

**REPORT NUMBER: SINCAP-MGA-2011-047**

**NEW CAR ASSESSMENT PROGRAM (NCAP)  
Moving Deformable Barrier Side Impact Test**

**HONDA MFG. OF ALABAMA, LLC  
2011 Honda Odyssey LX Minivan  
NHTSA No.: MB5313**

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



**Test Date: December 1, 2010**


**Final Report Date: January 7, 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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Approved by:   
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Approval Date: January 7, 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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<b>4. Title and Subtitle</b> Final Report of New Car Assessment Program Side Impact Testing of a 2011 Honda Odyssey LX Minivan NHTSA No.: MB5313		<b>5. Report Date</b> January 7, 2011																								
		<b>6. Performing Organization Code</b> MGA																								
<b>7. Author(s)</b> Donna Janovicz, Project Manager Ben Fischer, Project Engineer		<b>8. Performing Organization Report No.</b> SINCAP-MGA-2011-047																								
<b>9. Performing Organization Name and Address</b> MGA Research Corporation 5000 Warren Road Burlington, WI 53105		<b>10. Work Unit No.</b>																								
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<b>12. Sponsoring Agency Name and Address</b> U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards 1200 New Jersey Ave, SE, Room W43-410 Washington, D.C. 20590		<b>13. Type of Report and Period Covered:</b> Final Test Report December 1, 2010 to January 7, 2011																								
		<b>14. Sponsoring Agency Code</b> NVS-111																								
<b>15. Supplementary Notes</b>																										
<b>16. Abstract</b> A 55/28 km/h 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2011 Honda Odyssey LX Minivan in accordance with the specifications of the Office of Crashworthiness Standards NCAP Side Laboratory Test Procedure for the generation of consumer information on vehicle side crash protection. The test was conducted at MGA Research Corporation, in Burlington, Wisconsin, on December 1, 2010.  The impact velocity of the Moving Deformable Barrier (MDB) was 62.4 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 target vehicle post-test maximum crush was 271 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" style="text-align: center;">Driver ATD (ES-2re)</th> </tr> <tr> <th style="text-align: center;">Units</th> <th style="text-align: center;">Threshold</th> <th style="text-align: center;">Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC<sub>36</sub>)</td> <td style="text-align: center;">N/A</td> <td style="text-align: center;">1000</td> <td style="text-align: center;">57</td> </tr> <tr> <td>Maximum Thorax Rib Deflection</td> <td style="text-align: center;">mm</td> <td style="text-align: center;">44</td> <td style="text-align: center;">24</td> </tr> <tr> <td>Combined Abdominal Force</td> <td style="text-align: center;">N</td> <td style="text-align: center;">2500</td> <td style="text-align: center;">910</td> </tr> <tr> <td>Pubic Symphysis Force</td> <td style="text-align: center;">N</td> <td style="text-align: center;">6000</td> <td style="text-align: center;">1695</td> </tr> </tbody> </table>				Measurement Description	Driver ATD (ES-2re)			Units	Threshold	Result	Head Injury Criteria (HIC <sub>36</sub> )	N/A	1000	57	Maximum Thorax Rib Deflection	mm	44	24	Combined Abdominal Force	N	2500	910	Pubic Symphysis Force	N	6000	1695
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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.																										
<b>17. Key Words</b> New Car Assessment Program (NCAP) Side Impact MDB ES-2re SID-IIs		<b>18. Distribution Statement</b> Copies of this report are available from: National Highway Traffic Safety Adm. Technical Reference Division 1200 New Jersey Ave, SE Washington, D.C. 20590																								
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**SECTION 1**  
**PURPOSE AND SUMMARY OF TEST**

**PURPOSE**

This moving deformable barrier 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 Honda Odyssey LX Minivan. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Laboratory Test Procedure dated January 2010.

**SUMMARY**

A 2011 Honda Odyssey LX Minivan was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 62.4 km/h (38.8 mph). The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by MGA Research Corporation in Burlington, Wisconsin, on December 1, 2010. Pretest and post test photographs of the test vehicle, the MDB, and the dummies (ES-2re and SID-IIs) are included in this report.

Dummies were placed in the driver and left rear designated seating positions according to instructions specified in the OCWS NCAP Side Laboratory Test Procedure dated January 2010. The side impact event was documented by eleven (11) cameras. Camera locations are included in this report.

The dummies were instrumented in the following manner:

**DRIVER ATD (ES-2re)**

Head CG Triaxial Accelerometers  
Thorax Rib 1 to Rib 3 Displacement Potentiometers  
Abdomen Forward, Middle, and Rear Load Cells  
Lower Spine Triaxial Accelerometers  
Pubic Load Cell

**PASSENGER ATD (SID-IIs)**

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

### DUMMY INJURY VALUES

Measurement Description	Driver ATD (ES-2re)		
	Units	Threshold	Result
Head Injury Criteria (HIC <sub>36</sub> )	N/A	1000	57
Maximum Thorax Rib Deflection	mm	44	24
Combined Abdominal Force	N	2500	910
Pubic Symphysis Force	N	6000	1695

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC <sub>36</sub> )	N/A	1000	140
Lower Spine (T12) Resultant Acceleration	G	82	54
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3173

### SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Left Front (Driver) P1		Left Rear (Passenger) P4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No	No	
Knee Airbag	No		No	
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso/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](http://www.nhtsa.dot.gov)

### GENERAL COMMENTS

There was no valid data collected for:  
 Left Mid B-Post Y after 5 msec.  
 Left Lower A-Post Y  
 Driver Seat Track Y after 5 msec.

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

**SECTION 2**  
**OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS**

**DATA SHEET NO. 1**

**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2011 Honda Odyssey LX Minivan  
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5313  
 Test Date: 12/01/2010

**TEST VEHICLE INFORMATION AND OPTIONS**

NHTSA No.	MB5313	Anti-Lock Brakes	Yes
Model Year	2011	All Wheel Drive	No
Make	Honda	Power Steering	Yes
Model	Odyssey	Driver Front Airbag	Yes
Body Style	Minivan	Driver Curtain Airbag	Yes
VIN	5FNRL5H20BB007178	Driver Head/Torso Airbag	No
Body Color	Mocha Metallic	Driver Torso Airbag	No
Delivery Date	11/01/2010	Driver Torso/Pelvis Airbag	Yes
Odometer (mi)	34	Driver Pelvis Airbag	No
Odometer (km)	55	Driver Knee Airbag	No
Dealer	Rosen Honda	Rear Pass. Front Airbag	No
Transmission	Automatic	Rear Pass. Curtain Airbag	Yes
Final Drive	Front	Rear Pass. Head/Torso Airbag	No
Type/No. Cylinders	6	Rear Pass. Torso Airbag	No
Engine Displacement (L)	3.5	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	Yes	Load Limiters	Yes
Traction Control	Yes	Automatic Door Locks	Yes
Power Brakes	Yes	Bucket Seats	Yes
Front Disc	Yes	Tilt Steering	Yes
Rear Disc	Yes	Power Seats	Yes
Does owner's manual provide instruction to turn off automatic door locks?			Yes

**DATA FROM CERTIFICATION LABEL**

Manufactured By	Honda Mfg. of Alabama, LLC	GVWR (kg)	2730
Date of Manufacture	09/'10	GAWR Front (kg)	1320
		GAWR Rear (kg)	1450

**VEHICLE SEATING AND WEIGHT CAPACITY DATA**

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3	2	7	
Capacity Weight (VCW) (kg)				608	(A)
DSC x 68.04 (kg)				476	(B)
Cargo Weight (RCLW) (kg)				132	(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						X
Rear or Second Row			X			w/Lever	
Third Row Seat			X		X		

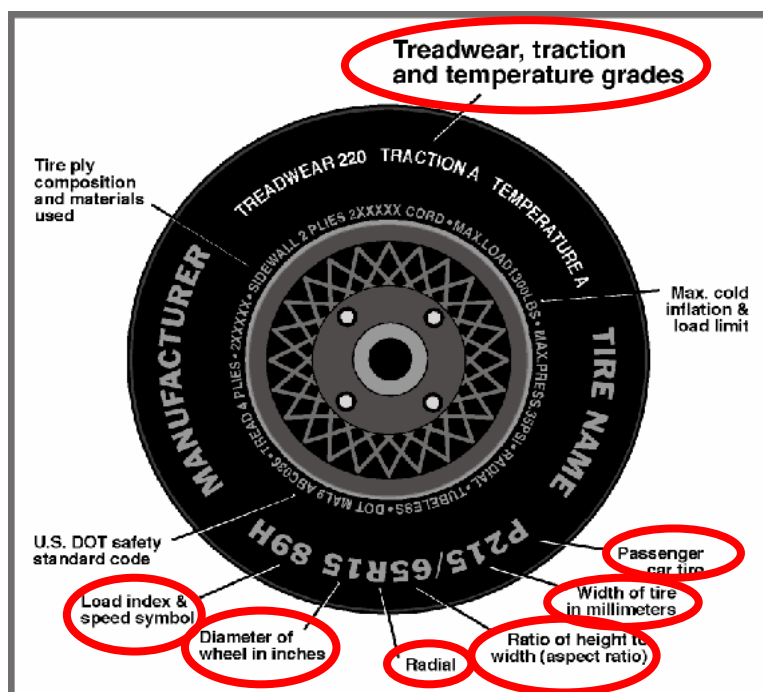
## DATA SHEET NO. 1 (continued)

### GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Honda Odyssey LX Minivan  
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5313  
 Test Date: 12/01/2010

### VEHICLE TIRE INFORMATION



### DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	230	230
Recommended Tire Size	P235/65R17	P235/65R17
Tire Size on Vehicle	P235/65R17	P235/65R17
Tire Manufacturer	Continental	Continental
Tire Model	Conti Pro Contact	Conti Pro Contact
Treadwear	500	500
Traction	AA	AA
Temperature Grades	A	A
Tire Plies Sidewall	1	1
Tire Plies Body	4	4
Load Index & Speed Symbol	103T	103T
Tire Material	Rubber	Rubber
DOT Safety Code Right	A387 3VM 3010	A387 3VM 3310
DOT Safety Code Left	A387 3VM 3110	A387 3VM 3110

**DATA SHEET NO. 1 (continued)**

**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2011 Honda Odyssey LX Minivan  
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5313  
 Test Date: 12/01/2010

**TEST VEHICLE WEIGHTS**

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	584.7	411.9		626.9	519.8		621.0	537.5	
Right	kg	545.2	431.4		557.5	523.0		542.5	533.0	
Ratio	%	57.3	42.7		53.2	46.8		52.1	47.9	
Totals	kg	1129.9	843.3	1973.2	1184.4	1042.8	2227.2	1163.5	1070.5	2234.0

**TARGET TEST WEIGHT CALCULATION**

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1973.2	(A)
Sum of Actual Weight of 2 P572 ATDs Used	kg	129.3	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	132	(C)
Calculated Target Vehicle Test Weight (TVTW)	kg	2234.5	(A+B+C)

**TEST VEHICLE ATTITUDES AND CG**

	Units	LF	RF	LR	RR	CG (aft of front axle)
Fully Loaded	mm	756	772	740	755	
As Tested (Fully Loaded $\pm$ 10mm at each wheel well)	mm	759	767	749	755	1407

**GENERAL TEST VEHICLE DATA**

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	3005
Total Vehicle Length at Left Side	mm	4147
Total Vehicle Length at Centerline	mm	5166
Total Vehicle Length at Right Side	mm	4147
Weight of Ballast in Cargo Area	kg	73.9
Weight of Vehicle Components Removed	kg	0
Amount of Stoddard Solvent in Fuel Tank	L	73.9

Vehicle components removed to meet target vehicle test weight: Right tail light, right side mirror.

**TEST VEHICLE VERTICAL IMPACT POINT DATA**

Measurement Description	Units	Value
Target Impact Point Aft of Front Axle	mm	508
Actual Impact Point Aft of Front Axle	mm	502

**DATA SHEET NO. 2**

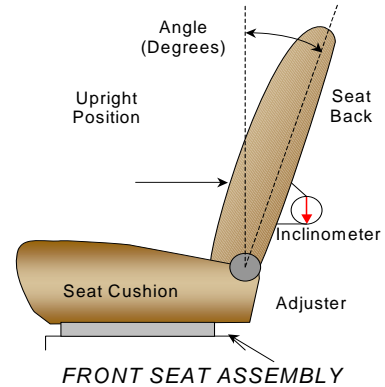
**SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA**

Test Vehicle: 2011 Honda Odyssey LX Minivan  
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5313  
 Test Date: 12/01/2010

**NOMINAL DESIGN RIDING POSITION**

The driver and right front passenger seat backs are positioned to the manufacturer's designated angle. The procedure is as follows: For the driver, set seat back at 12.4° at the headrest post guide. The rear passenger seat back was set as specified in Appendix B of the TP dated January 2010.



**SEAT BACK ANGLES**

	Degrees
Driver with Seated Dummy	12.1° on headrest post guide
Passenger with Seated Dummy	9.2° on headrest post guide

**SEAT FORE/AFT POSITIONS**

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	220 mm	110 mm (forward-most as 0)
Rear Seat	16 detents (1 <sup>st</sup> as 1)	15 <sup>th</sup> detent (forward-most as 0)

Describe method: For the driver seat track, using only the controls that primarily move the seat in the fore-aft direction, the seat was moved to the full rear position and marked. The seat was then moved to the foremost position and marked. The seat was then placed in the mid point of travel and marked. The left rear passenger seat track was set in the rear-most position.

**SEAT BELT UPPER ANCHORAGES**

	Total # of Positions	Placed in Position #
Driver Seat	4 detents	0 (uppermost as 0)
Rear Seat	4 detents	0 (uppermost as 0)

Describe method: The driver and left rear passenger seat anchorages were set in the uppermost position.

## DATA SHEET NO. 2 (CONTINUED)

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

Test Vehicle: 2011 Honda Odyssey LX Minivan  
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5313  
 Test Date: 12/01/2010

#### FUEL TANK CAPACITY DATA

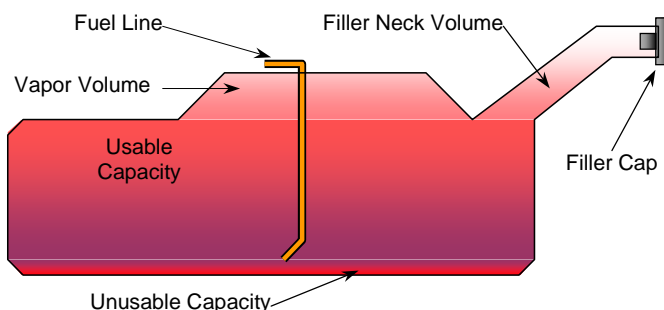
	Liters
Usable Capacity of "Standard Tank"	79.5
Usable Capacity of "Optional" Tank	
Usable Capacity Used for FMVSS 301	73.1 to 74.7
Actual Amount of Solvent used	73.9

#### FUEL PUMP

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

The test vehicle is equipped with an electric fuel pump. After the ignition key is turned from LOCK (0) to ON (II) position, the pump will be filled up for two seconds, and then the pressure is maintained.

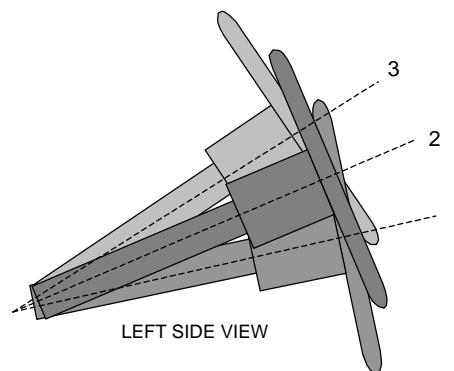
The fuel pipe is on the left side.



VEHICLE FUEL TANK ASSEMBLY

#### STEERING COLUMN ADJUSTMENT

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



STEERING COLUMN ASSEMBLY

#### STEERING COLUMN POSITION

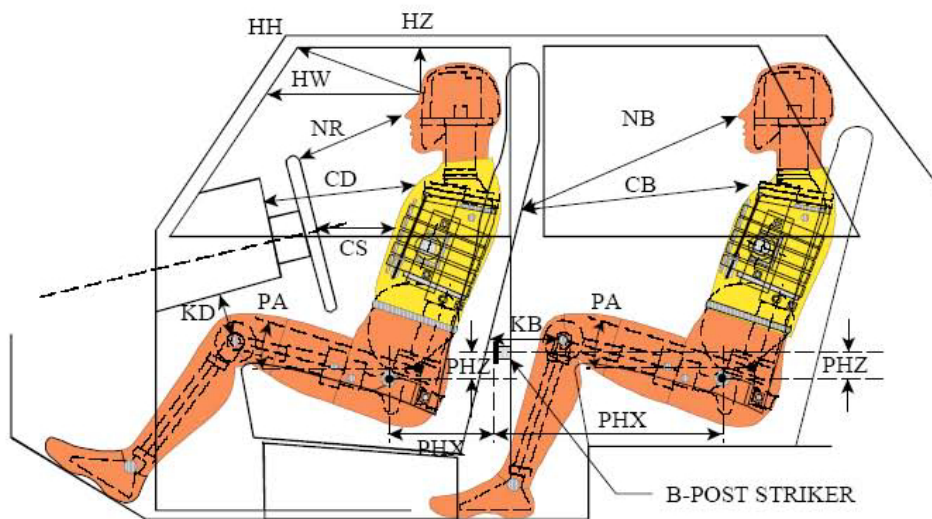
	Detent	Fore/Aft Position (mm)
Lowermost - Position 1	68.7	250
Geometric Center – Position 2	65.5	230
Uppermost – Position 3	62.3	210
Telescoping Steering Wheel Travel		40
Test Position	65.5	230

### DATA SHEET NO. 3

### DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2011 Honda Odyssey LX Minivan  
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5313  
 Test Date: 12/01/2010



**LEFT SIDE VIEW**

NOTE: 2-DOOR VEHICLE SHOWN.  
 REAR DUMMY PHX & PHZ  
 MEASUREMENTS FOR A 4-DOOR  
 VEHICLE WOULD USE THE C-POST  
 STRIKER AS A REFERENCE POINT

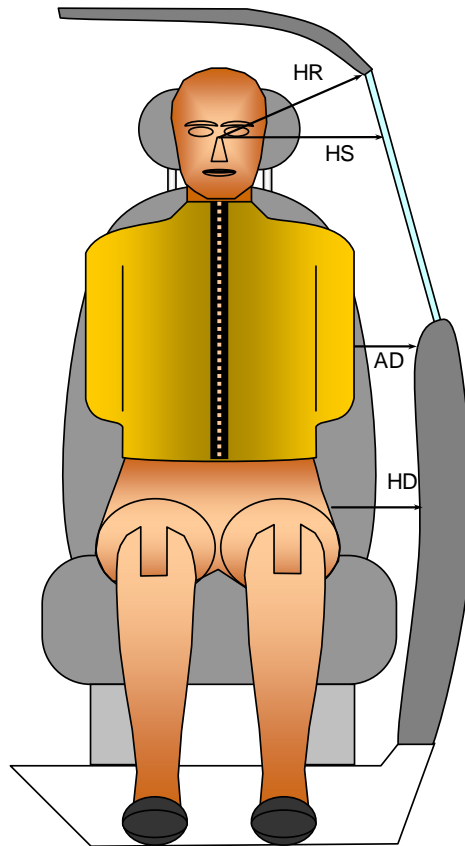
### DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver S/N 032		Passenger S/N 306	
			Length (mm)	Angle(°)	Length (mm)	Angle(°)
HH		Head to Header	377	19.2		
HW		Head to Windshield	659	0		
HZ	HZ	Head to Roof	181	90	277	90
NR	NB	Nose to Rim/Seat Back	447	15.2	596	15.2
CD	CB	Chest to Dash/Seat Back	563	9.4	587	11.1
CS		Chest to Steering Wheel	336	3.4		
KDL	KBL	Left Knee to Dash/Seat Back	146	26.6	354	13.5
KDR	KBR	Right Knee to Dash/Seat Back	118	29.2	355	13.3
PA	PA	Pelvic Angle		25.7		18.2
PHX	PHX	H-Point to Striker (X-Axis)	219	0	285	0
PHZ	PHZ	H-Point to Striker (Z-Axis)	32	90	98	90
SA	SA	Seat Back Angle		12.1		9.2

**DATA SHEET NO. 4**  
**DUMMY LATERAL CLEARANCE DIMENSIONS**

Test Vehicle: 2011 Honda Odyssey LX Minivan  
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5313  
 Test Date: 12/01/2010



*FRONT VIEW OF DUMMY*

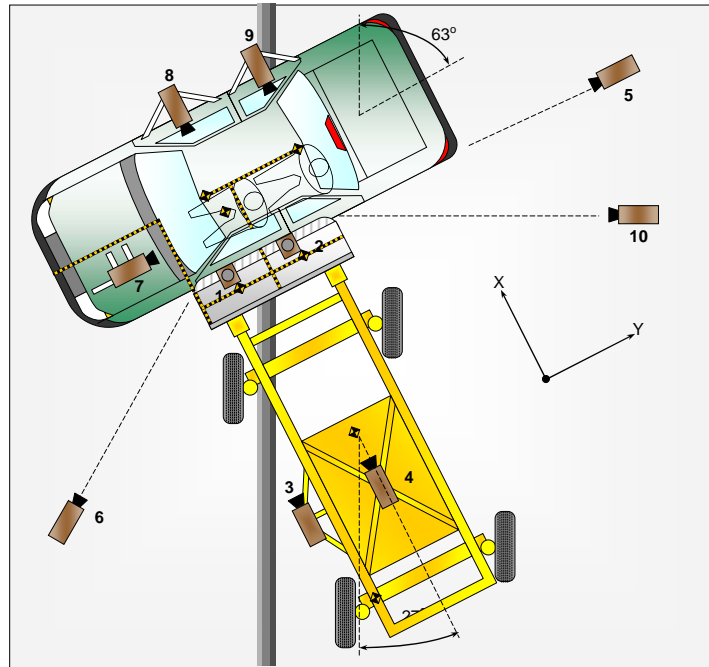
**DUMMY LATERAL CLEARANCE DIMENSION INFORMATION**

Code	Measurement Description	Units	Driver S/N 032	Passenger S/N 306
HR	Head to Side Header	mm	235	240
HS	Head to Side Window	mm	365	354
AD	Arm to Door	mm	128	157
HD	H-Point to Door	mm	132	221

**DATA SHEET NO. 5**  
**CAMERA LOCATIONS AND DATA**

Test Vehicle: 2011 Honda Odyssey LX Minivan  
Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5313  
Test Date: 12/01/2010



**CAMERA LOCATIONS AND DATA**

No.	Camera View	Coordinates (mm)			Angle	Lens (mm)	Film Speed (fps)
		X*	Y*	Z*			
1	Overhead Overall	-150	0	-5050	86.3	14	1000
2	Overhead Close-up	340	1160	-5050	80.5	50	1000
3	Left Impact Point (MDB)					50	1000
4	Side Overall (MDB)					16	1000
5	Rear	-40	5190	-1250	6.4	24	1000
6	Left Front	3650	-4230	-1220	6.8	24	1000
7	Driver Front (OB)					16	1000
8	Driver Side (OB)					8	1000
9	Passenger Side (OB)					8	1000
10	Real Time Left Rear						30
11	Real Time Inrun						30

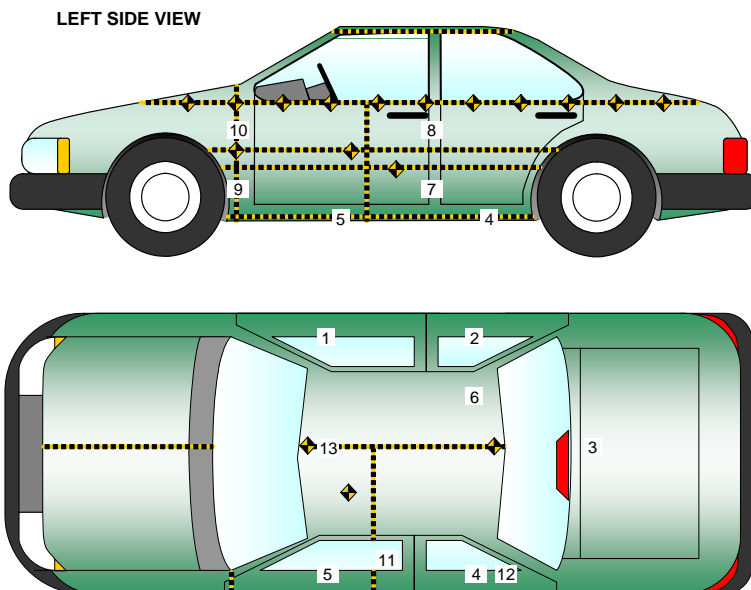
Reference: Impact Point projected to Ground  
+X = To Front of MDB, +Y = To Right of MDB, +Z = Down

\* All measurements accurate to  $\pm 6$  mm

**DATA SHEET NO. 6  
VEHICLE ACCELEROMETER LOCATIONS**

Test Vehicle: 2011 Honda Odyssey LX Minivan  
Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5313  
Test Date: 12/01/2010



**VEHICLE ACCELEROMETER PRE-TEST LOCATIONS**

Accelerometer Location				
No.	ID	Coordinates (mm)		
		X	Y	Z
1	Right Sill at Front Seat	3115	832	-210
2	Right Sill at Rear Seat	2059	837	-230
3	Rear Floorpan Above Axle	971	-120	-455
4	Left Sill at Rear Door	2132	-837	-230
5	Left Sill at Front Door	3260	-832	-210
6	Rt. Rear Occ. Compartment	2485	459	-395
7	Left Lower B-Post	2642	-818	-677
8	Left Middle B-Post	2642	-821	-895
9	Left Lower A-Post	3646	-820	-619
10	Left Middle A-Post	3729	-915	-860
11	Front Seat Track	2800	-634	-675
12	Rear Seat Track or Structure	2070	-630	-671
13	Vehicle CG	2751	0	-183

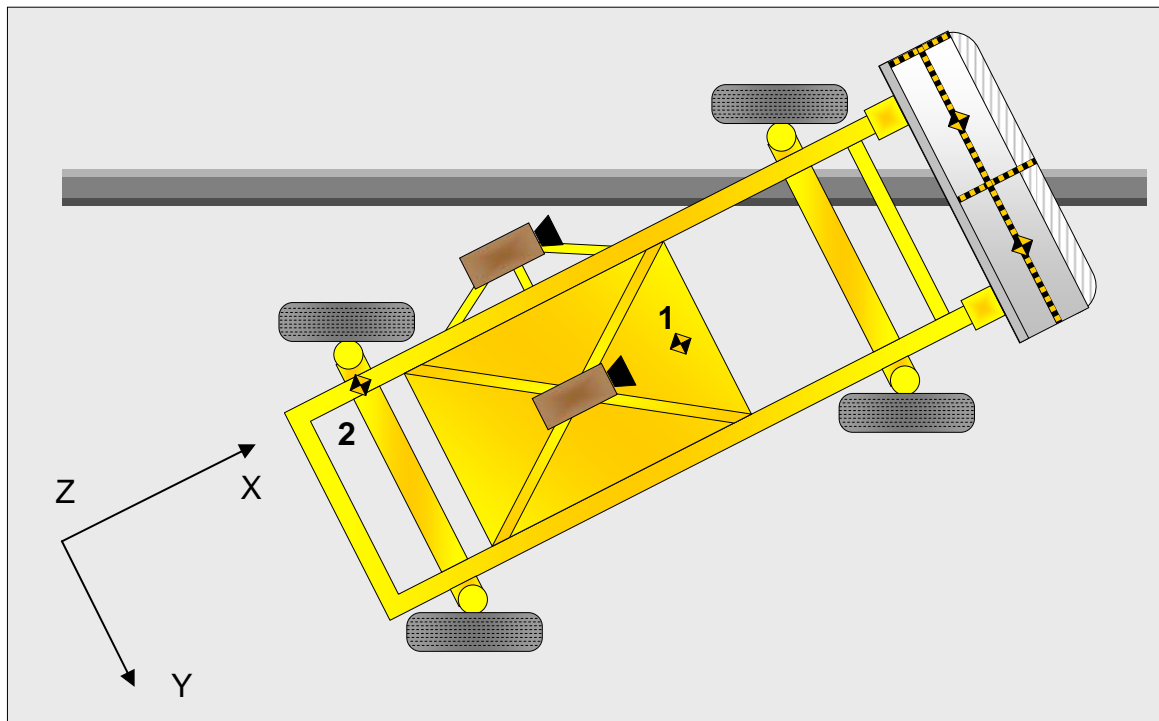
Reference: X – Rear Surface of Vehicle (+ forward)  
Y - Vehicle Centerline (+ to right)  
Z - Ground Plane (+ down)

## DATA SHEET NO. 7

### MOVING DEFORMABLE BARRIER (MDB) ACCELEROMETER LOCATIONS

Test Vehicle: 2011 Honda Odyssey LX Minivan  
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5313  
 Test Date: 12/01/2010



#### MDB ACCELEROMETER LOCATIONS

Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	MDB CG	-1105	0	-330
2	MDB Rear	-2580	-650	-625

Reference: X - MDB Face (+ forward)  
 Y - MDB Centerline (+ to right)  
 Z - Ground Plane (+ down)

## DATA SHEET NO. 8

### TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2011 Honda Odyssey LX Minivan  
Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5313  
Test Date: 12/01/2010

#### MAXIMUM EXTERIOR STATIC CRUSH

Level	Measurement Description	Units	Maximum Crush	Above Ground
1	Sill Top Height	mm	32	240
2	Mid Door	mm	268	655
3	Occupant H-Point	mm	271	730
4	Window Sill	mm	185	1010
5	Window Top	mm	22	1580
	Maximum Penetration	mm	271	

#### INSTRUMENTATION

Driver Dummy Channels	16
Passenger Dummy Channels	16
Vehicle Structure Accelerometers	21
MDB Accelerometers	5
Total No. of Contact Switches	8
Monitoring Channels	4
Total	70

#### CAMERA COVERAGE

High-Speed Vehicle Onboard	3
High-Speed Offboard	4
High-Speed MDB Onboard	2
Real-Time Stationary	1
Real-Time Panning	1
Total	11

**DATA SHEET NO. 9****MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS**

Test Vehicle: 2011 Honda Odyssey LX Minivan  
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5313  
 Test Date: 12/01/2010

**MDB SPECIFICATIONS**

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1252
Overall Length Including Honeycomb Face	4115
Wheelbase of Framework Carriage	2592
CG Location aft of Front Axle	1129

**MDB WEIGHTS**

	Units	Front Axle	Rear Axle	Total
Left	kg	411.8	281.6	
Right	kg	356.8	311.3	
Ratio	%	56.5	43.5	
Totals	kg	768.6	592.9	1361.5

**SPEED AND IMPACT DATA**

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.4
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.4
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	89.8

**MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE**

Row	Vertical Location		From Centerline		Maximum Crush
	Description	Height	Distance	Direction	
A	Center of Bumper	432	700	Right	231
B	Top of Bumper	533	800	Right	143
C	Mid-Level	686	0		103
D	Top of Stack	813	0		137

**MDB INSTRUMENTATION AND CAMERAS**

Accelerometers	5
Contact Switches	2
High-Speed Cameras	2

**DATA SHEET NO. 10**

**POST-TEST OBSERVATIONS**

Test Vehicle: 2011 Honda Odyssey LX Minivan  
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5313  
 Test Date: 12/01/2010

**TEST DUMMY INFORMATION AND CONTACT**

Description	Driver (ES-2re)	Passenger (SID-IIs)
Dummy Type / Serial No.	ES-2re / 032	SID-IIs / 306
Head Contact	Curtain Airbag, Headrest, Side Header	Curtain Airbag
Upper Torso Contact	Side Airbag, Seat	Door Panel
Lower Torso Contact	Side Airbag, Door Panel	Door Panel
Left Knee Contact	Door Panel	Door Panel
Right Knee Contact	Left Knee	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	None
Window Damage	Left Front and Left Rear Windows 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	No	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	

**MDB LEFT EDGE IMPACT POINT DATA**

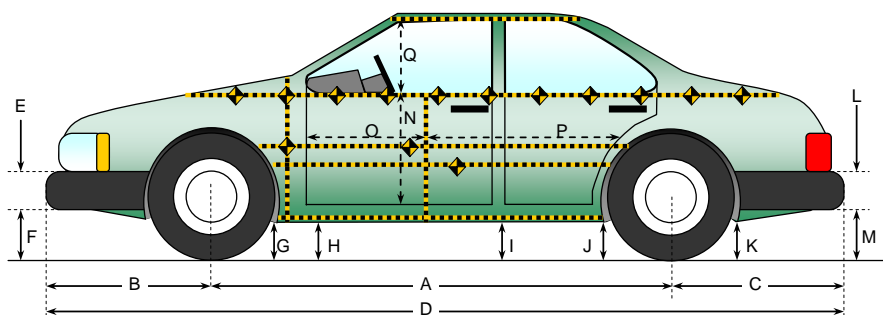
Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 50	6 forward
Vertical Offset	mm	+/-20	1 up

## DATA SHEET NO. 11

### VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2011 Honda Odyssey LX Minivan  
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5313  
 Test Date: 12/01/2010



All measurements in (mm) with tolerance of  $\pm 3$  mm

#### LEFT SIDE VIEW

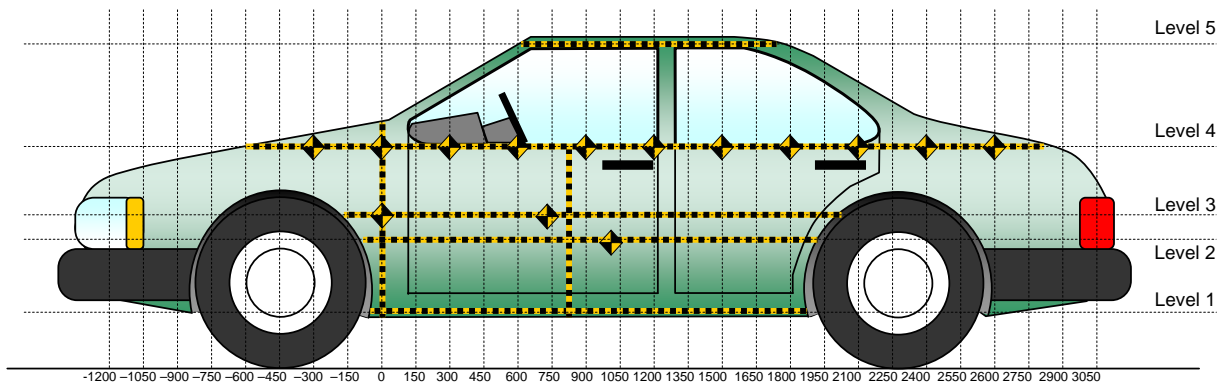
#### VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	3005	2995	10
B	Front Axle to FSOV	947	936	11
C	Rear Axle to RSOV	1214	1214	0
D	Total Length at Centerline	5166	5145	21
E	Front Bumper Thickness	130	130	0
F	Front Bumper Bottom to Ground	252	251	1
G	Sill Height at Front Wheel Well	176	188	-12
H	Sill Height at Front Door Leading Edge	185	192	-7
I	Sill Height at B Pillar	184	191	-7
J1	Sill Height at Rear Wheel Well	180	183	-3
J2	Pinch Weld Height at Rear Wheel Well	182	174	8
K	Sill Height Aft of Rear Wheel Well	158	173	-15
L	Rear Bumper Thickness	126	126	0
M	Rear Bumper Bottom to Ground	353	375	-22
N	Sill Height to Window Bottom Sill	826	753	73
O	Front Door Leading Edge to Impact CL	860	812	48
P	Rear Door Trailing Edge to Impact CL	1251	1218	33
Q	Front Window Opening	500	514	-14
R	Right Side Length	4147	4150	-3
S	Left Side Length	4147	4145	2
T	Vehicle Width at B Post	1984	1935	49

**DATA SHEET NO. 12**  
**VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2011 Honda Odyssey LX Minivan  
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5313  
 Test Date: 12/01/2010



All Measurements Shown in mm

**LEFT SIDE VIEW**

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	240
2	Mid Door	655
3	Occupant H-Point	730
4	Window Sill	1010
5	Window Top	1580

**DATA SHEET NO. 12 (CONTINUED)**  
**VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2011 Honda Odyssey LX Minivan  
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5313  
 Test Date: 12/01/2010

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900				258					266					8	
-750				225					236					11	
-600				206					223					17	
-450				194					214					20	
-300			98	182				112	201				14	19	
-150		101	108	170			116	127	193			15	19	23	
0	146	115	118	165		161	194	177	180		15	79	59	15	
150	145	116	118	160		161	292	287	227		16	176	169	67	
300	145	115	115	158		163	344	333	262		18	229	218	104	
450	144	113	114	155		163	353	346	261		19	240	232	106	
600	142	110	112	152	346	168	361	354	264	355	26	251	242	112	9
750	142	110	111	150	341	169	356	358	273	355	27	246	247	123	14
900	142	108	110	150	342	170	327	317	258	357	28	219	207	108	15
1050	144	108	109	148	342	172	300	302	272	364	28	192	193	124	22
1200	142	108	109	149	342	174	341	348	279	332	32	233	239	130	-10
1350	143	108	109	149	344	174	372	376	305	304	31	264	267	156	-40
1500	144	108	109	150	345	175	376	380	335	276	31	268	271	185	-69
1650	145	109	110	150	348	171	372	379	331	250	26	263	269	181	-98
1800	146	110	110	149	350	168	346	330	286	226	22	236	220	137	-124
1950	146	110	111	149	355	162	242	232	192	202	16	132	121	43	-153
2100		103	109	150	365		122	128	113	184		19	19	-37	-181
2250		99	100	156	375		107	106	170	384		8	6	14	9
2400			98	160	383			104	170	401			6	10	18
2550				165	394				172	404				7	10
2700				170	405				174	414				4	9
2850				176	419				178	427				2	8
3000				185	435				185	442				0	7
3150				194					195					1	
3300				209					211					2	

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

**MAXIMUM CRUSH DATA**

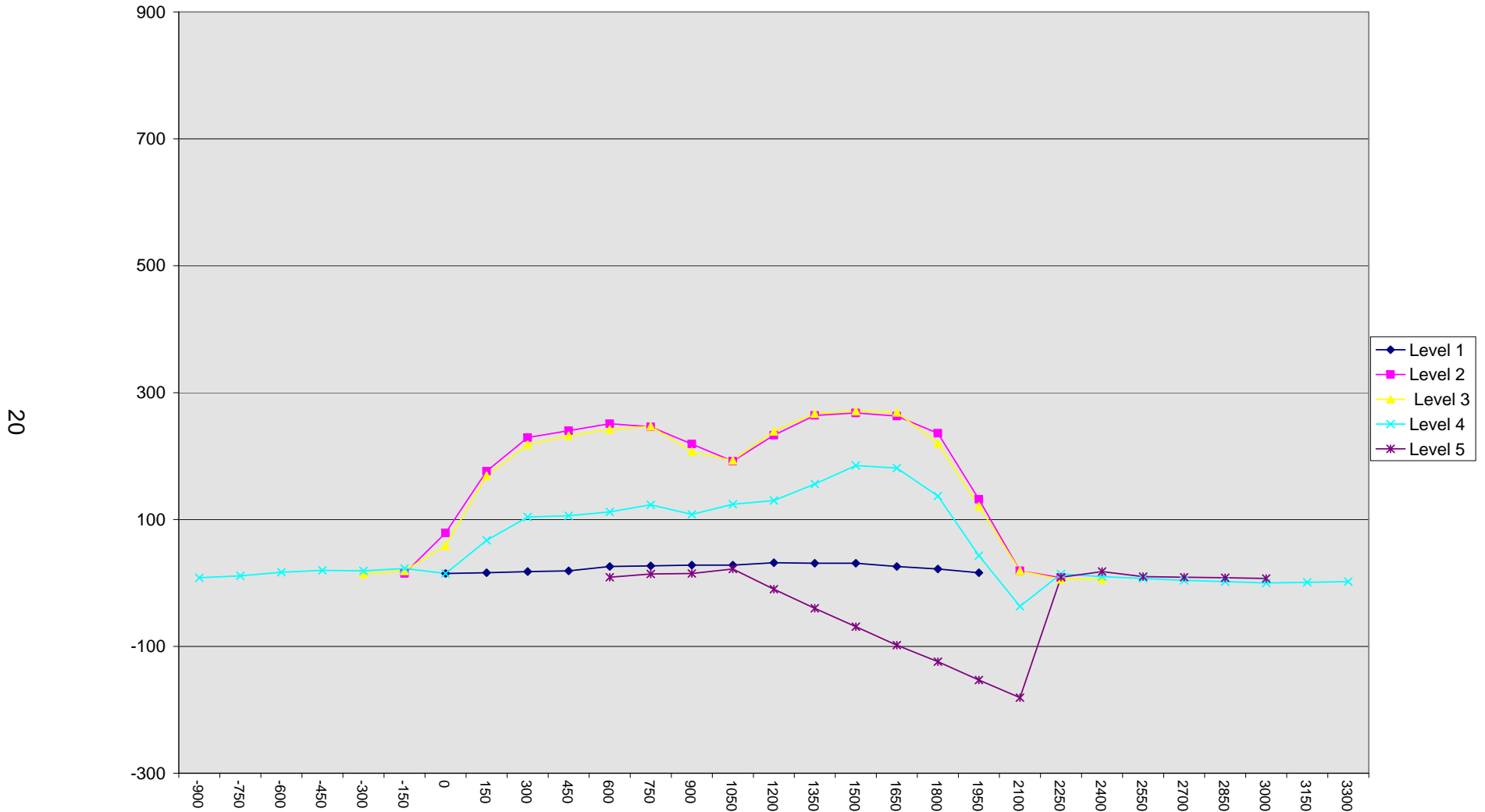
	Level 1	Level 2	Level 3	Level 4	Level 5
Maximum Crush (mm)	32	268	271	185	22
Distance From Impact (mm)	1200	1500	1500	1500	1050

DATA SHEET NO. 12 (continued)

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2011 Honda Odyssey LX Minivan  
Test Program: NCAP Side MDB Impact Test

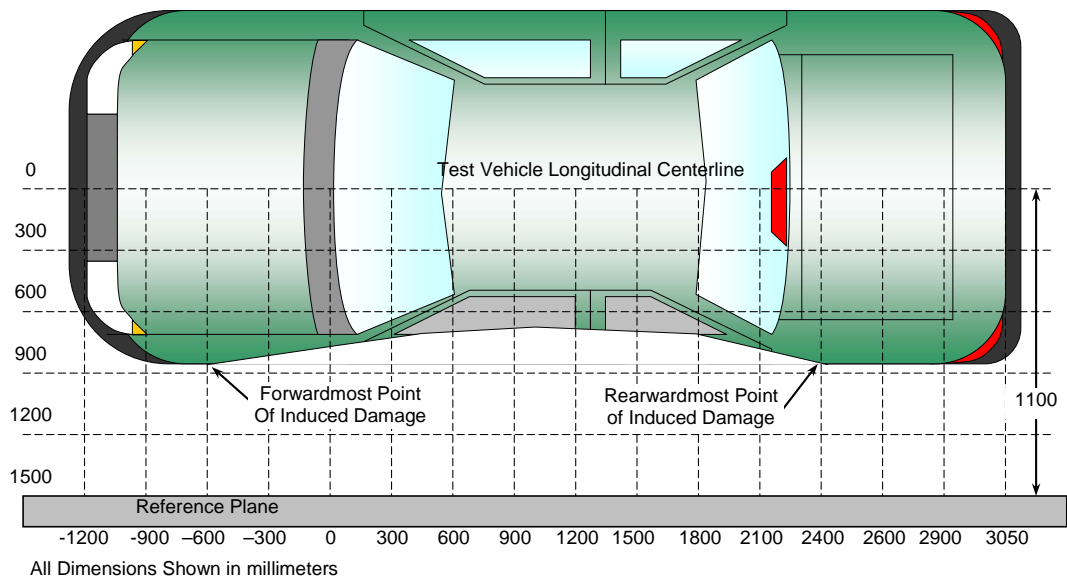
NHTSA No. MB5313  
Test Date: 12/01/2010



**DATA SHEET NO. 13**  
**VEHICLE DAMAGE PROFILE DISTANCES**

Test Vehicle: 2011 Honda Odyssey LX Minivan  
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5313  
 Test Date: 12/01/2010



**TOP VIEW**

**DAMAGE PROFILE DISTANCES**

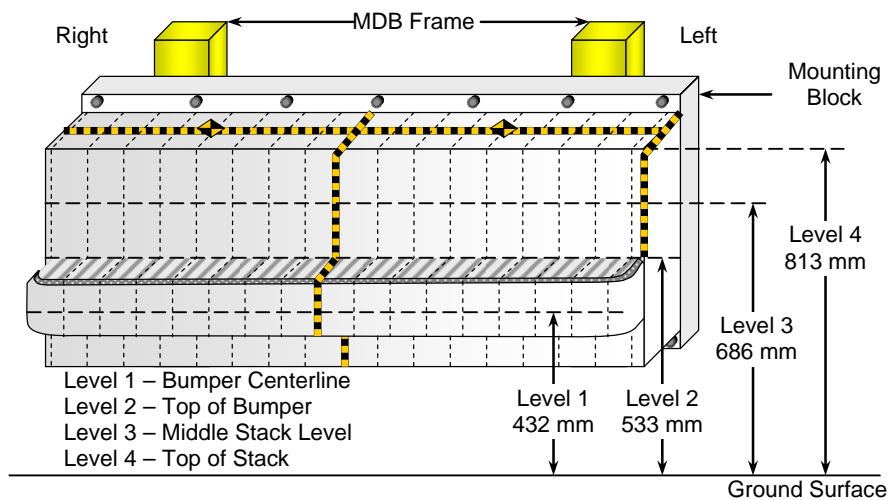
DPD	Distance from Impact Point (mm)	Level	Pre-Test (mm)	Post-Test (mm)	Max. Static Crush (mm)
1	3300	4	209	211	2
2	2460	4	173	161	12
3	1575	3	384	109	275
4	760	2	354	110	244
5	-90	4	192	168	24
6	-900	4	258	266	-8

**DATA SHEET NO. 14**

**EXTERIOR STATIC CRUSH FOR IMPACTOR FACE**

Test Vehicle: 2011 Honda Odyssey LX Minivan  
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5313  
 Test Date: 12/01/2010



**FRONT VIEW**

**DEFORMABLE BARRIER STATIC CRUSH**

Stack Level	Distance Right of Center (mm)								C <sub>L</sub>	Distance Left of Center (mm)							
	800	700	600	500	400	300	200	100		0	100	200	300	400	500	600	700
4	89	44	38	37	43	54	70	103	137	108	84	73	65	73	81	99	118
3	66	50	44	43	43	55	74	101	103	84	60	39	36	42	49	63	82
2	143	135	131	124	113	112	104	106	109	97	93	93	99	108	107	109	115
1	229	231	226	222	220	222	225	225	222	211	211	200	197	197	194	196	195

**DATA SHEET NO. 15**

**FMVSS 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA**

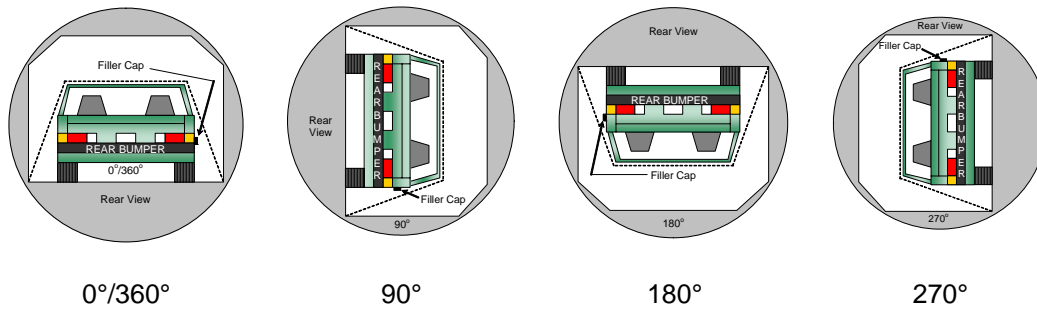
Test Vehicle: 2011 Honda Odyssey LX Minivan  
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5313  
 Test Date: 12/01/2010

Test Time: 11:46 am      Temperature: 21° C

- A. From impact until vehicle motion ceases: 0 oz.  
 (Maximum Allowable = 1 ounce)
- B. For the 5 minute period after motion ceases: None  
 (Maximum allowable = 5 ounces)
- C. For the following 25 minutes: None  
 (Maximum allowable = 1 oz./minute)
- D. Spillage Details: None

**FMVSS 301 STATIC ROLLOVER DATA**



**ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS**

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	107	300	407
90° to 180°	110	300	410
180° to 270°	103	300	403
270° to 360°	116	300	416

**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**

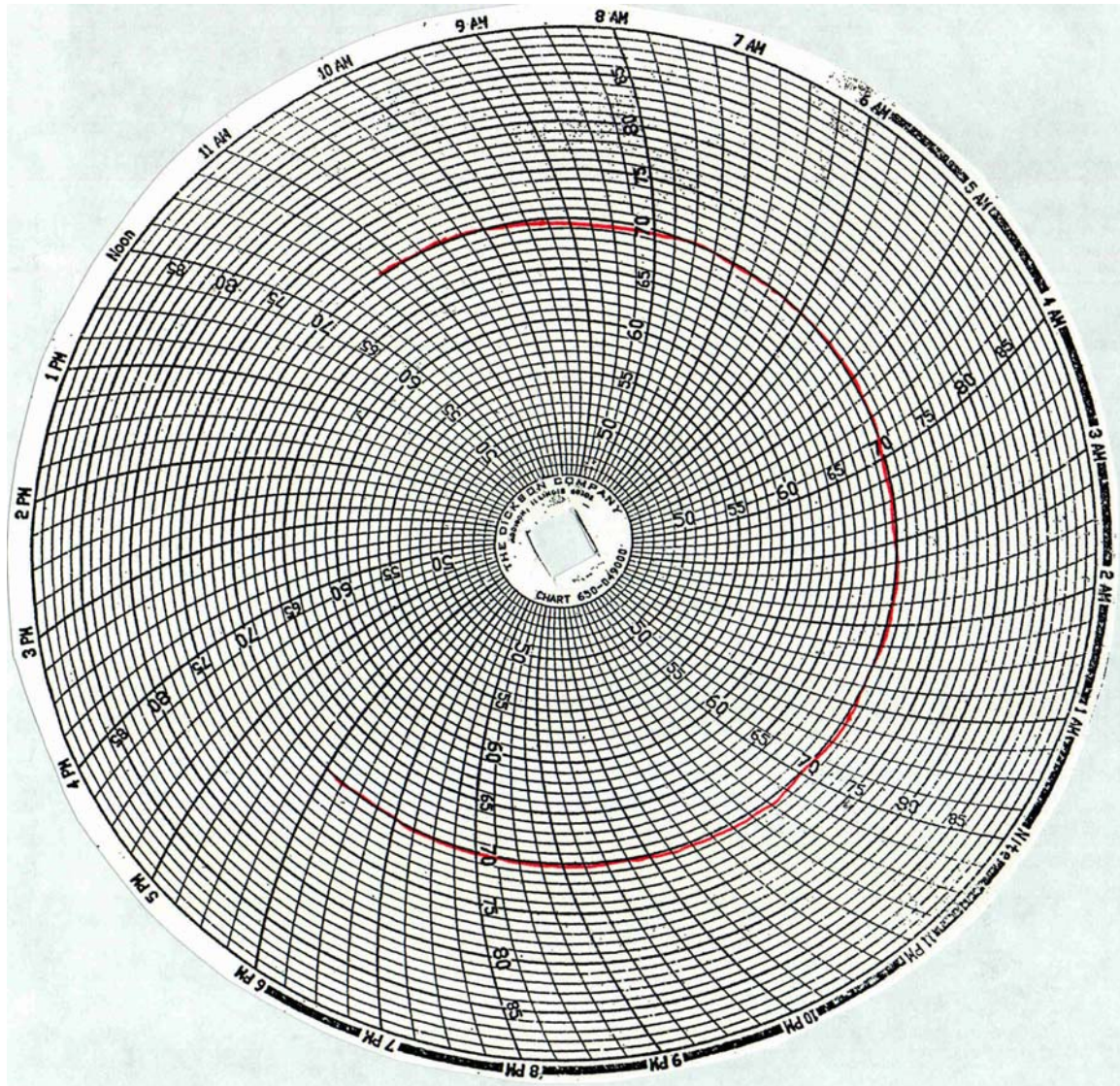
Test Phase	Spillage Location
0° to 90°	
90° to 180°	
180° to 270°	
270° to 360°	

DATA SHEET NO. 16

DUMMY/VEHICLE TEMPERATURE STABILIZATION DATA

Test Vehicle: 2011 Honda Odyssey LX Minivan  
Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5313  
Test Date: 12/01/2010



**APPENDIX A**  
**PHOTOGRAPHS**

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Photo No. 102.	Head Restraint Use and Adjustment Information from Vehicle Manual	A-55



As Delivered Right Front Three-Quarter View of Test Vehicle



As Delivered Left Rear Three-Quarter View of Test Vehicle



Pre-Test Frontal View of Test Vehicle



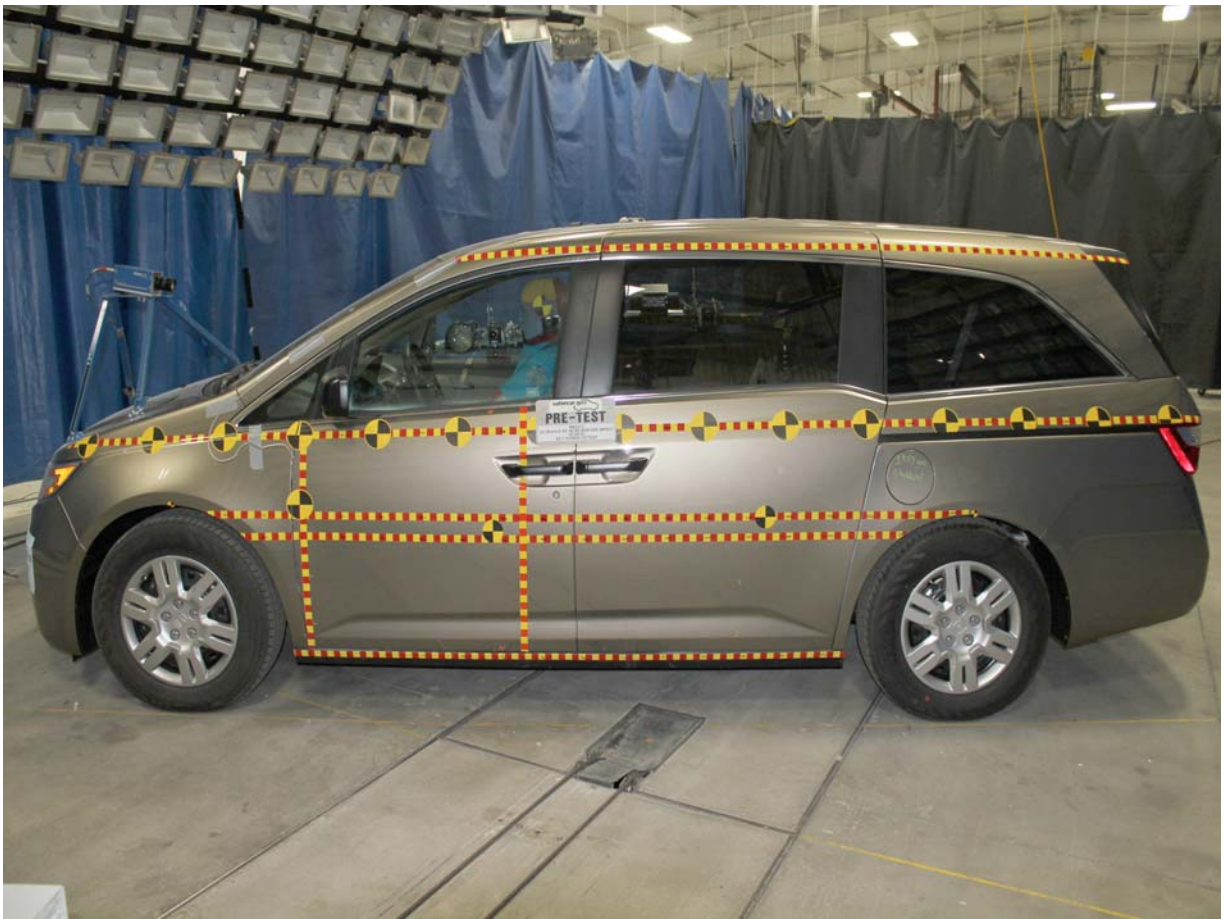
Post-Test Frontal View of Test Vehicle



Pre-Test Left Three-Quarter Front View of Test Vehicle



Post-Test Left Three-Quarter Front View of Test Vehicle



Pre-Test Left Side View of Test Vehicle



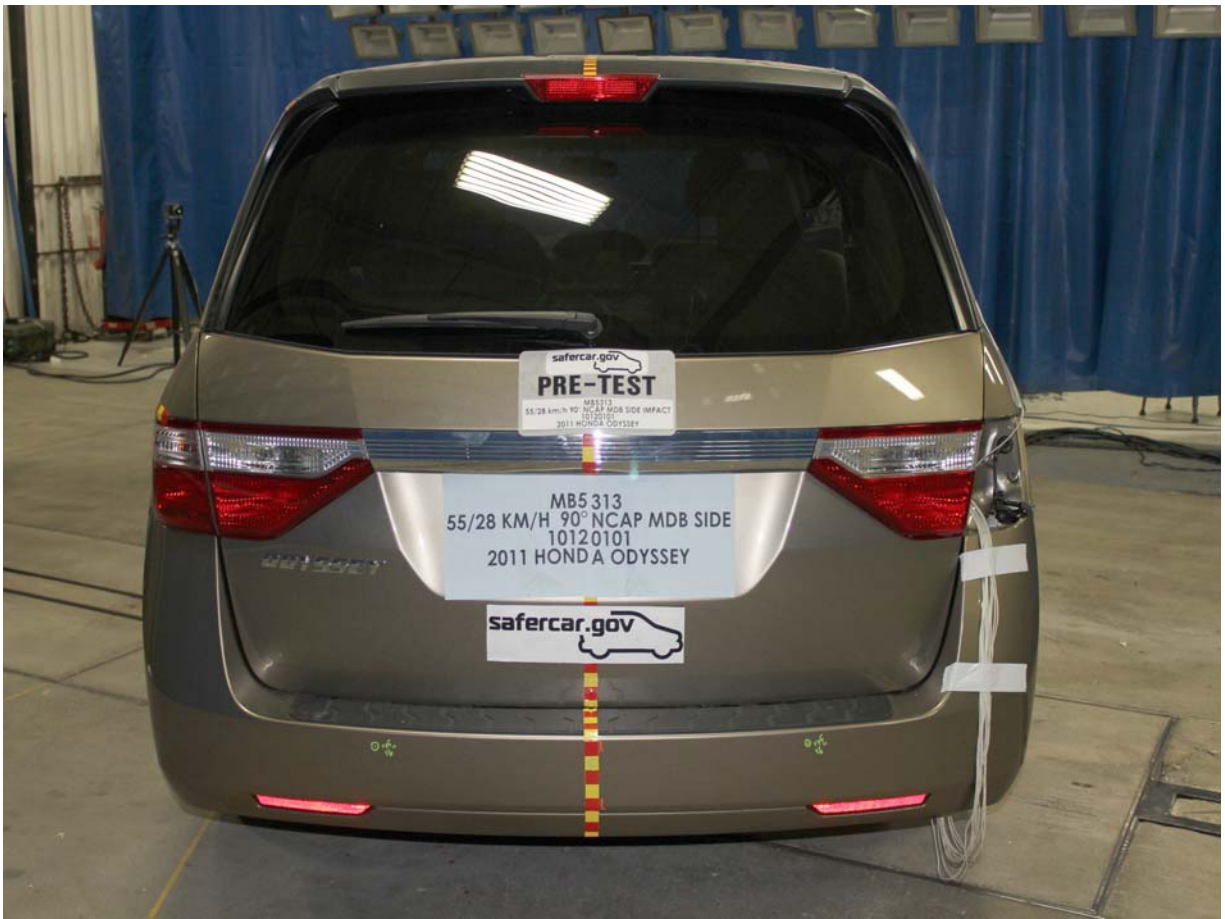
Post-Test Left Side View of Test Vehicle



