

REPORT NUMBER: SPNCAP-MGA-2011-085

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

**NISSAN MOTOR CO., LTD.
2011 Nissan Leaf SL 5-Dr Hatchback
NHTSA No.: MB5218**

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



Test Date: June 21, 2011

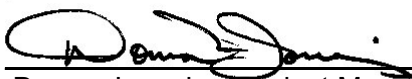
Final Report Date: July 25, 2011

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.

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Approval Date: July 25, 2011

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

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		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 2011 Nissan Leaf SL 5-Dr Hatchback 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 June 21, 2011. The impact velocity was 32.5 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 322 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>100</td> </tr> <tr> <td style="text-align: left;">Resultant Lower Spine Acceleration</td> <td>Gs</td> <td>82</td> <td>42</td> </tr> <tr> <td style="text-align: left;">Combined Acetabular and Iliac Pelvic Force</td> <td>N</td> <td>5525</td> <td>4390</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	100	Resultant Lower Spine Acceleration	Gs	82	42	Combined Acetabular and Iliac Pelvic Force	N	5525	4390
Measurement Description	Driver ATD (SID-IIs)																					
	Units	Threshold	Result																			
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Combined Acetabular and Iliac Pelvic Force	N	5525	4390																			
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 142	22. Price																			

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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 Nissan Leaf SL 5-Dr Hatchback. 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 Nissan Leaf SL 5-Dr Hatchback. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 32.5 km/h. The test was conducted by MGA Research Corporation in Burlington, Wisconsin, on June 21, 2011. 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	100	42	Iliac Wing	2185
			Acetabular	2343
			Sum	4390

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Left Front (Driver) P1		Left Rear (Passenger) P4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	Yes	No	
Knee Airbag	No		No	
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso/Pelvis 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
Driver Seat Track Y after 10 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 Nissan Leaf SL 5-Dr Hatchback
Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5218
Test Date: 6/21/2011

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	MB5218	Anti-Lock Brakes	Yes
Model Year	2011	All Wheel Drive	No
Make	Nissan	Power Steering	Yes
Model	Leaf	Driver Front Airbag	Yes
Body Style	5-Dr Hatchback	Driver Curtain Airbag	Yes
VIN	JN1AZ0CP8BT002473	Driver Head/Torso Airbag	No
Body Color	Super Black	Driver Torso Airbag	No
Delivery Date	6/10/2011	Driver Torso/Pelvis Airbag	Yes
Odometer (mi)	7	Driver Pelvis Airbag	No
Odometer (km)	11	Driver Knee Airbag	No
Dealer	Puente Hills Nissan	Rear Pass. Front Airbag	No
Transmission	Automatic	Rear Pass. Curtain Airbag	Yes
Final Drive	Front	Rear Pass. Head/Torso Airbag	No
Type/No. Cylinders	N/A	Rear Pass. Torso Airbag	No
Engine Displacement (L)	N/A	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	No
Does owner's manual provide instruction to turn off automatic door locks?			No

DATA FROM CERTIFICATION LABEL

Manufactured By	Nissan Motor Co., Ltd.	GVWR (kg)	1960
Date of Manufacture	4/11	GAWR Front (kg)	999
		GAWR Rear (kg)	966

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3		5	
Capacity Weight (VCW) (kg)				390	(A)
DSC x 68.04 kg				340	(B)
Cargo Weight (RCLW) (kg)				50	(A-B)

VEHICLE SEAT TYPE

Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
Front Seat	X					w/Lever	
Rear or Second Row			X		X		
Third Row Seat							

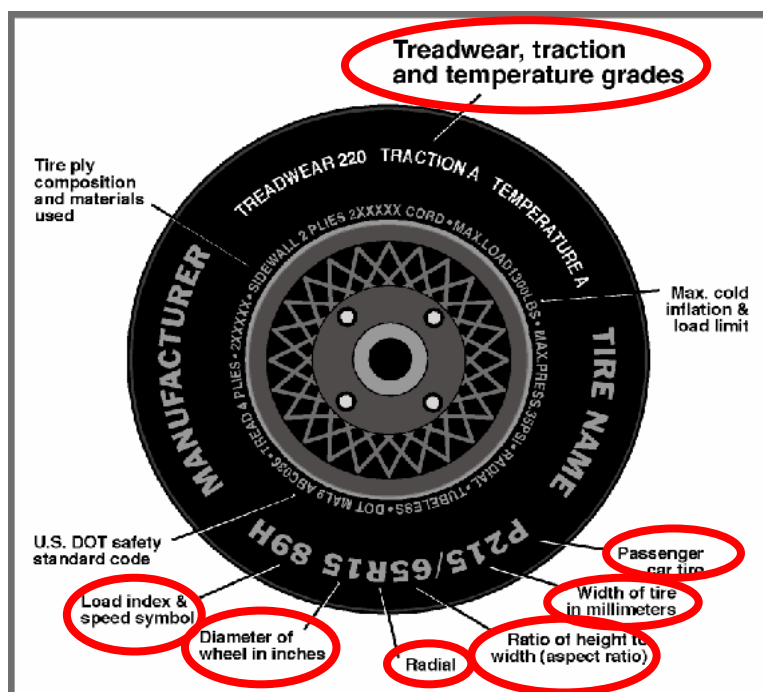
DATA SHEET NO. 1 (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Nissan Leaf SL 5-Dr Hatchback
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5218
 Test Date: 6/21/2011

VEHICLE TIRE INFORMATION



Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	250	250
Recommended Tire Size	P205/55R16	P205/55R16
Tire Size on Vehicle	P205/55R16	P205/55R16
Tire Manufacturer	Bridgestone	Bridgestone
Tire Model	Ecopia	Ecopia
Treadwear	400	400
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	1	1
Tire Plies Body	4	4
Load Index & Speed Symbol	89H	89H
Tire Material	Rubber	Rubber
DOT Safety Code Right	EL8K JBC 5210	EL8K JBC 5210
DOT Safety Code Left	EL8K JBC 5210	EL8K JBC 5210

DATA SHEET NO. 1 (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle:	2011 Nissan Leaf SL 5-Dr Hatchback	NHTSA No.	MB5218
Test Program:	NCAP Side Pole Impact Test	Test Date:	6/21/2011

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	422.8	345.2		448.6	385.1		442.7	389.2	
Right	kg	437.7	322.9		446.4	345.6		442.7	355.6	
Ratio	%	56.3	43.7		55.0	45.0		54.3	45.7	
Totals	kg	860.5	668.1	1528.6	895.0	730.7	1625.7	885.4	744.8	1630.2

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1528.6	(A)
Actual Weight of 1 P572V ATD (SID-IIs) ATD Used	kg	52.2	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	50	(C)
Calculated Target Vehicle Test Weight (TVTW)	kg	1630.8	(A+B+C)

TEST VEHICLE ATTITUDES AND CG

	Units	As Delivered	As Tested	Fully Loaded
Driver Door Sill Angle (front-to-rear)*	deg	-0.8	-0.5	-0.5
Front Passenger Sill Angle (front-to-rear)*	deg	-0.7	-0.5	-0.4
Front Bumper Angle (left-to-right)**	deg	-0.1	-0.1	-0.1
Rear Bumper Angle (left-to-right)**	deg	-0.3	-0.3	-0.3
Vehicle CG (Aft of Front Axle)	mm	1180	1214	1234
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	4	20	16

*Front up is positive ** Left up is positive

GENERAL VEHICLE TEST DATA

Measurement Description	Units	Value
Weight of Ballast in Cargo Area	kg	0.0
Weight of Vehicle Components Removed	kg	24.0

Vehicle components removed to meet target vehicle test weight: Right tail light, trunk carpet, passenger side mirror, charger for battery.

TEST VEHICLE IMPACT POINT DATA

Measurement Parameter	Units	Value
Vertical Impact Reference Line (Aft of Front Axle)	mm	1048
Actual Impact Point (Aft of Front Axle)	mm	1046
Impact Point Difference (- forward / + rearward)	mm	-2

DATA SHEET 1A
ELECTRIC VEHICLE PARAMETER DATA

Test Vehicle: 2011 Nissan Leaf SL 5-Dr Hatchback NHTSA No. MB5218
 Test Program: NCAP Side Pole Impact Test Test Date: 6/21/2011

Type of Electric Vehicle (Electric/Hybrid):	Electric
Propulsion Battery Type:	Lithium-Ion
Nominal Voltage (V):	360 V
Physical Location of Automatic Propulsion Battery Disconnect:	Inside the battery pack system
Auxiliary Battery Type:	Lead Acid Battery

PROPULSION BATTERY SYSTEM DATA (COTR SUPPLIED DATA)

Electrolyte Fluid Type:	Organic Electrolyte
Electrolyte Fluid Specific Gravity:	1.192 (@20°C)
Electrolyte Kinematic Viscosity (centistokes):	4.8 (@20°C)
Electrolyte Fluid Color:	Clear
Propulsion Battery Coolant Type, Color, Specific Gravity (if applicable):	Air
Location of Battery Modules:	Inside Passenger Compartment
	X Outside Passenger Compartment

MEASURE AND RECORD BATTERY STATE OF CHARGE

X	Maximum State of Charge recommended by manufacturer:	400 V
X	Test Voltage (>95% of Maximum State of Charge):	> 380 V
	Test Voltage (Within Normal Operating Voltage Range):	

VEHICLE CHASSIS GROUND POINT(S) LOCATION(S)

Details of Vehicle Chassis Ground Point(s) & Locations(s)	Rear fender RH Side
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PROPULSION BATTERY SYSTEM

Details of Propulsion Battery Components	Traction side inside battery module (+ terminal) (- terminal)
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DATA SHEET NO. 2

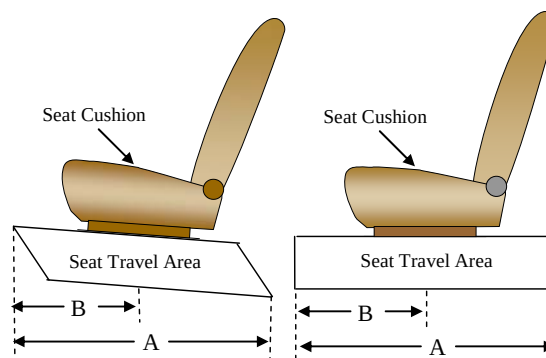
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT, AND FUEL SYSTEM DATA

Test Vehicle: 2011 Nissan Leaf SL 5-Dr Hatchback
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5218
 Test Date: 6/21/2011

SEAT FORE/AFT POSITIONS

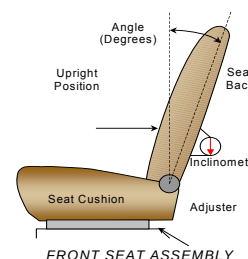
The driver seat was a manual fore/aft adjustable seat with manual height/angle adjustment. The seat travel was set as specified in Appendix B of the TP dated January 2010. The right front passenger seat was set to match the driver seat. The rear passenger seats were fixed.



SEAT FORE/AFT POSITIONING	Total Fore/Aft Travel	Placed in Detent # or Position
Driver Seat	20 detents (1 st as 0)	0 (forward-most as 0)
Front Passenger Seat	20 detents (1 st as 0)	0 (forward-most as 0)
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 on the headrest post.



SEAT BACK ANGLE	Degrees	Detents
Driver Seat Back Angle with Seated Dummy	3.4	
Front Passenger Seat Back Angle	2.3	
Struck Side Rear Seat Back Angle		Fixed
Non-Struck Side Rear Passenger Seat Back Angle		Fixed

SEAT BELT UPPER ANCHORAGE

The driver seat belt upper anchorage was set at the manufacturer's specified placement in Form 1.

SEAT BELT UPPER ANCHORAGES	Total # of Positions	Placed in Position #
Driver Seat	4 (1 st as 1)	0 (uppermost as 0)

DATA SHEET NO. 2 (CONTINUED)

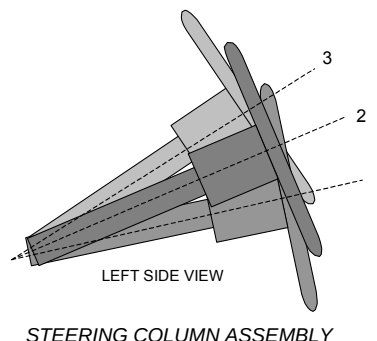
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT, AND FUEL SYSTEM DATA

Test Vehicle: 2011 Nissan Leaf SL 5-Dr Hatchback
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5218
 Test Date: 6/21/2011

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.



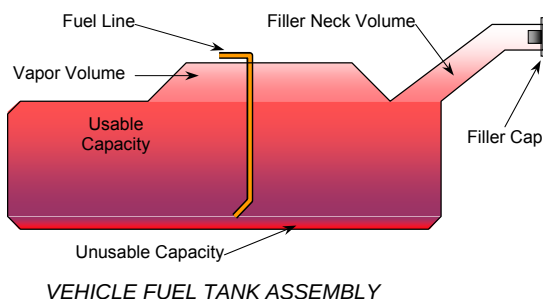
STEERING COLUMN POSITIONING

	Degrees	Fore/Aft Position (mm)
Lowermost - Position 1	66.2	
Geometric Center – Position 2	63.7	
Uppermost – Position 3	61.2	
Telescoping Steering Wheel Travel		
Test Position	63.7	

FUEL PUMP

Describe the fuel pump type, its behavior, and the location of the fuel filler pipe.

NONE



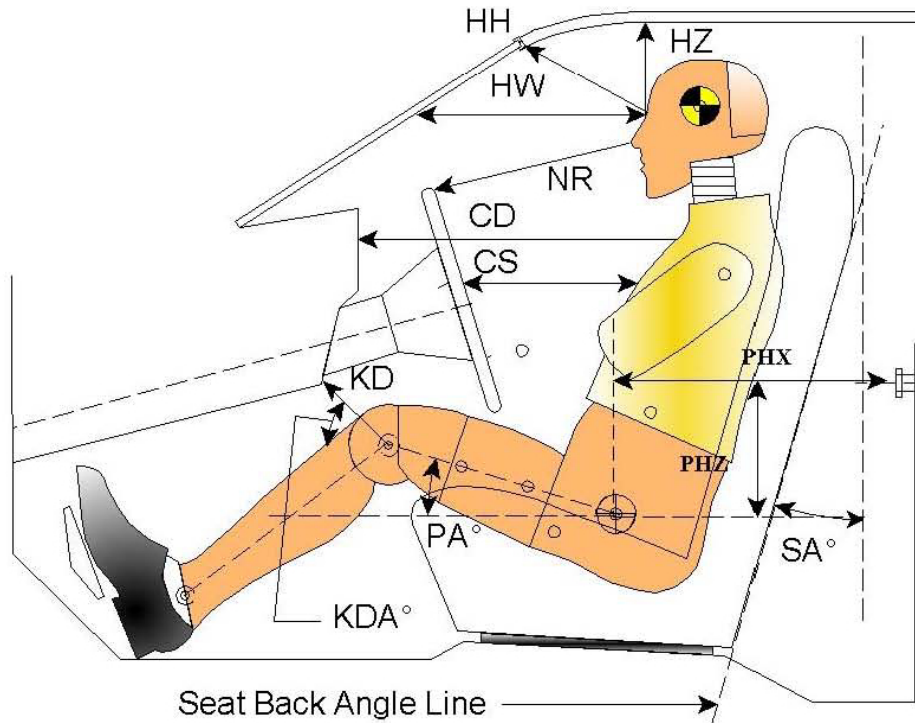
FUEL TANK CAPACITY DATA

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

.DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2011 Nissan Leaf SL 5-Dr Hatchback
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5218
 Test Date: 6/21/2011

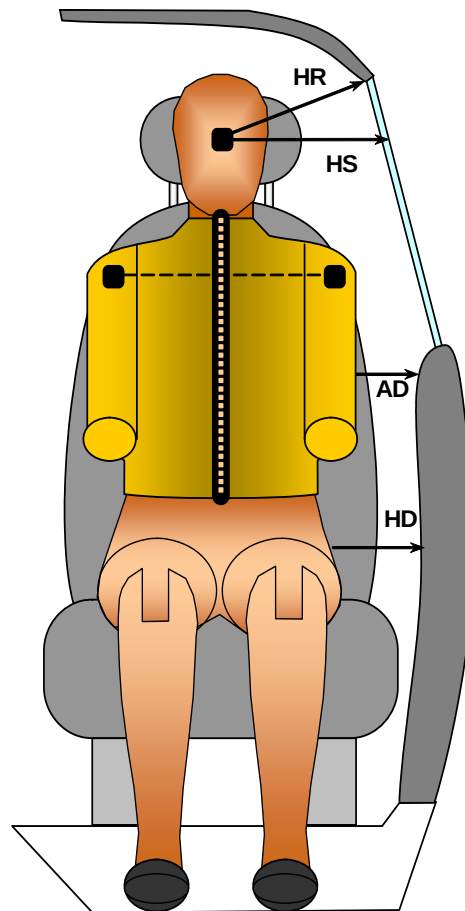


Code	Measurement Description	Driver S/N 296	
		Length (mm)	Angle (°)
HH	Head to Header	335	
HW	Head to Windshield	724	
HZ	Head to Roof	227	
NR	Nose to Rim	239	
CD	Chest to Dash	399	
CS	Chest to Steering Wheel	161	
KDL/KDAL	Left Knee to Dash	90	48.7
KDR/KDAR	Right Knee to Dash	88	46.2
PA	Pelvic Angle		21.9
PHX	H-Point to Striker (X-Axis)	403	
PHZ	H-Point to Striker (Z-Axis)	159	
SA	Seat Back Angle		3.4

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2011 Nissan Leaf SL 5-Dr Hatchback
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5218
 Test Date: 6/21/2011



FRONT VIEW OF DUMMY

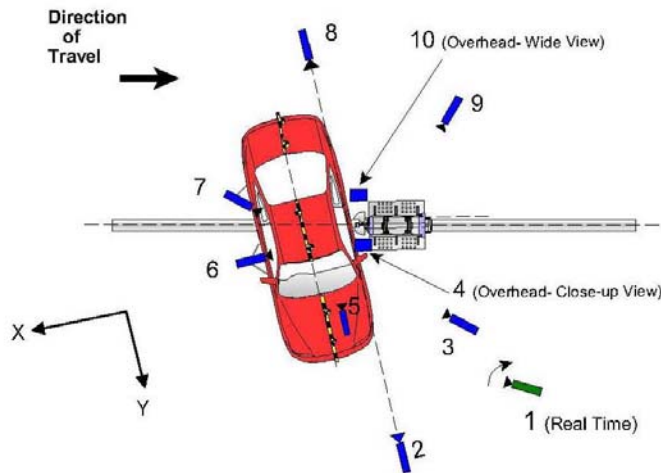
Code	Measurement Description	Driver S/N 296
		Length (mm)
HR	Head to Side Header	261
HS	Head to Side Window	373
AD	Arm to Door	164
HD	H-Point to Door	210

DATA SHEET NO. 5

CAMERA LOCATIONS AND DATA

Test Vehicle: 2011 Nissan Leaf SL 5-Dr Hatchback
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5218
 Test Date: 6/21/2011



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	50	5170	-1670	24	1000
3	Impact Side 45° Forward	-2180	3760	-1840	20	1000
4	Overhead Closeup	70	0	-4420	50	1000
5	Onboard – Driver Front				16	1000
6	Onboard – Driver Side				8	1000
7	Onboard – Driver Rear				8	1000
8	Rear Ground Level	40	-5460	-1690	24	1000
9	Impact Side 45° Rearward	-3820	-3240	-1780	20	1000
10	Overhead Wide View	280	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

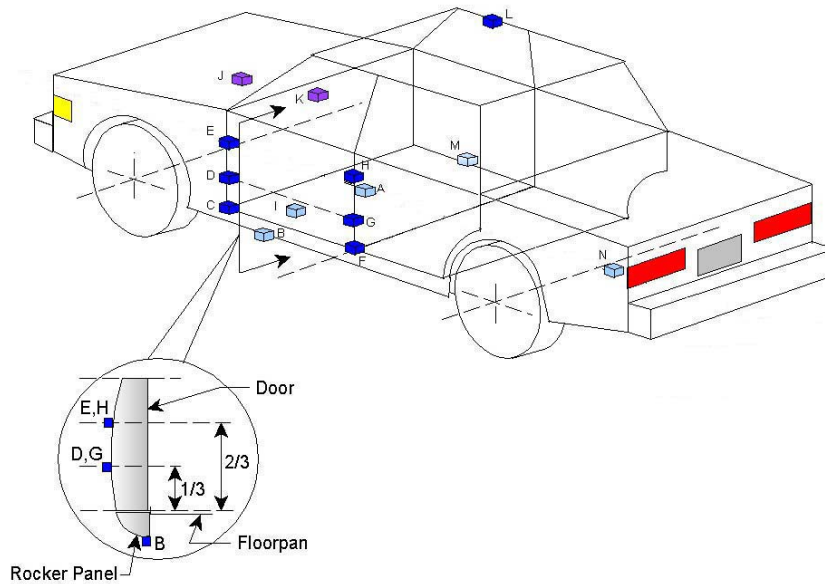
	Number of Channels
Driver Dummy	16
Vehicle Structure	21
Pole Load Cells – Not used	8
Contact Switches - Not used	3
Airbag Timing – Not used	2
Total No. of Data Channels	50

DATA SHEET NO. 6

VEHICLE ACCELEROMETER DATA

Test Vehicle: 2011 Nissan Leaf SL 5-Dr Hatchback
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5218
 Test Date: 6/21/2011



	Accelerometer Location			
	ID	Coordinates (mm)		
		X	Y	Z
A	Vehicle CG	2236	-200	-200
	Vehicle CG Sensor	2216	-200	-200
B	Left Floor Sill	2668	-720	-178
C	A Pillar Sill	2974	-720	-173
D	A Pillar Low	2947	-718	-505
E	A Pillar Mid	2989	-804	-780
F	B Pillar Sill	1783	-722	-193
G	B Pillar Low	1841	-729	-625
H	B Pillar Mid	1891	-722	-840
I	Driver Seat	2081	-546	-408
L	Engine Top	3695	0	-883
J	Firewall	3510	0	-891
K	Right Roof	2000	557	-1498
M	Right Floor Sill	2000	720	-188
N	Rear Floorpan	280	0	-470

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 Nissan Leaf SL 5-Dr Hatchback
Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5218
Test Date: 6/21/2011



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 Nissan Leaf SL 5-Dr HatchbackNHTSA No. MB5218Test Program: NCAP Side Pole Impact TestTest Date: 6/21/2011**TEST DUMMY INFORMATION AND CONTACT**

Description	Driver
Dummy Type / Serial No.	SID-IIs / 296
Head Contact	Curtain Airbag, Headrest
Upper Torso Contact	Side Airbag, Seat
Lower Torso Contact	Side Airbag, Seat
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 Broke
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	Yes	No	
Knee Airbag	No		No	
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso/Pelvis 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	32.5
Trap No. 2 Velocity (Redundant)	km/h	31.4 to 33.0	32.6

DATA SHEET NO. 9

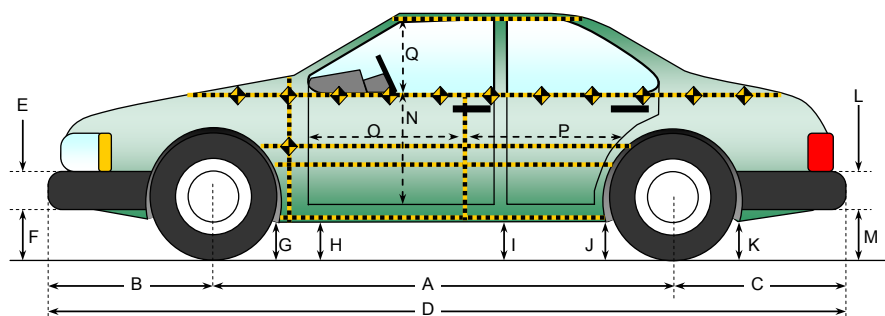
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2011 Nissan Leaf SL 5-Dr Hatchback

NHTSA No. MB5218

Test Program: NCAP Side Pole Impact Test

Test Date: 6/21/2011



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

LEFT SIDE VIEW

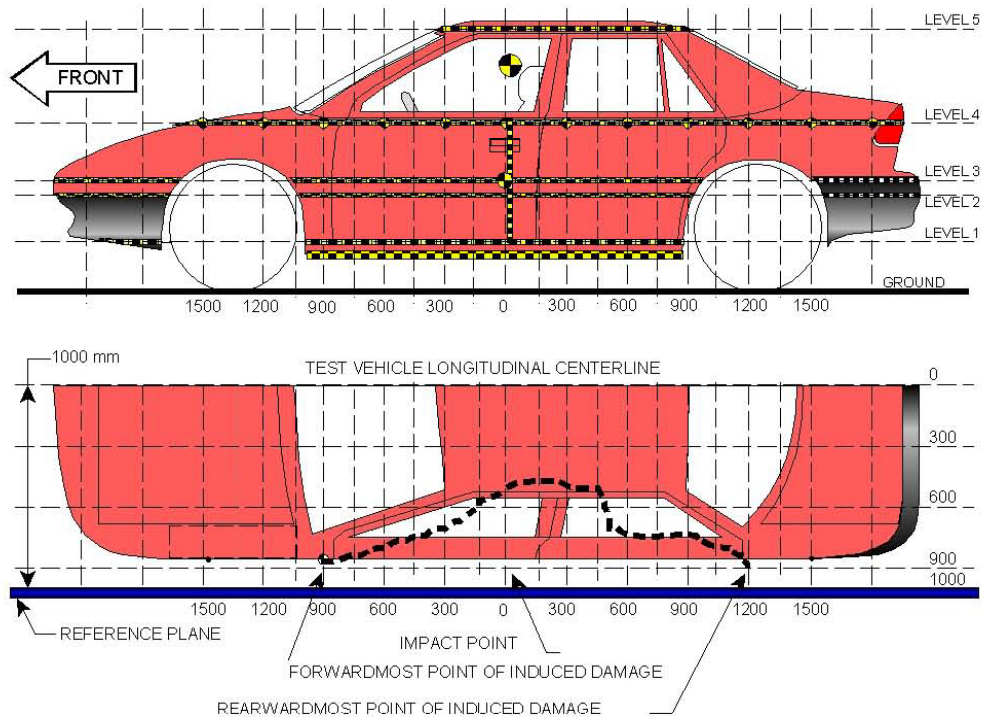
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2700	2665	35
B	Front Axle to FSOV	970	970	0
C	Rear Axle to RSOV	791	791	0
D1	Total Vehicle Length at Left Side	3742	3672	70
D2	Total Vehicle Length at Centerline	4461	4426	35
D3	Total Vehicle Length at Right Side	3742	3746	-4
E	Front Bumper Thickness	150	150	0
F	Front Bumper Bottom to Ground	241	269	-28
G	Sill Height at Front Wheel Well	157	159	-2
H	Sill Height at Front Door Leading Edge	155	157	-2
I	Sill Height at B Pillar	171	180	-9
J1	Sill Height at Rear Wheel Well	178	185	-7
J2	Pinch Weld Height at Rear Wheel Well	176	179	-3
K	Sill Height Aft of Rear Wheel Well	253	252	1
L	Rear Bumper Thickness	120	120	0
M	Rear Bumper Bottom to Ground	345	332	13
N	Sill Height to Window Bottom Sill	746	730	16
O	Front Door Leading Edge to Impact CL	564	565	-1
P	Rear Door Trailing Edge to Impact CL	1419	1460	-41
Q	Front Window Opening	450	405	45
R	Right Side Length	3742	3746	-4
S	Left Side Length	3742	3672	70
T	Vehicle Width at B Post	1770	1698	72

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2011 Nissan Leaf SL 5-Dr Hatchback
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5218
 Test Date: 6/21/2011



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	270
2	Occupant H-Point	584
3	Mid Door	639
4	Window Sill	973
5	Window Top	1458

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

Test Vehicle: 2011 Nissan Leaf SL 5-Dr Hatchback
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5218
 Test Date: 6/21/2011

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1050				355					351					-4	
-900				333					335					2	
-750			211	320				206	314				-5	-6	
-600	269	214	216	312		247	201	203	289		-22	-13	-13	-23	
-525	271	219	220	308		250	235	232	323		-21	16	12	15	
-450	276	221	220	302		288	277	272	341		12	56	52	39	
-375	280	220	220	302		312	309	309	352		32	89	89	50	
-300	281	220	218	300		335	347	380	390		54	127	162	90	
-225	282	218	217	295		360	385	422	427		78	167	205	132	
-150	280	217	215	293		393	425	435	457		113	208	220	164	
-75	280	216	215	290	500	432	461	460	492	617	152	245	245	202	117
0	277	215	214	287	498	482	502	515	532	639	205	287	301	245	141
75	279	215	212	285	495	515	534	534	555	635	236	319	322	270	140
150	276	214	212	285	495	477	524	522	545	609	201	310	310	260	114
225	276	214	212	281	493	454	484	484	500	592	178	270	272	219	99
300	276	213	212	280	492	401	424	428	455	571	125	211	216	175	79
375	276	213	212	275	491	375	378	385	415	560	99	165	173	140	69
450	276	213	212	275	492	355	333	337	378	545	79	120	125	103	53
525	277	213	212	270	492	338	281	288	338	532	61	68	76	68	40
600	280	215	212	269	494	323	268	268	327	518	43	53	56	58	24
750	279	218	215	266	499	292	250	250	300	505	13	32	35	34	6
900	279	220	218	261	505	264	236	236	284	507	-15	16	18	23	2
1050	278	223	221	271	514	258	221	223	266	514	-20	-2	2	-5	0
1200	267	220	220	262	524	243	196	201	251	521	-24	-24	-19	-11	-3
1350		212	212	264	539		170	173	243	536		-42	-39	-21	-3
1500			210	270	554			207	225	550			-3	-45	-4
1650				280	567				281	573				1	6

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 Nissan Leaf SL 5-Dr Hatchback NHTSA No. MB5218
Test Program: NCAP Side Pole Impact Test Test Date: 6/21/2011

MAXIMUM CRUSH DATA

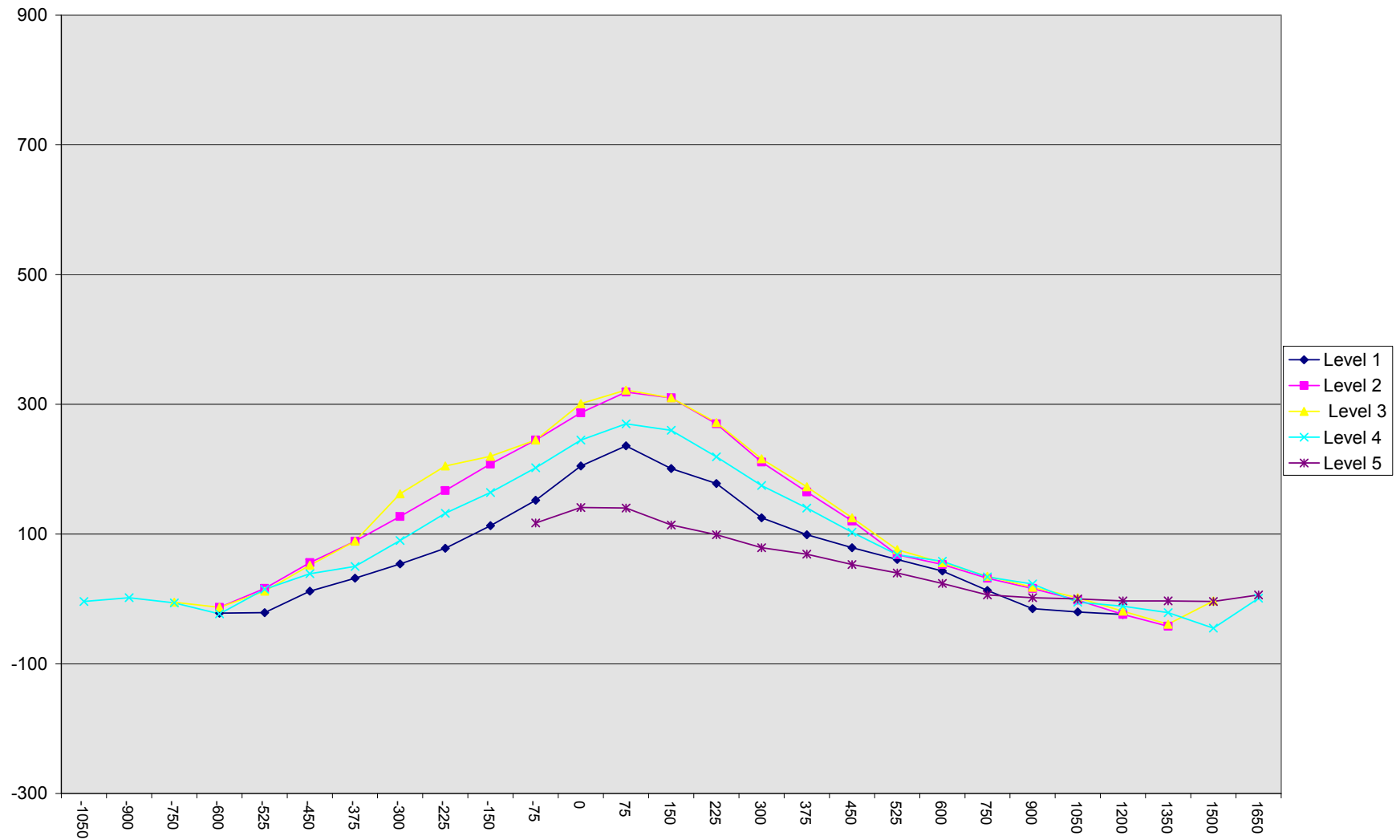
	Level 1	Level 2	Level 3	Level 4	Level 5
Maximum Crush (mm)	236	319	322	270	141
Distance From Impact (mm)	75	75	78	75	0

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 Nissan Leaf SL 5-Dr Hatchback
Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5218
Test Date: 6/21/2011



DATA SHEET NO. 11A

FMVSS 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2011 Nissan Leaf SL 5-Dr Hatchback
 Test Program: NCAP Side Pole Impact Test

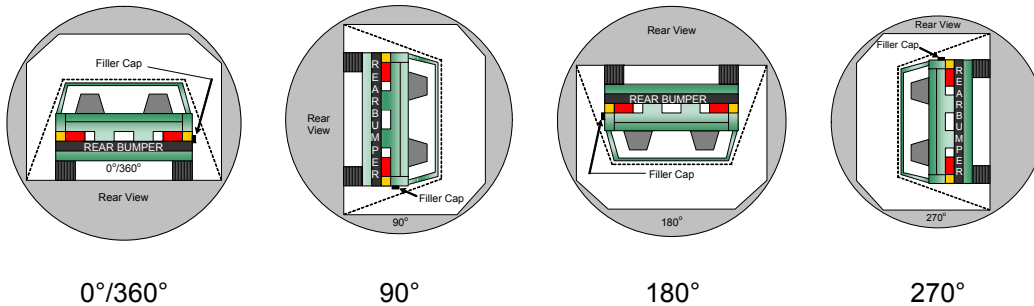
NHTSA No. MB5218
 Test Date: 6/21/2011

Test Time: 10:35 am

Temperature: 21° C

- A. From impact until vehicle motion ceases: N/A
 (Maximum Allowable = 1 ounce)
 B. For the 5 minute period after motion ceases: N/A
 (Maximum allowable = 5 ounces)
 C. For the following 25 minutes: N/A
 (Maximum allowable = 1 oz./minute)
 D. Spillage Details: N/A

FMVSS 301 STATIC ROLLOVER DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°			
90° to 180°			
180° to 270°			
270° to 360°			

FMVSS 301 ROLLOVER SPILLAGE TABLE (units in ounces)

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

ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

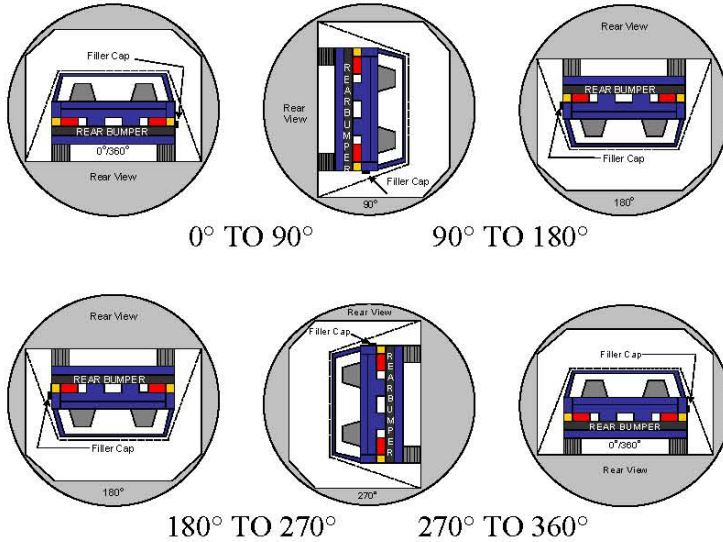
Test Phase	Spillage Location
0° to 90°	
90° to 180°	
180° to 270°	
270° to 360°	

DATA SHEET 11B

FMVSS 305 STATIC ROLLOVER RESULTS FOR ELECTRIC-POWERED VEHICLES

Test Vehicle: 2011 Nissan Leaf SL 5-Dr Hatchback
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5218
 Test Date: 6/21/2011



1. The specified fixture rollover rate for each 90° of rotation is 60 to 180 seconds.
2. The position hold time at each position is 300 seconds (minimum).
3. Details of electrolyte spillage: **None**

ELECTROLYTE COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	119	300	419
90° to 180°	114	300	414
180° to 270°	109	300	409
270° to 360°	117	300	417

FMVSS 305 ELECTROLYTE SPILLAGE LOCATION TABLE (units in liters)

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

Total Spillage: 0 L

	Yes	No
Is the total spillage of propulsion battery electrolyte greater than 5.0 Liters?		X
Is propulsion battery electrolyte spillage visible in the passenger compartment?		X

DATA SHEET 11B (CONTINUED)

FMVSS 305 STATIC ROLLOVER RESULTS FOR ELECTRIC-POWERED VEHICLES

Test Vehicle:	<u>2011 Nissan Leaf SL 5-Dr Hatchback</u>	NHTSA No.:	<u>MB5218</u>
Test Program:	<u>NCAP Side Pole Impact Test</u>	Test Date:	<u>6/21/2011</u>

VOLTMETER INFORMATION

Make:	Fluke
Model:	11
Serial Number:	68541895
Internal Impedance Value (MΩ):	>10 MΩ < 100 pF
Nominal Propulsion Battery Voltage (Vb) (V):	360

ELECTRICAL ISOLATION MEASUREMENT

V1 =	0	V	90°	Time:	2	Minutes	00	s
V1 =	0	V	180°	Time:	2	Minutes	01	s
V1 =	0	V	270°	Time:	1	Minutes	56	s
V1 =	0	V	360°	Time:	2	Minutes	03	s
V2 =	0	V	90°	Time:	2	Minutes	11	s
V2 =	0	V	180°	Time:	2	Minutes	17	s
V2 =	0	V	270°	Time:	2	Minutes	08	s
V2 =	0	V	360°	Time:	2	Minutes	12	s
V1' =	0	V	90°	Time:	2	Minutes	06	s
V1' =	0	V	180°	Time:	2	Minutes	12	s
V1' =	0	V	270°	Time:	2	Minutes	02	s
V1' =	0	V	360°	Time:	2	Minutes	08	s
V2' =	0	V	90°	Time:	2	Minutes	16	s
V2' =	0	V	180°	Time:	2	Minutes	21	s
V2' =	0	V	270°	Time:	2	Minutes	12	s
V2' =	0	V	360°	Time:	2	Minutes	17	s

DATA SHEET 11B (CONTINUED)

FMVSS 305 STATIC ROLLOVER RESULTS FOR ELECTRIC-POWERED VEHICLES

Test Vehicle: 2011 Nissan Leaf SL 5-Dr Hatchback
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5218
 Test Date: 6/21/2011

ELECTRICAL ISOLATION CALCULATION

Note: If measured voltage is zero and results in a division by zero, record "Zero Volts".
 This "zero voltage" condition is considered as being compliant.

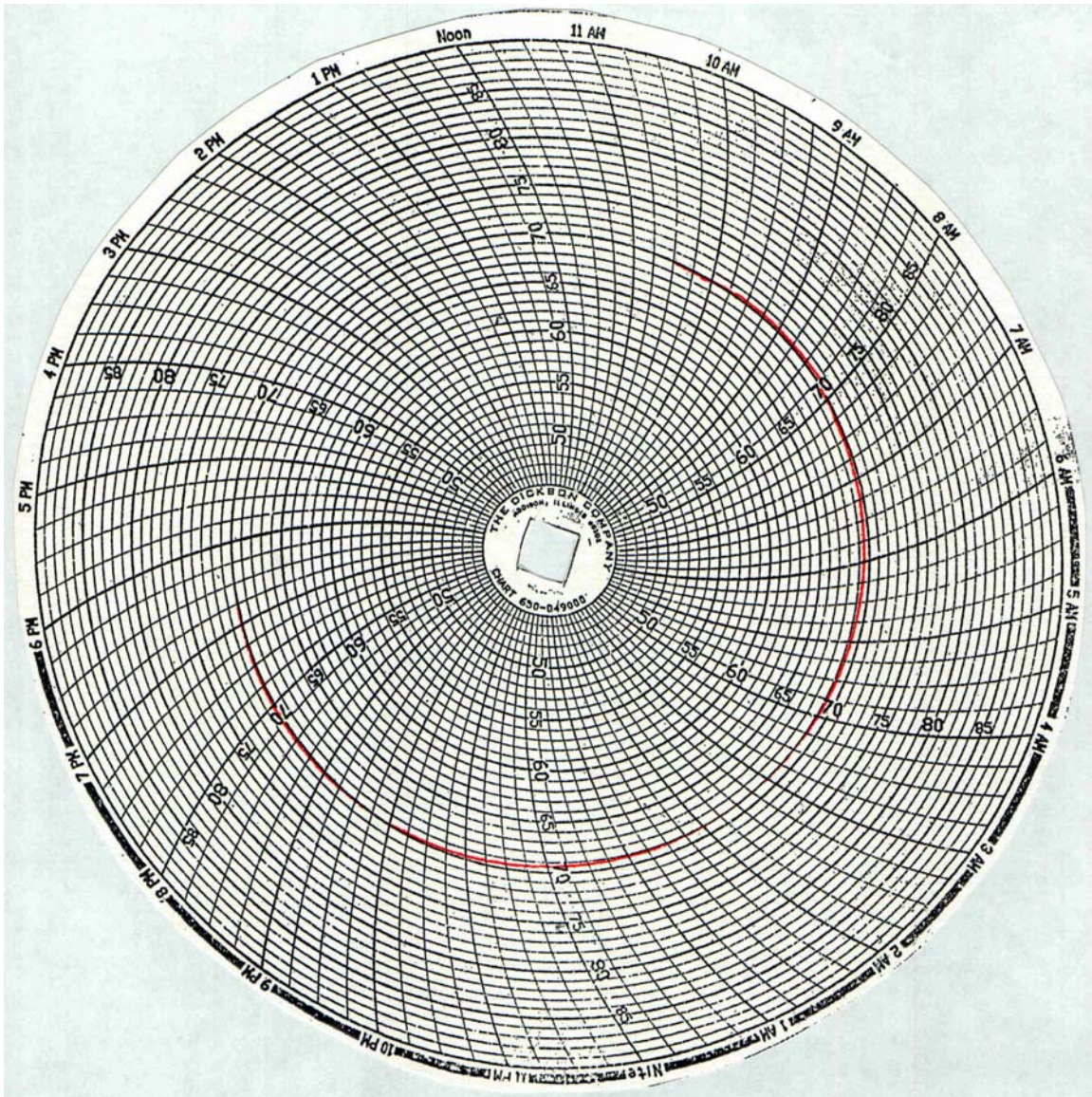
$R_{i1} = R_o (1 + V_2/V_1) [(V_1 - V_1')/V_1']$								
Ri1 =	Zero volts	Ω	90°	Time:	2	Minutes	11	s
Ri1 =	Zero volts	Ω	180°	Time:	2	Minutes	17	s
Ri1 =	Zero volts	Ω	270°	Time:	2	Minutes	08	s
Ri1 =	Zero volts	Ω	360°	Time:	2	Minutes	12	s
$R_{i2} = R_o (1 + V_1/V_2) [(V_2 - V_2')/V_2']$								
Ri2 =	Zero volts	Ω	90°	Time:	2	Minutes	16	s
Ri2 =	Zero volts	Ω	180°	Time:	2	Minutes	21	s
Ri2 =	Zero volts	Ω	270°	Time:	2	Minutes	12	s
Ri2 =	Zero volts	Ω	360°	Time:	2	Minutes	17	s
Ri = The lesser of Ri1 and Ri2								
Ri =	Zero volts	Ω	90°	Time:	2	Minutes	16	s
Ri =	Zero volts	Ω	180°	Time:	2	Minutes	21	s
Ri =	Zero volts	Ω	270°	Time:	2	Minutes	12	s
Ri =	Zero volts	Ω	360°	Time:	2	Minutes	17	s
Ri/Vb = Electrical Isolation Value/Nominal Battery Voltage Minimum Electrical Isolation Value is 500 Ω /V								
Ri/Vb =	Zero volts	Ω/V	90°	Time:	2	Minutes	16	s
Ri/Vb =	Zero volts	Ω/V	180°	Time:	2	Minutes	21	s
Ri/Vb =	Zero volts	Ω/V	270°	Time:	2	Minutes	12	s
Ri/Vb =	Zero volts	Ω/V	360°	Time:	2	Minutes	17	s

	Yes	No, Fail
Is the measured Electrical Isolation Value $\geq$ 500 Ω/V?	X	

DATA SHEET NO. 12
DUMMY/VEHICLE TEMPERATURE STABILIZATION DATA

Test Vehicle: 2011 Nissan Leaf SL 5-Dr Hatchback
Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5218
Test Date: 6/21/2011



DATA SHEET 13

PRE-IMPACT ELECTRIC ISOLATION MEASUREMENTS AND CALCULATIONS

Test Vehicle: 2011 Nissan Leaf SL 5-Dr Hatchback
Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5218
Test Date: 6/21/2011

VOLTMETER INFORMATION

Make:	Fluke
Model:	11
Serial Number:	68541895
Internal Impedance Value (M Ω):	>10 M Ω < 100 pF
Resolution (V):	0.001
Last Calibration Date:	1/24/2011

PROPULSION BATTERY VOLTAGE

Measurement shall be made with propulsion battery connected to the vehicle propulsion system, and the vehicle in the "ready-to-drive" (Propulsion motor(s) activated) position.

If voltage measurement is not at the voltage or within the normal operating voltage range specified by the manufacturer, the battery must be charged.

Vb (V):	388.4
---------	-------

PROPULSION BATTERY TO VEHICLE CHASSIS

Vehicle chassis point(s) determined and supplied to contractor by COTR.

V1 (V):	242.7
V2 (V):	322.1

PROPULSION BATTERY TO VEHICLE CHASSIS ACROSS RESISTOR

The known resistance Ro (in ohms) should be approximately 500 times the normal operating voltage of the vehicle (in volts) per SAE J1766.

Ro (Ω):	200 K Ω
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DATA SHEET 13 (CONTINUED)

PRE-IMPACT ELECTRIC ISOLATION MEASUREMENTS AND CALCULATIONS

Test Vehicle: 2011 Nissan Leaf SL 5-Dr Hatchback NHTSA No. MB5218
 Test Program: NCAP Side Pole Impact Test Test Date: 6/21/2011

ELECTRICAL ISOLATION MEASUREMENT

Note: If measured voltage is zero and results in a division by zero, record "Zero Volts".
 This "zero voltage" condition is considered as being compliant.

V1' (V):	1.9 V
$R_{i1} = R_o (1 + V_2/V_1) [(V_1 - V_1')/V_1']$	
Ri1 (Ω):	59046 K Ω
V2' (V):	2.2 V
$R_{i2} = R_o (1 + V_1/V_2) [(V_2 - V_2')/V_2']$	
Ri2 (Ω):	51045 K Ω
Ri = The lesser of Ti1 and Ri2	
Ri Pre-Test ((Ω):	51045 K Ω
Ri/Vb (Ω/V):	131425.7 Ω/V (Electrical Isolation Value)
Minimum Electrical Isolation Value is 500 Ω/V	

Note: Measured 5 minutes before impact.

