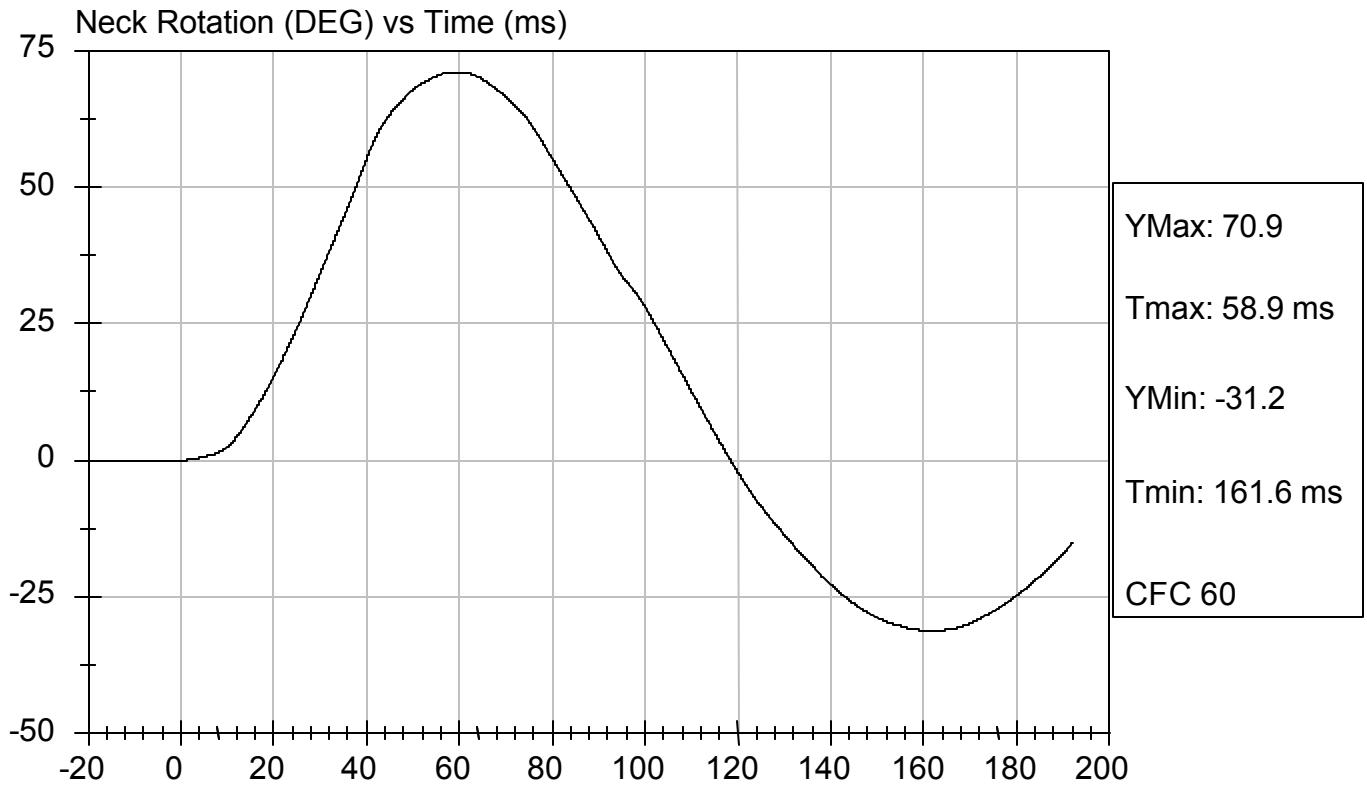
Test Date: 6/11/09
Speed: 23.15 ft/sec, 7.06 m/sec





Test Desc: Neck Bending
Component ID: D091469

Test Date: 6/11/09
Speed: 23.15 ft/sec, 7.06 m/sec



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

6/11/09
Test Date