

REPORT NUMBER: SPNCAP-MGA-2011-024

**NEW CAR ASSESSMENT PROGRAM (NCAP)
Side Impact Pole Test**

**GENERAL MOTORS LLC
2011 Buick Lucerne CX 4-Dr Sedan
NHTSA No.: MB0106**

**MGA RESEARCH CORPORATION
5000 Warren Road
Burlington, WI 53105**



Test Date: September 21, 2010

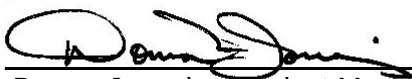
Final Report Date: October 28, 2010

FINAL REPORT

**U.S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Office of Crashworthiness Standards
1200 New Jersey Ave, SE
Mail Code: NVS 111, Room W43-410
Washington, DC 20590**

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

This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Prepared by: 
Donna Janovicz, Project Manager

Approved by: 
Ben Fischer, Project Engineer

Approval Date: October 28, 2010

FINAL REPORT ACCEPTANCE BY OCWS:

Division Chief, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date: _____

COTR, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date: _____

Technical Report Documentation Page

1. Report No. SPNCAP-MGA-2011-024	2. Government Accession No.	3. Recipient's Catalog No.																				
4. Title and Subtitle Final Report of New Car Assessment Program Side Impact Pole Testing of 2011 Buick Lucerne CX 4-Dr Sedan NHTSA No.: MB0106		5. Report Date October 28, 2010																				
		6. Performing Organization Code MGA																				
7. Author(s) Donna Janovicz, Project Manager Ben Fischer, Project Engineer		8. Performing Organization Report No. SPNCAP-MGA-2011-024																				
9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105		10. Work Unit No.																				
		11. Contract or Grant No. DTNH22-09-D-00124																				
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards 1200 New Jersey Ave, SE, Room W43-410 Washington, DC 20590		13. Type of Report and Period Covered: Final Test Report September 21 – October 28, 2010																				
		14. Sponsoring Agency Code NVS-111																				
15. Supplementary Notes																						
16. Abstract A 32.2 km/h (20 mph), 75° oblique impact NCAP Side Pole Test was conducted on the subject of 2011 Buick Lucerne CX 4-Dr Sedan in accordance with the specifications of the Office of Crashworthiness Standards NCAP Side Pole Laboratory Test Procedure for the generation of consumer information on vehicle side pole crash protection. The test was conducted at MGA Research Corporation, in Burlington, Wisconsin, on September 21, 2010. The impact velocity was 32.3 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 21°C. The test vehicle post-test maximum crush was 444 mm at level 3. The test vehicle's performance was as follows: <table border="1" style="margin: 10px auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2" style="text-align: left;">Measurement Description</th> <th colspan="3">Driver ATD (SID-IIs)</th> </tr> <tr> <th>Units</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td style="text-align: left;">Head Injury Criteria (HIC₃₆)</td> <td>N/A</td> <td>1000</td> <td>434</td> </tr> <tr> <td style="text-align: left;">Resultant Lower Spine Acceleration</td> <td>Gs</td> <td>82</td> <td>64</td> </tr> <tr> <td style="text-align: left;">Combined Acetabular and Iliac Pelvic Force</td> <td>N</td> <td>5525</td> <td>5396</td> </tr> </tbody> </table> The two 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.				Measurement Description	Driver ATD (SID-IIs)			Units	Threshold	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	434	Resultant Lower Spine Acceleration	Gs	82	64	Combined Acetabular and Iliac Pelvic Force	N	5525	5396
Measurement Description	Driver ATD (SID-IIs)																					
	Units	Threshold	Result																			
Head Injury Criteria (HIC ₃₆)	N/A	1000	434																			
Resultant Lower Spine Acceleration	Gs	82	64																			
Combined Acetabular and Iliac Pelvic Force	N	5525	5396																			
17. Key Words New Car Assessment Program (NCAP) Side Impact Pole Part 572V SID-IIs		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Adm. Technical Reference Division 1200 New Jersey Ave, SE Washington, D.C. 20590																				
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 126	22. Price																			

TABLE OF CONTENTS

<u>Section</u>		<u>Page No.</u>
----------------	--	-----------------

1	Test Purpose and Procedure	1
2	Summary of Test Results	2
3	Occupant and Vehicle Information	4

<u>Data Sheet No.</u>		<u>Page No.</u>
-----------------------	--	-----------------

1	General Test and Vehicle Parameter Data	5
2	Seat, Seat Belt, Steering Wheel Adjustment, and Fuel System Data	8
3	Dummy Longitudinal Clearance Dimensions	10
4	Dummy Lateral Clearance Dimensions	11
5	Camera and Instrumentation Data	12
6	Vehicle Accelerometer Data	13
7	Rigid Pole Load Cell Data	14
8	Post Test Observations	15
9	Vehicle Profile Measurements	16
10	Vehicle Exterior Crush Measurements	17
11	FMVSS 301 Fuel System Integrity Post-Impact Data	21
12	Dummy/Vehicle Temperature Stabilization Data	22

Appendix

A	Photographs	A
B	Dummy Response Data	B
C	Dummy Calibration and Performance Verification Data	C

SECTION 1
TEST PURPOSE AND PROCEDURE

This side impact test is part of the MY 2011 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-09-D-00124. The purpose of this test is to generate comparative side impact performance in a 2011 Buick Lucerne CX 4-Dr Sedan. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Pole Laboratory Test Procedure, dated January 2010.

SECTION 2

SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a 2011 Buick Lucerne CX 4-Dr Sedan. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 32.3 km/h. The test was conducted by MGA Research Corporation in Burlington, Wisconsin, on September 21, 2010. Pre-test and post-test photographs of the test vehicle and side impact dummy (SID-IIs) are included in Appendix A of this report.

One Part 572V (SID-IIs) dummy was placed in the driver designated seating position according to instructions specified in the OCWS NCAP Side Pole Laboratory Test Procedure dated January 2010. Camera locations and other pertinent camera information are included in this report.

The Part 572V (SID-IIs) dummy was instrumented accordingly:

Head CG Triaxial Accelerometers
 Thorax Upper, Middle, and Lower Rib Displacement Potentiometers
 Abdomen Upper and Lower Rib Displacement Potentiometers
 Lower Spine Triaxial Accelerometers
 Iliac Load Cell
 Acetabulum Load Cell

Appendix B contains the vehicle and dummy response data. Dummy configuration and performance verification data can be found in Appendix C of this report.

The following table summarizes the results of the test:

DUMMY INJURY VALUES

Dummy	HIC (36ms)	Resultant Lower Spine Acceleration	Pelvic Force (N)	
SID-IIs 5 th Percentile Female	434	64	Iliac Wing	2780
			Acetabular	2843
			Sum	5396

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Left Front (Driver) P1		Left Rear (Passenger) P4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No	No	
Knee Airbag	No		No	
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso Airbag	Yes	Yes	No	
Seat Belt Pretensioner	Yes	Yes	No	
Seat Belt Load Limiter	Yes		No	

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

GENERAL COMMENTS

There was no valid data collected for:

- Rotation About Z Axis
- Left Floor Sill Y
- Left B-Post @ Sill Y
- Left Lower B-Post Y after 25 msec.
- Left Mid B-Post Y after 25 msec.
- Driver Seat Track Y after 70 msec.

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

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Buick Lucerne CX 4-Dr Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB0106
 Test Date: 9/21/2010

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	MB0106	Anti-Lock Brakes	Yes
Model Year	2011	All Wheel Drive	No
Make	Buick	Power Steering	Yes
Model	Lucerne	Driver Front Airbag	Yes
Body Style	Sedan	Driver Curtain Airbag	Yes
VIN	1G4HA5EM8BU102758	Driver Head/Torso Airbag	No
Body Color	Quicksilver Metallic	Driver Torso Airbag	Yes
Delivery Date	8/30/2010	Driver Torso/Pelvis Airbag	No
Odometer (mi)	3	Driver Pelvis Airbag	No
Odometer (km)	5	Driver Knee Airbag	No
Dealer	Mike Haggerty Buick	Rear Pass. Front Airbag	No
Transmission	Automatic	Rear Pass. Curtain Airbag	Yes
Final Drive	Front	Rear Pass. Head/Torso Airbag	No
Type/No. Cylinders	6	Rear Pass. Torso Airbag	No
Engine Displacement (L)	3.9	Rear Pass. Torso/Pelvis Airbag	No
Engine Placement	Lateral	Rear Pass. Pelvis Airbag	No
Roof Rack	No	Rear Pass. Knee Airbag	No
Sunroof/T-Top	No	Pretensioners	Yes
Tinted Glass	No	Load Limiters	Yes
Traction Control	Yes	Automatic Door Locks	Yes
Power Brakes	Yes	Bucket Seats	Yes
Front Disc	Yes	Tilt Steering	Yes
Rear Disc	Yes	Power Seats	Yes
Does owner's manual provide instruction to turn off automatic door locks?			No

DATA FROM CERTIFICATION LABEL

Manufactured By	General Motors LLC	GVWR (kg)	2221
Date of Manufacture	06/10	GAWR Front (kg)	1207
		GAWR Rear (kg)	1014

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	3	3		6	
Capacity Weight (VCW) (kg)				488	(A)
DSC x 68.04 kg				408	(B)
Cargo Weight (RCLW) (kg)				80	(A-B)

VEHICLE SEAT TYPE

Seating Location	Type of Seat Pan				Type of Seat Back		
	40/20/40 Split	Bench	60/40 Split	Contoured	Fixed	Adjustable	
						Manual	Power
Front Seat	X						X
Rear or Second Row		X			X		
Third Row Seat							

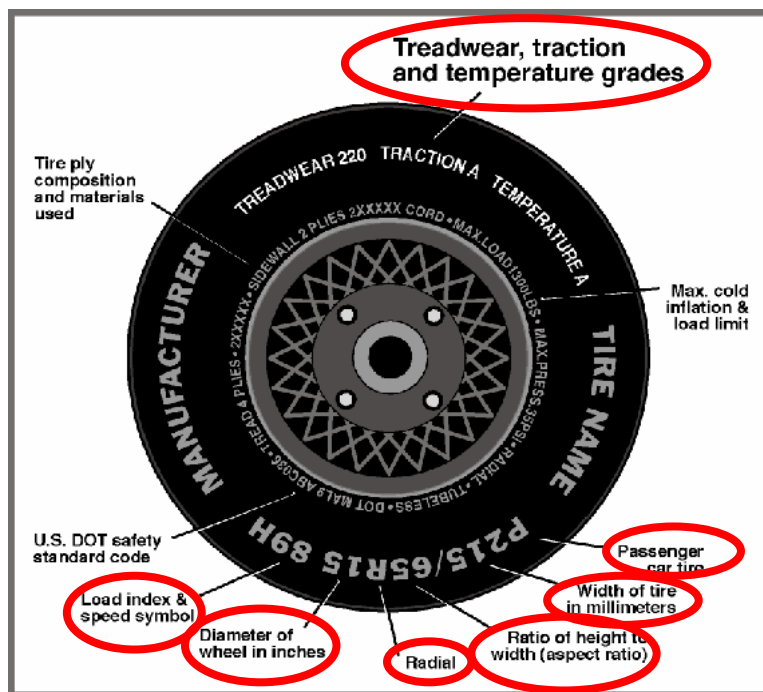
DATA SHEET NO. 1 (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Buick Lucerne CX 4-Dr Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB0106
 Test Date: 9/21/2010

VEHICLE TIRE INFORMATION



Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	210	210
Recommended Tire Size	P235/55R17	P235/55R17
Tire Size on Vehicle	P235/55R17	P235/55R17
Tire Manufacturer	Michelin	Michelin
Tire Model	ENERGY	ENERGY
Treadwear	400	400
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2	2
Tire Plies Body	5	5
Load Index & Speed Symbol	98H	98H
Tire Material	Rubber	Rubber
DOT Safety Code Right	B9JJ ENXX	B9JJ ENXX
DOT Safety Code Left	B9JJ ENXX	B9JJ ENXX

DATA SHEET NO. 1 (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Buick Lucerne CX 4-Dr Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB0106
 Test Date: 9/21/2010

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	513.9	332.5		528.4	394.6		528.9	398.7	
Right	kg	543.4	315.7		539.8	367.9		540.2	369.7	
Ratio	%	62.0	38.0		58.4	41.6		58.2	41.8	
Totals	kg	1057.3	648.2	1705.5	1068.2	762.5	1830.7	1069.1	768.4	1837.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1705.5	(A)
Actual Weight of 1 P572V ATD (SID-IIs) ATD Used	kg	52.2	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	80	(C)
Calculated Target Vehicle Test Weight (TVTW)	kg	1837.7	(A+B+C)

TEST VEHICLE ATTITUDES AND CG

	Units	As Delivered	As Tested	Fully Loaded
Driver Door Sill Angle (front-to-rear)*	deg	-0.1	-0.1	-0.1
Front Passenger Sill Angle (front-to-rear)*	deg	-0.7	-0.4	-0.4
Front Bumper Angle (left-to-right)**	deg	-0.3	-0.4	-0.3
Rear Bumper Angle (left-to-right)**	deg	0.5	0.4	0.5
Vehicle CG (Aft of Front Axle)	mm	1116	1223	1228
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	6	7	8

*Front up is positive ** Left up is positive

GENERAL VEHICLE TEST DATA

Measurement Description	Units	Value
Weight of Ballast in Cargo Area	kg	15.9
Weight of Vehicle Components Removed	kg	8.2

Vehicle components removed to meet target vehicle test weight: Right tail light, air compressor for tire, right mirror, trunk carpet, trunk plastic.

TEST VEHICLE IMPACT POINT DATA

Measurement Parameter	Units	Value
Vertical Impact Reference Line (Aft of Front Axle)	mm	1129
Actual Impact Point (Aft of Front Axle)	mm	1131
Impact Point Difference (- forward / + rearward)	mm	2

DATA SHEET NO. 2

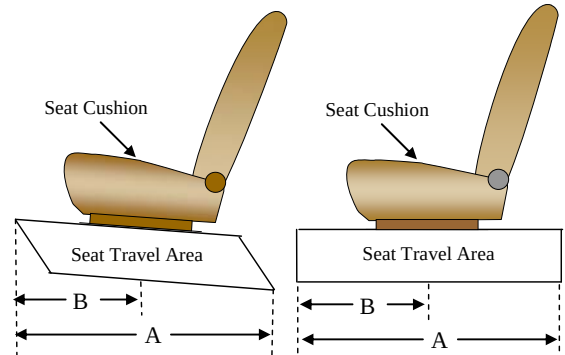
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT, AND FUEL SYSTEM DATA

Test Vehicle: 2011 Buick Lucerne CX 4-Dr Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB0106
 Test Date: 9/21/2010

SEAT FORE/AFT POSITIONS

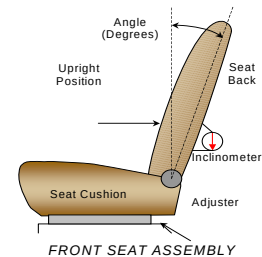
The driver seat was a power fore/aft adjustable seat with power angle/height adjustments. The seat travel was set as specified in Appendix B of the TP dated January 2010. The right front passenger manual seat was set to match the driver seat. The rear passenger seats' were non-adjustable.



SEAT FORE/AFT POSITIONING	Total Fore/Aft Travel (mm)	Placed in Detent # or Position (mm)
Driver Seat	271 mm	0 mm (full forward)
Front Passenger Seat	271 mm	0 mm (full forward)
Rear Seat – Struck Side	Fixed	
Rear Seat – Non-Struck Side	Fixed	

SEAT BACK ANGLE POSITION

The seat back was set as specified in Appendix B of the TP dated January 2010. The seat back angle measurement was made relative to the rocker sill at the headrest post.



SEAT BACK ANGLE	Degrees	Detents
Driver Seat Back Angle with Seated Dummy	-3.2	
Front Passenger Seat Back Angle	-2.5	
Struck Side Rear Seat Back Angle	Fixed	
Non-Struck Side Rear Passenger Seat Back Angle	Fixed	

SEAT BELT UPPER ANCHORAGE

The driver and passenger seat belt upper anchorages were set at the manufacturer's specified placement in Form 1.

SEAT BELT UPPER ANCHORAGES	Total # of Positions	Placed in Position #
Driver Seat	4 detents	0 (uppermost as 0)
Front Passenger Seat	4 detents	0 (uppermost as 0)

DATA SHEET NO. 2 (CONTINUED)

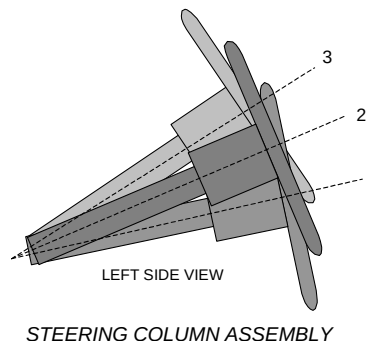
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT, AND FUEL SYSTEM DATA

Test Vehicle: 2011 Buick Lucerne CX 4-Dr Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB0106
 Test Date: 9/21/2010

STEERING COLUMN ADJUSTMENT

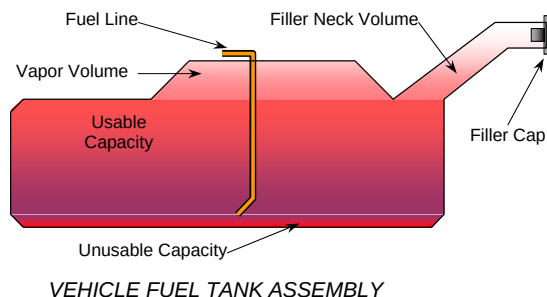
Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when moved through its full range of motion. An aluminum plate is placed across the rim of the steering wheel, an inclinometer is placed on the plate and the angle is measured.



STEERING COLUMN POSITIONING

	Degrees	Fore/Aft Position (mm)
Lowermost - Position 1	80.7	
Geometric Center – Position 2	70.7	
Uppermost – Position 3	60.7	
Telescoping Steering Wheel Travel		
Test Position	70.7	

Describe the fuel pump type, its behavior, and the location of the fuel filler pipe. The vehicle is equipped with an electric fuel pump. At Key-on, the pump will run for 2-3 sec as a priming sequence. The pump will then turn off and will run continuously again once the vehicle's engine is started. The fuel pipe is on the left side.



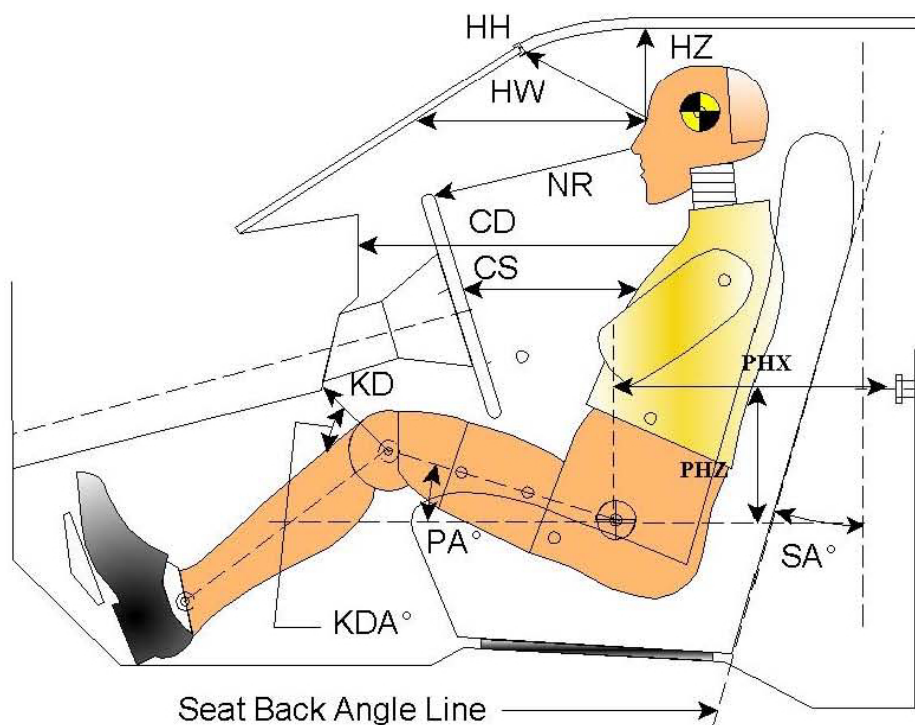
FUEL TANK CAPACITY DATA

	Liters
Usable Capacity of "Standard" Tank	70.0
Usable Capacity of "Optional" Tank	
Usable Capacity of Standard Tank as Specified in Owner's Manual	70.0
Usable Capacity of Optional Tank as Specified in Owner's Manual	
92-94% of Usable Capacity	64.4 to 65.8
Actual Amount of Solvent Used	65.1
1/3 of Usable Capacity	23.3

.DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2011 Buick Lucerne CX 4-Dr Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB0106
 Test Date: 9/21/2010

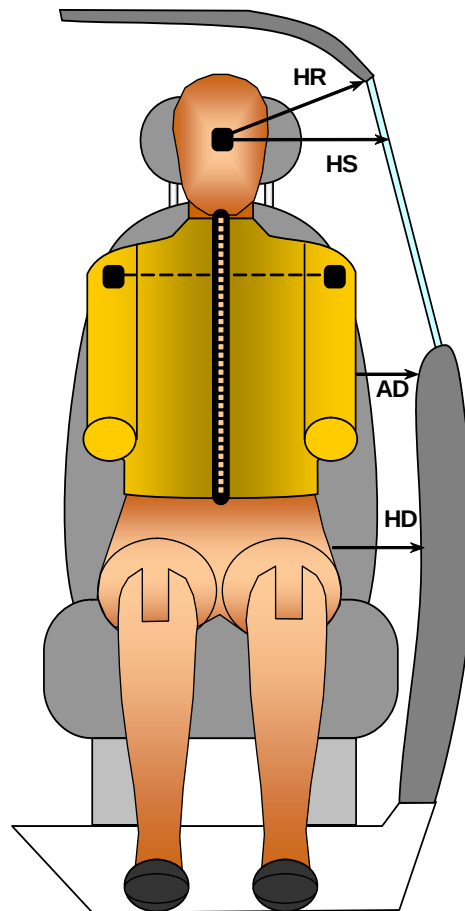


Code	Measurement Description	Driver S/N 296	
		Length (mm)	Angle (°)
HH	Head to Header	223	
HW	Head to Windshield	537	
HZ	Head to Roof	167	
NR	Nose to Rim	200	
CD	Chest to Dash	392	
CS	Chest to Steering Wheel	159	
KDL/KDAL	Left Knee to Dash	66	42.6
KDR/KDAR	Right Knee to Dash	63	41.3
PA	Pelvic Angle		18.1
PHX	H-Point to Striker (X-Axis)	333	
PHZ	H-Point to Striker (Z-Axis)	100	
SA	Seat Back Angle		-3.2

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2011 Buick Lucerne CX 4-Dr Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB0106
 Test Date: 9/21/2010



FRONT VIEW OF DUMMY

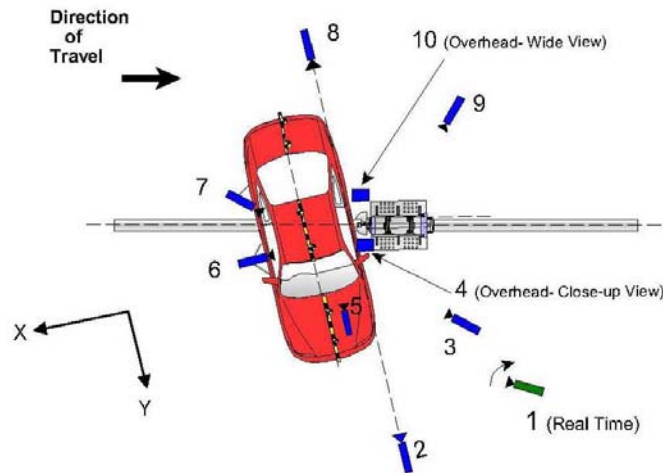
Code	Measurement Description	Driver S/N 296
		Length (mm)
HR	Head to Side Header	222
HS	Head to Side Window	384
AD	Arm to Door	199
HD	H-Point to Door	246

DATA SHEET NO. 5

CAMERA LOCATIONS AND DATA

Test Vehicle: 2011 Buick Lucerne CX 4-Dr Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB0106
 Test Date: 9/21/2010



Reference: From Point of Impact for X and Y; from Ground for Z):
 +X = Forward of Impact, + Y = Right of Impact, +Z = Down

Camera No.	View	Coordinates (mm)			Lens (mm)	Film Speed (fps)
		X*	Y*	Z*		
1	Real-Time Pan View					30
2	Front Ground Level	40	5570	-1580	24	1000
3	Impact Side 45° Forward	-1750	4120	-1610	20	1000
4	Overhead Closeup	30	0	-4520	50	1000
5	Onboard – Driver Front				12.5	1000
6	Onboard – Driver Side				8	1000
7	Onboard – Driver Rear				8	1000
8	Rear Ground Level	0	-6540	-1600	24	1000
9	Impact Side 45° Rearward	-3560	-2830	-1590	20	1000
10	Overhead Wide View	120	0	-4610	14	1000
11	Real-Time Dummy Front View					30

* All measurements accurate to ± 6 mm

Note: Vehicle was at a 15° angle to the rigid pole.

INSTRUMENTATION

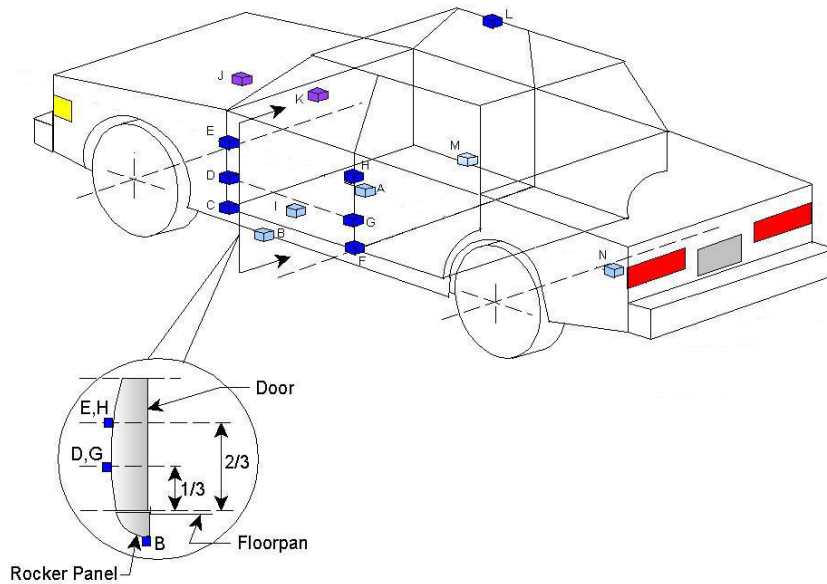
	Number of Channels
Driver Dummy	16
Vehicle Structure	21
Pole Load Cells – Not used	8
Contact Switches	3
Airbag Timing	2
Total No. of Data Channels	50

DATA SHEET NO. 6

VEHICLE ACCELEROMETER DATA

Test Vehicle: 2011 Buick Lucerne CX 4-Dr Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB0106
 Test Date: 9/21/2010



	Accelerometer Location			
	ID	Coordinates (mm)		
		X	Y	Z
A	Vehicle CG	2764	430	-178
	Vehicle CG Sensor	2774	430	-178
B	Left Floor Sill	3166	-768	-210
C	A Pillar Sill	3580	-775	-210
D	A Pillar Low	3571	-371	-533
E	A Pillar Mid	3505	-256	-754
F	B Pillar Sill	2454	-768	-210
G	B Pillar Low	2372	-381	-505
H	B Pillar Mid	2385	-376	-749
I	Driver Seat	2560	-610	-310
L	Engine Top	4455	0	-780
J	Firewall	4016	0	-910
K	Right Roof	2584	560	-1448
M	Right Floor Sill	2663	768	-210
N	Rear Floorpan	854	30	-495

Reference: From Point of Impact for X and Y; from Ground for Z):
 +X = Forward of Vehicle, + Y = Right of Vehicle, +Z = Down

DATA SHEET NO. 7
RIGID POLE LOAD CELL DATA

Test Vehicle: 2011 Buick Lucerne CX 4-Dr Sedan
Test Program: NCAP Side Pole Impact Test

NHTSA No. MB0106
Test Date: 9/21/2010



254 mm Diameter Rigid Pole

The pole was not instrumented.

Load Cell Locations	
ID	Height From Ground (m)
1	
2	
3	
4	
5	
6	
7	
8	

DATA SHEET NO. 8**POST-TEST OBSERVATIONS**Test Vehicle: 2011 Buick Lucerne CX 4-Dr SedanNHTSA No. MB0106Test Program: NCAP Side Pole Impact TestTest Date: 9/21/2010**TEST DUMMY INFORMATION AND CONTACT**

Description	Driver
Dummy Type / Serial No.	SID-IIs / 296
Head Contact	Curtain Airbag, Headrest
Upper Torso Contact	Side Airbag
Lower Torso Contact	Door Panel
Left Knee Contact	Door Panel
Right Knee Contact	Left Knee

POST TEST DOOR OPENING AND SEAT TRACK INFORMATION

Description	Front	Rear
Left Side Doors	Remained closed and jammed shut	Remained closed and jammed shut
Right Side Doors	Remained closed and operational	Remained closed and operational
Hatch and Other Doors	Remained closed and operational	Remained closed and operational
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	Cracked
Window Damage	Left Front Window Cracked
Other Notable Effects	None

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Left Front (Driver) P1		Left Rear (Passenger) P4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No	No	
Knee Airbag	No		No	
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso Airbag	Yes	Yes	No	
Seat Belt Pretensioner	Yes	Yes	No	
Seat Belt Load Limiter	Yes		No	

VEHICLE SPEED AND IMPACT DATA

Measured Parameter	Units	Requirement	Value
Horizontal Offset from Vertical Impact Reference Line	mm	+/- 38	+2
Trap No. 1 Velocity (Primary)	km/h	31.4 to 33.0	32.3
Trap No. 2 Velocity (Redundant)	km/h	31.4 to 33.0	32.3

DATA SHEET NO. 9

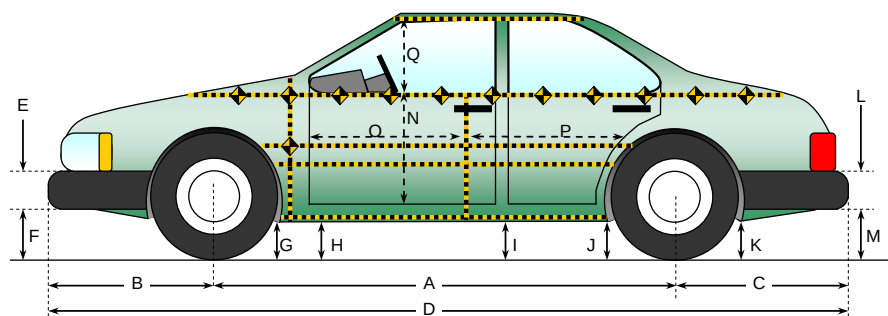
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2011 Buick Lucerne CX 4-Dr Sedan

NHTSA No. MB0106

Test Program: NCAP Side Pole Impact Test

Test Date: 9/21/2010



All measurements in (mm) with tolerance of ± 3 mm

LEFT SIDE VIEW

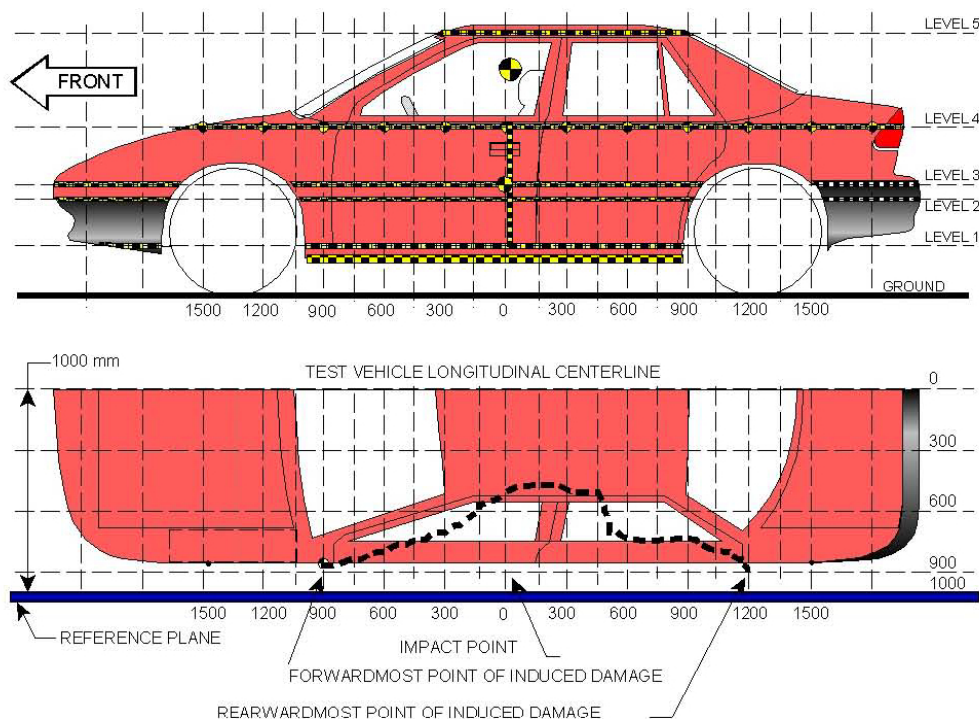
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2937	2800	137
B	Front Axle to FSOV	1091	1091	0
C	Rear Axle to RSOV	1162	1130	32
D1	Total Vehicle Length at Left Side	4968	4792	176
D2	Total Vehicle Length at Centerline	5190	5021	169
D3	Total Vehicle Length at Right Side	4968	4950	18
E	Front Bumper Thickness	90	90	0
F	Front Bumper Bottom to Ground	255	307	-52
G	Sill Height at Front Wheel Well	187	172	15
H	Sill Height at Front Door Leading Edge	189	178	11
I	Sill Height at B Pillar	192	205	-13
J1	Sill Height at Rear Wheel Well	191	220	-29
J2	Pinch Weld Height at Rear Wheel Well	194	223	-29
K	Sill Height Aft of Rear Wheel Well	256	268	-12
L	Rear Bumper Thickness	150	150	0
M	Rear Bumper Bottom to Ground	295	285	10
N	Sill Height to Window Bottom Sill	719	715	4
O	Front Door Leading Edge to Impact CL	667	660	7
P	Rear Door Trailing Edge to Impact CL	1420	1415	6
Q	Front Window Opening	461	411	50
R	Right Side Length	4968	4950	18
S	Left Side Length	4968	4792	176
T	Vehicle Width at B Post	1849	1650	199

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2011 Buick Lucerne CX 4-Dr Sedan
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB0106
 Test Date: 9/21/2010



NOTE: The measurements are taken along the vertical impact reference line. Vehicle measurements forward of the vertical impact reference line are negative.

Level	Measurement Description	Height Above Ground (mm)
1	Sill Top	290
2	Occupant H-Point	555
3	Mid-Door	650
4	Window Sill	930
5	Window Top	1380

DATA SHEET NO. 10 (CONTINUED)

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2011 Buick Lucerne CX 4-Dr Sedan

NHTSA No. MB0106

Test Program: NCAP Side Pole Impact Test

Test Date: 9/21/2010

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1050				266					267					1	
-900				257					259					2	
-825			169	250				193	246				24	-4	
-750		175	174	247			205	200	260			30	26	13	
-675	219	177	175	243		244	202	198	275		25	25	23	32	
-600	220	177	175	242		288	234	230	268		68	57	55	26	
-525	221	177	174	240		332	277	273	294		111	100	99	54	
-450	221	176	174	239		366	318	313	321		145	142	139	82	
-375	220	176	173	236		397	357	355	362		177	181	182	126	
-300	218	176	172	233		440	416	414	417		222	240	242	184	
-225	218	176	172	232		478	465	466	469		260	289	294	237	
-150	218	175	172	229	499	537	527	530	533	682	319	352	358	304	183
-75	218	175	172	228	495	584	571	581	587	687	366	396	409	359	192
0	217	175	172	227	494	616	616	616	625	697	399	441	444	398	203
75	218	175	172	225	495	597	609	615	630	713	379	434	443	405	218
150	218	175	172	223	496	550	568	583	590	710	332	393	411	367	214
225	218	175	172	223	497	488	515	534	531	695	270	340	362	308	198
300	218	175	172	222	497	456	448	461	475	675	238	273	289	253	178
375	220	175	173	222	499	425	406	413	439	668	205	231	240	217	169
450	220	178	175	222	499	380	353	359	419	648	160	175	184	197	149
525	221	179	176	222	499	352	333	338	398	630	131	154	162	176	131
600	222	181	177	223	502	334	318	322	381	619	112	137	145	158	117
750	223	183	174	223	504	303	291	250	354	599	80	108	76	131	95
900	225	185	177	224	506	268	260	220	324	575	43	75	43	100	69
1050	228	188	179	227	517	232	227	225	294	555	4	39	46	67	38
1200	232	191	183	228	522	203	196	196	264	546	-29	5	13	36	24
1350		184	185	231			157	164	234			-27	-21	3	
1500				234					206					-28	
1650				239					252					13	
1800				243					256					13	
1950				251					263					12	
2100				261					271					10	
2250				276					282					6	
2400				294					298					4	

NOTE: The measurements are taken along the vertical impact reference line.
Vehicle measurements forward of the vertical impact reference line are negative.

DATA SHEET NO. 10 (CONTINUED)

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2011 Buick Lucerne CX 4-Dr Sedan
Test Program: NCAP Side Pole Impact Test

NHTSA No. MB0106
Test Date: 9/21/2010

MAXIMUM CRUSH DATA

	Level 1	Level 2	Level 3	Level 4	Level 5
Maximum Crush (mm)	399	441	444	405	218
Distance From Impact (mm)	0	0	0	75	75

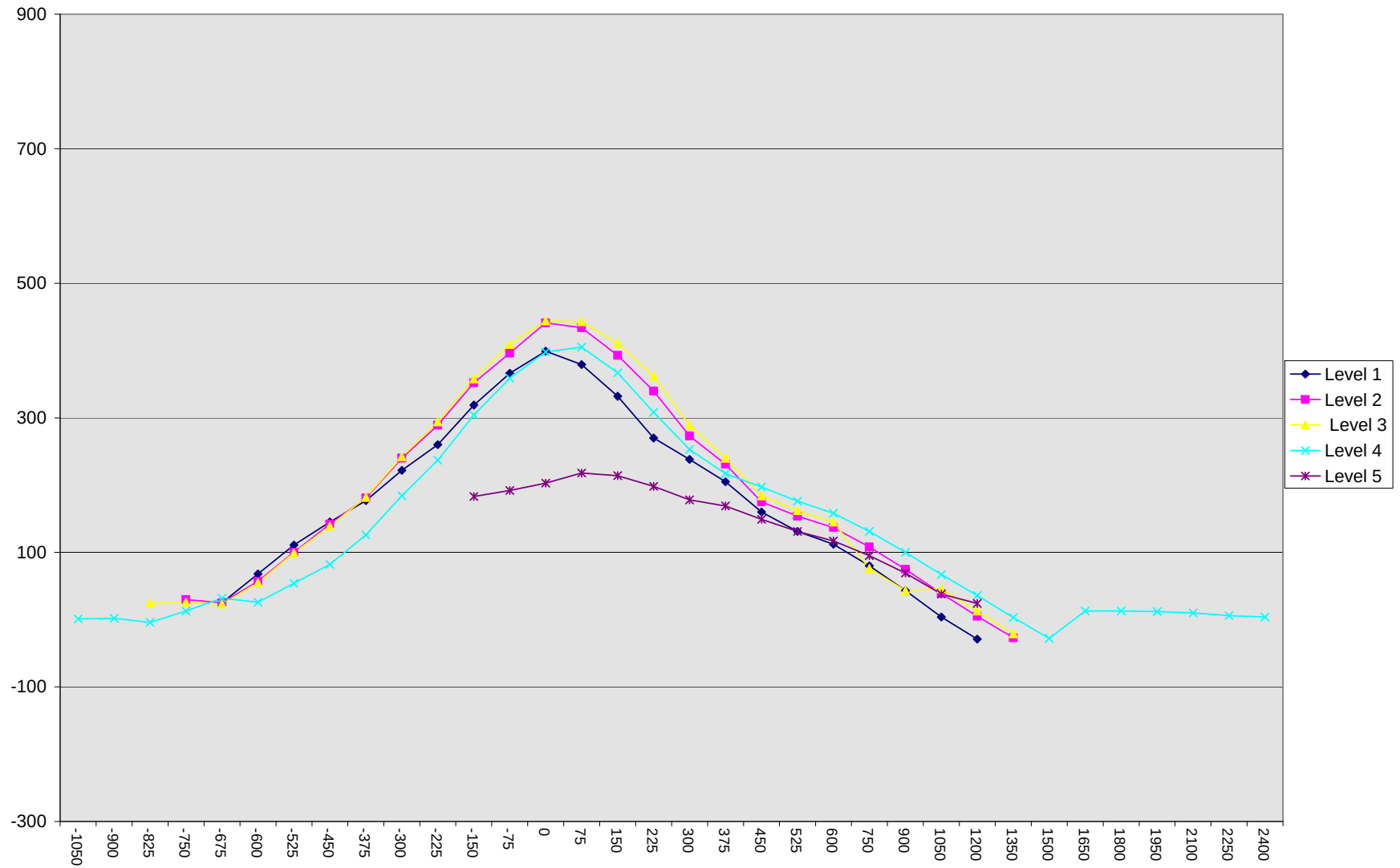
Note: Pre-test measurements are taken when the vehicle is in the "As Tested" weight condition. Vehicle measurements forward of the vertical impact reference line are negative. The crush profile grid is established prior to test based on an estimated impact point. The final distance to impact is determined after the final dummy positioning and the pole is aligned with the center of gravity of the dummy's head.

