

REPORT NUMBER: MCW-DOT-09SN01

**NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST**

2009 CHEVROLET IMPALA LT 4-DOOR SEDAN

NHTSA NUMBER: M90100

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FINAL REPORT

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Prepared by:_____

Date:

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16. Abstract A 55/28 km/h 90° Moving Deformable Barrier (MDB) New Car Assessment Program (NCAP) side impact was conducted on the subject 2008 Chevrolet Impala LT 4-door sedan to obtain new car assessment and research data indicant of FMVSS No. 214D performance. The test was conducted at the Medical College of Wisconsin (MCW) in Milwaukee, Wisconsin on 9 September 2008. The impact velocity of the Moving Deformable Barrier (MDB) was 61.8 km/h, and the ambient temperature at the struck side of the vehicle was 20 °C. The target vehicle's maximum post test static crush was 303 mm at level 3. The test vehicle's occupant performance is as follows: <table border="1" data-bbox="154 1218 1299 1491"> <thead> <tr> <th></th> <th><u>Units</u></th> <th><u>DRIVER</u></th> <th><u>PASS.</u></th> </tr> </thead> <tbody> <tr> <td>Left upper rib (LUR) acceleration</td> <td>G</td> <td>36.5</td> <td>57.3</td> </tr> <tr> <td>Left lower rib (LLR) acceleration</td> <td>G</td> <td>34.0</td> <td>66.2</td> </tr> <tr> <td>Lower spine (T₁₂) acceleration</td> <td>G</td> <td>42.9</td> <td>51.1</td> </tr> <tr> <td>Thoracic Trauma Index (TTI)</td> <td></td> <td>40</td> <td>59</td> </tr> <tr> <td>Pelvis (PEV) acceleration</td> <td>G</td> <td>54.6</td> <td>73.2</td> </tr> <tr> <td>HIC</td> <td></td> <td>146.1</td> <td>292.7</td> </tr> </tbody> </table> The doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.							<u>Units</u>	<u>DRIVER</u>	<u>PASS.</u>	Left upper rib (LUR) acceleration	G	36.5	57.3	Left lower rib (LLR) acceleration	G	34.0	66.2	Lower spine (T ₁₂) acceleration	G	42.9	51.1	Thoracic Trauma Index (TTI)		40	59	Pelvis (PEV) acceleration	G	54.6	73.2	HIC		146.1	292.7
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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: U.S. Department of Transportation National Highway Traffic Safety Administration Rulemaking, Office of Crashworthiness Standards, NVS-111 1200 New Jersey Ave, SE, Room W43-410 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 FY'09 test program sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-03-D-42005. The purpose of this test was to evaluate side impact protection of a manufactured by General Motors Corporation.

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. The procedures for receiving, inspection, testing, and reporting of test results are described in the test procedures and are not repeated in this report.

SECTION 2

SUMMARY OF NCAP SIDE IMPACT TEST

A 2009 Chevrolet Impala LT 4-door sedan was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) modeling a 90° impact as if the test vehicle were moving forward at 28 km/h perpendicular to and across the path of the MDB traveling forward at 55 km/h. Here the test vehicle was stationary and positioned 27° from perpendicular to the MDB tow road guidance system and the MDB was towed 27° ("crabbed") from the guidance system. [See p 26.] The 1864.6 kg test vehicle was impacted by the 1360 kg MDB traveling at a speed of 61.8 km/h (measured inline with the guidance system.) The test was conducted at the Medical College of Wisconsin on 9 September 2008.

Two (2) 50th percentile adult male Hybrid III-Side Impact Dummies (SID/HIIIs) were placed in designated seating positions within the test vehicle: one (1) driver, and one (1) left rear passenger; serial numbers 056 and 058 respectively. Each SID/HIII was instrumented in the following locations:

- Left upper rib uni-axial (Y) accelerometers (primary and redundant)
- Left lower rib uni-axial (Y) accelerometers (primary and redundant)
- Lower thoracic spine uni-axial (Y) accelerometers (primary and redundant)
- Pelvis uni-axial (Y) accelerometers (primary and redundant)
- Head center of gravity tri-axial (X, Y, Z) accelerometers (primary and redundant)
- Upper neck tri-axial (X, Y, Z) force load cells and tri-axial (X, Y, Z) moment load cells

The test vehicle was instrumented with twenty-one (21) structural accelerometers and the MDB was instrumented with six (6) accelerometers. All data channels were recorded with a fully self contained on-board DTS TDAS Pro Data Acquisition System. The data were digitally sampled at 12.5 kHz and processed according to SAEJ211-1 (March 1995).

One (1) real-time video camera and nine (9) high-speed video 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 dummies can be found in Appendix A.

All of the above was conducted in accordance to the Laboratory Test Procedure for New Car Assessment Program Side Impact Testing dated November 2002.

2.2 GENERAL COMMENTS

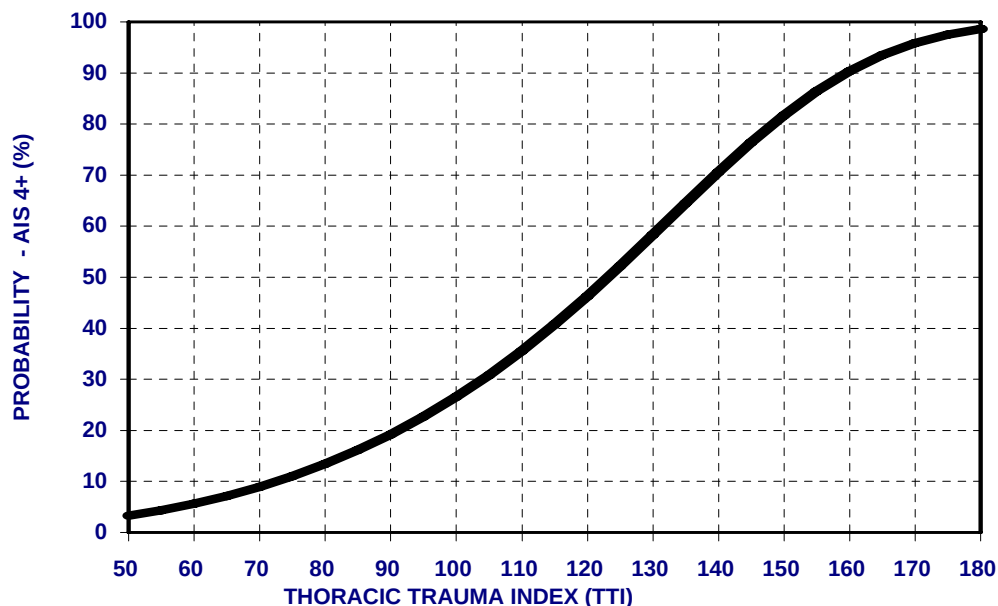
The test vehicle sustained a maximum static crush of 303 mm at level 3, 1650 mm rearward of the vertical impact line.

Test summaries, post test observations, vehicle, MDB, camera, and occupant measurements are presented in datasheets 1-16. Appendix A contains the still photograph prints. Appendix B contains selected driver and passenger SID/HIII's response data traces. Appendix C contains the SID/HIII's configuration and performance verification data.

OCCUPANT SUMMARY		
Injury criteria	Driver (P1)	Left rear passenger (P4)
HIC36	146.1	292.7
T1 (ms)	26.6	40.0
T2 (ms)	50.8	68.7
TTI	40	59
Maximum pelvic acceleration (G)	54.6	73.2

Head Injury Criterion (HIC) is the standardized calculation using resultant head acceleration to assess head injury. Generally, a higher HIC represents an increase in the likelihood of a serious head injury. HIC36 specifies a time 'window' of 36 milliseconds over which the integral is calculated. T1 and T2 represent the time of the lower and upper bounds of the window in which the HIC is calculated.

The Thoracic Trauma Index (TTI) is computed from the crash test dummy's accelerations at the upper rib, lower rib, and lower spine to quantify the risk of a serious thorax injury during a typical near side impact crash. The injury risk curve is shown below. The vertical axis of the curve is the probability of sustaining an Abbreviated Injury Scale (AIS) level 4 or greater injury. AIS is an anatomical scoring system used to assess a 'threat to life' associated with a specific injury; injuries are ranked on a scale of 1 to 6, with 1 being 'minor', 4 'severe' and 6 an 'unsurvivable' injury. A lower TTI corresponds to a decreased probability of a severe thorax injury. (www.trauma.org)



The maximum pelvic acceleration is used to assess the likelihood of injury to the pelvis during a side impact crash. Higher pelvic accelerations correspond to an increase in the likelihood of sustaining a severe pelvis injury.

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION				
Restraint type	Left front (driver) occupant Location 01		Left rear (passenger) occupant Location 04	
	Installed	Operation	Installed	Operation
Front airbag	Yes – steering wheel	Did not deploy	No	N/a
Side airbag	Yes – side back	Deployed	No	N/a
Head airbag	No	N/a	No	N/a
Curtain airbag	Yes – side header	Deployed	Yes	Deployed
Seat belt pretensioner	Yes	Deployed	No	N/a
Seat belt load limiter	Yes	N/a	Yes	N/a

These test data and report can be found in detail on the NHTSA website at www.nhtsa.dot.gov.

A brief summary of the crash test can be located at www.safercar.gov

TEST NOTES

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

VEHICLE INFORMATION		VEHICLE OPTIONS	
Year	2009	Air conditioning	Yes
Make	Chevrolet	Anti-lock brakes	Yes
Model	Impala LT	AM/FM radio	Yes
Body style	4-door Sedan	All wheel drive	No
NHTSA number	M9 0100	Combo bag	No
MCW test ID	09SN01	Console	Yes
VIN	2G1WT57K391107558	Cruise/speed control	Yes
Color	Mocha	Curtain bag	Yes - front and rear
Build date	July 2008	Disc brakes	Yes - front and rear
Engine No. of cylinders	6	Frontal bag	Yes
Engine Displacement (L)	3.5	Power brakes	Yes
Engine Placement	Lateral	Power door locks	Yes
Transmission	Automatic with O/D	Power steering	Yes
Final drive	Front wheel drive	Power windows	Yes
Delivery date	August 20, 2008	Rear window defroster	Yes
Odometer reading	16 miles	Tilt steering wheel	Yes

CERTIFICATION LABEL INFORMATION			
Manufacturer	General Motors Corp.	GVWR (kg)	2069
		GAWR front (kg)	1115
Date of manufacture	July 2008	GAWR rear (kg)	954

SEAT INFORMATION			
	Number of occupants	Seat type	Seat back type
Front	2	Bucket	Adjustable
Back	3	Split bench	Fixed
Third	0		
Total	5		

CARGO CAPACITY CALCULATION			
	Units	Value	Reference label
Vehicle maximum capacity	kg	428	(A)
Number of occupants (7) X 68.04 kg	kg	340.2	(B)
Cargo capacity (RCLW) †	kg	87.8	(C) = (A)-(B) †

† Note if RCLW is > 136.1 kg (300 lbs), use 136.1 kg

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

TEST VEHICLE MASS INFORMATION				
	Units	As delivered	As tested	Fully loaded
Left front	kg	495.5	546.4	537.5
Right front	kg	502.7	504.1	501.9
Left rear	kg	307.3	420.5	425.2
Right rear	kg	316.8	393.6	406.9
Total front	kg	998.2	1050.5	1039.4
% Total front	%	61.5	56.3	55.5
Total rear	kg	624.1	814.1	832.1
% Total rear	%	38.5	43.7	44.5
Total	kg	1622.3	1864.6	1871.5

As delivered mass is vehicle mass with maximum fluids

Fully loaded mass is the as delivered mass + 1 or 2 ATD's + RCLW

As tested mass is the mass of test vehicle with 1 or 2 ATD's + instrumentation + ballast (if necessary)

CALCULATION OF TEST VEHICLE TARGET MASS			
	Units	Value	Reference label
As delivered test vehicle mass	kg	1622.3	(D)
Maximum cargo capacity (RCLW)	kg	87.8	(C)
Mass of SID HIII's (1 or 2)	kg	161.4	(E)
Test vehicle target mass (TVTW)	kg	1871.5	(D) + (C) + (E)

As tested mass must be 4.5 kg to 9 kg less than the test vehicle target mass

BALLAST INFORMATION	
Mass of ballast added (kg)	26.8 kg
Location	Beneath spare tire in trunk
<u>Components removed from test vehicle</u> Non-struck front and rear door glasses, right rear tail-light, right rear speaker Non-struck front and rear door interior panels	

IMPACT LOCATION ON TEST VEHICLE	
Wheelbase	2805 mm
Nominal impact point	462.5 mm rearward of front axle
Actual impact point	443.5 mm rearward of front axle

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

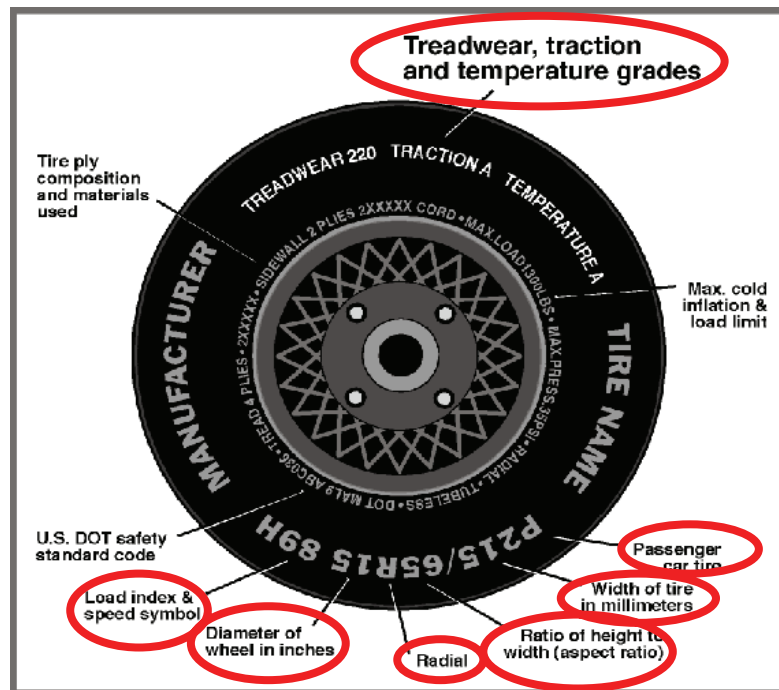
TEST VEHICLE ATTITUDES				
	Units	As delivered	As tested	Fully loaded
Left front	mm	763	751	749
Right front	mm	762	756	740
Left rear	mm	768	716	710
Right rear	mm	766	723	719
CG (X)	mm	1079.1	1224.7	1247.1

As tested attitudes must be between as delivered and fully loaded attitudes

CG (X) measured rearward from front axle centerline

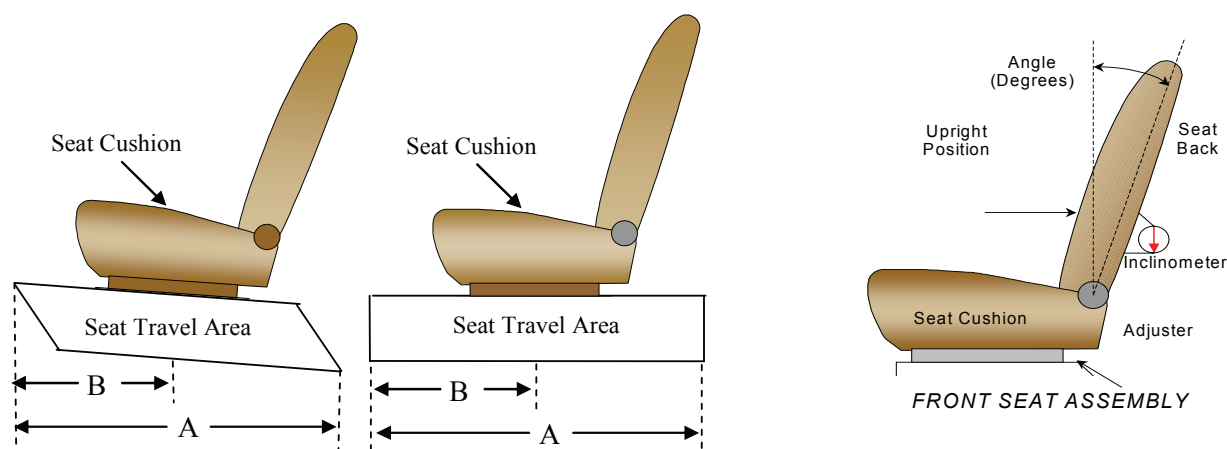
AUTOMATIC DOOR LOCK (ADL) INFORMATION				
	Left front	Left rear	Right front	Right rear
ADL present	Yes	Yes	Yes	Yes
ADL deactivated	No	No	No	No
Deactivation method	N/a			
Door lock status	Locked	Locked	Locked	Locked

DATA SHEET NO. 2
TEST VEHICLE TIRE INFORMATION



TIRE INFORMATION		
Measured Parameter	Front	Rear
Maximum tire pressure (kPa)	300	300
Cold / test pressure (kPa)	210	210
Recommended tire size	P225/60R16	P225/60R16
Tire size on vehicle	P225/60R16	P225/60R16
Tire manufacturer	Goodyear	Goodyear
Tire name	Integrity	Integrity
Tire type	Tubeless radial	Tubeless radial
Tire width (mm)	225	225
Ratio of height to width (aspect ratio)	60	60
Radial	Yes	Yes
Wheel diameter (inches)	16	16
Load index & speed symbol	97S	97S
Tread wear	460	460
Traction grade	A	A
Temperature grade	B	B

DATA SHEET NO. 3 TEST VEHICLE INFORMATION



Seat fore/aft positions

The total seat travel was measured from forward most position to rearmost position, irrespective of vertical seat height in those positions. The seat was set at the longitudinal mid position with vertical adjustment at the lowest position obtainable for both the driver and passenger.

SEAT FORE/AFT POSITION		
	Left front seat	Left rear seat
Type	Automatic	Non-adjustable
Fore/aft total travel (mm)	250	N/a
Number of detents	N/a	N/a
Test position	Mid-position 125 mm from full forward	N/a

‡Full forward = notch 0

Seat back position

The driver and passenger seat back is positioned according to the manufacturers designated angle.