	Yes	No, Fail
Is the measured Electrical Isolation Value $\geq$ 500 Ω/V?	X	

DATA SHEET 14

POST-IMPACT ELECTRIC ISOLATION MEASUREMENTS AND CALCULATIONS

Test Vehicle: 2011 Nissan Leaf SL 5-Dr Hatchback
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5218
 Test Date: 6/21/2011

VOLTMETER INFORMATION

Make:	Fluke
Model:	11
Serial Number:	68541895
Internal Impedance Value (MΩ):	> 10 MΩ < 100 pF
Nominal Propulsion Battery Voltage (Vb) (V):	360

PROPULSION BATTERY VOLTAGE

NOTE: Record V1, V2, V1', V2' voltage measurements immediately after the impacted vehicle **comes to rest**.

VB =	6.1	V	Impact Time:	0	Minutes	24	s
V1 =	1.0	V	Impact Time:	0	Minutes	30	s
V2 =	2.2	V	Impact Time:	0	Minutes	43	s
V1' =	0.1	V	Impact Time:	0	Minutes	38	s
V2' =	0.1	V	Impact Time:	0	Minutes	48	s

ELECTRICAL ISOLATION MEASUREMENT

Note: If measured voltage is zero and results in a division by zero, record "Zero Volts". This "zero voltage" condition is considered as being compliant.

$R_{i1} = R_o (1 + V_2/V_1) [(V_1 - V_1')/V_1']$							
Ri1 =	5765 K	Ω	Impact Time:	0	Minutes	43	s
$R_{i2} = R_o (1 + V_1/V_2) [(V_2 - V_2')/V_2']$							
Ri2 =	6115 K	Ω	Impact Time:	0	Minutes	48	s
Ri = The lesser of Ri1 and Ri2							
Ri =	5765 K	Ω	Impact Time:	0	Minutes	43	s
Ri/Vb = electrical Isolation Value/Nominal Battery Voltage							
Minimum Electrical Value is 500 Ω/V							
Ri/Vb =	14844.9	Ω/V	Impact Time:	0	Minutes	43	s

	Yes	No, Fail
Is the measured Electrical Isolation Value $\geq$ 500 Ω/V?	X	

DATA SHEET 14 (CONTINUED)

POST-IMPACT ELECTRIC ISOLATION MEASUREMENTS AND CALCULATIONS

Test Vehicle: 2011 Nissan Leaf SL 5-Dr Hatchback
Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5218
Test Date: 6/21/2011

PROPULSION BATTERY SYSTEM COMPONENTS

Describe Propulsion Battery Module movement within the passenger compartment [Supply photographs as appropriate]:
Not Applicable

	Yes	No
Has the Propulsion Battery Module moved within the passenger compartment?		X

Describe intrusion of an outside Propulsion Battery Component into the passenger compartment [Supply photographs as appropriate]:
No Intrusion

	Yes	No
Has an outside Propulsion Battery Component intruded into the passenger compartment?		X

	Yes	No
Is propulsion battery electrolyte spillage visible in the passenger compartment?		X

APPENDIX A
PHOTOGRAPHS

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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



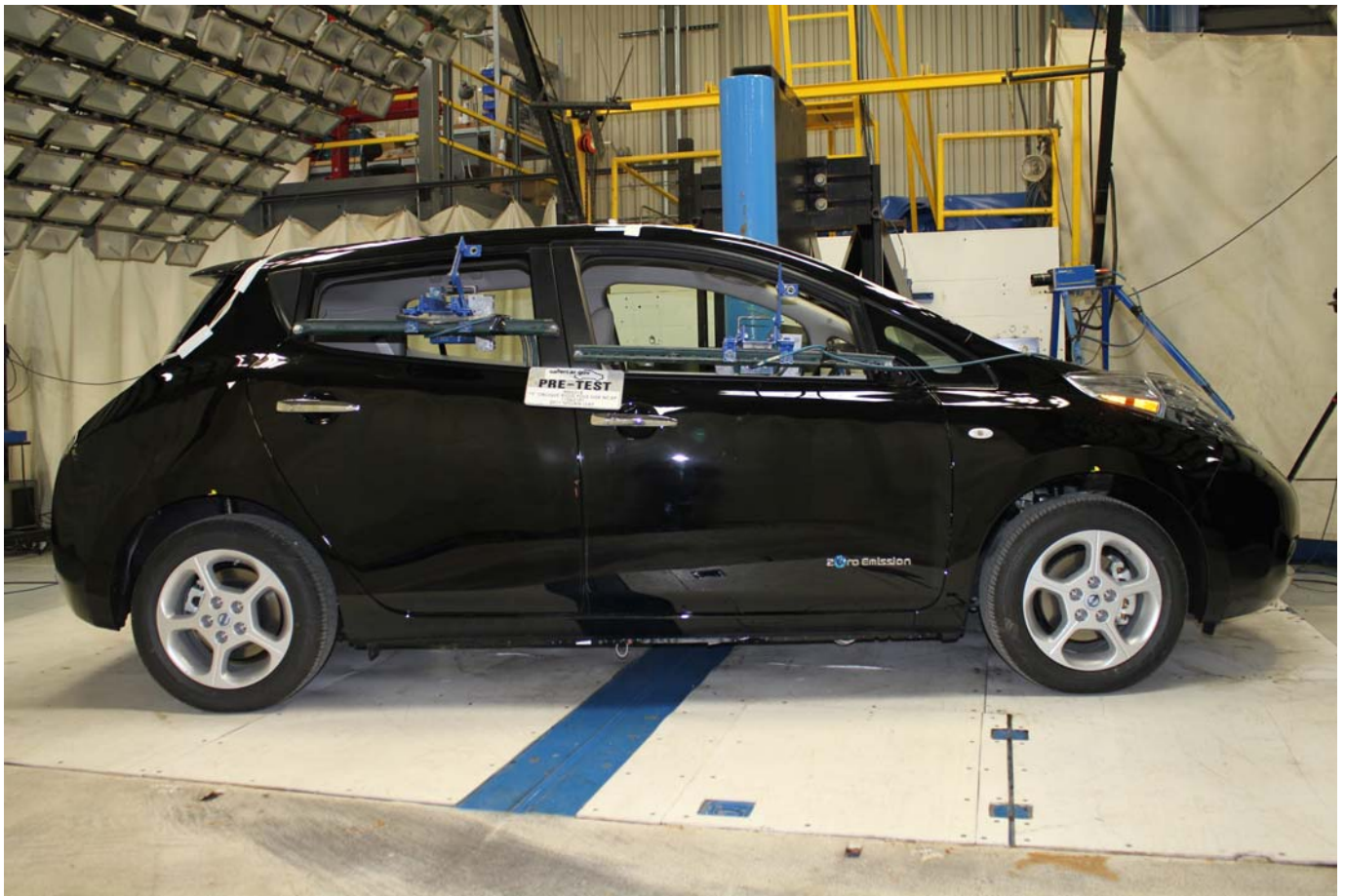
Post-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



Pre-Test Rear View of Test Vehicle



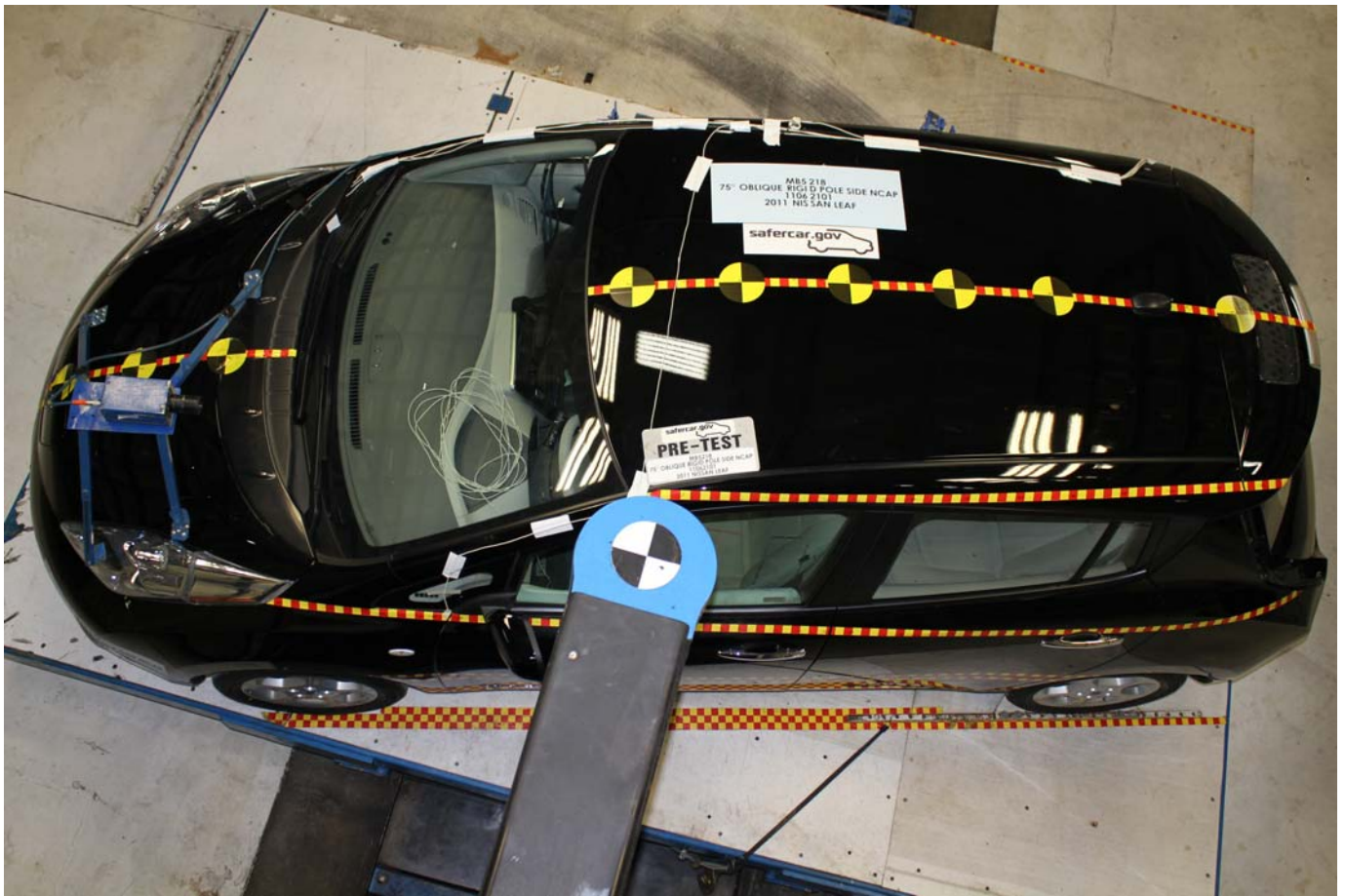
Post-Test Rear View of Test Vehicle



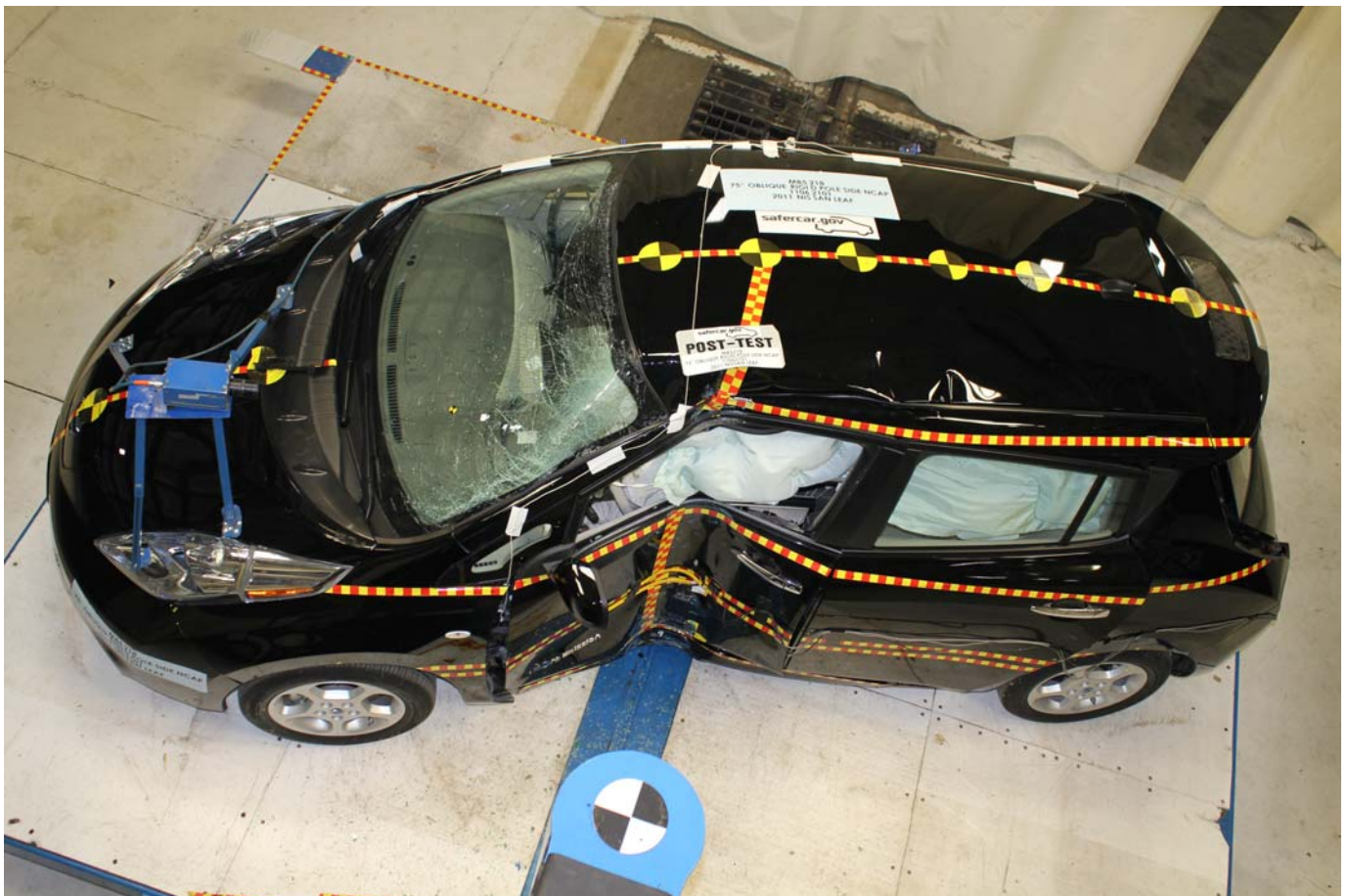
Pre-Test Right Side View of Test Vehicle



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 at Ideal Impact Point



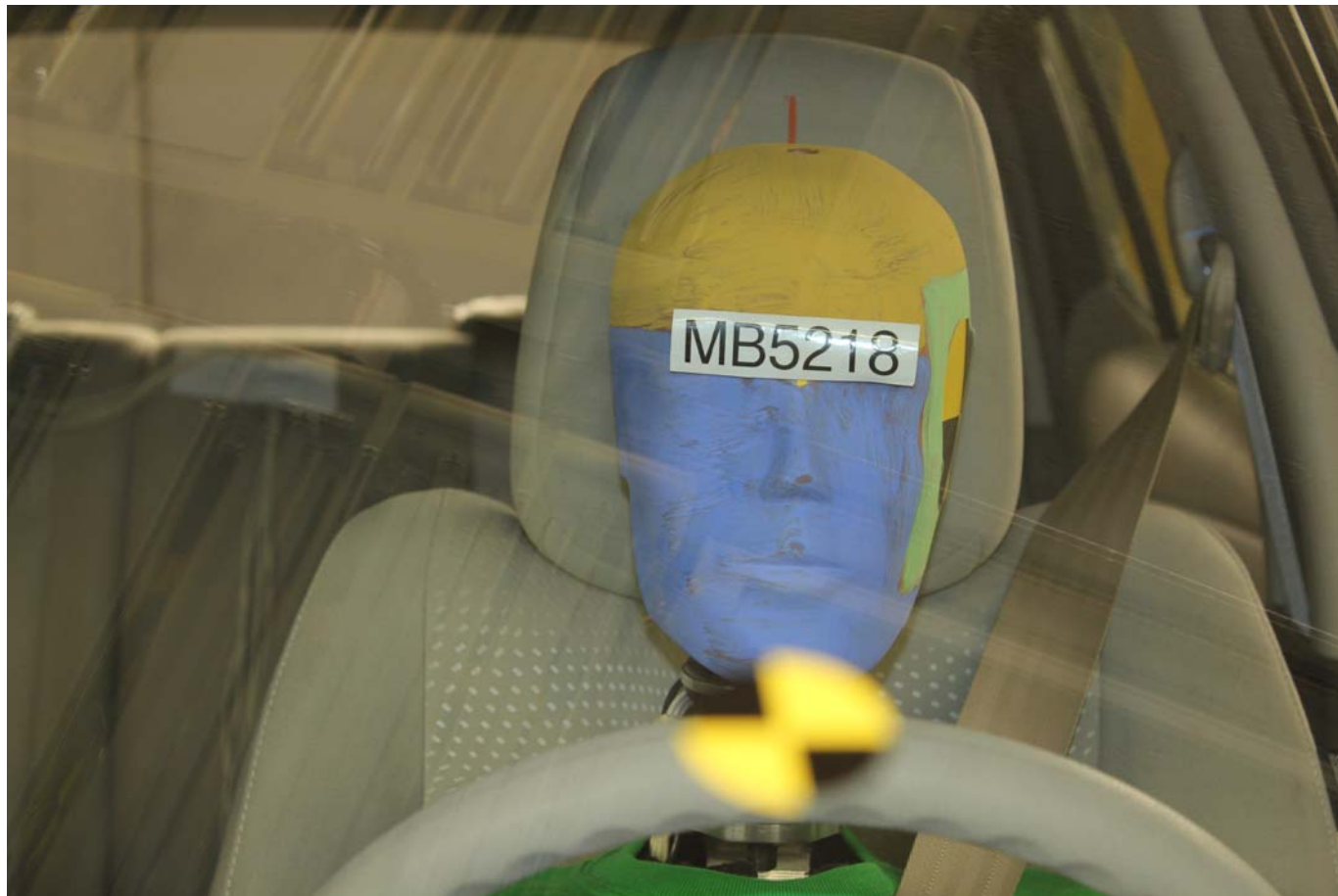
Pre-Test Right Side View of Pole Positioned Against Side of Vehicle at Ideal Impact Point



Pre-Test Close-Up View of Impact Point Target



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



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)



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



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

PHOTOGRAPH NOT AVAILABLE

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

PHOTOGRAPH NOT AVAILABLE

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



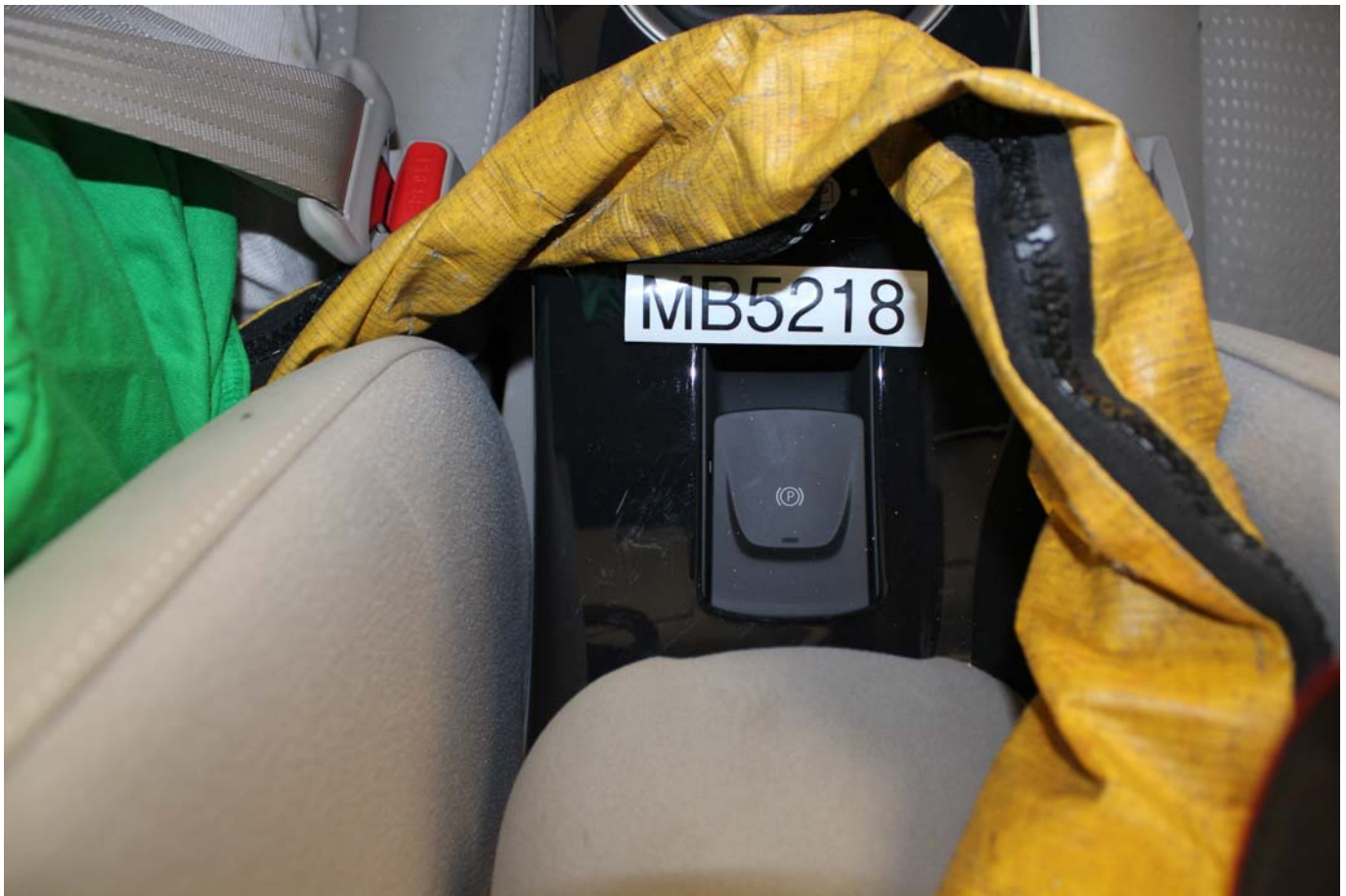
Pre-Test Placement of Dummy's Feet



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



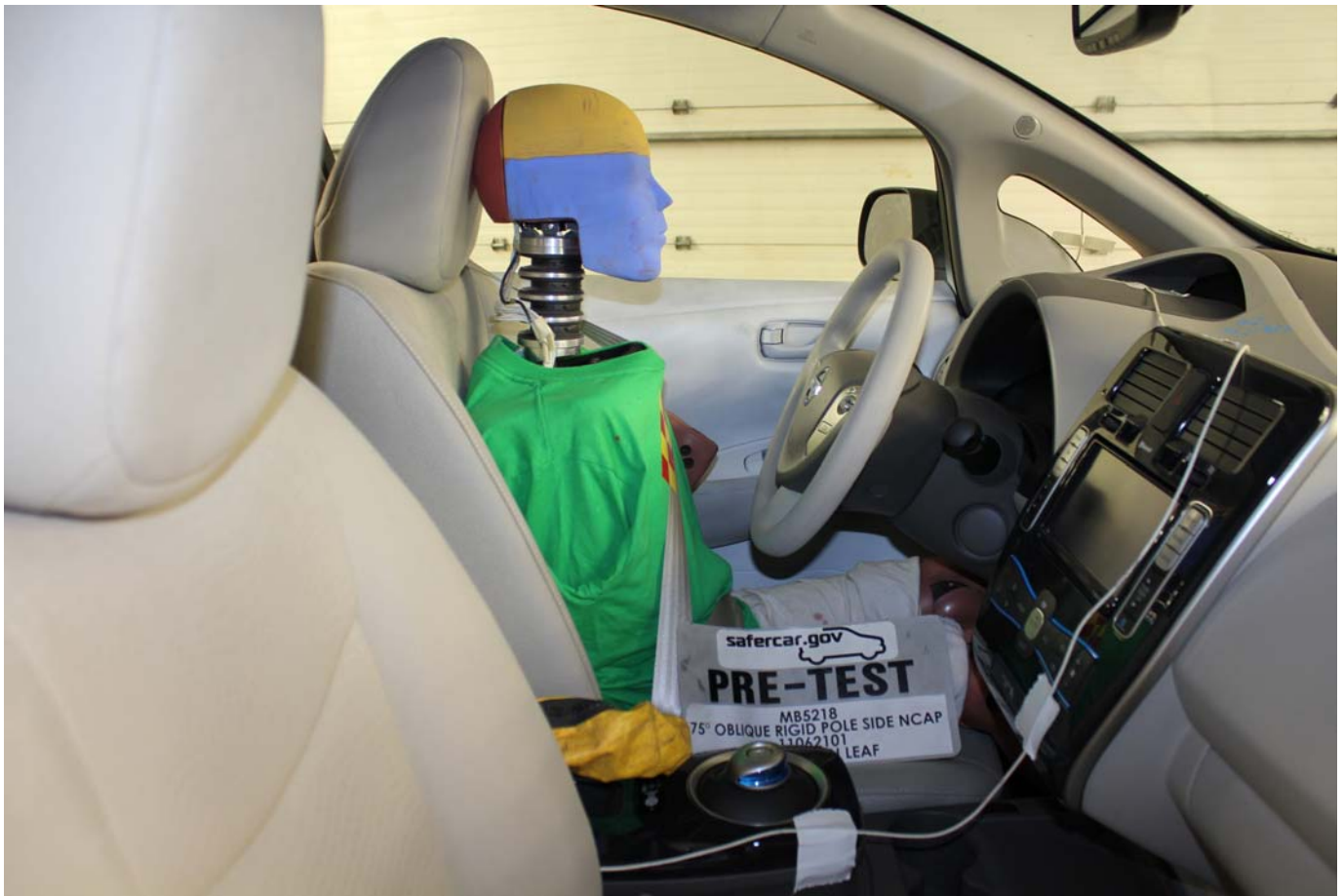
Pre-Test Close-Up View of Driver Seat Back or Head Restraint Showing Seat Back Test Position



Pre-Test Dummy and Door Clearance View



Post-Test Dummy and Door Clearance View



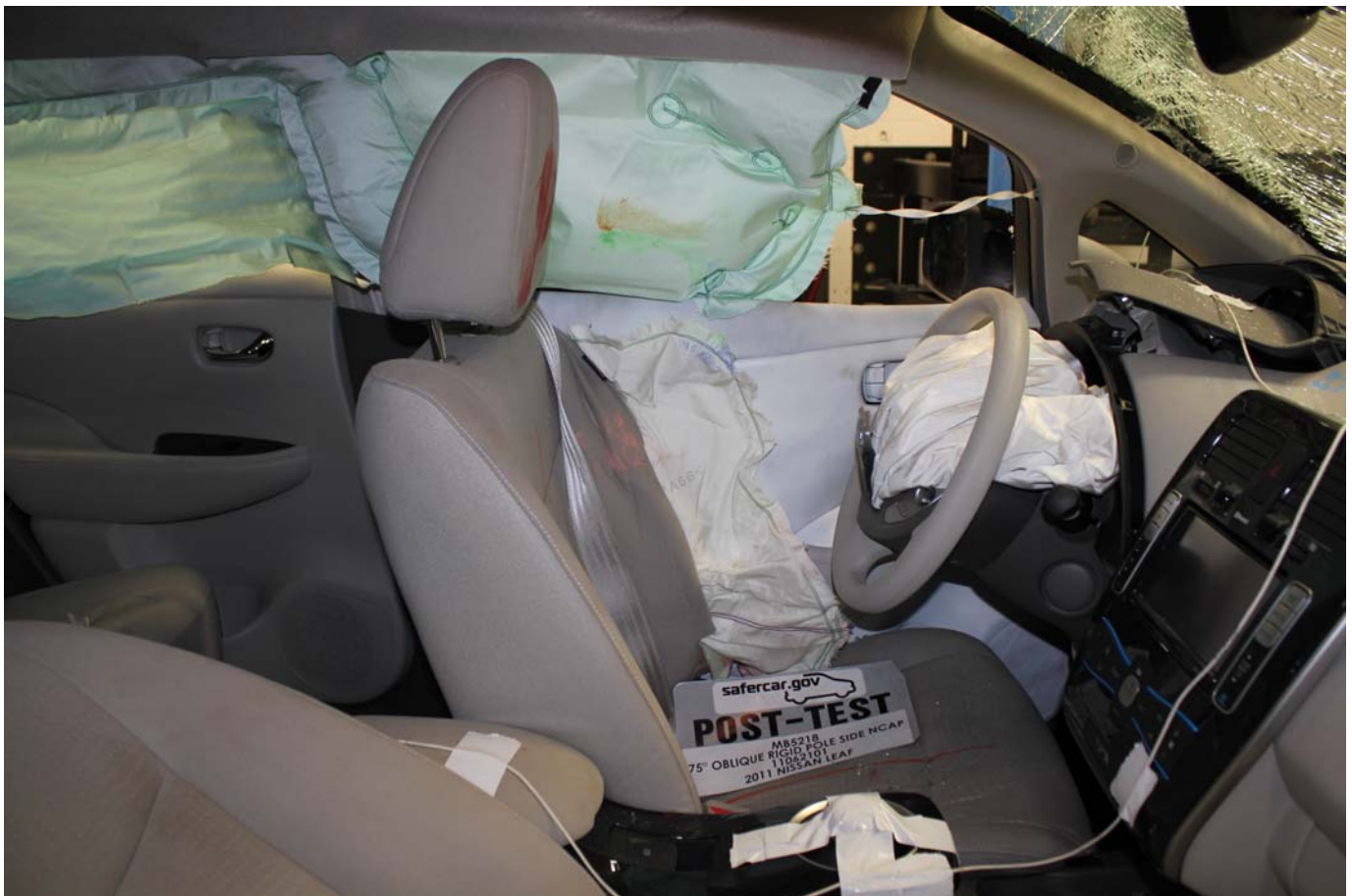
Pre-Test Right Side View of Dummy and Front Seat Occupant Compartment



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



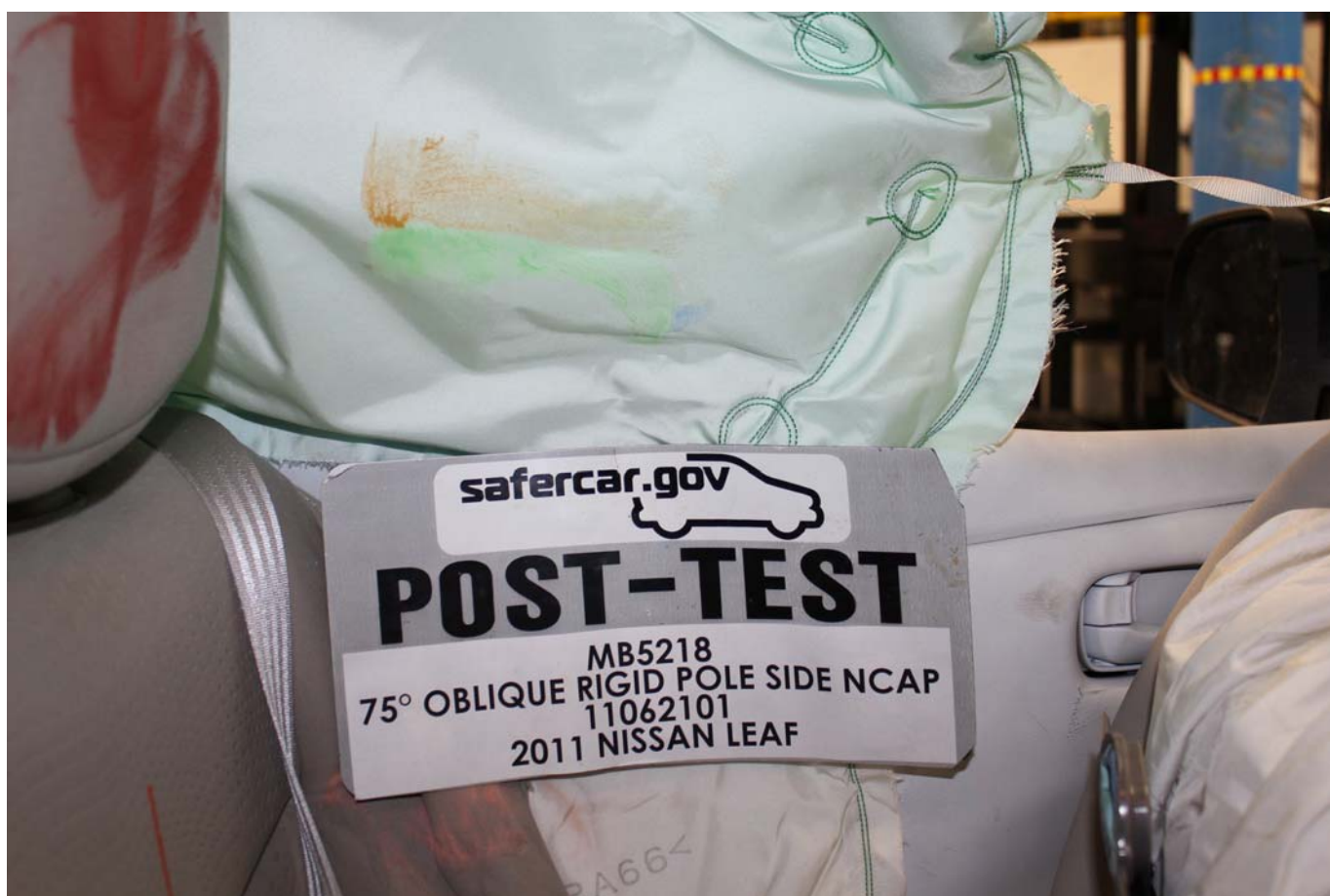
Pre-Test Inner Driver Door Panel View



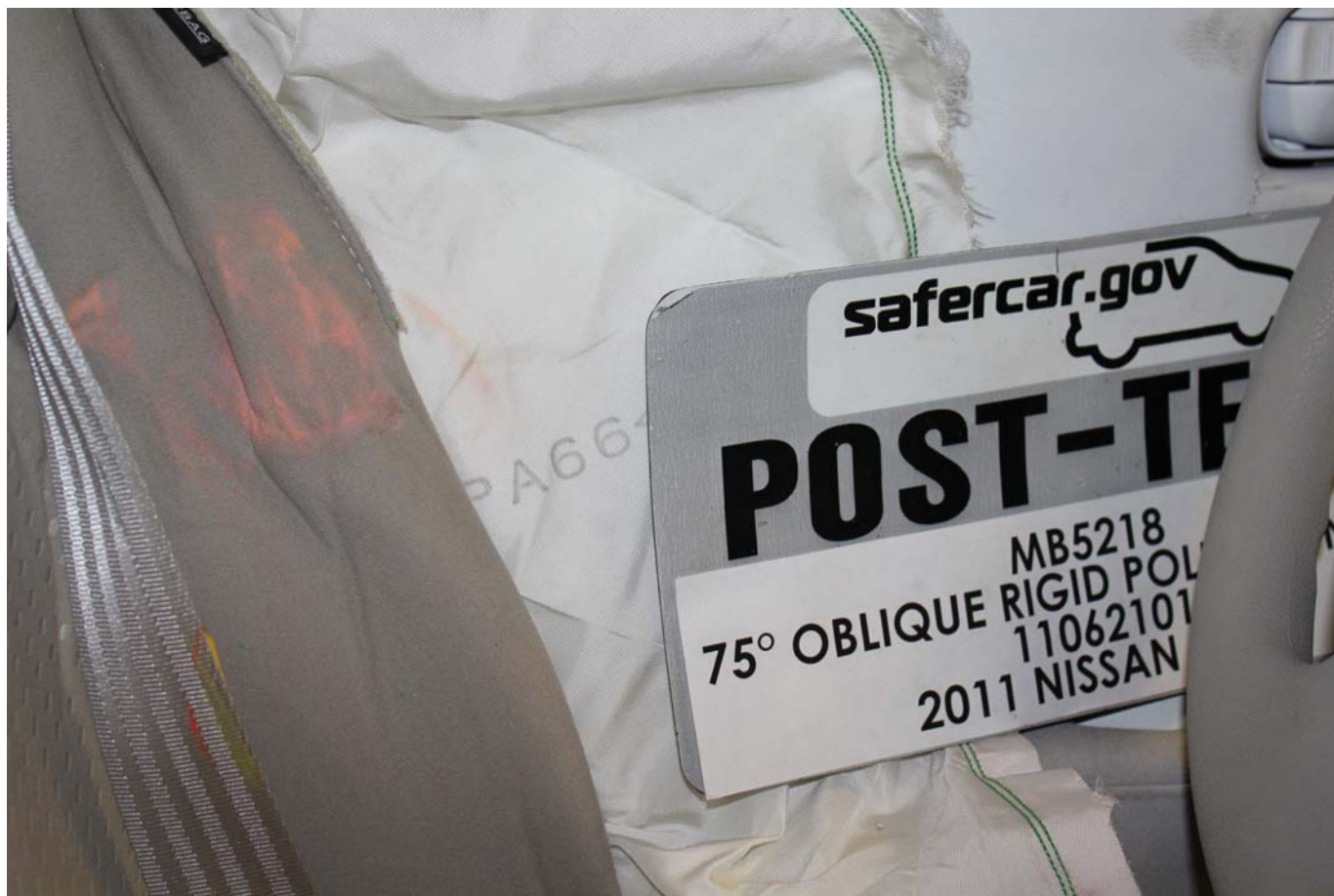
Post-Test Inner Driver Door Panel View Showing Dummy Contact Location



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



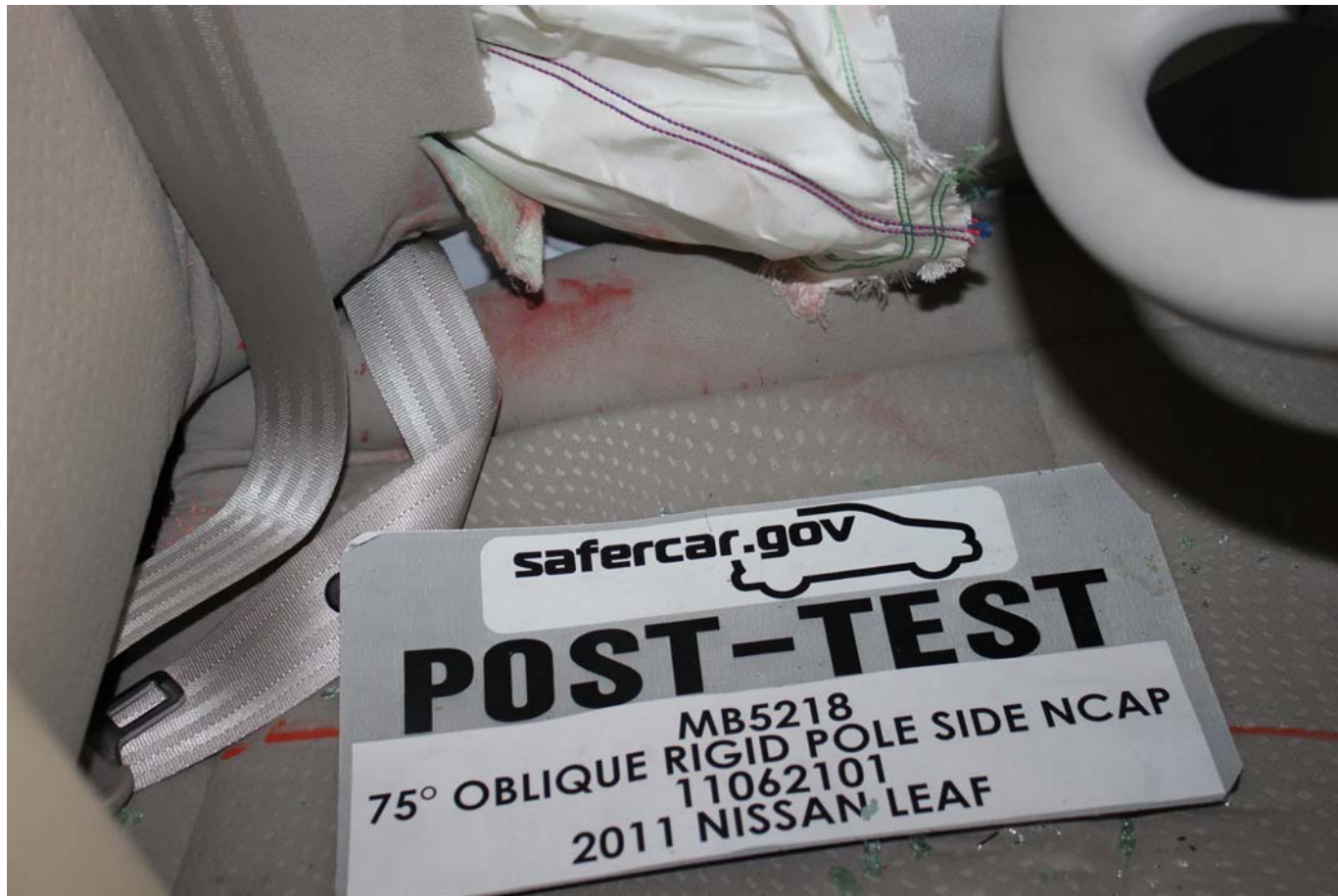
Post-Test Dummy Close-Up Head Contact with Side Airbag View



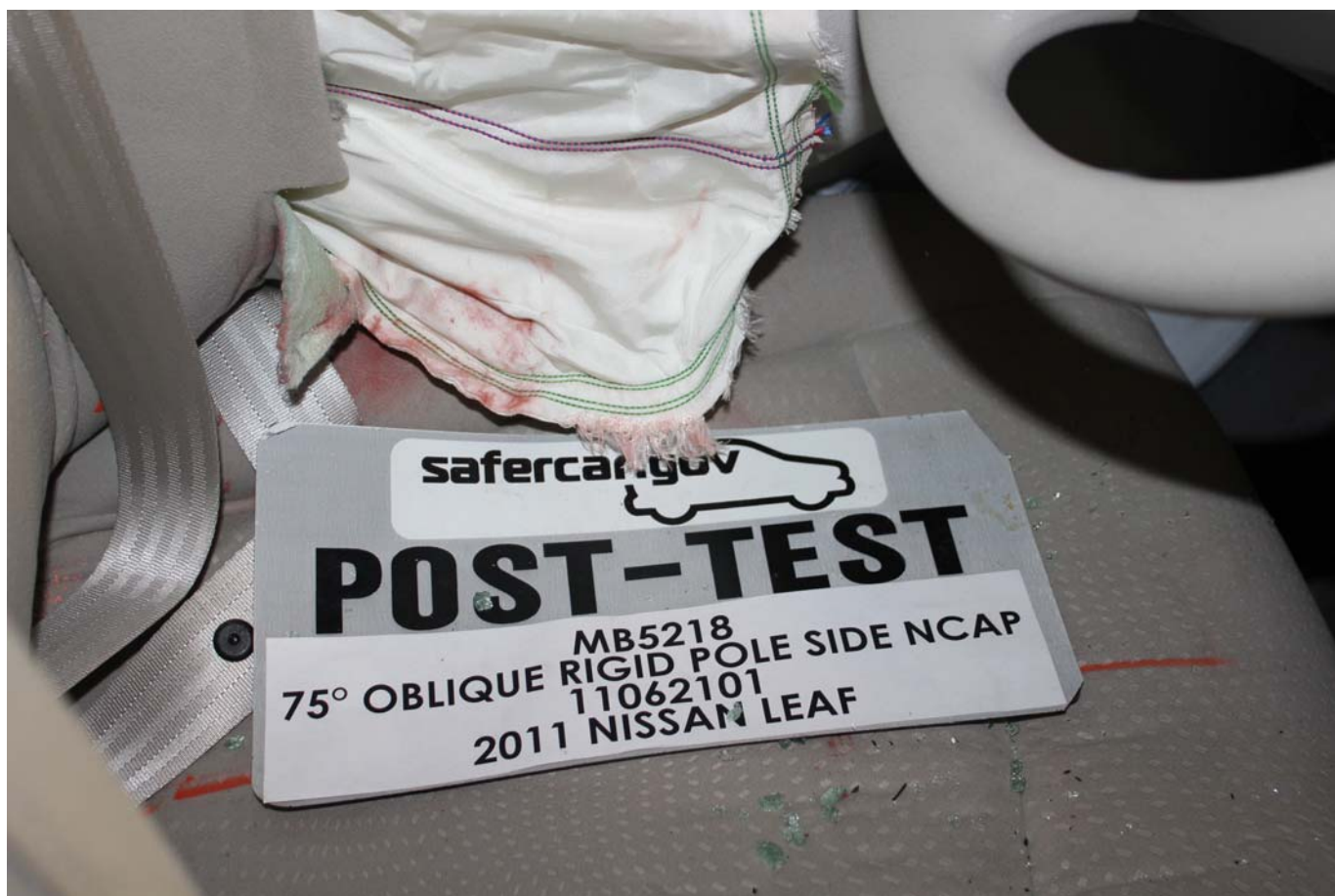
Post-Test Dummy Close-Up Torso Contact with Vehicle Interior View



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

PHOTOGRAPH NOT APPLICABLE

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

PHOTOGRAPH NOT APPLICABLE

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



Close-Up View of Vehicle's Certification Label



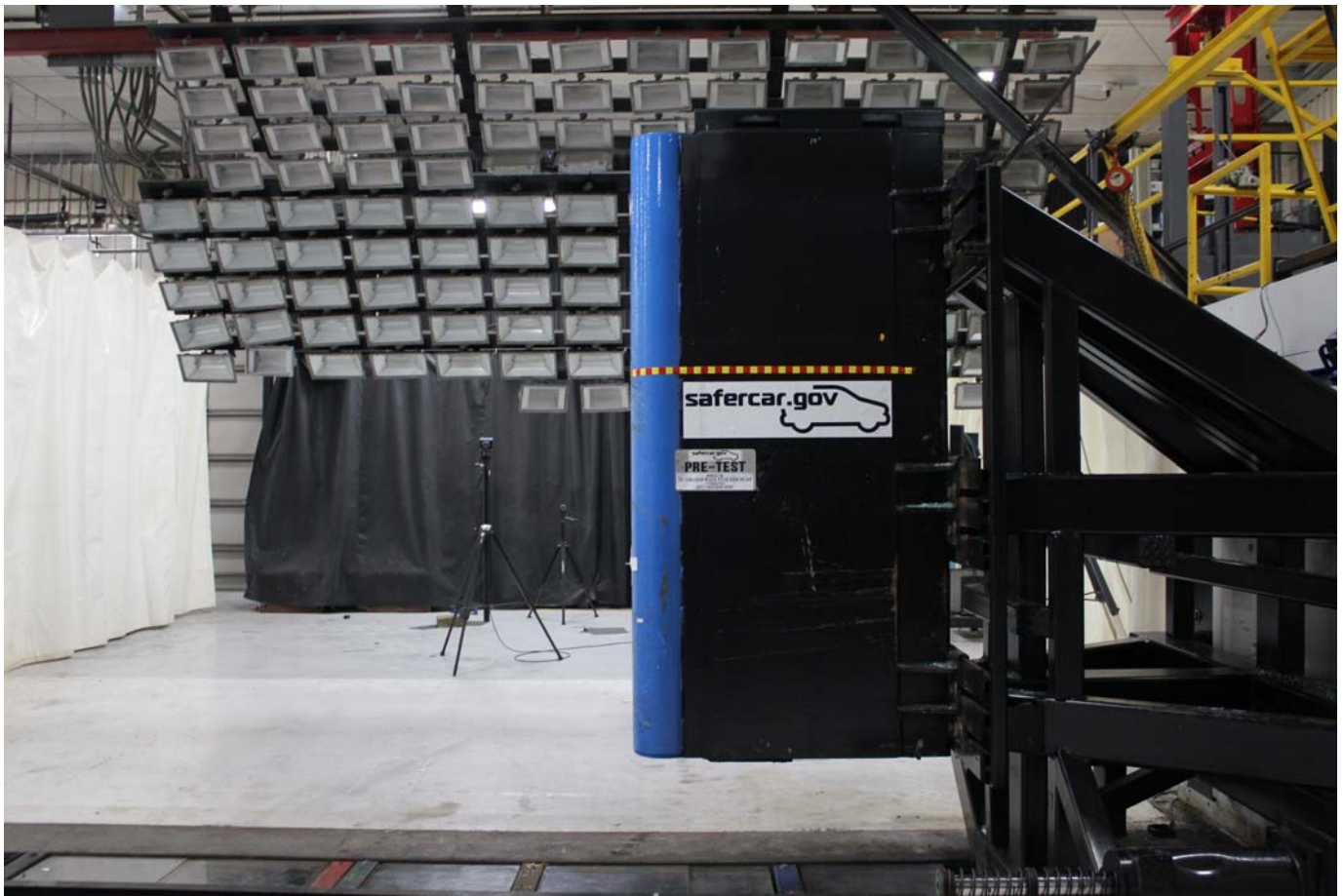
Close-Up View of Vehicle's Tire Information Placard or Label