Pre-Test Left Three-Quarter Rear View of Test Vehicle



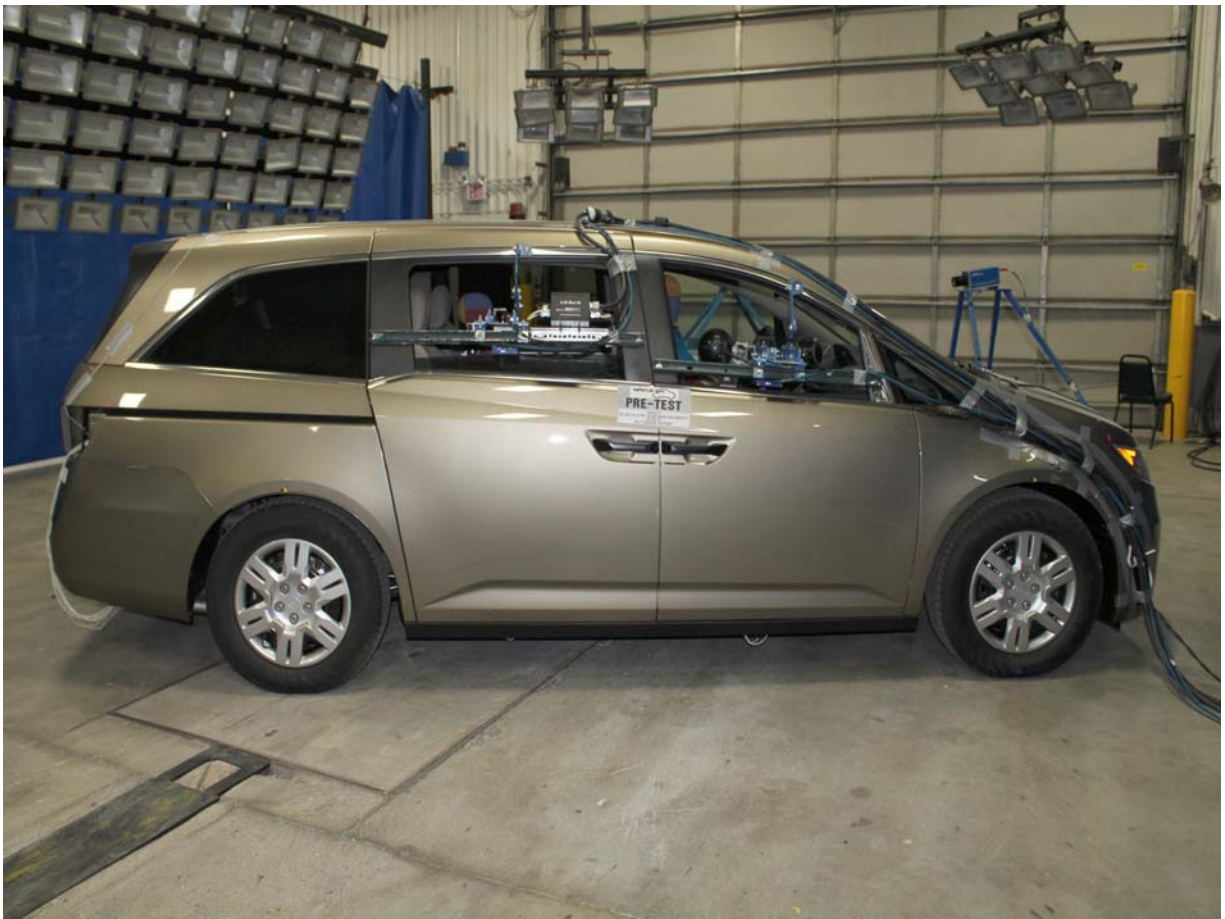
Post-Test Left Three-Quarter Rear View of Test Vehicle



Pre-Test Rear View of Test Vehicle



Post-Test Rear View of Test Vehicle



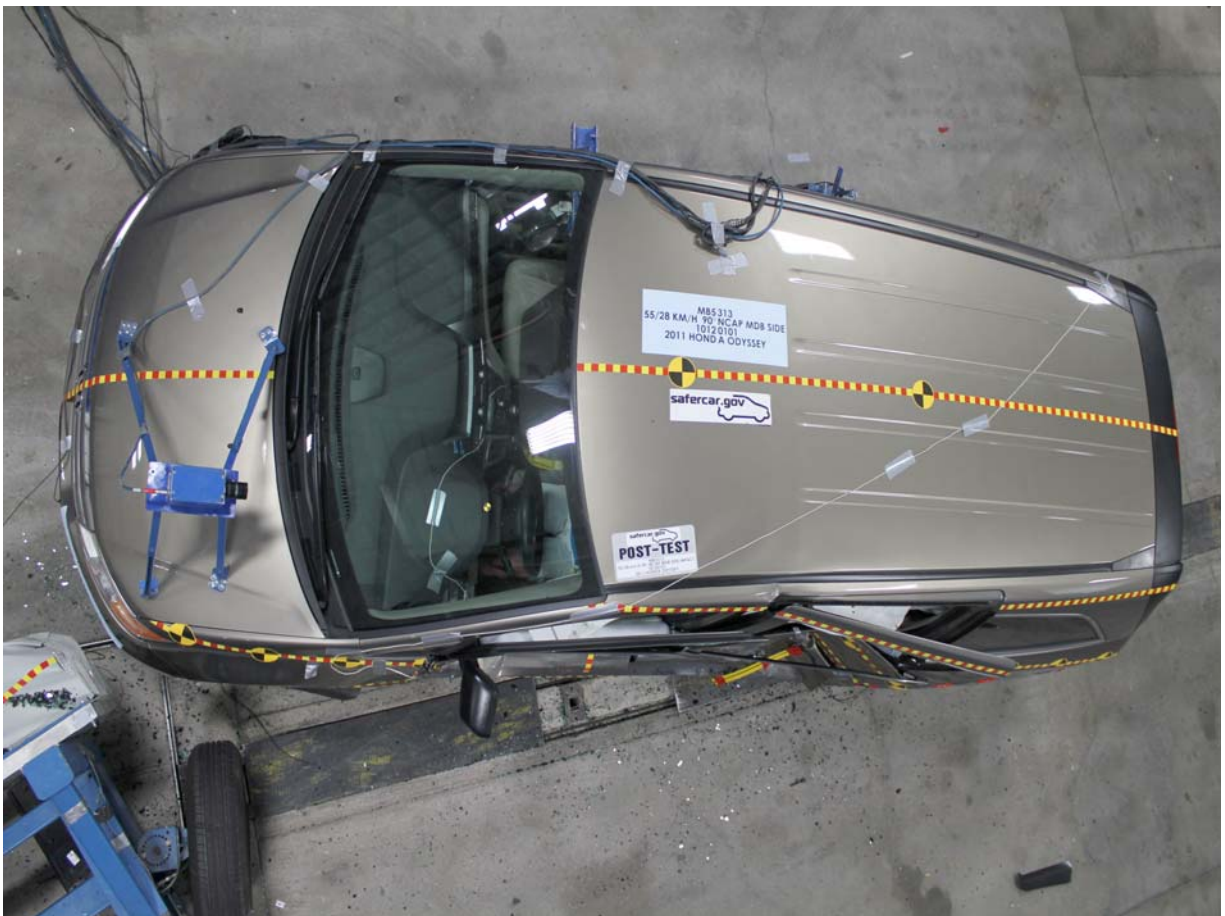
Pre-Test Right Side View of Test Vehicle



Post-Test Right Side View of Test Vehicle



Pre-Test Overhead View of Test Vehicle with MDB Positioned Against Side of Test Vehicle



Post-Test Overhead View of Test Vehicle and MDB



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



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



Pre-Test Close-Up View of Impact Point Target



Post-Test Close-Up View of Impact Point Target



Pre-Test Left Front Door Latch Close-Up



Post-Test Left Front Door Latch Close-Up



Pre-Test Left Rear Door Latch Close-Up



Post-Test Left Rear Door Latch Close-Up





Pre-Test Left Side View of Driver Dummy Showing Belt, Chalking, and Contact Switches



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



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



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



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



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



Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan



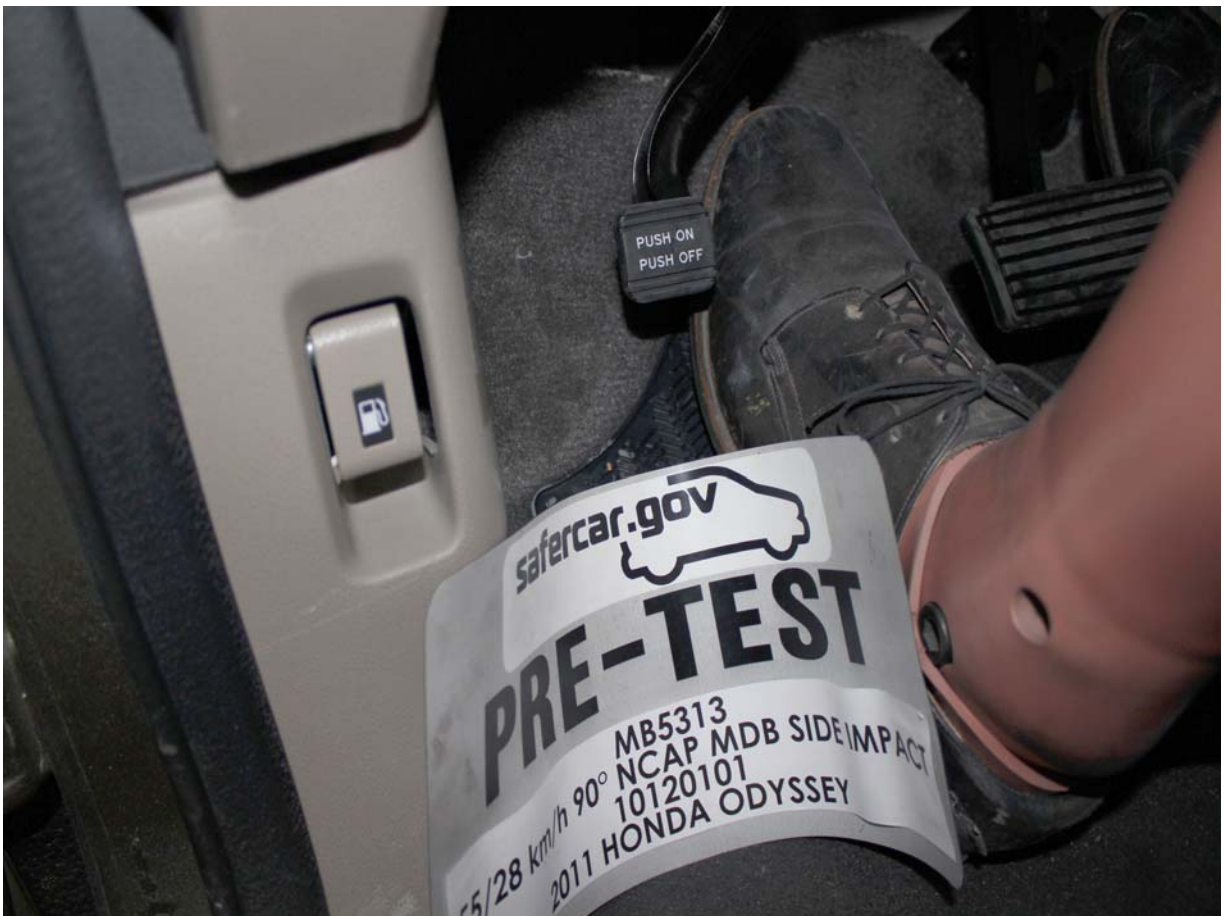
Pre-Test Placement of Driver Dummy's Feet



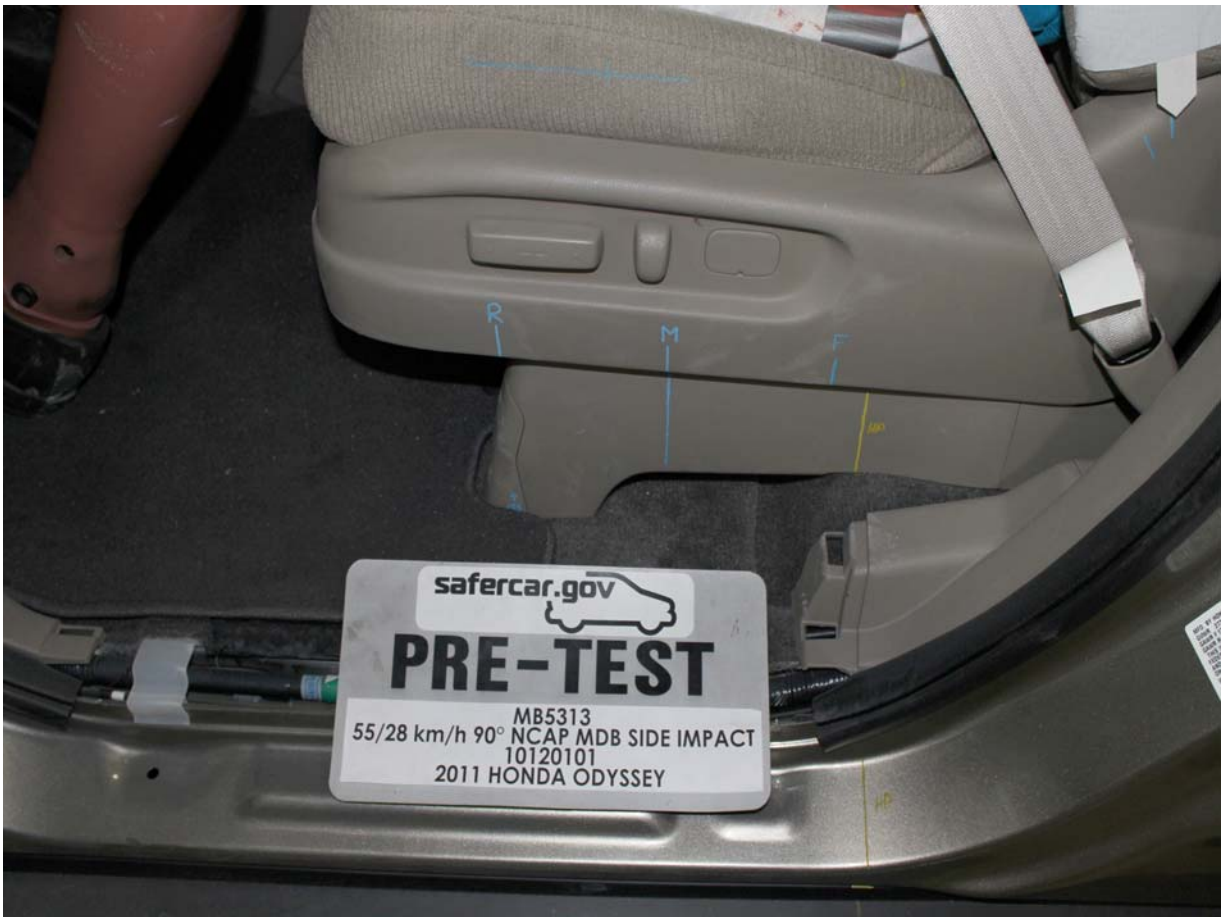
Pre-Test View of Belt Anchorage for Driver Dummy



Pre-Test Left Side View of Steering Wheel



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 Driver Dummy and Door Clearance View



Post-Test Driver Dummy and Door Clearance View



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



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



Pre-Test Driver Inner Door Panel View



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



Post-Test Driver Dummy Close-up Head Contact with Vehicle View



Post-Test Driver Dummy Close-up Head Contact with Side Airbag View



Post-Test Driver Dummy Close-up Torso Contact with Vehicle Interior View



Post-Test Driver Dummy Close-up Torso Contact with Side Airbag View



Post-Test Driver Dummy Close-up Pelvis Contact with Vehicle Interior View



Post-Test Driver Dummy Close-up Pelvis Contact with Side Airbag View



Pre-Test Left Side View of Passenger Dummy Showing Belt, Chalking, and Contact Switches



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



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



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



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



Pre-Test Overhead View of Rear Passenger Seat Pan Prior to Dummy Positioning



Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan



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



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



Pre-Test Placement of Rear Passenger Dummy's Feet



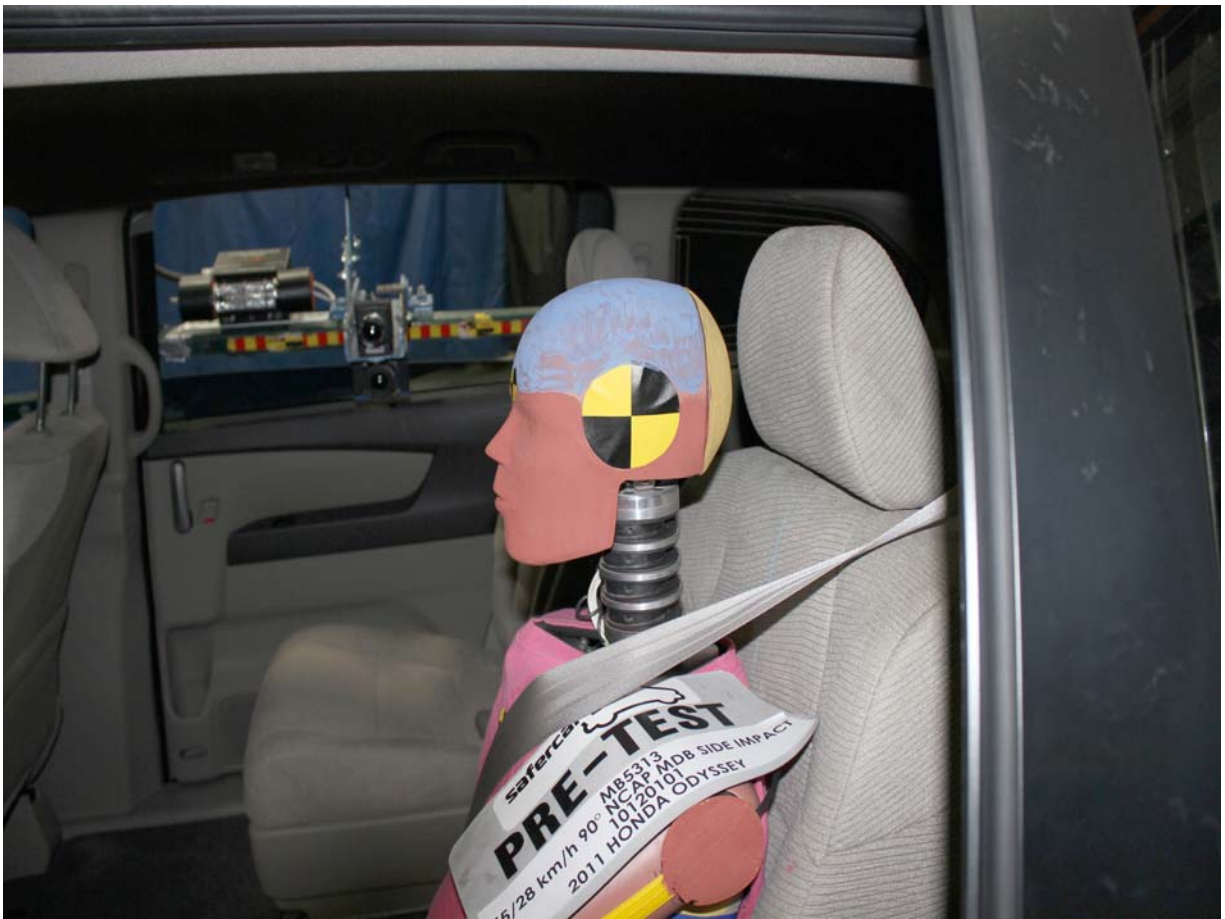
Pre-Test View of Belt Anchorage for Rear Passenger Dummy



Pre-Test Close-Up Left Side View of Rear Passenger Seat Track



Pre-Test Close-Up Left Side View of Rear Passenger Seat Back



Pre-Test Close-up View of Rear Passenger Seat Back or Head Restraint



Pre-Test Rear Passenger Dummy and Door Clearance View



Post-Test Rear Passenger Dummy and Door Clearance View



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



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



Pre-Test Passenger Inner Door Panel View



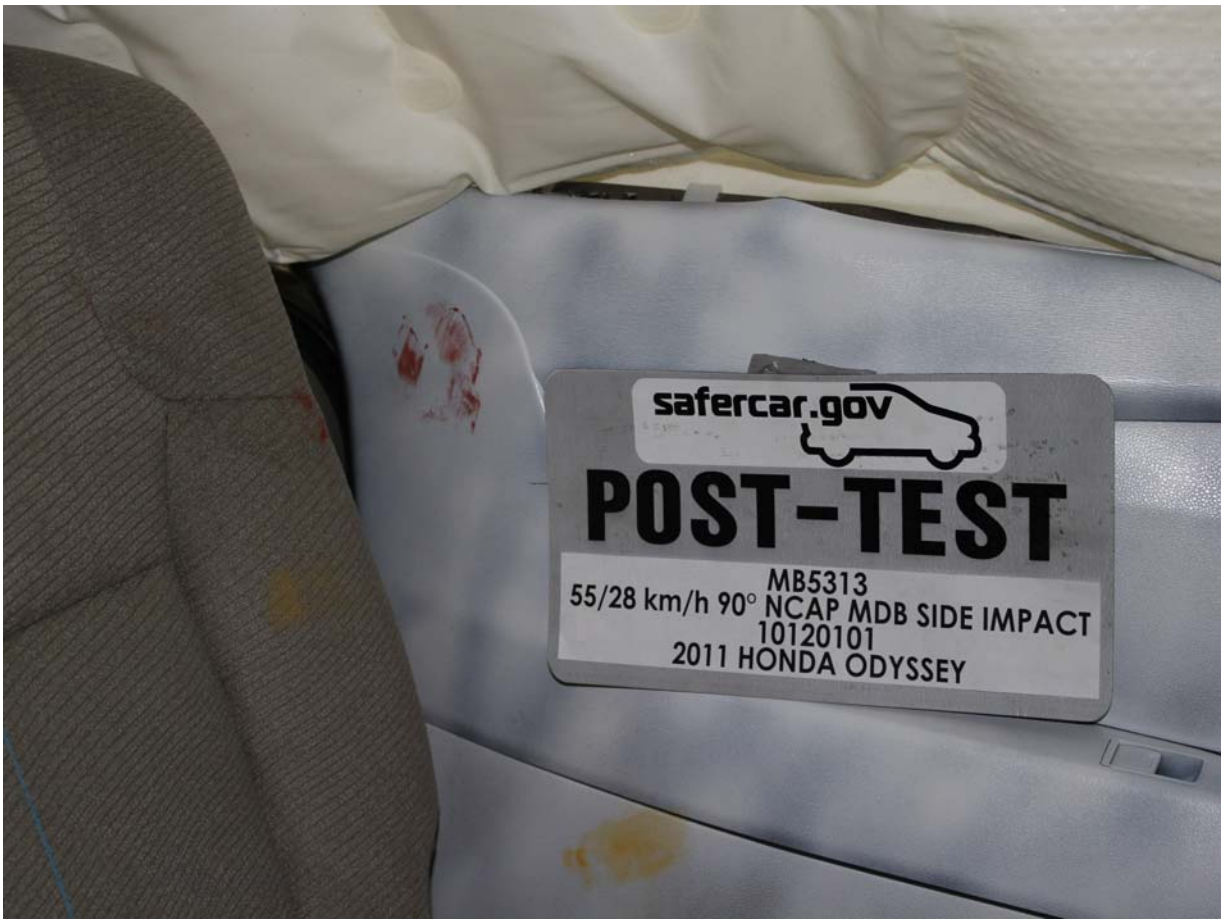
Post-Test Rear Passenger Inner Door Panel View Showing Dummy Contact Locations

PHOTOGRAPH NOT APPLICABLE

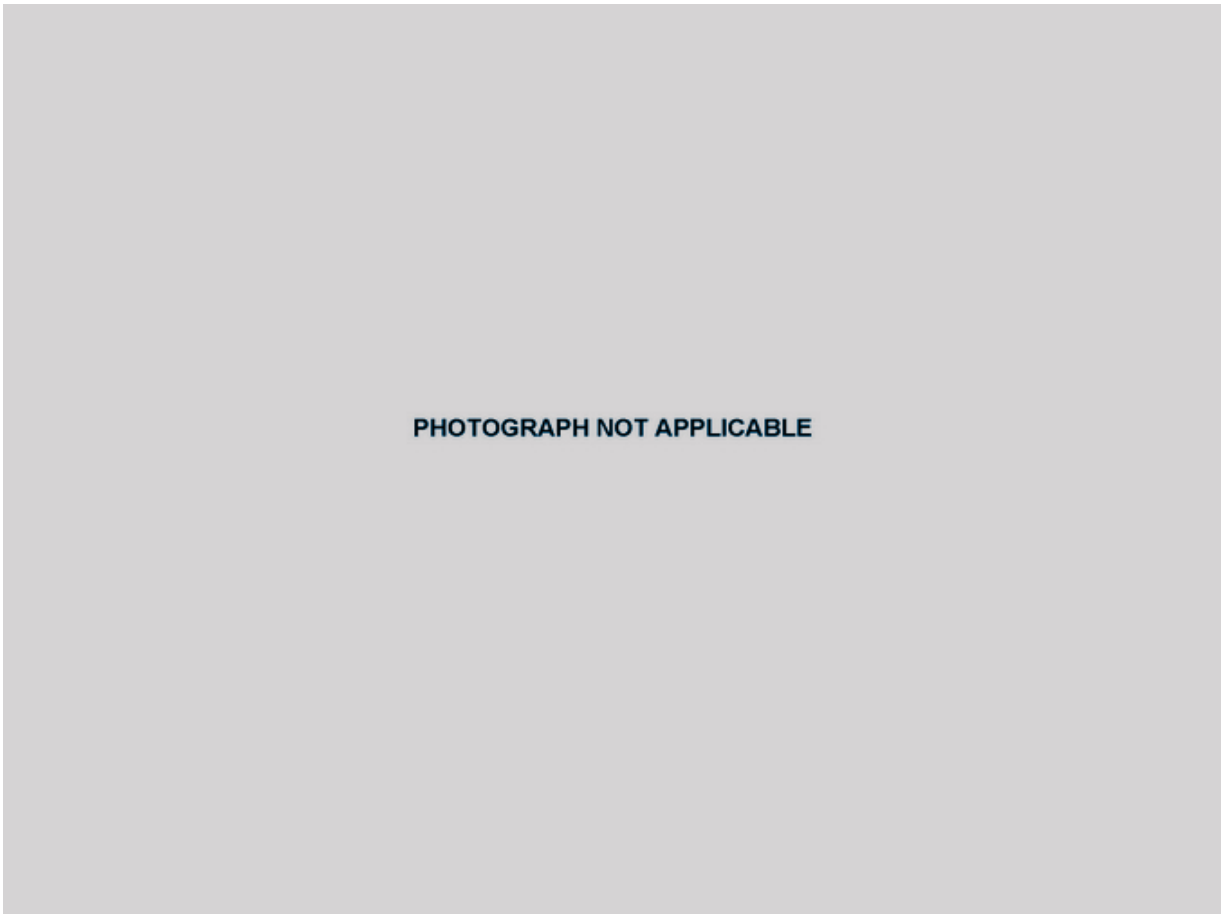
Post-Test Rear Passenger Dummy Close-up Head Contact with Vehicle View



Post-Test Rear Passenger Dummy Close-up Head Contact with Side Airbag View



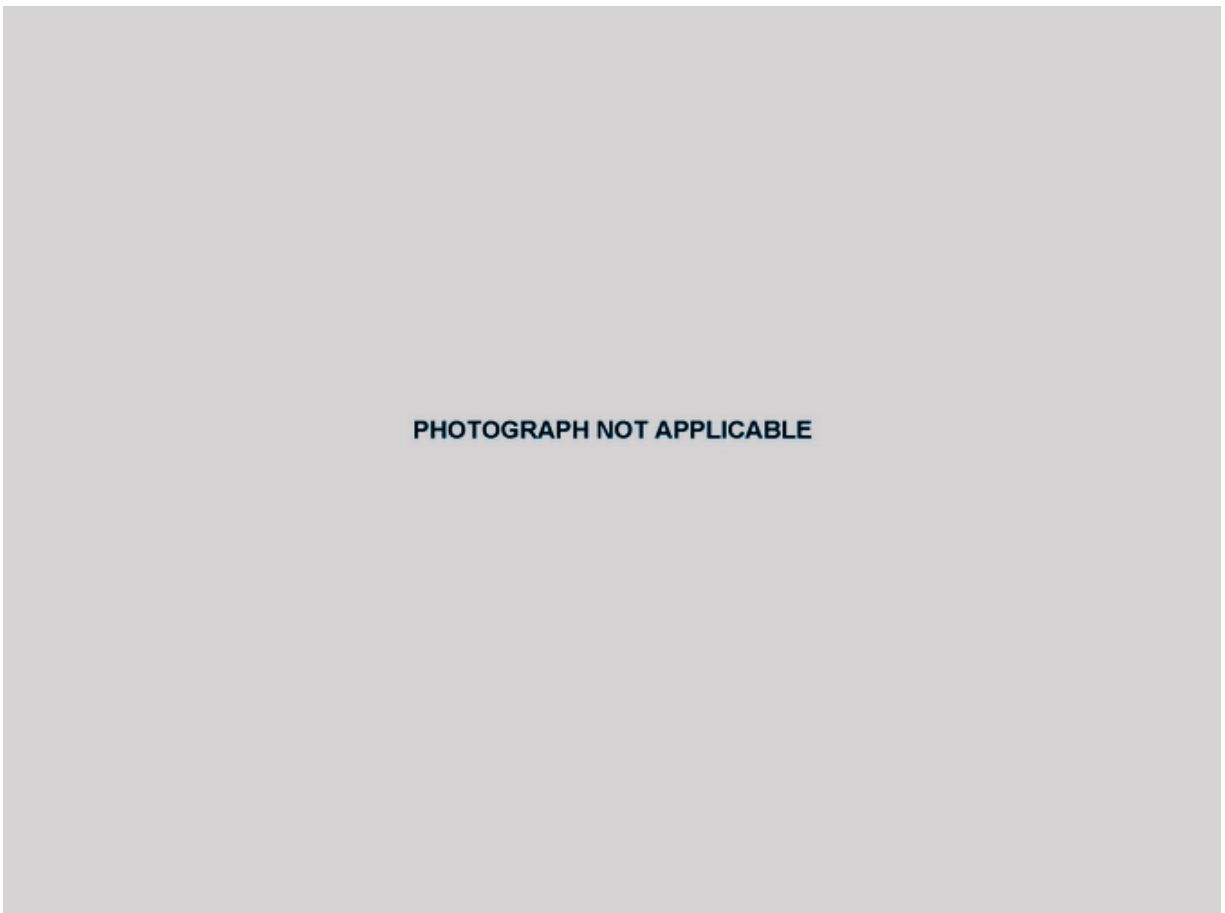
Post-Test Rear Passenger Dummy Close-up Torso Contact with Vehicle Interior View



Post-Test Rear Passenger Dummy Close-up Torso Contact with Side Airbag View



Post-Test Rear Passenger Dummy Close-up Pelvis Contact with Vehicle Interior View



Post-Test Rear Passenger Dummy Close-up Pelvis Contact with Side Airbag View



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



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



Pre-Test Front View of MDB Impactor Face



Post-Test Front View of MDB Impactor Face



Pre-Test Top View of MDB Impactor Face



Post-Test Top View of MDB Impactor Face



Pre-Test Left Side View of MDB Impactor Face



Post-Test Left Side View of MDB Impactor Face



Pre-Test Right Side View of MDB Impactor Face



Post-Test Right Side View of MDB Impactor Face



Close-Up View of Vehicle's Certification Label



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



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 ODYSSEY 5DR LX**  
 VEHICLE NUMBER: 5FNRL5H20B8007178  
 ENGINE NUMBER: J34326-1007770  
 CONTROL NUMBER: 0133669  
 EXC: MOCHA METALLIC  
 INT: BEIGE

**STANDARD EQUIPMENT AT NO EXTRA COST**

- **TECHNICAL FEATURES\***
  - 248hp 3.5-Liter SOHC 24-Valve I-VTEC V6 Engine with Variable Cylinder Management (VCM)
  - 5-Speed Automatic Transmission with Grade Logic Control
  - 4-Wheel Disc Brakes
  - Front MacPherson Strut Suspension
  - Rear Double Wishbone Suspension
  - Variable Valve Timing and Lift Intake System
  - Power Steering
  - Immobilizer Theft-Deterrent System
- **SAFETY FEATURES\***
  - Driver's and Front Passenger's Dual-Stage Airbags (SRS)
  - Driver's and Front Passenger's Side Airbags
  - Side Curtain Airbags with Rollover Sensor
  - Active Front Head Restraints
  - Side-Entry Child Rest (SECR)
  - Anti-Lock Braking System (ABS) Brake Assist
  - Electronic Brake Distribution (EBD)
  - Tire Pressure Monitoring System
  - 3-Point Seat Belts
  - Front Seat Belts with Automatic Tensioning System
  - ACE Body Structure
  - Daytime Running Lights (DRL)
  - LATCH System for Child Seats

- **INTERIOR FEATURES\***
  - AM/FM/CD Audio System w/ 5 Speakers Incl. MP3/WMA Playback
  - MP3/Auxiliary Input-Jack
  - Tilt & Telescopic Steering Column
  - Front and Rear Air Conditioning
  - One-Motion 60/40 Split Folding 3rd-Row Magic Seat
  - 10 Speakers
  - 10 Power Windows
  - Driver's Auto Dimming Mirror
  - Power Door and Tailgate Locks
  - Sunrings Holder
  - 12-Volt Power Outlets
  - Floor Mats
  - Maintenance Minder System
- **EXTERIOR FEATURES\***
  - 17" x 7.0" Steel Wheels with Full Wheel Covers
  - 235/65 R17 All-Season Tires
  - Dual Sliding Doors
  - Power Mirrors
  - Remote Entry System

Manufacturer's Suggested Retail Price **\$27,800.00**  
 Full Tank of Fuel **No Charge**

#35798

Destination and Handling **780.00**  
**TOTAL VEHICLE PRICE**  
 (Includes Pre-Delivery Service) **\$28,580.00**

License and title fees, state and local taxes and dealer options and accessories are not included in the manufacturer's suggested retail price.

ROSEN HONDA  
 7000 GRAND AVENUE  
 GURNEE, IL 60031  
 PORT OF ENTRY: ALABAMA  
 DELIVERY POINT: SCHAUMBURG  
 SHIP#:   
 ROW/SPACE: 115-001 726-008  
 TRANS.METHOD: N50 ELWOOD  
 VIN: 5FNRL5H20B8007178

ORIG. DLR: 207853  
 REF. NO.: 40363  
 HN CODE: HN-4971  
 EMISSION: 50 STATE  
 DEALER: 207853



**Environmental Performance**

Protect the environment, choose vehicles with higher scores:  
**Global Warming Score Smog Score**



Vehicle emissions are a primary contributor to global warming and smog. Scores are determined by the California Air Resources Board based on this vehicle's measured emissions. Please visit [www.DriveClean.ca.gov](http://www.DriveClean.ca.gov) for more information. AIR RESOURCES BOARD

**EPA Fuel Economy Estimates**

**CITY MPG**  
**18**  
 Expected range for most drivers 14 to 22 MPG

**Estimated Annual Fuel Cost**  
**\$2,142**  
 based on 15,000 miles at \$3.00 per gallon

**HIGHWAY MPG**  
**27**  
 Expected range for most drivers 22 to 32 MPG

**Combined Fuel Economy**  
**This Vehicle**  
**21**  
 18 ————— 22

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

All Special Purpose Vehicles - Minivans



See the FREE Fuel Economy Guide at dealers or [www.fueleconomy.gov](http://www.fueleconomy.gov)



**PARTS CONTENT INFORMATION**

FOR VEHICLES IN THIS CARLINE  
 U.S./Canadian Parts Content: **75 %**  
 Major Sources of Foreign Parts Content:  
**JAPAN 15 %**

NOTE: Parts content does not include final assembly, distribution or other non-parts costs.

**GOVERNMENT SAFETY RATINGS**

<b>Frontal Crash</b>	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.		
<b>Side Crash</b>	Front seat	Not Rated
	Rear seat	Not Rated
Star ratings based on the risk of injury in a side impact.		
<b>Rollover</b>		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](http://www.safercar.gov) or 1-888-327-4236

FOR THIS VEHICLE  
 Final Assembly Point:  
**USA**  
**LINCOLN, ALABAMA**

Country of Origin: Engine:

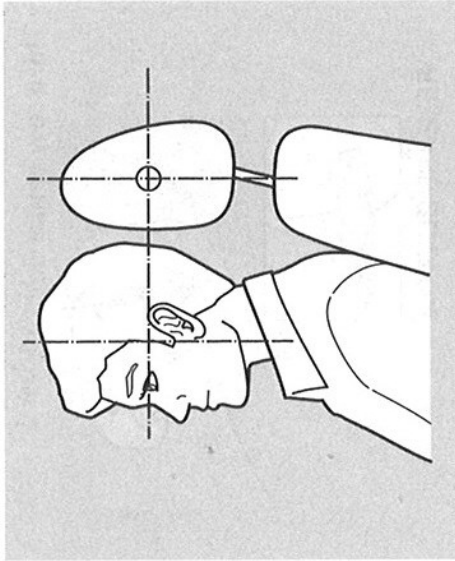
**U.S.A.**

Transmission:

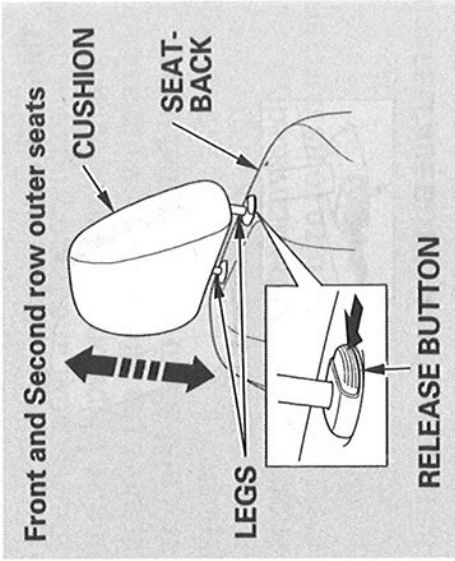
**U.S.A.**

**Head Restraints**  
 See page 14 for important safety information and a warning about improperly positioning head restraints.

Your vehicle is equipped with head restraints in all seating positions to help protect you and your passengers from the likelihood of whiplash and other injuries.



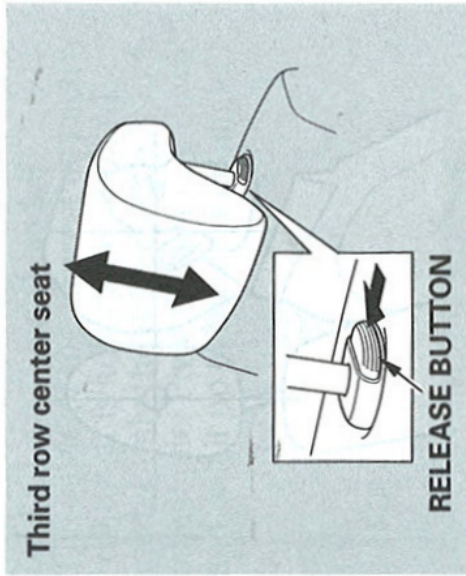
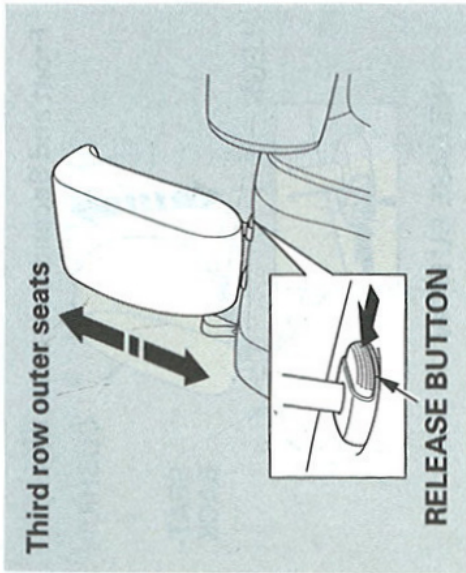
They are most effective when you adjust them so the center of the back of the occupant's head rests against the center of the restraint.



**Adjusting the Head Restraint**  
 The head restraints adjust for height. You need both hands to adjust a restraint. Do not attempt to adjust it while driving. To raise it, pull upward. To lower the restraint, push the release button sideways, and push the restraint down.

CONTINUED

# Seats



Make sure the removed head restraints are securely stored.

When reinstalling a head restraint, put the legs back in place. Then adjust it to the appropriate height while pressing the release button.

## Removing the Head Restraint

To remove a head restraint for cleaning or repair, pull it up as far as it will go. Push the release button, then pull the restraint out of the seat-back.

## For Third Row Seat Outer Head Restraints

The seat-back must be folded forward (see page 177 ) to get ceiling clearance for removal of the head restraints.

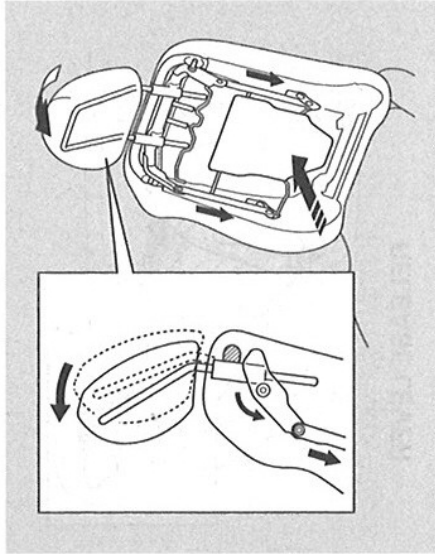
### **⚠ WARNING**

Failure to reinstall the head restraints can result in severe injury during a crash.

Always replace the head restraints before driving.

Make sure the head restraint locks in position when you reinstall it.

### **Active Head Restraints**



The driver's and front passenger's seats have active head restraints. If the vehicle is struck severely from the rear, the occupant properly secured with the seat belt will be pushed against the seat-back and the head restraint will automatically move forward.

This reduces the distance between the restraint and the occupant's head. It also helps protect the occupants against the likelihood of whiplash and injuries to the neck and upper spine.

After a collision, the activated restraint should return to its normal position.

If the restraints do not return to their normal position, or in the event of a severe collision, have the vehicle inspected by a Honda dealer.

CONTINUED

**APPENDIX B**  
**DUMMY RESPONSE DATA**

**TABLE OF DATA PLOTS**  
**Driver & Passenger Dummy Instrumentation Plots**  
**FILTERED DATA**

<b><u>No.</u></b>	<b><u>Description</u></b>	<b><u>Page No.</u></b>
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 Acceleration Primary vs. Time	B-1
Figure No. 5.	Driver Upper Thorax Rib Deflection (Y) vs. Time	B-2
Figure No. 6.	Driver Middle Thorax Rib Deflection (Y) vs. Time	B-2
Figure No. 7.	Driver Lower Thorax Rib Deflection (Y) vs. Time	B-2
Figure No. 8.	Driver Thorax Rib Deflection Maximum vs. Time	B-2
Figure No. 9.	Driver Anterior Abdomen Force (Y) vs. Time	B-3
Figure No. 10.	Driver Middle Abdomen Force (Y) vs. Time	B-3
Figure No. 11.	Driver Posterior Abdomen Force (Y) vs. Time	B-3
Figure No. 12.	Driver Total Abdominal Force (Y) vs. Time	B-3
Figure No. 13.	Driver Pubic Symphysis Force (Y) vs. Time	B-4
Figure No. 14.	Passenger Head Acceleration (X) Primary vs. Time	B-5
Figure No. 15.	Passenger Head Acceleration (Y) Primary vs. Time	B-5
Figure No. 16.	Passenger Head Acceleration (Z) Primary vs. Time	B-5
Figure No. 17.	Passenger Head Resultant Acceleration Primary vs. Time	B-5
Figure No. 18.	Passenger Lower Spine T12 Acceleration (X) vs. Time	B-6
Figure No. 19.	Passenger Lower Spine T12 Acceleration (Y) vs. Time	B-6
Figure No. 20.	Passenger Lower Spine T12 Acceleration (Z) vs. Time	B-6
Figure No. 21.	Passenger Lower Spine T12 Resultant Acceleration vs. Time	B-6
Figure No. 22.	Passenger Iliac Force on Impact Side (Y) vs. Time	B-7
Figure No. 23.	Passenger Acetabulum Force on Impact Side (Y) vs. Time	B-7
Figure No. 24.	Passenger Total Pelvic Force on Impact Side (Y) vs. Time	B-7

**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](http://www.nhtsa.dot.gov)**

### **Driver & Passenger Dummy Instrumentation Data**

Driver Lower Spine T12 Acceleration (X)

Driver Lower Spine T12 Acceleration (Y)

Driver Lower Spine T12 Acceleration (Z)

Passenger Upper Thorax Rib Deflection (Y)

Passenger Middle Thorax Rib Deflection (Y)

Passenger Lower Thorax Rib Deflection (Y)

Passenger Upper Abdomen Rib Deflection (Y)

Passenger Lower Abdomen Rib Deflection (Y)

Driver Head Acceleration Redundant (X)

Driver Head Acceleration Redundant (Y)

Driver Head Acceleration Redundant (Z)

Driver Shoulder Contact Switch

Driver Torso Contact Switch

Driver Pelvis Contact Switch

Passenger Head Acceleration Redundant (X)

Passenger Head Acceleration Redundant (Y)

Passenger Head Acceleration Redundant (Z)

Passenger Shoulder Contact Switch

Passenger Torso Contact Switch

Passenger Pelvis Contact Switch

### **Vehicle Instrumentation Data**

Driver Side Airbag Timing

Driver Side Curtain Airbag Timing (not installed)

Passenger Side Airbag Timing (not installed)

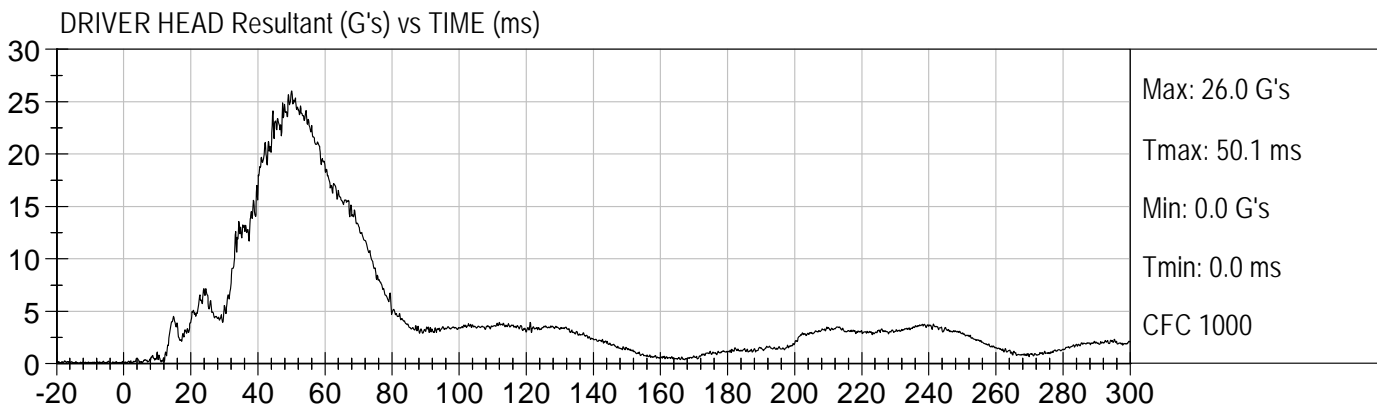
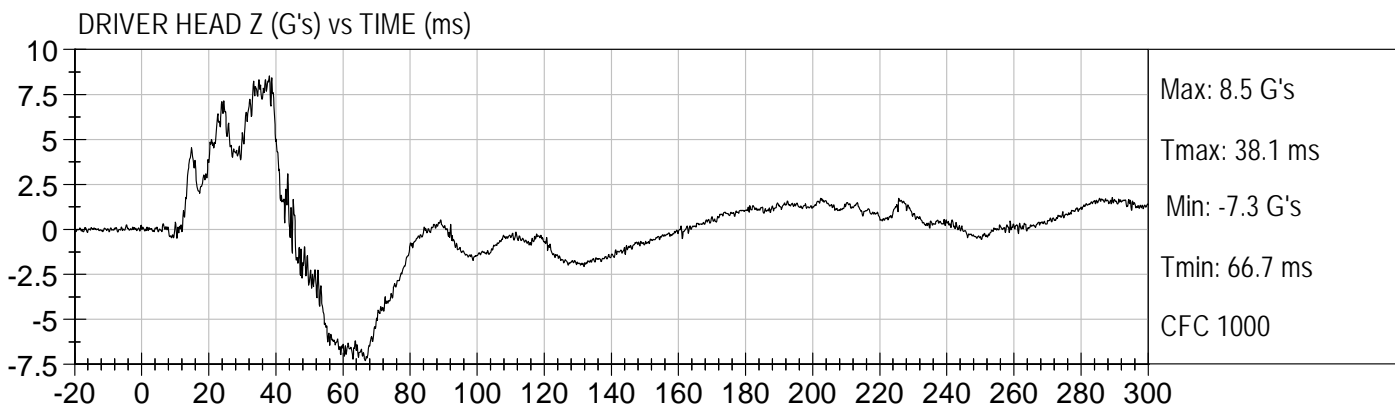
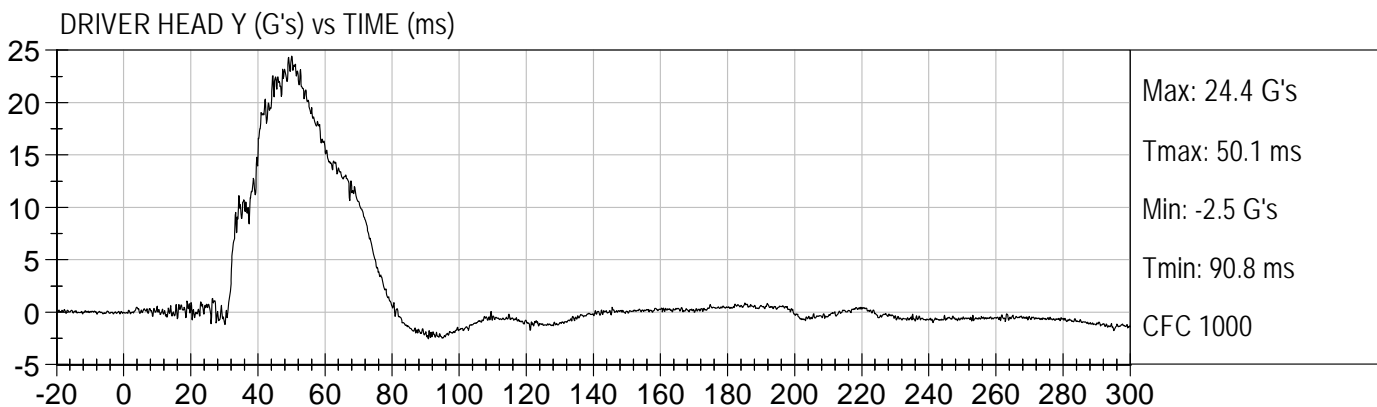
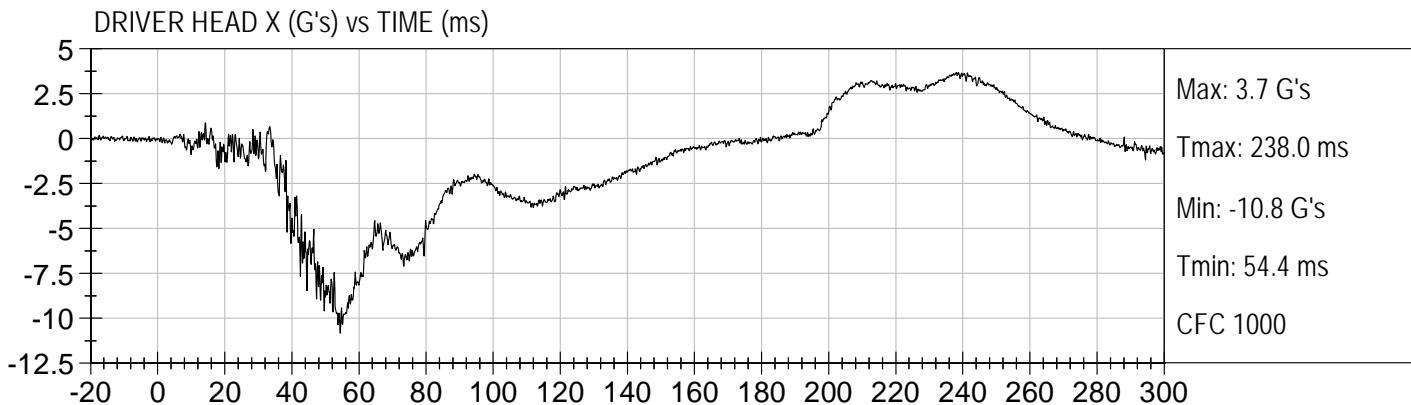
Passenger Side Curtain Airbag Timing (not installed)

Right Side Sill at Front Seat Acceleration (X)

Right Side Sill at Front Seat Acceleration (Y)  
Right Side Sill at Front Seat Acceleration (Z)  
Right Side Sill at Rear Seat Acceleration (X)  
Right Side Sill at Rear Seat Acceleration (Y)  
Right Side Sill at Rear Seat Acceleration (Z)  
Rear Floorpan Above Axle Acceleration (X)  
Rear Floorpan Above Axle Acceleration (Y)  
Rear Floorpan Above Axle Acceleration (Z)  
Left Side Sill at Front Seat Acceleration (Y)  
Left Side Sill at Rear Seat Acceleration (Y)  
Right Rear Occupant Compartment Acceleration (Y)  
Lower A-Post Acceleration (Y)  
Middle A-Post Acceleration (Y)  
Lower B-Post Acceleration (Y)  
Middle B-Post Acceleration (Y)  
Front Seat Track Acceleration (Y)  
Rear Seat Track Acceleration (Y)  
Vehicle Center of Gravity Acceleration (X)  
Vehicle Center of Gravity Acceleration (Y)  
Vehicle Center of Gravity Acceleration (Z)