SEAT BACK POSITION		
	Left front seat	Left rear seat
Seat back angle @ head rest post	9.5°	Fixed
Test position	7th notch from full upright	N/a

‡Full upright = notch 0

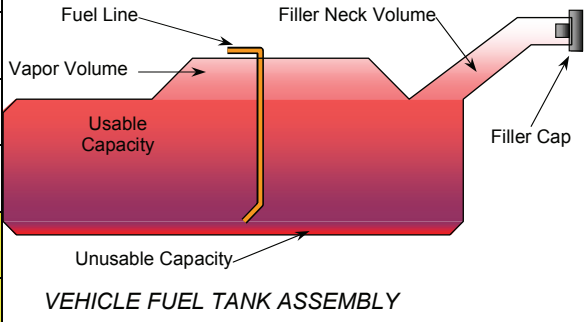
Seat belt position

The adjustable anchorage locations are positioned according to the manufacture's specifications.

SEAT BELT ADJUSTABLE ANCHORAGE (D-RING)		
	Left Front Seat	Left Rear Seat
Adjustable anchor present	Yes	Fixed
Total travel (mm)	75	N/a
Test position	1st detent, with highest being 0	N/a

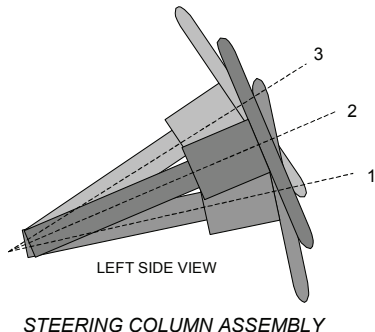
DATA SHEET NO. 3
TEST VEHICLE INFORMATION (CONTINUED)

Fuel tank information

STODDARD INFORMATION			
Description	Units	Value	
Usable capacity of standard equipment fuel tank	L	66.2	
Usable capacity of optional equipment fuel tank	L	N/a	
Usable capacity of vehicle used for certification testing to requirements	L	66.2	
Amount of stoddard added for test	L	61.6	
% Usable capacity (92%-94%)	%	93.1	
Operational instructions	None		
Electric fuel pump present	Yes		
Operating condition of test vehicle for fuel pump operation	The fuel pump is activated when the ignition is turned on.		

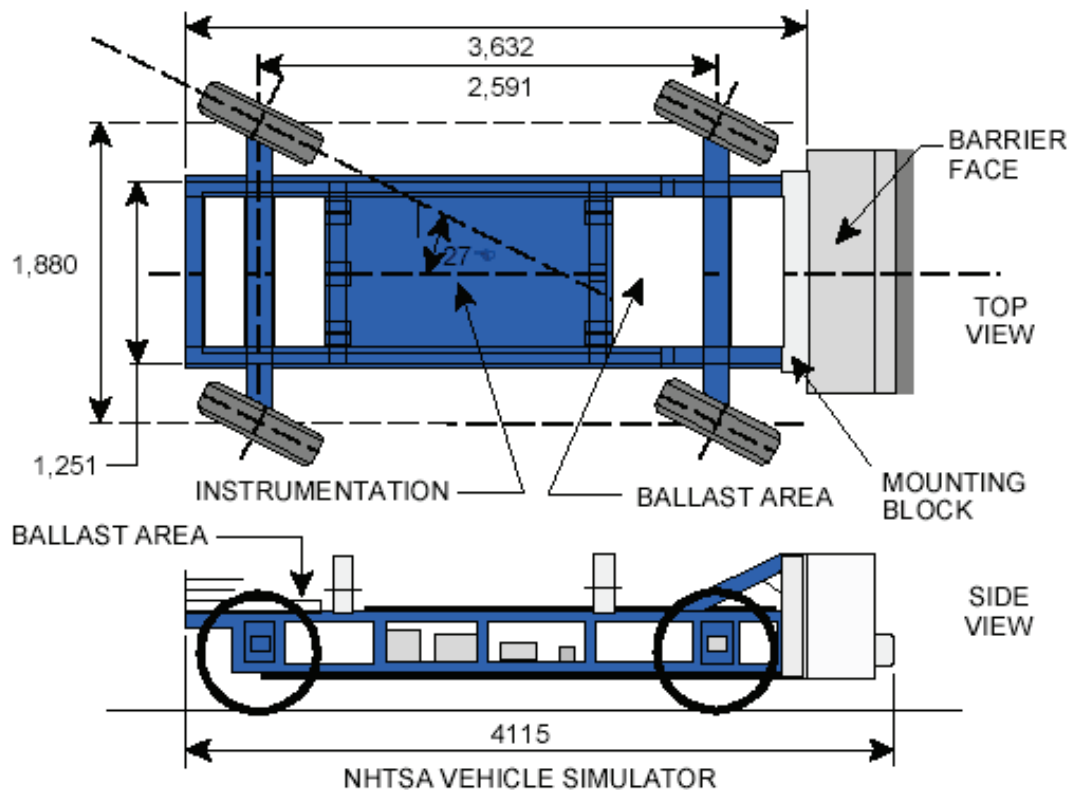
Steering wheel information

Steering wheel and column adjustments are placed according to the manufacturer's specifications.

ADJUSTABLE STEERING COLUMN		
Adjustable column	Yes	
Steering wheel angle in upper most position	39.2°	
Steering wheel fore/aft travel	Non-telescoping	
Number of detents	N/a	
Test position	Steering wheel positioned 26.9° relative to side sill panel. The steering column does not have a telescope adjustment.	

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

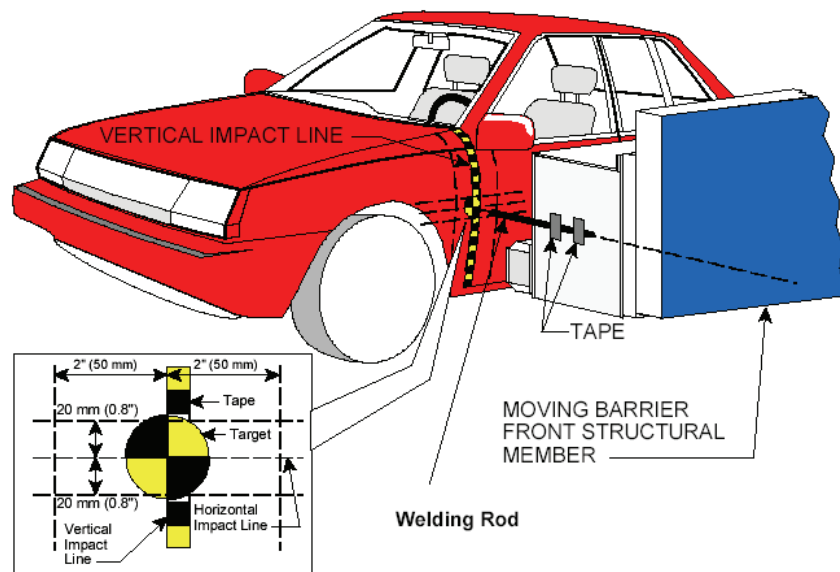
MDB SPECIFICATIONS				
	Units	Specification	Range	Value
Overall Width of Framework Carriage	mm	1251	1226-1276	1245
Overall Length w/Impactor Face	mm	4115	4090-4140	4101
Overall Length w/o Impactor Face	mm	3632	3607-3657	3617
Longitudinal Cg from Front Axle	mm	1123	1098-1148	1135
Track Width	mm	1880	1855-2005	1864
Mass	kg	1361	1356.5-1365.5	1360
MOI (X)	kg-m ²	508	483-533	496
MOI (Y)	kg-m ²	2263	2150-2376	2227
MOI (Z)	kg-m ²	2572	2443-2701	2609



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

MDB MASS INFORMATION		
	Units	As tested
Left front	kg	418.6
Right front	kg	342.3
Left rear	kg	264.1
Right rear	kg	335
Total front	kg	760.9
% Total front	%	55.9
Total rear	kg	599.1
%Total rear	%	44.1
Total	kg	1360

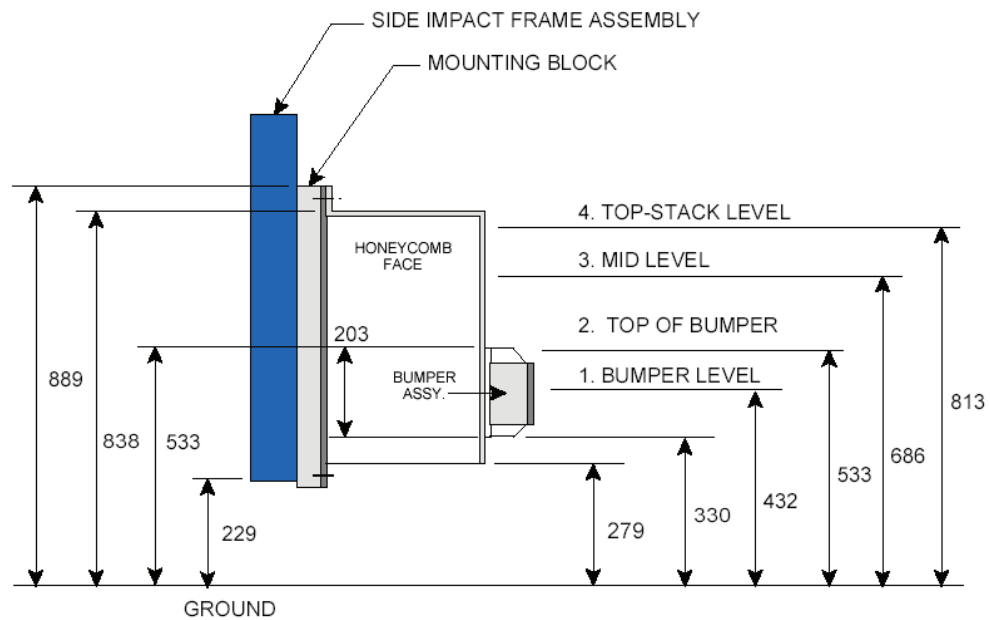
IMPACT SPEED				
	Units	Specification	Range	Value
Primary speed trap	kmh	61.9	61.1-62.7	61.8
Redundant speed trap	kmh	61.9	61.1-62.7	61.6



IMPACT POINT INFORMATION		
Vertical impact line is	462.5 mm rearward of front axle	
Actual impact is	443.5 mm rearward of front axle	
Measurement	Value	Tolerance
Impact point distance from vertical impact line	19 mm forward	+/- 50 mm
Impact point distance from horizontal impact line	3 mm below	+/- 20 mm

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

HONEYCOMB FACE CLEARANCE					
	Units	Specification	Range	Left	Right
Bottom of barrier	mm	279	276-282	277	277
Bottom of bumper	mm	330	327-333	329	330
Top of bumper	mm	533	530-536	533	532
Top of barrier	mm	838	835-841	835	835



RIGHT SIDE VIEW

**DATA SHEET NUMBER 5
POST TEST OBSERVATIONS**

TEST DUMMY INFORMATION AND CONTACT POINTS		
Description	Left front seat	Left rear seat
Dummy type / serial no.	SID HIII/056	SID HIII/058
Head contact	To side curtain airbag; top of head to roof rail	To side curtain airbag; top of head to roof rail
Upper torso contact	To seat mounted side airbag	To left rear door panel below window sill
Lower torso contact	To seat mounted side airbag and armrest	To left rear door panel along top of armrest
Left leg contact	To left front door panel 170 mm below arm rest	To left rear door panel 125 mm below armrest
Left knee contact	To left front door panel 140 mm below arm rest	To left rear door panel 140 mm below armrest

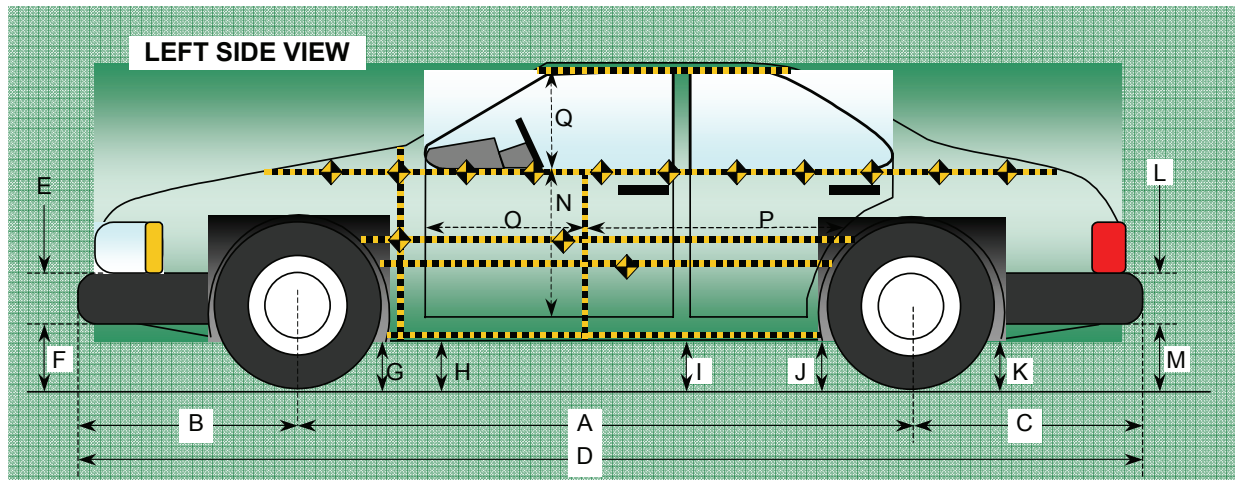
POST TEST DOOR OPENING AND SEAT TRACK INFORMATION		
Description	Front	Rear
Locked/unlocked doors	Locked	Locked
Left side door opening	Closed/latched/inoperable	Closed/latched/inoperable
Right side door opening	Closed/latched/operable	Closed/latched/operable
Seat movement	97 mm of seat crush at mid-seat	116 mm of seat crush at mid-seat
Seat back failure	None	None

POST TEST STRUCTURAL OBSERVATIONS	
Critical areas of performance	Observations/conclusions
Pillar performance	Lower b-pillar panel separated from mid-panel
Sill separation	Front door max separation 45mm at mid-door; rear door max separation 48 mm at mid-door
Windshield damage	Heavy damage at upper right corner; moved downward and ~560 mm medially; light cracking on right side
Window damage	Front window was undamaged; rear window shattered at impact
Other notable effects	None

DATA SHEET NUMBER 5
POST TEST OBSERVATIONS (CONTINUED)

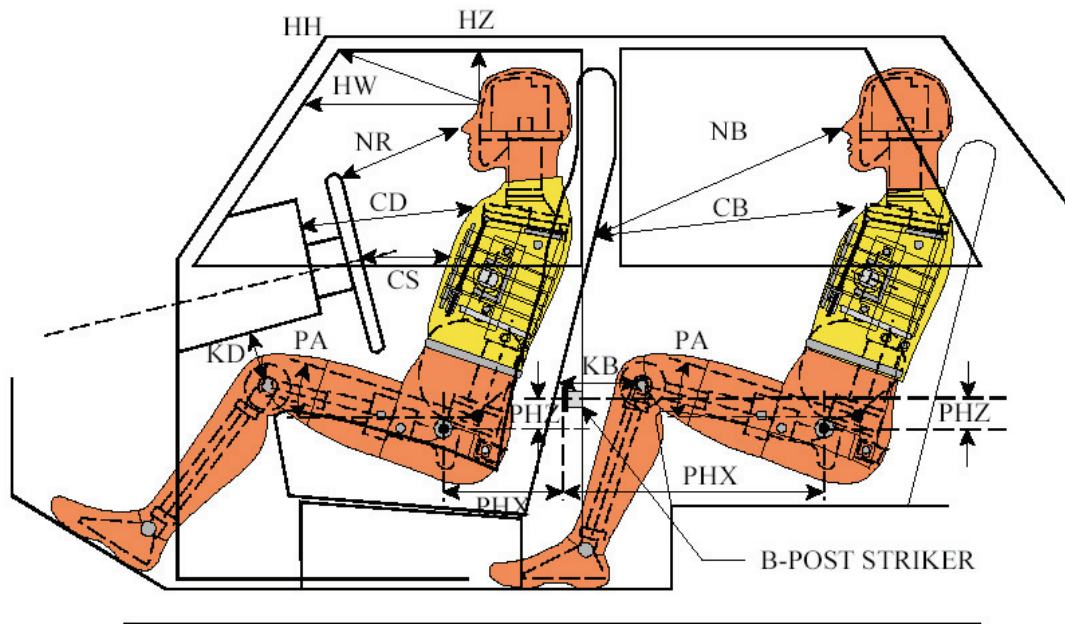
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION				
Restraint Type	Left front (Driver) occupant Location 01		Left rear (passenger) occupant Location 04	
	Installed	Operation	Installed	Operation
Front airbag	Yes - steering wheel	Did not deploy	No	N/a
Side airbag	Yes - seat back	Deployed	No	N/a
Head airbag	No	N/a	No	N/a
Curtain airbag	Yes - roof rail	Deployed	Yes - roof rail	Deployed
Seat belt pretensioner	Yes	Yes	No	N/a
Seat belt load limiter	Yes	N/a	Yes	N/a