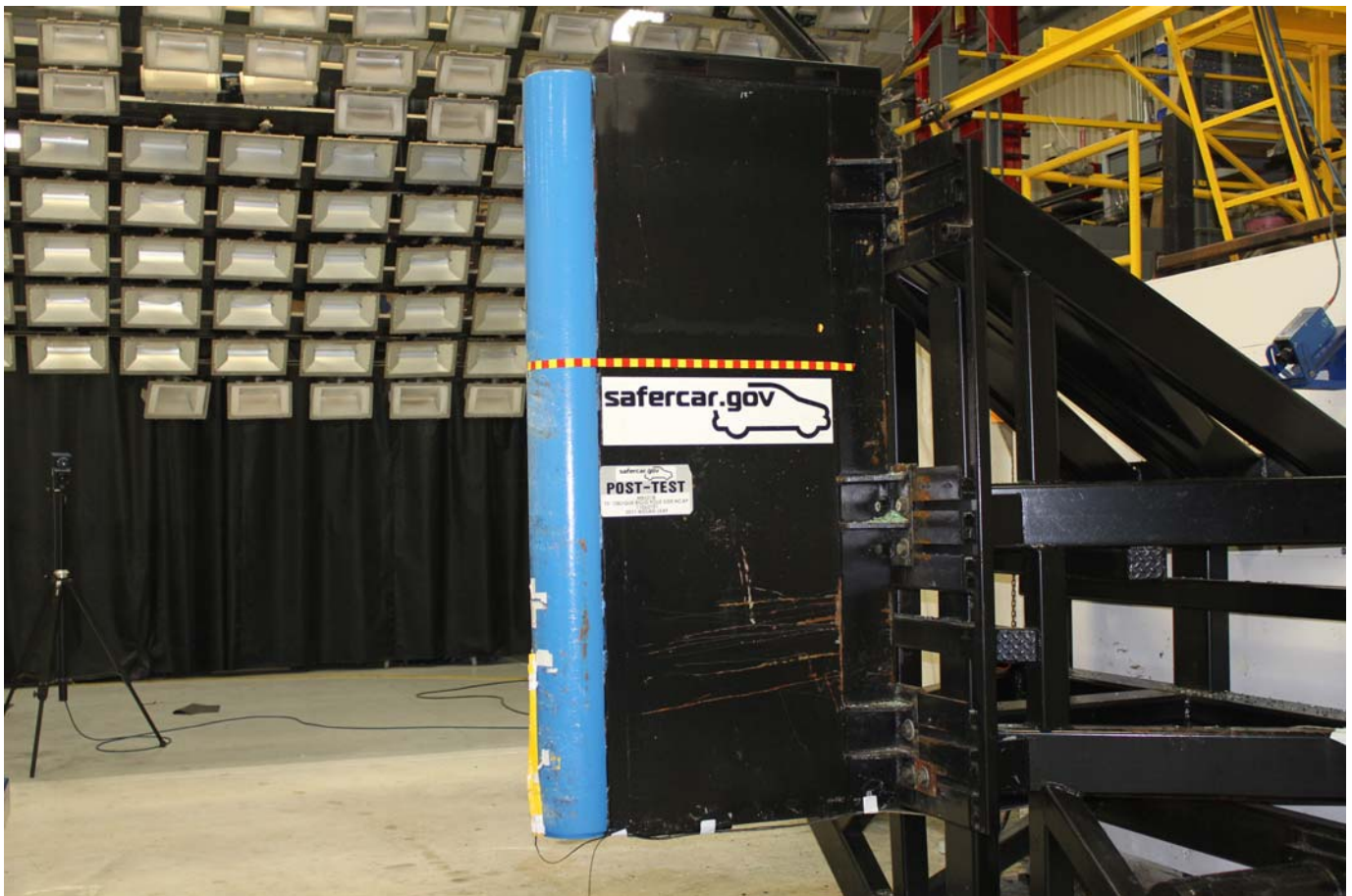
Pre-Test Pole Barrier Front View



Post-Test Pole Barrier Front View



Pre-Test Pole Barrier Side View



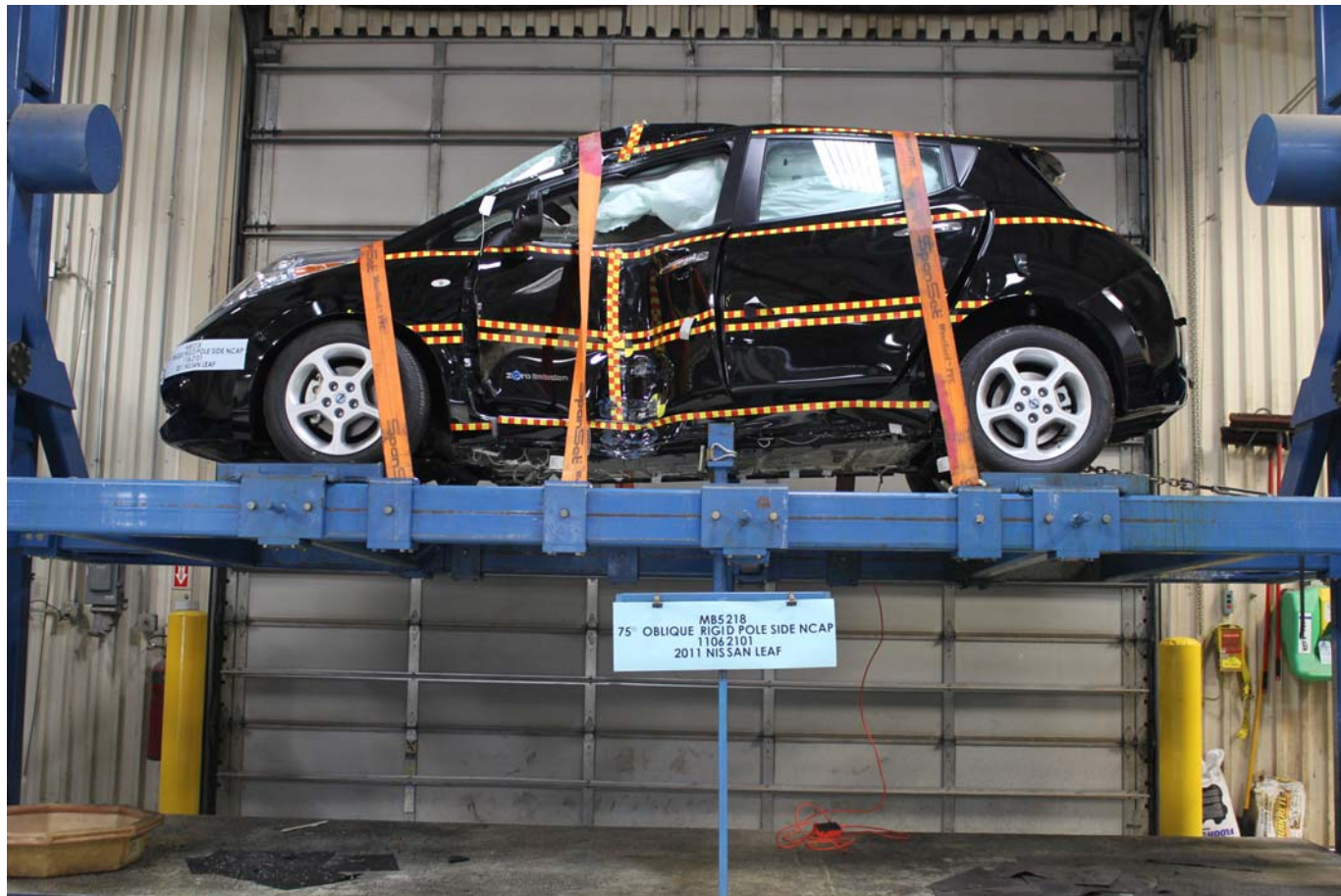
Post-Test Pole Barrier Side View

PHOTOGRAPH NOT APPLICABLE

Pre-Test Ballast View



Post-Test Primary and Redundant Speed Trap Read-Out



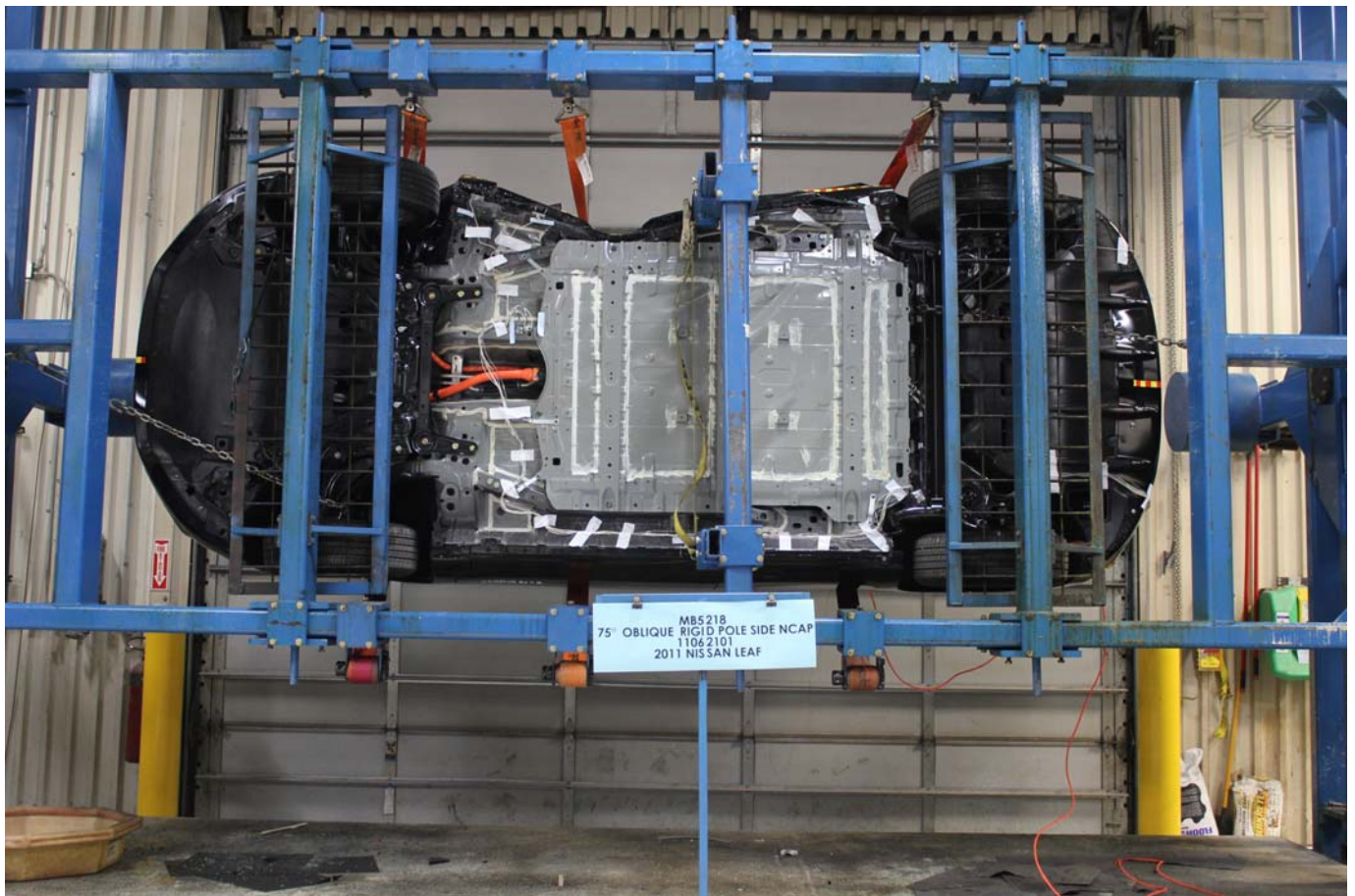
FMVSS No. 301/305 Rollover 0 Degrees



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 NISSAN LEAF SL

100% Electric, No Gas, Zero Emissions Vehicle

Standard Equipment Included at No Extra Charge

MECHANICAL & PERFORMANCE
24 kWh lithium-ion battery
130 kW AC and DC charging
3.3 kW On-Board Charger
Regenerative Braking System
Vehicle Speed-Sensitive Power-Assisted Steering
Front and Rear Stabilizer Bars
4-Wheel Power-Assisted Variable Disc Brakes
Electronic Parking Brake
16" Alloy Wheels
P205/55R16 Tires
Tire Repair Kit
Portable Tickle Charge Cable (120V EVSE)

SAFETY & SECURITY
Nissan Advanced Air Bag System (AABS)
Front Seat-Mounted Side Impact Supplemental Air Bags
Roof-Mounted Curtain Side Impact Supplemental Air Bags for Front and Rear-Seat Outboard Occupant Head Protection
Front Seat Belts with Pretensioners, Load Limiters and Adjustable Upper Anchors
3-Point Seat Belts with ALSEVER (Lower SEAT ONLY)
Child Safety Seats and Tethers for Children (LATCH)
Zone Body Construction with Front and Rear Crumple Zones
Pole-Style Side-Door Guard Beams
4-Wheel Anti-Lock Braking System (ABS)
Energy-Absorbing Steering Column
Vehicle Dynamic Control (VDC) with Traction Control System (TCS)
Tire Pressure Monitoring System (TPMS)
Electronic Brake Force Distribution (EBD)
and Brake Assist (BA)
Nissan Vehicle Immobilizer System

COMFORT & CONVENIENCE
6-Way Manual Driver Seat
4-Way Manual Front Passenger Seat
Partially Recycled Cloth Seat Fabric
60/40 Split Fold-Down Rear Seat
Palm-Shift Drive Selector
Cruise Control with Steering-Wheel-Mounted Controls

6-Speaker AM/FM/CD Audio System with MP3/WMA/CD-ROM Playback Capability
Auxiliary Audio Input Jack
USB Connection Port for iPod® Interface and other Compatible Devices
XM® Satellite Radio***
Nissan Navigation System
CARWINGS****
Bluetooth® Hands-Free Phone System
Rear-View Monitor
Digital Meter Cluster
Multi-Function Trip Computer
Automatic Temperature Control (ATC)
Nissan Intelligent Key™ with Push Button Start
Power Windows with Driver's Window One-Touch Auto-Up/Down
Power Door Locks with Auto-Locking Feature
Sun Visors
Auto-Dimming Inside Mirror
HomeLink® Universal Transceiver
Front Center Console with Cup Holders and Storage
Rear Cargo Area Cover
12-Volt DC Power Outlet

EXTERIOR FEATURES
Aerodynamic LED Headlights and Taillights
Automatic On/Off Headlights
Fog Lights
Dual Power Remote-Controlled Outside Mirrors
Body-Color Front and Rear Bumpers
Photovoltaic Solar Panel Spoiler
Aerodynamic Underbody Cover and Rear Diffuser
Chrome Outside Door Handles
Variable Intermittent Front Windshield Wipers
Intermittent Rear Window Wiper
Fixed Roof Antenna

Manufacturer's Suggested Retail Base Price:

Options Included by Manufacturer
QUICK CHARGE PORT
FLOOR MATS & CARGO AREA MAT

\$33,720.00
709.00
170.00

Destination Charges:

850.00

Total* \$35,440.00

***XM® includes activation & 3 months of service only. XM® coverage not available in HI or AK and some markets.

****Includes activation and 36 months of service. Requires cellular network. Signal strength may vary or not exist. Standard text rates may apply. After 36 months, subscription service required.

EPA Fuel Economy and Environmental Comparisons

99 MPG equivalent
106 city
92 highway
34 kw-hrs per 100 miles
Charge & Range
Full Battery Charge Time
7 hours
at 240V

combined city/hwy
on fully charged battery, vehicle can travel about

73 miles

How This Vehicle Compares
Among all vehicles and within midsize car

Worst 9 Best 99

MPG

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Annual Electric Cost

\$561



73 miles

Environment

Greenhouse 987

Acid Precip 0

CO2 (CO2 per mile, lighter only)

Other Air 10

Pollutants 10

Worst 10 Best

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



GOVERNMENT SAFETY RATINGS

Frontal Crash Driver Not Rated Passenger Not Rated

Star ratings based on the risk of injury in a frontal impact. Frontal ratings should ONLY be compared to other vehicles of similar size and weight.

Side Crash Front seat Not Rated Rear seat Not Rated

Star ratings based on the risk of injury in a side impact.

Rollover Not Rated

Star ratings based on the risk of rollover in a single vehicle crash.

Star ratings range from 1 to 5 stars (* * * * *), with 5 being the highest. Source: National Highway Traffic Safety Administration (NHTSA).

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

This Vehicle qualifies for Nissan's

Security+Plus Vehicle Protection Plan

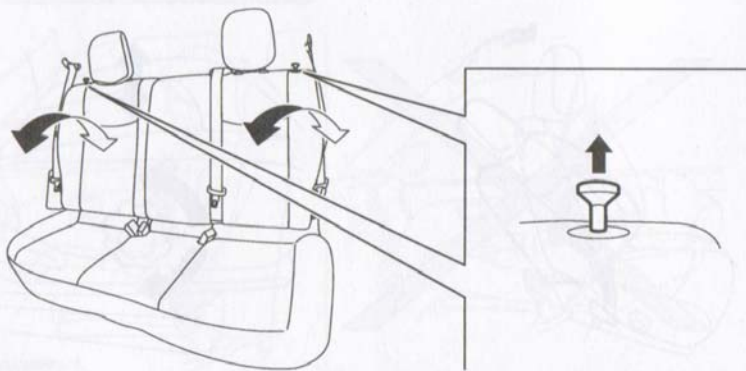
The only service agreement backed by Nissan!

Ask your dealer for details, or call 1-800-NISSAN-1 for more information

VIN: JN1AZ0CP88T002473
EPA: 50 STATE EMISSIONS
MDL: 17211-002473 KH3-K
OPT: G-C03F01192266

20110521021331RF5258

*Does not include dealer installed options and accessories, local taxes or license fees. This label has been applied pursuant to federal law. Do not remove prior to delivery to the ultimate purchaser.



REAR SEATS

Folding

Before folding the rear seats:

- Secure the seat belts on the seat belt hooks located on the side wall. See "Seat belt hooks" later in this section.

To fold down the seatback, pull the release knob.

To return the seatback to the seating position, lift up each seatback and push it to the upright position until it is latched.

⚠ WARNING

- Do not fold down the rear seats when occupants are in the rear seat area or any objects are on the rear seats.
- Never allow anyone to ride in the cargo area or on the rear seats when they are in the folded-down position. Use of these areas by passengers without proper restraints could result in serious injury in an accident or sudden stop.

- Properly secure all cargo with ropes or straps to help prevent it from sliding or shifting. Do not place cargo higher than the seatbacks. In a sudden stop or collision, unsecured cargo could cause personal injury.
- When returning the seatbacks to the upright position, be certain they are completely secured in the latched position. If they are not completely secured, passengers may be injured in an accident or sudden stop.

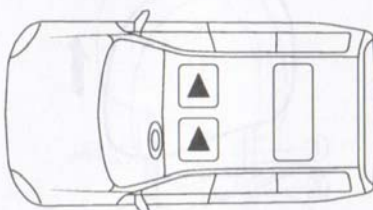
HEAD RESTRAINTS

⚠ WARNING

Head restraints supplement the other vehicle safety systems. They may provide additional protection against injury in certain rear end collisions. Adjust the head restraints properly, as specified in this section. Check the adjustment after someone else uses the seat. Do not attach anything to the head restraint stalks or remove the head restraint. Do not use the seat if the head restraint

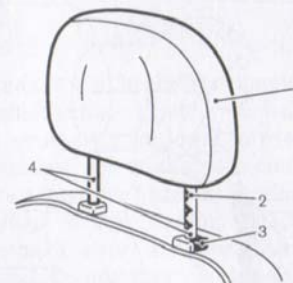
1-4 Safety—Seats, seat belts and supplemental restraint system

has been removed. If the head restraint was removed, reinstall and properly adjust the head restraint before an occupant uses the seating position. Failure to follow these instructions can reduce the effectiveness of the head restraints. This may increase the risk of serious injury or death in a collision.



The illustration shows the seating positions equipped with head restraints. The head restraints are adjustable.

▲ Indicates the seating position is equipped with a head restraint.



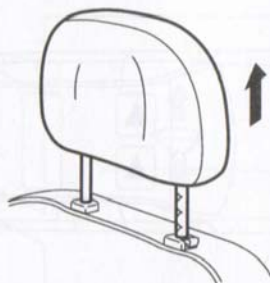
Components

- Head restraint
- Adjustment notches
- Lock knob
- Stalks

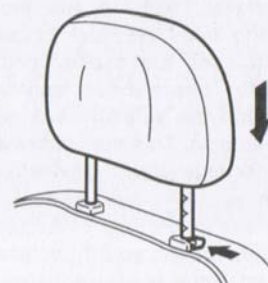


Adjustment

Adjust the head restraint so the center is level with the center of your ears.

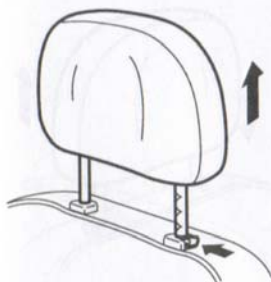


To raise the head restraint, pull it up.



To lower, push and hold the lock knob and push the head restraint down.

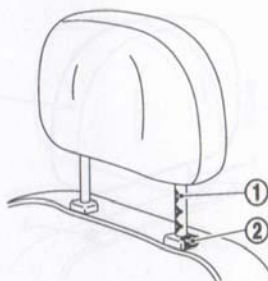
1-6 Safety—Seats, seat belts and supplemental restraint system



Removal

Use the following procedure to remove the adjustable head restraints.

1. Pull the head restraint up to the highest position.
2. Push and hold the lock knob.
3. Remove the head restraint from the seat.
4. Store the head restraint properly in a secure place so it is not loose in the vehicle.
5. Reinstall and properly adjust the head restraint before an occupant uses the seating position.



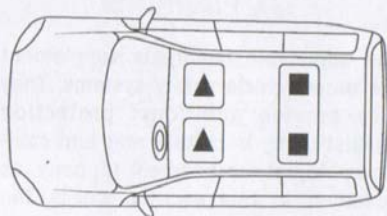
Install

1. Align the head restraint stalks with the holes in the seat. Make sure that the head restraint is facing the correct direction. The stalk with the adjustment notches ① must be installed in the hole with the lock knob ②.
2. Push and hold the lock knob and push the head restraint down.
3. Properly adjust the head restraint before an occupant uses the seating position.

ADJUSTABLE HEADRESTS

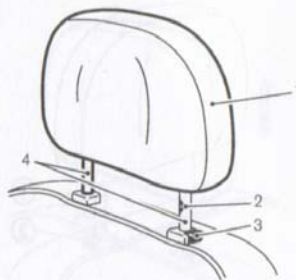
⚠ WARNING

The adjustable headrests supplement the other vehicle safety systems. They may provide additional protection against injury in certain rear end collisions. Adjust the headrest properly, as specified in this section. Check the adjustment after someone else uses the seat. Do not attach anything to the adjustable headrest stalks or remove the adjustable headrest. Do not use the seat if the adjustable headrest has been removed. If the adjustable headrest was removed, reinstall and properly adjust the headrest before an occupant uses the seating position. Failure to follow these instructions can reduce the effectiveness of the adjustable headrests. This may increase the risk of serious injury or death in a collision.



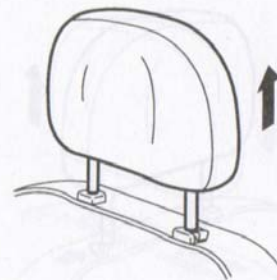
The illustration shows the seating positions equipped with adjustable headrests.

■ Indicates the seating position is equipped with an adjustable headrest.



Components

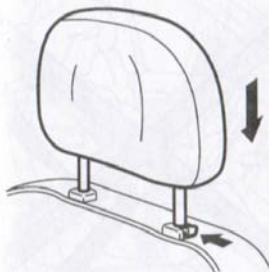
1. Adjustable headrest
2. Adjustment notch
3. Lock knob
4. Stalks



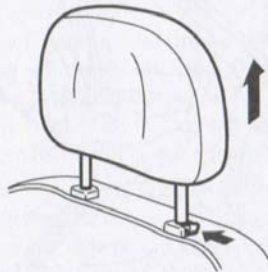
Adjustment

To raise the headrest, pull it up.

1-8 Safety—Seats, seat belts and supplemental restraint system



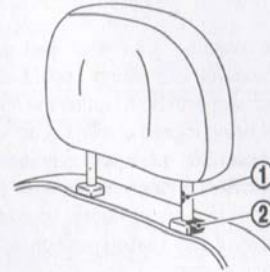
To lower, push and hold the lock knob and push the headrest down.



Removal

Use the following procedure to remove the adjustable headrests.

1. Pull the headrest up to the highest position.
2. Push and hold the lock knob.
3. Remove the headrest from the seat.
4. Store the headrest properly in a secure place so it is not loose in the vehicle.
5. Reinstall and properly adjust the headrest.



Install

1. Align the headrest stalks with the holes in the seat. Make sure that the headrest is facing the correct direction. The stalk with the adjustment notch (1) must be installed in the hole with the lock knob (2).
2. Push and hold the lock knob and push the headrest down.
3. Properly adjust the headrest before an occupant uses the seating position.



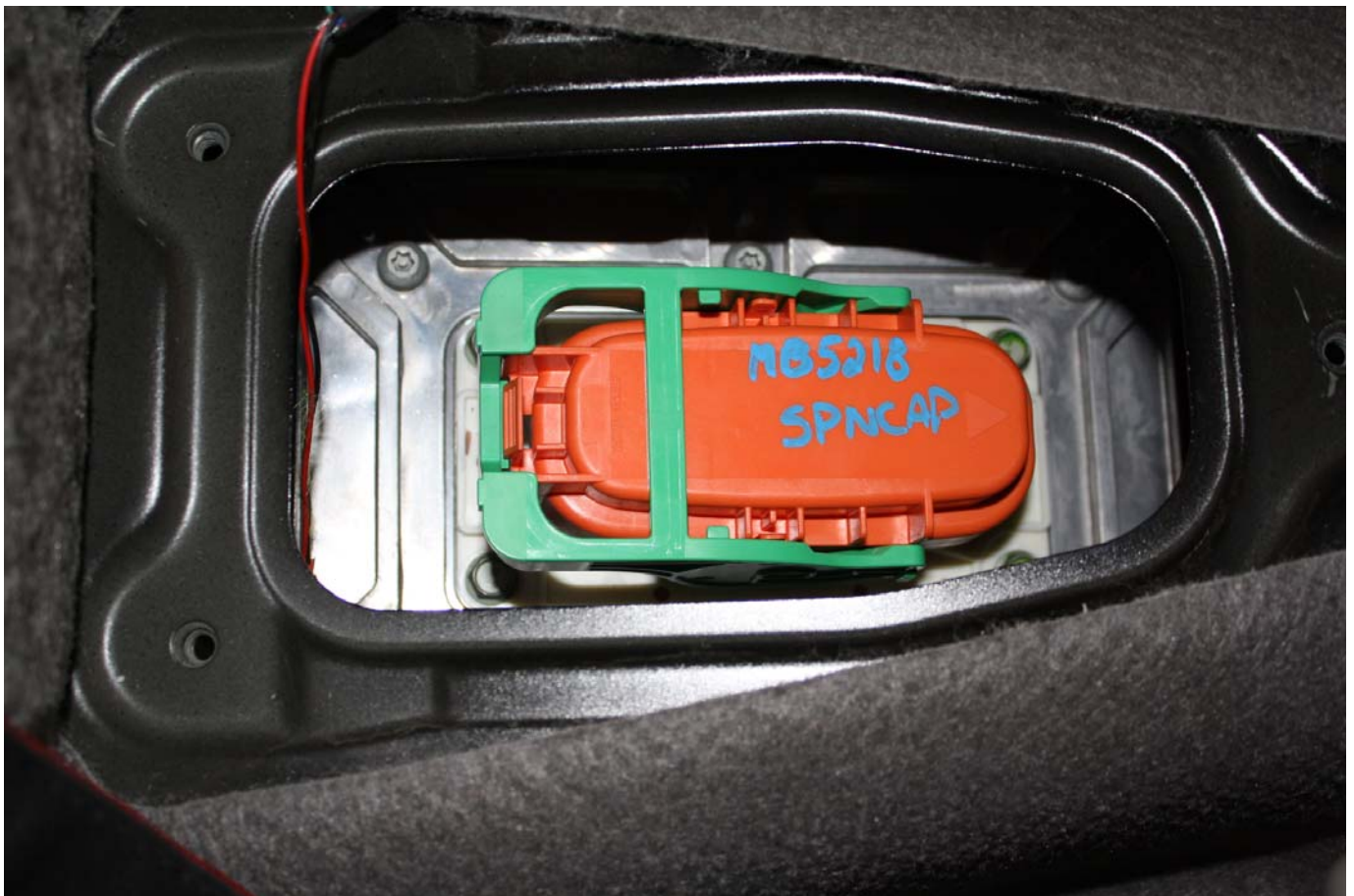
Pre-Test View of Propulsion Battery



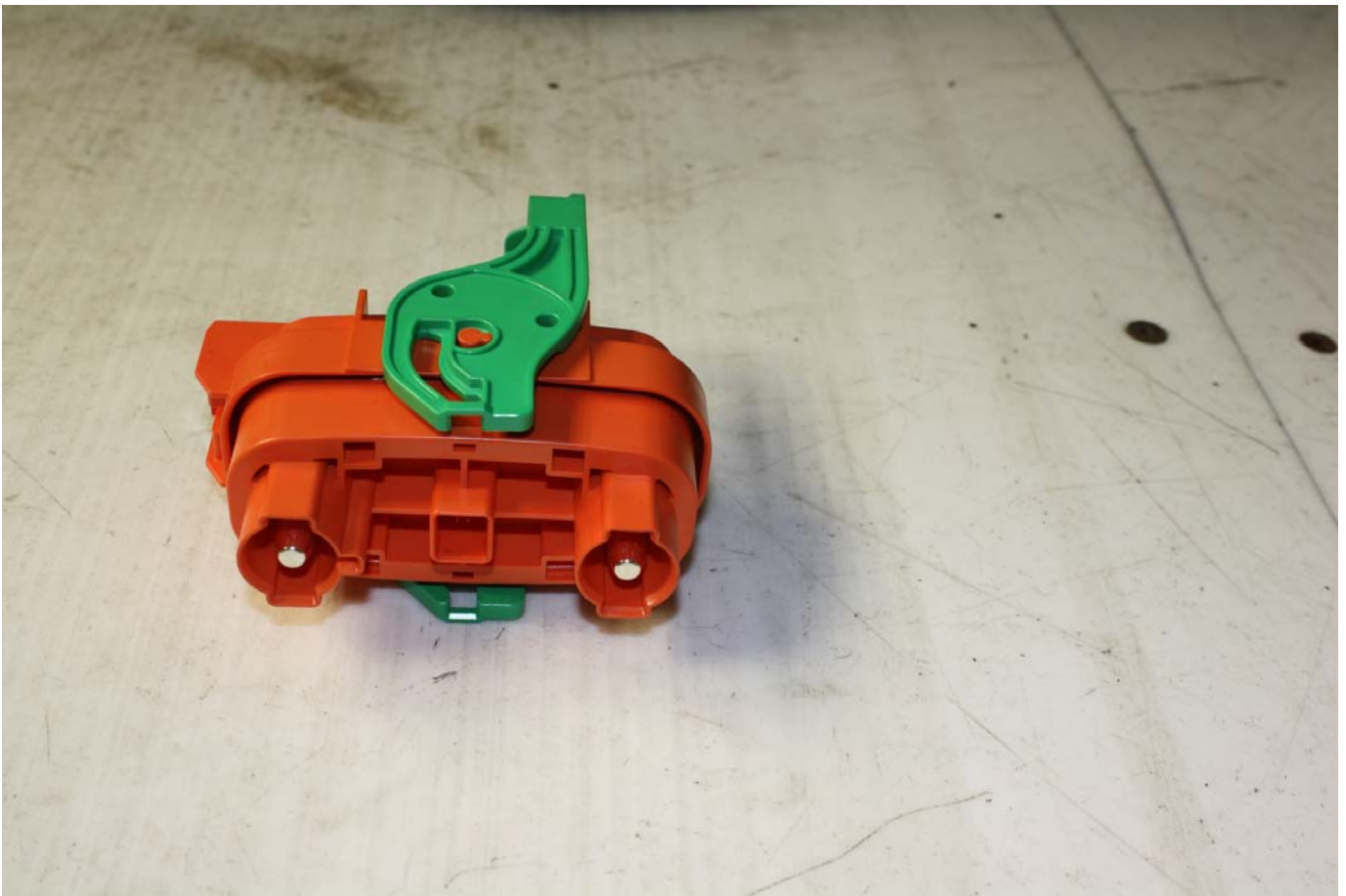
Post-Test View of Propulsion Battery



View of Electric Propulsion Drive



Manual High Voltage Service Disconnect



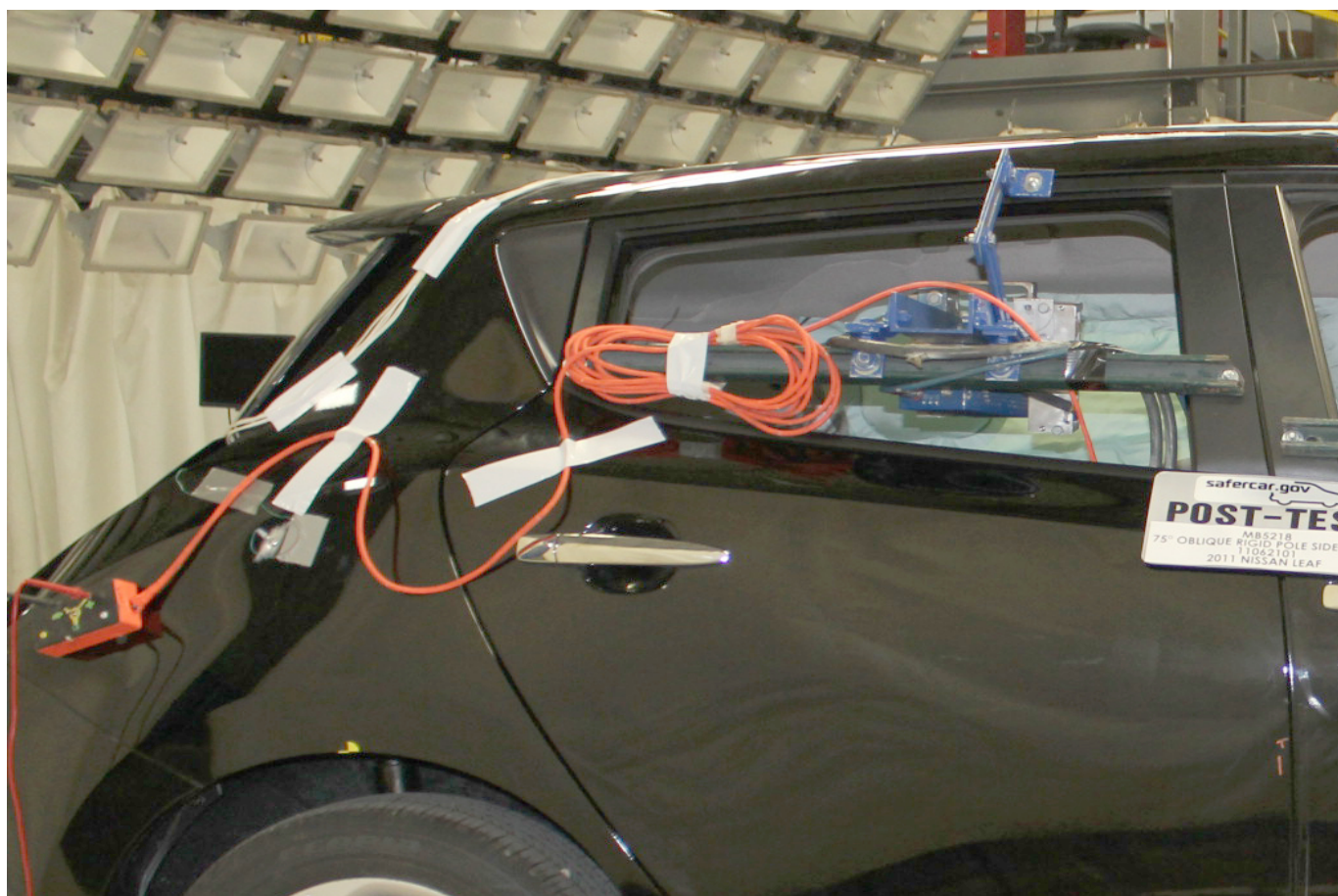
Manual High Voltage Service Disconnect



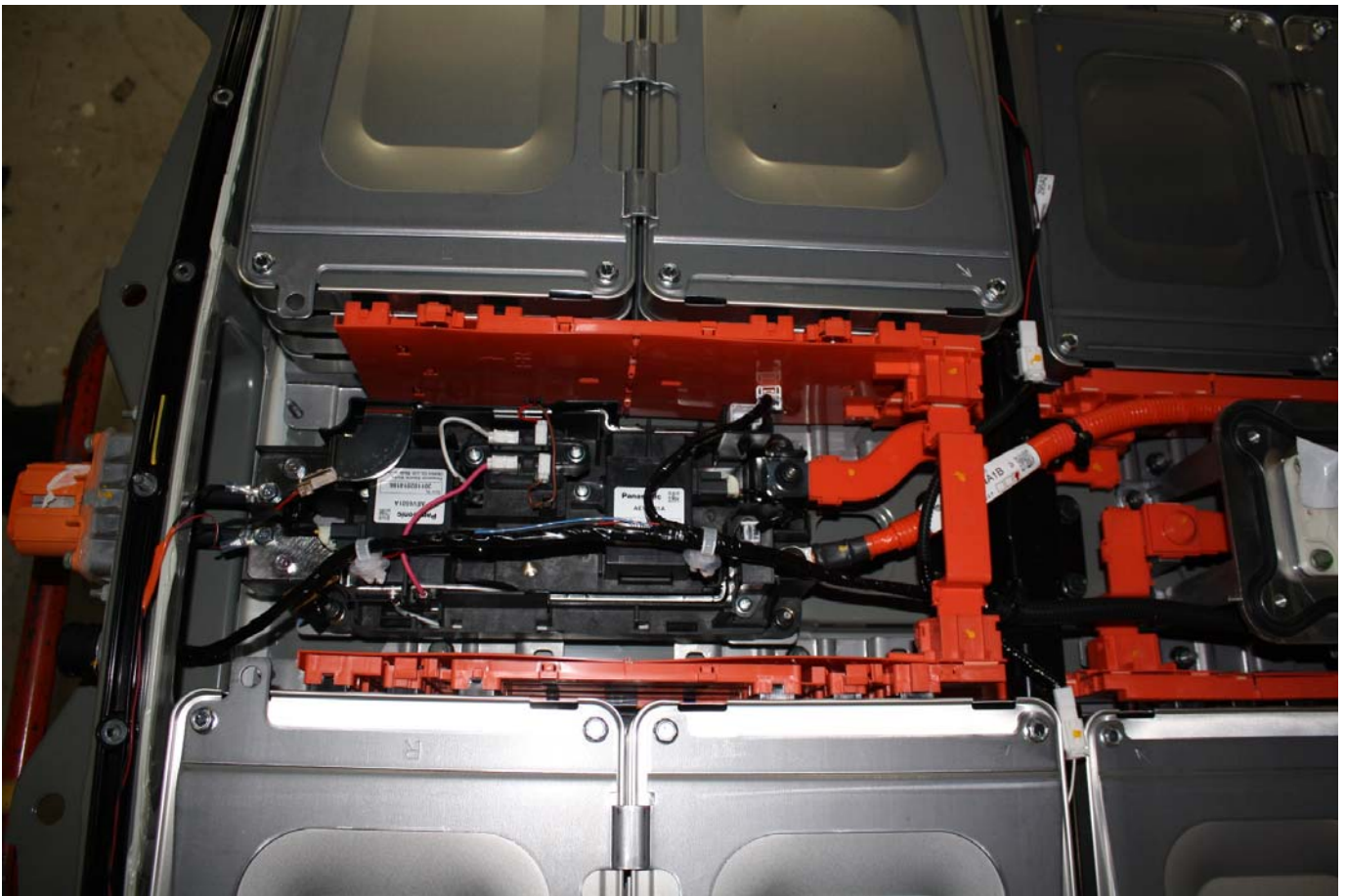
Manual High Voltage Service Disconnect



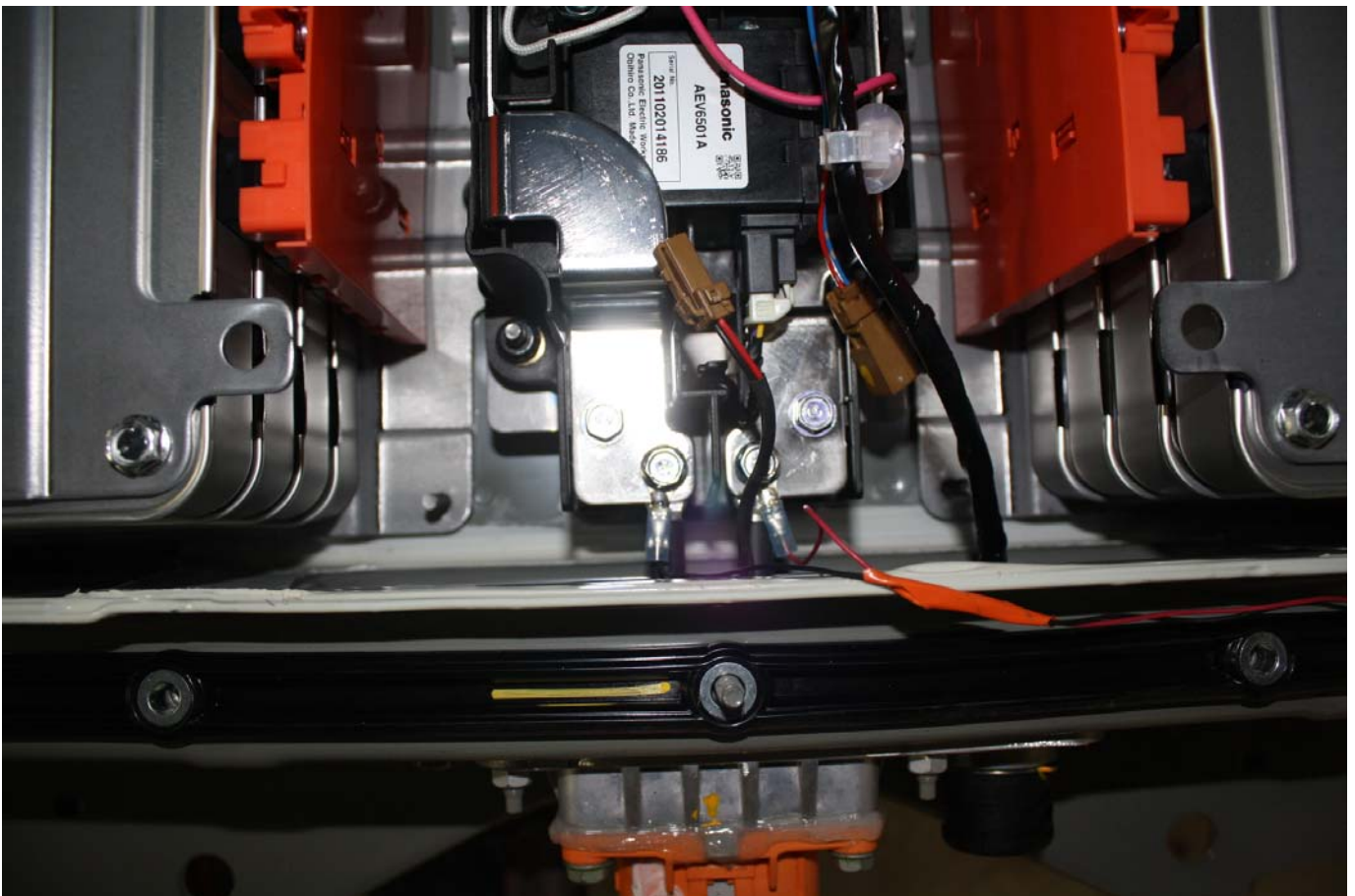
Power Inverter Warning Label



Close-Up of Ground Lead Attached



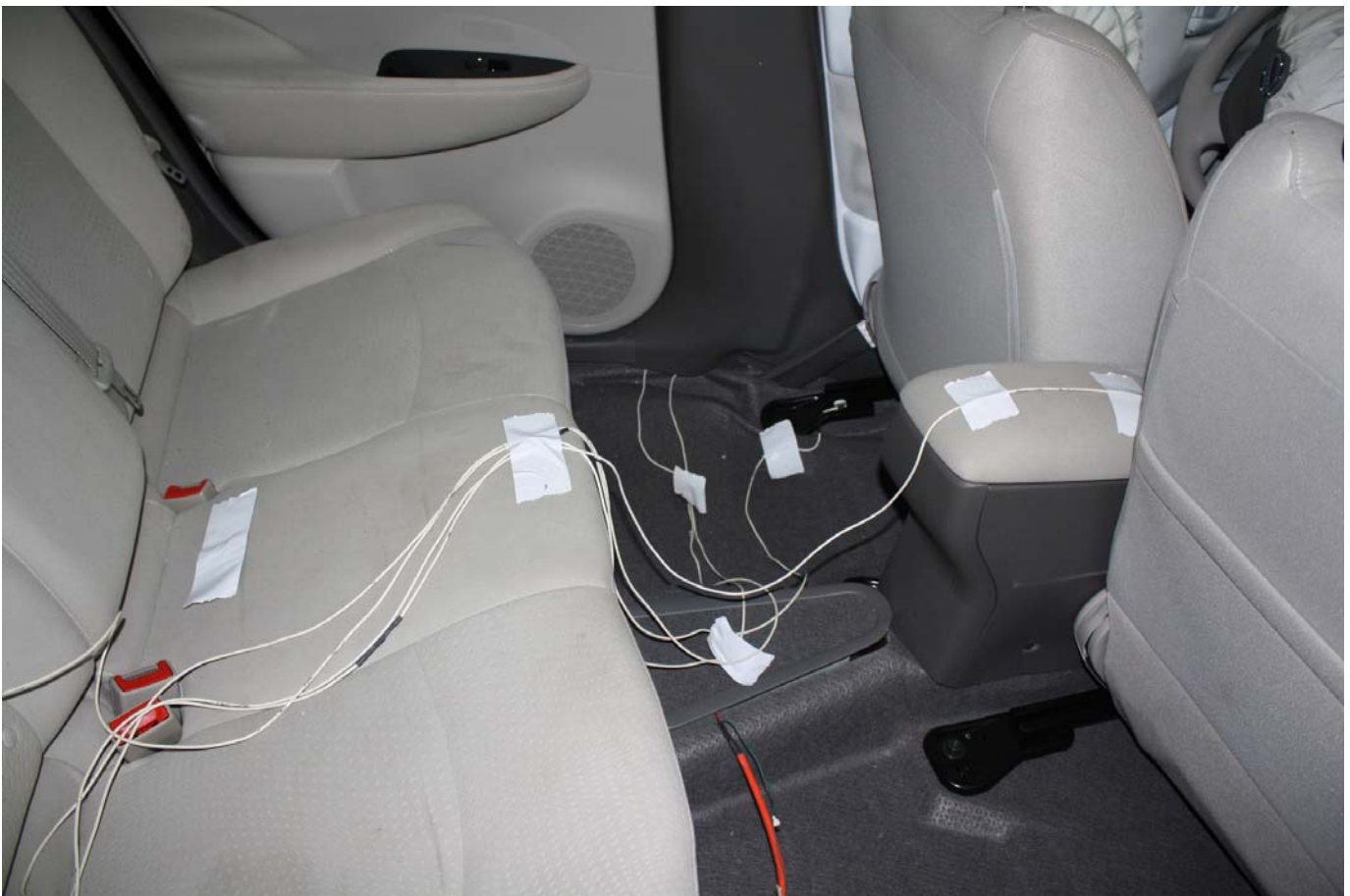
Close-Up of High Voltage Leads Attached



Close-Up of High Voltage Leads Attached



Pre-Test View of Vehicle's Passenger Compartment Adjacent to Propulsion Battery



Post-Test View of Vehicle's Passenger Compartment Adjacent to Propulsion Battery

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 – Not Installed

Driver Torso Contact Switch – Not Installed

Driver Pelvis Contact Switch – Not Installed

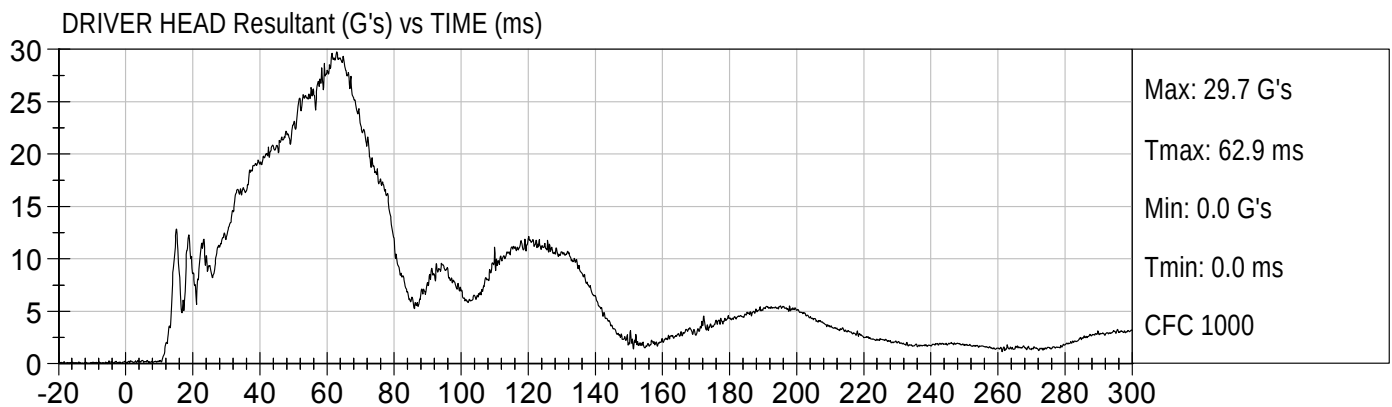
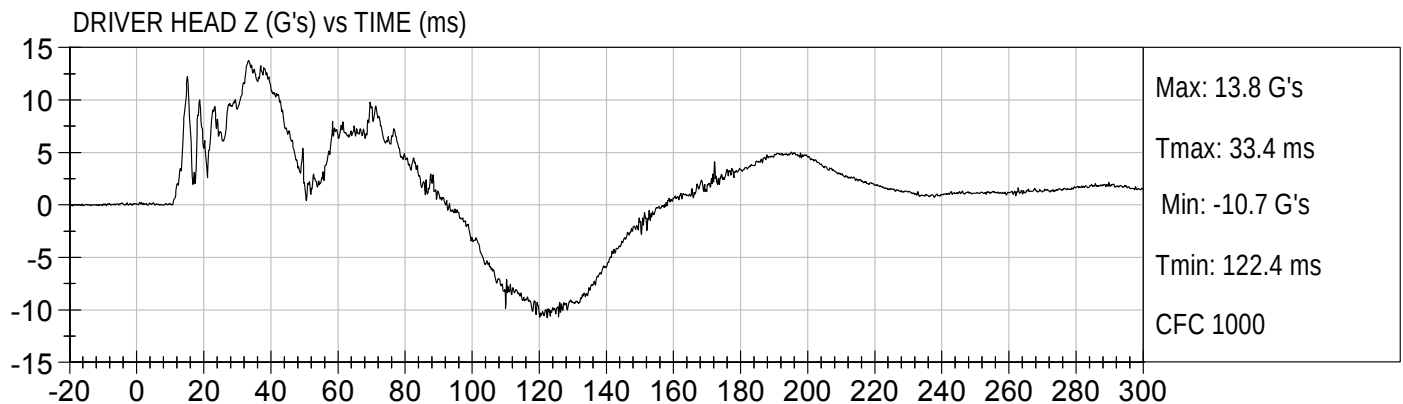
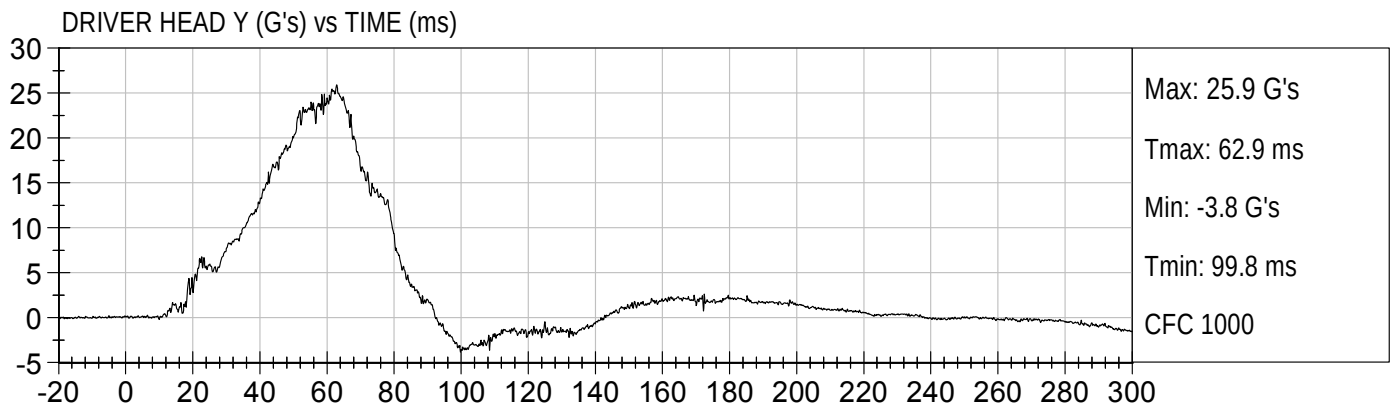
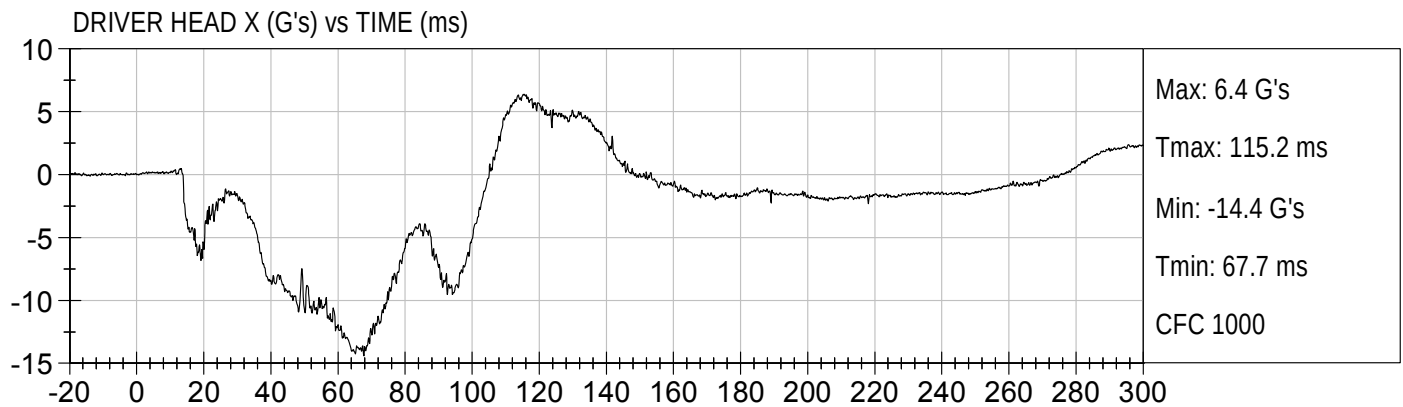
Vehicle CG Acceleration (X)