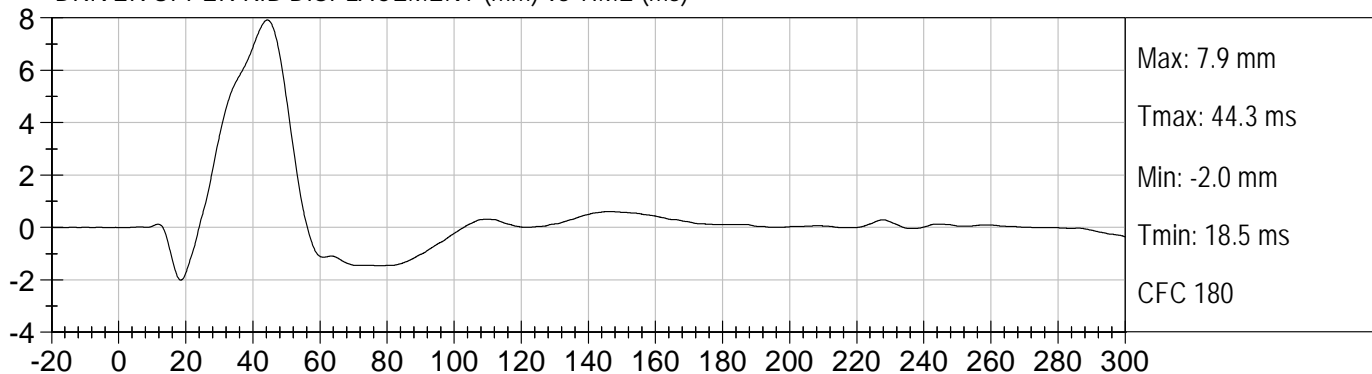
#### **MDB Instrumentation Data**

MDB Center of Gravity Acceleration (X)  
MDB Center of Gravity Acceleration (Y)  
MDB Center of Gravity Acceleration (Z)  
MDB Rear Acceleration (X)  
MDB Rear Acceleration (Y)  
Left MDB Contact Switch  
Right MDB Contact Switch

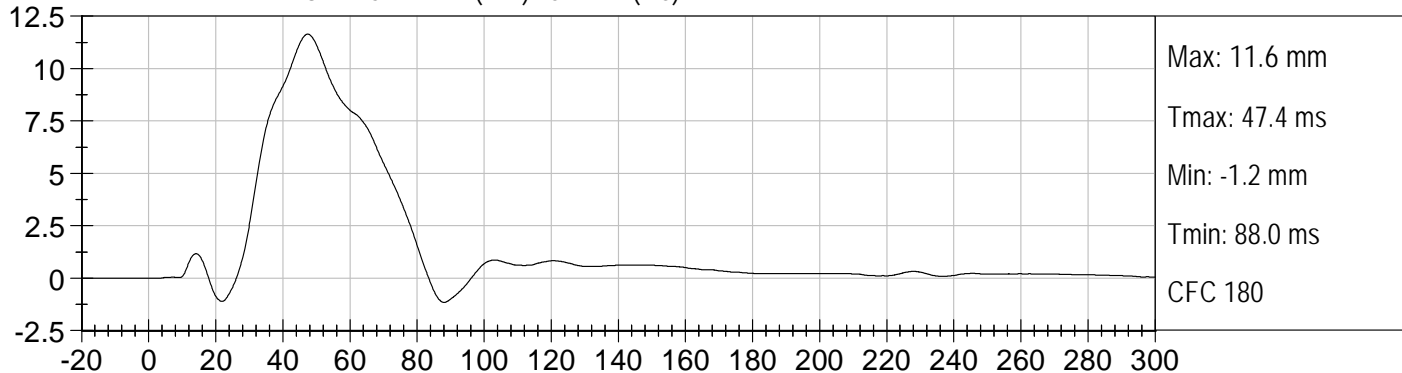




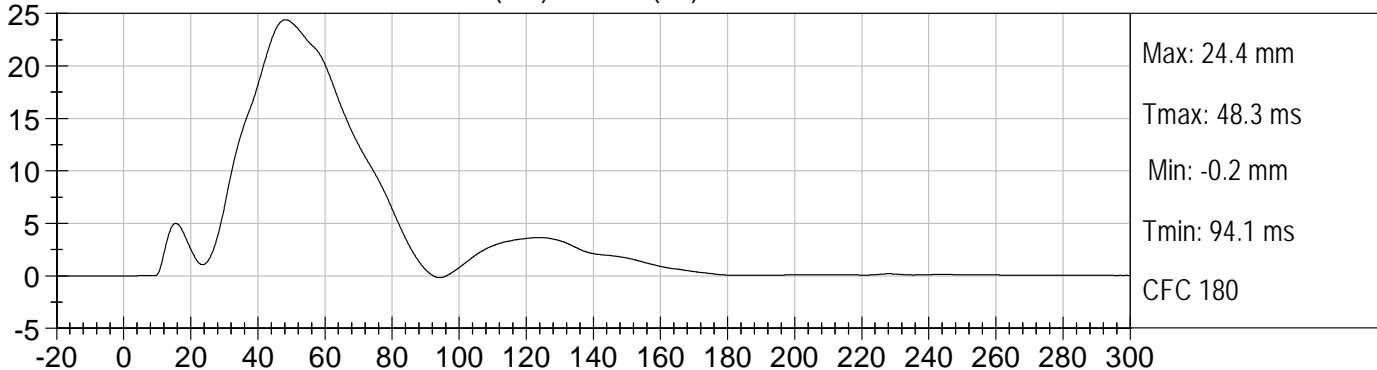
DRIVER UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



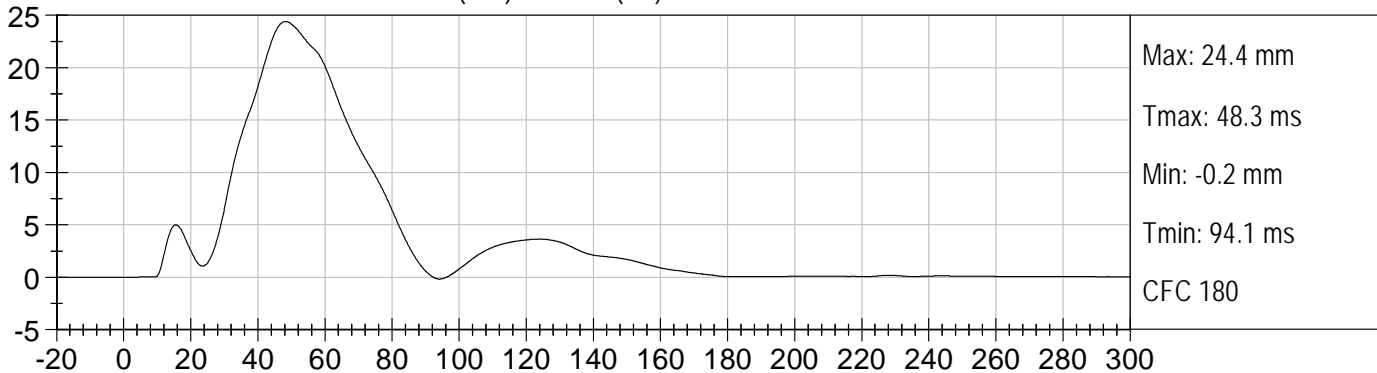
DRIVER MID RIB DISPLACEMENT (mm) vs TIME (ms)

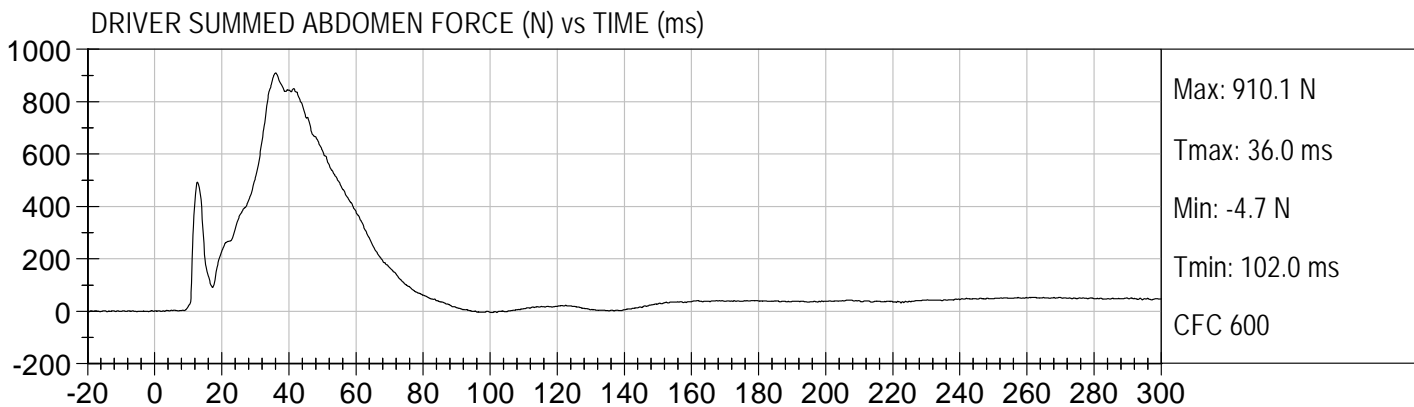
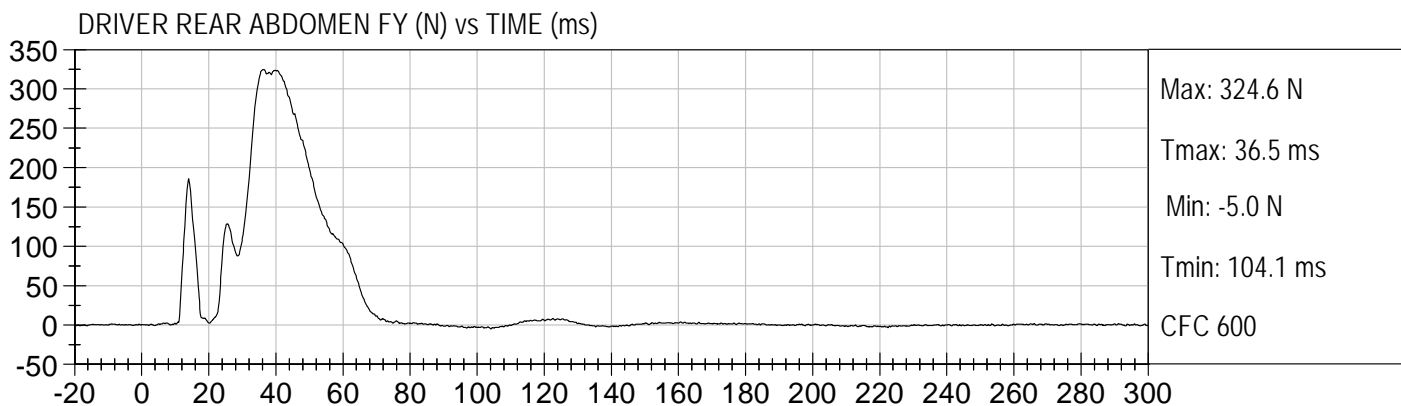
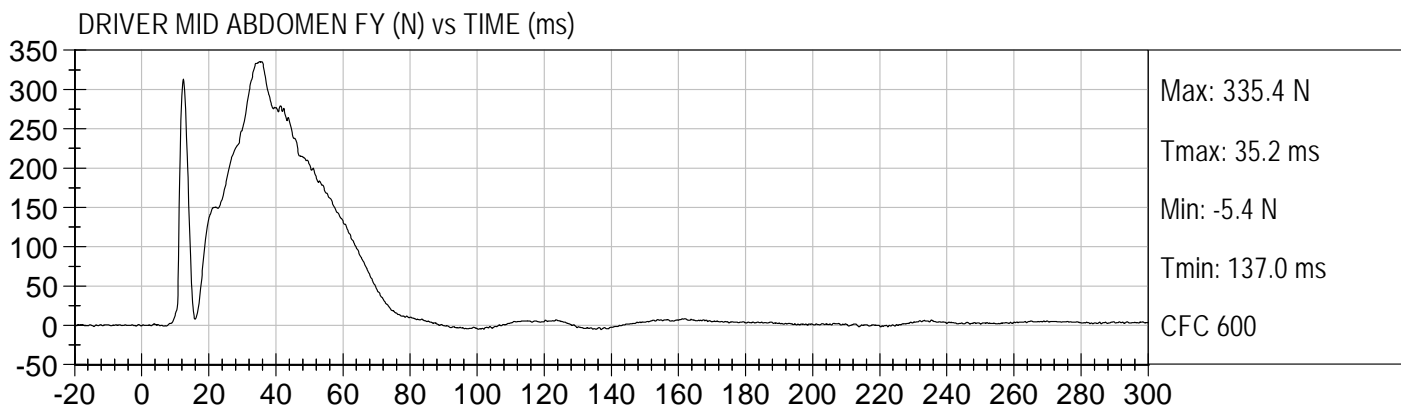
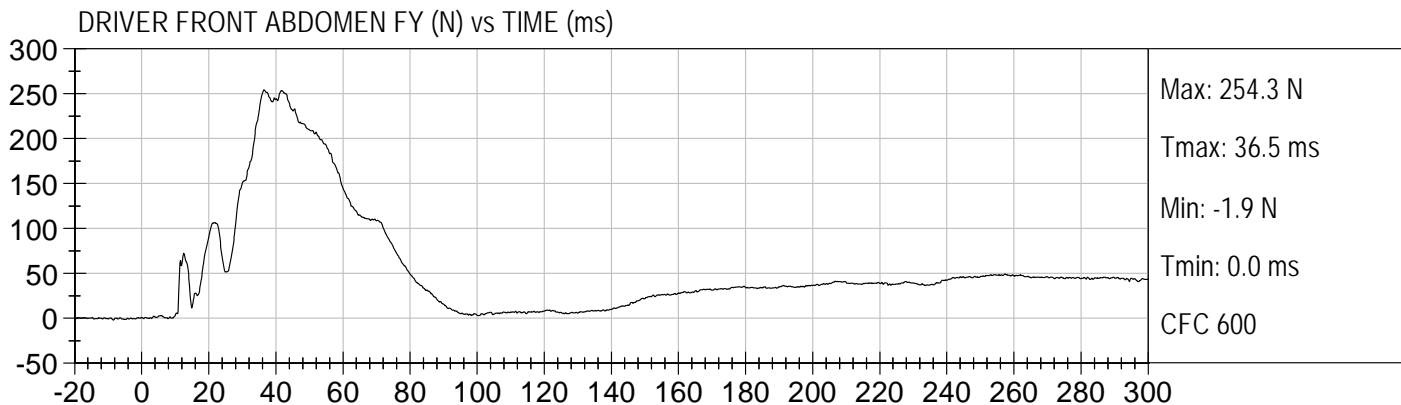


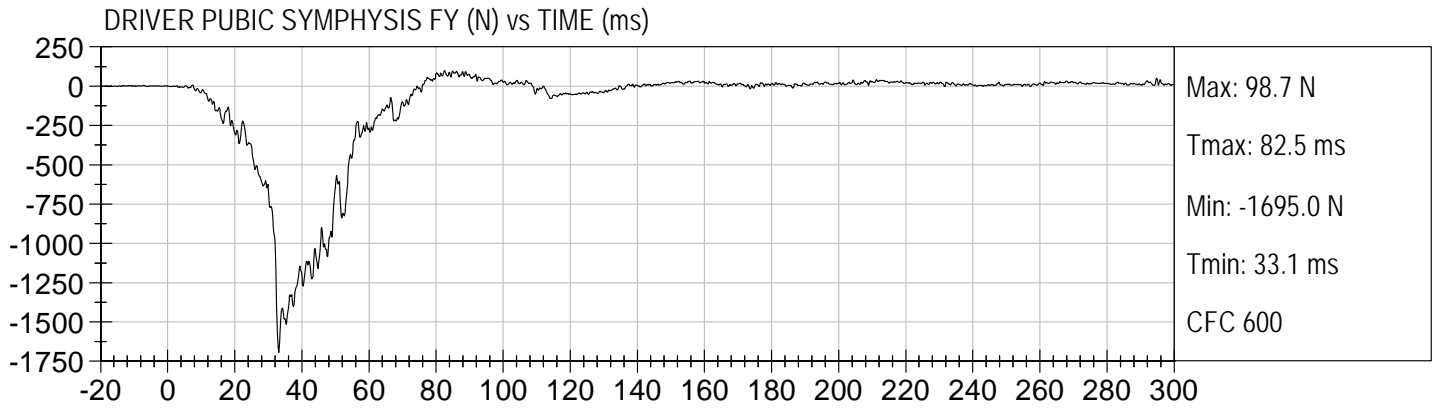
DRIVER LOWER RIB DISPLACEMENT (mm) vs TIME (ms)

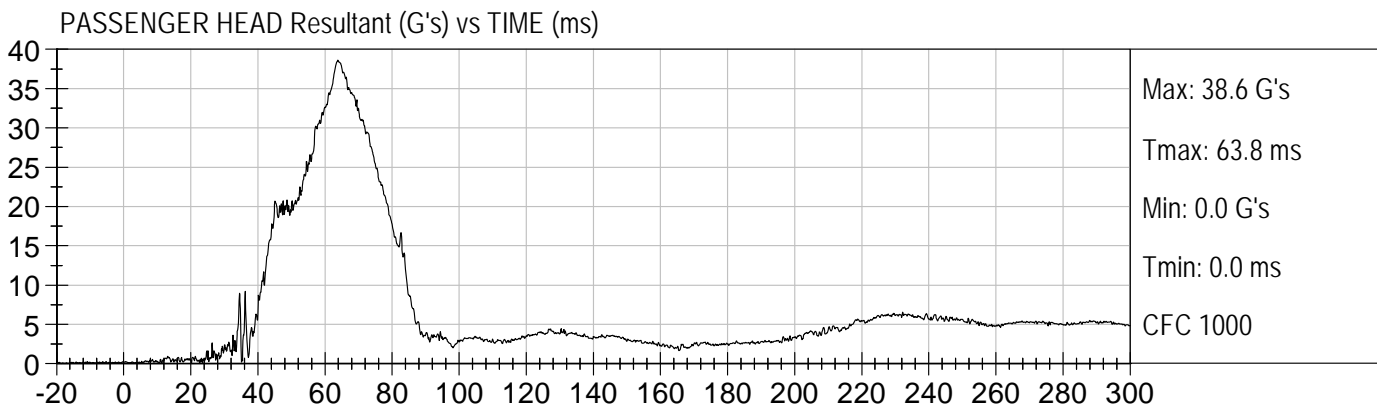
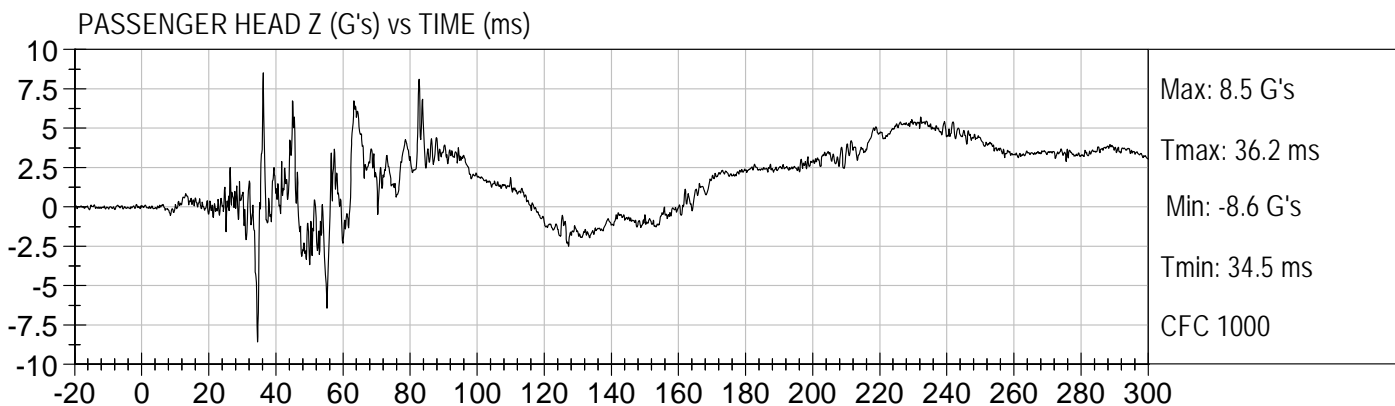
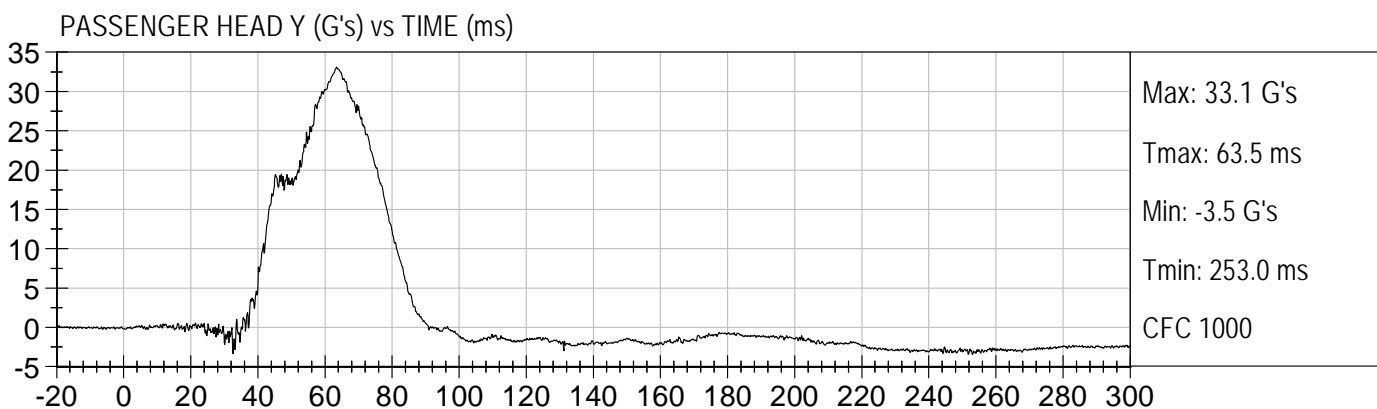
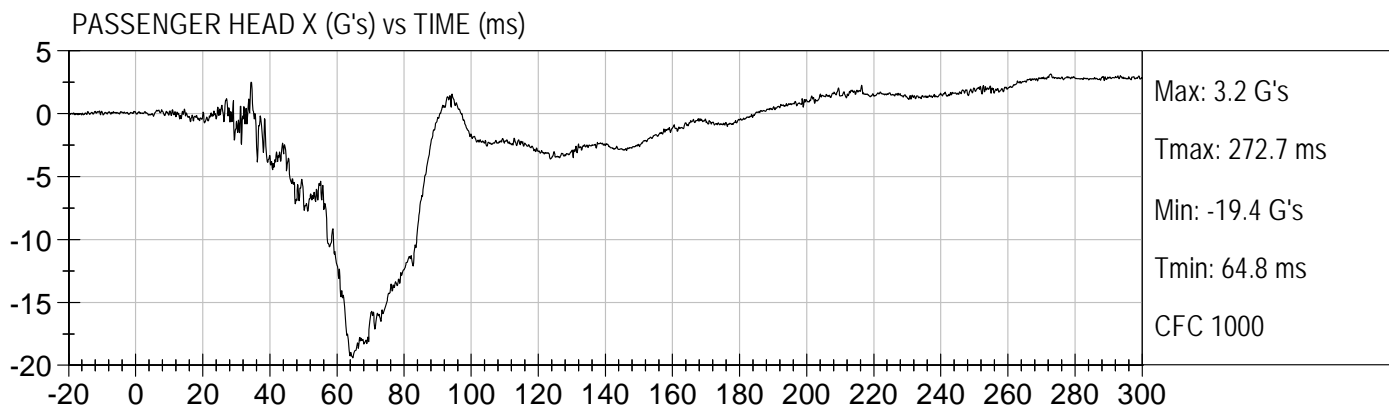


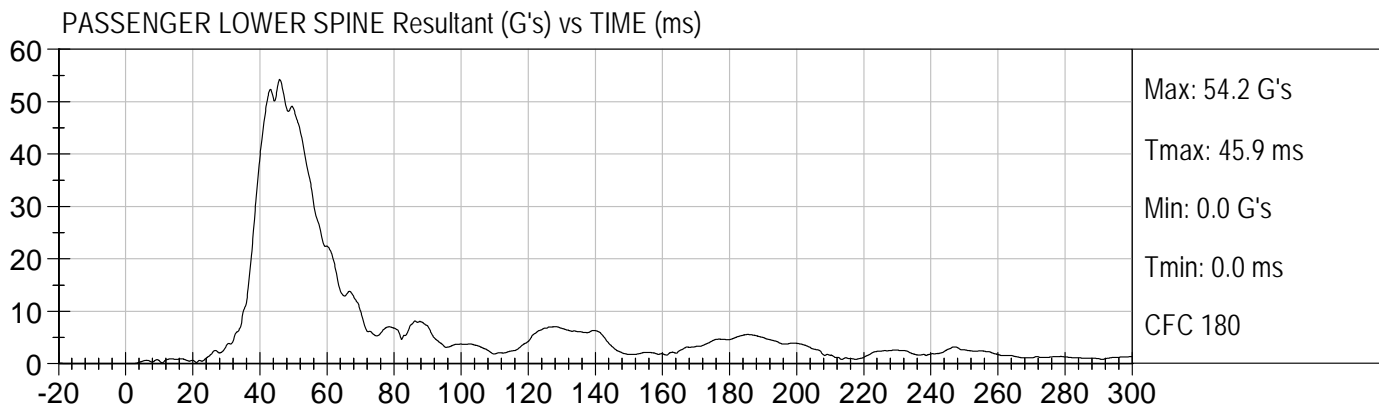
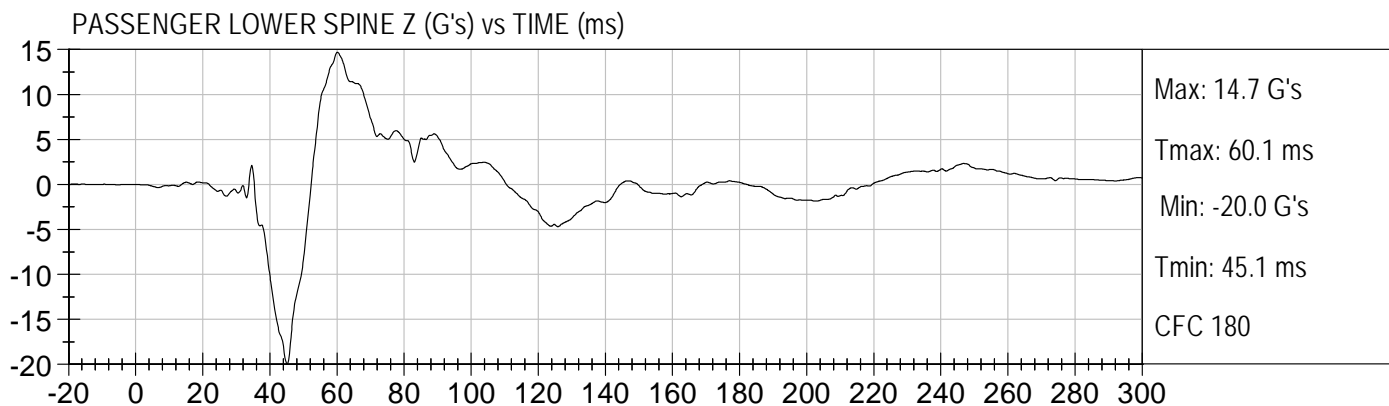
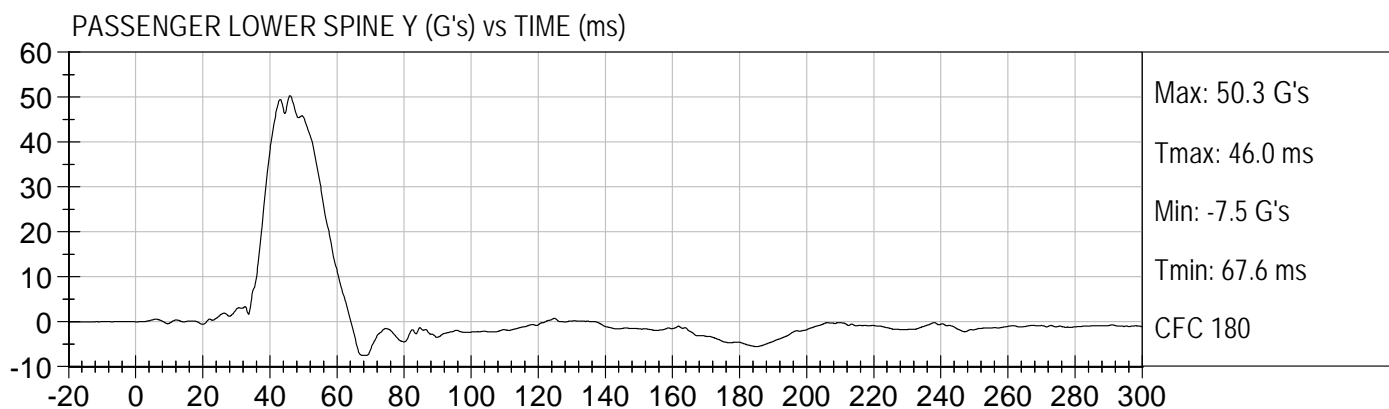
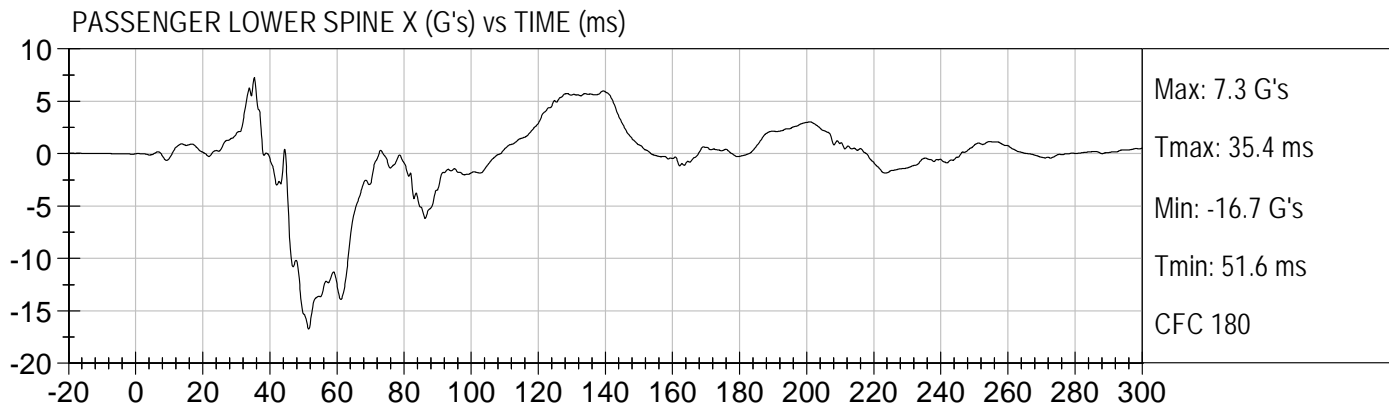
DRIVER MAX RIB DISPLACEMENT (mm) vs TIME (ms)

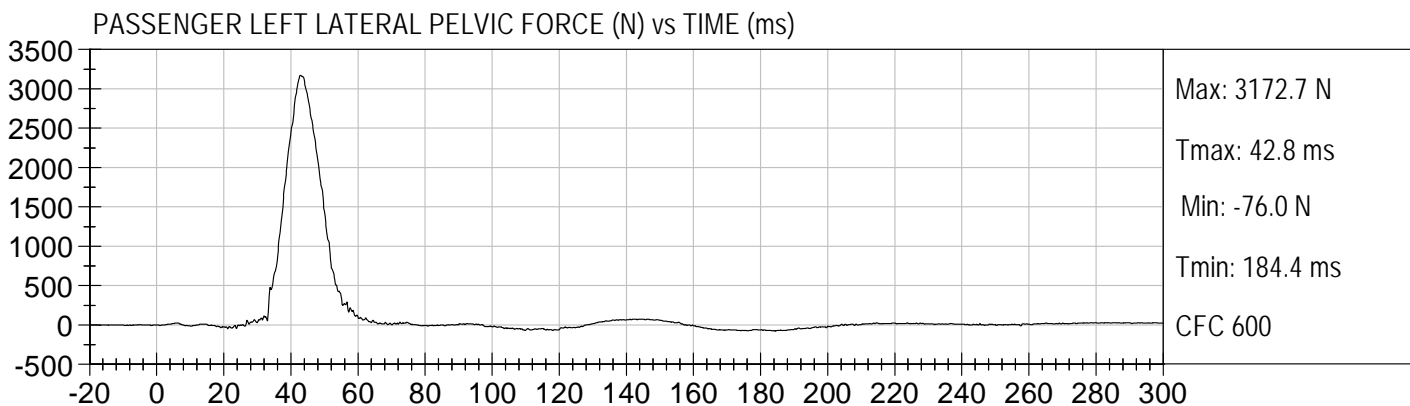
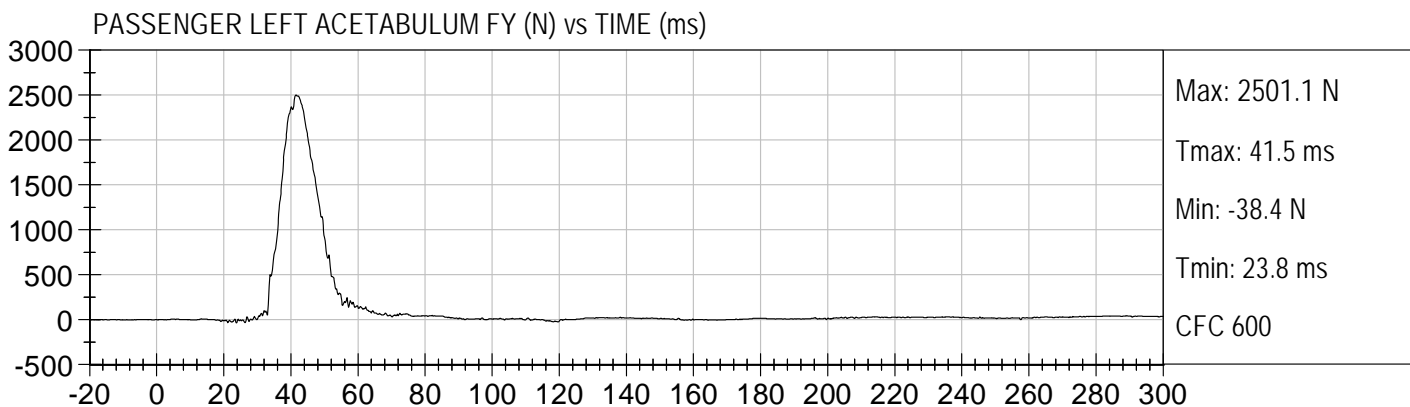
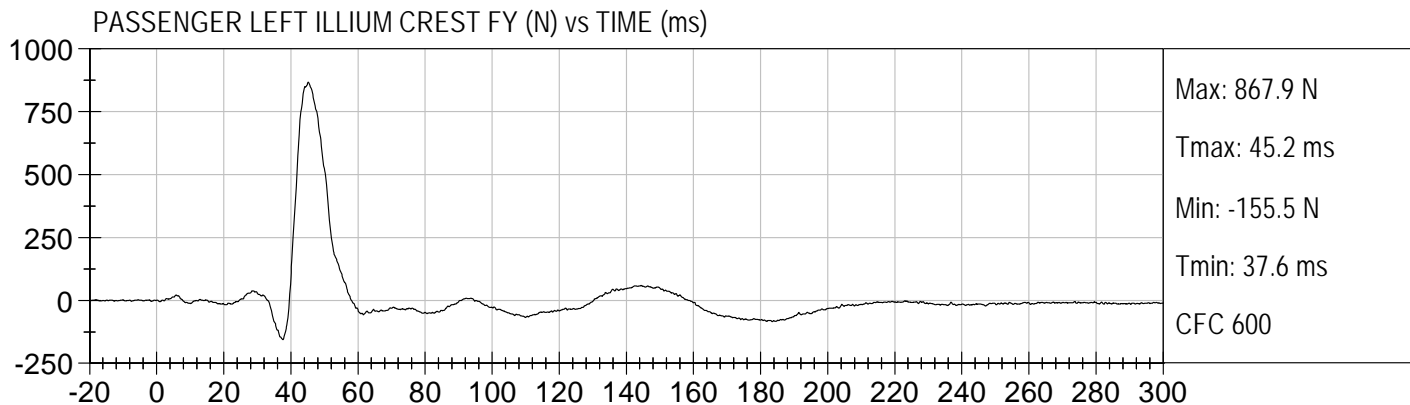












## **APPENDIX C**

### **DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA**

**MGA RESEARCH CORPORATION**  
**HEAD DROP TEST**  
**ES-2re DUMMY**

ATD Serial No: 032

Test ID: D104121

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	23	Pass
Peak Resultant Acceleration	G's	125 to 155	150	Pass
Peak Lateral Acceleration	G's	+/- 15	-9	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 15% of peak	Yes	Pass
Overall Test Results				Pass

*Jessica Gall*  
 Laboratory Technician

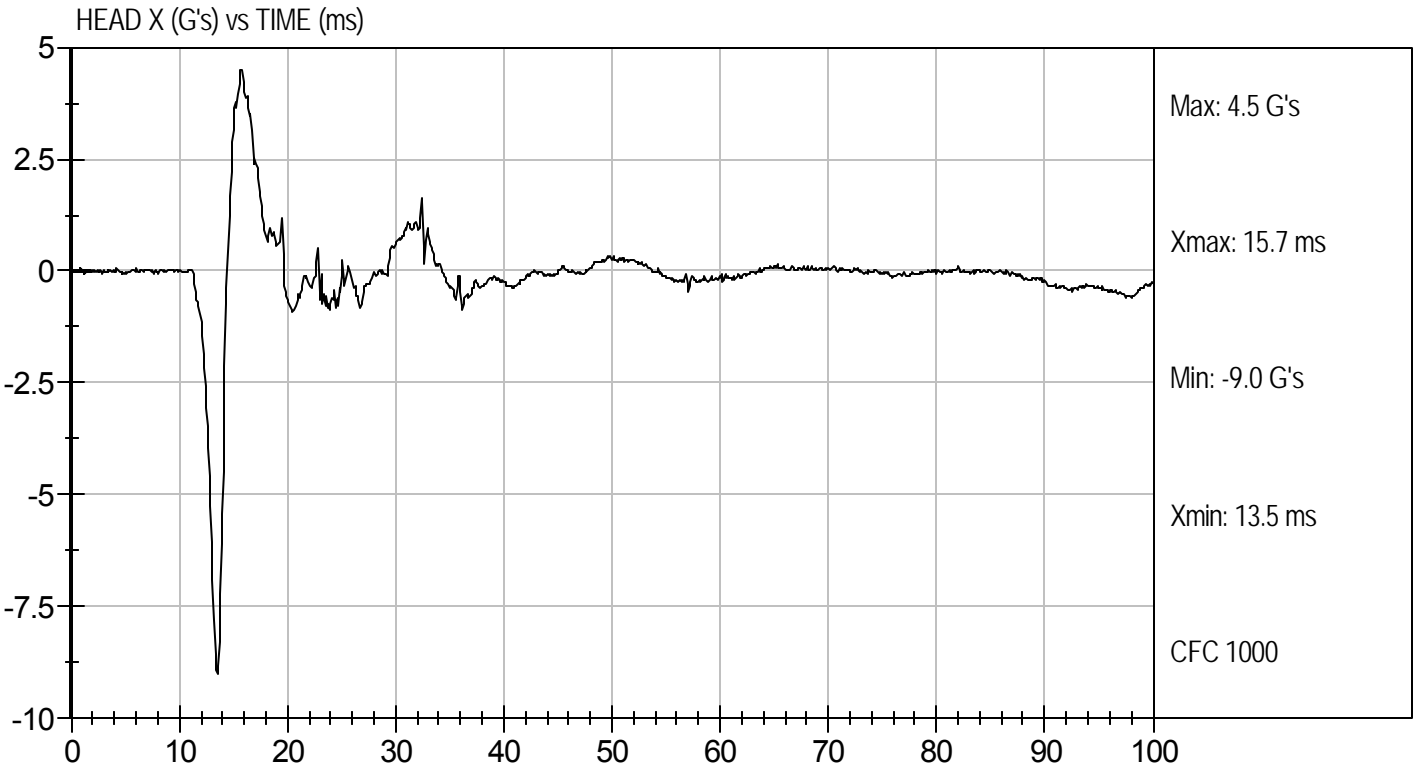
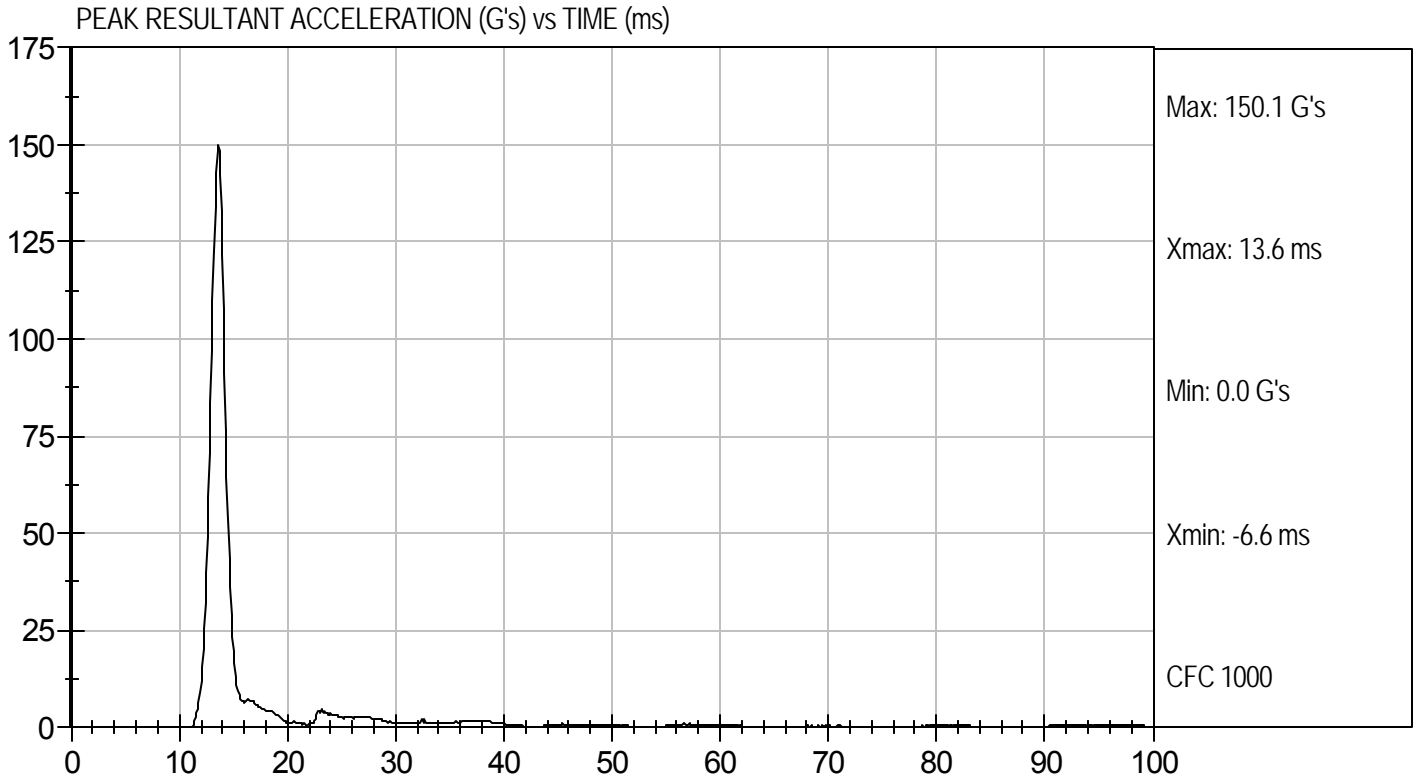
11/23/10  
 Test Date

*David Winkelbauer*  
 Approved By



Test Desc: Head Drop  
Component ID: D104121

Test Date: 11/23/10  
Velocity: 0 ft/s, 0 m/s



**MGA RESEARCH CORPORATION**  
**NECK PENDULUM TEST**  
**ES-2re DUMMY**

ATD Serial No: 032

Test I.D.: D104122

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	18.0 to 22.0	21.5	Pass
Laboratory Relative Humidity		%	10 to 70	24	Pass
Pendulum Speed		m/s	3.3 to 3.5	3.5	Pass
Pendulum Deceleration	1 ms	m/s	0.00 to -0.05	-0.02	Pass
	3 ms	m/s	-0.25 to -0.375	-0.33	Pass
	14 ms	m/s	-3.20 to -3.70	-3.27	Pass
Maximum Flexion Angle		deg	49.0 to 59.0	55.1	Pass
Time of Maximum Flexion Angle		ms	54.0 to 66.0	60.7	Pass
Head Rotation Decay Time to 0 degree		ms	53.0 to 88.0	55.3	Pass
Overall Test Results					Pass

*Jessica Hall*  
 Laboratory Technician

11/23/10  
 Test Date

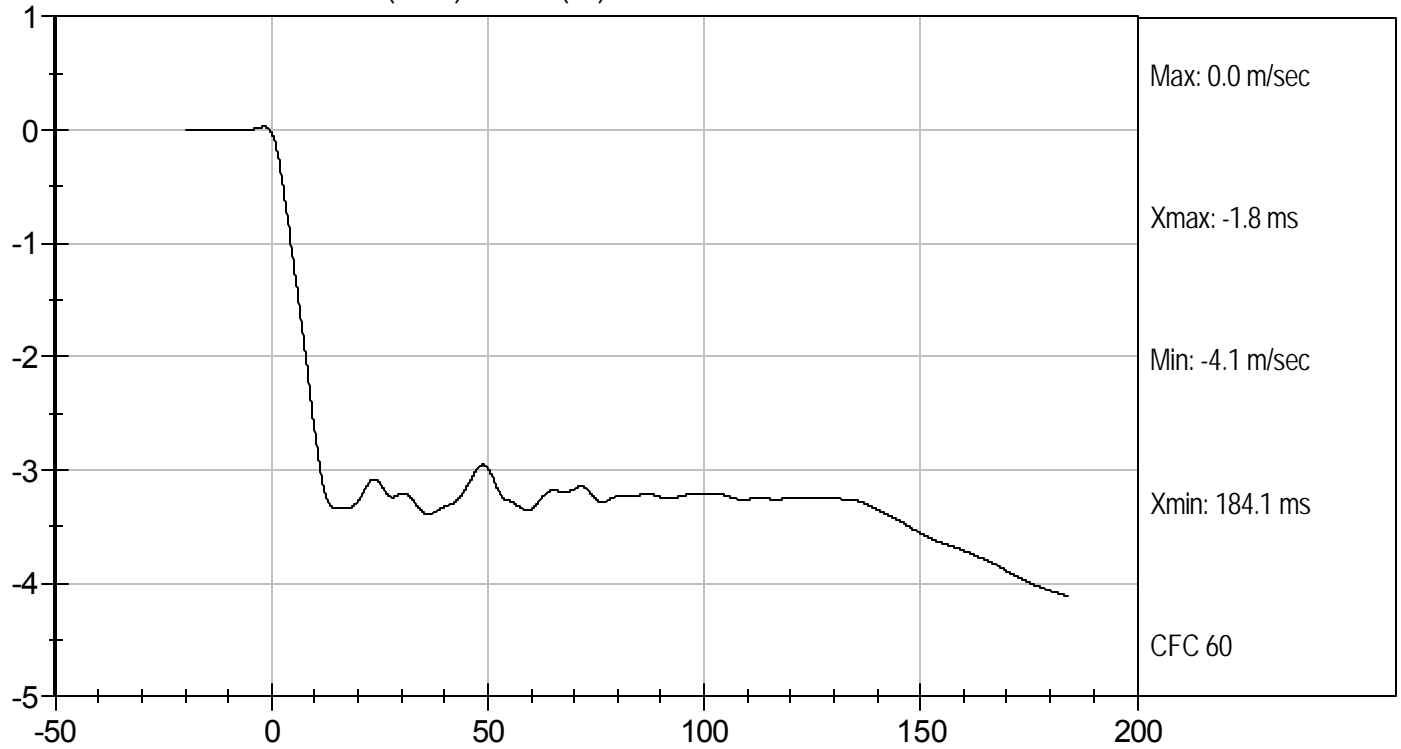
*David Winkelbauer*  
 Approved By



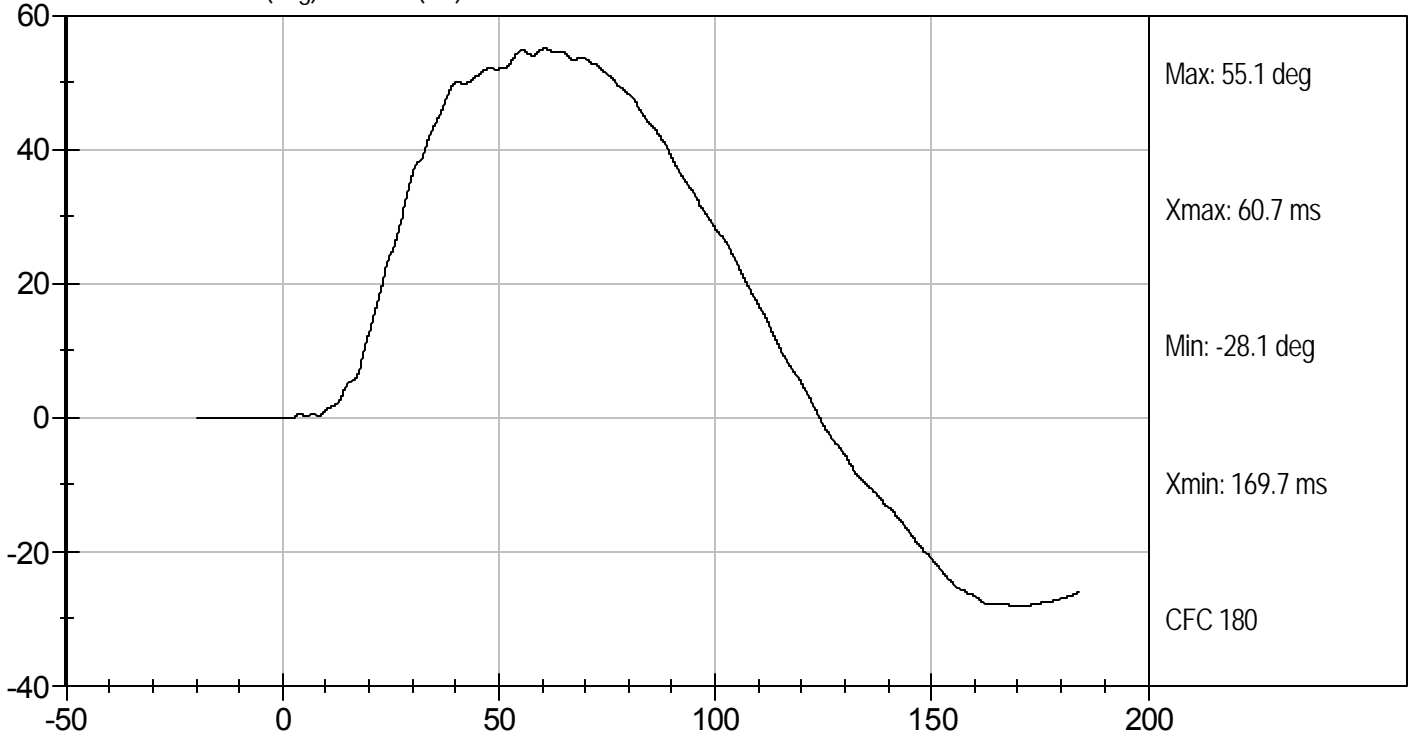
Test Desc: Neck Bending  
Component ID: D104122

Test Date: 11/23/10  
Velocity: 11.41 ft/s, 3.5 m/s

PENDULUM DECELERATION (m/sec) vs TIME (ms)



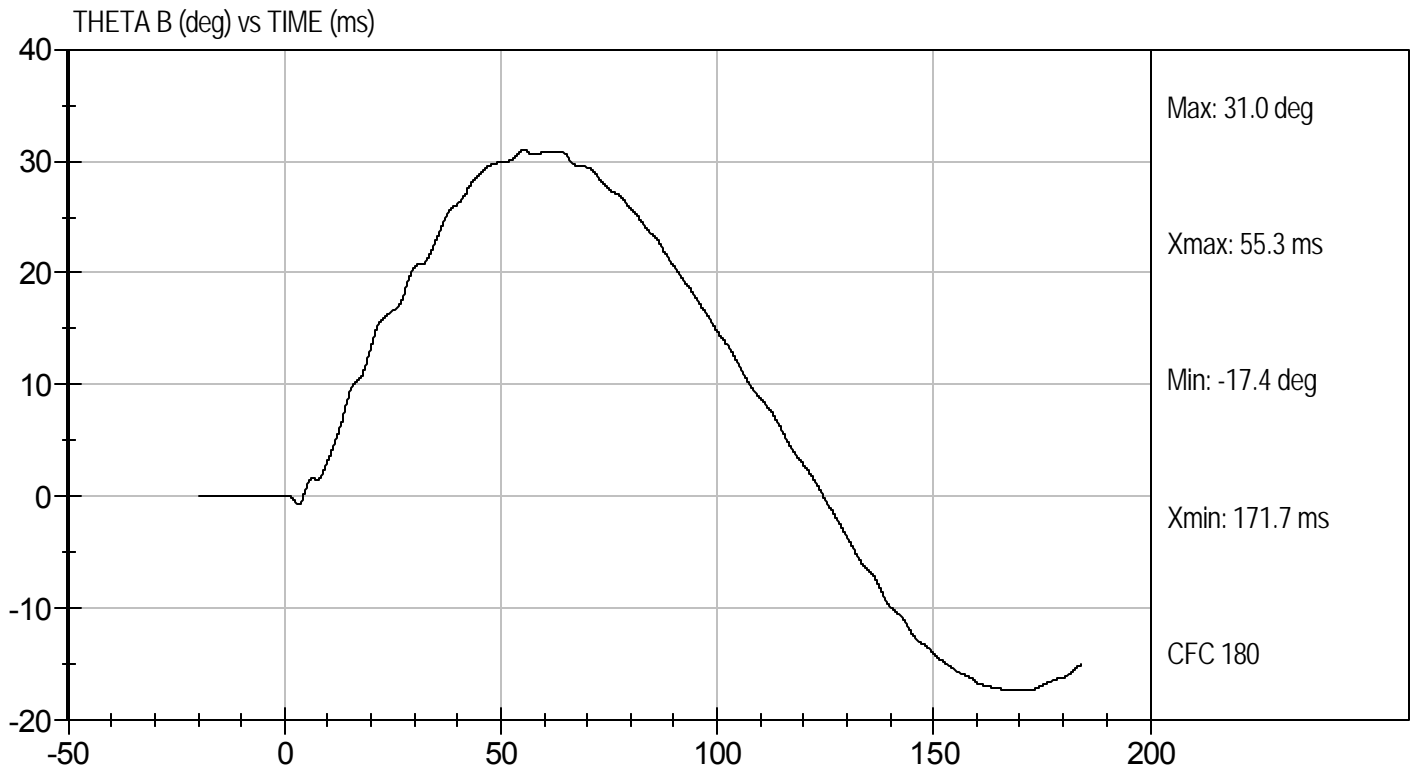
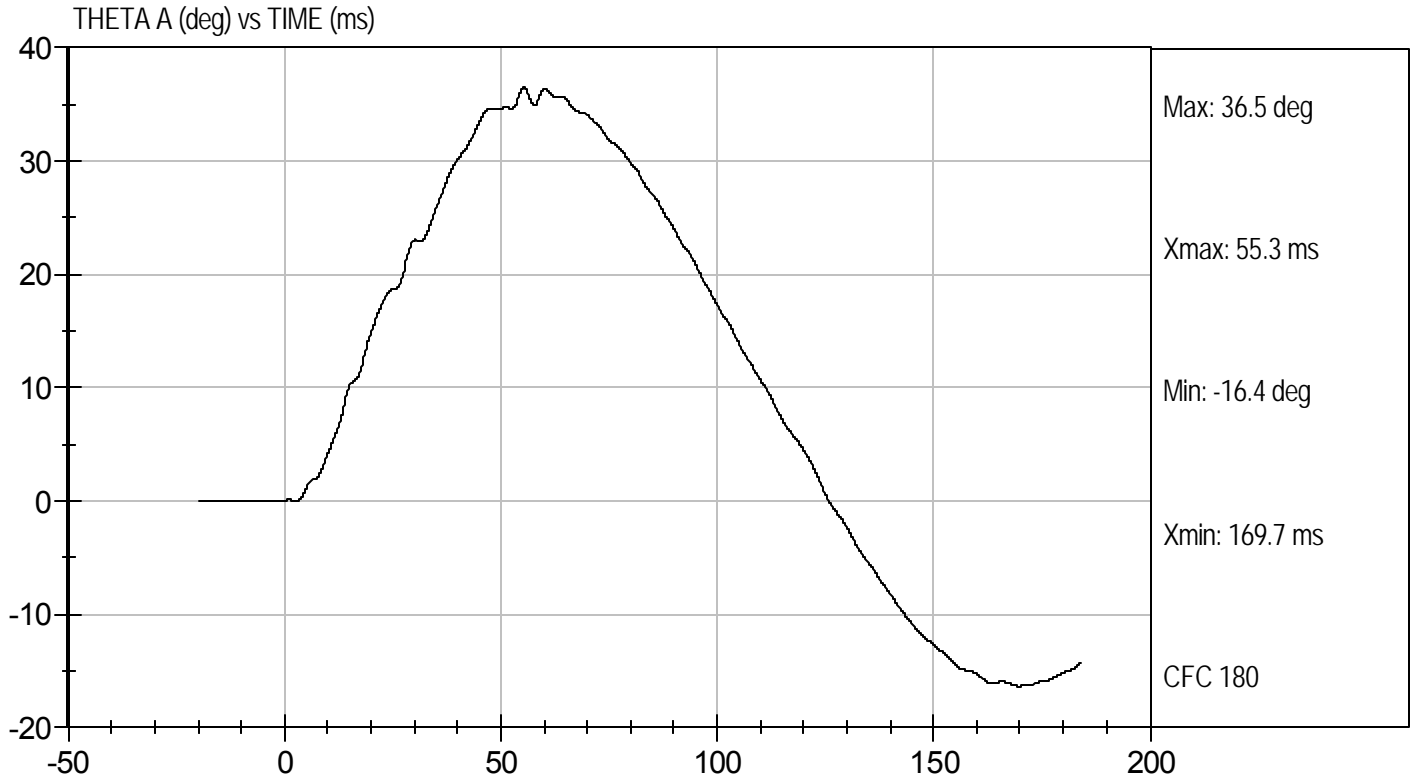
FLEXION ANGLE (deg) vs TIME (ms)