DATA SHEET NUMBER 6
VEHICLE PRE AND POST MEASUREMENTS



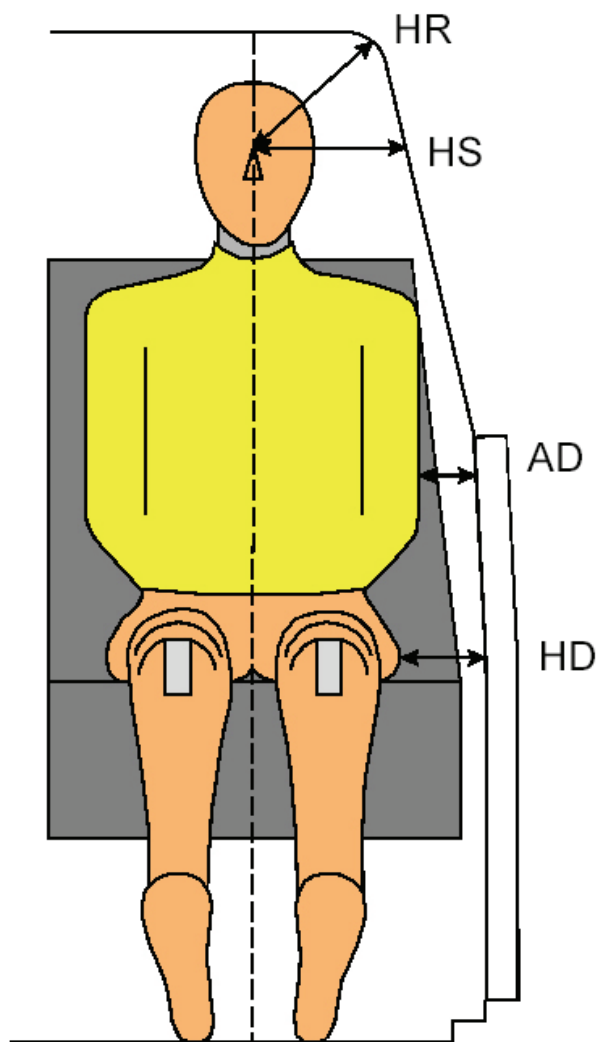
VEHICLE DIMENSIONS				
Code	Description	Pre test	Post test	Change
		mm	mm	mm
A	Wheelbase	2805	2744	-61
B	Front axle to front side of vehicle	717	720	3
C	Rear axle to rear side of vehicle	1043	1059	16
D	Total length at centerline	5095	5083	-12
E	Front bumper thickness	181	181	0
F	Front bumper bottom to ground	286	314	28
G	Sill height at front wheel well	232	210	-22
H	Sill height at front door leading edge	222	208	-14
I	Sill height at b-pillar	235	206	-29
J1	Sill height at rear wheel well	220	172	-48
J2	Pinch weld height at rear wheel well	242	200	-42
K	Sill height aft of rear wheel well	333	274	-59
L	Rear bumper thickness	182	182	0
M	Rear bumper bottom to ground	498	442	-56
N	Sill height to window bottom sill	730	659	-71
O	Front door leading edge to impact C/L	1085	1042	-43
P	Rear door trailing edge to impact C/L	891	807	-84
Q	Front window opening	421	430	9
R	Right side length	4565	4577	12
S	Left side length	4565	4523	-42
T	Vehicle width at b-pillar	1846	1655	-191

DATA SHEET NUMBER 7
SID HIII LONGITUDINAL CLEARANCES



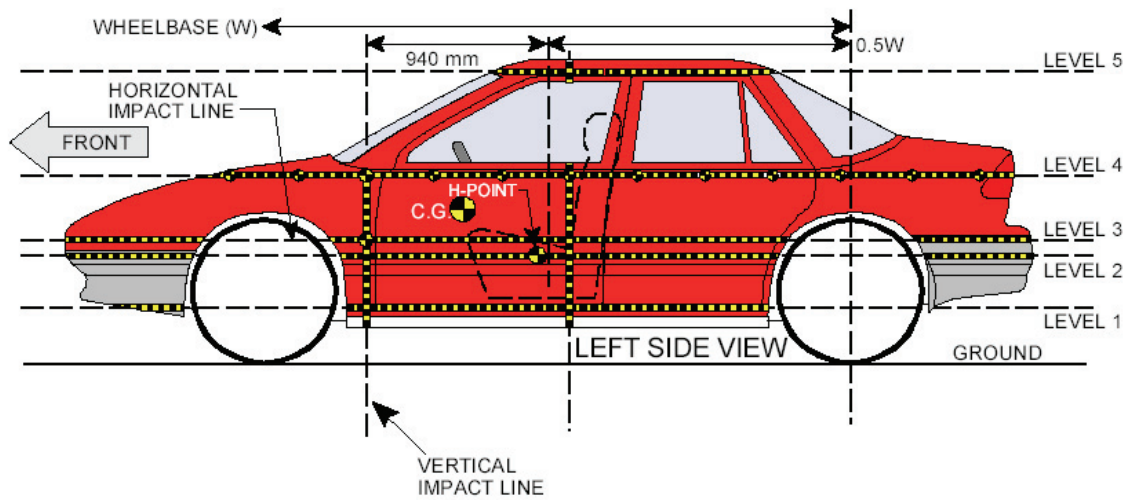
SID HIII LONGITUDINAL CLEARANCE MEASUREMENTS					
Driver code	Pass. code	Measurement description	Units	Left front seat	Left rear seat
		ATD serial number	-	056	058
HH	-	Head to header	mm	334	N/a
HW	-	Head to windshield	mm	672	N/a
HZ	HZ	Head to roof	mm	170	135
NR	NB	Nose to rim/nose to seatback	mm	454	704
CD	CB	Chest to dash or seatback	mm	548	584
CS	-	Chest to steering wheel	mm	338	N/a
KDL	KBL	Left knee to dash or seatback length	mm	176	219
KDA	KBA	Left knee to dash or seatback angle	°	23.4	23.9
KDR	KBR	Right Knee to dash or seatback length	mm	163	214
KDA	KDA	Right knee to dash or seatback angle	°	20.4	26.1
PA	PA	Pelvic angle	°	23.4	23.2
PHX	PHX	H-Point to striker (x-axis)	mm	229.2	272.4
PHZ	PHZ	H-Point to striker (z-axis)	mm	-123.4	-313.5

DATA SHEET NUMBER 8
SID HIII LATERAL CLEARANCES



SID HIII LATERAL CLEARANCE MEASUREMENTS				
Code	Measurement description	Units	Left front seat	Left rear seat
-	ATD serial number	-	056	058
HR	Head to side header	mm	196	156
HS	Head to side window	mm	339	184
-	Shoulder to door	mm	122	108
AD	Arm to door	mm	180	174

DATA SHEET 9 VEHICLE SIDE MEASUREMENTS



VEHICLE STATIC CRUSH SUMMARY				
Level	Description	Height above ground (mm)	Maximum static crush (mm)	Longitudinal (X) distance from impact point (mm)
5	Window top	1374	148	1350
4	Window sill	941	236	1500
3	Mid-door	637	303	1650
2	Driver H-point	495	289	1650
1	Axle centerline or sill top	263	82	150
Maximum static crush		303 mm at level 3 1650 mm rearward from vertical impact line		

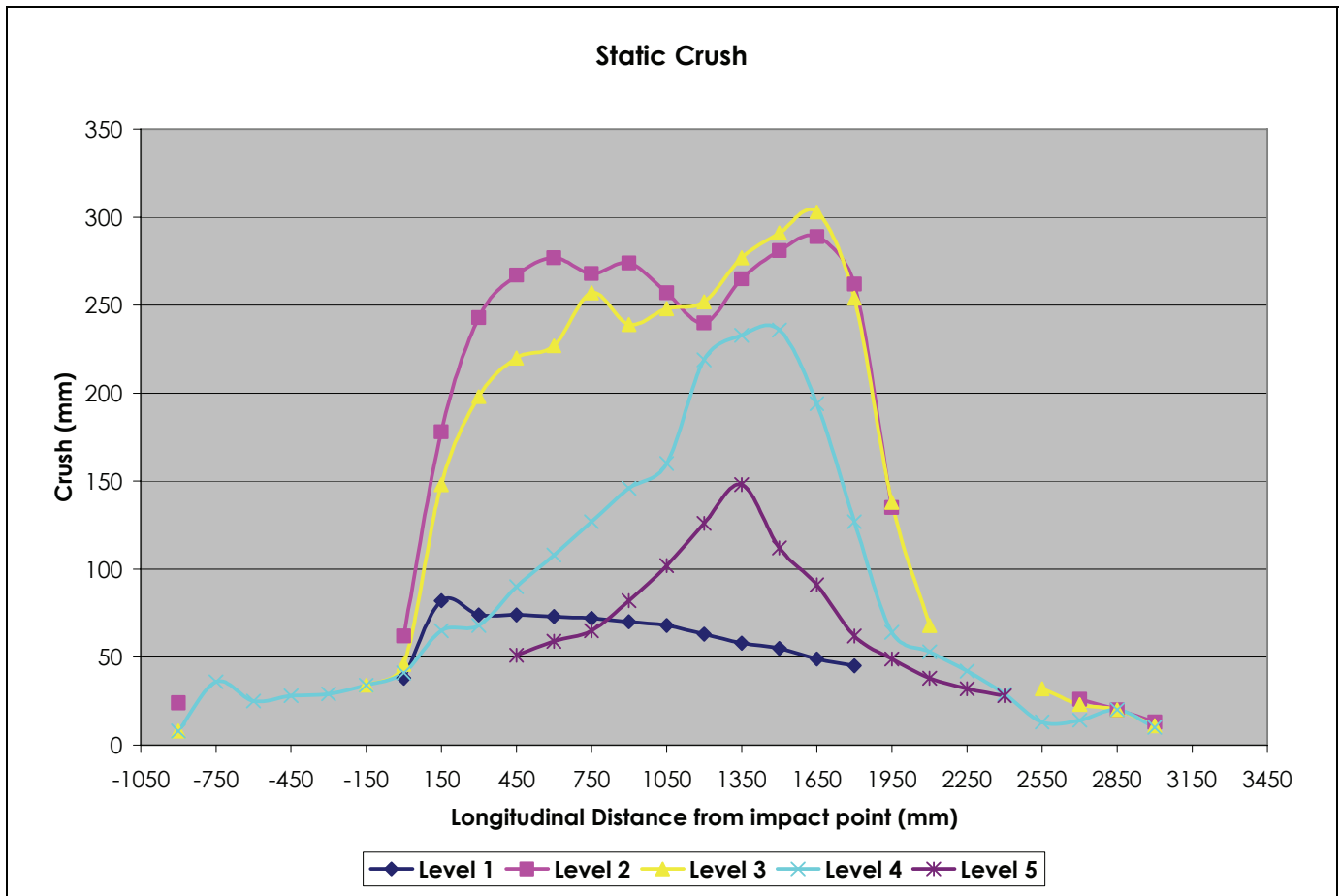
Height measurements taken 750 mm rearward from vertical impact line.

DATA SHEET 10
VEHICLE STATIC CRUSH PROFILE

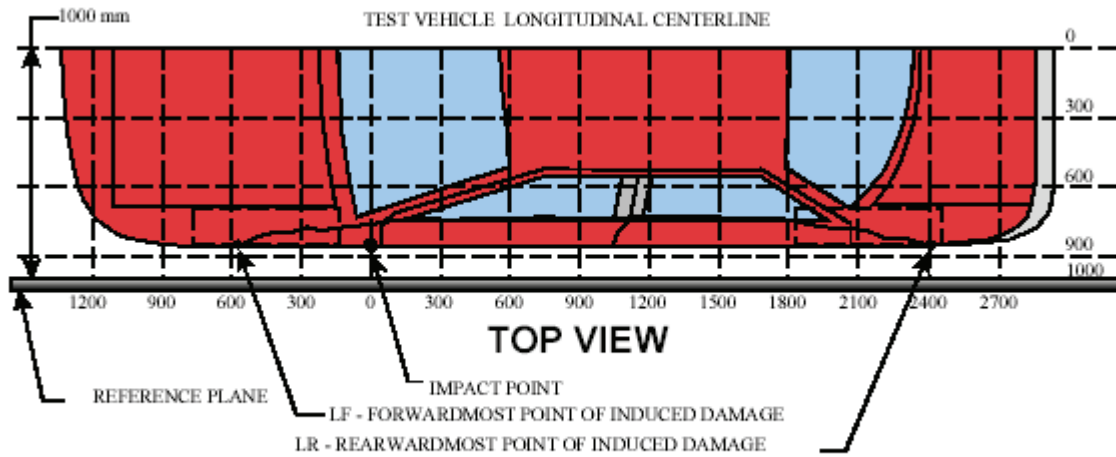
Note: All dimensions are in millimeters with a tolerance of ± 3 mm

TEST VEHICLE STATIC CRUSH																
Level	1			2			3			4			5			
Height	263			495			637			941			1374			
	Pre	Post	Crush	Pre	Post	Crush	Pre	Post	Crush	Pre	Post	Crush	Pre	Post	Crush	
DISTANCE IN MILLIMETERS (mm) FROM IMPACT POINT	-1050															
	-900				170	194	24	192	200	8	264	272	8			
	-750										248	284	36			
	-600										241	266	25			
	-450										234	262	28			
	-300										231	260	29			
	-150							137	171	34	229	263	34			
	0	184	222	38	132	194	62	146	192	46	224	265	41			
	150	187	269	82	145	323	178	150	298	148	224	289	65			
	300	195	269	74	146	389	243	150	348	198	222	290	68			
	450	193	267	74	144	411	267	149	369	220	222	312	90	384	435	51
	600	192	265	73	143	420	277	147	374	227	222	330	108	413	472	59
	750	192	264	72	142	410	268	147	404	257	222	349	127	448	513	65
	900	192	262	70	142	416	274	146	385	239	222	368	146	470	552	82
	1050	192	260	68	143	400	257	145	393	248	223	383	160	484	586	102
	1200	193	256	63	144	384	240	147	399	252	226	445	219	492	618	126
	1350	194	252	58	145	410	265	147	424	277	227	460	233	492	640	148
	1500	195	250	55	146	427	281	148	439	291	229	465	236	496	608	112
	1650	197	246	49	147	436	289	150	453	303	231	425	194	495	586	91
	1800	198	243	45	147	409	262	151	405	254	233	360	127	492	554	62
	1950				144	279	135	149	287	138	235	299	64	485	534	49
	2100							143	211	68	240	293	53	476	514	38
	2250										245	287	42	461	493	32
	2400										250	279	29	451	479	28
	2550							148	180	32	265	278	13			
	2700				163	189	26	167	190	23	284	298	14			
	2850				185	205	20	183	203	20	302	322	20			
	3000				205	218	13	207	218	11	327	337	10			
	3150															
	3330															

DATA SHEET 10
VEHICLE STATIC CRUSH PROFILE

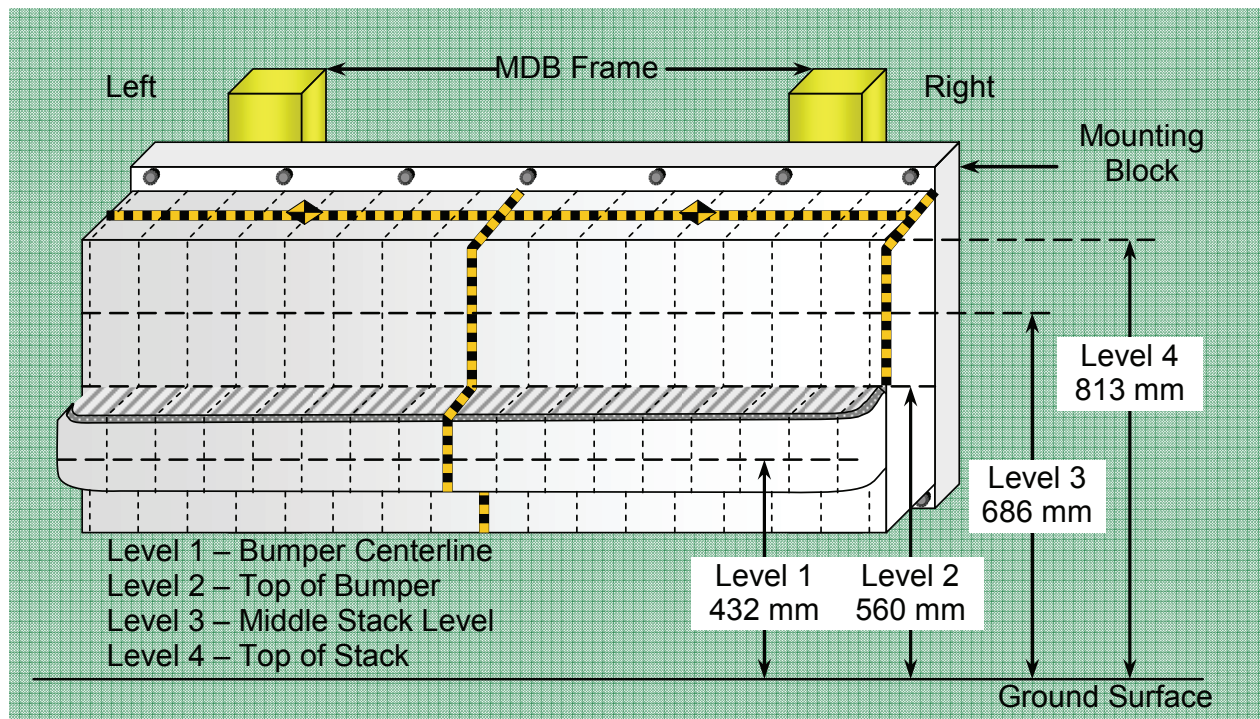


DATA SHEET 11
VEHICLE DAMAGE PROFILE DISTANCES (DPD)



DPD MEASUREMENTS				
	DPD measurement (mm)	Pre test (mm)	Post test (mm)	Crush (mm)
1	-150	170	170	0
2	390	172	376	204
3	930	177	389	212
4	1470	177	432	255
5	2010	178	228	50
6	2550	180	180	0

DATA SHEET 12
DEFORMABLE BARRIER STATIC CRUSH

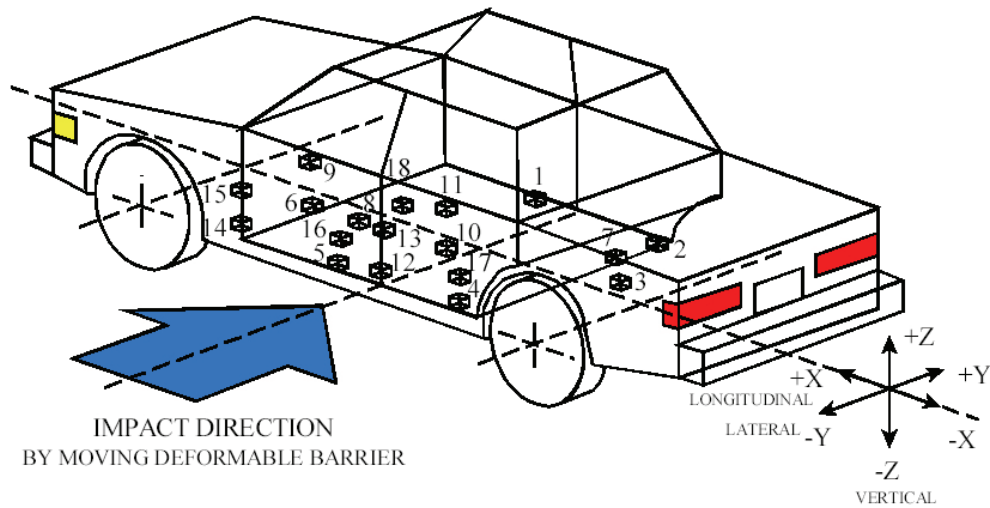


DEFORMABLE BARRIER FACE SUMMARY		
Barrier face manufacturer		Plascore
Serial number		186B0706-165A0806
Level	Description	Maximum crush
1	Center of bumper	180
2	Top of bumper	123
3	Middle of stack	131
4	Top of stack	115
Maximum post test intrusion is 180 mm at level 1		