DATA SHEET NO. 10 (CONTINUED)
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2011 Buick Lucerne CX 4-Dr Sedan
Test Program: NCAP Side Pole Impact Test

NHTSA No. MB0106
Test Date: 9/21/2010

20



DATA SHEET NO. 11

FMVSS 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2011 Buick Lucerne CX 4-Dr Sedan

NHTSA No. MB0106

Test Program: NCAP Side Pole Impact Test

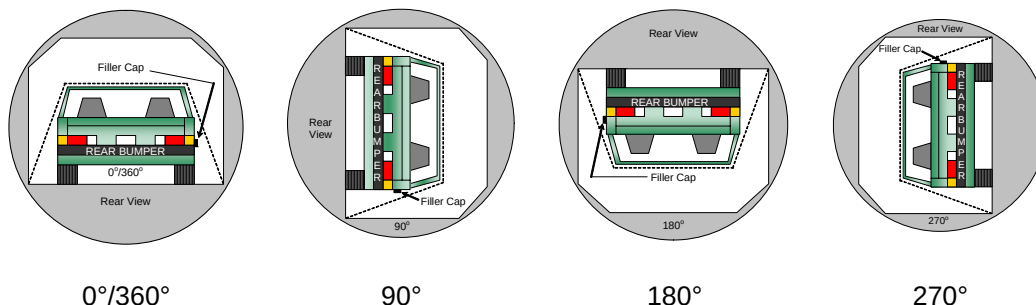
Test Date: 9/21/2010

Test Time: 10:29 am

Temperature: 21° C

- 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



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	110	300	410
90° to 180°	109	300	409
180° to 270°	105	300	405
270° to 360°	113	300	413

FMVSS 301 ROLLOVER SPILLAGE TABLE (units in ounces)

Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eight Minute
0° to 90°	0	0	0	0
90° to 180°	0	0	0	0
180° to 270°	0	0	0	0
270° to 360°	0	0	0	0

ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

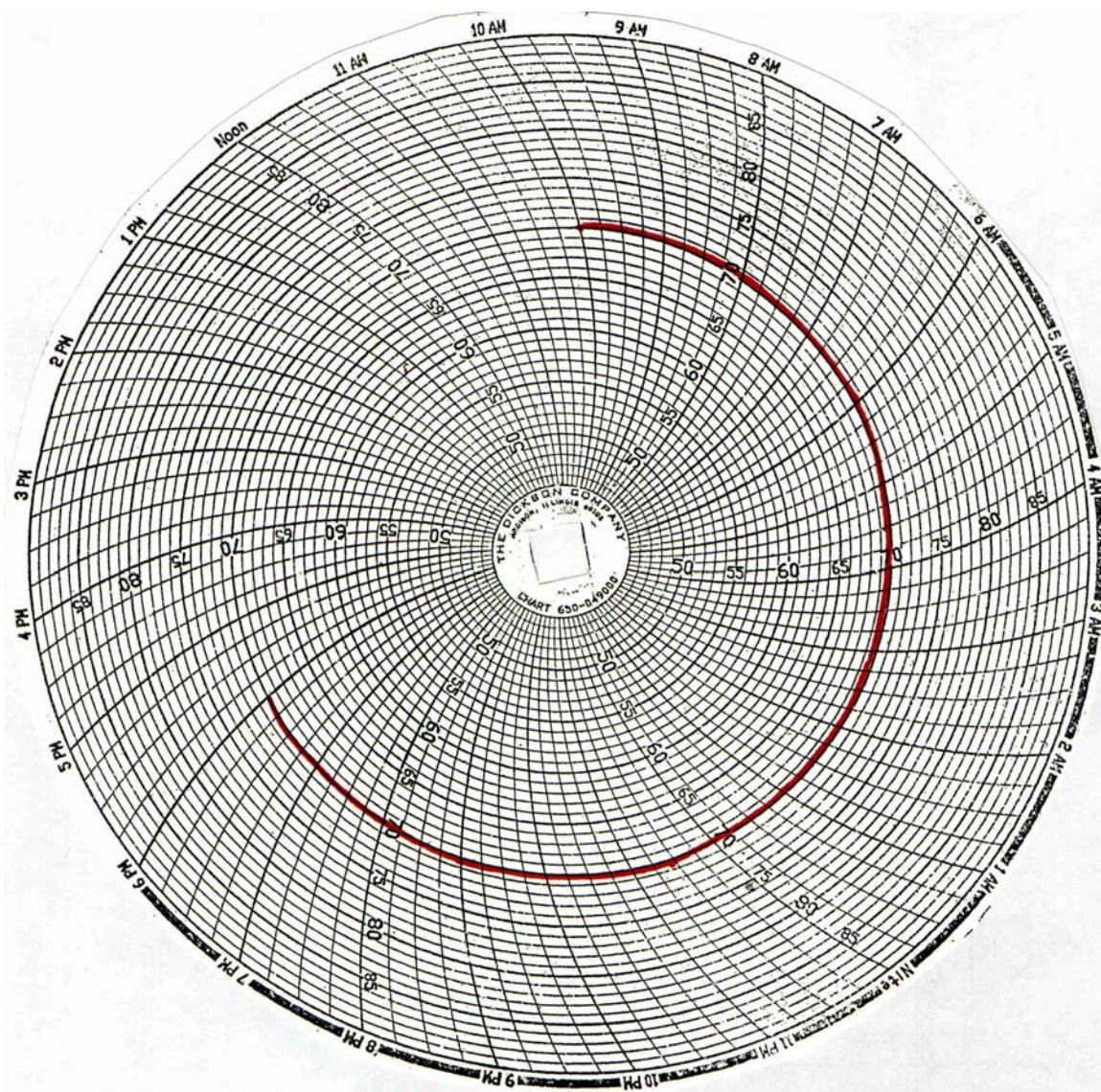
Test Phase	Spillage Location
0° to 90°	
90° to 180°	
180° to 270°	
270° to 360°	

DATA SHEET NO. 12

DUMMY/VEHICLE TEMPERATURE STABILIZATION DATA

Test Vehicle: 2011 Buick Lucerne CX 4-Dr Sedan
Test Program: NCAP Side Pole Impact Test

NHTSA No. MB0106
Test Date: 9/21/2010



APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

	<u>Page No.</u>
Photo No. 1. As Delivered Right Front $\frac{3}{4}$ View of Test Vehicle	A-1
Photo No. 2. As Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle	A-1
Photo No. 3. Pre-Test Frontal View of Test Vehicle	A-2
Photo No. 4. Post-Test Frontal View of Test Vehicle	A-2
Photo No. 5. Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle	A-3
Photo No. 6. Post-Test Left Front $\frac{3}{4}$ View of Test Vehicle	A-3
Photo No. 7. Pre-Test Left Side View of Test Vehicle	A-4
Photo No. 8. Post-Test Left Side View of Test Vehicle	A-4
Photo No. 9. Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle	A-5
Photo No. 10. Post-Test Left Rear $\frac{3}{4}$ View of Test Vehicle	A-5
Photo No. 11. Pre-Test Rear View of Test Vehicle	A-6
Photo No. 12. Post-Test Rear View of Test Vehicle	A-6
Photo No. 13. Pre-Test Right Side View of Test Vehicle	A-7
Photo No. 14. Post-Test Right Side View of Test Vehicle	A-7
Photo No. 15. Pre-Test Overhead View of Test Vehicle and Pole	A-8
Photo No. 16. Post-Test Overhead View of Test Vehicle and Pole	A-8
Photo No. 17. Pre-Test Left Side View of Pole Positioned Against Side of Vehicle	A-9
Photo No. 18. Pre-Test Right Side View of Pole Positioned Against Side of Vehicle	A-9
Photo No. 19. Pre-Test Close-Up View of Impact Point Target	A-10
Photo No. 20. Post-Test Close-Up View of Impact Point Target Showing	A-10

		<u>Page No.</u>
Photo No. 21.	Pre-Test Front Close-Up View of Dummy	A-11
Photo No. 22.	Post-Test Front Close-Up View of Dummy	A-11
Photo No. 23.	Pre-Test Left Side View of Dummy Showing Belts, Chalking, and Contact Switches (Door Open) – Upper Half	A-12
Photo No. 24.	Pre-Test Left Side View of Dummy Showing Belts, Chalking, and Contact Switches (Door Open) – Lower Half	A-12
Photo No. 25.	Pre-Test Left Side View of Dummy Shoulder and Door Top View	A-13
Photo No. 26.	Post-Test Left Side View of Dummy Shoulder and Door Top View	A-13
Photo No. 27.	Pre-Test Frontal View of Seat Back Prior to Dummy Positioning	A-14
Photo No. 28.	Pre-Test Frontal View of Dummy Head and Shoulders in Relation to Head Restraint	A-14
Photo No. 29.	Pre-Test Frontal View of Seat Pan Prior to Dummy Positioning	A-15
Photo No. 30.	Pre-Test Overhead View of Dummy Thighs on Seat Pan	A-15
Photo No. 31.	Pre-Test View of Dummy's Neck Showing Position of Adjustable Neck Bracket	A-16
Photo No. 32.	Pre-Test View of Dummy's Head Showing Dummy's Head is Level	A-16
Photo No. 33.	Pre-Test Placement of Dummy's Feet	A-17
Photo No. 34.	Pre-Test View of Belt Anchorage for Dummy to Show Position	A-17
Photo No. 35.	Pre-Test Left Side View of Steering Wheel to Show Position	A-18
Photo No. 36.	Pre-Test View of Parking Brake	A-18
Photo No. 37.	Pre-Test Close-Up Left Side View of Driver Seat Track Showing Test Position	A-19
Photo No. 38.	Pre-Test Close-Up Left Side View of Driver Seat Back Showing Test Position	A-19
Photo No. 39.	Pre-Test Close-Up View of Driver Seat Back or Head Restraint Showing Seat Back Test Position	A-20
Photo No. 40.	Pre-Test Dummy and Door Clearance View	A-21

	<u>Page No.</u>
Photo No. 41. Post-Test Dummy and Door Clearance View	A-21
Photo No. 42. Pre-Test Right Side View of Dummy and Front Seat Occupant Compartment	A-22
Photo No. 43. Post-Test Right Side View of Dummy and Front Seat Occupant Compartment	A-22
Photo No. 44. Pre-Test Inner Driver Door Panel View	A-23
Photo No. 45. Post-Test Inner Driver Door Panel View Showing Dummy Contact Location	A-23
Photo No. 46. Post-Test Dummy Close-Up Head Contact with Vehicle Interior View	A-24
Photo No. 47. Post-Test Dummy Close-Up Head Contact with Side Airbag View	A-24
Photo No. 48. Post-Test Dummy Close-Up Torso Contact with Vehicle Interior View	A-25
Photo No. 49. Post-Test Dummy Close-Up Torso Contact with Side Airbag View	A-25
Photo No. 50. Post-Test Dummy Close-Up Pelvis Contact with Vehicle Interior View	A-26
Photo No. 51. Post-Test Dummy Close-Up Pelvis Contact with Side Airbag View	A-26
Photo No. 52. Pre-Test View of Fuel Filler Cap or Fuel Filler Neck	A-27
Photo No. 53. Post-Test View of Fuel Filler Cap or Fuel Filler Neck	A-27
Photo No. 54. Close-Up View of Vehicle's Certification Label	A-28
Photo No. 55. Close-Up View of Vehicle's Tire Information Placard of Label	A-28
Photo No. 56. Pre-Test Pole Barrier Front View	A-29
Photo No. 57. Post-Test Pole Barrier Front View	A-29
Photo No. 58. Pre-Test Pole Barrier Side View	A-30
Photo No. 59. Post-Test Pole Barrier Side View	A-30
Photo No. 60. Pre-Test Ballast View	A-31
Photo No. 61. Post-Test Primary and Redundant Speed Trap Read-Out	A-31

	<u>Page No.</u>
Photo No. 62. FMVSS No. 301/305 Rollover 0 Degrees	A-32
Photo No. 63. FMVSS No. 301/305 Rollover 90 Degrees	A-32
Photo No. 64. FMVSS No. 301/305 Rollover 180 Degrees	A-33
Photo No. 65. FMVSS No. 301/305 Rollover 270 Degrees	A-33
Photo No. 66. FMVSS No. 301/305 Rollover 360 Degrees	A-34
Photo No. 67. Impact Event	A-34
Photo No. 68. Monroney Label	A-35
Photo No. 69. Head Restraint Use and Adjustment Information from Vehicle Owner's Manual	A-36



As Delivered Right Front $\frac{3}{4}$ View of Test Vehicle



As Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle



Pre-Test Frontal View of Test Vehicle



Post-Test Frontal View of Test Vehicle



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



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



Pre-Test Left Side View of Test Vehicle



Post-Test Left Side View of Test Vehicle



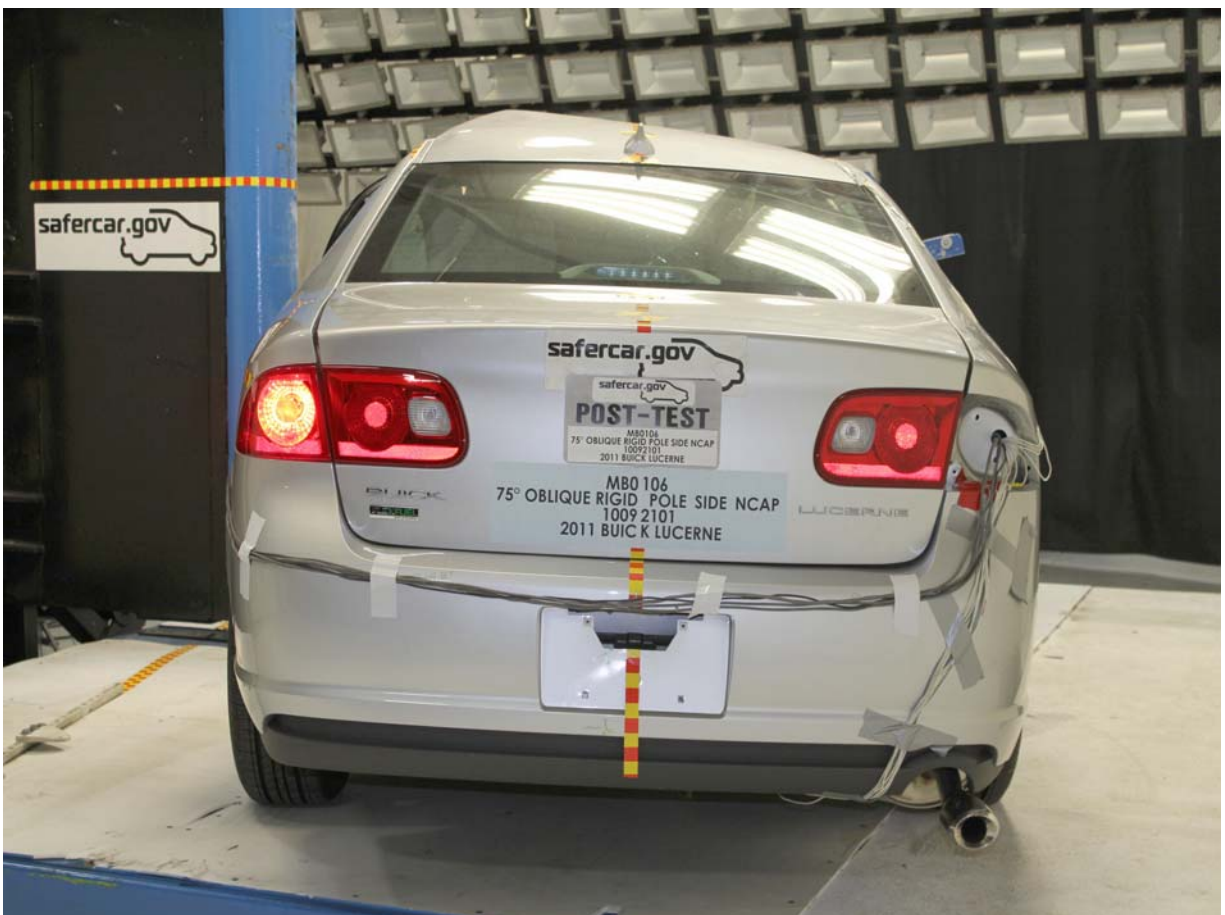
Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



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



Pre-Test Rear View of Test Vehicle



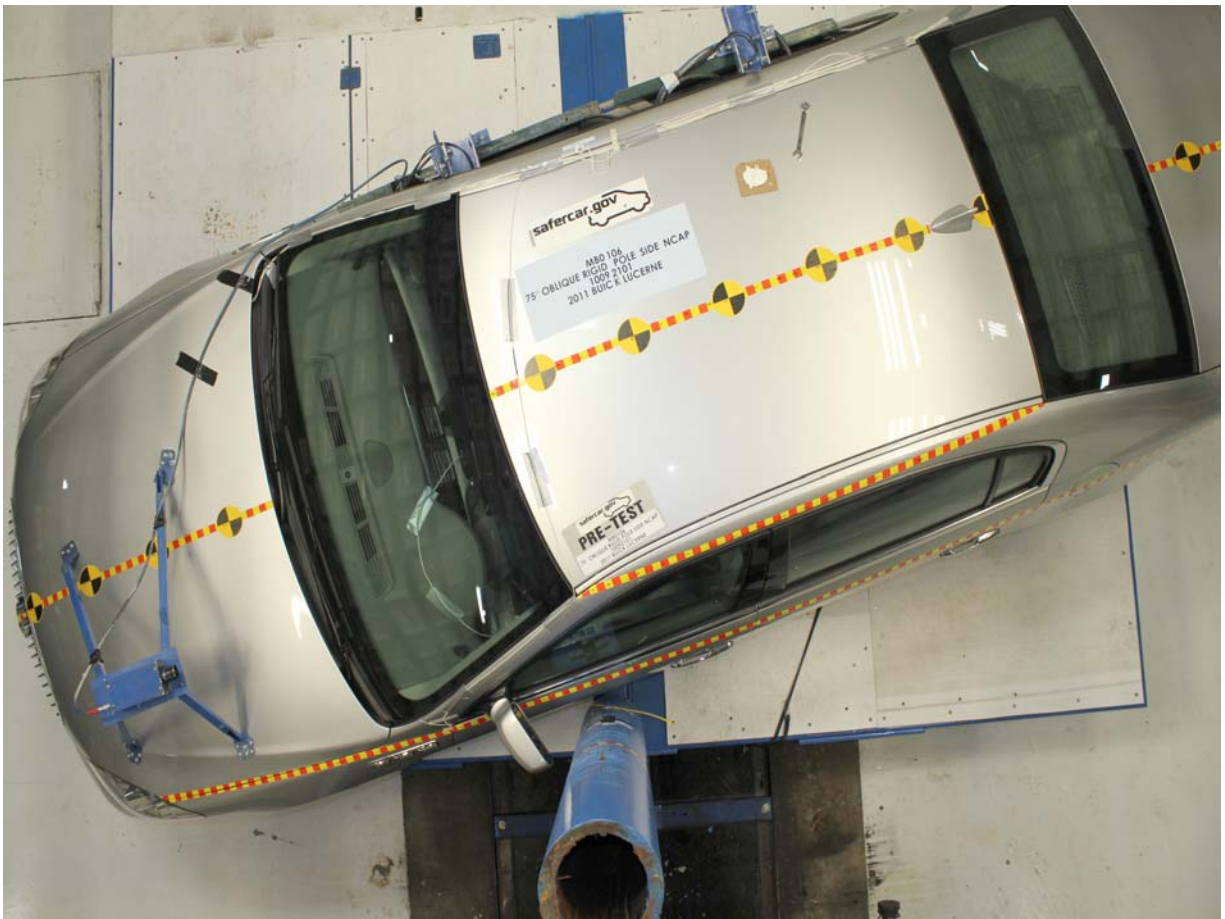
Post-Test Rear View of Test Vehicle



Pre-Test Right Side View of Test Vehicle



Post-Test Right Side View of Test Vehicle



Pre-Test Overhead View of Test Vehicle and Pole



Post-Test Overhead View of Test Vehicle and Pole



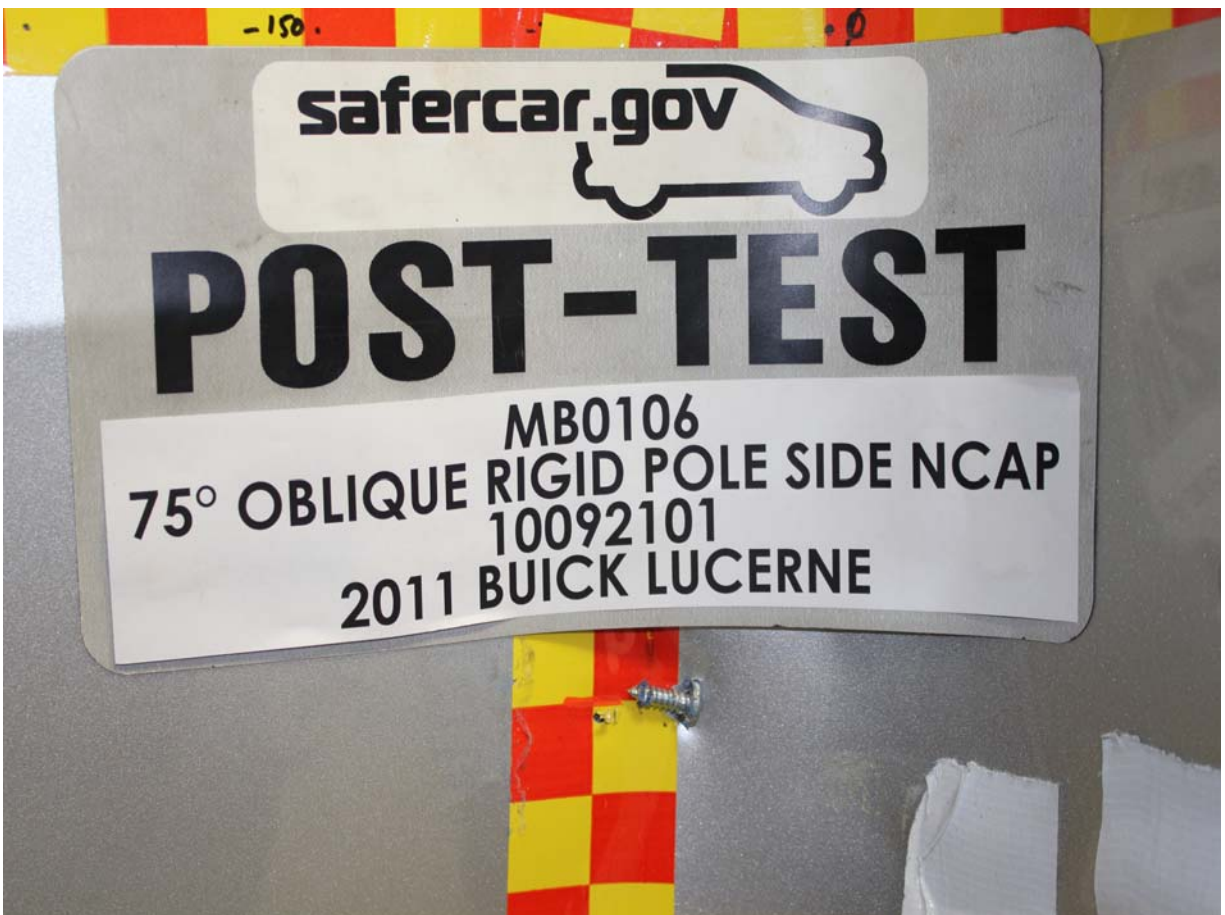
Pre-Test Left Side View of Pole Positioned Against Side of Vehicle



Pre-Test Right Side View of Pole Positioned Against Side of Vehicle



Pre-Test Close-Up View of Impact Point Target



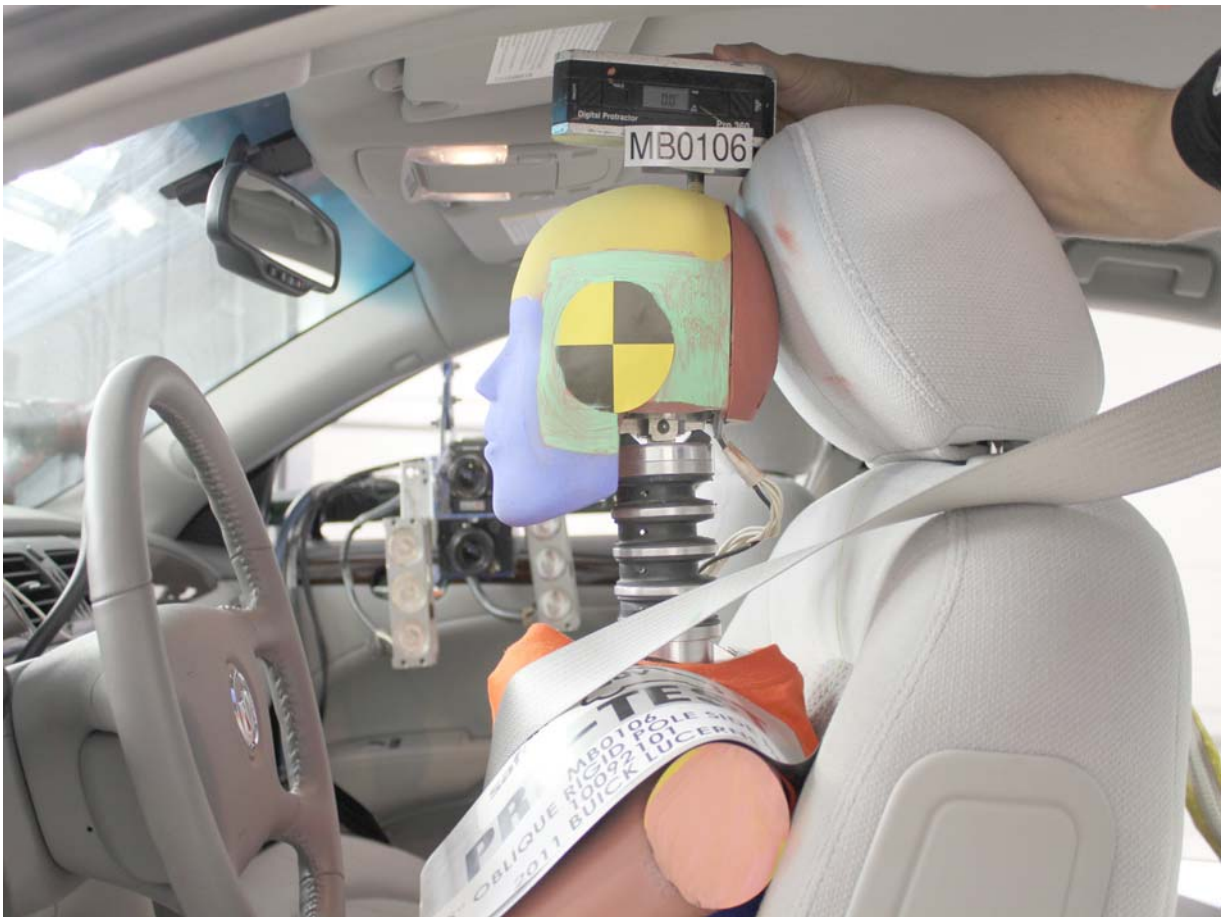
Post-Test Close-Up View of Impact Point Target Showing



Pre-Test Front Close-Up View of Dummy



Post-Test Front Close-Up View of Dummy



Pre-Test Left Side View of Dummy Showing Belts, Chalking, and Contact Switches (Door Open) - Upper Half



Pre-Test Left Side View of Dummy Showing Belts, Chalking, and Contact Switches (Door Open) - Lower Half



Pre-Test Left Side View of Dummy Shoulder and Door Top View



Post-Test Left Side View of Dummy Shoulder and Door Top View



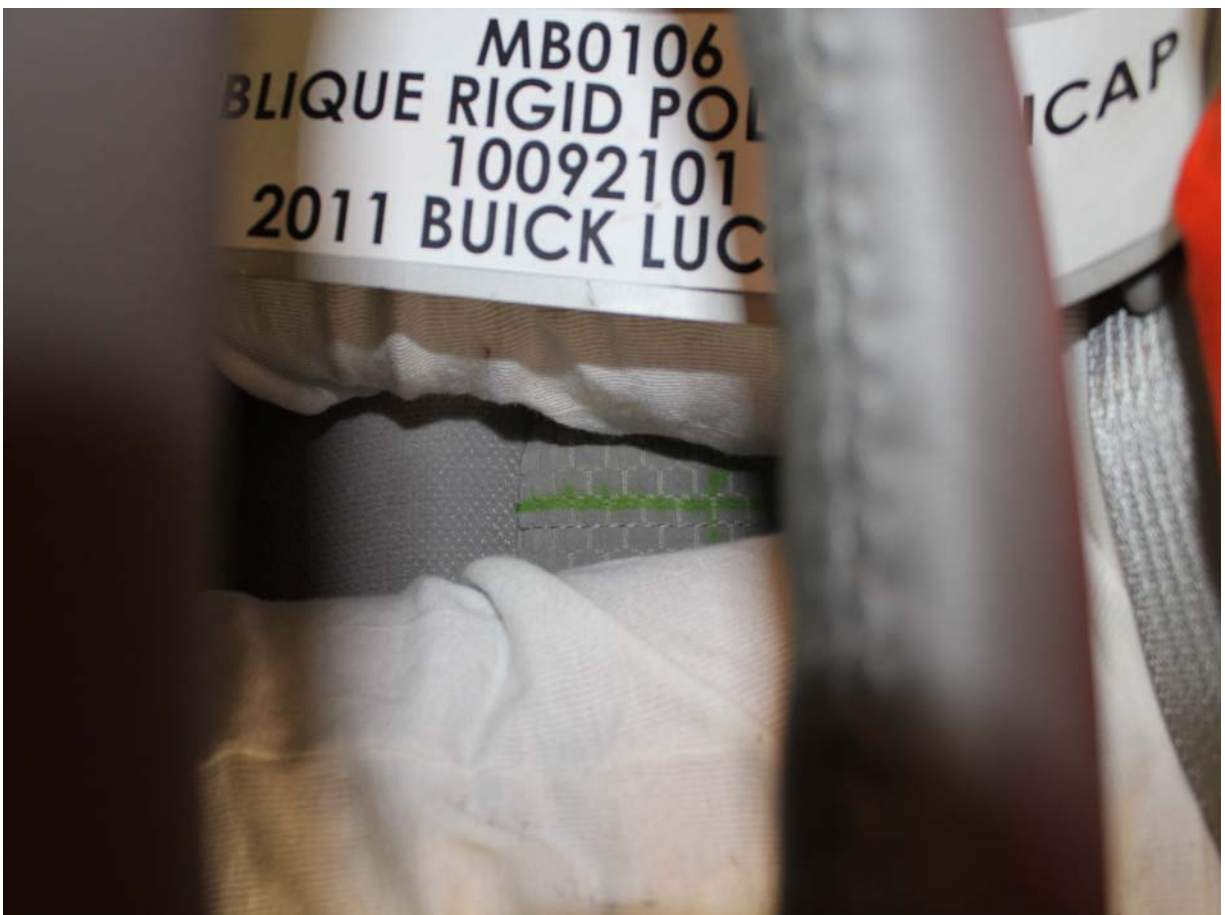
Pre-Test Frontal View of Seat Back Prior to Dummy Positioning



Pre-Test Frontal View of Dummy Head and Shoulders in Relation to Head Restraint



Pre-Test Frontal View of Seat Pan Prior to Dummy Positioning



Pre-Test Overhead View of Dummy Thighs on Seat Pan



Pre-Test View of Dummy's Neck Showing Position of Adjustable Neck Bracket



Pre-Test View of Dummy's Head Showing Dummy's Head is Level



Pre-Test Placement of Dummy's Feet



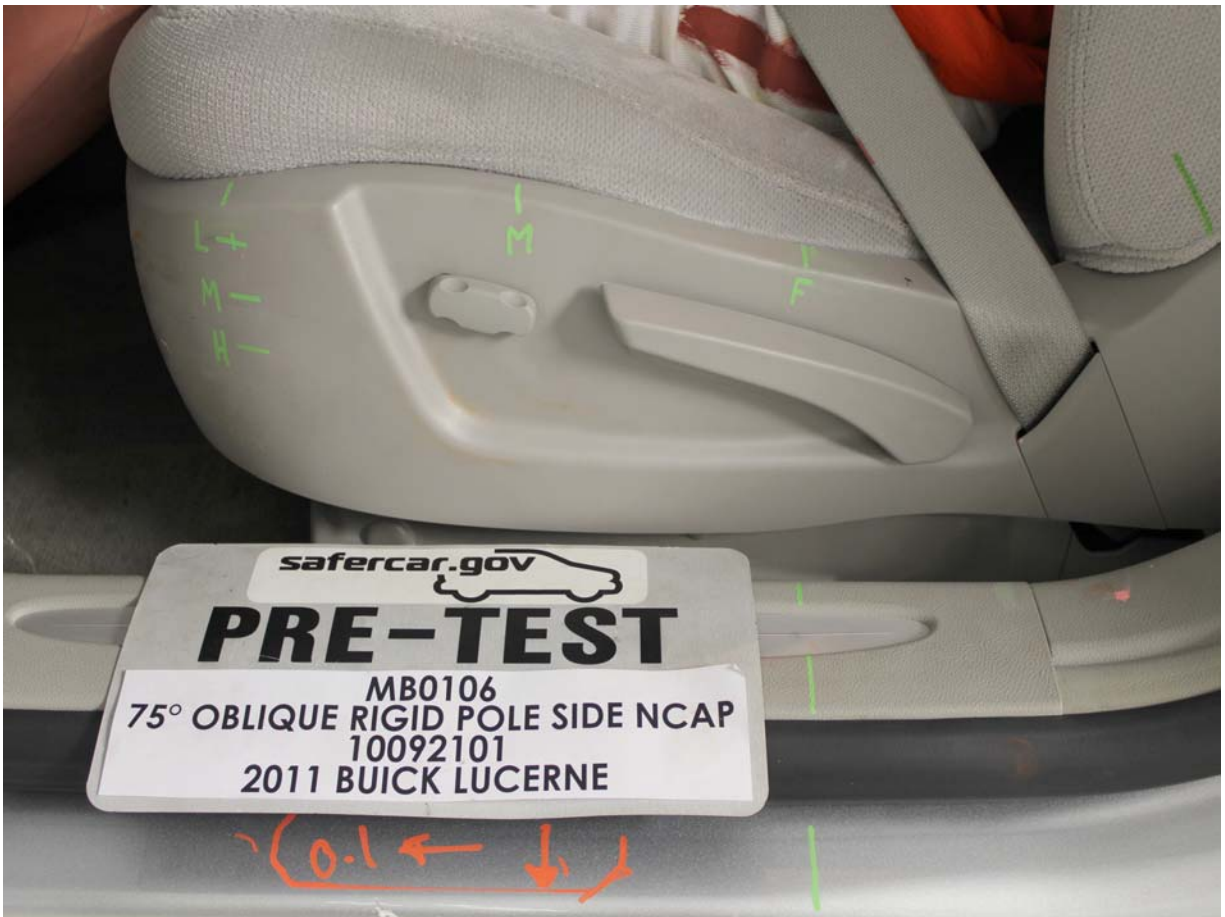
Pre-Test View of Belt Anchorage for Dummy to Show Position



Pre-Test Left Side View of Steering Wheel to Show Position



Pre-Test View of Parking Brake



Pre-Test Close-Up Left Side View of Driver Seat Track Showing Test Position



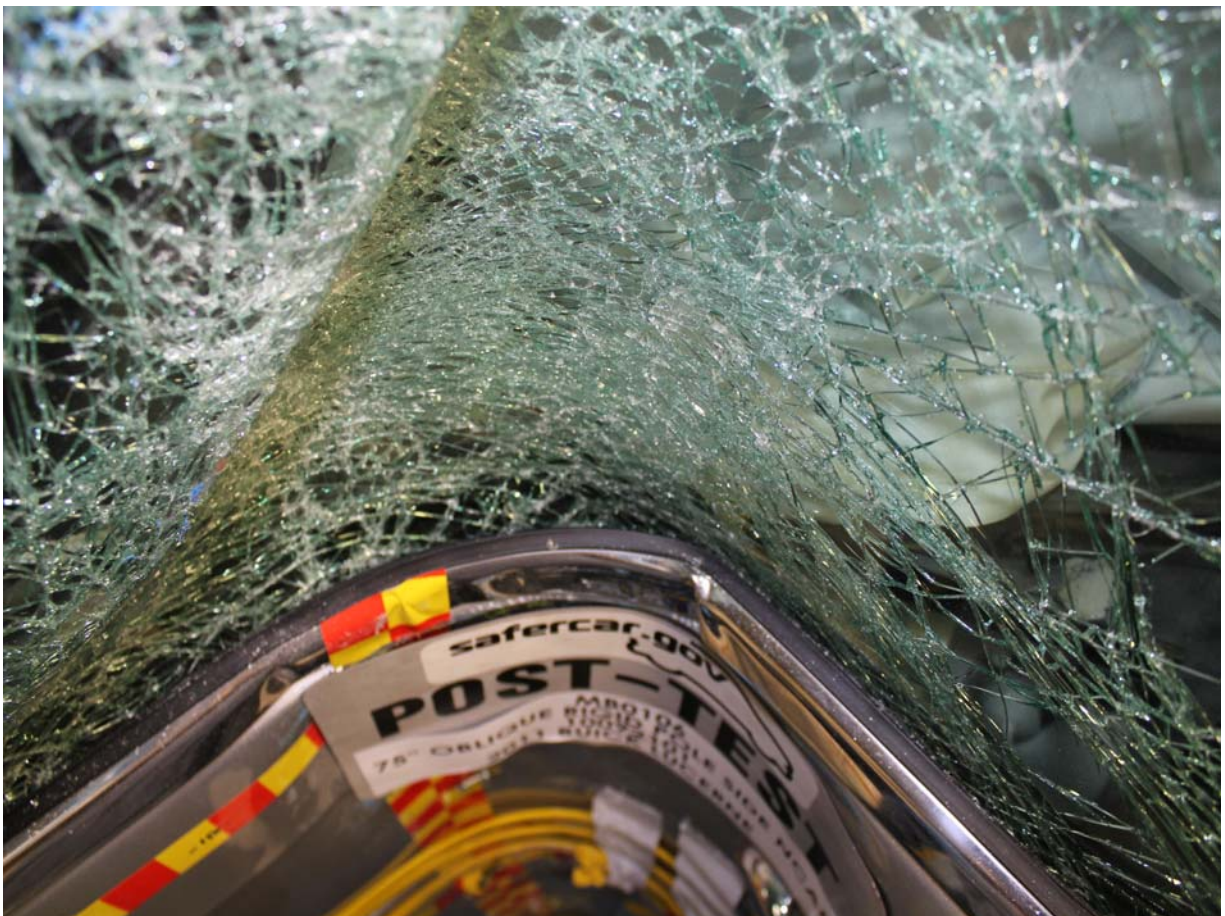
Pre-Test Close-Up Left Side View of Driver Seat Back Showing Test Position



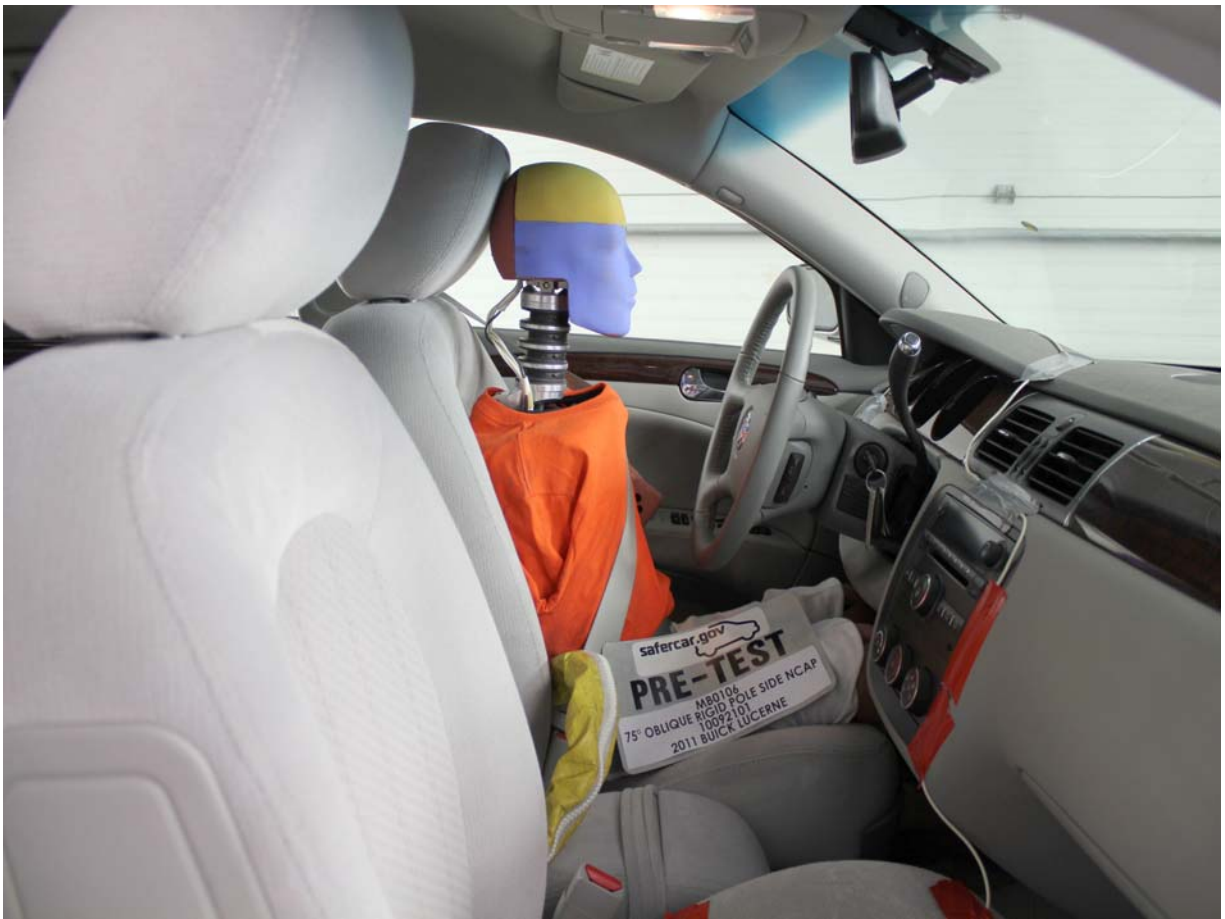
Pre-Test Close-Up View of Driver Seat Back or Head Restraint Showing Seat Back Test Position



Pre-Test Dummy and Door Clearance View



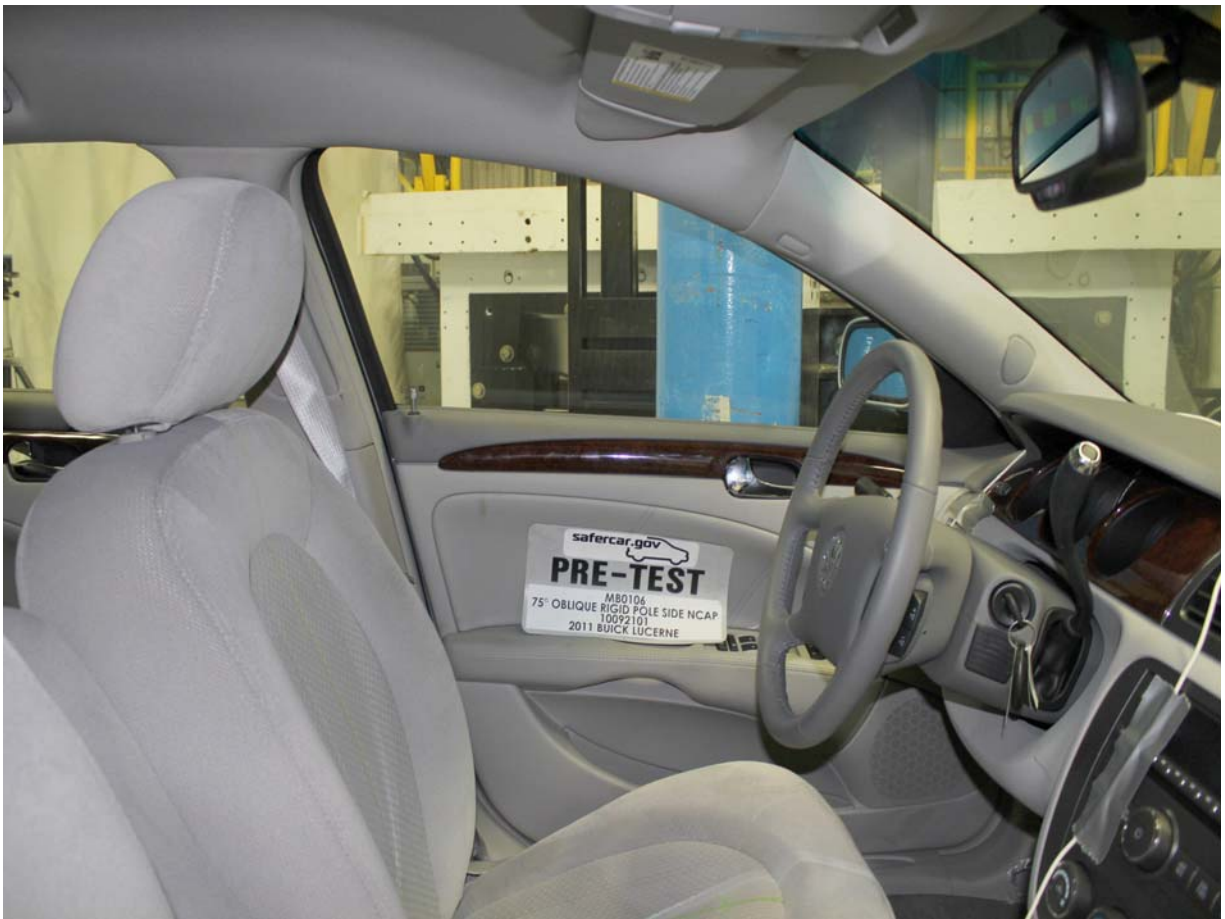
Post-Test Dummy and Door Clearance View



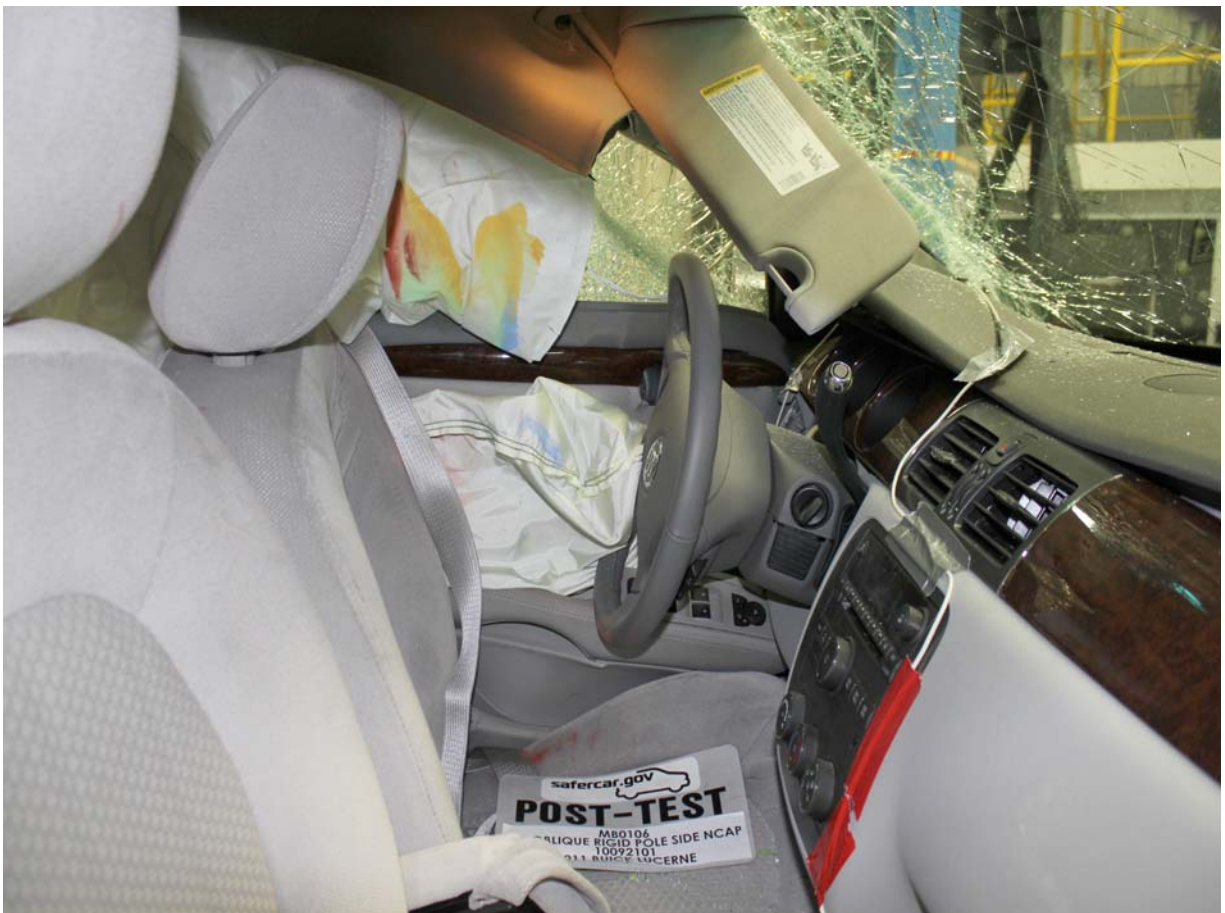
Pre-Test Right Side View of Dummy and Front Seat Occupant Compartment