Test Desc: Neck Bending  
Component ID: D104122

Test Date: 11/23/10  
Velocity: 11.41 ft/s, 3.5 m/s



**MGA RESEARCH CORPORATION**  
**SHOULDER IMPACT TEST**  
**ES-2re DUMMY**

ATD Serial No: 032

Test I.D: D104123

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	25	Pass
Pendulum Speed	m/s	4.2 to 4.4	4.2	Pass
Peak Shoulder Acceleration	G's	7.5 to 10.5	10.1	Pass
Time of Peak Shoulder Acceleration	ms	NA	16.2	Pass
Overall Test Results				Pass

Jessica Hall  
 Laboratory Technician

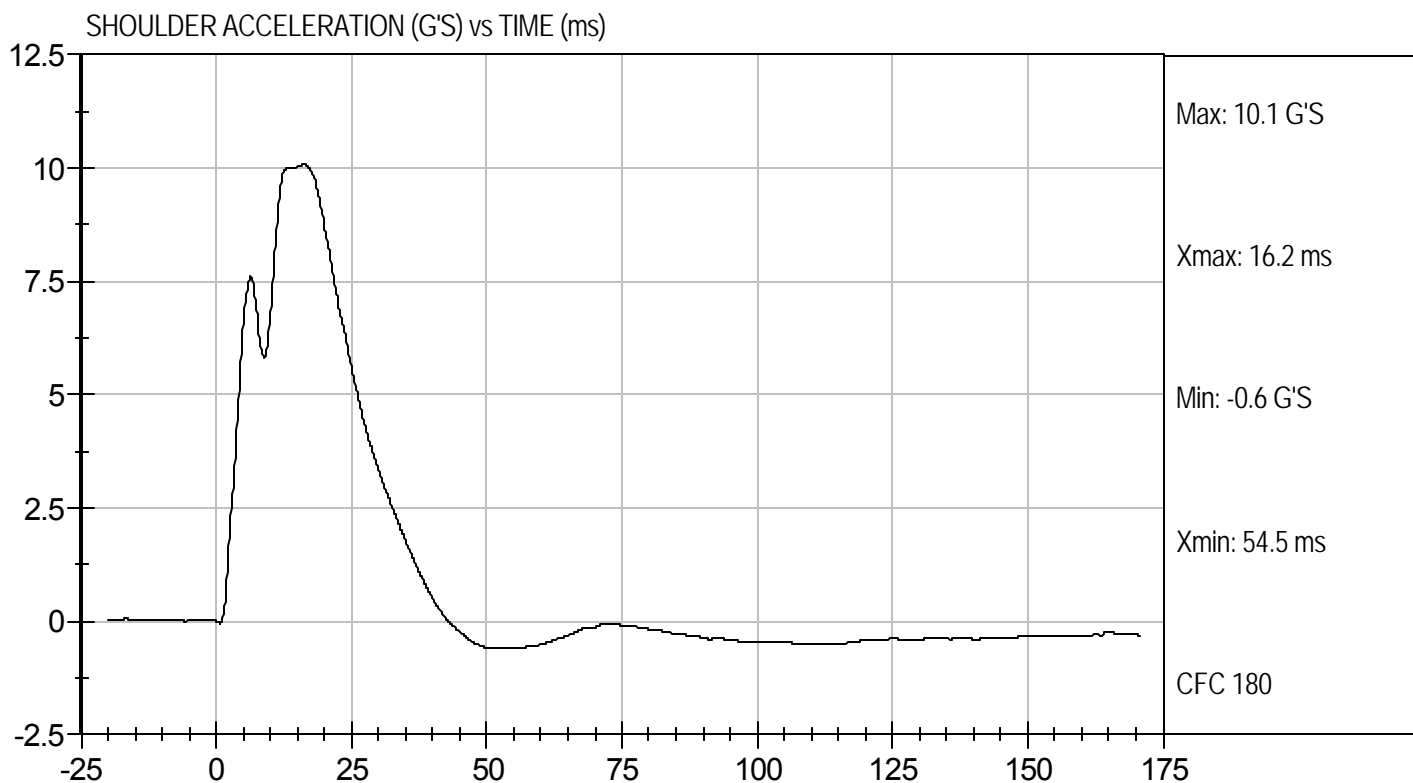
11/24/10  
 Test Date

David Winkelbauer  
 Approved By



Test Desc: Shoulder Impact  
Component ID: D104123

Test Date: 11/24/10  
Velocity: 13.88 ft/s, 4.2 m/s



MGA RESEARCH CORPORATION

UPPER RIB TEST

ES-2re DUMMY

ATD Serial No: 032

Test I.D: D104124

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	23	Pass
Displacement at 3 m/s	mm	36.0 to 40.0	38.2	Pass
Displacement at 4 m/s	mm	46.0 to 51.0	48.2	Pass
Overall Test Results				Pass

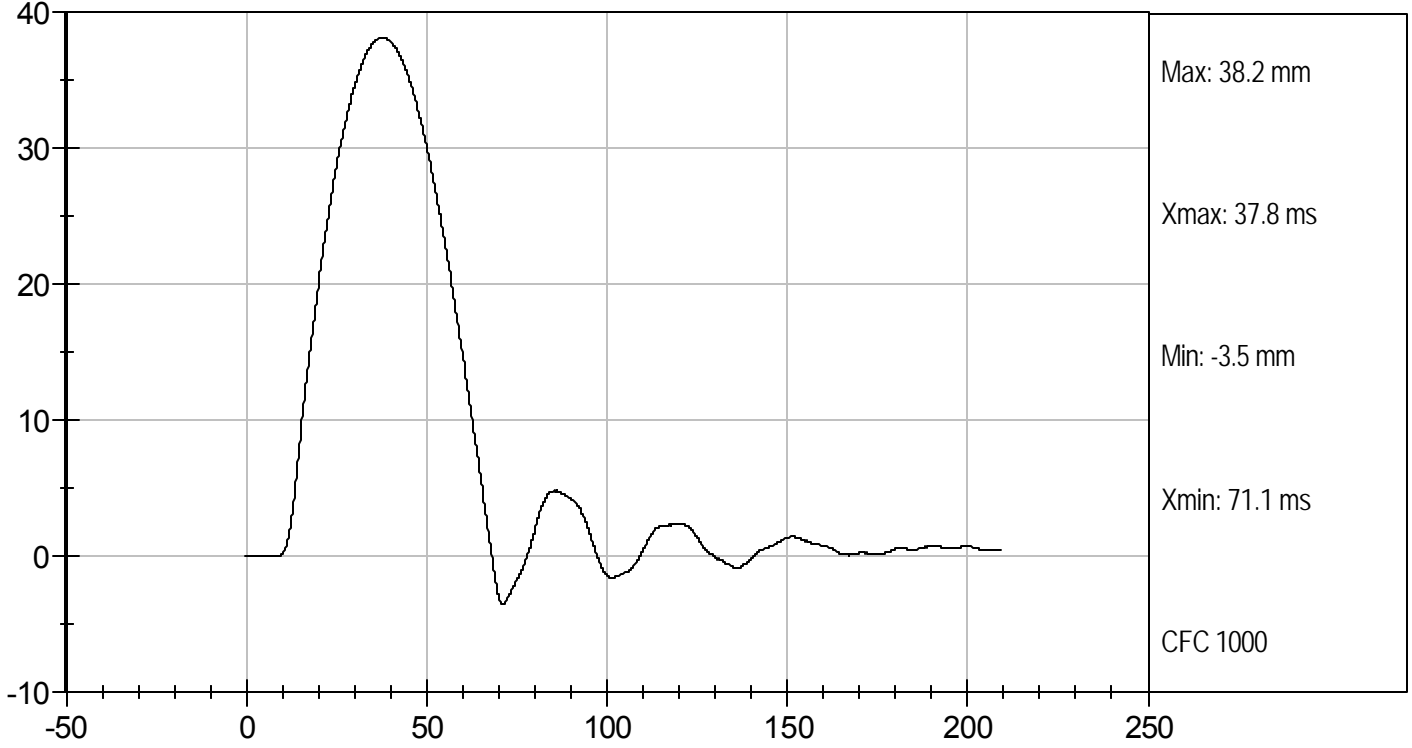
Jessica Gall  
Laboratory Technician

11/23/10  
Test Date

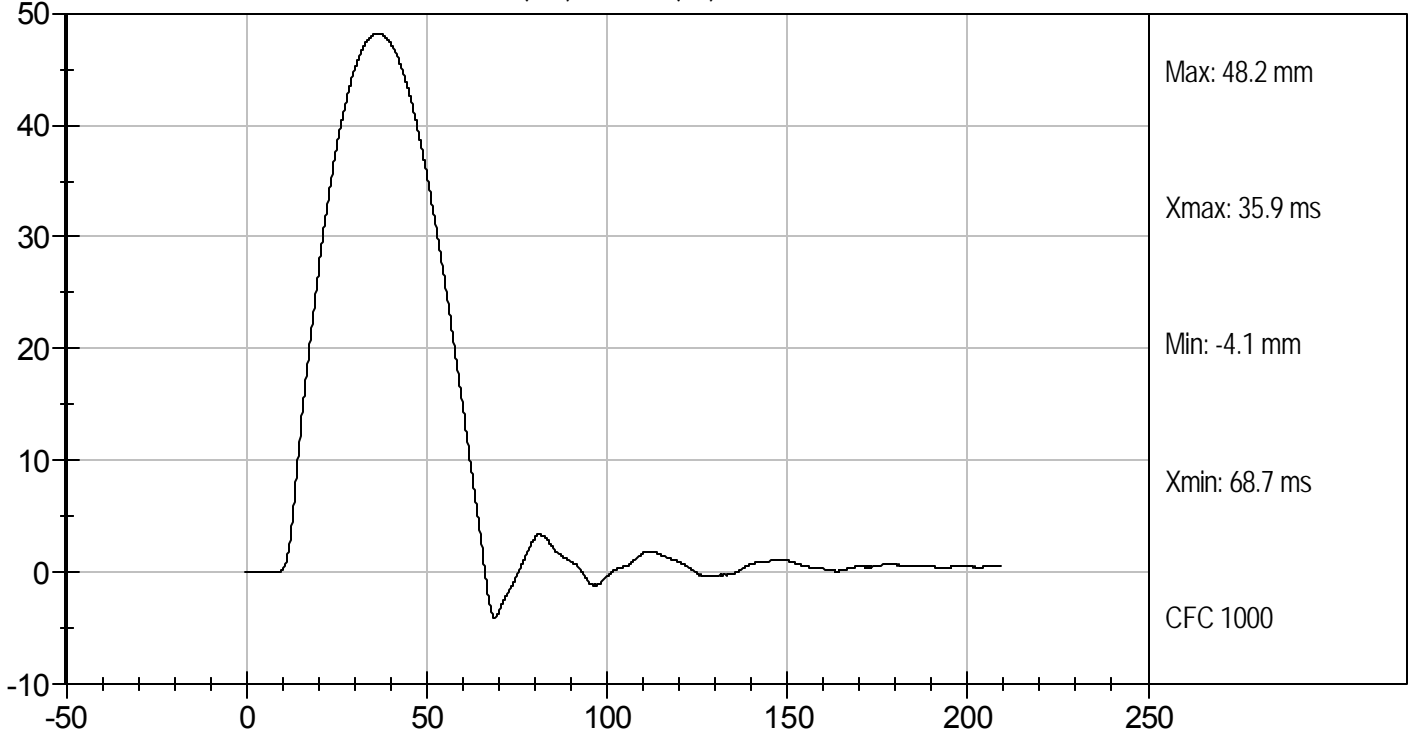
David Winkelbauer  
Approved By



UPPER RIB DISPLACEMENT @ 3 M/SEC (mm) vs TIME (ms)



UPPER RIB DISPLACEMENT @ 4 M/SEC (mm) vs TIME (ms)



MGA RESEARCH CORPORATION

MID RIB TEST

ES-2re DUMMY

ATD Serial No: 032

Test I.D: D104125

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	23	Pass
Displacement at 3 m/s	mm	36.0 to 40.0	37.5	Pass
Displacement at 4 m/s	mm	46.0 to 51.0	48.0	Pass
Overall Test Results				Pass

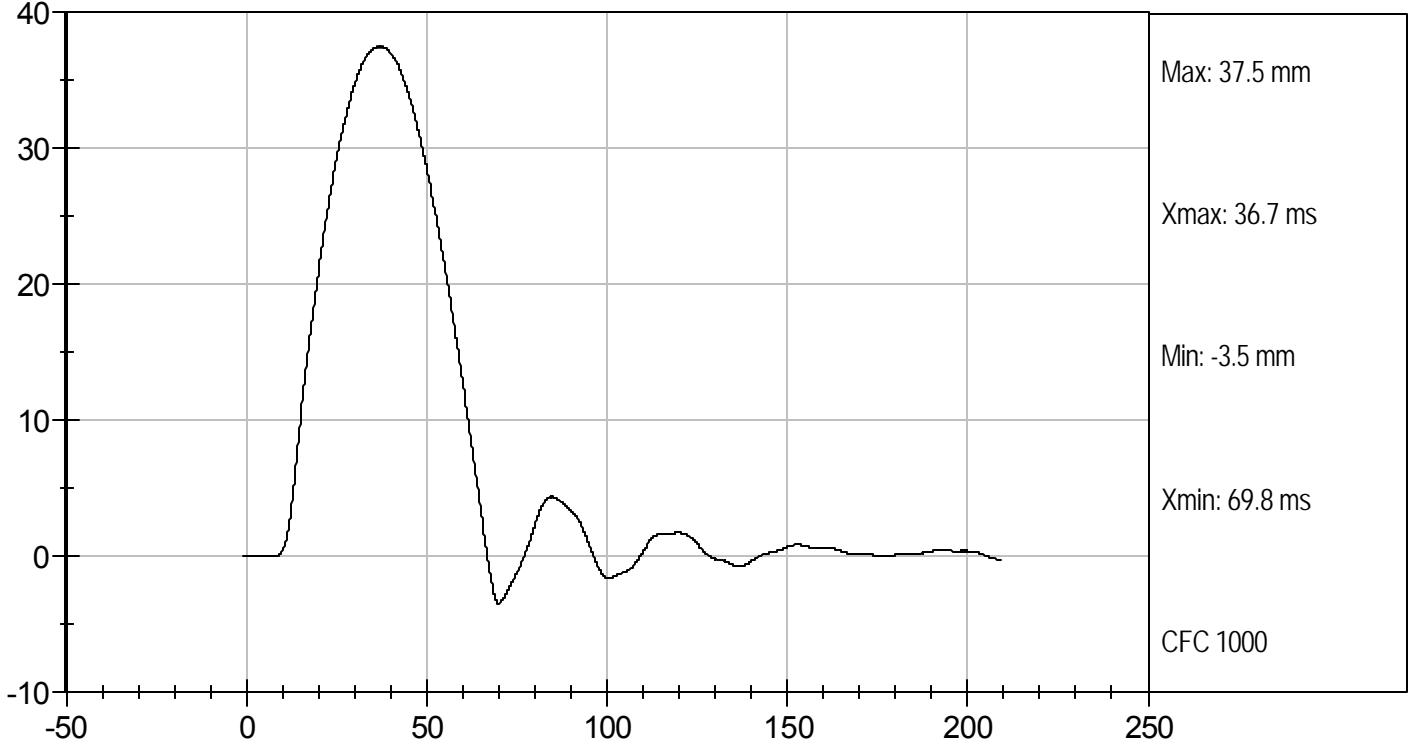
Jessica Gall  
Laboratory Technician

11/23/10  
Test Date

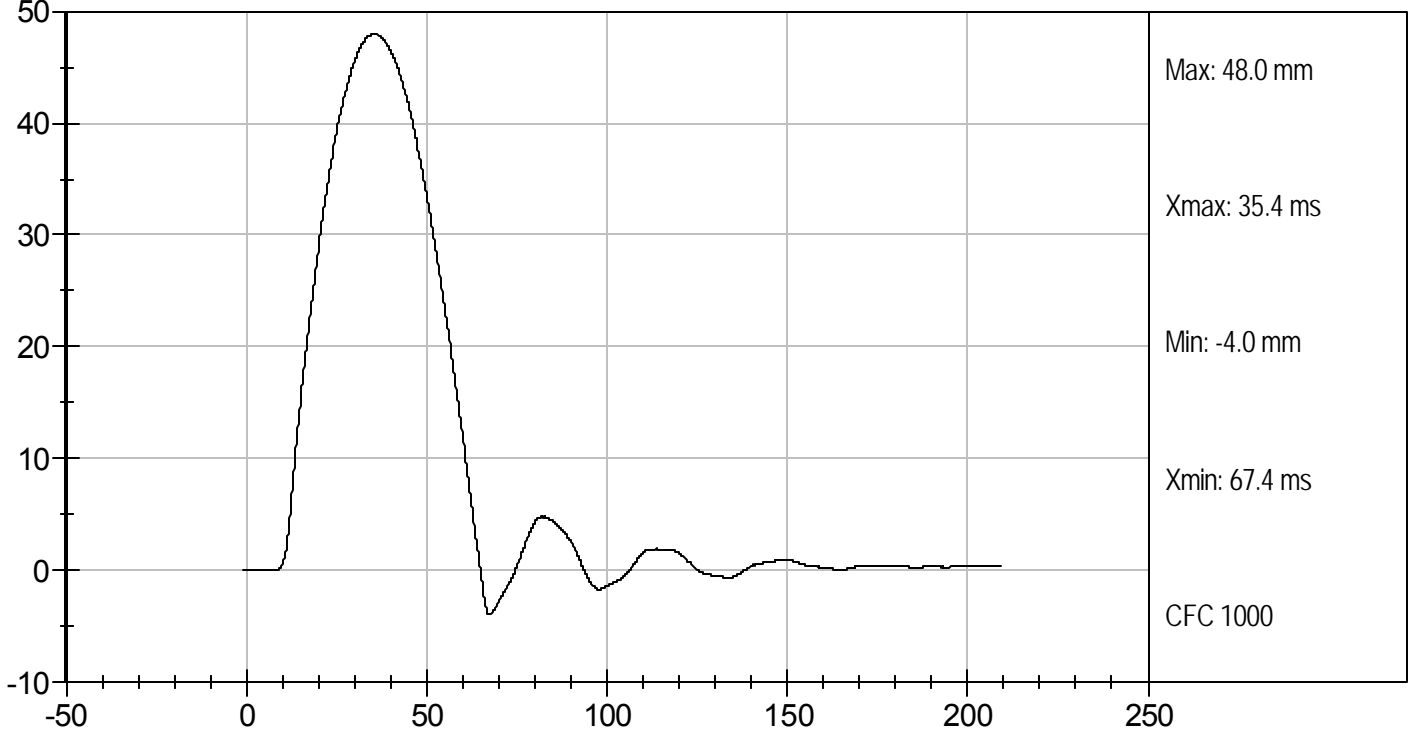
David Winkelbauer  
Approved By



MID RIB DISPLACEMENT @ 3 M/SEC (mm) vs TIME (ms)



MID RIB DISPLACEMENT @ 4 M/SEC (mm) vs TIME (ms)



MGA RESEARCH CORPORATION

LOWER RIB TEST

ES-2re DUMMY

ATD Serial No: 032

Test I.D: D104126

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	23	Pass
Displacement at 3 m/s	mm	36.0 to 40.0	38.7	Pass
Displacement at 4 m/s	mm	46.0 to 51.0	49.2	Pass
Overall Test Results				Pass

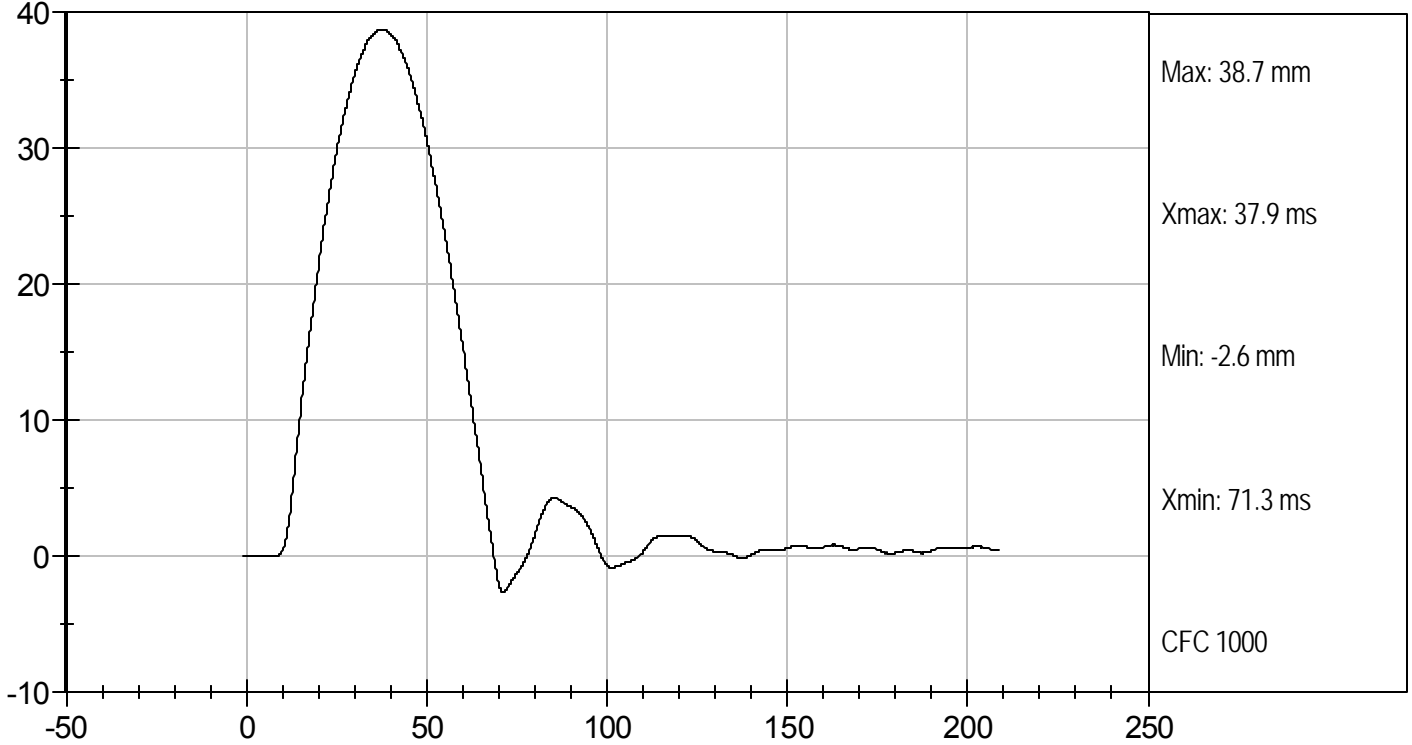
Jessica Gall  
Laboratory Technician

11/23/10  
Test Date

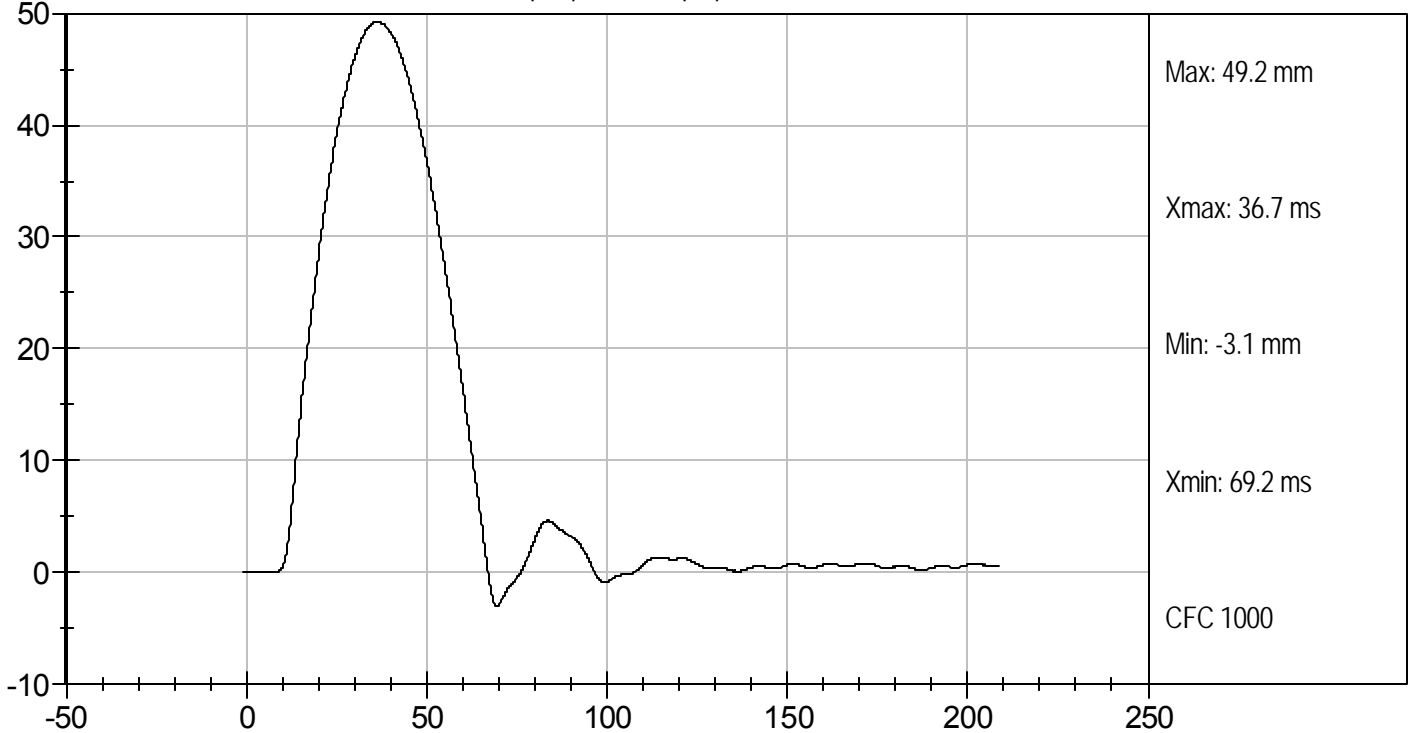
David Winkelbauer  
Approved By



LOWER RIB DISPLACEMENT @ 3 M/SEC (mm) vs TIME (ms)



LOWER RIB DISPLACEMENT @ 4 M/SEC (mm) vs TIME (ms)



MGA RESEARCH CORPORATION

ABDOMEN TEST

ES-2re DUMMY

ATD Serial No: 032

Test I.D: D104127

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	25	Pass
Probe Speed	m/s	3.90 to 4.10	4.10	Pass
Maximum Impact Force	kN	4.00 to 4.80	4.35	Pass
Time of Maximum Impact Force	ms	10.60 to 13.00	10.80	Pass
Maximum Total Abdomen Force	kN	2.20 to 2.70	2.56	Pass
Time of Maximum Abdomen Force	ms	10.00 to 12.30	10.70	Pass
Overall Test Results				Pass

Jessica Hall  
Laboratory Technician

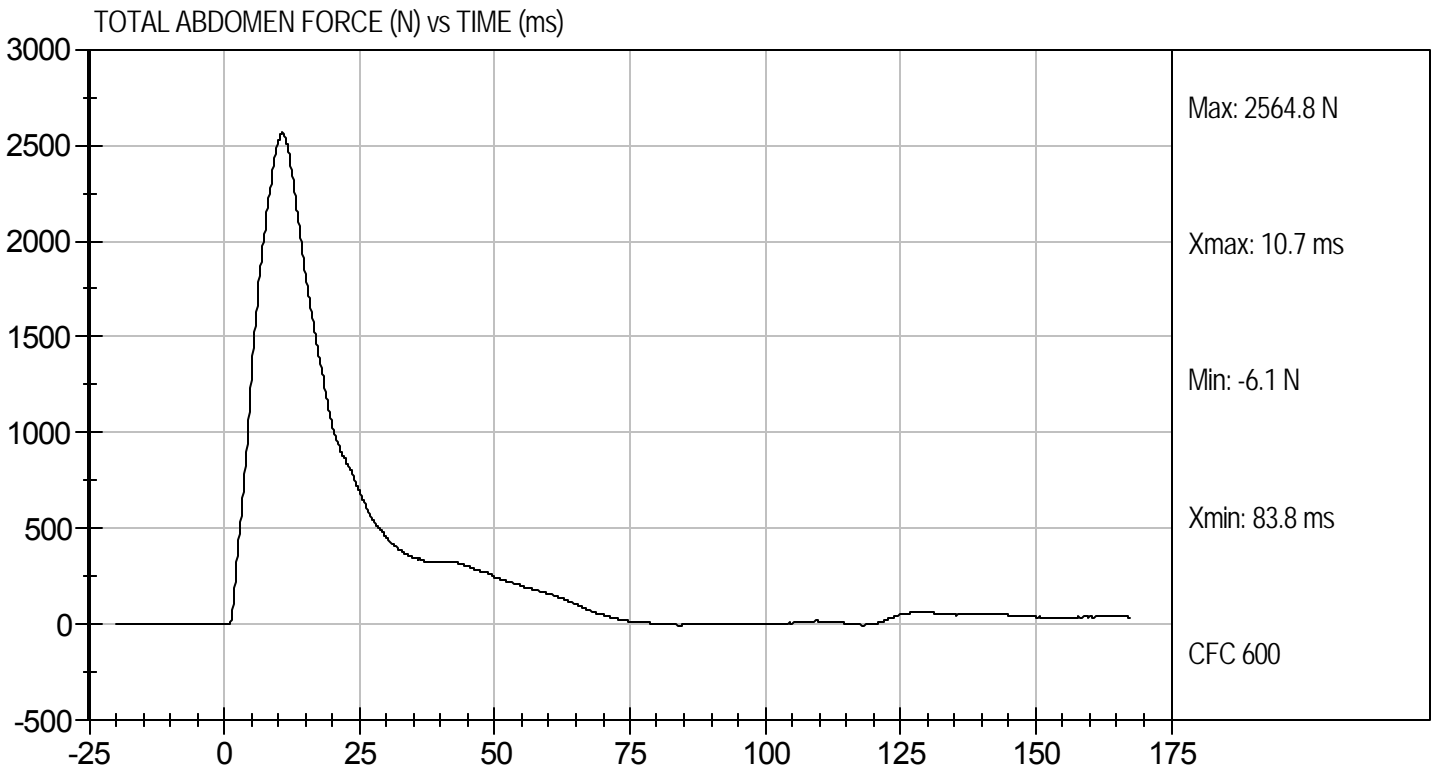
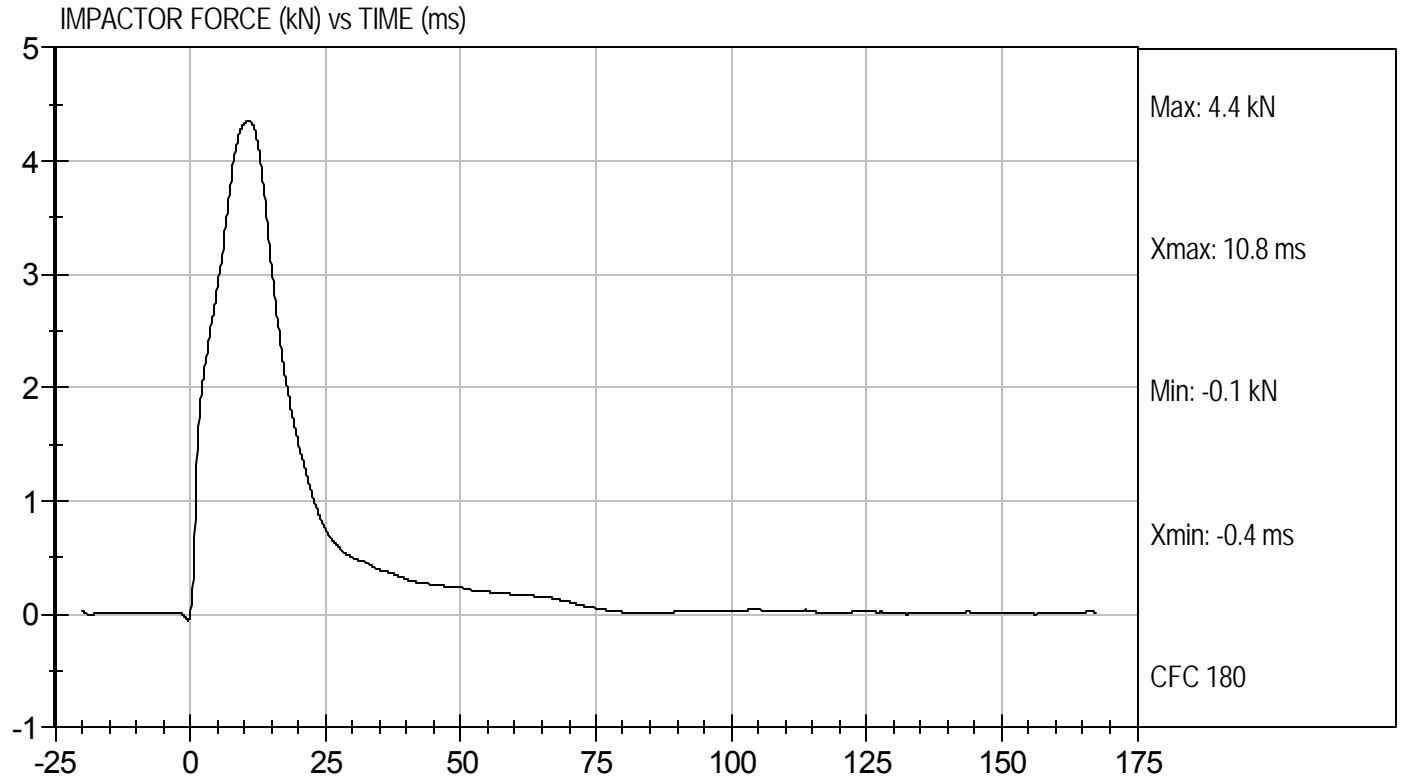
11/24/10  
Test Date

David Winkelbauer  
Approved By



Test Desc: Abdomen Impact  
Component ID: D104127

Test Date: 11/24/10  
Velocity: 13.44 ft/s, 4.1 m/s



**MGA RESEARCH CORPORATION**  
**LUMBAR SPINE TEST**  
**ES-2re DUMMY**

ATD Serial No: 032

Test I.D.: D104128

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	23	Pass
Pendulum Speed		m/s	5.95 to 6.15	6.10	Pass
Pendulum Deceleration	1 ms	m/s	-0.05 to 0.00	-0.02	Pass
	3.7 ms	m/s	-0.425 to -0.24	-0.40	Pass
	27 ms	m/s	-6.50 to -5.80	-6.05	Pass
	30 ms	m/s	>= -6.5	-6.05	Pass
Maximum Flexion Angle		deg	45.0 to 55.0	51.1	Pass
Time of Maximum Flexion Angle		ms	39.0 to 53.0	45.3	Pass
Headform Rotation Decay to Initial Position		ms	37 to 57	43	Pass
Overall Results					Pass

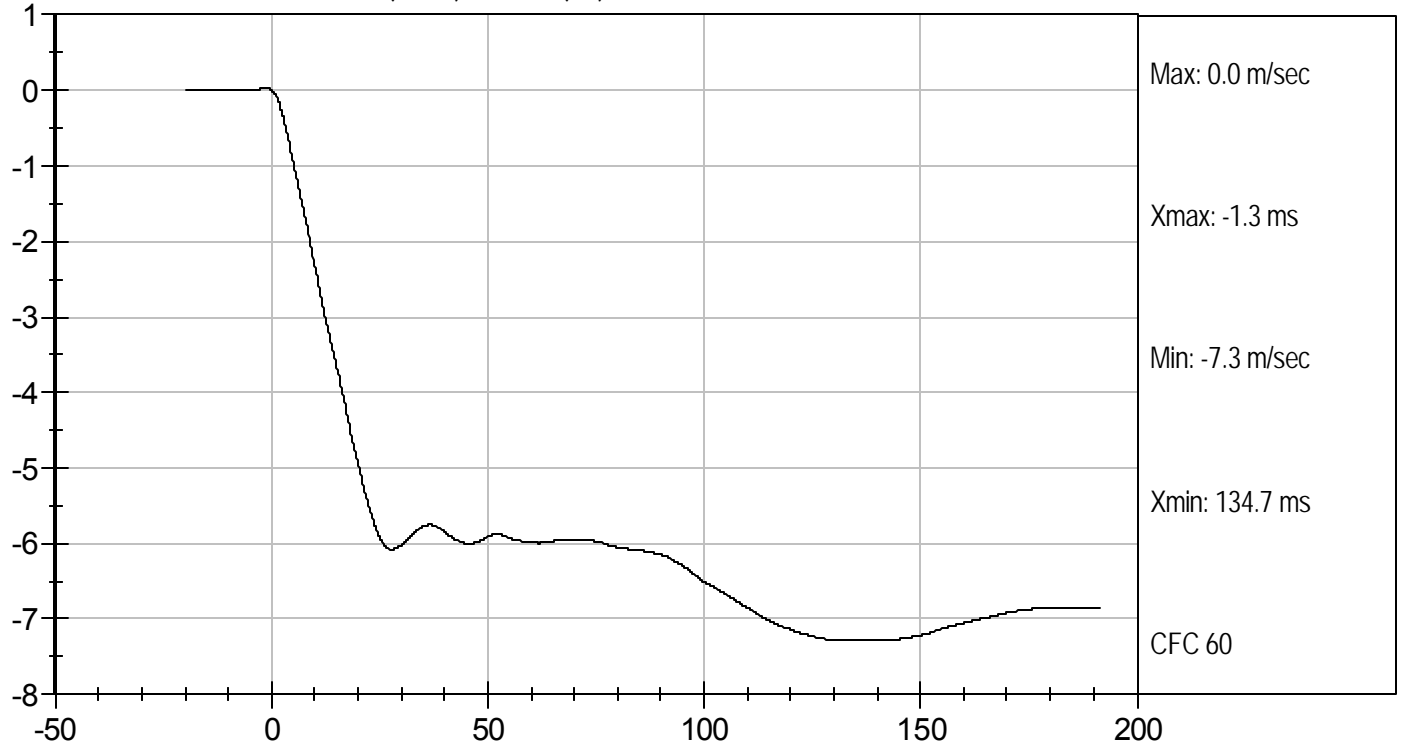
*Jessica Hall*  
 Laboratory Technician

11/23/10  
 Test Date

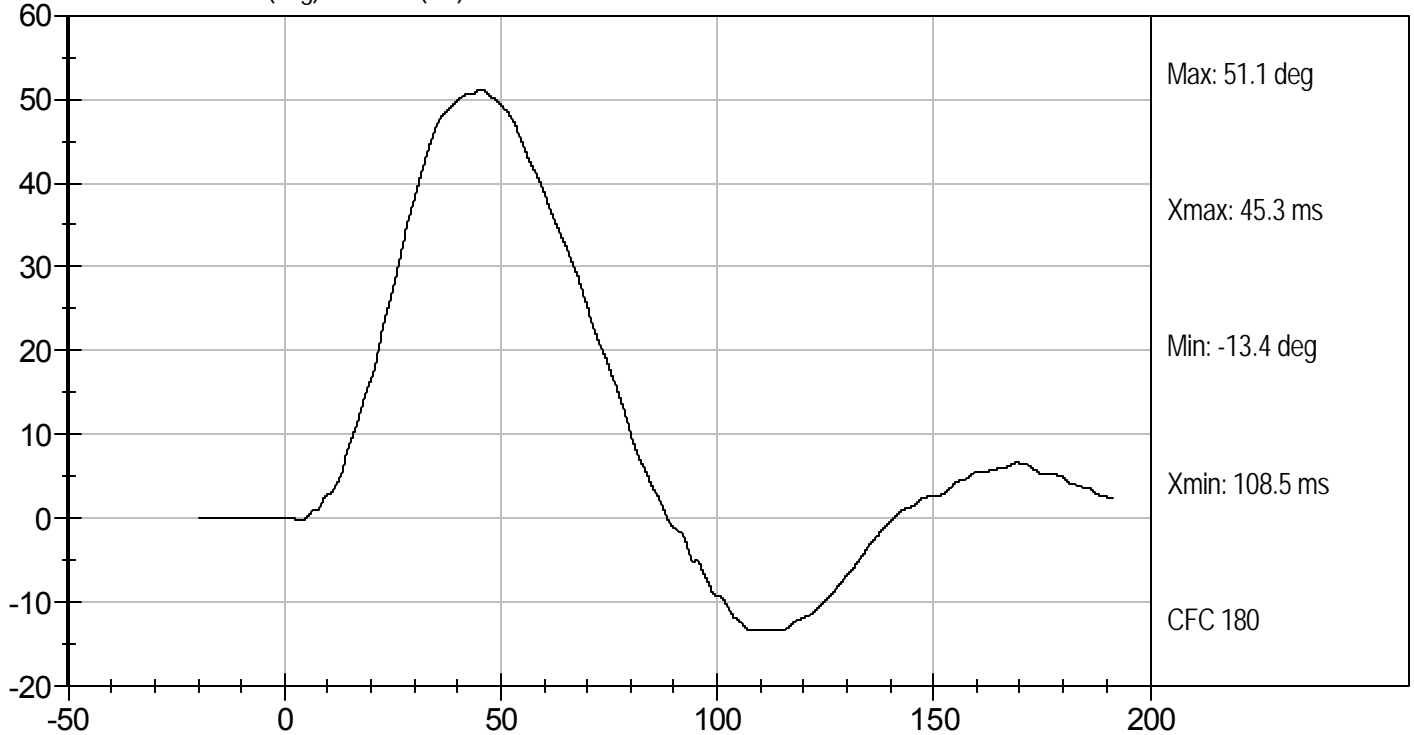
*David Winkelbauer*  
 Approved By

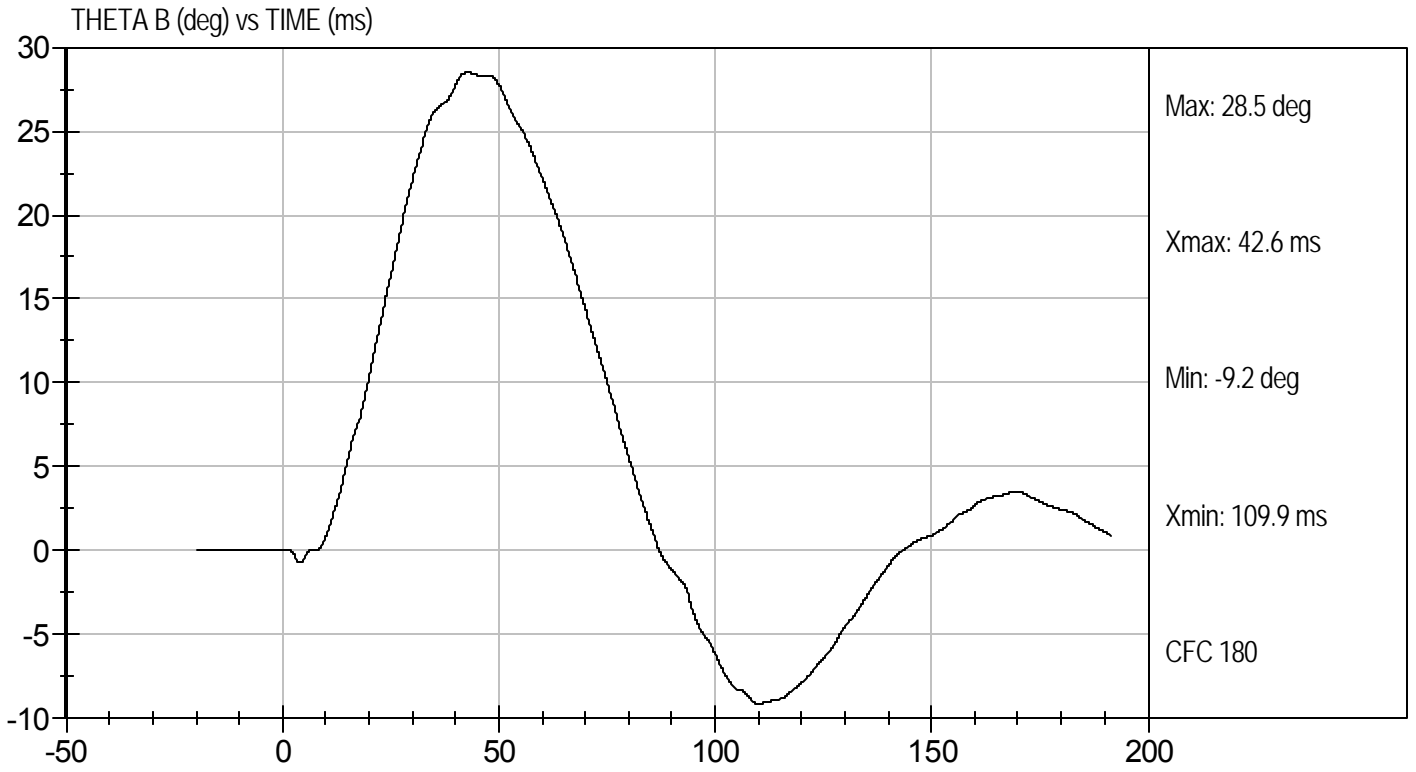
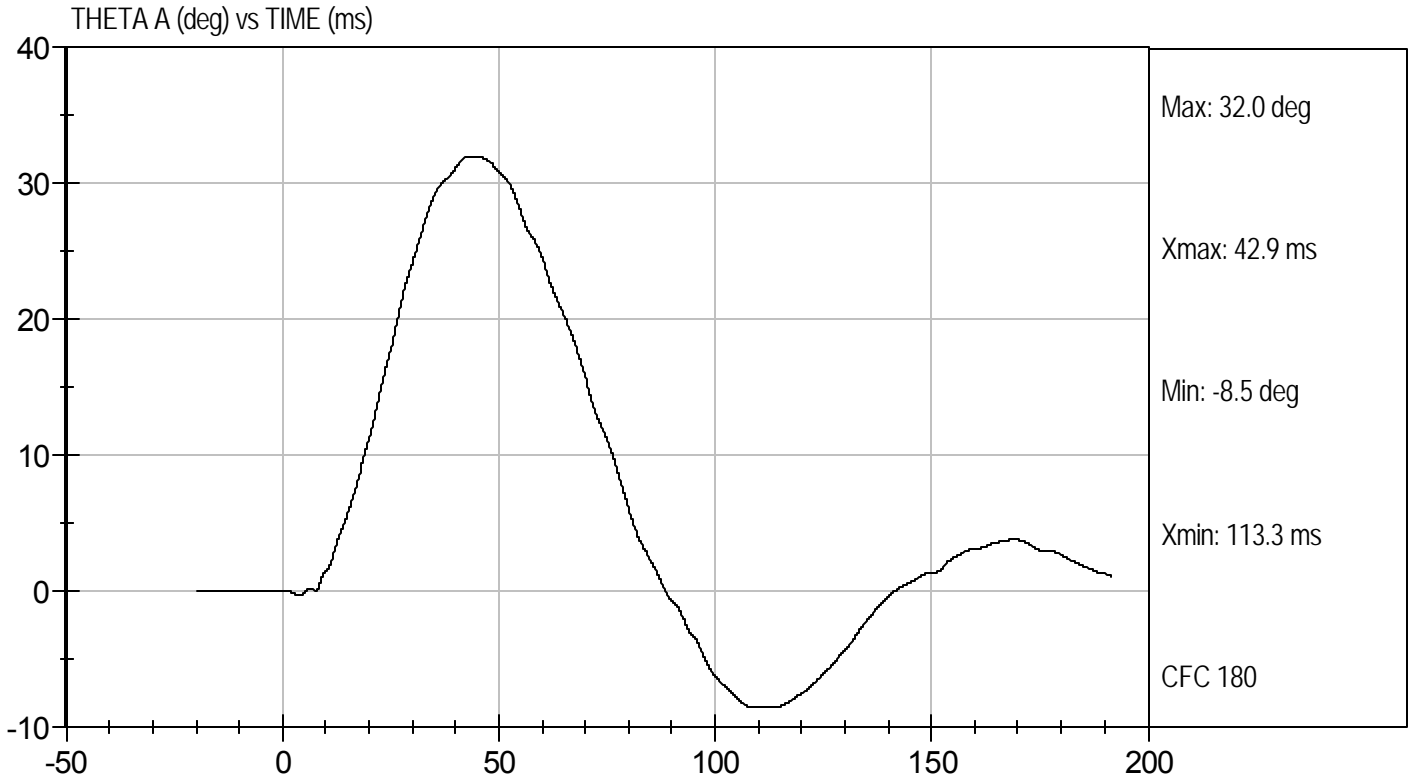


PENDULUM DECELERATION (m/sec) vs TIME (ms)



FLEXION ANGLE (deg) vs TIME (ms)





MGA RESEARCH CORPORATION

PELVIS TEST  
ES-2re DUMMY

ATD Serial No: 032

Test I.D: D104129

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	25	Pass
Probe Speed	m/s	4.20 to 4.40	4.38	Pass
Maximum Impactor Force	kN	4.70 to 5.40	4.74	Pass
Time of Maximum Impactor Force	ms	11.80 to 16.10	12.50	Pass
Maximum Pubic Force	kN	1.23 to 1.59	1.35	Pass
Time of Maximum Pubic Force	ms	12.20 to 17.00	13.50	Pass
Overall Test Results				Pass

Jessica Gall  
Laboratory Technician

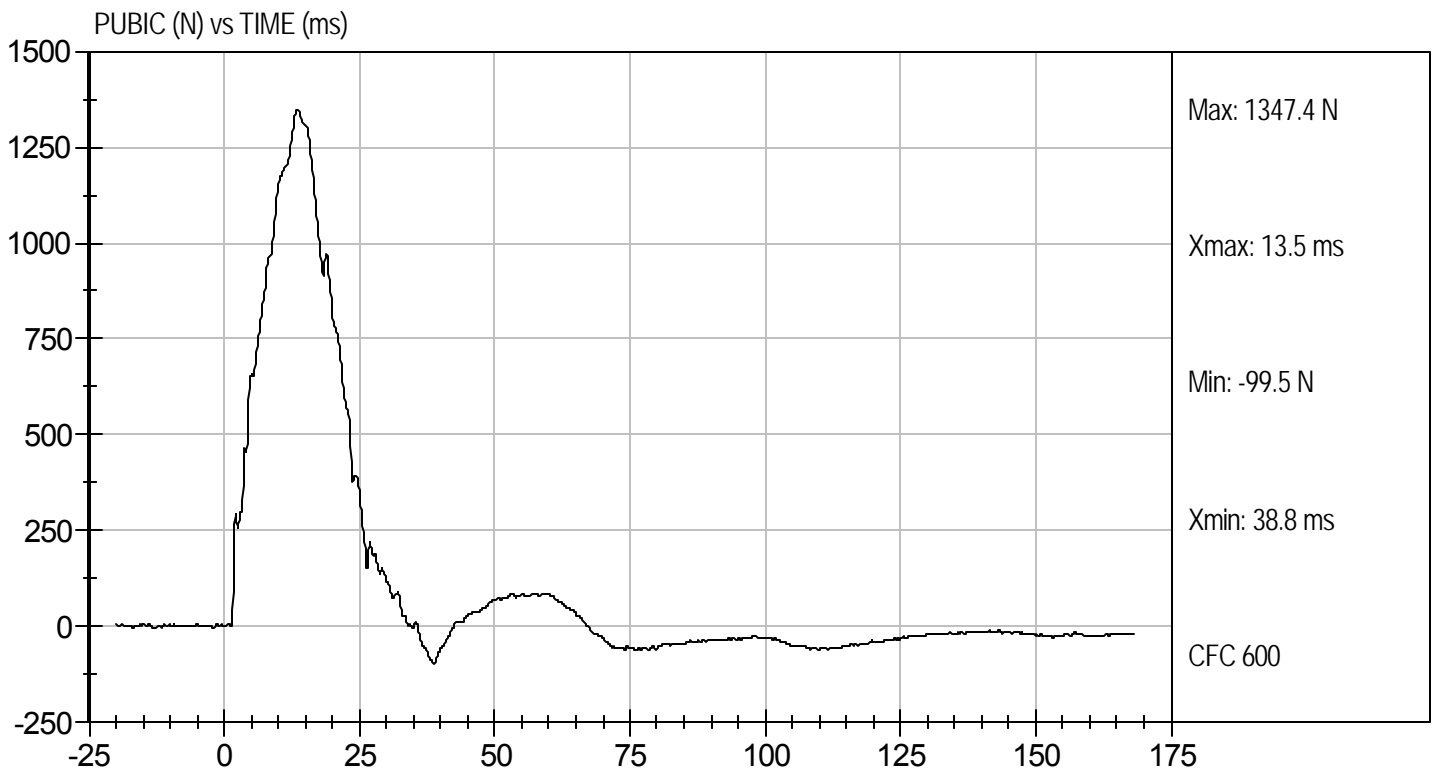
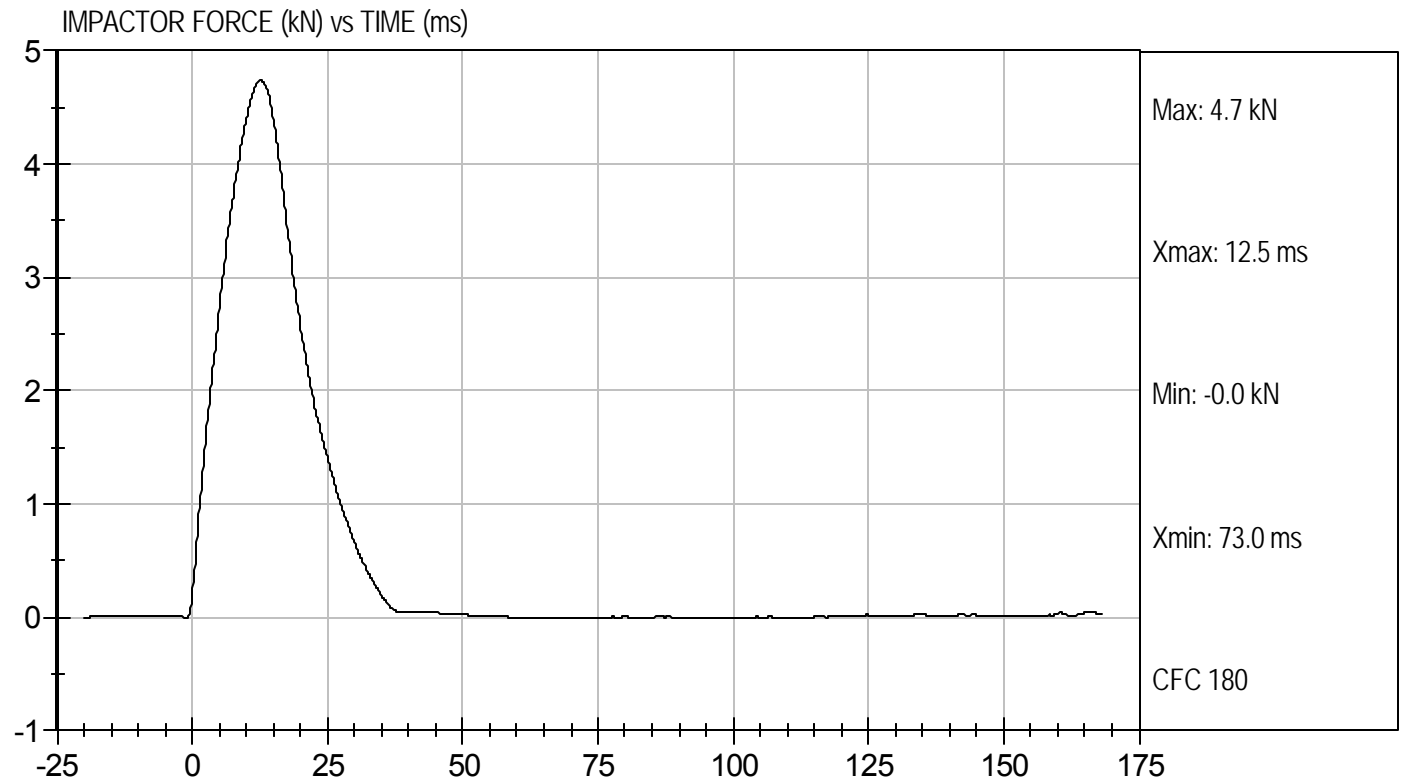
11/24/10  
Test Date