BARRIER STATIC CRUSH																	
	Distance left of center								C _L	Distance right of center							
	800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800
4	69	18	-4	-2	7	21	44	43	41	38	46	54	55	63	77	97	115
3	56	31	20	29	31	45	68	48	31	25	26	25	32	43	54	73	131
2	72	105	102	104	111	106	107	97	77	62	50	50	58	66	80	103	123
1	76	88	111	134	153	181	164	154	123	113	107	102	113	120	129	150	180

all values in mm

DATA SHEET 13
VEHICLE ACCELEROMETER LOCATIONS



TEST VEHICLE ACCELEROMETER LOCATIONS				
Loc. no.	Accelerometer location	Measurements (mm)		
		X	Y	Z
1	Right sill at front seat	2958.4	670.4	275.8
2	Right sill at rear seat	1987.8	686.6	266.1
3	Rear floor pan above axle	1071.0	-14.5	-33.8
4	Left sill at rear door	1964.9	-751.7	260.9
5	Left sill at front door	2949.0	-764.3	269.2
6	Left front door C/L	†	†	†
7	Rear occupant compartment	2125.2	344.8	170.8
8	Left front door mid-rear	†	†	†
9	Left front door upper C/L	†	†	†
10	Left rear door mid-rear	†	†	†
11	Left rear door upper C/L	†	†	†
12	Left lower b-pillar	2521.3	-693.6	-37.2
13	Left middle b-pillar	2461.3	-703.7	-307.1
14	Left lower a-pillar	3452.1	-806.9	-30.1
15	Left middle a-pillar	3445.9	-807.5	-226.9
16	Front seat track	2776.0	-669.0	182.0
17	Rear seat track or structure	2133.9	-342.2	170.1
18	Vehicle CG	3075.0	-40.5	-35.4

Origin

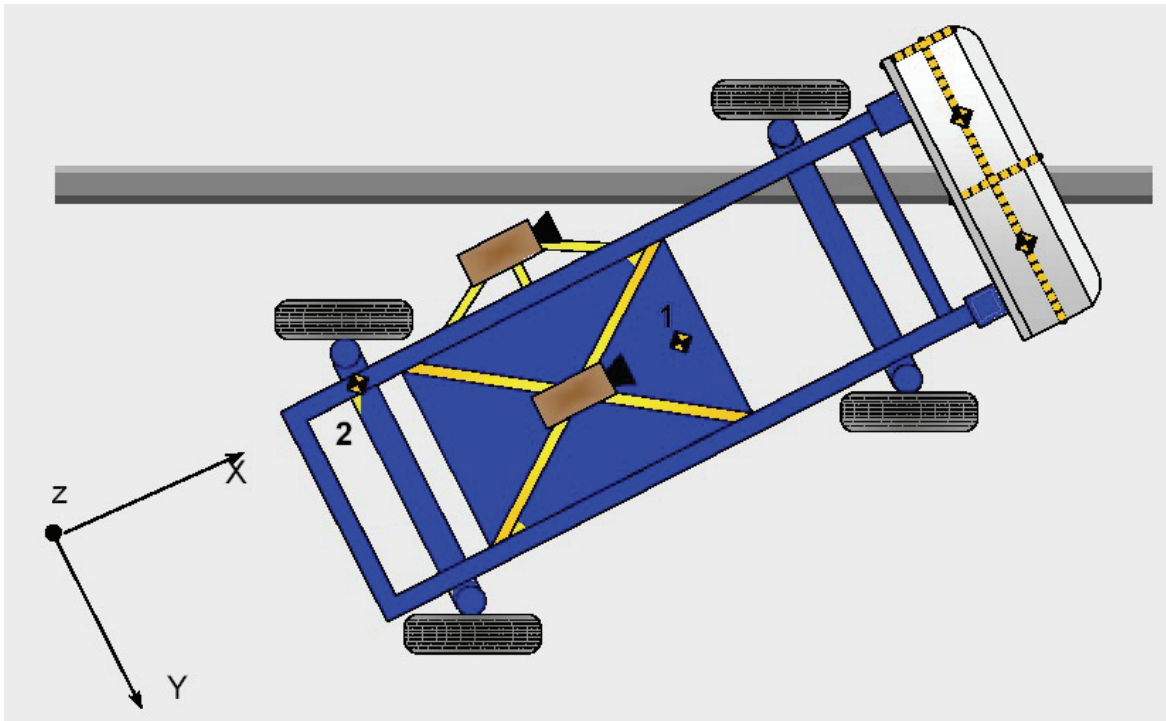
X Rear bumper
Y Midline of vehicle
Z Top of rear bumper

Orientation

X +(X) Forward
Y +(Y) Right
Z +(Z) Down

† Front and rear door accelerometers not installed as per NCAP policy (02Nov05)

DATA SHEET 14
MDB ACCELEROMETER LOCATIONS



MDB ACCELEROMETER LOCATIONS			
Location	Measurements (mm)		
	X	Y	Z
Center of gravity	1113	-1	311
Right rear	2812	-614	585

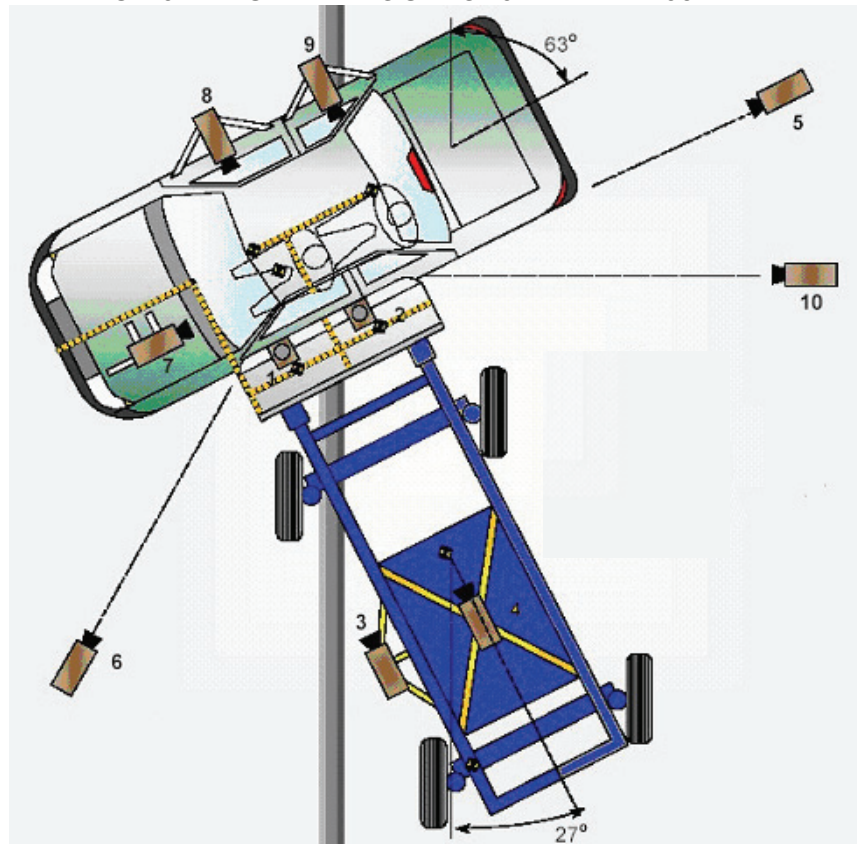
Origin

X Rear structural member
Y Midline of MDB
Z Middle of rear structural member

Orientation

X +(X) Forward
Y +(Y) Right
Z +(Z) Down

DATA SHEET 15
HIGH-SPEED CAMERA LOCATIONS AND DATA SUMMARY



	View	Coordinates †			Angle °	Lens mm	Rate fps
		X	Y	Z			
		mm	mm	mm			
1†	Overhead view of test vehicle	-315	-665	-4862	90	12.5	1000
2	Overhead close-up view of impact plane	-634	-197	-4503	90	16	1000
3	MDB onboard close-up view of impact point	-2096	-94	-112	0.5	25.4	1000
4	MDB onboard view of driver dummy	-2269	798	-881	4.3	13	1000
5	Right side ground level overall view	-712	13037	-1044	4.2	50	1000
6	Left side ground level overall view	-1597	-3743	-1165	8.8	25	1000
7	Test vehicle onboard driver front view	-504	-551	-497	13.8	25	1000
8	Test vehicle onboard driver side view	1749	952	-356	14.0	12.5	1000
9	Test vehicle onboard passenger side view	1711	1783	-382	14.4	12.5	1000
10	Real-time film coverage of test	-	-	-	-	-	-

Origin

X

Y

Z

Impact Point

Impact Point

Impact Point

† Camera did not trigger at impact

Orientation

X

Y

Z

+(X) Forward

+(Y) Right

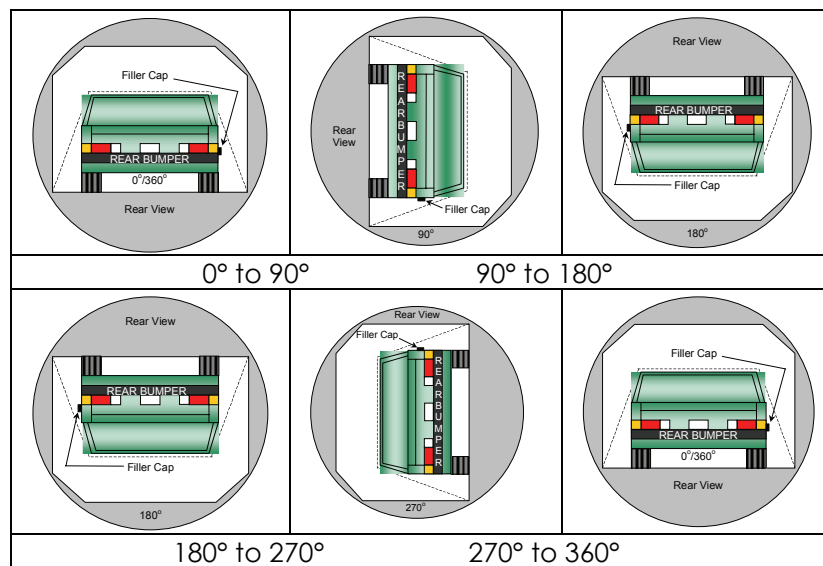
+(Z) Down

DATA SHEET 16
FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 20° C Test Time: 1:25 pm

STODDARD SOLVENT SPILLAGE MEASUREMENTS				
Period	Description	Maximum allowable spillage	Spillage	
			Amount	Location
A	From impact until vehicle motion ceases	1 oz	0	N/a
B	5 minutes after vehicle motion ceases	5 oz	0	N/a
C	Next 25 minutes	1 oz/minute	0	N/a

FMVSS 301 STATIC ROLLOVER



FMVSS301 STATIC ROLLOVER DATA			
Test phase	Rotation time (sec.)	Hold time (sec.)	Total time (sec.)
Tolerance	60-180	>= 300	-
0° to 90°	65	300	365
90° to 180°	66	302	368
180° to 270°	70	300	370
270° to 360°	66	300	366

DATA SHEET 16
FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA (CONTINUED)

FMVSS301 STATIC ROLLOVER - SPILLAGE				
	First five minutes (oz)	Sixth minute (oz)	Seventh minute (oz)	Eighth minute (oz)
Max allowable leakage	5.0	1.0	1.0	1.0
0° to 90°	0	0	0	N/a
90° to 180°	0	0	0	N/a
180° to 270°	0	0	0	N/a
270° to 360°	0	0	0	N/a

SPILLAGE LOCATION(s)	
0° to 90°	N/a
90° to 180°	N/a
180° to 270°	N/a
270° to 360°	N/a

APPENDIX A
PHOTOGRAPHS

LIST OF PHOTOGRAPHS

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A-7	Pre test left front $\frac{3}{4}$ view of test vehicle	A-7
A-8	Post test left front $\frac{3}{4}$ view of test vehicle	A-7
A-9	Pre test left side view of test vehicle	A-8
A-10	Post test left side view of test vehicle	A-8
A-11	Pre test left rear $\frac{3}{4}$ view of test vehicle	A-9
A-12	Post test left rear $\frac{3}{4}$ view of test vehicle	A-9
A-13	Pre test rear view of test vehicle	A-10
A-14	Post test rear view of test vehicle	A-10
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A-16	Post test right rear $\frac{3}{4}$ view of test vehicle	A-11
A-17	Pre test right side view of test vehicle	A-12
A-18	Post test right side view of test vehicle	A-12
A-19	Pre test right front $\frac{3}{4}$ view of test vehicle	A-13
A-20	Post test right front $\frac{3}{4}$ view of test vehicle	A-13
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A-25	Pre test impact point	A-16
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A-27	Pre test front $\frac{3}{4}$ view of left side doors	A-17
A-28	Post test front $\frac{3}{4}$ view of left side doors	A-17
A-29	Pre test rear $\frac{3}{4}$ view of left side doors	A-18
A-30	Post test rear $\frac{3}{4}$ view of left side doors	A-18
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A-46	Post test passenger shoulder clearance	A-26

Figure	Photograph Description	Page
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A-48	Post test passenger, right side view	A-27
A-49	Post test passenger contact locations (1)	A-28
A-50	Post test passenger contact locations (2)	A-28
A-51	Pre test front view of MDB barrier face	A-29
A-52	Post test front view of MDB barrier face	A-29
A-53	Pre test overhead view of MDB barrier face	A-30
A-54	Post test overhead view of MDB barrier face	A-30
A-55	Pre test right side view of MDB barrier face	A-31
A-56	Post test right side view of MDB barrier face	A-31
A-57	Pre test left side view of MDB barrier face	A-32
A-58	Post test left side view of MDB barrier face	A-32
A-59	FMVSS301 0 degrees	A-33
A-60	FMVSS301 90 degrees	A-33
A-61	FMVSS301 180 degrees	A-34
A-62	FMVSS301 270 degrees	A-34
A-63	FMVSS301 360 degrees	A-35
A-64	Impact	A-35



