

REPORT NUMBER: SPNCAP-MGA-2012-042

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

**GENERAL MOTORS LLC
2012 Chevrolet Silverado 2500 2WD Crew Cab
NHTSA No.: MC0114**

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



Test Date: December 20, 2011

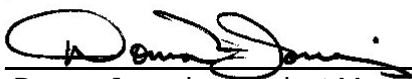
Final Report Date: February 10, 2012

FINAL REPORT

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

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Approved by: 
Ben Fischer, Project Engineer

Approval Date: February 10, 2012

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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		13. Type of Report and Period Covered: Final Test Report December 20, 2011 to February 10, 2012																														
15. Supplementary Notes		14. Sponsoring Agency Code NVS-111																														
		16. Abstract A 32.2 km/h (20 mph), 75° oblique impact Side NCAP Test was conducted on the subject 2012 Chevrolet Silverado 2500 2WD Crew Cab in accordance with the specifications of the Office of Crashworthiness Standards Side NCAP 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 December 20, 2011. The impact velocity was 32.0 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 21.5°C. The test vehicle post-test maximum crush was 447 mm at level 3. The test vehicle's performance was as follows:																														
<table border="1" style="margin: auto; border-collapse: collapse;"> <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>Head Injury Criteria (HIC₃₆)</td> <td>N/A</td> <td>1000</td> <td style="background-color: yellow;">12246</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td>Gs</td> <td>82</td> <td style="background-color: yellow;">70</td> </tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td> <td>N</td> <td>5525</td> <td style="background-color: yellow;">4458</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38*</td> <td style="background-color: yellow;">48</td> </tr> <tr> <td>Maximum Abdomen Rib Deflection</td> <td>mm</td> <td>45*</td> <td style="background-color: yellow;">46</td> </tr> </tbody> </table>						Measurement Description	Driver ATD (SID-IIs)			Units	Threshold	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	12246	Resultant Lower Spine Acceleration	Gs	82	70	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	4458	Maximum Thoracic Rib Deflection	mm	38*	48	Maximum Abdomen Rib Deflection	mm	45*	46
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* Proposed IARV																																
The doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.																																
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 Administration Technical Information Services Division, NPO-411 1200 New Jersey Ave, SE, Room E12-100 Washington, DC 20590 Email: tis@nhtsa.dot.gov FAX: 202-493-2833																														
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SECTION 1

TEST PURPOSE AND PROCEDURE

This side impact test is part of the MY 2012 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 2012 Chevrolet Silverado 2500 2WD Crew Cab. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Pole Laboratory Test Procedure, dated August 2011.

SECTION 2 SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a 2012 Chevrolet Silverado 2500 2WD Crew Cab. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 32.0 km/h. The test was conducted by MGA Research Corporation in Burlington, Wisconsin, on December 20, 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 Side NCAP Pole Laboratory Test Procedure dated August 2011. Camera locations and other pertinent camera information are included in this report.

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

Primary and Redundant Head CG Triaxial Accelerometers
Chest Upper Rib, Middle Rib, and Lower Rib Y-Axis Displacement Potentiometers
Abdomen Upper Rib and Lower Rib Y-Axis Displacement Potentiometers
Lower Spine (T12) Triaxial Accelerometers
Acetabulum and Iliac Wing Y-Axis Load Cells

Appendix B contains the dummy response data. Dummy configuration and performance verification data can be found in Appendix C of this report. Appendix D contains the test equipment and instrumentation calibration data.

Injury readings for the SID-IIs dummy were recorded as follows:

Measurement Description	Driver ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	12246
Resultant Lower Spine Acceleration	Gs	82	70
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	4458
Maximum Thoracic Rib Deflection	mm	38*	48
Maximum Abdomen Rib Deflection	mm	45*	46

*Proposed IARV

Supplemental restraint information is given below:

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	No			
Side Curtain Airbag	No		No	
Side Torso Airbag	No		No	
Seat Belt Pretensioner	Yes	No	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:

- Left Floor Sill Y after 17 msec.
- Left A-Post @ Sill Y after 32 msec.
- Driver Seat Track Y after 21 msec.
- Floorpan @ Rear Axle X after 68 msec.

Left Mid B-Post Y is questionable from 200-204 msec.

Floorpan @ Rear Axle X is questionable from 36-39 and 56-62 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: 2012 Chevrolet Silverado 2500 2WD Crew Cab NHTSA No. MC0114
 Test Program: NCAP Side Pole Impact Test Test Date: 12/20/2011

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	MC0114	Traction Control System (TCS)	Yes
Model Year	2012	Auto-Leveling System	No
Make	Chevrolet	Automatic Door Locks (ADL)	Yes
Model	Silverado 2500	Power Window Auto-Reverse	No
Body Style	Crew Cab	Other Optional Feature	N/A
VIN	1GC1CXCG0CF104003	Driver Front Airbag	Yes
Body Color	Blue Granite Metallic	Driver Curtain Airbag	No
Odometer Reading (km/mi)	249 / 155	Driver Head/Torso Airbag	No
Engine Displacement (L)	6.0	Driver Torso Airbag	No
Type/No. Cylinders	8	Driver Torso/Pelvis Airbag	No
Engine Placement	Longitudinal	Driver Pelvis Airbag	No
Transmission Type	Automatic	Driver Knee Airbag	No
Transmission Speeds	6	Rear Pass. Curtain Airbag	No
Overdrive	Yes	Rear Pass. Head/Torso Airbag	No
Final Drive	Rear	Rear Pass. Torso Airbag	No
Roof Rack	No	Rear Pass. Torso/Pelvis Airbag	No
Sunroof/T-Top	No	Rear Pass. Pelvis Airbag	No
Running Boards	Yes	Driver Seat Belt Pretensioner	Yes
Tilt Steering Wheel	Yes	Rear Pass. Seat Belt Pretensioner	No
Power Seats	Yes, driver's only	Driver Load Limiter	Yes
Anti-Lock Brakes (ABS)	Yes	Rear Pass. Load Limiter	No
All Wheel Drive (AWD)	No	Other Safety Restraint	N/A
Does owner's manual provide instruction to turn off automatic door locks?			No

DATA FROM CERTIFICATION LABEL

Manufactured By	General Motors LLC	GVWR (kg)	4309
Date of Manufacture	08/11	GAWR Front (kg)	1996
Vehicle Type	Truck	GAWR Rear (kg)	2812

VEHICLE SEATING AND WEIGHT CAPACITY DATA

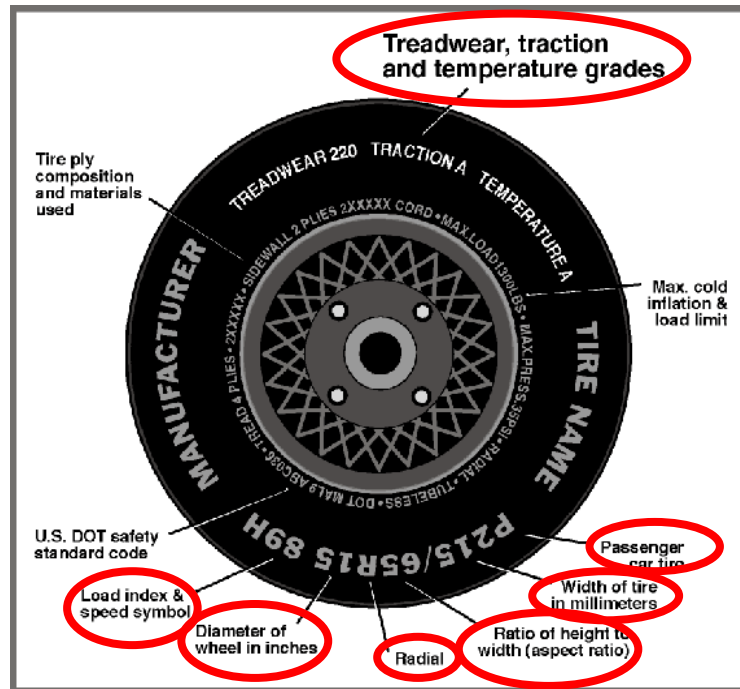
Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	3	3		6	
Capacity Weight (VCW) (kg)				1381	(A)
DSC x 68.04 kg				408	(B)
Rated Cargo and Luggage Weight (RCLW)				973	(A-B)

VEHICLE SEAT TYPE

Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						Manual	Power
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: 2012 Chevrolet Silverado 2500 2WD Crew Cab NHTSA No. MC0114
 Test Program: NCAP Side Pole Impact Test Test Date: 12/20/2011



TIRE PLACARD INFORMATION

Measured Parameter	Front	Rear
Recommended Cold Tire Pressure (kPa)	420	480
Recommended Tire Size	LT265/70R18	LT265/70R18

TIRE SIDEWALL INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	550	550
Tire Size on Vehicle	LT265/70R18	LT265/70R18
Tire Manufacturer	Goodyear	Goodyear
Tire Name	Wrangler	Wrangler
Tire Type	Light Truck	Light Truck
Tire Width	265	265
Aspect Ratio	70	70
Radial	Yes	Yes
Wheel Diameter	18	18
Load Index/Speed Symbol	124/121S	124/121S
Treadwear		
Traction Grade		
Temperature Grade		
Tire Material	Rubber	Rubber

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

Test Vehicle: 2012 Chevrolet Silverado 2500 2WD Crew Cab NHTSA No. MC0114
 Test Program: NCAP Side Pole Impact Test Test Date: 12/20/2011

TEST PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kpa	420	420	480	480
Tire Placard	kpa	420	420	480	480
Owner's Manual	kpa				
As Tested	kpa	420	420	480	480

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	812.8	661.8		828.7	735.3		828.7	758.9	
Right	kg	781.6	631.0		795.2	709.0		771.6	715.8	
Ratio	%	55.2	44.8		52.9	47.1		52.0	48.0	
Totals	kg	1594.4	1292.8	2887.2	1623.9	1444.3	3068.2	1600.3	1474.7	3075.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	2887.2	(A)
Actual Weight of 1 P572V ATD (SID-IIs) ATD Used	kg	52.2	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	136	(C)
Calculated Vehicle Target Weight (TVTW)	kg	3075.4	(A+B+C)

Does the measured As Tested Vehicle Weight lie within the required weight range
 (i.e. Calculated Test Vehicle Target Weight – 4.5 kg to 9 kg)? **YES**

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Weight of Ballast, if any	71.7
Right Side Mirror	3.2

TEST VEHICLE ATTITUDES AND CG

	Units	As Delivered	As Tested	Fully Loaded	Meets Requirement***
Driver Door Sill Angle (front-to-rear)*	deg	-1.0	-0.9	-0.8	Yes
Front Pass. Sill Angle (front-to-rear)*	deg	-1.2	-1.1	-1.1	Yes
Front Bumper Angle (left-to-right)**	deg	-0.5	-0.5	-0.7	Yes
Rear Bumper Angle (left-to-right)**	deg	0.0	0.0	0.0	Yes
Vehicle CG (Aft of Front Axle)	mm	1753	1843	1878	
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	18	16	27	

*ND=Nose Down (-), NU=Nose Up (+) ** LD=Left Down (-), LU=Left Up (+)

*** The "As Tested" vehicle attitude measurements must be equal to or between the "As Delivered" and "Fully Loaded" vehicle attitude measurements.

DATA SHEET NO. 2
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEM DATA

Test Vehicle: 2012 Chevrolet Silverado 2500 2WD Crew Cab NHTSA No. MC0114
 Test Program: NCAP Side Pole Impact Test Test Date: 12/20/2011

SEAT POSITIONING

The driver's seat, front center seat (if applicable), and right front passenger's seat should be set to the forward-most, mid-height, mid-angle position. The struck-side rear passenger's seat, rear center seat, and non-struck side rear passenger's seats should be set to the rear-most, lowest, mid-angle position.

SCRL ANGLE RANGE

Seat	SCRL (°)		
	Max	Min	Mid
Driver Seat	17.1	5.1	11.1
Front Passenger Seat	Fixed	Fixed	Fixed
Front Center Seat	Fixed	Fixed	Fixed
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCR Height (mm)	SCR Height Position	SCR Height (mm)		
				Rear-most	Mid-Fore/Aft	Forward-Most
Driver Seat	11.1	22	Max	43	43	43
	11.1	22	Mid	22	22	22
	11.1	22	Min	0	0	0
Front Passenger Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
	Fixed	Fixed	Mid	Fixed	Fixed	Fixed
	Fixed	Fixed	Min	Fixed	Fixed	Fixed
Front Center Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
	Fixed	Fixed	Mid	Fixed	Fixed	Fixed
	Fixed	Fixed	Min	Fixed	Fixed	Fixed
Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
	Fixed	Fixed	Mid	Fixed	Fixed	Fixed
	Fixed	Fixed	Min	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
	Fixed	Fixed	Mid	Fixed	Fixed	Fixed
	Fixed	Fixed	Min	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
	Fixed	Fixed	Mid	Fixed	Fixed	Fixed
	Fixed	Fixed	Min	Fixed	Fixed	Fixed

DATA SHEET NO. 2 (CONTINUED)
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT, AND FUEL SYSTEM DATA

Test Vehicle: 2012 Chevrolet Silverado 2500 2WD Crew Cab
 Test Program: NCAP Side Pole Impact Test

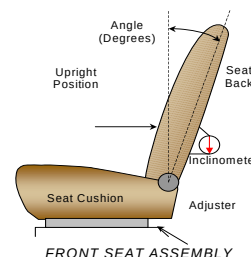
NHTSA No. MC0114
 Test Date: 12/20/2011

SEAT FORE/AFT POSITIONS

Seat	Total Fore/Aft Travel		Test Position from Forward-most Position	
	mm	Detents	mm	Detent
Driver Seat	240		0	
Front Passenger Seat	210	22 (1 st as 1)	0	0 (1 st as 0)
Front Center Seat	Fixed	Fixed	Fixed	Fixed
Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Non-Struck Side	Fixed	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed	Fixed

SEAT BACK ANGLE ADJUSTMENT

The driver's seat back is positioned such that the dummy's head is level. The front center and front passenger's seat backs are positioned in a similar manner as the driver's seat back. The struck-side rear passenger seat back is positioned in accordance with the information provided by the manufacturer on Form No. 1 for the 5th percentile female dummy in a Side NCAP MDB test. The rear center and non-struck side rear passenger's seat back is set to match the struck-side rear seat back.



Seat	Total Seat Back Angle Range		Test Position from Vertical	
	Degrees	Detents	Degrees	Detent
Driver Seat w/Seated Dummy	50.2		0.6	5 th (1 st as 0)
Front Passenger Seat	49.0		0.5	4 th (1 st as 0)
Front Center Seat	Fixed		Fixed	Fixed
Struck Side Rear Seat	Fixed		Fixed	Fixed
Non-Struck Side Rear Seat	Fixed		Fixed	Fixed
Rear Center Seat	Fixed		Fixed	Fixed

SEAT BELT ANCHORAGE ADJUSTMENT

Seat belt anchorages are adjusted in accordance with the information provided by the manufacturer on Form No. 1.

	Total # of Positions	Placed in Position #
Driver Seat	5 (1 st as 1)	0 (uppermost as 0)

HEAD RESTRAINT ADJUSTMENT

Head restraints are adjusted to the lowest and most full forward in-use position.

	Total # of Positions	Placed in Position #
Driver Seat	4	Lowest

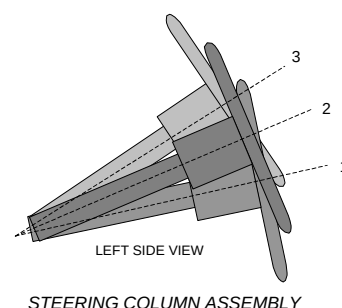
DATA SHEET NO. 2 (CONTINUED)
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT, AND FUEL SYSTEM DATA

Test Vehicle: 2012 Chevrolet Silverado 2500 2WD Crew Cab NHTSA No. MC0114
 Test Program: NCAP Side Pole Impact Test Test Date: 12/20/2011

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel geometric locus is described when it moves through its full range of motion.

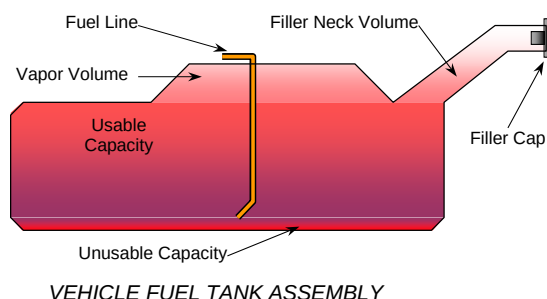
	Degrees	Fore/Aft Position (mm)
Lowermost, Position 1	78.8	
Geometric Center, Position 2	68.8	
Uppermost, Position 3	58.8	
Telescoping Steering Wheel Travel		
Test Position	68.8	



FUEL PUMP

Describe the fuel pump type, details about how it operates and the location of the fuel filler pipe.

The vehicle is equipped with an electric fuel pump. Pump will run when engine is running. Also, it will run briefly when ignition key is turned to the "on" position without starting the engine. The fuel pipe is on the left side.



FUEL TANK CAPACITY DATA

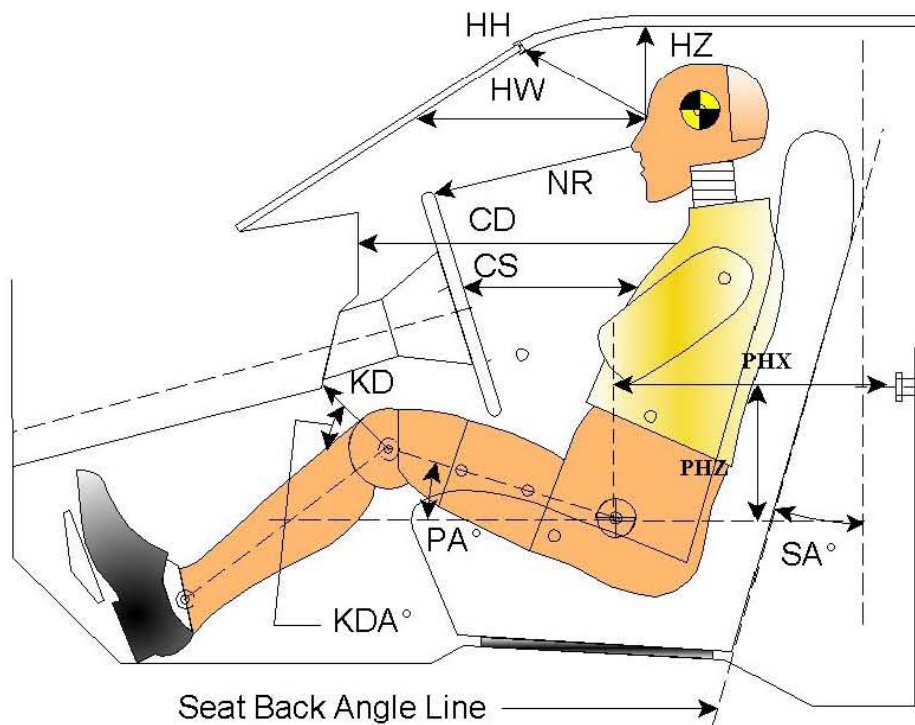
	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	135.1
Usable Capacity of "Optional Tank" (see Form No. 1)	
Usable Capacity of Standard Tank as Specified in Owner's Manual	136.3
Usable Capacity of Optional Tank as Specified in Owner's Manual	
93% of Usable Capacity	125.6
Actual Amount of Solvent Used	125.7
1/3 of Usable Capacity	45.0

Is the actual amount of solvent used in the test equal to 93% $\pm$ 1% of the Usable Capacity stated in Form No. 1? **YES**

.DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2012 Chevrolet Silverado 2500 2WD Crew Cab
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MC0114
 Test Date: 12/20/2011



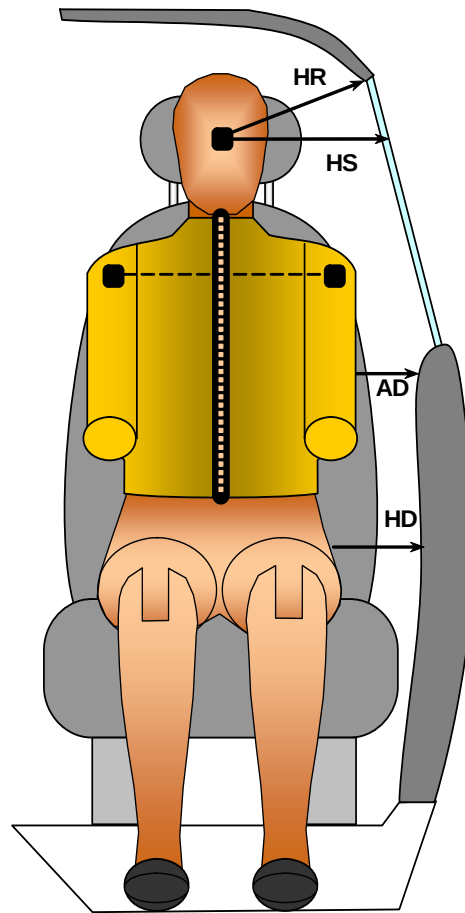
LEFT SIDE VIEW

Code	Measurement Description	Driver S/N 296	
		Length (mm)	Angle (°)
HH	Head to Header	333	
HW	Head to Windshield	614	
HZ	Head to Roof Liner	254	
NR	Nose to Rim	219	
CD	Chest to Dashboard	395	
CS	Chest to Steering Wheel	176	
KDL/KDAL°	Left Knee to Dash	95	38.2
KDR/KDAR°	Right Knee to Dash	89	36.5
PAX°	Pelvic Tilt Angle (X-Axis)		20.4
PAY°	Pelvic Tilt Angle (Y-Axis)		0.6
PHX	Hip Point to Striker (X-Axis)	462	
PHZ	Hip Point to Striker (Z-Axis)	-4	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2012 Chevrolet Silverado 2500 2WD Crew Cab
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MC0114
 Test Date: 12/20/2011



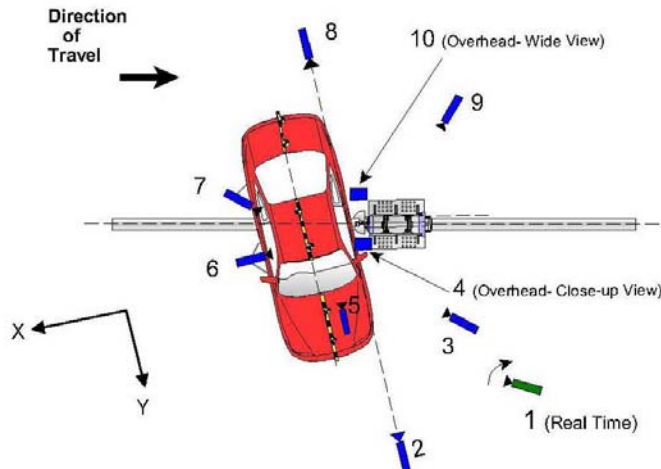
FRONT VIEW OF DUMMY

Code	Measurement Description	Driver S/N 296
		Length (mm)
HR	Head to Side Header	255
HS	Head to Side Window	373
AD	Arm to Door	188
HD	Hip Point to Door	164

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2012 Chevrolet Silverado 2500 2WD Crew Cab
Test Program: NCAP Side Pole Impact Test

NHTSA No. MC0114
Test Date: 12/20/2011



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	-90	6360	-1850	24	1000
3	Impact Side 45° Forward	-2150	5370	-1940	20	1000
4	Overhead Closeup	120	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	-80	-7150	-1830	24	1000
9	Impact Side 45° Rearward	-4200	-4590	-1930	20	1000
10	Overhead Wide View	370	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.

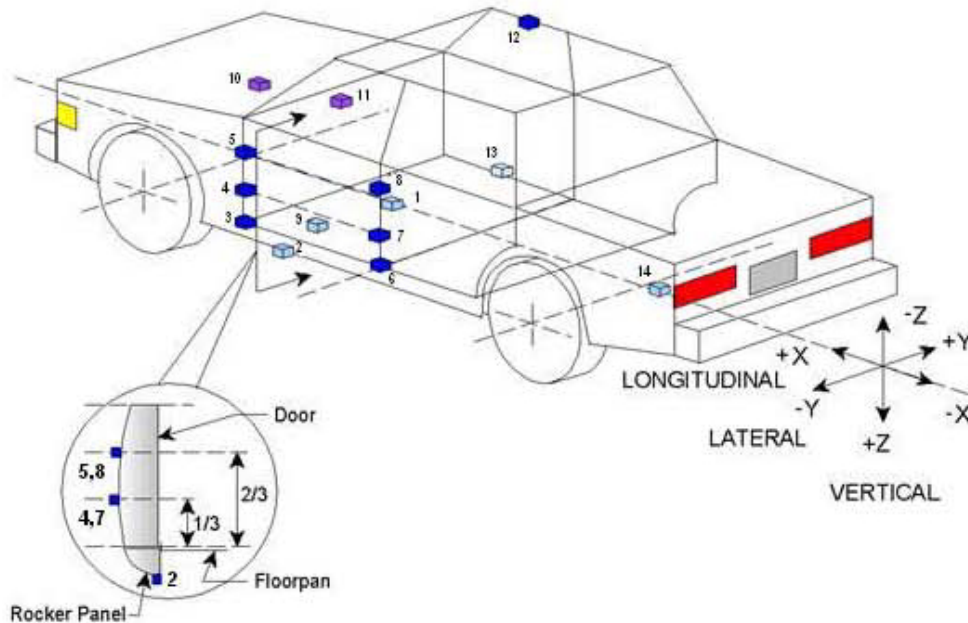
Explain why camera(s) did not operate as intended: Not Applicable

INSTRUMENTATION

	Number of Channels
Driver Dummy	16
Vehicle Structure	18
Pole Load Cells	8
TOTAL	42

DATA SHEET NO. 6
TEST VEHICLE ACCELEROMETER DATA

Test Vehicle: 2012 Chevrolet Silverado 2500 2WD Crew Cab NHTSA No. MC0114
Test Program: NCAP Side Pole Impact Test Test Date: 12/20/2011



	Accelerometer Location			
	ID	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	3417	-150	-616
2	Left Floor Sill	4402	-800	-530
3	A Pillar Sill	4478	-800	-505
4	A Pillar Low	4440	-793	-885
5	A Pillar Mid	4518	-868	-1104
6	B Pillar Sill	3514	-820	-545
7	B Pillar Low	3372	-830	-850
8	B Pillar Mid	3331	-820	-1133
9	Driver Seat Track	3795	-617	-727
10	Engine Top	5145	0	-1192
11	Firewall	4892	0	-1314
12	Right Roof	3312	630	-1942
13	Right Floor Sill	3484	820	-507
14	Rear Floorpan	823	0	-980

Reference:

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

DATA SHEET NO. 7
RIGID POLE LOAD CELL DATA

Test Vehicle: 2012 Chevrolet Silverado 2500 2WD Crew Cab NHTSA No. MC0114
Test Program: NCAP Side Pole Impact Test Test Date: 12/20/2011



254 mm Diameter Rigid Pole

Load Cell Locations	
ID	Height From Impact Surface (mm)
1	182
2	470
3	698
4	986
5	1212
6	1641
7	1854
8	2053

DATA SHEET NO. 8
POST-TEST OBSERVATIONS

Test Vehicle: 2012 Chevrolet Silverado 2500 2WD Crew Cab NHTSA No. MC0114
Test Program: NCAP Side Pole Impact Test Test Date: 12/20/2011

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Driver SID-IIs Dummy
Face	None
Top of Head	Pole
Left Side of Head	Pole
Back of Head	Headrest
Left Shoulder	Door Panel
Upper Torso	Door Panel, Seatback
Lower Torso	Door Panel, Seatback
Left Hip	Door Panel, Seat Cushion
Left Knee	Door Panel

POST-TEST DOOR PERFORMANCE

Description	Struck Side		Non-Struck Side		Rear Hatch/ Other Door
	Front	Rear	Front	Rear	
Remained Closed and Operational	No	No	Yes	Yes	Yes
Total Separation from Vehicle at Hinges or Latches	No	No	No	No	No
Latch or Hinge Systems Pulled Out of Their Anchorages	No	No	No	No	No
Disengaged from Latched Position	No	No	No	No	No
Latch Separated from Striker	No	No	No	No	No
Jammed Shut	Yes	Yes	No	No	No
If Door Opened at Striker, Record Width of Opening at Striker (mm)	N/A	N/A	N/A	N/A	N/A

POST-TEST SEAT PERFORMANCE

Description	Struck Side		Non-Struck Side	
	Front	Rear	Front	Rear
Seat Movement Along Seat Track	No	No	No	No
Seat Disengagement from Floor Pan	No	No	No	No
Seat Back Movement from Initial Position	No	No	No	No
Seat Back Collapse	No	No	No	No

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	No Separation
Sill Separation	None
Windshield Damage	Cracked
Side Window Damage	Left Front Window Broke
Other Notable Effects	None

DATA SHEET NO. 8 (CONTINUED)
POST-TEST OBSERVATIONS

Test Vehicle: 2012 Chevrolet Silverado 2500 2WD Crew Cab NHTSA No. MC0114
 Test Program: NCAP Side Pole Impact Test Test Date: 12/20/2011

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	No			
Side Curtain Airbag	No		No	
Side Torso Airbag	No		No	
Seat Belt Pretensioner	Yes	No	No	
Seat Belt Load Limiter	Yes		No	

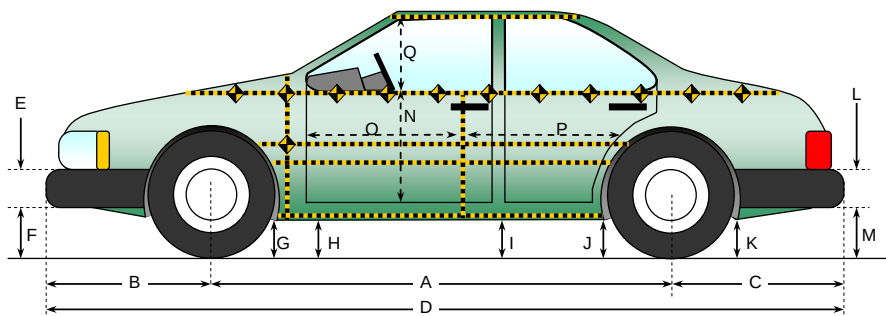
VEHICLE SPEED, VEHICLE ANGLE AT IMPACT, AND IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		1207
Actual Impact Point (Aft of Front Axle)	mm		1209
Horizontal Offset (+forward / -rearward)	mm	+/- 38 of Intended Impact Point	-2
Angle Between Vehicle's Longitudinal Centerline and Line of Forward Motion	Deg	75 +/- 3	75
Trap No. 1 Velocity (Primary)	km/h	31.4 to 33.0	32.0
Trap No. 2 Velocity (Redundant)	km/h	31.4 to 33.0	32.1

DATA SHEET NO. 9 VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2012 Chevrolet Silverado 2500 2WD Crew Cab
Test Program: NCAP Side Pole Impact Test

NHTSA No. MC0114
Test Date: 12/20/2011



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

LEFT SIDE VIEW

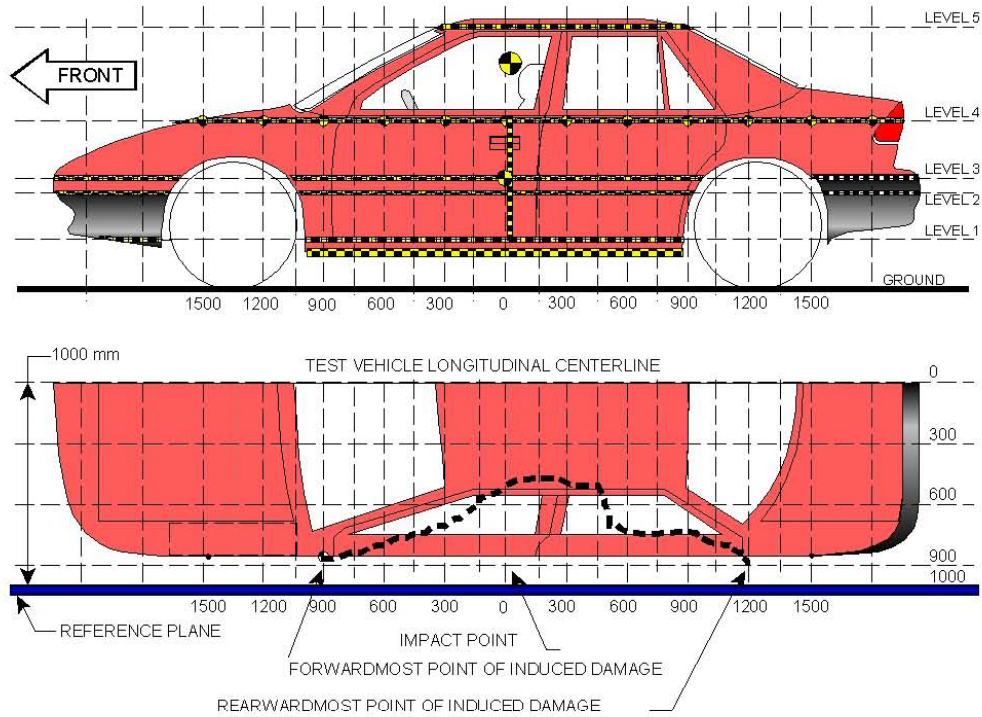
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	3915	3820	95
B	Front Axle to FSOV	995	1030	-35
C	Rear Axle to RSOV	1195	1195	0
D	Total Vehicle Length at Centerline	6105	6045	60
E	Front Bumper Thickness	195	195	0
F	Front Bumper Bottom to Ground	262	281	-19
G	Sill Height at Front Wheel Well	324	303	21
H	Sill Height at Front Door Leading Edge	326	304	22
I	Sill Height at B Pillar	335	329	6
J1	Sill Height at Rear Wheel Well	330	322	8
J2	Pinch Weld Height at Rear Wheel Well	319	317	2
K	Sill Height Aft of Rear Wheel Well	552	580	-28
L	Rear Bumper Thickness	200	200	0
M	Rear Bumper Bottom to Ground	453	502	-49
N	Sill Height to Bottom of Front Window Sill	840	835	5
O	Front Door Leading Edge to Impact CL	671	665	6
P	Rear Door Trailing Edge to Impact CL	1483	1521	-38
Q	Front Window Opening	523	502	21
R	Right Side Length	5250	5284	-34
S	Left Side Length	5250	5005	245
T	Vehicle Width at B-Pillars	2004	1906	98

DATA SHEET NO. 10 **VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2012 Chevrolet Silverado 2500 2WD Crew Cab
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MC0114
 Test Date: 12/20/2011



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

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Height Above Ground (mm)
1	Sill Top	578
2	Mid Door	909
3	Occupant Hip Point	970
4	Window Sill	1264
5	Window Top	1880

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

Test Vehicle: 2012 Chevrolet Silverado 2500 2WD Crew Cab NHTSA No. MC0114
 Test Program: NCAP Side Pole Impact Test Test Date: 12/20/2011

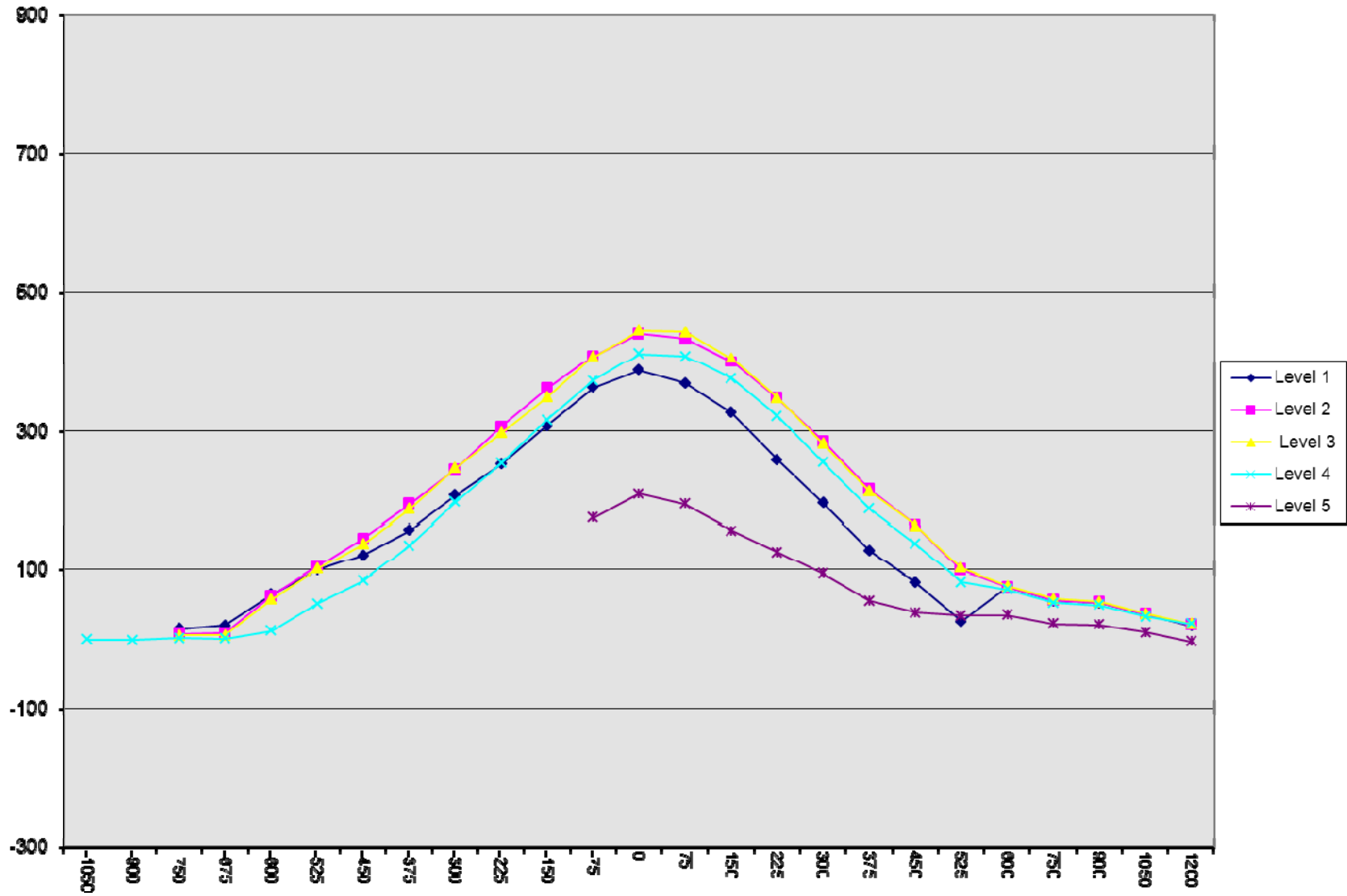
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1050				151					152					1	
-900				151					151					0	
-750	146	94	95	161		162	103	102	164		16	9	7	3	
-675	153	116	120	162		174	126	127	164		21	10	7	2	
-600	162	119	119	161		227	182	177	174		65	63	58	13	
-525	162	117	118	159		262	223	220	211		100	106	102	52	
-450	164	115	117	157		286	261	255	242		122	146	138	85	
-375	165	115	115	155		323	309	302	291		158	194	187	136	
-300	165	114	115	152		372	358	361	349		207	244	246	197	
-225	164	114	112	151		416	420	409	404		252	306	297	253	
-150	165	112	112	149		472	473	461	465		307	361	349	316	
-75	165	110	111	148	396	528	520	520	521	571	363	410	409	373	175
0	165	110	110	146	392	553	552	557	559	601	388	442	447	413	209
75	165	110	109	146	389	534	545	554	556	583	369	435	445	410	194
150	164	110	109	145	384	490	511	515	521	541	326	401	406	376	157
225	164	109	108	144	384	422	456	456	465	510	258	347	348	321	126
300	166	109	108	144	381	362	394	389	399	476	196	285	281	255	95
375	164	109	108	143	380	293	325	321	331	436	129	216	213	188	56
450	165	108	107	142	380	247	272	271	280	419	82	164	164	138	39
525	166	108	106	140	378	193	208	209	223	413	27	100	103	83	35
600	169	109	108	141	378	245	185	185	213	414	76	76	77	72	36
750	169	108	107	139	376	225	165	166	192	399	56	57	59	53	23
900	171	108	107	139	374	224	162	162	189	396	53	54	55	50	22
1050	174	110	109	139	373	211	147	147	173	384	37	37	38	34	11
1200	178	111	110	137	373	198	133	133	160	371	20	22	23	23	-2