Post-Test Right Side View of Dummy and Front Seat Occupant Compartment



Pre-Test Inner Driver Door Panel View



Post-Test Inner Driver Door Panel View Showing Dummy Contact Location



Post-Test Dummy Close-Up Head Contact with Vehicle Interior View



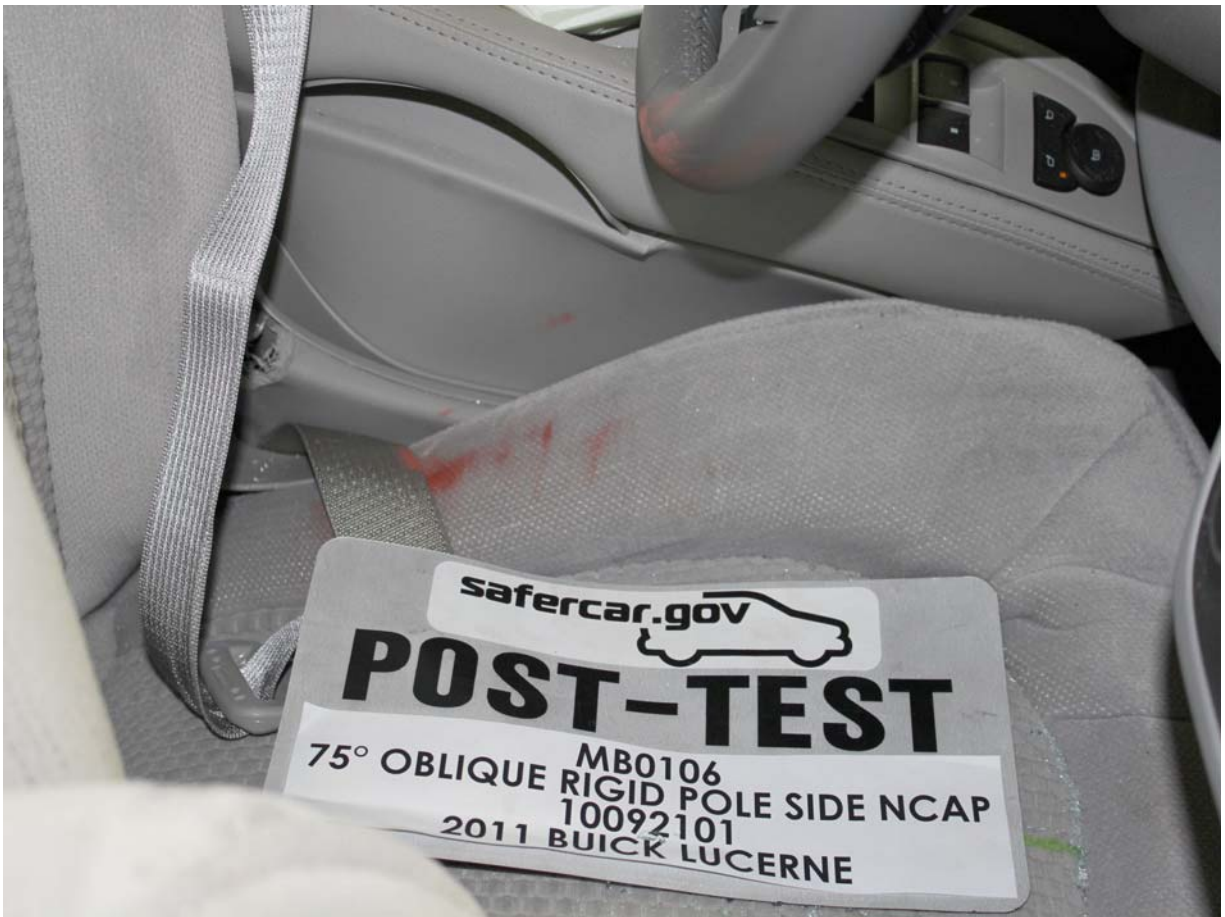
Post-Test Dummy Close-Up Head Contact with Side Airbag View

PHOTOGRAPH NOT APPLICABLE

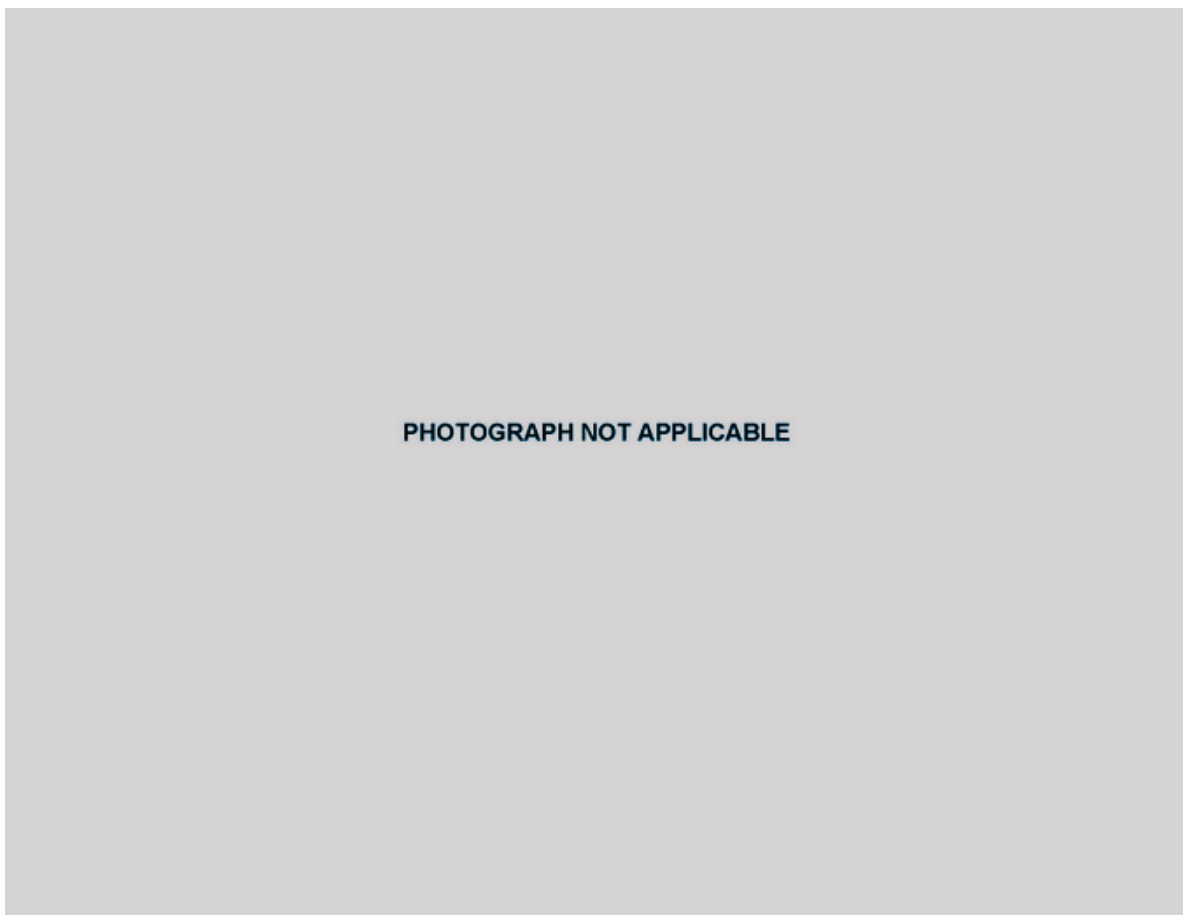
Post-Test Dummy Close-Up Torso Contact with Vehicle Interior View



Post-Test Dummy Close-Up Torso Contact with Side Airbag View



Post-Test Dummy Close-Up Pelvis Contact with Vehicle Interior View



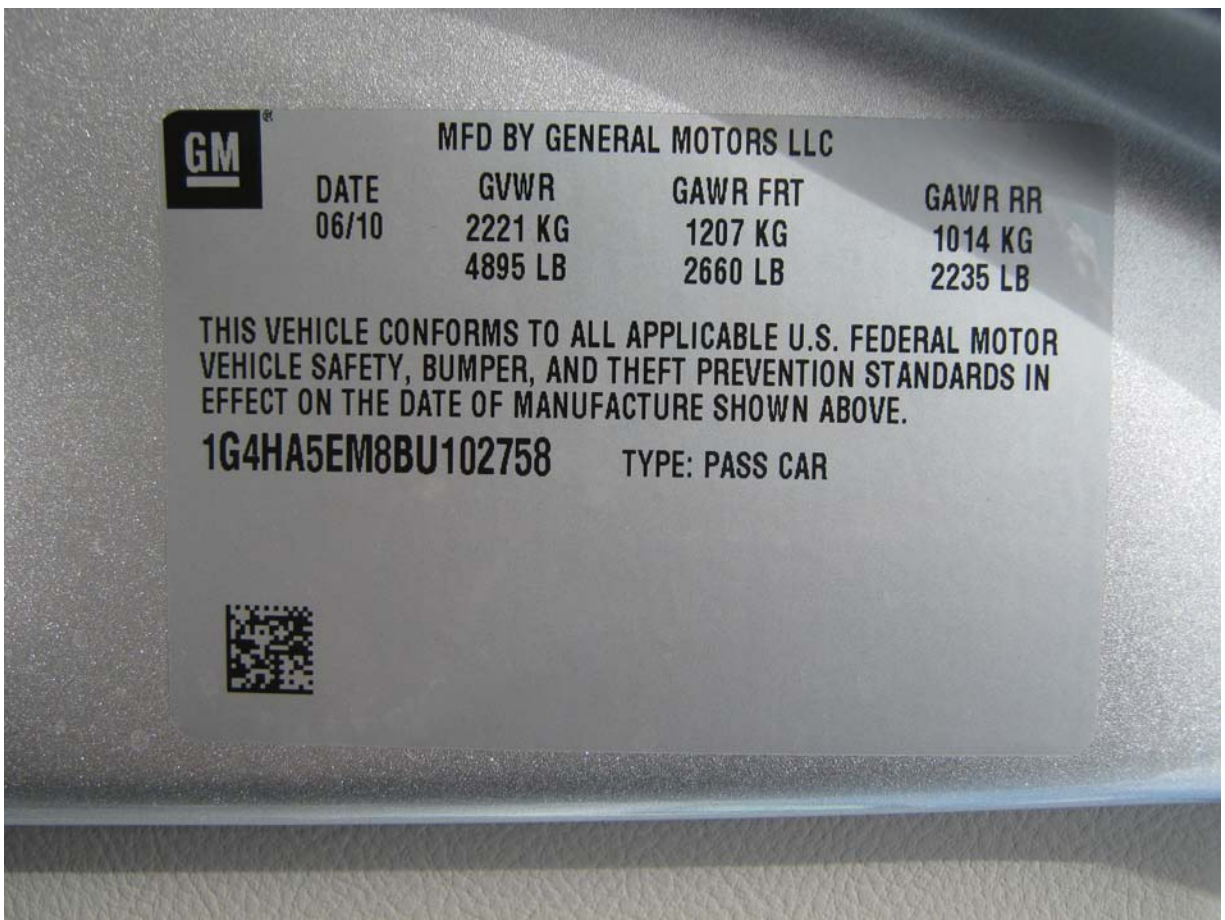
Post-Test Dummy Close-Up Pelvis Contact with Side Airbag View



Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



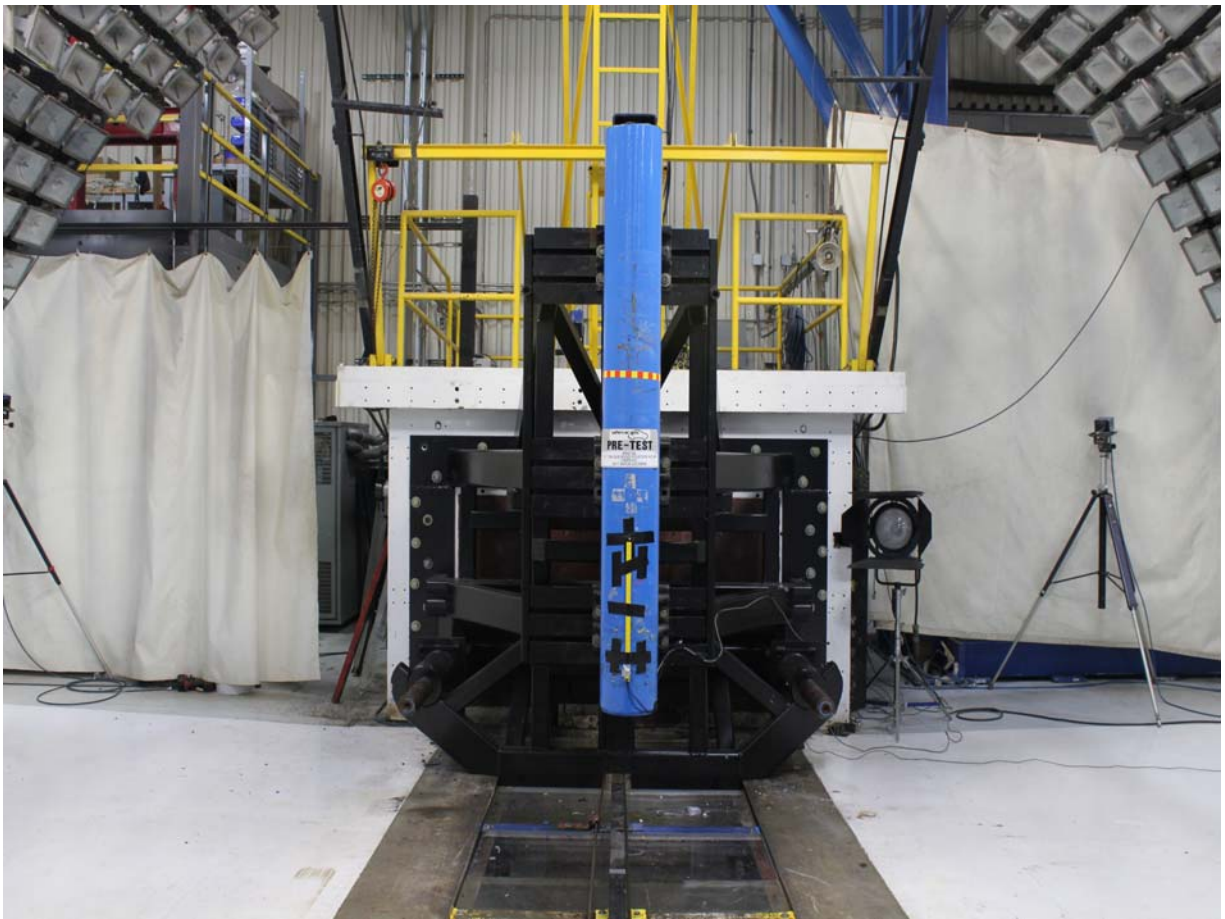
Post-Test View of Fuel Filler Cap or Fuel Filler Neck



Close-Up View of Vehicle's Certification Label



Close-Up View of Vehicle's Tire Information Placard of Label



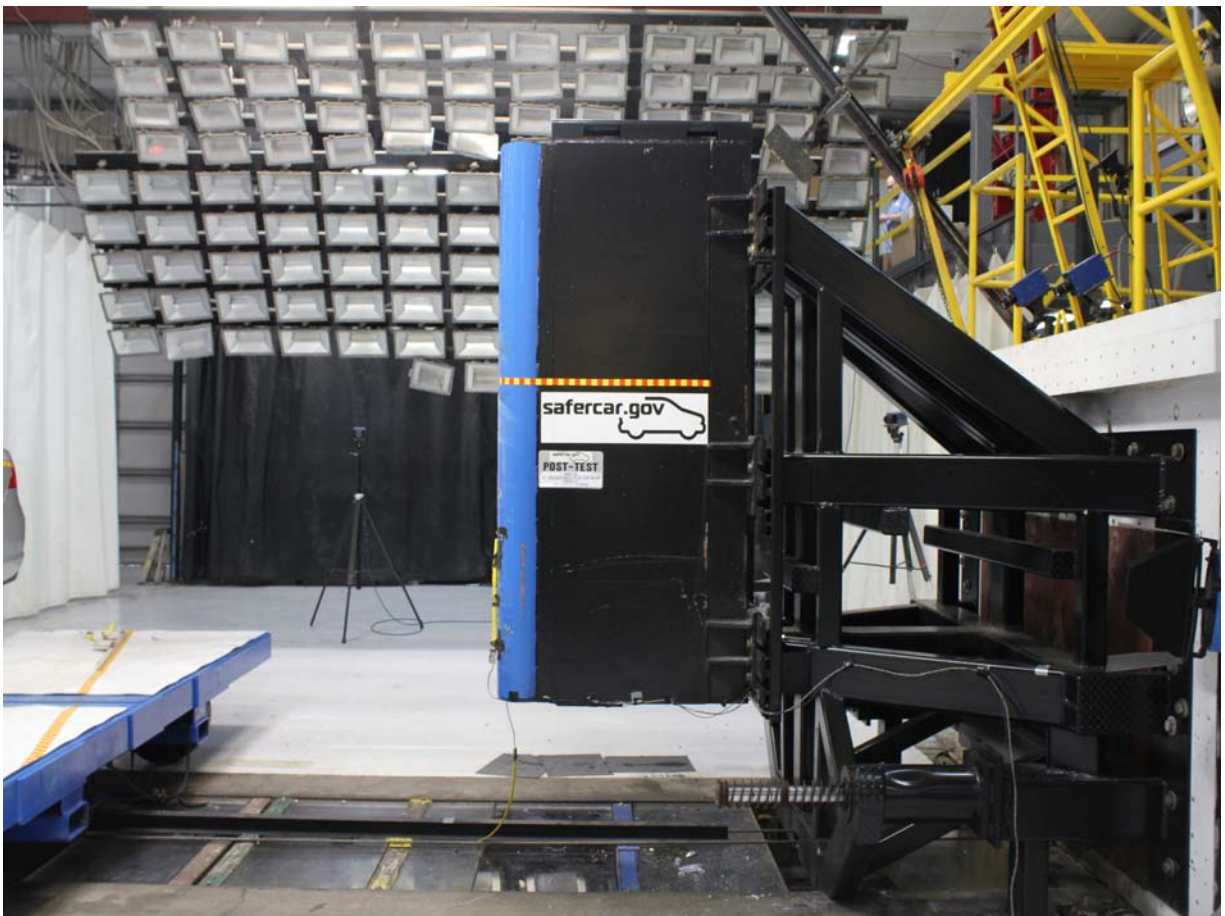
Pre-Test Pole Barrier Front View



Post-Test Pole Barrier Front View



Pre-Test Pole Barrier Side View



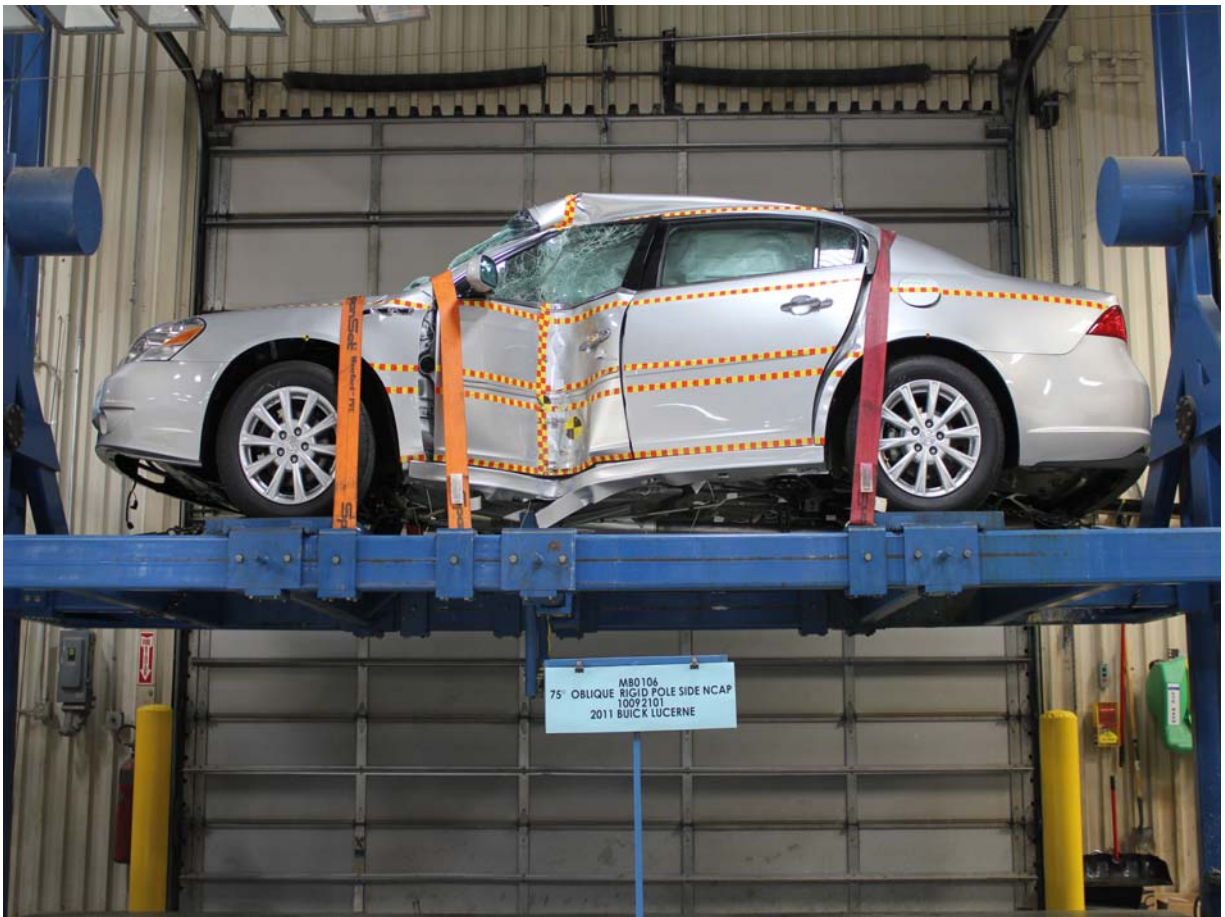
Post-Test Pole Barrier Side View



Pre-Test Ballast View



Post-Test Primary and Redundant Speed Trap Read-Out



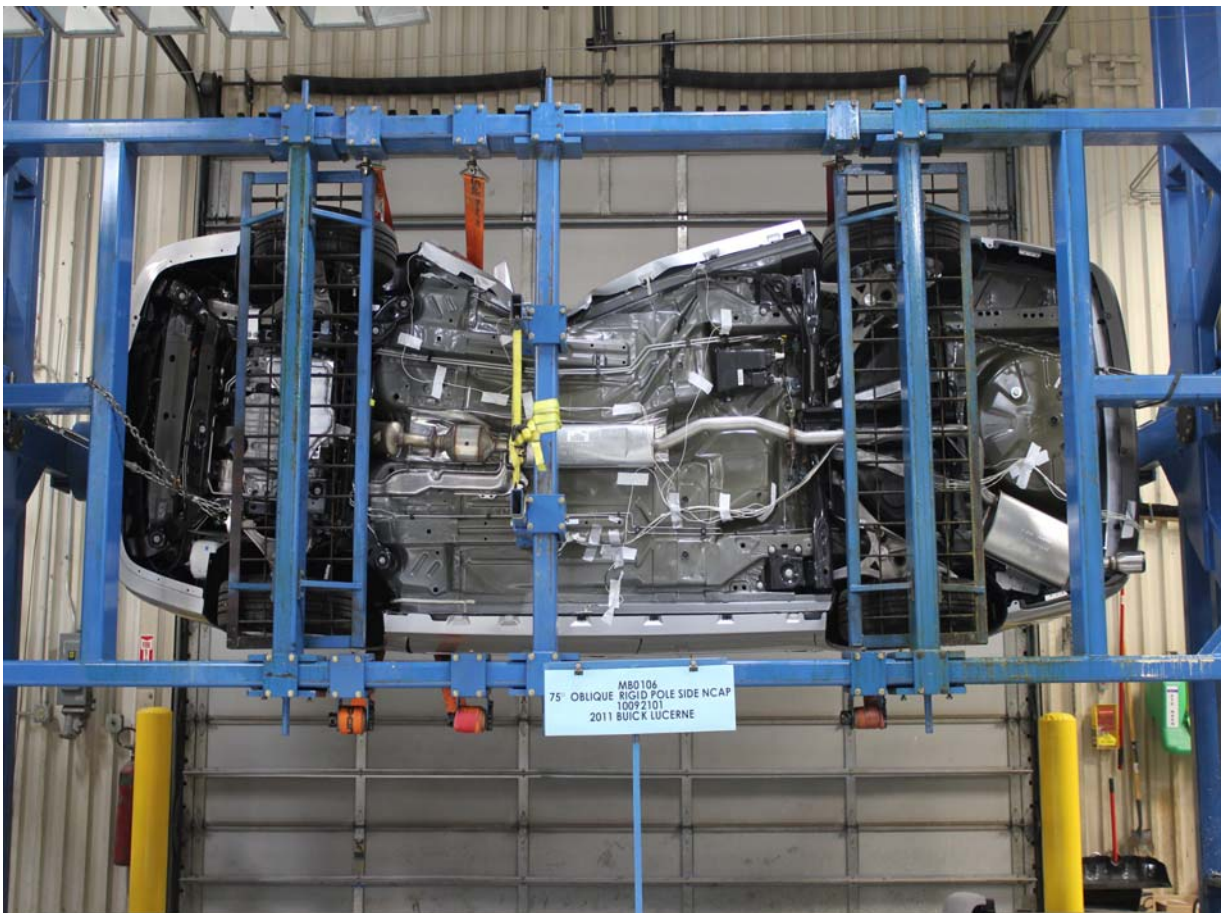
FMVSS No. 301/305 Rollover 0 Degrees



FMVSS No. 301/305 Rollover 90 Degrees



FMVSS No. 301/305 Rollover 180 Degrees



FMVSS No. 301/305 Rollover 270 Degrees



FMVSS No. 301/305 Rollover 360 Degrees



Impact Event



2011 LUCERNE CX

EXTERIOR: QUICKSILVER METALLIC
INTERIOR: TITANIUM

ENGINE: 3.9L V6 SFI FLEX-FUEL
TRANSMISSION: 4 SPEED AUTOMATIC

STANDARD EQUIPMENT

ITEMS FEATURED BELOW ARE INCLUDED AT NO EXTRA CHARGE IN THE STANDARD VEHICLE PRICE SHOWN.

- 5 YEAR / 100,000 MILE POWERTRAIN LIMITED WARRANTY SEE DEALER FOR DETAILS
- 4 YEAR / 50,000 MILE BUMPER-TO-BUMPER WARRANTY SEE DEALER FOR DETAILS

MECHANICAL

- ENGINE, 3.9L V6 WITH FLEX-FUEL CAPABILITY
- TRANSMISSION, 4 SPD AUTOMATIC
- ANTILOCK BRAKE SYSTEM, 4 WHEEL DISC
- POWER RACK & PINION STEERING
- 4 WHEEL IND SUSPENSION SYSTEM
- TRACTION CONTROL
- STABILITRAK-STABILITY CONTROL
- LOAD LEVEL CONTROL, AUTOMATIC

SAFETY

- AIRBAGS, FRONT, SIDE THORAX

- W/ PASSENGER SENSING, HEAD CURTAIN SIDE AIRBAG, ALL OUTBOARD SEATING POSITIONS
- REAR CHILD-SEAT LATCH ANCHORS
- REMOTE KEYLESS ENTRY EXT RANGE
- THEFT DETERRENT SYSTEM
- 8 MTHS ONSTAR DIRECTIONS & CONNECTIONS WITH AUTOMATIC CRASH RESPONSE AND TURN-BY-TURN NAVIGATION (ASK DEALER ABOUT GEOGRAPHIC COVERAGE)

EXTERIOR

- POWER HEATED OUTSIDE MIRRORS, DRIVER SIDE AUTO DIMMING
- SOLAR-RAY LIGHT-TINTED GLASS
- 17" ALUM PREMIUM PAINTED WHEELS
- FOG LAMPS
- CHROME GRILL

INTERIOR

- BUICK QUIETTUNING
- SEATS, FRONT BUCKET, CLOTH

- PWR SEAT ADJUST, DRIVER & FRONT PASSENGER, 6 WAY
- LEATHER WRAP STEERING WHEEL
- W/ RADIO AND CRUISE CONTROLS
- POWER DOOR LOCKS, POWER WINDOWS
- DRIVER INFO CENTER W/COMPASS
- XM/FM STEREO, CD PLAYER
- XM RADIO - SERVICE SUBSCRIPTION SOLD SEPARATELY BY SIRIUS/XM AFTER 3 MONTHS
- INTERIOR LIGHTING
- INSIDE REARVIEW MIRROR, WITH AUTO DIMMING
- VISOR MIRRORS, LIGHTED
- REAR WINDOW DEFOGGER
- AIR PARTICULATE FILTER
- FLOOR MATS, FRONT/REAR

OPTIONS & PRICING

MANUFACTURER'S SUGGESTED RETAIL PRICE

STANDARD VEHICLE PRICE \$29,730.00

Visit us at www.buick.com

OPTIONS INSTALLED BY THE MANUFACTURER MAY REPLACE STANDARD EQUIPMENT SHOWN

SEATS, 6 PASSENGER, FRONT 40/20/40 SPLIT	295.00
TIRE SEALANT AND INFLATOR KIT	-100.00
TOTAL OPTIONS	\$195.00
TOTAL VEHICLE & OPTIONS	\$29,925.00
DESTINATION CHARGE	765.00

TOTAL VEHICLE PRICE* \$30,690.00

EPA Fuel Economy Estimates

GASOLINE
CITY MPG

17

Expected range
for most drivers
14 to 20 MPG

*Fuel economy when
operating on E85 will
yield different values
than gasoline. See Fuel
Economy Guide for
more information.

FLEXIBLE FUEL VEHICLE*
GASOLINE - ETHANOL(E85)

Estimated
Annual Fuel Cost
\$1,856

based on 15,000 miles at
\$2.60 per gallon of GASOLINE

Combined GASOLINE
Fuel Economy

This Vehicle

21

13

25

ALL LARGE CARS

GASOLINE
HIGHWAY MPG

27

Expected range
for most drivers
22 to 32 MPG

Your actual
mileage will vary
depending on how you
drive and maintain
your vehicle.

AF9



See the FREE Fuel Economy Guide at dealers or www.fueleconomy.gov

GOVERNMENT SAFETY RATINGS

This vehicle has not been rated by the government
for frontal crash, side crash or rollover risk.
Source: National Highway Traffic Safety
Administration (NHTSA).

PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS CARLINE:
U.S./CANADIAN PARTS CONTENT: 76%

NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL
ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS.

FOR THIS VEHICLE:
FINAL ASSEMBLY POINT:
DETROIT, MI U.S.A.
COUNTRY OF ORIGIN:
ENGINE: UNITED STATES
TRANSMISSION: UNITED STATES

This label has been ignored
and removed prior to delivery to the
dealer. The dealer is responsible for
Manufacturer's Recommended
Pre-Delivery Service. Does not
include dealer prep, taxes, title,
and accessories not listed above.
Local taxes or altered fees.

© 2010 General Motors LLC
GMLBL_PROD_001E - 06/21/2009

ORDER NO. INVOICE SALES CODE E
DEALER NO. 42277
SALES MODEL CODE 4P09
VIN 1G4HA5EM8BU102758
DETROIT, MI U.S.A.

DEALER TO WHOM DELIVERED
MIKE HAGGERTY BUICK GMC, INC.
3001 SOUTH CHESAIRE AVE
OAK LAWN, IL 60453-2517

www.safercar.gov or 1-888-327-4236



DC
1000925301

Head Restraints

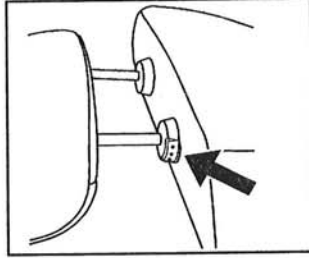
The front seats have adjustable head restraints in the outboard seating positions.

WARNING:

With head restraints that are not installed and adjusted properly, there is a greater chance that occupants will suffer a neck/spinal injury in a crash. Do not drive until the head restraints for all occupants are installed and adjusted properly.



Adjust the head restraint so that the top of the restraint is at the same height as the top of the occupant's head. This position reduces the chance of a neck injury in a crash.



Pull the head restraint up to raise it. To lower the head restraint, press the button, located on the top of the seatback, and push the restraint down.

Push down on the head restraint after the button is released to make sure that it is locked in place. The head restraints are not designed to be removed.

APPENDIX B
DUMMY RESPONSE DATA

TABLE OF DATA PLOTS

		<u>Page No.</u>
List of Data Plots Provided in the Test Report		
Figure No. 1.	Driver Head Acceleration (X) Primary vs. Time	B-1
Figure No. 2.	Driver Head Acceleration (Y) Primary vs. Time	B-1
Figure No. 3.	Driver Head Acceleration (Z) Primary vs. Time	B-1
Figure No. 4.	Driver Head Resultant Primary Acceleration vs. Time	B-1
Figure No. 5.	Driver Lower Spine T12 Acceleration (X) vs. Time	B-2
Figure No. 6.	Driver Lower Spine T12 Acceleration (Y) vs. Time	B-2
Figure No. 7.	Driver Lower Spine T12 Acceleration (Z) vs. Time	B-2
Figure No. 8.	Driver Lower Spine T12 Resultant Acceleration vs. Time	B-2
Figure No. 9.	Driver Iliac Wing Force on Impact Side (Y) vs. Time	B-3
Figure No. 10.	Driver Acetabulum Force on Impact Side (Y) vs. Time	B-3
Figure No. 11.	Driver Total Pelvis Force on Impact Side (Y) vs. Time	B-3

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 Acceleration (X) Redundant

Driver Head Acceleration (Y) Redundant

Driver Head Acceleration (Z) Redundant

Driver Upper Thorax Rib Deflection (Y)

Driver Middle Thorax Rib Deflection (Y)

Driver Lower Thorax Rib Deflection (Y)

Driver Upper Abdomen Rib Deflection (Y)

Driver Lower Abdomen Rib Deflection (Y)

Driver Shoulder Contact Switch

Driver Torso Contact Switch

Driver Pelvis Contact Switch

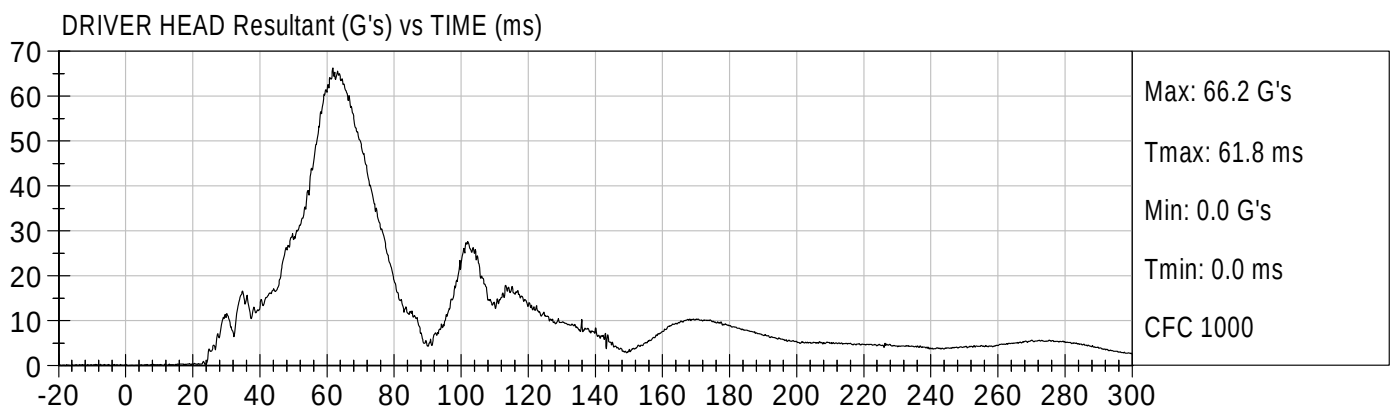
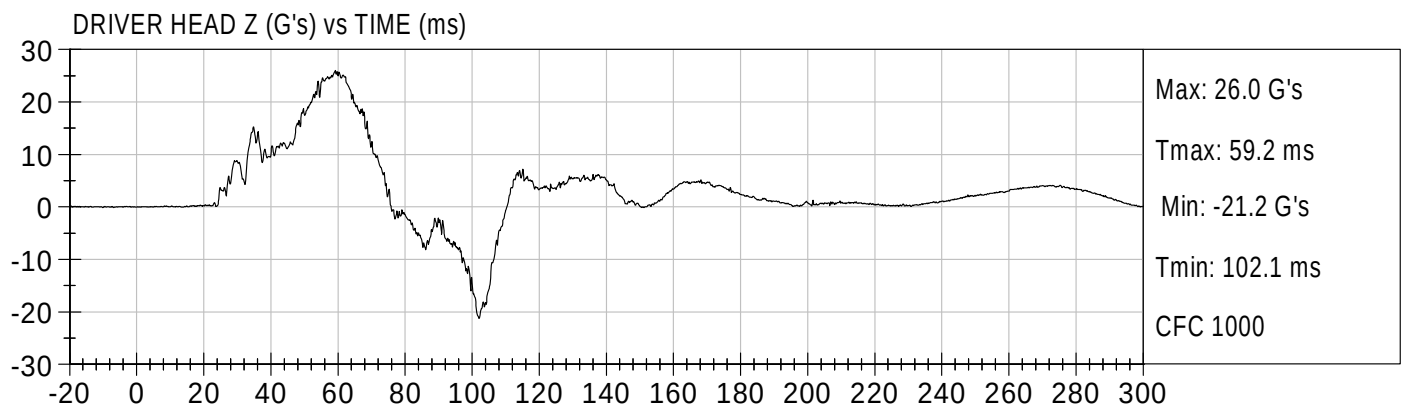
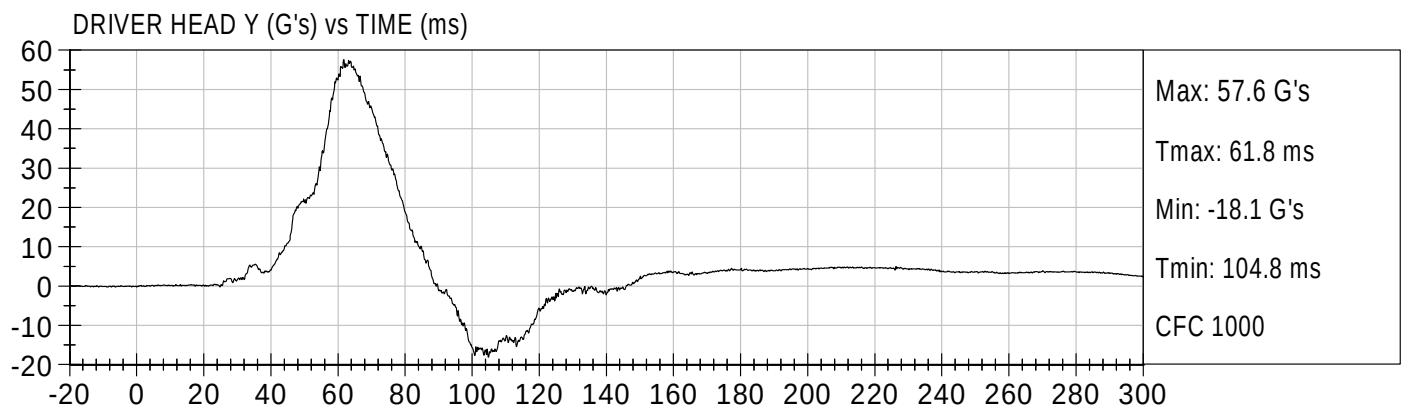
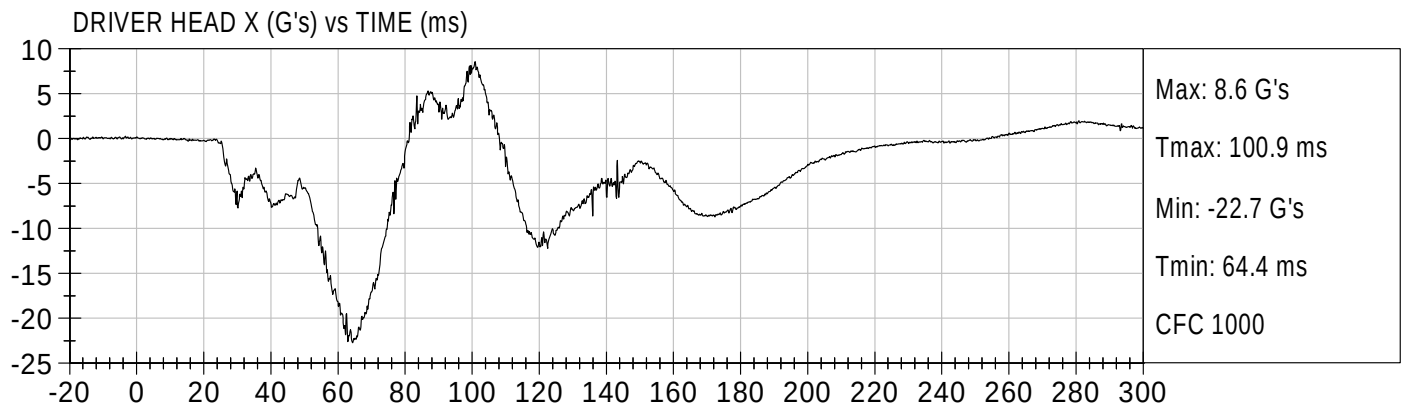
Vehicle CG Acceleration (X)

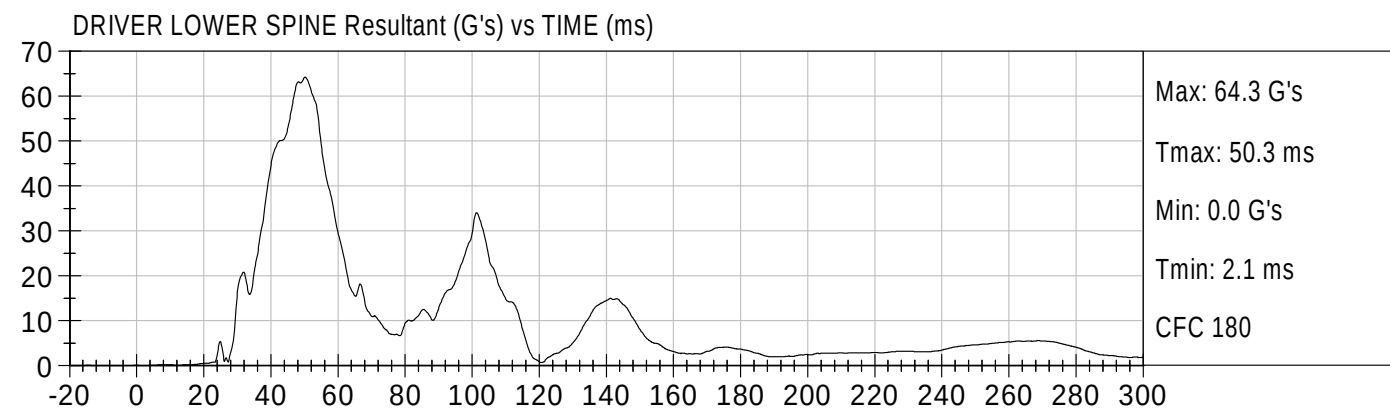
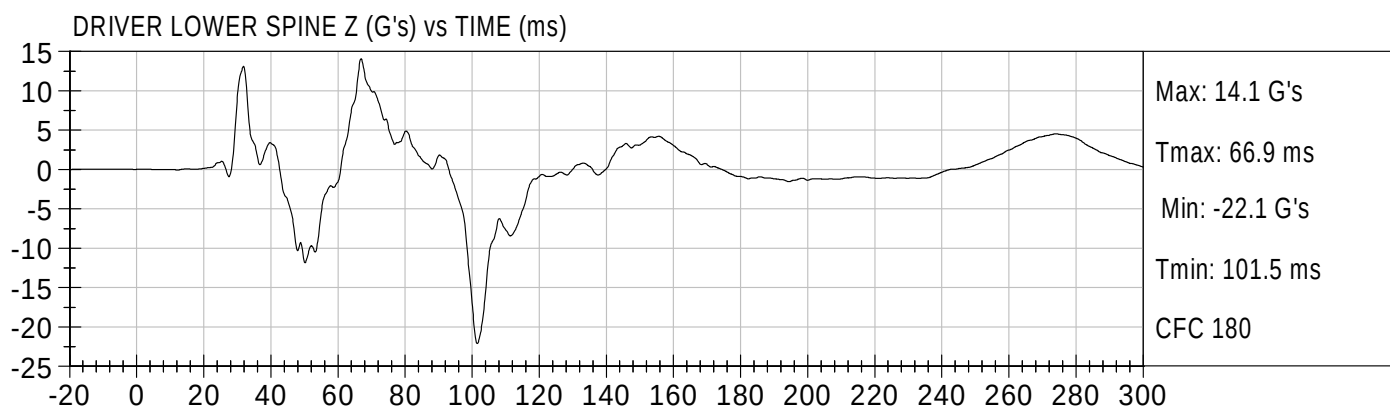
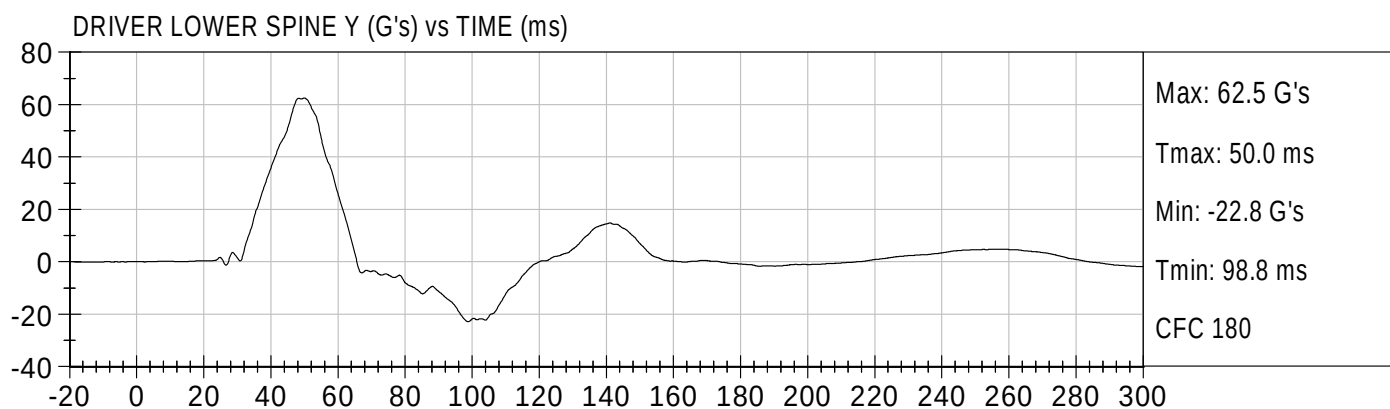
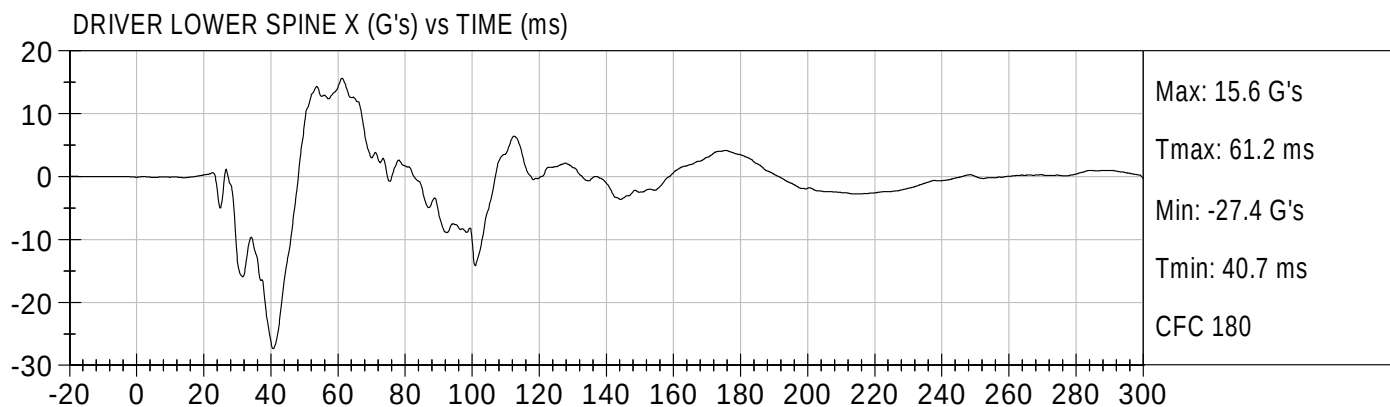
Vehicle CG Acceleration (Y)