Figure A-1: Left front 3/4 view, as delivered



Figure A-2: Right rear 3/4 view, as delivered



Figure A-3: Manufacturer's label



Figure A-4: Tire placard



Figure A-5: Pre test front view of test vehicle



Figure A-6: Post test front view of test vehicle



Figure A-7: Pre test left front 3/4 view of test vehicle



Figure A-8: Post test left front 3/4 view of test vehicle



Figure A-9: Pre test left side view of test vehicle



Figure A-10: Post test left side view of test vehicle



Figure A-11: Pre test left rear 3/4 view of test vehicle



Figure A-12: Post test left rear 3/4 view of test vehicle



Figure A-13: Pre test rear view of test vehicle



Figure A-14: Post test rear view of test vehicle



Figure A-15: Pre test right rear 3/4 view of test vehicle



Figure A-16: Post test right rear 3/4 view of test vehicle



Figure A-17: Pre test right side view of test vehicle



Figure A-18: Post test right side view of test vehicle



Figure A-19: Pre test right front 3/4 view of test vehicle



Figure A-20: Post test right front 3/4 view of test vehicle



Figure A-21: Pre test overhead view

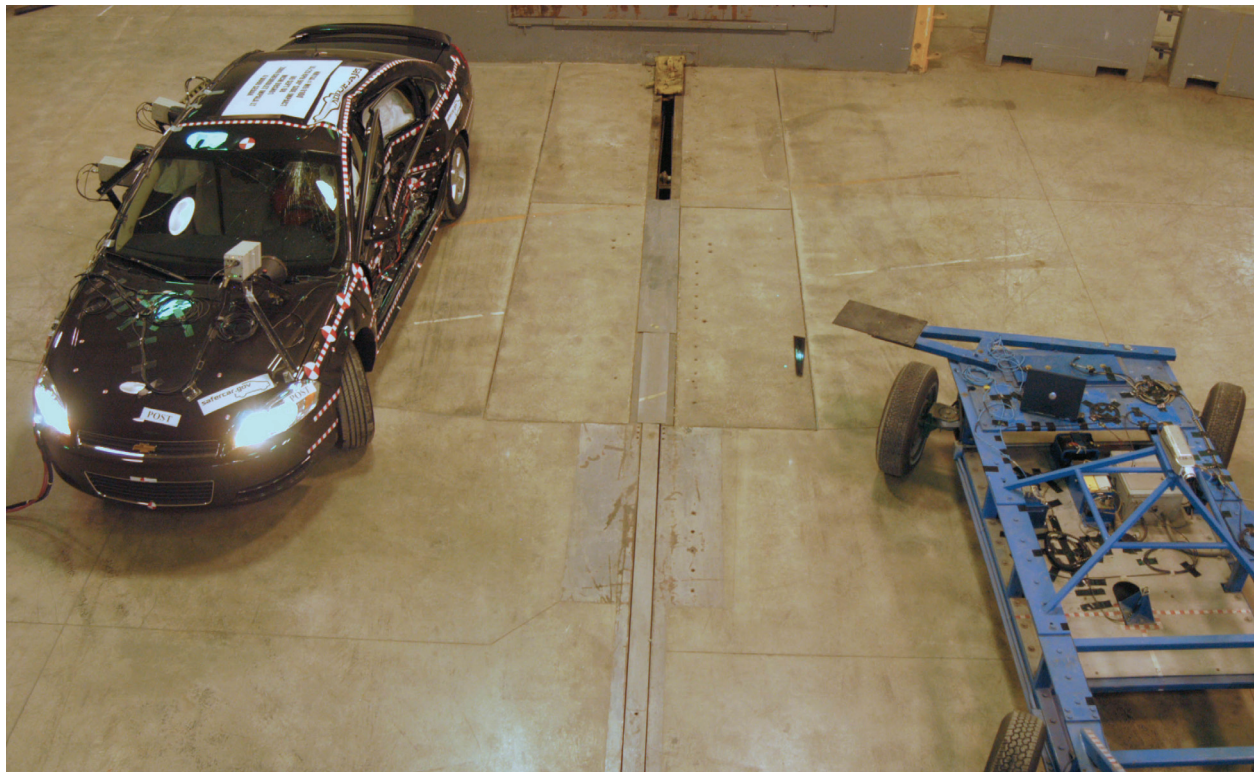


Figure A-22: Post test overhead view

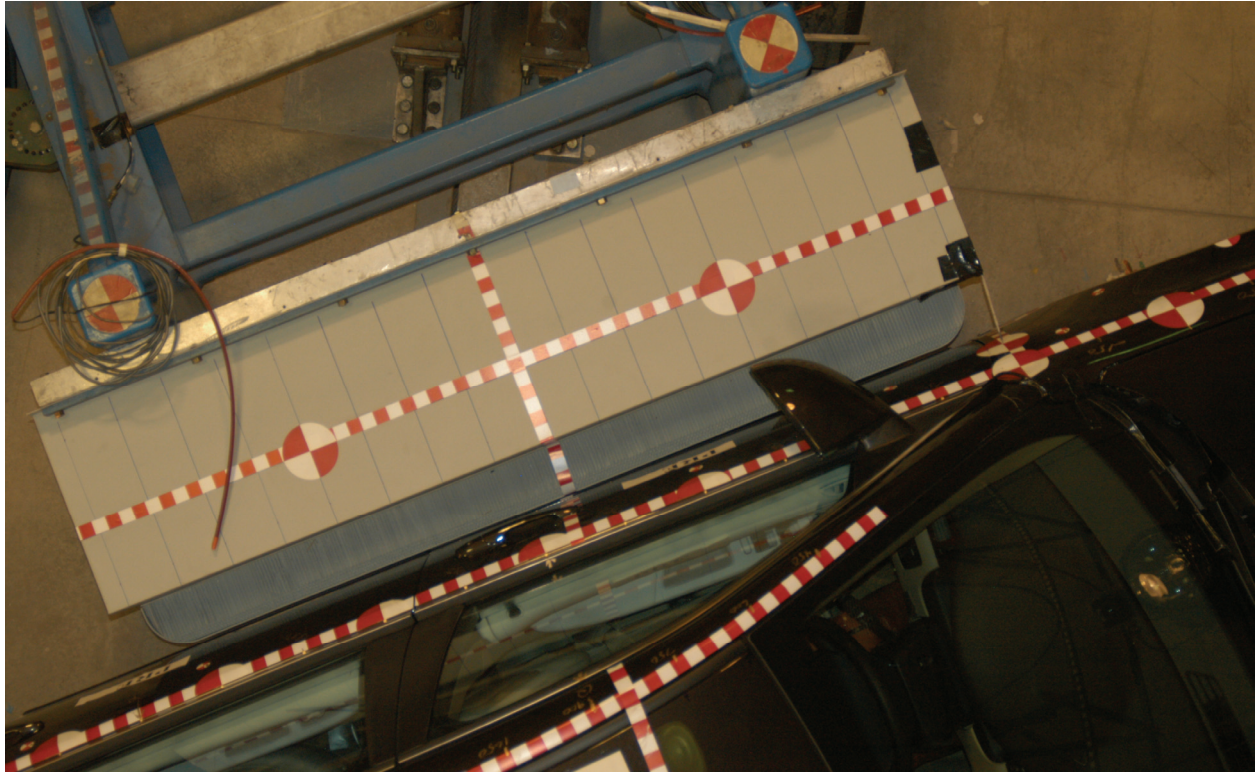


Figure A-23: Pre test overhead close-up view



Figure A-24: Post test overhead close-up view



Figure A-25: Pre test impact point



Figure A-26: Post test impact point



Figure A-27: Pre test front 3/4 view of left side doors



Figure A-28: Post test front 3/4 view of left side doors



Figure A-29: Pre test rear 3/4 view of left side doors



Figure A-30: Post test rear 3/4 view of left side doors



Figure A-31: Pre test left front door



Figure A-32: Post test left front door



Figure A-33: Pre test left rear door



Figure A-34: Post test left rear door



Figure A-35: Pre test driver left side view



Figure A-36: Post test driver left side view



Figure A-37: Pre test driver shoulder clearance



Figure A-38: Post test driver shoulder clearance



Figure A-39: Pre test driver right side view



Figure A-40: Post test driver right side view



Figure A-41: Post test driver contact locations (1)



Figure A-42: Post test driver contact locations (2)



Figure A-43: Pre test passenger left side view



Figure A-44: Post test passenger left side view



Figure A-45: Pre test passenger shoulder clearance



Figure A-46 Post test passenger shoulder clearance



Figure A-47: Pre test passenger right side view



Figure A-48: Post test passenger right side view



Figure A-49: Post test passenger contact locations (1)



Figure A-50: Post test passenger contact locations (2)