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 the test based on an estimated impact point. The final distance from 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: 2012 Chevrolet Silverado 2500 2WD Crew Cab
Test Program: NCAP Side Pole Impact Test

NHTSA No. MC0114
Test Date: 12/20/2011



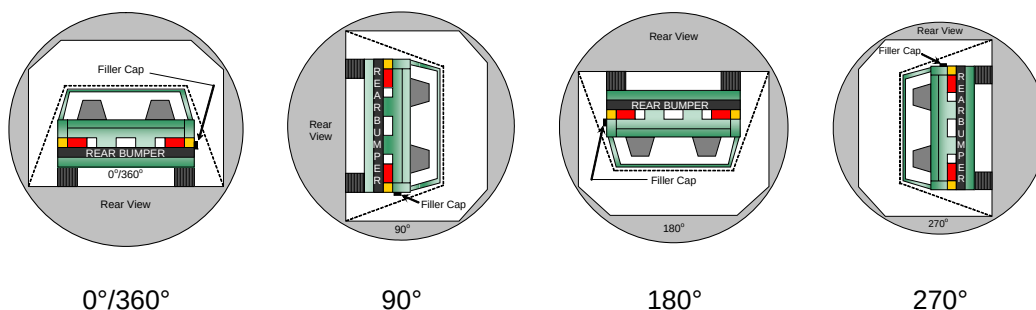
DATA SHEET NO. 11
FMVSS 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2012 Chevrolet Silverado 2500 2WD Crew Cab NHTSA No. MC0114
 Test Program: NCAP Side Pole Impact Test Test Date: 12/20/2011

Test Time: 10:00 am Temperature: 21.5° 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°	166	300	466
90° to 180°	150	300	450
180° to 270°	134	300	434
270° to 360°	159	300	459

FMVSS 301 ROLLOVER SPILLAGE TABLE (units in ounces)

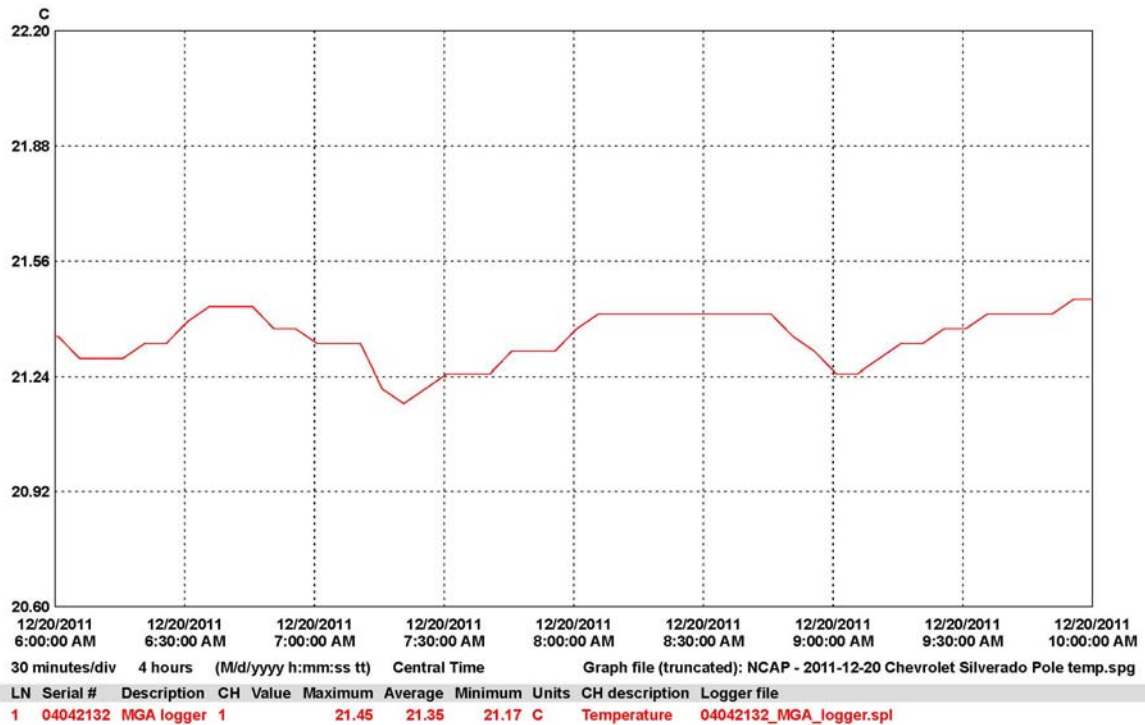
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eight Minute
0° to 90°	0	0	0	0
90° to 180°	0	0	0	0
180° to 270°	0	0	0	0
270° to 360°	0	0	0	0

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: 2012 Chevrolet Silverado 2500 2WD Crew Cab NHTSA No. MC0114
 Test Program: NCAP Side Pole Impact Test Test Date: 12/20/2011



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



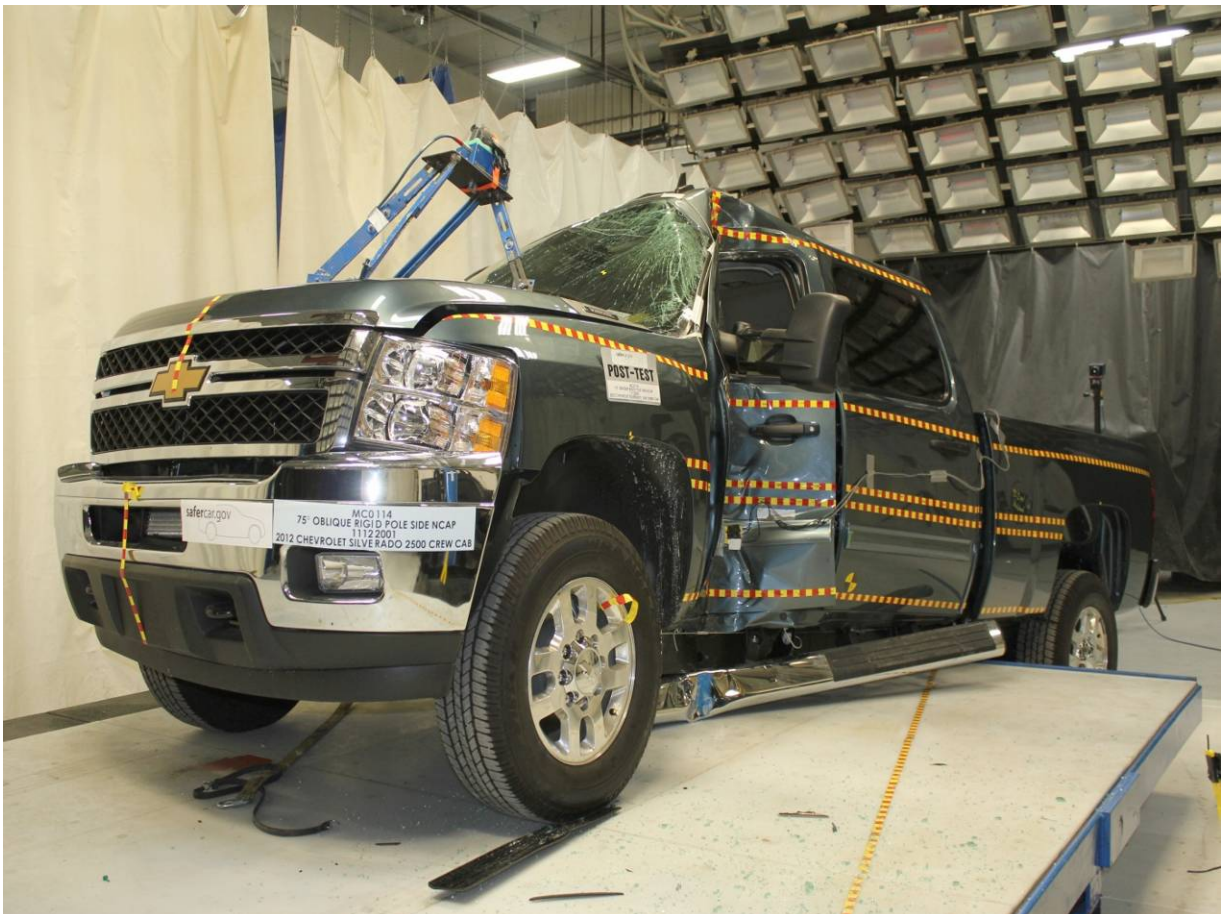
Pre-Test Frontal View of Test Vehicle



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 Area



Post-Test Overhead View of Test Area



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 Impact Location



Pre-Test Front Close-Up View of Dummy Head and Chest



Post-Test Front Close-Up View of Dummy



Pre-Test Left Side View of Dummy Showing Belt and Chalking



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 Front View of Seat Back Prior to Dummy Positioning



Pre-Test Front Close-Up View of Dummy Head and Shoulders in Relation to Head Restraint



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



Pre-Test Overhead View of Dummy Thighs on Seat Pan



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



Pre-Test Left Side 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



Pre-Test Left Side View of Steering Wheel



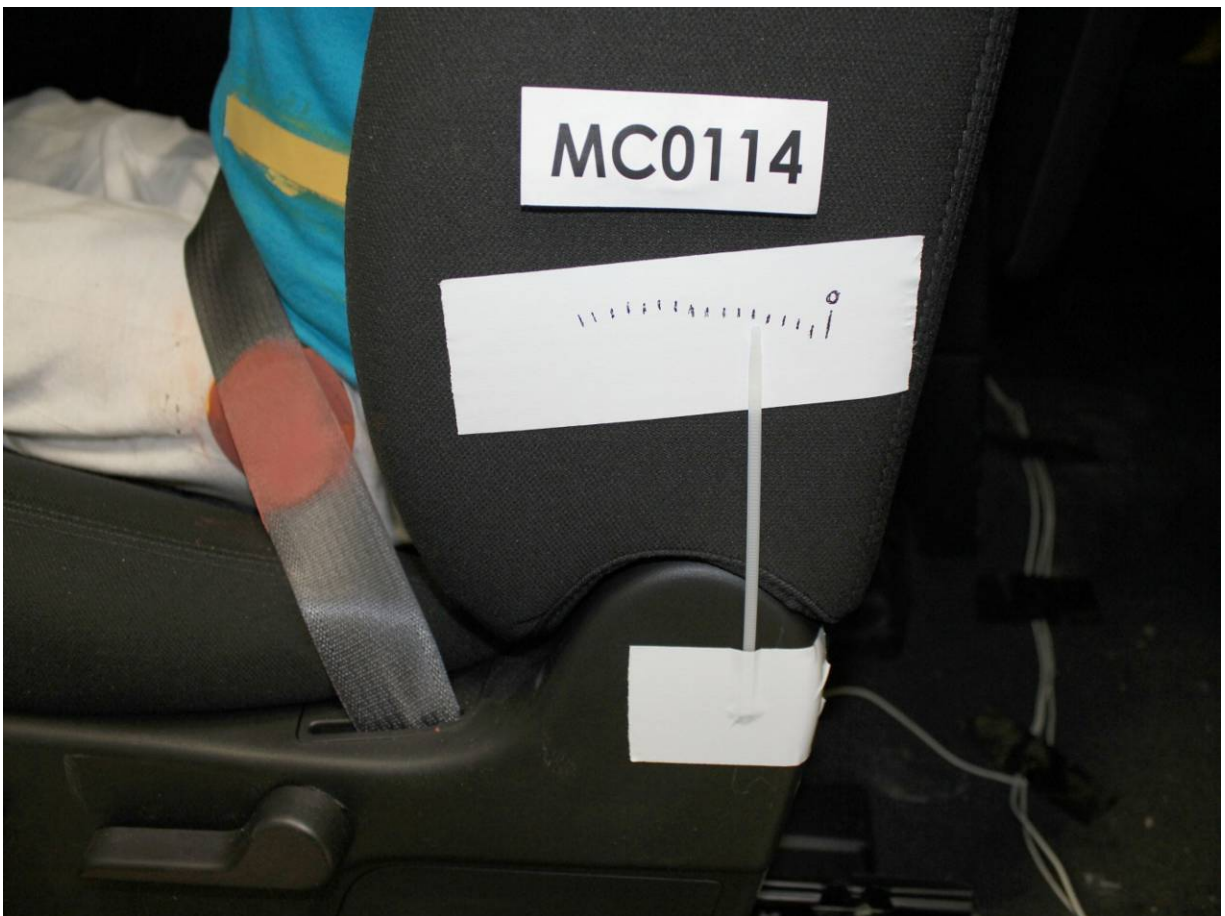
Pre-Test View of Disengaged Parking Brake



Pre-Test View of Parking Brake



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



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



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



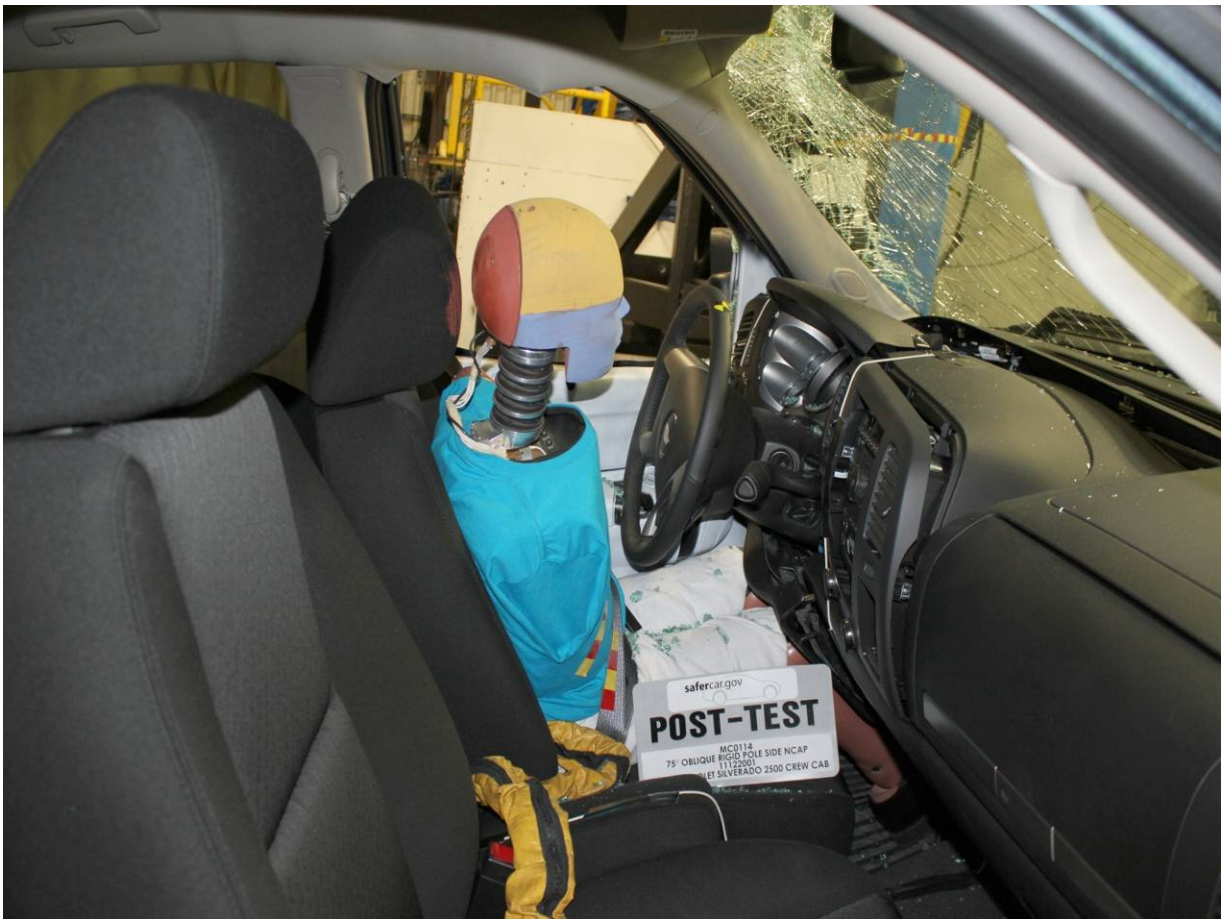
Pre-Test Dummy and Door Clearance View



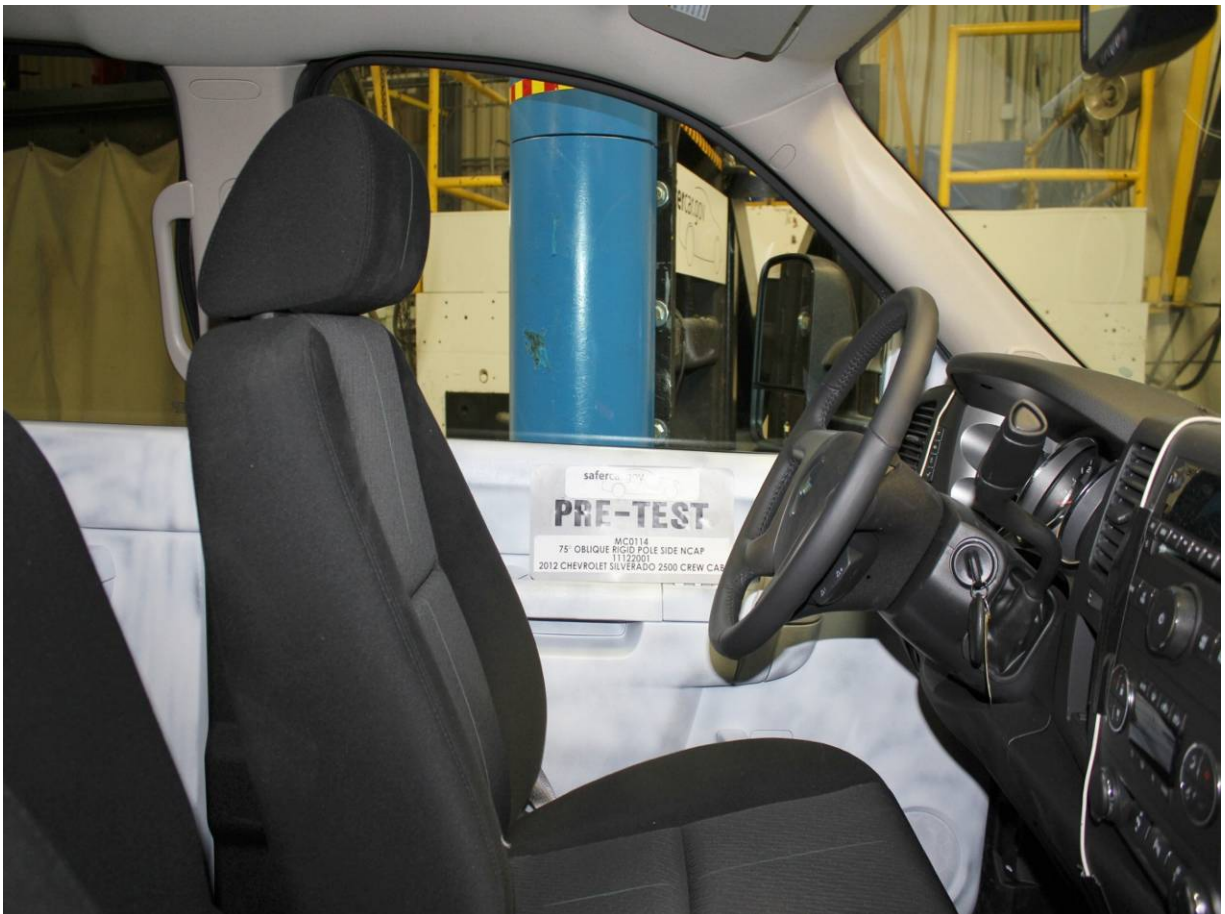
Post-Test Dummy and Door Clearance View



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



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



Pre-Test Inner Door Panel View



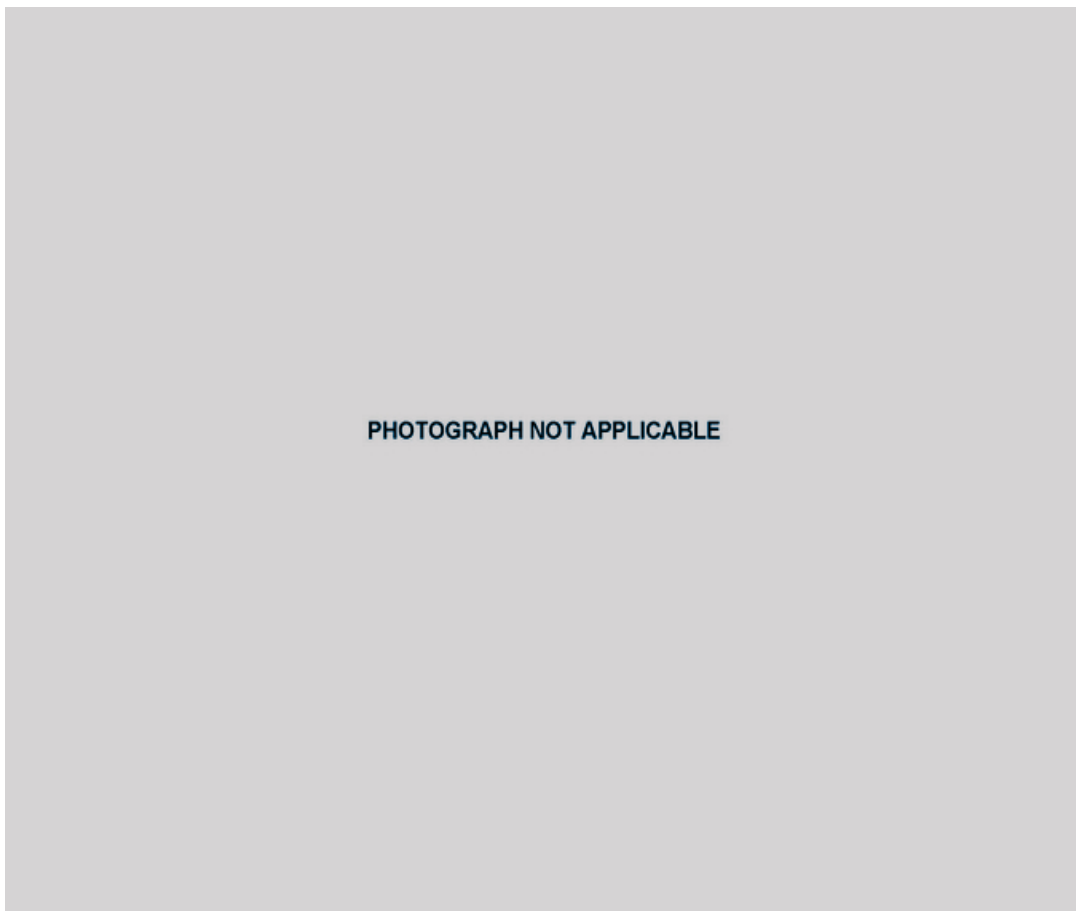
Post-Test Inner Door Panel View Showing Dummy Contact Location



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



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



Post-Test Dummy Close-Up Head Contact with Side Air Bag View



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



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

PHOTOGRAPH NOT APPLICABLE

Post-Test Dummy Close-Up Torso Contact with Side Air Bag View



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

PHOTOGRAPH NOT APPLICABLE

Post-Test Dummy Close-Up Pelvis Contact with Side Air Bag View



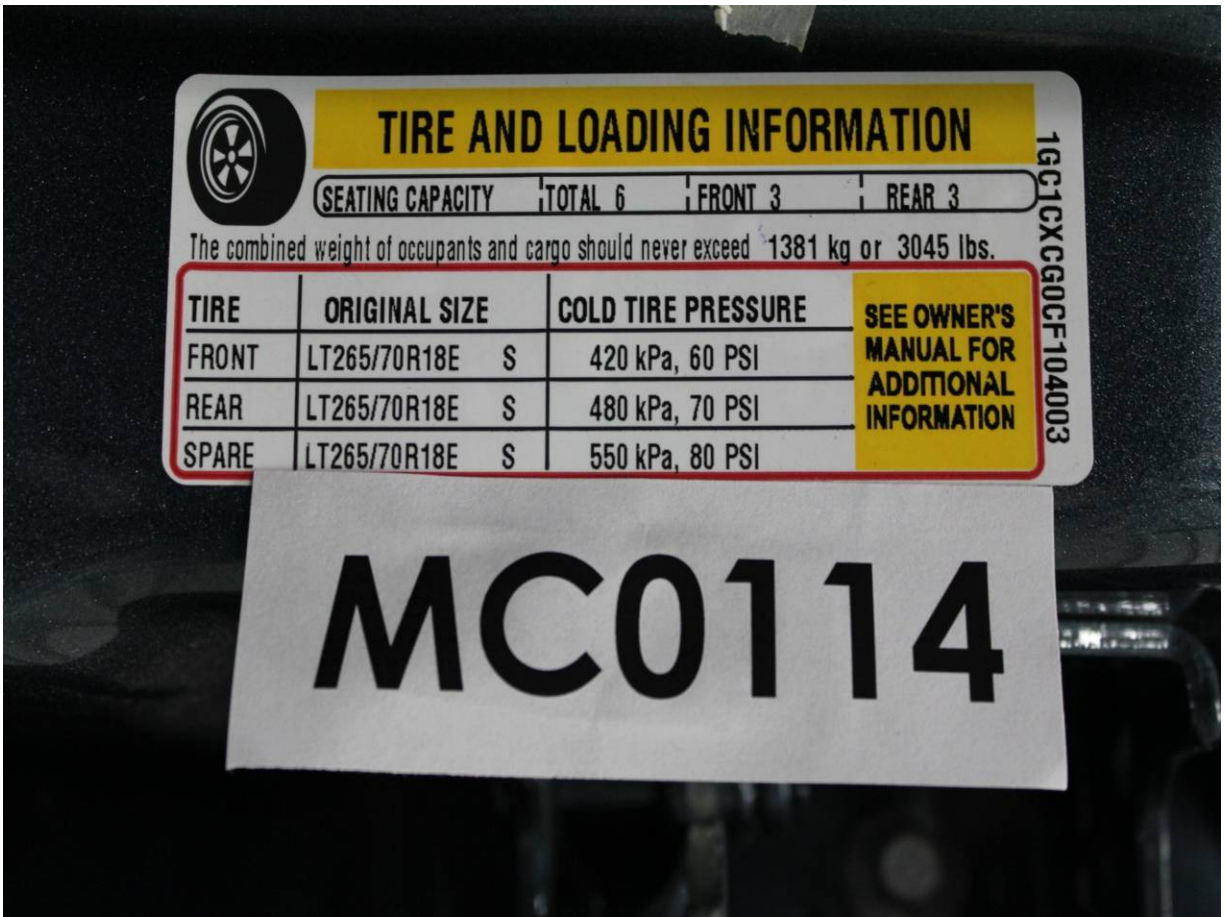
Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



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 or Label



Pre-Test Pole Barrier Front View



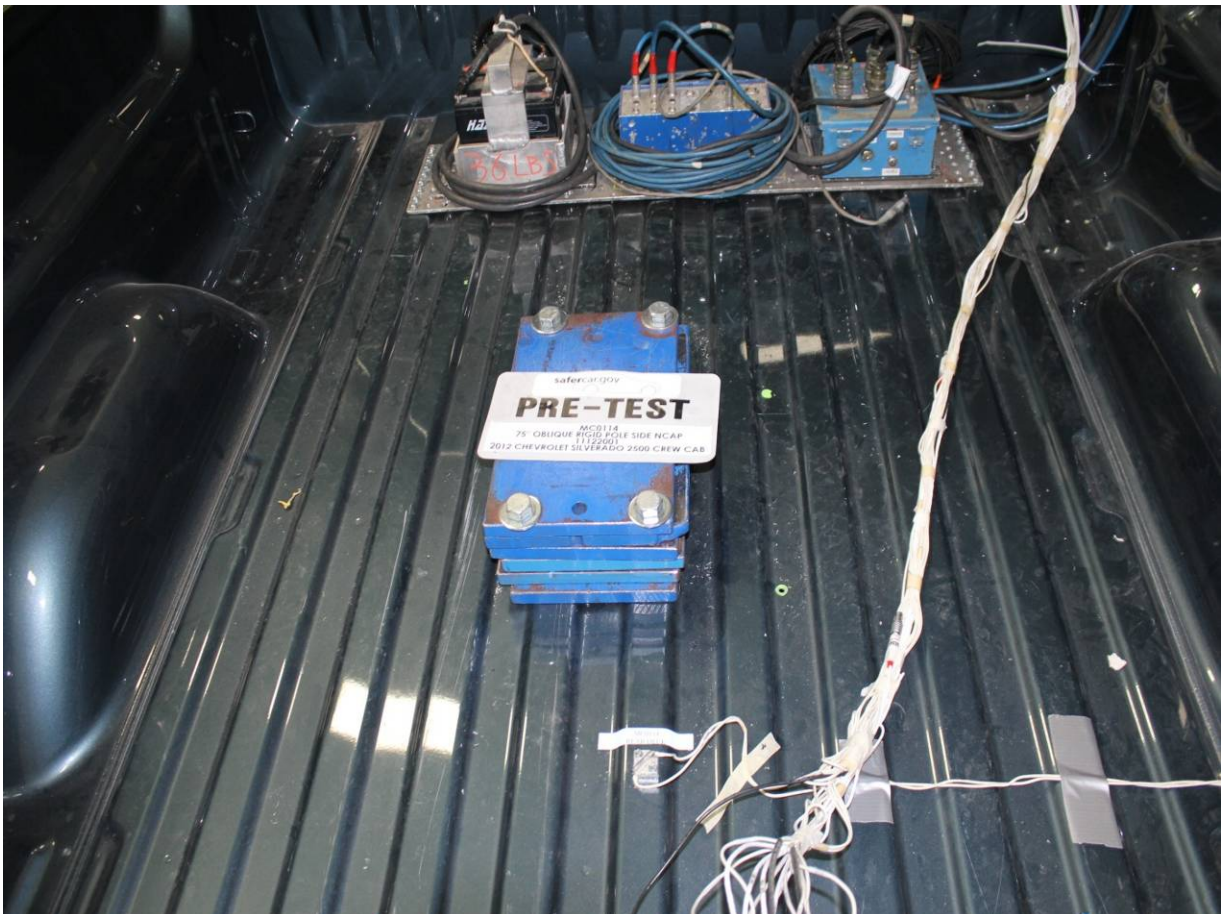
Post-Test Pole Barrier Front View



Pre-Test Pole Barrier Side View



Post-Test Pole Barrier Side View



Pre-Test Ballast View



Post-Test Primary and Redundant Speed Trap Read-Out



FMVSS No. 301 Static Rollover 0 Degrees



FMVSS No. 301 Static Rollover 90 Degrees



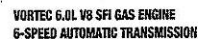
FMVSS No. 301 Static Rollover 180 Degrees



FMVSS No. 301 Static Rollover 270 Degrees



FMVSS No. 301 Static Rollover 360 Degrees



EPA Fuel Economy Estimates



Frontal Crash	Driver 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 Rear seat	Not Rated
Star ratings based on the risk of injury in a side impact.		
Rollover		★ ★ ★
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

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G1000 General Motors LLC
GALAXY 3000 7000 9000 9000 9000 9000

CHEVROLET/BUICK CADILLAC/OLDSMOBILE/COAST COAST
DEALER NO 17366
FIVE, ADDRESS
RUMBLE, USA
VIN 1GCTCXC60C0F104003
DEALER TO WHICH DELIVERED
RIDGEMAN CHEVROLET/INC.
17300 S TORRENCE AVE
LANSING, IL 60438-1350

FF
2GA1551907

Head Restraints

Front Seats

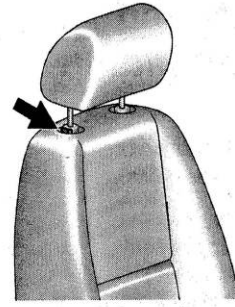
The front seats have adjustable head restraints in the outboard seating positions.

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.



The height of the head restraint can be adjusted. Pull the head restraint up to raise it. Try to move the head restraint to make sure that it is locked in place.

To lower the head restraint, press the button, located on the top of the seatback, and push the restraint down. Try to move the head restraint after the button is released to make sure that it is locked in place.

Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

The front seat outboard head restraints are not designed to be removed.

Rear Seats

The rear seat has adjustable headrests in the outboard seating positions.

The height of the headrest can be adjusted. Pull the headrest up to raise it. To lower the headrest, push down on the headrest.

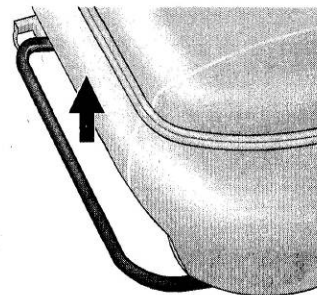
Rear outboard headrests are not designed to be removed.

Front Seats

Seat Adjustment

WARNING

You can lose control of the vehicle if you try to adjust a manual driver seat while the vehicle is moving. The sudden movement could startle and confuse you, or make you push a pedal when you do not want to. Adjust the driver seat only when the vehicle is not moving.



Split Bench or Bucket Seat

To adjust the seat:

1. Lift the bar to unlock the seat.
2. Slide the seat to the desired position and release the bar.
3. Try to move the seat back and forth to be sure the seat is locked in place.

Head Restraint Use and Adjustment Information from Vehicle Owner's Manual



Post-Test Dummy Knee Contact with Vehicle Interior View

APPENDIX B

VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS
Driver Dummy Instrumentation Plots

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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
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Figure No. 9.	Driver Iliac Wing Force on Impact Side (Y) vs. Time	B-3
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Figure No. 11.	Driver Total Pelvis Force on Impact Side (Y) vs. Time	B-3

The following additional data for this test can be obtained from the Research and Development section of the NHTSA website. The website can be found at
www.NHTSA.dot.gov

Additional Driver Dummy Instrumentation Data

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)

Vehicle Instrumentation Data

Vehicle Center of Gravity Acceleration (X)

Vehicle Center of Gravity Acceleration (Y)

Vehicle Center of Gravity Acceleration (Z)

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 Hip 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)

Pole Instrumentation Data

Load Cell Pole Barrier #1 Force (Y)

Load Cell Pole Barrier #2 Force (Y)

Load Cell Pole Barrier #3 Force (Y)

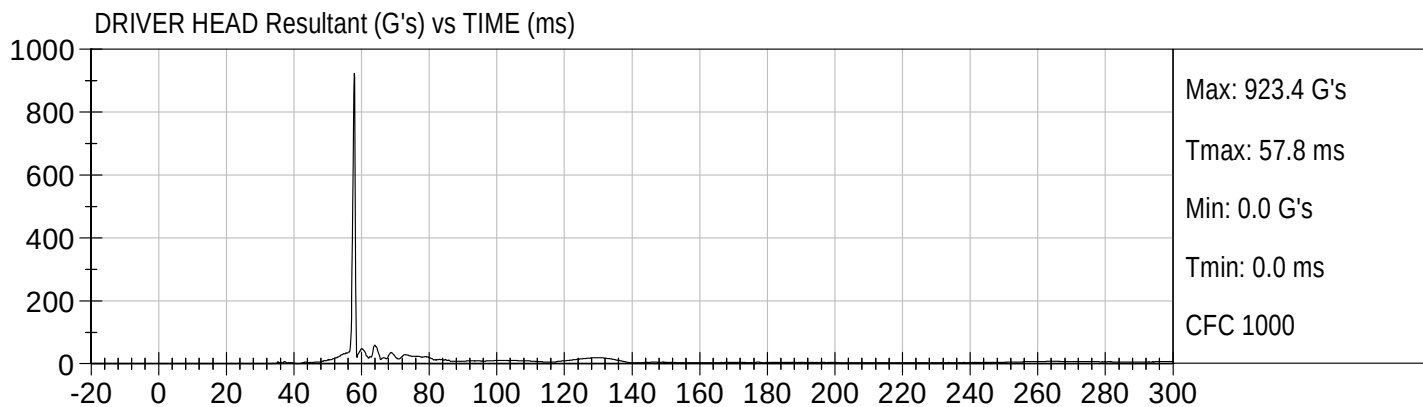
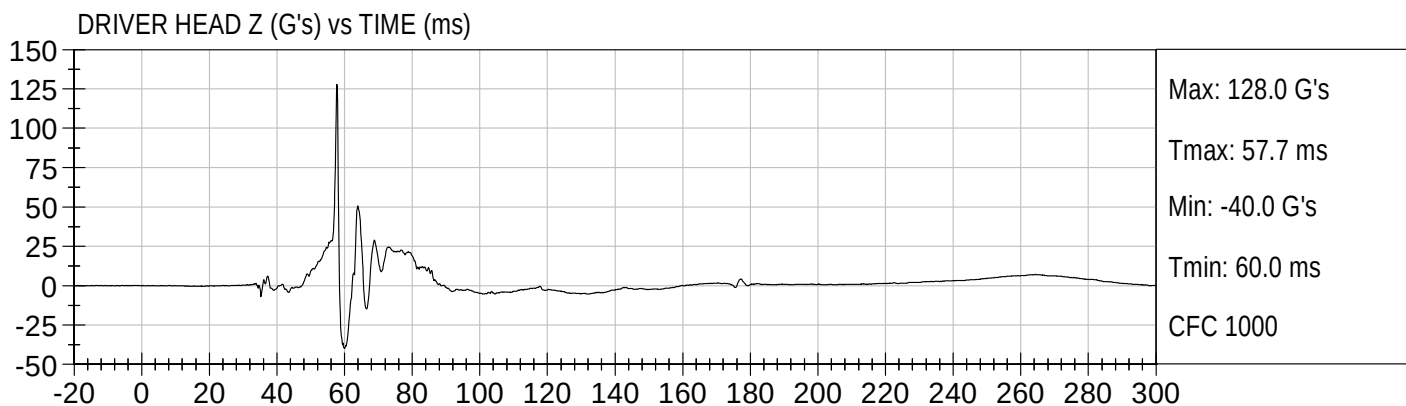
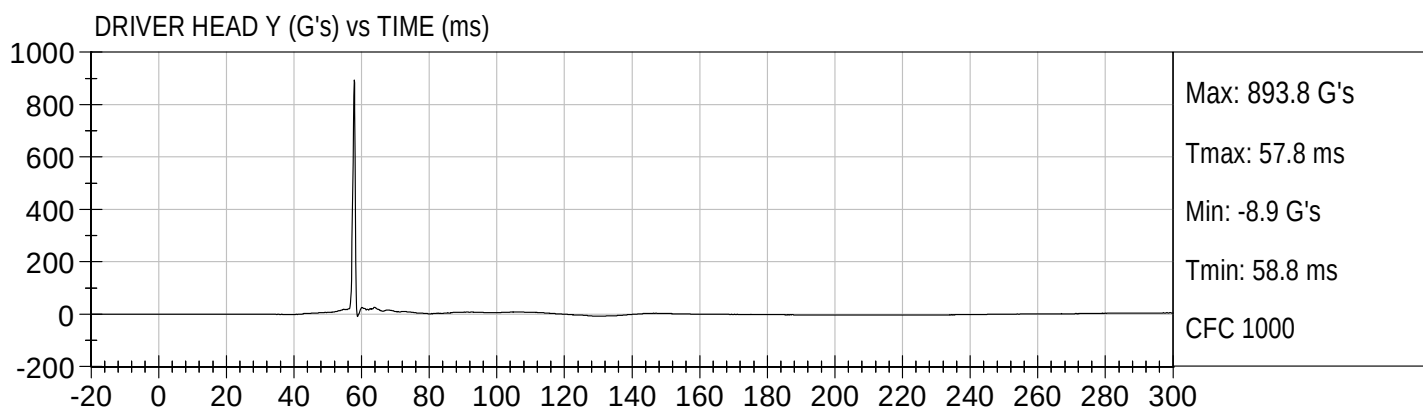
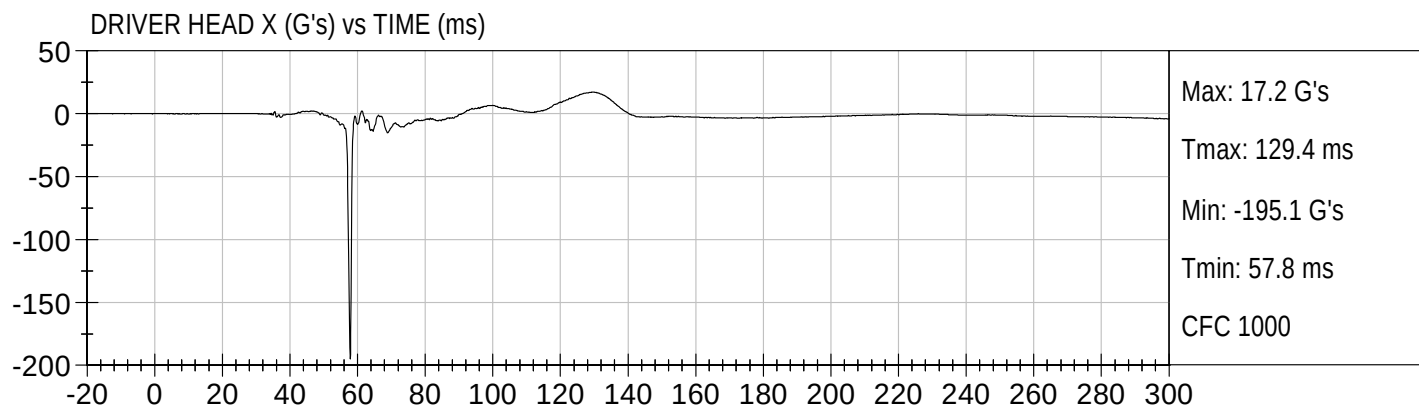
Load Cell Pole Barrier #4 Force (Y)