David Winkelbauer  
Approved By



Test Desc: Pelvis Impact  
Component ID: D104129

Test Date: 11/24/10  
Velocity: 14.36 ft/s, 4.38 m/s



**MGA RESEARCH CORPORATION**  
**FULL BODY THORAX IMPACT TEST**  
**ES-2re DUMMY**

ATD Serial No: 032

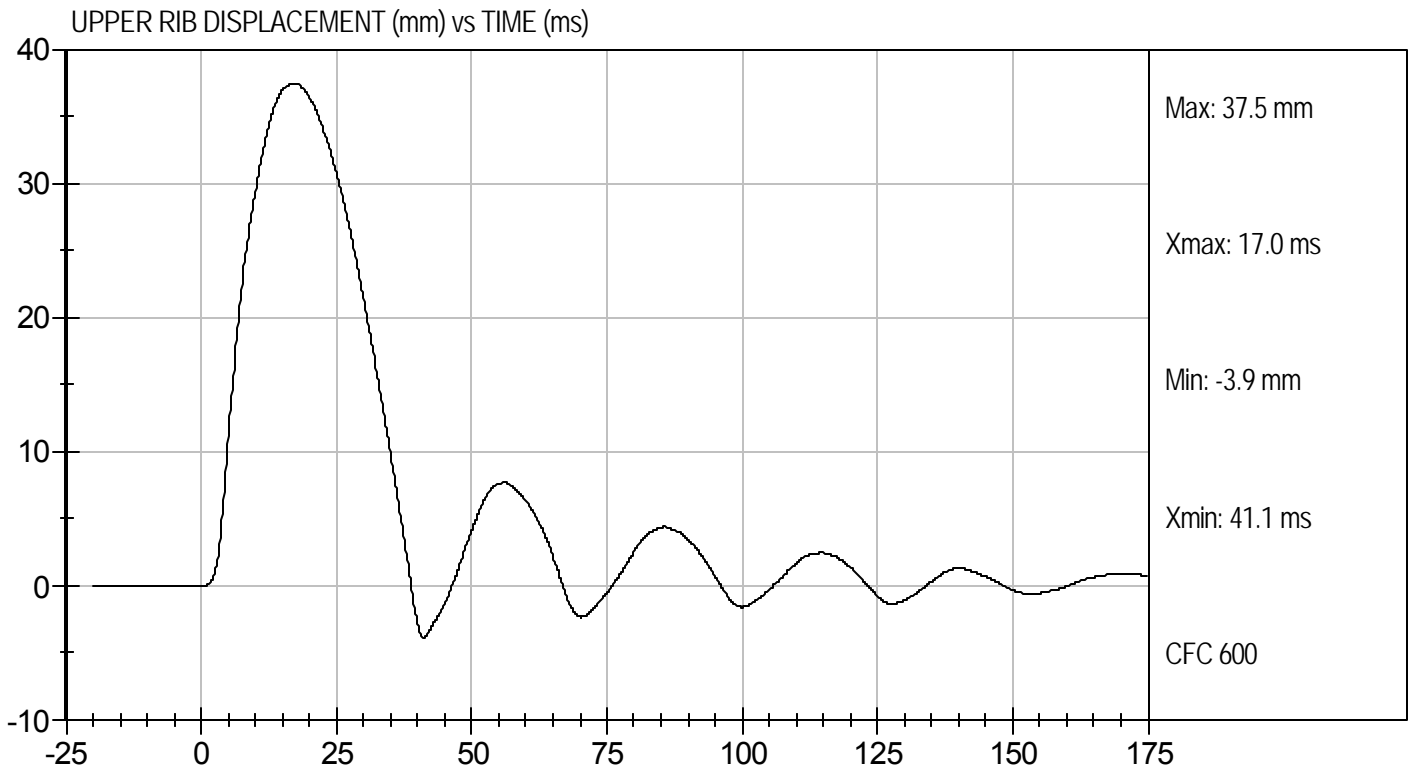
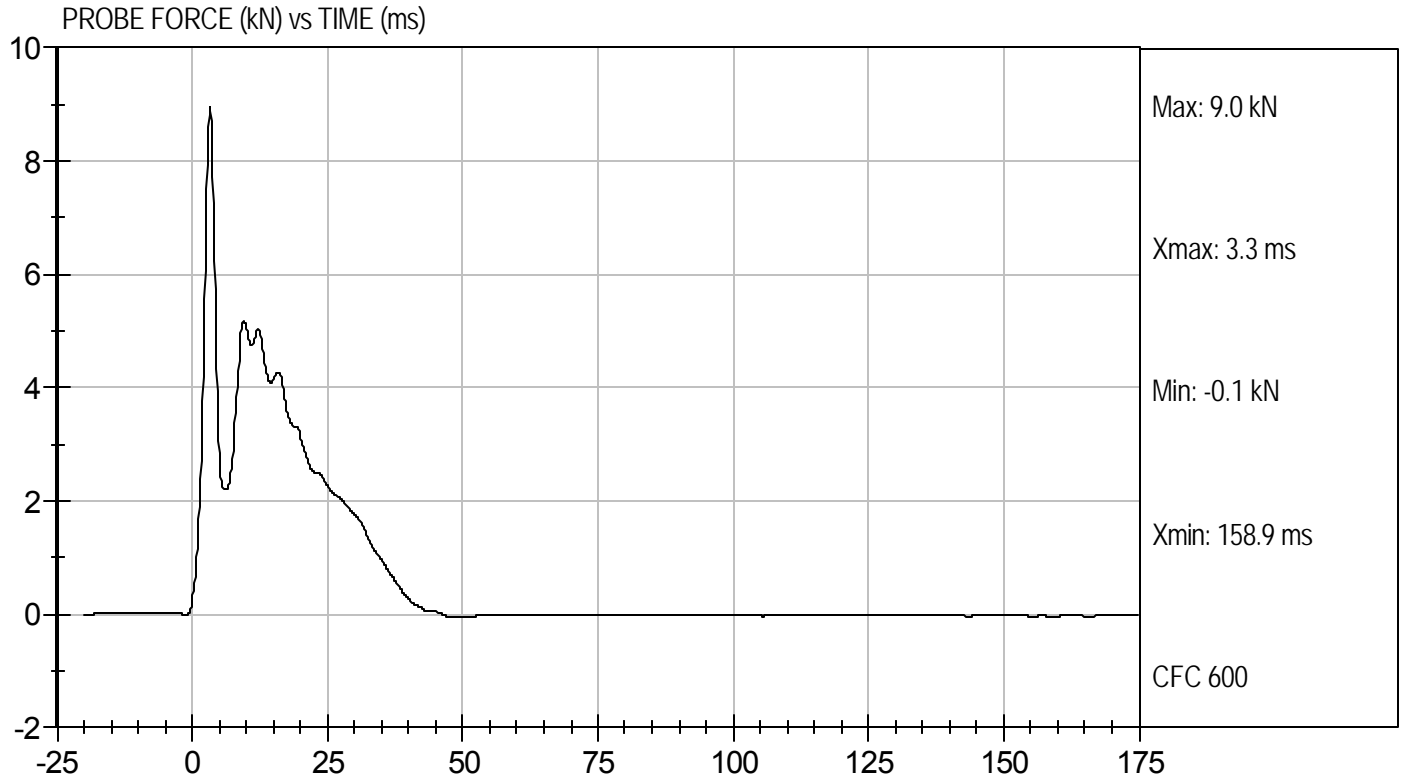
Test I.D: D104120

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.9	Pass
Humidity	%	10 to 70	25	Pass
Probe Speed	m/s	5.40 to 5.60	5.52	Pass
Maximum Impactor Force (after 6 ms)	kN	5.10 to 6.20	5.18	Pass
Upper Rib Displacement	mm	34.0 to 41.0	37.5	Pass
Middle Rib Displacement	mm	37.0 to 45.0	40.1	Pass
Lower Rib Displacement	mm	37.0 to 44.0	39.7	Pass
Overall Test Results				Pass

Jessica Gall  
 Laboratory Technician

11/24/10  
 Test Date

David Winkelbauer  
 Approved By

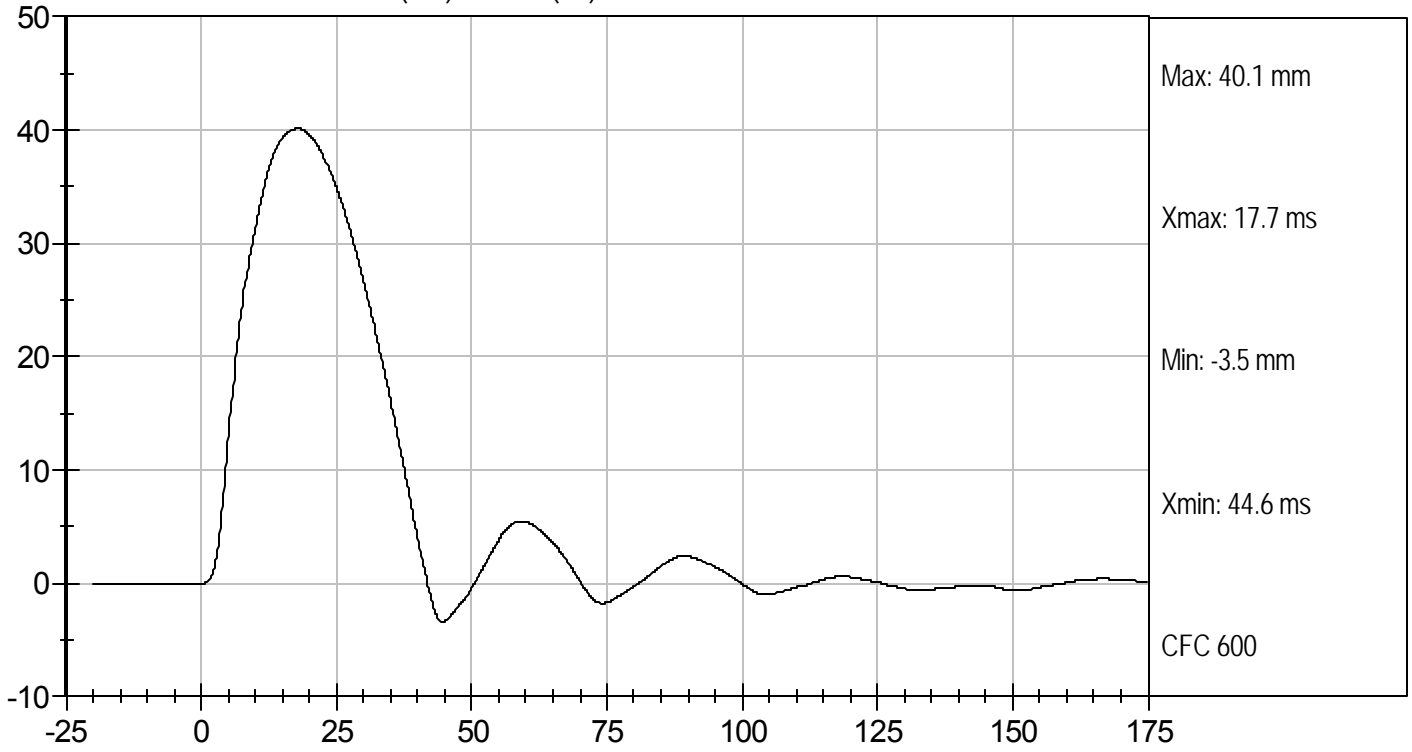




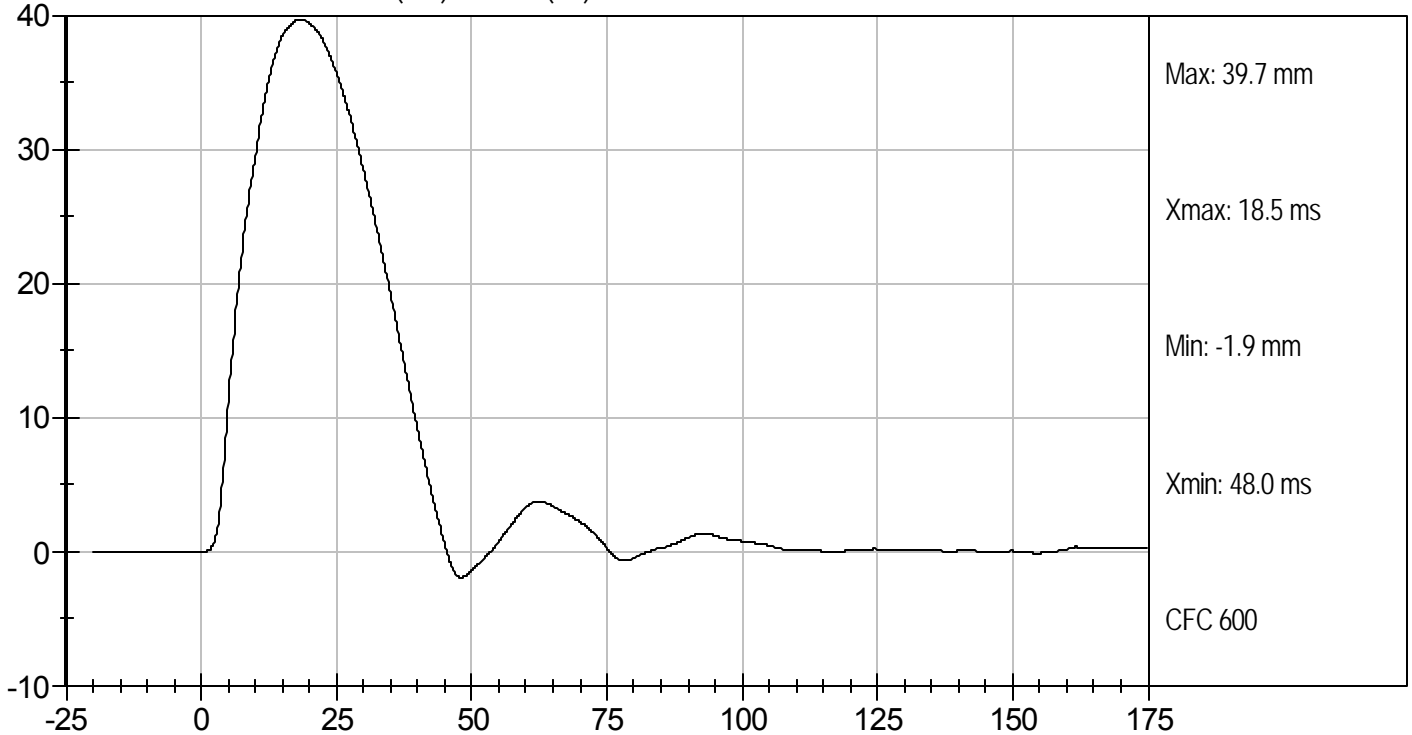
Test Desc: Thorax Impact  
Component ID: D104120

Test Date: 11/24/10  
Velocity: 18.11 ft/s, 5.52 m/s

MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



**MGA RESEARCH CORPORATION**  
**HEAD DROP TEST**  
**ES-2re DUMMY**

ATD Serial No: 032

Test ID: D104211

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	21	Pass
Peak Resultant Acceleration	G's	125 to 155	150	Pass
Peak Lateral Acceleration	G's	+/- 15	-14	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 15% of peak	Yes	Pass
Overall Test Results				Pass

*Jessica Hall*  
 Laboratory Technician

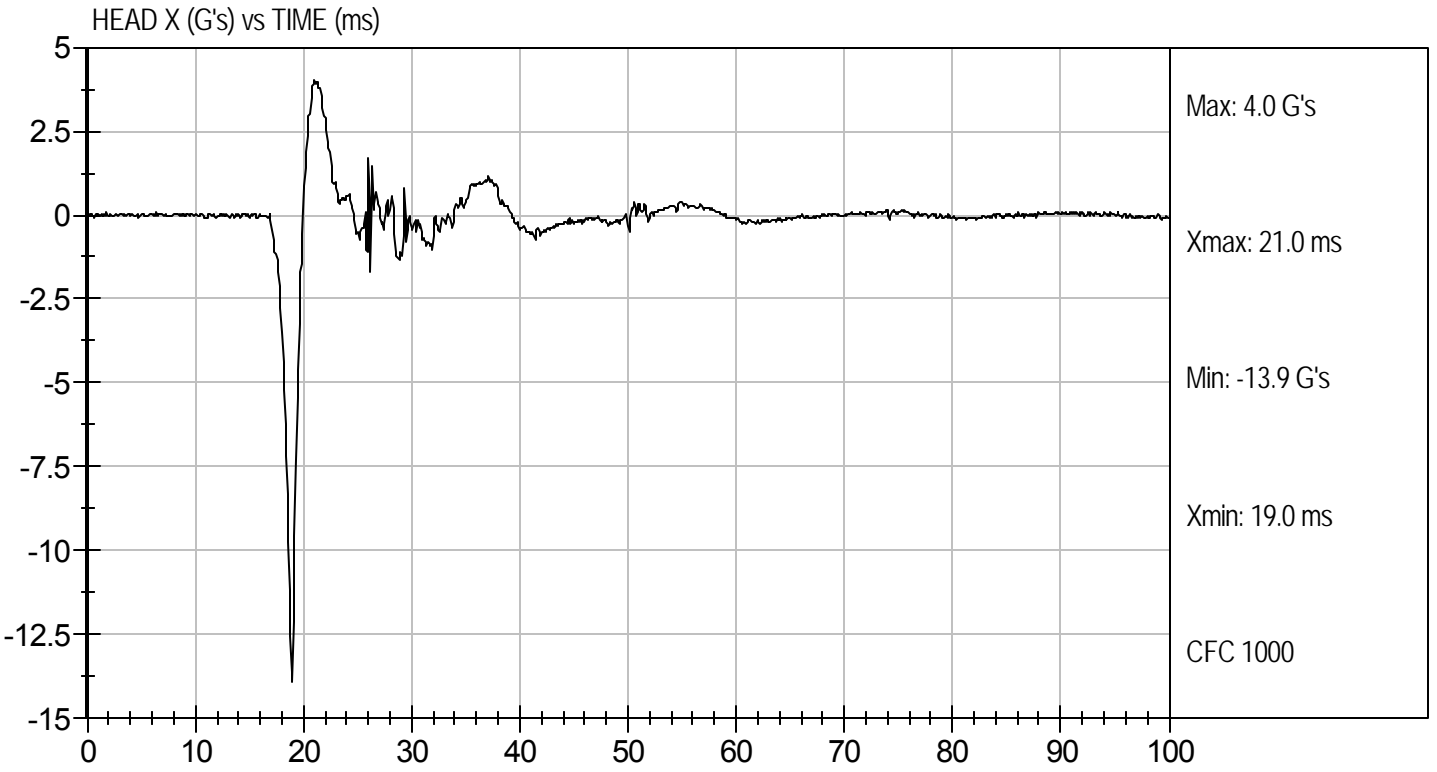
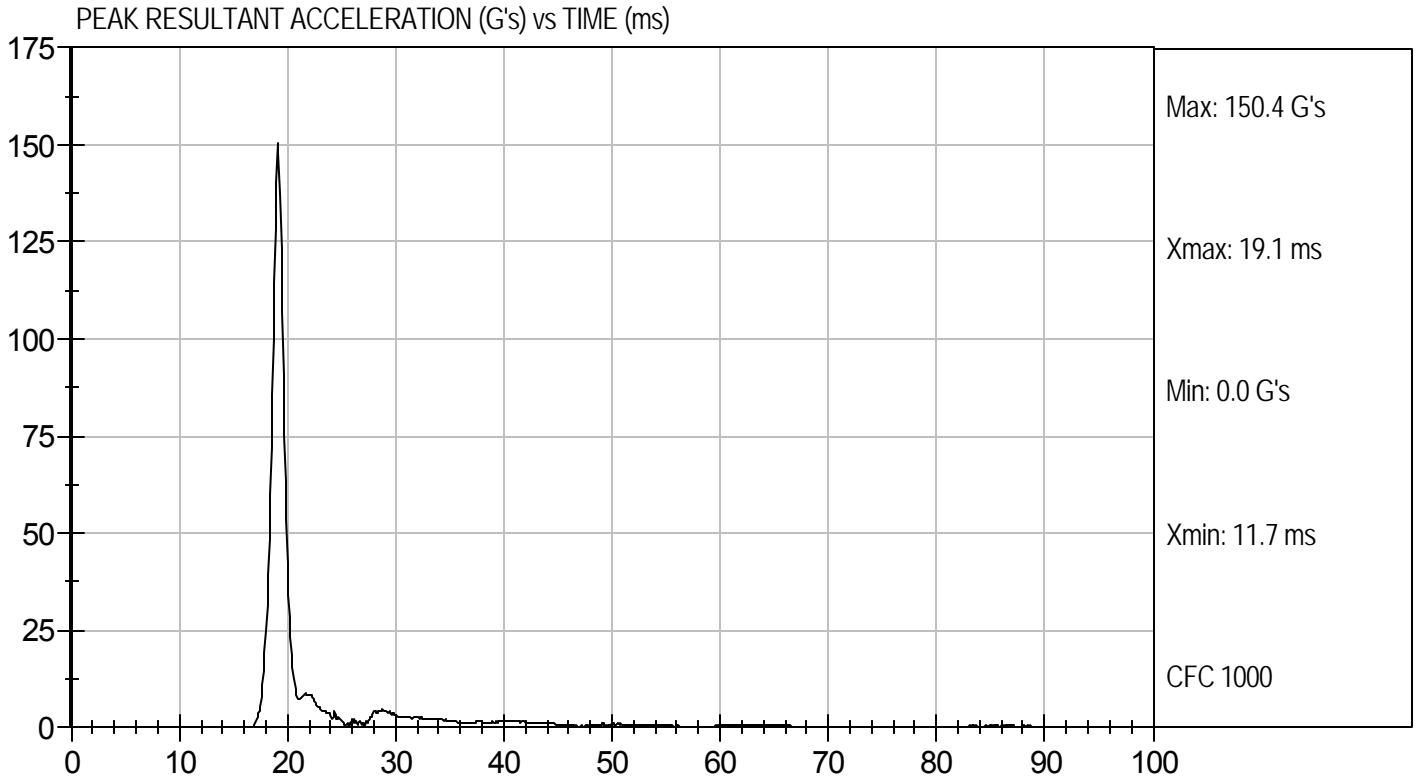
12/1/10  
 Test Date

*David Winkelbauer*  
 Approved By



Test Desc: Head Drop  
Component ID: D104211

Test Date: 12/1/10  
Velocity: 0 ft/s, 0 m/s



**MGA RESEARCH CORPORATION**  
**NECK PENDULUM TEST**  
**ES-2re DUMMY**

ATD Serial No: 032

Test I.D.: D104212

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	18.0 to 22.0	21.6	Pass
Laboratory Relative Humidity		%	10 to 70	19	Pass
Pendulum Speed		m/s	3.3 to 3.5	3.3	Pass
Pendulum Deceleration	1 ms	m/s	0.00 to -0.05	-0.02	Pass
	3 ms	m/s	-0.25 to -0.375	-0.33	Pass
	14 ms	m/s	-3.20 to -3.70	-3.48	Pass
Maximum Flexion Angle		deg	49.0 to 59.0	51.8	Pass
Time of Maximum Flexion Angle		ms	54.0 to 66.0	55.2	Pass
Head Rotation Decay Time to 0 degree		ms	53.0 to 88.0	55.0	Pass
Overall Test Results					Pass

*Jessica Hall*  
 \_\_\_\_\_  
 Laboratory Technician

12/2/10  
 \_\_\_\_\_  
 Test Date

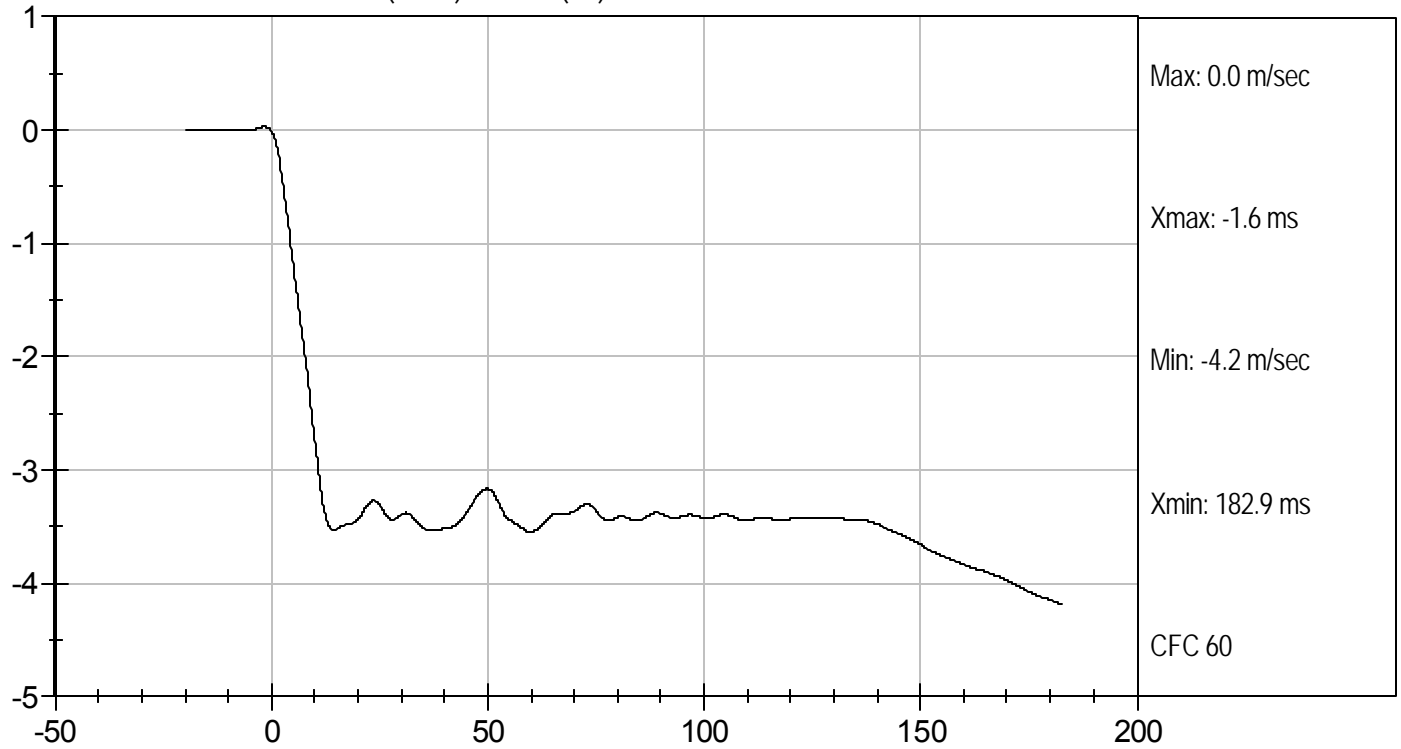
*David Winkelbauer*  
 \_\_\_\_\_  
 Approved By



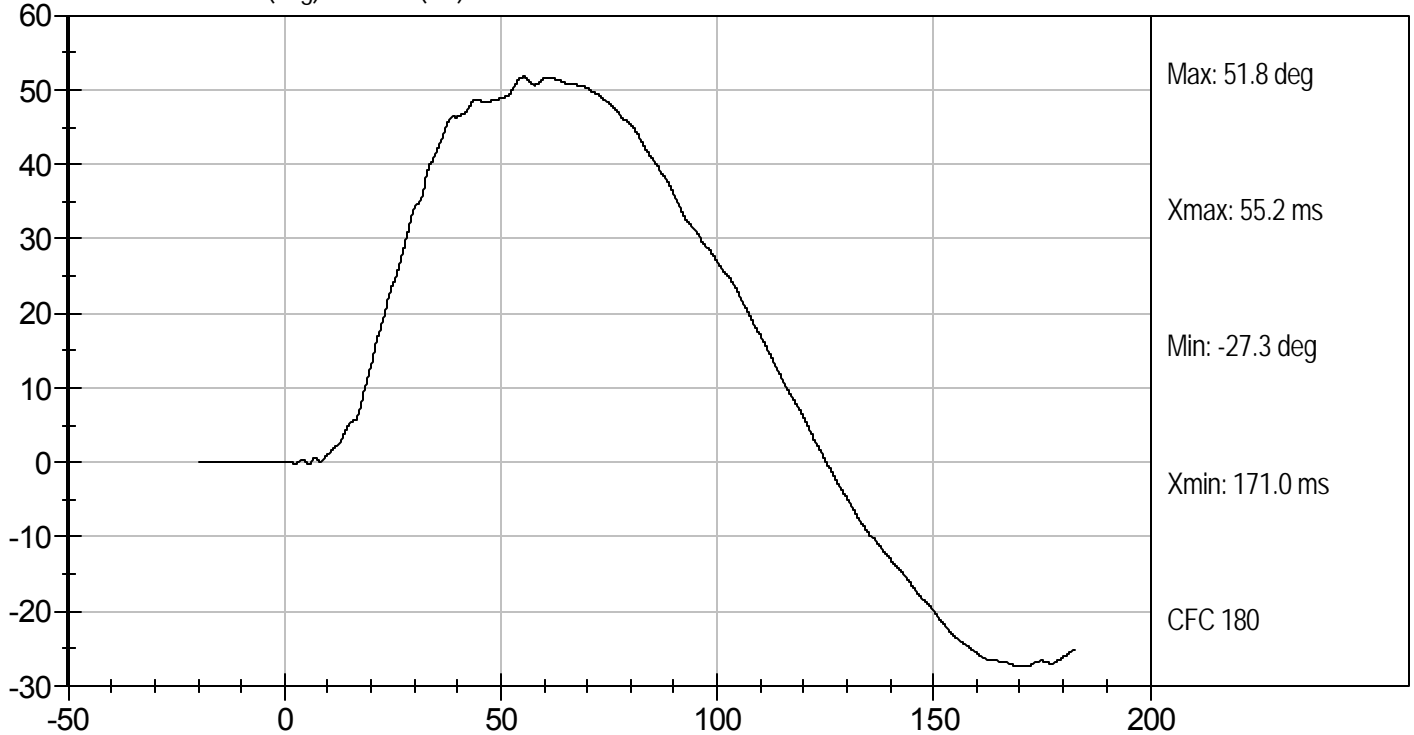
Test Desc: Neck Bending  
Component ID: D104212

Test Date: 12/2/10  
Velocity: 10.85 ft/s, 3.3 m/s

PENDULUM DECELERATION (m/sec) vs TIME (ms)



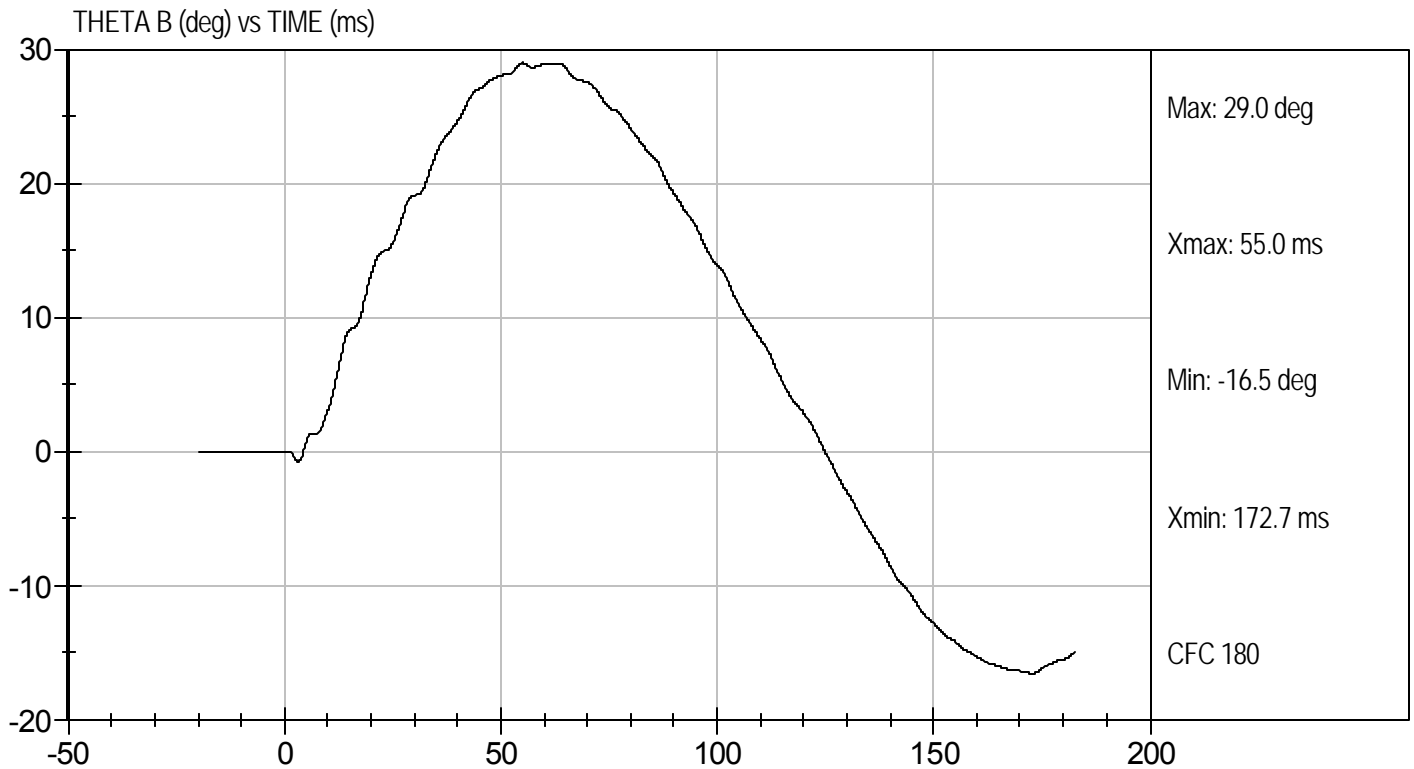
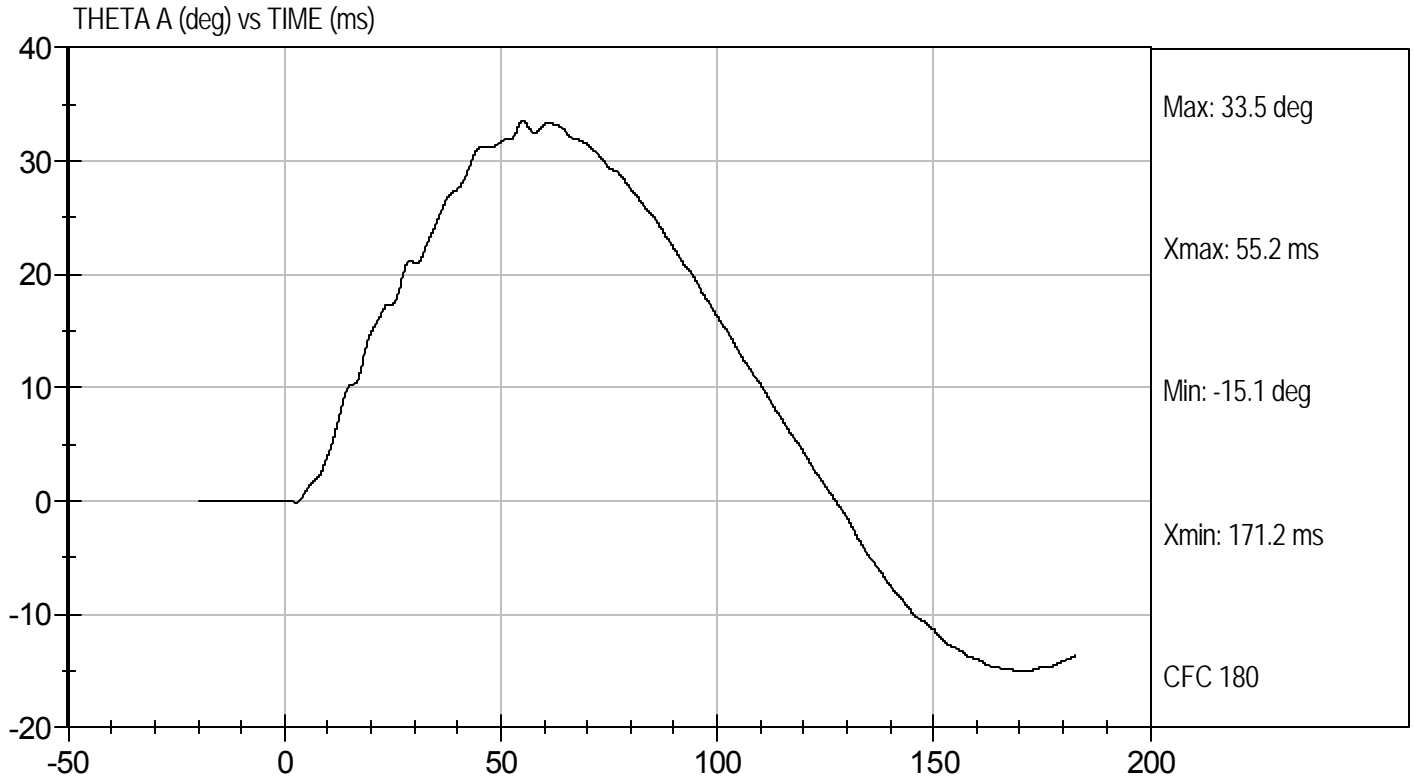
FLEXION ANGLE (deg) vs TIME (ms)





Test Desc: Neck Bending  
Component ID: D104212

Test Date: 12/2/10  
Velocity: 10.85 ft/s, 3.3 m/s



**MGA RESEARCH CORPORATION**  
**SHOULDER IMPACT TEST**  
**ES-2re DUMMY**

ATD Serial No: 032

Test I.D: D104213

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Pendulum Speed	m/s	4.2 to 4.4	4.2	Pass
Peak Shoulder Acceleration	G's	7.5 to 10.5	10.1	Pass
Time of Peak Shoulder Acceleration	ms	NA	25.6	Pass
Overall Test Results				Pass

Jessica Hall  
 Laboratory Technician

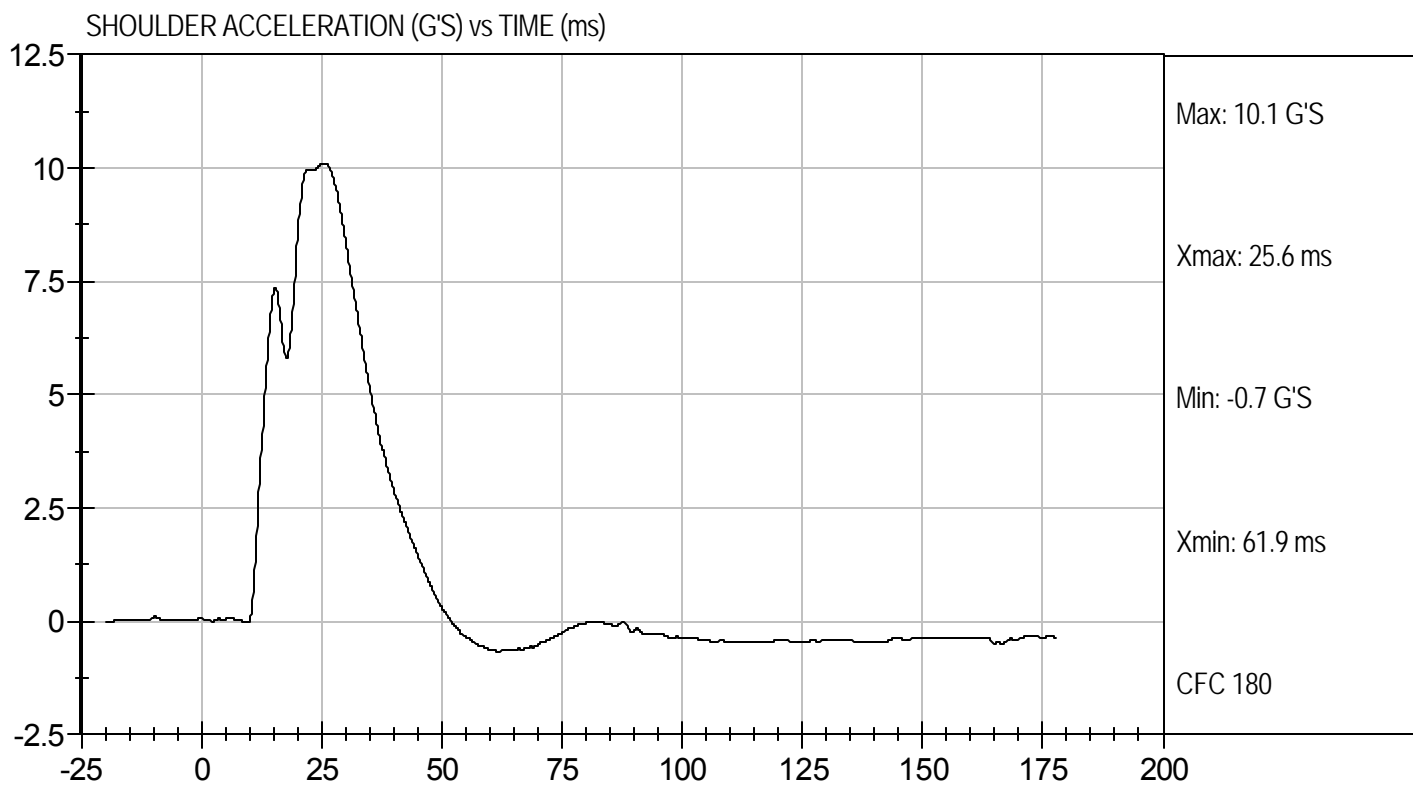
12/2/10  
 Test Date

David Winkelbauer  
 Approved By



Test Desc: Shoulder Impact  
Component ID: D104213

Test Date: 12/2/10  
Velocity: 13.88 ft/s, 4.2 m/s



MGA RESEARCH CORPORATION

UPPER RIB TEST

ES-2re DUMMY

ATD Serial No: 032

Test I.D: D104214

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Displacement at 3 m/s	mm	36.0 to 40.0	38.0	Pass
Displacement at 4 m/s	mm	46.0 to 51.0	48.4	Pass
Overall Test Results				Pass

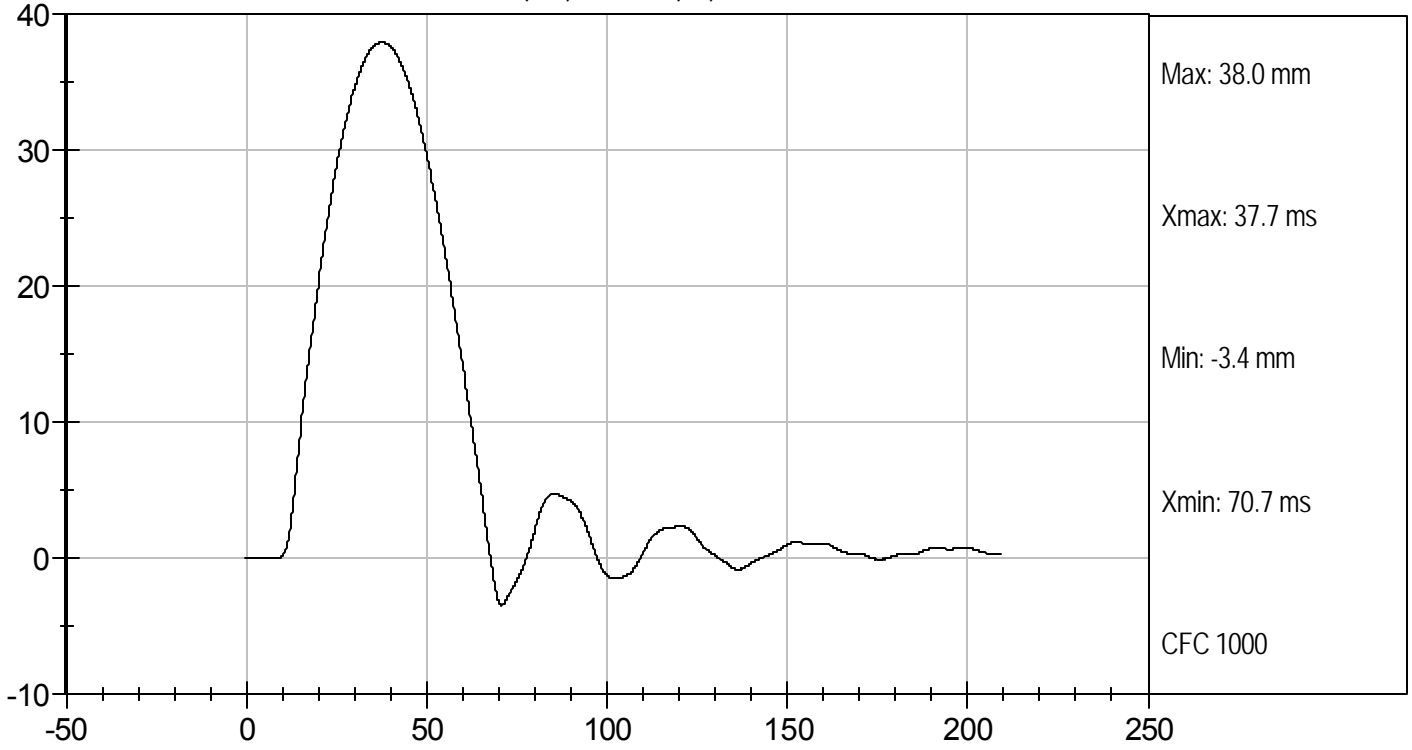
Jessica Gall  
Laboratory Technician

12/2/10  
Test Date

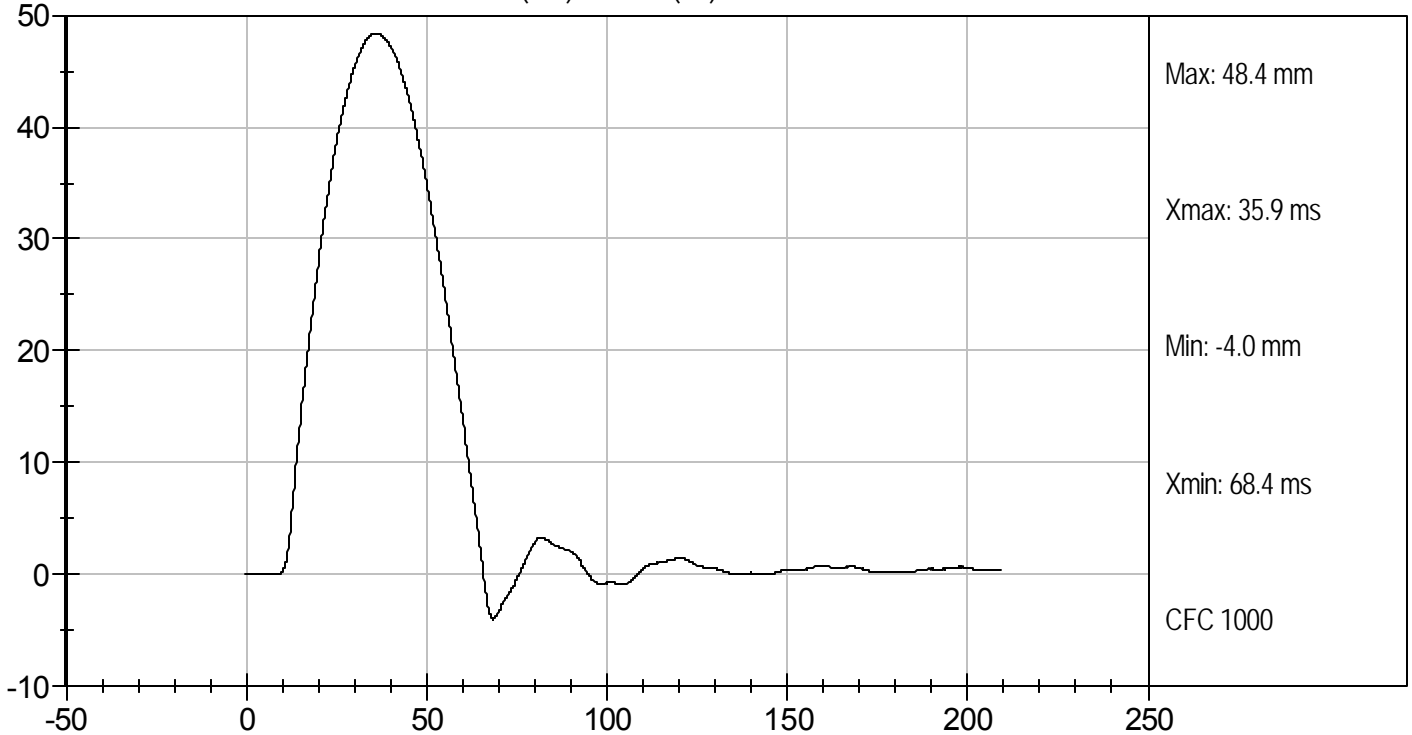
David Winkelbauer  
Approved By



UPPER RIB DISPLACEMENT @ 3 M/SEC (mm) vs TIME (ms)



UPPER RIB DISPLACEMENT @ 4 M/SEC (mm) vs TIME (ms)



MGA RESEARCH CORPORATION

MID RIB TEST

ES-2re DUMMY

ATD Serial No: 032

Test I.D: D104215

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Displacement at 3 m/s	mm	36.0 to 40.0	37.9	Pass
Displacement at 4 m/s	mm	46.0 to 51.0	48.3	Pass
Overall Test Results				Pass

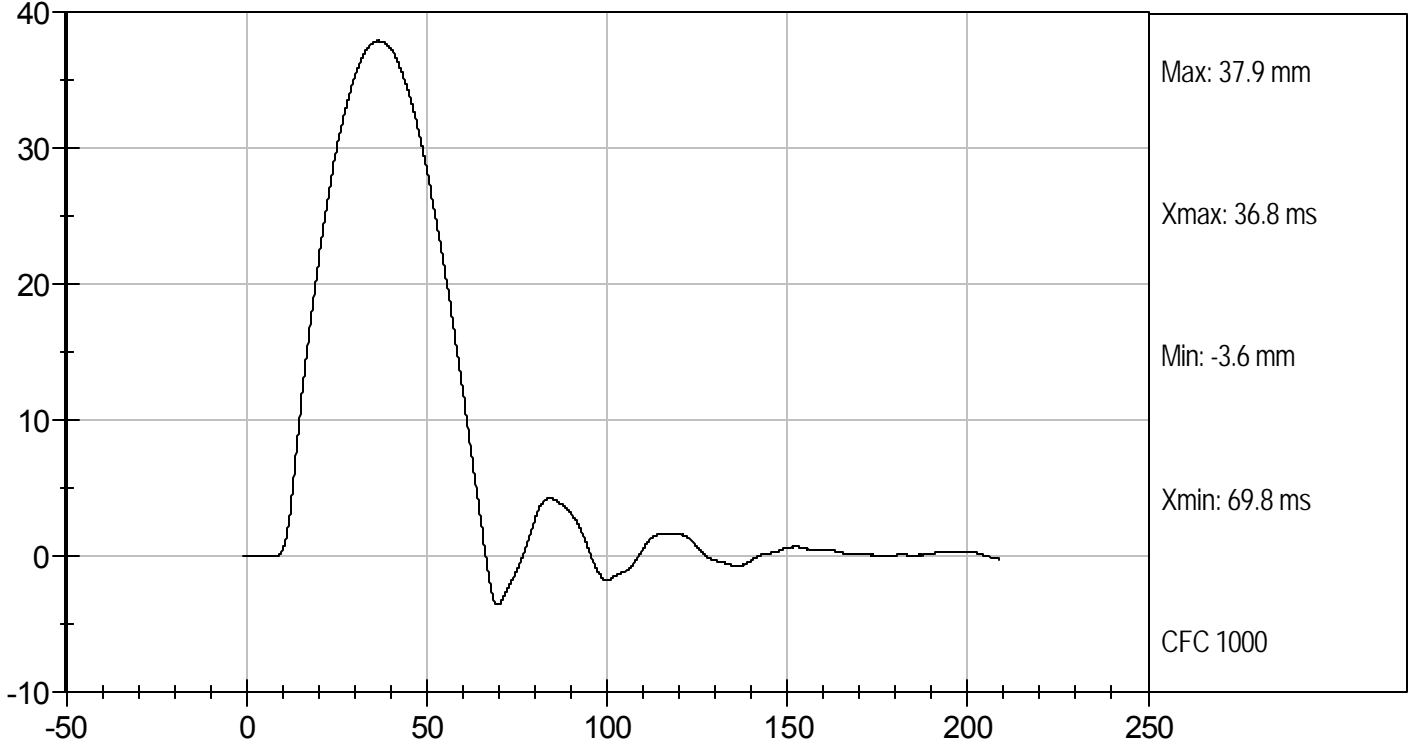
Jessica Gall  
Laboratory Technician

12/2/10  
Test Date

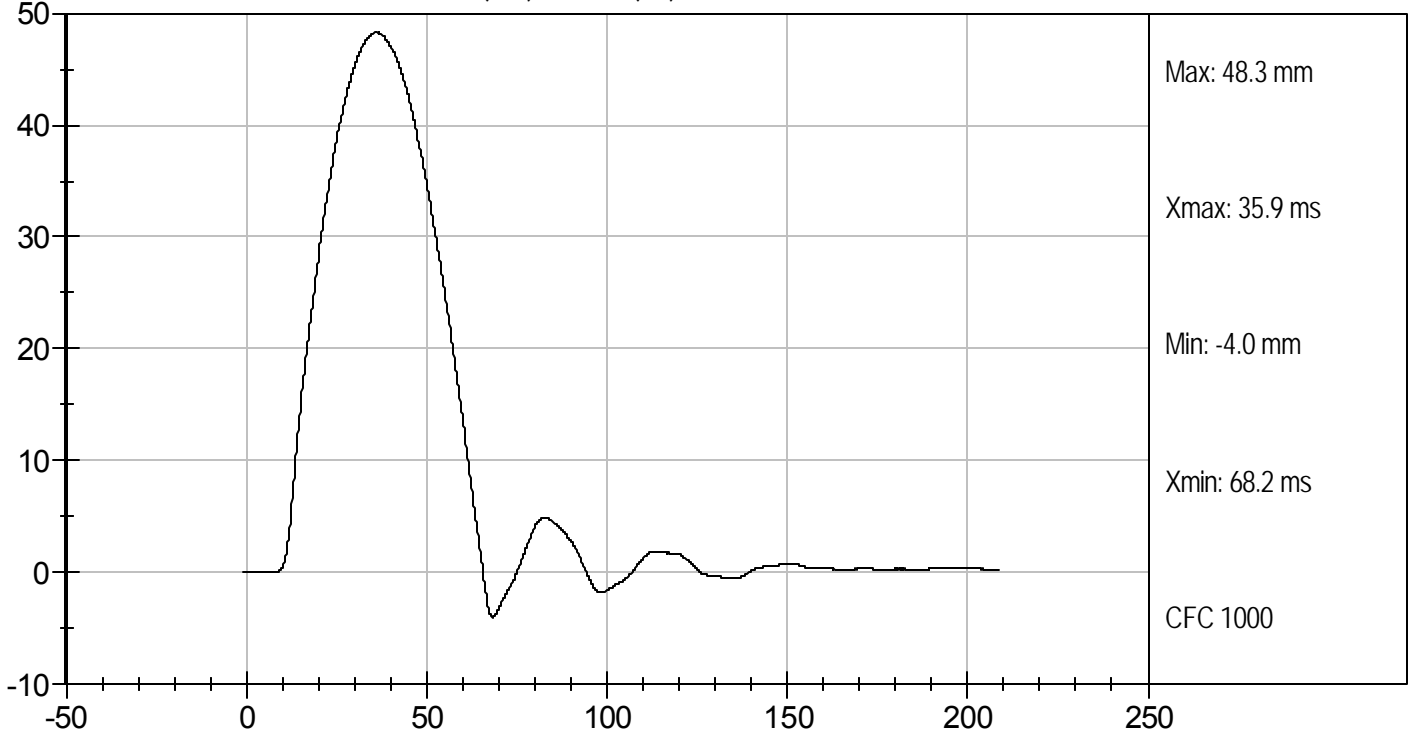
David Winkelbauer  
Approved By



MID RIB DISPLACEMENT @ 3 M/SEC (mm) vs TIME (ms)



MID RIB DISPLACEMENT @ 4 M/SEC (mm) vs TIME (ms)



MGA RESEARCH CORPORATION

LOWER RIB TEST

ES-2re DUMMY

ATD Serial No: 032

Test I.D: D104216

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Displacement at 3 m/s	mm	36.0 to 40.0	38.6	Pass
Displacement at 4 m/s	mm	46.0 to 51.0	49.0	Pass
Overall Test Results				Pass