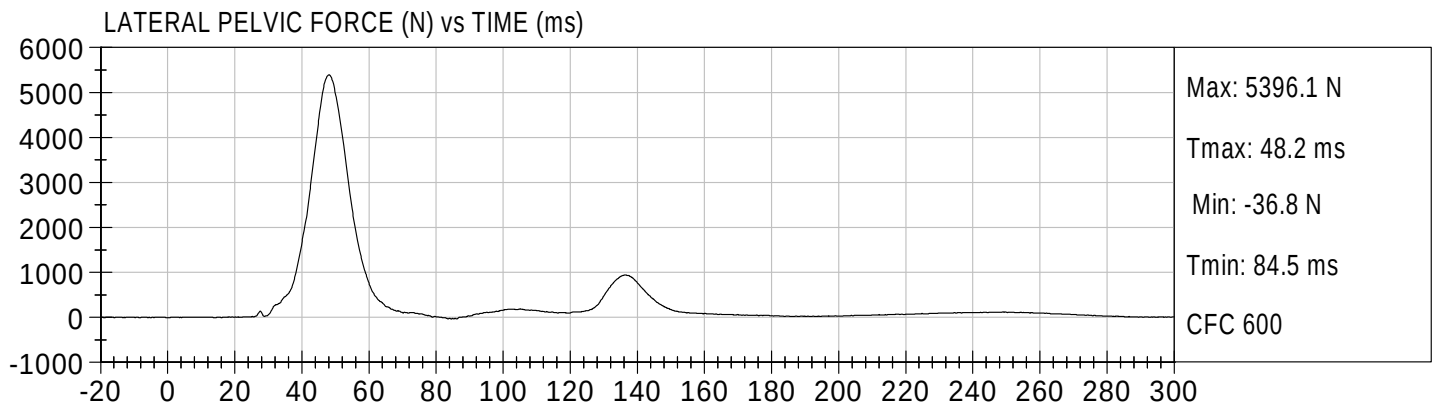
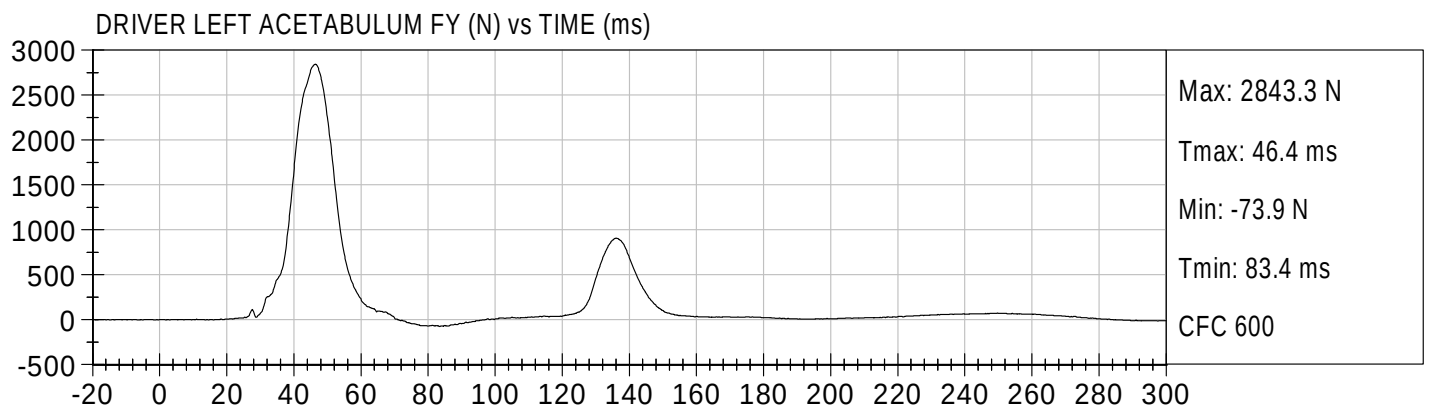
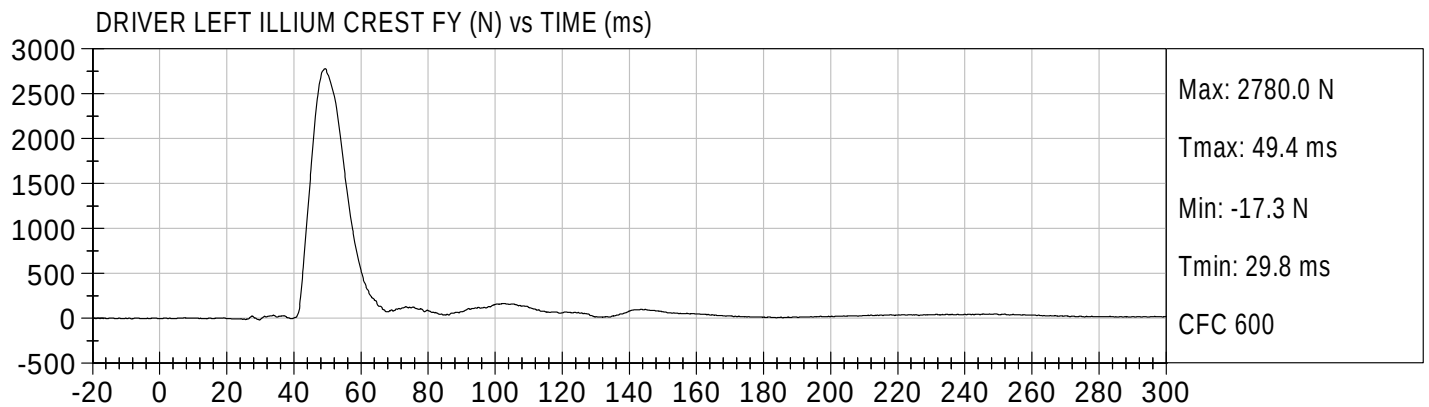
Vehicle CG Acceleration (Z)

Vehicle CG Angular Rate About X (Roll)

Vehicle CG Angular Rate About Y (Pitch)
Vehicle CG Angular Rate About Z (Yaw)
Left Floor Sill Acceleration (Y)
Left A-Pillar Sill Acceleration (Y)
Left Lower A-Pillar Acceleration (Y)
Left Mid A-Pillar Acceleration (Y)
Left B-Pillar Sill Acceleration (Y)
Left Lower B-Pillar Acceleration (Y)
Left Mid B-Pillar Acceleration (Y)
Driver Seat Track at Dummy H-Point Acceleration (Y)
Engine Top Acceleration (X)
Engine Top Acceleration (Y)
Firewall Center Acceleration (Y)
Right Roof at Vertical Impact Reference Line Acceleration (Y)
Right Sill at Vertical Impact Reference Line Acceleration (Y)
Rear Floorpan Behind Rear Axle at Centerline Acceleration (X)
Rear Floorpan Behind Rear Axle at Centerline Acceleration (Y)
Driver Side Airbag Timing
Driver Side Curtain Airbag Timing
Load Cell Pole Barrier #1 Force (Y) – Not used
Load Cell Pole Barrier #2 Force (Y) – Not used
Load Cell Pole Barrier #3 Force (Y) – Not used
Load Cell Pole Barrier #4 Force (Y) – Not used
Load Cell Pole Barrier #5 Force (Y) – Not used
Load Cell Pole Barrier #6 Force (Y) – Not used
Load Cell Pole Barrier #7 Force (Y) – Not used
Load Cell Pole Barrier #8 Force (Y) – Not used







APPENDIX C

DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA

MGA RESEARCH CORPORATION
HEAD DROP TEST
SID-Its BUILD LEVEL D DUMMY

ATD Serial No: 296

Test ID: D103061

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	48	Pass
Peak Resultant Acceleration	G's	115 to 137	122	Pass
Peak Lateral Acceleration	G's	+/- 15	-4.3	Pass
Unimodal	N/A	<15%	Yes	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

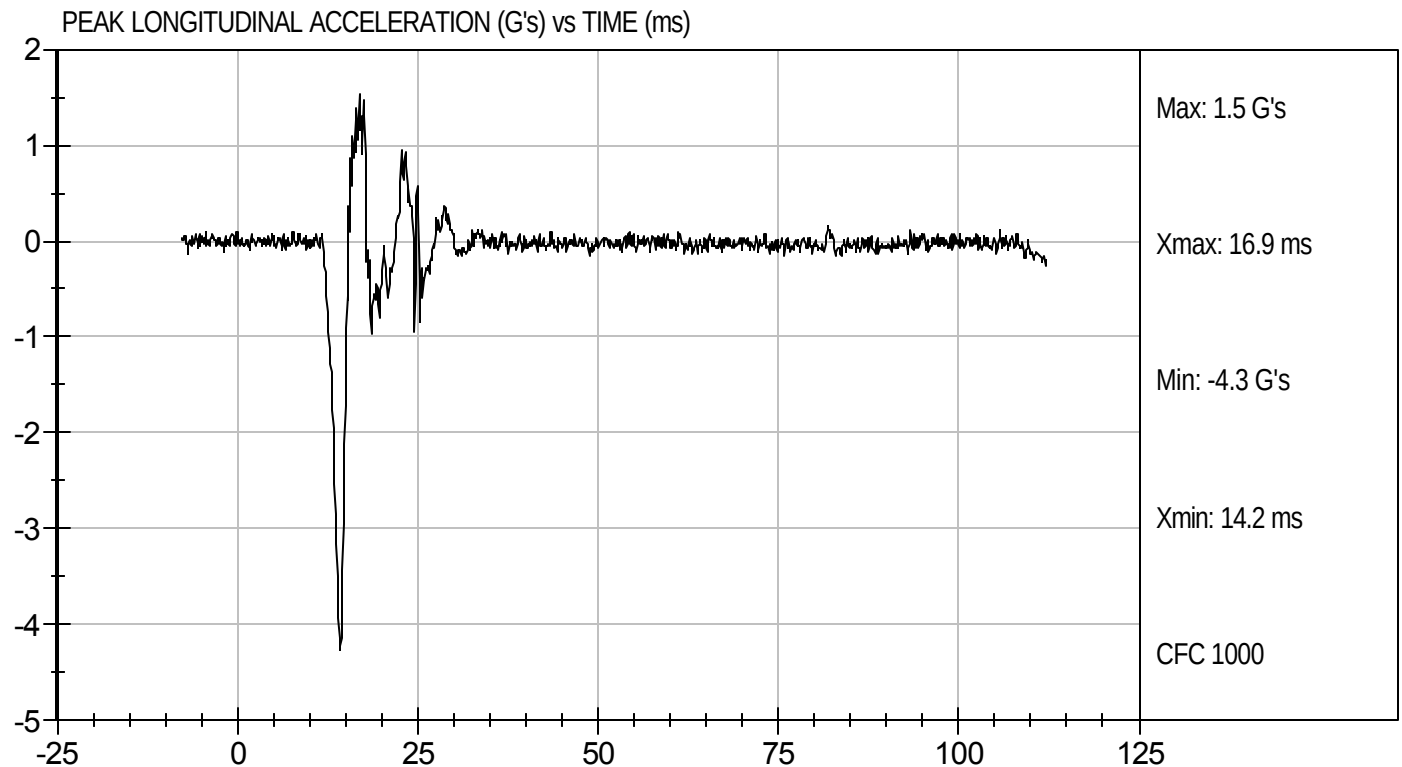
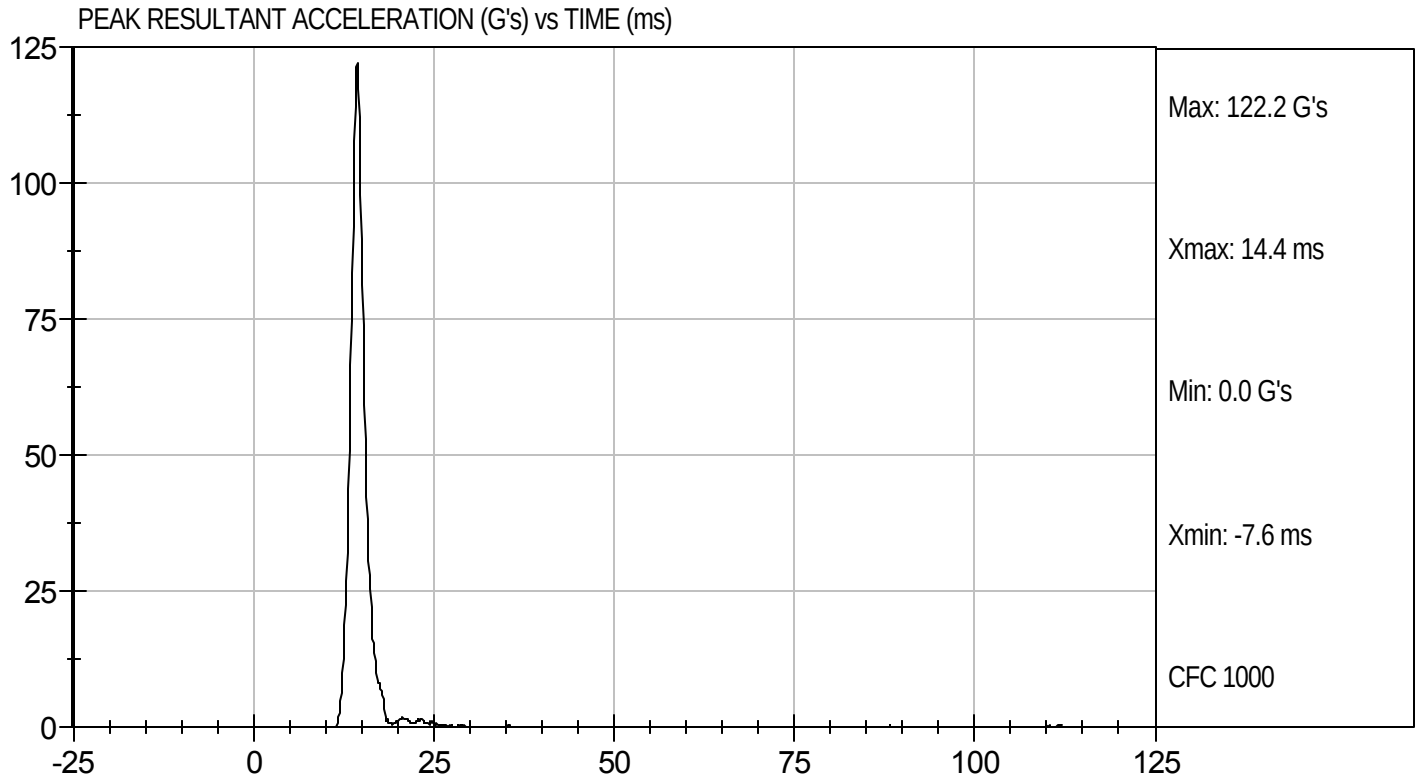
9/15/10
Test Date

David Winkelbauer
Approved By



Test Desc: Head Drop
Component ID: D103061

Test Date: 9/15/10
Velocity: 0 ft/s, 0.00 m/s



MGA RESEARCH CORPORATION
LATERAL NECK PENDULUM TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D103062

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	22.0	Pass
Humidity		%	10 to 70	54	Pass
Impact Velocity		m/s	5.51 to 5.63	5.58	Pass
Delta Velocity	10 ms	m/s	2.20 to 2.80	2.66	Pass
	15 ms	m/s	3.30 to 4.10	3.84	Pass
	20 ms	m/s	4.40 to 5.40	5.21	Pass
	25 ms	m/s	5.40 to 6.10	5.55	Pass
	25-100 ms	m/s	5.50 to 6.20	5.57	Pass
Maximum D-Plane Rotation		deg	71 to 81	73	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	59	Pass
Maximum Occipital Condyle Moment during Rotation Interval Nm			-44 to -36	-44	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	115	Pass
Overall Test Results				Pass	


 Laboratory Technician

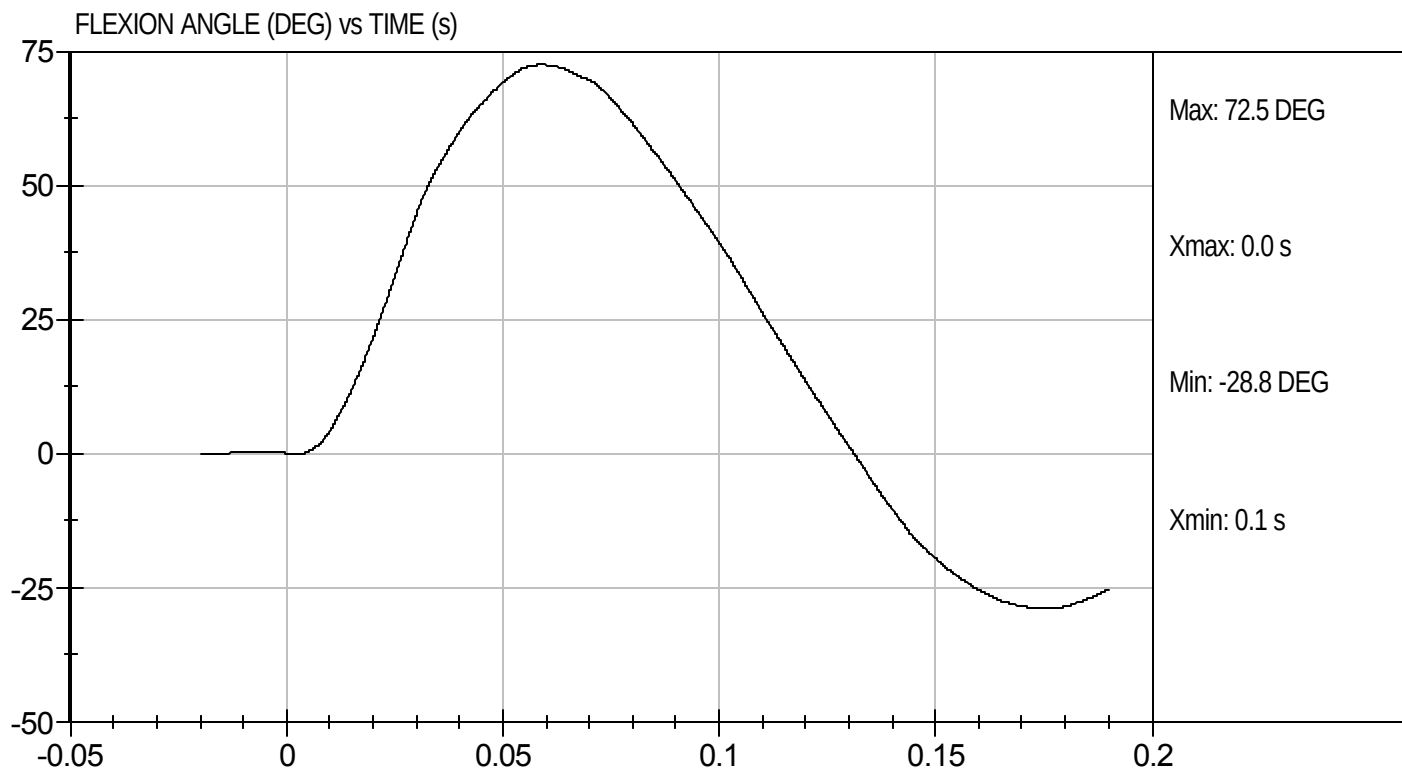
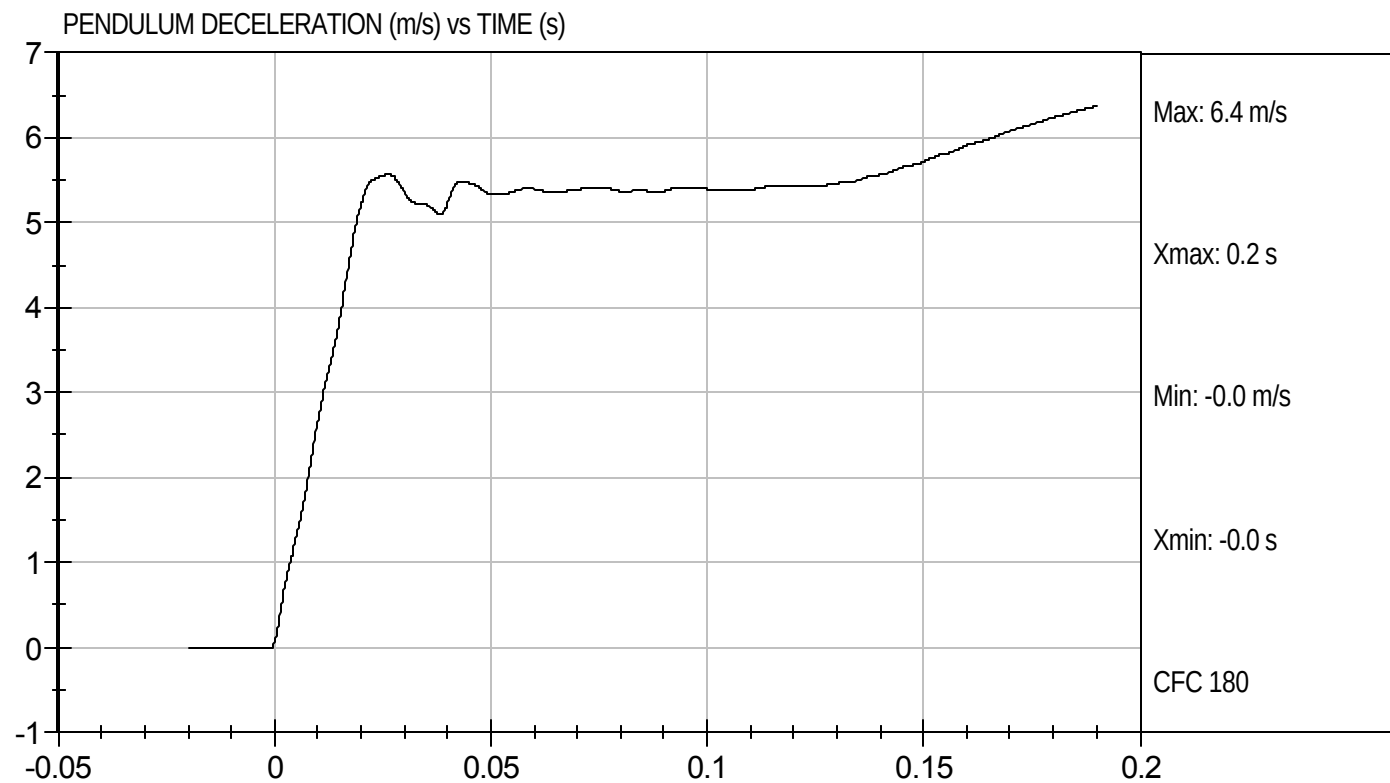
9/16/10
 Test Date


 Approved By



Test Desc: Neck Bending
Component ID: D103062

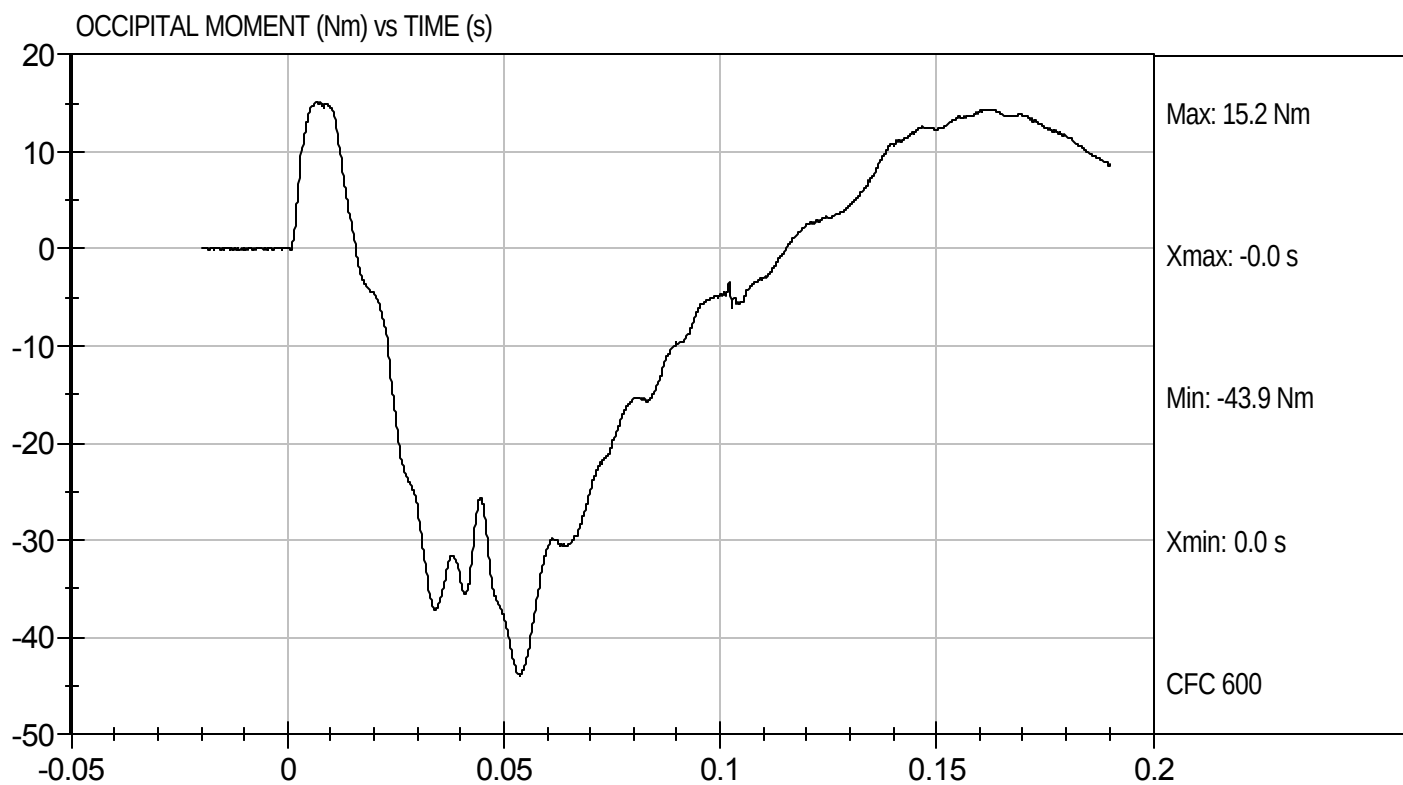
Test Date: 9/16/10
Velocity: 18.32 ft/s, 5.58 m/s





Test Desc: Neck Bending
Component ID: D103062

Test Date: 9/16/10
Velocity: 18.32 ft/s, 5.58 m/s



MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
SID-Its BUILD LEVEL D DUMMY

ATD Serial No: 296

Test ID: D103063

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	54	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Maximum Probe Acceleration	G's	13 to 18	15	Pass
Shoulder Displacement	mm	28 to 37	32	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	18	Pass
			Overall Test Results	Pass


Laboratory Technician

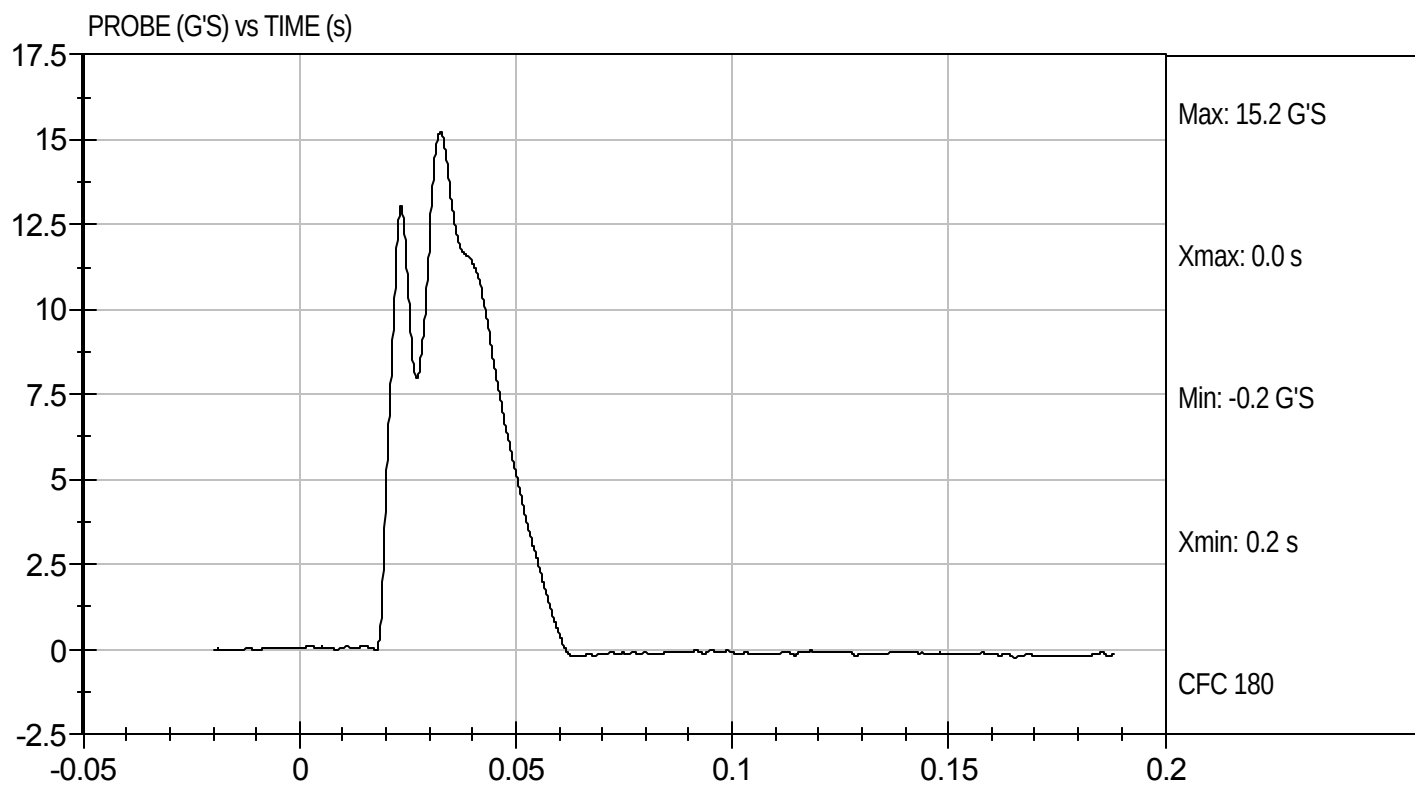
9/16/10
Test Date


Approved By



Test Desc: Shoulder Impact
Component ID: D103063

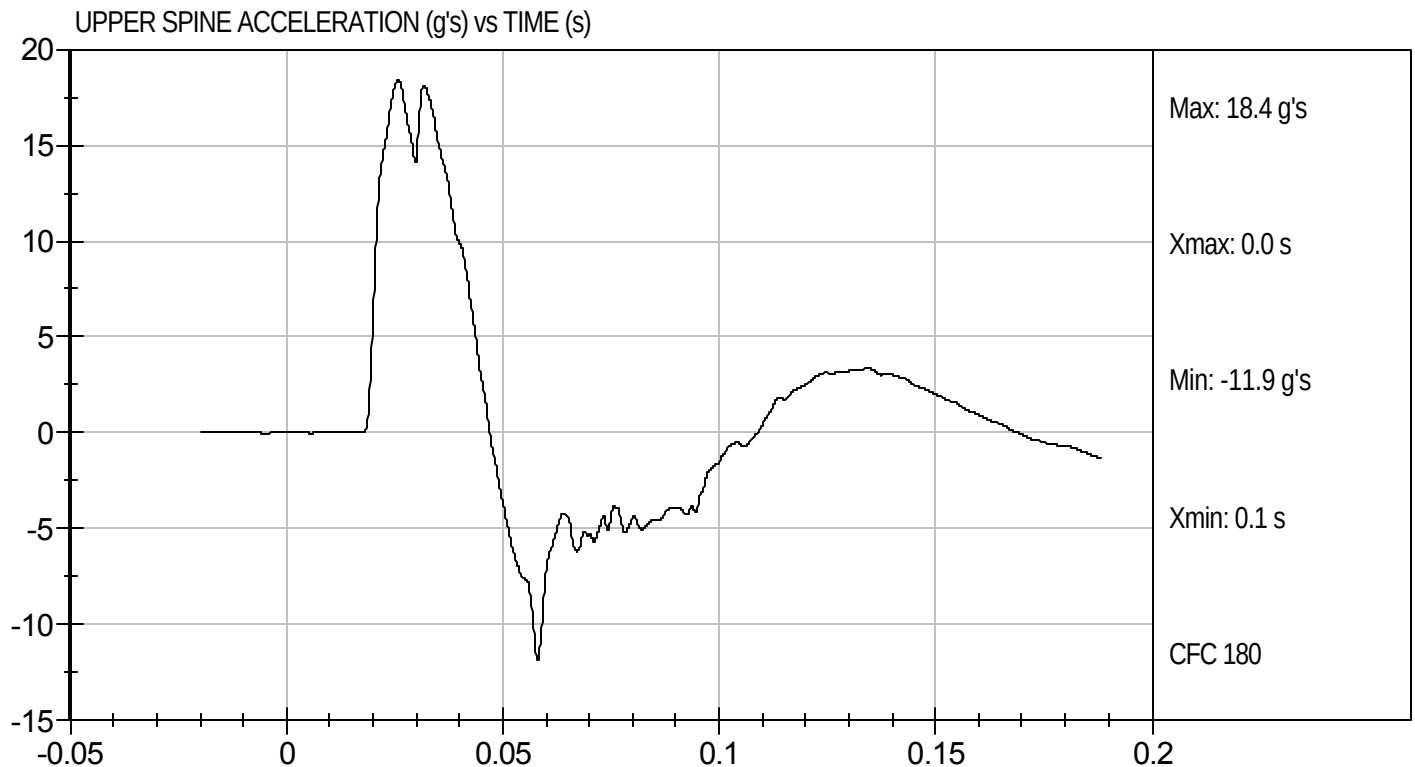
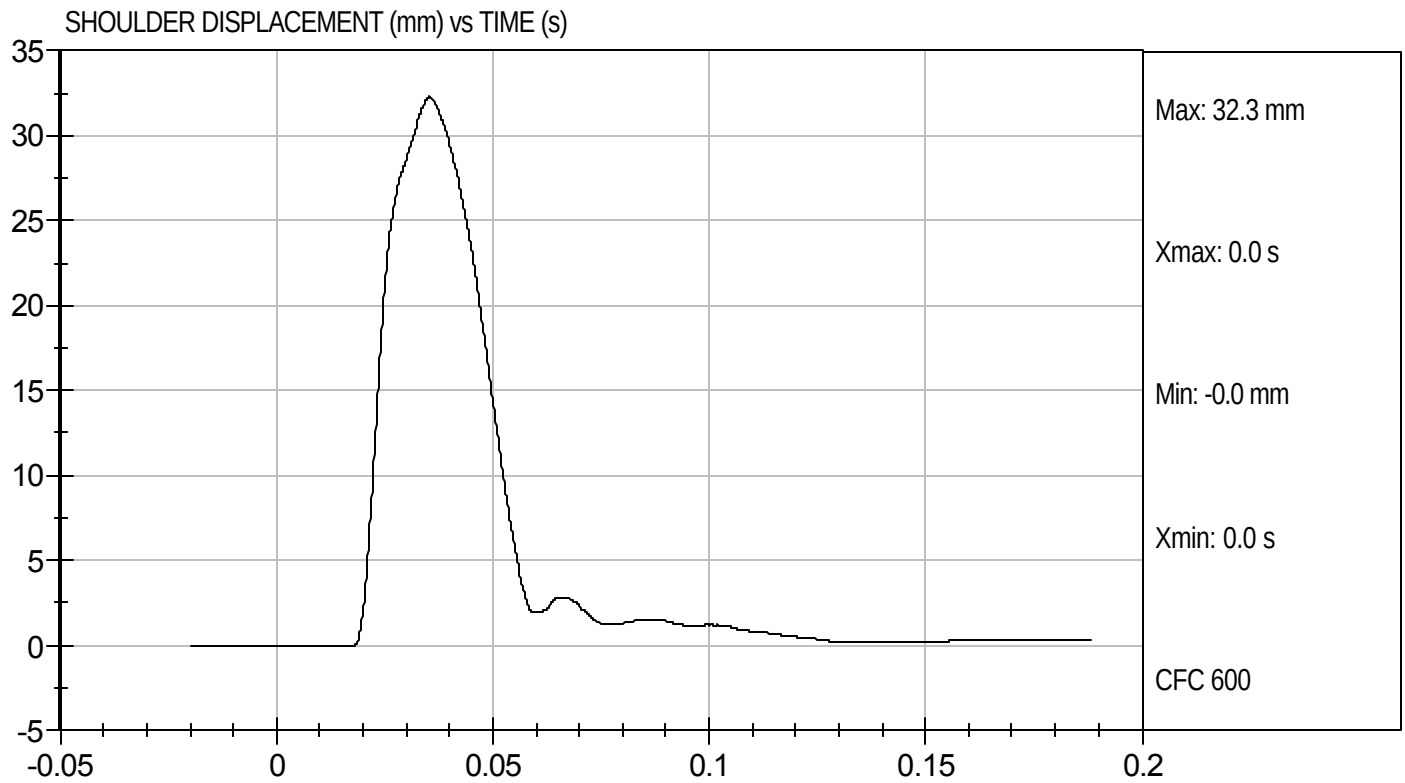
Test Date: 9/16/10
Velocity: 14.25 ft/s, 4.34 m/s





Test Desc: Shoulder Impact
Component ID: D103063

Test Date: 9/16/10
Velocity: 14.25 ft/s, 4.34 m/s



MGA RESEARCH CORPORATION
THORAX (WITH ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D103064

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	22.0	Pass
Humidity	%	10 to 70	53	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	Pass
Peak Impactor Acceleration	G's	30 to 36	32	Pass
Shoulder Displacement	mm	31 to 40	37	Pass
Upper Rib Displacement	mm	25 to 32	27	Pass
Middle Rib Displacement	mm	30 to 36	31	Pass
Lower Rib Displacement	mm	32 to 38	33	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	37	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	33	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

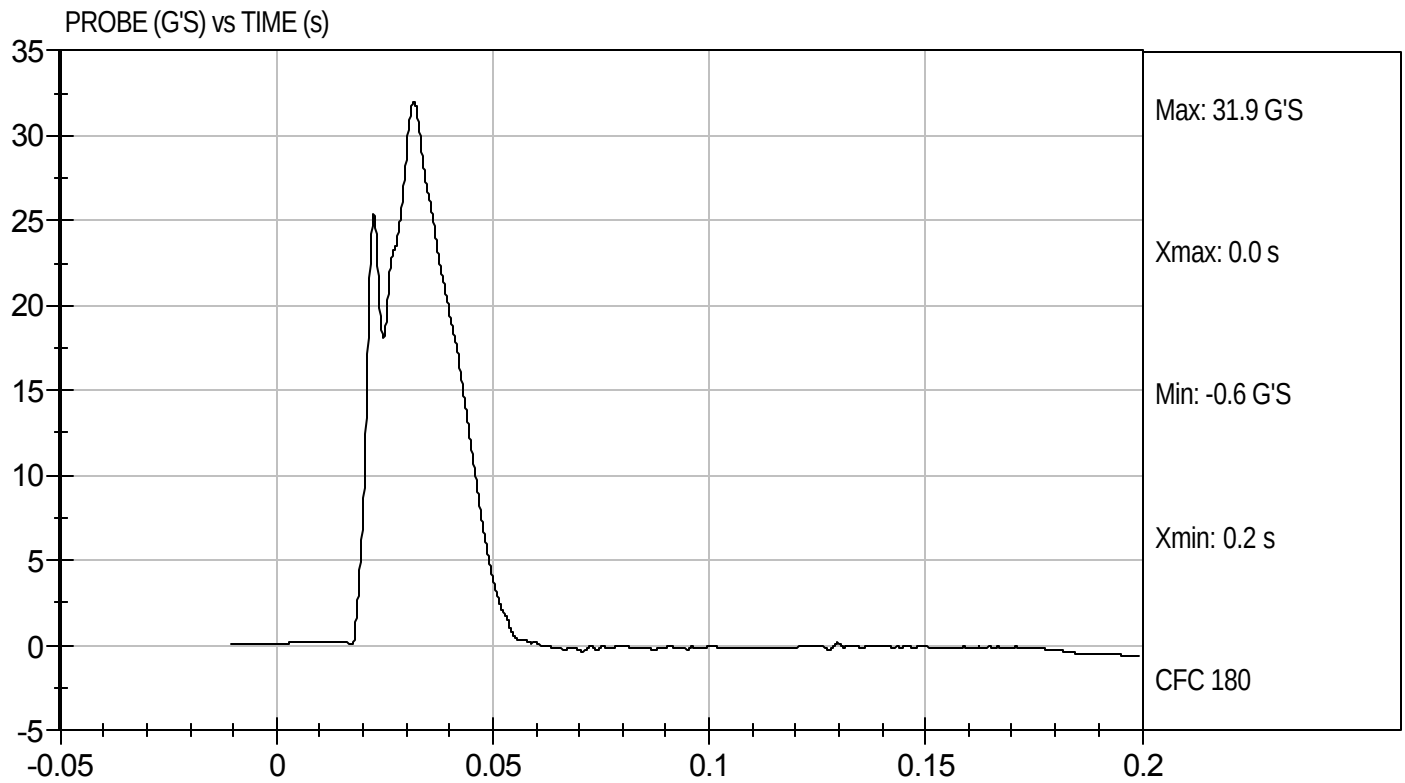
9/16/10
Test Date

David Winkelbauer
Approved By



Test Desc: Thorax With Arm
Component ID: D103064

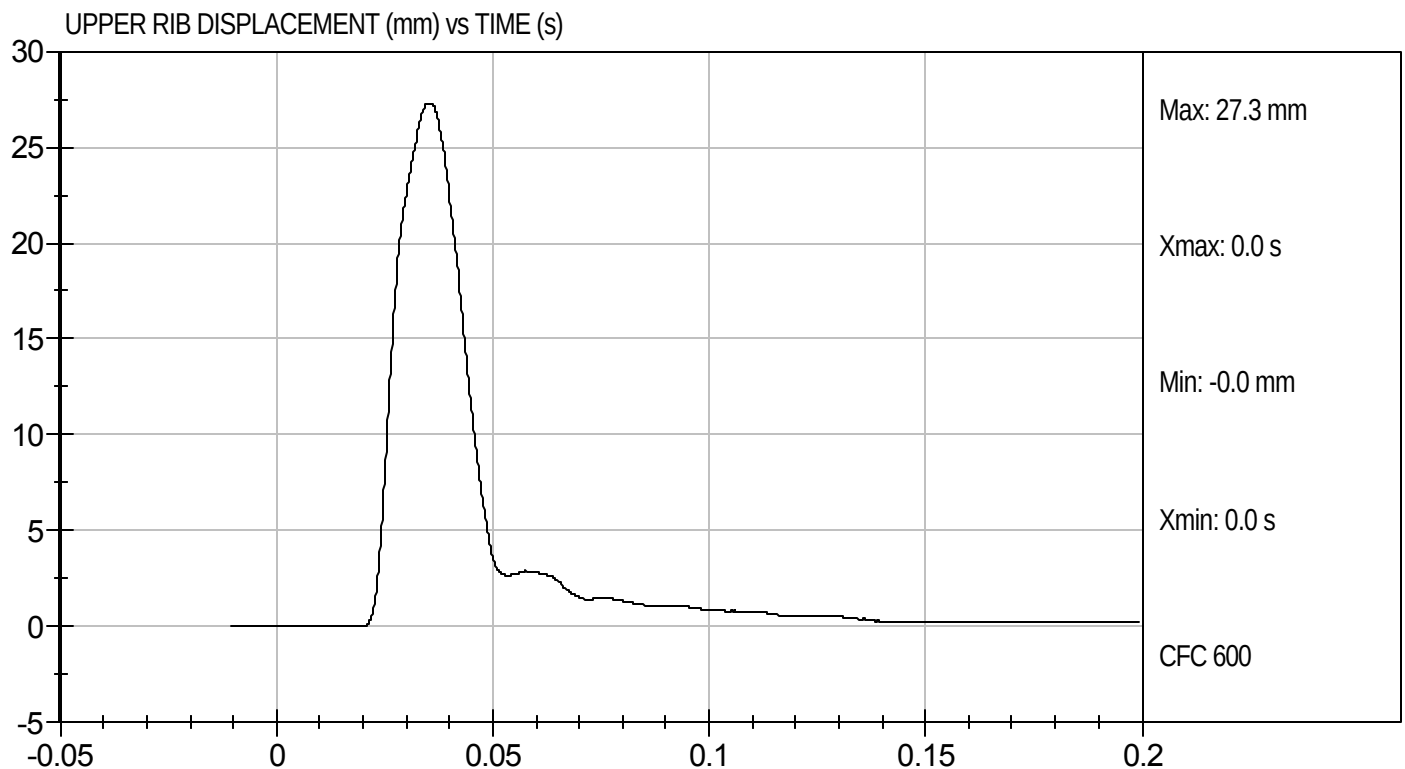
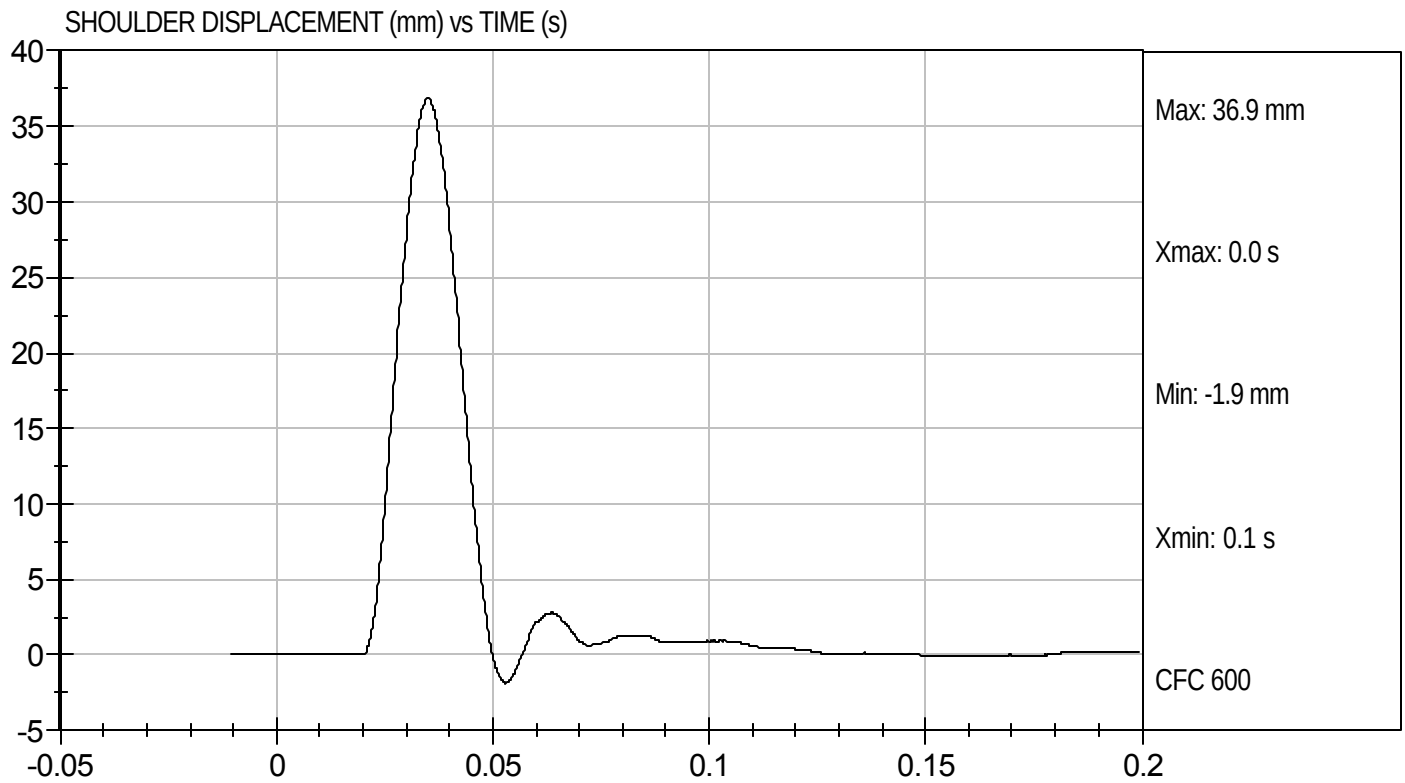
Test Date: 9/16/10
Velocity: 22.22 ft/s, 6.77 m/s