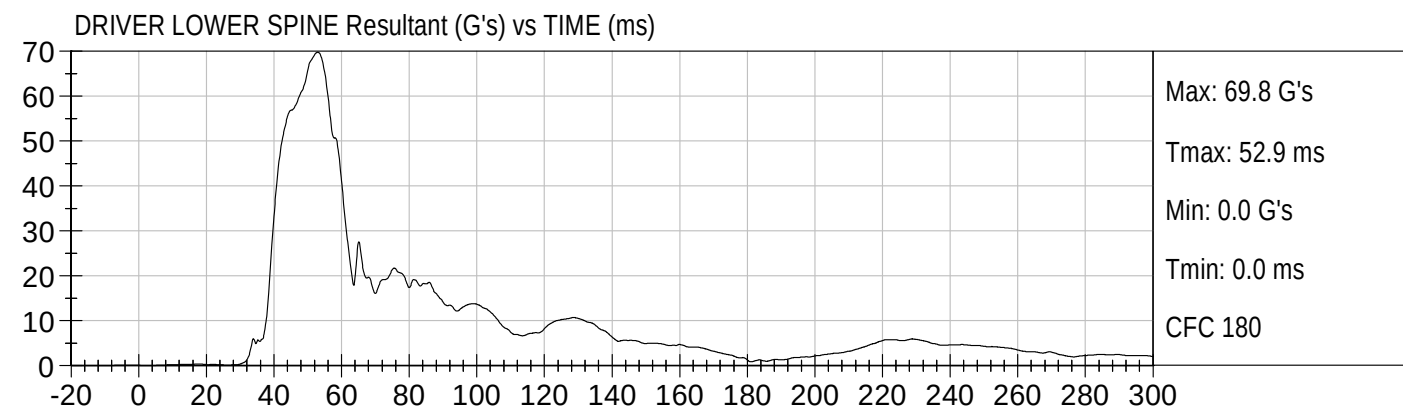
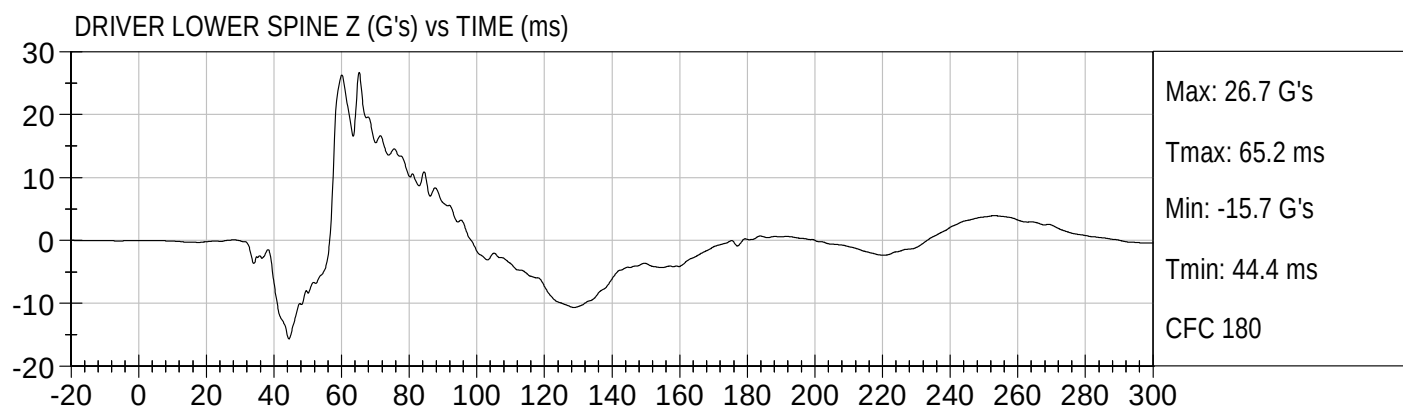
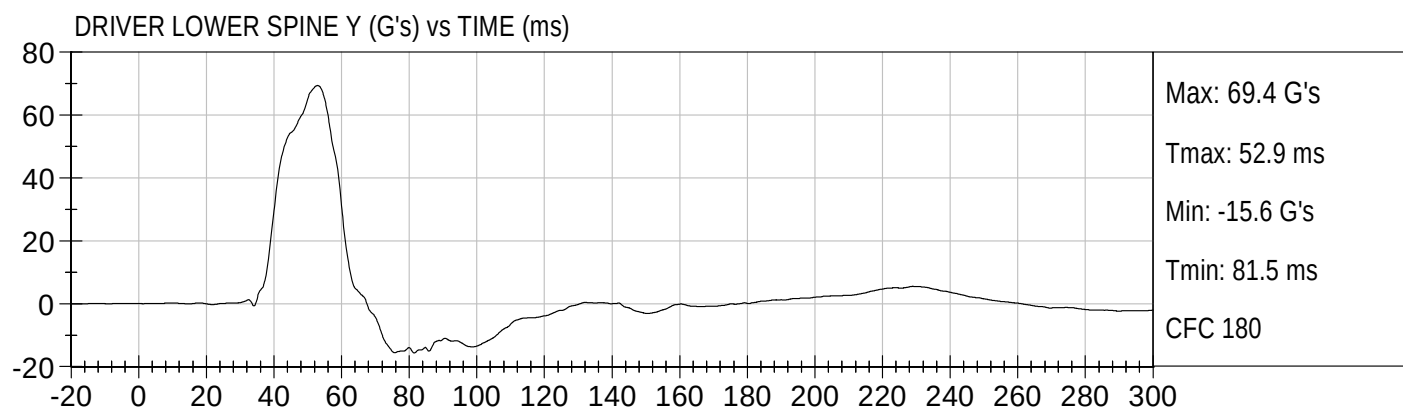
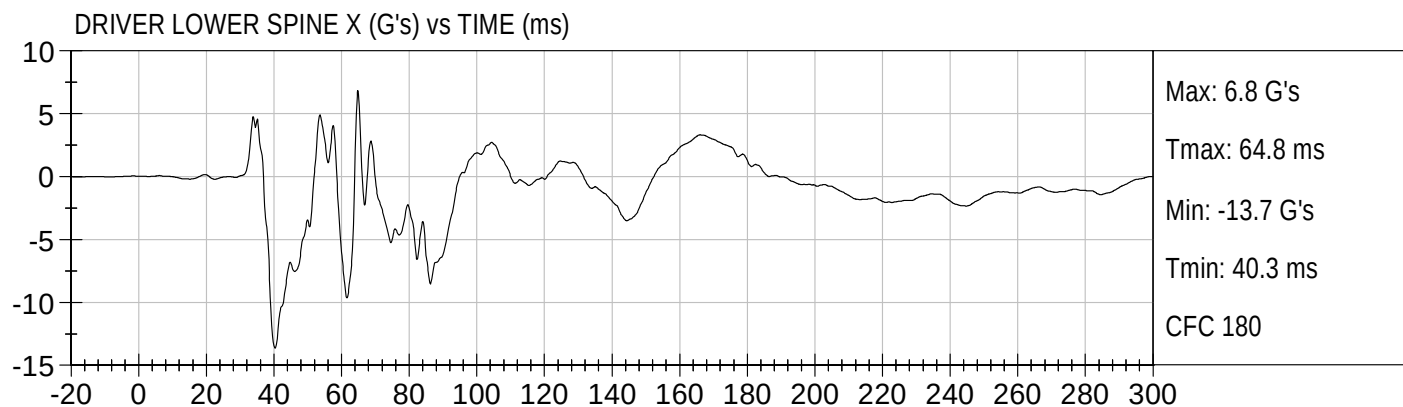
Load Cell Pole Barrier #5 Force (Y)

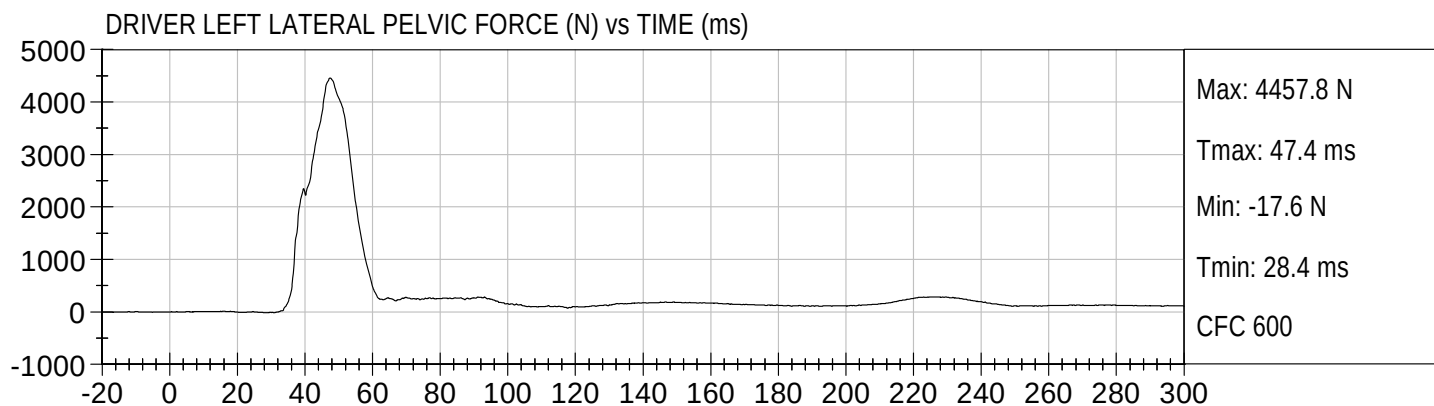
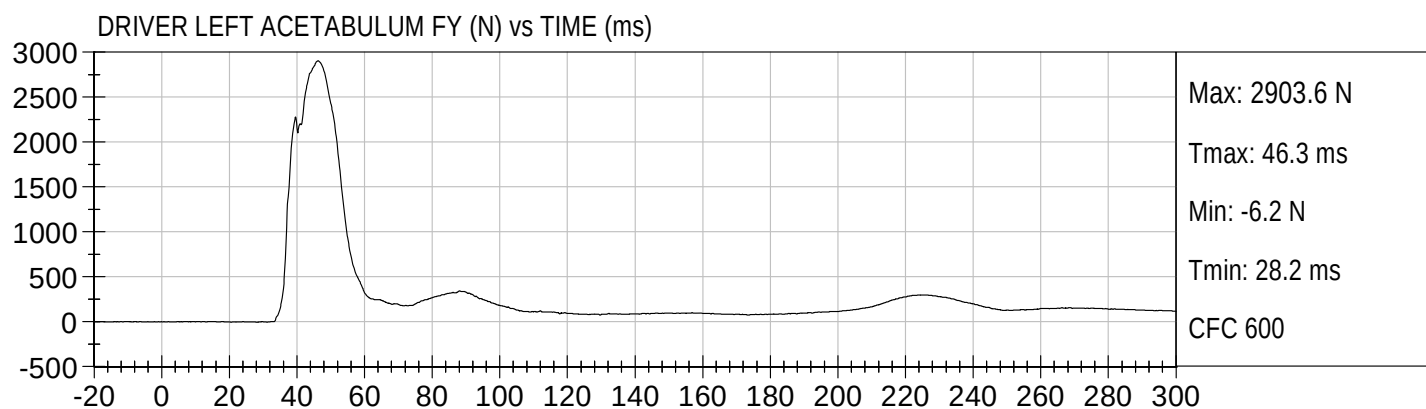
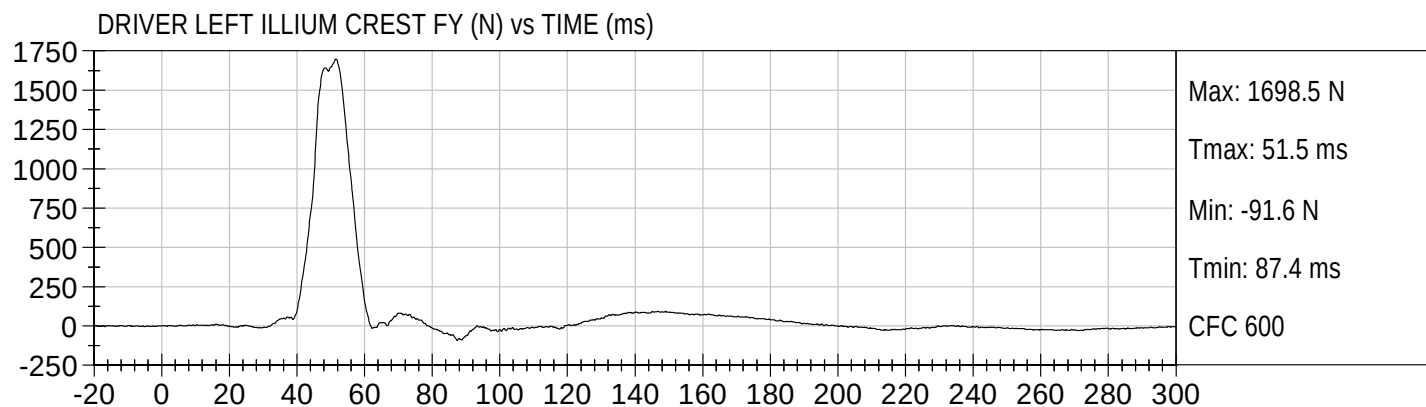
Load Cell Pole Barrier #6 Force (Y)

Load Cell Pole Barrier #7 Force (Y)

Load Cell Pole Barrier #8 Force (Y)







APPENDIX C

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

SID-IIsD External Measurements
SN: 296

No.	Name	Spec. (mm)	Result	Pass/Fail
A	Sitting Height	772 - 788	784	Pass
B	Shoulder Pivot Height	437 - 453	442	Pass
C	H-point Height	79 - 89	83	Pass
D	H-point from Seatback	141 - 151	145	Pass
E	Shoulder Pivot from Backline	97 - 107	99	Pass
F	Thigh Clearance	119 -135	121	Pass
G	Head Breadth	140 - 148	142	Pass
H	Head Back from Backline	40 - 46	45	Pass
I	Head Depth	178 - 188	180	Pass
J	Head Circumference	541 - 551	548	Pass
K	Buttock to Knee Length	514 - 540	535	Pass
L	Popliteal Height	343 - 369	358	Pass
M	Knee Pivot to Floor Height	392 - 409	404	Pass
N	Buttock Popliteal Length	416 - 442	435	Pass
O	Chest Depth w/o Jacket	195 - 211	206	Pass
P	Foot Length	216 - 232	219	Pass
Q	Hip Breadth (w/ pelvic plugs)	313 - 323	316	Pass
R	Arm Length	249 - 259	250	Pass
S	Knee Joint to Seatback	477 - 493	481	Pass
V	Shoulder Width	341 - 357	346	Pass
W	Foot Width	78 - 94	85	Pass
Y	Chest Circumference w/ jacket	851 - 881	870	Pass
Z	Waist Circumference	761 - 791	772	Pass

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

ATD Serial No: 296

Test ID: D114161

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	20.7	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Peak Resultant Acceleration	G's	115 to 137	130	Pass
Peak Longitudinal Acceleration	G's	+/- 15	4.3	Pass
Unimodal	N/A	<15%	Yes	Pass
Overall Test Results				Pass



Laboratory Technician

12/13/11
Test Date

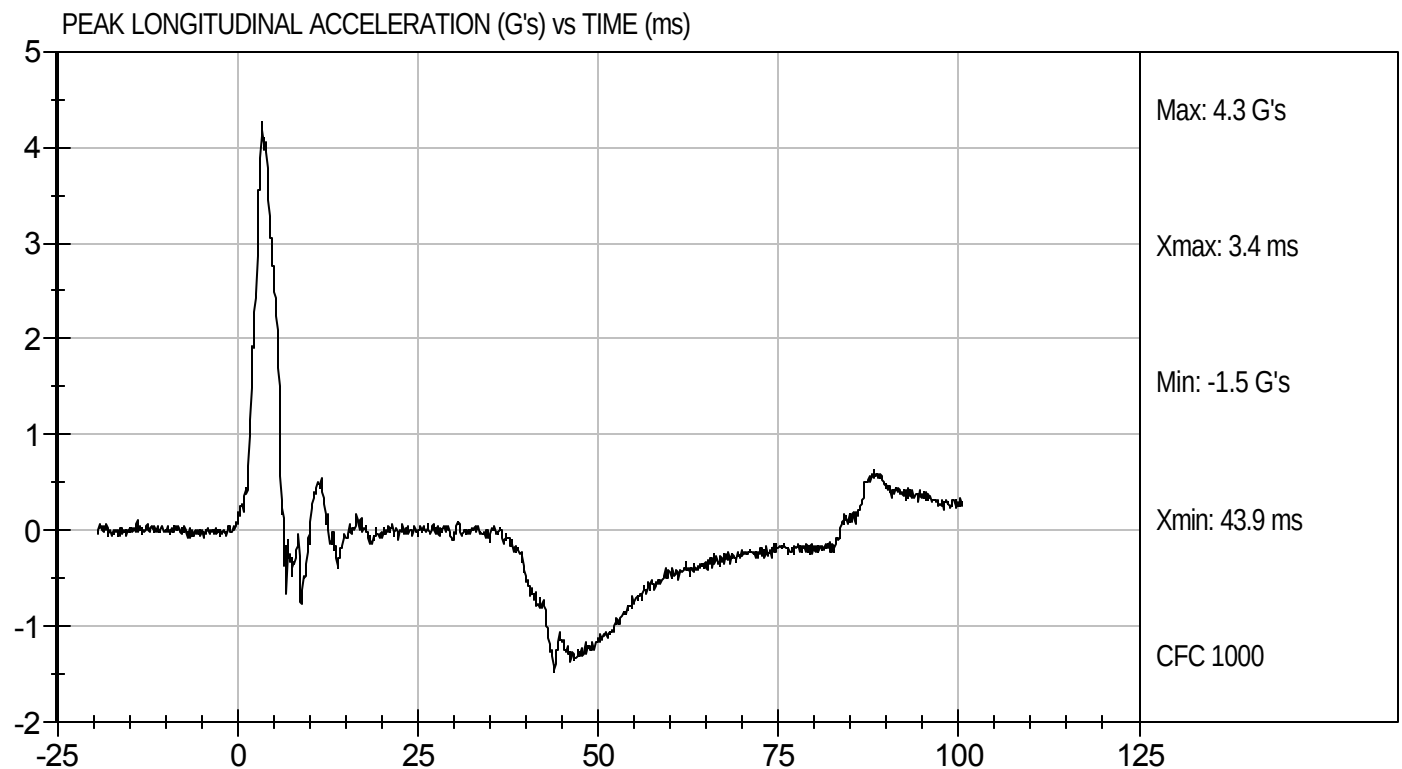
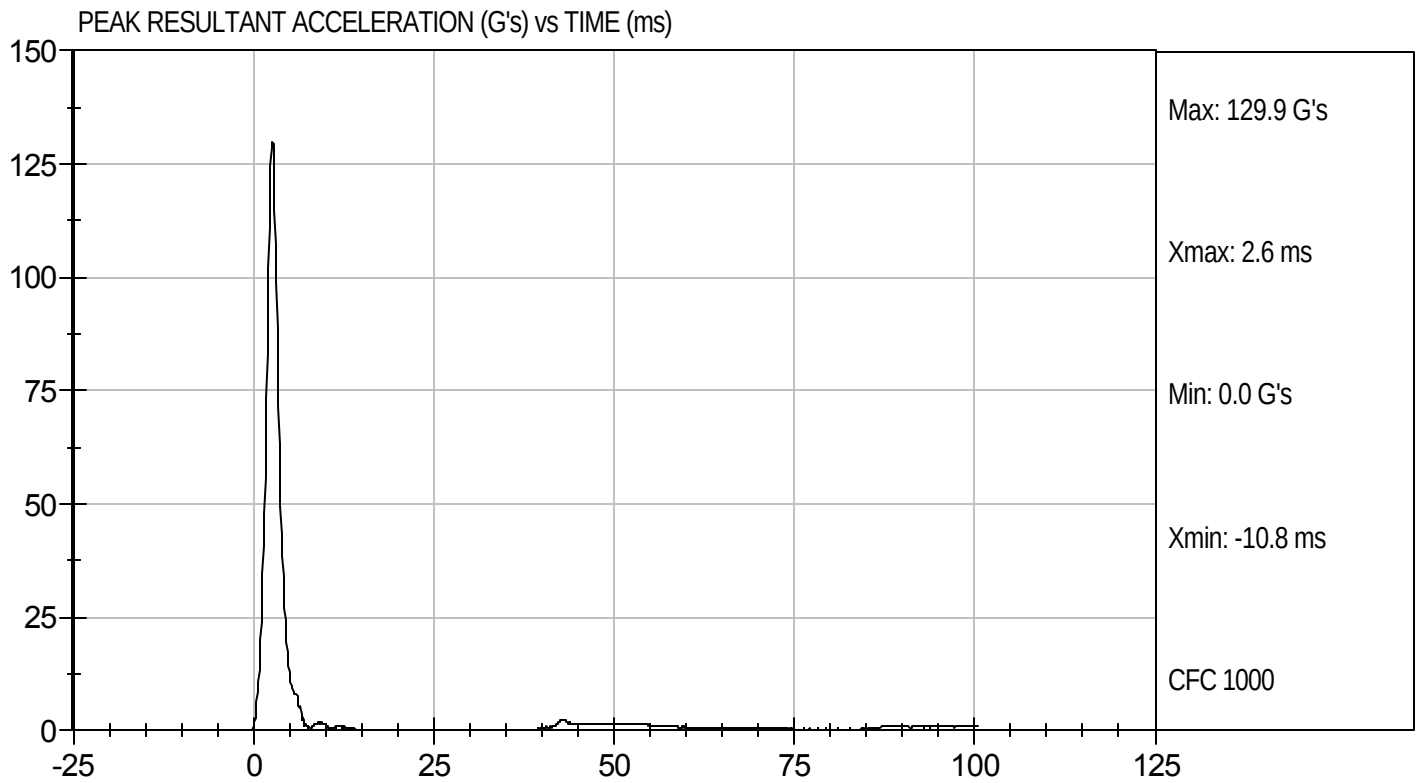


Approved By



Test Desc: Head Drop
Component ID: D114161

Test Date: 12/13/11
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: D114162

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	20.9	Pass
Humidity		%	10 to 70	23	Pass
Impact Velocity		m/s	5.51 to 5.63	5.58	Pass
Delta Velocity	10 ms	m/s	2.20 to 2.80	2.45	Pass
	15 ms	m/s	3.30 to 4.10	3.49	Pass
	20 ms	m/s	4.40 to 5.40	4.62	Pass
	25 ms	m/s	5.40 to 6.10	5.47	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	60	Pass
Maximum Occipital Condyle Moment during Rotation Interval Nm			-44 to -36	-40	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	117	Pass
Overall Test Results				Pass	


 Laboratory Technician

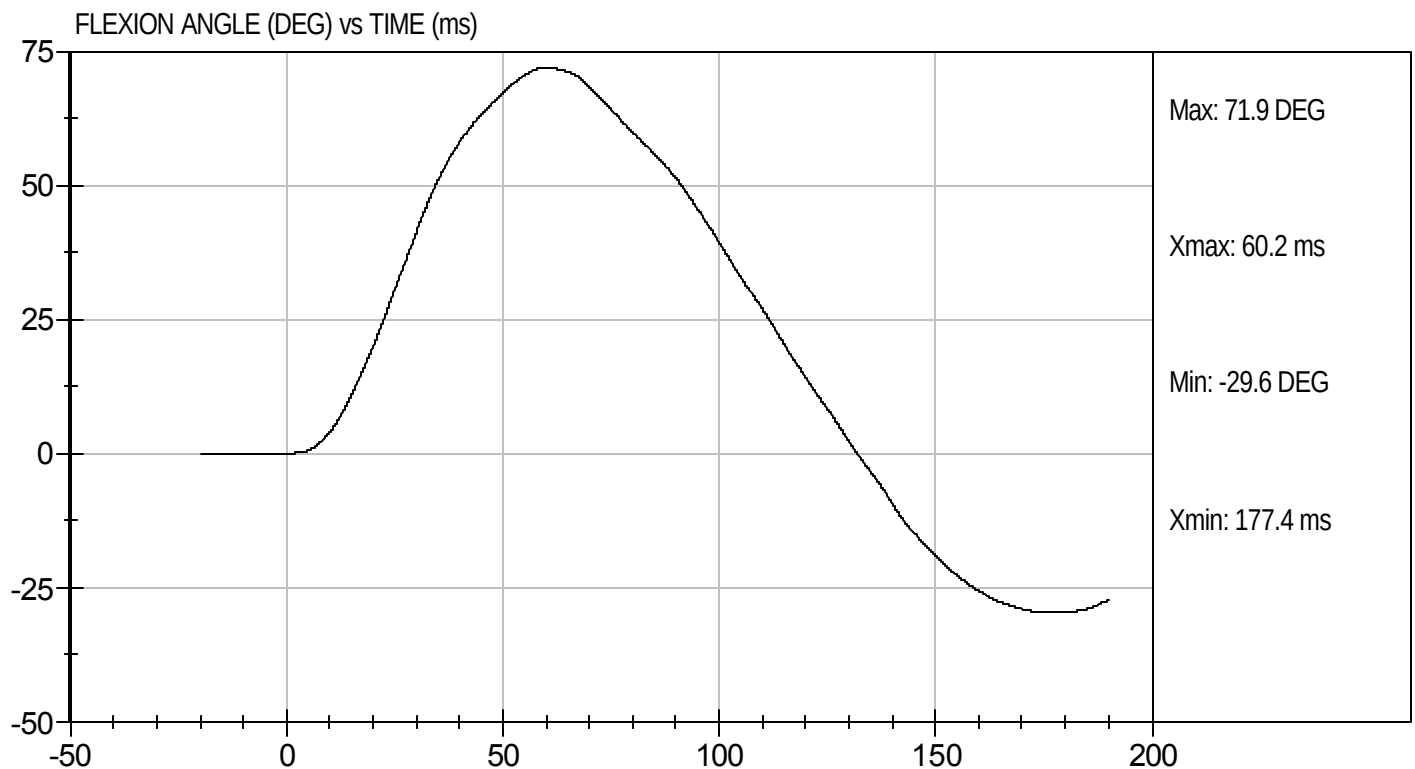
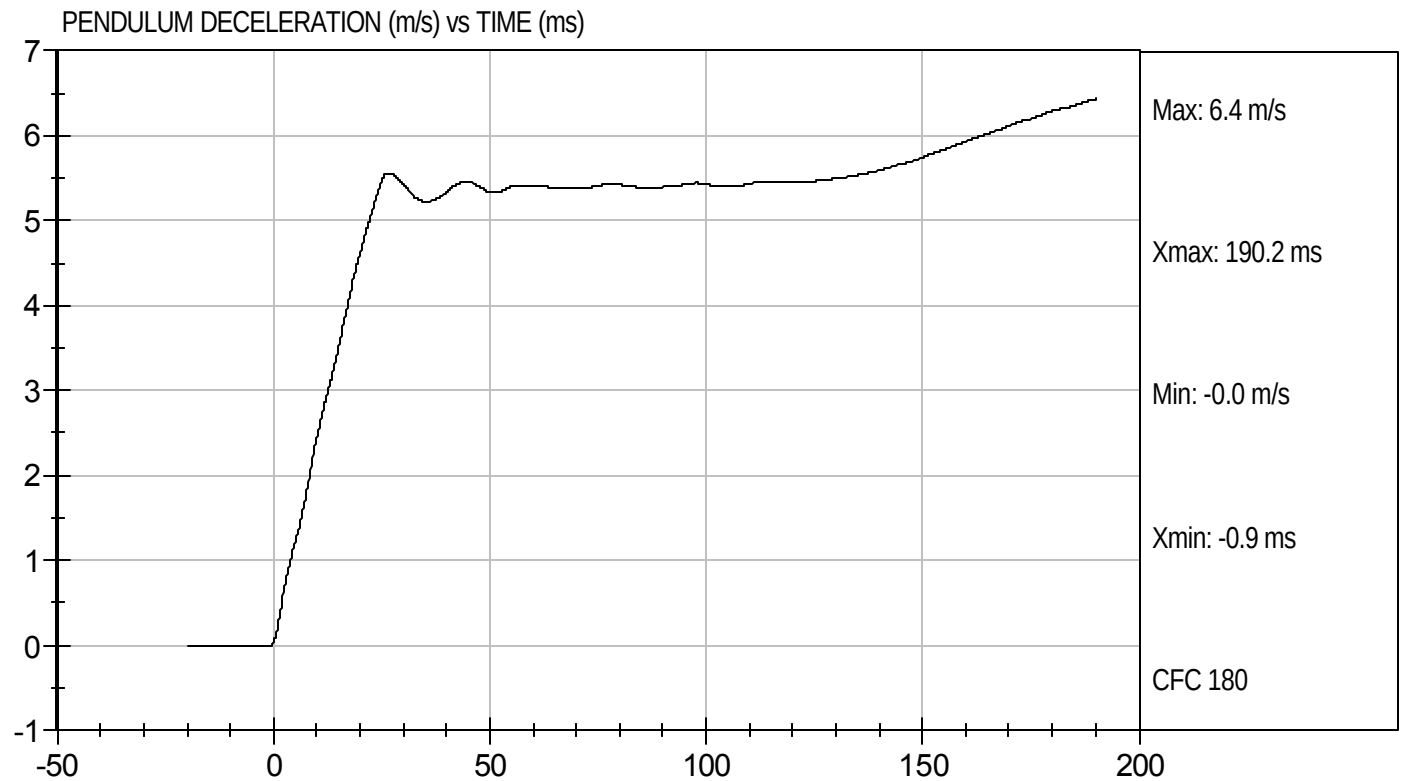
12/13/11
 Test Date


 Approved By



Test Desc: Neck Bending
Component ID: D114162

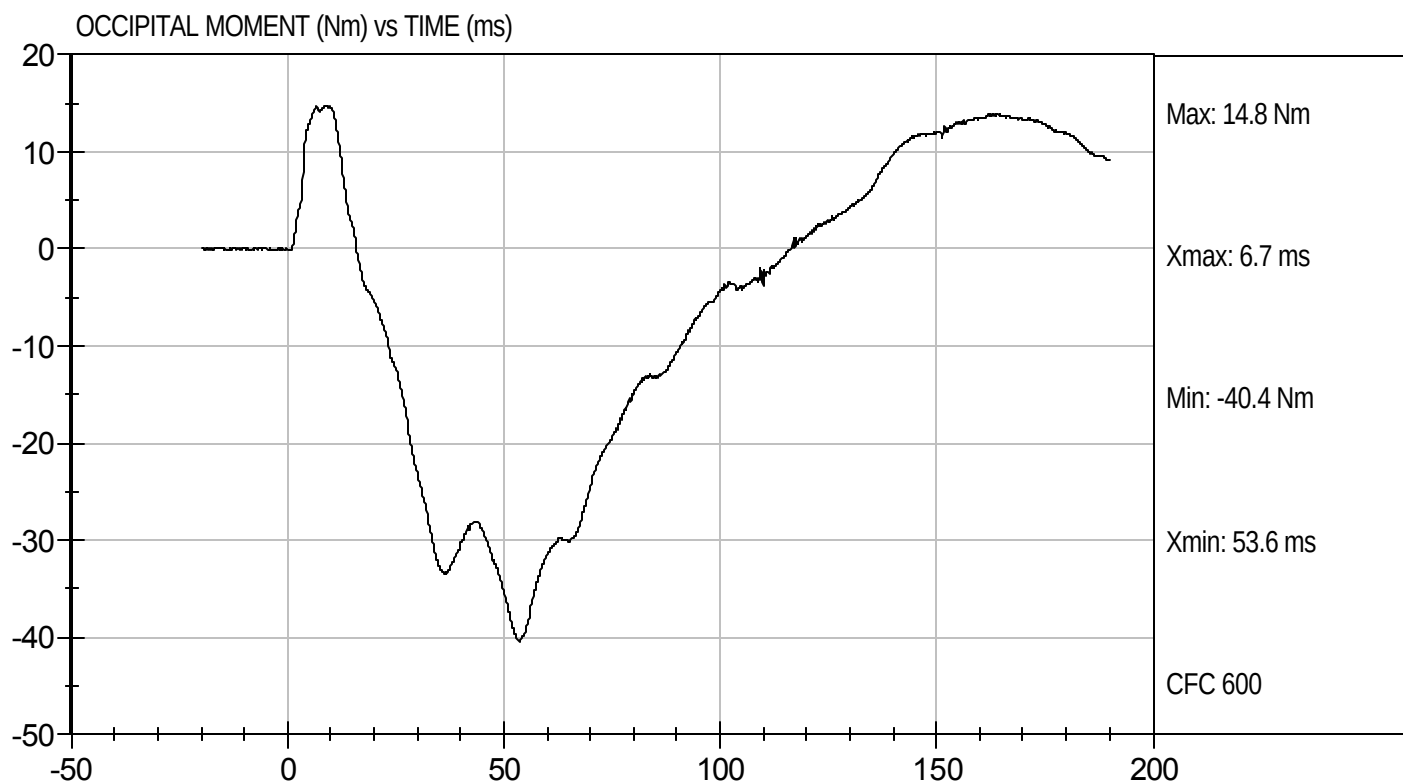
Test Date: 12/13/11
Velocity: 18.31 ft/s, 5.58 m/s





Test Desc: Neck Bending
Component ID: D114162

Test Date: 12/13/11
Velocity: 18.31 ft/s, 5.58 m/s



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

ATD Serial No: 296

Test ID: D114163

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	20.8	Pass
Laboratory Relative Humidity	%	10 to 70	23	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	31	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	19	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

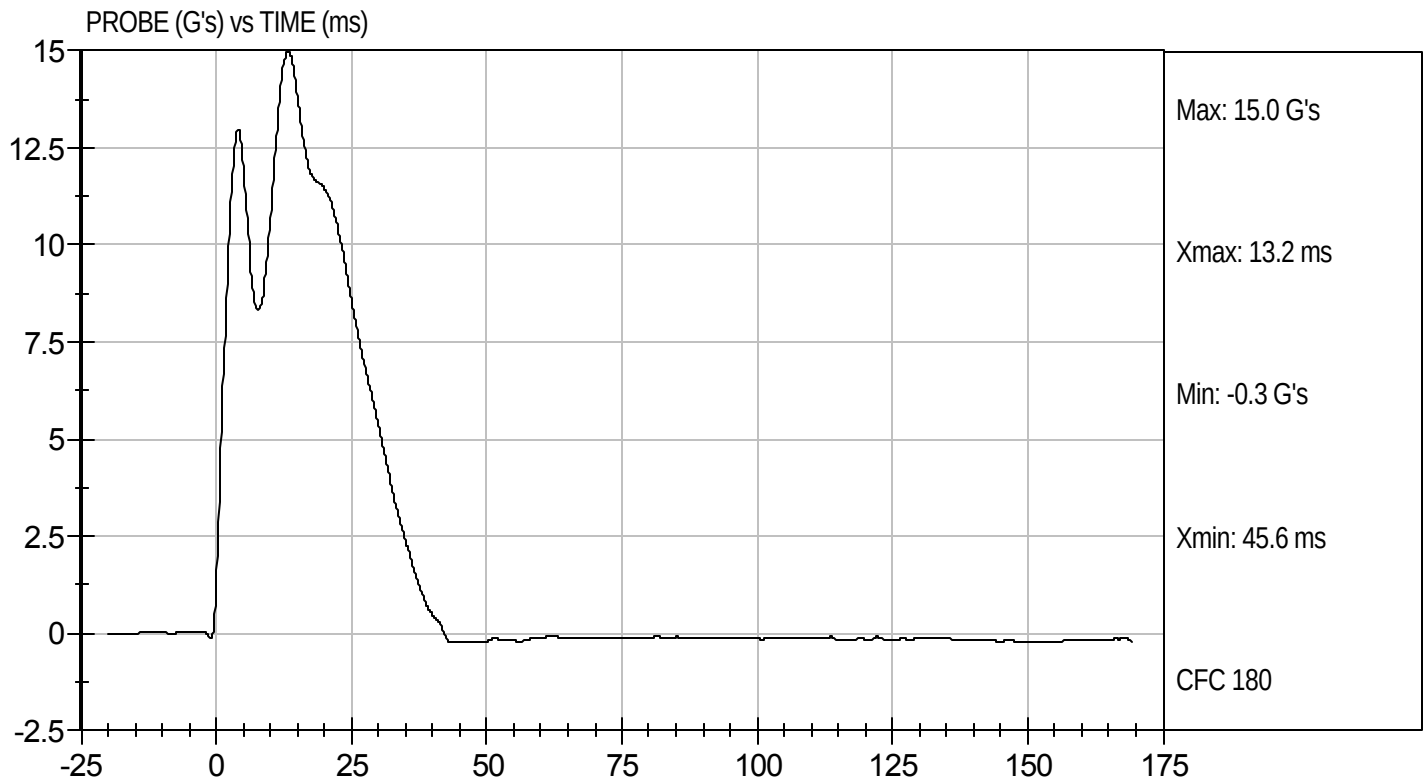
12/13/11
Test Date

David Winkelbauer
Approved By



Test Desc: Shoulder Impact
Component ID: D114163

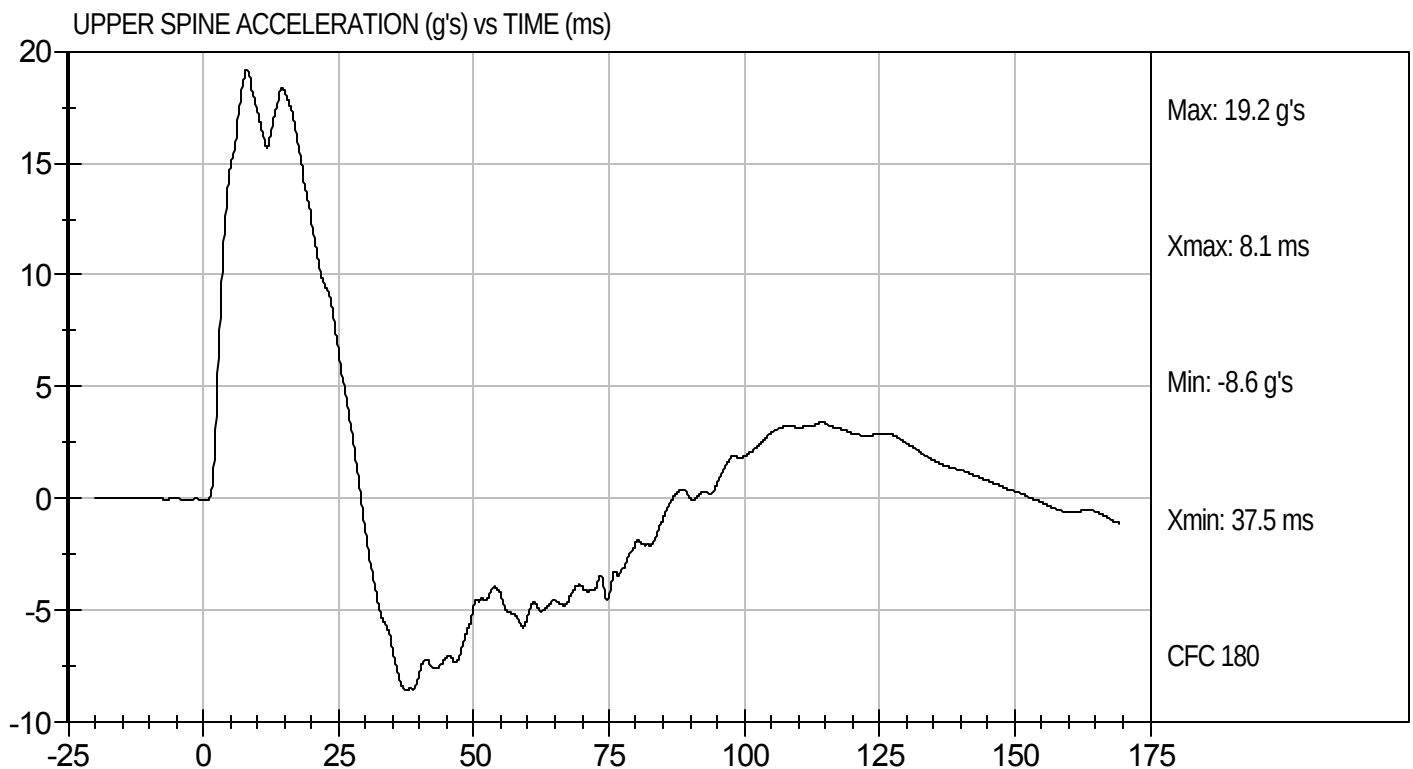
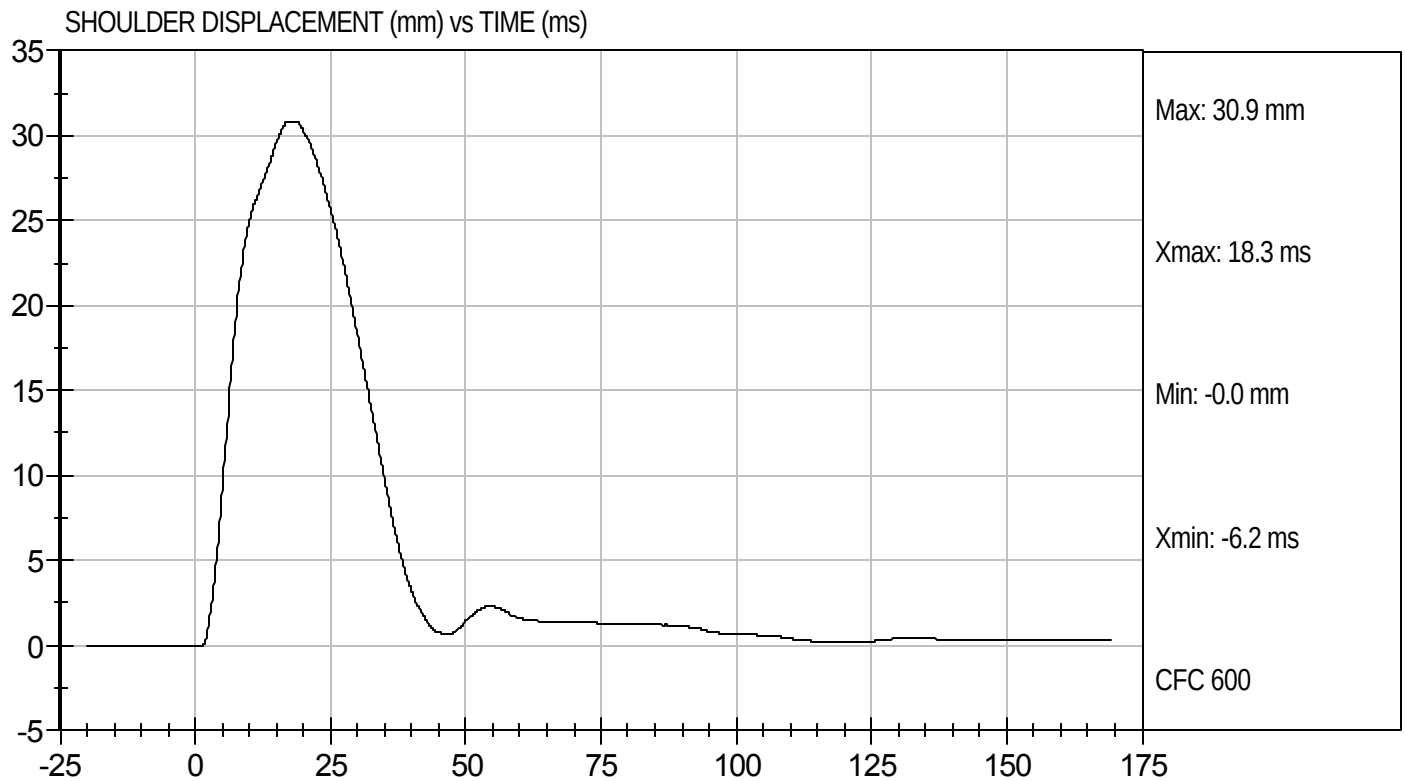
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Velocity: 14.36 ft/s, 4.38 m/s