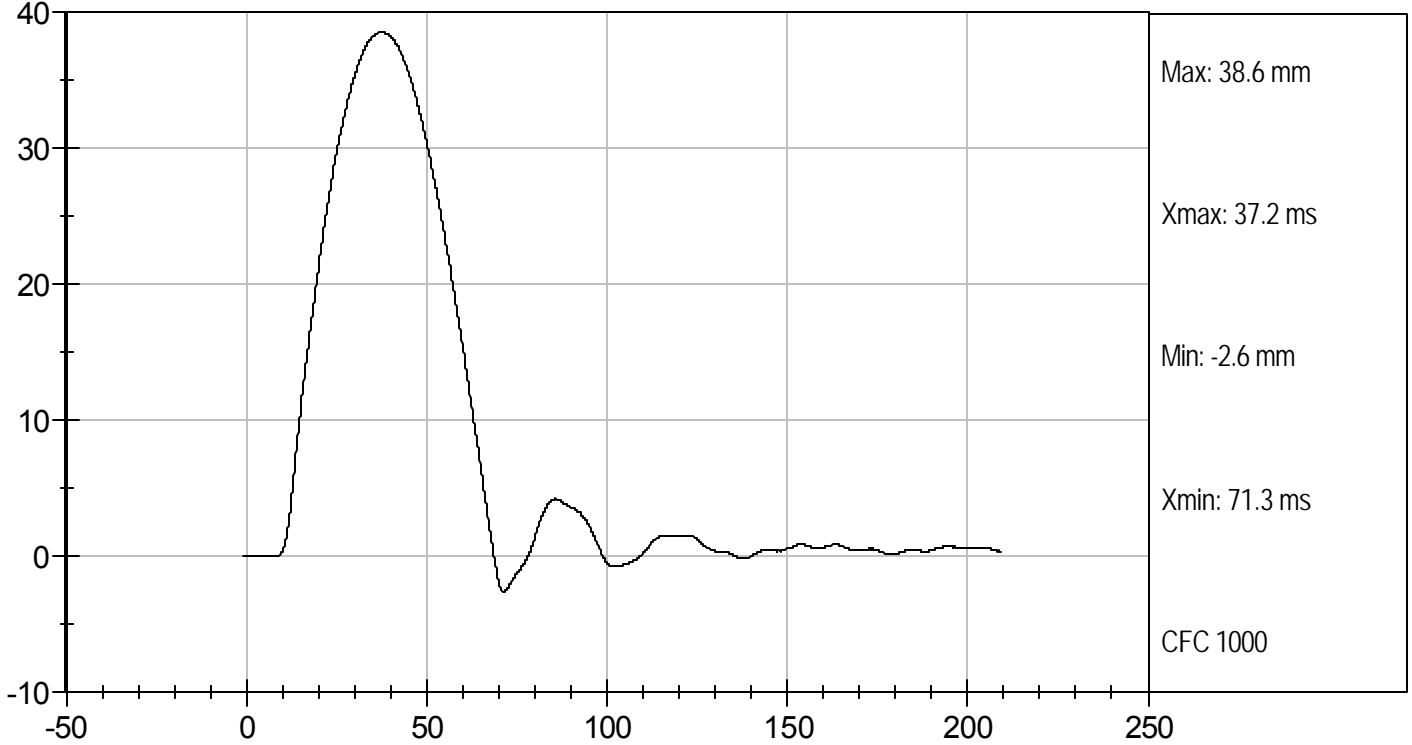
Jessica Hall  
Laboratory Technician

12/2/10  
Test Date

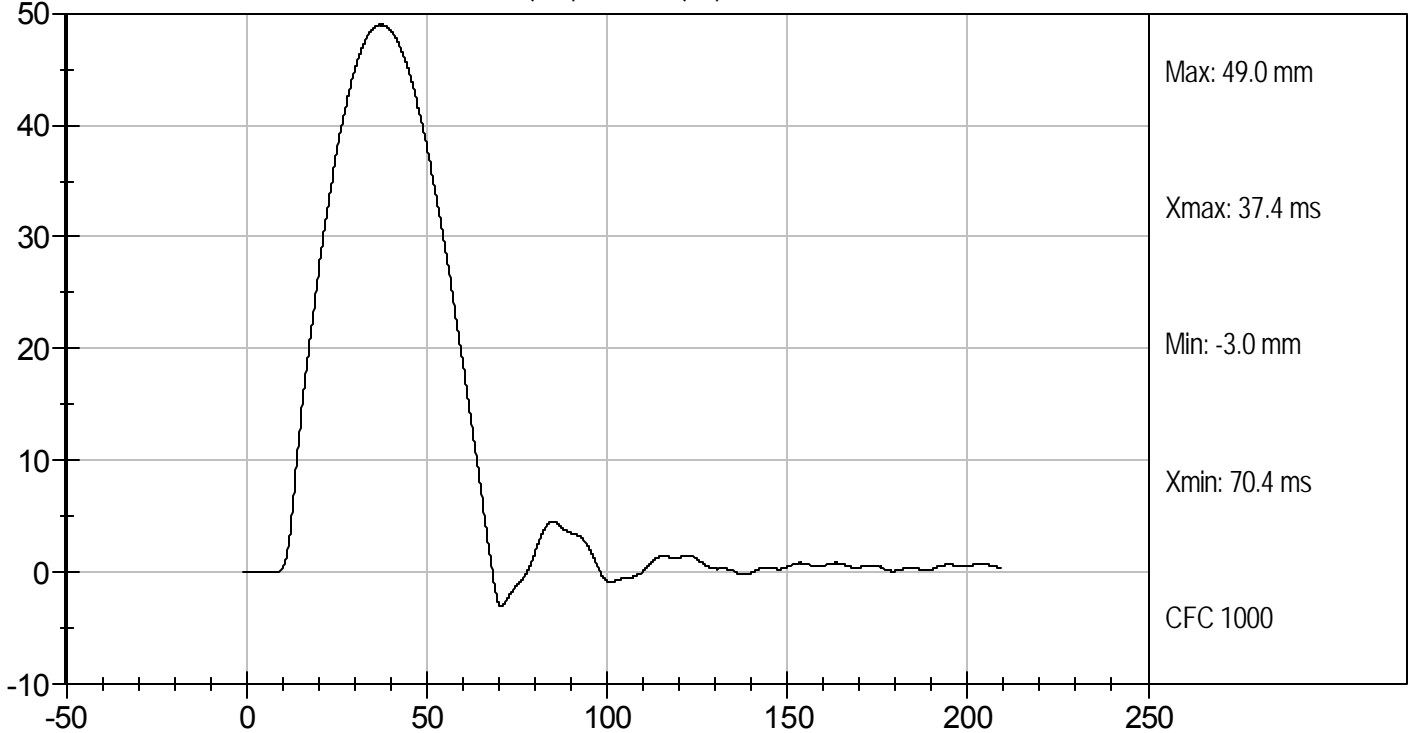
David Winkelbauer  
Approved By



LOWER RIB DISPLACEMENT @ 3 M/SEC (mm) vs TIME (ms)



LOWER RIB DISPLACEMENT @ 4 M/SEC (mm) vs TIME (ms)



**MGA RESEARCH CORPORATION**

**ABDOMEN TEST**

**ES-2re DUMMY**

ATD Serial No: 032

Test I.D: D104217

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Probe Speed	m/s	3.90 to 4.10	4.03	Pass
Maximum Impact Force	kN	4.00 to 4.80	4.27	Pass
Time of Maximum Impactor Force	ms	10.60 to 13.00	10.90	Pass
Maximum Total Abdomen Force	kN	2.20 to 2.70	2.48	Pass
Time of Maximum Abdomen Force	ms	10.00 to 12.30	10.10	Pass
Overall Test Results				Pass

Jessica Gall  
Laboratory Technician

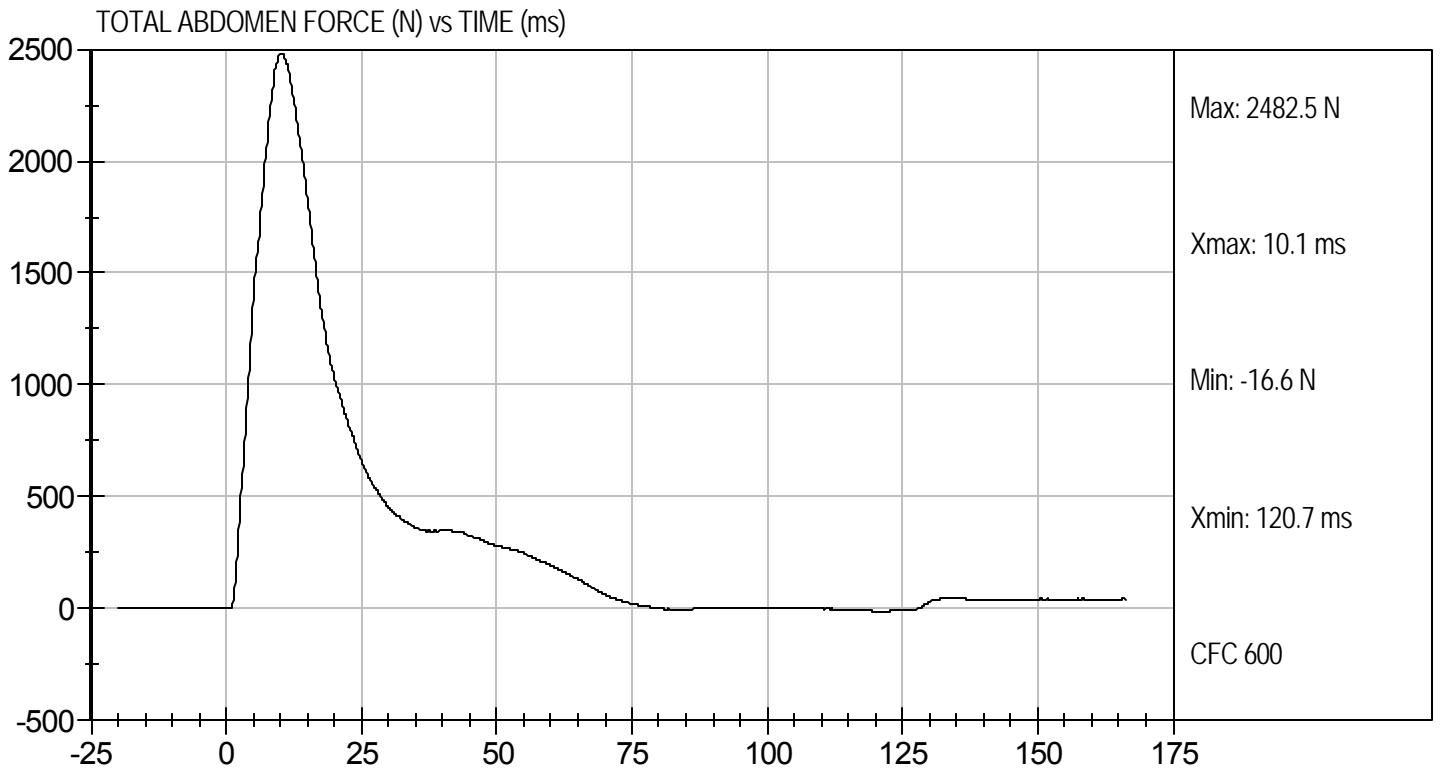
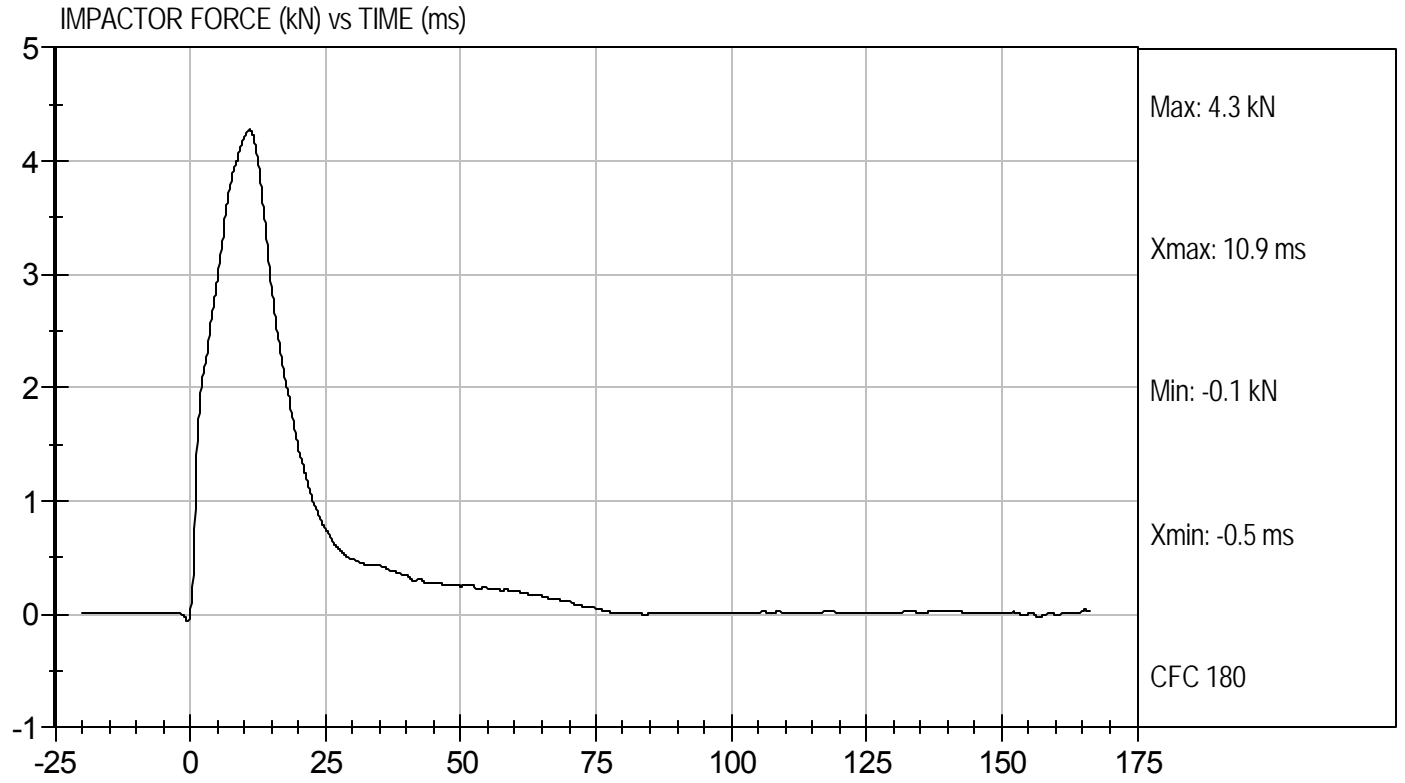
12/2/10  
Test Date

David Winkelbauer  
Approved By



Test Desc: Abdomen Impact  
Component ID: D104217

Test Date: 12/2/10  
Velocity: 13.22 ft/s, 4.03 m/s



**MGA RESEARCH CORPORATION**  
**LUMBAR SPINE TEST**  
**ES-2re DUMMY**

ATD Serial No: 032

Test I.D.: D104218

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity		%	10 to 70	19	Pass
Pendulum Speed		m/s	5.95 to 6.15	6.05	Pass
Pendulum Deceleration	1 ms	m/s	-0.05 to 0.00	-0.02	Pass
	3.7 ms	m/s	-0.425 to -0.24	-0.41	Pass
	27 ms	m/s	-6.50 to -5.80	-6.06	Pass
	30 ms	m/s	>= -6.5	-5.99	Pass
Maximum Flexion Angle		deg	45.0 to 55.0	49.9	Pass
Time of Maximum Flexion Angle		ms	39.0 to 53.0	44.7	Pass
Headform Rotation Decay to Initial Position		ms	37 to 57	45	Pass
Overall Results					Pass

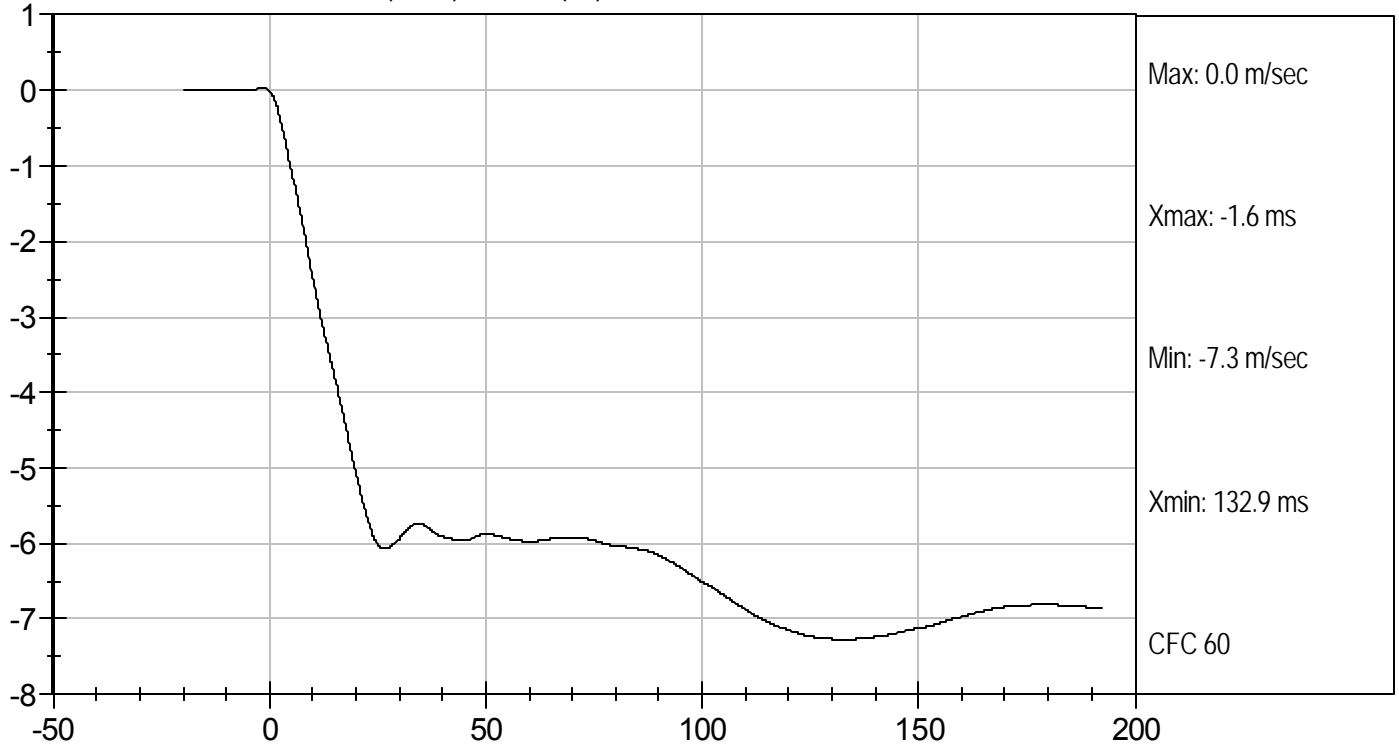
Jessica Hall  
Laboratory Technician

12/2/10  
Test Date

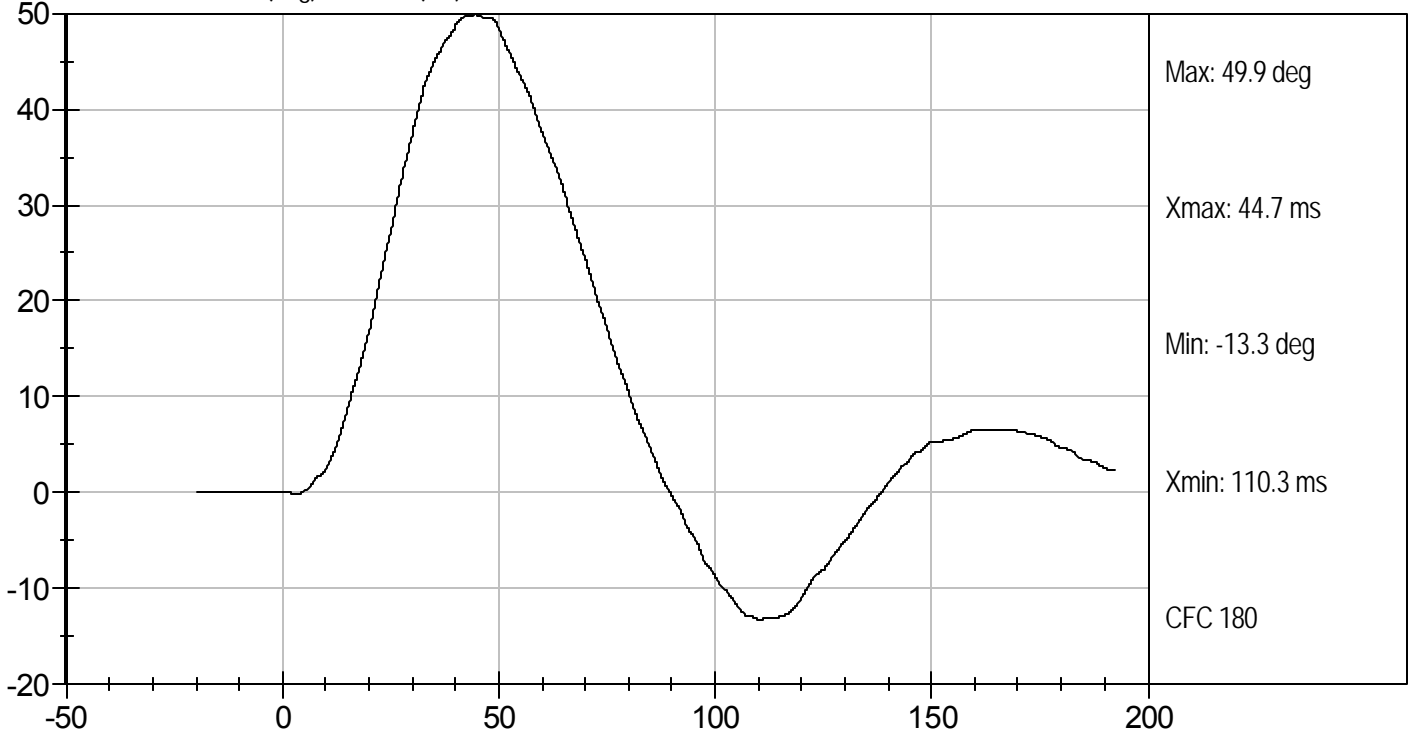
David Winkelbauer  
Approved By



PENDULUM DECELERATION (m/sec) vs TIME (ms)



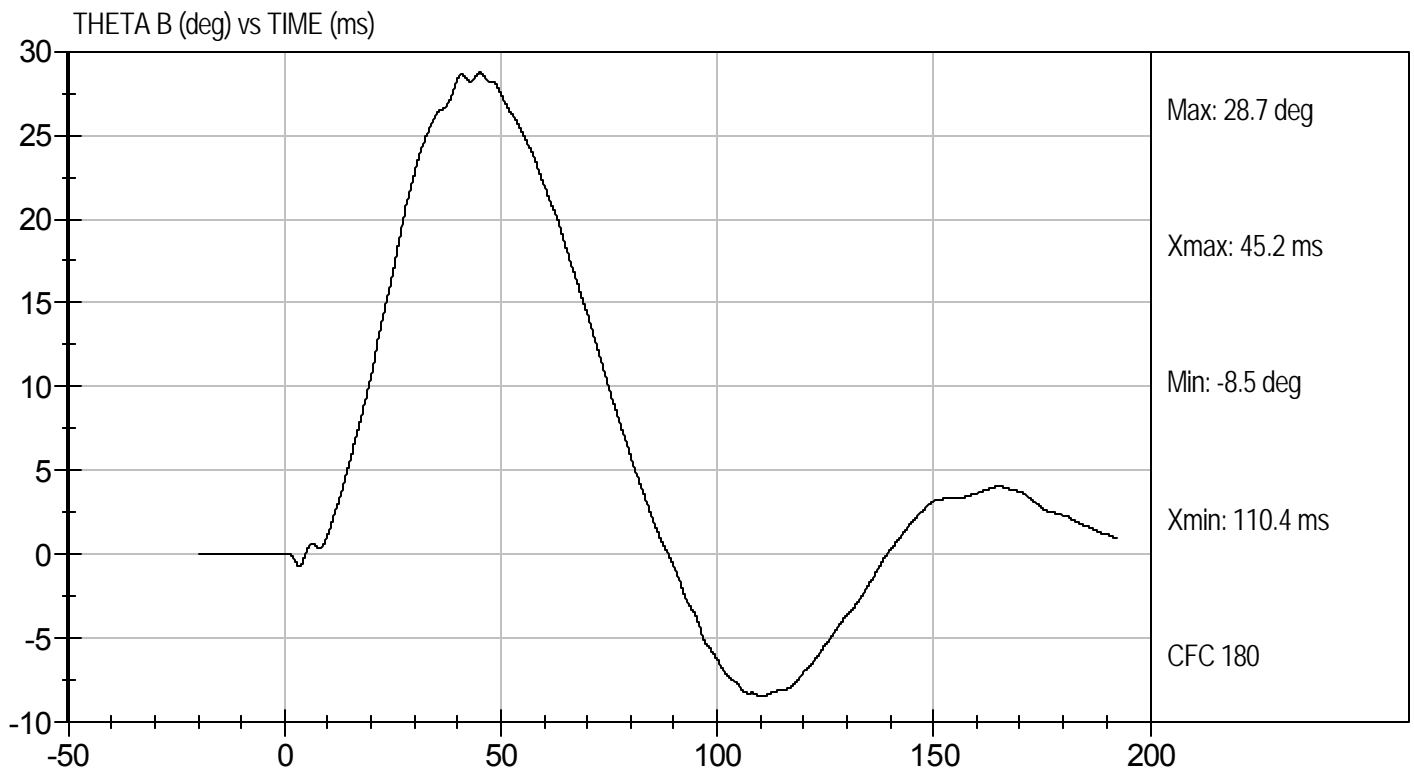
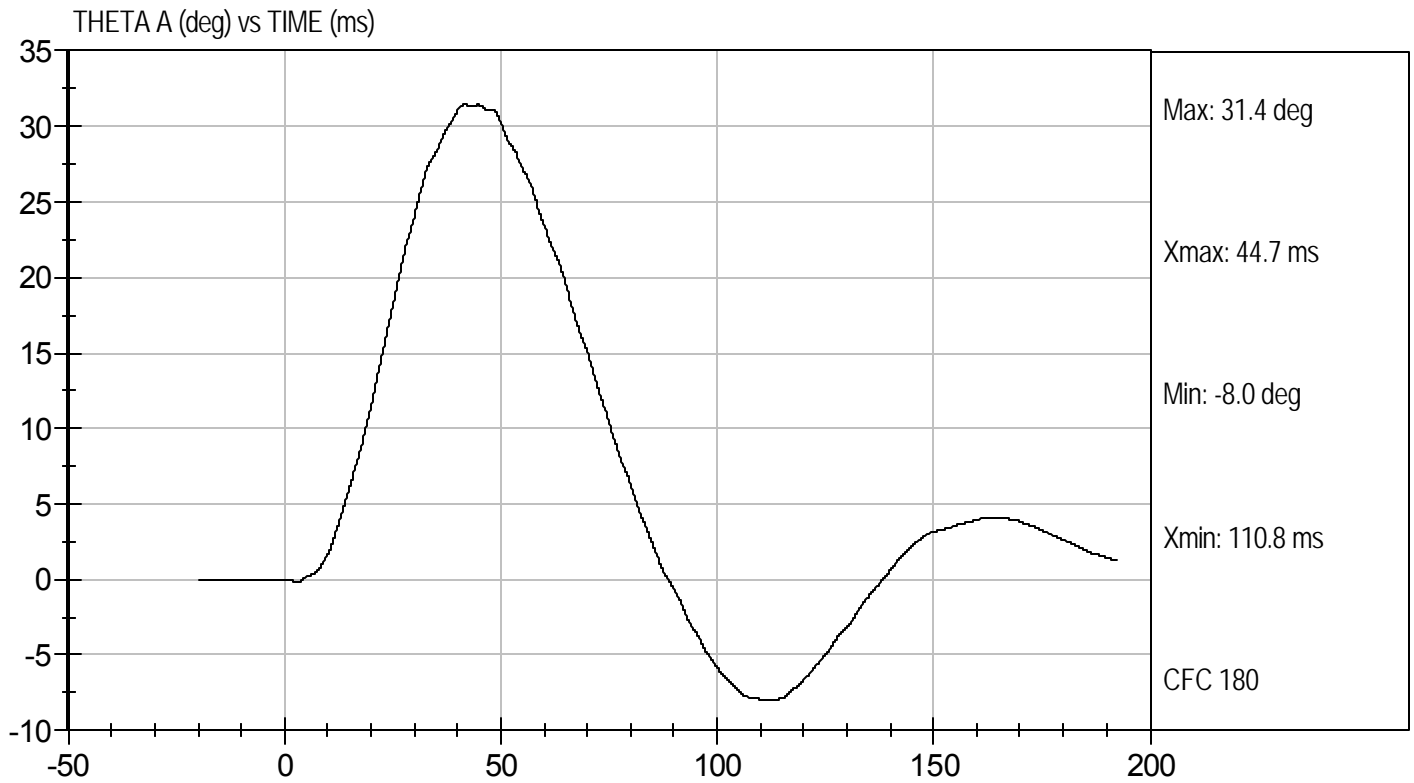
FLEXION ANGLE (deg) vs TIME (ms)





Test Desc: Lumbar Bending  
Component ID: D104218

Test Date: 12/2/10  
Velocity: 19.84 ft/s, 6.05 m/s



**MGA RESEARCH CORPORATION**

**PELVIS TEST  
ES-2re DUMMY**

ATD Serial No: 032

Test I.D: D104219

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Probe Speed	m/s	4.20 to 4.40	4.38	Pass
Maximum Impactor Force	kN	4.70 to 5.40	4.74	Pass
Time of Maximum Impactor Force	ms	11.80 to 16.10	12.60	Pass
Maximum Pubic Force	kN	1.23 to 1.59	1.31	Pass
Time of Maximum Pubic Force	ms	12.20 to 17.00	13.80	Pass
Overall Test Results				Pass

*Jessica Gall*  
Laboratory Technician

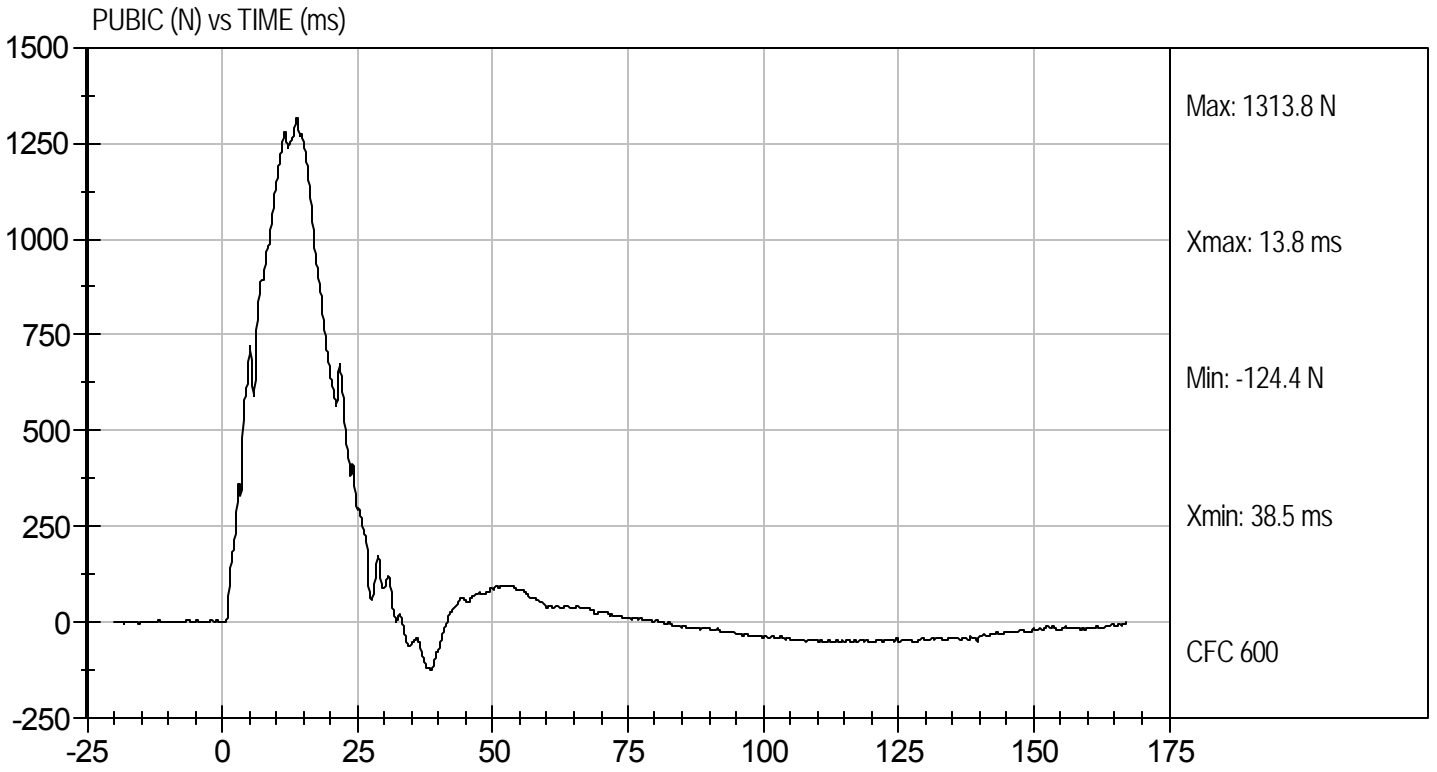
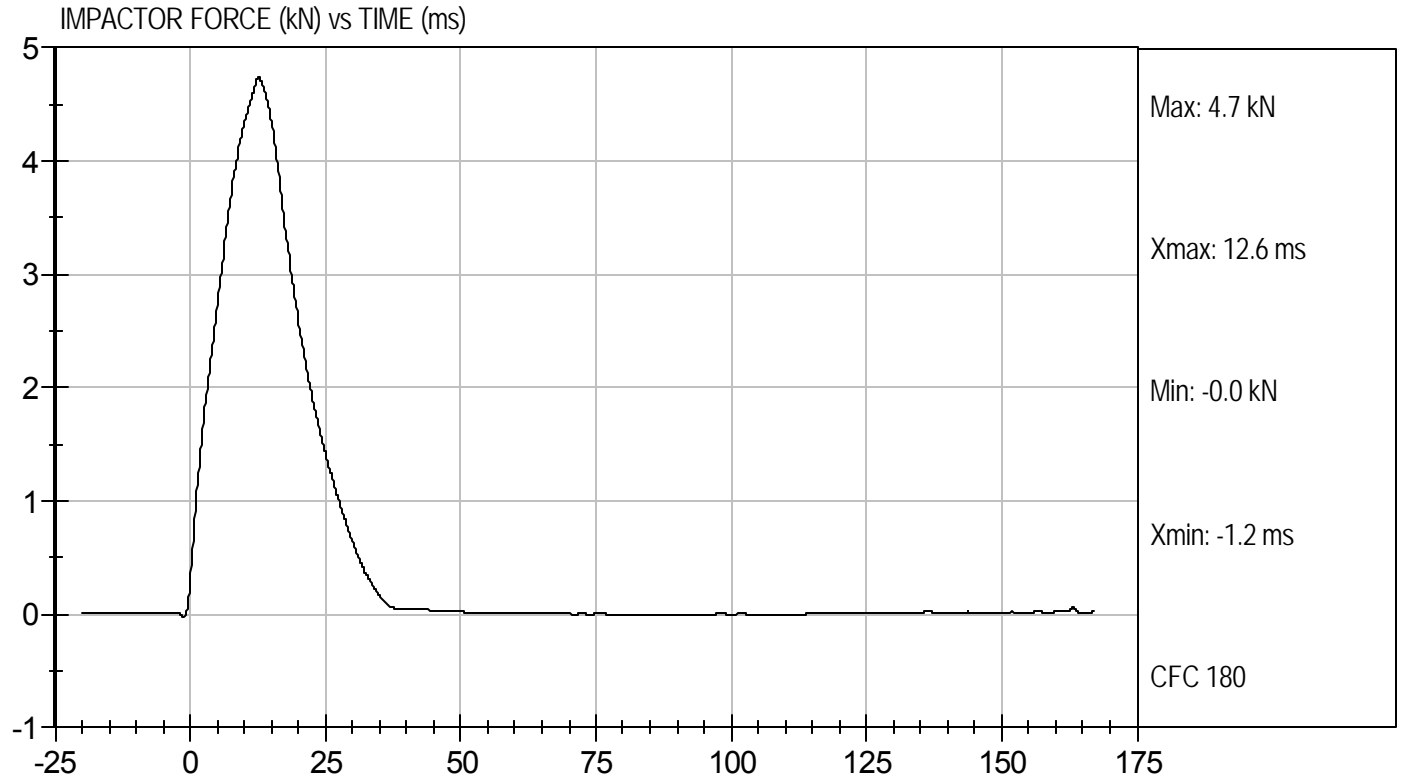
12/2/10  
Test Date

*David Winkelbauer*  
Approved By



Test Desc: Pelvis Impact  
Component ID: D104219

Test Date: 12/2/10  
Velocity: 14.36 ft/s, 4.38 m/s



**MGA RESEARCH CORPORATION**  
**FULL BODY THORAX IMPACT TEST**  
**ES-2re DUMMY**

ATD Serial No: 032

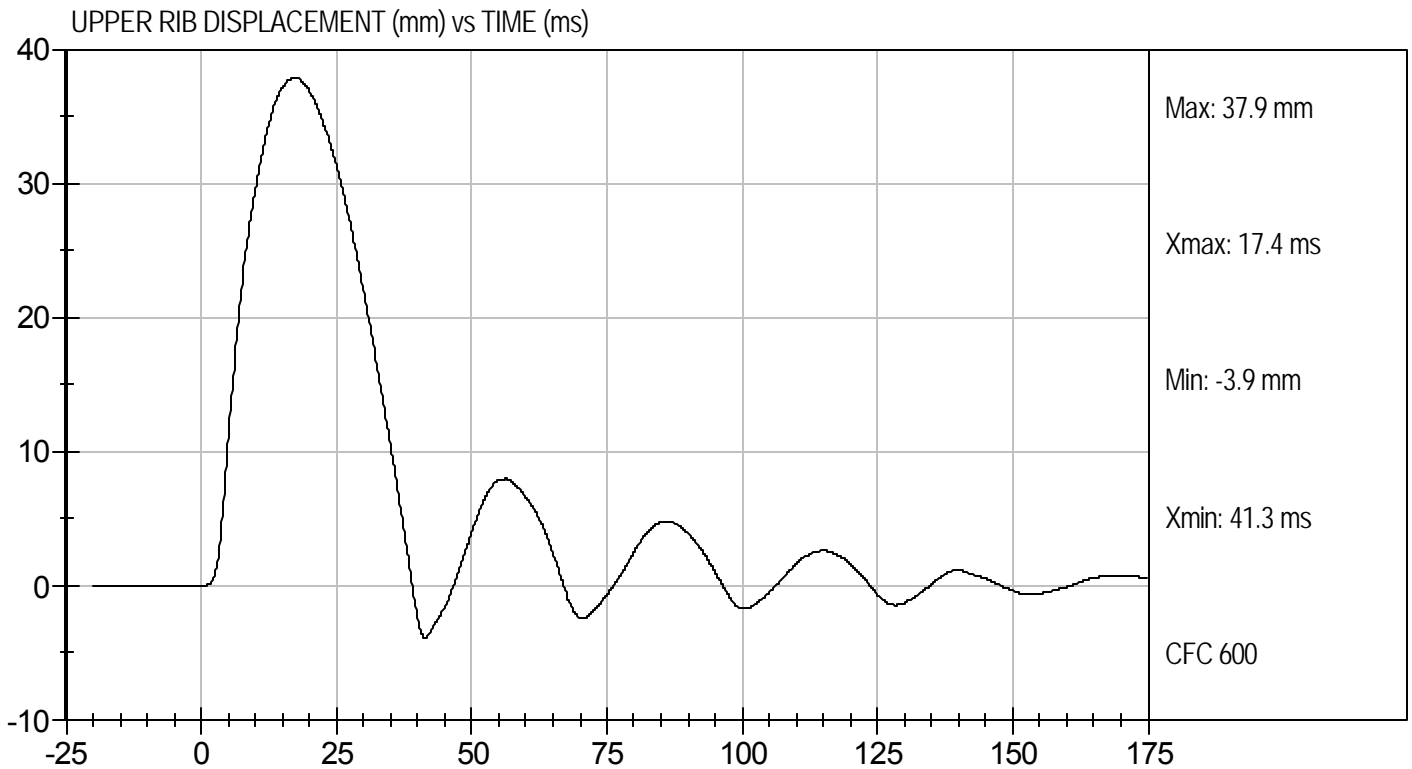
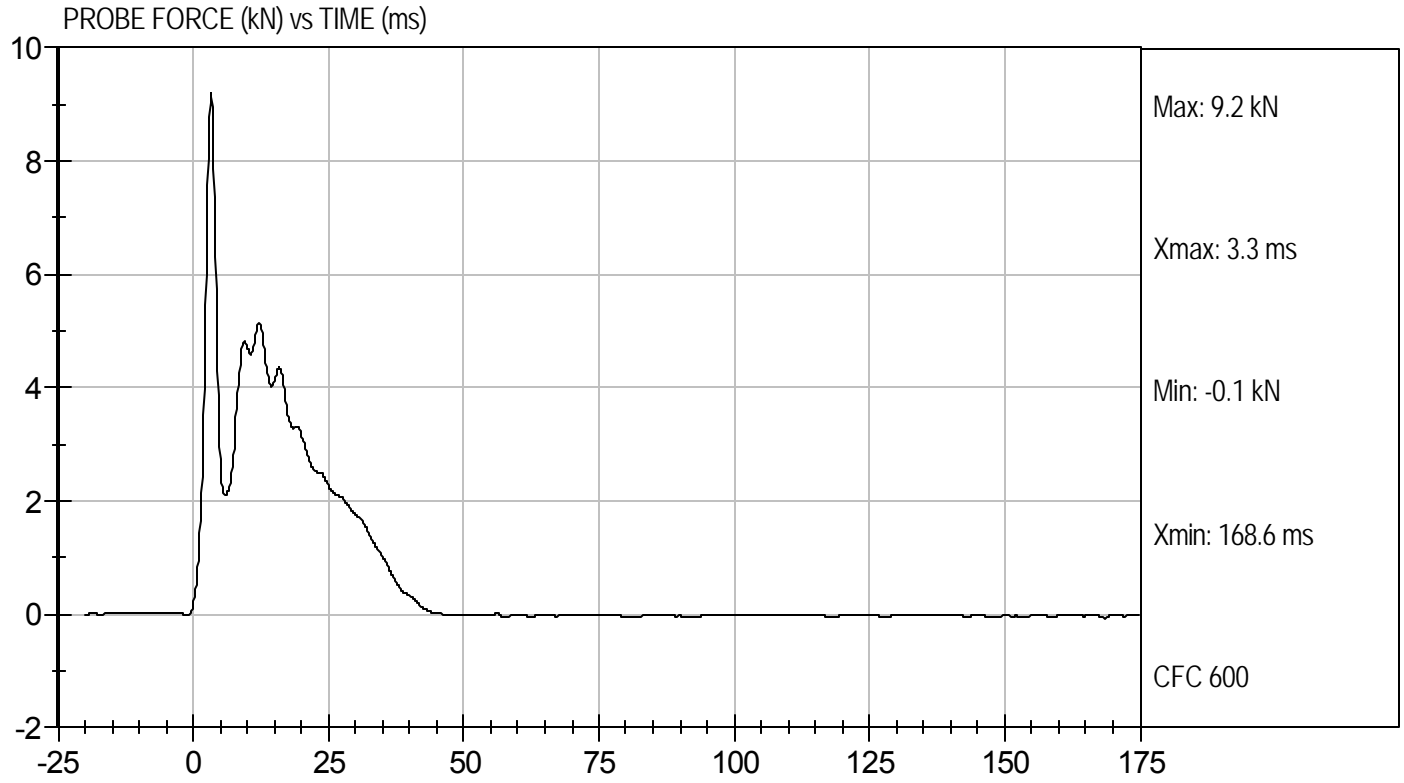
Test I.D: D104210

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	22	Pass
Humidity	%	10 to 70	19	Pass
Probe Speed	m/s	5.40 to 5.60	5.58	Pass
Maximum Impactor Force (after 6 ms)	kN	5.10 to 6.20	5.15	Pass
Upper Rib Displacement	mm	34.0 to 41.0	37.9	Pass
Middle Rib Displacement	mm	37.0 to 45.0	40.5	Pass
Lower Rib Displacement	mm	37.0 to 44.0	39.8	Pass
Overall Test Results				Pass

*Jessica Gall*  
 Laboratory Technician

12/2/10  
 Test Date

*David Winkelbauer*  
 Approved By

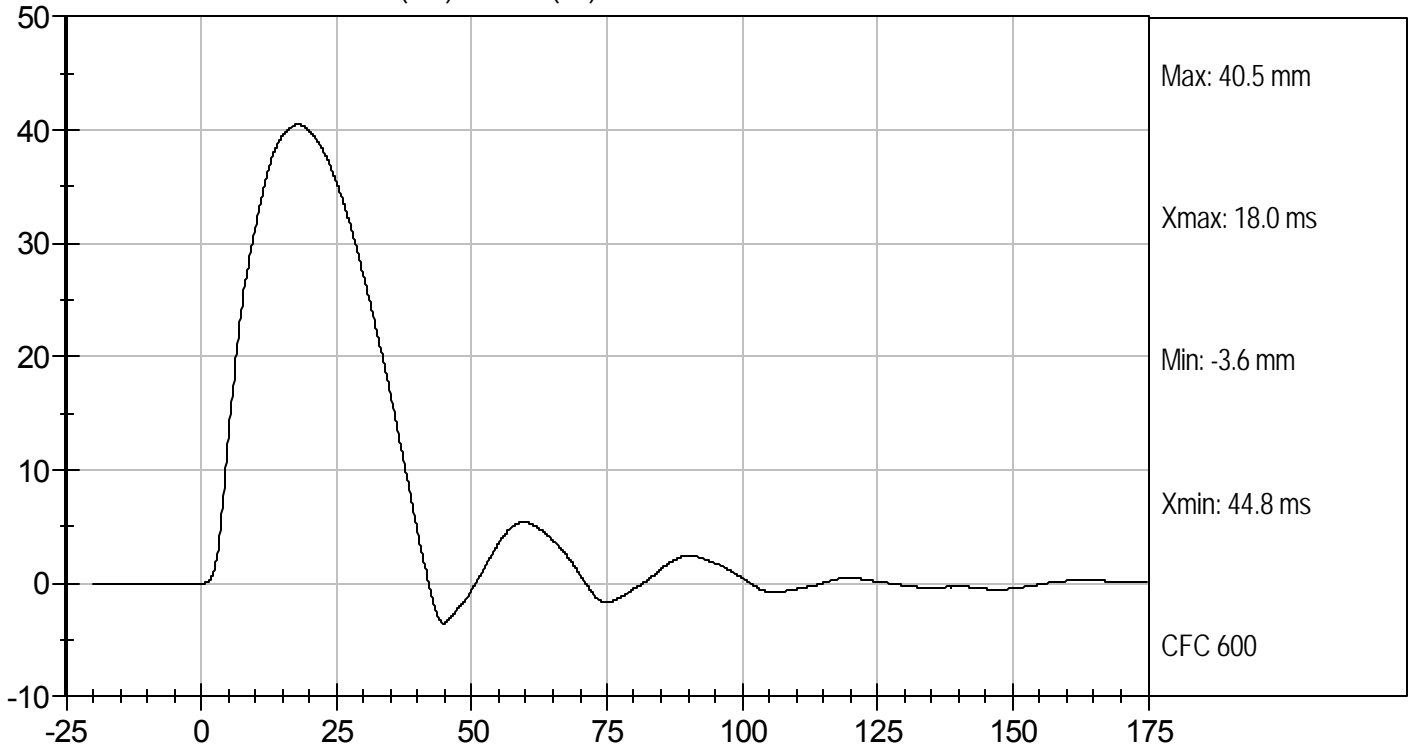




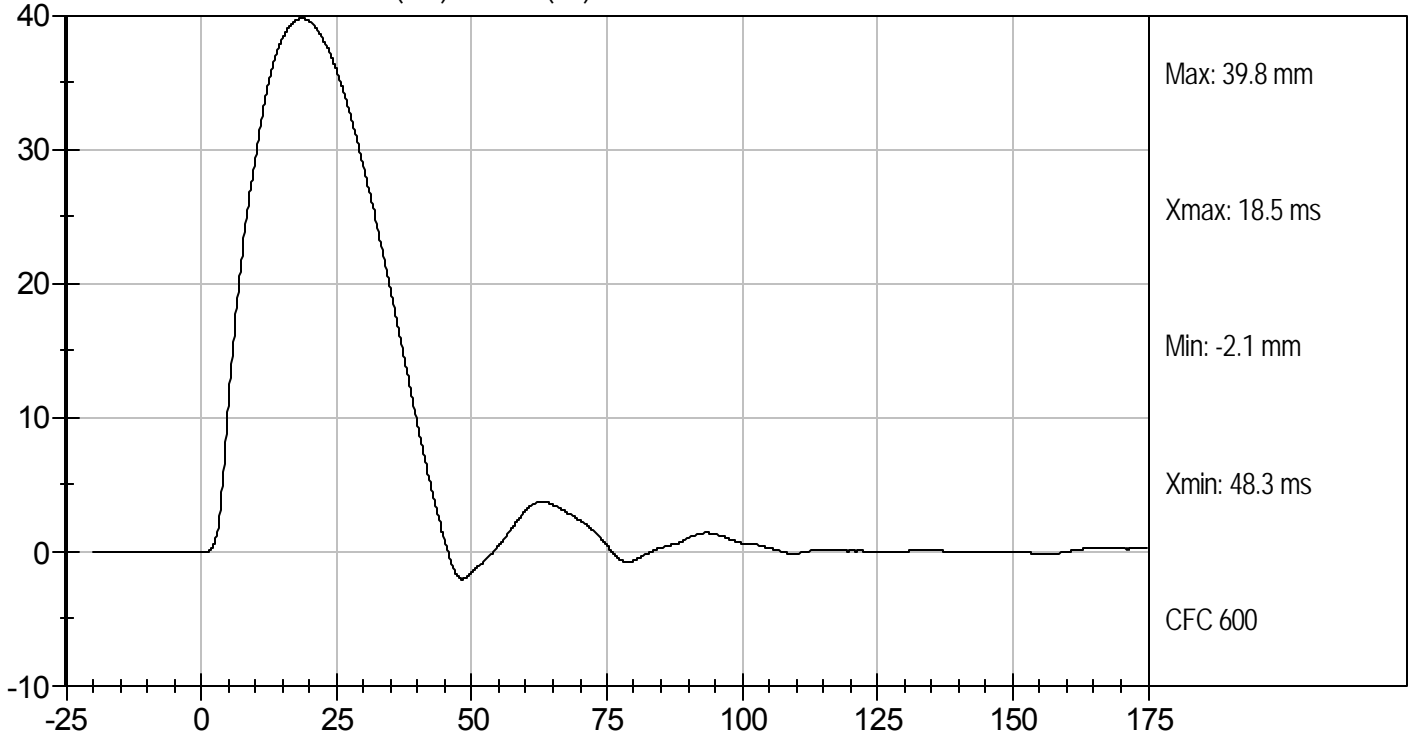
Test Desc: Thorax Impact  
Component ID: D104210

Test Date: 12/2/10  
Velocity: 18.31 ft/s, 5.58 m/s

MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



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

ATD Serial No: 306

Test ID: D104131

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	25	Pass
Peak Resultant Acceleration	G's	115 to 137	121	Pass
Peak Lateral Acceleration	G's	+/- 15	-4.9	Pass
Unimodal	N/A	<15%	Yes	Pass
Overall Test Results				Pass

Jessica Hall  
Laboratory Technician

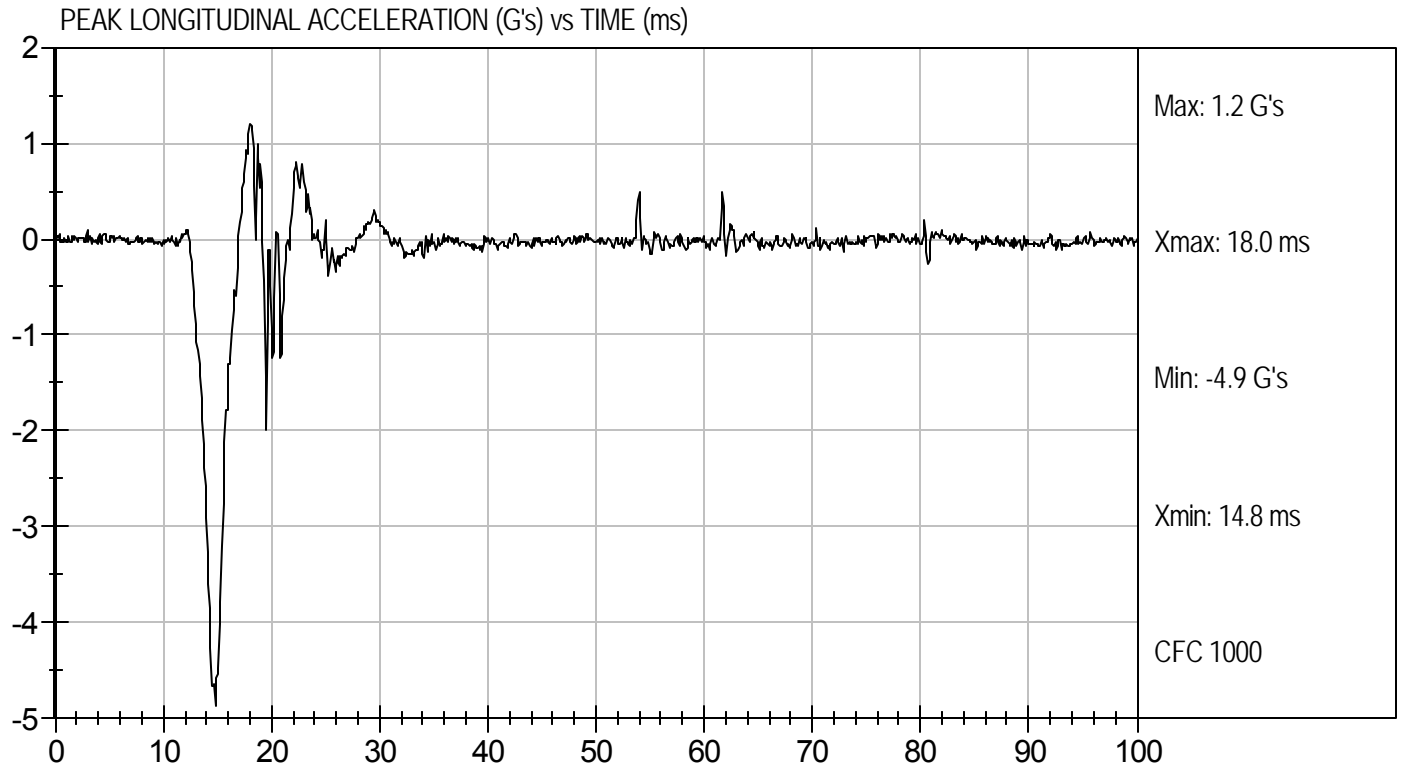
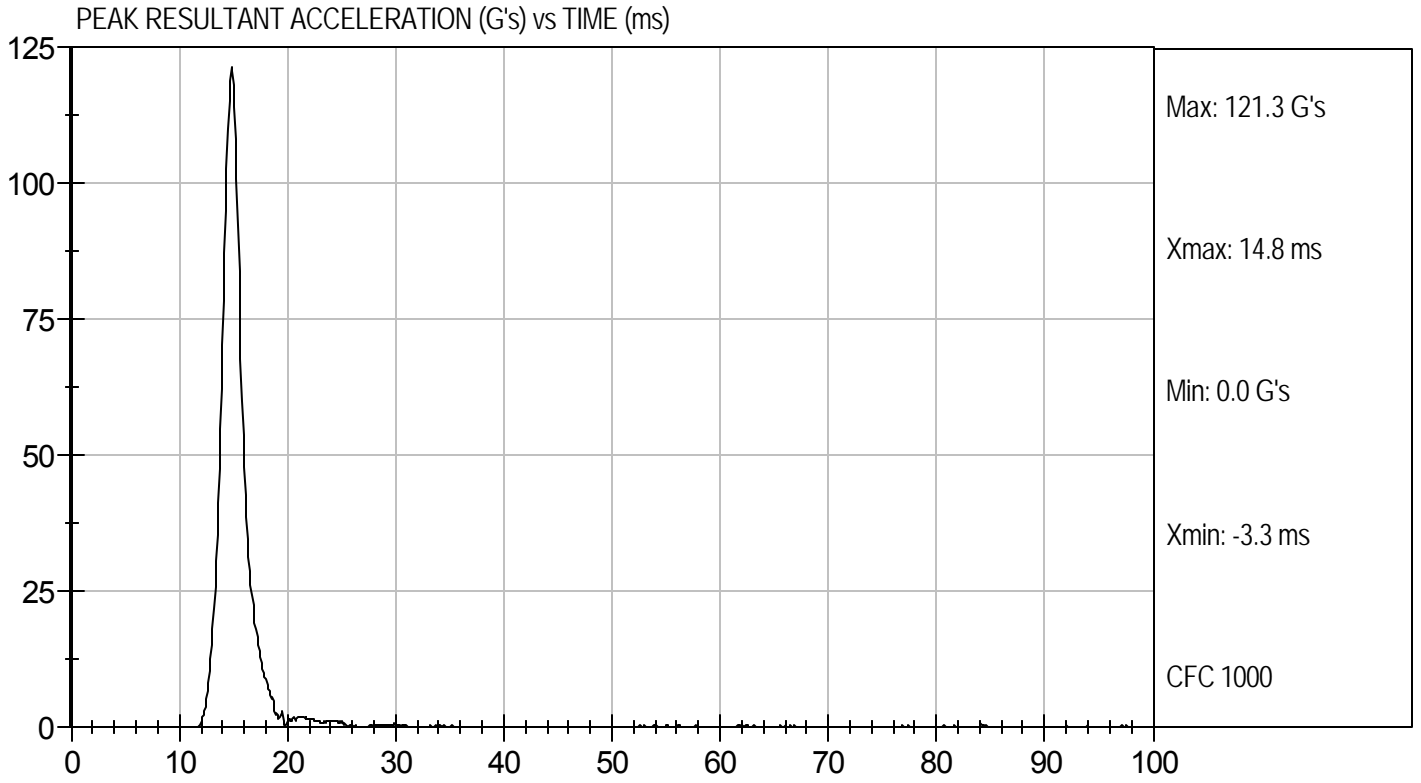
11/24/10  
Test Date