Test Desc: Thorax With Arm
Component ID: D103064

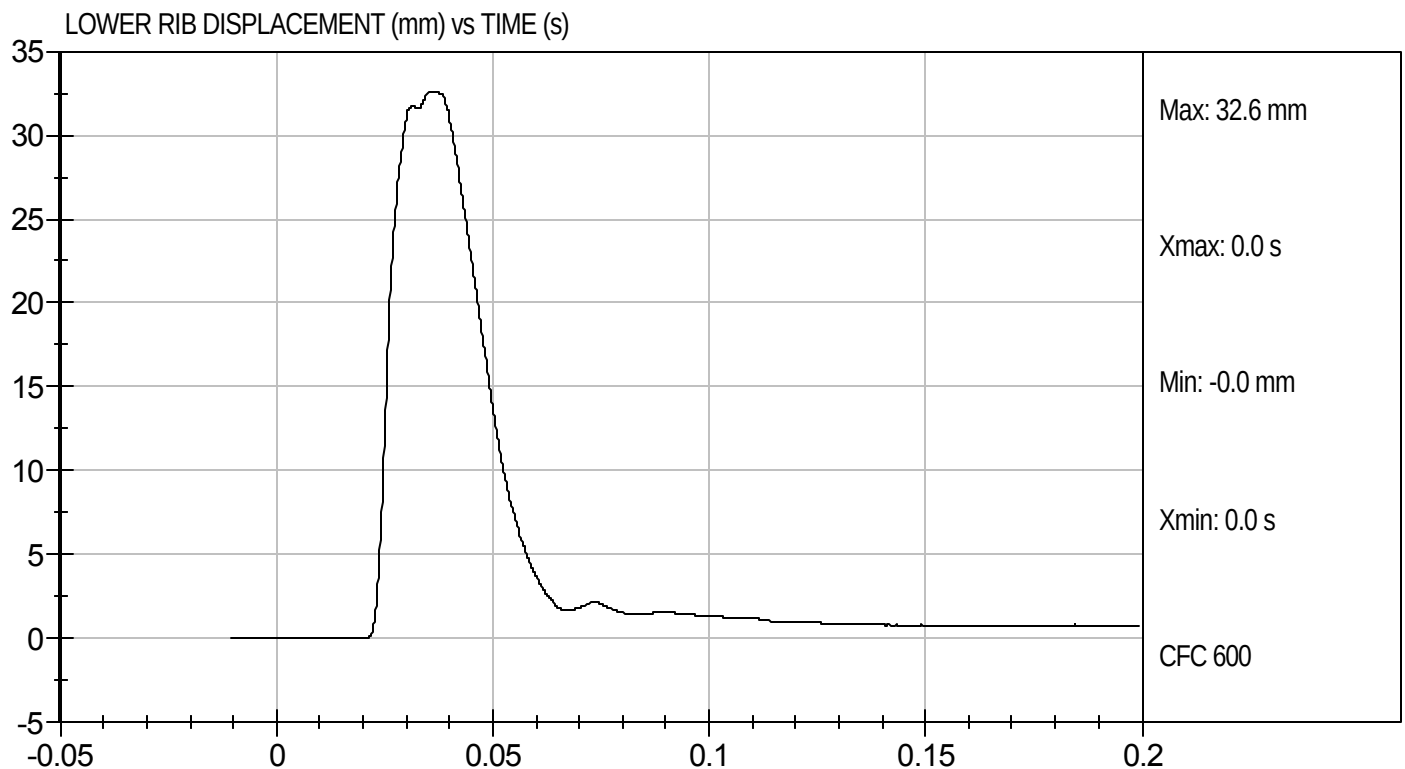
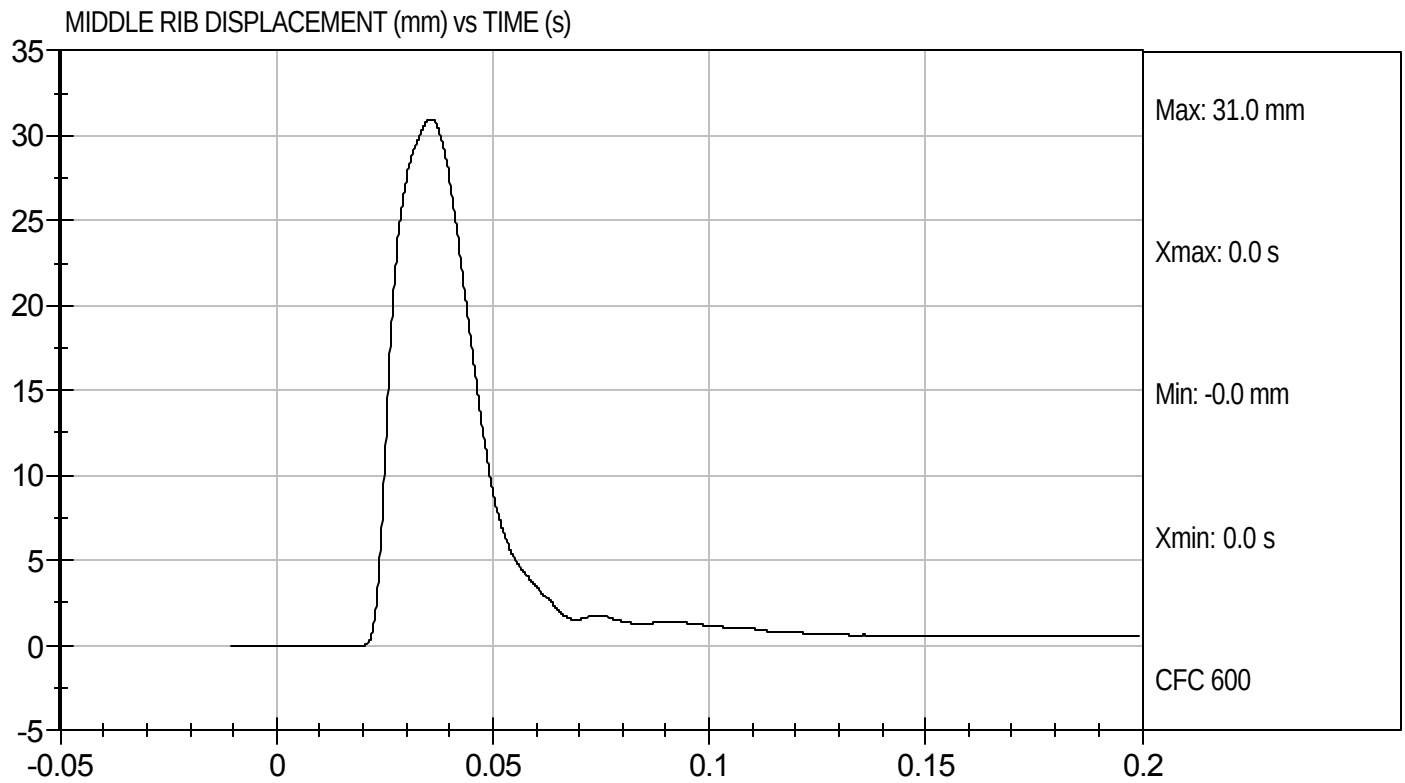
Test Date: 9/16/10
Velocity: 22.22 ft/s, 6.77 m/s





Test Desc: Thorax With Arm
Component ID: D103064

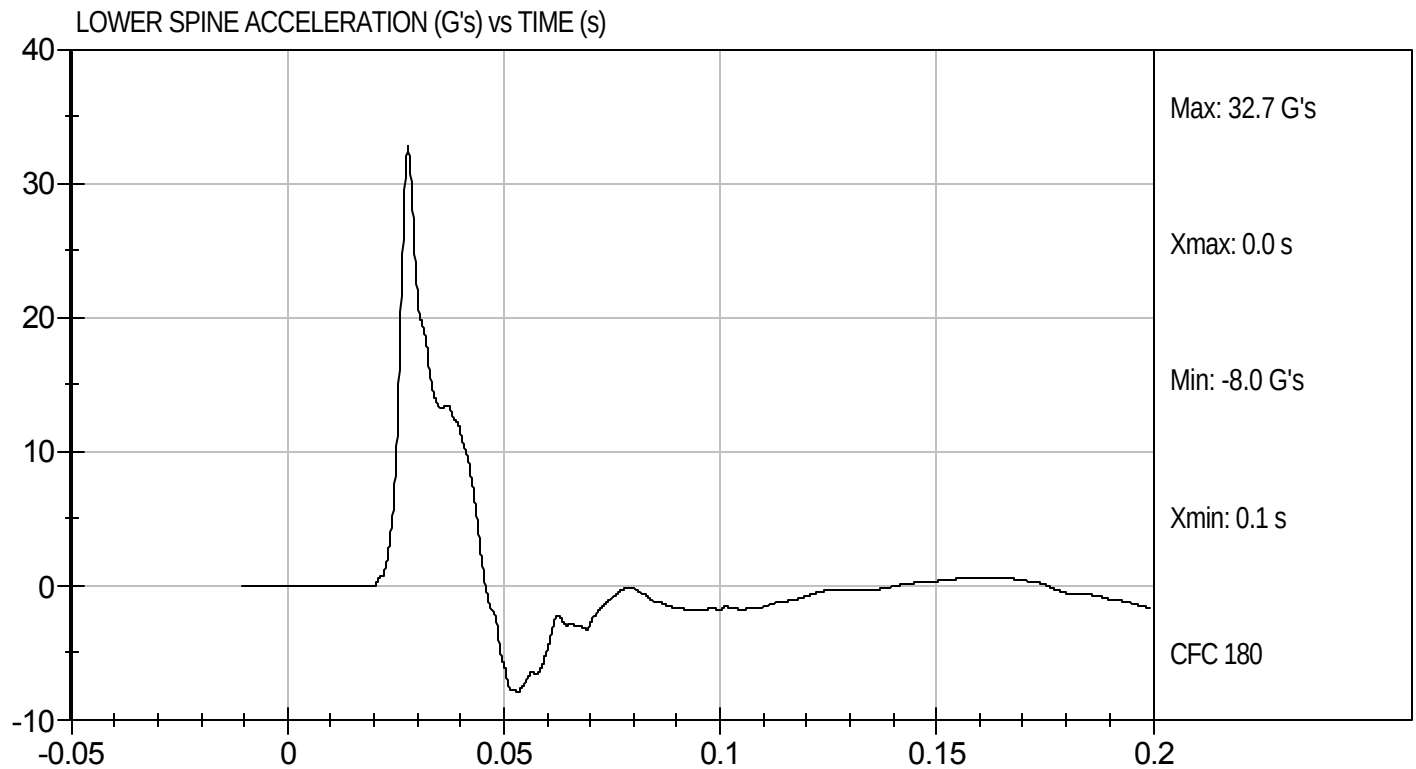
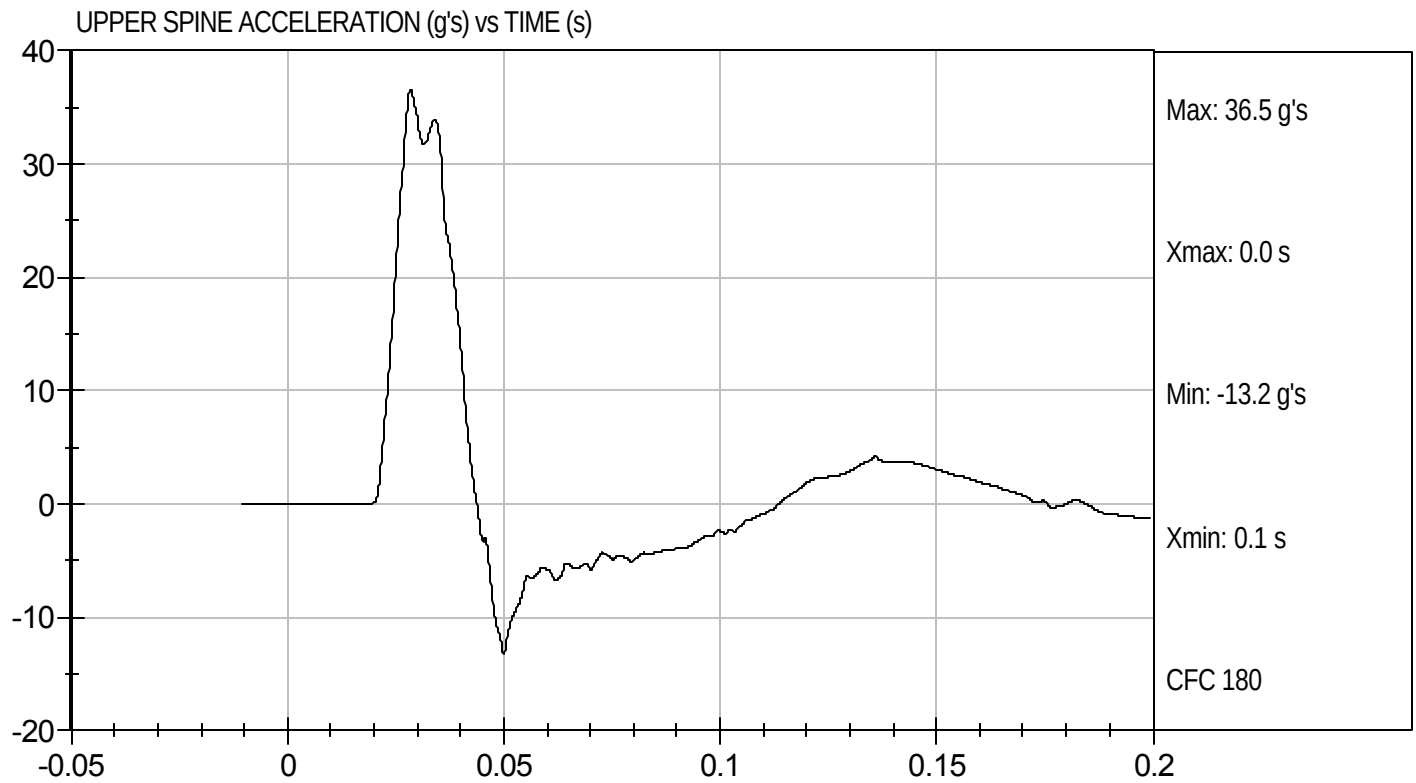
Test Date: 9/16/10
Velocity: 22.22 ft/s, 6.77 m/s





Test Desc: Thorax With Arm
Component ID: D103064

Test Date: 9/16/10
Velocity: 22.22 ft/s, 6.77 m/s



MGA RESEARCH CORPORATION
THORAX (WITHOUT ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D103065

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	22.0	Pass
Humidity	%	10 to 70	53	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Peak Impactor Force	G's	14 to 18	15	Pass
Upper Rib Displacement	mm	32 to 40	35	Pass
Middle Rib Displacement	mm	39 to 45	41	Pass
Lower Rib Displacement	mm	35 to 43	39	Pass
Upper Spine (T1) Y Acceleration	G's	13 to 17	15	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	9	Pass
Overall Test Results			Pass	


Laboratory Technician

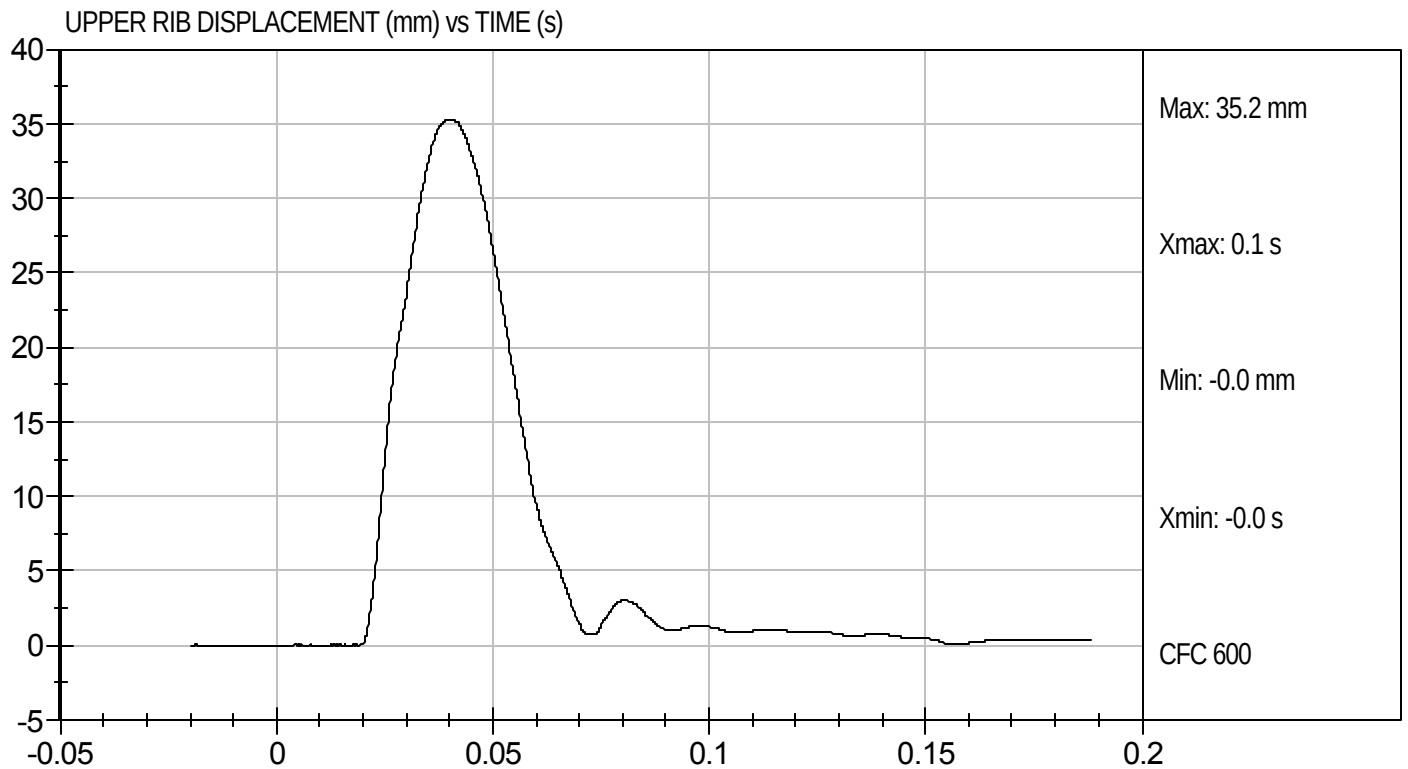
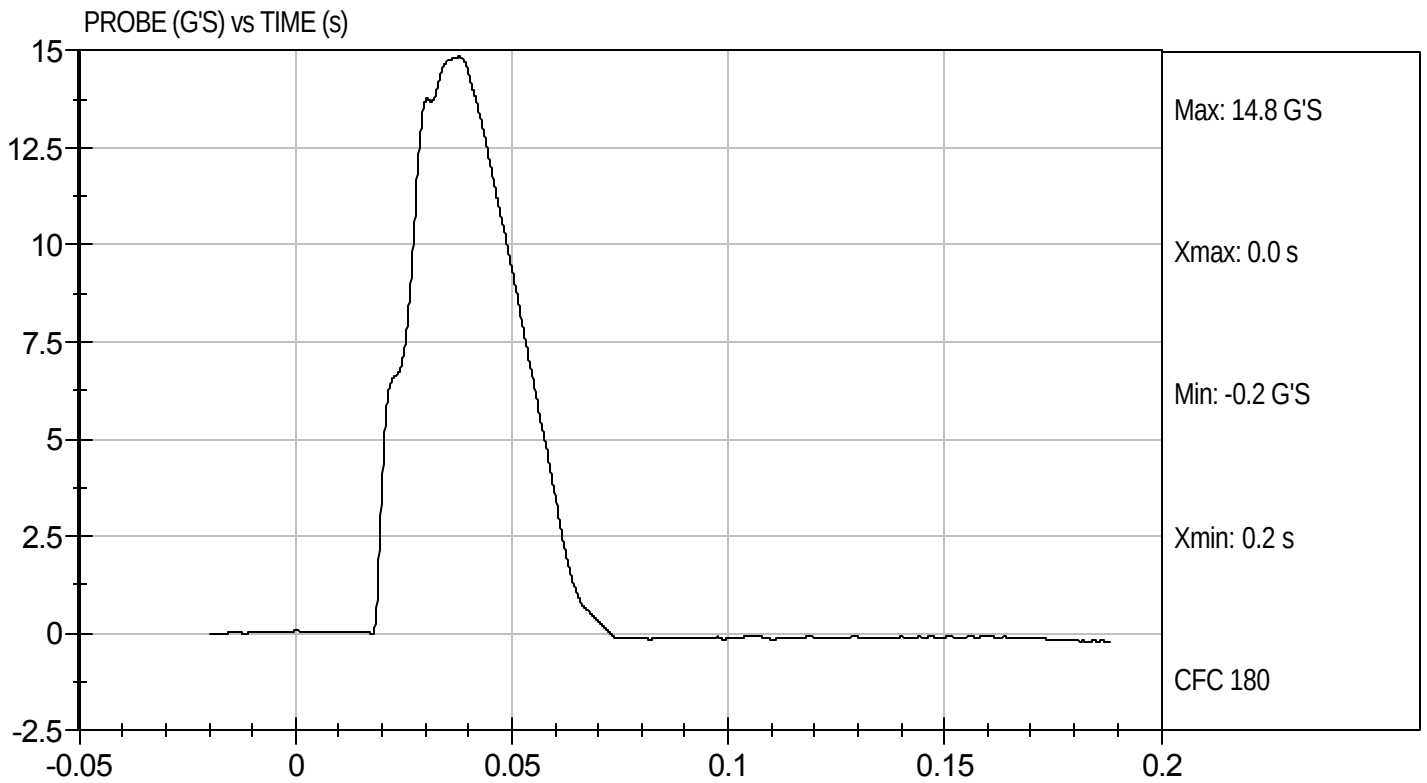
9/16/10
Test Date


Approved By



Test Desc: Thorax Without Arm
Component ID: D103065

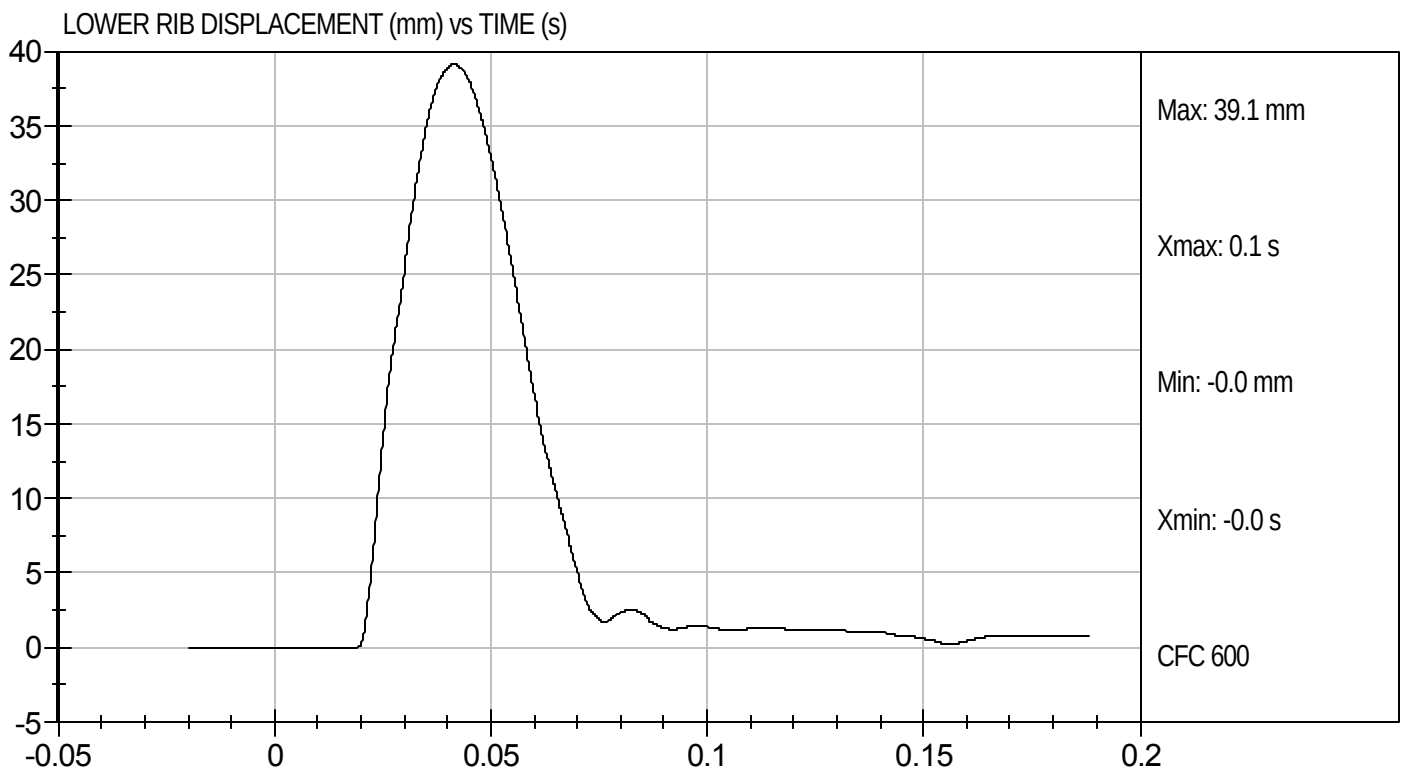
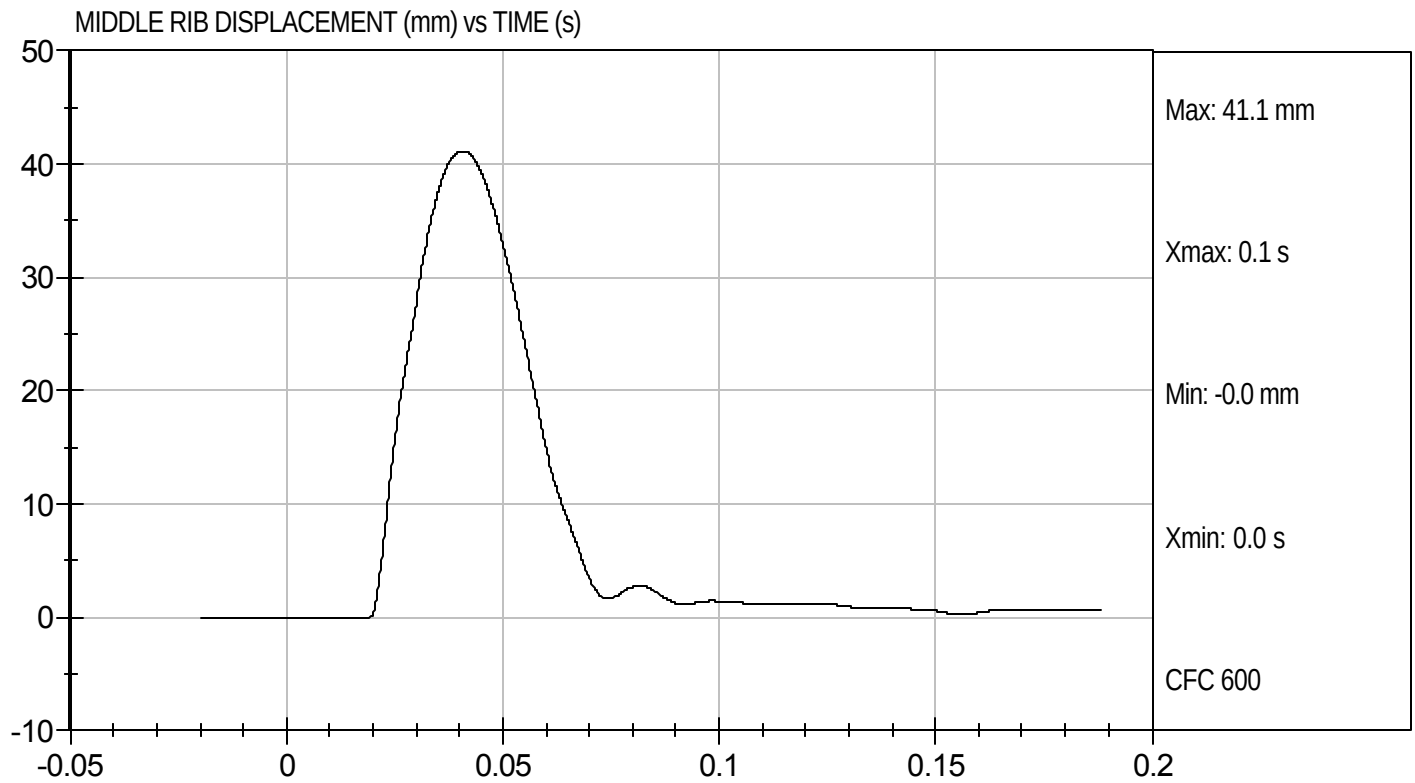
Test Date: 9/16/10
Velocity: 14.37 ft/s, 4.38 m/s





Test Desc: Thorax Without Arm
Component ID: D103065

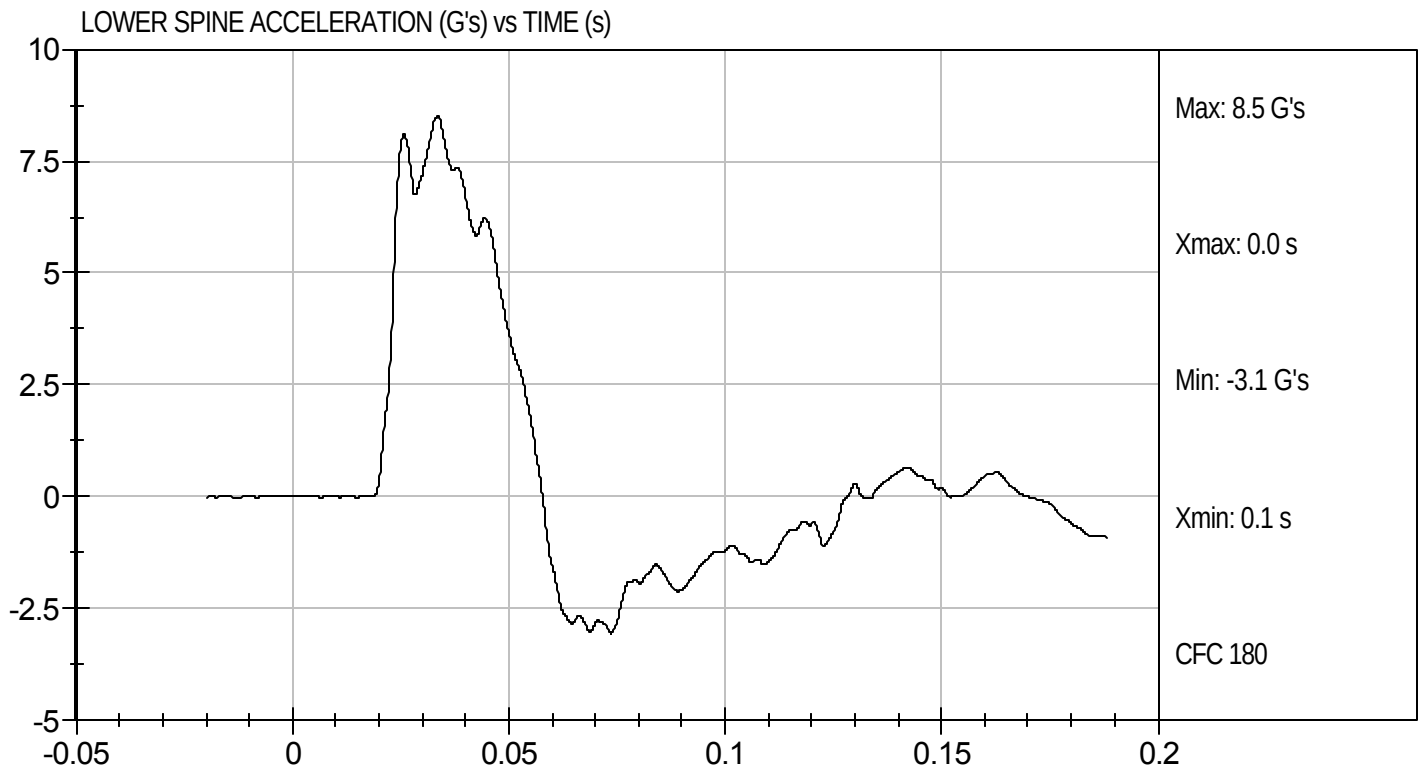
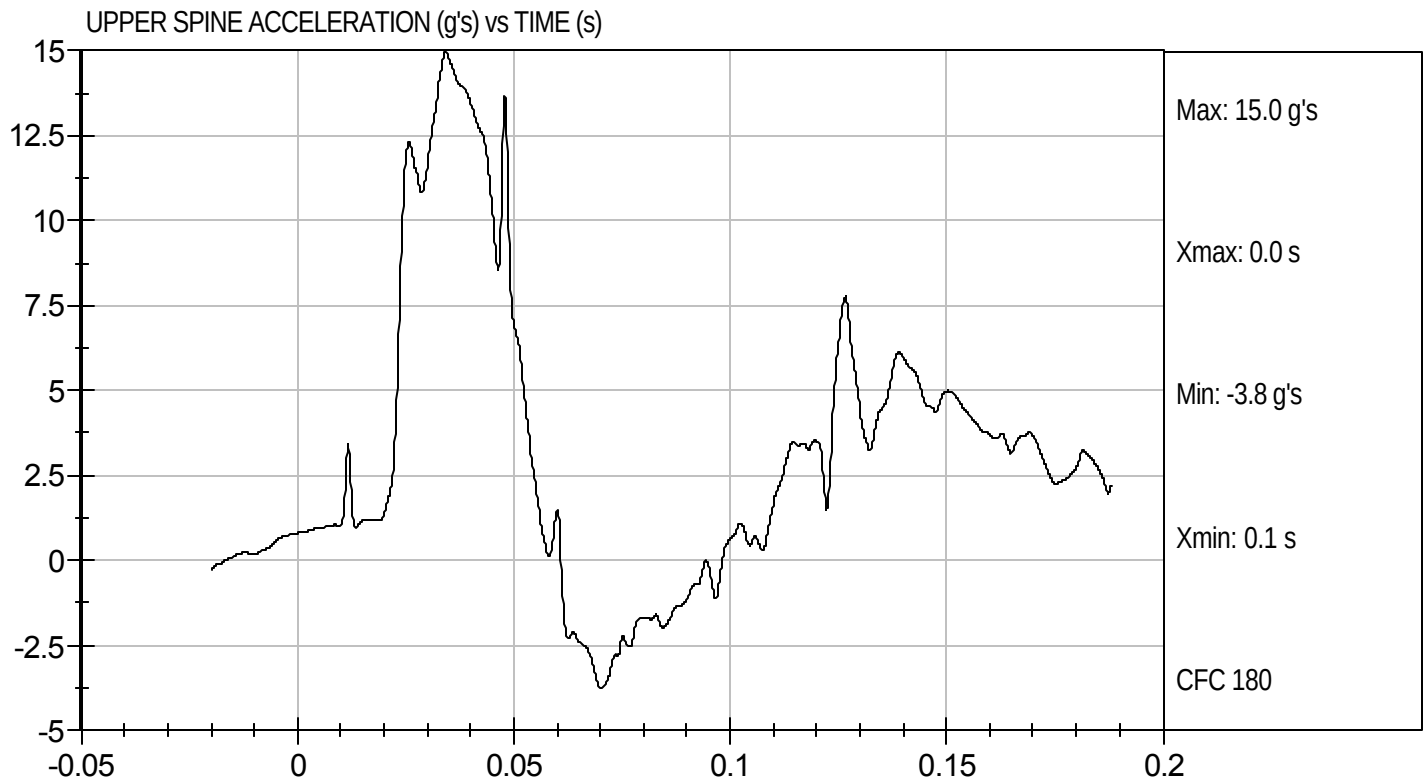
Test Date: 9/16/10
Velocity: 14.37 ft/s, 4.38 m/s





Test Desc: Thorax Without Arm
Component ID: D103065

Test Date: 9/16/10
Velocity: 14.37 ft/s, 4.38 m/s



MGA RESEARCH CORPORATION
ABDOMINAL IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D103066

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.9	Pass
Humidity	%	10 to 70	54	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Peak Impactor Acceleration	G's	12 to 16	14	Pass
Upper Rib Displacement	mm	36 to 47	41	Pass
Lower Rib Displacement	mm	33 to 44	37	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	11	Pass
			Overall Test Results	Pass


Laboratory Technician

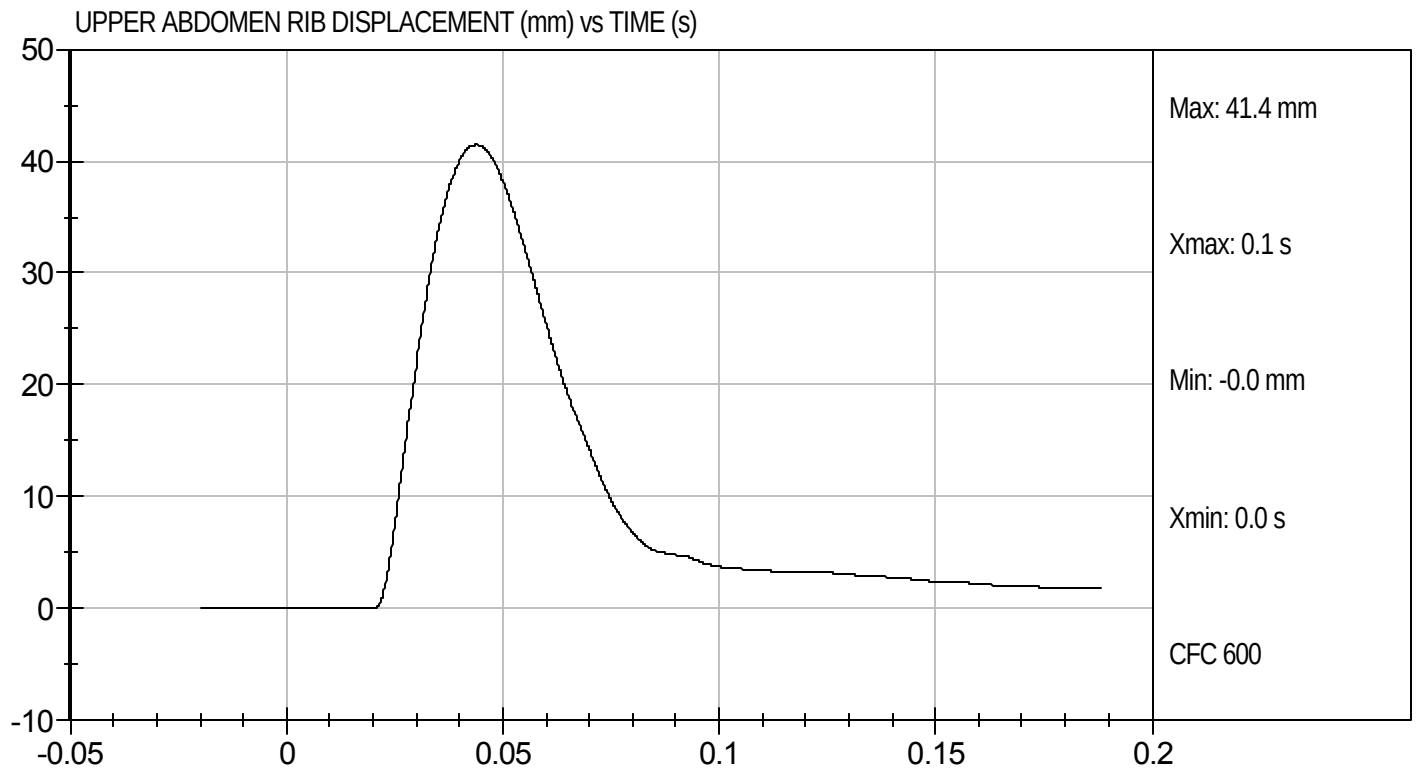
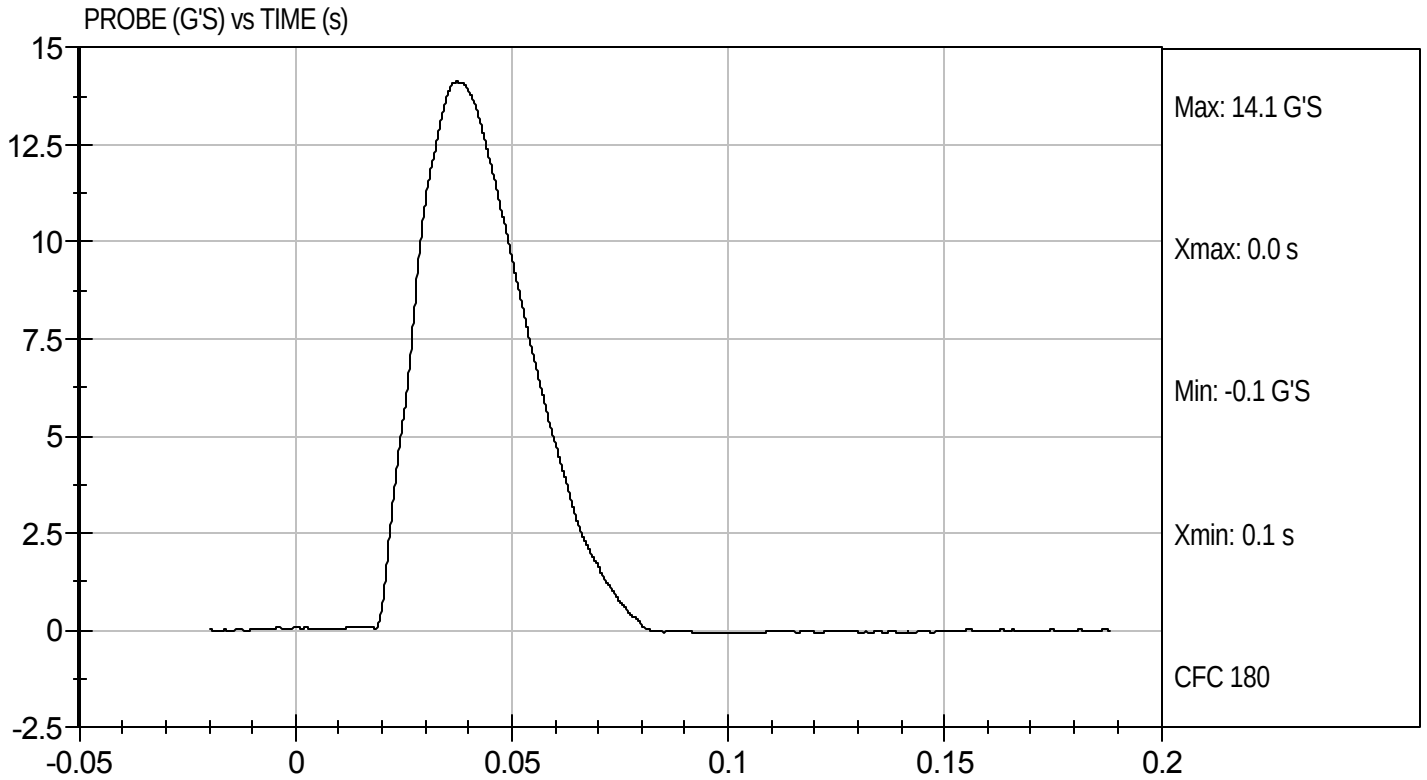
9/16/10
Test Date