Test Desc: Shoulder Impact
Component ID: D114163

Test Date: 12/13/11
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: D114164

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.8	Pass
Humidity	%	10 to 70	23	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	Pass
Peak Impactor Acceleration	G's	30 to 36	33	Pass
Shoulder Displacement	mm	31 to 40	35	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	34	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	38	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	33	Pass
Overall Test Results			Pass	


Laboratory Technician

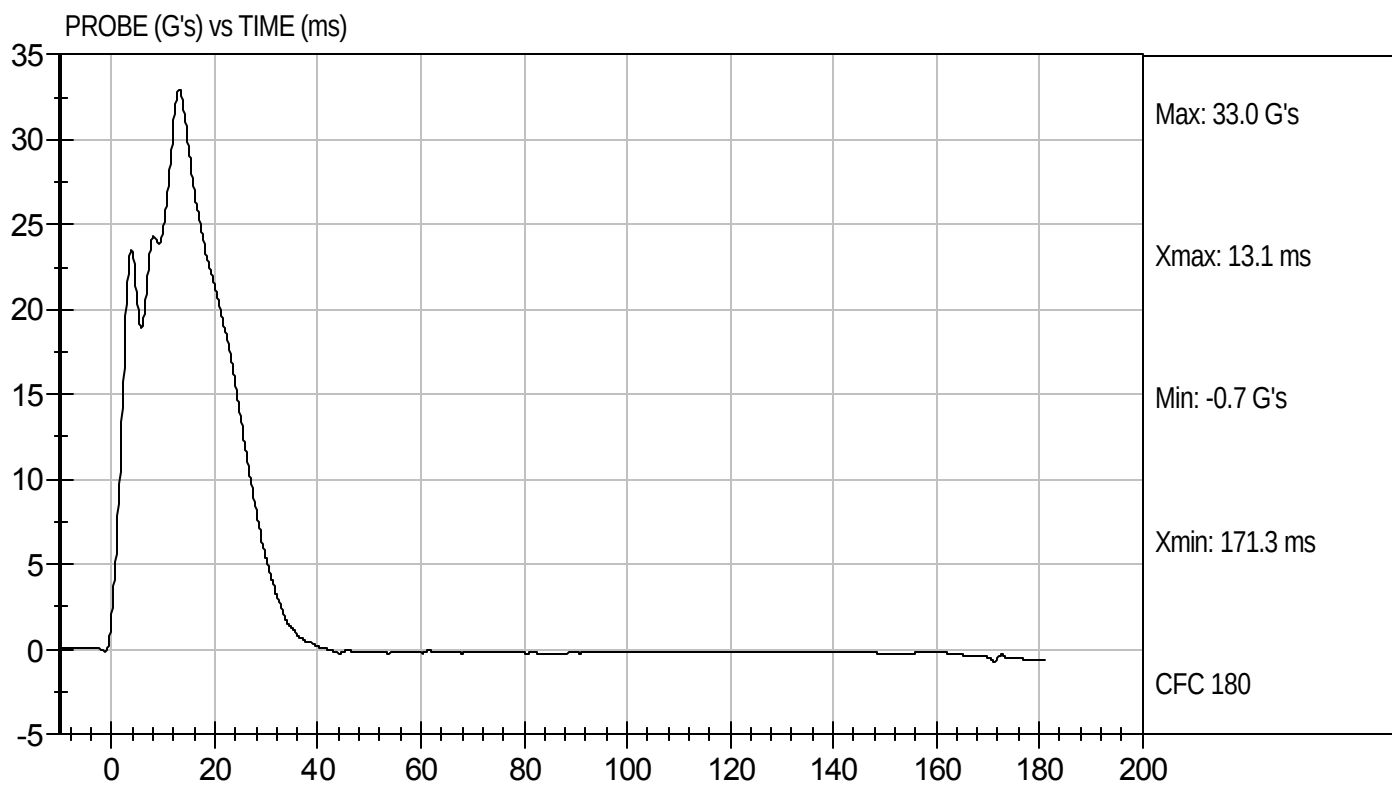
12/13/11
Test Date


Approved By



Test Desc: Thorax With Arm
Component ID: D114164

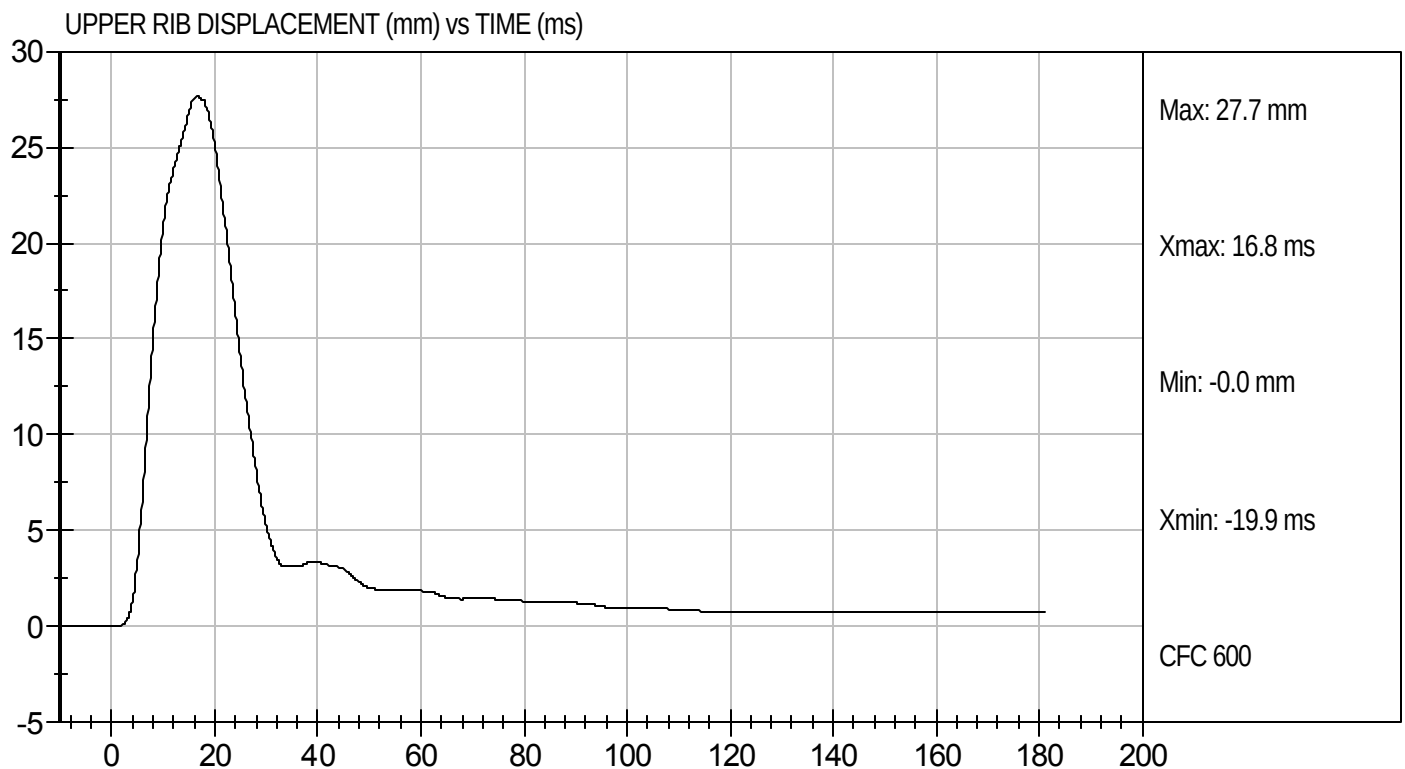
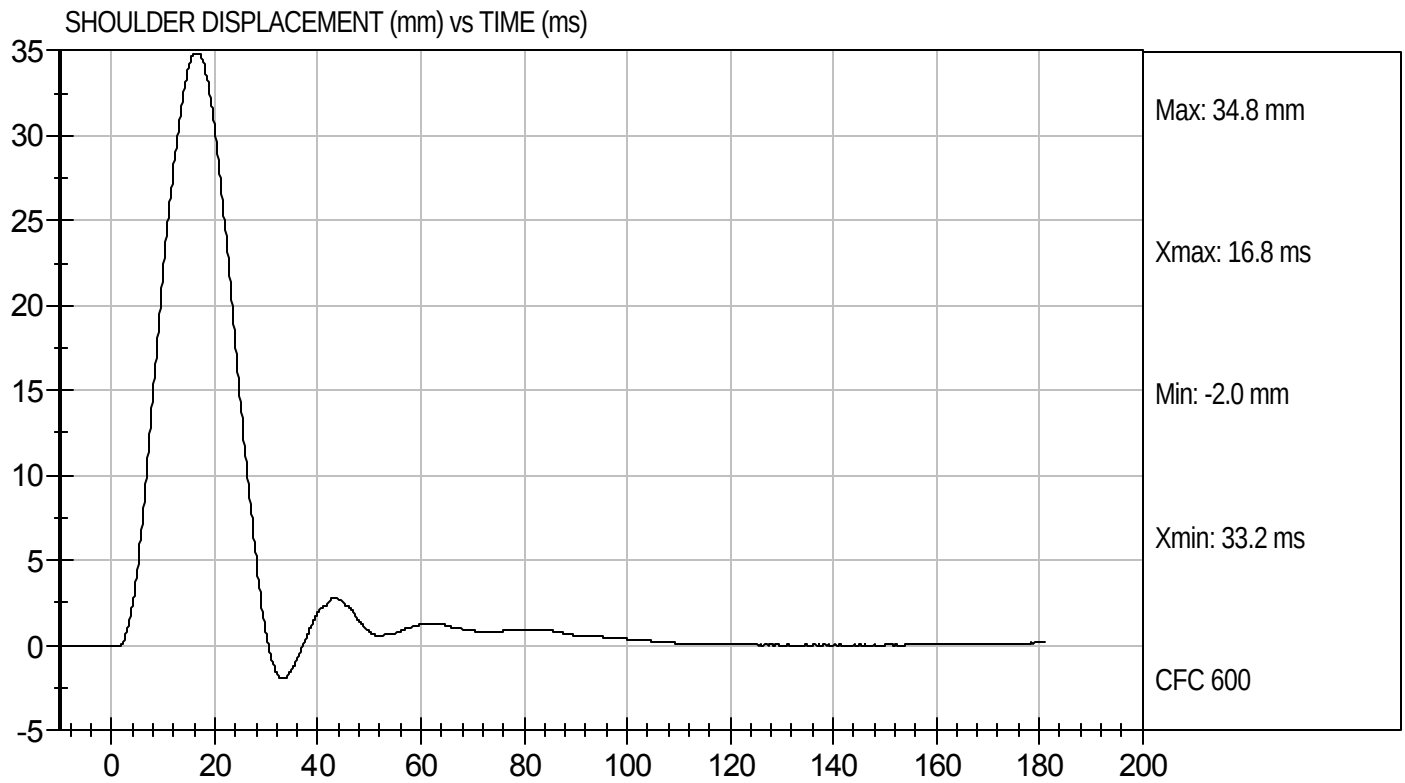
Test Date: 12/13/11
Velocity: 22.2 ft/s, 6.77 m/s





Test Desc: Thorax With Arm
Component ID: D114164

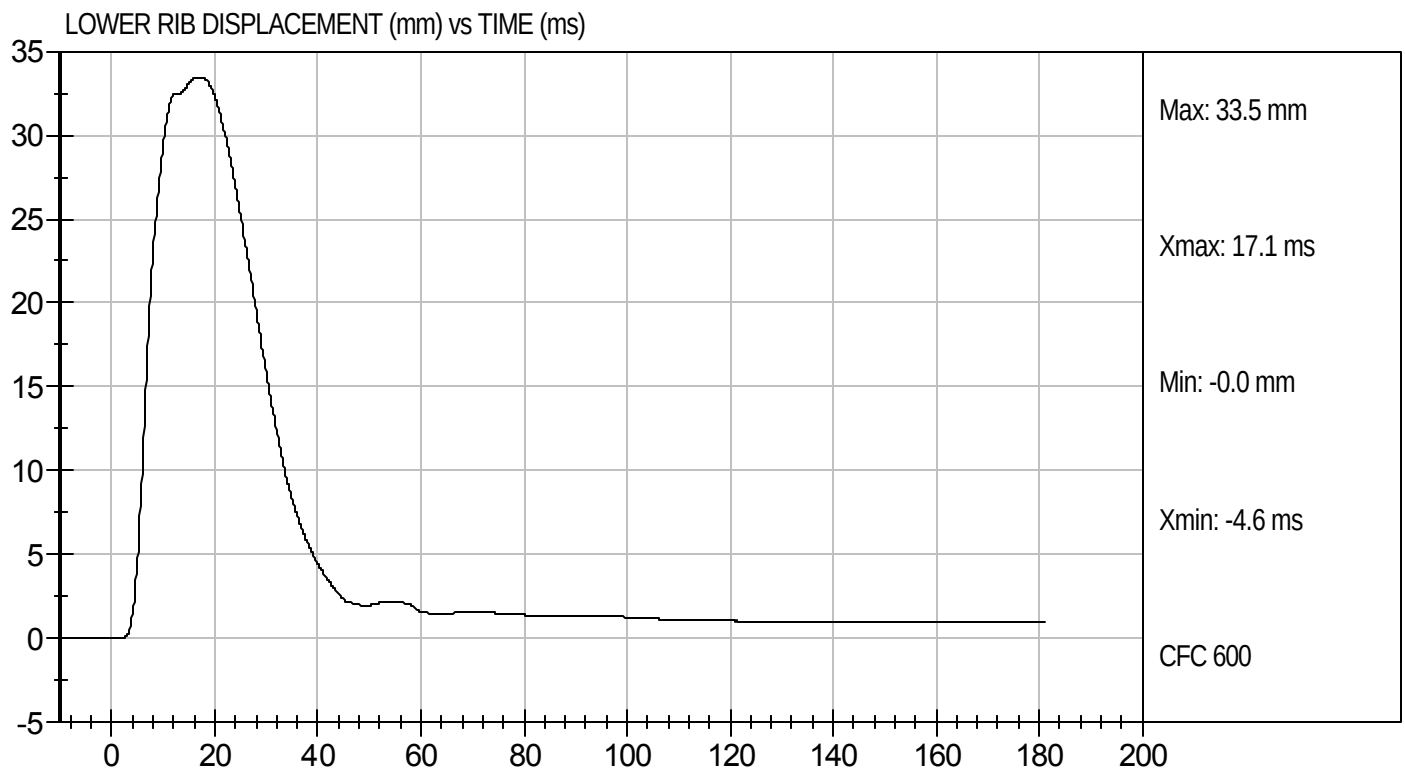
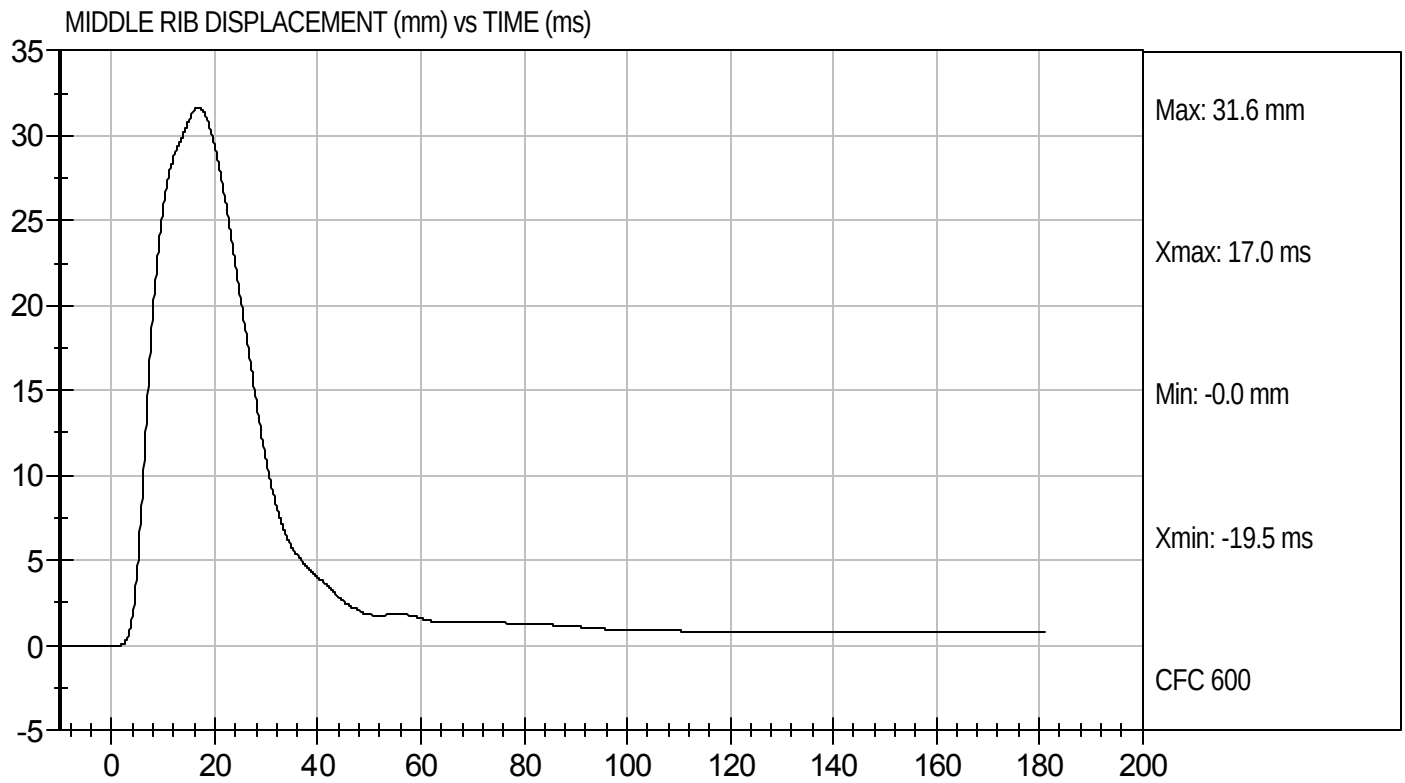
Test Date: 12/13/11
Velocity: 22.2 ft/s, 6.77 m/s





Test Desc: Thorax With Arm
Component ID: D114164

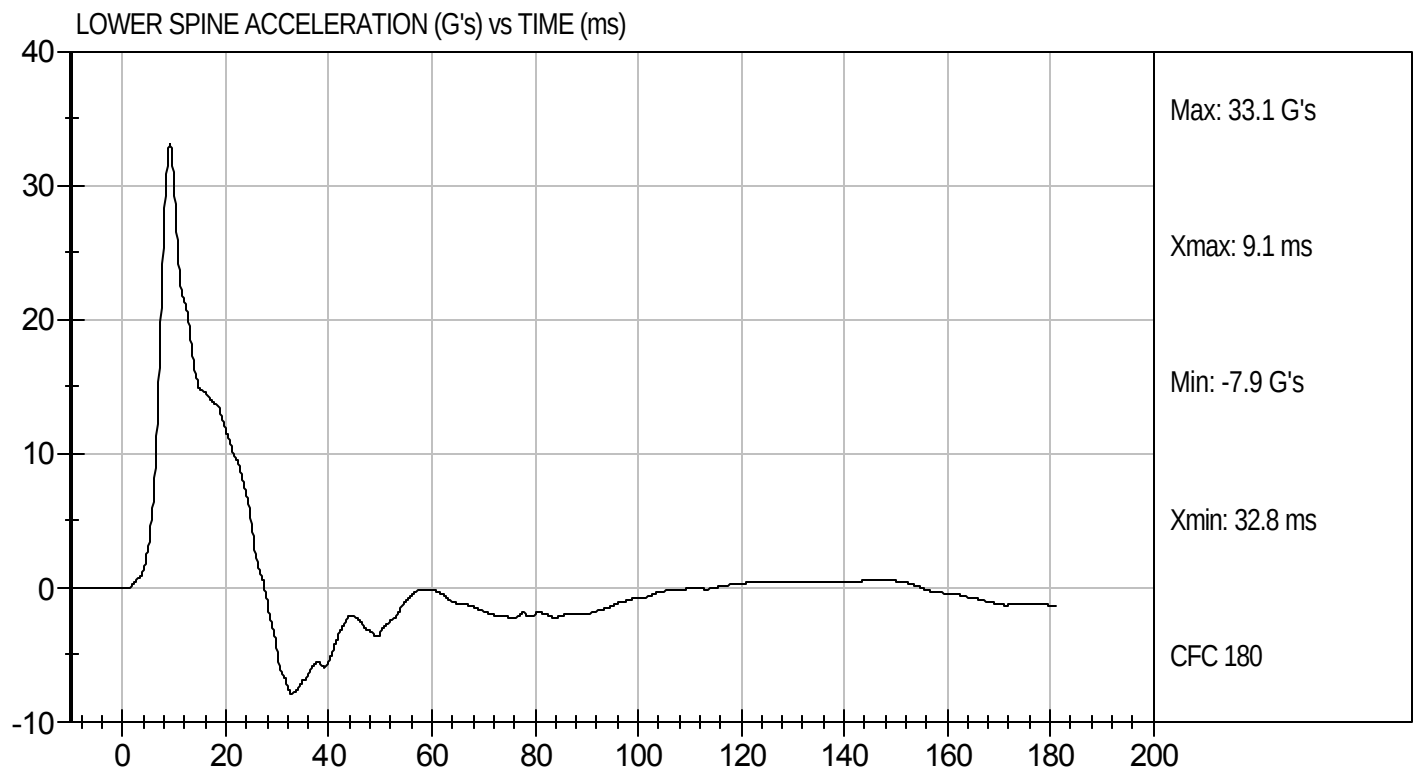
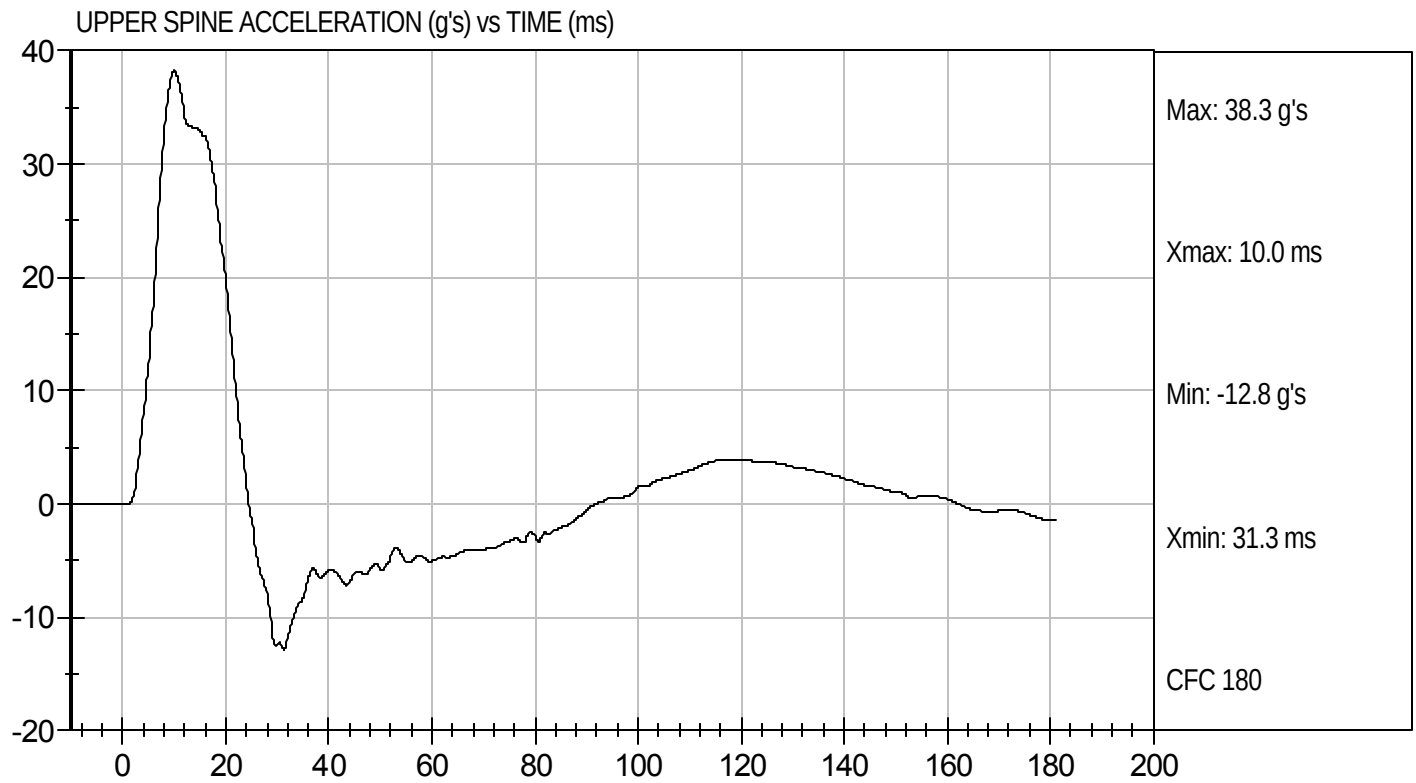
Test Date: 12/13/11
Velocity: 22.2 ft/s, 6.77 m/s





Test Desc: Thorax With Arm
Component ID: D114164

Test Date: 12/13/11
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: D114165

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.8	Pass
Humidity	%	10 to 70	23	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	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	14	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	8	Pass
Overall Test Results			Pass	


Laboratory Technician

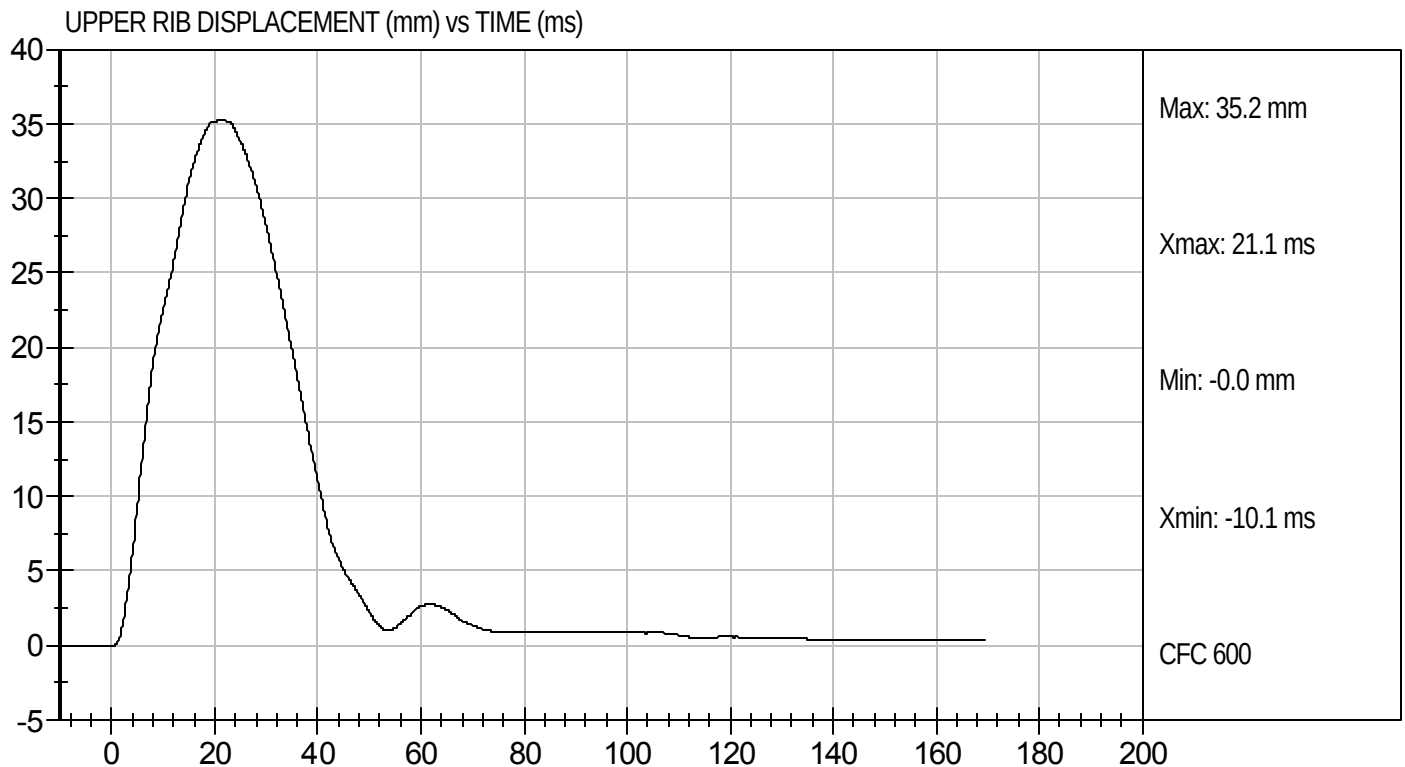
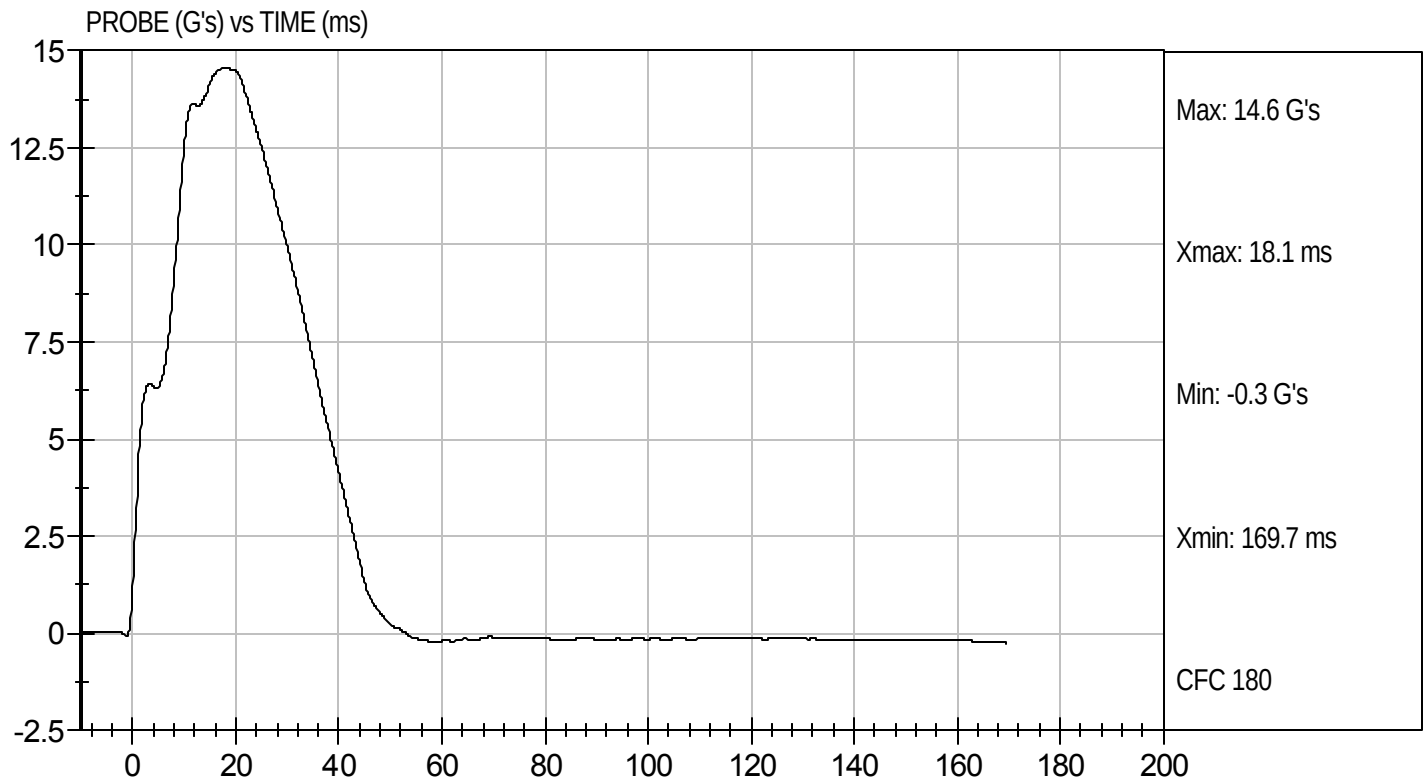
12/13/11
Test Date


Approved By



Test Desc: Thorax Without Arm
Component ID: D114165

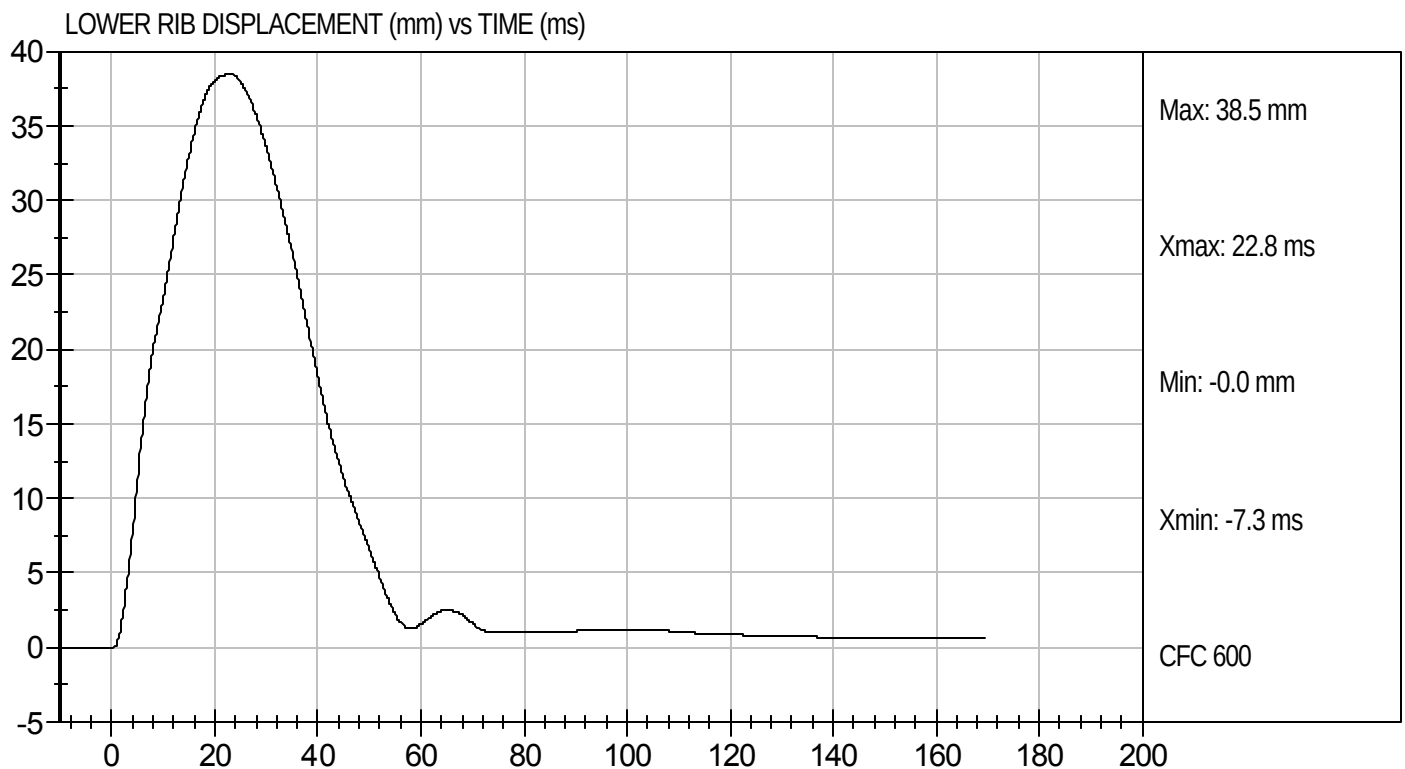
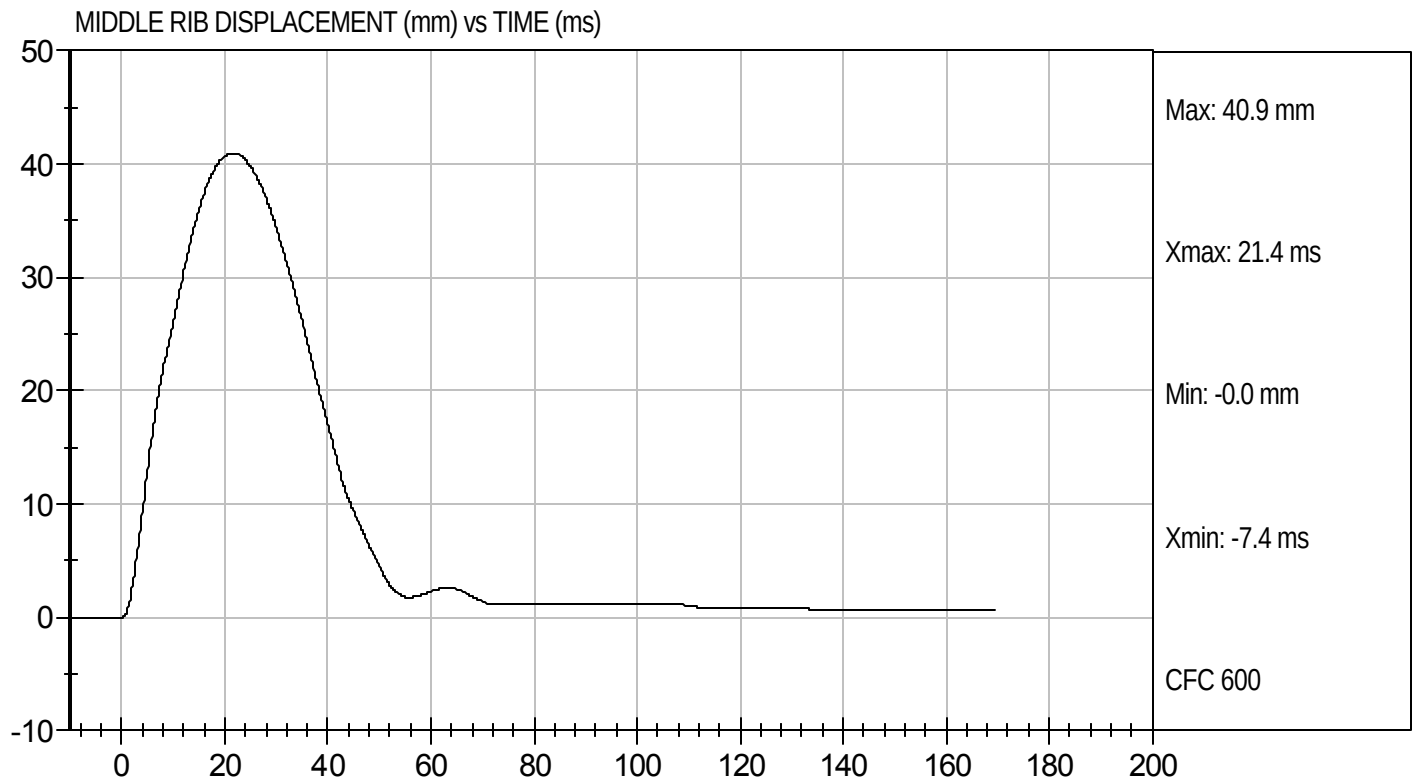
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Test Desc: Thorax Without Arm
Component ID: D114165