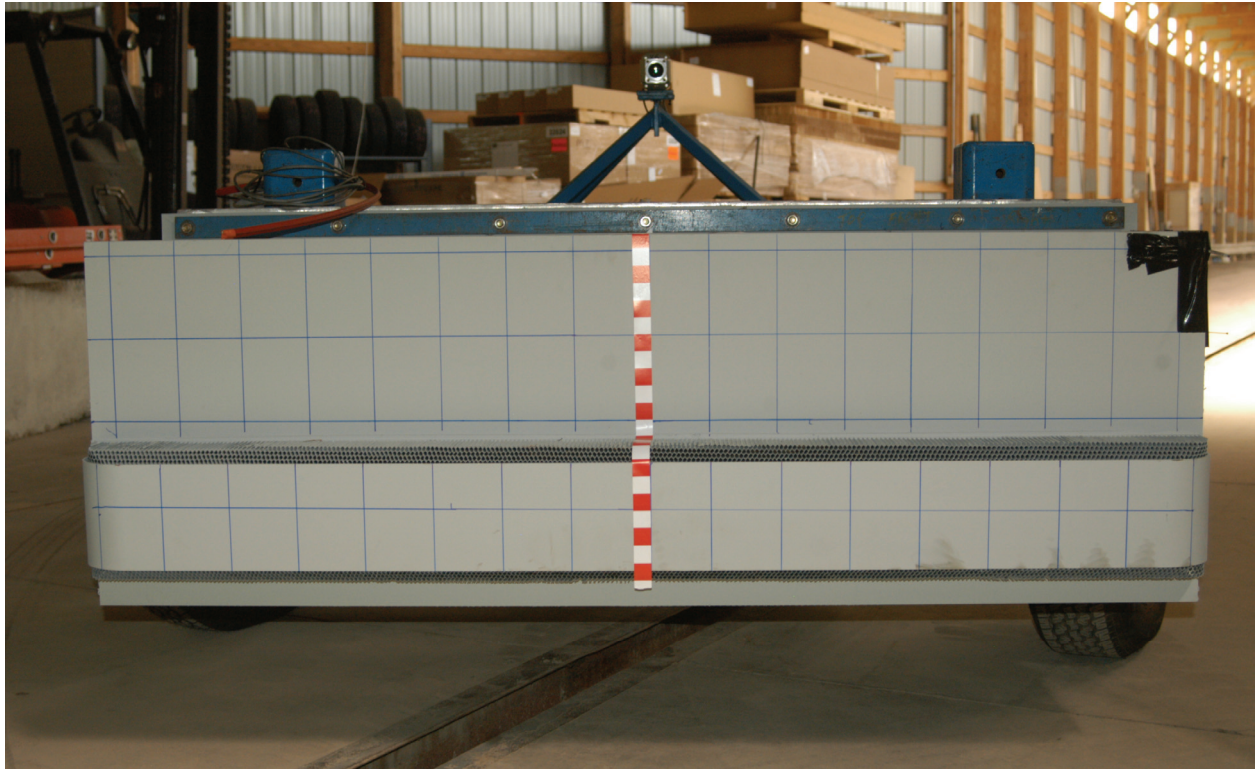


Figure A-51: Pre test front view of MDB barrier face

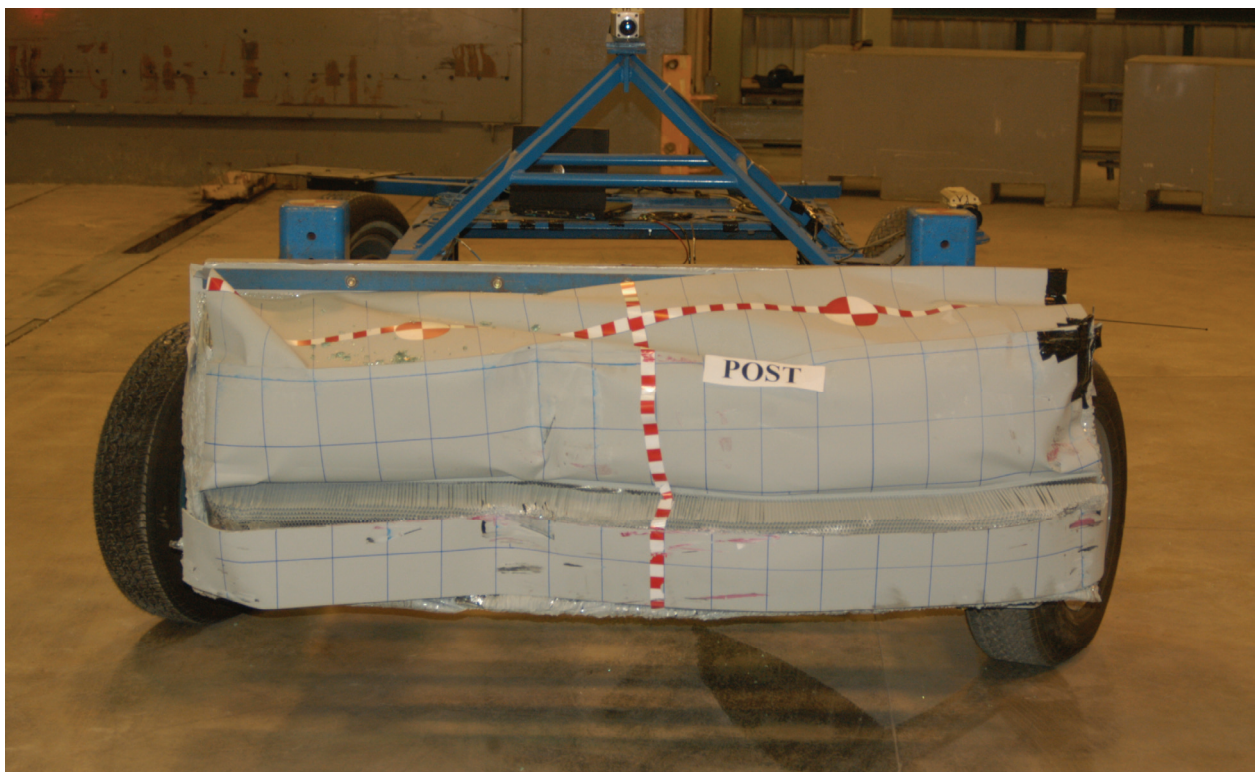


Figure A-52: Post test front view of MDB barrier face

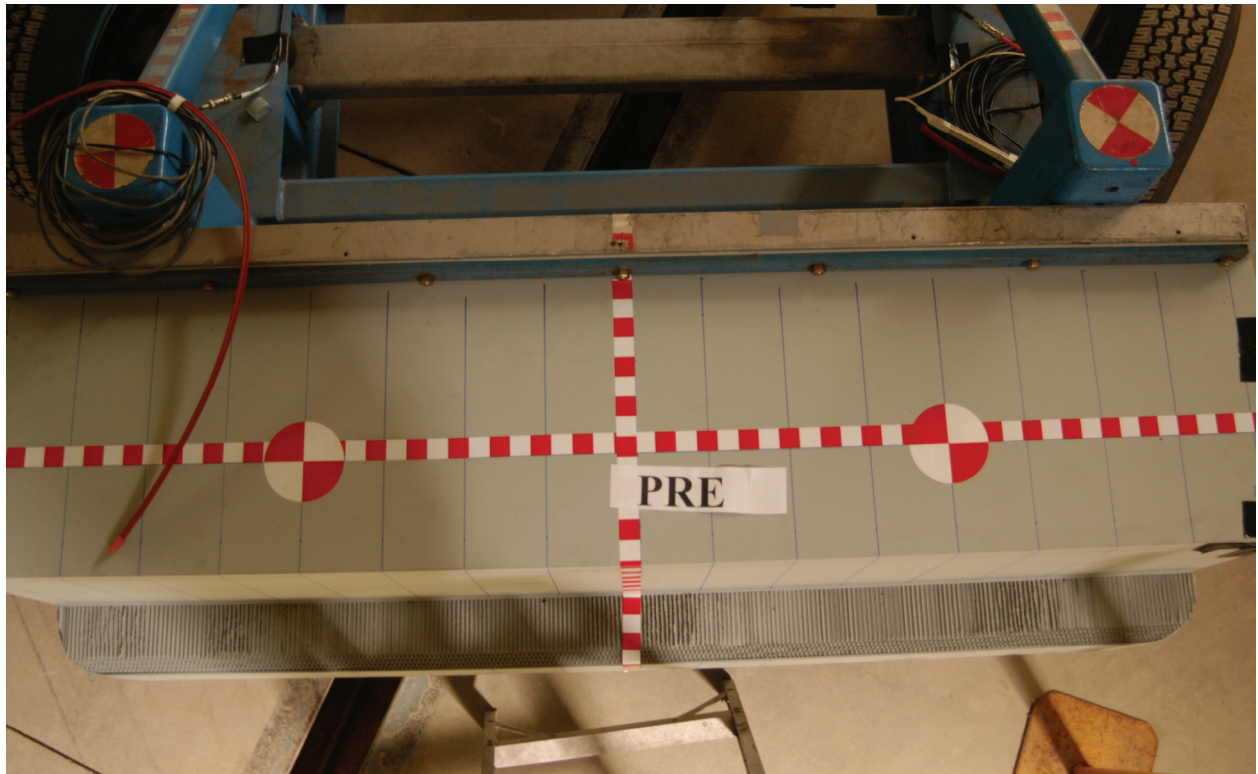


Figure A-53: Pre test overhead view of MDB barrier face

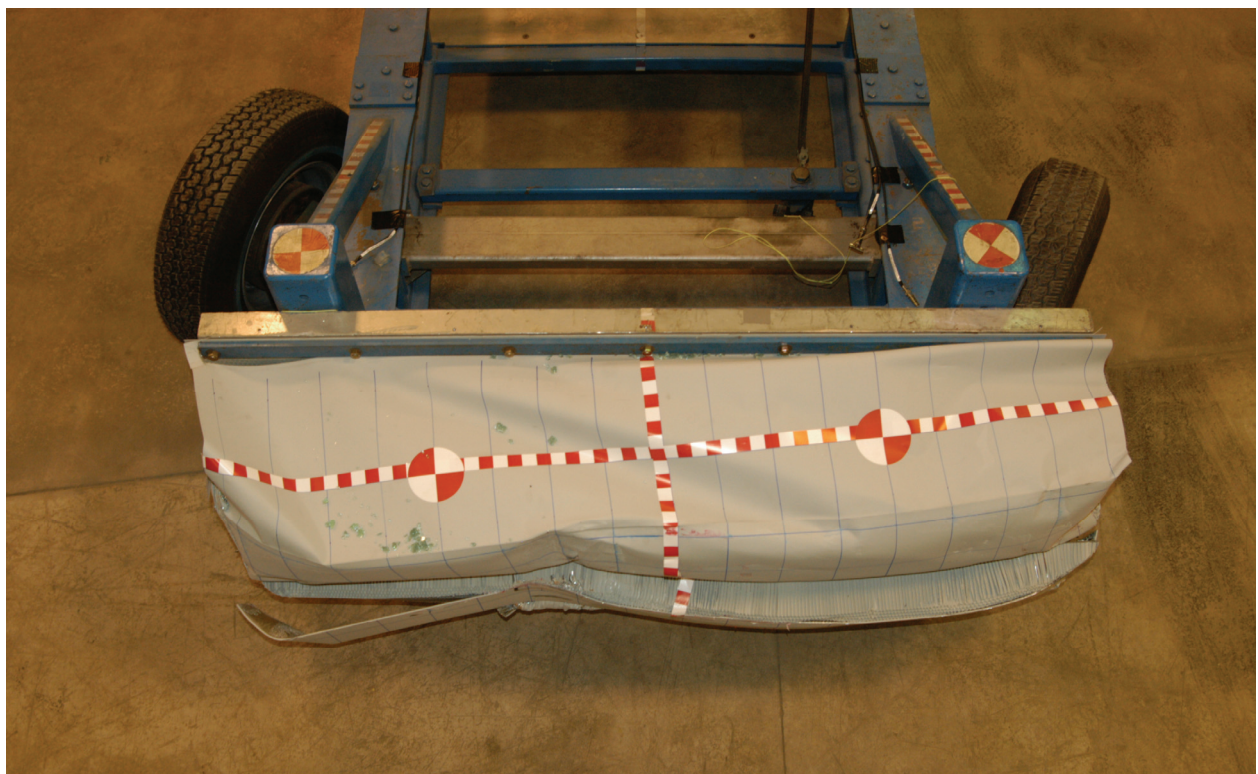


Figure A-54: Post test overhead view of MDB barrier face



Figure A-55: Pre test right side view of MDB barrier face



Figure A-56: Post test right side view of MDB barrier face



Figure A-57: Pre test left side view of MDB barrier face



Figure A-58: Post test left side view of MDB barrier face



Figure A-59: FMVSS 301 0 degrees

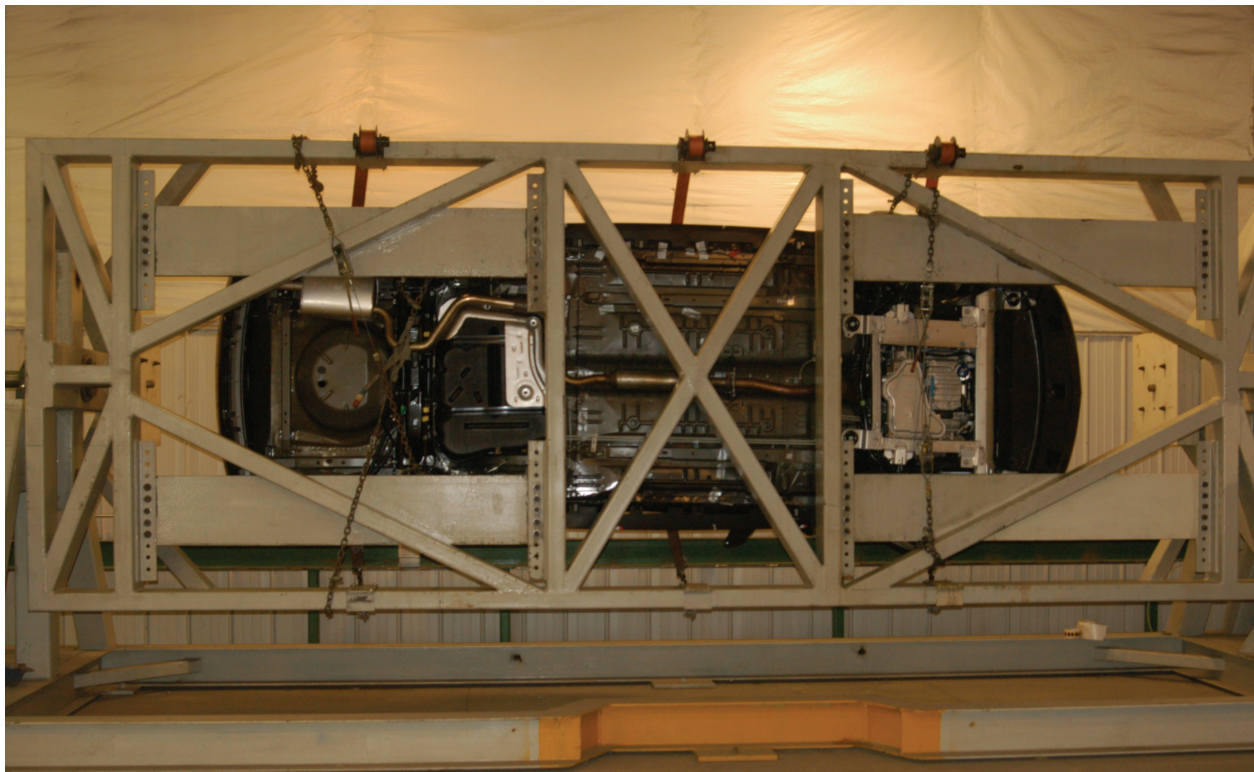


Figure A-60: FMVSS 301 90 degrees

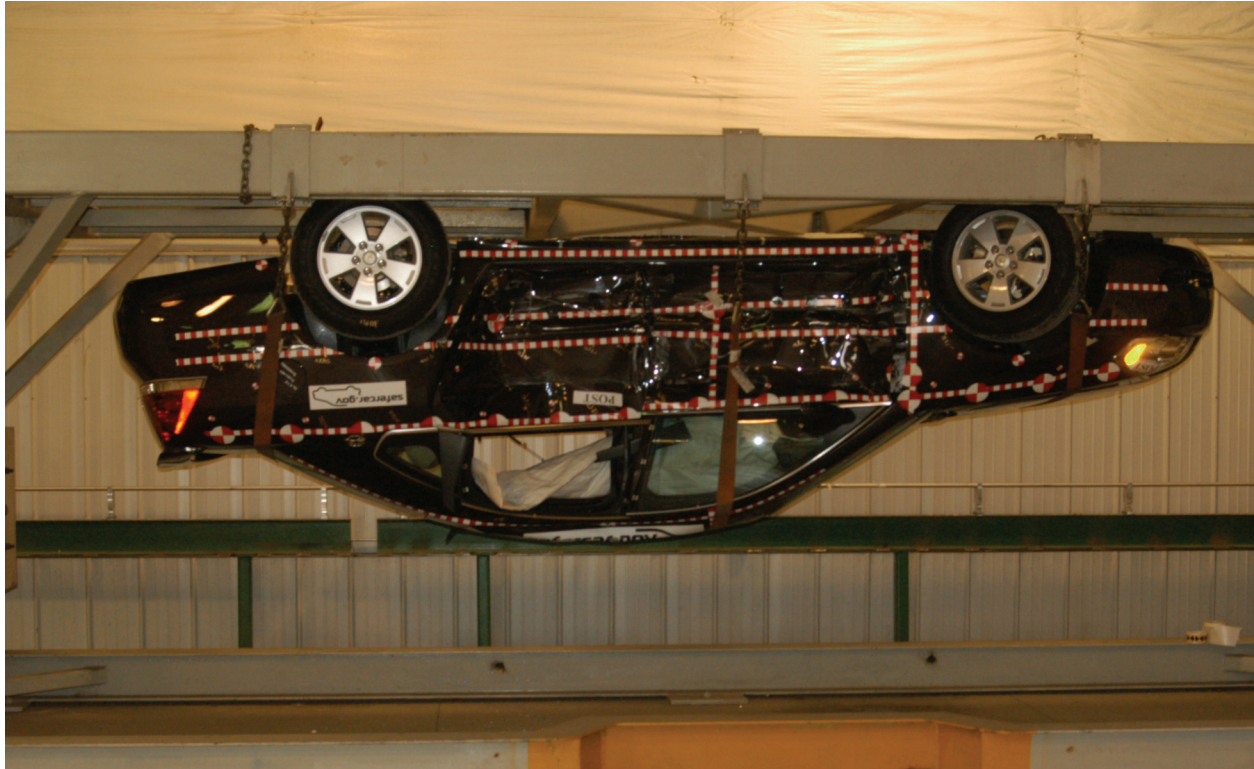


Figure A-61: FMVSS 301 180 degrees



Figure A-62: FMVSS 301 270 degrees



Figure A-63: FMVSS 301 360 degrees



Figure A-64: Impact

APPENDIX B

SID/HIII, VEHICLE AND MDB RESPONSE DATA

The following plots are provided in the test report

Data Plot	Description	Page
B-1	Driver upper rib(y) acceleration - primary – FIR100	B-4
B-2	Driver lower rib(y) acceleration - primary – FIR100	B-5
B-3	Driver lower spine (y) acceleration - primary – FIR100	B-6
B-4	Driver pelvis (y)acceleration - primary – FIR100	B-7
B-5	Passenger upper rib(y) acceleration - primary – FIR100	B-8
B-6	Passenger lower rib(y) acceleration - primary – FIR100	B-9
B-7	Passenger lower spine (y) acceleration - primary – FIR100	B-10
B-8	Passenger pelvis (y)acceleration - primary – FIR100	B-11

The following dummy, vehicle, and MDB response data can be found in the R&D section of the NHTSA website at: www-nrd.nhtsa.dot.gov/database/nrd-11/veh_db.html.

Description
Driver head (x) acceleration
Driver head (y) acceleration
Driver head (z) acceleration
Driver upper neck (x) force
Driver upper neck (y) force
Driver upper neck (z) force
Driver upper neck (x) moment
Driver upper neck (y) moment
Driver upper neck (z) moment
Driver upper rib (y) acceleration – redundant
Driver lower rib (y) acceleration – redundant
Driver lower spine (y) acceleration – redundant
Driver pelvis (y) acceleration – redundant
Passenger head (x) acceleration
Passenger head (y) acceleration
Passenger head (z) acceleration
Passenger upper neck (x) force
Passenger upper neck (y) force
Passenger upper neck (z) force
Passenger upper neck (x) moment
Passenger upper neck (y) moment
Passenger upper neck (z) moment
Passenger upper rib (y) acceleration – redundant
Passenger lower rib (y) acceleration – redundant
Passenger lower spine (y) acceleration – redundant
Passenger pelvis (y) acceleration – redundant
Vehicle right side sill at front seat (x) acceleration
Vehicle right side sill at front seat (y) acceleration
Vehicle right side sill at front seat (z) acceleration
Vehicle right side sill at rear seat (x) acceleration
Vehicle right side sill at rear seat (y) acceleration
Vehicle right side sill at rear seat (z) acceleration
Vehicle rear floor pan above axle (x) acceleration
Vehicle rear floor pan above axle (y) acceleration
Vehicle rear floor pan above axle (z) acceleration
Vehicle left side sill at rear seat (y) acceleration
Vehicle left side sill at front seat (y) acceleration
Vehicle right rear occupant compartment (y) acceleration

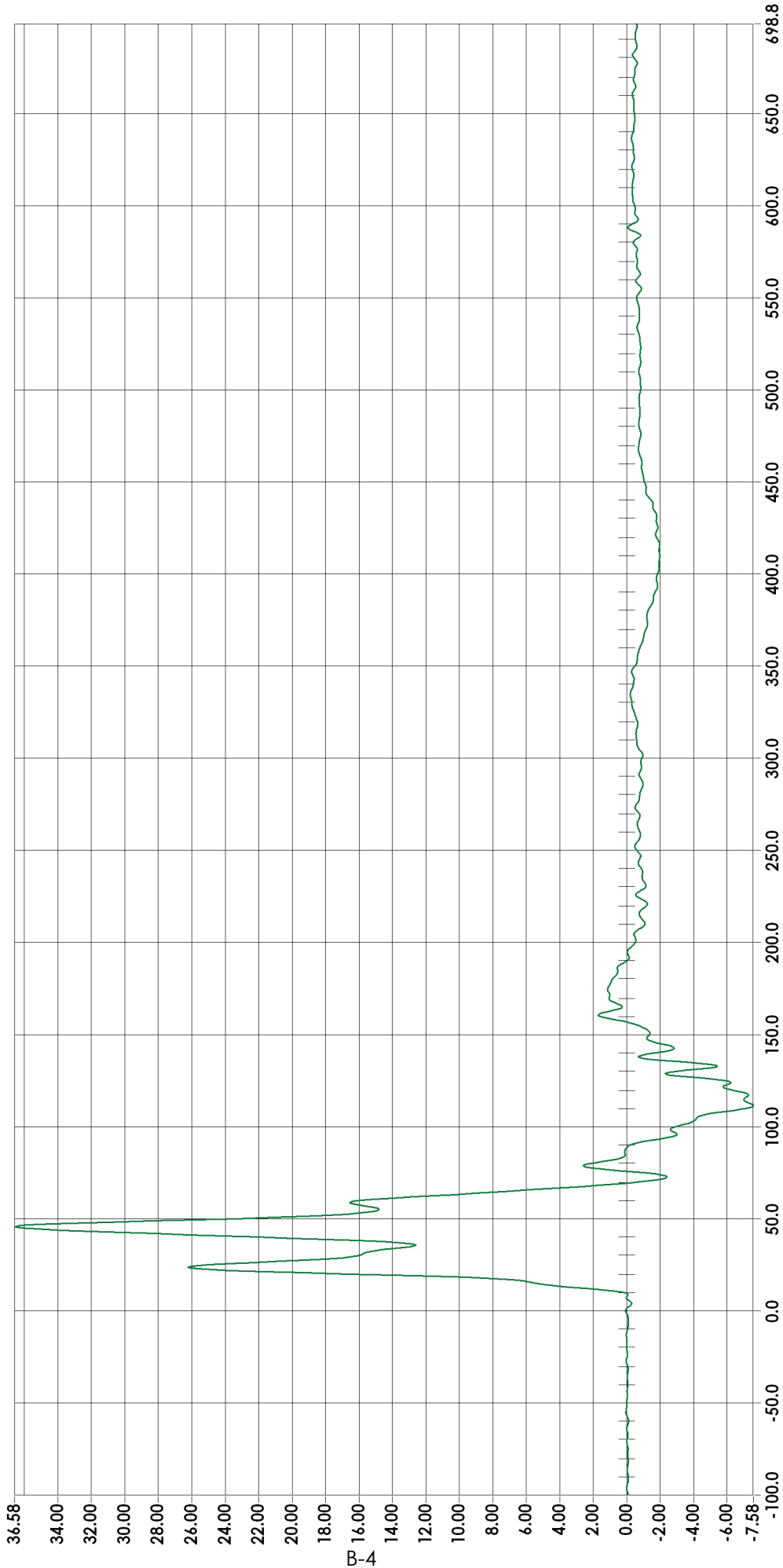
Vehicle left lower b-pillar (y) acceleration
Vehicle left middle b-pillar (y) acceleration
Vehicle left lower a-pillar (y) acceleration
Vehicle left middle a-pillar (y) acceleration
Vehicle front seat track (y) acceleration
Vehicle rear seat track/structure (y) acceleration
Vehicle center of gravity (x) acceleration
Vehicle center of gravity (y) acceleration
Vehicle center of gravity (z) acceleration
MDB center of gravity (x) acceleration
MDB center of gravity (y) acceleration
MDB center of gravity (z) acceleration
MDB rear (x) acceleration
MDB rear (y) acceleration

Test ID	09SN01
Date	09-09-2008
Description	2009 Chevrolet Impala LT Side NCAP Test

Filter Class	FIR100
Sampling Rate (Hz)	1600
Number of Points	1280
Pretrigger Points	160
Sensor Location	RBLU
Sensor Mnf & Model	NA NA
Serial Number	NA



Driver upper rib acceleration (P) - FIR100 YL



Max	36.58	G's	at	45.62	msec
Min	-7.58	G's	at	111.25	msec

09SN01 Plot 068

Time (msec)

G's

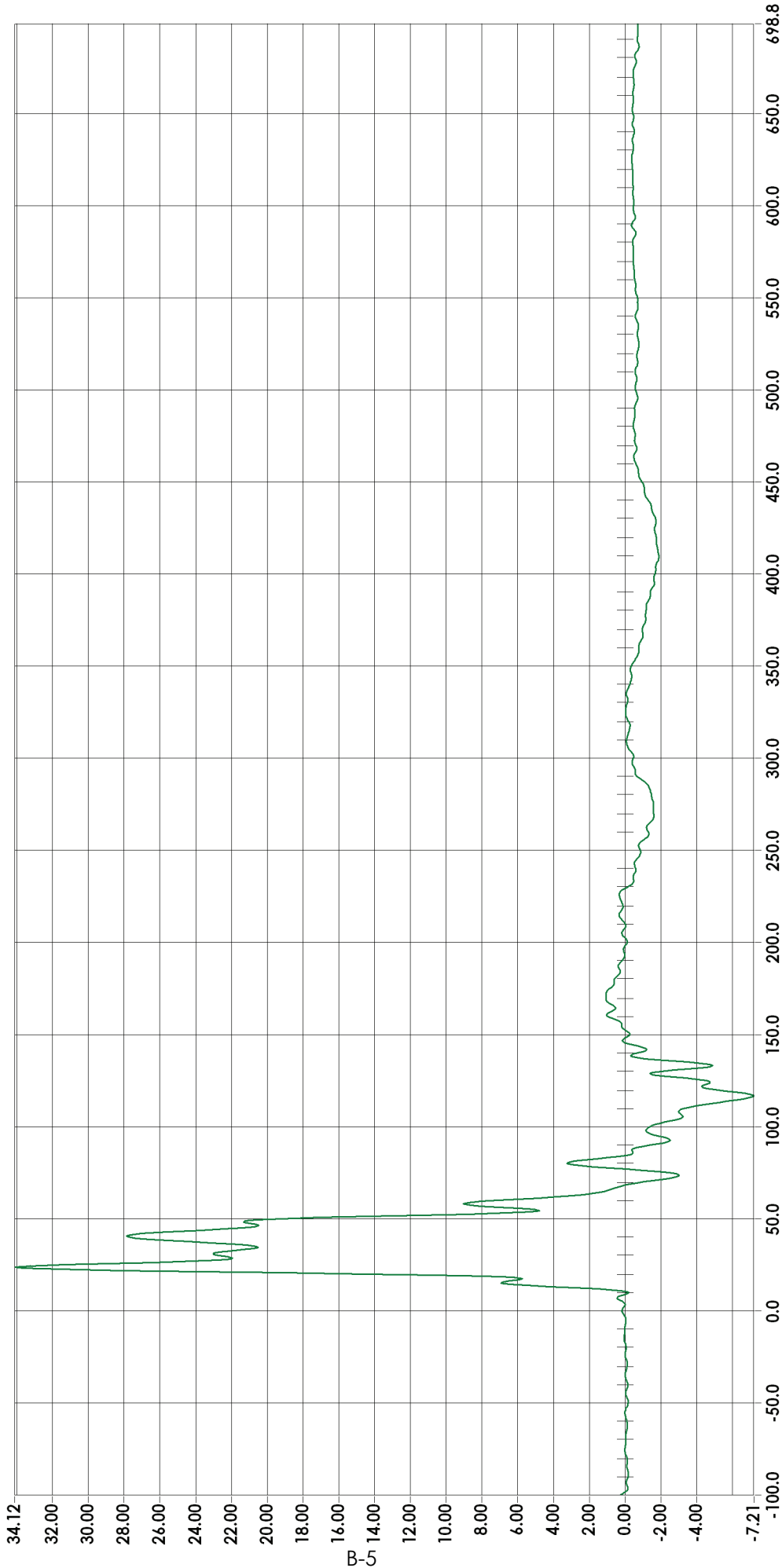
Neuroscience Research Labs
5000 West National Ave
Research 151
Milwaukee, WI 53295

Test ID	09SN01
Date	09-09-2008
Description	2009 Chevrolet Impala LT Side NCAP Test

Filter Class	FIR100
Sampling Rate (Hz)	1600
Number of Points	1280
Pretrigger Points	160
Sensor Location	RBLL
Sensor Mnf & Model	NA NA
Serial Number	NA



Driver lower rib acceleration (P) - FIR100 YL



Max	34.12	G's	at	23.75	msec
Min	-7.21	G's	at	116.88	msec

09SN01 Plot 069

Time (msec)