Approved By



Test Desc: Abdomen Impact
Component ID: D103066

Test Date: 9/16/10
Velocity: 14.37 ft/s, 4.38 m/s

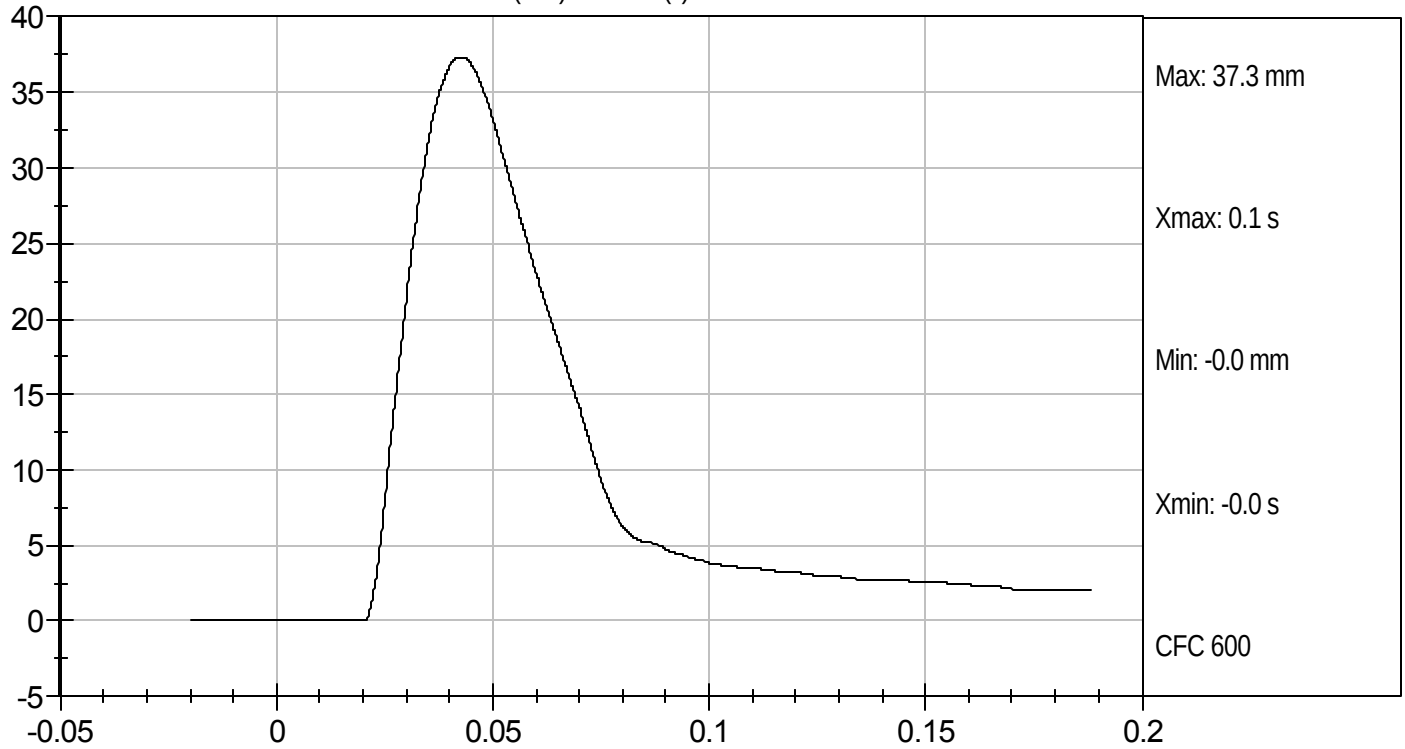




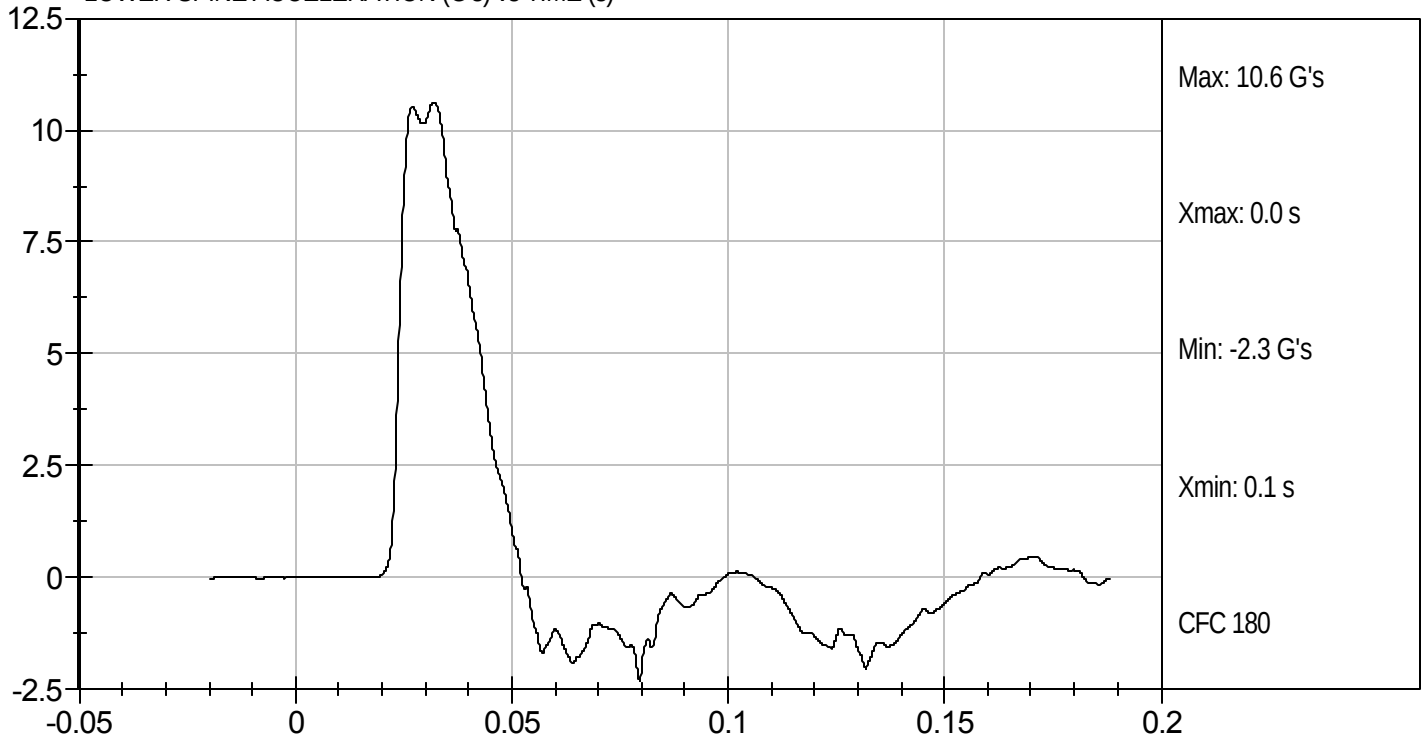
Test Desc: Abdomen Impact
Component ID: D103066

Test Date: 9/16/10
Velocity: 14.37 ft/s, 4.38 m/s

LOWER ABDOMEN RIB DISPLACEMENT (mm) vs TIME (s)



LOWER SPINE ACCELERATION (G's) vs TIME (s)



MGA RESEARCH CORPORATION
PELVIS IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D103067

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	22.0	Pass
Humidity	%	10 to 70	54	Pass
Impact Velocity	m/s	6.60 to 6.80	6.69	Pass
Peak Impactor Acceleration	G's	38 to 47	44	Pass
Pelvis Y Acceleration after 6 ms	G's	34 to 42	41	Pass
Peak Acetabulum Force	N	3600 to 4300	4125	Pass
Overall Test Results			Pass	


Laboratory Technician

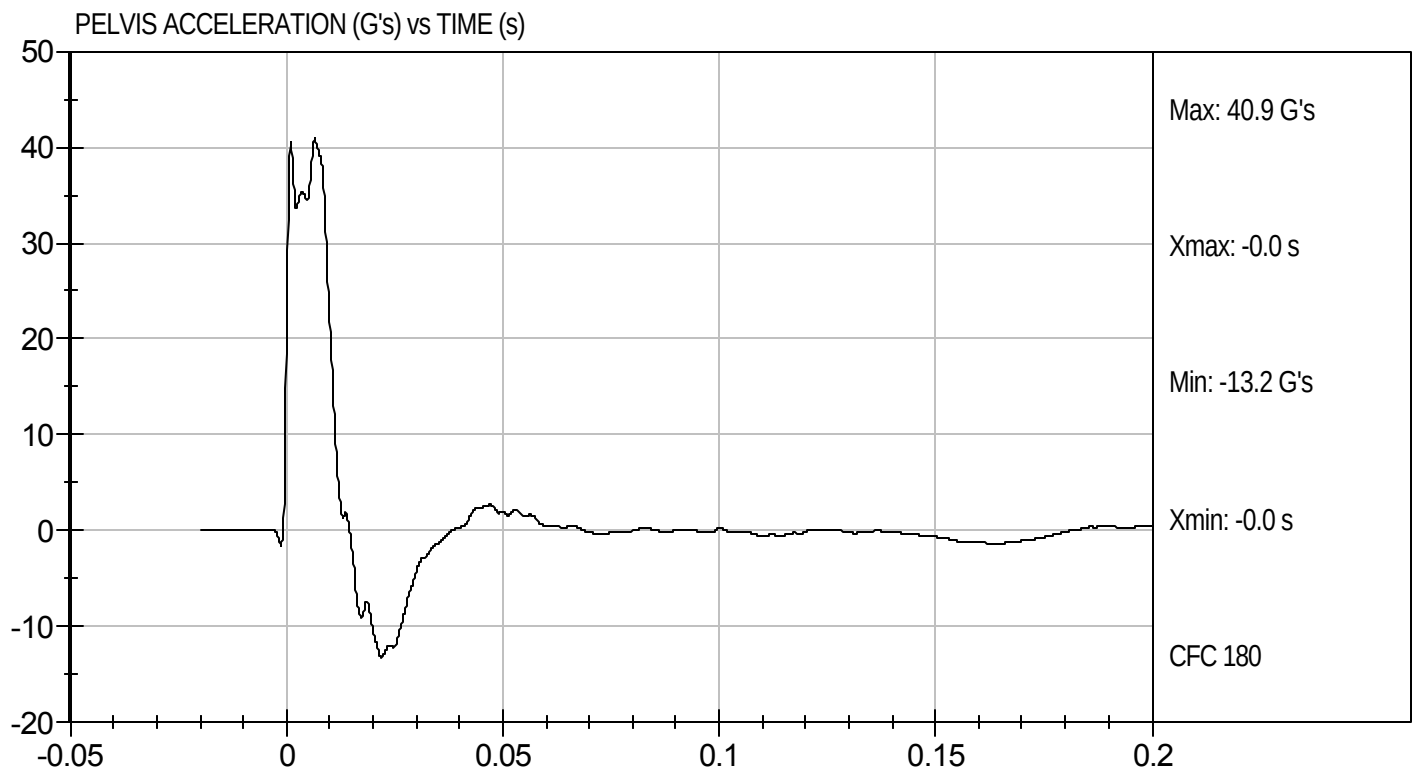
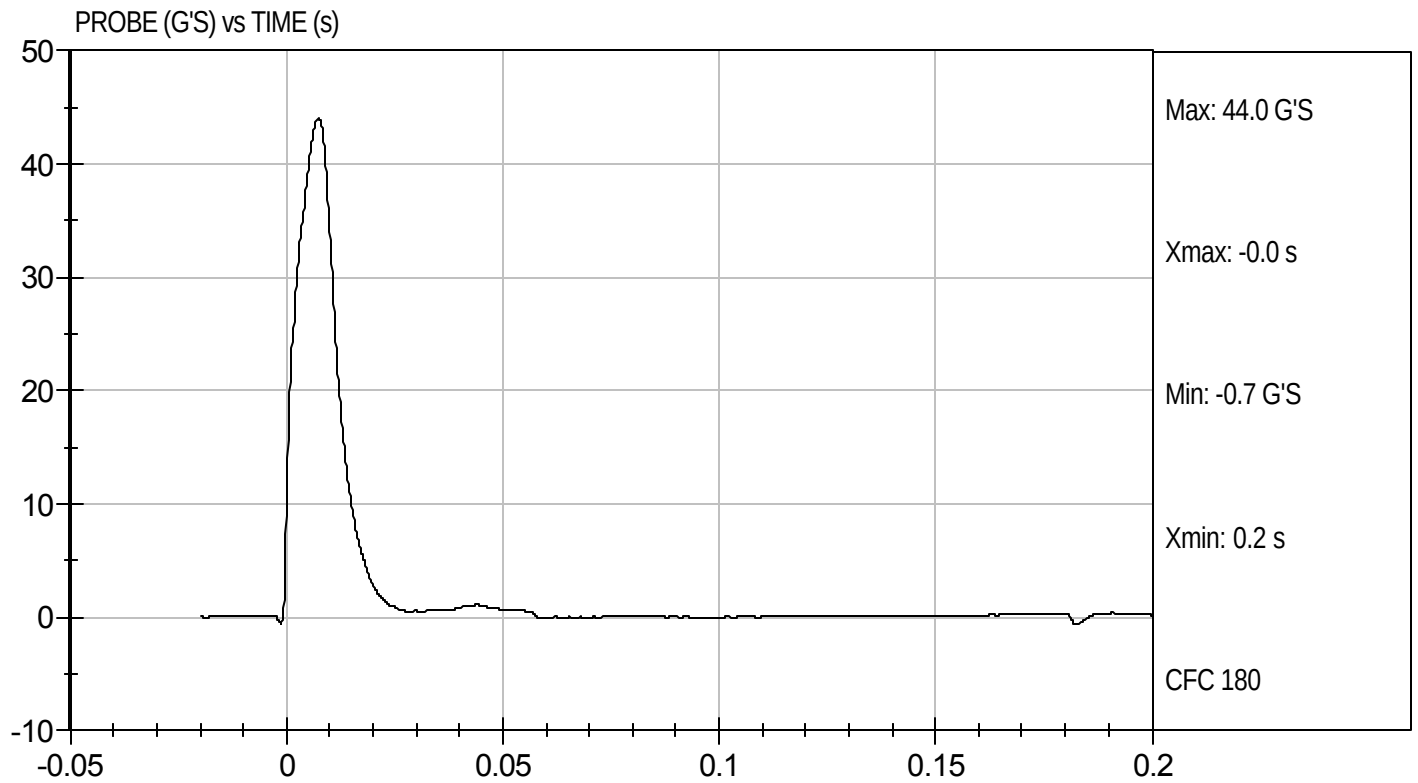
9/16/10
Test Date


Approved By



Test Desc: Pelvis Impact
Component ID: D103067

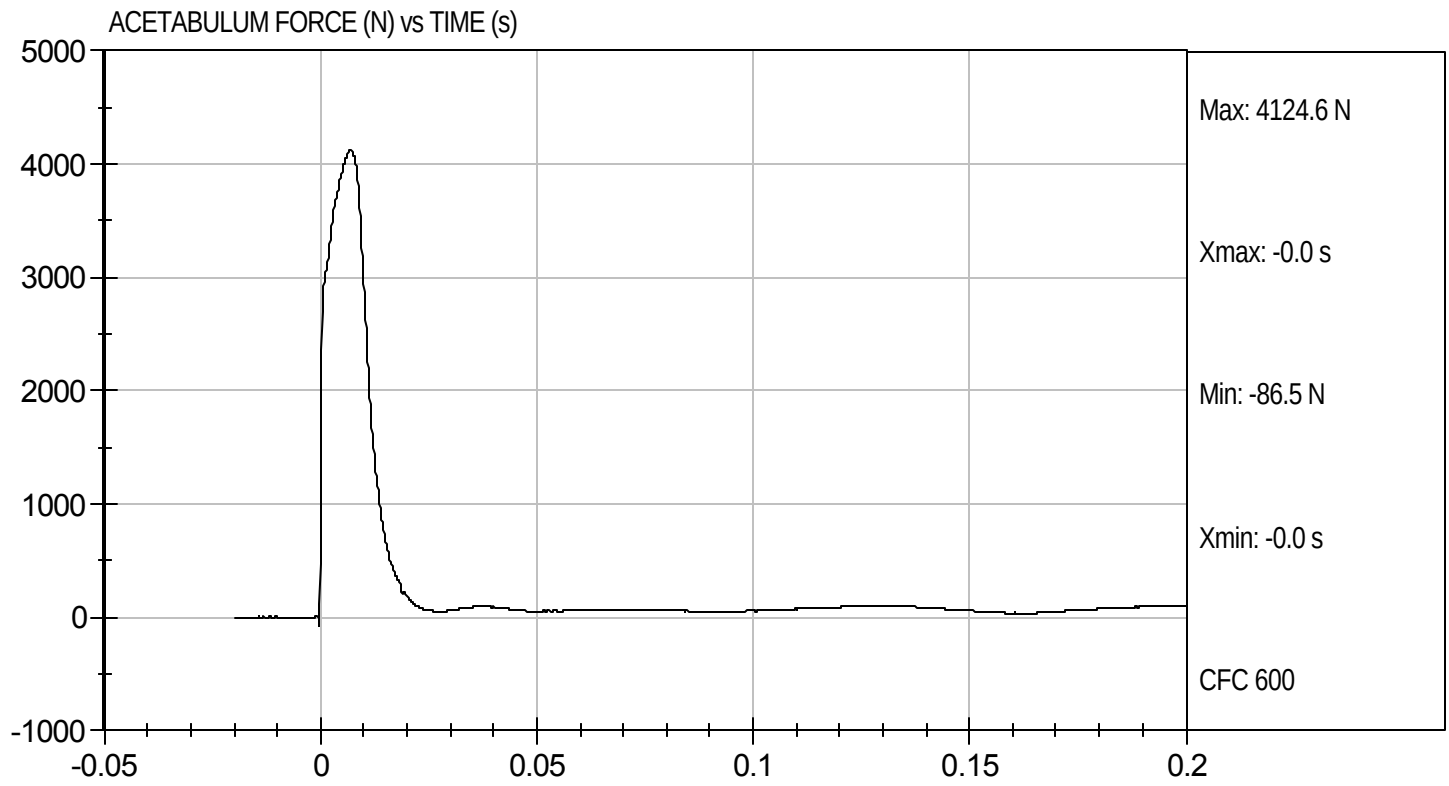
Test Date: 9/16/10
Velocity: 21.95 ft/s, 6.69 m/s





Test Desc: Pelvis Impact
Component ID: D103067

Test Date: 9/16/10
Velocity: 21.95 ft/s, 6.69 m/s



MGA RESEARCH CORPORATION
ILIAC IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D103068

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.8	Pass
Humidity	%	10 to 70	53	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Peak Impactor Acceleration	G's	36 to 45	37	Pass
Pelvis Y Acceleration	G's	28 to 39	30	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4530	Pass
Overall Test Results				Pass


Laboratory Technician

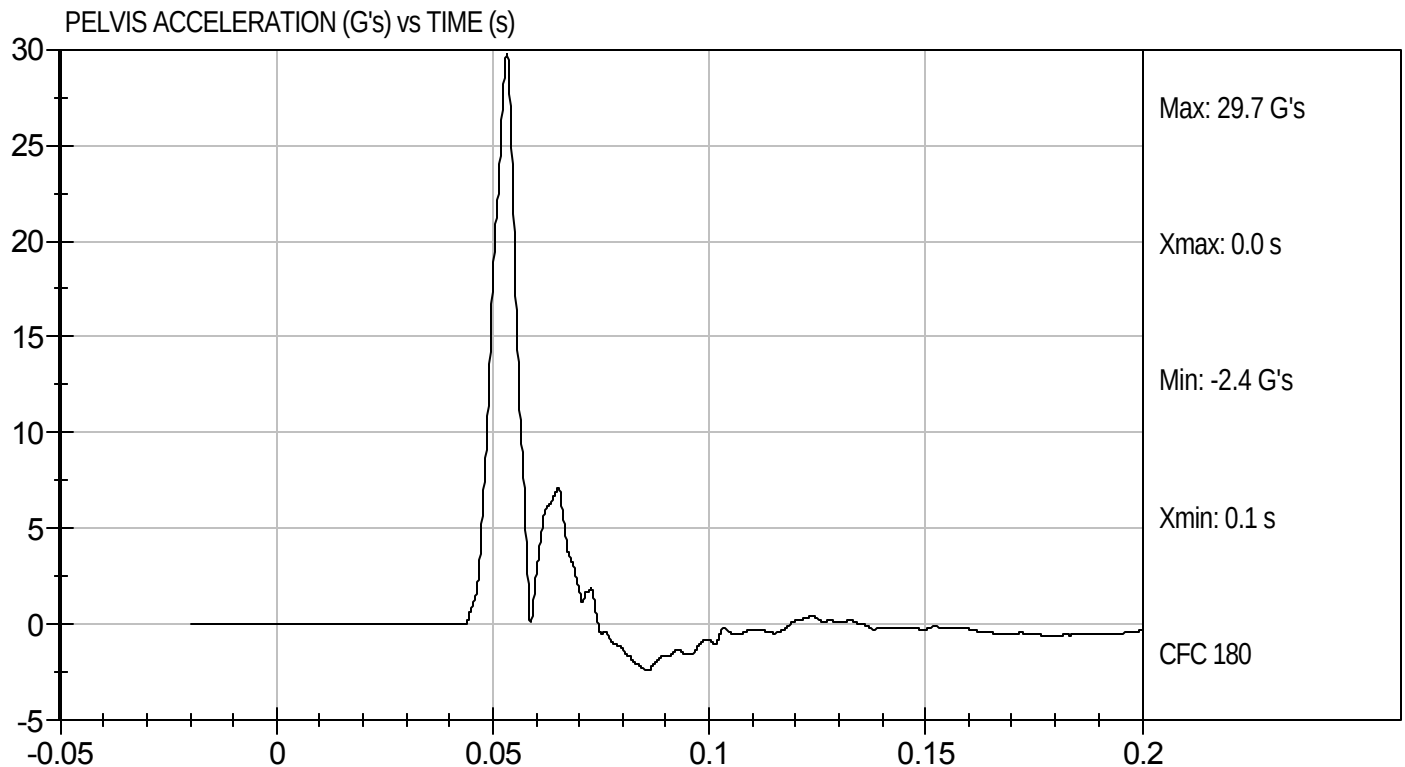
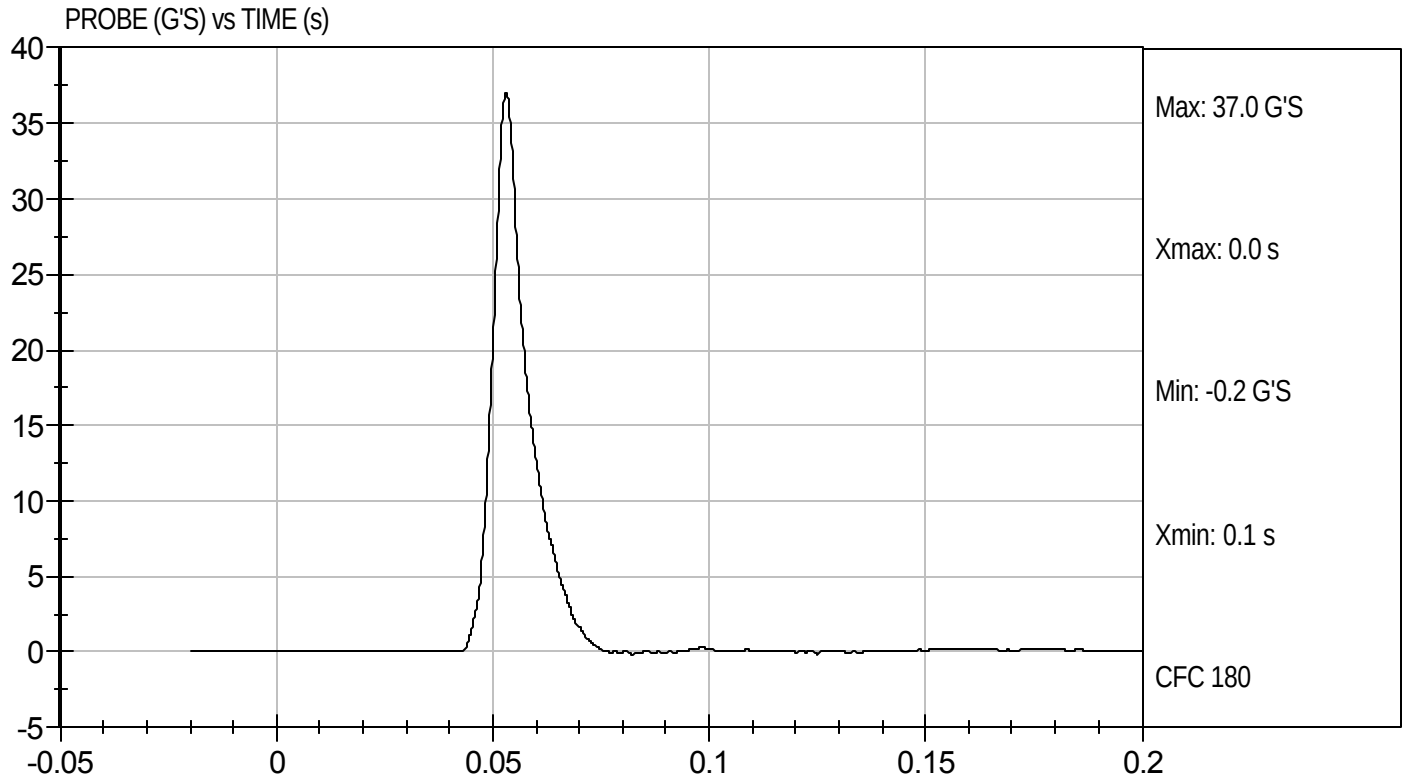
9/16/10
Test Date


Approved By



Test Desc: Iliac Impact
Component ID: D103068

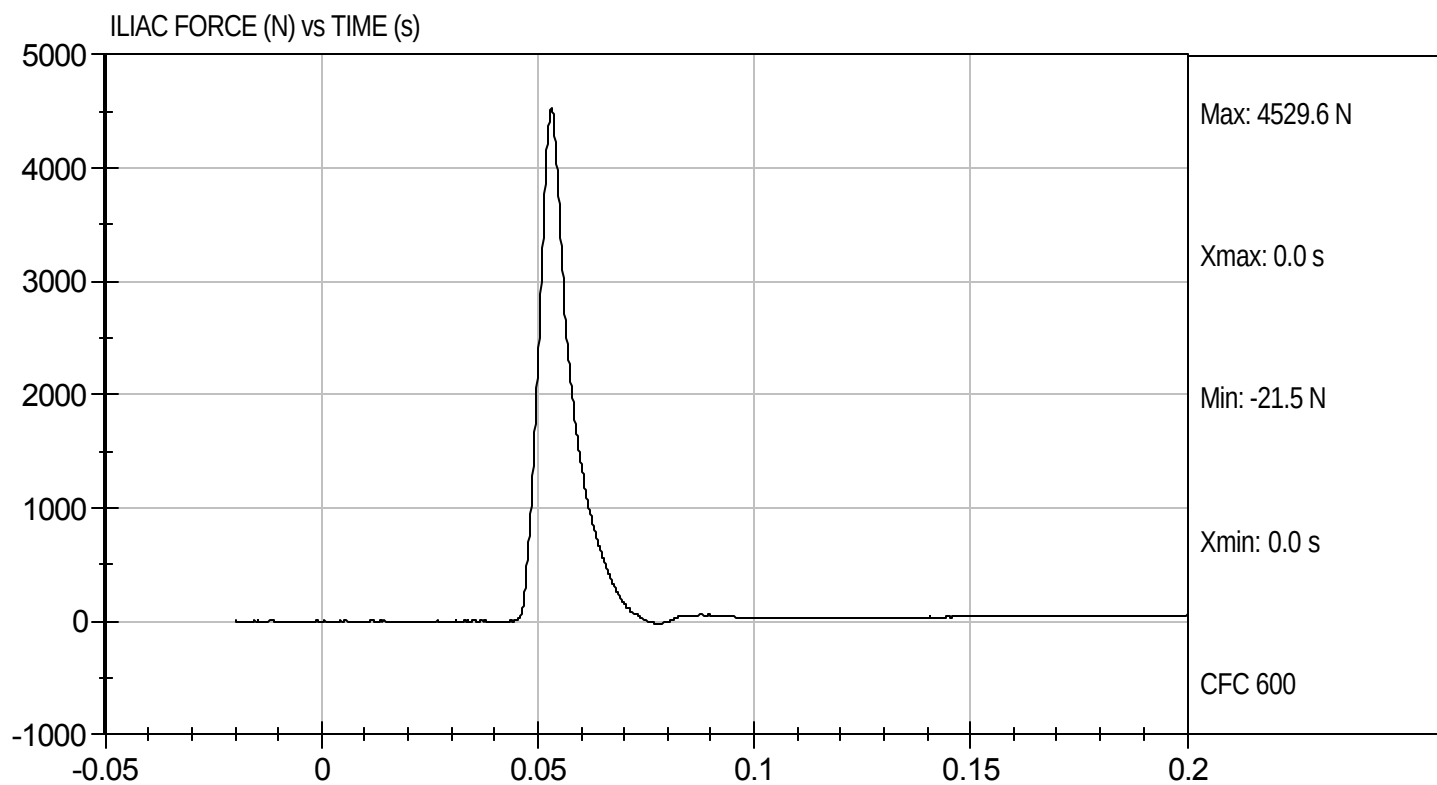
Test Date: 9/16/10
Velocity: 14.37 ft/s, 4.38 m/s





Test Desc: Iliac Impact
Component ID: D103068

Test Date: 9/16/10
Velocity: 14.37 ft/s, 4.38 m/s



MGA RESEARCH CORPORATION
HEAD DROP TEST
SID-Its BUILD LEVEL D DUMMY

ATD Serial No: 296

Test ID: D103171

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	55	Pass
Peak Resultant Acceleration	G's	115 to 137	118	Pass
Peak Lateral Acceleration	G's	+/- 15	-7.2	Pass
Unimodal	N/A	<15%	Yes	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

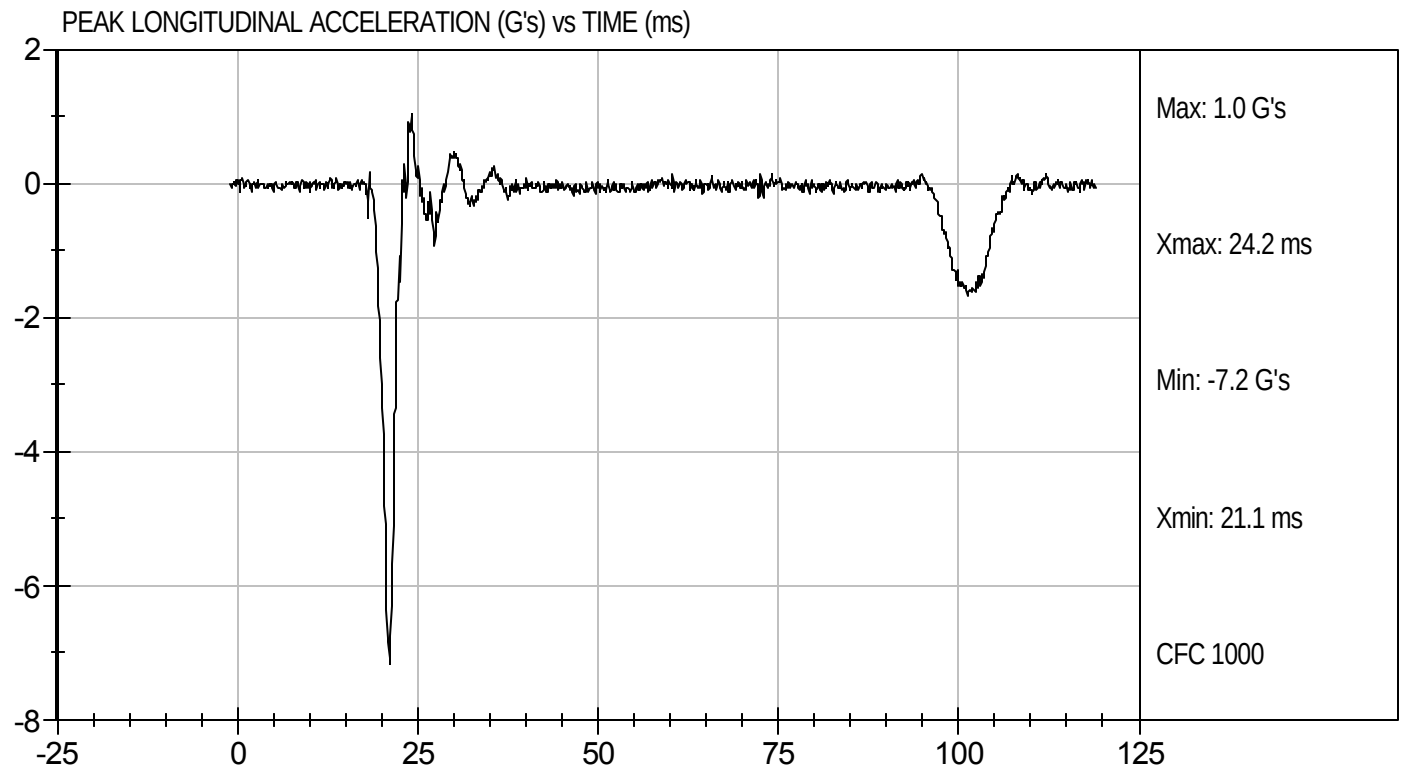
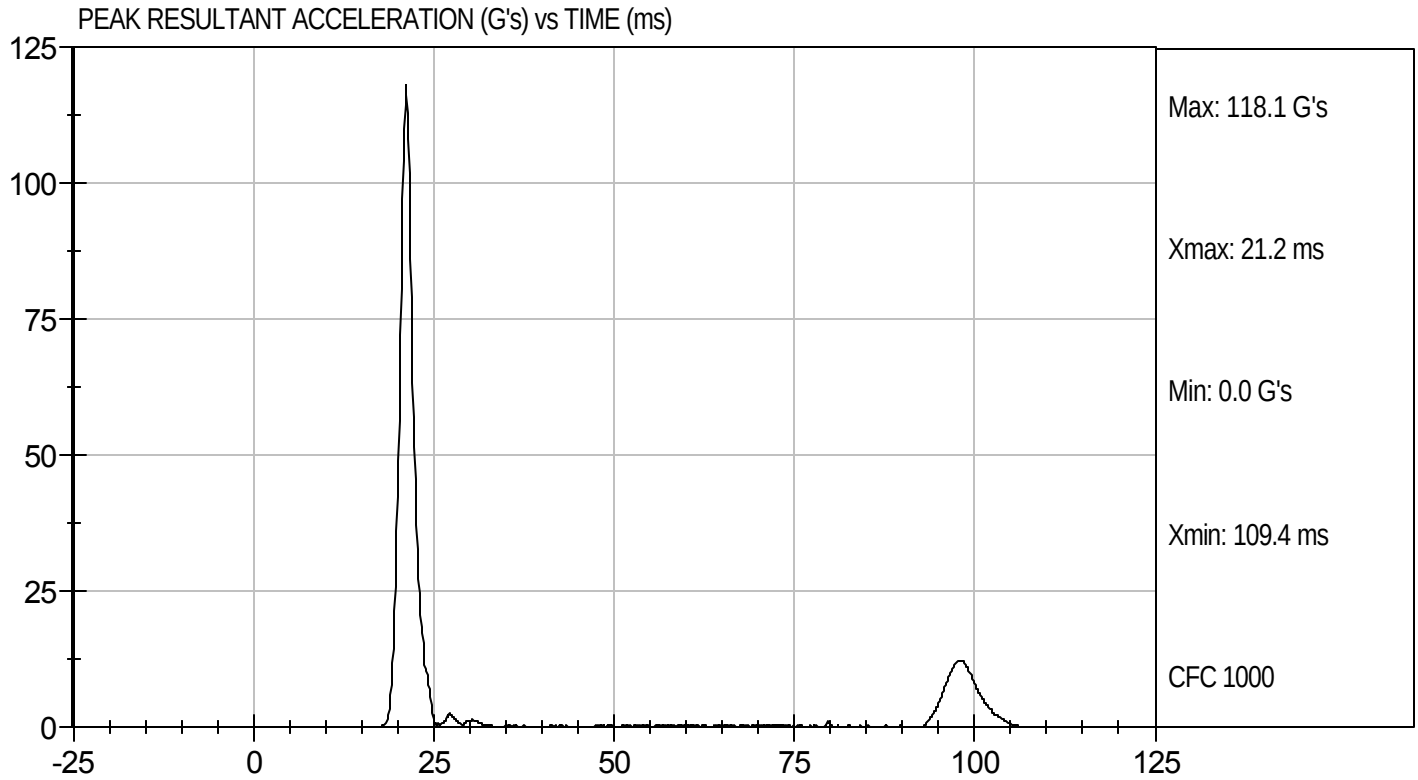
9/22/10
Test Date

David Winkelbauer
Approved By



Test Desc: Head Drop
Component ID: D103171

Test Date: 9/22/10
Velocity: 0 ft/s, 0 m/s

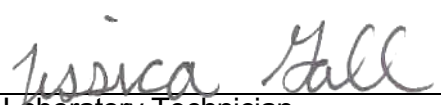


MGA RESEARCH CORPORATION
LATERAL NECK PENDULUM TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D103172

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	20.8	Pass
Humidity		%	10 to 70	54	Pass
Impact Velocity		m/s	5.51 to 5.63	5.58	Pass
Delta Velocity	10 ms	m/s	2.20 to 2.80	2.73	Pass
	15 ms	m/s	3.30 to 4.10	3.95	Pass
	20 ms	m/s	4.40 to 5.40	5.25	Pass
	25 ms	m/s	5.40 to 6.10	5.54	Pass
	25-100 ms	m/s	5.50 to 6.20	5.56	Pass
Maximum D-Plane Rotation		deg	71 to 81	72	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	62	Pass
Maximum Occipital Condyle Moment during Rotation Interval Nm			-44 to -36	-41	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	115	Pass
Overall Test Results				Pass	


 Laboratory Technician

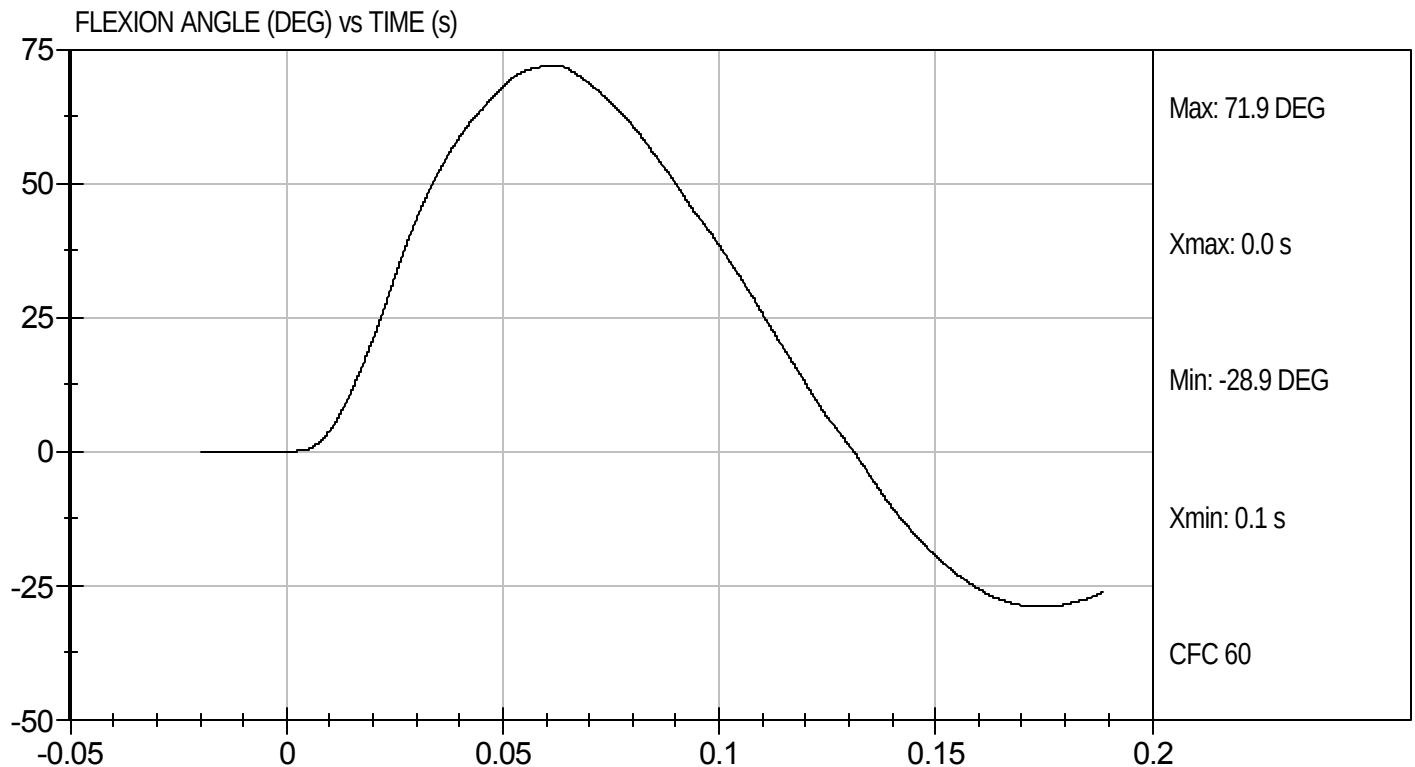
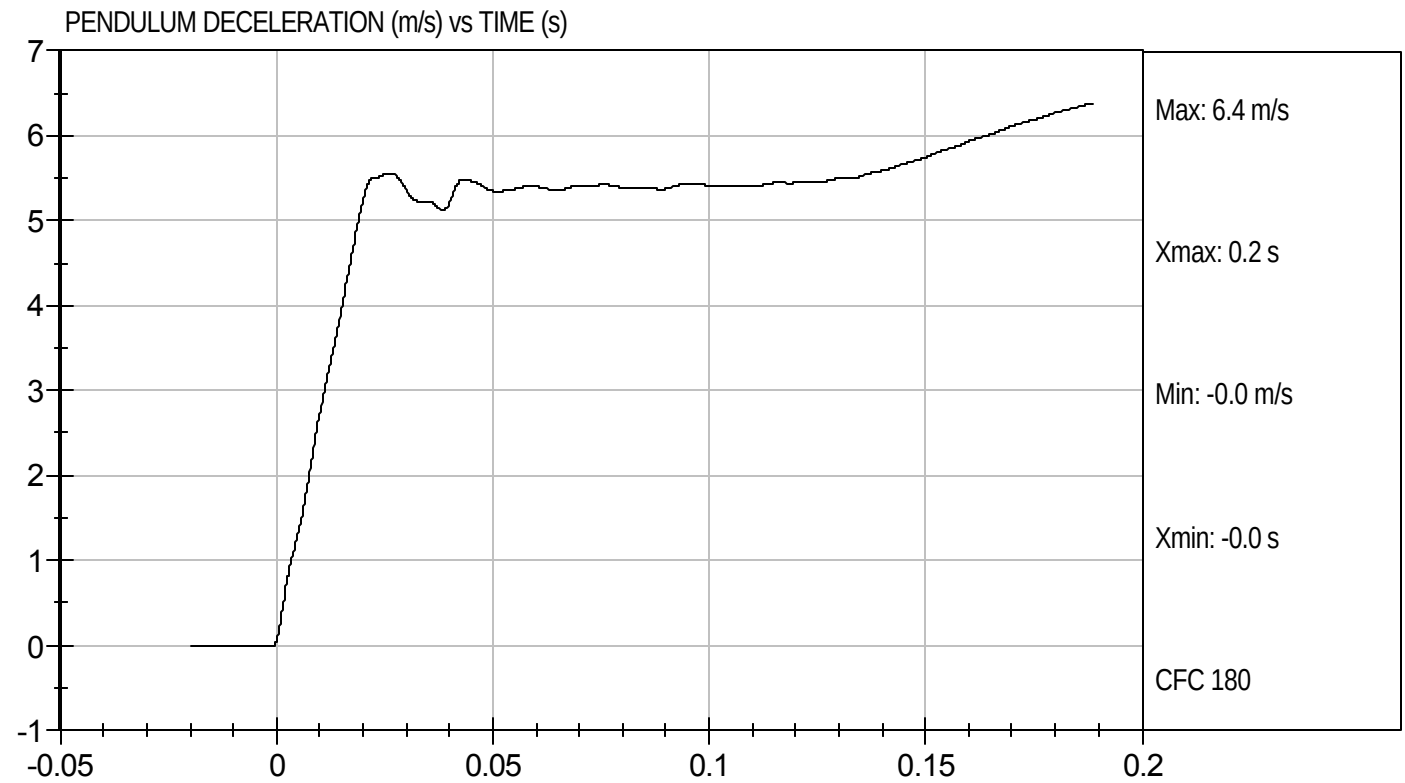
9/21/10
 Test Date


 Approved By



Test Desc: Neck Bending
Component ID: D103172

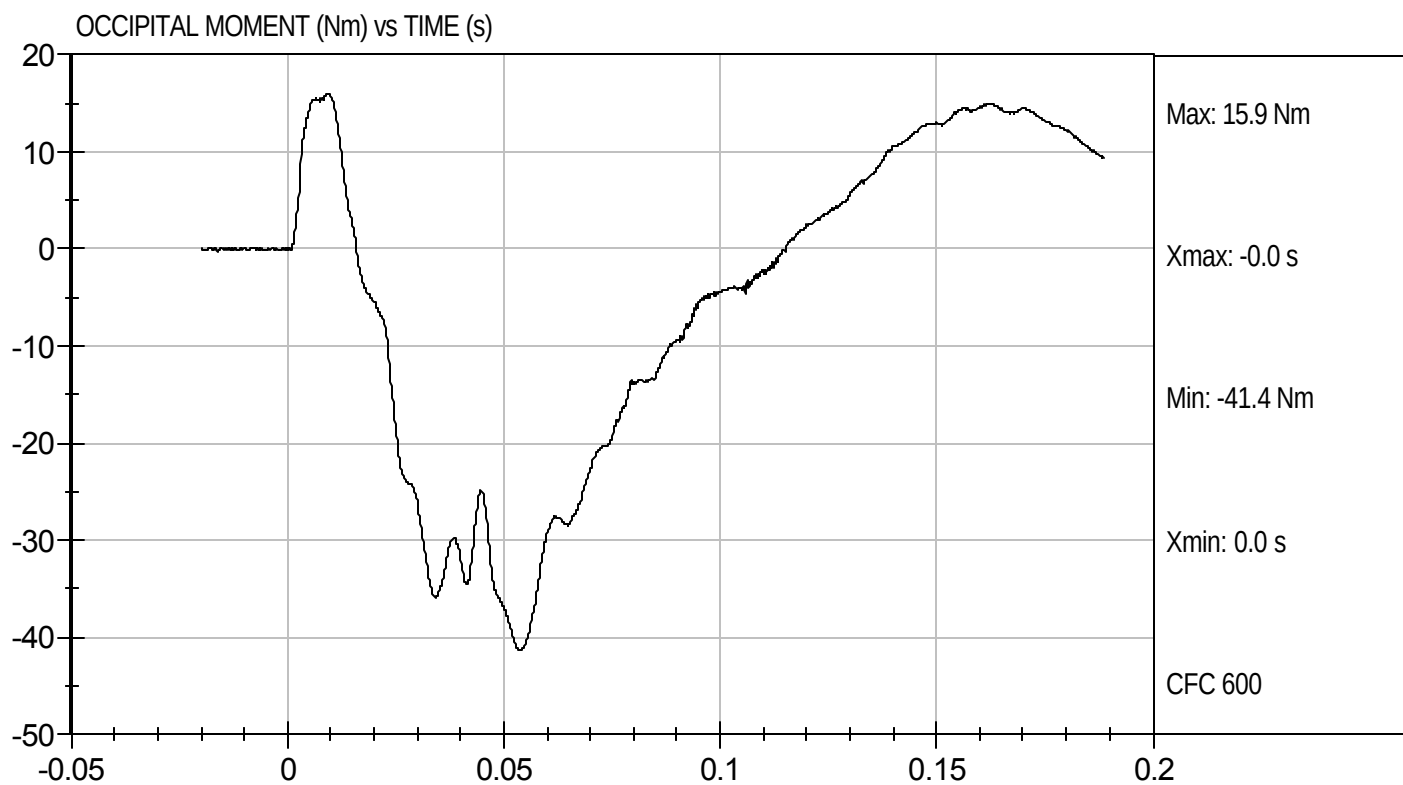
Test Date: 9/21/10
Velocity: 18.31 ft/s, 5.58 m/s