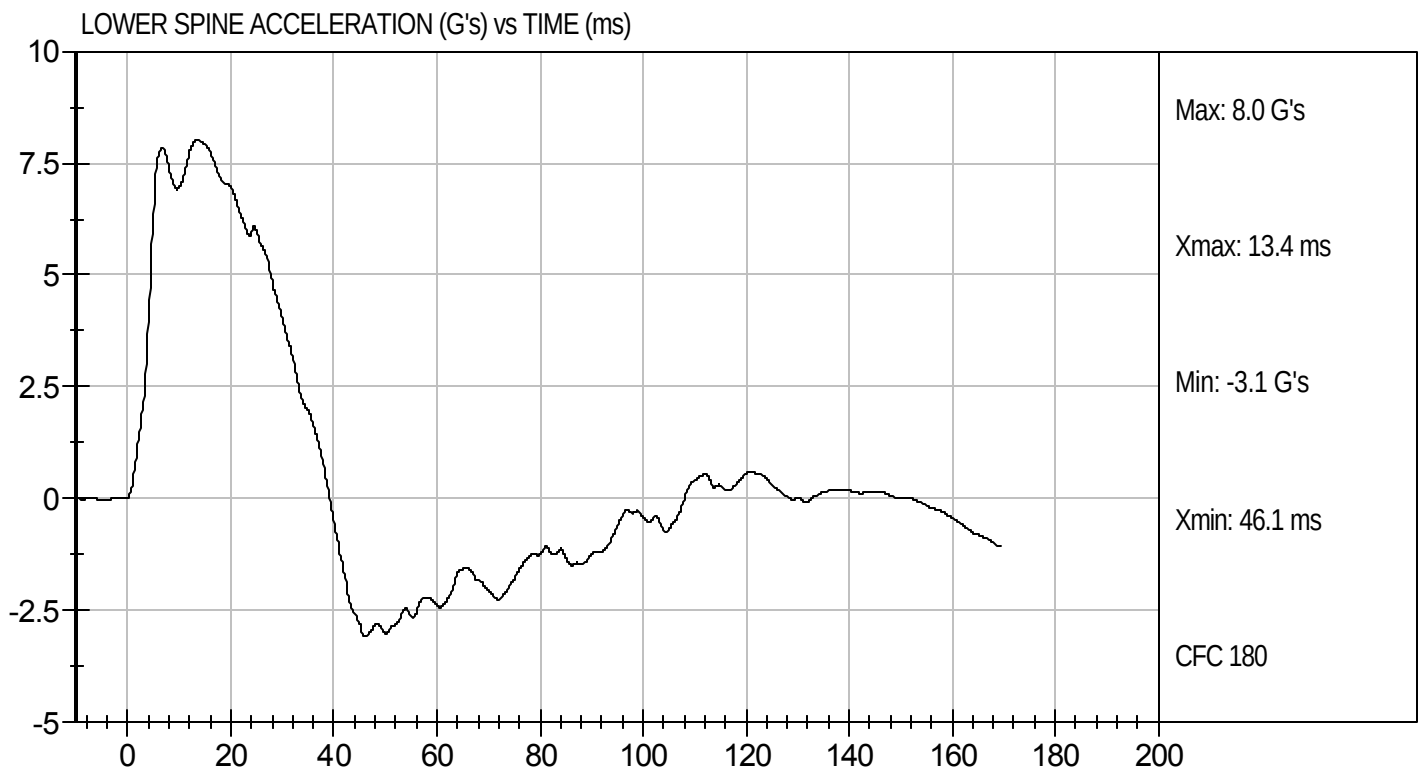
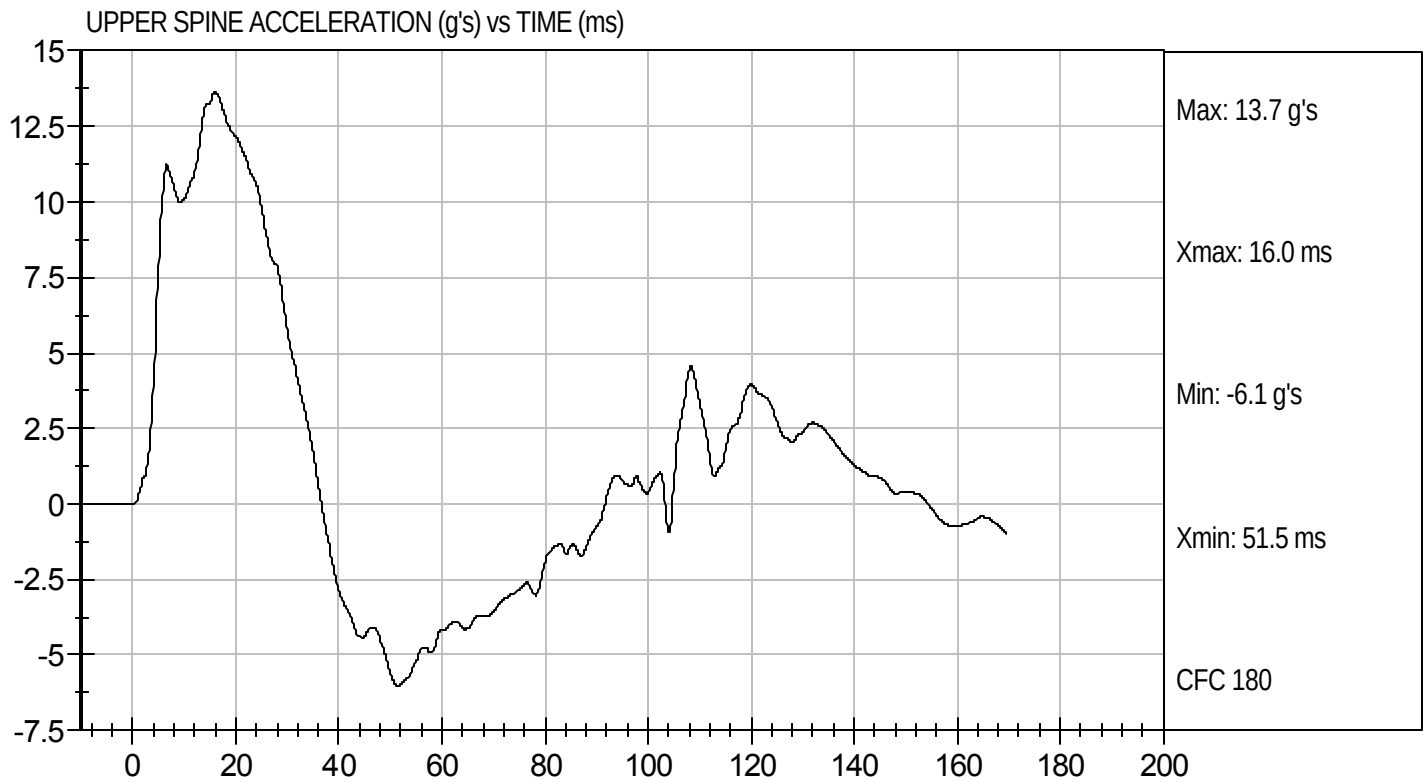
Test Date: 12/13/11
Velocity: 14.24 ft/s, 4.34 m/s





Test Desc: Thorax Without Arm
Component ID: D114165

Test Date: 12/13/11
Velocity: 14.24 ft/s, 4.34 m/s



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

ATD Serial No: 296

Test I.D: D114166

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.8	Pass
Humidity	%	10 to 70	23	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Peak Impactor Acceleration	G's	12 to 16	14	Pass
Upper Rib Displacement	mm	36 to 47	37	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	

Jessica Gall
Laboratory Technician

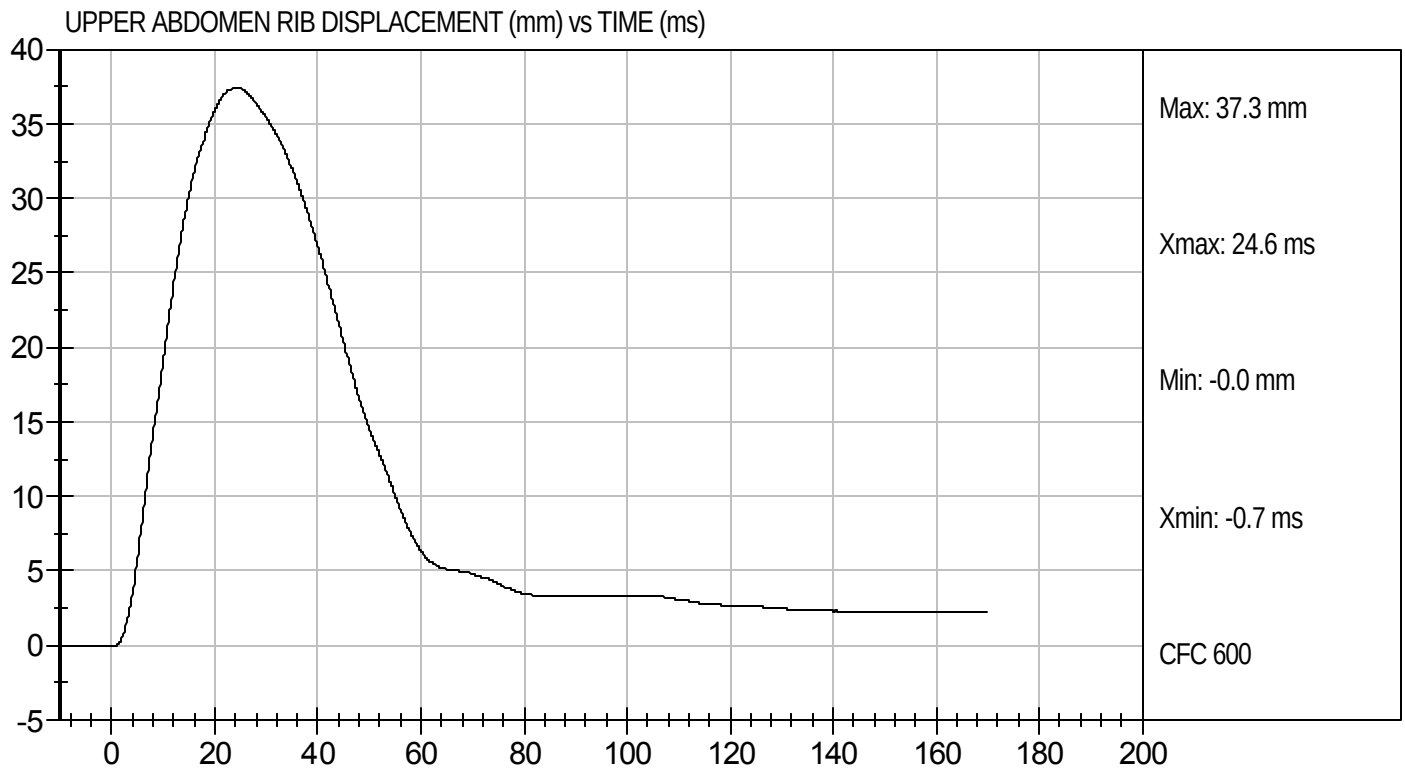
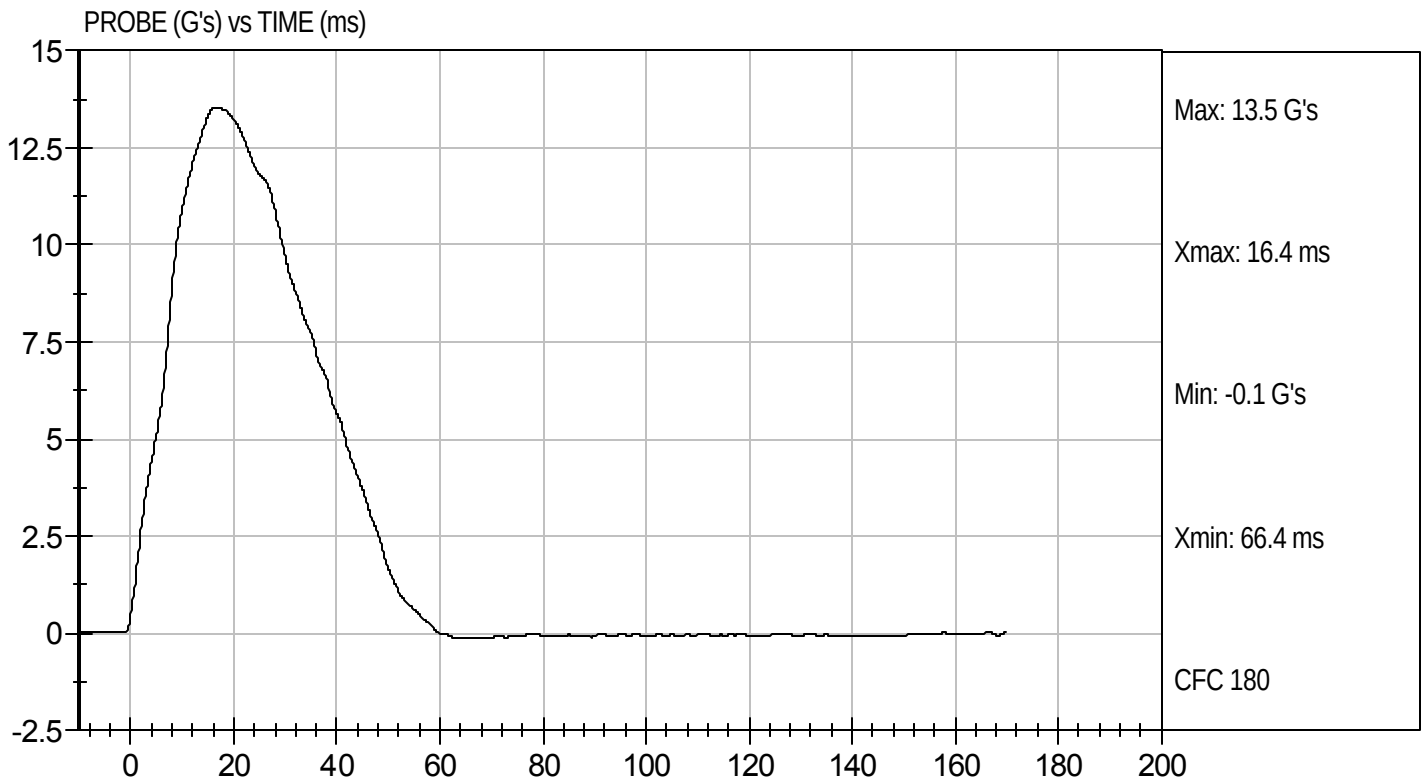
12/13/11
Test Date

David Winkelbauer
Approved By



Test Desc: Abdomen Impact
Component ID: D114166

Test Date: 12/13/11
Velocity: 14.24 ft/s, 4.34 m/s

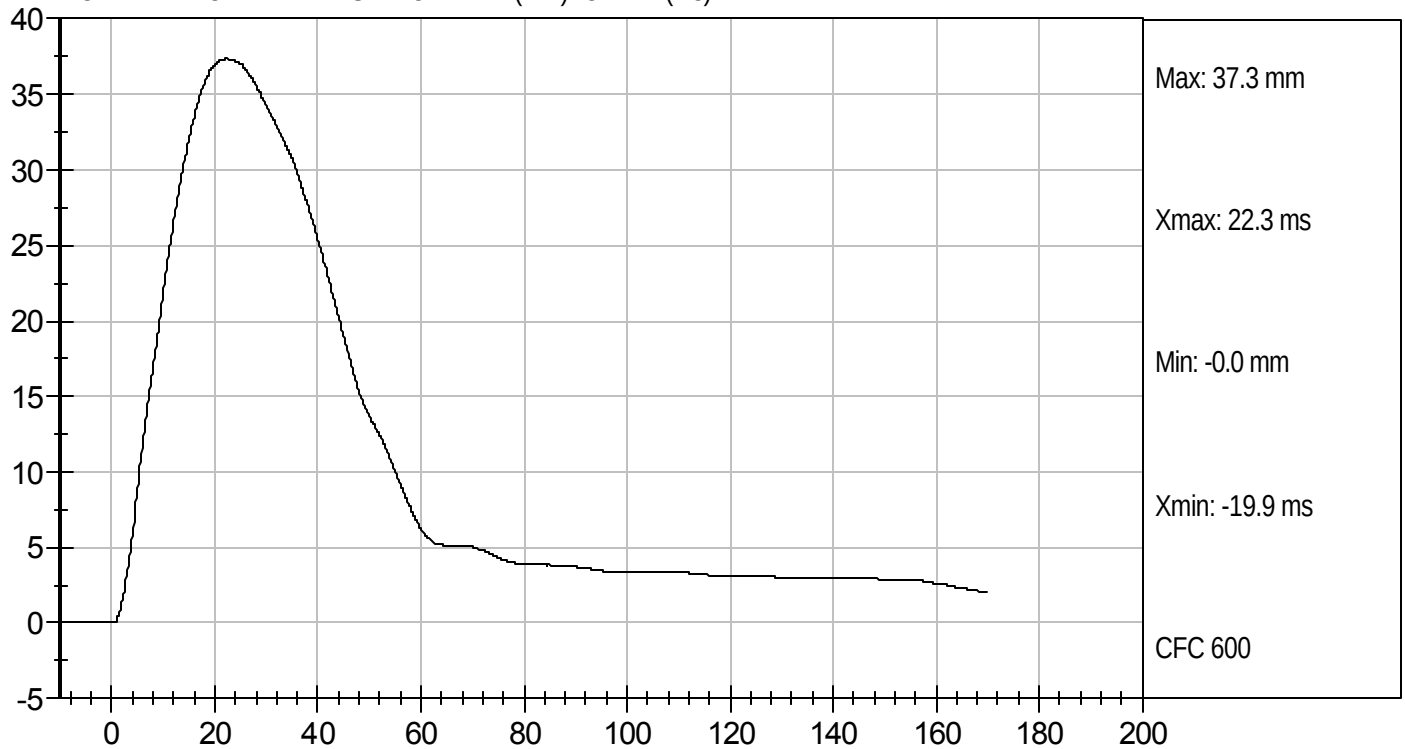




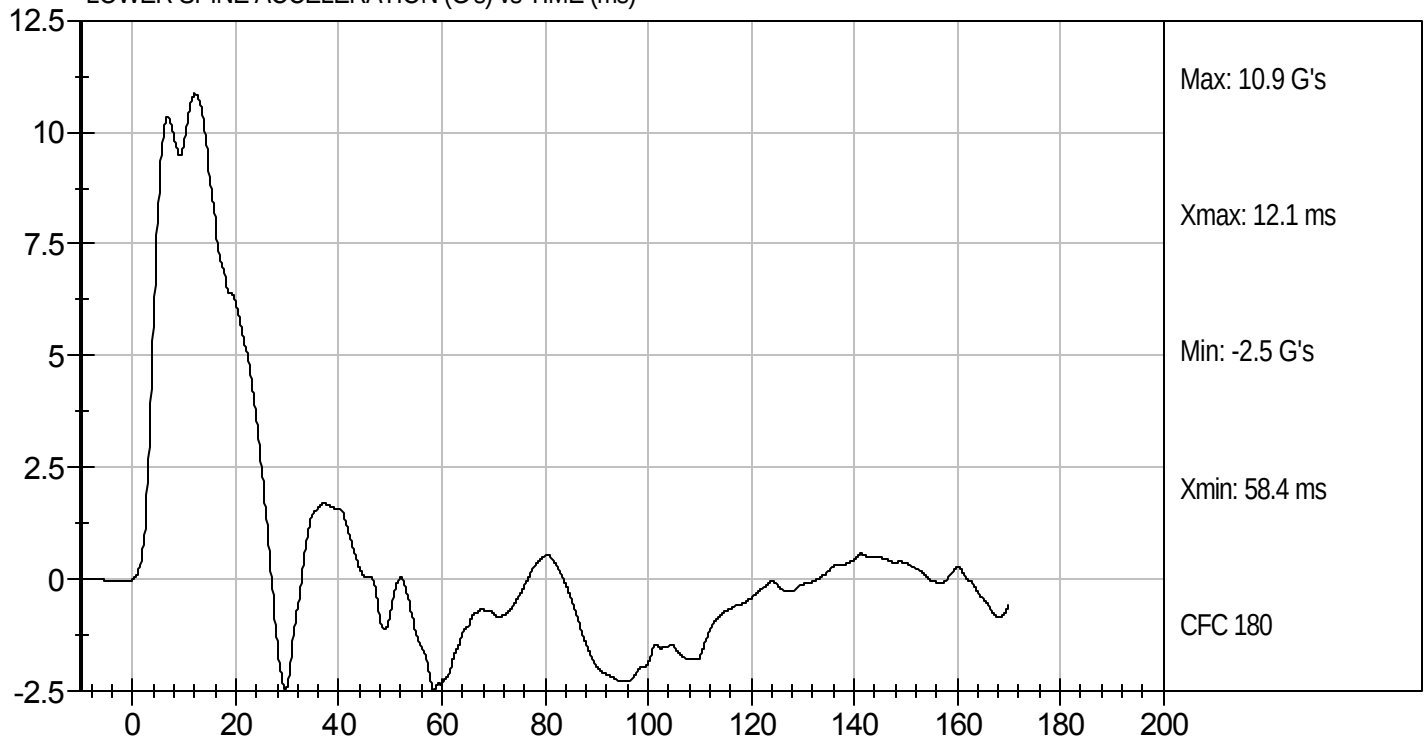
Test Desc: Abdomen Impact
Component ID: D114166

Test Date: 12/13/11
Velocity: 14.24 ft/s, 4.34 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: D114167

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.8	Pass
Humidity	%	10 to 70	23	Pass
Impact Velocity	m/s	6.60 to 6.80	6.68	Pass
Peak Impactor Acceleration	G's	38 to 47	43	Pass
Pelvis Y Acceleration after 6 ms	G's	34 to 42	40	Pass
Peak Acetabulum Force	N	3600 to 4300	3871	Pass
Overall Test Results			Pass	


Laboratory Technician

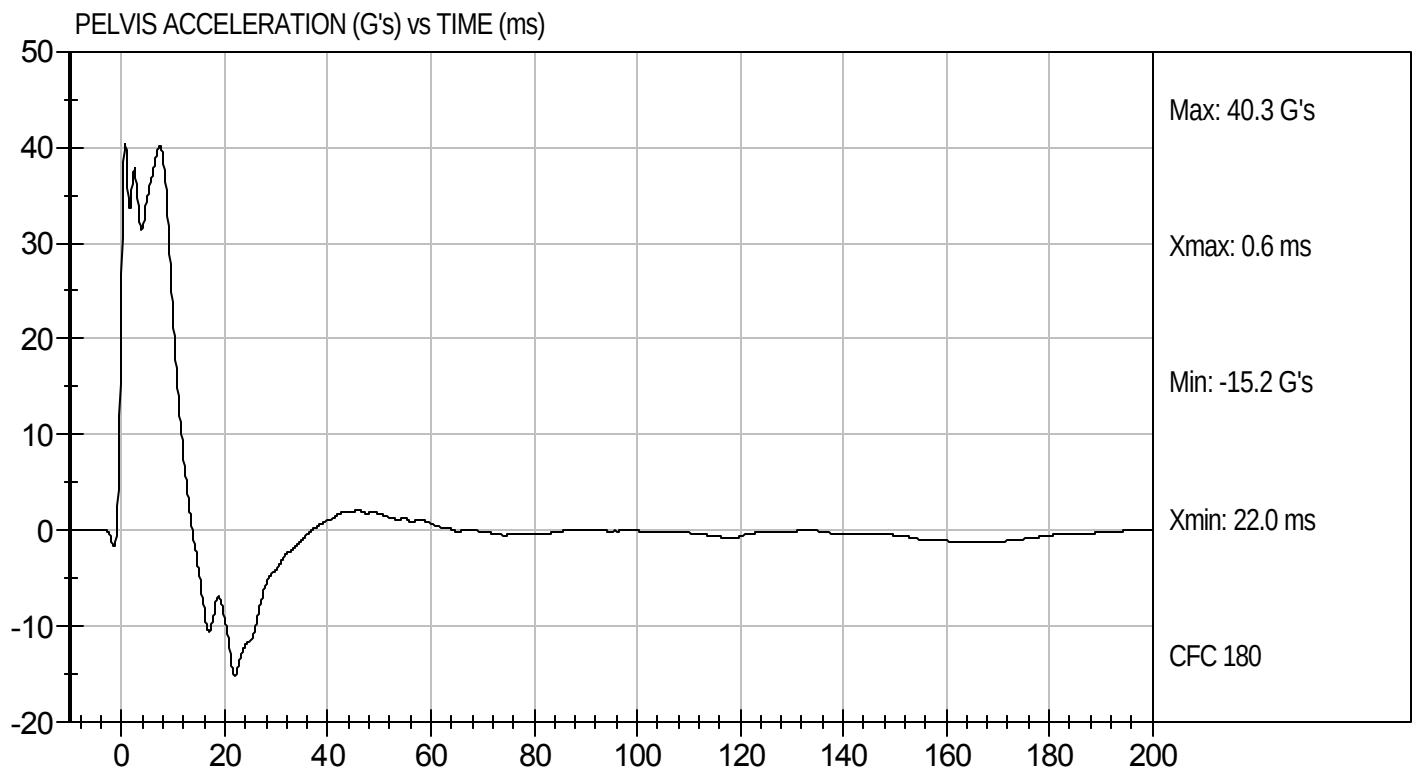
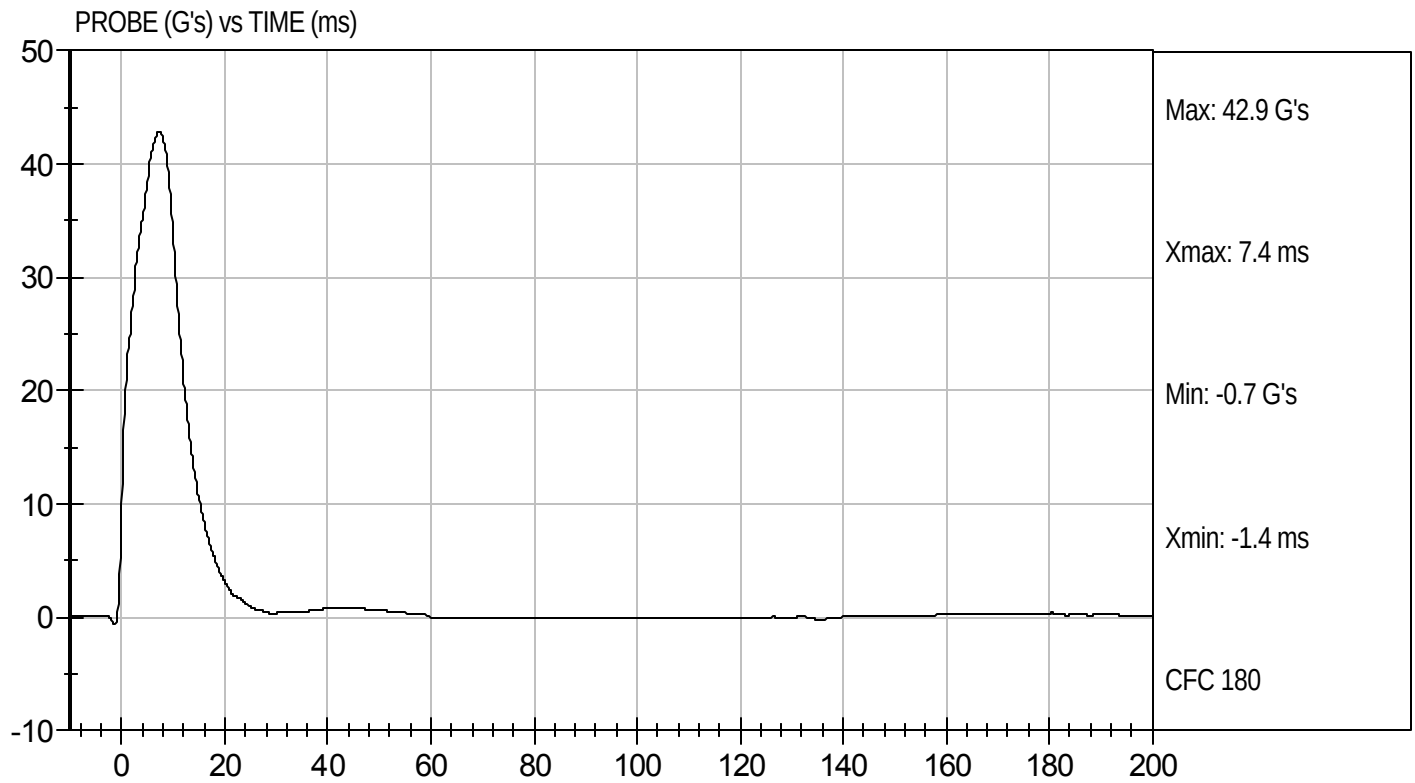
12/13/11
Test Date


Approved By



Test Desc: Pelvis Impact
Component ID: D114167

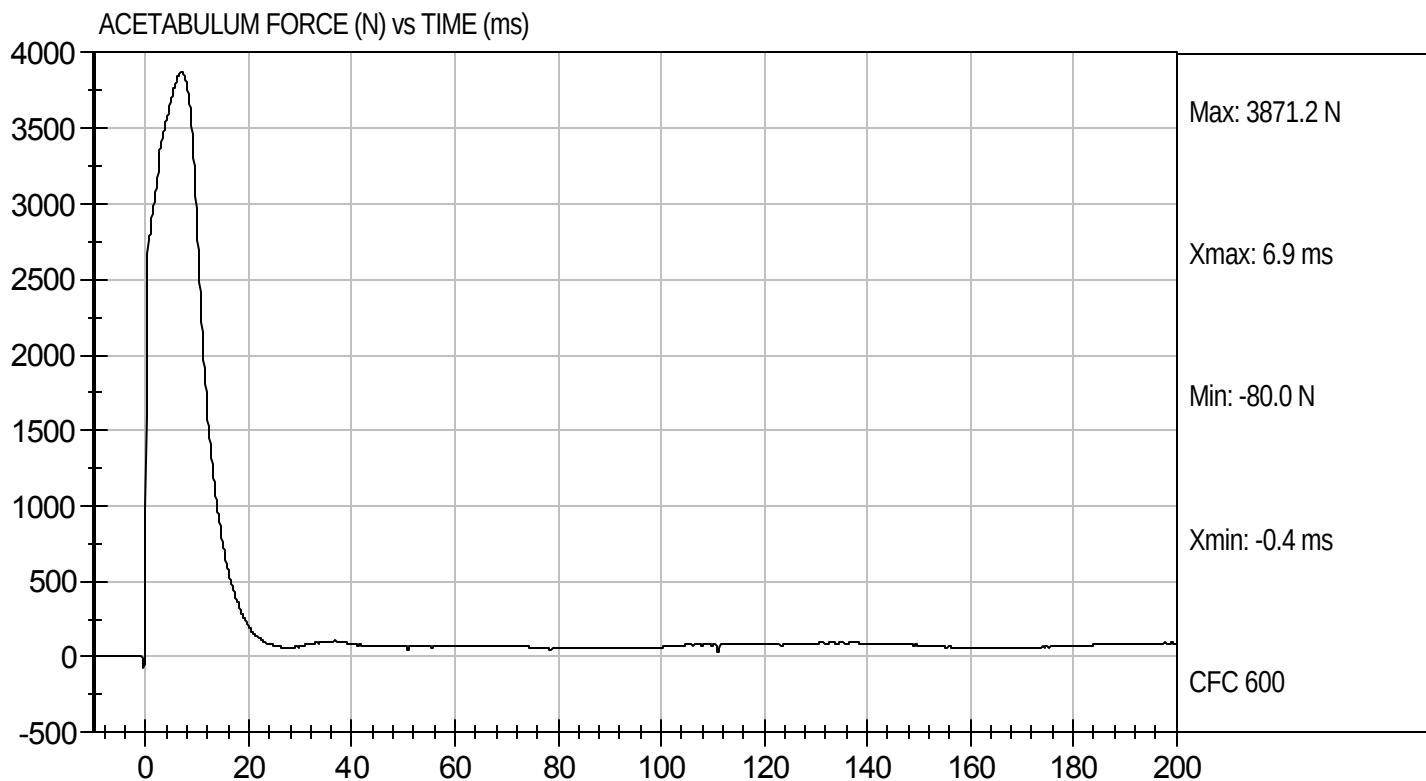
Test Date: 12/13/11
Velocity: 21.9 ft/s, 6.68 m/s





Test Desc: Pelvis Impact
Component ID: D114167

Test Date: 12/13/11
Velocity: 21.9 ft/s, 6.68 m/s



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

ATD Serial No: 296

Test I.D: D114168

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.8	Pass
Humidity	%	10 to 70	23	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	32	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4487	Pass
Overall Test Results				Pass


Laboratory Technician

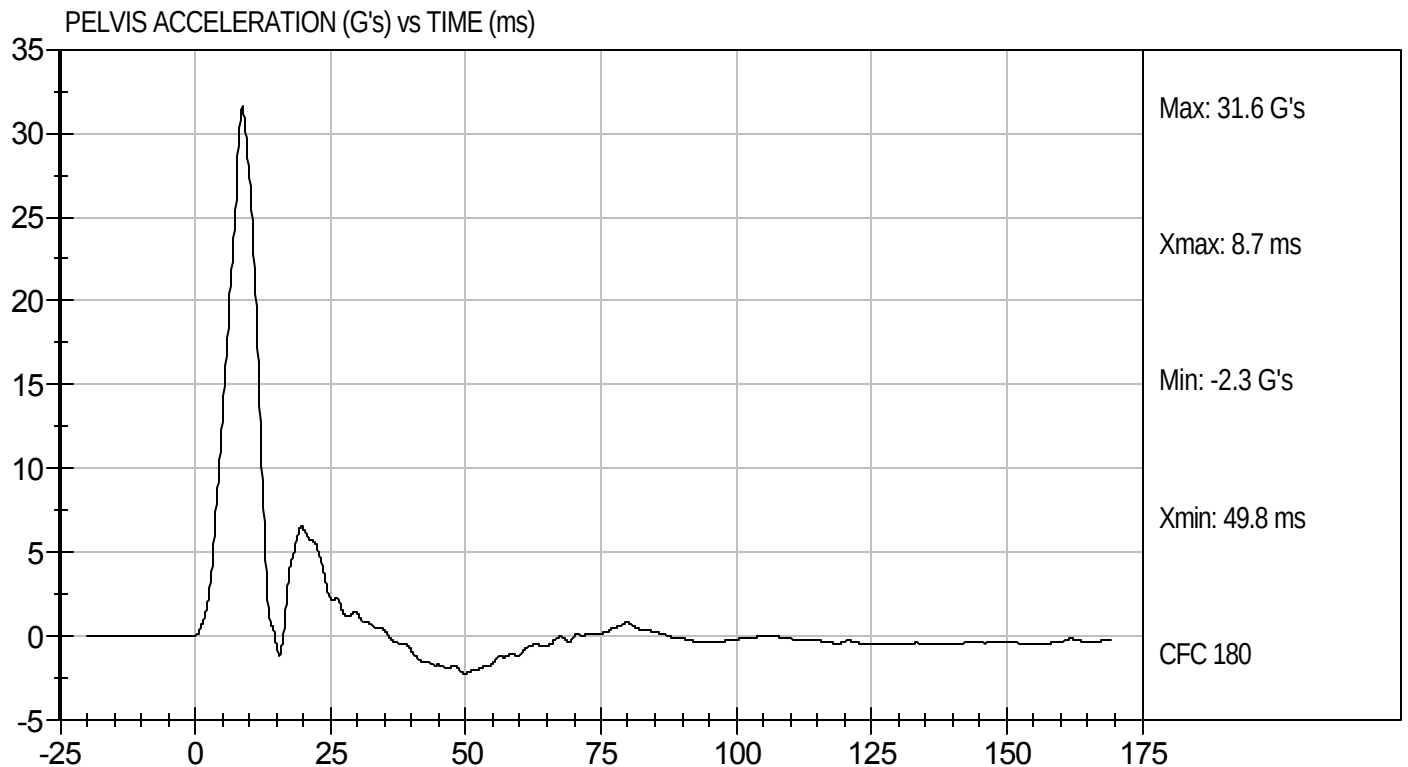
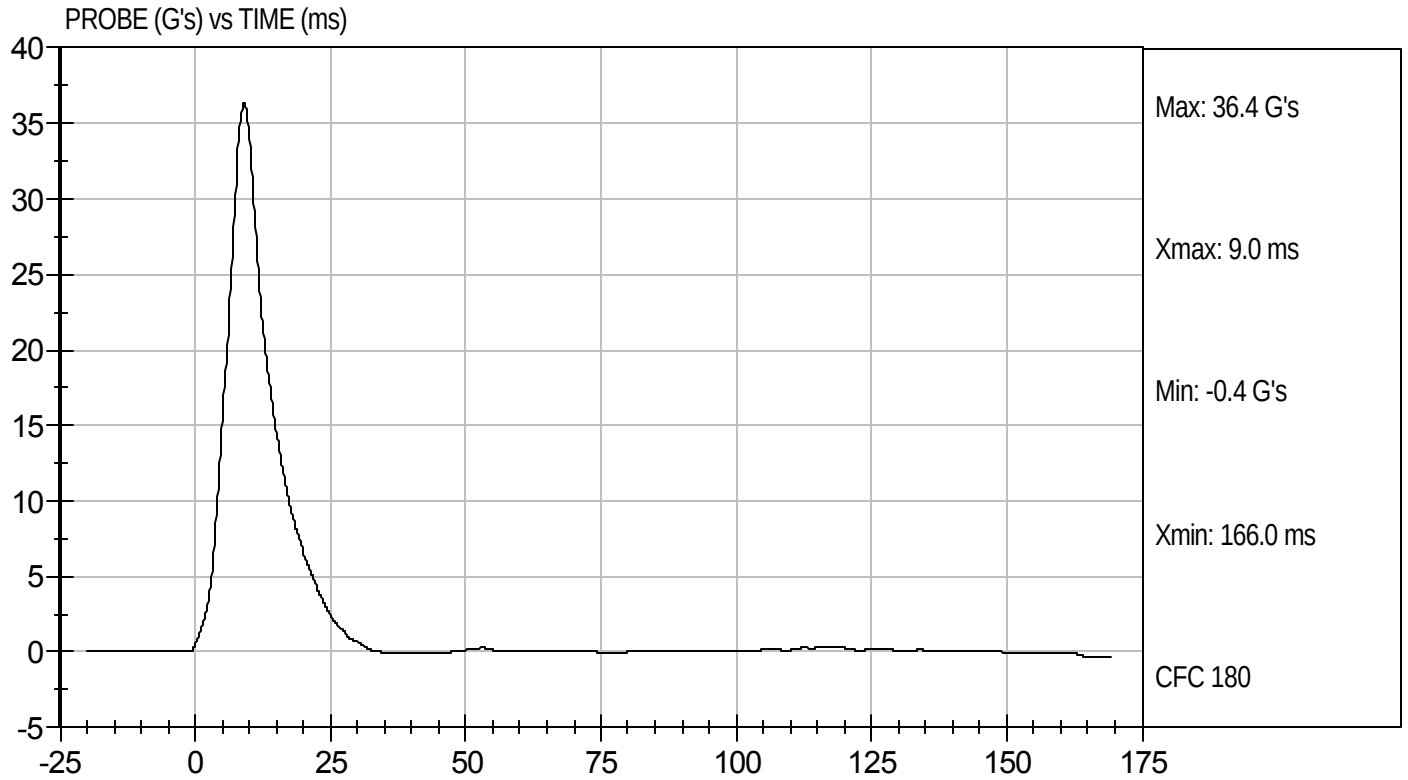
12/13/11
Test Date