G's

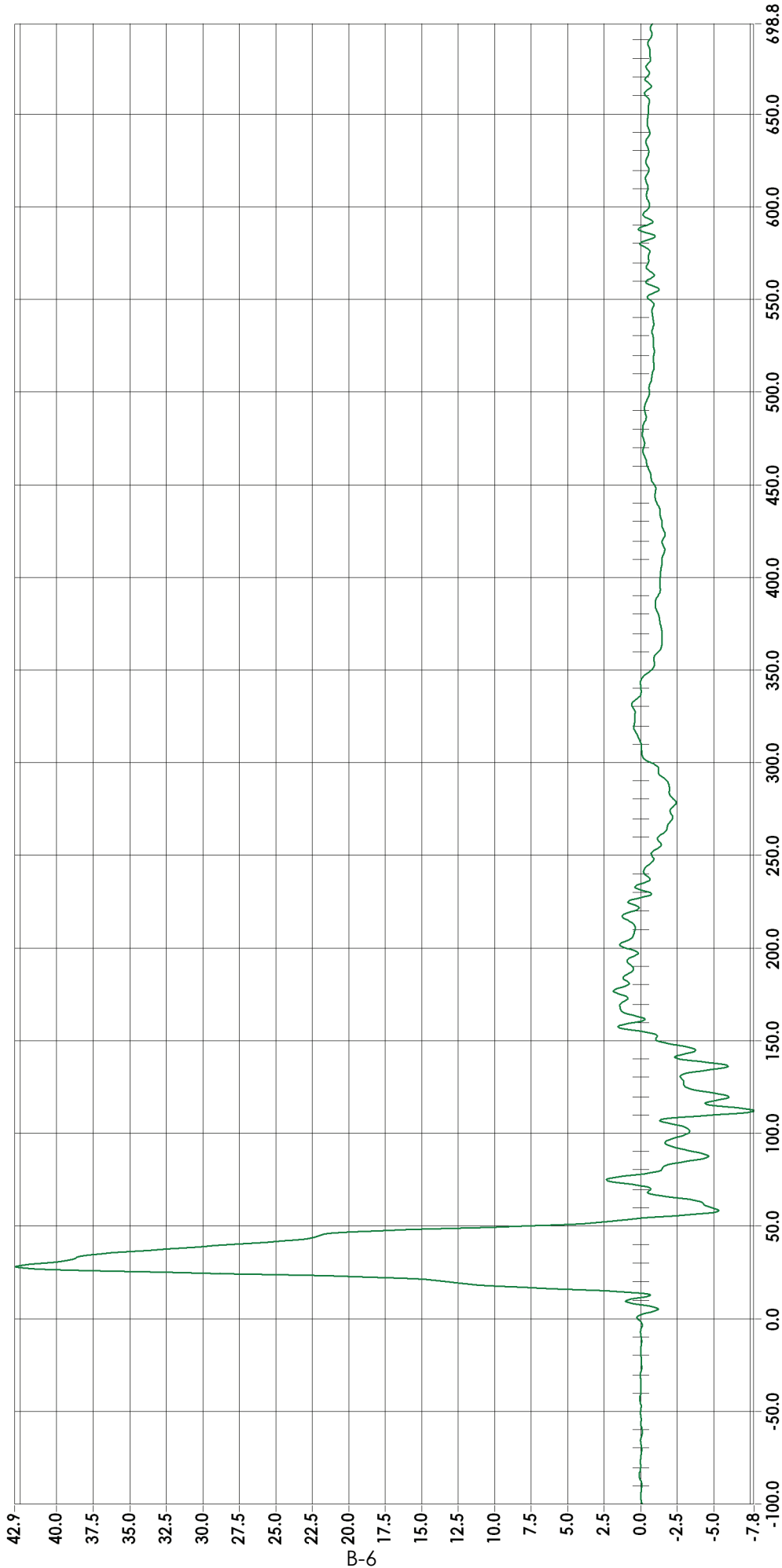
Neuroscience Research Labs
5000 West National Ave
Research 151
Milwaukee, WI 53295

Test ID	09SN01
Date	09-09-2008
Description	2009 Chevrolet Impala LT Side NCAP Test

Filter Class	FIR100	Sensor Location	SPNL
Sampling Rate (Hz)	1600	Sensor Mnf & Model	NA NA
Number of Points	1280	Serial Number	NA
Pretrigger Points	160		



Driver lower spine acceleration (P) - FIR100 YL



Max	42.88	G's	at	28.12	msec
Min	-7.76	G's	at	112.50	msec

09SN01 Plot 070

Time (msec)

G's

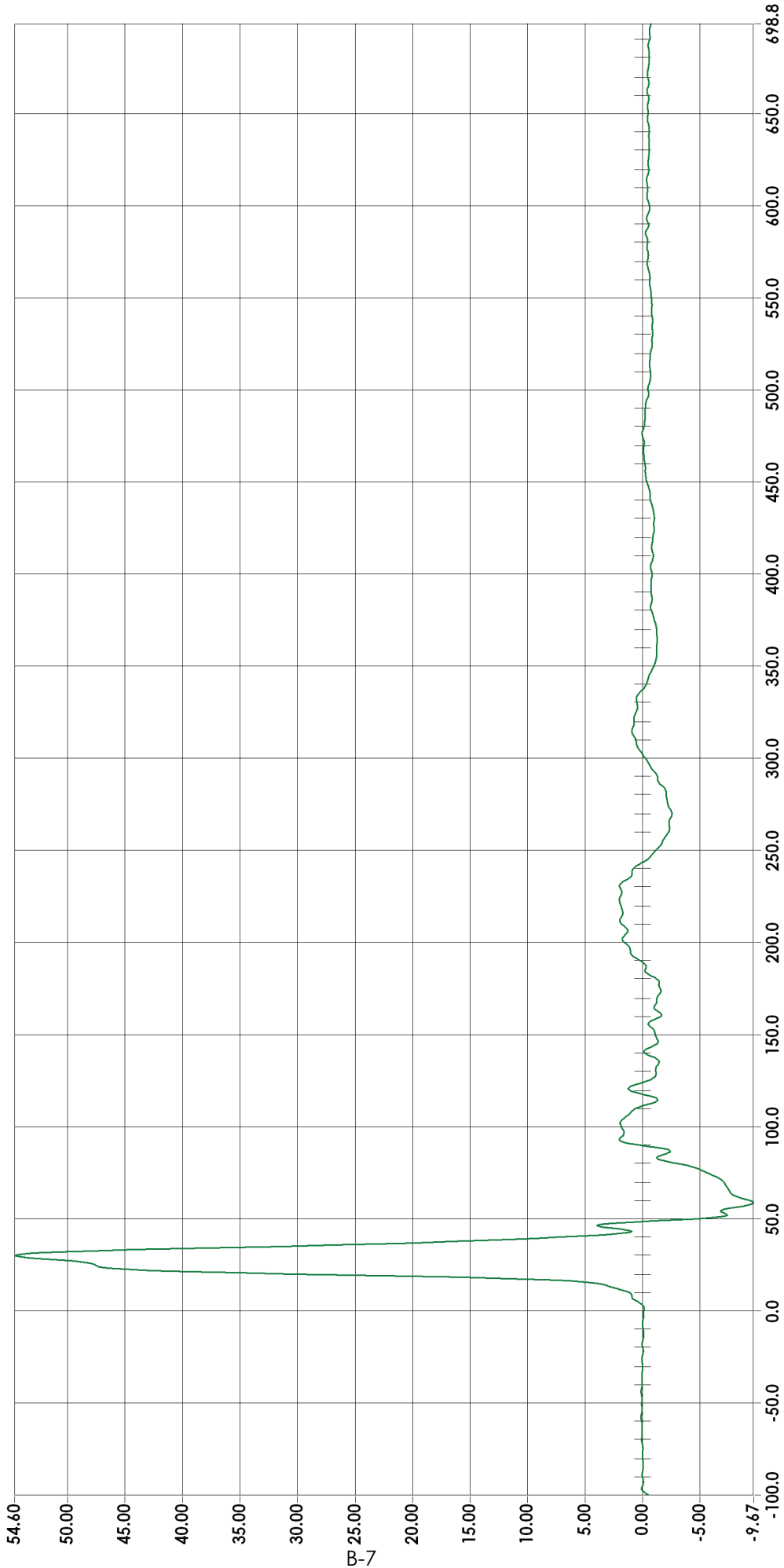
Neuroscience Research Labs
5000 West National Ave
Research 151
Milwaukee, WI 53295

Test ID	09SN01
Date	09-09-2008
Description	2009 Chevrolet Impala LT Side NCAP Test

Filter Class	FIR100
Sampling Rate (Hz)	1600
Number of Points	1280
Pretigger Points	160
Sensor Location	PVCN
Sensor Mnf & Model	NA NA
Serial Number	NA



Driver pelvis acceleration (P) - FIR100 YL



Max	54.60	G's	at	30.00	msec
Min	-9.67	G's	at	58.75	msec

09SN01 Plot 071

Time (msec)

G's

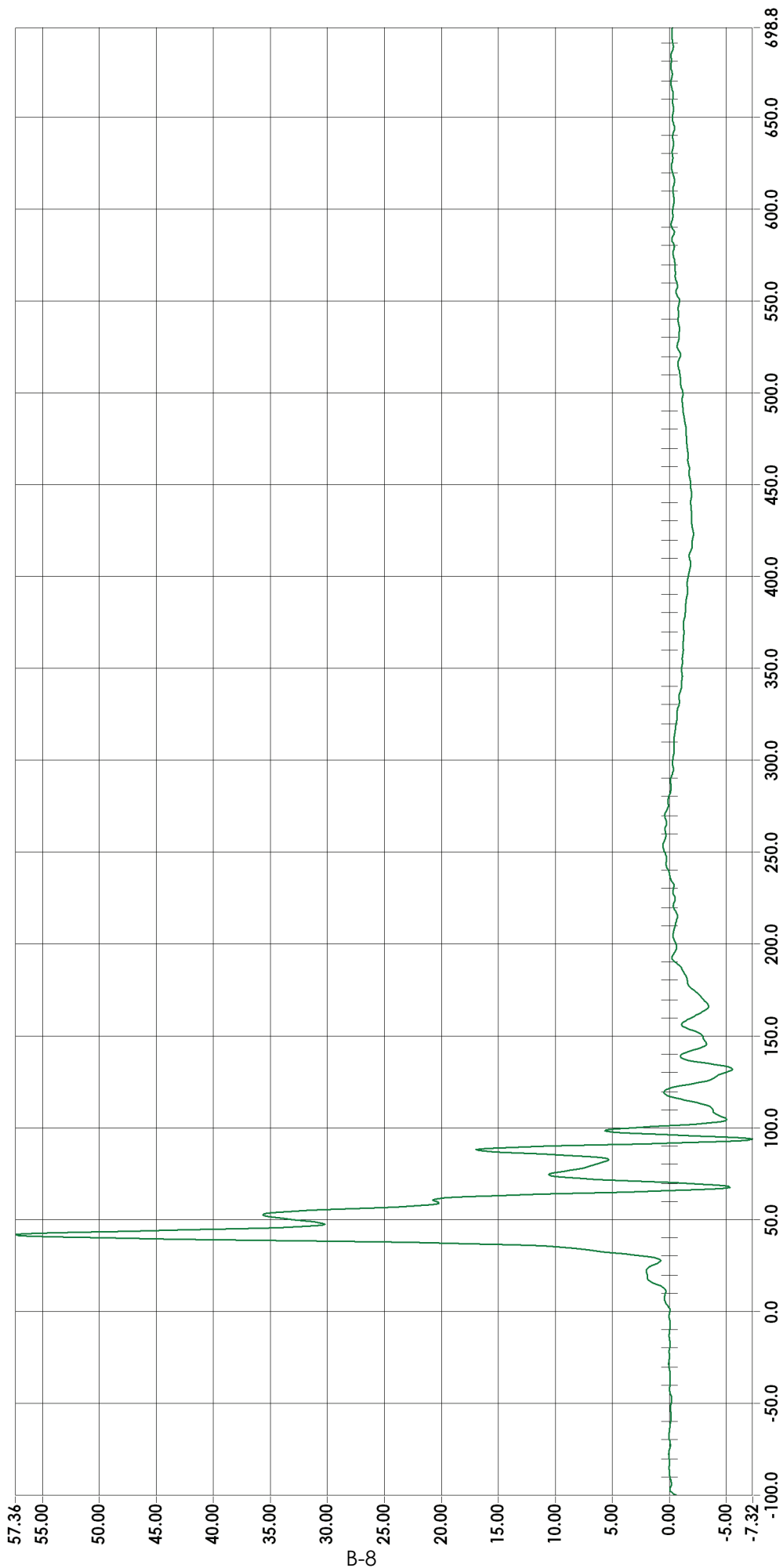
Neuroscience Research Labs
5000 West National Ave
Research 151
Milwaukee, WI 53295



Filter Class		FIR100	
Sampling Rate (Hz)	1600	Sensor Location	RBLU
Number of Points	1280	Sensor Mnf & Model	NA NA
Pretrigger Points	160	Serial Number	NA

Test ID	09SN01
Date	09-09-2008
Description	2009 Chevrolet Impala LT Side NCAP Test

Passenger upper rib acceleration (P) - FIR100 YL



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Max	57.36	G's	at	41.88	msec
Min	-7.32	G's	at	93.75	msec

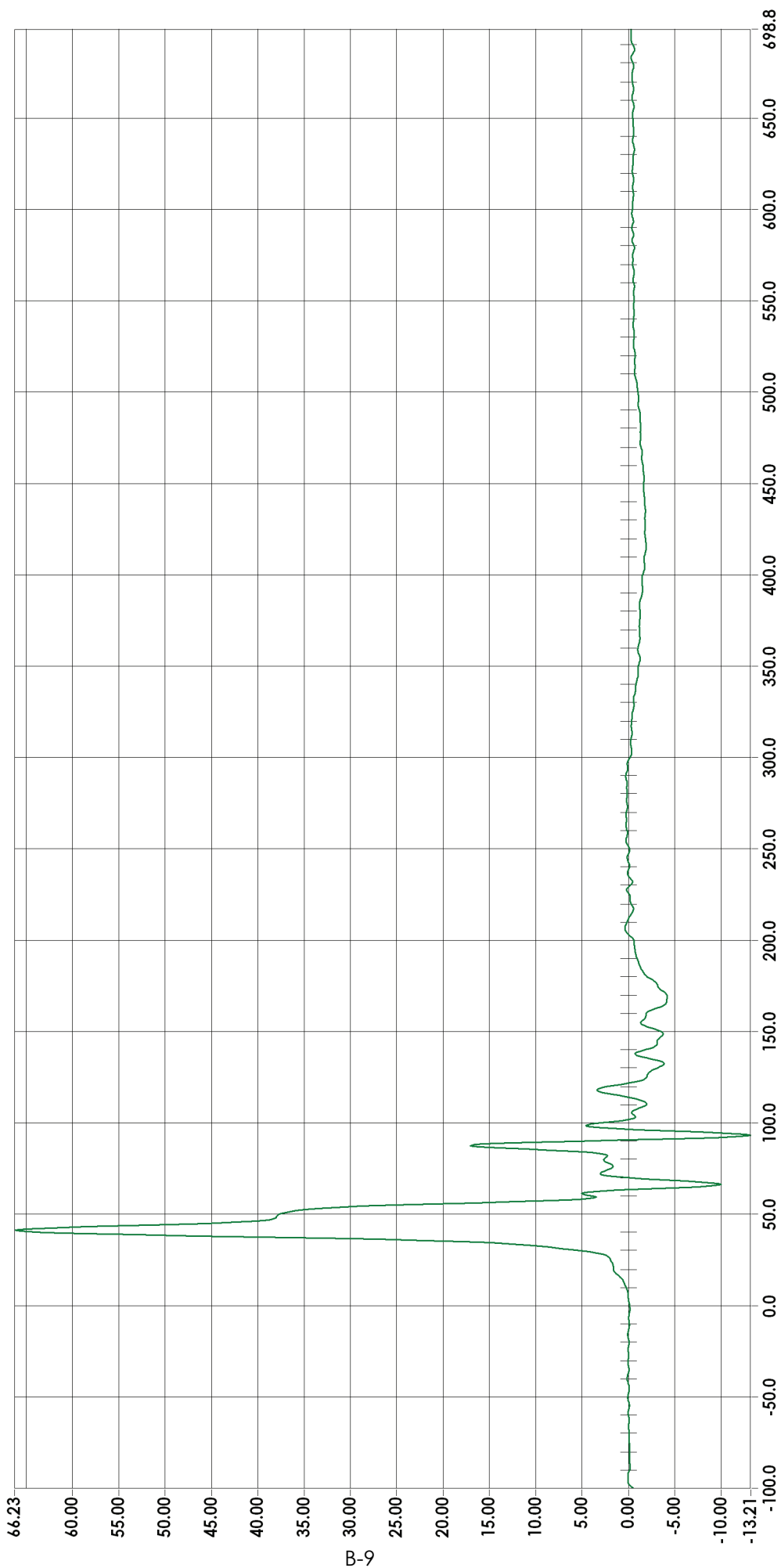
09SN01 Plot 072

Test ID	09SN01
Date	09-09-2008
Description	2009 Chevrolet Impala LT Side NCAP Test

Filter Class	FIR100
Sampling Rate (Hz)	1600
Number of Points	1280
Pretrigger Points	160
Sensor Location	RBLL
Sensor Mnf & Model	NA NA
Serial Number	NA



Passenger lower rib acceleration (P) - FIR100 YL



Max	66.23	G's	at	41.25	msec
Min	-13.21	G's	at	93.12	msec

09SN01 Plot 073

Time (msec)