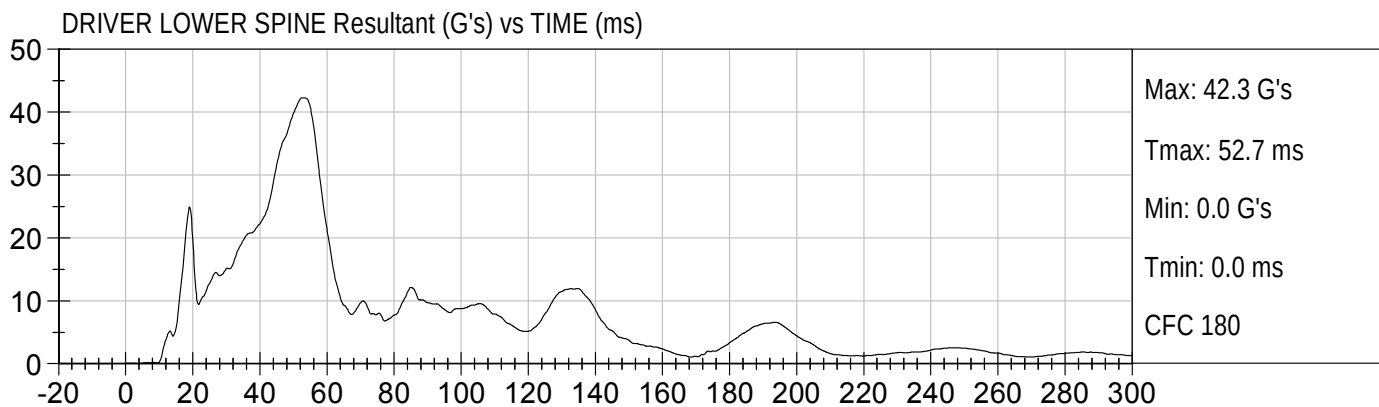
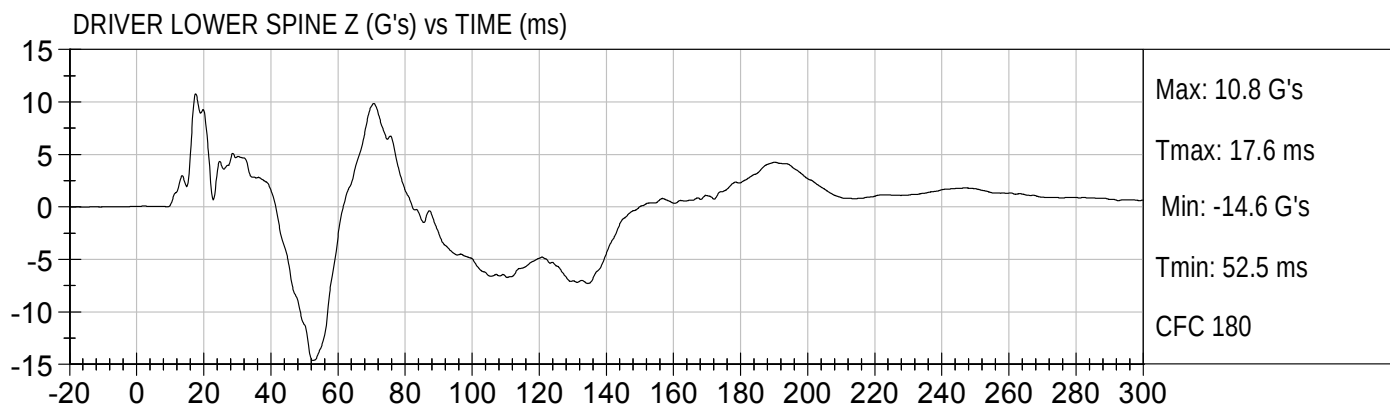
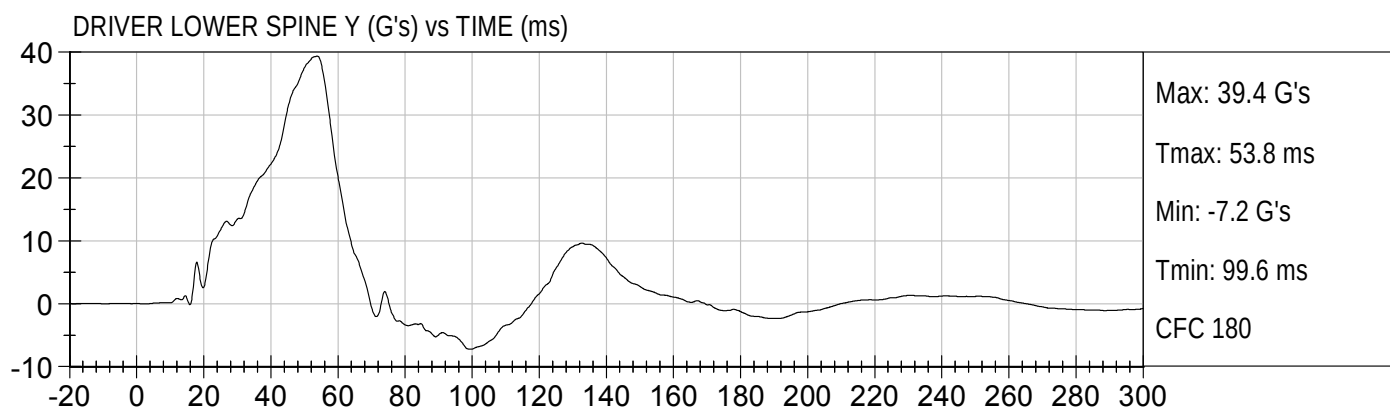
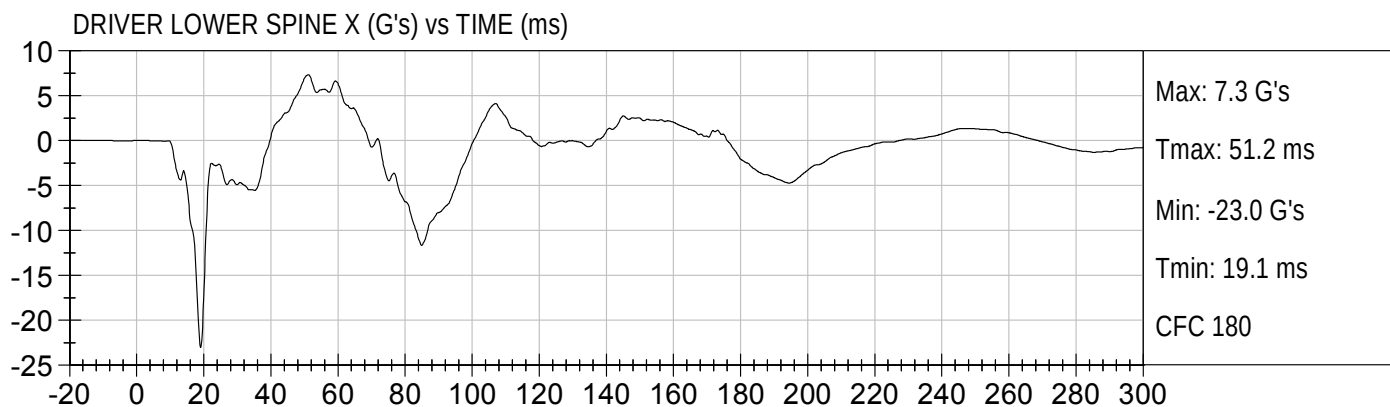
Vehicle CG Acceleration (Y)

Vehicle CG Acceleration (Z)

Vehicle CG Angular Rate About X (Roll)

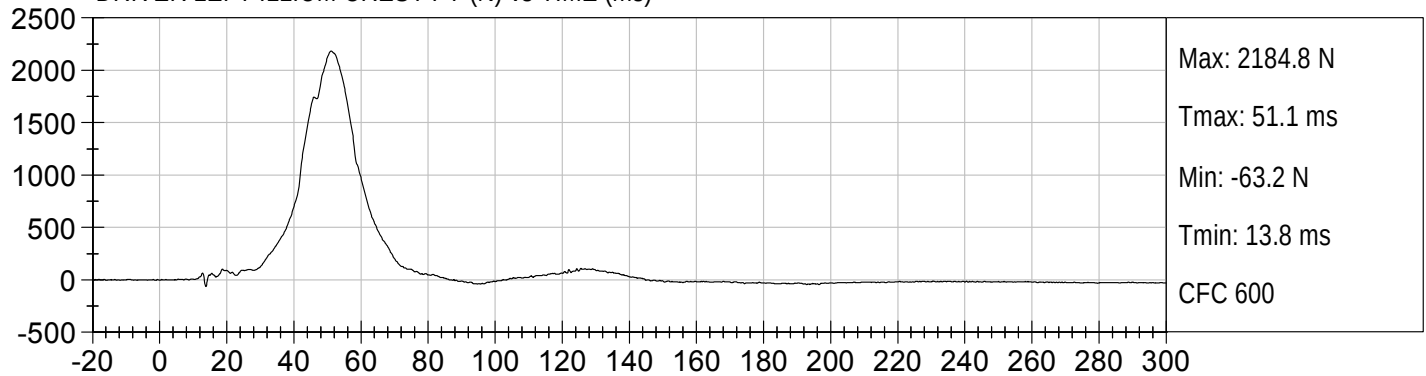
Vehicle CG Angular Rate About Y (Pitch)
Vehicle CG Angular Rate About Z (Yaw)
Left Floor Sill Acceleration (Y)
Left A-Pillar Sill Acceleration (Y)
Left Lower A-Pillar Acceleration (Y)
Left Mid A-Pillar Acceleration (Y)
Left B-Pillar Sill Acceleration (Y)
Left Lower B-Pillar Acceleration (Y)
Left Mid 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 – Not Installed
Driver Side Curtain Airbag Timing – Not Installed
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



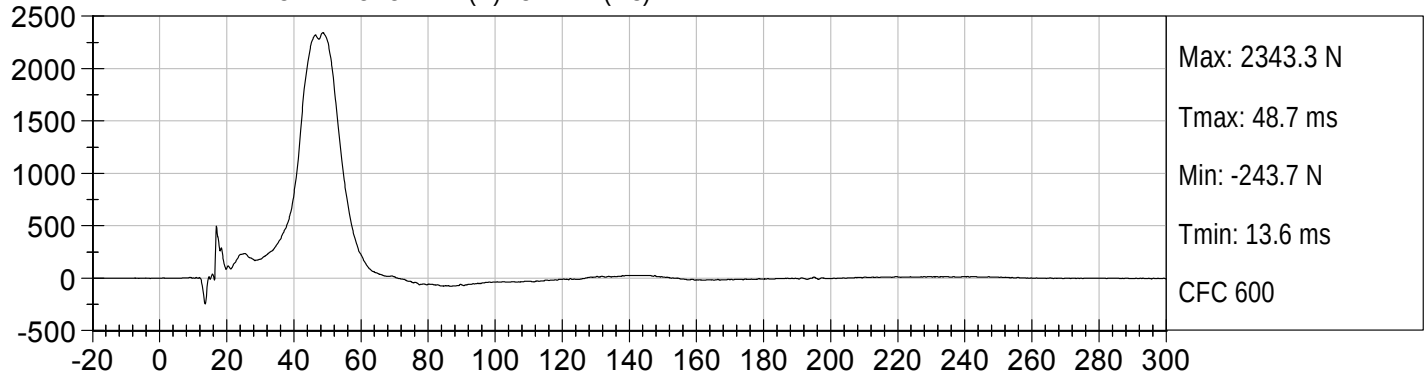




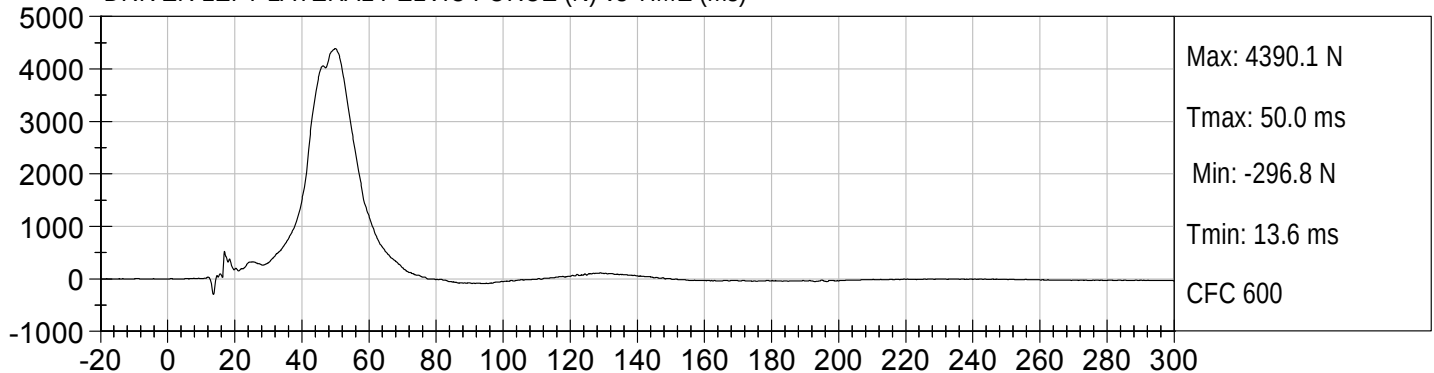
DRIVER LEFT ILLIUM CREST FY (N) vs TIME (ms)



DRIVER LEFT ACETABULUM FY (N) vs TIME (ms)



DRIVER LEFT LATERAL PELVIC FORCE (N) vs TIME (ms)



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: D112091

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	51	Pass
Peak Resultant Acceleration	G's	115 to 137	124	Pass
Peak Lateral Acceleration	G's	+/- 15	-2.7	Pass
Unimodal	N/A	<15%	Yes	Pass
Overall Test Results				Pass


Laboratory Technician

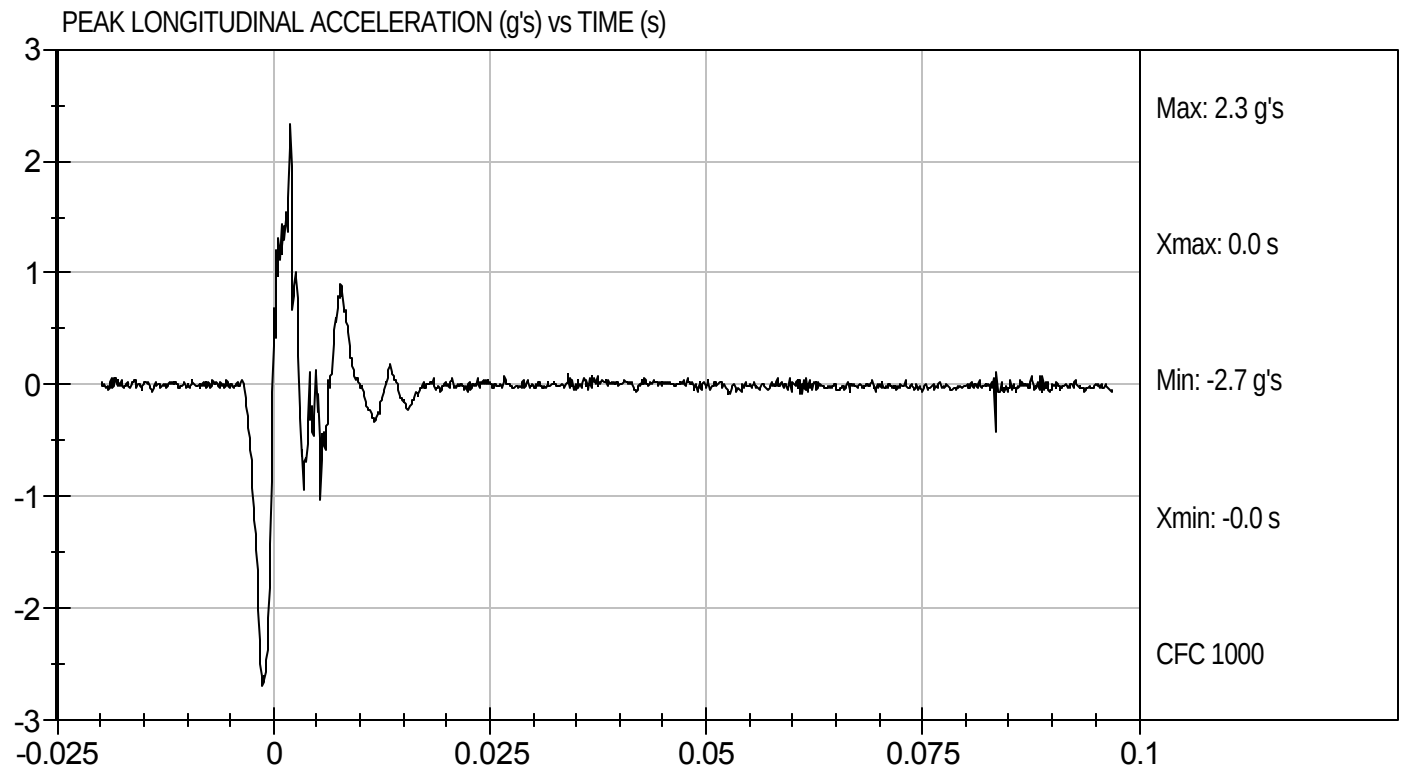
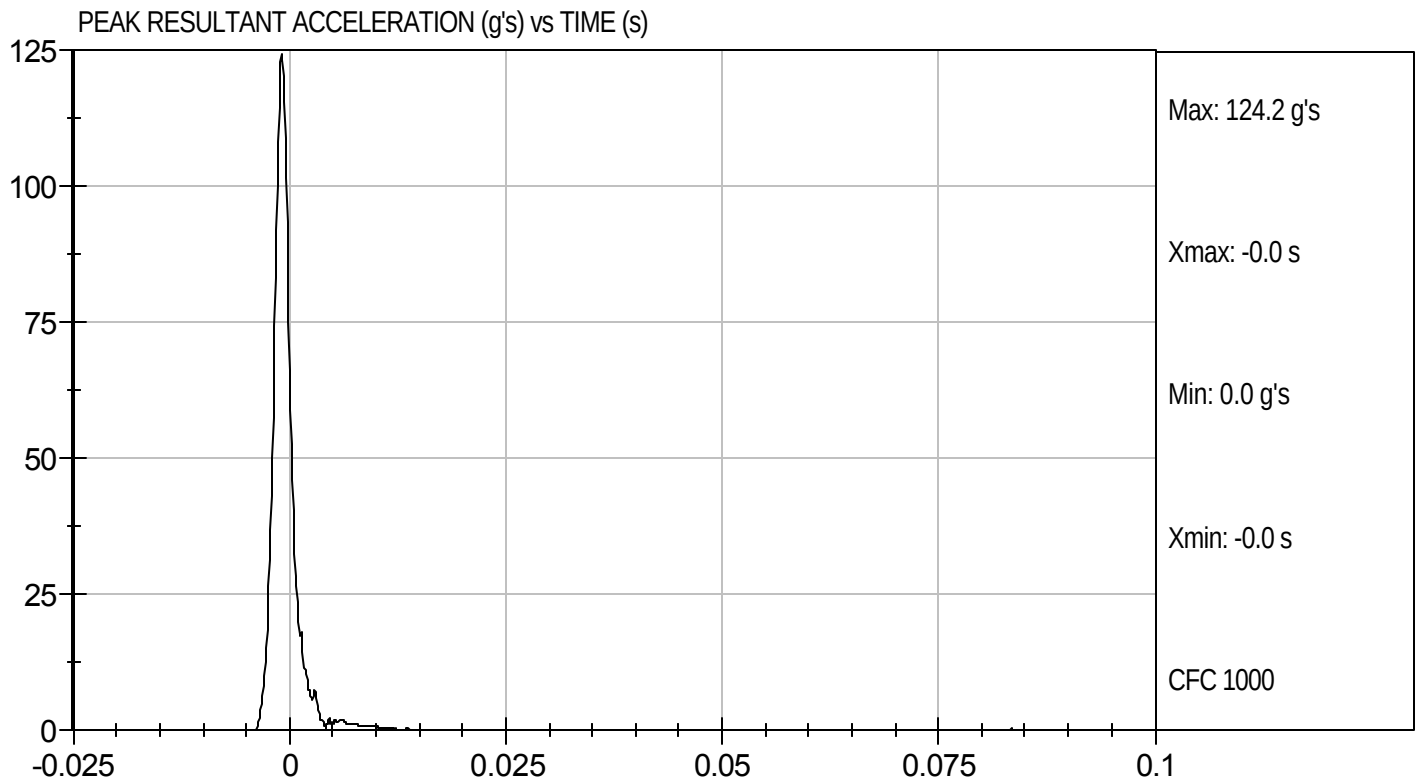
6/16/11
Test Date


Approved By



Test Desc: Head Drop
Component ID: D112091

Test Date: 6/16/11
Velocity: 0 ft/s, 0 m/s

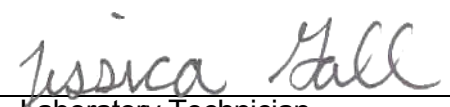


MGA RESEARCH CORPORATION
LATERAL NECK PENDULUM TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D112092

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	21.6	Pass
Humidity		%	10 to 70	52	Pass
Impact Velocity		m/s	5.51 to 5.63	5.58	Pass
Delta Velocity	10 ms	m/s	2.20 to 2.80	2.77	Pass
	15 ms	m/s	3.30 to 4.10	3.87	Pass
	20 ms	m/s	4.40 to 5.40	5.06	Pass
	25 ms	m/s	5.40 to 6.10	5.51	Pass
	25-100 ms	m/s	5.50 to 6.20	5.52	Pass
Maximum D-Plane Rotation		deg	71 to 81	72	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	57	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	113	Pass
Overall Test Results				Pass	


 Laboratory Technician

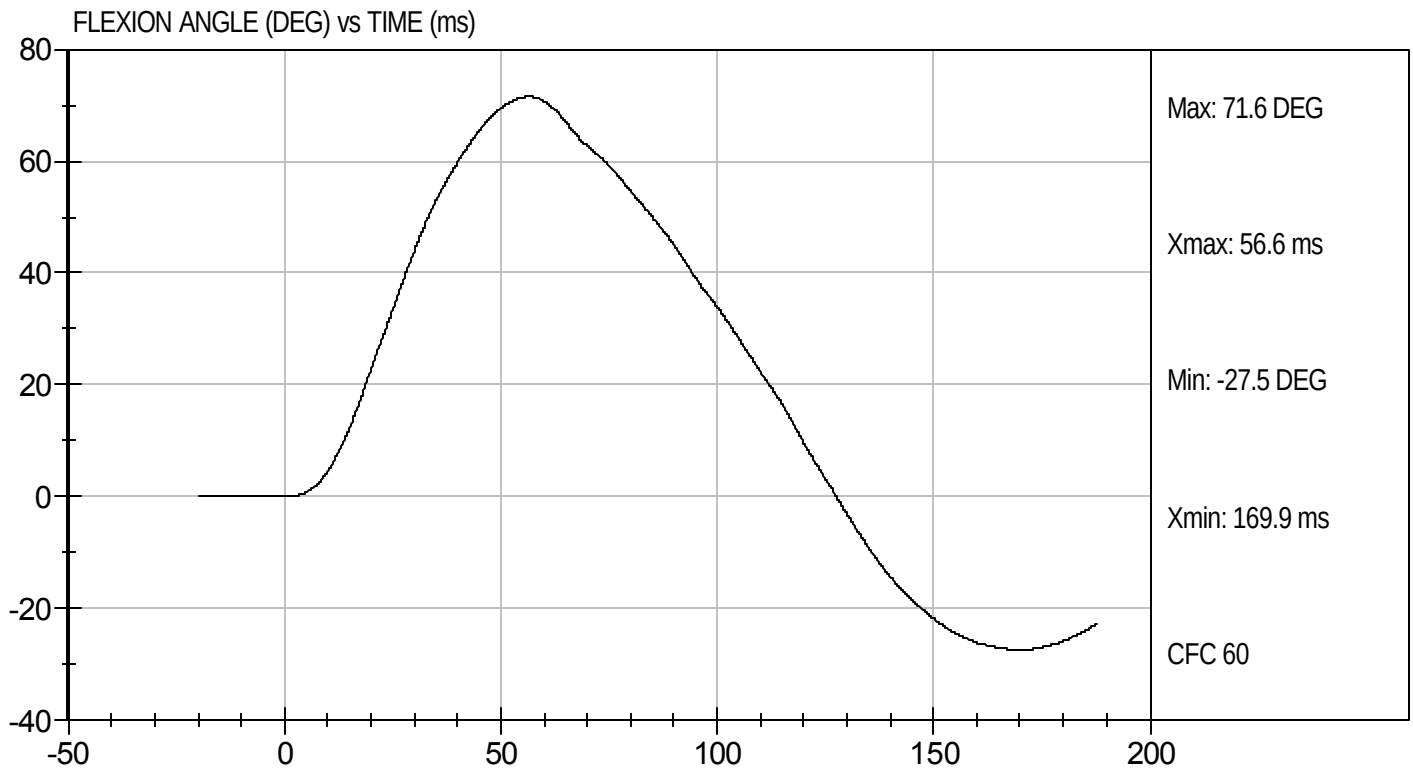
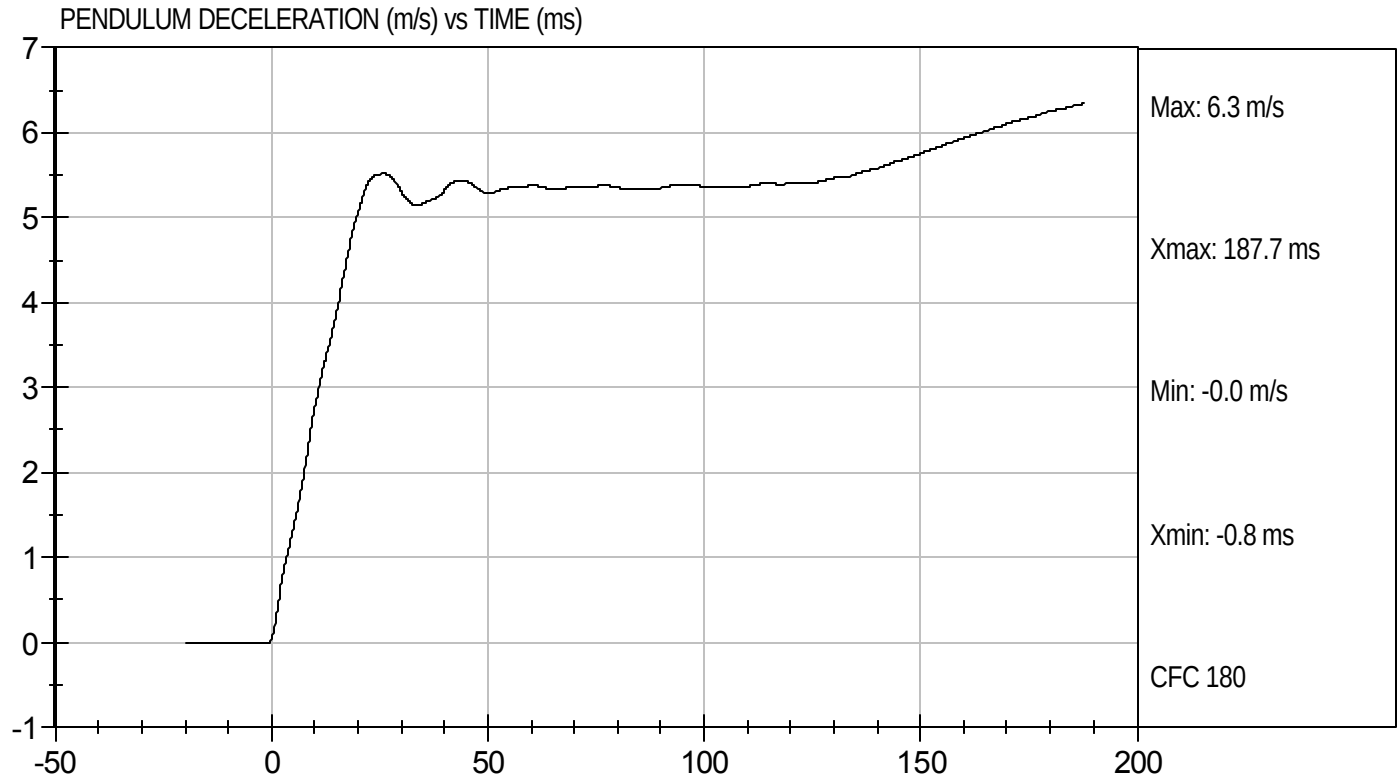
6/16/11
 Test Date


 Approved By



Test Desc: Neck Bending
Component ID: D112092

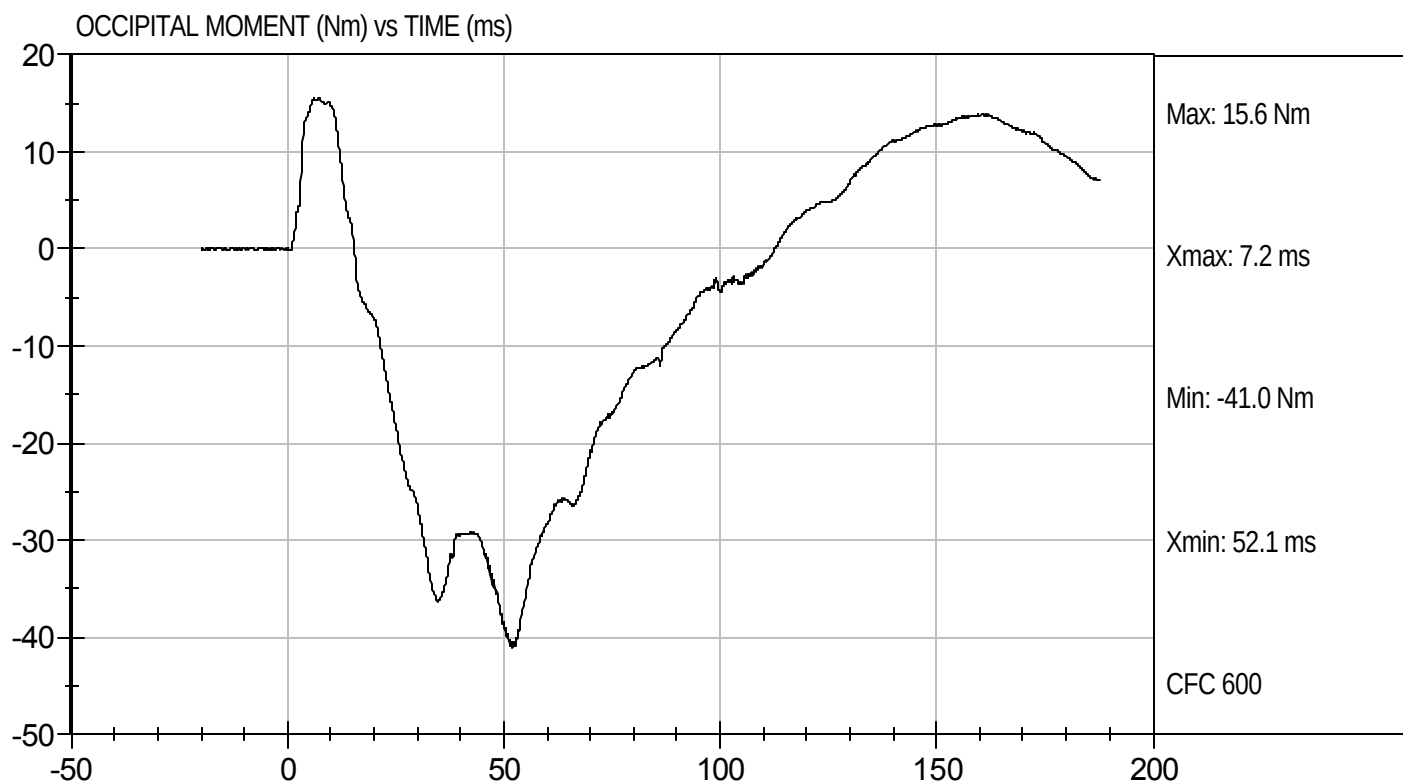
Test Date: 6/16/11
Velocity: 18.32 ft/s, 5.58 m/s





Test Desc: Neck Bending
Component ID: D112092

Test Date: 6/16/11
Velocity: 18.32 ft/s, 5.58 m/s



MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
SID-11s BUILD LEVEL D DUMMY

ATD Serial No: 296

Test ID: D112093

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	51	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	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

Jessica Hall
Laboratory Technician

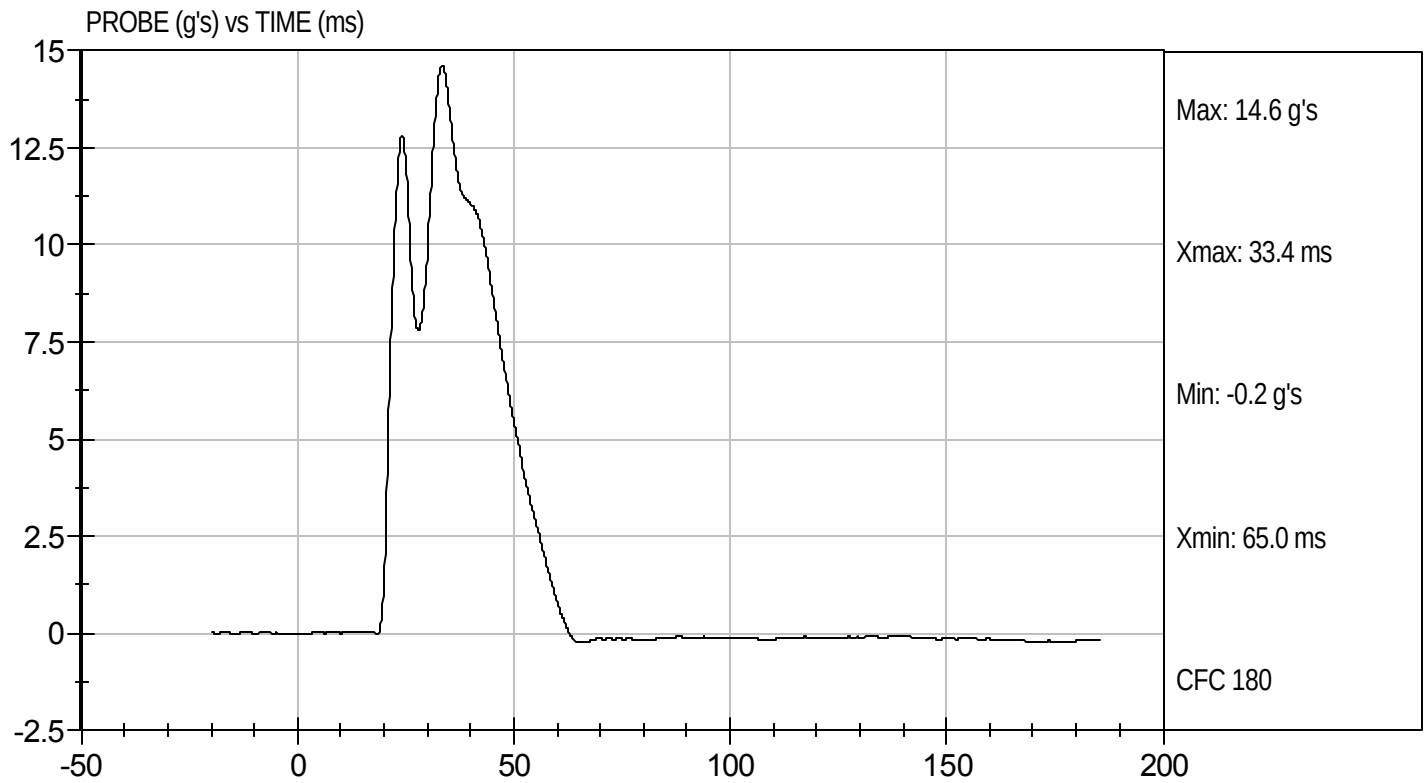
6/16/11
Test Date

David Winkelbauer
Approved By



Test Desc: Shoulder Impact
Component ID: D112093

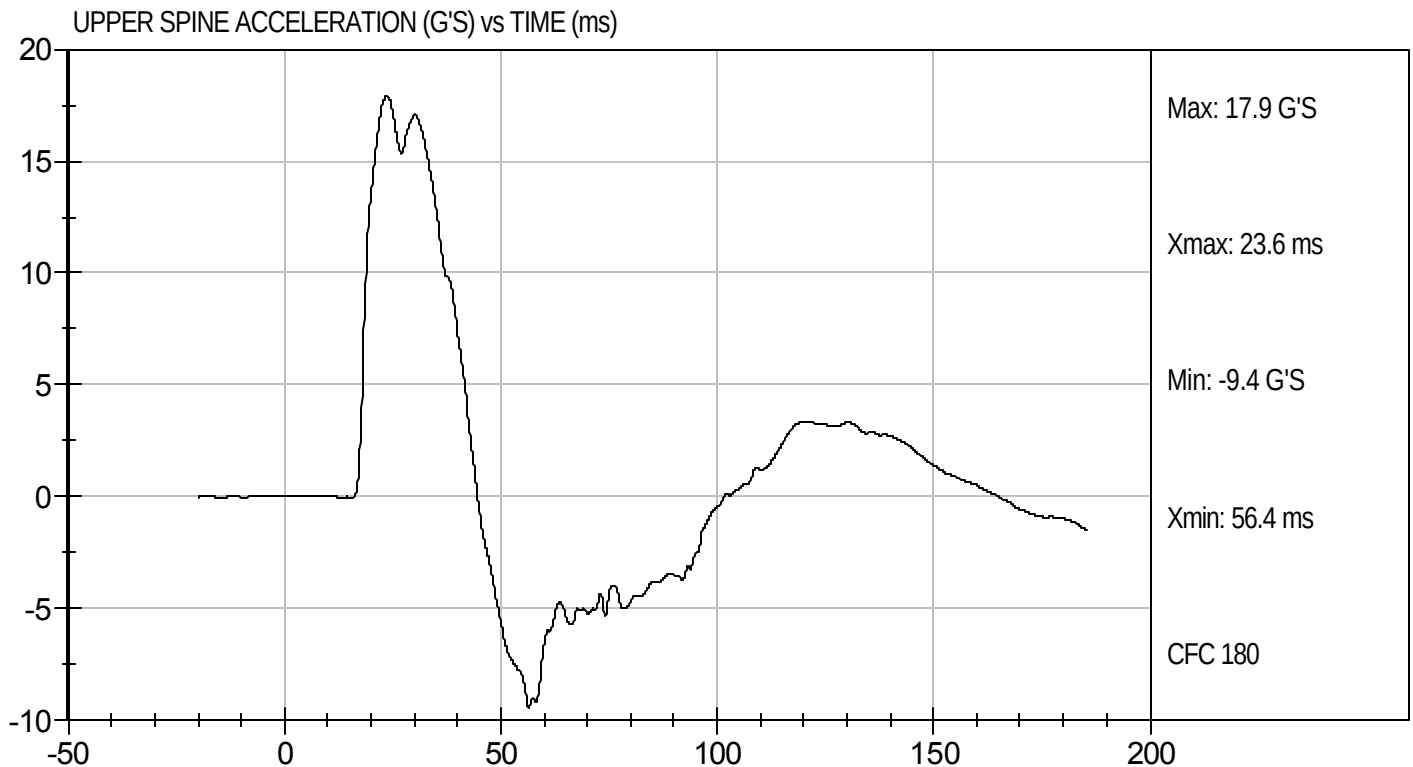
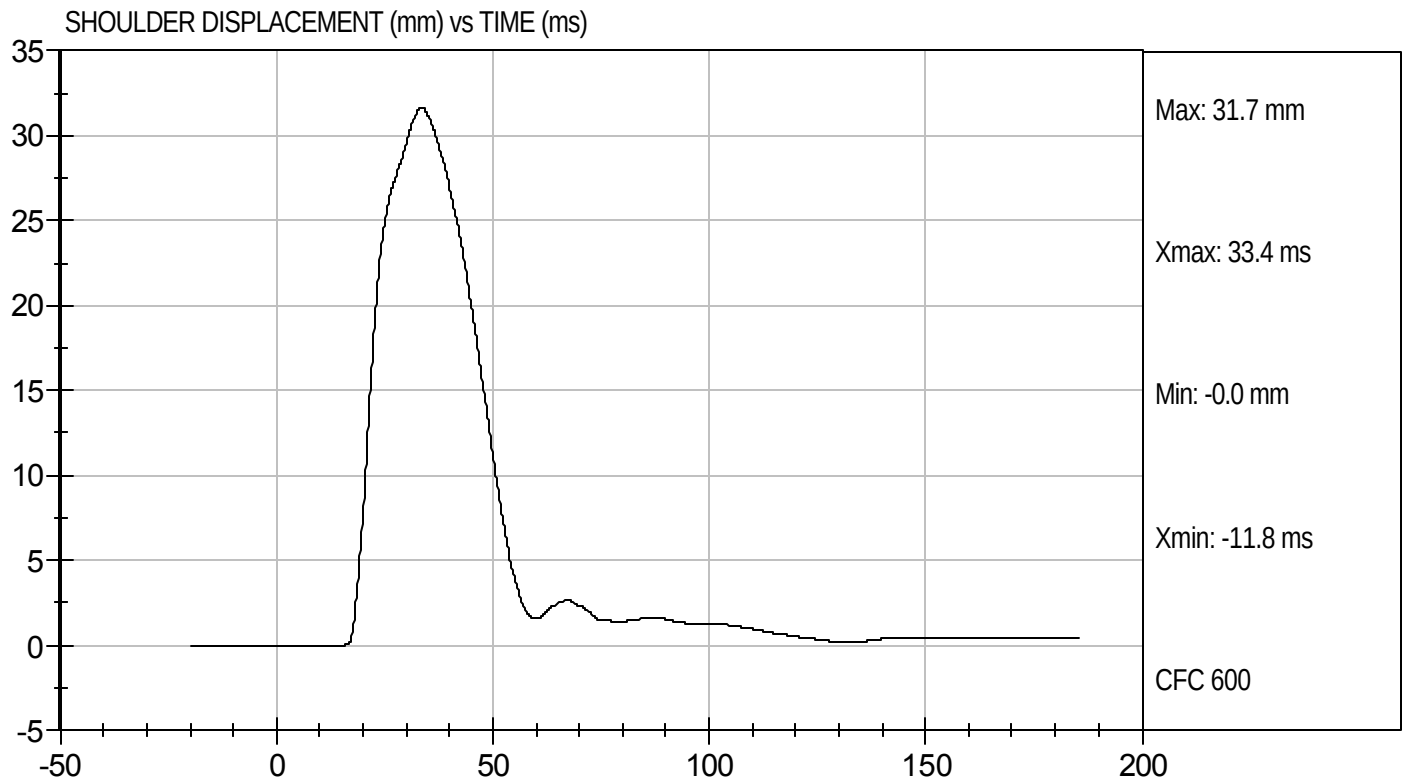
Test Date: 6/16/11
Velocity: 14.36 ft/s, 4.38 m/s