Test Desc: Neck Bending
Component ID: D103172

Test Date: 9/21/10
Velocity: 18.31 ft/s, 5.58 m/s

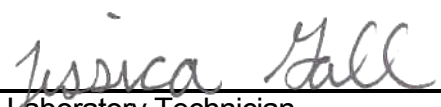


MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
SID-Its BUILD LEVEL D DUMMY

ATD Serial No: 296

Test ID: D103173

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	53	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Maximum Probe Acceleration	G's	13 to 18	15	Pass
Shoulder Displacement	mm	28 to 37	31	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	18	Pass
			Overall Test Results	Pass


Laboratory Technician

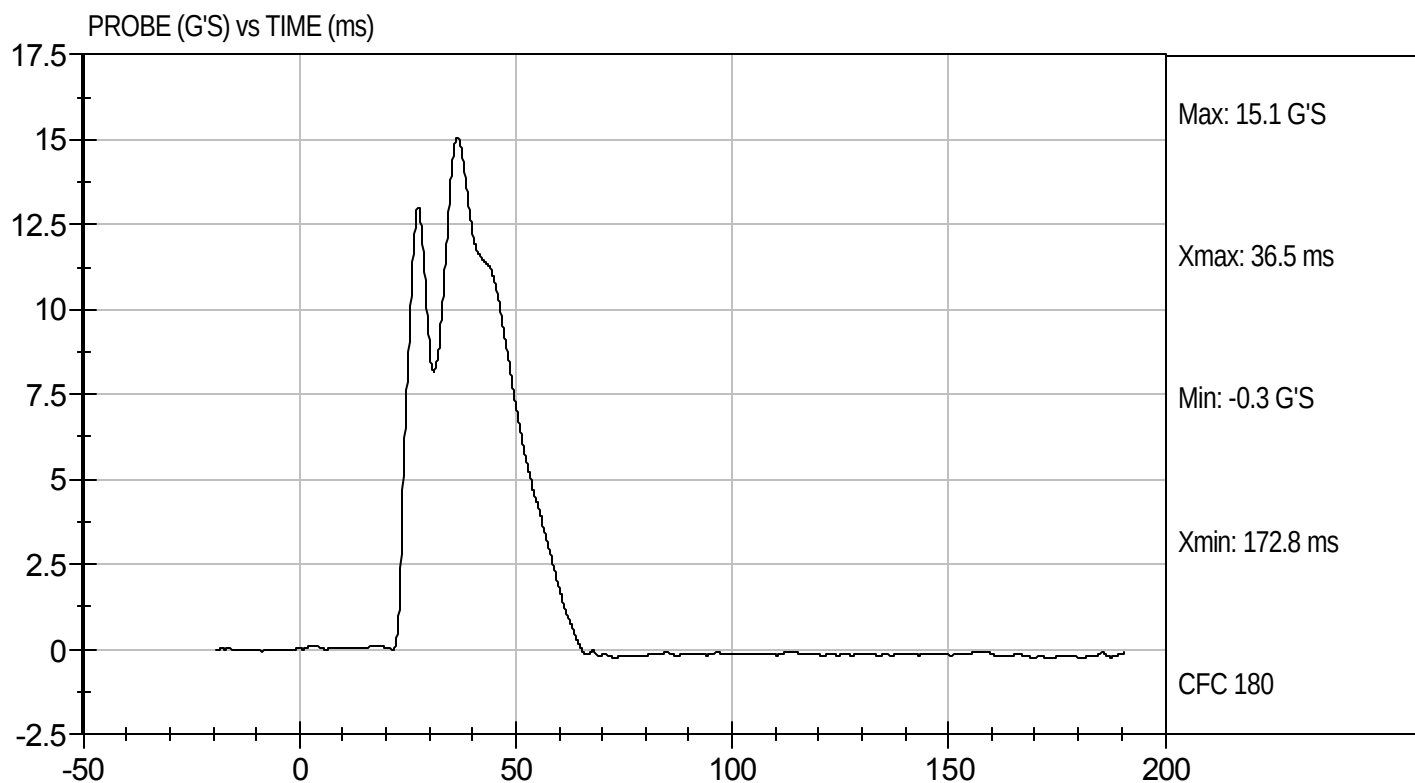
9/22/10
Test Date


Approved By



Test Desc: Shoulder Impact
Component ID: D103173

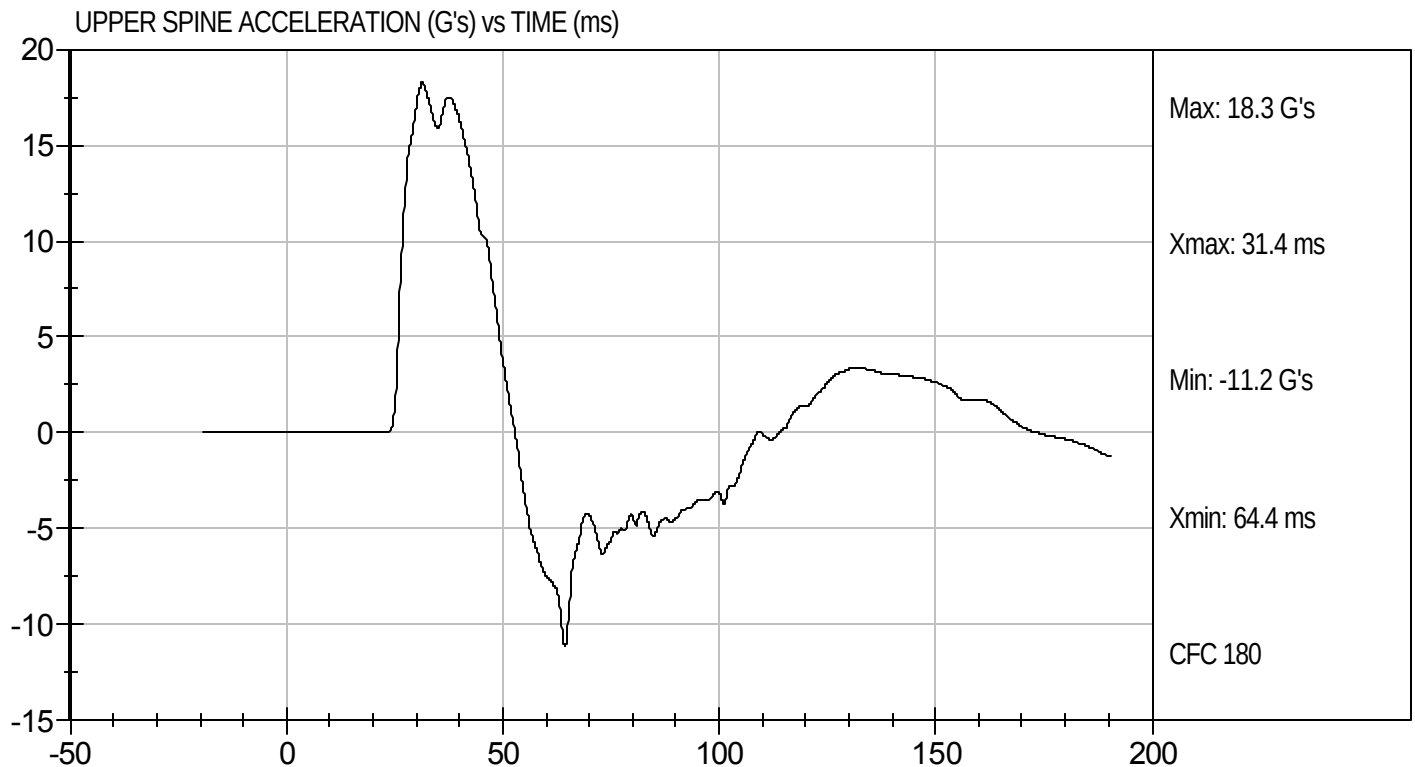
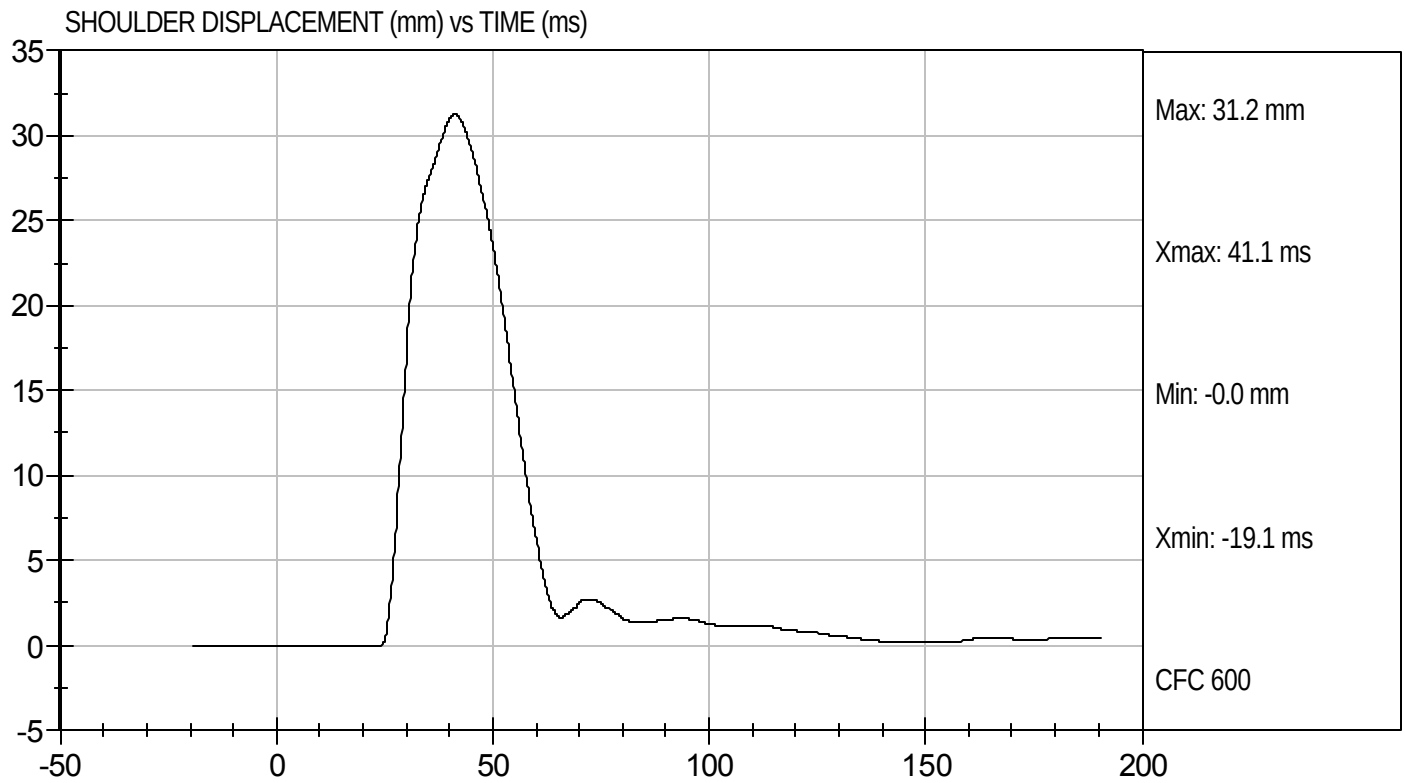
Test Date: 9/22/10
Velocity: 14.25 ft/s, 4.34 m/s





Test Desc: Shoulder Impact
Component ID: D103173

Test Date: 9/22/10
Velocity: 14.25 ft/s, m/s



MGA RESEARCH CORPORATION
THORAX (WITH ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D103174

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.6	Pass
Humidity	%	10 to 70	54	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	Pass
Peak Impactor Acceleration	G's	30 to 36	32	Pass
Shoulder Displacement	mm	31 to 40	34	Pass
Upper Rib Displacement	mm	25 to 32	26	Pass
Middle Rib Displacement	mm	30 to 36	31	Pass
Lower Rib Displacement	mm	32 to 38	34	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	36	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	31	Pass
Overall Test Results			Pass	


Laboratory Technician

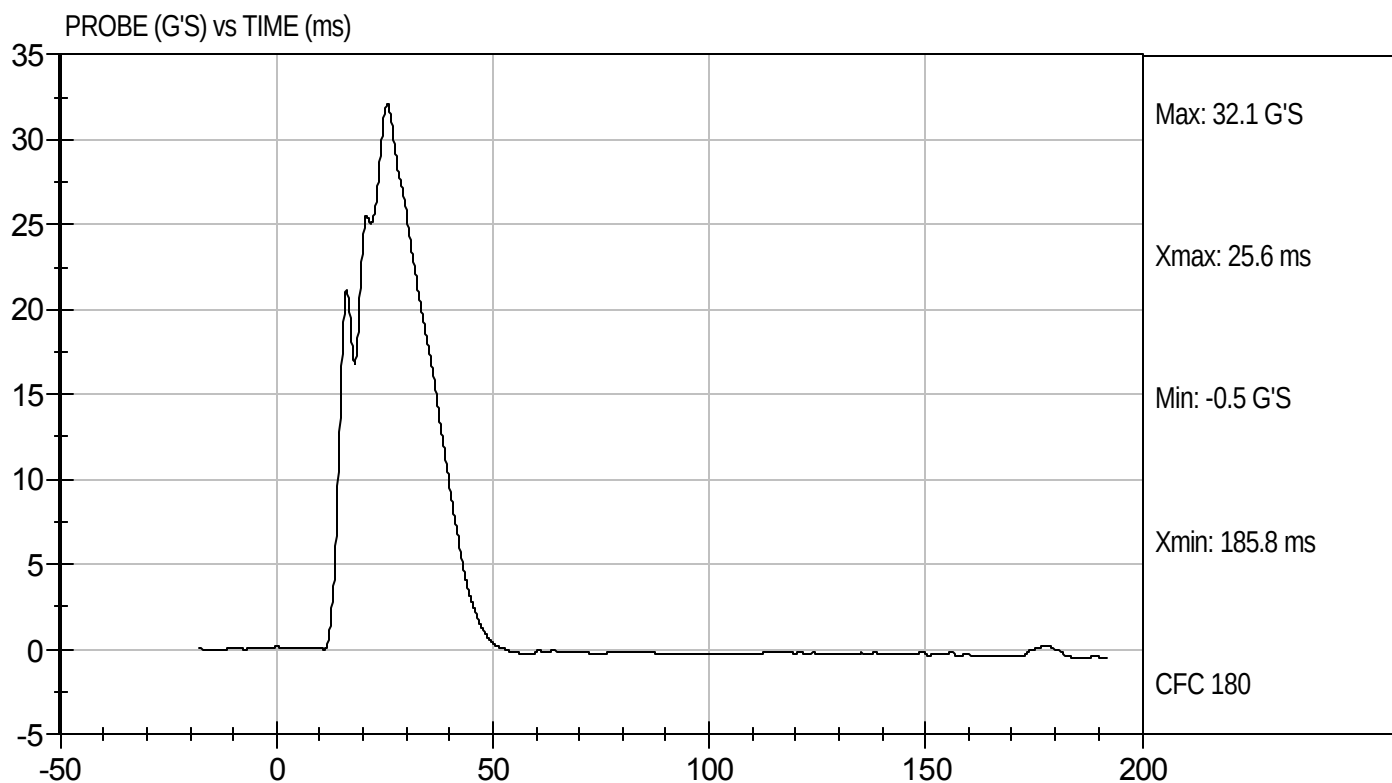
9/22/10
Test Date


Approved By



Test Desc: Thorax With Arm
Component ID: D103174

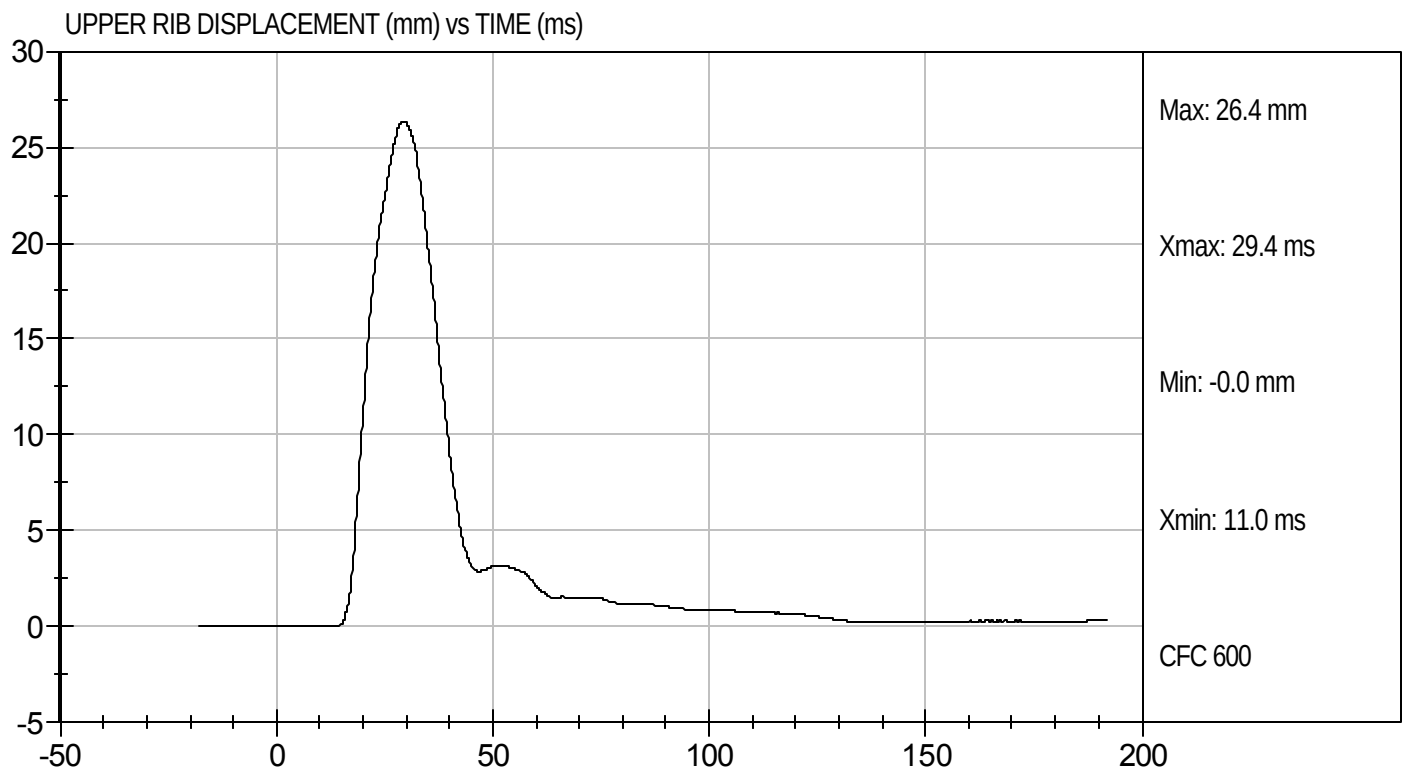
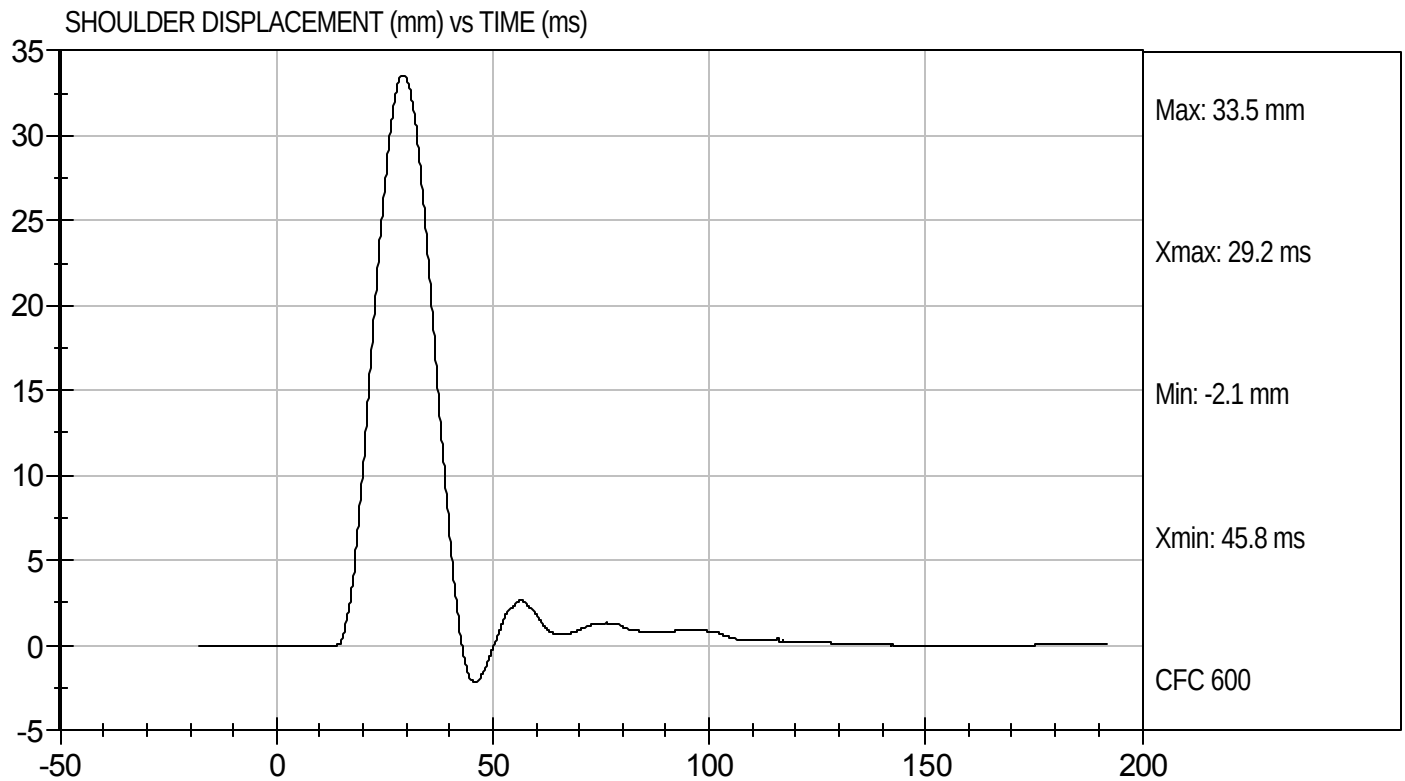
Test Date: 9/22/10
Velocity: 22.22 ft/s, 6.77 m/s





Test Desc: Thorax With Arm
Component ID: D103174

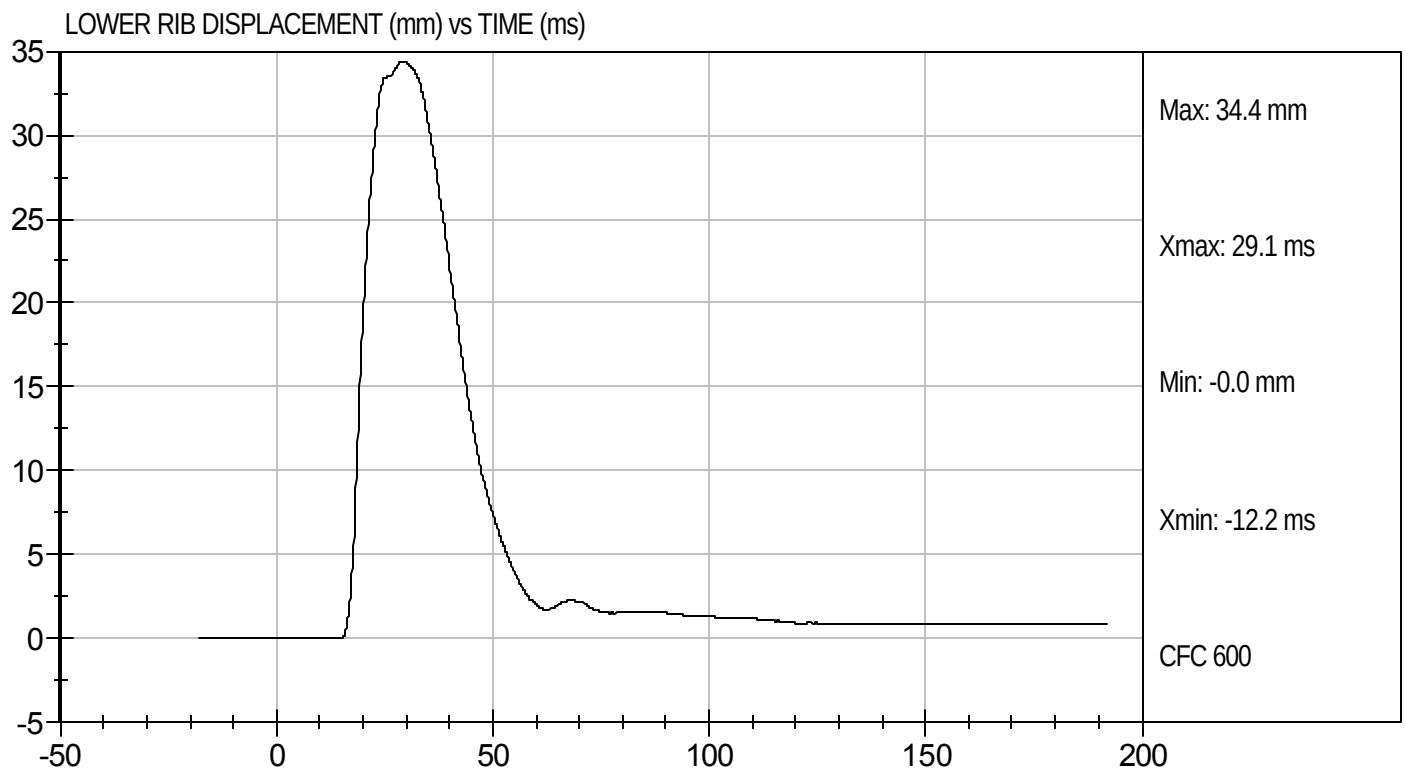
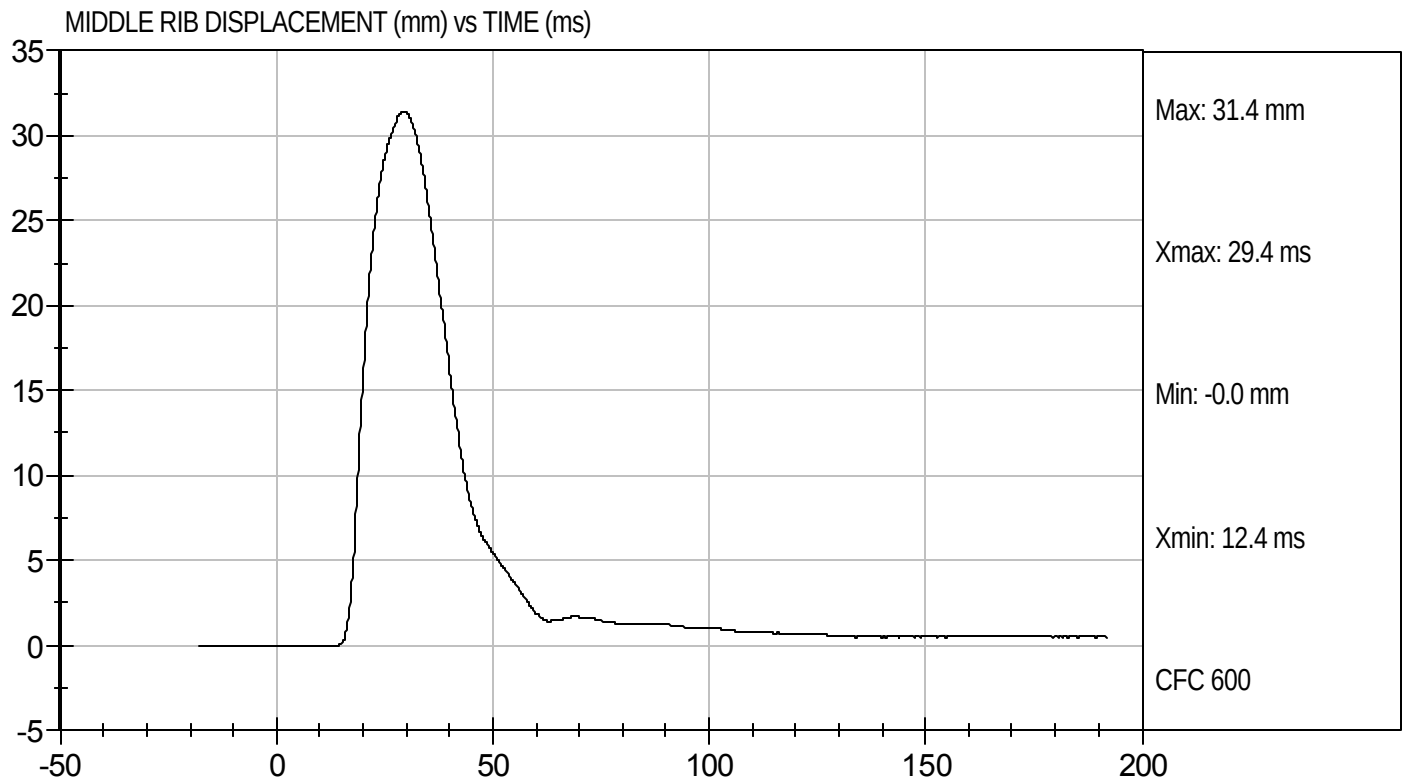
Test Date: 9/22/10
Velocity: 22.22 ft/s, 6.77 m/s





Test Desc: Thorax With Arm
Component ID: D103174

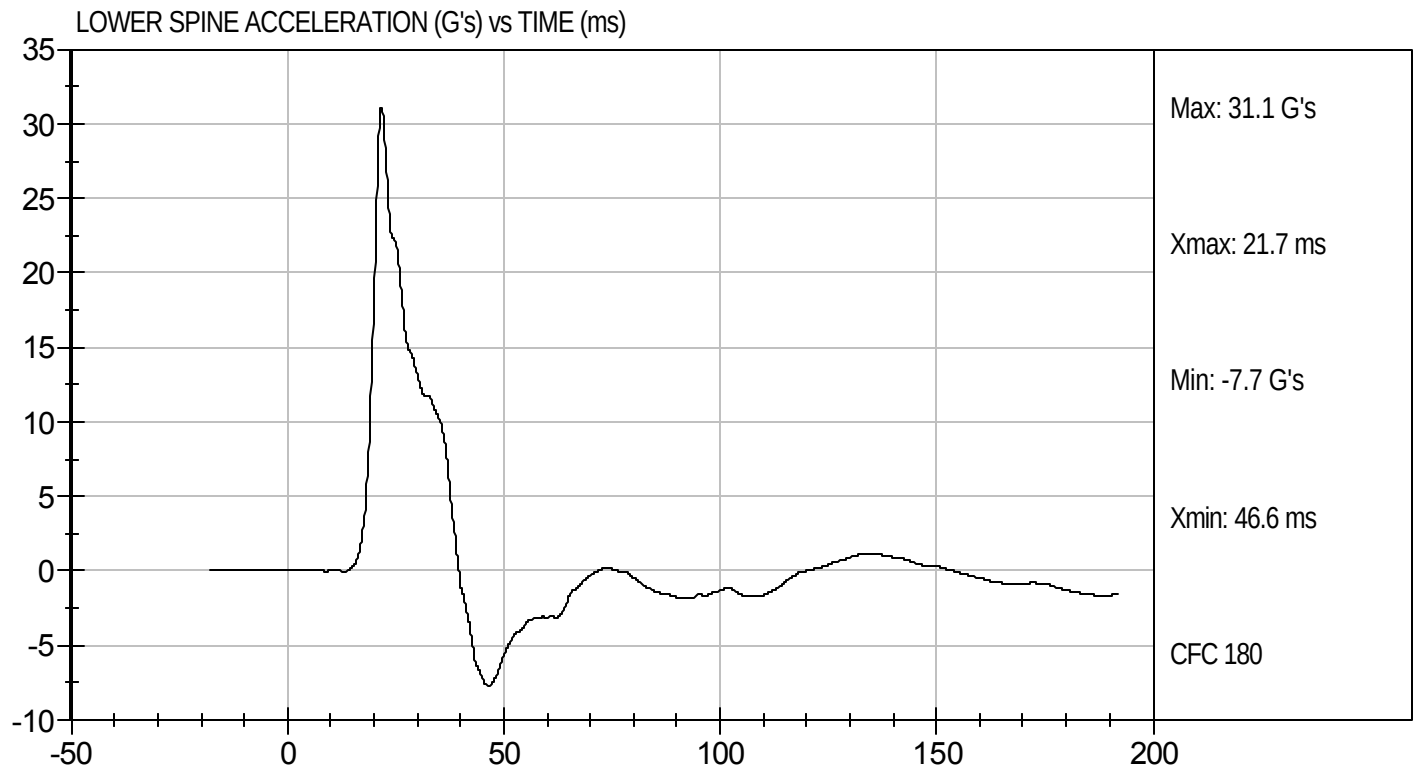
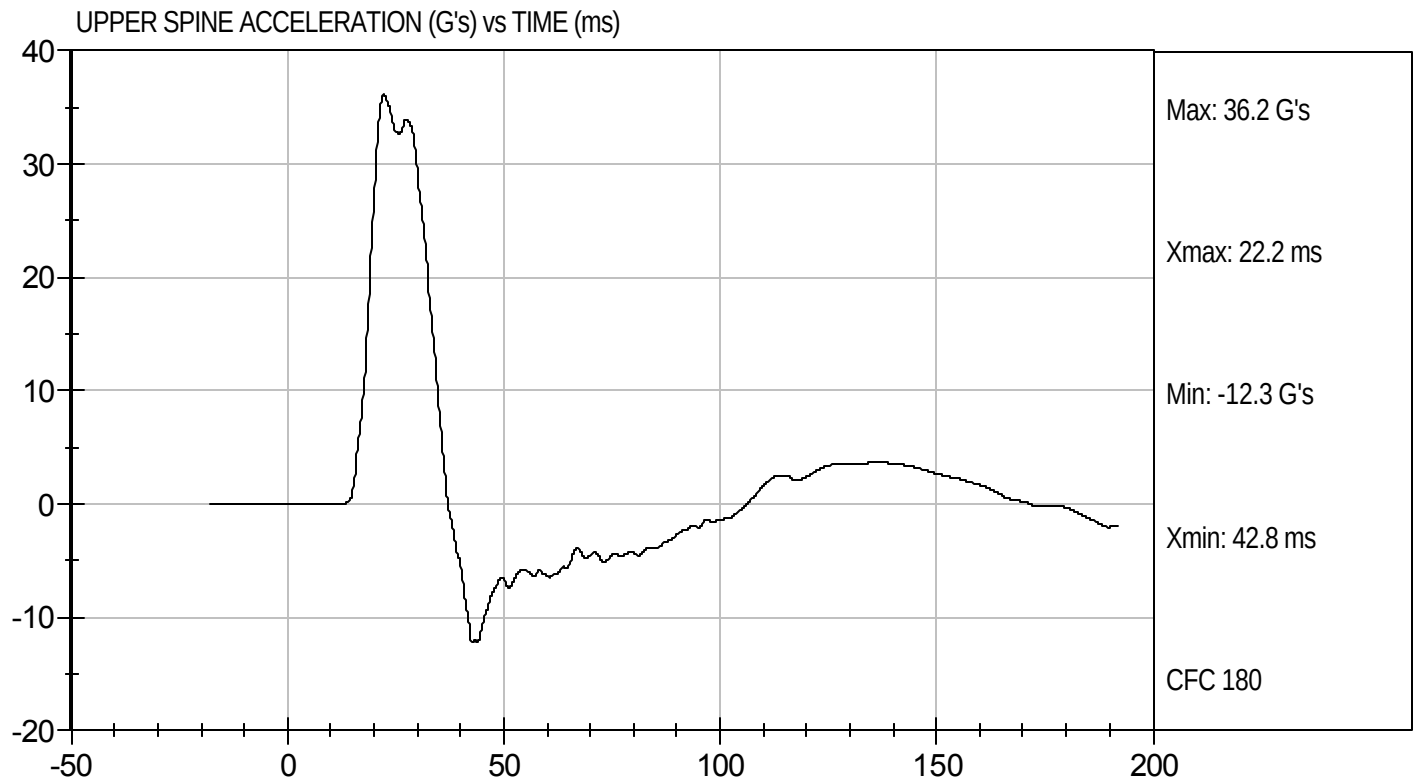
Test Date: 9/22/10
Velocity: 22.22 ft/s, 6.77 m/s





Test Desc: Thorax With Arm
Component ID: D103174

Test Date: 9/22/10
Velocity: 22.22 ft/s, 6.77 m/s

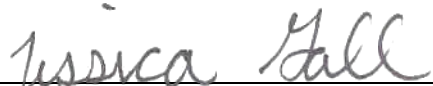


MGA RESEARCH CORPORATION
THORAX (WITHOUT ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D103175

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.8	Pass
Humidity	%	10 to 70	58	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Peak Impactor Force	G's	14 to 18	15	Pass
Upper Rib Displacement	mm	32 to 40	38	Pass
Middle Rib Displacement	mm	39 to 45	42	Pass
Lower Rib Displacement	mm	35 to 43	39	Pass
Upper Spine (T1) Y Acceleration	G's	13 to 17	14	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	9	Pass
Overall Test Results			Pass	


Laboratory Technician

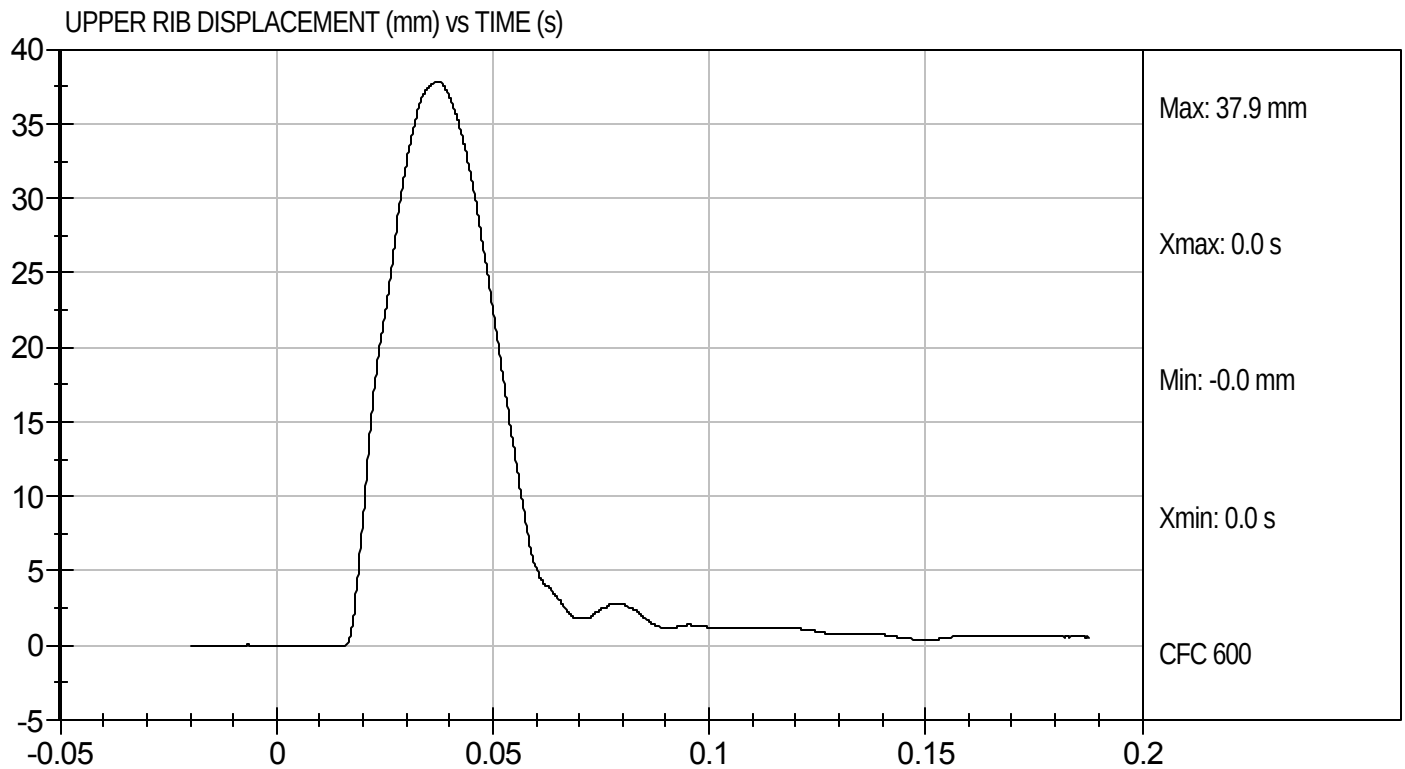
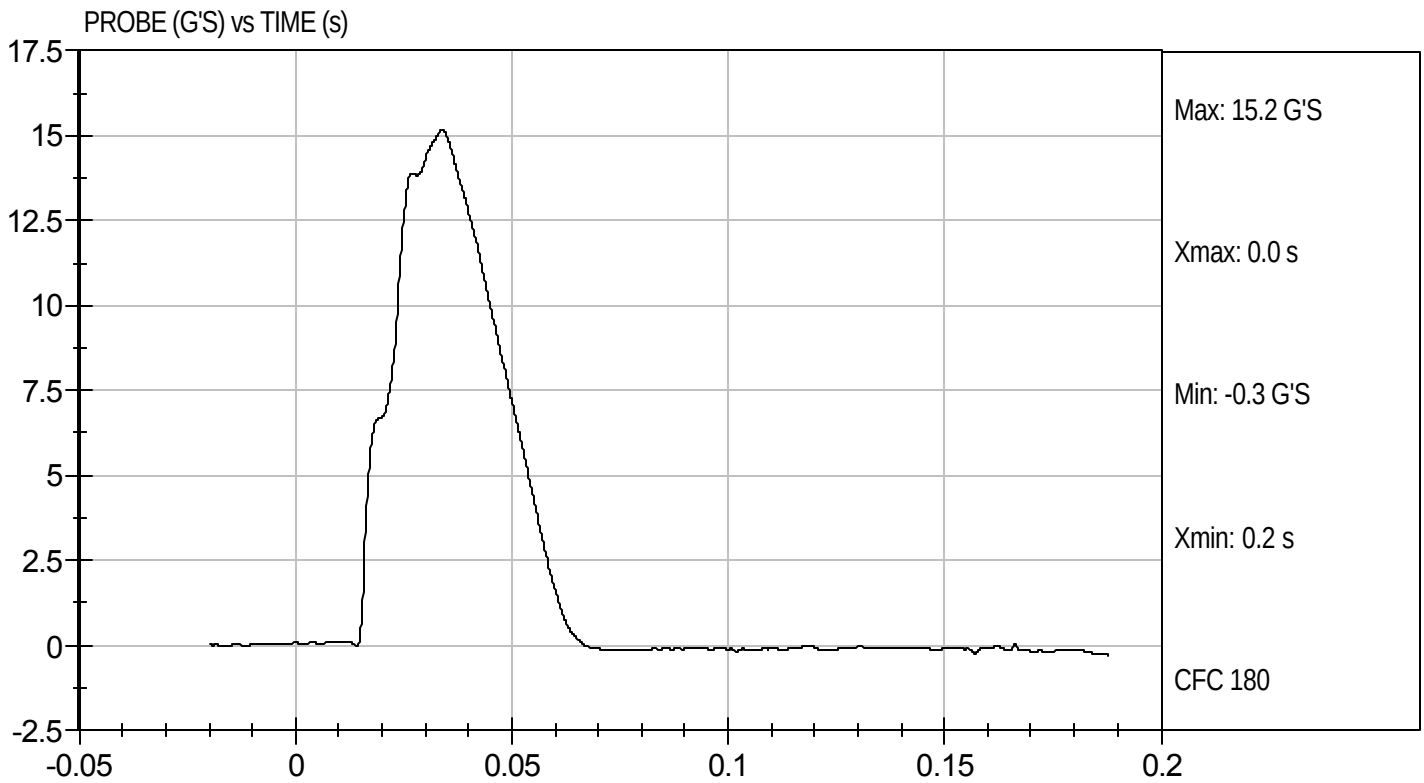
9/22/10
Test Date