G's

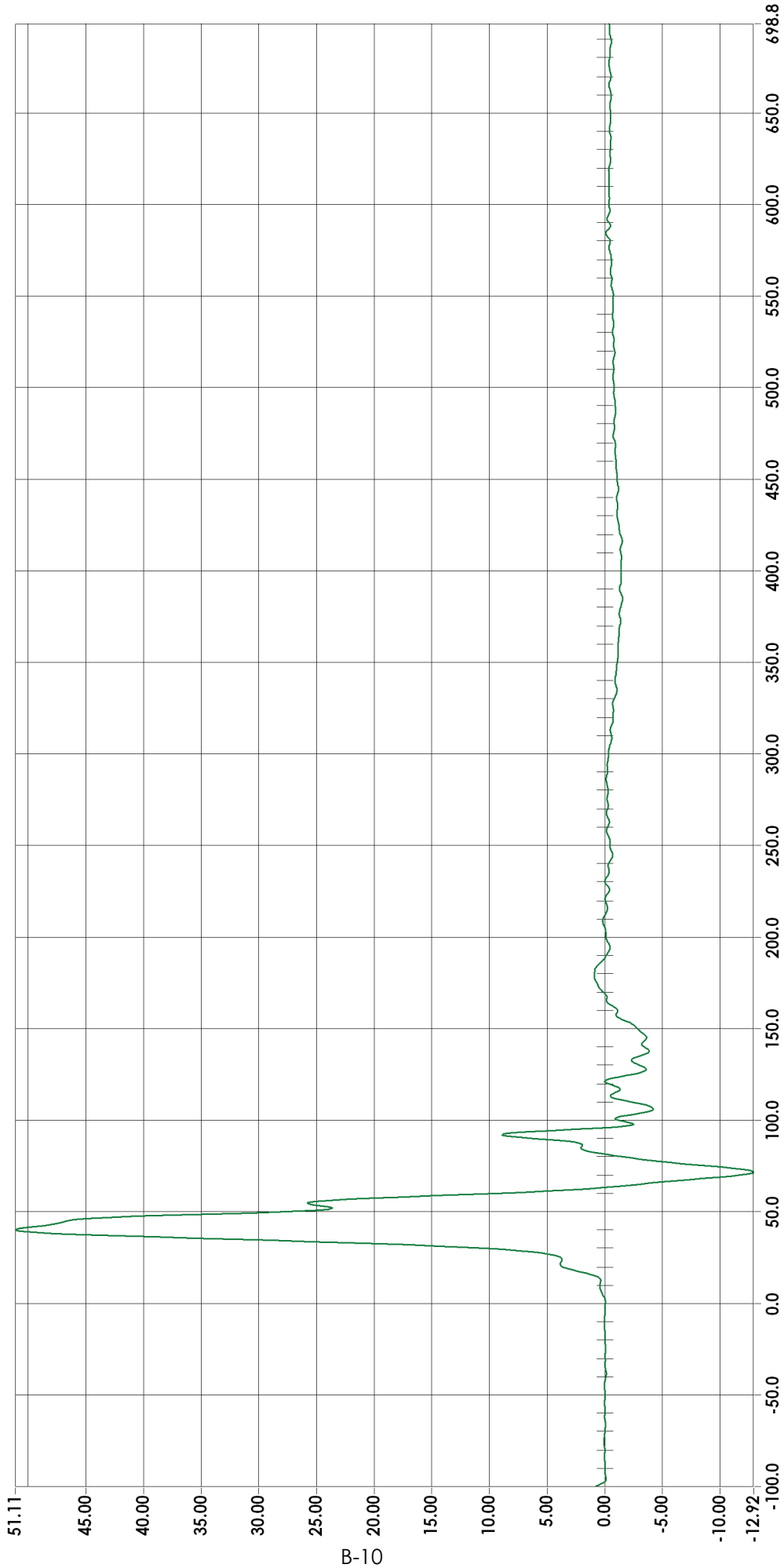
Neuroscience Research Labs
5000 West National Ave
Research 151
Milwaukee, WI 53295

Test ID	09SN01
Date	09-09-2008
Description	2009 Chevrolet Impala LT Side NCAP Test

Filter Class	FIR100
Sampling Rate (Hz)	1600
Number of Points	1280
Pretigger Points	160
Sensor Location	SPNL
Sensor Mnf & Model	NA NA
Serial Number	NA



Passenger lower spine acceleration (P) - FIR100 YL



Max	51.11	G's	at	40.00	msec
Min	-12.92	G's	at	71.88	msec

09SN01 Plot 074

Time (msec)

G's

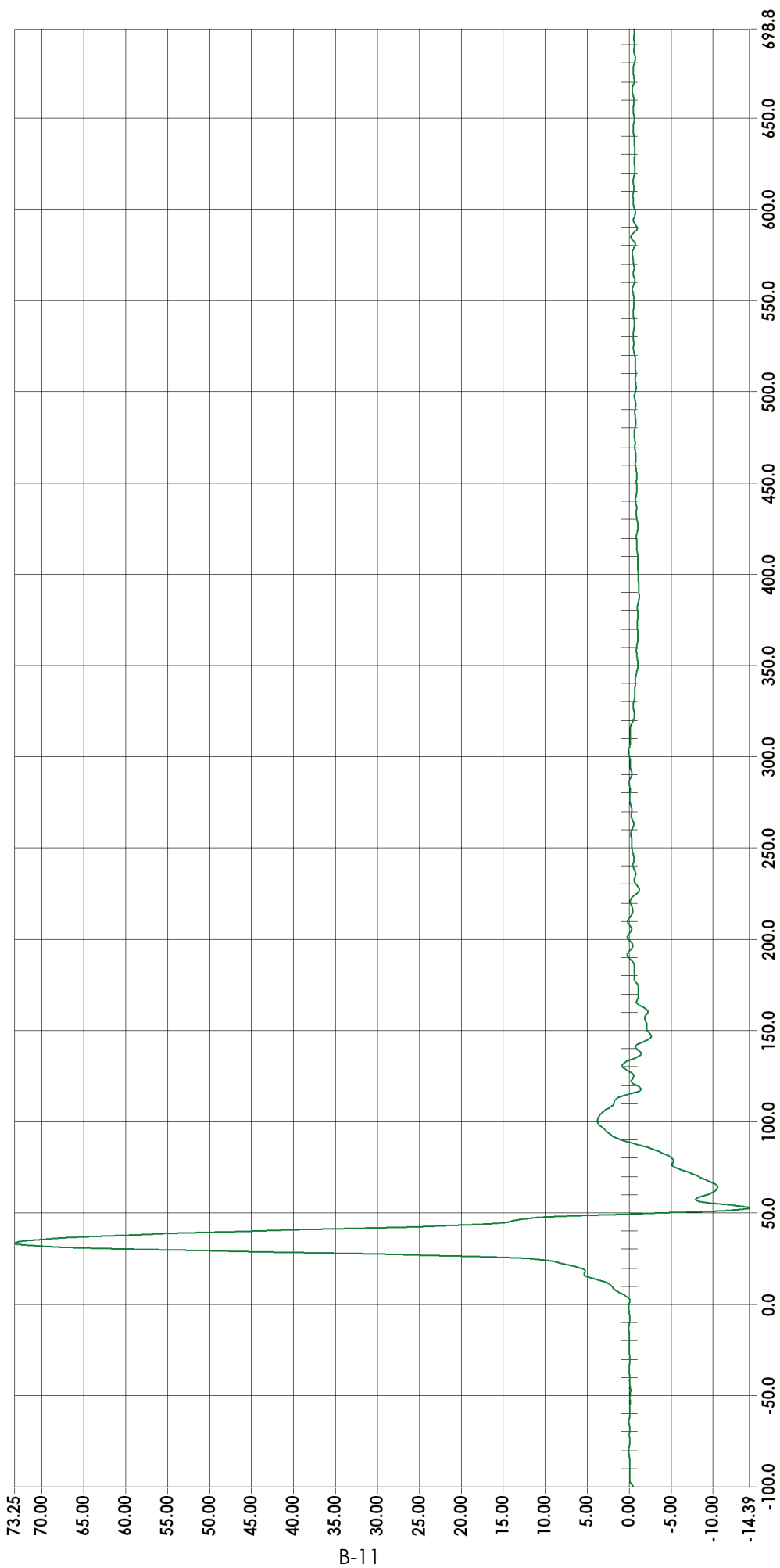
Neuroscience Research Labs
5000 West National Ave
Research 151
Milwaukee, WI 53295

Test ID	09SN01
Date	09-09-2008
Description	2009 Chevrolet Impala LT Side NCAP Test

Filter Class	FIR100
Sampling Rate (Hz)	1600
Number of Points	1280
Pretrigger Points	160
Sensor Location	PVCN
Sensor Mnf & Model	NA NA
Serial Number	NA



Passenger pelvis acceleration (P) - FIR100 YL



Max	73.25	G's	at	33.75	msec
Min	-14.39	G's	at	52.50	msec

09SN01 Plot 075

Time (msec)

G's

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APPENDIX C
DUMMY CALIBRATION DATA

**VERIFICATION TEST RESULTS SUMMARY
PRE AND POST TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial Number 056Test Sequences 1 and 2

TEST	PRE		POST	
	COMMENTS	BY	COMMENTS	BY
EXTERNAL DIMENSIONS	Pass all requirements	Mike Rawski	Pass all requirements	Mike Rawski
THORACIC SHOCK ABSORBER TEST	Pass all requirements	Mike Rawski	Pass all requirements	Mike Rawski
LATERAL THORAX IMPACT TEST	Pass all requirements	Mike Rawski	Pass all requirements	Mike Rawski
LATERAL PELVIS IMPACT TEST	Pass all requirements	Mike Rawski	Pass all requirements	Mike Rawski
ABDOMINAL COMPRESSION	Pass all requirements	Mike Rawski	Pass all requirements	Mike Rawski
LUMBAR FLEXION	Pass all requirements	Mike Rawski	Pass all requirements	Mike Rawski
HYBRID III LATERAL NECK TEST	Pass all requirements	Mike Rawski	Pass all requirements	Mike Rawski
HYBRID III LATERAL HEAD DROP	Pass all requirements	Mike Rawski	Pass all requirements	Mike Rawski

SID Serial Number 058Test Sequences 1 and 2

TEST	PRE		POST	
	COMMENTS	BY	COMMENTS	BY
EXTERNAL DIMENSIONS	Pass all requirements	Mike Rawski	Pass all requirements	Mike Rawski
THORACIC SHOCK ABSORBER TEST	Pass all requirements	Mike Rawski	Pass all requirements	Mike Rawski
LATERAL THORAX IMPACT TEST	Pass all requirements	Mike Rawski	Pass all requirements	Mike Rawski
LATERAL PELVIS IMPACT TEST	Pass all requirements	Mike Rawski	Pass all requirements	Mike Rawski
ABDOMINAL COMPRESSION	Pass all requirements	Mike Rawski	Pass all requirements	Mike Rawski
LUMBAR FLEXION	Pass all requirements	Mike Rawski	Pass all requirements	Mike Rawski
HYBRID III LATERAL NECK TEST	Pass all requirements	Mike Rawski	Pass all requirements	Mike Rawski
HYBRID III LATERAL HEAD DROP	Pass all requirements	Mike Rawski	Pass all requirements	Mike Rawski

SUMMARY
SID H3 PRE AND POST VERIFICATION
CONFIGURED FOR LEFT SIDE IMPACT

TEST PARAMETER	SPEC	SID HIII/056		SID HIII/058	
		PRE	POST	PRE	POST
MEASUREMENTS					
Date	-	04Sept08	18Sept08	04Sept08	18Sept08
Sequential Test Number	-	1	2	1	2
Temperature (°C)	18.9-25.5	20.0	21.6	20.2	20.9
Relative Humidity (%)	10-70	53.5	48.7	52.9	49.3
SH – Seated Height (mm)	889-909	908	902	908	905
RH – Rib Height (mm)	501-521	510	505	519	515
HP – Hip Pivot Height (mm)	99	99/99	99/99	99/99	99/99
RD – Rib From Back Line (mm)	229-241	230	230	230	230
KH – Knee Pivot from Back Line (mm)	511-526	525/520	525/520	525/525	525/525
KV – Knee Pivot to Floor (mm)	490-505	505/500	505/505	503/505	505/505
HW – Hip Width (mm)	356-391	360	365	358	358
THORAX IMPACTS					
Date	-	04Sept08	19Sept08	04Sept08	19Sept08
Sequential Test Number	-	1	2	1	2
Temperature (°C)	18.9-25.5	20.0	21.0	20.3	21.3
Relative Humidity (%)	10-70	46.5	49.7	48.2	50.7
Probe Speed (m/s)	4.21-4.33	4.30	4.24	4.25	4.25
Upper Rib Acceleration (G)	37-46	40.6	38.2	44.2	44.5
Lower Rib Acceleration (G)	37-46	39.8	37.6	44.2	43.3
Lower Spine Acceleration (G)	15-22	20.3	19.3	19.9	20.0
PELVIS IMPACTS					
Date	-	04Sept08	19Sept08	04Sept08	19Sept08
Sequential Test Number	-	1	2	1	2
Temperature (°C)	18.9-25.5	20.0	21.1	20.0	21.5
Relative Humidity (%)	10-70	46.7	49.7	49.1	50.3
Probe Speed (m/s)	4.21-4.33	4.25	4.25	4.25	4.25
Pelvis Acceleration (G)	40-60	40.2	48.3	43.5	42.5
THORACIC SHOCK ABSORBER					
Shock Absorber ID Number	-	1746		31310164	
Damper Setting	1-10	6		5	
Date	-	03Sept08		03Sept08	
Sequential Test Number	-	1		1	
Temperature	18.9-25.5	20.0		20.0	
Relative Humidity	10-70	53.1		45.2	
Probe Speed (m/s) Low	3.05	3.10		3.09	
Force (N)	836 – 1125	1007.1		901.7	
Displacement (mm)	30 – 35	30.5		30.8	
Probe Speed (m/s) Middle	4.27	4.30		4.30	
Force (N)	1730 – 2099	1749.1		1771.7	
Displacement (mm)	32 – 37	34.1		34.2	
Probe Speed (m/s) High	6.10	6.13		6.07	
Force (N)	3741 – 4448	3816.5		3788.3	
Displacement (mm)	33 - 40	37.4		35.829	

TEST PARAMETER	SPEC	SID HIII/056		SID HIII/058	
		PRE	POST	PRE	POST
ABDOMINAL COMPRESSION					
Date	-	29Aug08	16Sept08	29Aug08	17Sept08
Sequential Test Number	-	1	2	1	2
Temperature (°C)	18.9-25.5	21.2	22.2	22.3	22.3
Relative Humidity (%)	10-70	30.6	49.8	31.2	50.1
Force at 13 mm (N)	104-162	125.5	142.4	126.5	148.9
Force at 19 mm (N)	163-221	176.5	200.6	170.4	204.2
Force at 25 mm (N)	222-280	234.7	265.0	230.9	261.7
Force at 33 mm (N)	325-391	332.8	371.0	325.2	360.0
LUMBAR FLEXION					
Date	-	29Aug08	16Sept08	29Aug08	17Sept08
Sequential Test Number	-	1	2	1	2
Temperature (°C)	18.9-25.5	21.0	19.5	21.7	19.7
Relative Humidity (%)	10-70	50.0	50.6	51.3	50.8
Force at 0° (N)	0-26.7	0	0	0	0
Force at 0° (N)	97.8-151.2	111.3	116.2	101.5	119.3
Force at 0° (N)	151.2-204.6	165.1	160.4	155.7	181.2
Force at 0° (N)	204.6-258	213.2	207.5	217.3	221.5
Return Angle	12° Maximum	5.8	6.5	5.3	7.1
HYBRID III LATERAL NECK					
Date	-	02Sept08	17Sept08	02Sept08	19Sept08
Sequential Test Number	-	1	2	1	2
Temperature (°C)	18.9-25.5	21.9	22.3	21.9	21.2
Relative Humidity (%)	10-70	42.9	48.7	42.9	48.7
Pendulum Speed (m/s)	6.89-7.13	7.09	7.02	7.02	7.07
Pendulum Pulse 10ms (m/s)	1.96-2.55	2.40	1.98	2.11	2.25
Pendulum Pulse 20ms (m/s)	4.12-5.10	5.06	4.28	4.79	4.88
Pendulum Pulse 30ms (m/s)	5.73-7.01	6.97	6.59	6.96	7.00
Pendulum Pulse 40 –70 ms (m/s)	6.27-7.64	6.91	7.22	6.99	7.00
Max Head rotation (deg)	66-82	76.7	79.8	81.5	81.7
Head angle crosses zero (ms)	58-67	61.8	65.5	66.7	60.2
Peak Moment (Nm)	73-88	88.0	87.4	83.4	86.4
Moment crosses zero (ms)	49-63	56.1	61.8	57.9	54.2
Max rotation wrt pk. moment (ms)	2-15	7.28	9.36	2.40	7.76
HYBRID III LATERAL HEAD DROP					
Date	-	22Aug08	16Sept08	28Aug08	16Sept08
Sequential Test Number	-	1	2	1	2
Temperature (°C)	18.9-25.5	21.0	19.1	22.3	19.0
Relative Humidity (%)	10-70	32.7	53.2	31.5	51.0
Resultant Max (G)	120-150	137.2	134.3	142.7	131.9
Longituidinal Max (G)	<15	5.70	4.57	7.03	14.0

**DUMMY INSPECTION LIST
PRE AND POST TEST**

CONFIGURED FOR LEFT SIDE IMPACT

		SID H3 056		SID H3 058	
		PRE	POST	PRE	POST
	Date	08Sept08	09Sept08	08Sept08	09Sept08
	Performed By	Mike Rawski	Mike Rawski	Mike Rawski	Mike Rawski
PART	INSPECTION	RESULT	RESULT	RESULT	RESULT
Skin	Visual	Pass	Pass	Pass	Pass
Head	Visual, Ballast, Accelerometer Mount	Pass	Pass	Pass	Pass
Neck	Visual and Palpated, Cable Torque	Pass	Pass	Pass	Pass
Spine Box	Visual, Ballast, Weldment, Accelerometer Mount	Pass	Pass	Pass	Pass
Rib Cage	Visual, Palpated, Measured, Stiffness	Pass	Pass	Pass	Pass
Sternum	Visual	Pass	Pass	Pass	Pass
Lumbar Spine	Visual	Pass	Pass	Pass	Pass
Abdomen	Visual	Pass	Pass	Pass	Pass
Pelvis	Visual, Palpated, Accelerometer Mount	Pass	Pass	Pass	Pass
Upper Legs	Visual	Pass	Pass	Pass	Pass
Knees	Visual, Stops, Inserts	Pass	Pass	Pass	Pass
Lower Legs	Visual, Range of Motion	Pass	Pass	Pass	Pass
Ankles	Visual, Range of Motion	Pass	Pass	Pass	Pass
Feet	Visual, Range of Motion	Pass	Pass	Pass	Pass
Joints	1 to 2 G Range	Pass	Pass	Pass	Pass
Other		N/a	N/a	N/a	N/a