Test Desc: Shoulder Impact
Component ID: D112093

Test Date: 6/16/11
Velocity: 14.36 ft/s, 4.38 m/s



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

ATD Serial No: 296

Test I.D: D112094

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.6	Pass
Humidity	%	10 to 70	51	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	Pass
Peak Impactor Acceleration	G's	30 to 36	31	Pass
Shoulder Displacement	mm	31 to 40	37	Pass
Upper Rib Displacement	mm	25 to 32	28	Pass
Middle Rib Displacement	mm	30 to 36	32	Pass
Lower Rib Displacement	mm	32 to 38	33	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	38	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	32	Pass
Overall Test Results				Pass


 Laboratory Technician

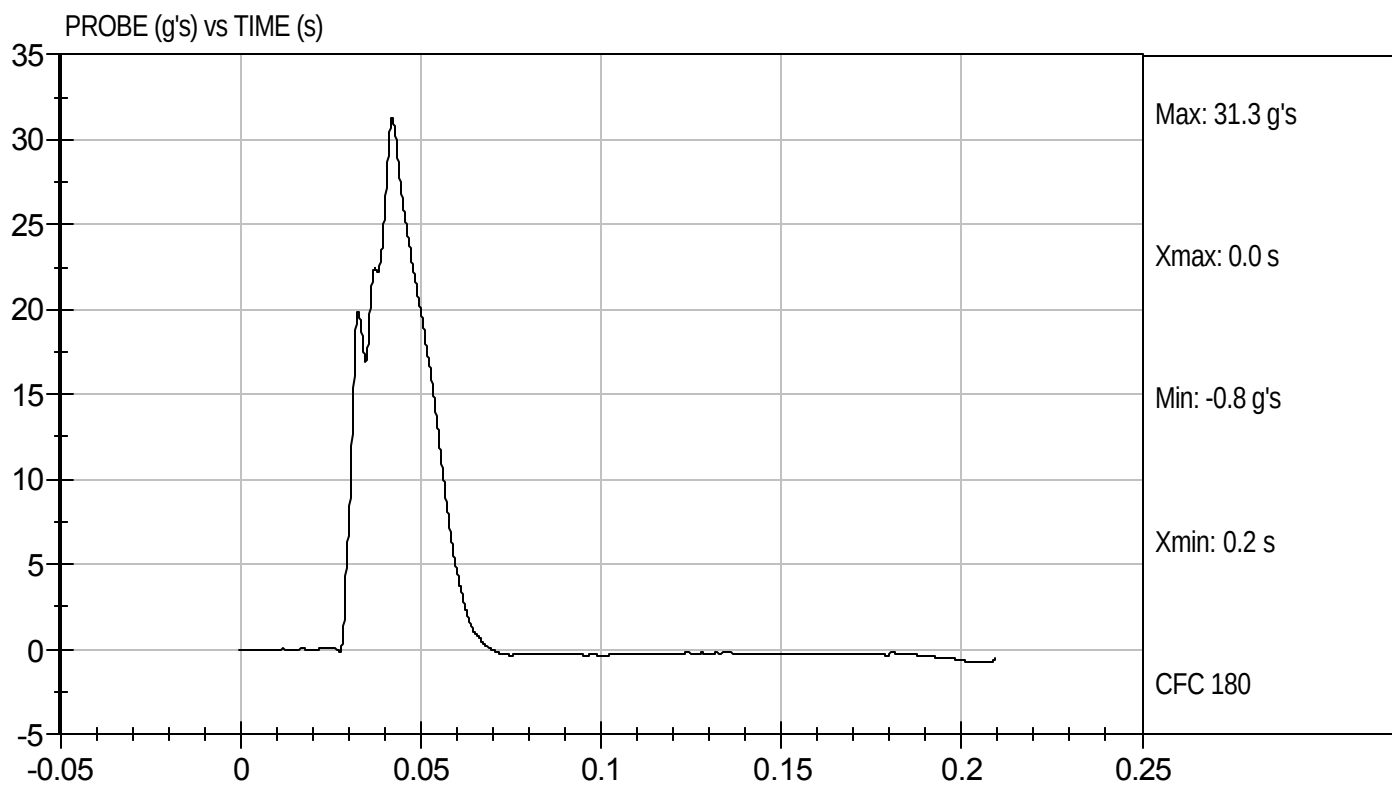
6/16/11
 Test Date


 Approved By



Test Desc: Thorax With Arm
Component ID: D112094

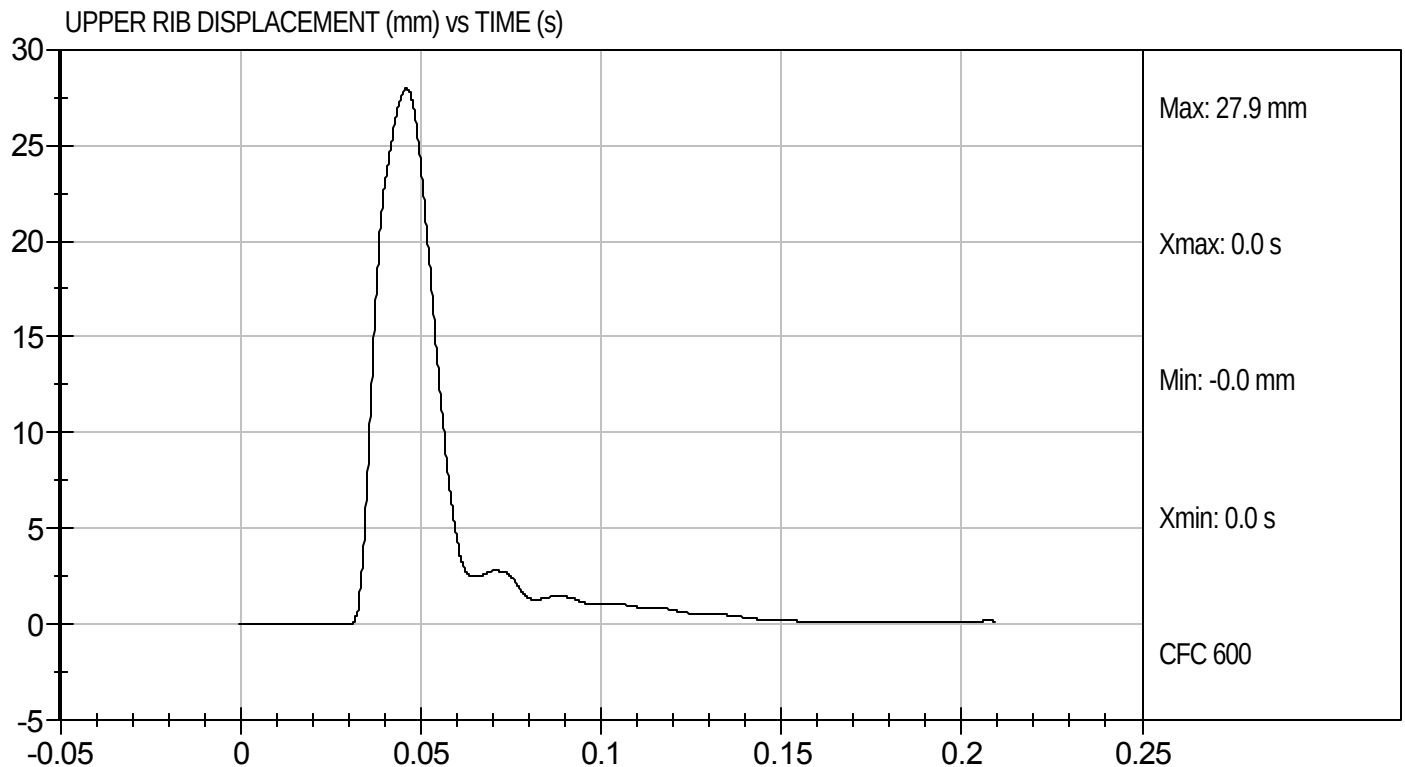
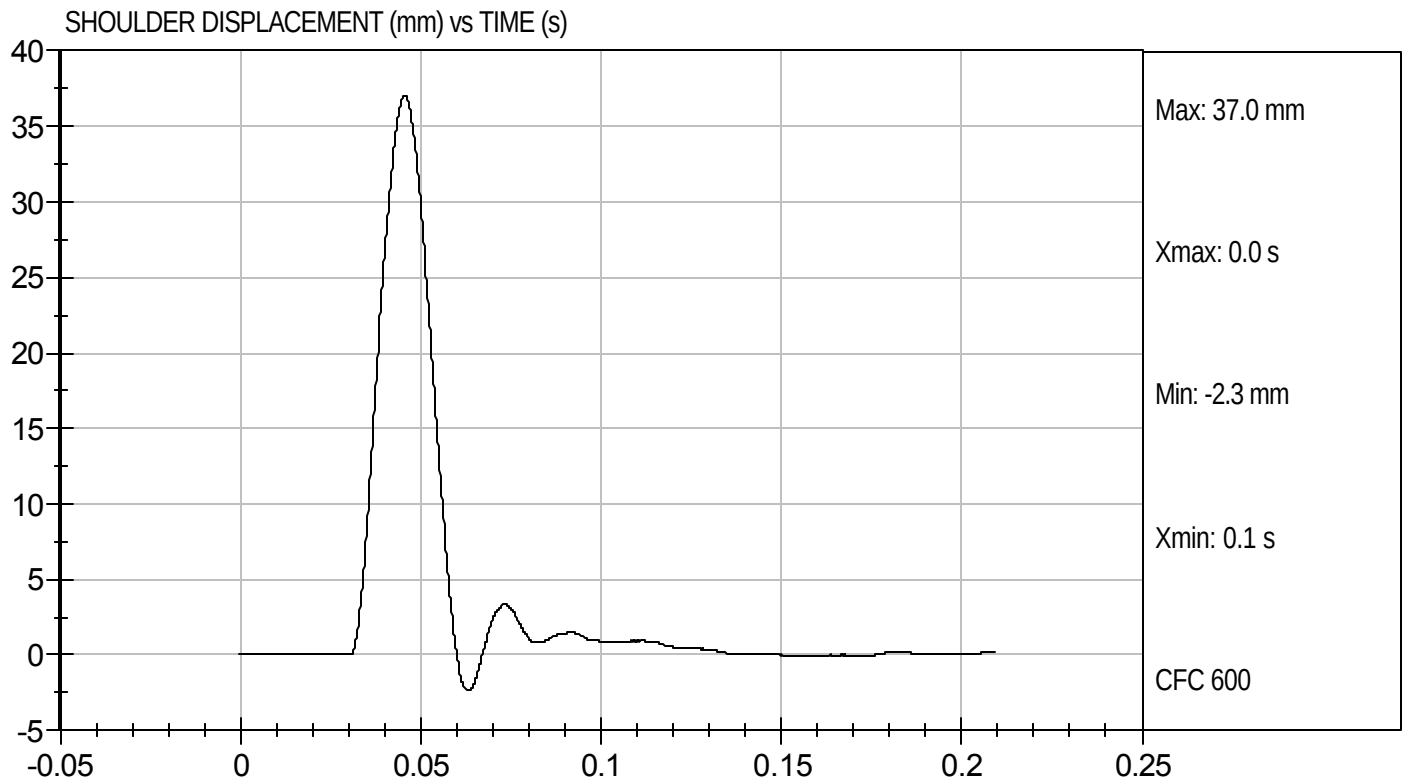
Test Date: 6/16/11
Velocity: 22.22 ft/s, 6.77 m/s





Test Desc: Thorax With Arm
Component ID: D112094

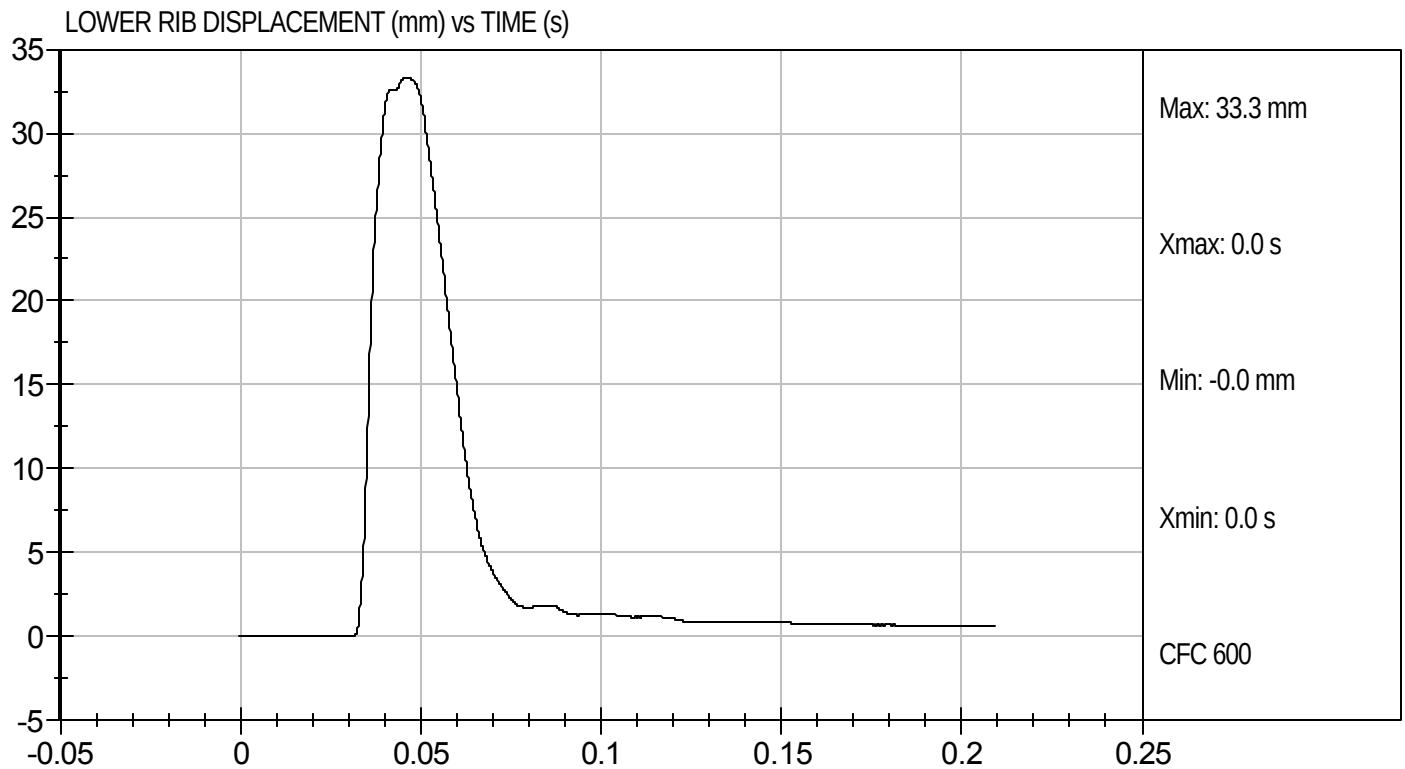
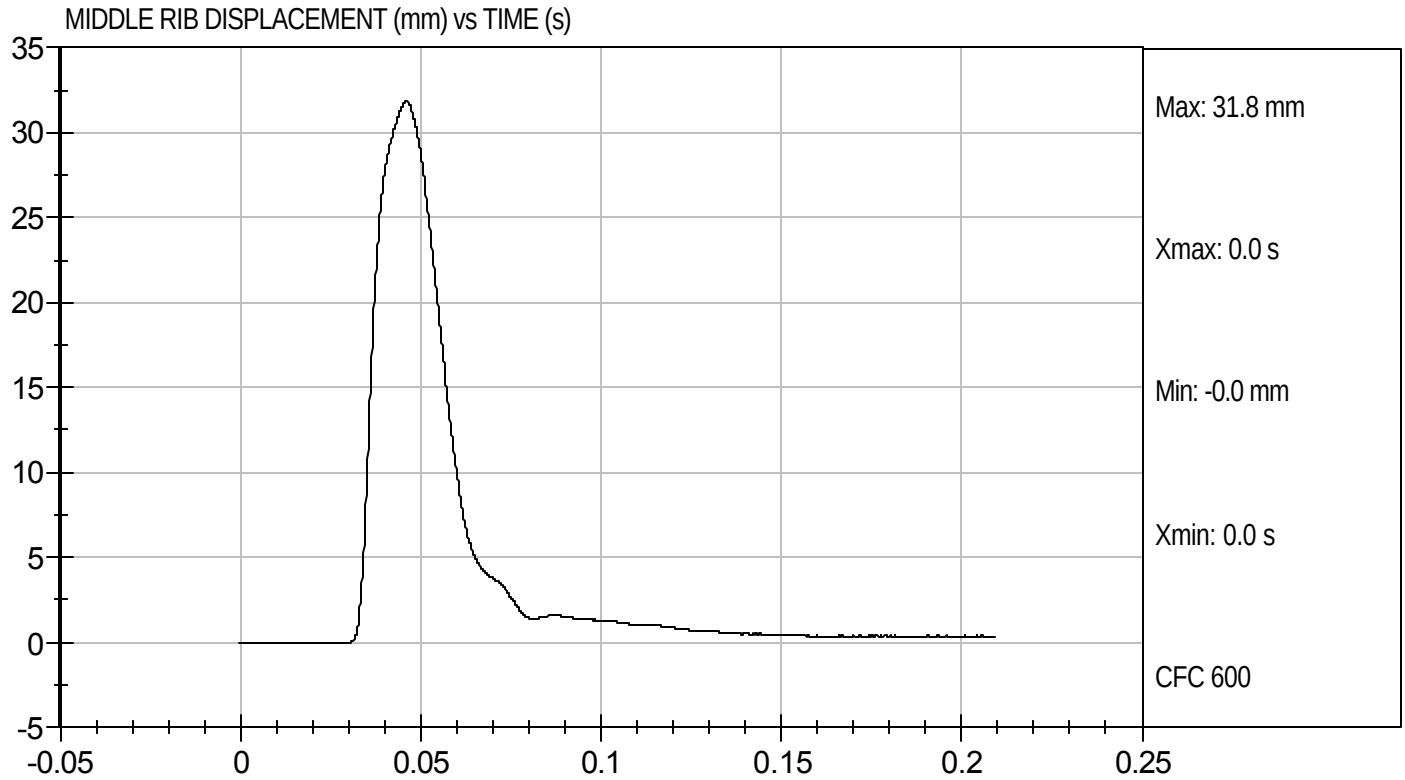
Test Date: 6/16/11
Velocity: 22.22 ft/s, 6.77 m/s





Test Desc: Thorax With Arm
Component ID: D112094

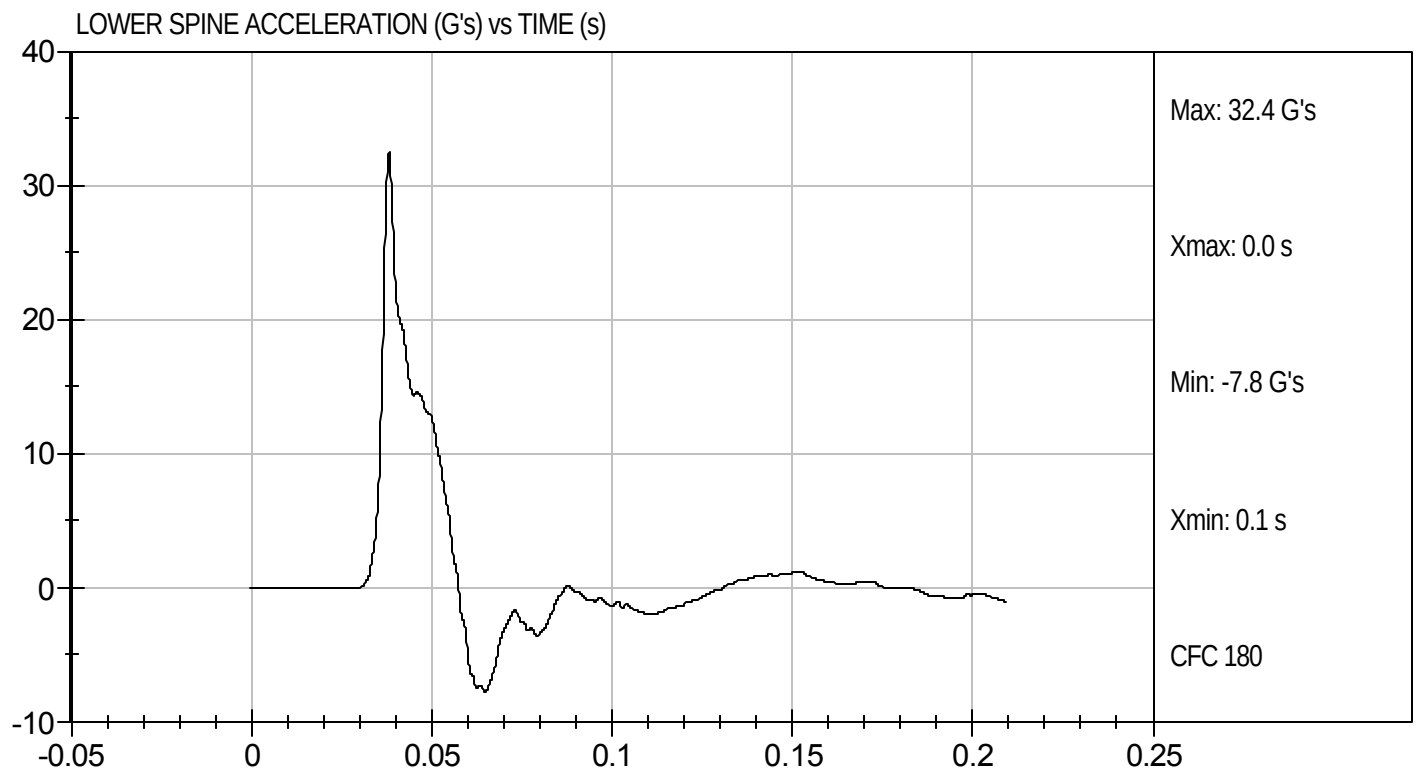
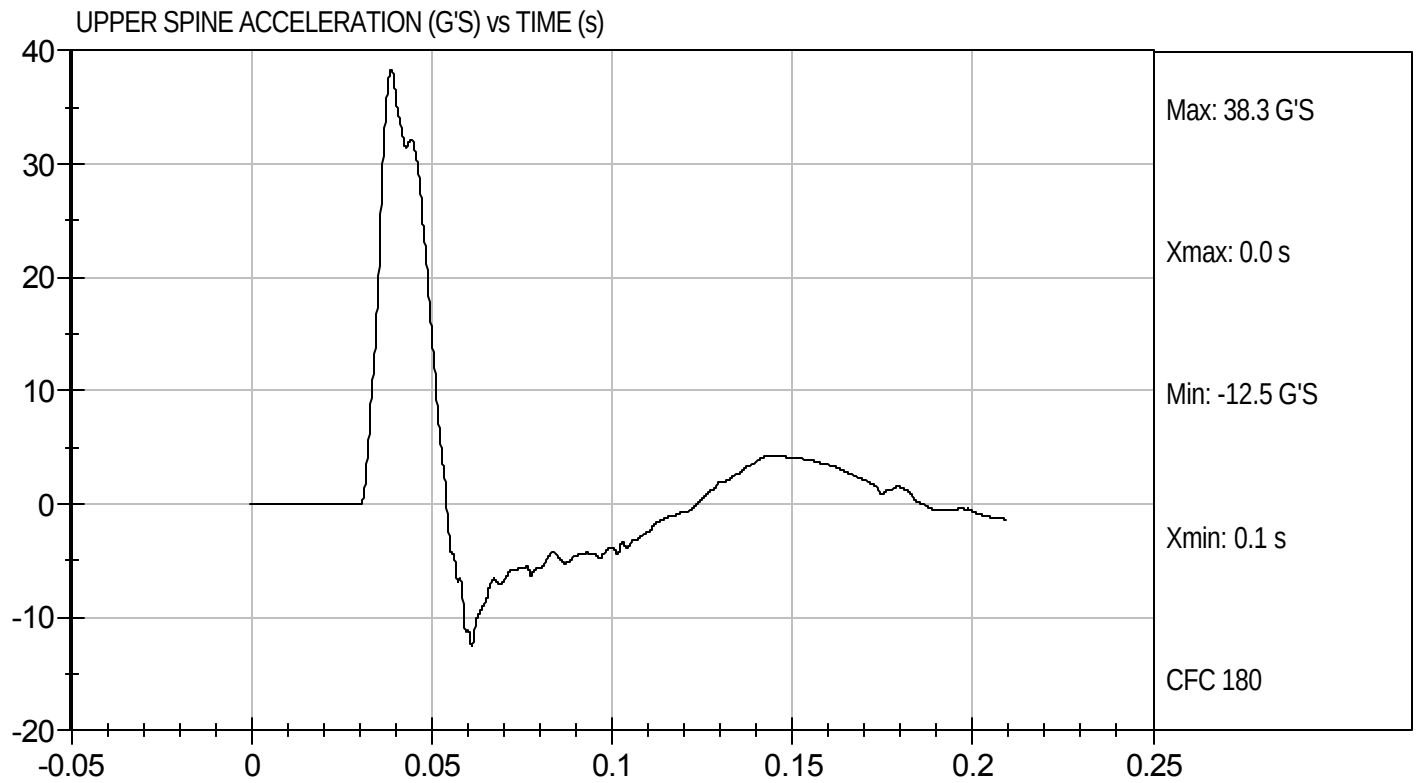
Test Date: 6/16/11
Velocity: 22.22 ft/s, 6.77 m/s





Test Desc: Thorax With Arm
Component ID: D112094

Test Date: 6/16/11
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: D112095

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.4	Pass
Humidity	%	10 to 70	51	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Peak Impactor Force	G's	14 to 18	14	Pass
Upper Rib Displacement	mm	32 to 40	36	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	14	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	8	Pass
Overall Test Results			Pass	


Laboratory Technician

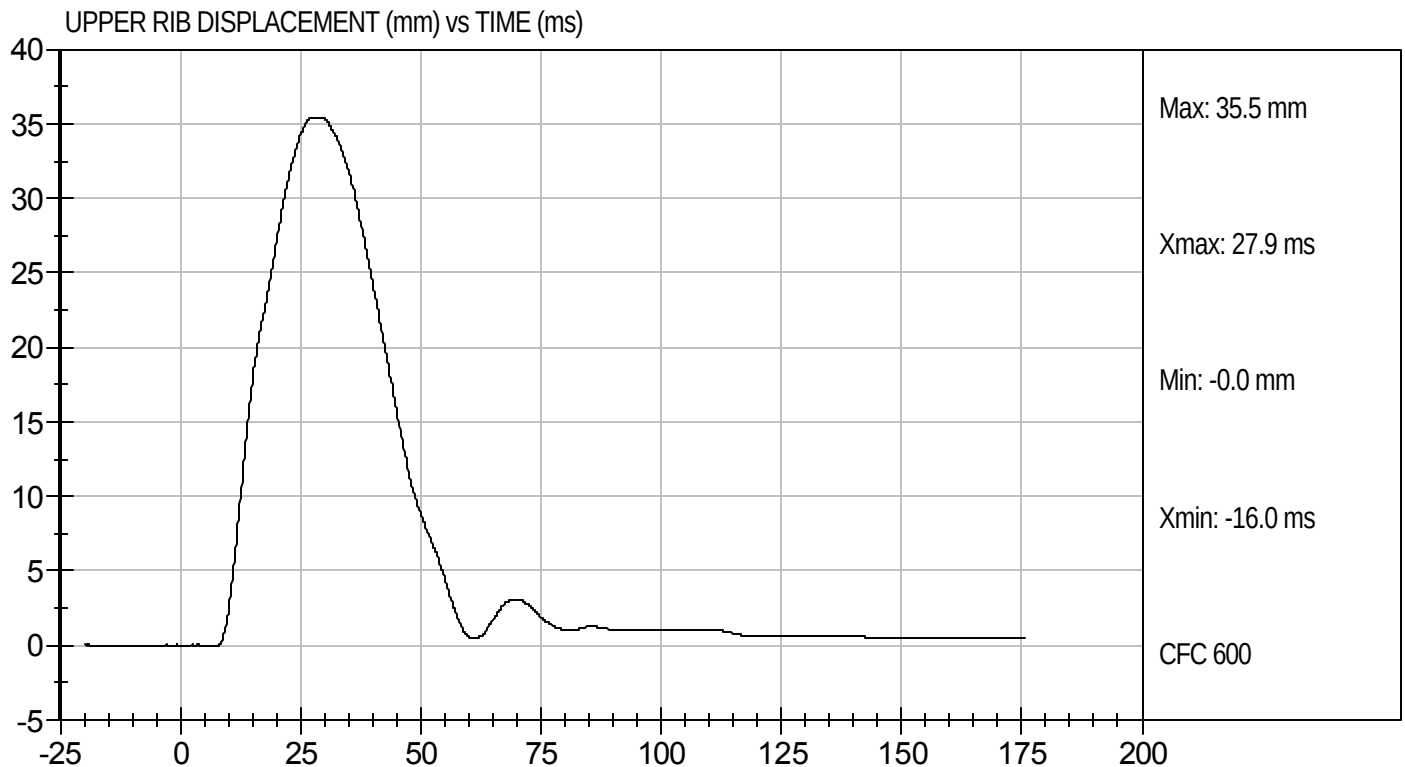
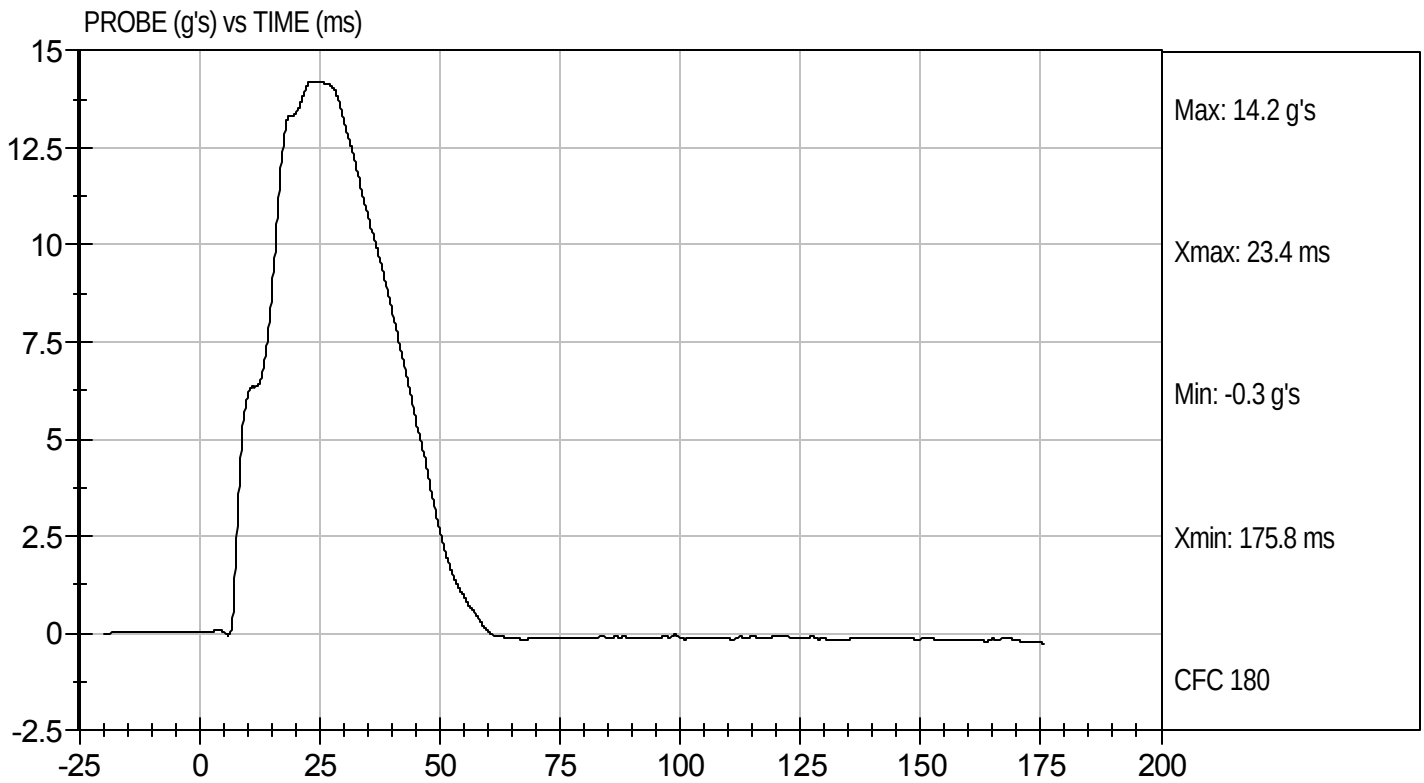
6/16/11
Test Date


Approved By



Test Desc: Thorax Without Arm
Component ID: D112095

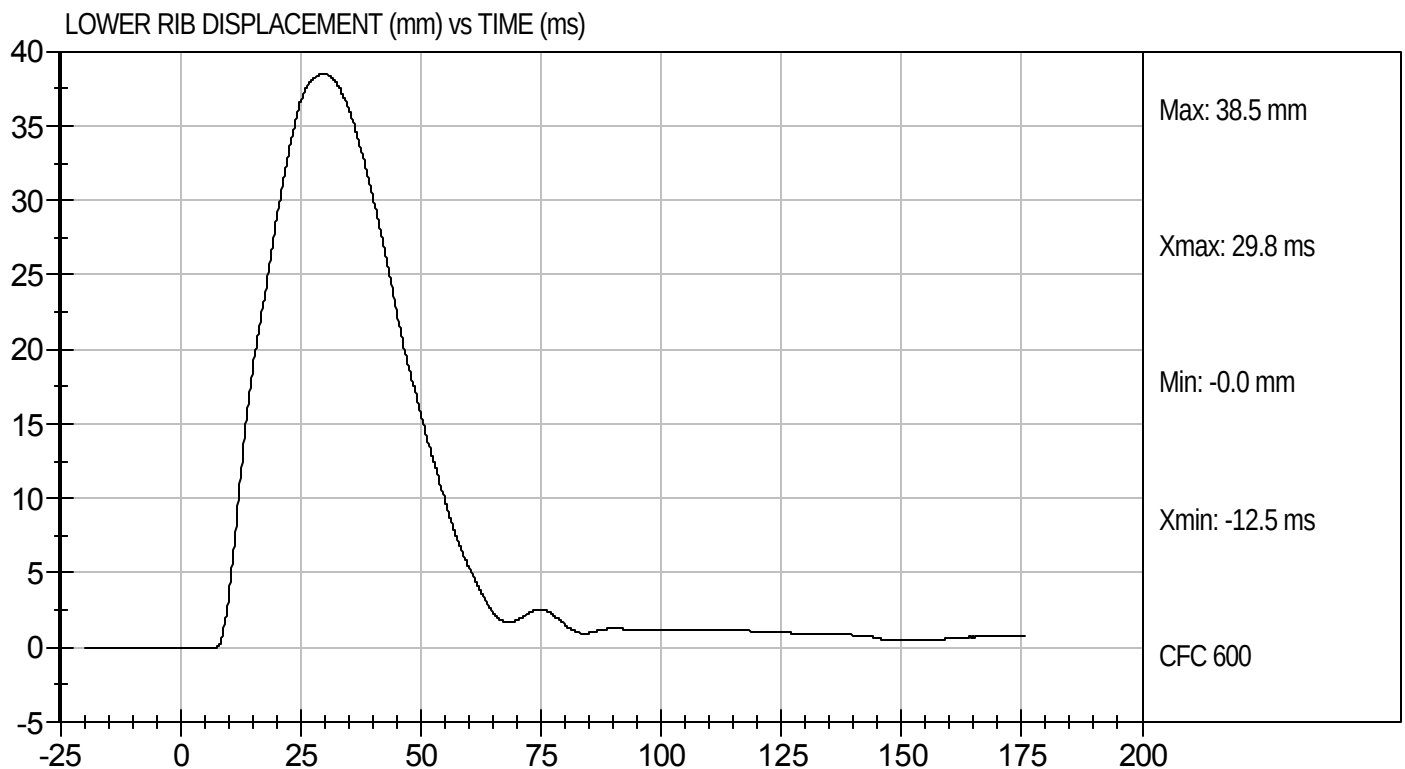
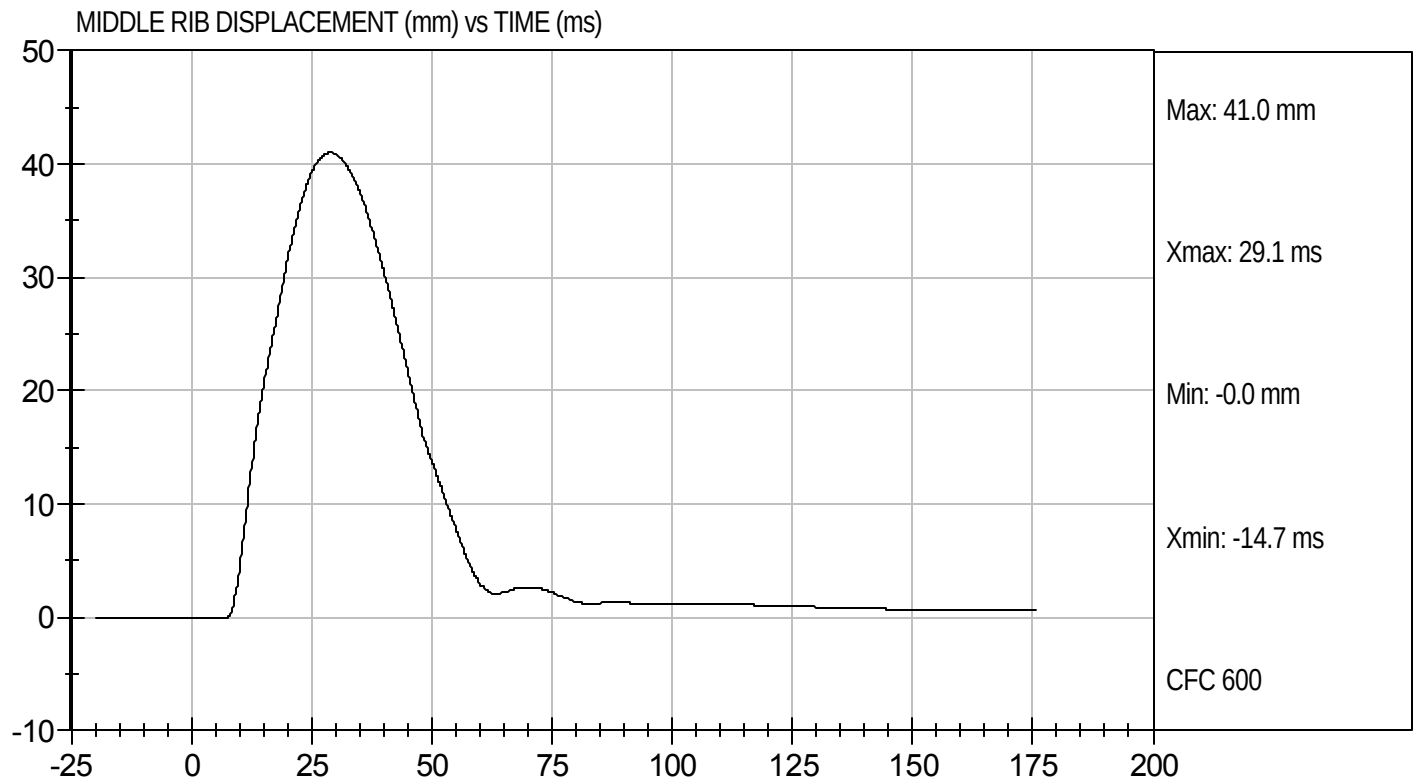
Test Date: 6/16/11
Velocity: 14.36 ft/s, 4.38 m/s





Test Desc: Thorax Without Arm
Component ID: D112095

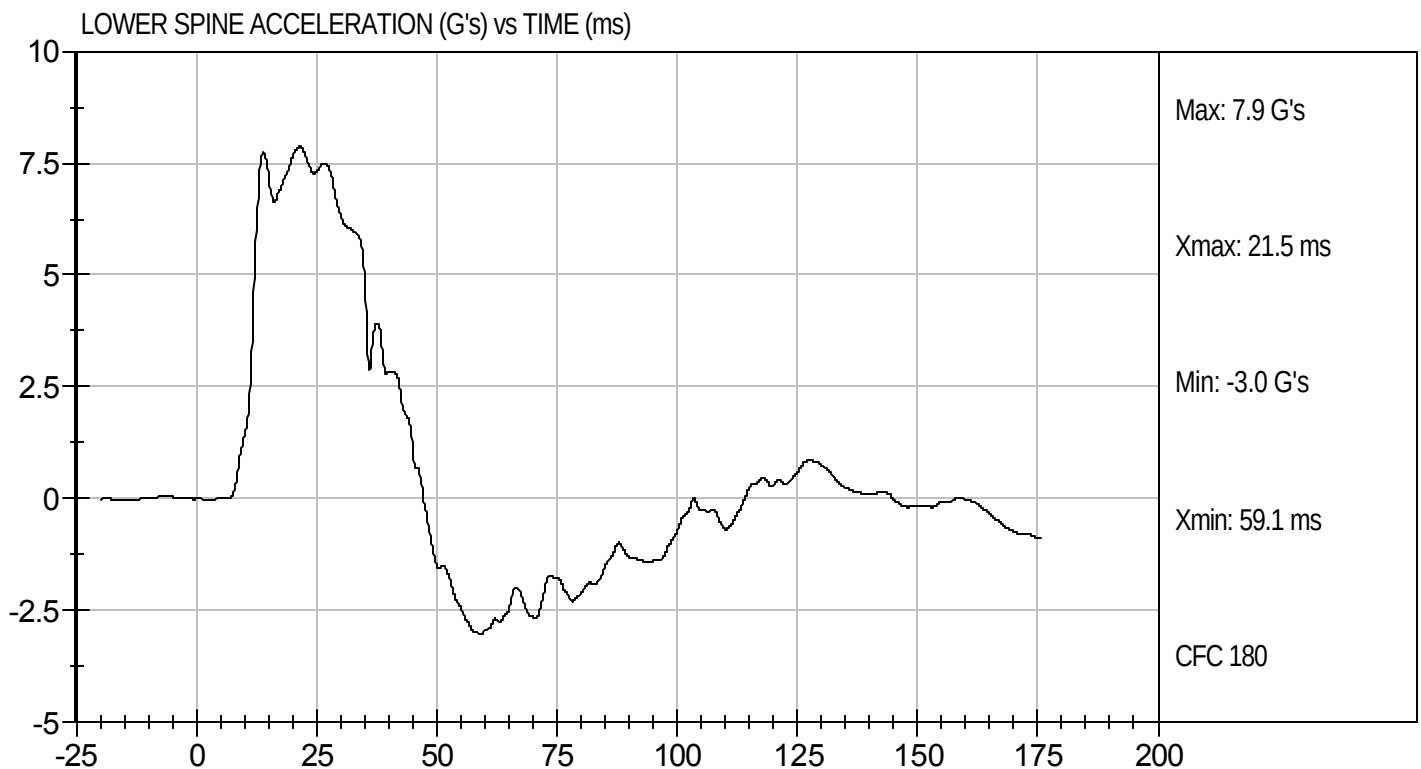
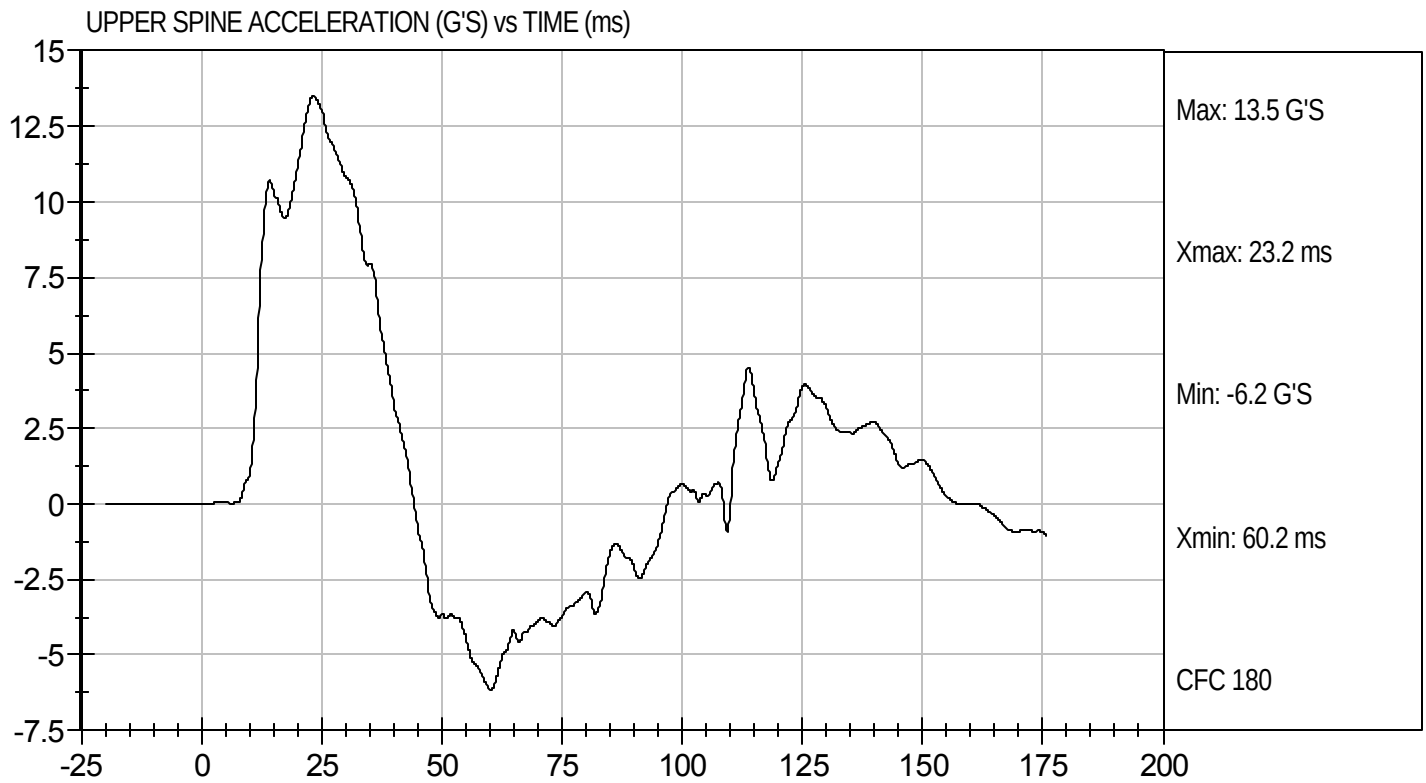
Test Date: 6/16/11
Velocity: 14.36 ft/s, 4.38 m/s





Test Desc: Thorax Without Arm
Component ID: D112095

Test Date: 6/16/11
Velocity: 14.36 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: D112096

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.4	Pass
Humidity	%	10 to 70	51	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Peak Impactor Acceleration	G's	12 to 16	13	Pass
Upper Rib Displacement	mm	36 to 47	38	Pass
Lower Rib Displacement	mm	33 to 44	39	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	10	Pass
			Overall Test Results	Pass