David Winkelbauer  
Approved By



Test Desc: Head Drop  
Component ID: D104131

Test Date: 11/24/10  
Velocity: 0 ft/s, 0 m/s



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

ATD Serial No: 306

Test I.D.: D104132

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	20.7	Pass
Humidity		%	10 to 70	25	Pass
Impact Velocity		m/s	5.51 to 5.63	5.58	Pass
Delta Velocity	10 ms	m/s	2.20 to 2.80	2.47	Pass
	15 ms	m/s	3.30 to 4.10	3.52	Pass
	20 ms	m/s	4.40 to 5.40	4.74	Pass
	25 ms	m/s	5.40 to 6.10	5.48	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	59	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	118	Pass
Overall Test Results					Pass

Jessica Gall  
Laboratory Technician

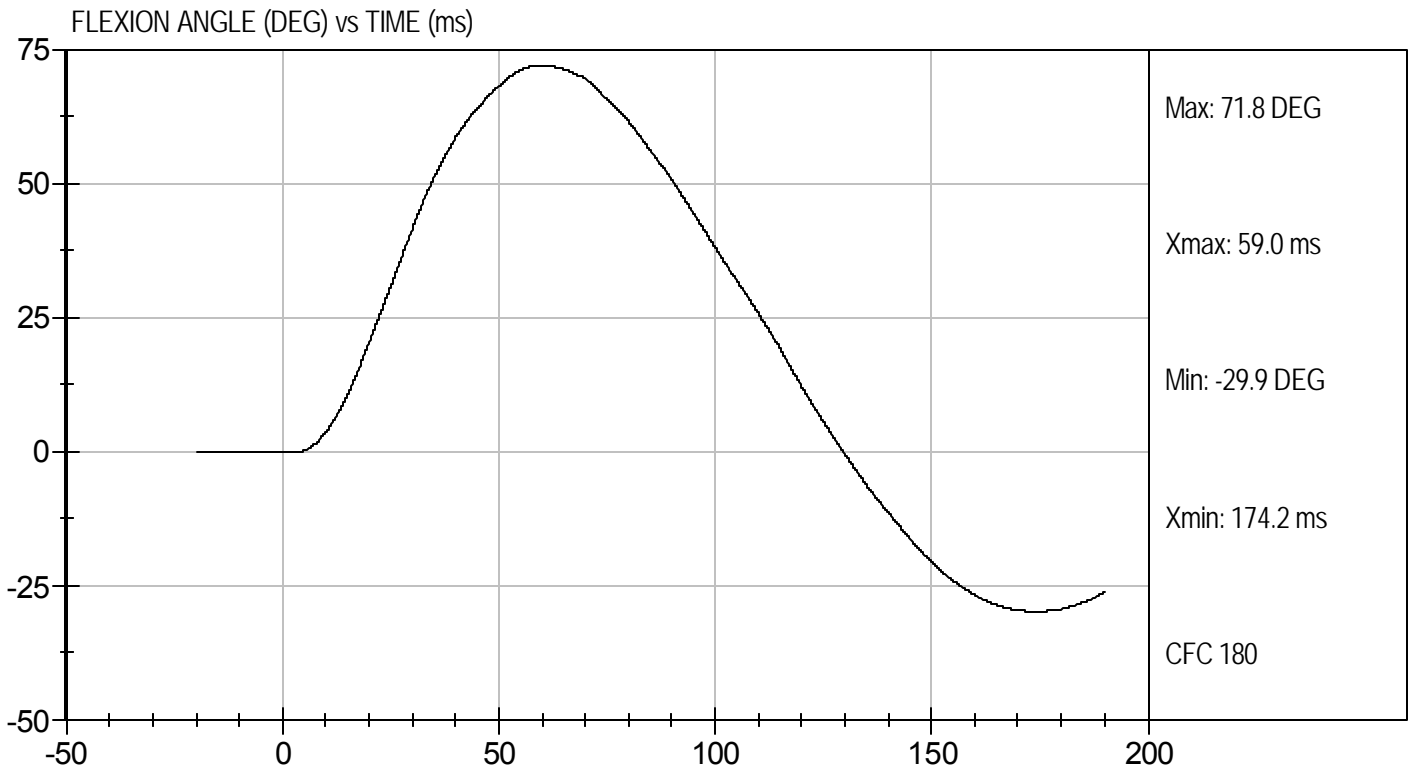
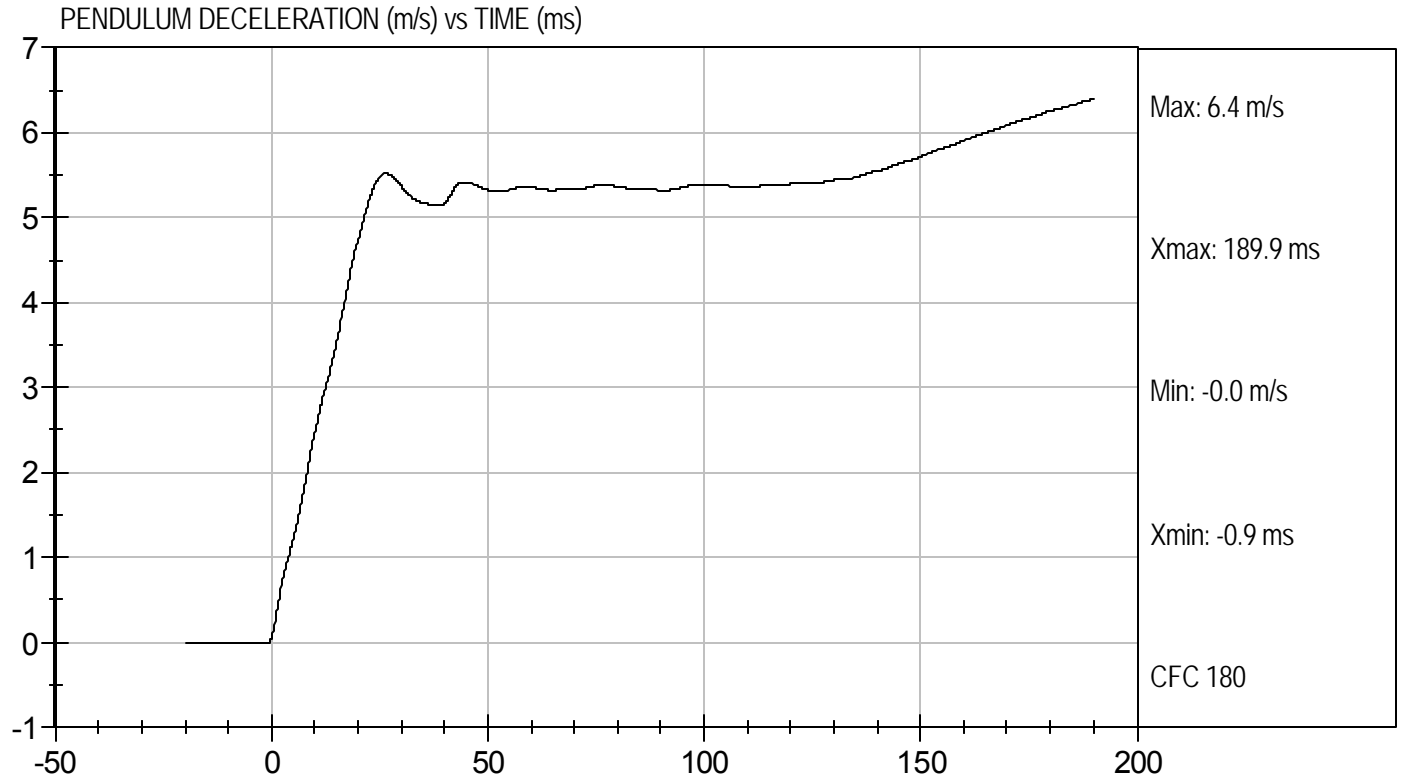
11/24/10  
Test Date

David Winkelbauer  
Approved By



Test Desc: Neck Bending  
Component ID: D104132

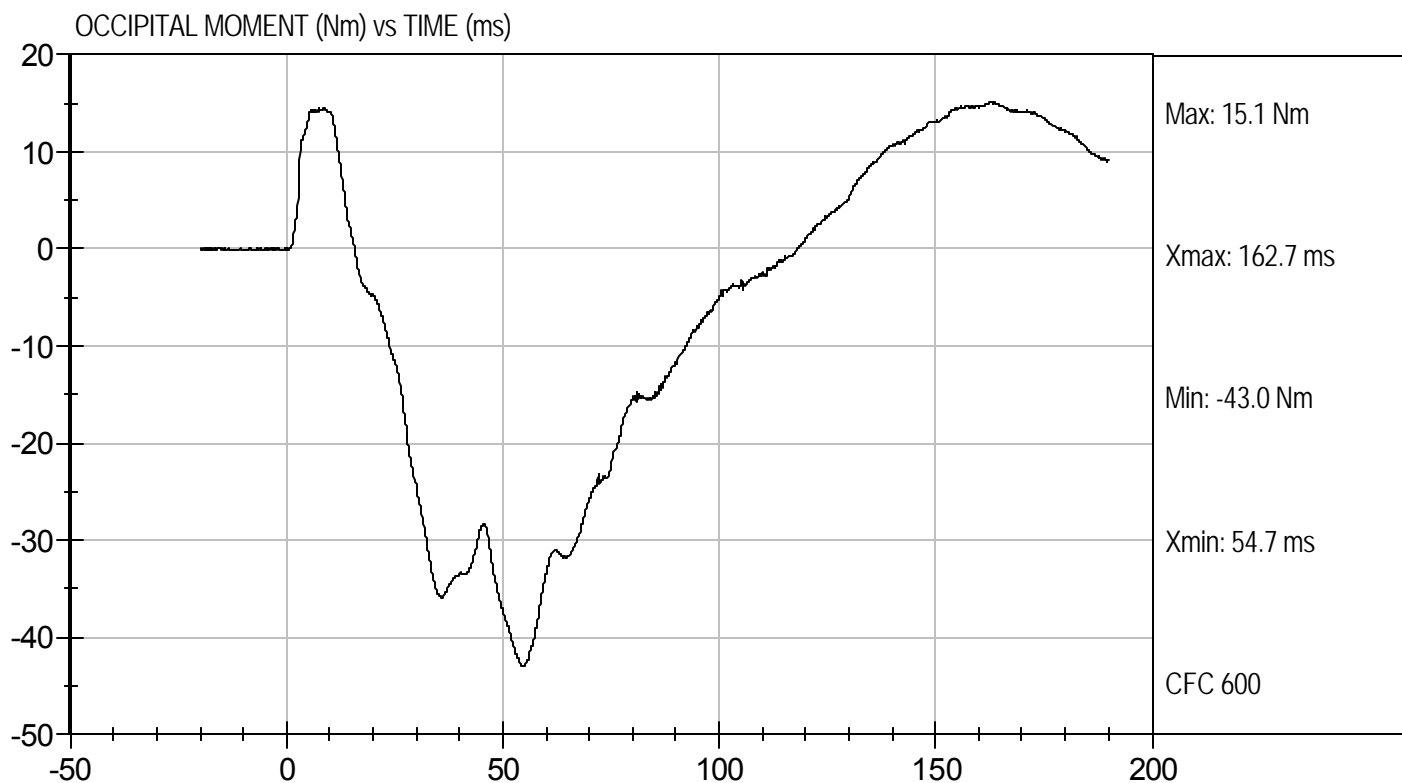
Test Date: 11/24/10  
Velocity: 18.32 ft/s, 5.58 m/s





Test Desc: Neck Bending  
Component ID: D104132

Test Date: 11/24/10  
Velocity: 18.32 ft/s, 5.58 m/s



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

ATD Serial No: 306

Test ID: D104133

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	21	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Maximum Probe Acceleration	G's	13 to 18	16	Pass
Shoulder Displacement	mm	28 to 37	30	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	20	Pass
Overall Test Results				Pass

*Jessica Hall*  
 Laboratory Technician

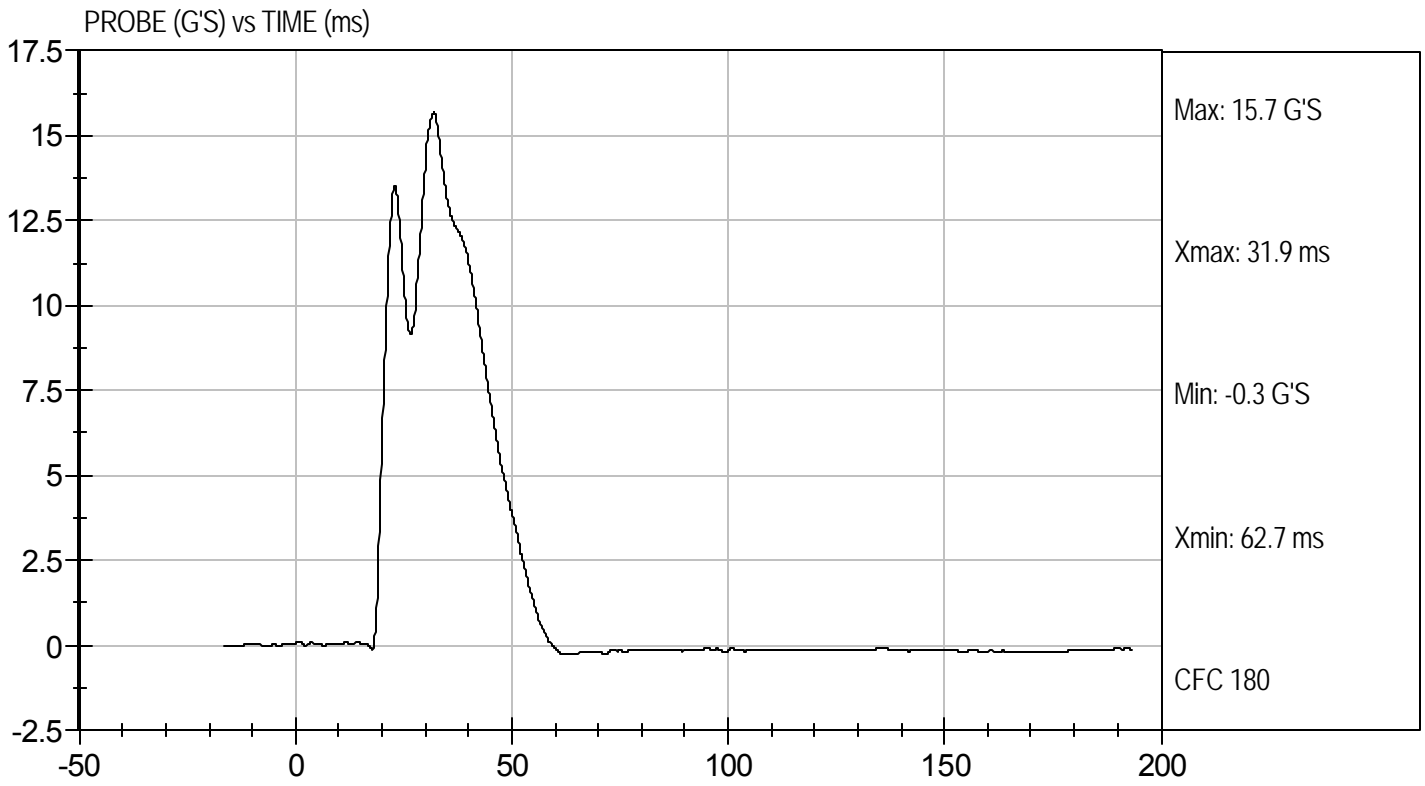
11/23/10  
 Test Date

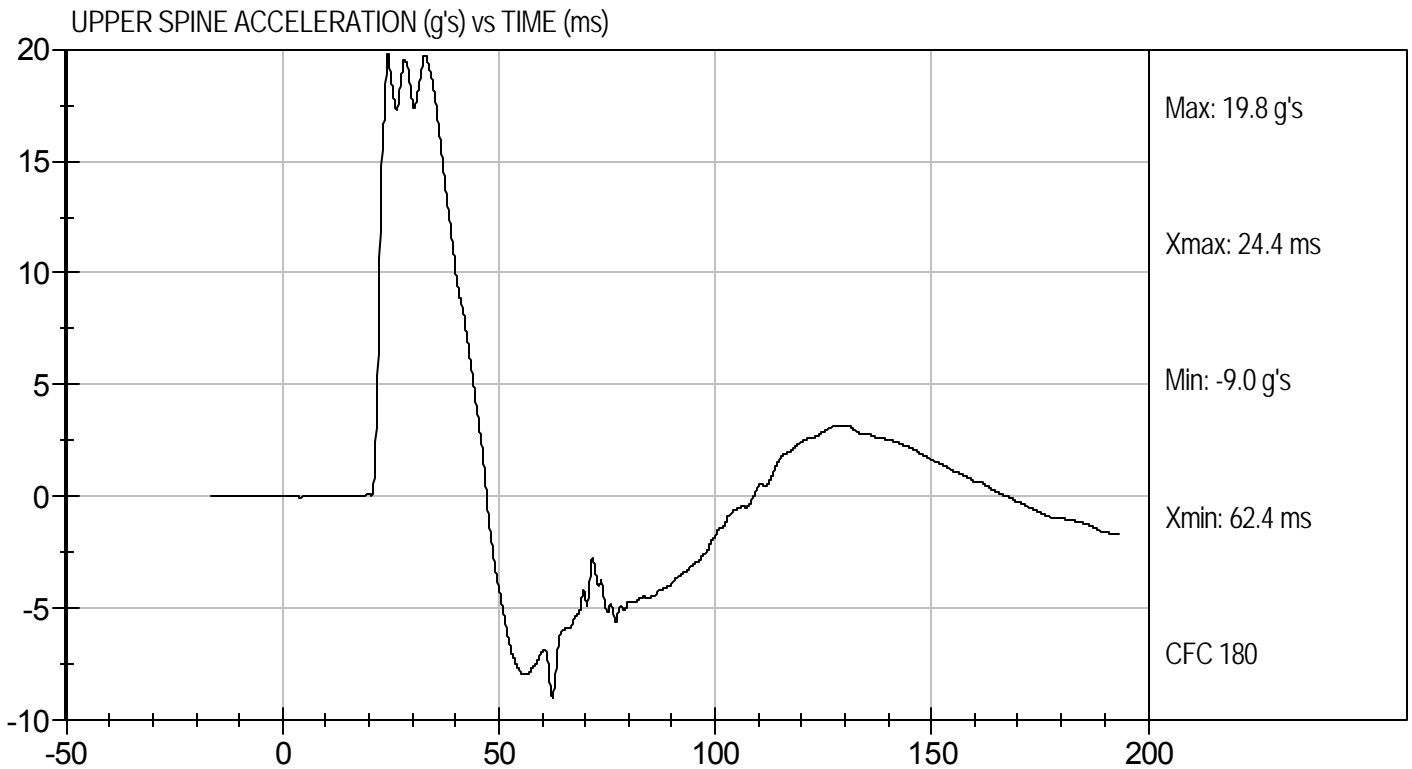
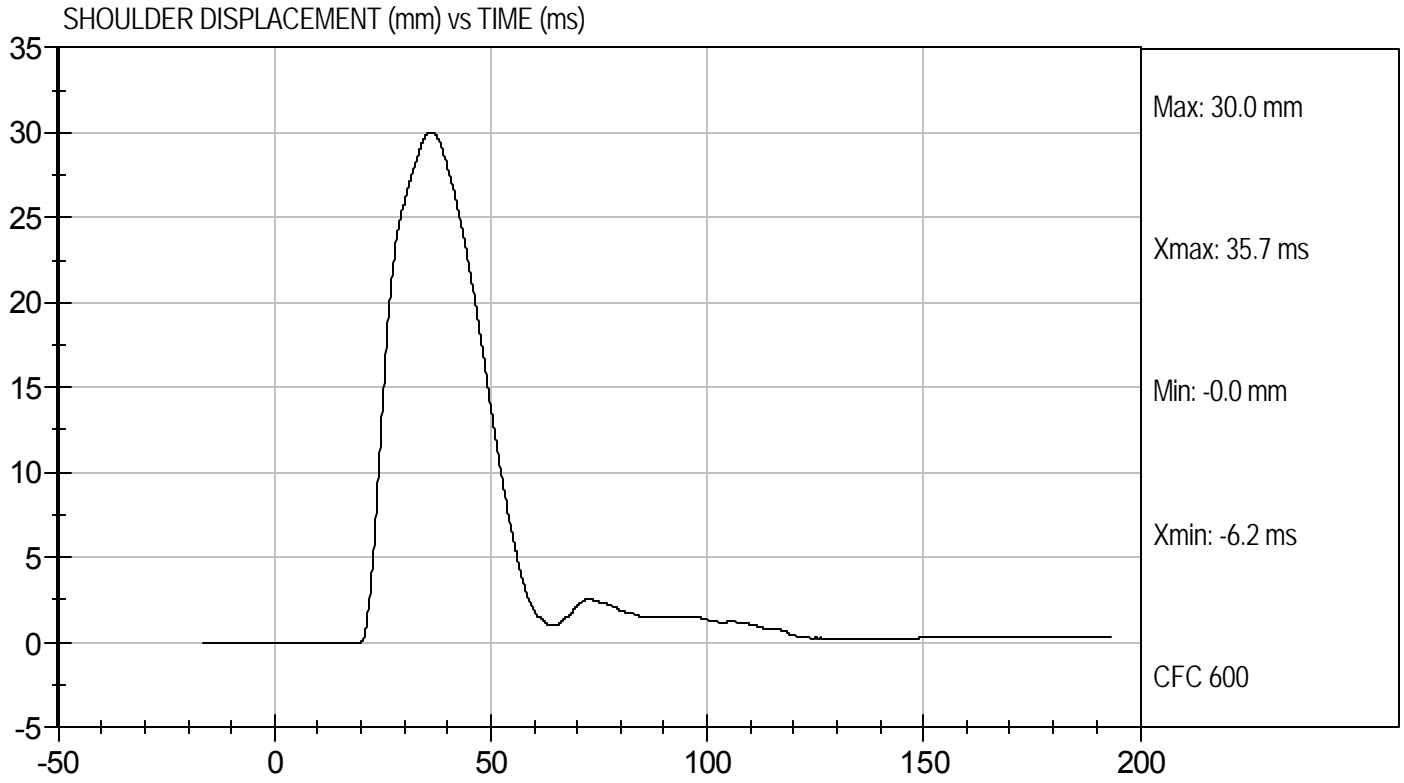
*David Winkelbauer*  
 Approved By



Test Desc: Shoulder Impact  
Component ID: D104133

Test Date: 11/23/10  
Velocity: 14.37 ft/s, 4.38 m/s





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

ATD Serial No: 306

Test I.D: D104134

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.8	Pass
Humidity	%	10 to 70	21	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	32	Pass
Upper Rib Displacement	mm	25 to 32	27	Pass
Middle Rib Displacement	mm	30 to 36	31	Pass
Lower Rib Displacement	mm	32 to 38	33	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	43	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	33	Pass
Overall Test Results				Pass

Jessica Hall  
Laboratory Technician

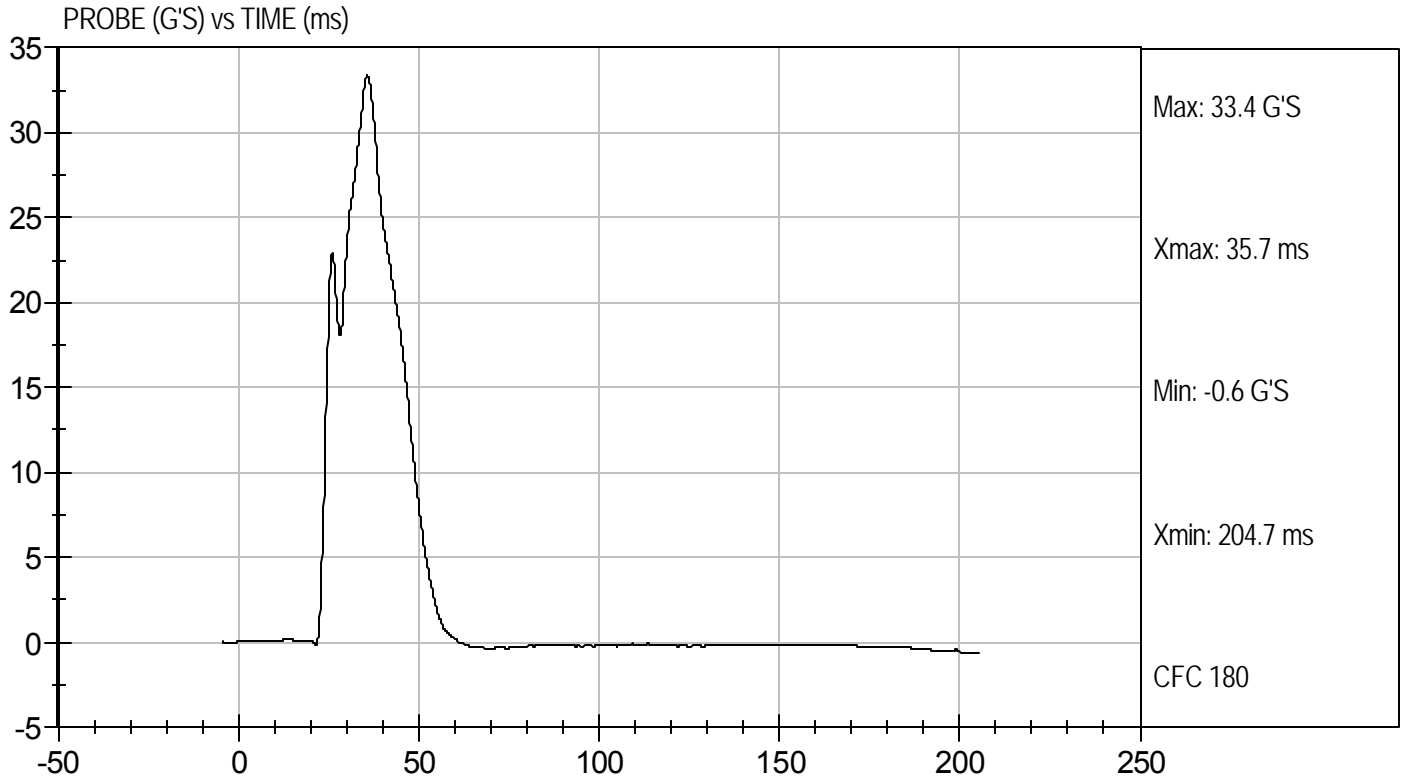
11/23/10  
Test Date

David Winkelbauer  
Approved By



Test Desc: Thorax With Arm  
Component ID: D104134

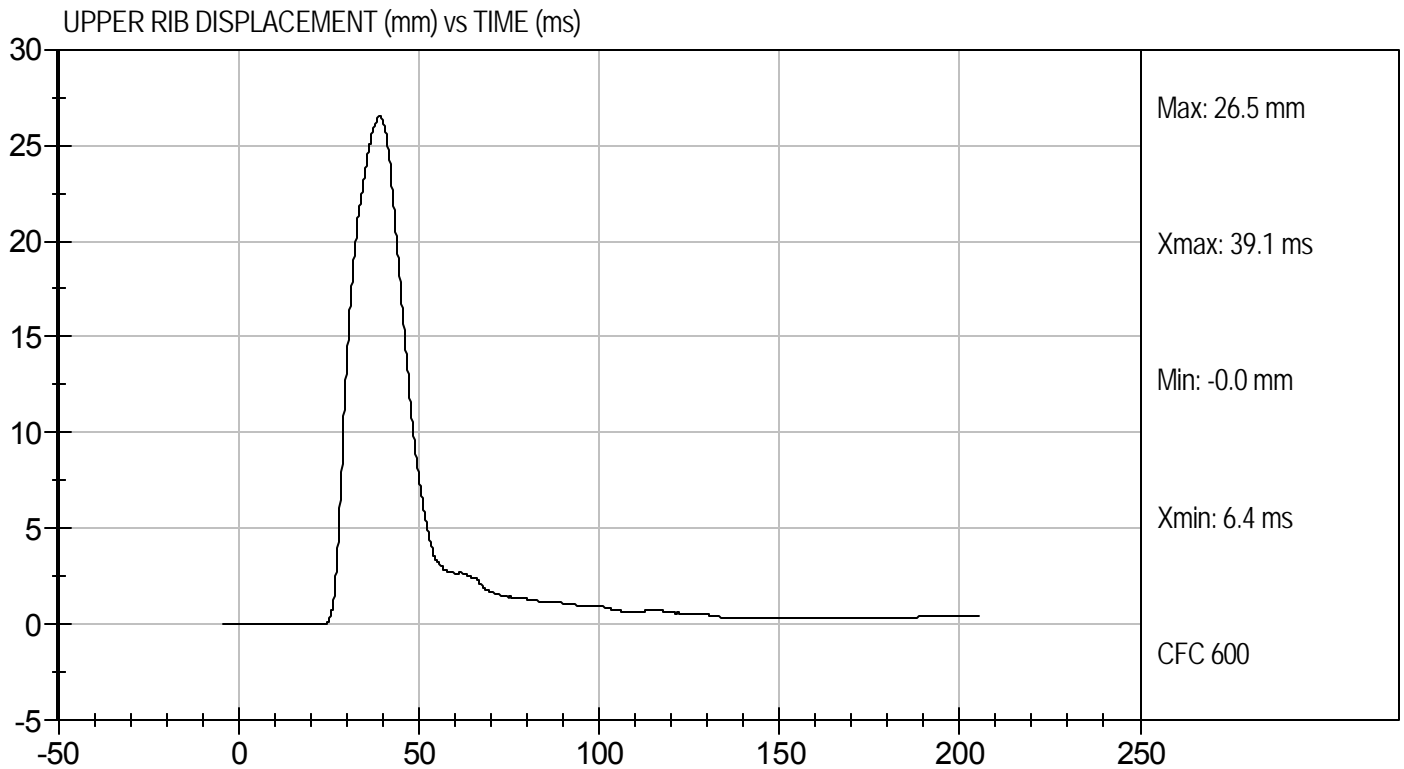
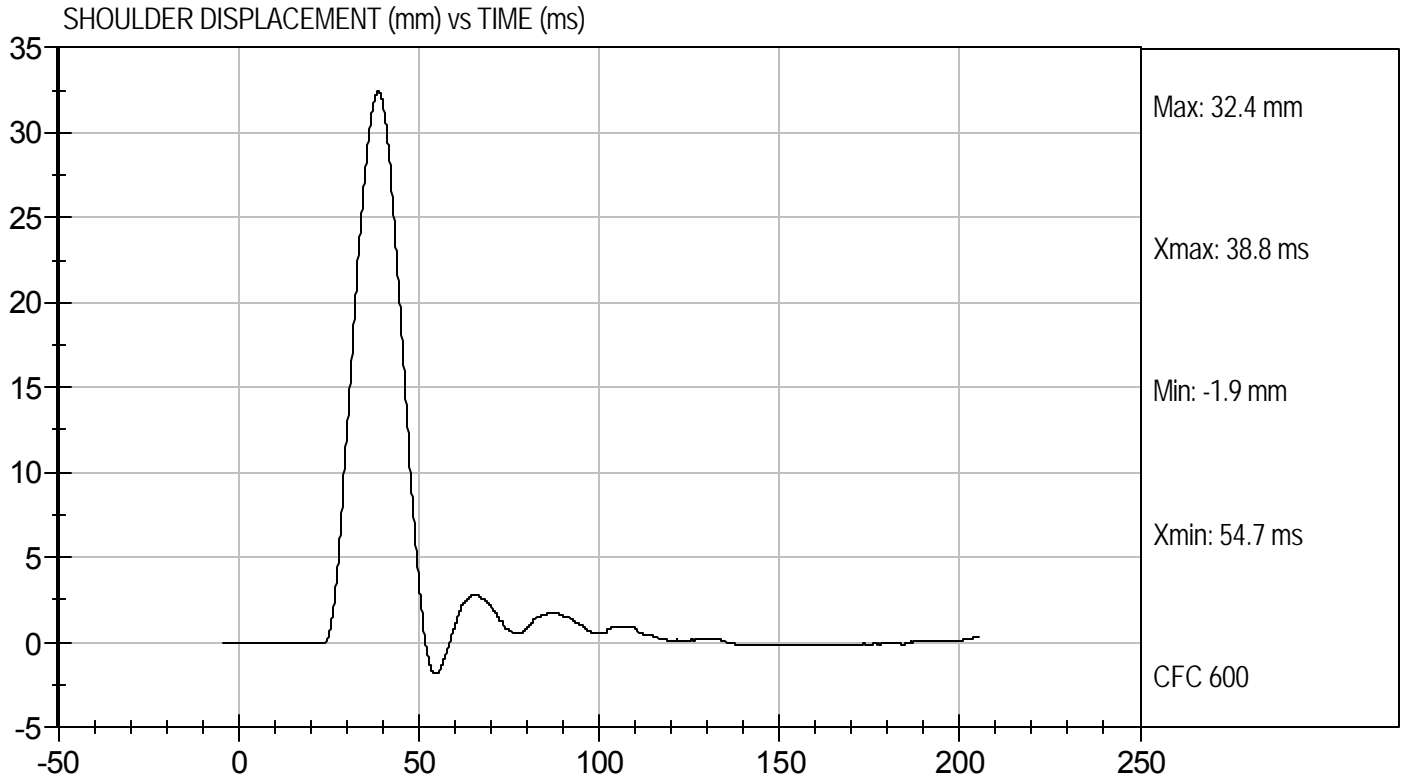
Test Date: 11/23/10  
Velocity: 22.22 ft/s, 6.77 m/s





Test Desc: Thorax With Arm  
Component ID: D104134

Test Date: 11/23/10  
Velocity: 22.22 ft/s, 6.77 m/s

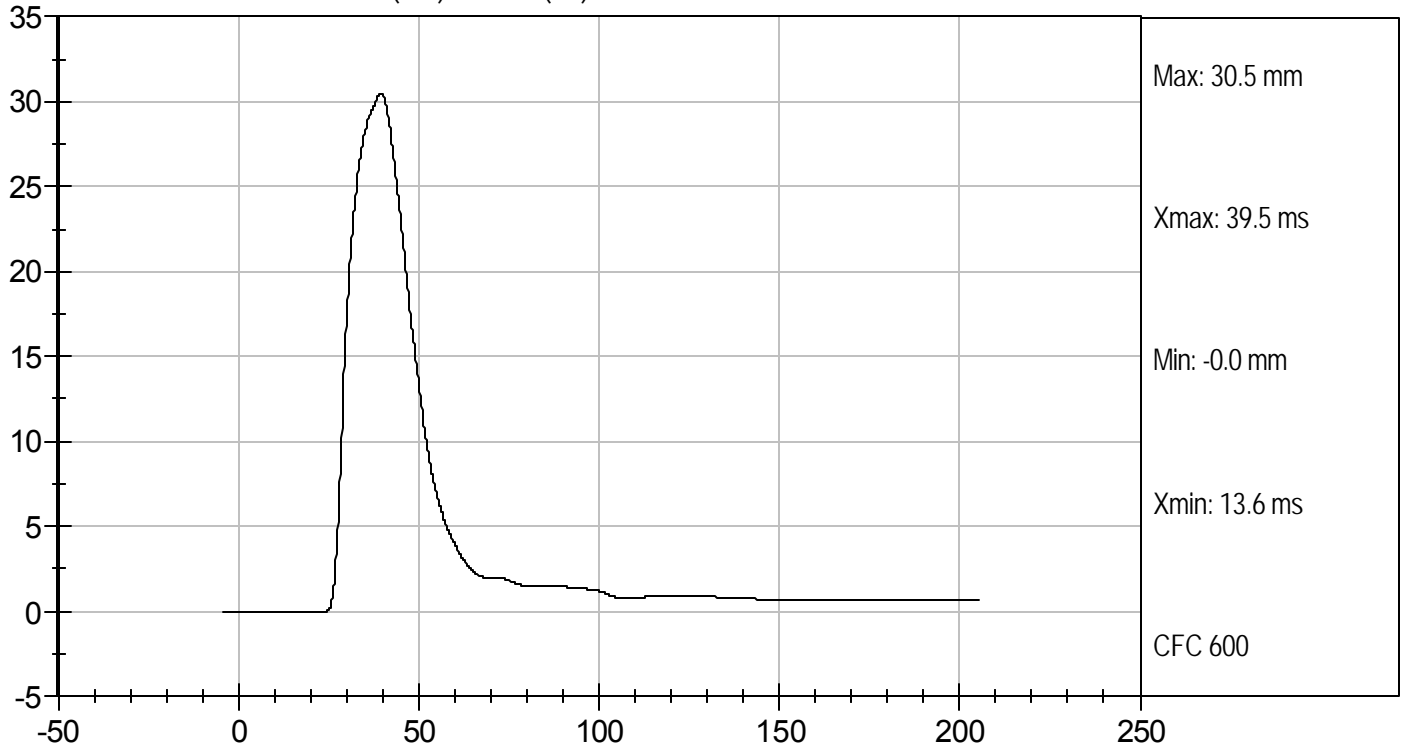




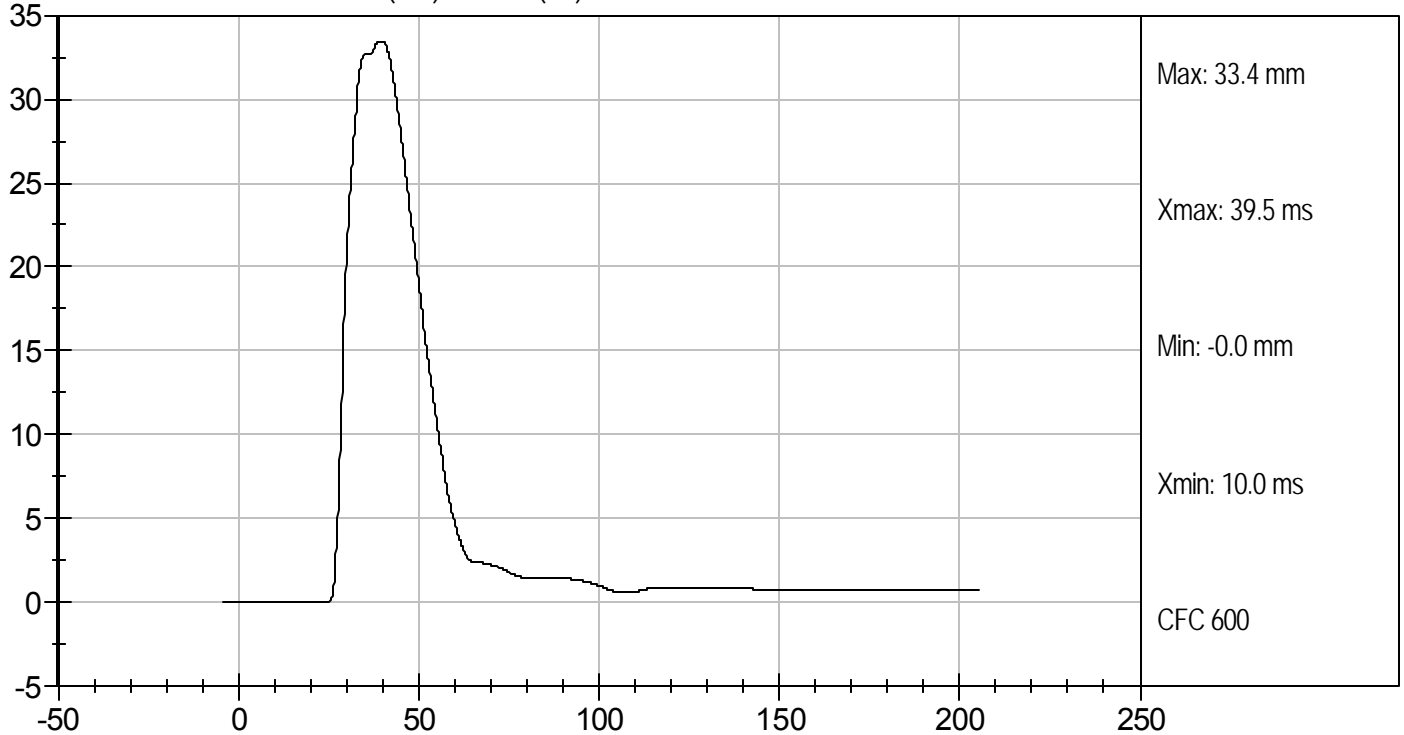
Test Desc: Thorax With Arm  
Component ID: D104134

Test Date: 11/23/10  
Velocity: 22.22 ft/s, 6.77 m/s

MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



LOWER RIB DISPLACEMENT (mm) vs TIME (ms)

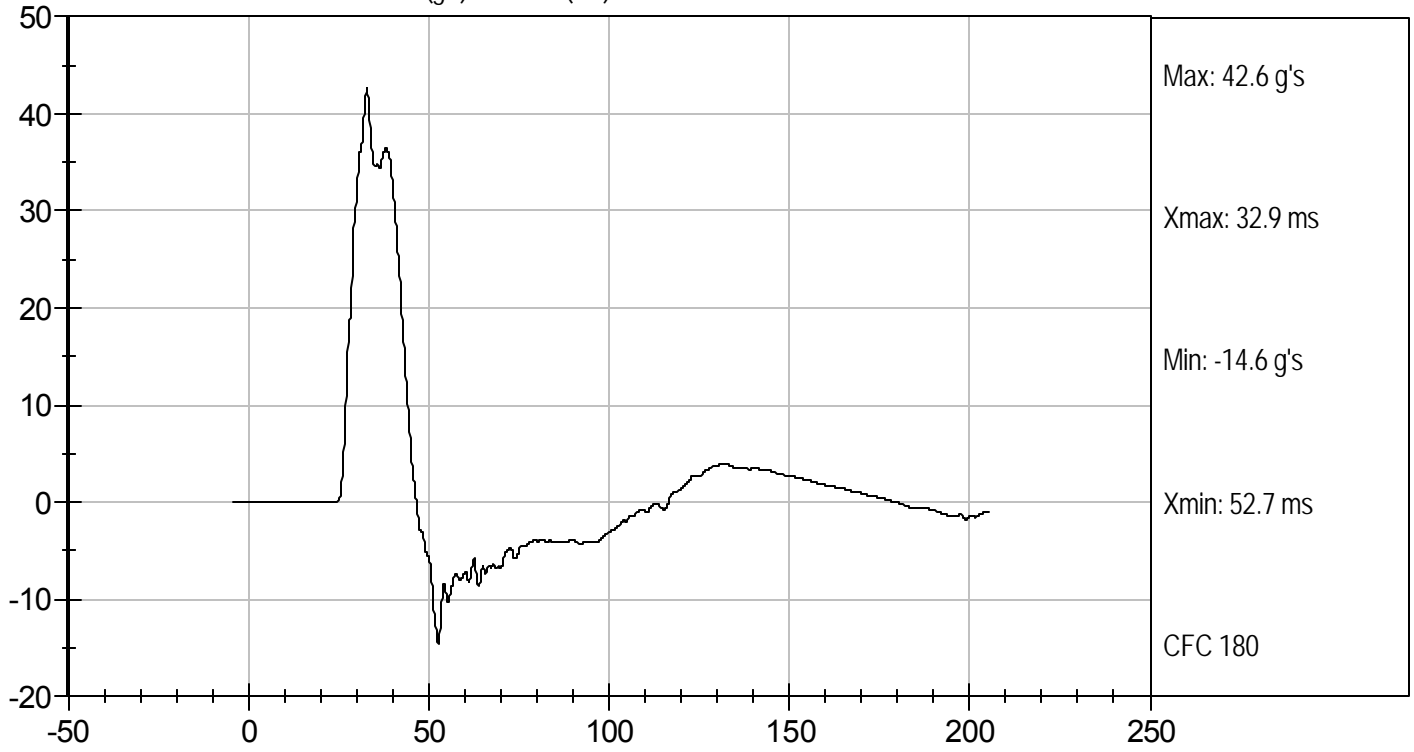




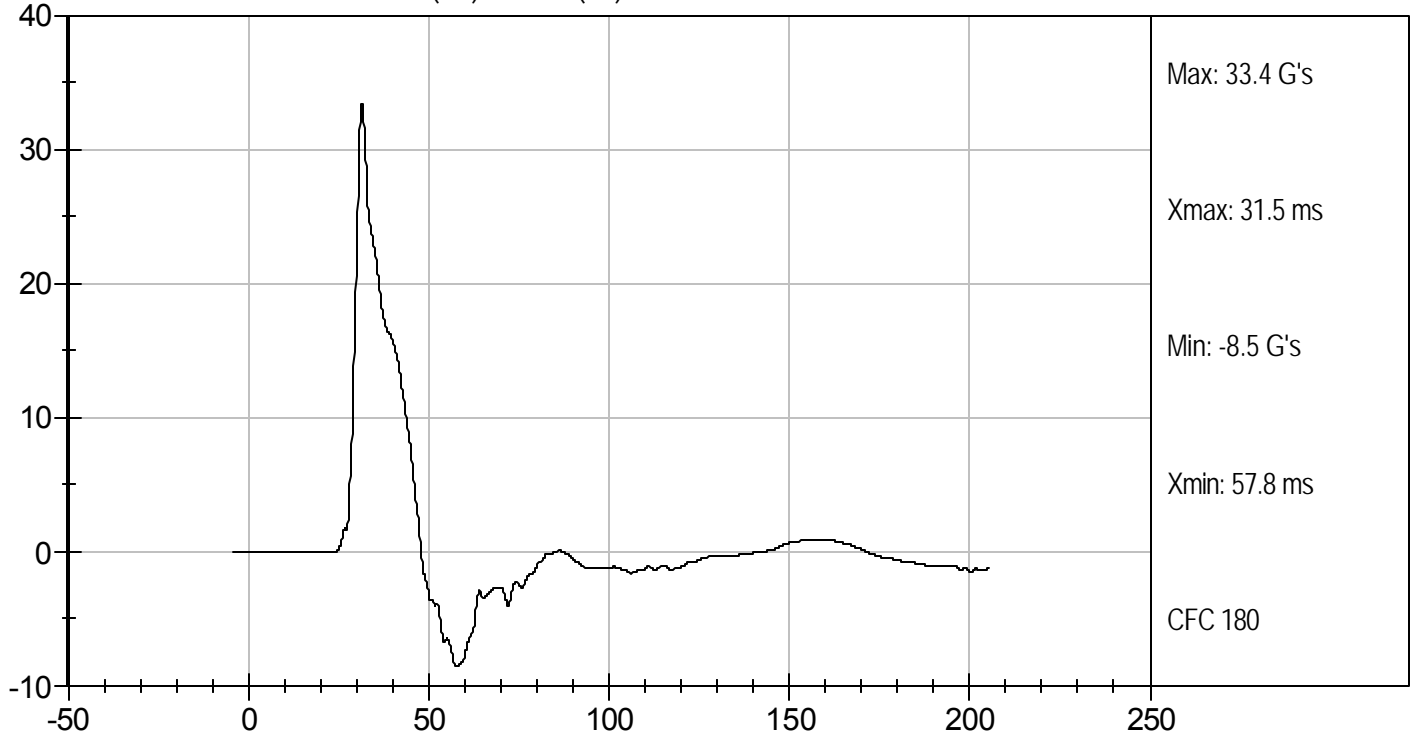
Test Desc: Thorax With Arm  
Component ID: D104134

Test Date: 11/23/10  
Velocity: 22.22 ft/s, 6.77 m/s

UPPER SPINE ACCELERATION (g's) vs TIME (ms)



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



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

ATD Serial No: 306

Test I.D: D104135

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.8	Pass
Humidity	%	10 to 70	21	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Peak Impactor Force	G's	14 to 18	16	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	40	Pass
Upper Spine (T1) Y Acceleration	G's	13 to 17	16	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	9	Pass
Overall Test Results				Pass

Jessica Gall  
 Laboratory Technician

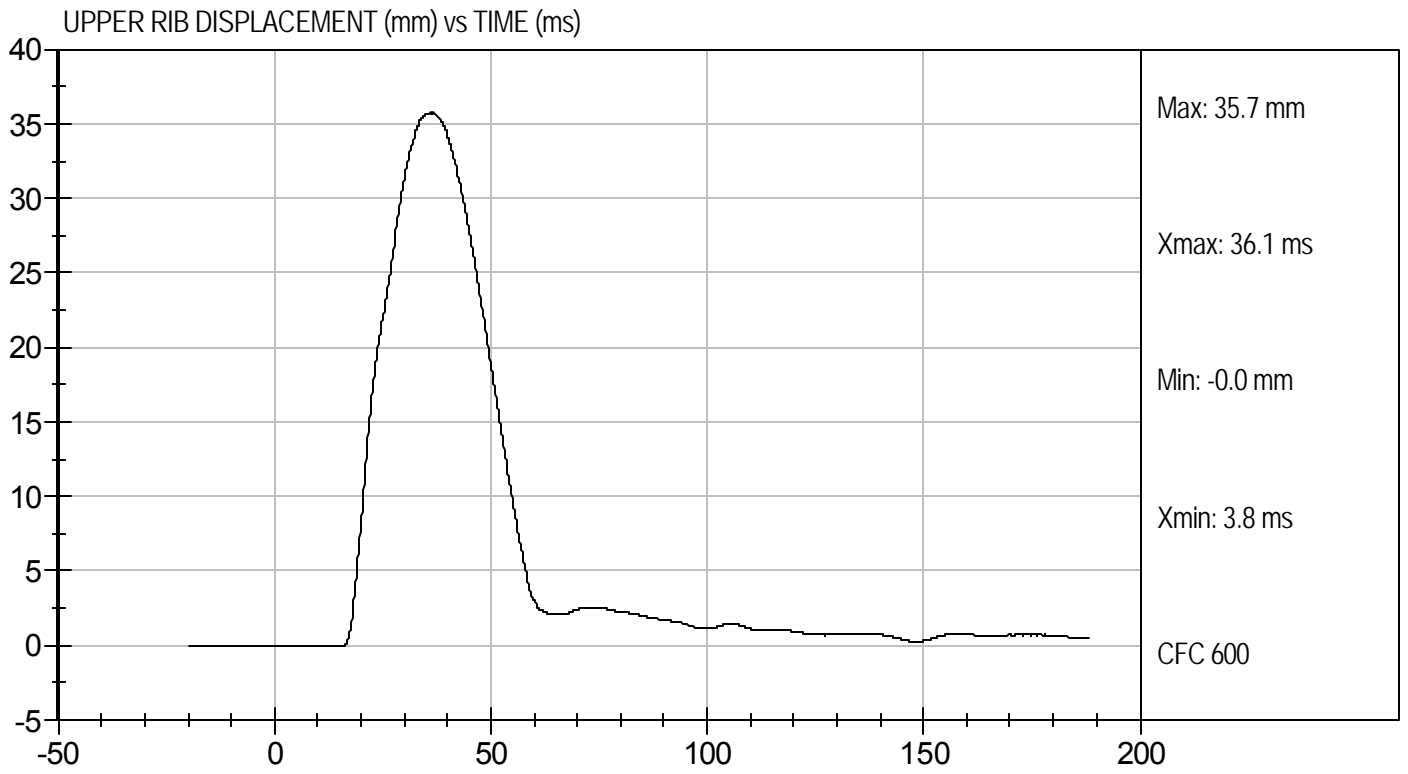
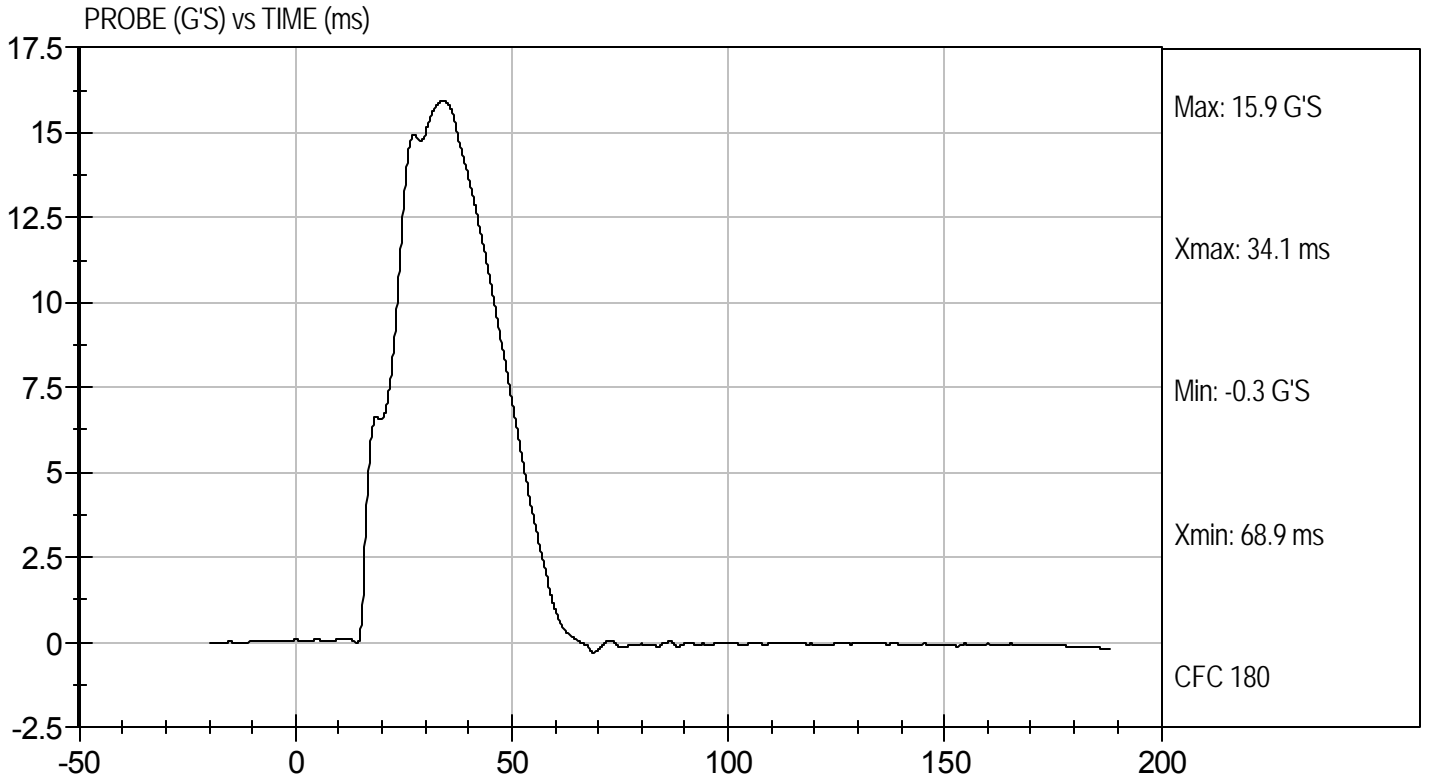
11/23/10  
 Test Date