Approved By



Test Desc: Iliac Impact
Component ID: D114168

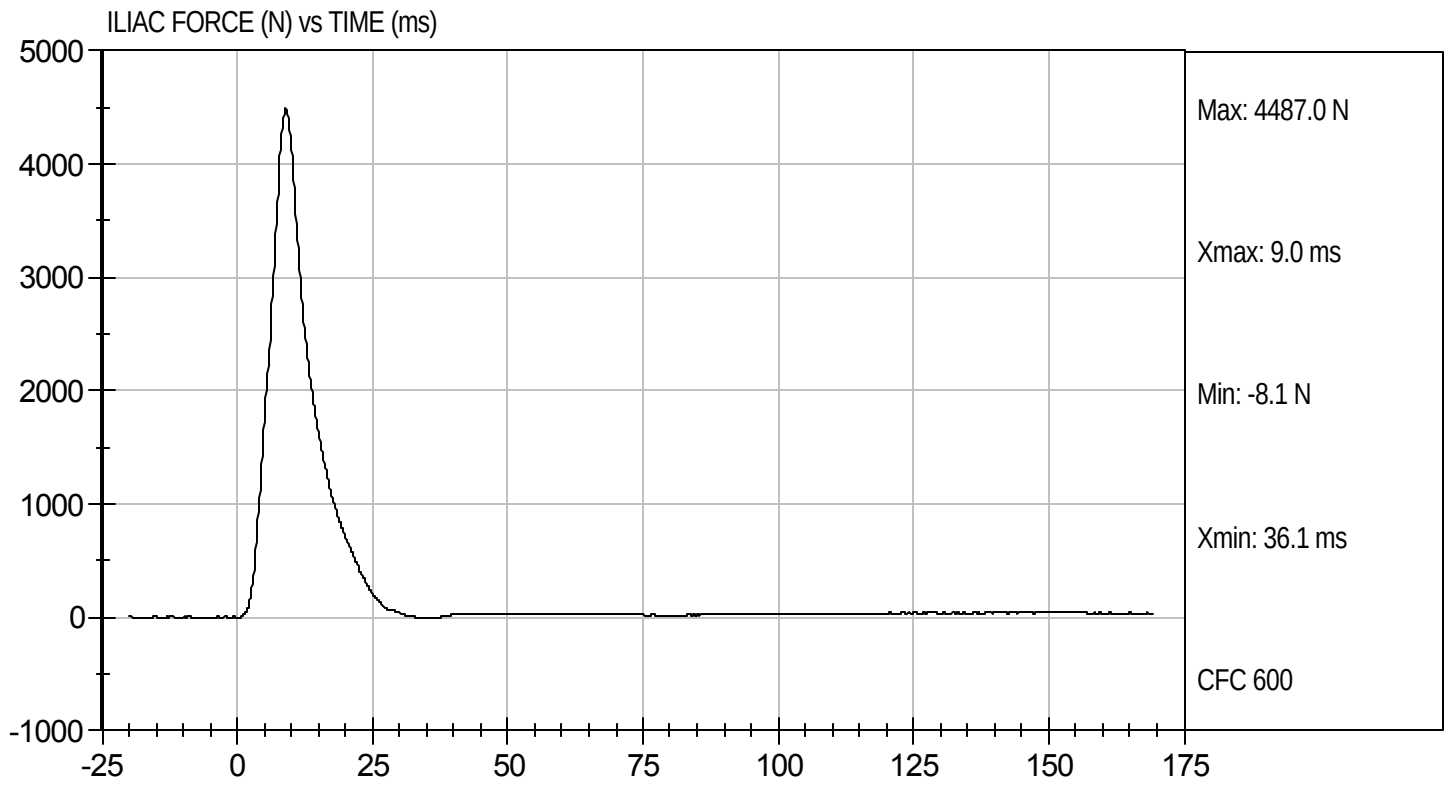
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Velocity: 14.36 ft/s, 4.38 m/s





Test Desc: Iliac Impact
Component ID: D114168

Test Date: 12/13/11
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: D114311

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	34	Pass
Peak Resultant Acceleration	G's	115 to 137	123	Pass
Peak Longitudinal Acceleration	G's	+/- 15	2.2	Pass
Unimodal	N/A	<15%	Yes	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

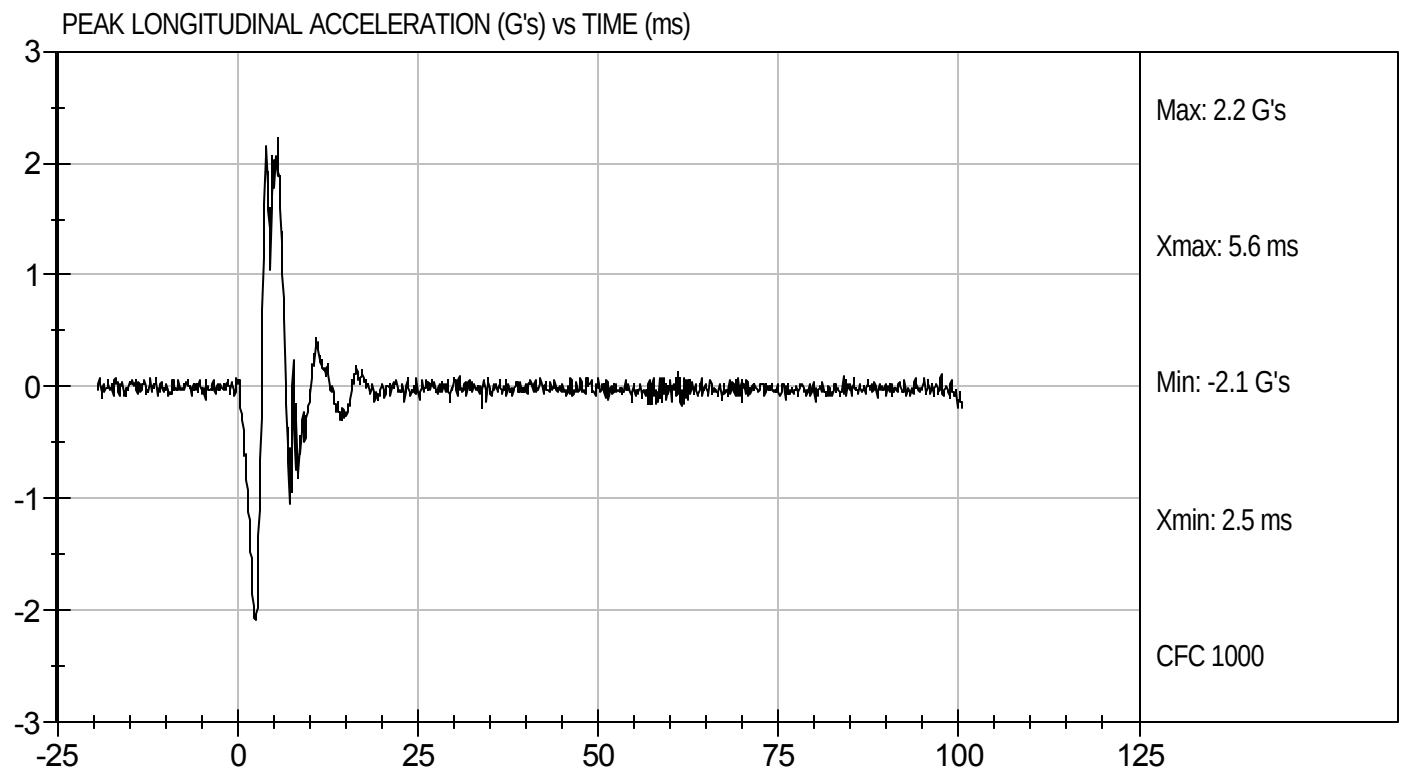
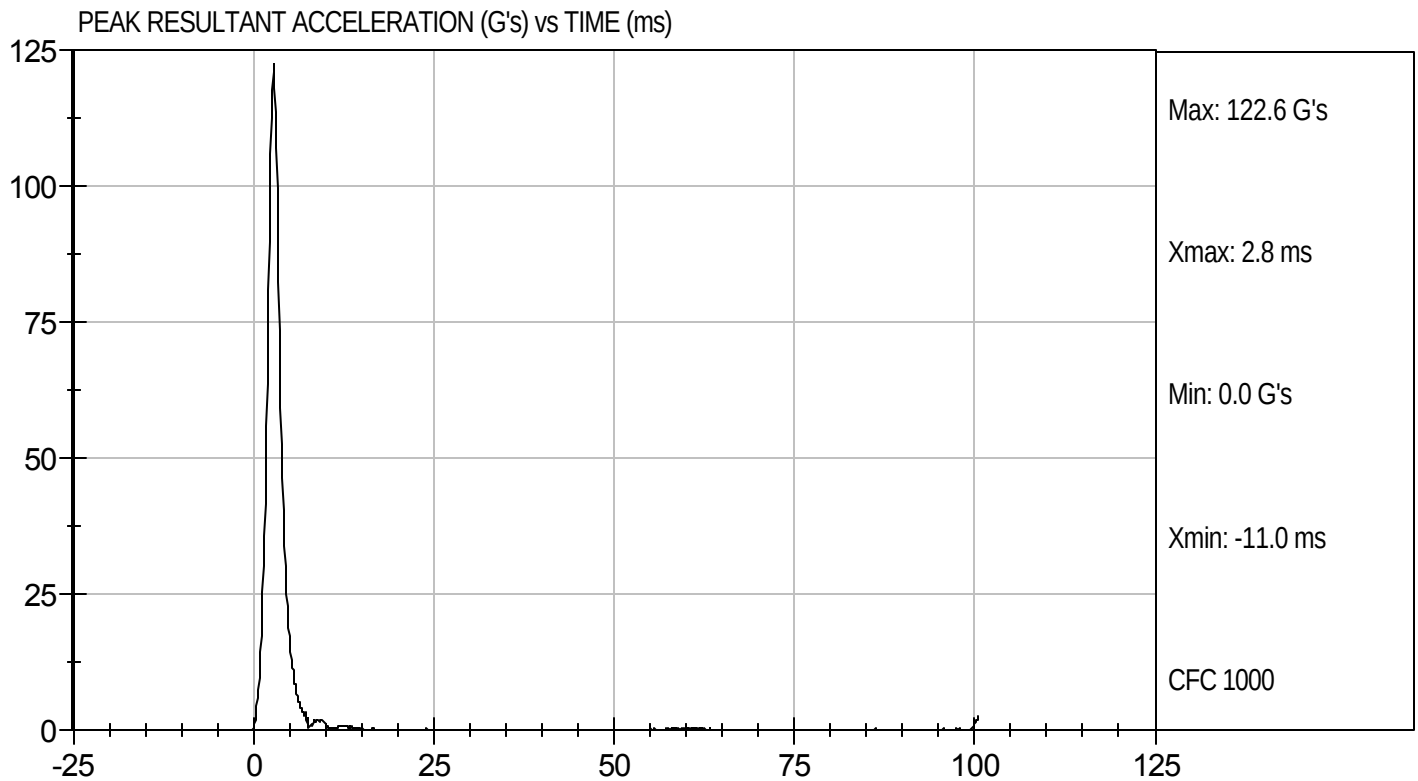
12/20/11
Test Date

David Winkelbauer
Approved By



Test Desc: Head Drop
Component ID: D114311

Test Date: 12/20/11
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: D114312

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	20.9	Pass
Humidity		%	10 to 70	34	Pass
Impact Velocity		m/s	5.51 to 5.63	5.58	Pass
Delta Velocity	10 ms	m/s	2.20 to 2.80	2.58	Pass
	15 ms	m/s	3.30 to 4.10	3.60	Pass
	20 ms	m/s	4.40 to 5.40	4.71	Pass
	25 ms	m/s	5.40 to 6.10	5.45	Pass
	25-100 ms	m/s	5.50 to 6.20	5.54	Pass
Maximum D-Plane Rotation		deg	71 to 81	73	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	61	Pass
Maximum Occipital Condyle Moment during Rotation Interval Nm			-44 to -36	-40	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	118	Pass
Overall Test Results				Pass	


 Laboratory Technician

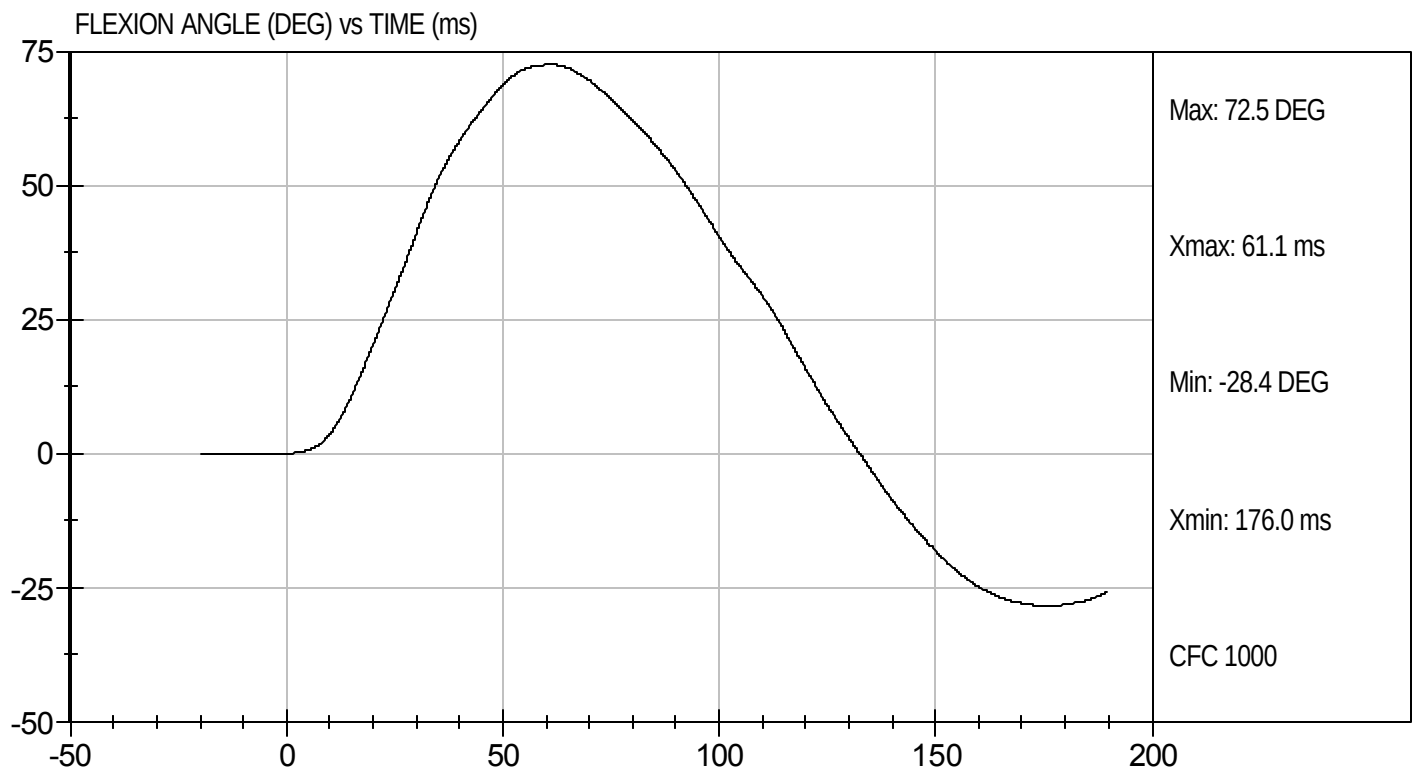
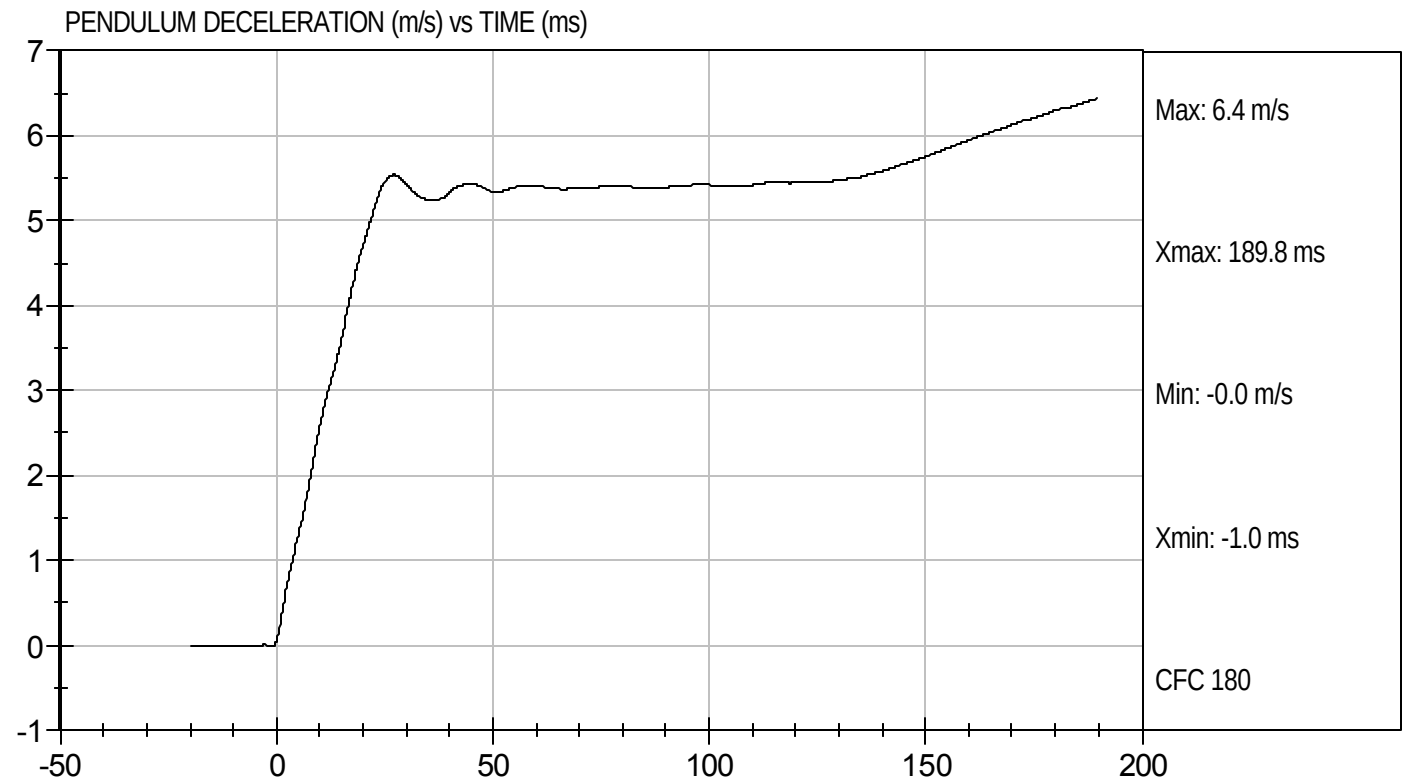
12/20/11
 Test Date


 Approved By



Test Desc: Neck Bending
Component ID: D114312

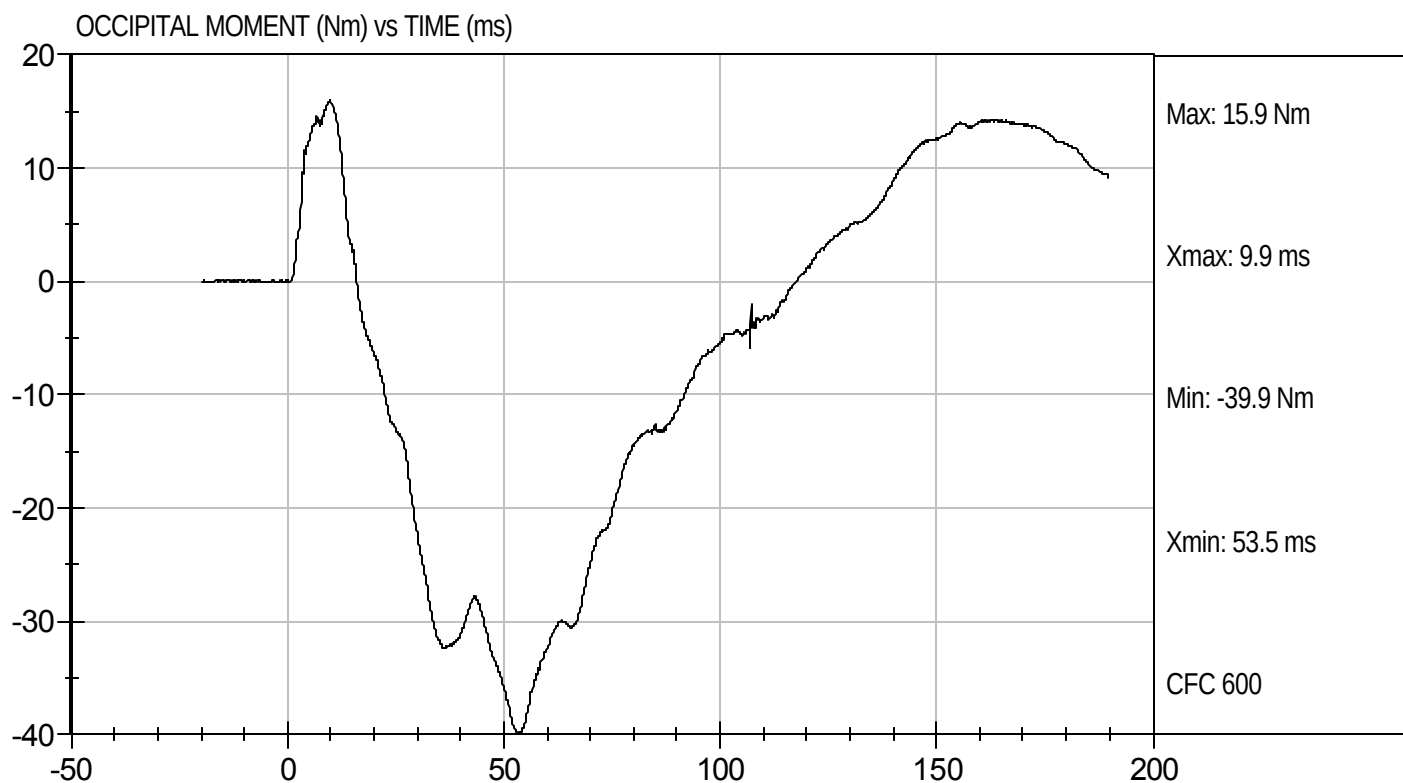
Test Date: 12/20/11
Velocity: 18.32 ft/s, 5.58 m/s





Test Desc: Neck Bending
Component ID: D114312

Test Date: 12/20/11
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: D114313

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	25	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	19	Pass
Overall Test Results				Pass

Jessica Gall
Laboratory Technician

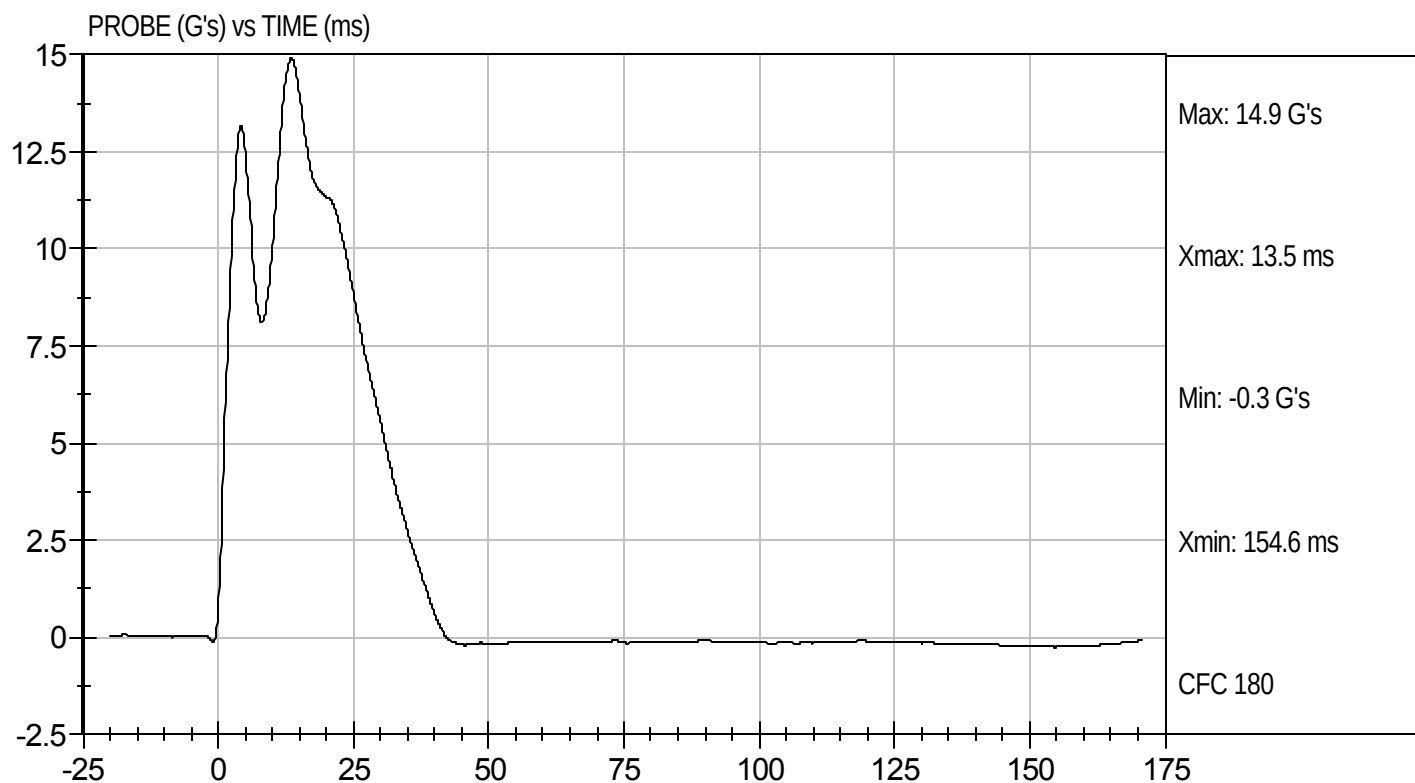
12/20/11
Test Date

David Winkelbauer
Approved By



Test Desc: Shoulder Impact
Component ID: D114313

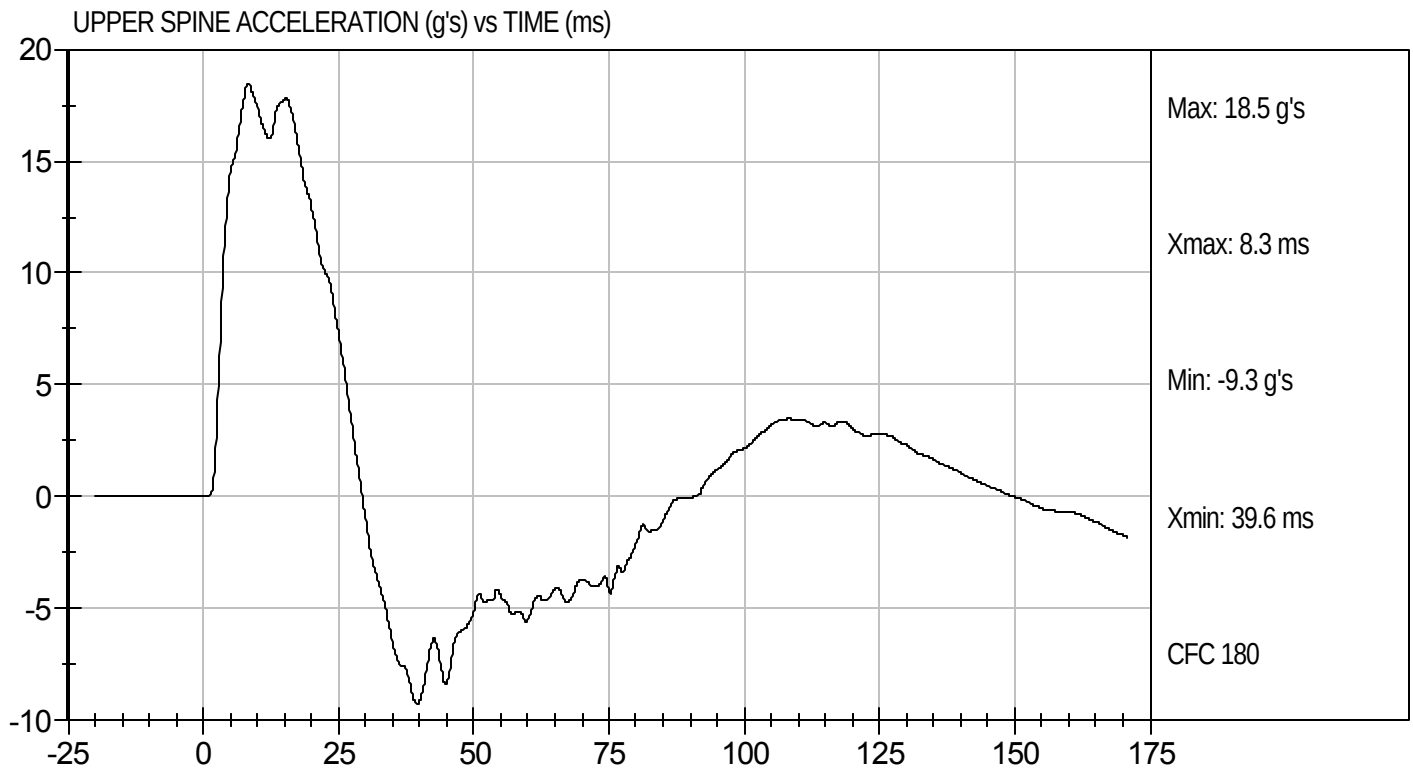
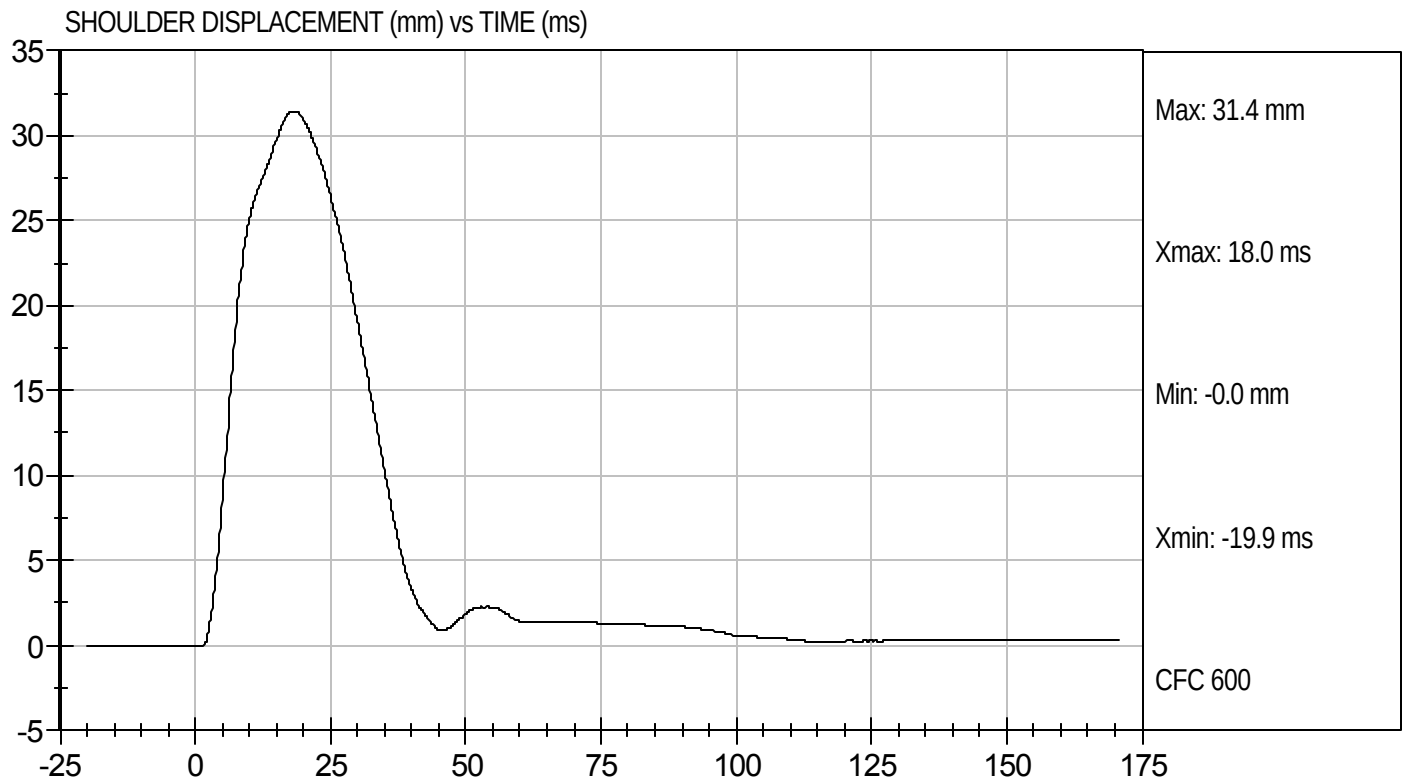
Test Date: 12/20/11
Velocity: 14.24 ft/s, 4.34 m/s





Test Desc: Shoulder Impact
Component ID: D114313

Test Date: 12/20/11
Velocity: 14.24 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: D114314

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	25	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	27	Pass
Middle Rib Displacement	mm	30 to 36	32	Pass
Lower Rib Displacement	mm	32 to 38	35	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	38	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	31	Pass
Overall Test Results				Pass