Jessica Gall
Laboratory Technician

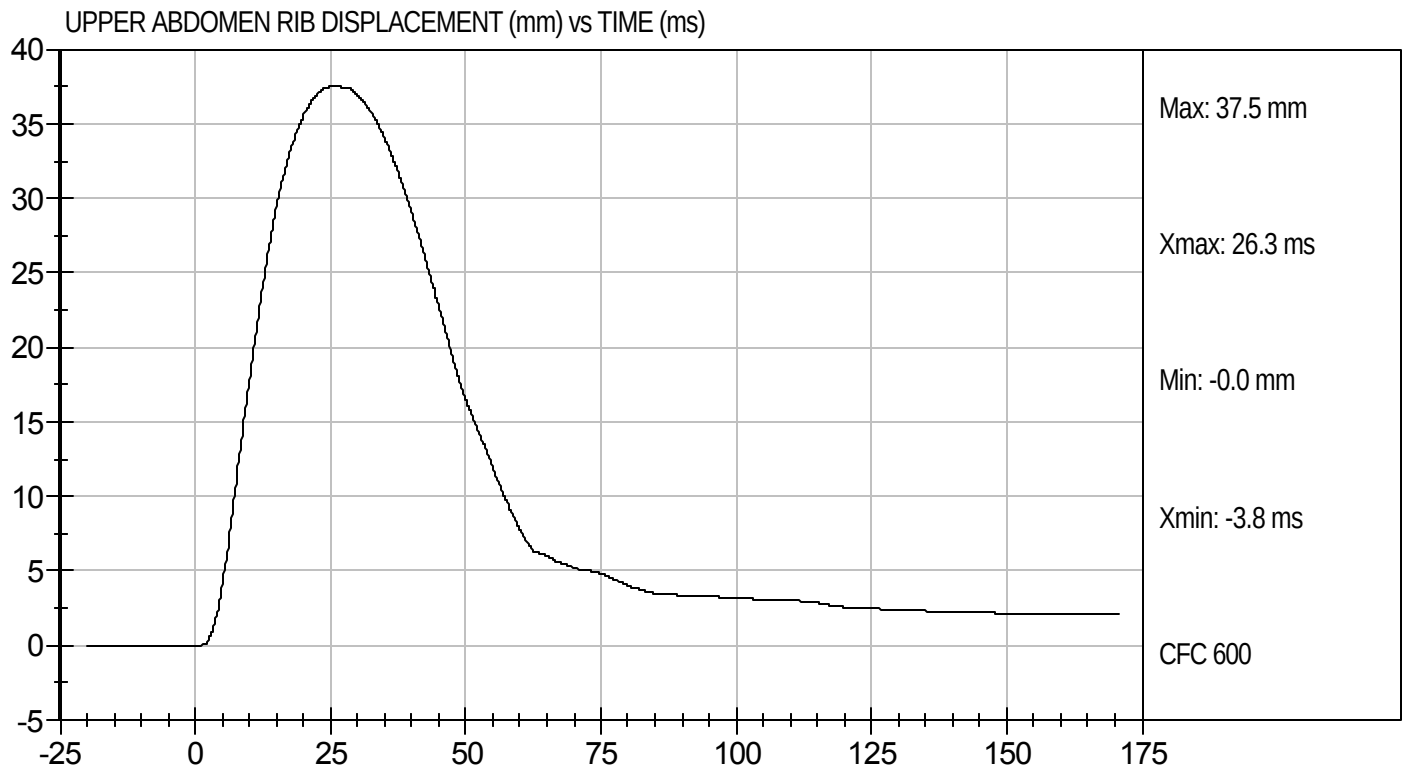
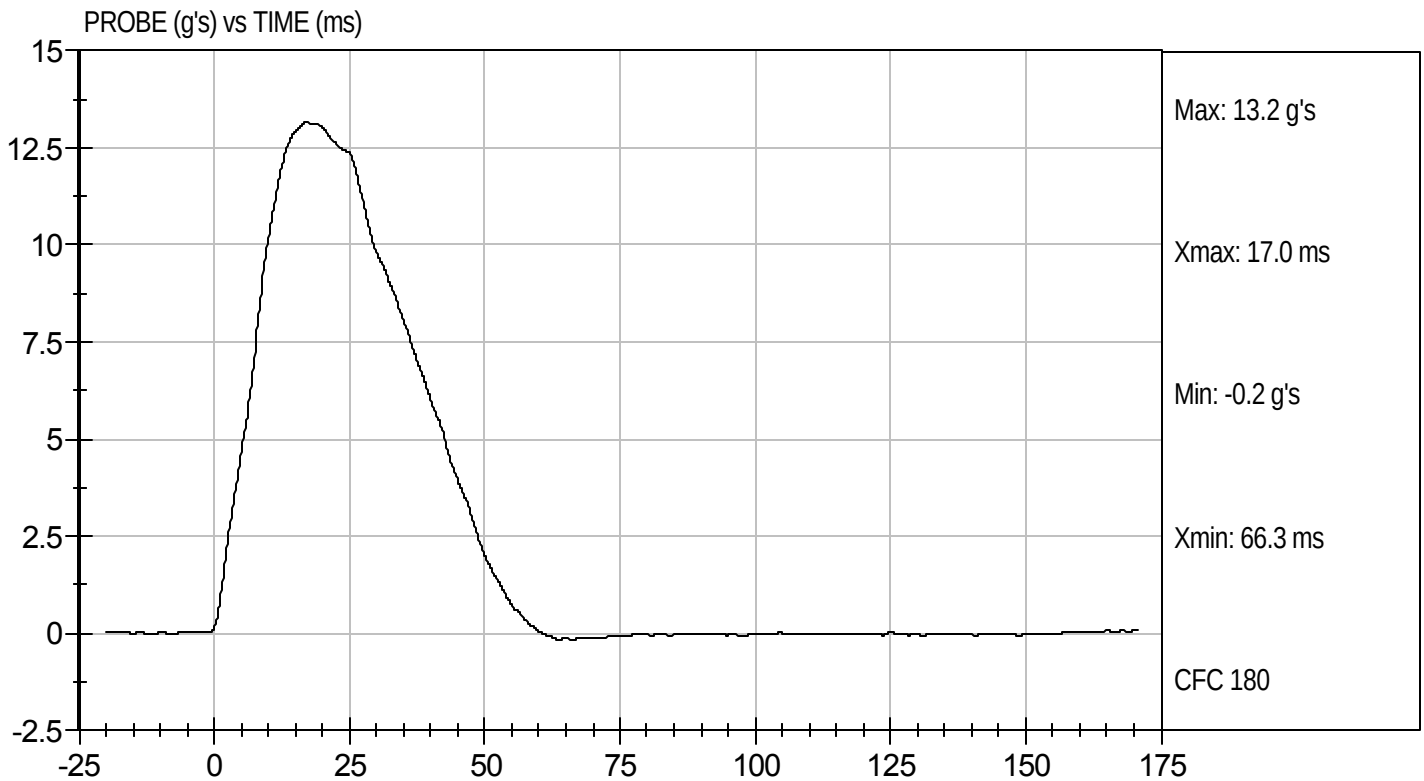
6/16/11
Test Date

David Winkelbauer
Approved By



Test Desc: Abdomen Impact
Component ID: D112096

Test Date: 6/16/11
Velocity: 14.36 ft/s, 4.38 m/s

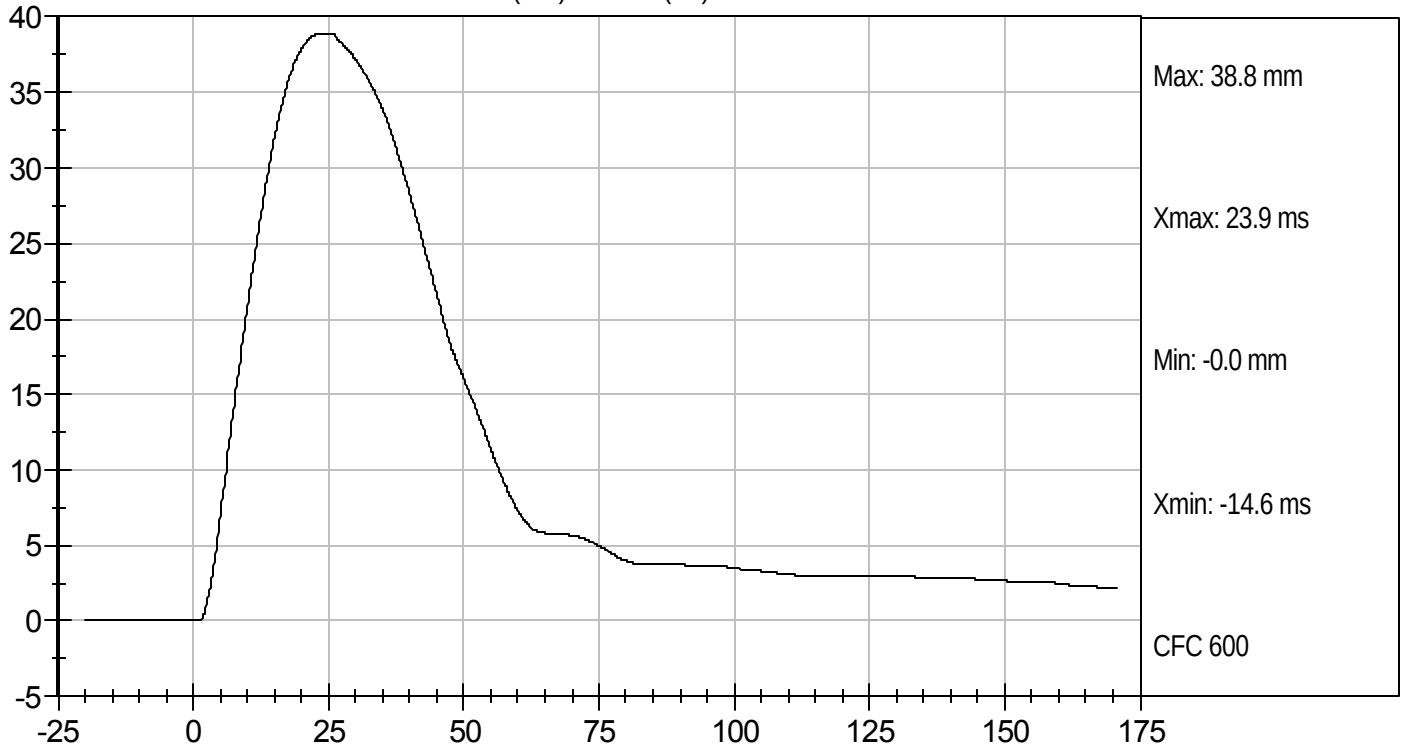




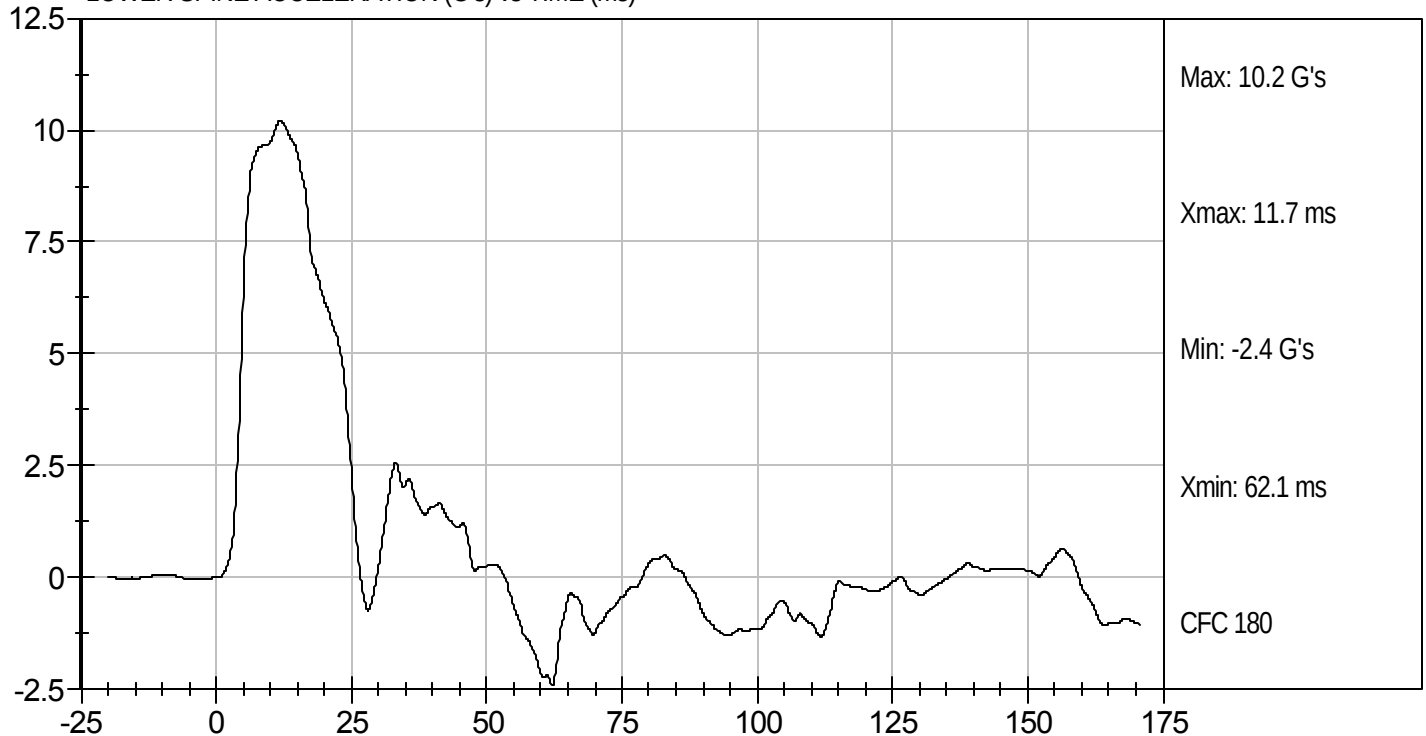
Test Desc: Abdomen Impact
Component ID: D112096

Test Date: 6/16/11
Velocity: 14.36 ft/s, 4.38 m/s

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



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

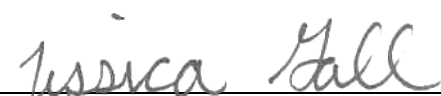


MGA RESEARCH CORPORATION
PELVIS IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D112097

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.4	Pass
Humidity	%	10 to 70	51	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	Pass
Peak Impactor Acceleration	G's	38 to 47	43	Pass
Pelvis Y Acceleration after 6 ms	G's	34 to 42	41	Pass
Peak Acetabulum Force	N	3600 to 4300	3817	Pass
Overall Test Results				Pass


Laboratory Technician

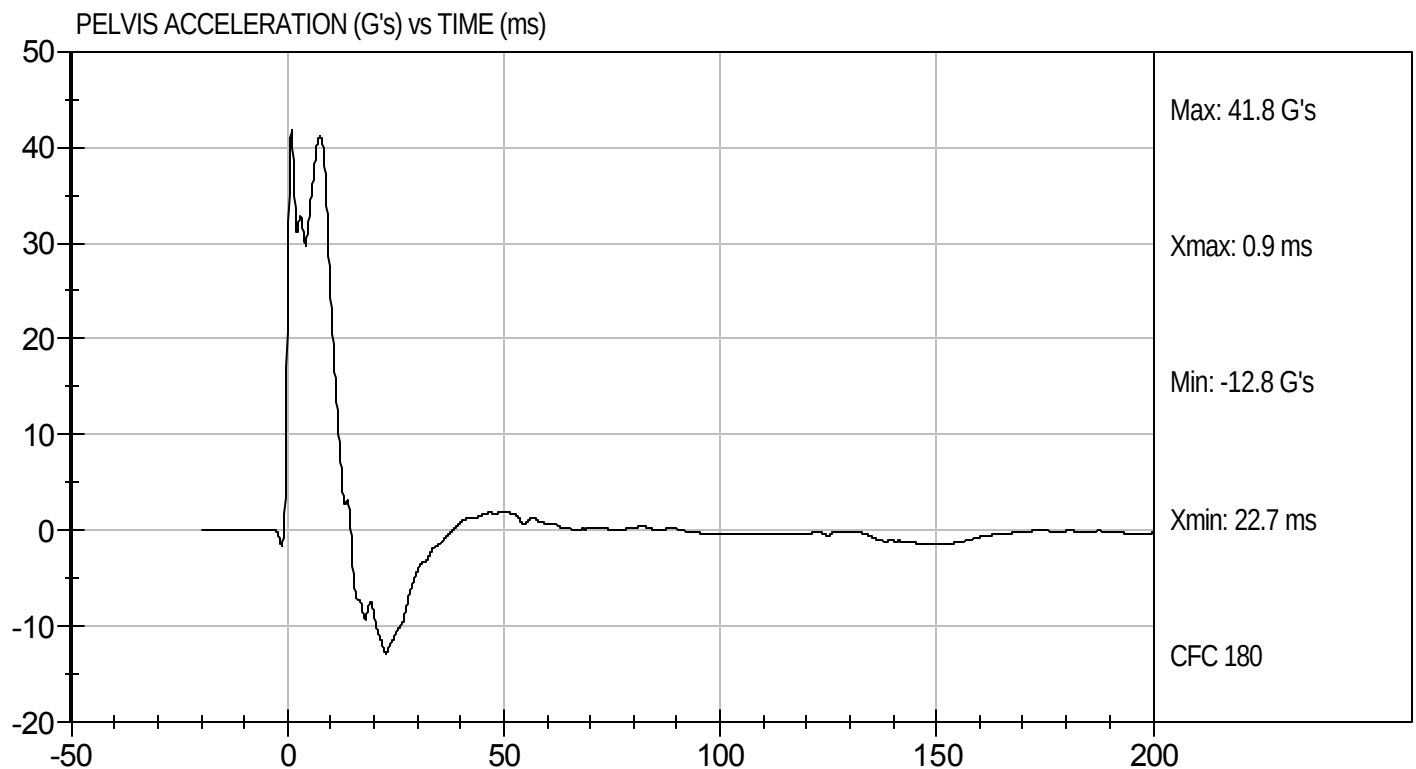
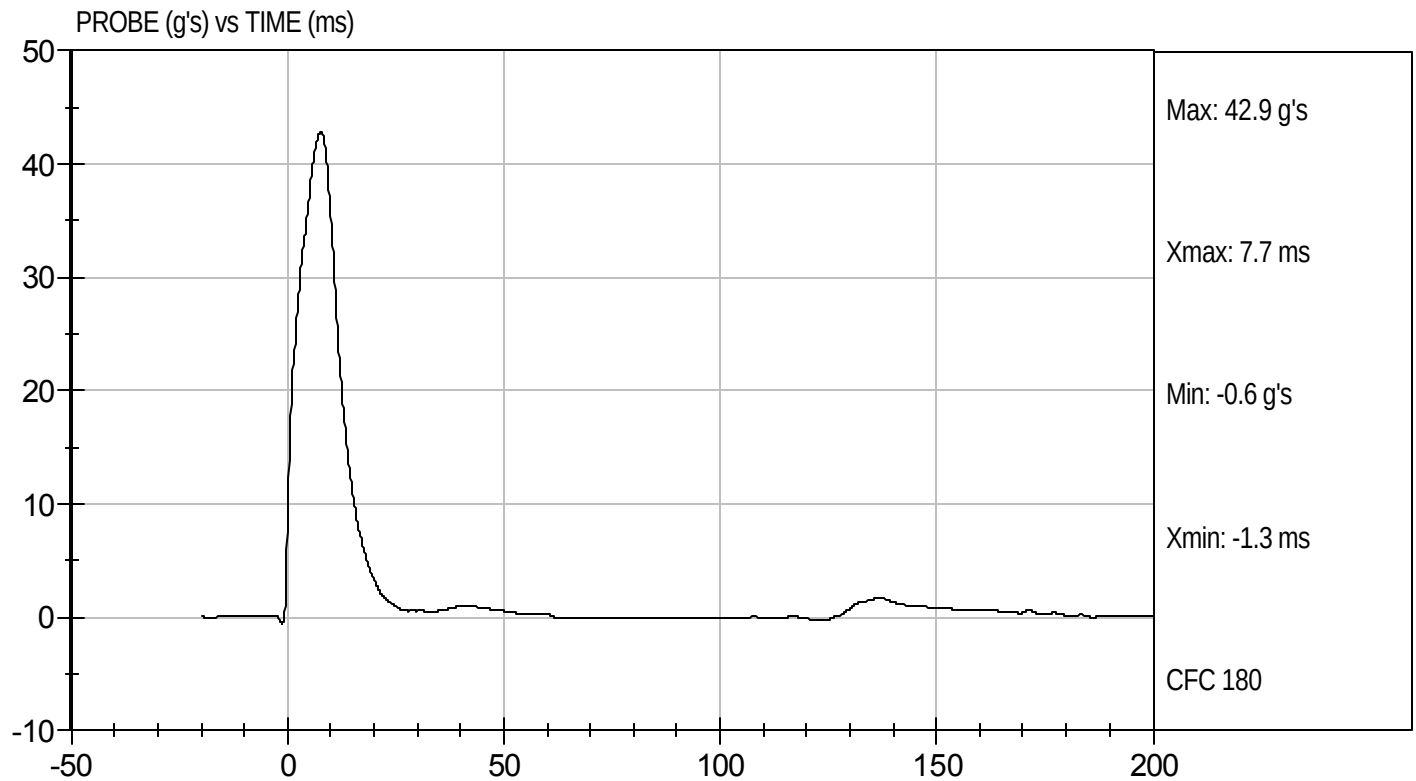
6/16/11
Test Date


Approved By



Test Desc: Pelvis Impact
Component ID: D112097

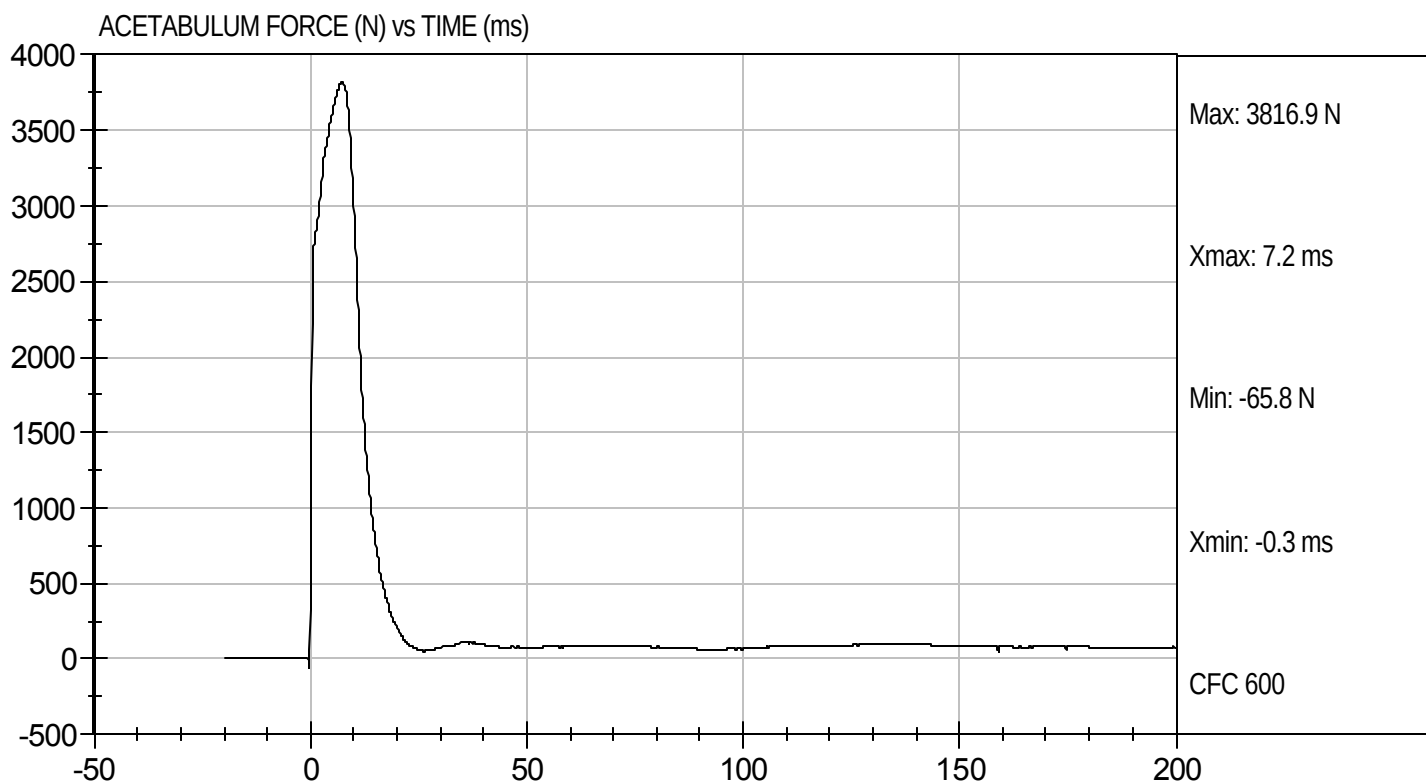
Test Date: 6/16/11
Velocity: 22.2 ft/s, 6.77 m/s





Test Desc: Pelvis Impact
Component ID: D112097

Test Date: 6/16/11
Velocity: 22.2 ft/s, 6.77 m/s



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

ATD Serial No: 296

Test I.D: D112098

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.4	Pass
Humidity	%	10 to 70	51	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Peak Impactor Acceleration	G's	36 to 45	36	Pass
Pelvis Y Acceleration	G's	28 to 39	31	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4543	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

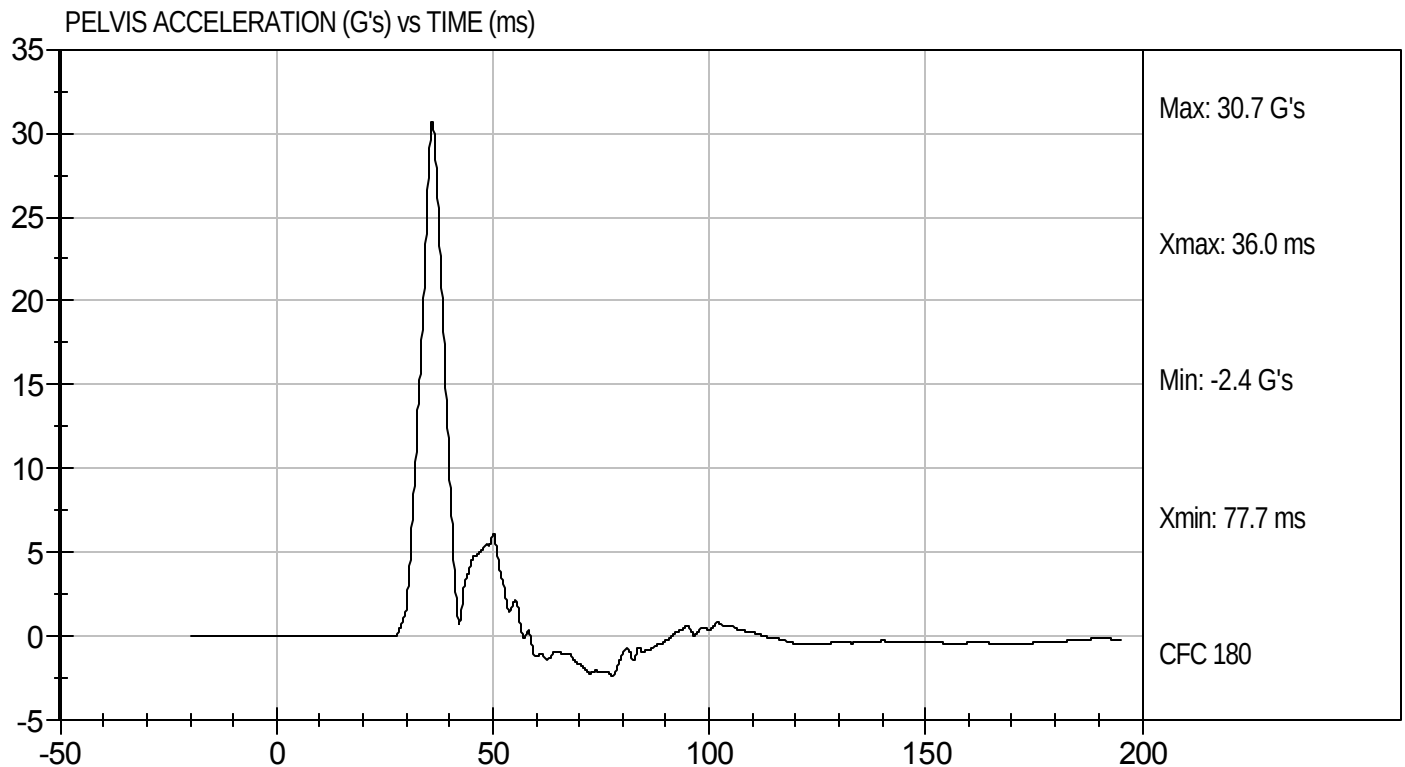
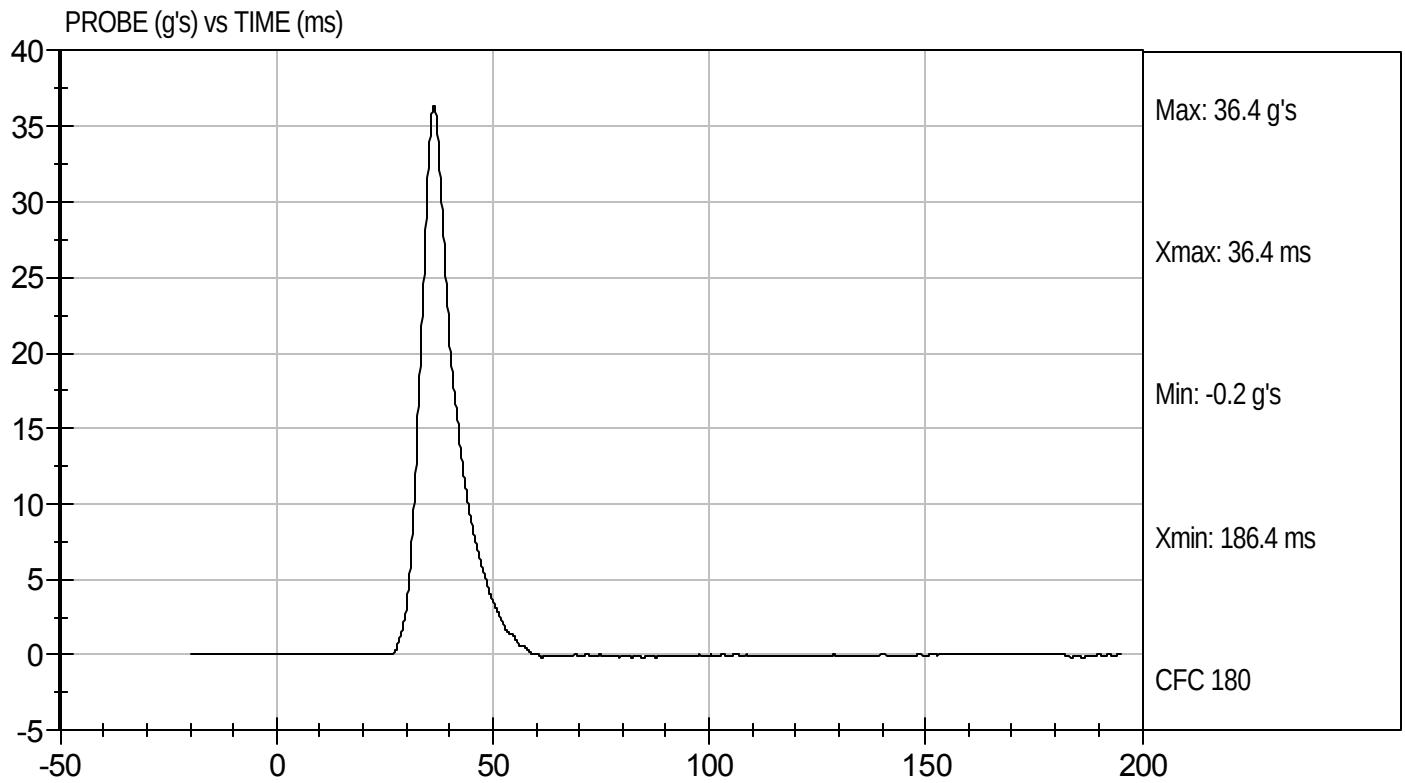
6/16/11
Test Date

David Winkelbauer
Approved By



Test Desc: Iliac Impact
Component ID: D112098

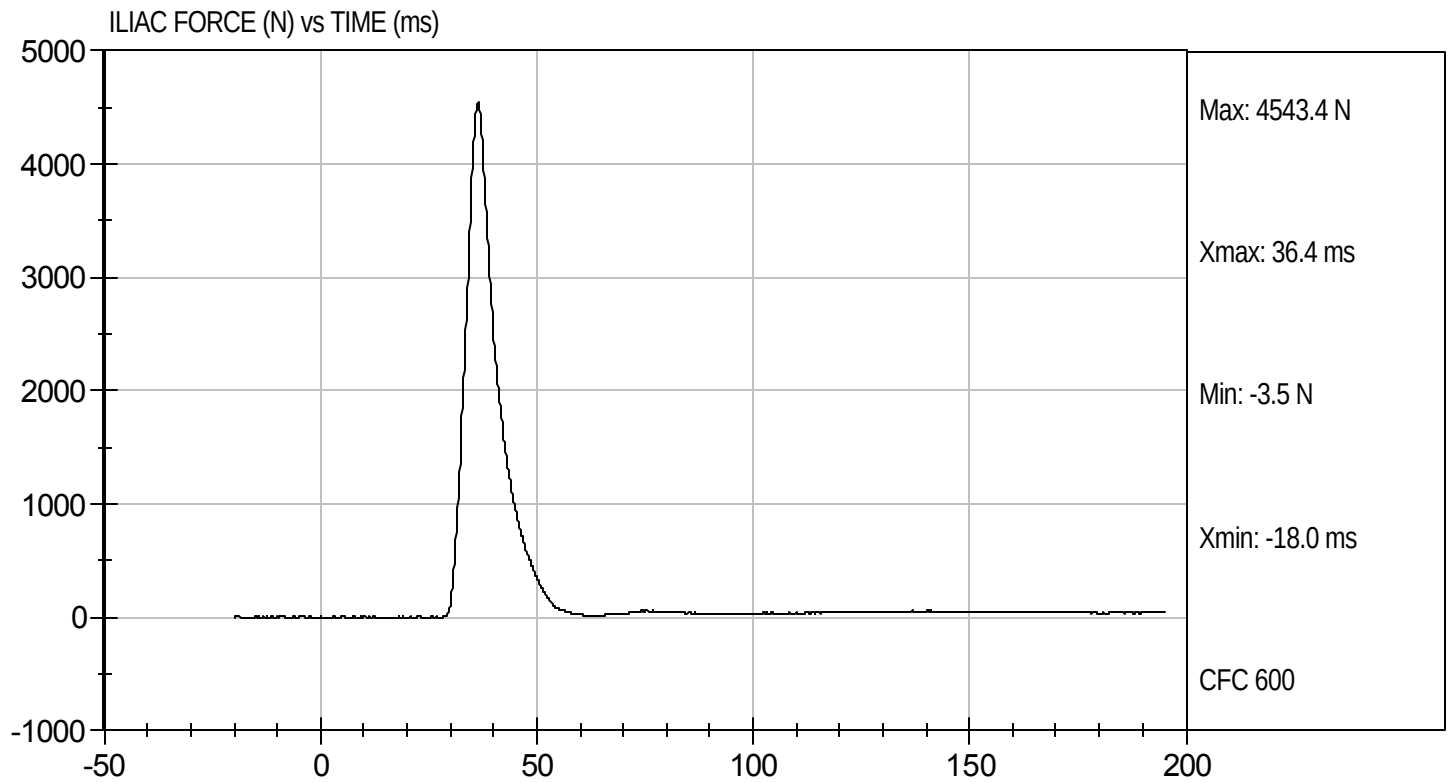
Test Date: 6/16/11
Velocity: 14.36 ft/s, 4.38 m/s





Test Desc: Iliac Impact
Component ID: D112098

Test Date: 6/16/11
Velocity: 14.36 ft/s, 4.38 m/s

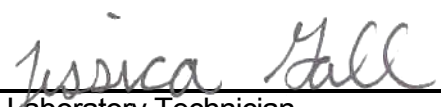


MGA RESEARCH CORPORATION
HEAD DROP TEST
SID-Its BUILD LEVEL D DUMMY

ATD Serial No: 296

Test ID: D112171

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	53	Pass
Peak Resultant Acceleration	G's	115 to 137	121	Pass
Peak Lateral Acceleration	G's	+/- 15	-5.3	Pass
Unimodal	N/A	<15%	Yes	Pass
Overall Test Results				Pass


Laboratory Technician

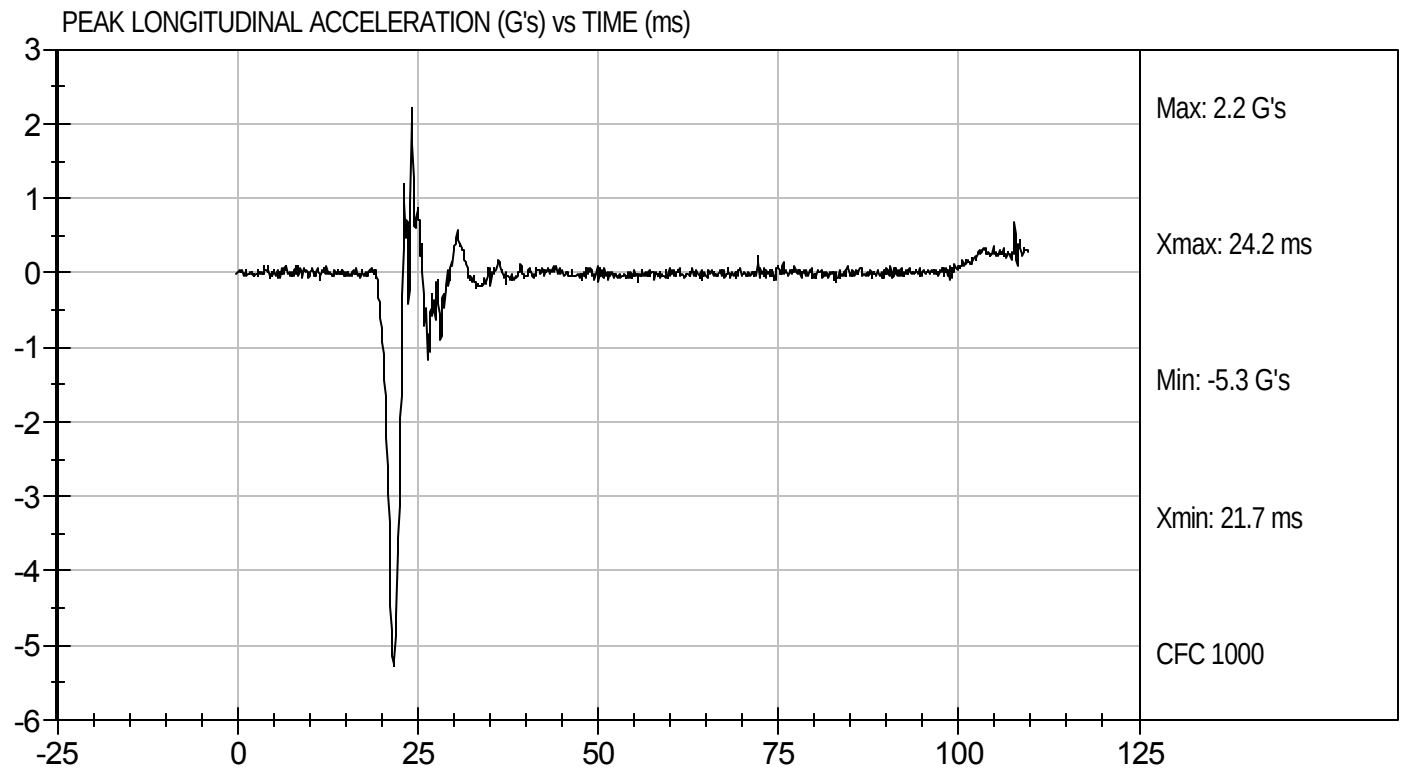
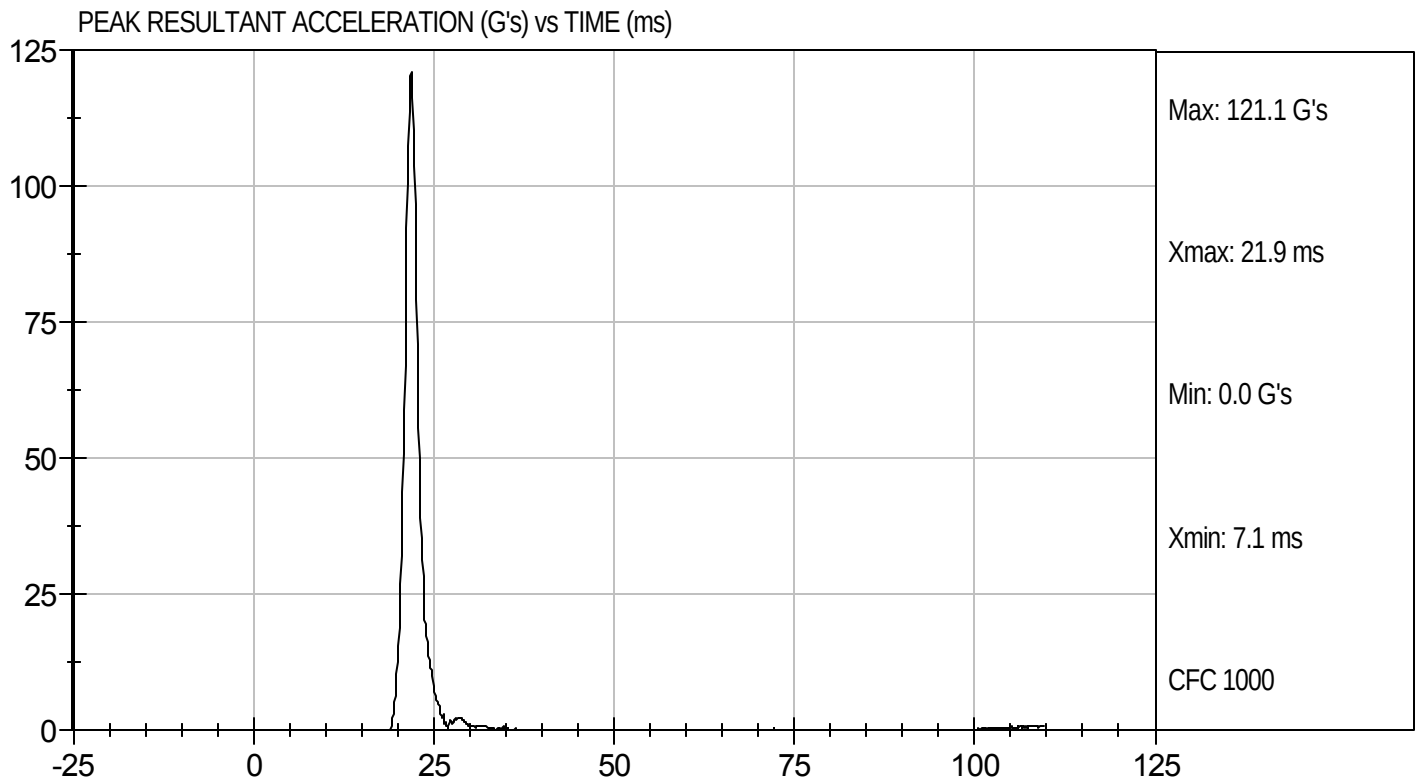
6/22/11
Test Date


Approved By



Test Desc: Head Drop
Component ID: D112171

Test Date: 6/22/11
Velocity: 0 ft/s, 0 m/s

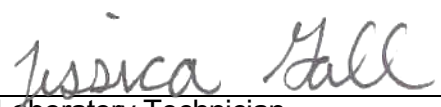


MGA RESEARCH CORPORATION
LATERAL NECK PENDULUM TEST
SID-IIs BUILD LEVEL D DUMMY

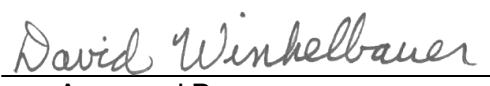
ATD Serial No: 296

Test I.D: D112172

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	22.0	Pass
Humidity		%	10 to 70	58	Pass
Impact Velocity		m/s	5.51 to 5.63	5.58	Pass
Delta Velocity	10 ms	m/s	2.20 to 2.80	2.68	Pass
	15 ms	m/s	3.30 to 4.10	3.79	Pass
	20 ms	m/s	4.40 to 5.40	4.92	Pass
	25 ms	m/s	5.40 to 6.10	5.54	Pass
	25-100 ms	m/s	5.50 to 6.20	5.54	Pass
Maximum D-Plane Rotation		deg	71 to 81	75	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	55	Pass
Maximum Occipital Condyle Moment during Rotation Interval Nm			-44 to -36	-43	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	114	Pass
Overall Test Results				Pass	


 Laboratory Technician

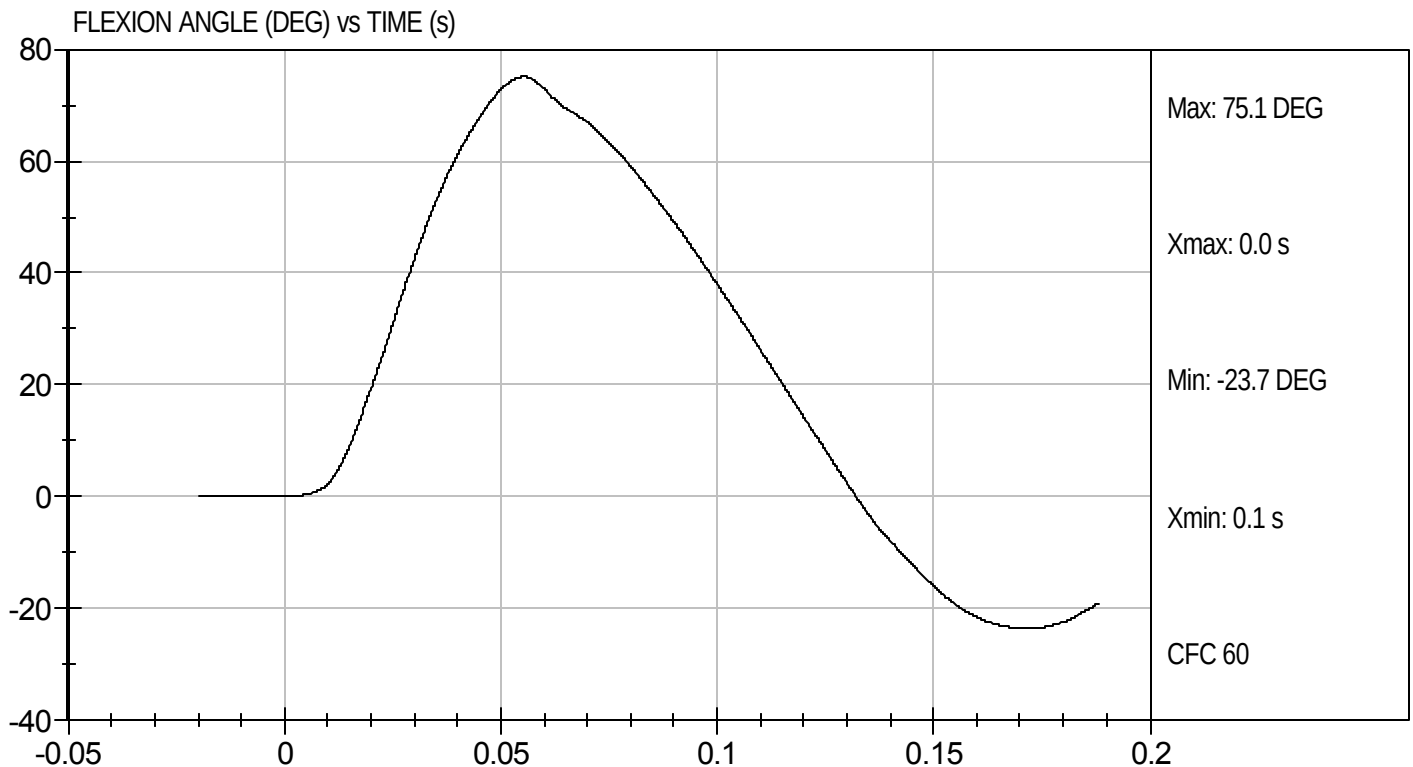
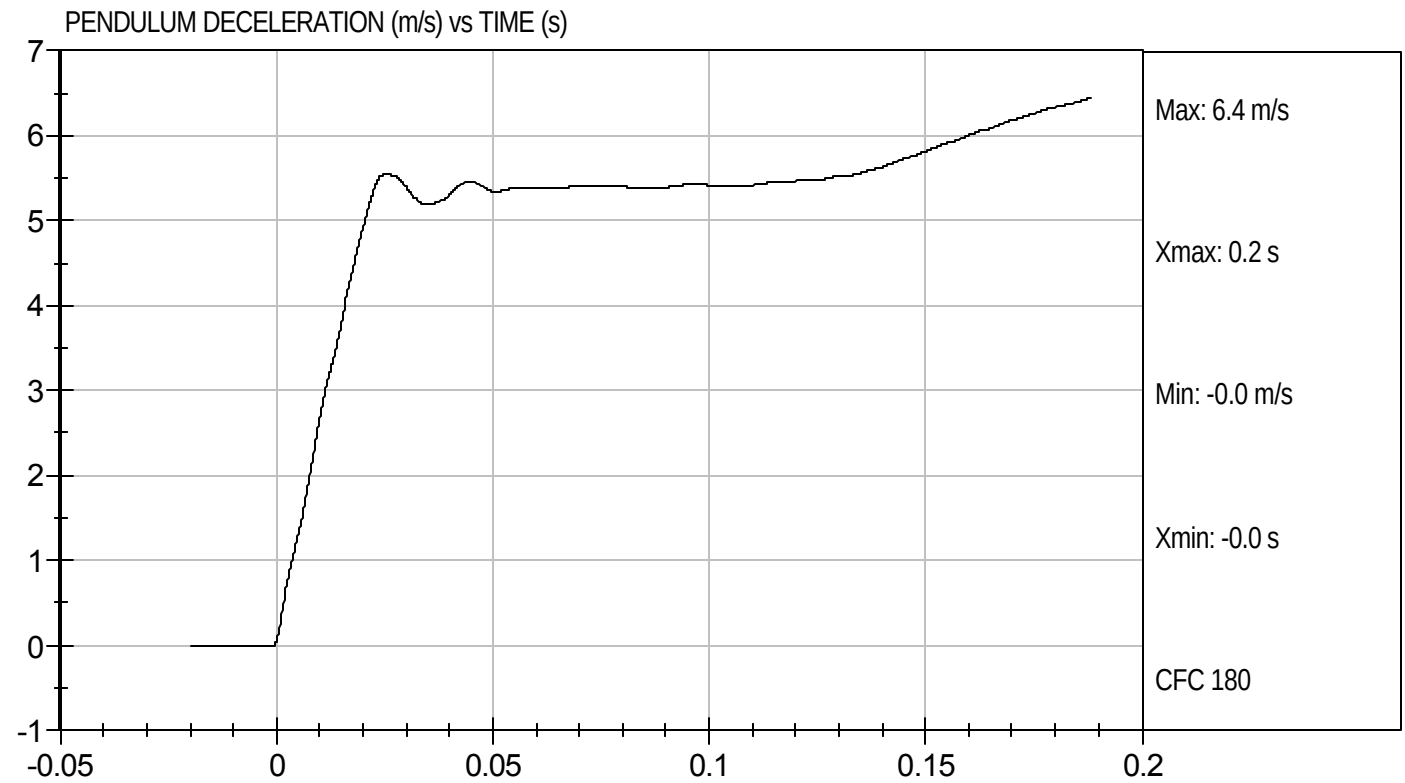
6/22/11
 Test Date