Approved By



Test Desc: Thorax Without Arm
Component ID: D103175

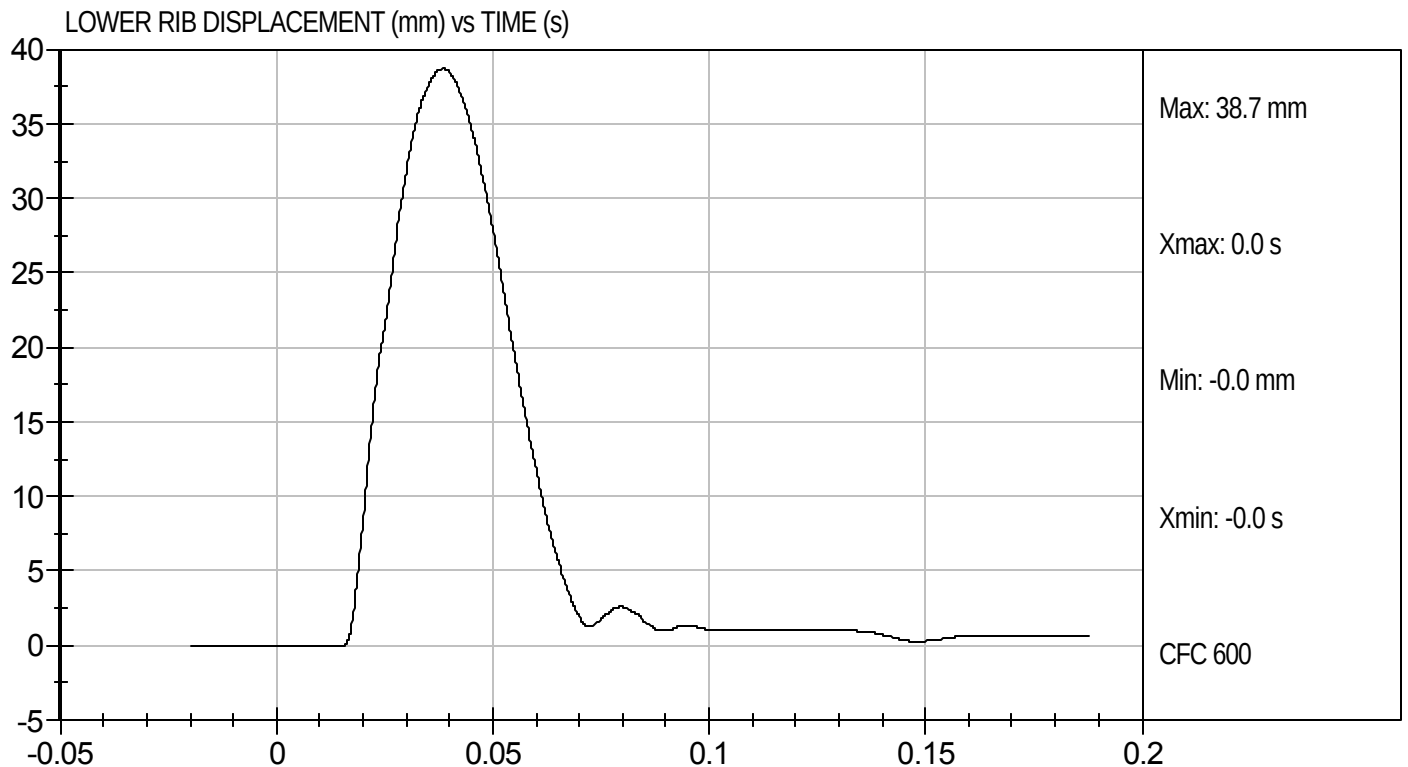
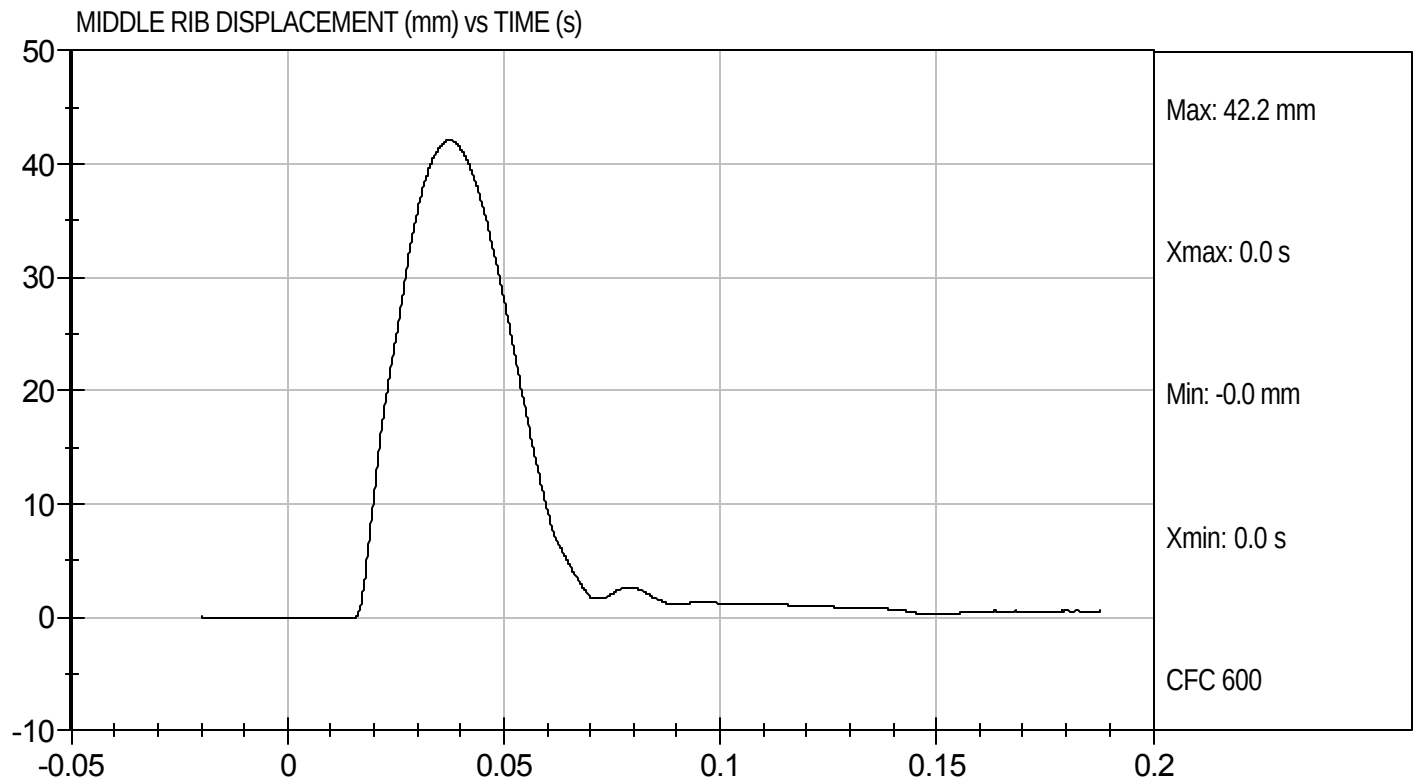
Test Date: 9/22/10
Velocity: 14.25 ft/s, 4.34 m/s





Test Desc: Thorax Without Arm
Component ID: D103175

Test Date: 9/22/10
Velocity: 14.25 ft/s, 4.34 m/s

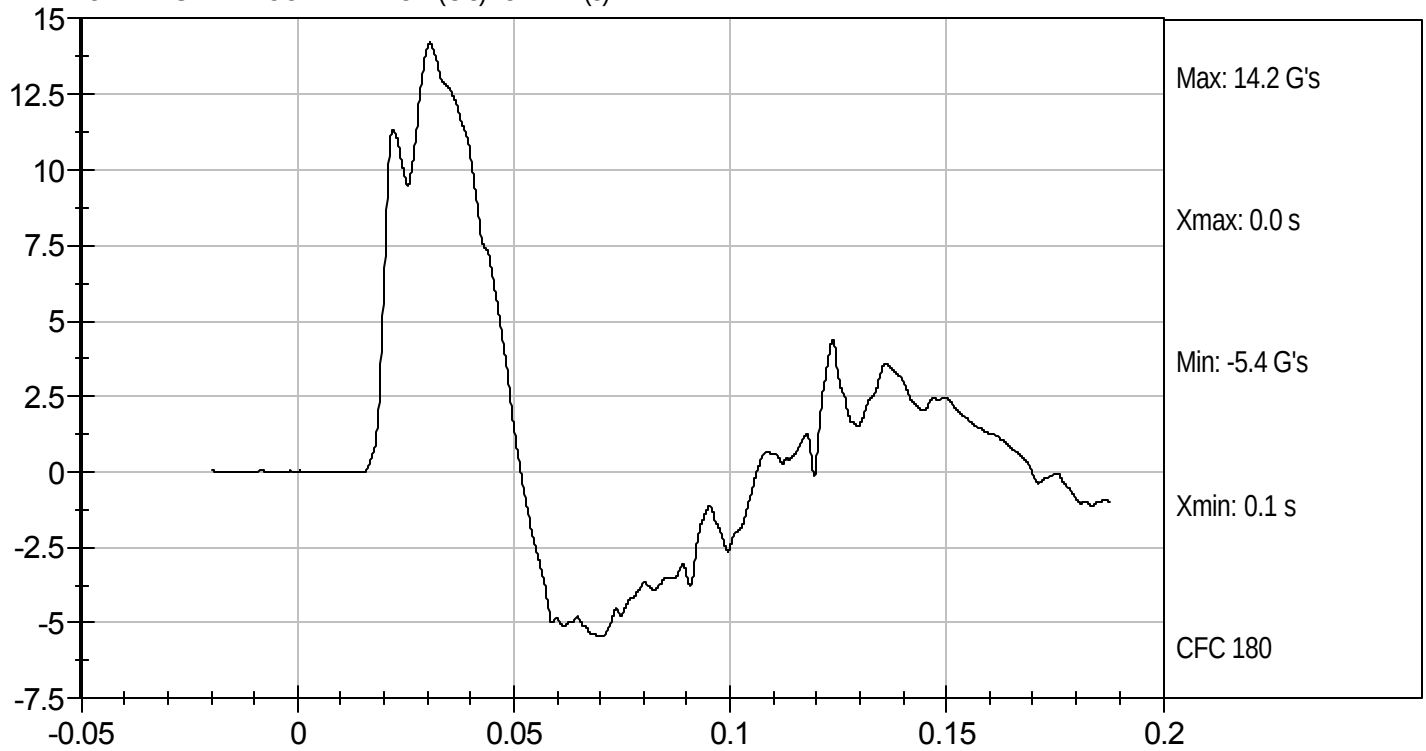




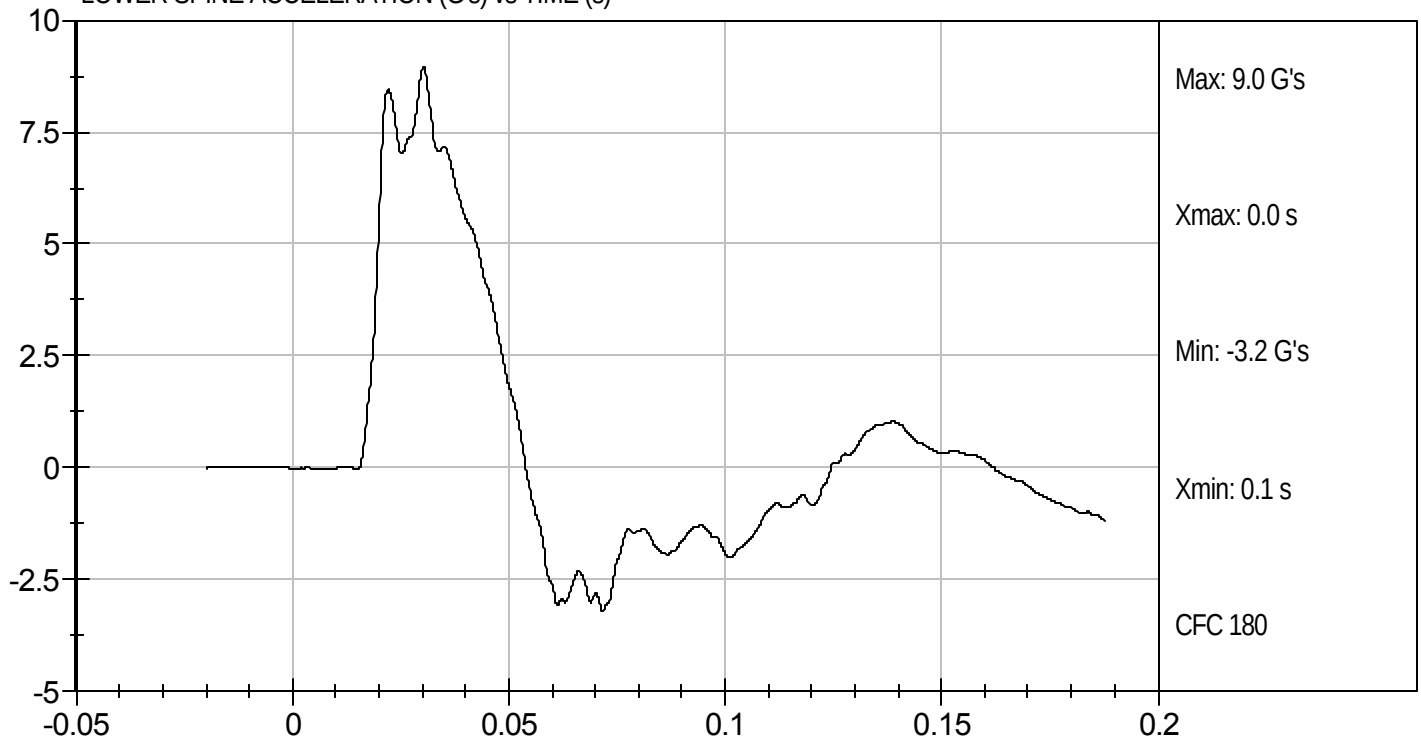
Test Desc: Thorax Without Arm
Component ID: D103175

Test Date: 9/22/10
Velocity: 14.25 ft/s, 4.34 m/s

UPPER SPINE ACCELERATION (G's) vs TIME (s)



LOWER SPINE ACCELERATION (G's) vs TIME (s)

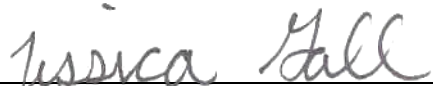


MGA RESEARCH CORPORATION
ABDOMINAL IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

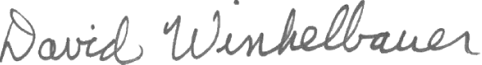
ATD Serial No: 296

Test I.D: D103176

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.9	Pass
Humidity	%	10 to 70	57	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Peak Impactor Acceleration	G's	12 to 16	14	Pass
Upper Rib Displacement	mm	36 to 47	43	Pass
Lower Rib Displacement	mm	33 to 44	38	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	11	Pass
			Overall Test Results	Pass


Laboratory Technician

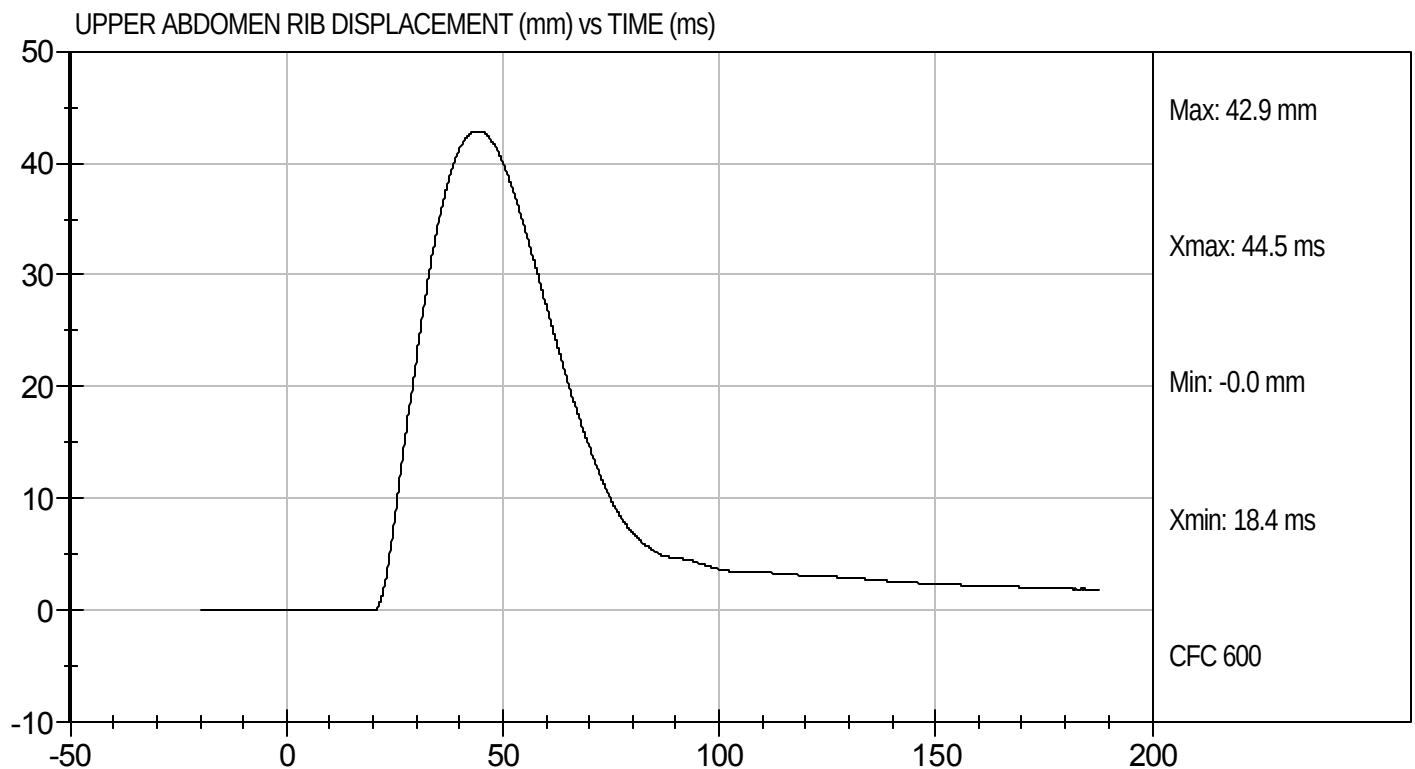
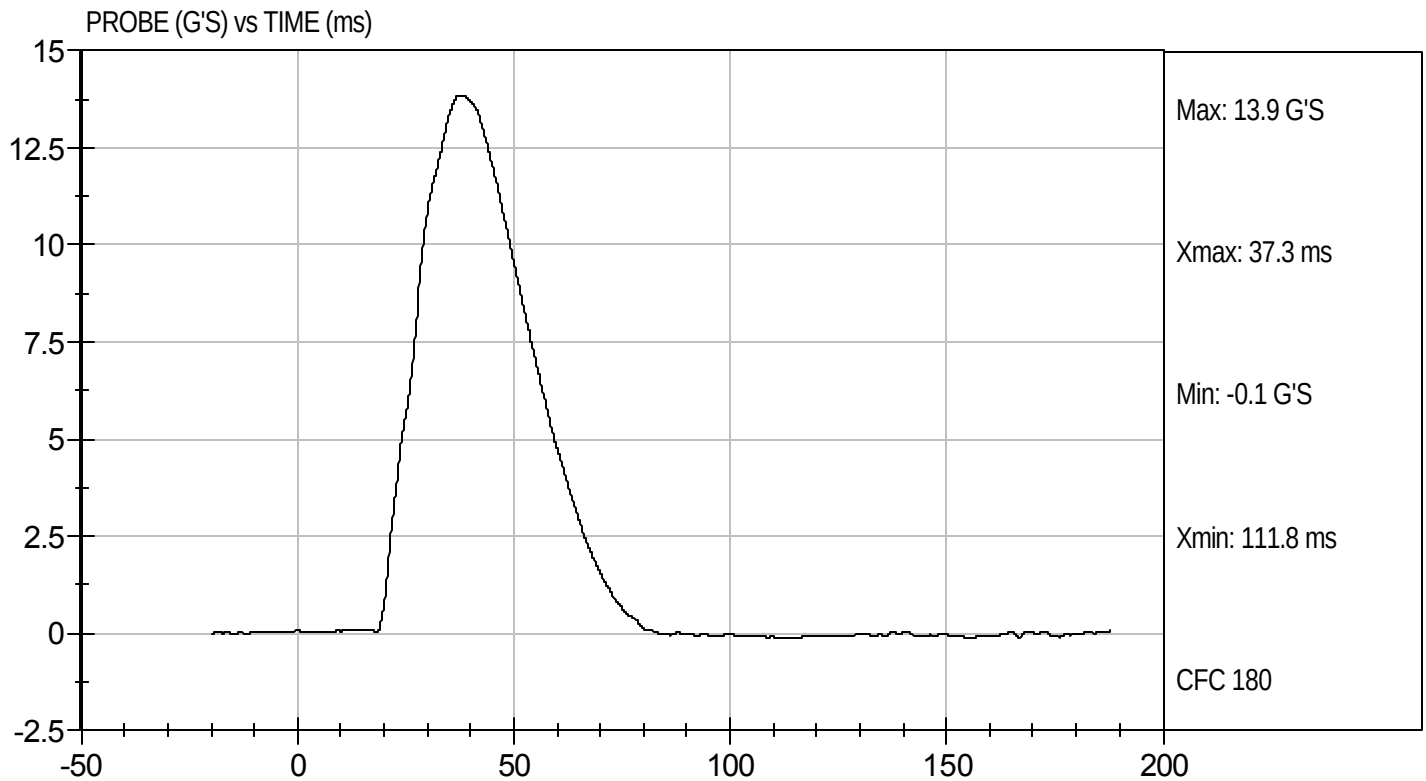
9/22/10
Test Date


Approved By



Test Desc: Abdomen Impact
Component ID: D103176

Test Date: 9/22/10
Velocity: 14.37 ft/s, 4.38 m/s

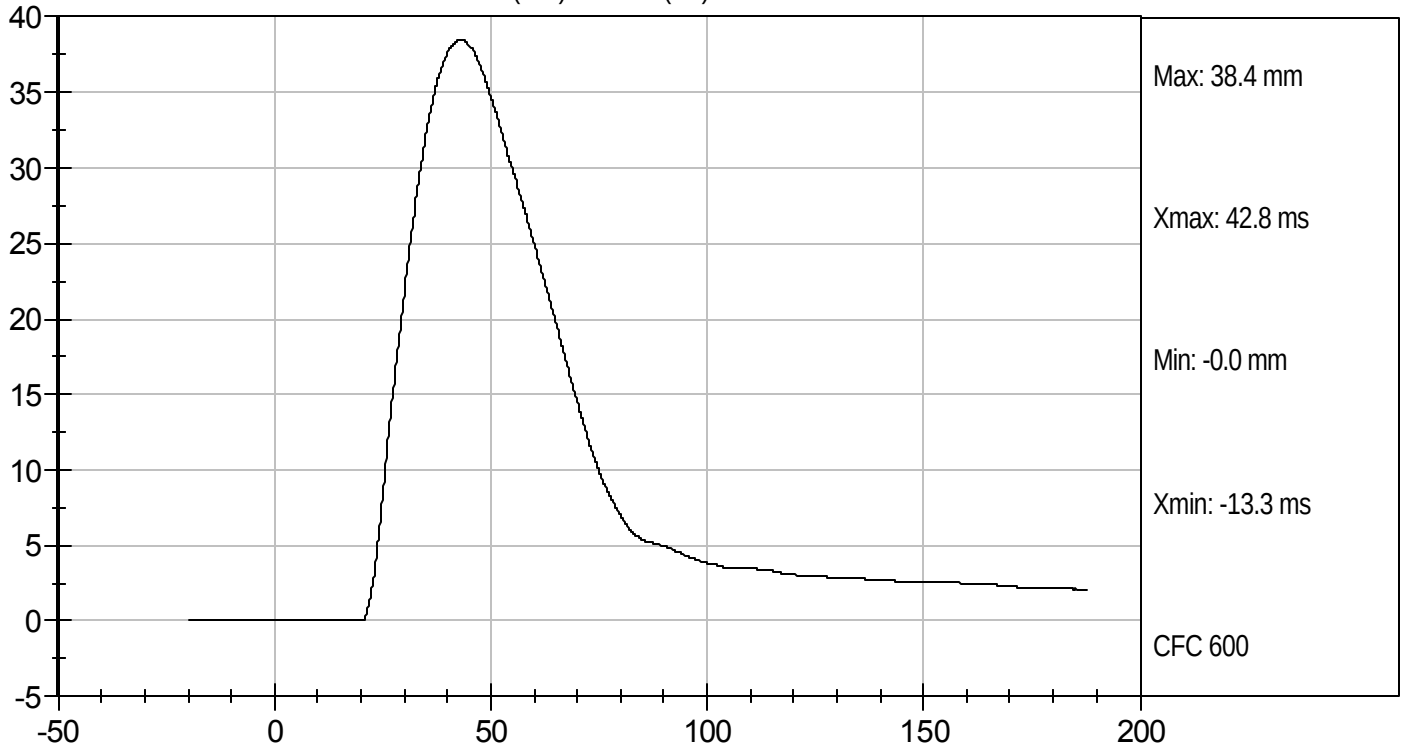




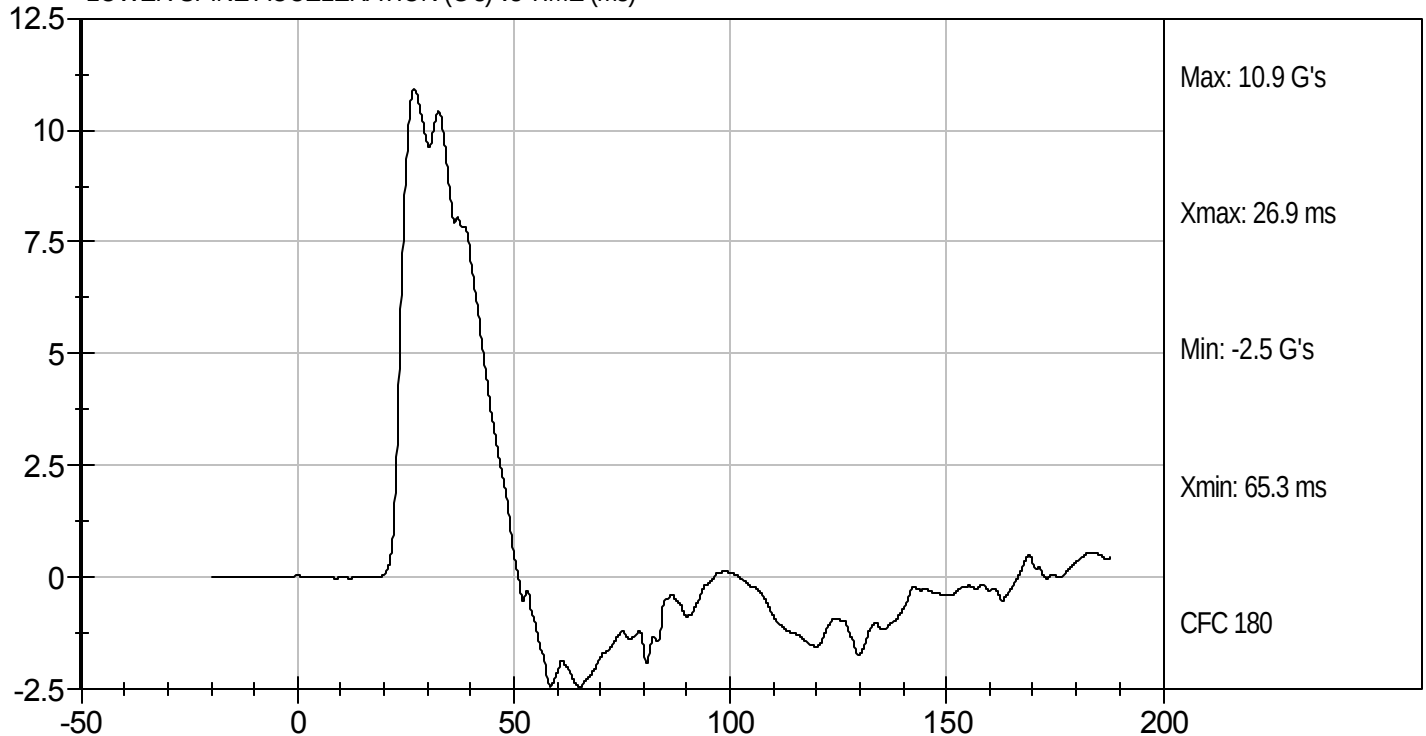
Test Desc: Abdomen Impact
Component ID: D103176

Test Date: 9/22/10
Velocity: 14.37 ft/s, 4.38 m/s

LOWER ABDOMEN RIB DISPLACEMENT (mm) vs TIME (ms)



LOWER SPINE ACCELERATION (G's) vs TIME (ms)



MGA RESEARCH CORPORATION
PELVIS IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D103177

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.0	Pass
Humidity	%	10 to 70	57	Pass
Impact Velocity	m/s	6.60 to 6.80	6.71	Pass
Peak Impactor Acceleration	G's	38 to 47	44	Pass
Pelvis Y Acceleration after 6 ms	G's	34 to 42	39	Pass
Peak Acetabulum Force	N	3600 to 4300	4123	Pass
Overall Test Results				Pass


Laboratory Technician

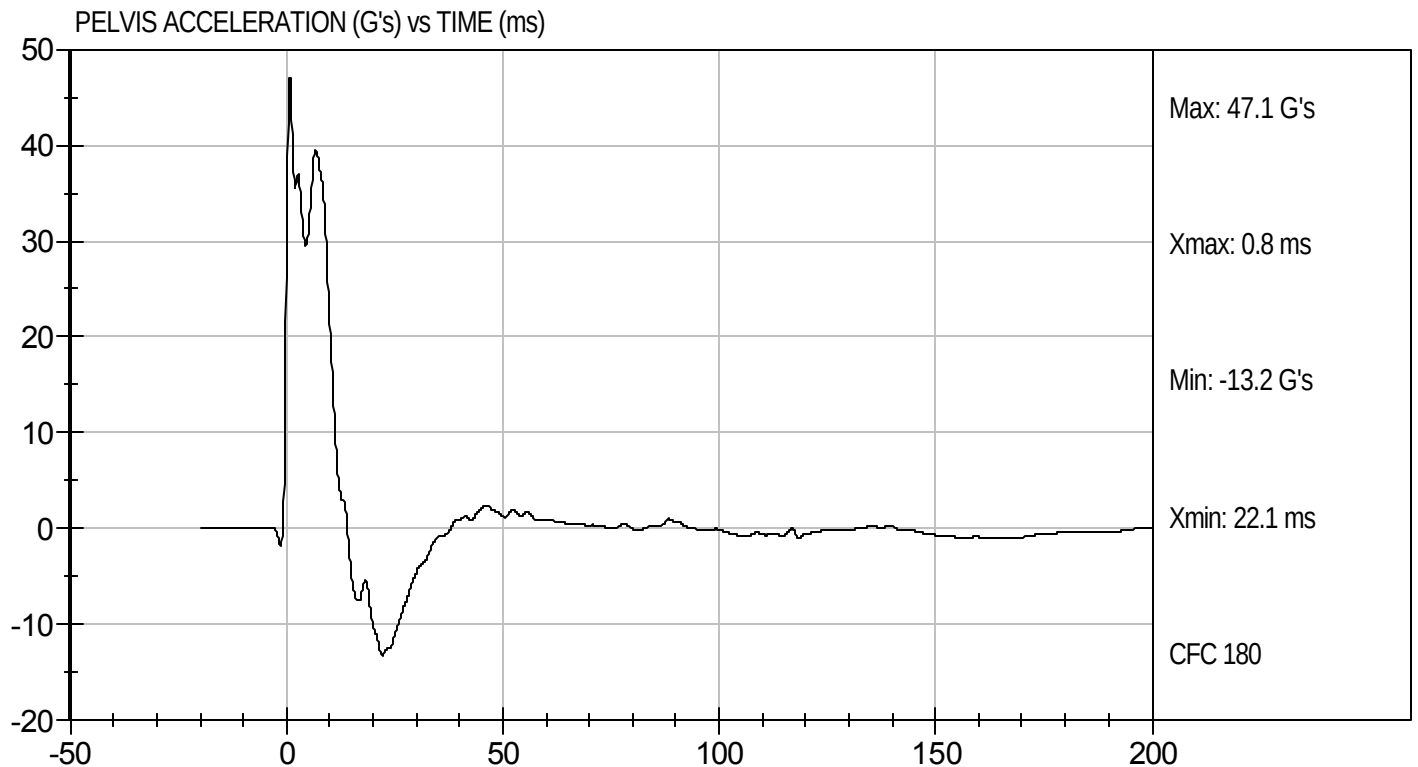
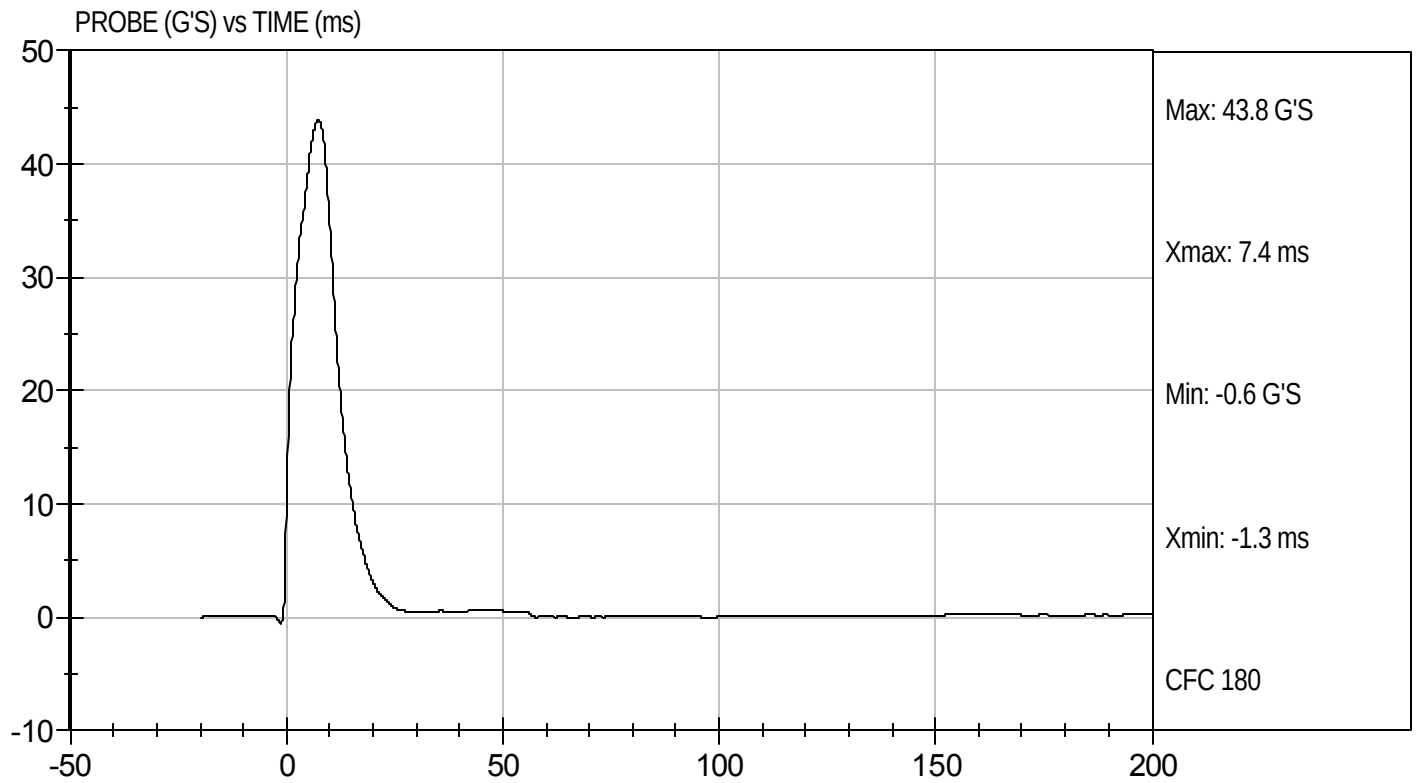
9/22/10
Test Date


Approved By



Test Desc: Pelvis Impact
Component ID: D103177

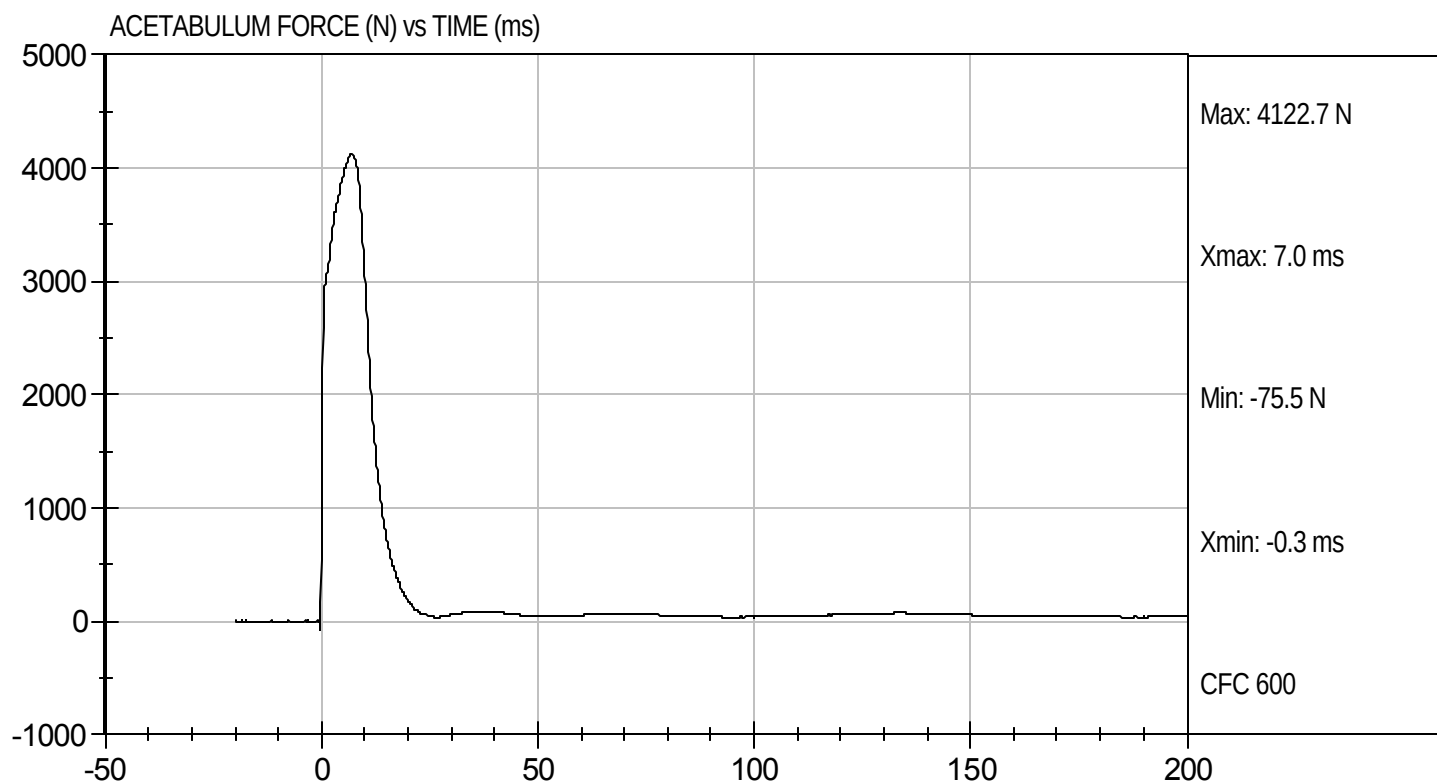
Test Date: 9/22/10
Velocity: 22.01 ft/s, 6.71 m/s





Test Desc: Pelvis Impact
Component ID: D103177

Test Date: 9/22/10
Velocity: 22.01 ft/s, 6.71 m/s

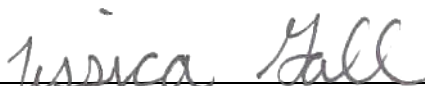


MGA RESEARCH CORPORATION
ILIAC IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D103178

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.1	Pass
Humidity	%	10 to 70	58	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Peak Impactor Acceleration	G's	36 to 45	37	Pass
Pelvis Y Acceleration	G's	28 to 39	33	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4518	Pass
Overall Test Results				Pass


Laboratory Technician

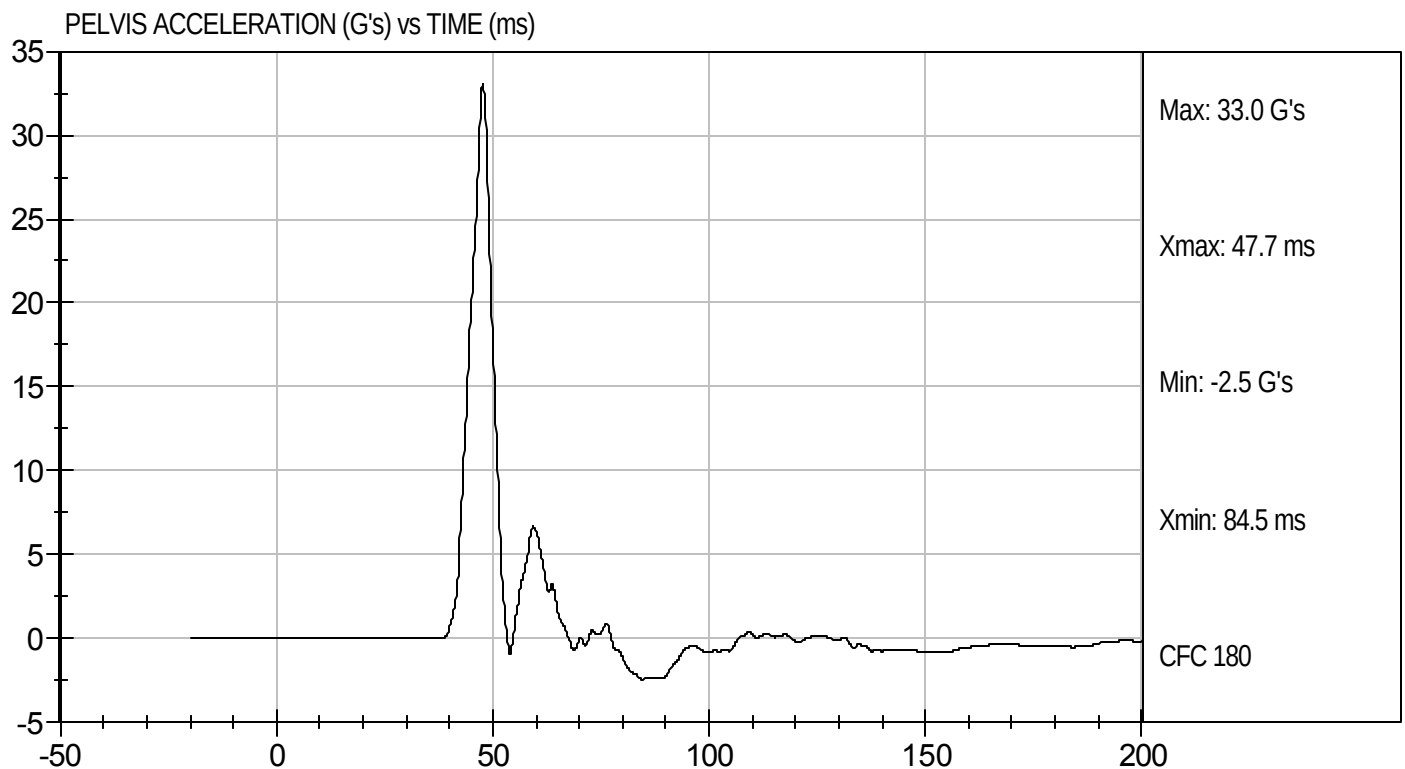
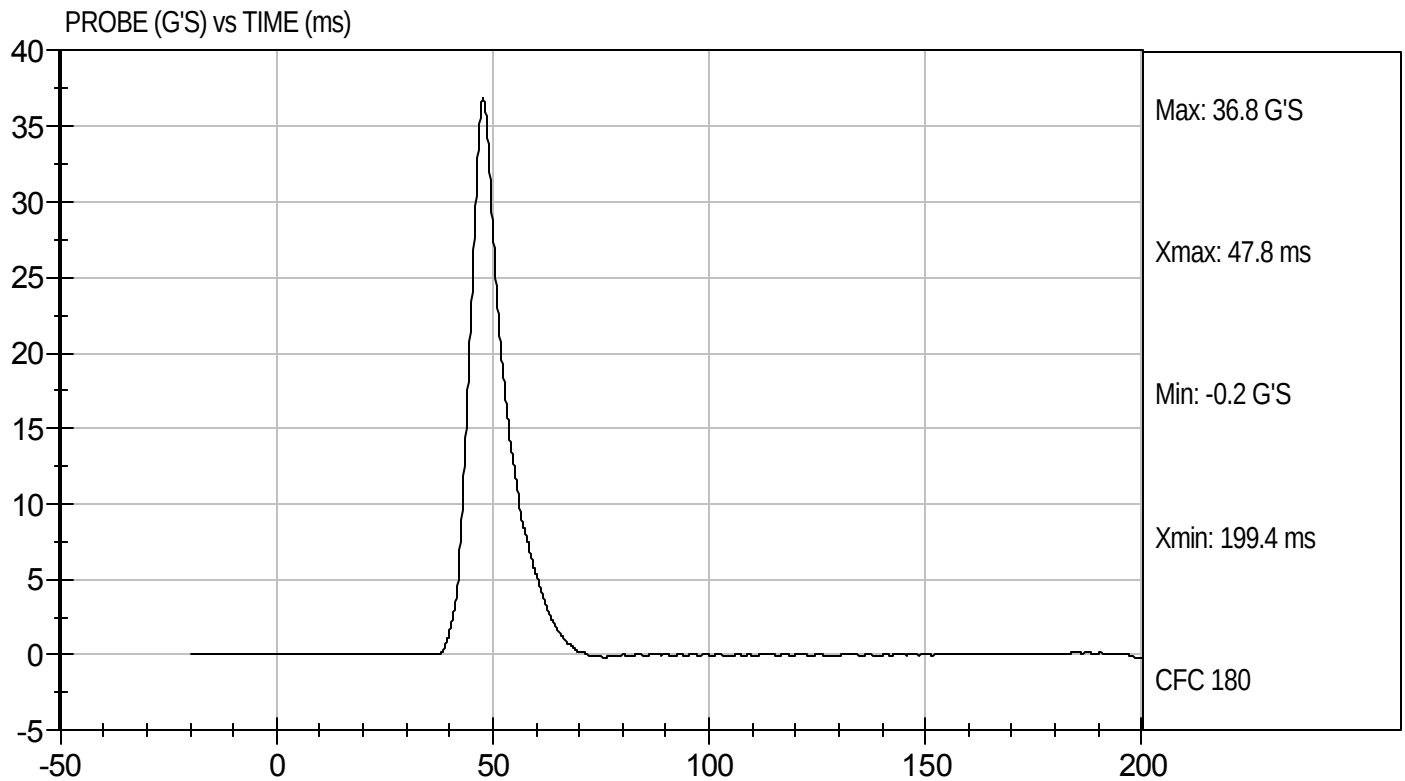
9/22/10
Test Date


Approved By



Test Desc: Iliac Impact
Component ID: D103178

Test Date: 9/22/10
Velocity: 14.37 ft/s, 4.38 m/s





Test Desc: Iliac Impact
Component ID: D103178

Test Date: 9/22/10
Velocity: 14.37 ft/s, 4.38 m/s