Laboratory Technician

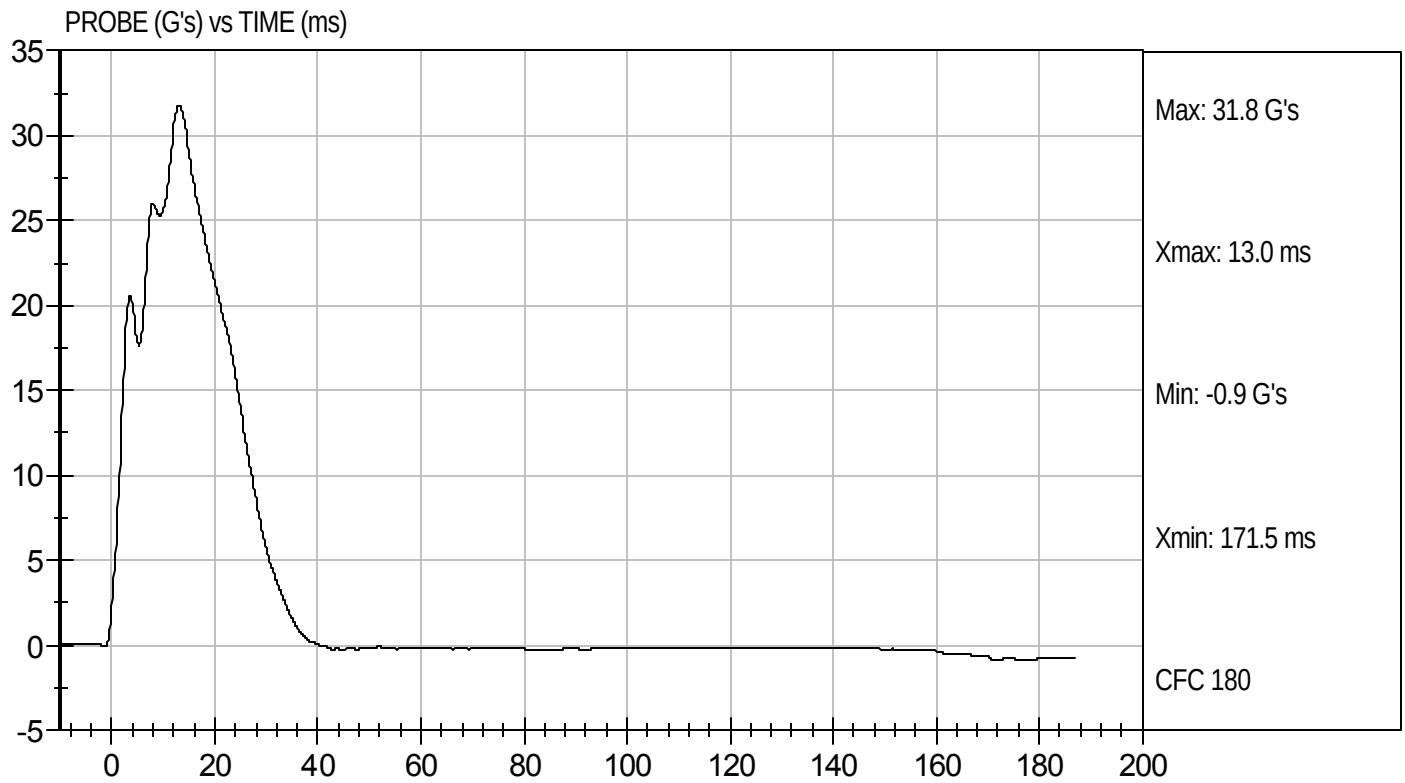
12/20/11
Test Date


Approved By



Test Desc: Thorax With Arm
Component ID: D114314

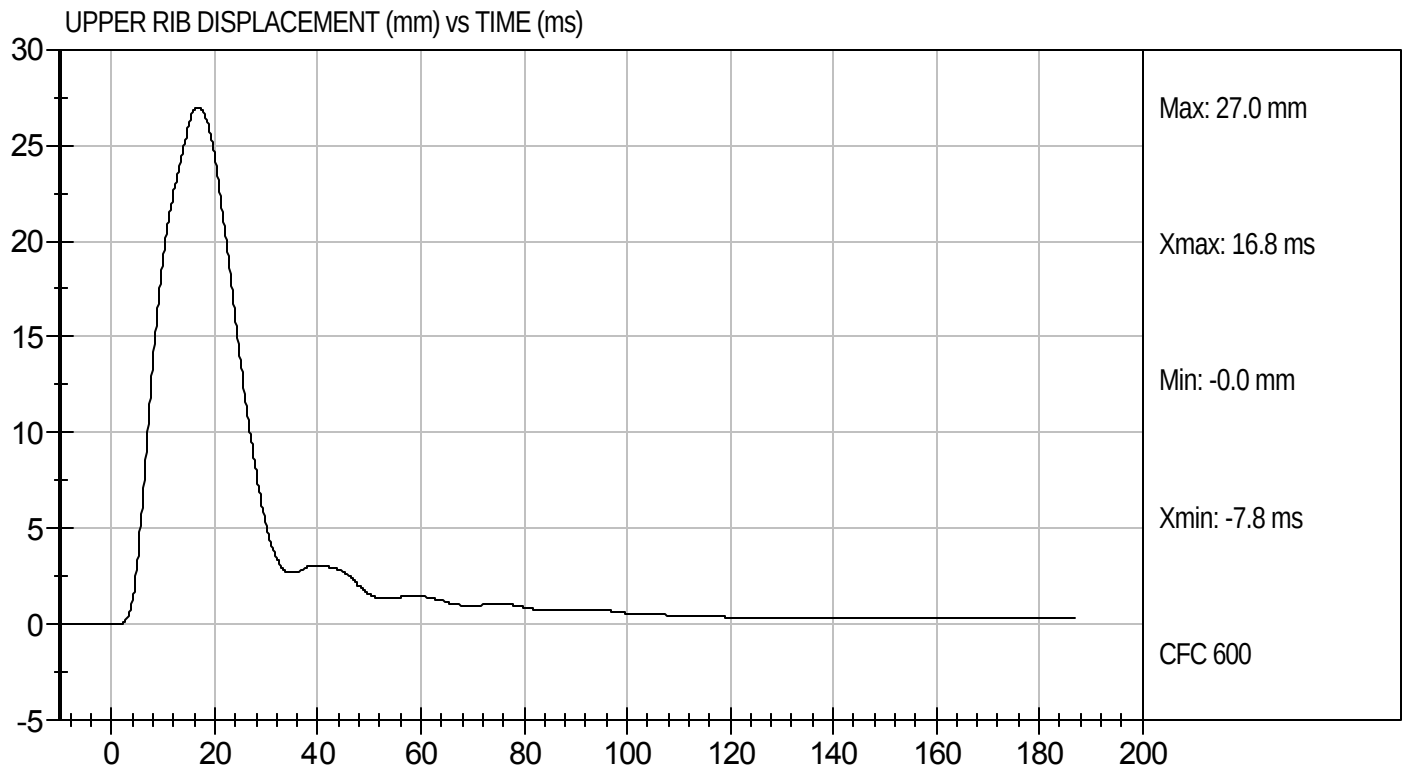
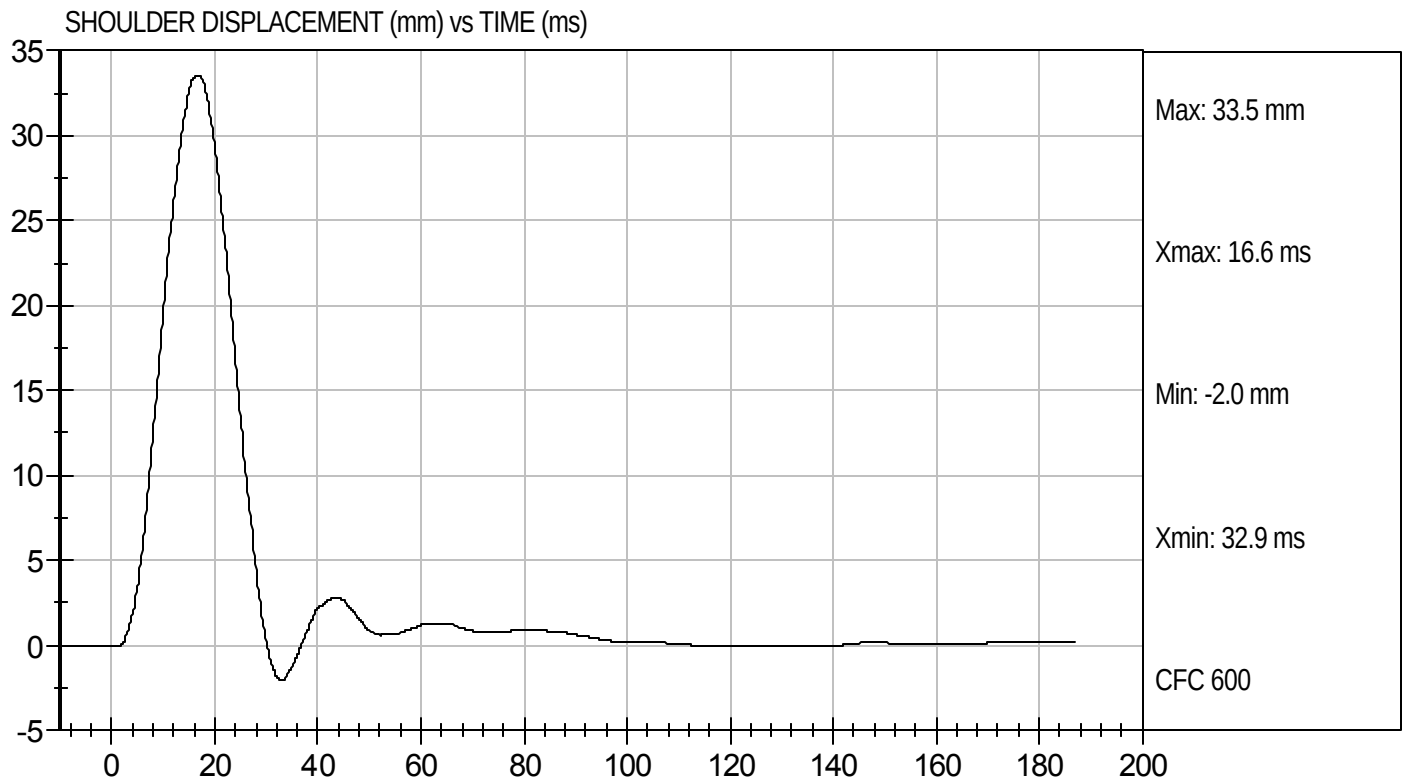
Test Date: 12/20/11
Velocity: 22.2 ft/s, 6.77 m/s





Test Desc: Thorax With Arm
Component ID: D114314

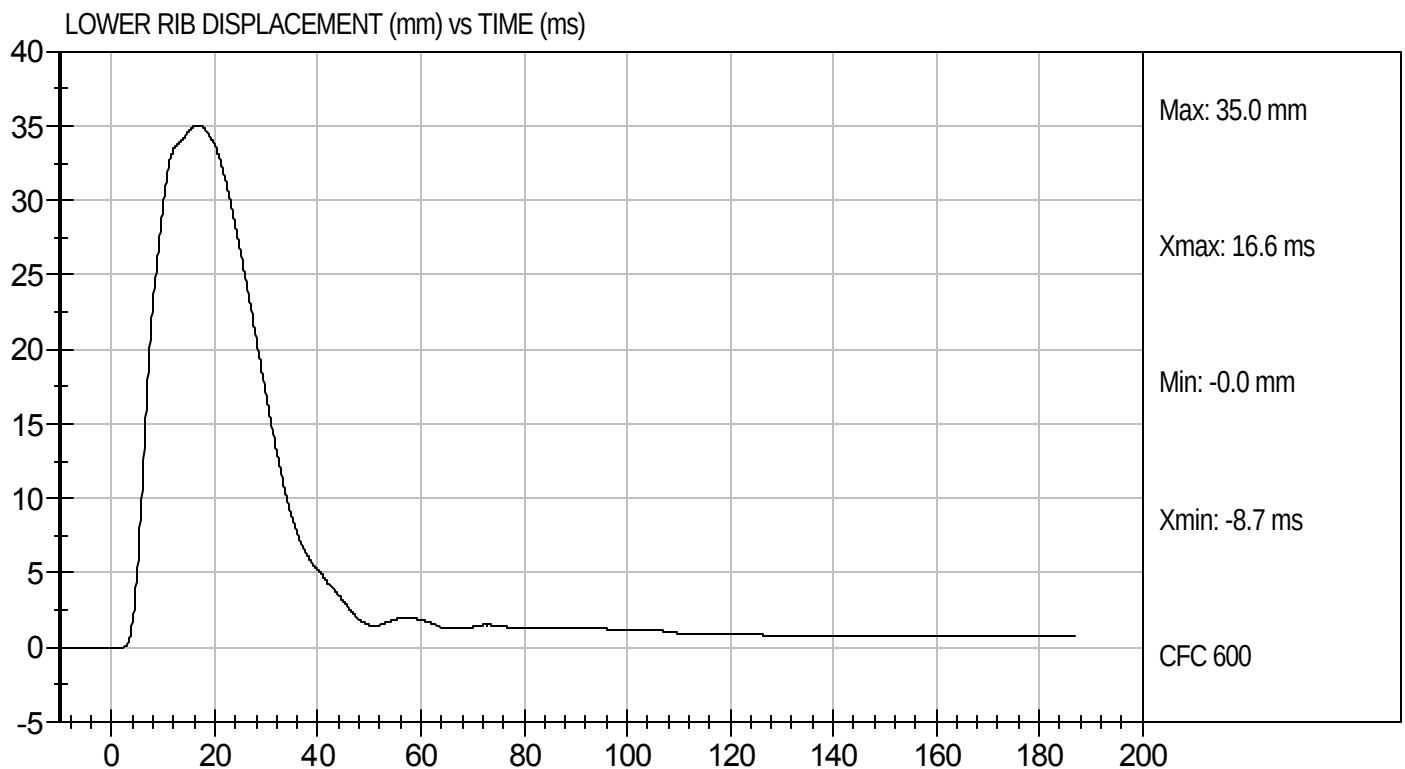
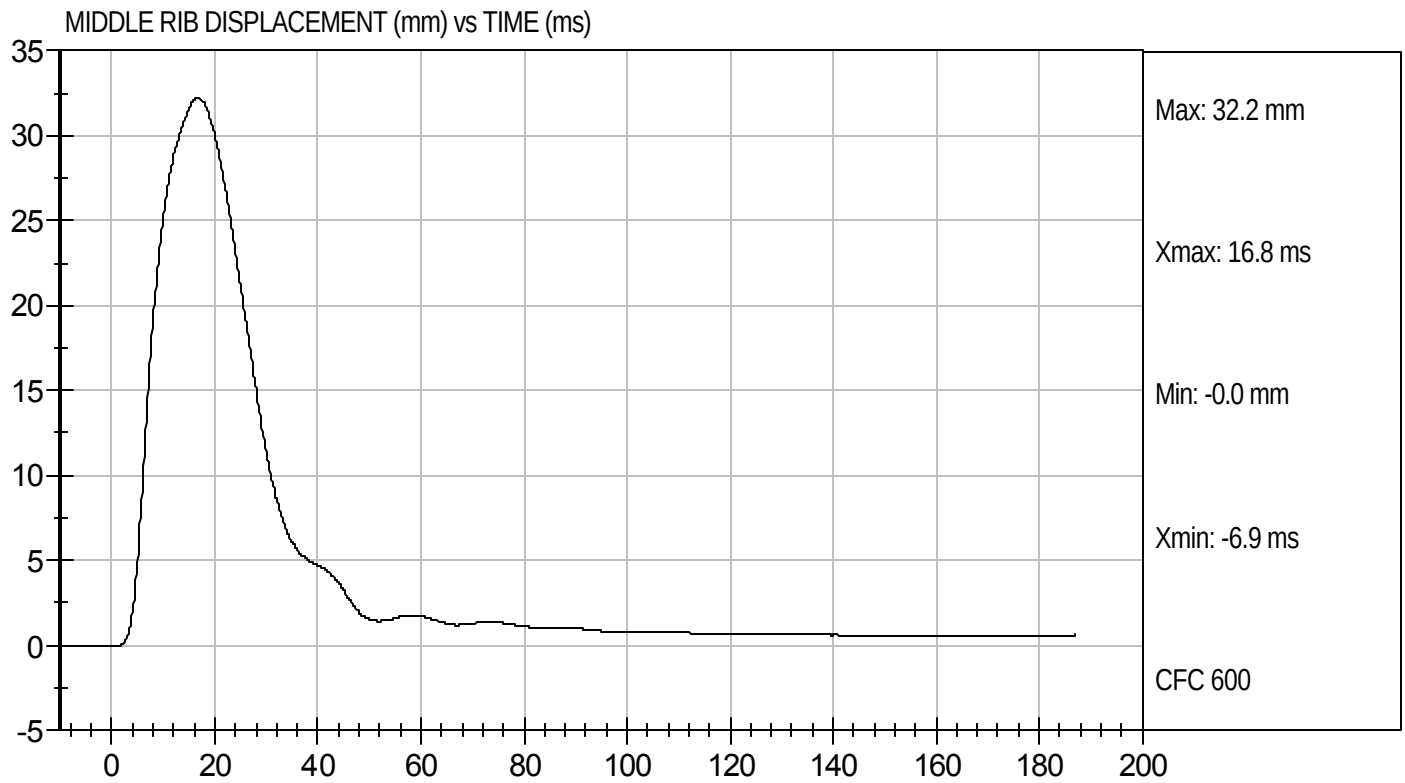
Test Date: 12/20/11
Velocity: 22.2 ft/s, 6.77 m/s





Test Desc: Thorax With Arm
Component ID: D114314

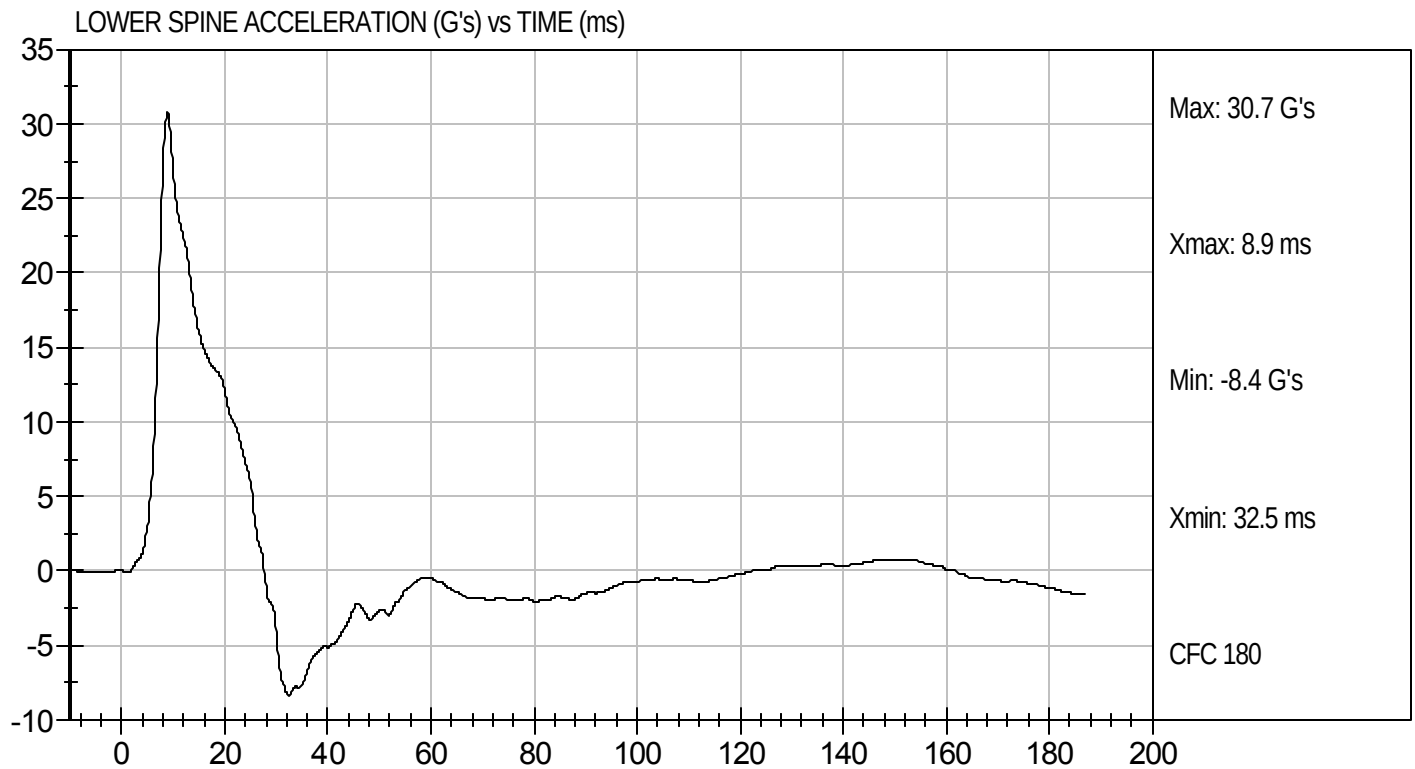
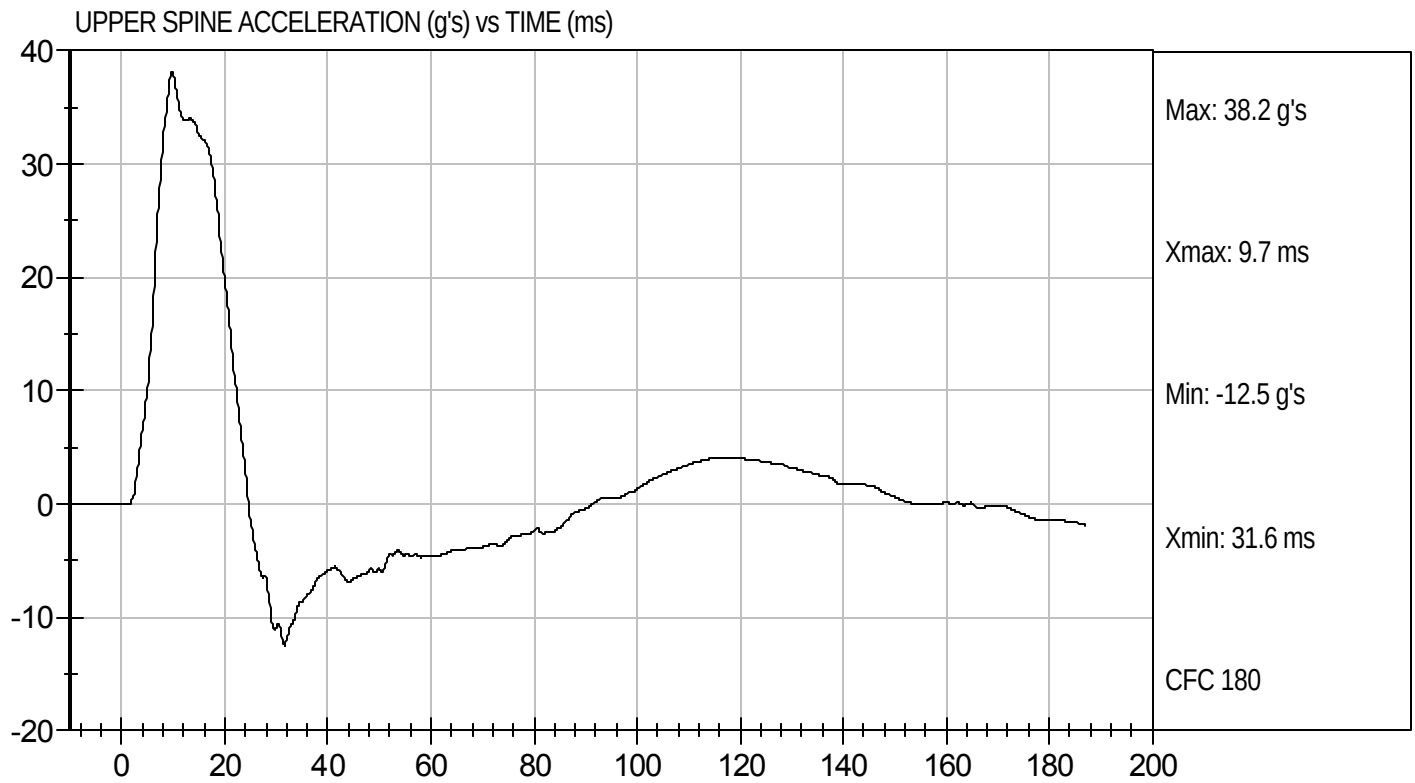
Test Date: 12/20/11
Velocity: 22.2 ft/s, 6.77 m/s





Test Desc: Thorax With Arm
Component ID: D114314

Test Date: 12/20/11
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: D114315

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	25	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	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	42	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

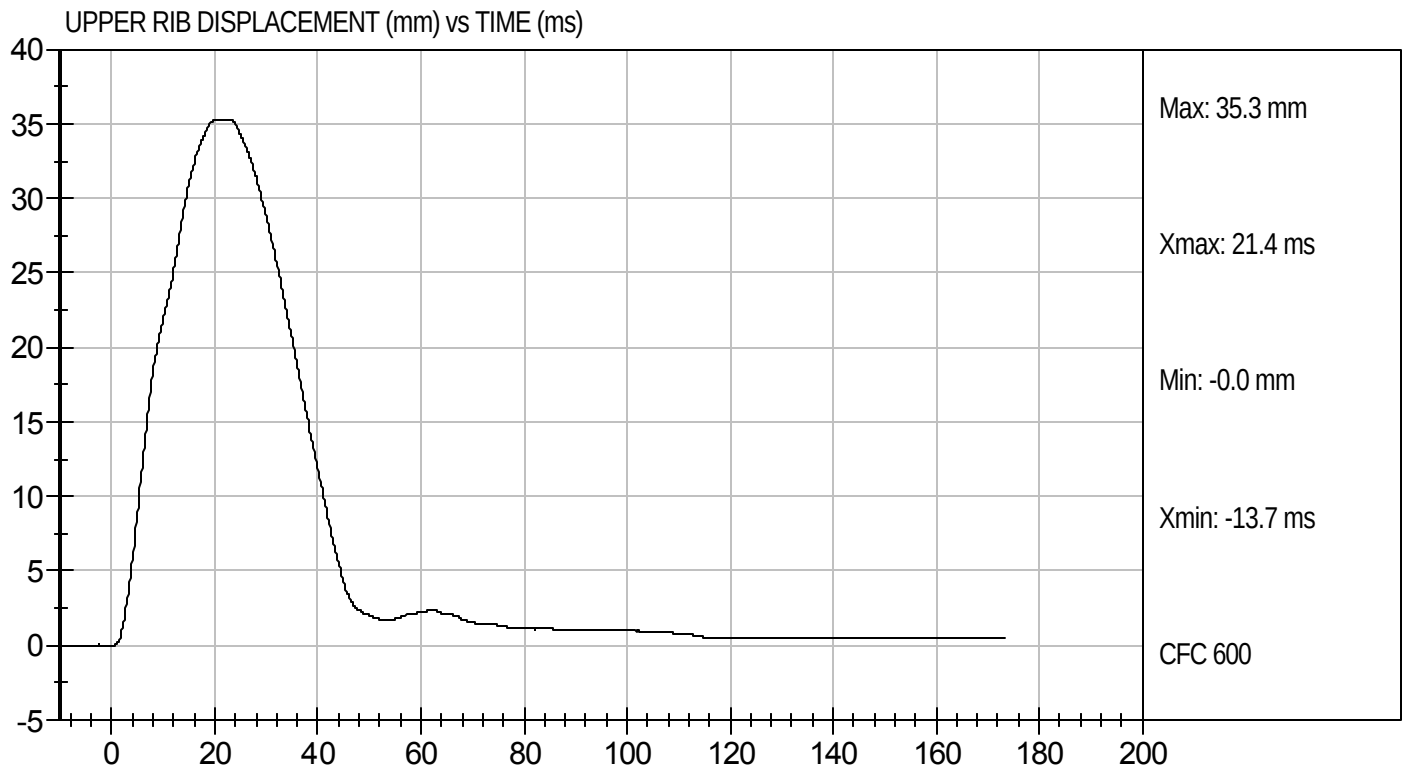
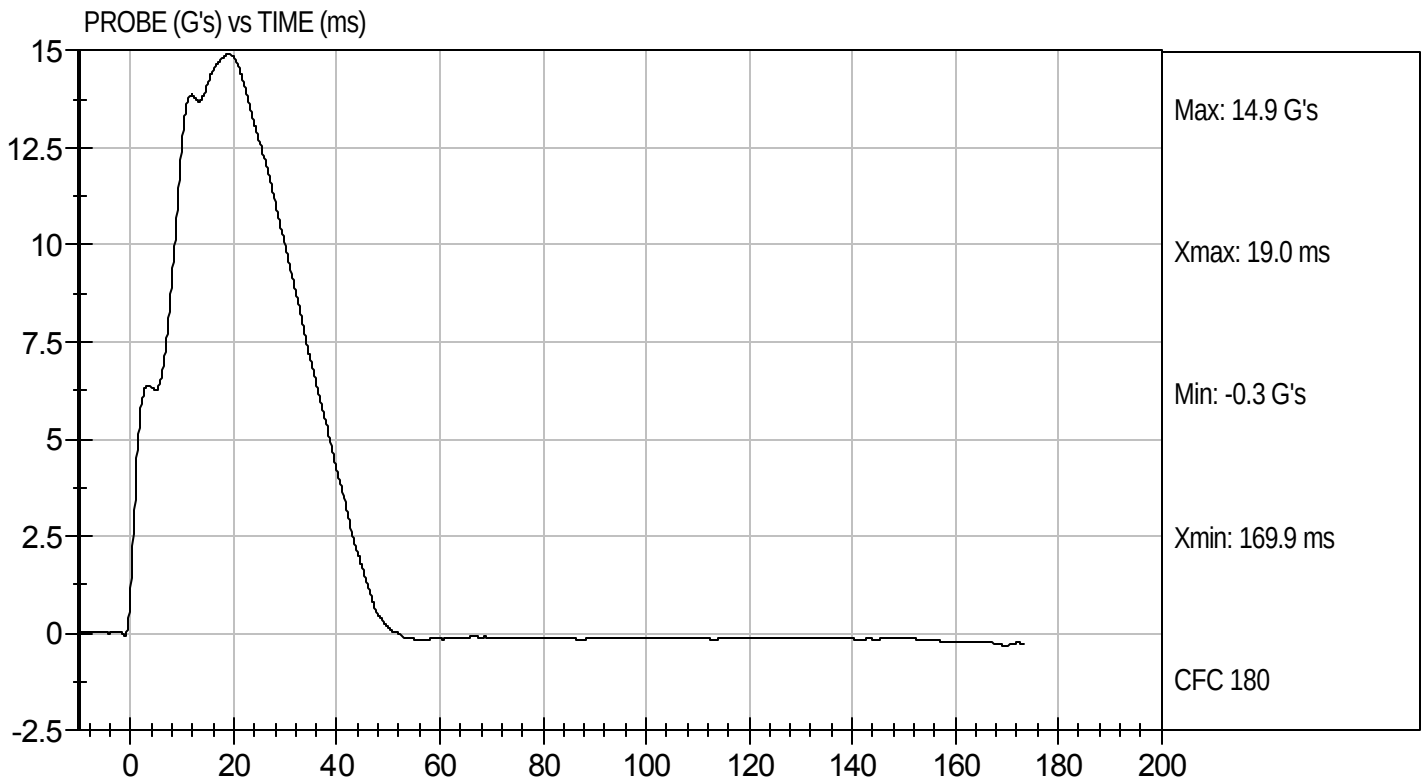
12/20/11
Test Date


Approved By



Test Desc: Thorax Without Arm
Component ID: D114315

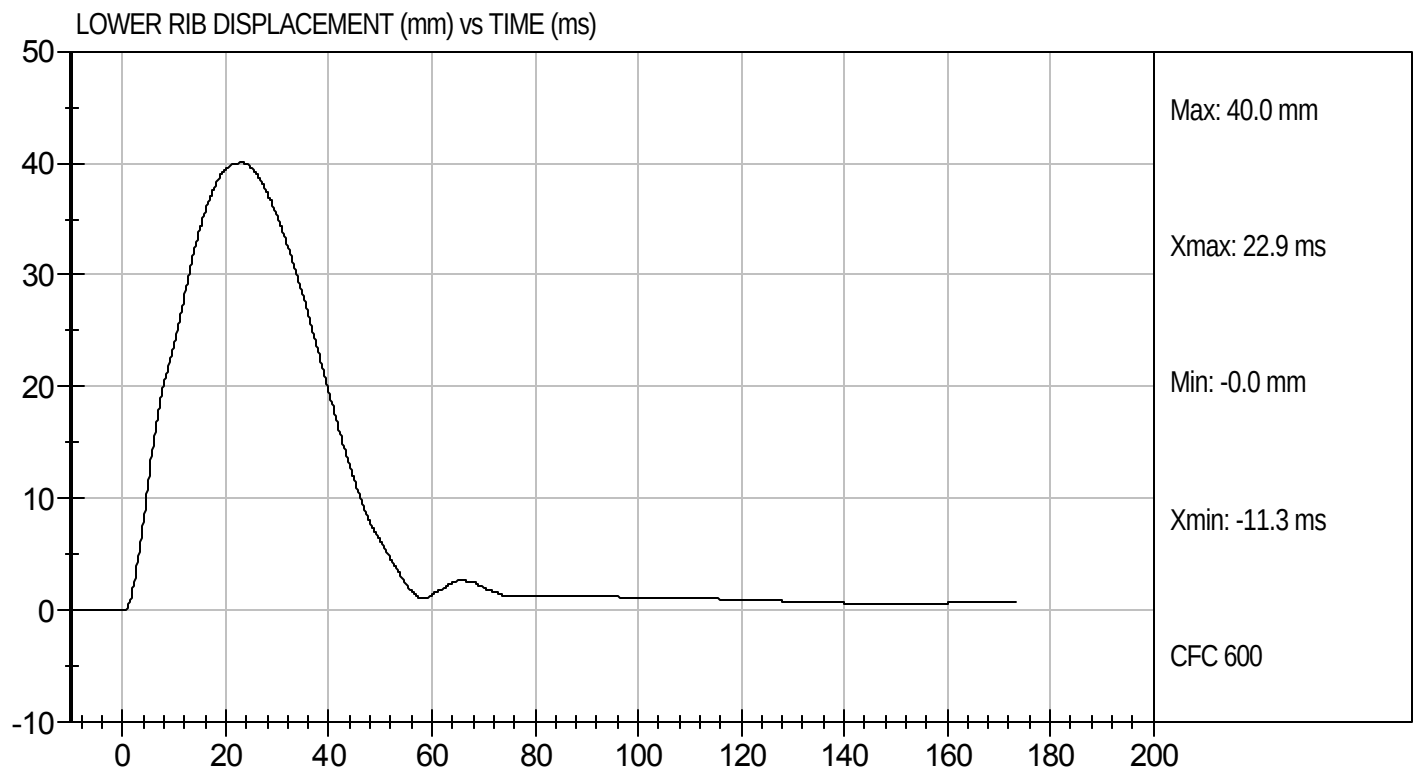
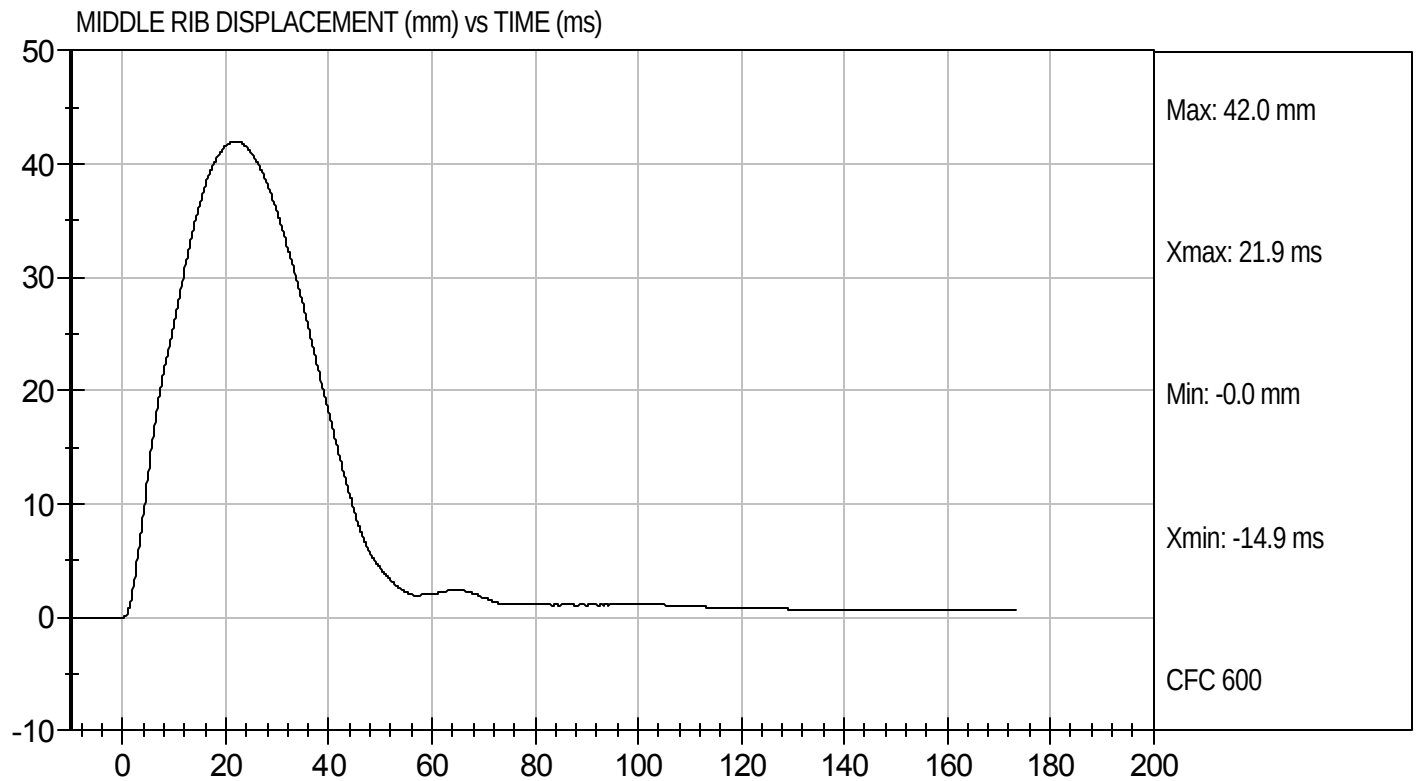
Test Date: 12/20/11
Velocity: 14.12 ft/s, 4.30 m/s





Test Desc: Thorax Without Arm
Component ID: D114315

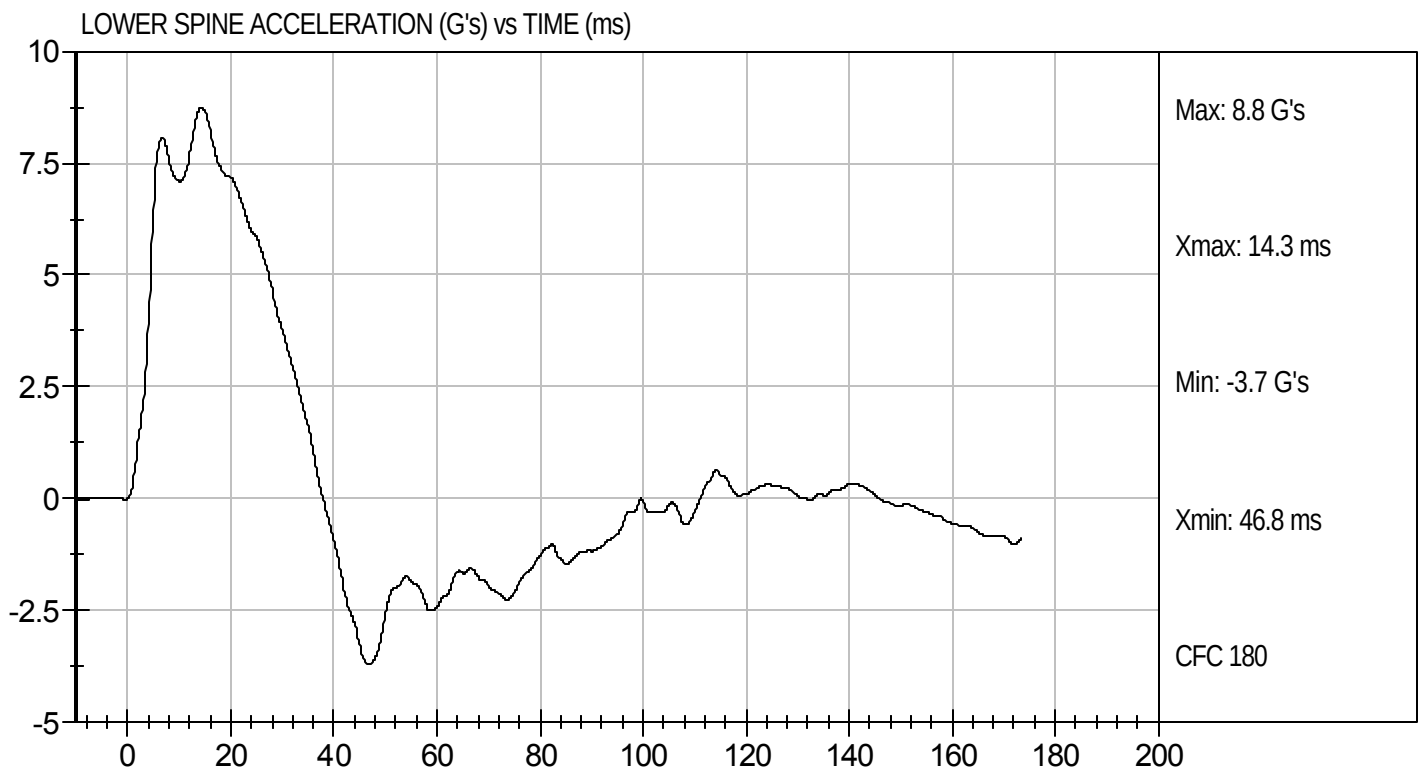
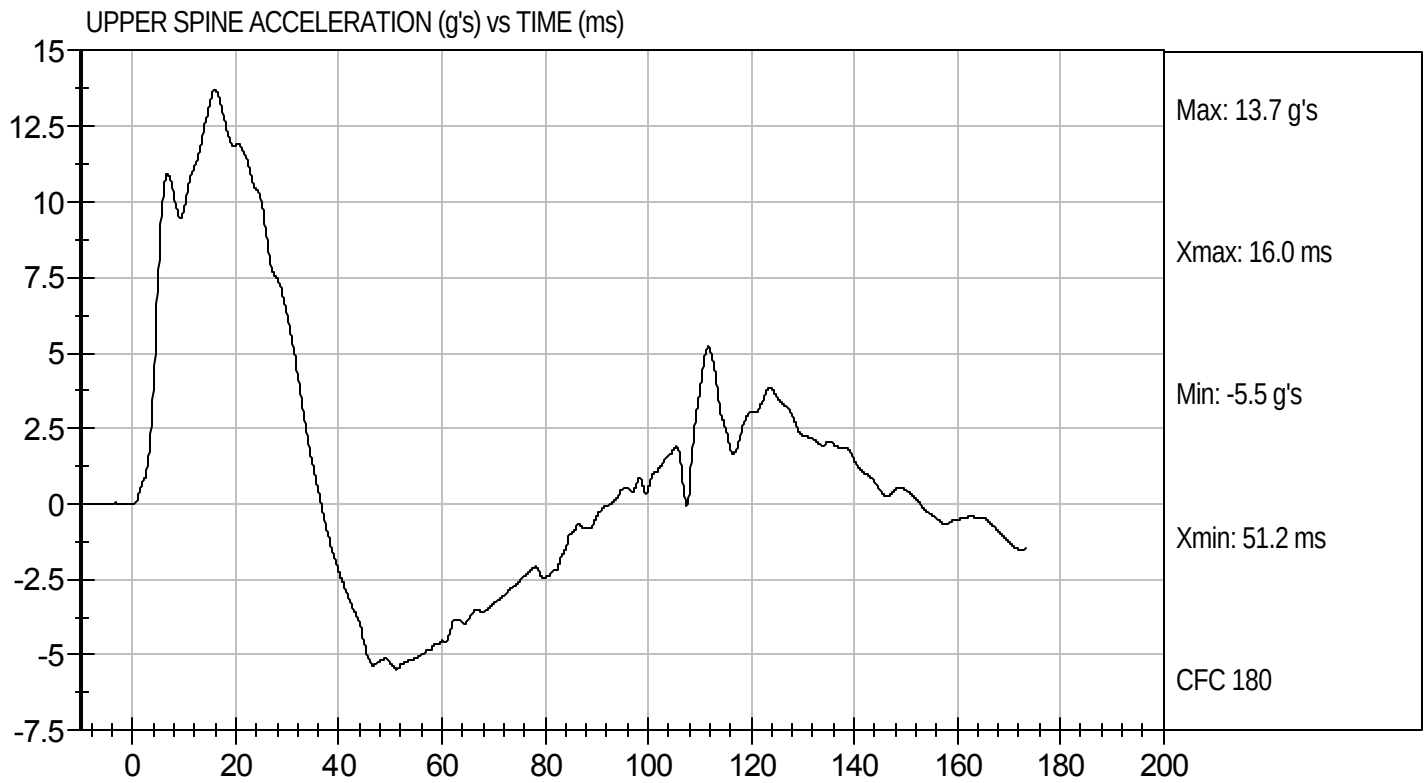
Test Date: 12/20/11
Velocity: 14.12 ft/s, 4.30 m/s