 Approved By



Test Desc: Neck Bending
Component ID: D112172

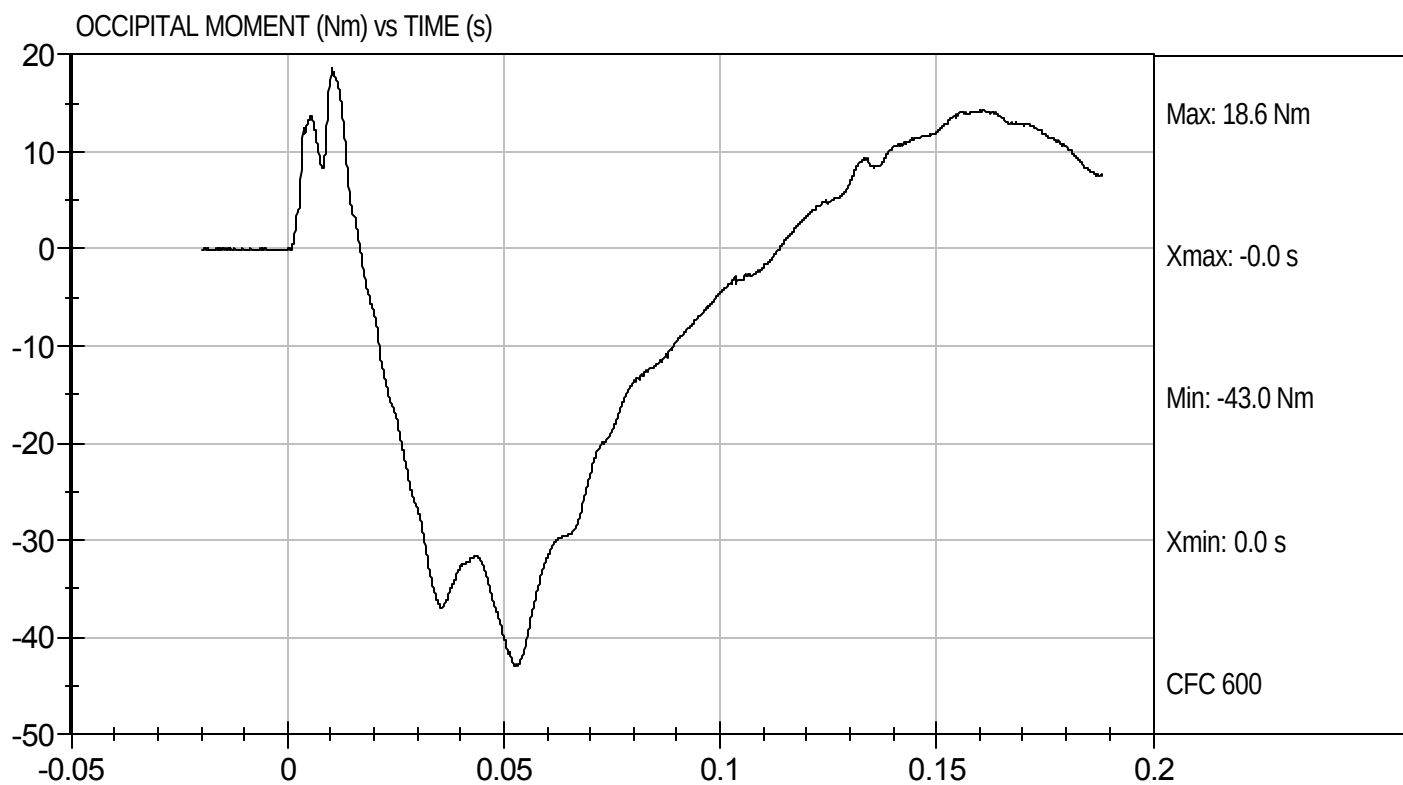
Test Date: 6/22/11
Velocity: 18.32 ft/s, 5.58 m/s





Test Desc: Neck Bending
Component ID: D112172

Test Date: 6/22/11
Velocity: 18.32 ft/s, 5.58 m/s



MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
SID-11s BUILD LEVEL D DUMMY

ATD Serial No: 296

Test ID: D112173

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	53	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Maximum Probe Acceleration	G's	13 to 18	14	Pass
Shoulder Displacement	mm	28 to 37	32	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	21	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

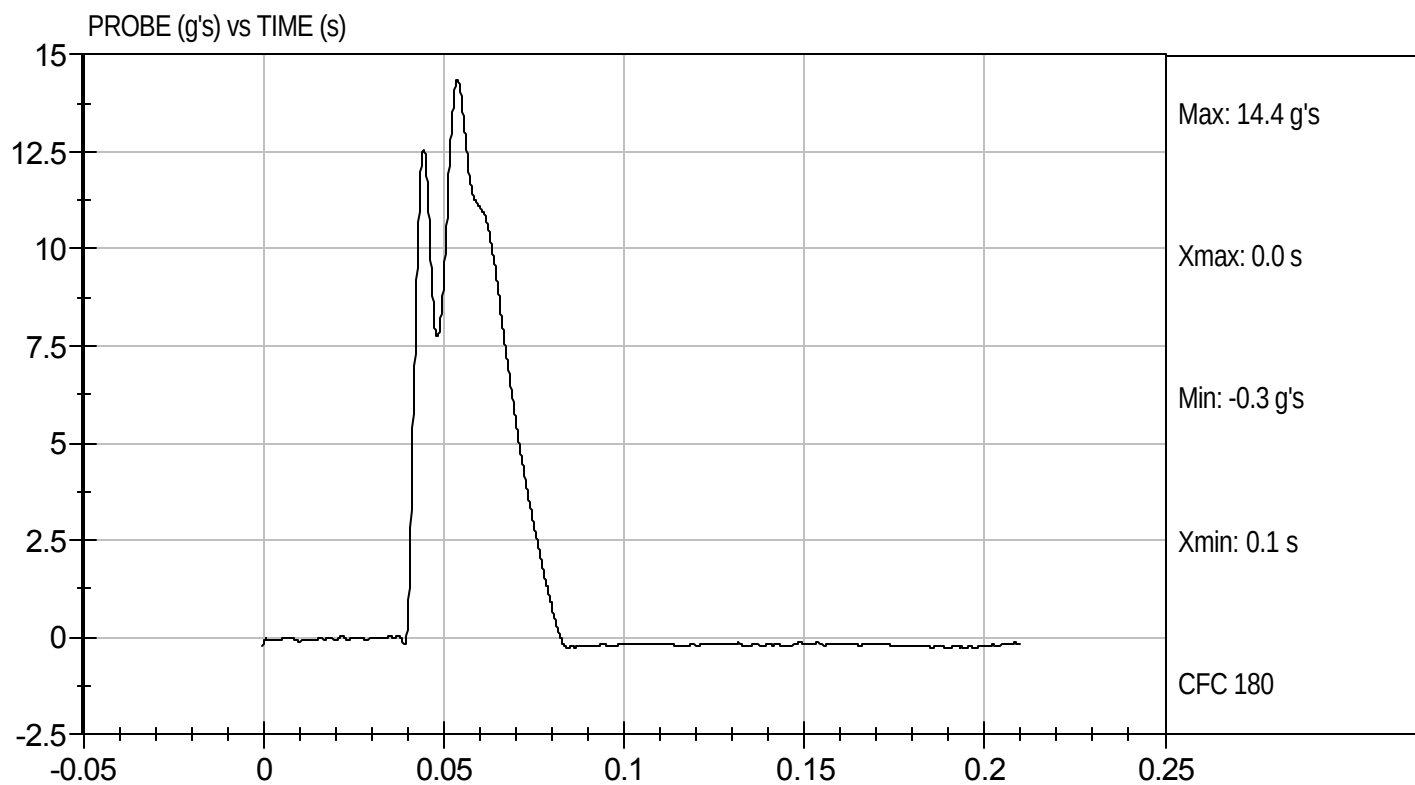
6/21/11
Test Date

David Winkelbauer
Approved By



Test Desc: Shoulder Impact
Component ID: D112173

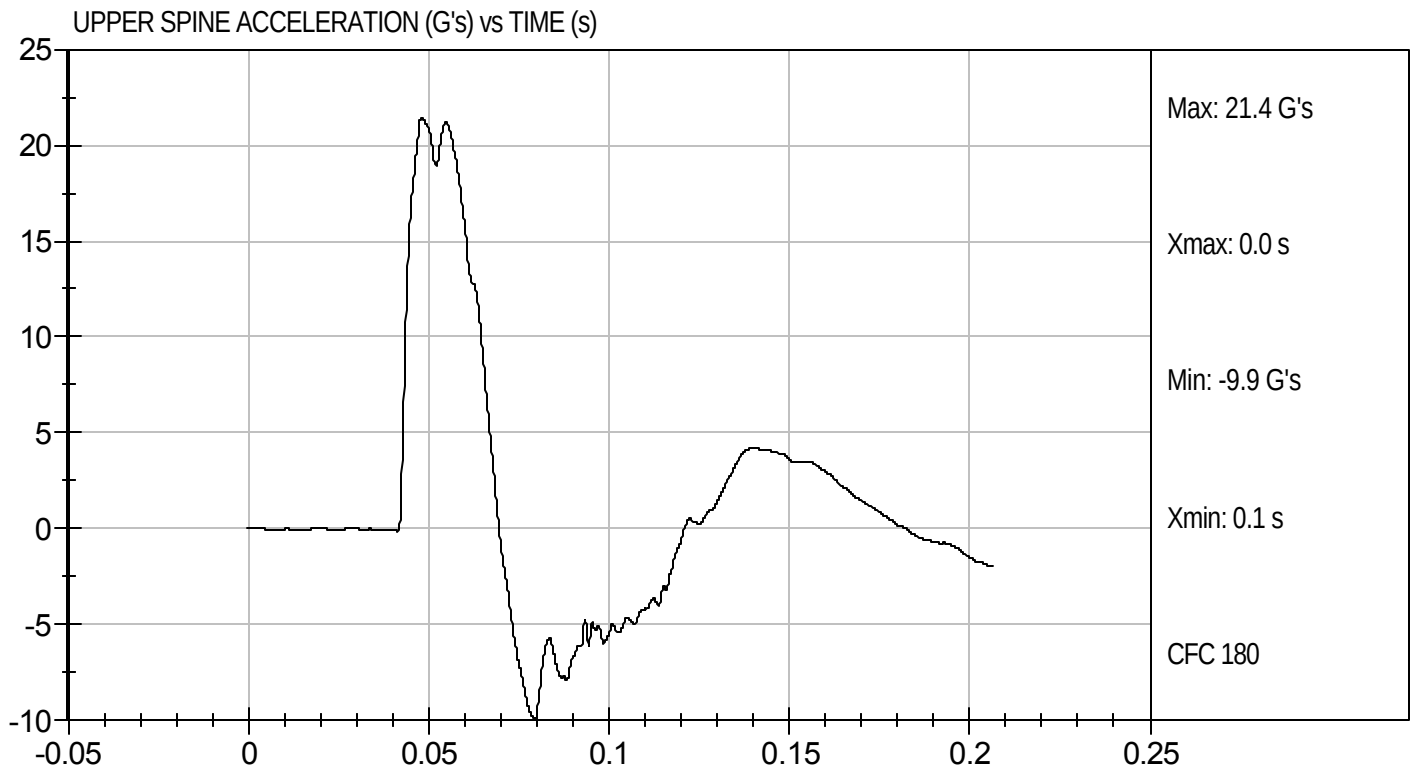
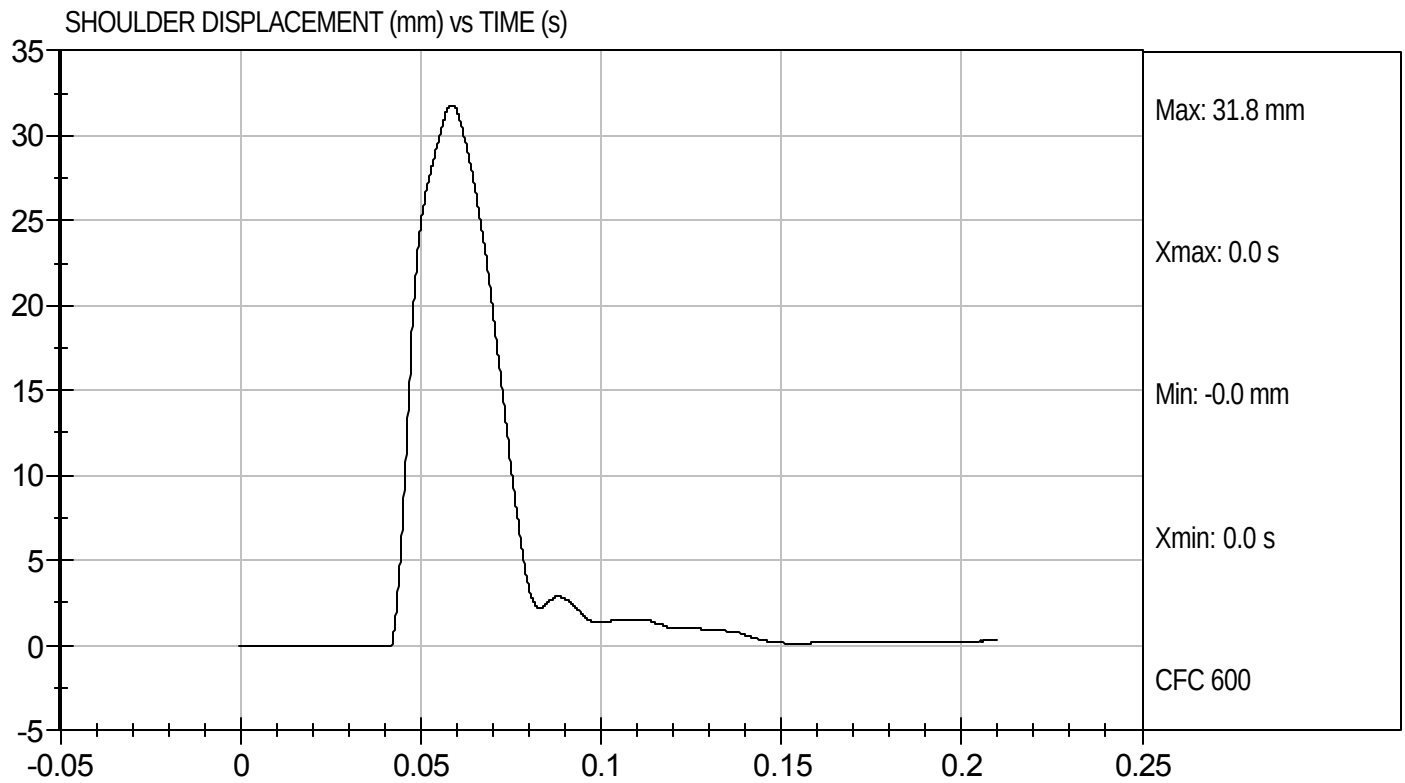
Test Date: 6/21/11
Velocity: 14.25 ft/s, 4.34 m/s





Test Desc: Shoulder Impact
Component ID: D112173

Test Date: 6/21/11
Velocity: 14.25 ft/s, 4.34 m/s

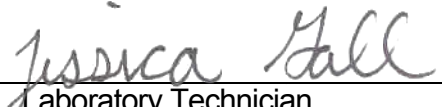


MGA RESEARCH CORPORATION
THORAX (WITH ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D112174

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.7	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	30	Pass
Shoulder Displacement	mm	31 to 40	38	Pass
Upper Rib Displacement	mm	25 to 32	28	Pass
Middle Rib Displacement	mm	30 to 36	32	Pass
Lower Rib Displacement	mm	32 to 38	33	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	36	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	33	Pass
Overall Test Results				Pass


 Laboratory Technician

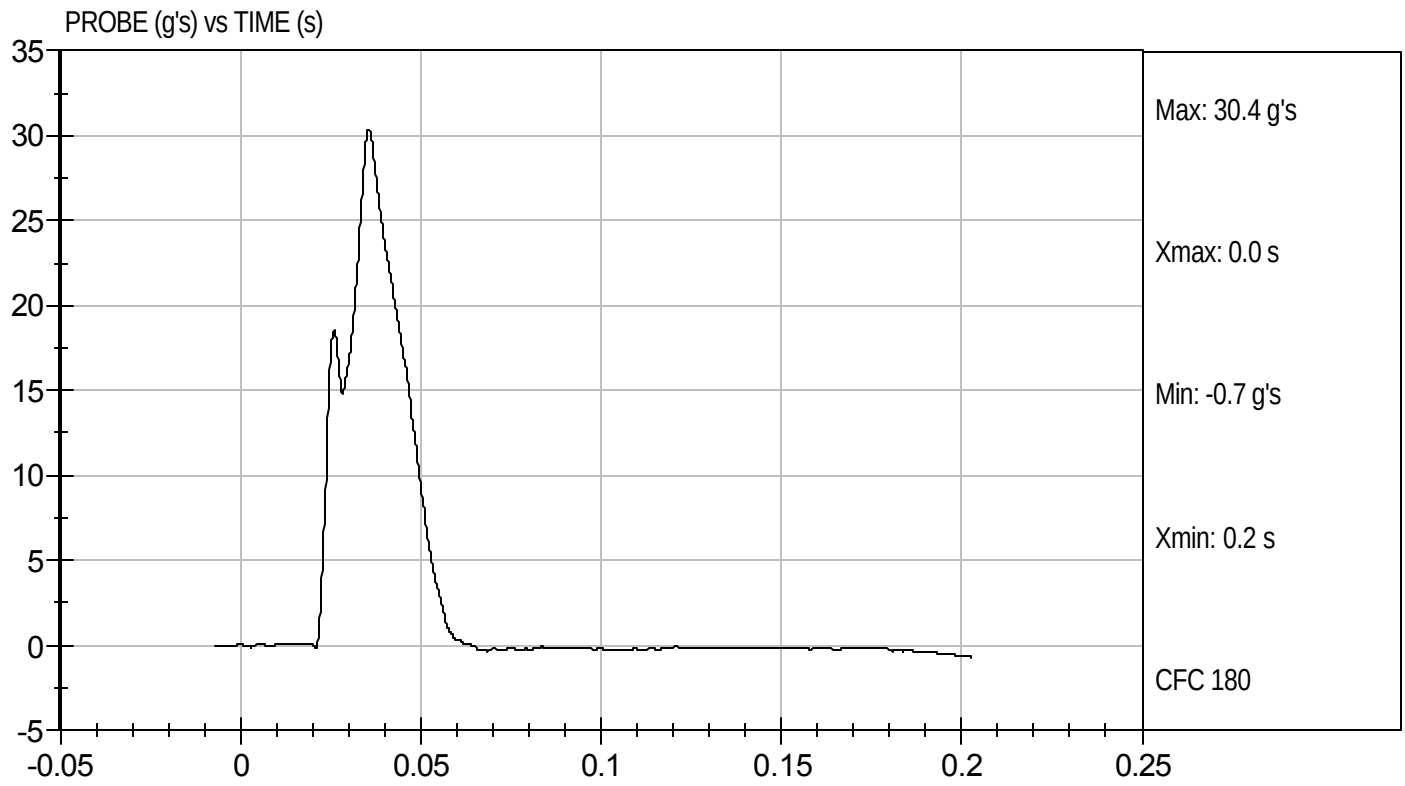
6/21/11
 Test Date


 Approved By



Test Desc: Thorax With Arm
Component ID: D112174

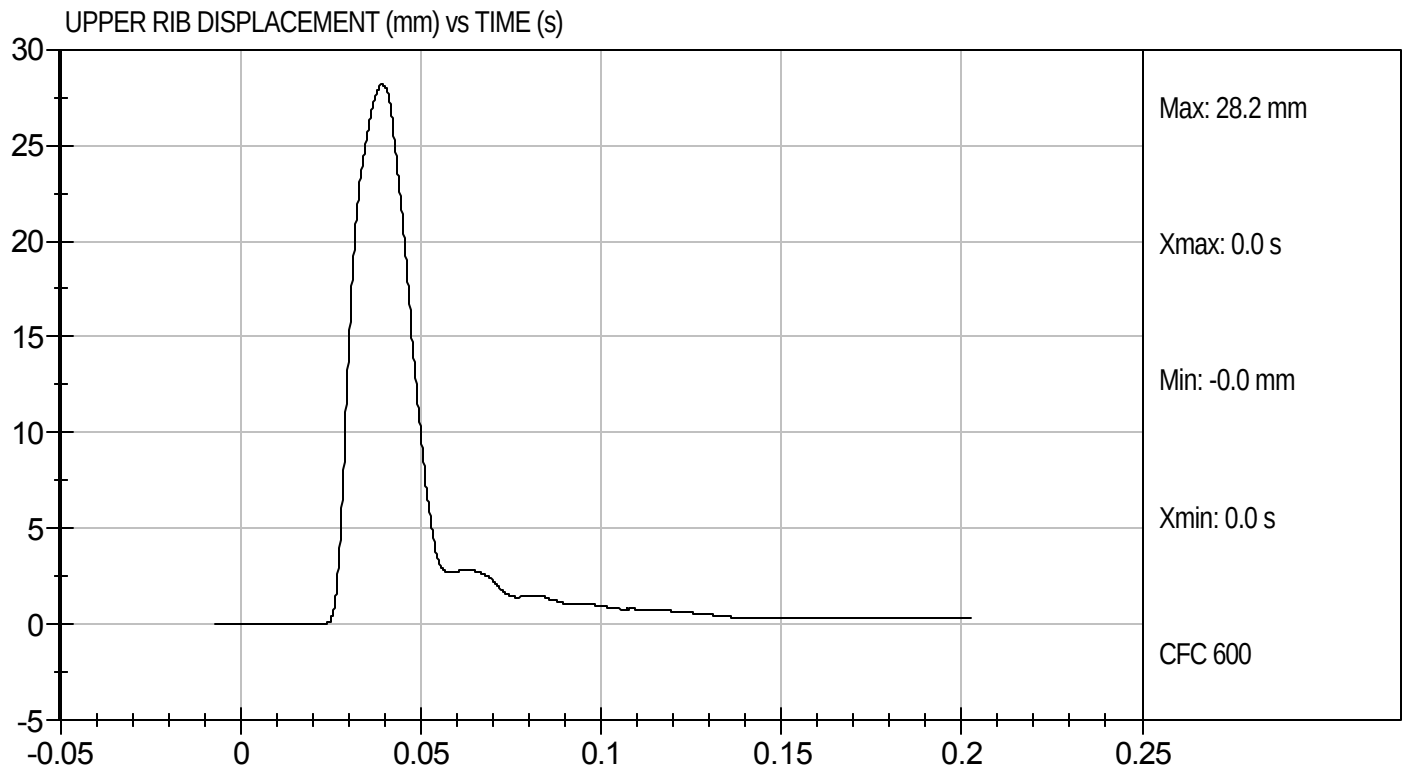
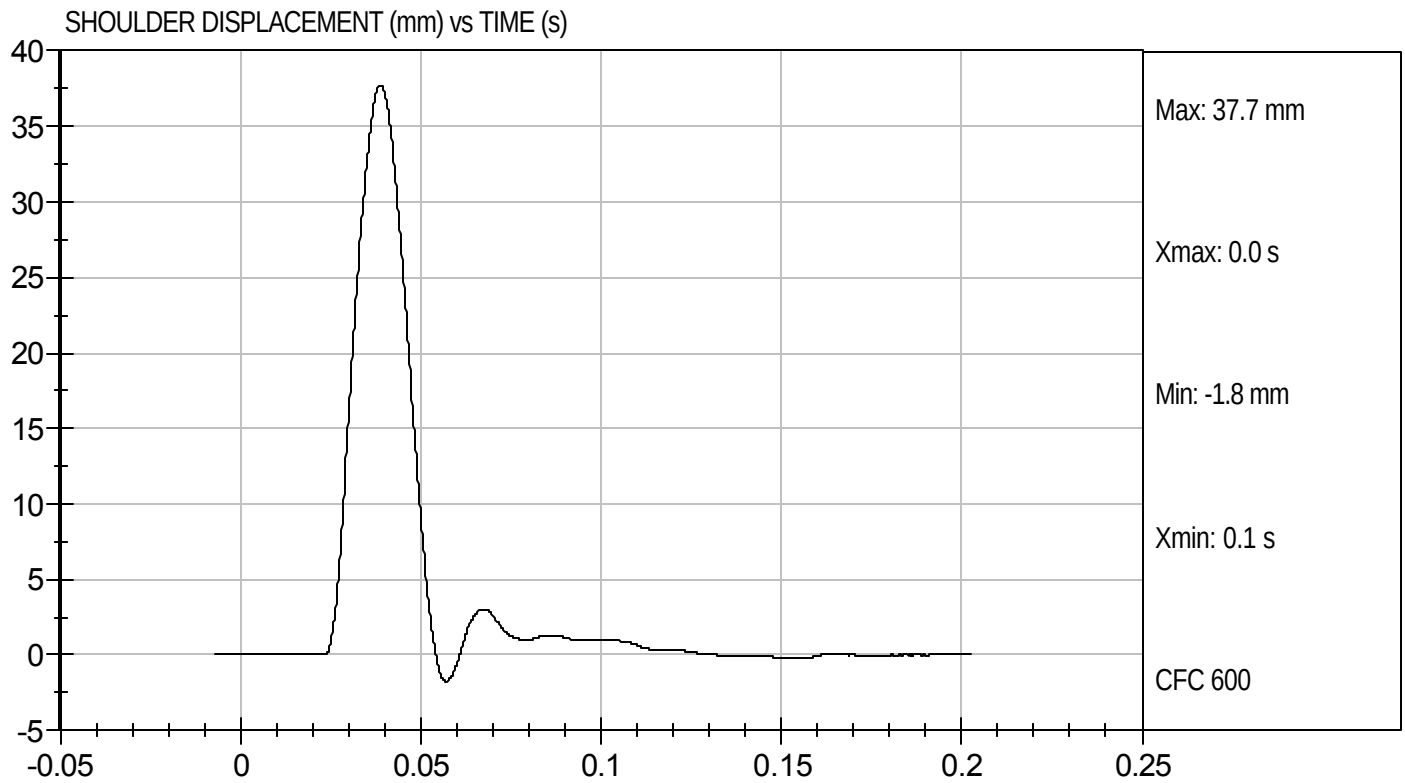
Test Date: 6/21/11
Velocity: 22.2 ft/s, 6.77 m/s





Test Desc: Thorax With Arm
Component ID: D112174

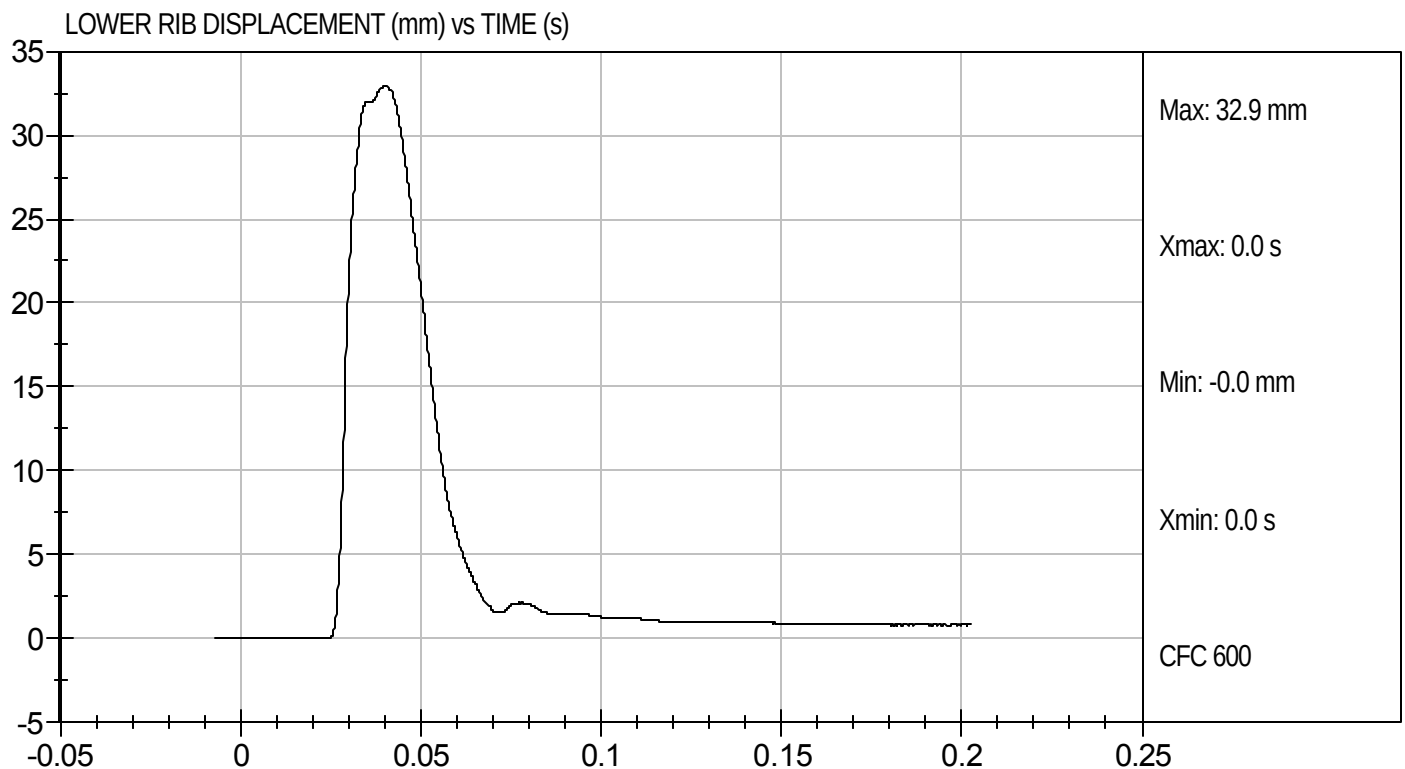
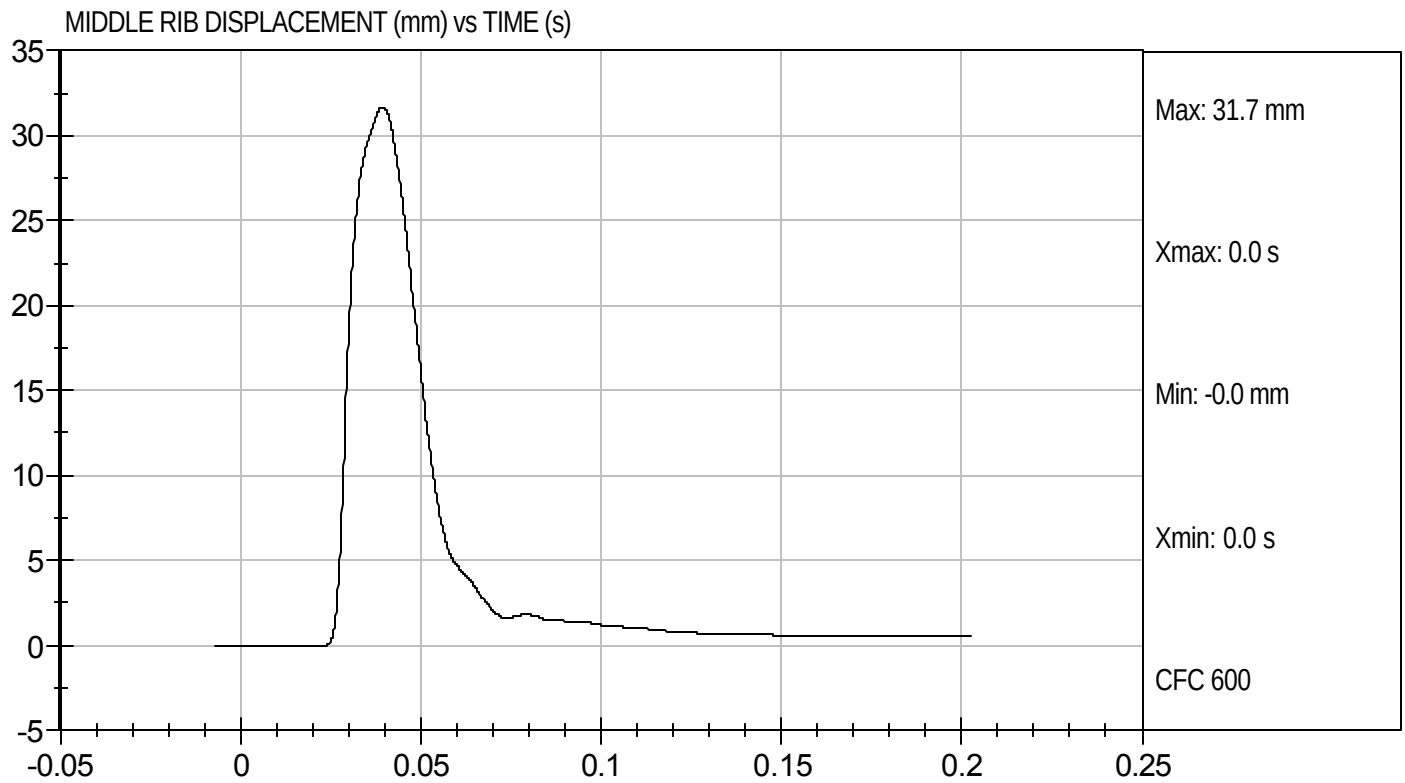
Test Date: 6/21/11
Velocity: 22.2 ft/s, 6.77 m/s





Test Desc: Thorax With Arm
Component ID: D112174

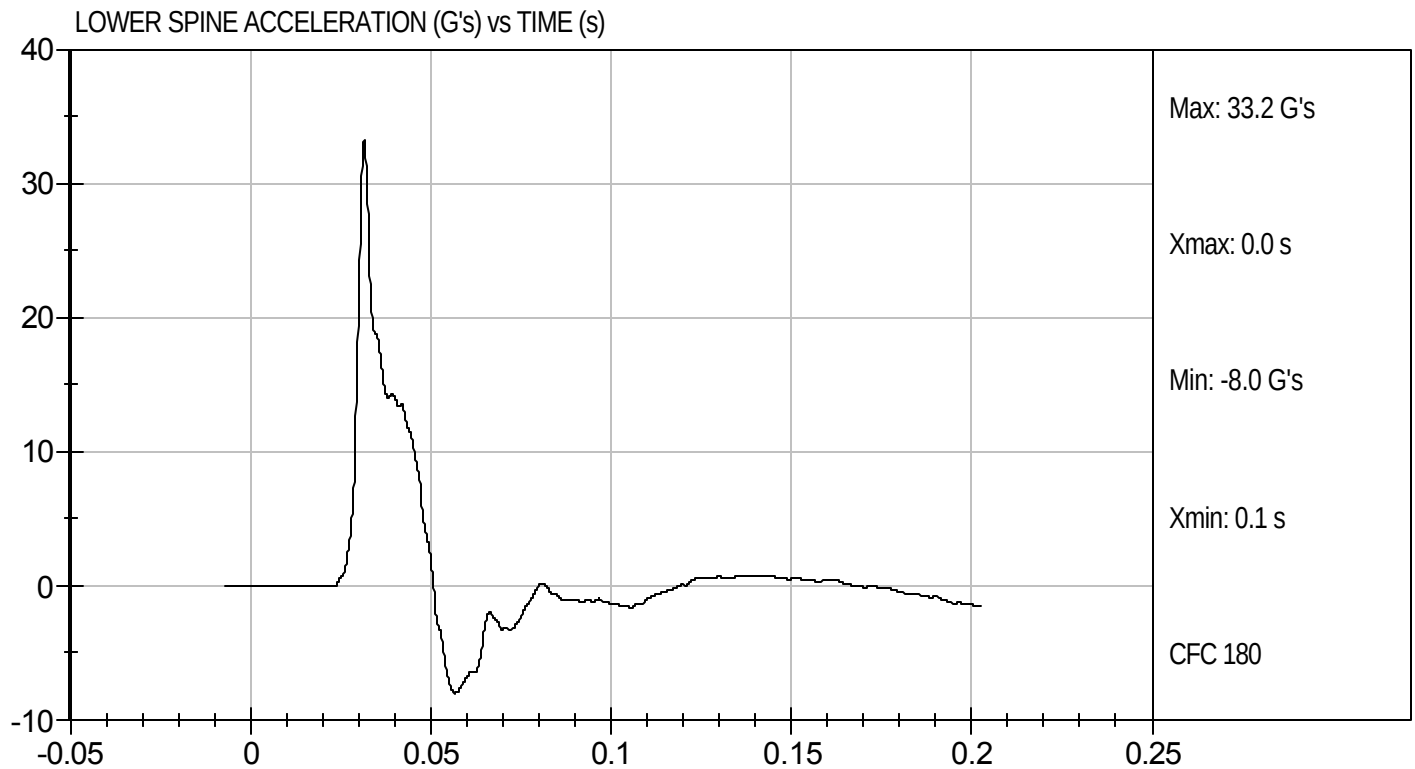
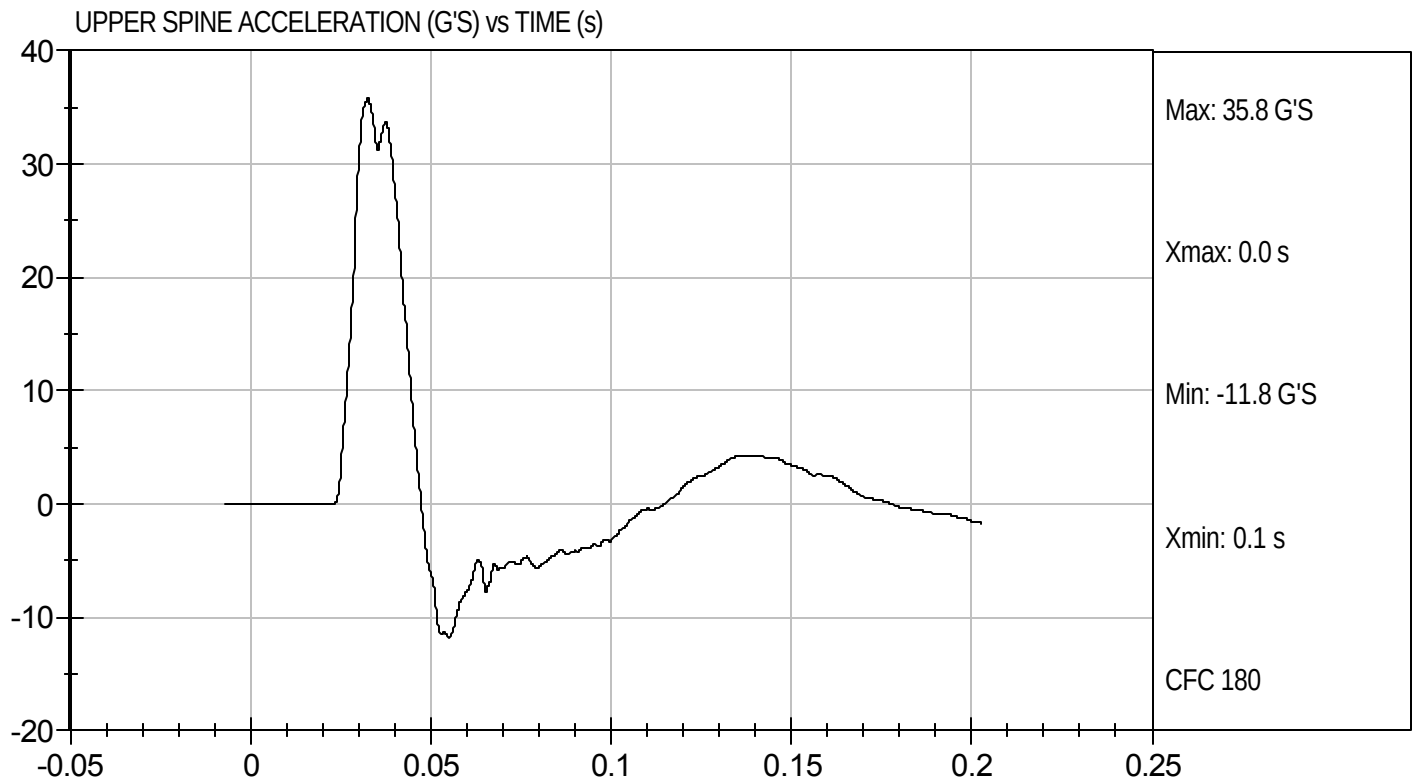
Test Date: 6/21/11
Velocity: 22.2 ft/s, 6.77 m/s





Test Desc: Thorax With Arm
Component ID: D112174

Test Date: 6/21/11
Velocity: 22.2 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: D112175

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.7	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	39	Pass
Middle Rib Displacement	mm	39 to 45	43	Pass
Lower Rib Displacement	mm	35 to 43	40	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

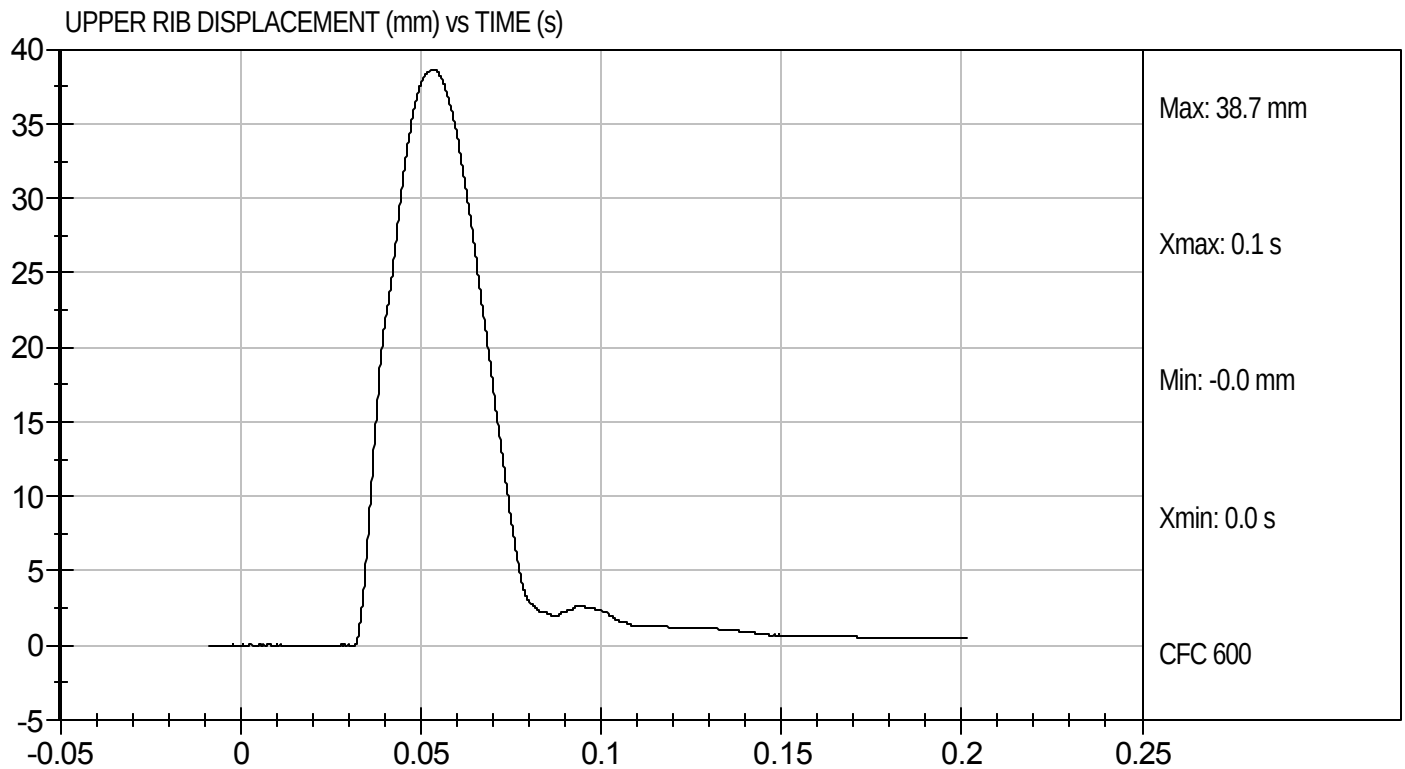
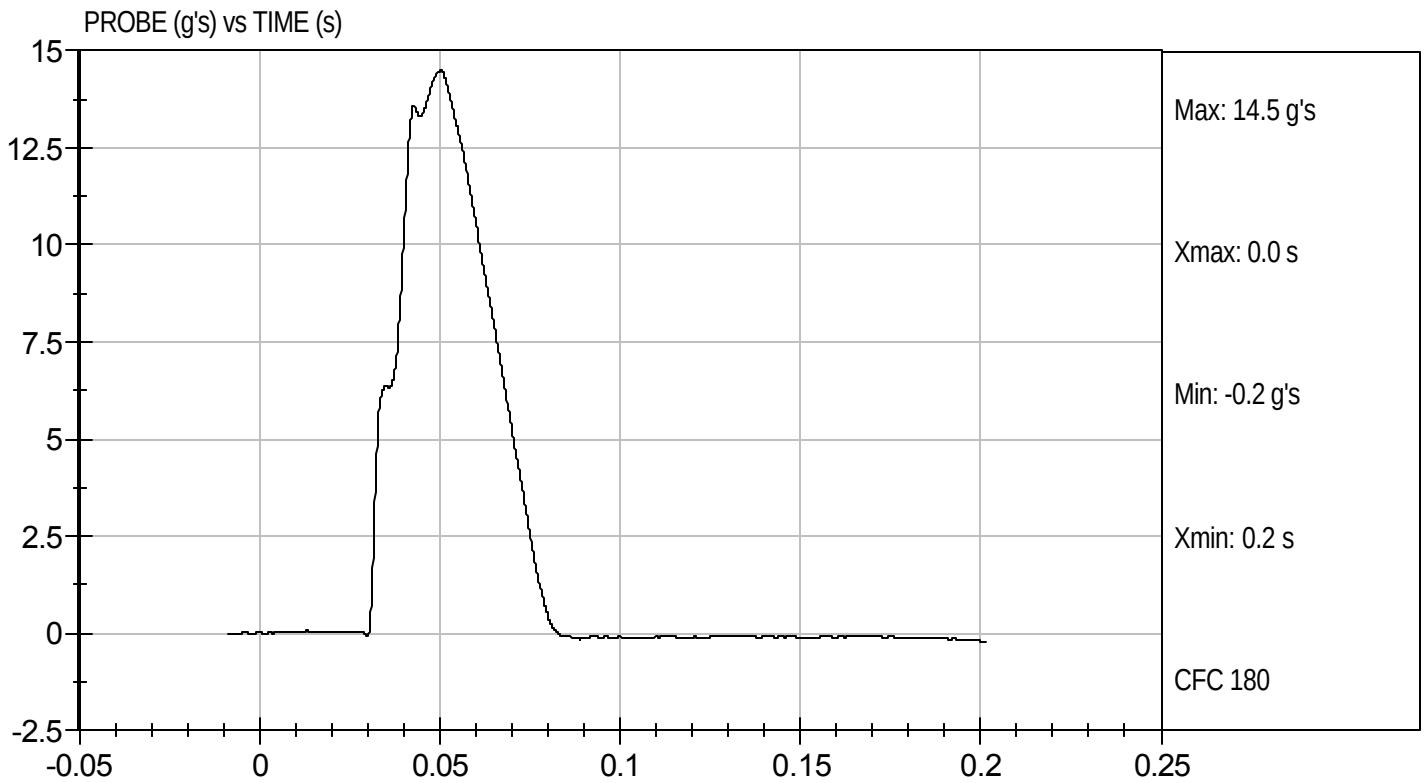
6/21/11
Test Date


Approved By



Test Desc: Thorax Without Arm
Component ID: D112175

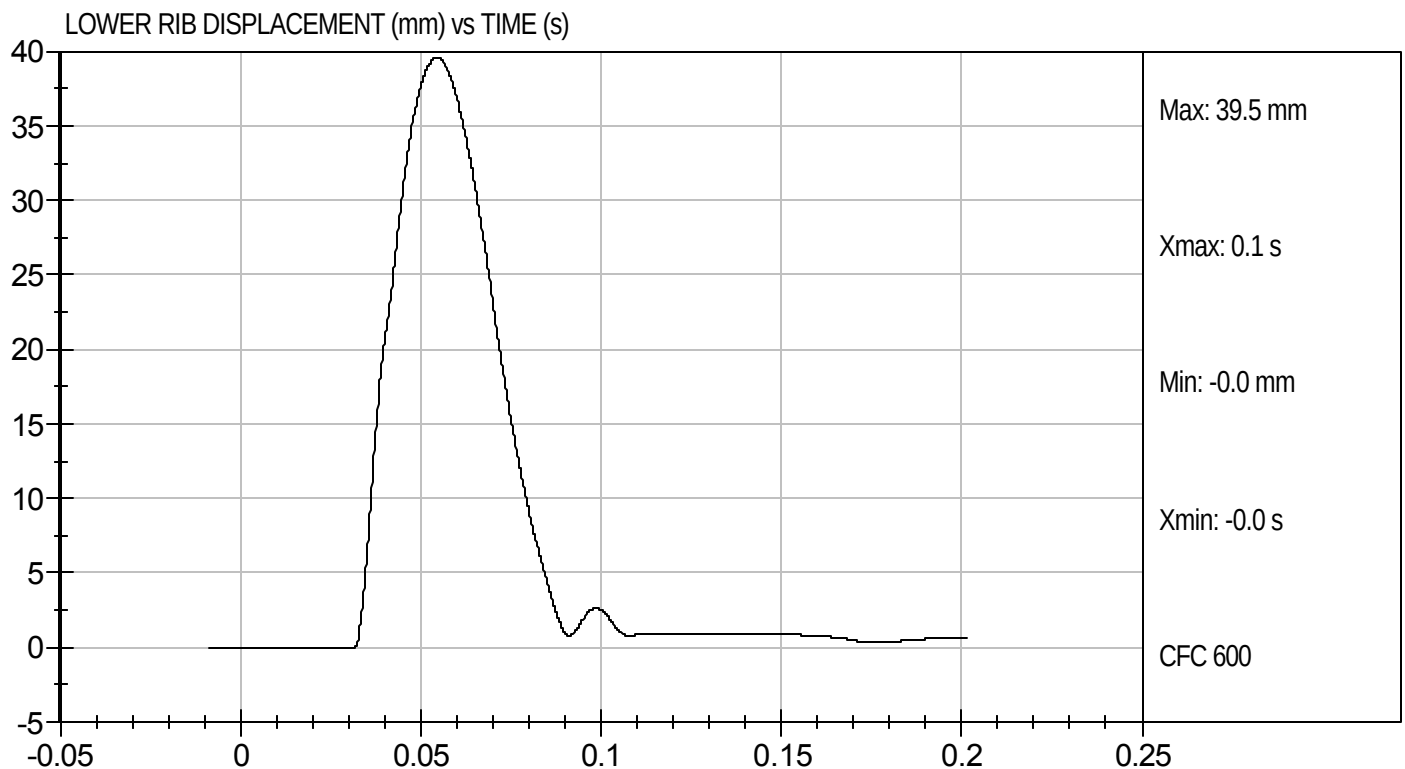
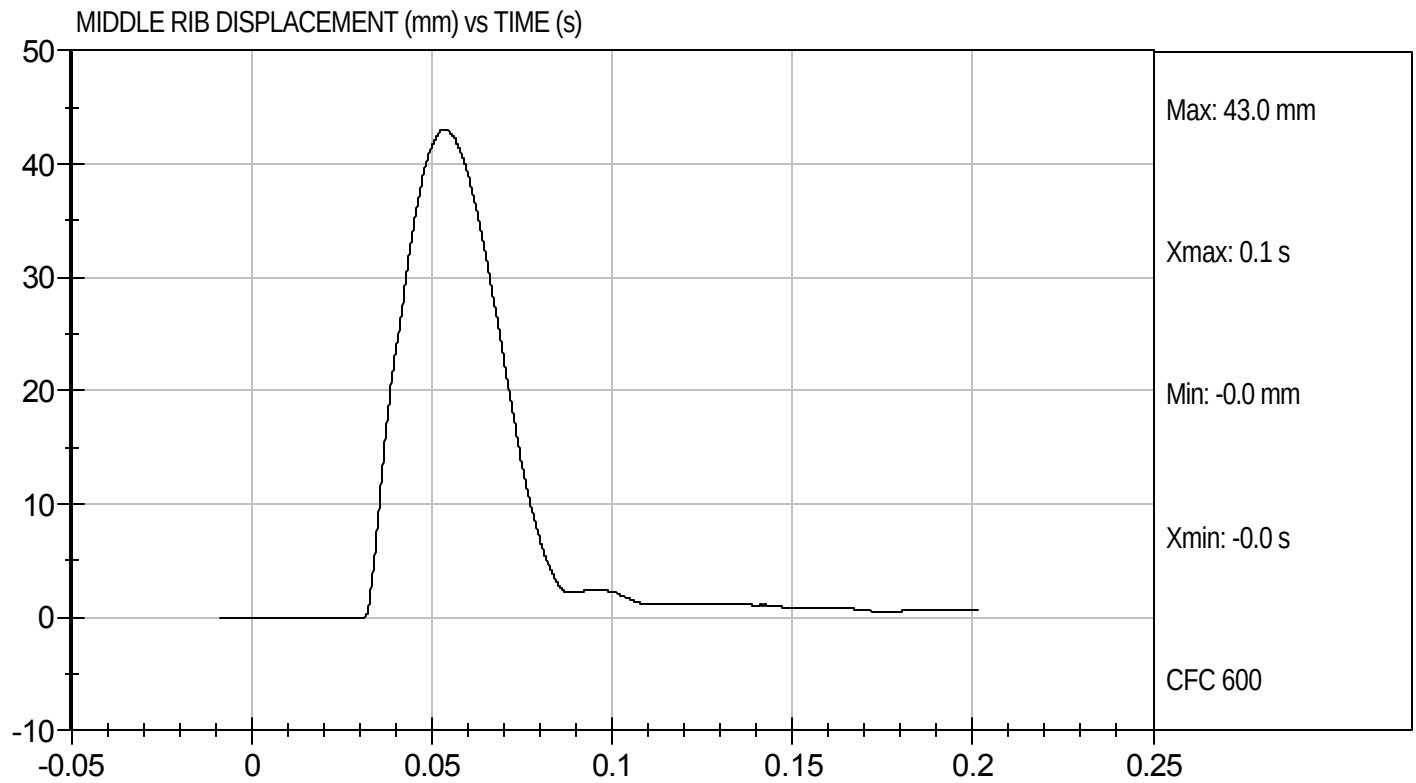
Test Date: 6/21/11
Velocity: 14.36 ft/s, 4.38 m/s





Test Desc: Thorax Without Arm
Component ID: D112175

Test Date: 6/21/11
Velocity: 14.36 ft/s, 4.38 m/s

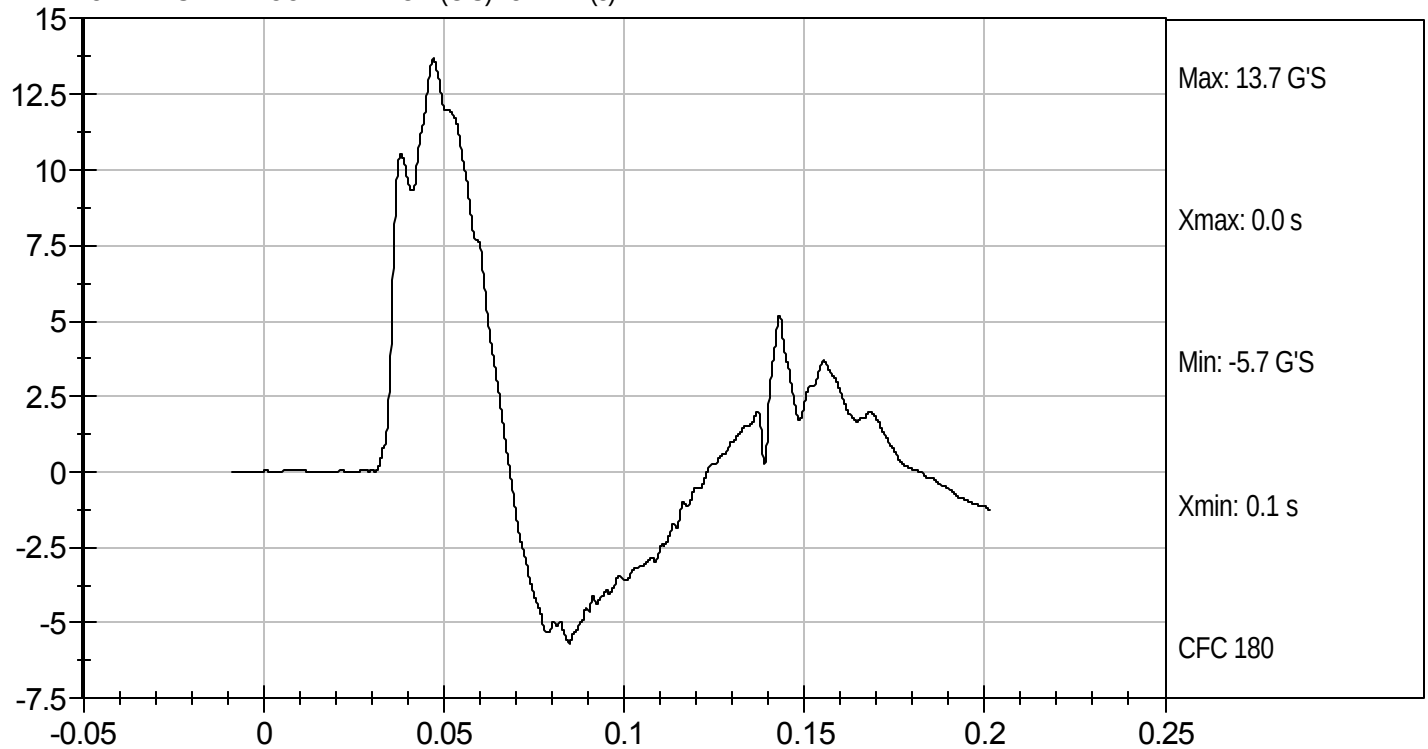




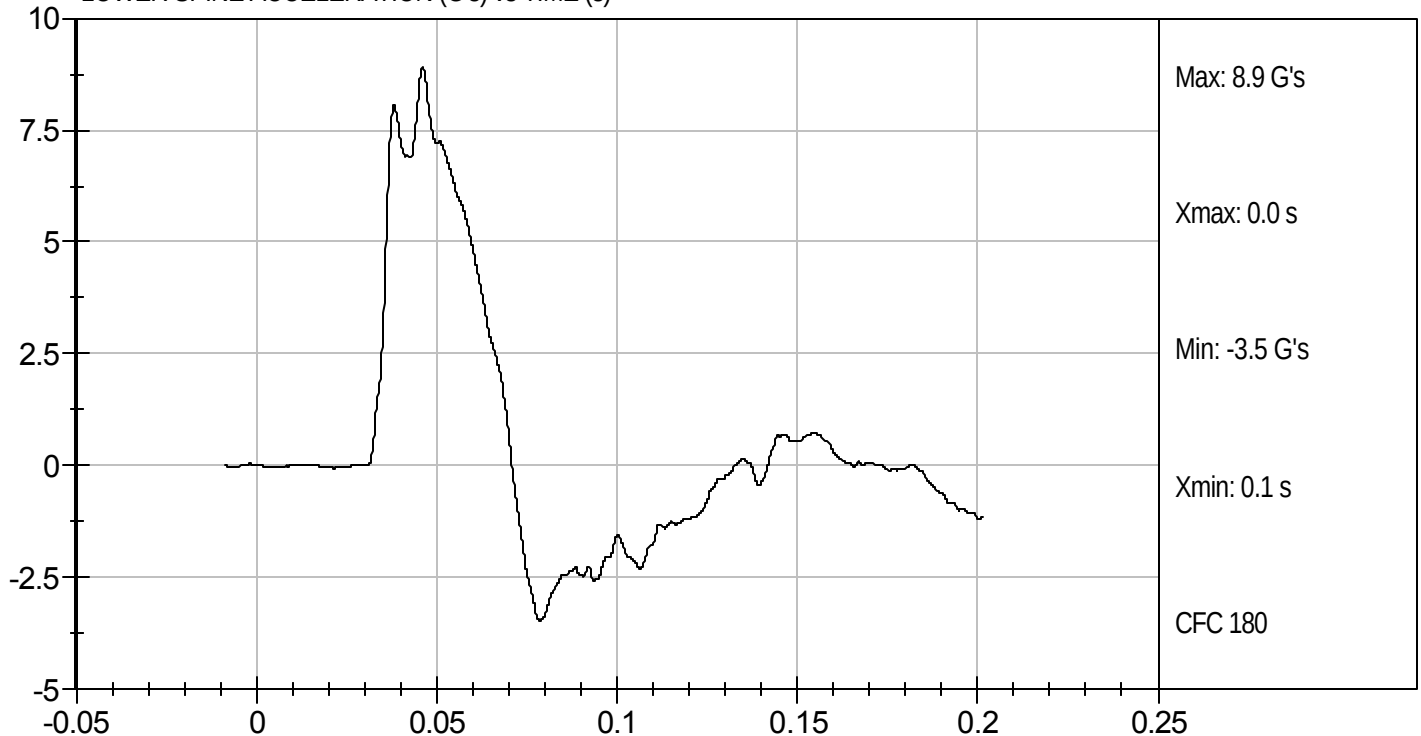
Test Desc: Thorax Without Arm
Component ID: D112175

Test Date: 6/21/11
Velocity: 14.36 ft/s, 4.38 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: D112176

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.7	Pass
Humidity	%	10 to 70	53	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	39	Pass
Lower Rib Displacement	mm	33 to 44	42	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	10	Pass
			Overall Test Results	Pass


Laboratory Technician

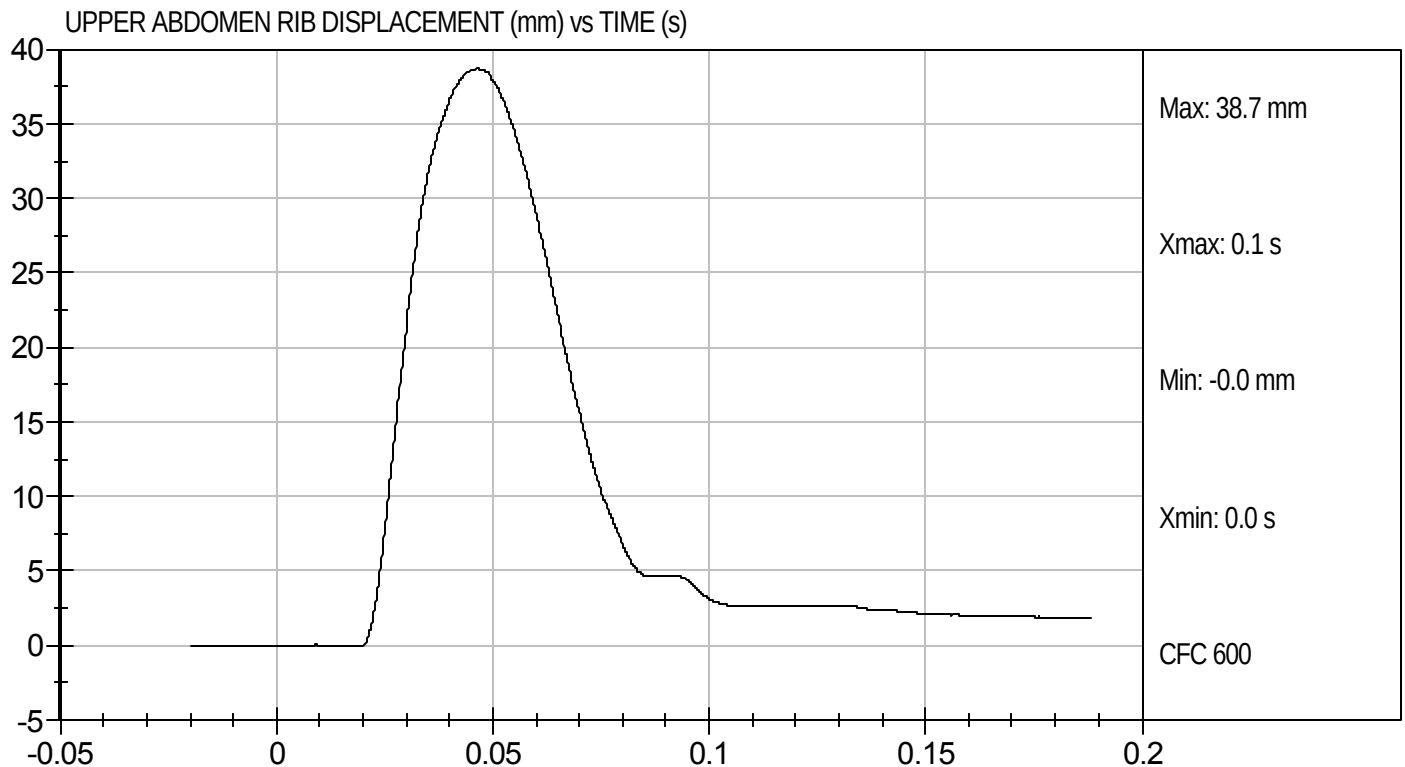
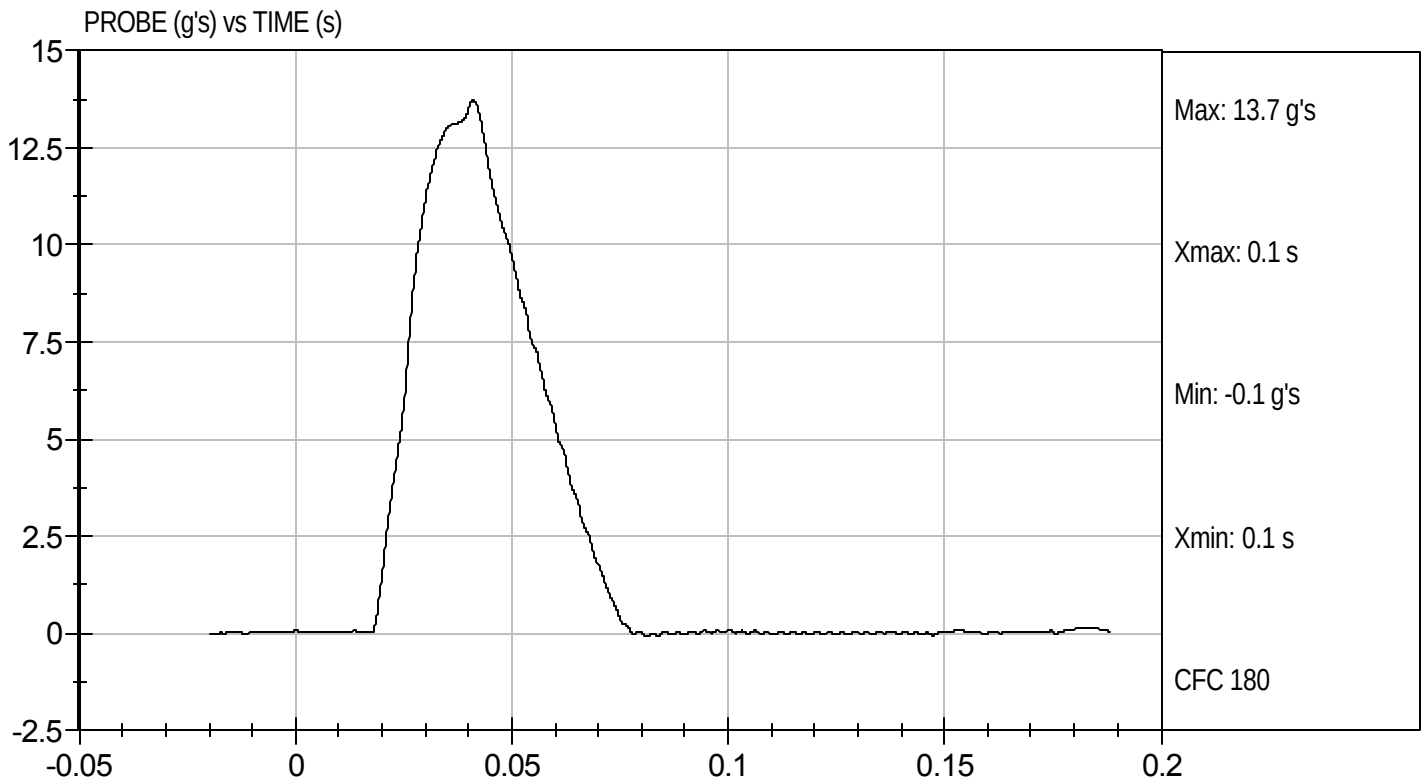
6/21/11
Test Date


Approved By



Test Desc: Abdomen Impact
Component ID: D112176

Test Date: 6/21/11
Velocity: 14.36 ft/s, 4.38 m/s

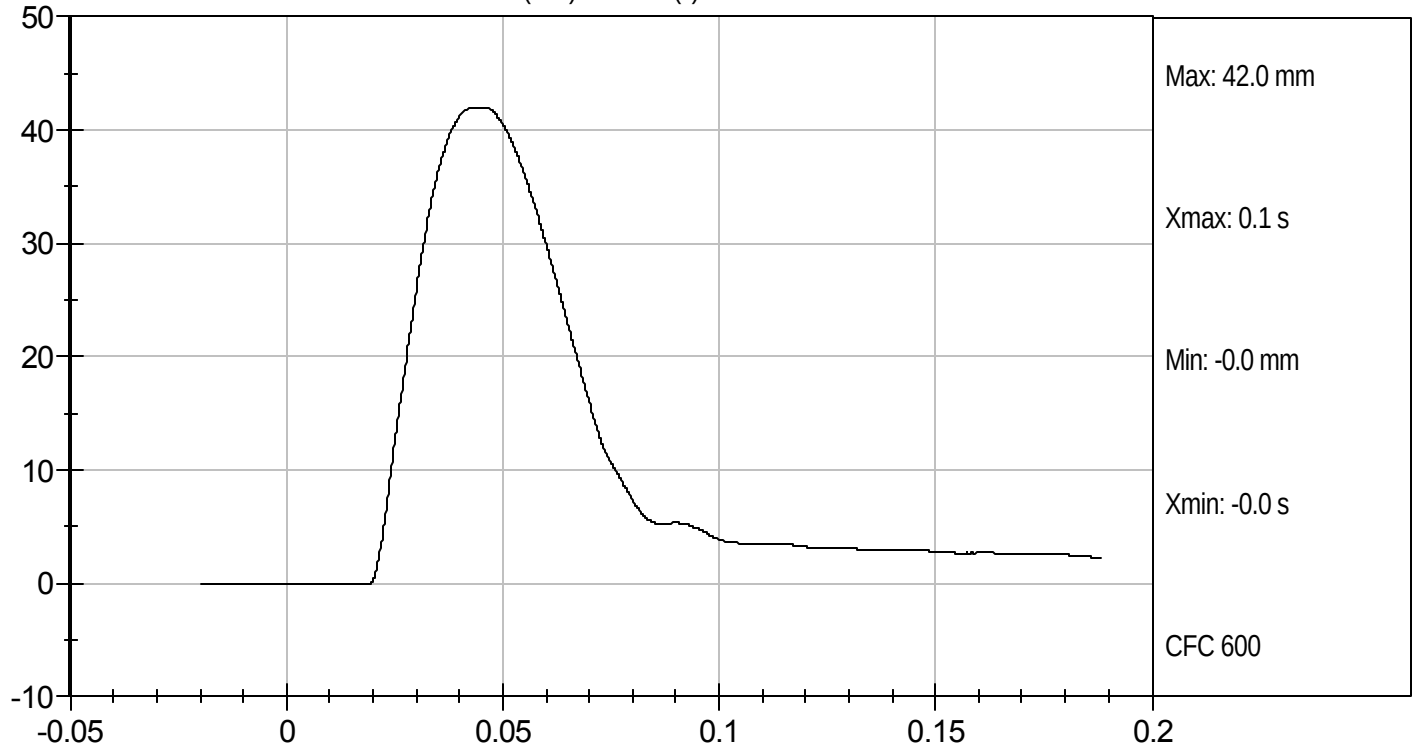




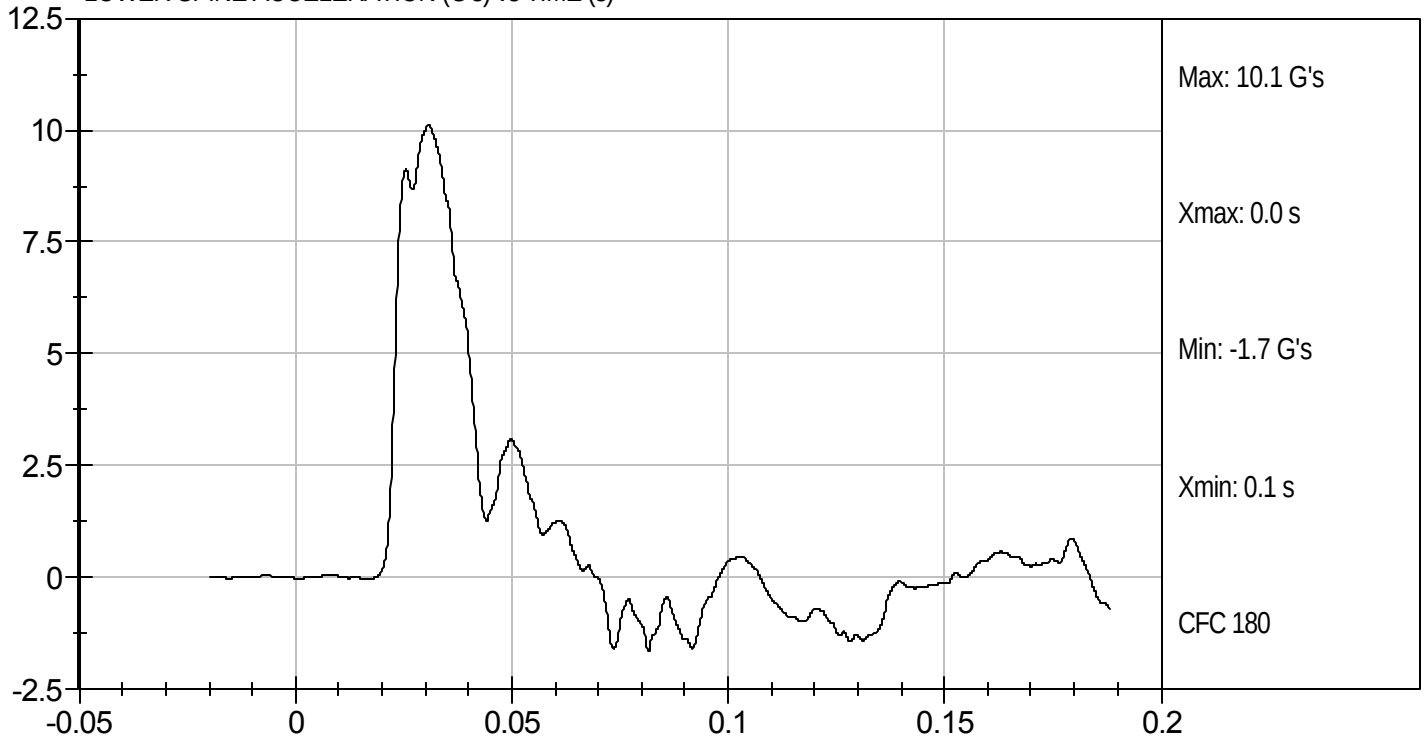
Test Desc: Abdomen Impact
Component ID: D112176

Test Date: 6/21/11
Velocity: 14.36 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: D112177

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.7	Pass
Humidity	%	10 to 70	53	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	Pass
Peak Impactor Acceleration	G's	38 to 47	42	Pass
Pelvis Y Acceleration after 6 ms	G's	34 to 42	40	Pass
Peak Acetabulum Force	N	3600 to 4300	3897	Pass
Overall Test Results				Pass


Laboratory Technician

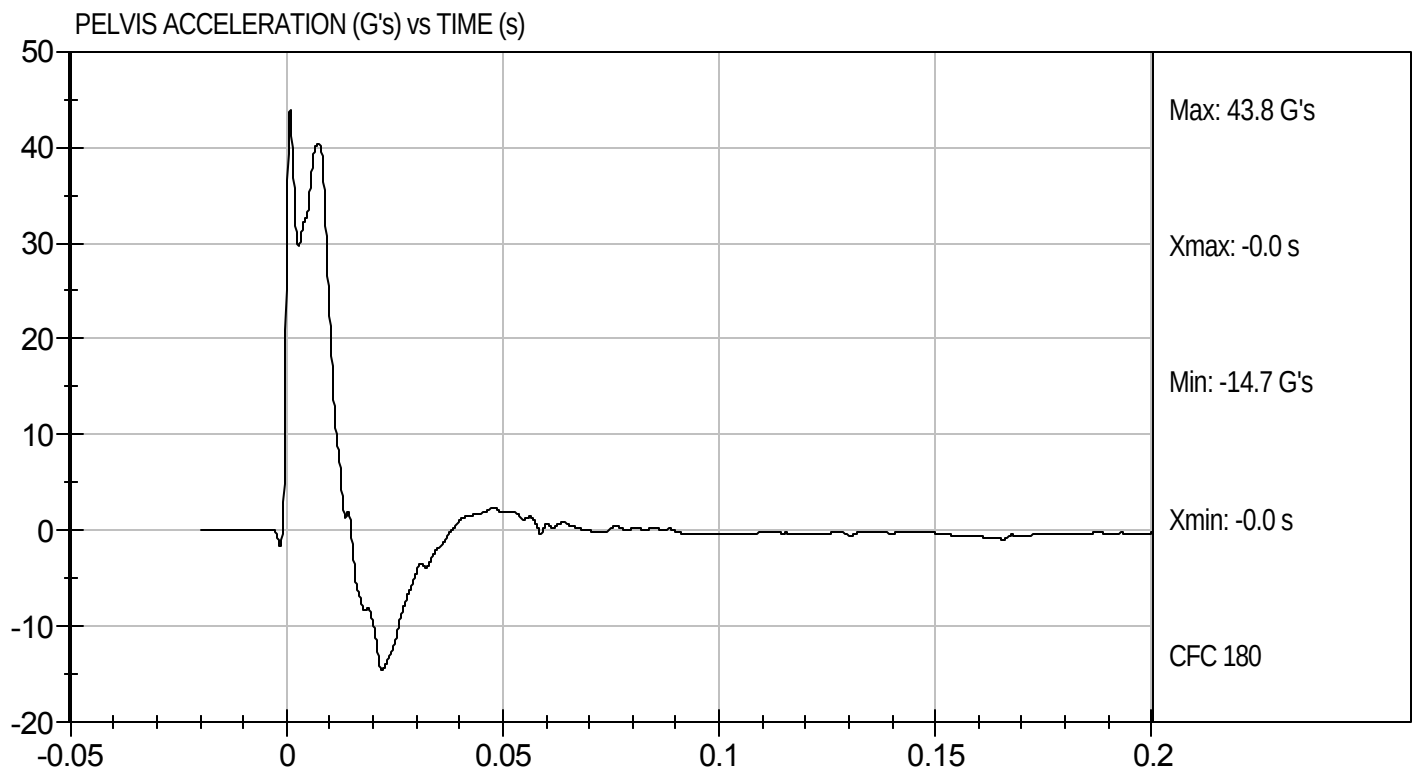
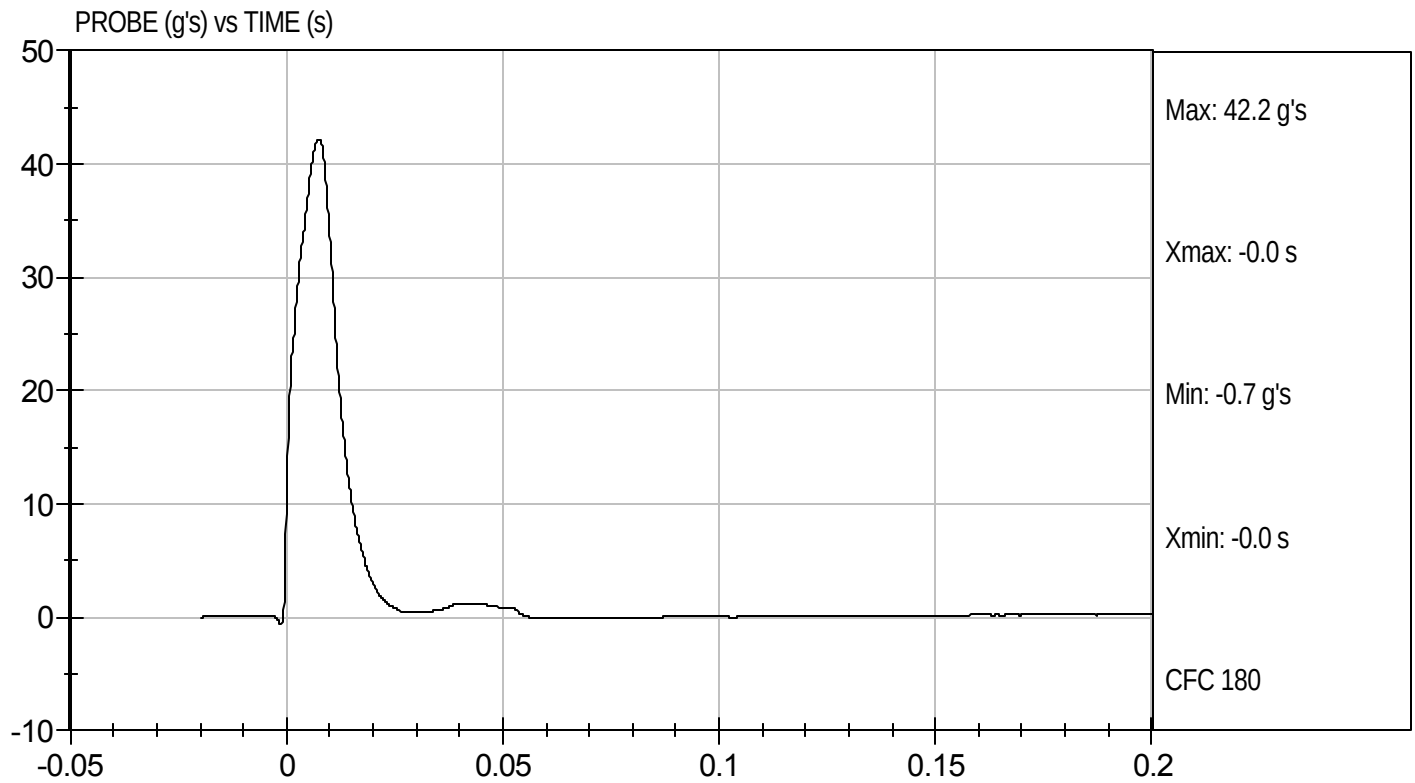
6/21/11
Test Date


Approved By



Test Desc: Pelvis Impact
Component ID: D112177

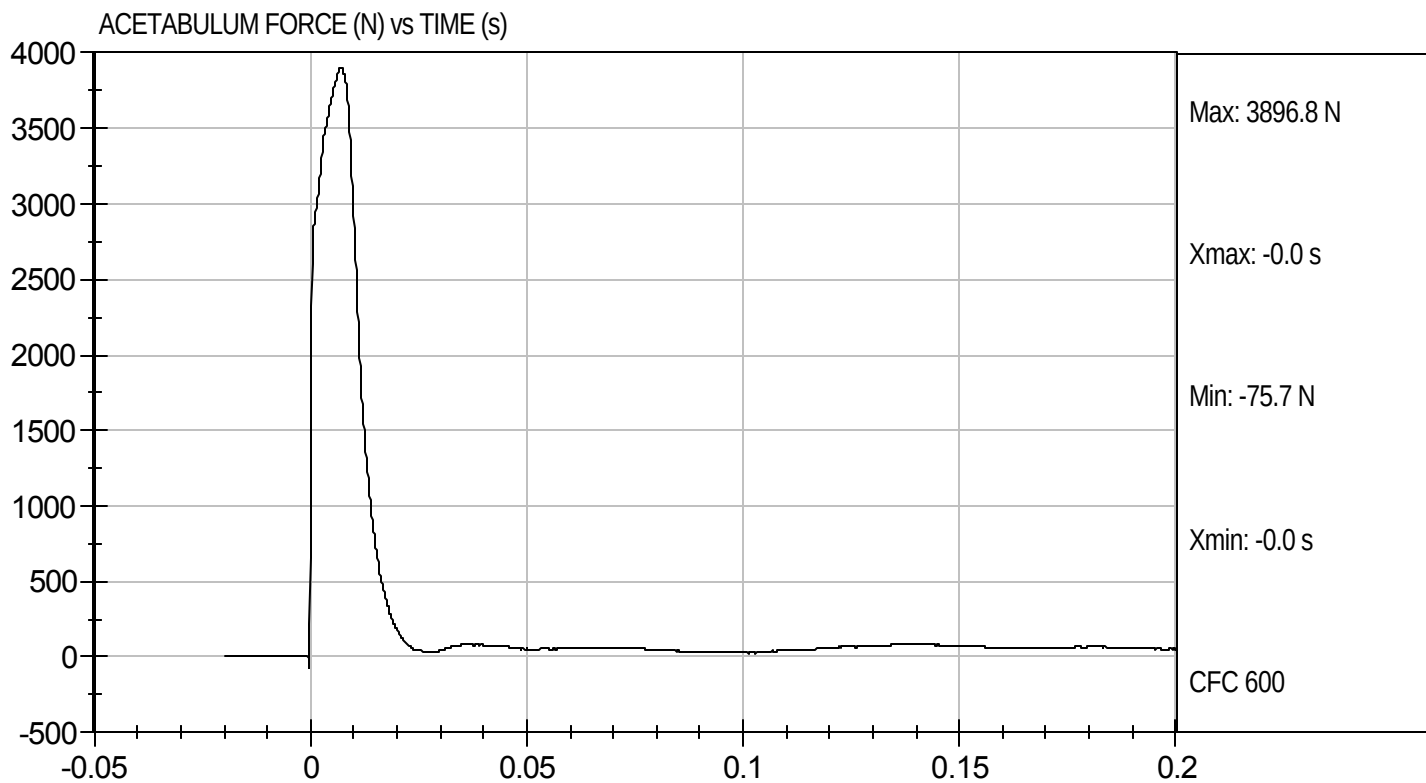
Test Date: 6/21/11
Velocity: 22.2 ft/s, 6.77 m/s





Test Desc: Pelvis Impact
Component ID: D112177

Test Date: 6/21/11
Velocity: 22.2 ft/s, 6.77 m/s



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

ATD Serial No: 296

Test I.D: D112178

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.7	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	31	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4773	Pass
Overall Test Results			Pass	


Laboratory Technician

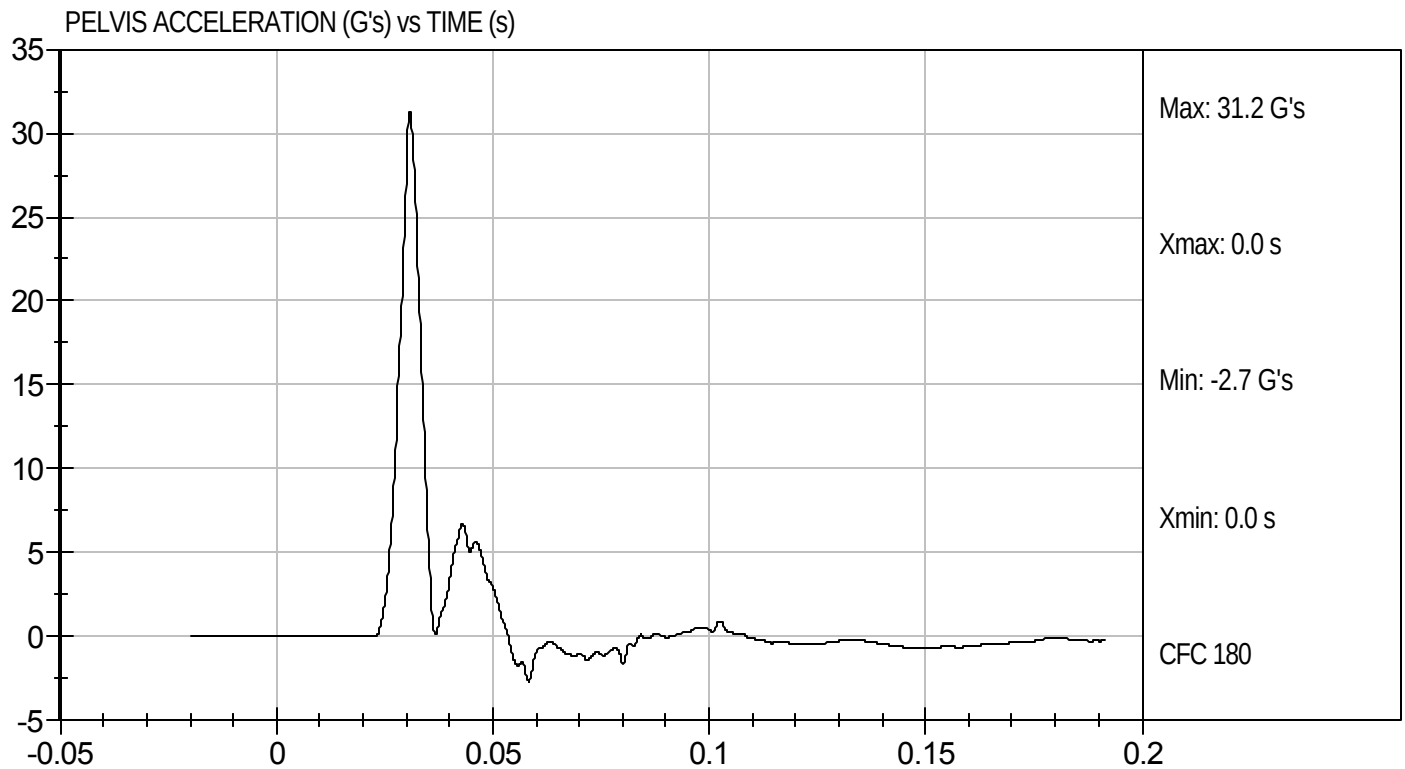
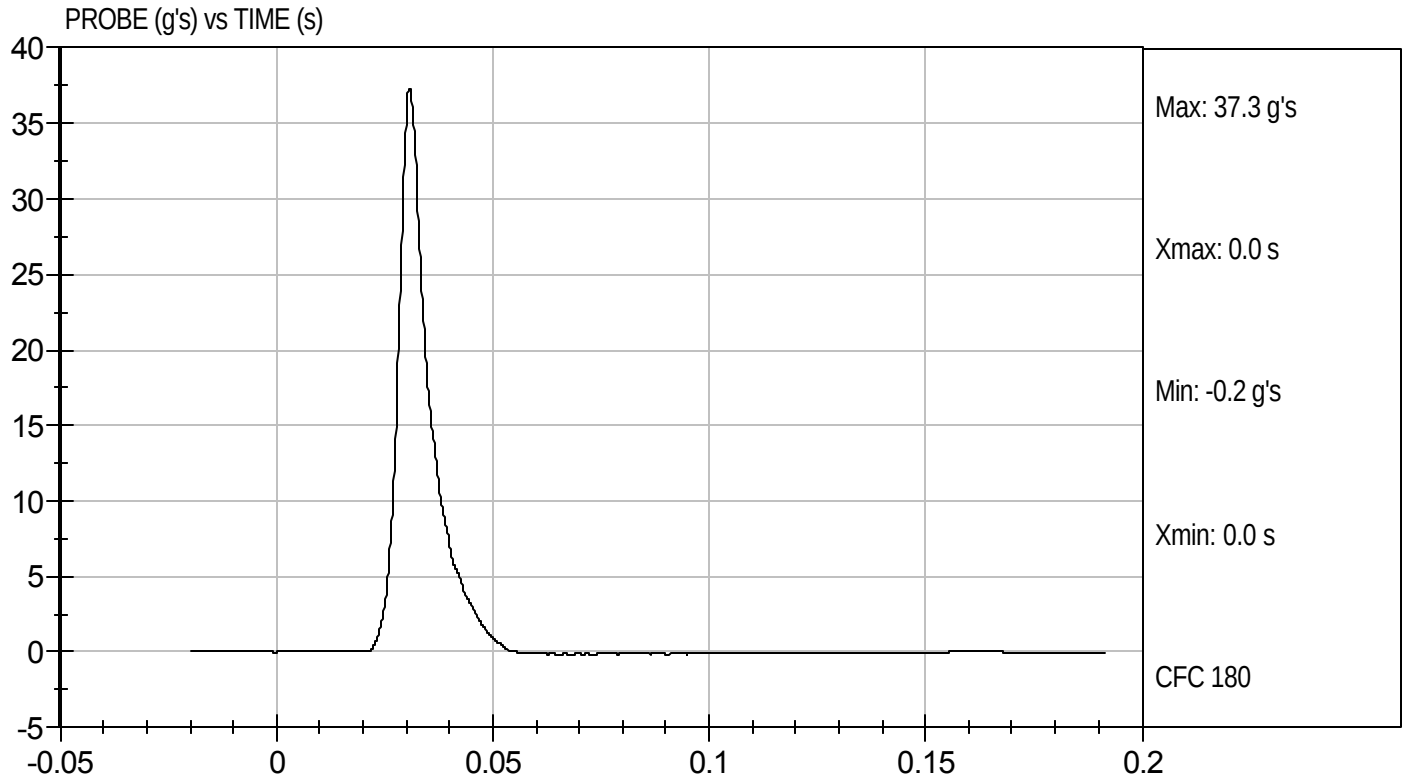
6/21/11
Test Date


Approved By



Test Desc: Iliac Impact
Component ID: D112178

Test Date: 6/21/11
Velocity: 14.36 ft/s, 4.38 m/s





Test Desc: Iliac Impact
Component ID: D112178

Test Date: 6/21/11
Velocity: 14.36 ft/s, 4.38 m/s