Test Desc: Thorax Without Arm
Component ID: D114315

Test Date: 12/20/11
Velocity: 14.12 ft/s, 4.30 m/s



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

ATD Serial No: 296

Test I.D: D114316

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	25	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	Pass
Peak Impactor Acceleration	G's	12 to 16	14	Pass
Upper Rib Displacement	mm	36 to 47	42	Pass
Lower Rib Displacement	mm	33 to 44	36	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	11	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

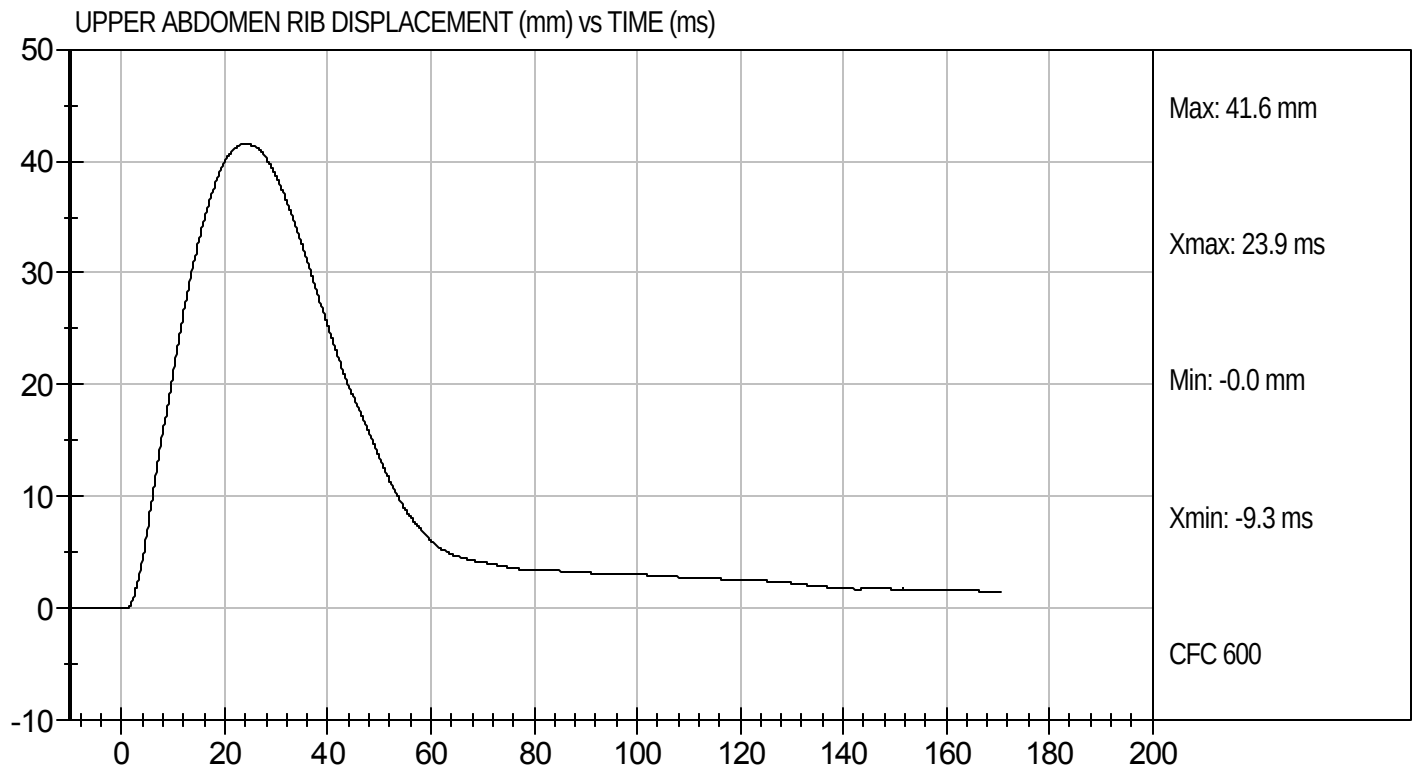
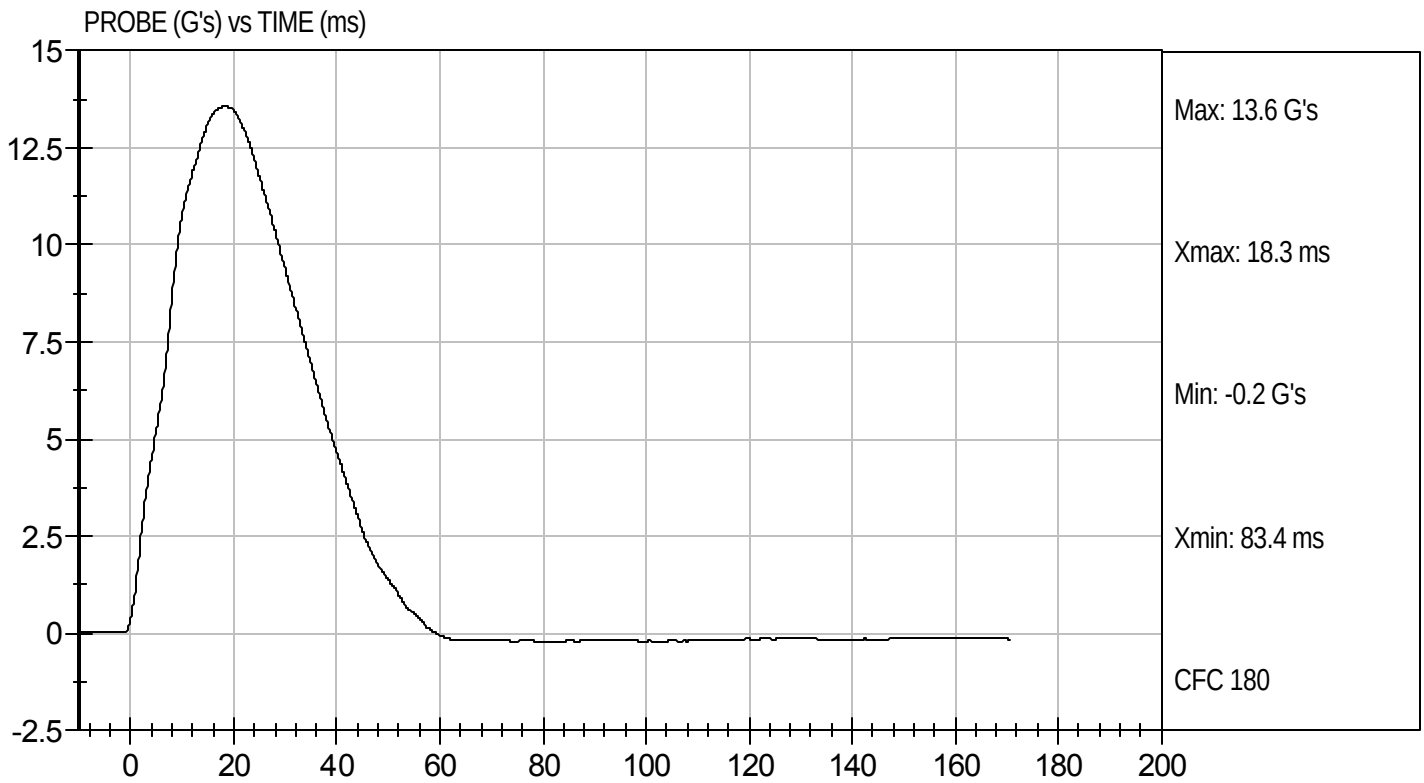
12/20/11
Test Date

David Winkelbauer
Approved By



Test Desc: Abdomen Impact
Component ID: D114316

Test Date: 12/20/11
Velocity: 14.12 ft/s, 4.30 m/s

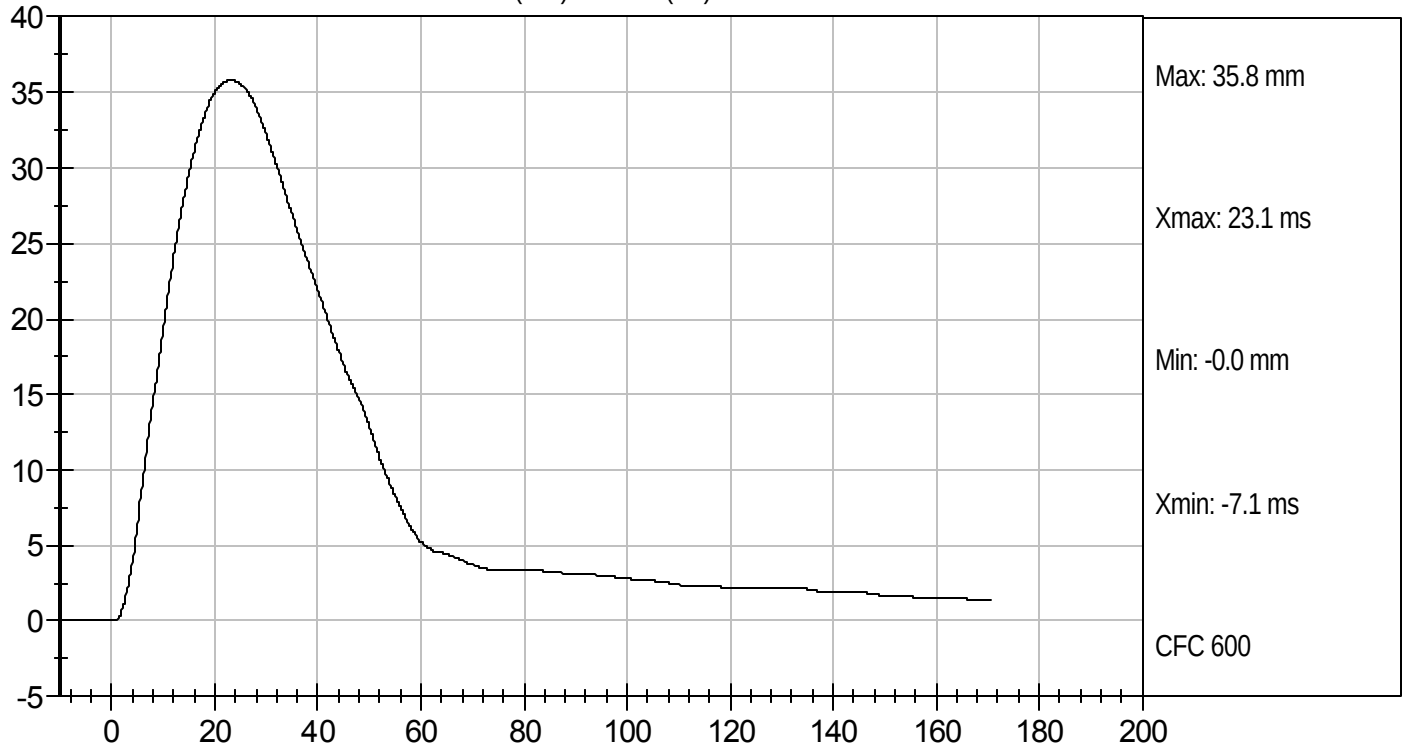




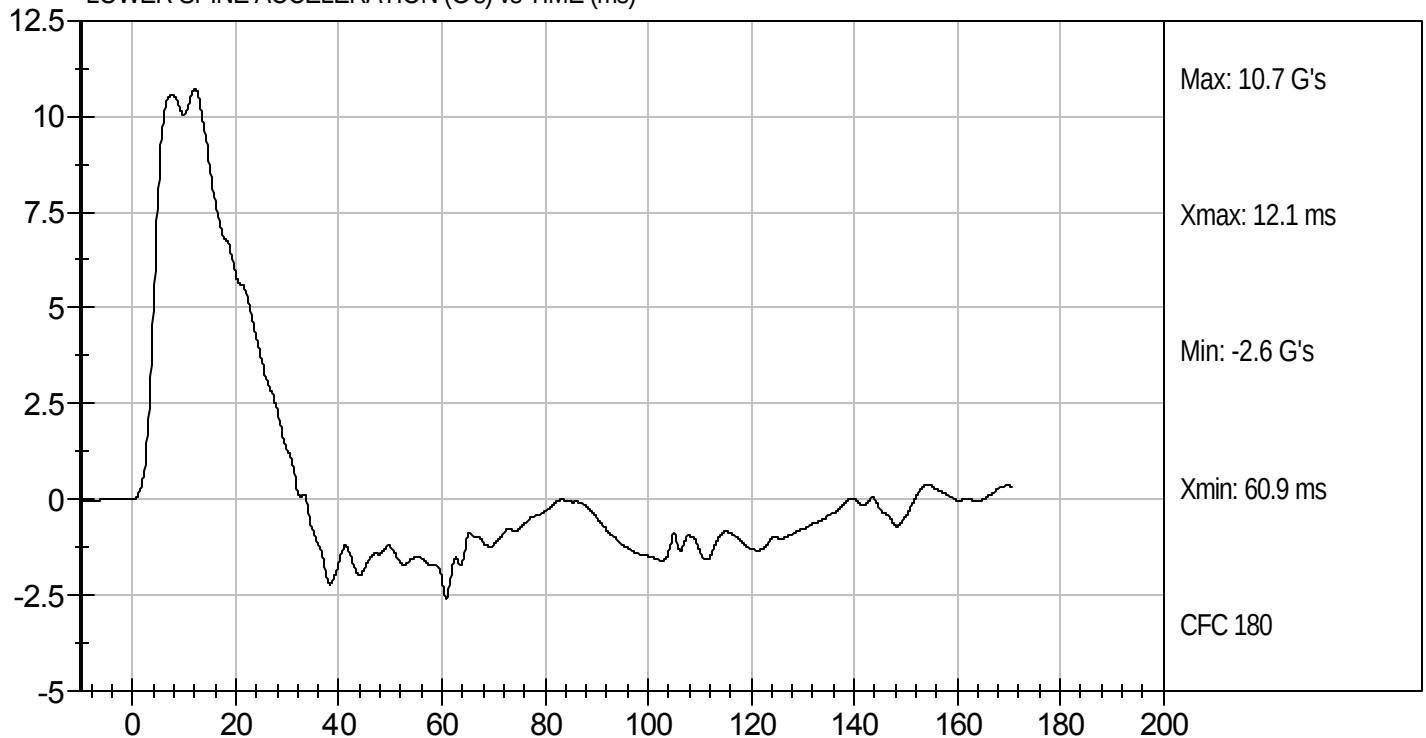
Test Desc: Abdomen Impact
Component ID: D114316

Test Date: 12/20/11
Velocity: 14.12 ft/s, 4.30 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: D114317

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	25	Pass
Impact Velocity	m/s	6.60 to 6.80	6.68	Pass
Peak Impactor Acceleration	G's	38 to 47	43	Pass
Pelvis Y Acceleration after 6 ms	G's	34 to 42	40	Pass
Peak Acetabulum Force	N	3600 to 4300	4041	Pass
Overall Test Results				Pass


Laboratory Technician

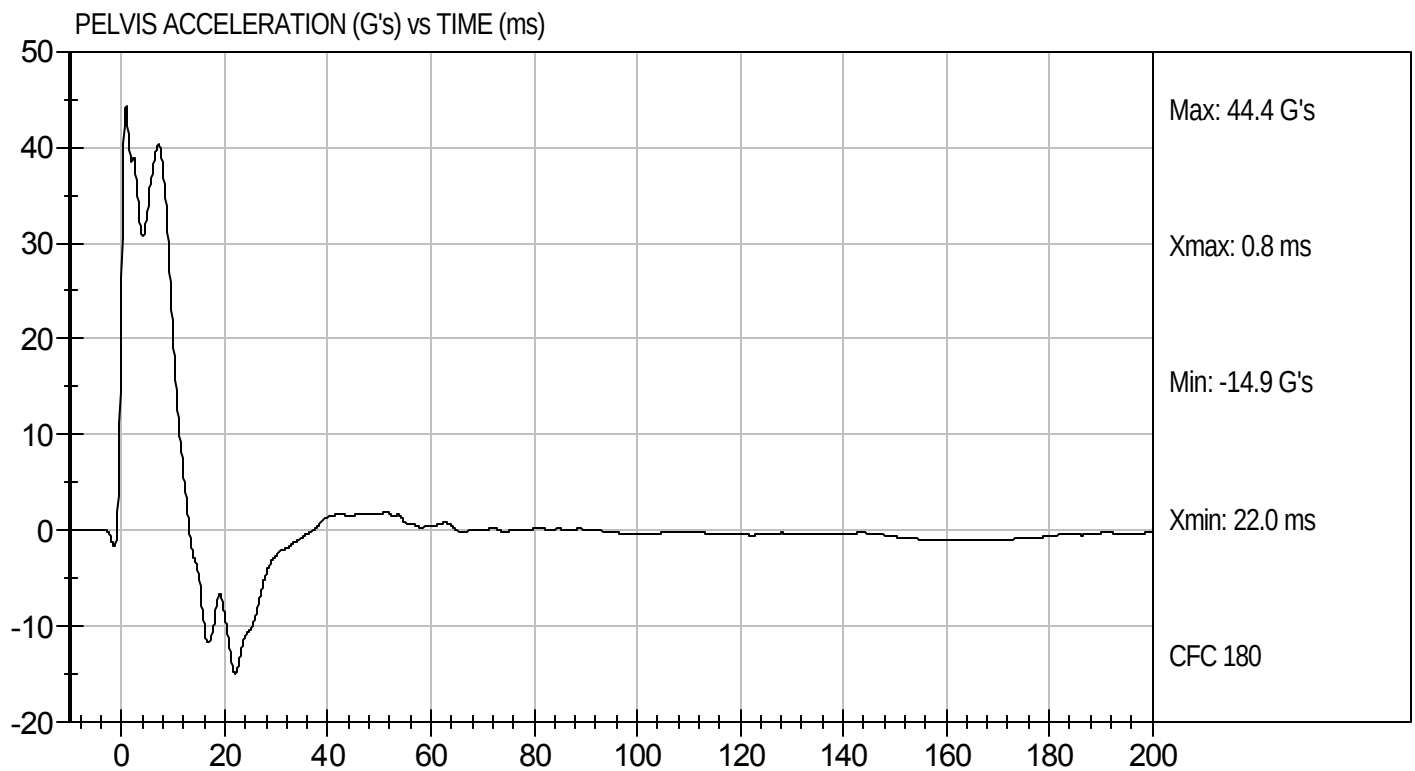
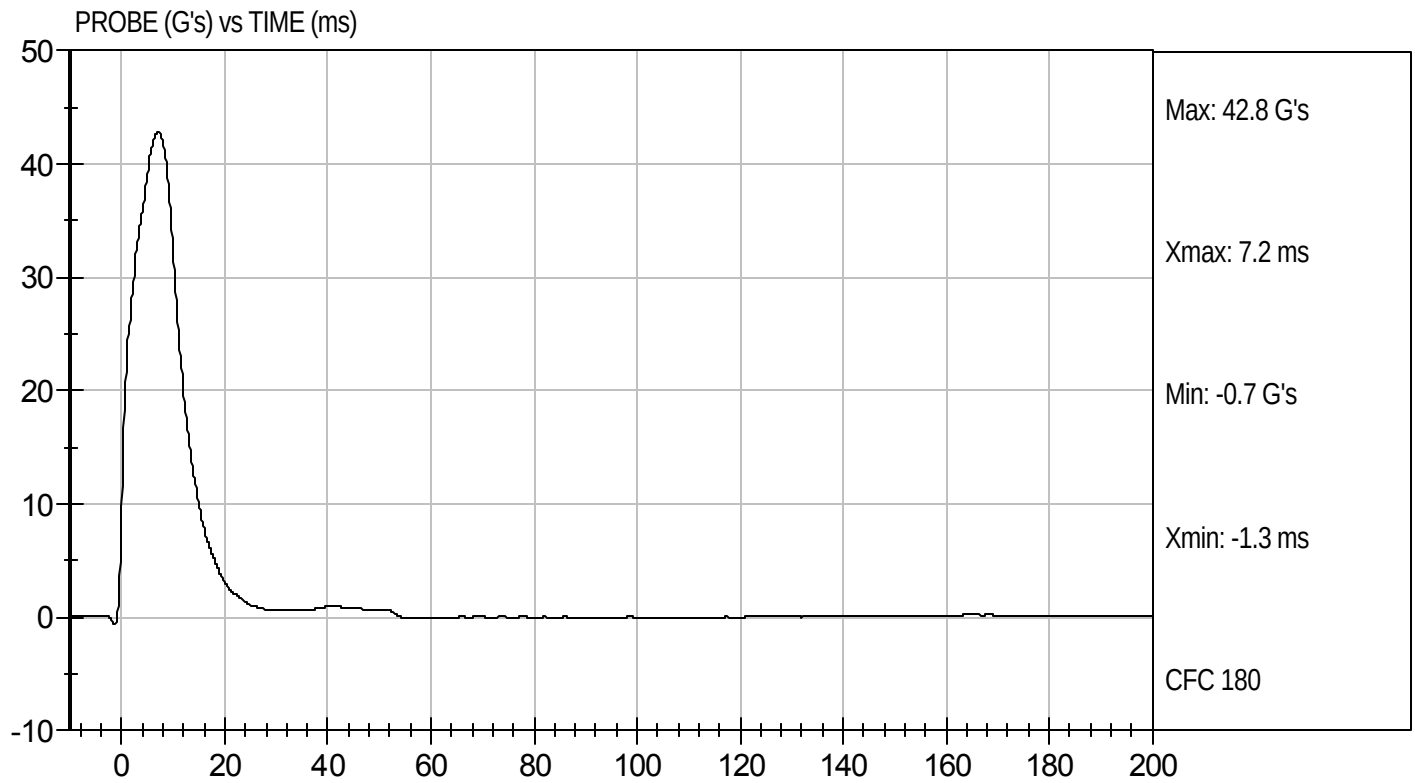
12/20/11
Test Date


Approved By



Test Desc: Pelvis Impact
Component ID: D114317

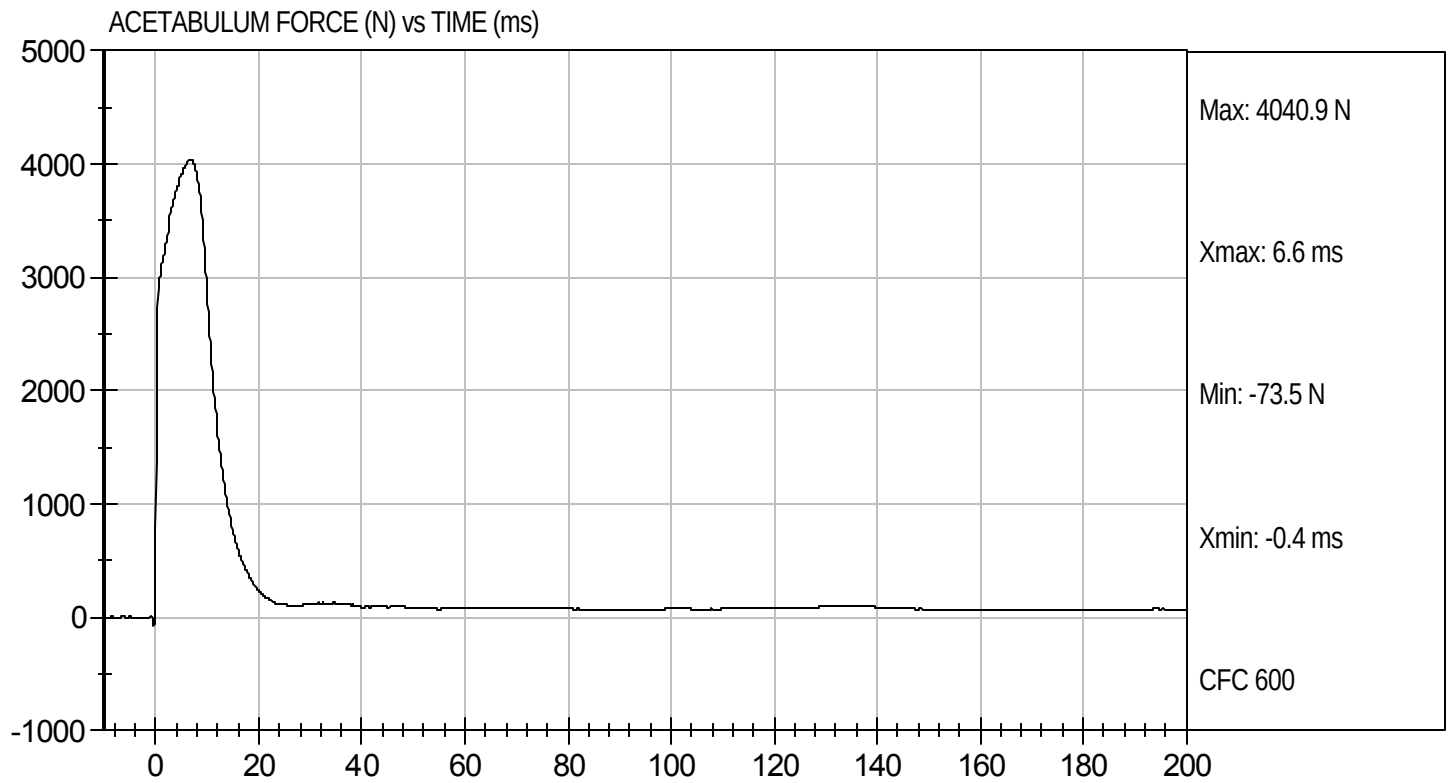
Test Date: 12/20/11
Velocity: 21.9 ft/s, 6.68 m/s





Test Desc: Pelvis Impact
Component ID: D114317

Test Date: 12/20/11
Velocity: 21.9 ft/s, 6.68 m/s



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

ATD Serial No: 296

Test I.D: D114318

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	25	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Peak Impactor Acceleration	G's	36 to 45	38	Pass
Pelvis Y Acceleration	G's	28 to 39	31	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4570	Pass
Overall Test Results				Pass

Jessica Gall
Laboratory Technician

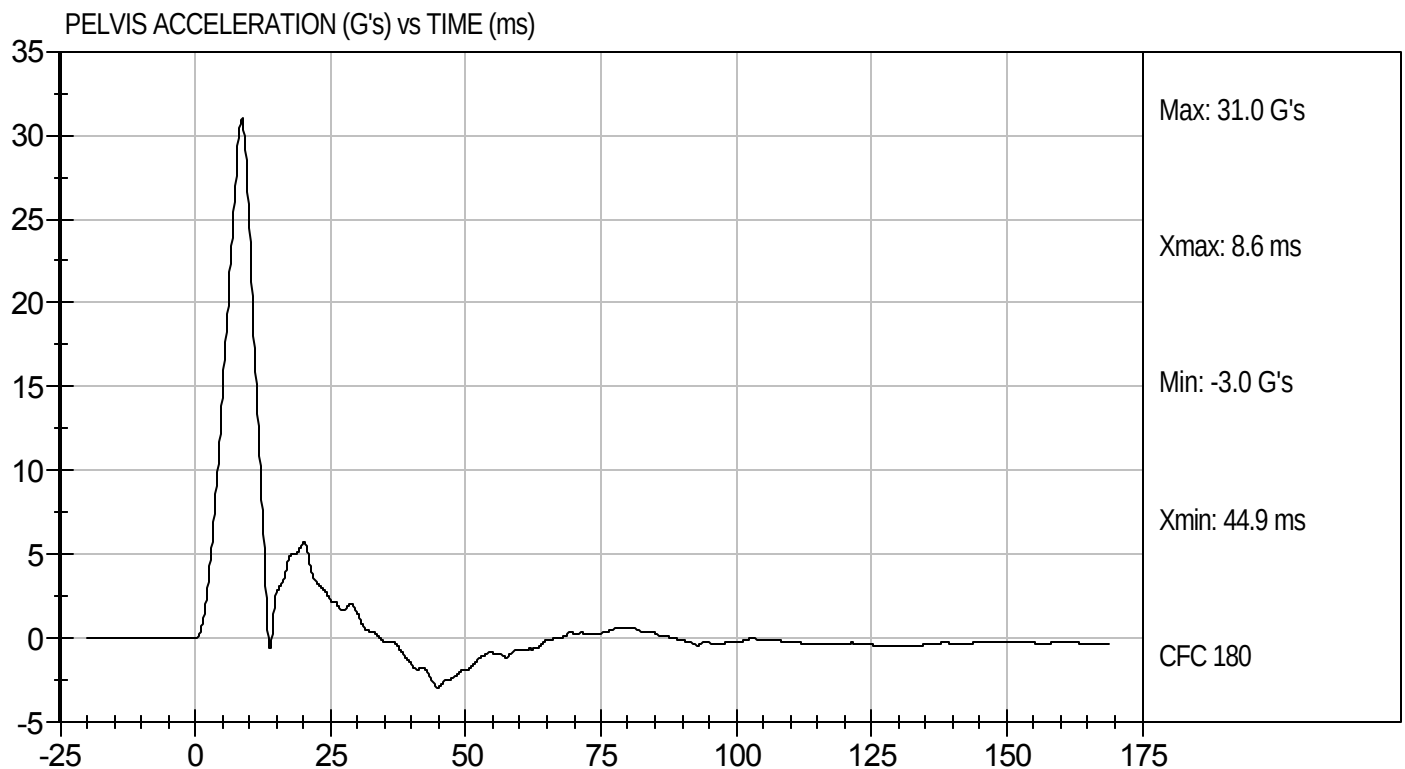
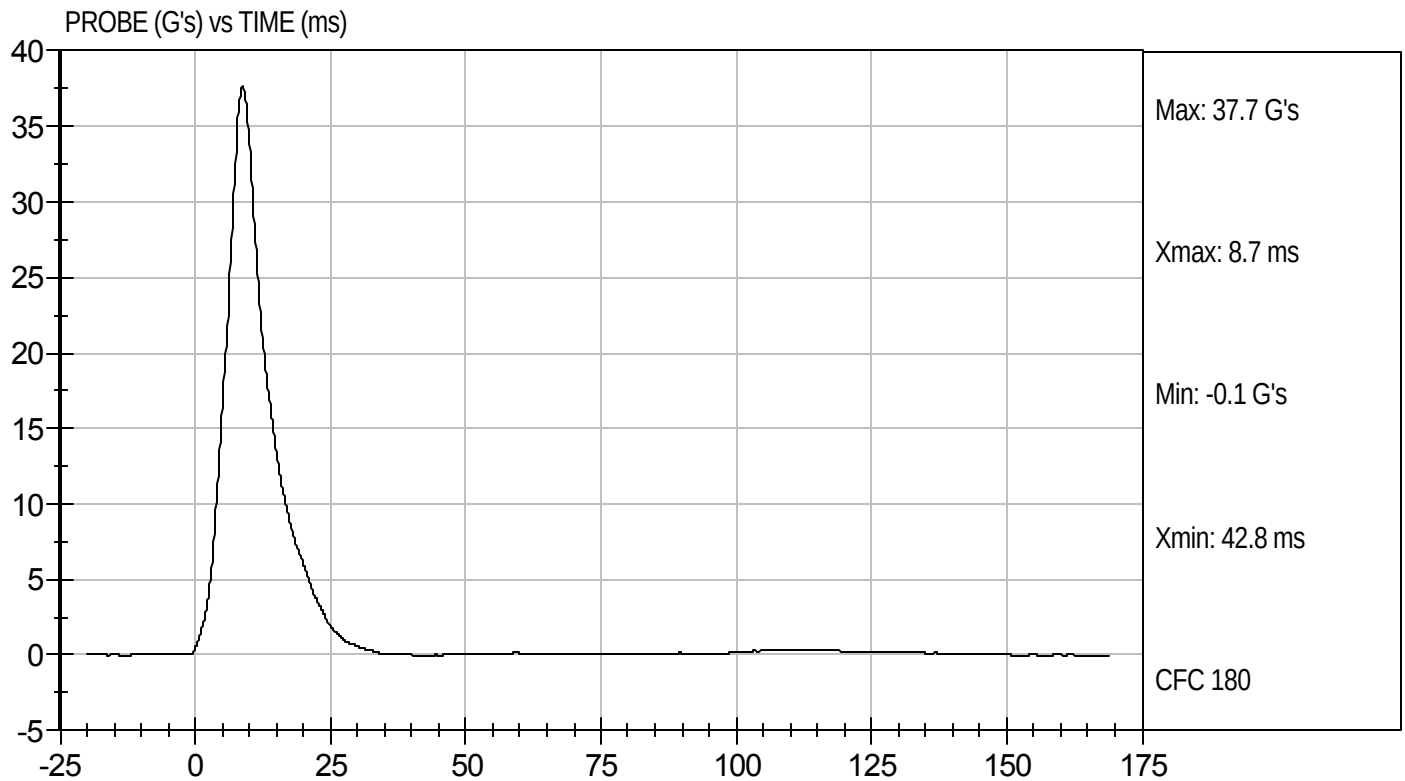
12/20/11
Test Date

David Winkelbauer
Approved By



Test Desc: Iliac Impact
Component ID: D114318

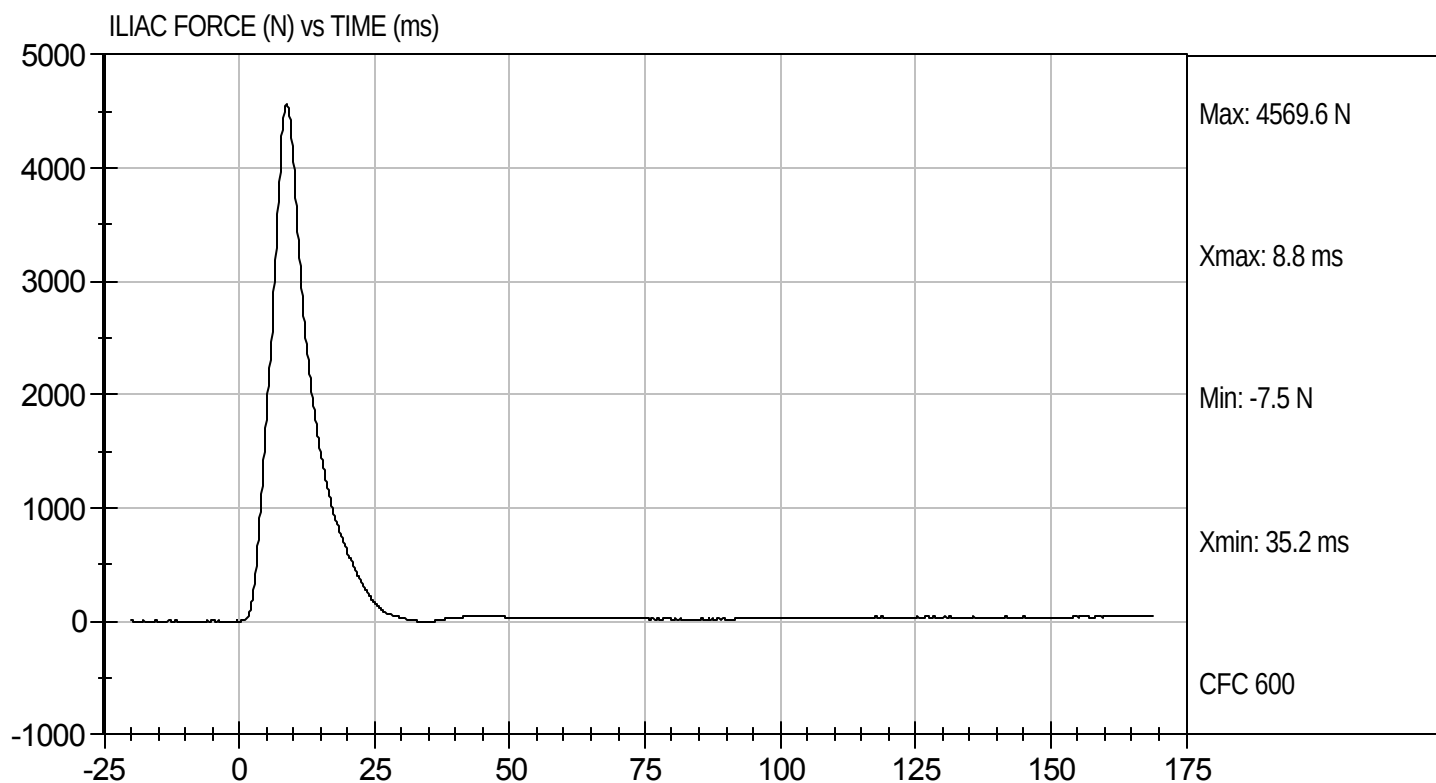
Test Date: 12/20/11
Velocity: 14.24 ft/s, 4.34 m/s





Test Desc: Iliac Impact
Component ID: D114318

Test Date: 12/20/11
Velocity: 14.24 ft/s, 4.34 m/s



APPENDIX D

TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 – Dummy Instrumentation

				SID-IIs S/N 296			
				Serial Number	Manufacturer	Calibration Date	
Head Accelerometers				X	P67363	Endevco	10/13/11
				Y	P67364	Endevco	10/13/11
				Z	P67365	Endevco	10/13/11
Head Accelerometers				Xr	P64023	Endevco	10/13/11
				Yr	P66672	Endevco	10/13/11
				Zr	P66762	Endevco	10/13/11
Displacement Potentiometers	Thoracic Rib	Upper	Y	G1214	FTSS	10/18/11	
		Middle	Y	G1163	FTSS	10/18/11	
		Lower	Y	G1158	FTSS	10/18/11	
	Abdominal Rib	Upper	Y	G1146	FTSS	10/18/11	
		Lower	Y	G1126	FTSS	10/18/11	
Lower Spine Accelerometers (T12)				X	P67286	Endevco	09/22/11
				Y	P67289	Endevco	09/22/11
				Z	P67291	Endevco	09/22/11
Acetabulum Load Cell				Y	ACG269	Denton	01/06/11
Iliac Wing Load Cell				Y	IWG282	Denton	01/06/11
Pelvis Plug (struck side)					46421	FTSS	09/22/11
Pelvis Plug (non-struck side)					38408	FTSS	12/29/10

Table 2 – Vehicle Instrumentation

		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	P63514	Endevco	10/25/11
Vehicle Center of Gravity	Y	P63515	Endevco	10/25/11
Vehicle Center of Gravity	Z	P63513	Endevco	10/25/11
Left Floor Sill	Y	P37910	Endevco	07/07/11
A-Pillar Sill	Y	P47115	Endevco	09/12/11
A-Pillar Low	Y	P59283	Endevco	07/07/11
A-Pillar Mid	Y	P59275	Endevco	11/04/11
B-Pillar Sill	Y	P63226	Endevco	10/20/11
B-Pillar Low	Y	P47079	Endevco	10/20/11
B-Pillar Mid	V	P53288	Endevco	09/12/11
Driver Seat	Y	P52170	Endevco	10/20/11
Engine Top	X	P59273	Endevco	08/22/11
Engine Top	Y	P59272	Endevco	08/22/11
Firewall	Y	P63219	Endevco	10/25/11
Right Roof	Y	P59230	Endevco	10/20/11
Right Floor Sill	Y	P55687	Endevco	11/04/11
Rear Floorpan	X	P63388	Endevco	09/13/11
Rear Floorpan	Y	P63387	Endevco	09/13/11

Table 3 – Pole Instrumentation

	Serial Number	Manufacturer	Calibration Date
Load Cell 1	DG6277	FTSS	09/15/11
Load Cell 2	DG6278	FTSS	09/15/11
Load Cell 3	DG6279	FTSS	09/15/11
Load Cell 4	DG6280	FTSS	09/15/11
Load Cell 5	DG6281	FTSS	09/15/11
Load Cell 6	DG6283	FTSS	09/15/11
Load Cell 7	DG6284	FTSS	09/15/11
Load Cell 8	DG6582	FTSS	09/15/11