David Winkelbauer  
 Approved By



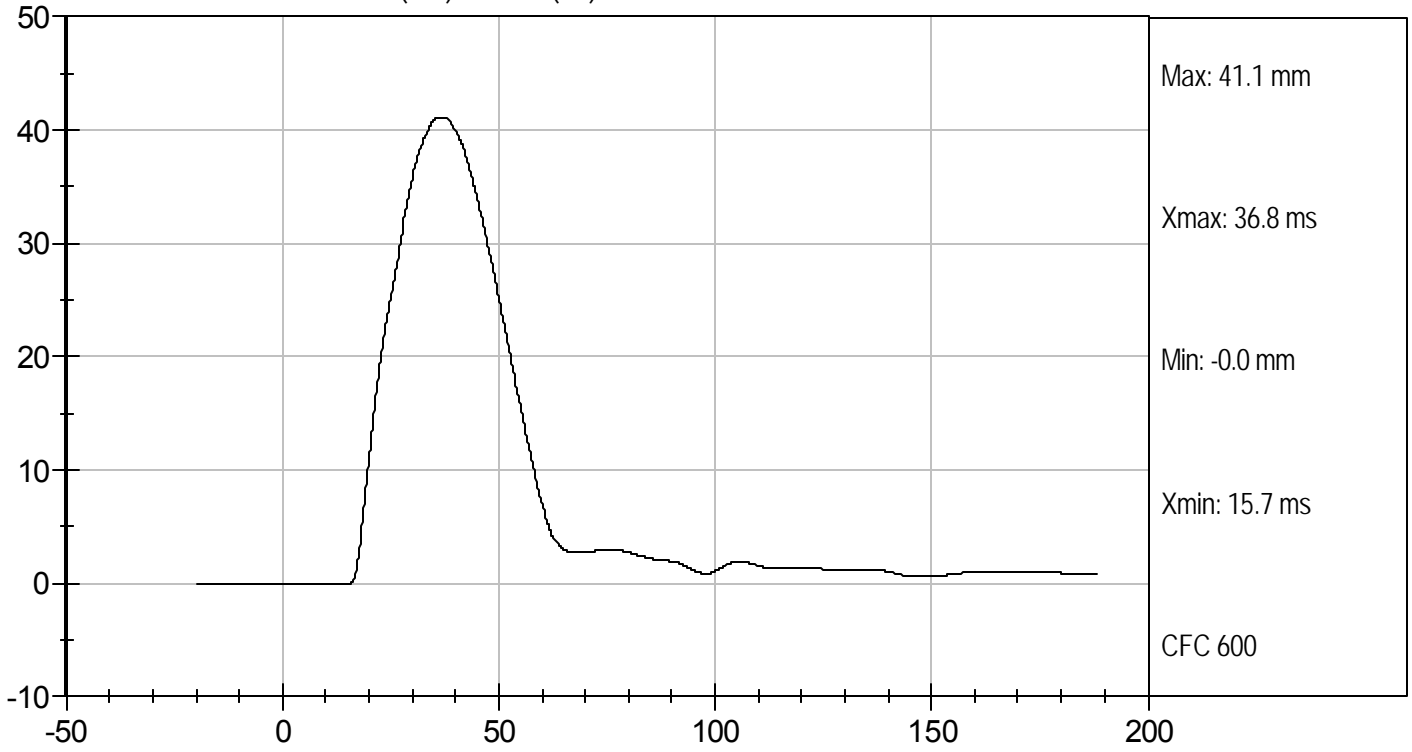
Test Desc: Thorax Without Arm  
Component ID: D104135

Test Date: 11/23/10  
Velocity: 14.37 ft/s, 4.38 m/s

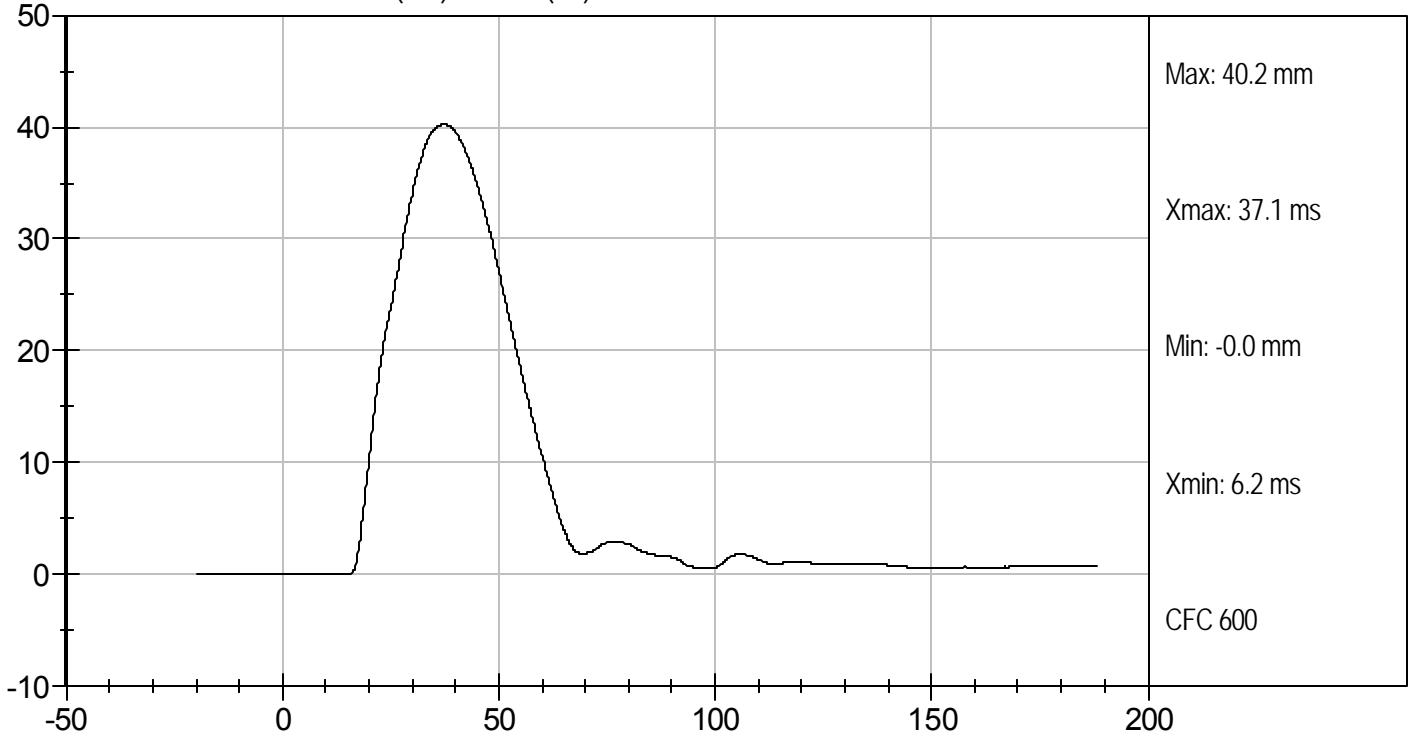




MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



LOWER RIB DISPLACEMENT (mm) vs TIME (ms)

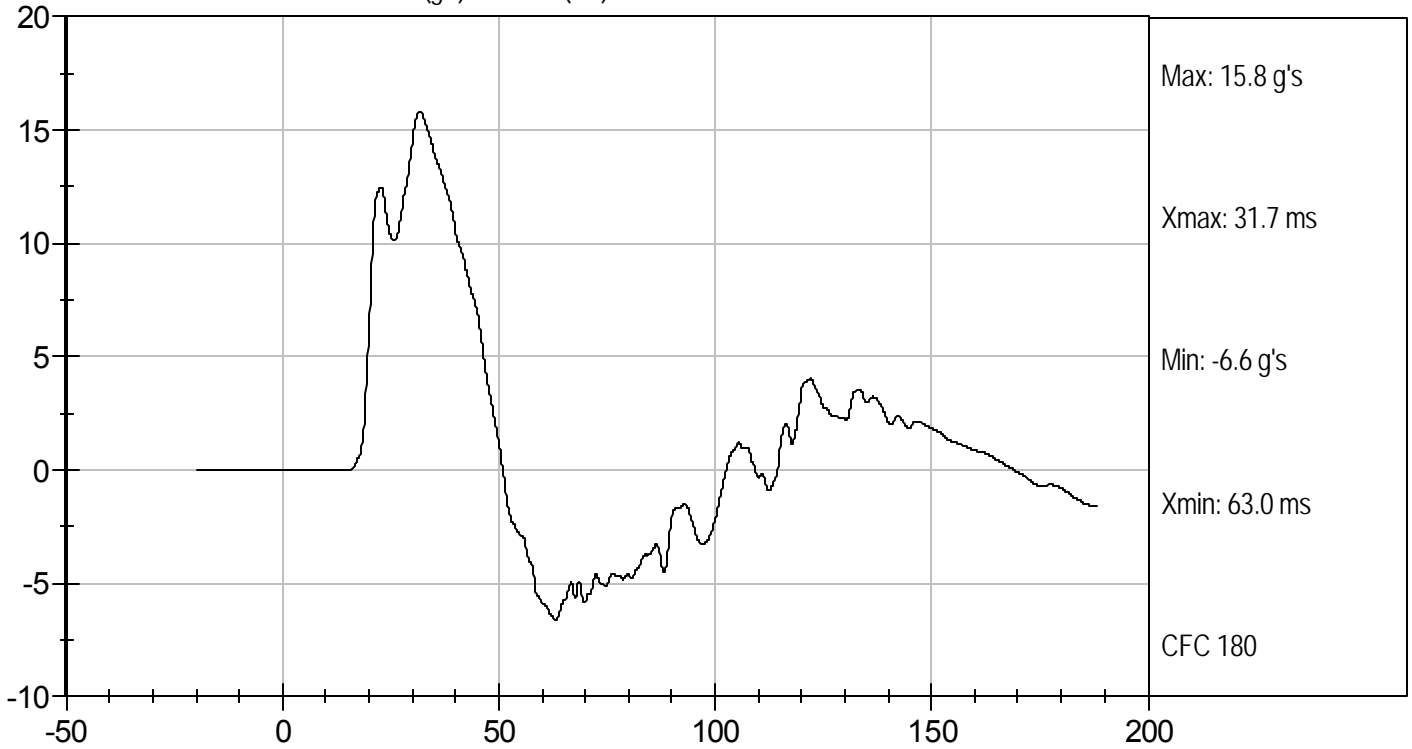




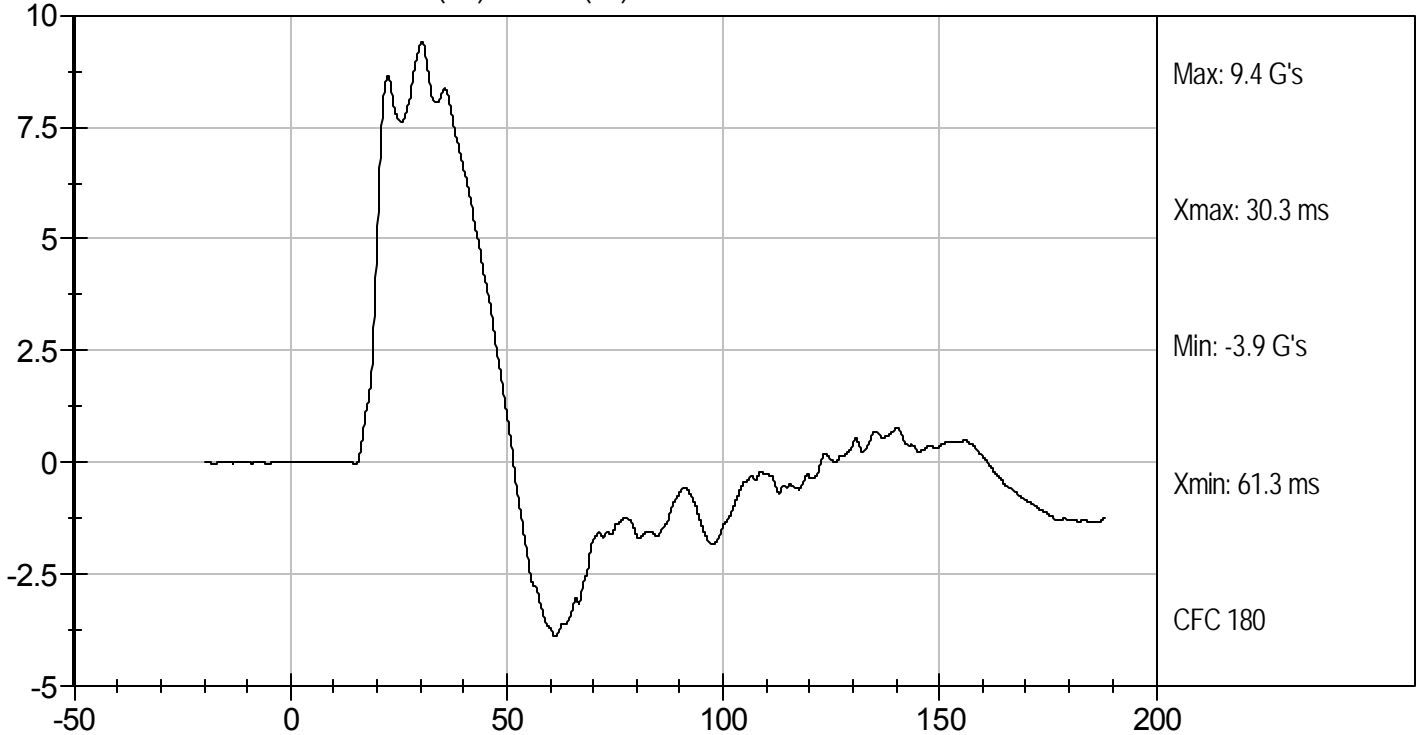
Test Desc: Thorax Without Arm  
Component ID: D104135

Test Date: 11/23/10  
Velocity: 14.37 ft/s, 4.38 m/s

UPPER SPINE ACCELERATION (g's) vs TIME (ms)



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



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

ATD Serial No: 306

Test I.D: D104136

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.4	Pass
Humidity	%	10 to 70	23	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Peak Impactor Acceleration	G's	12 to 16	15	Pass
Upper Rib Displacement	mm	36 to 47	43	Pass
Lower Rib Displacement	mm	33 to 44	33	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	11	Pass
Overall Test Results				Pass

Jessica Hall  
Laboratory Technician

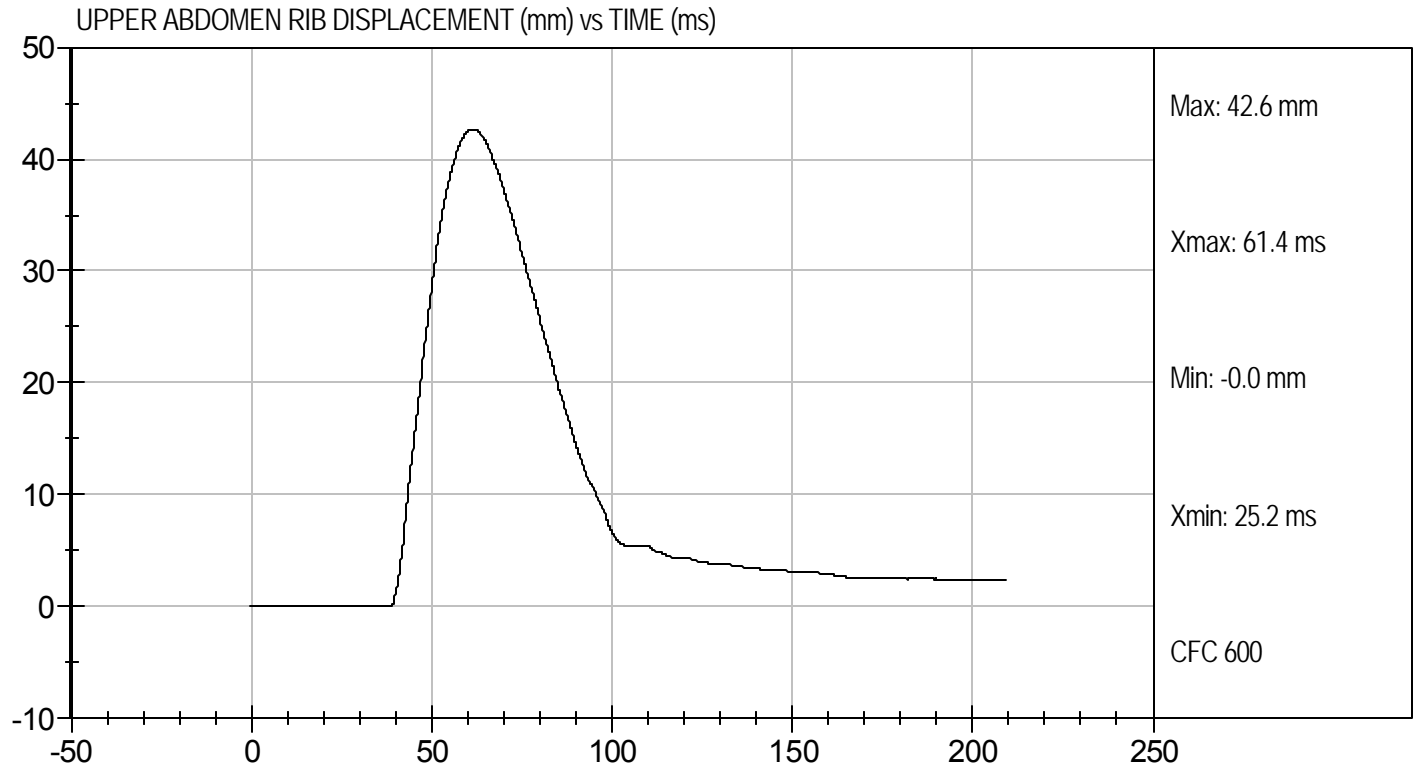
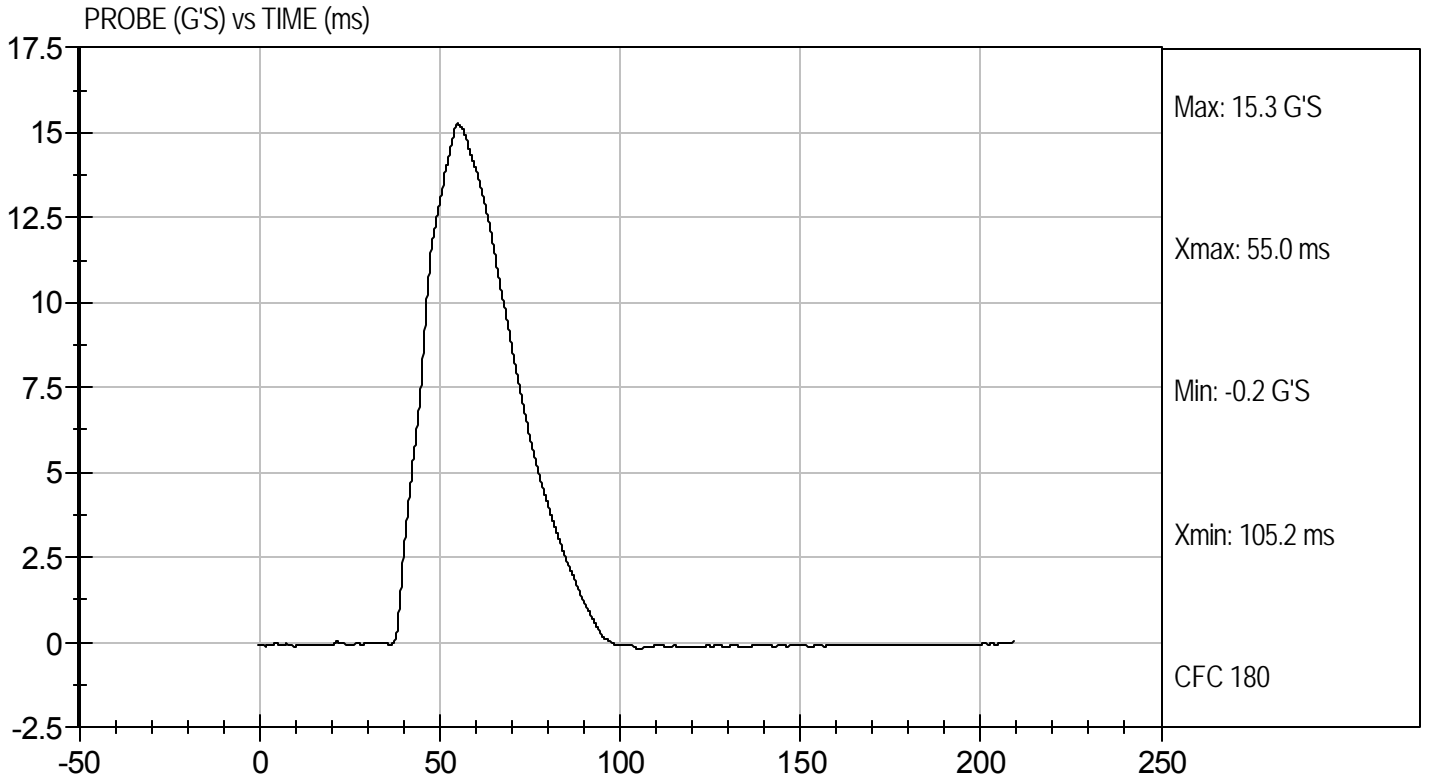
11/23/10  
Test Date

David Winkelbauer  
Approved By



Test Desc: Abdomen Impact  
Component ID: D104136

Test Date: 11/23/10  
Velocity: 14.37 ft/s, 4.38 m/s

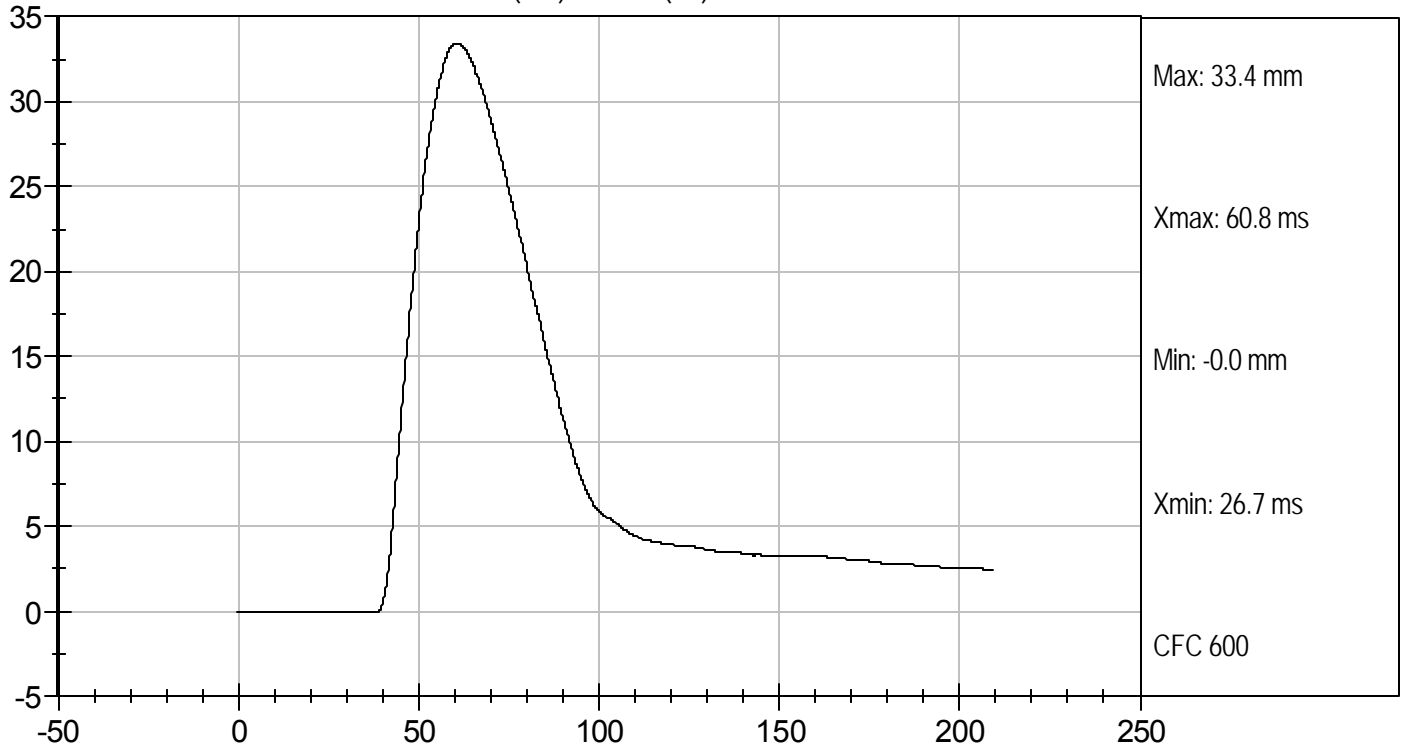




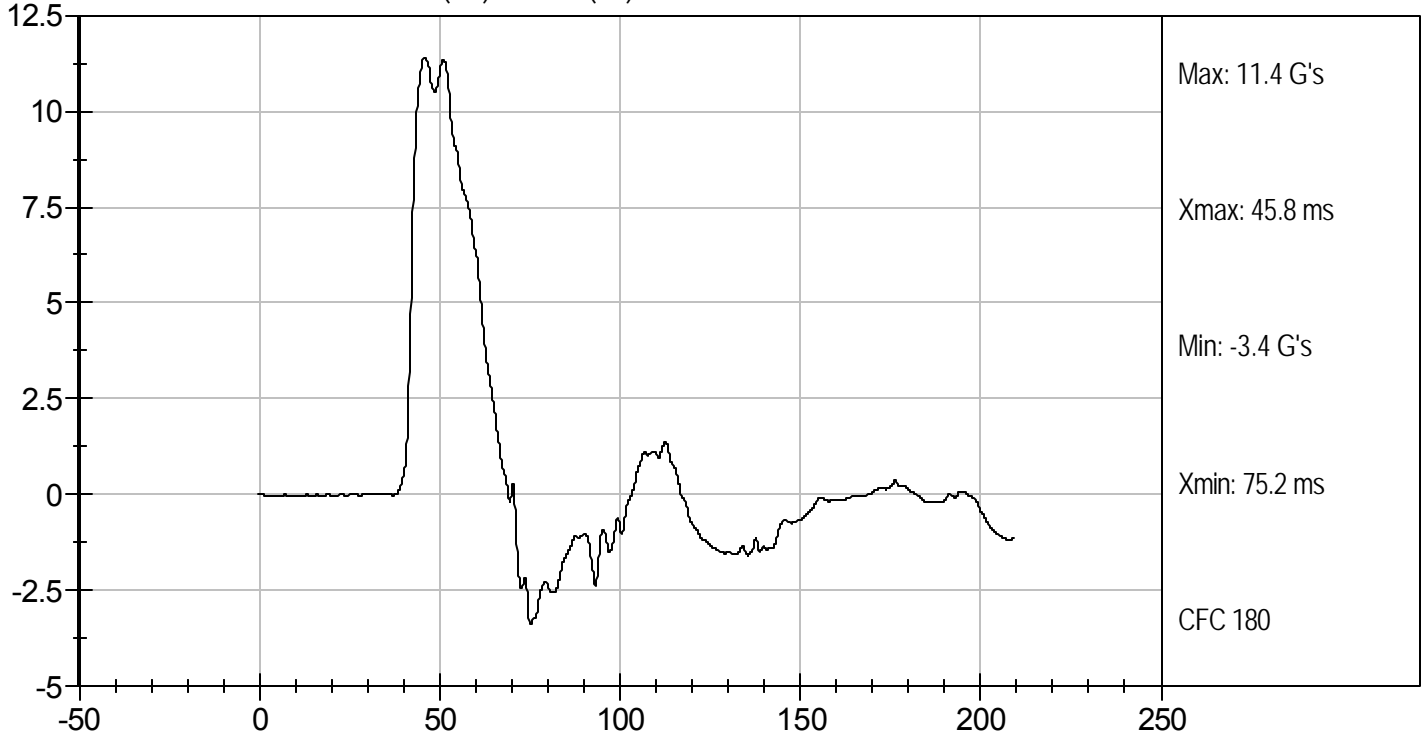
Test Desc: Abdomen Impact  
Component ID: D104136

Test Date: 11/23/10  
Velocity: 14.37 ft/s, 4.38 m/s

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



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



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

ATD Serial No: 306

Test I.D: D104137

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.4	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	44	Pass
Pelvis Y Acceleration after 6 ms	G's	34 to 42	42	Pass
Peak Acetabulum Force	N	3600 to 4300	4132	Pass
Overall Test Results				Pass

  
 Laboratory Technician

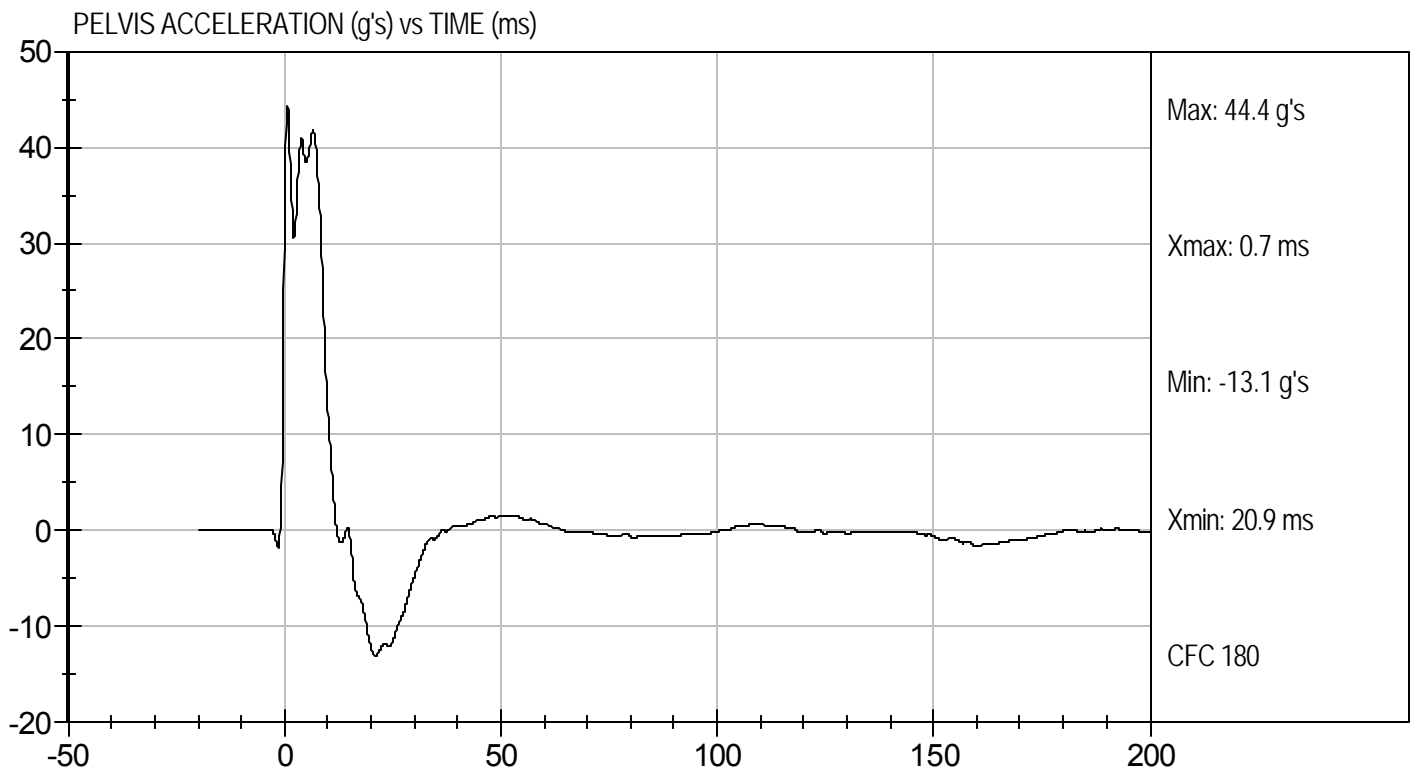
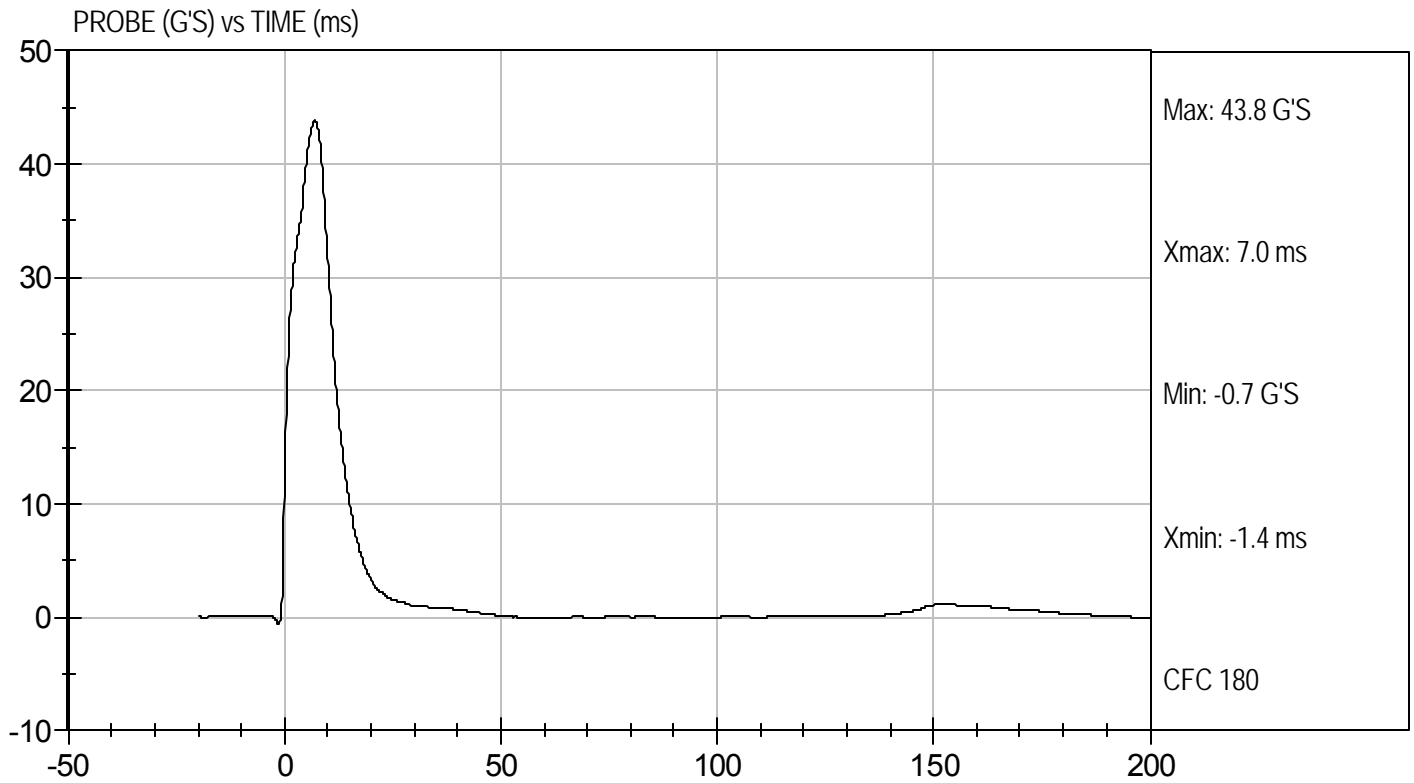
11/23/10  
 Test Date

  
 Approved By



Test Desc: Pelvis Impact  
Component ID: D104137

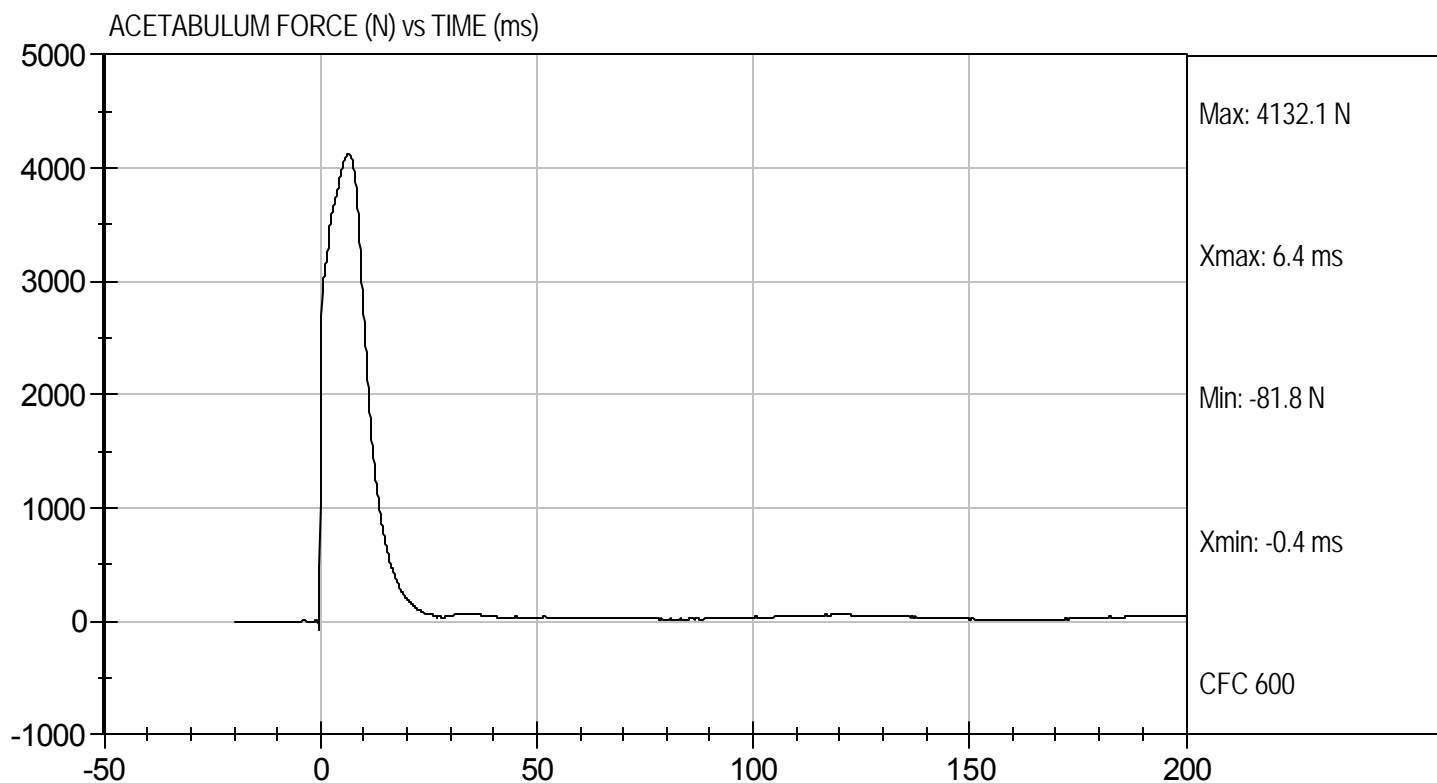
Test Date: 11/23/10  
Velocity: 21.90 ft/s, 6.68 m/s





Test Desc: Pelvis Impact  
Component ID: D104137

Test Date: 11/23/10  
Velocity: 21.90 ft/s, 6.68 m/s



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

ATD Serial No: 306

Test I.D: D104138

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.6	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	41	Pass
Pelvis Y Acceleration	G's	28 to 39	32	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	5048	Pass
Overall Test Results				Pass

Jessica Hall  
 Laboratory Technician

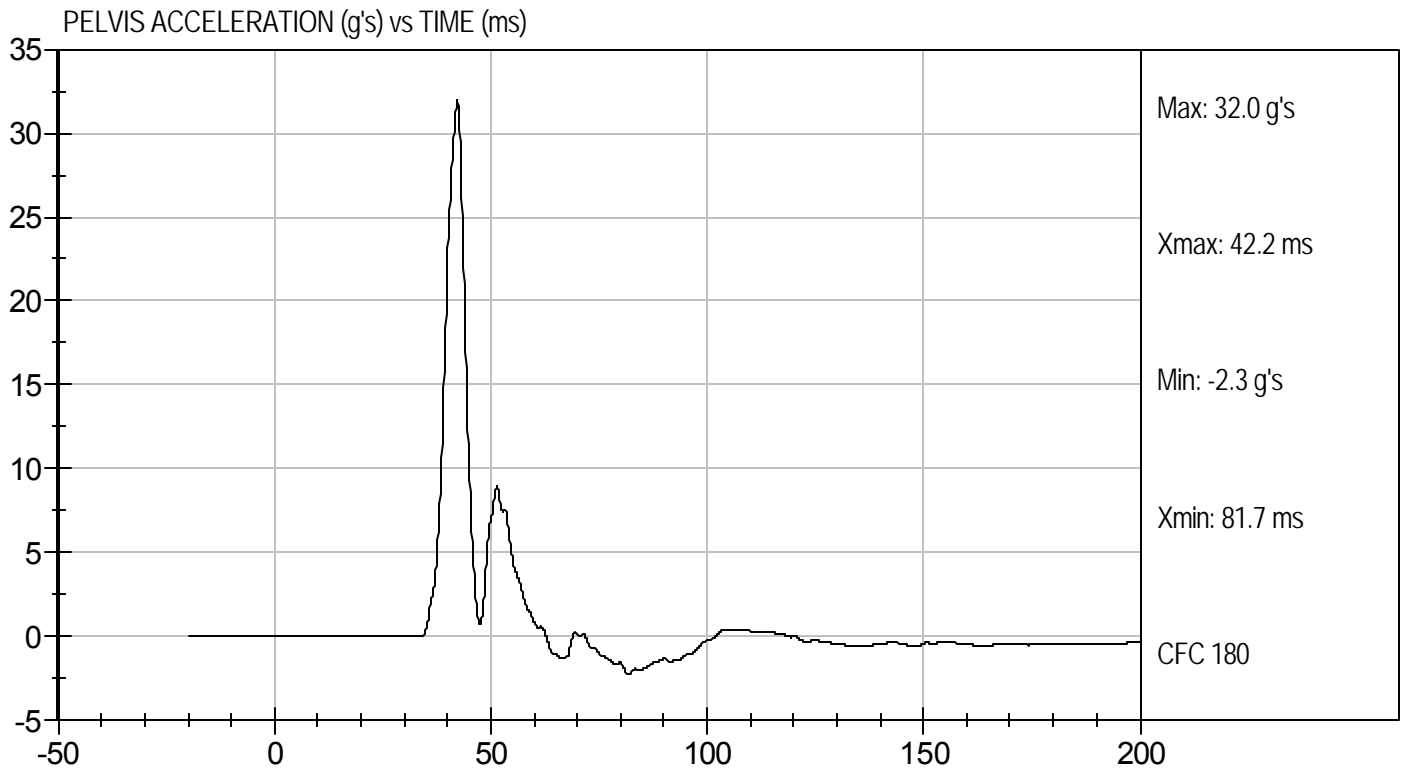
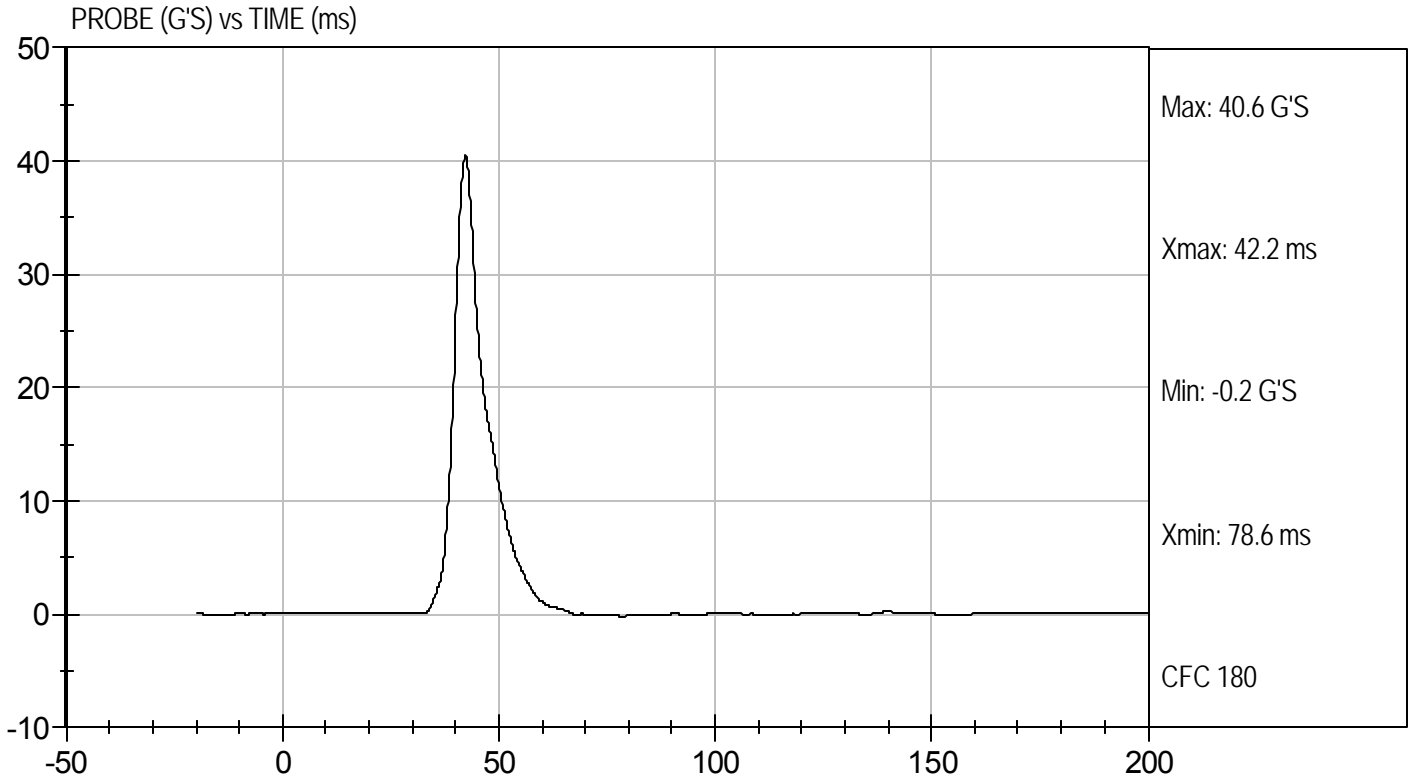
11/23/10  
 Test Date

David Winkelbauer  
 Approved By



Test Desc: Iliac Impact  
Component ID: D104138

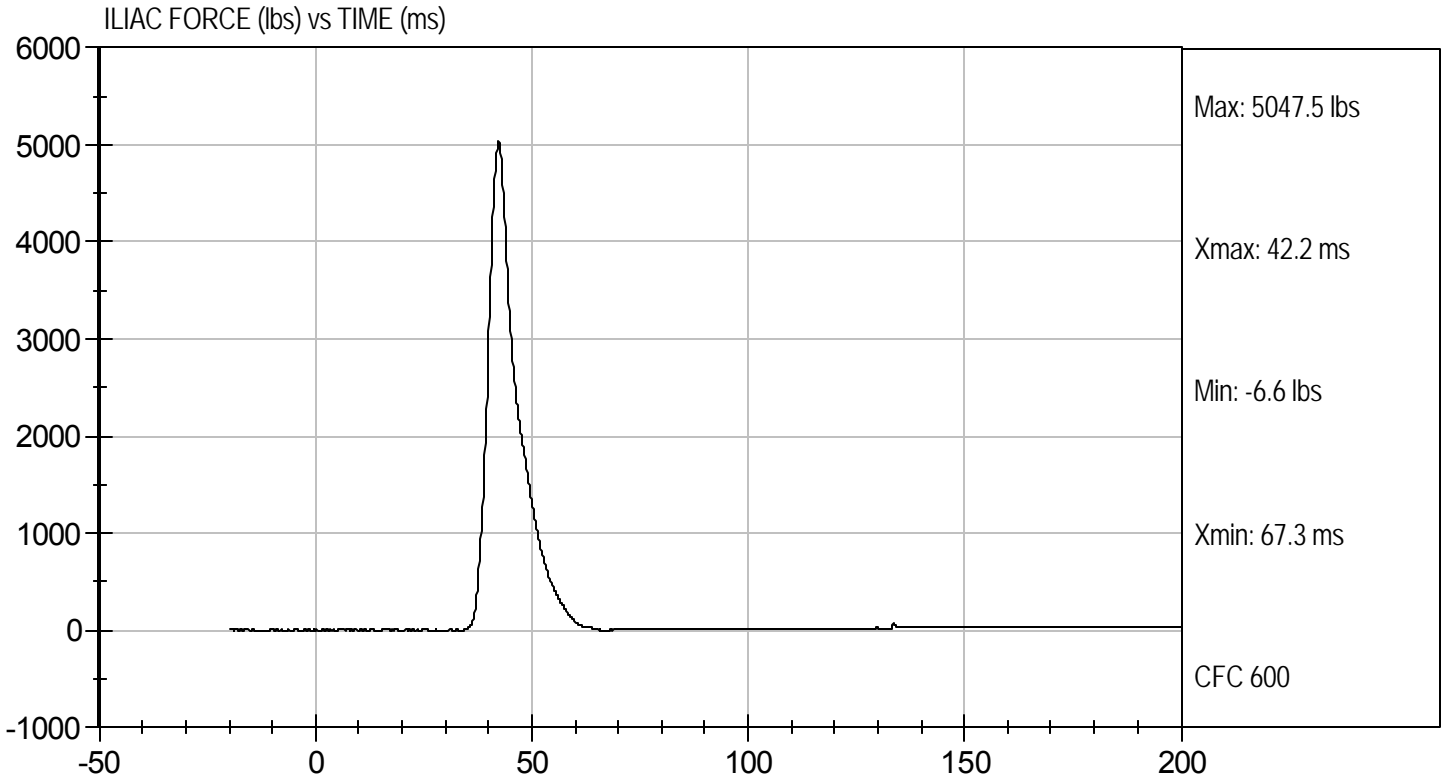
Test Date: 11/23/10  
Velocity: 14.37 ft/s, 4.38 m/s





Test Desc: Iliac Impact  
Component ID: D104138

Test Date: 11/23/10  
Velocity: 14.37 ft/s, 4.38 m/s



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

ATD Serial No: 306

Test ID: D104201

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	21	Pass
Peak Resultant Acceleration	G's	115 to 137	124	Pass
Peak Lateral Acceleration	G's	+/- 15	6.2	Pass
Unimodal	N/A	<15%	Yes	Pass
Overall Test Results				Pass

Jessica Hall  
Laboratory Technician

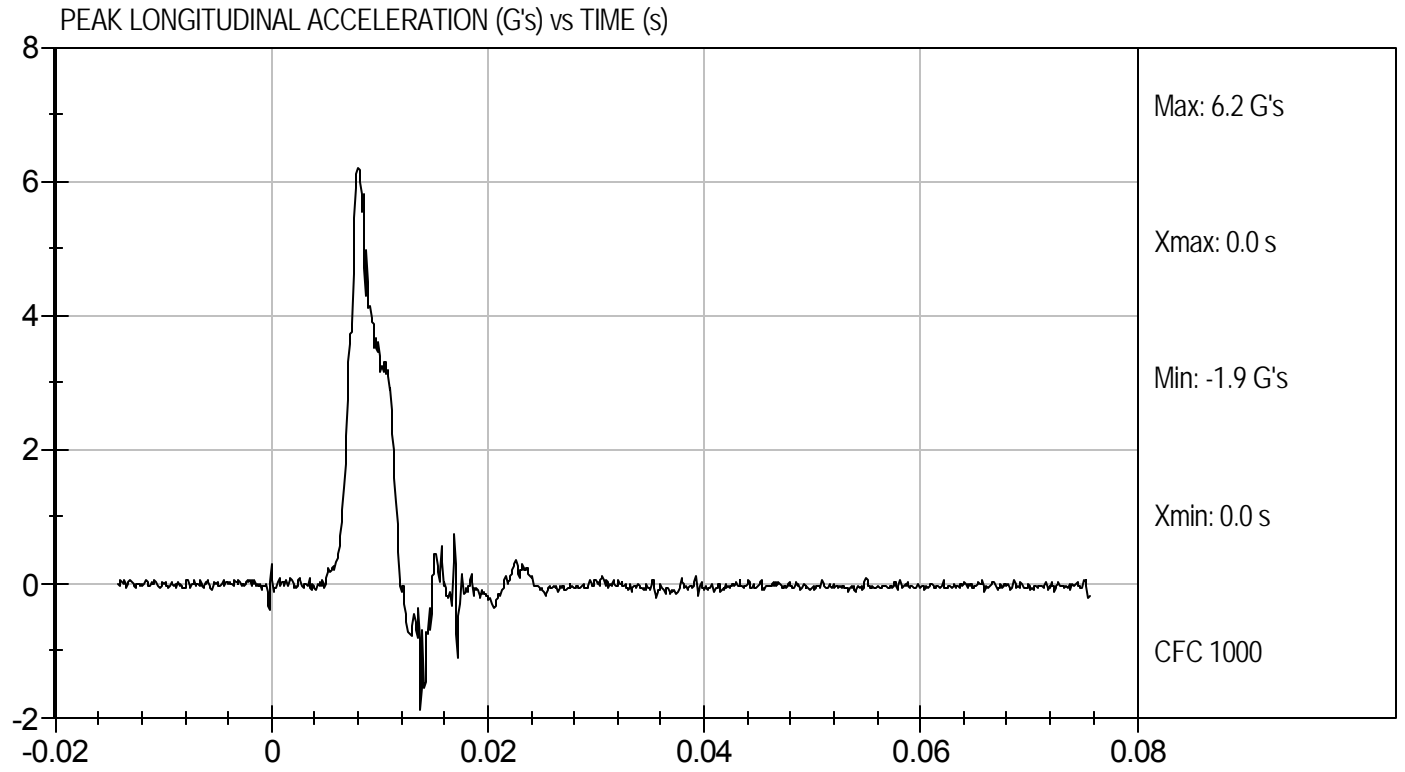
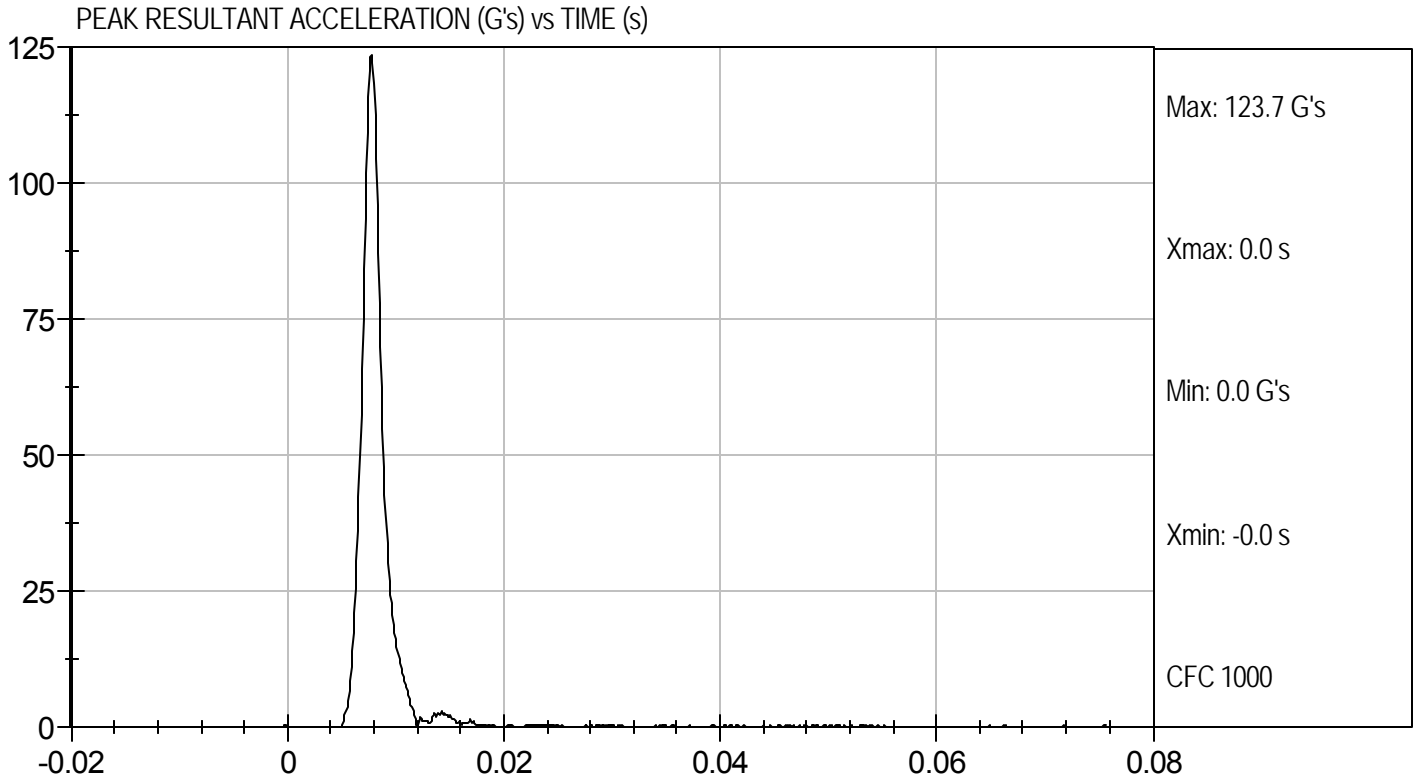
12/1/10  
Test Date

David Winkelbauer  
Approved By



Test Desc: Head Drop  
Component ID: D104201

Test Date: 12/1/10  
Velocity: 0 ft/s, 0 m/s



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

ATD Serial No: 306

Test I.D.: D104202

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	21.8	Pass
Humidity		%	10 to 70	20	Pass
Impact Velocity		m/s	5.51 to 5.63	5.52	Pass
Delta Velocity	10 ms	m/s	2.20 to 2.80	2.43	Pass
	15 ms	m/s	3.30 to 4.10	3.38	Pass
	20 ms	m/s	4.40 to 5.40	4.47	Pass
	25 ms	m/s	5.40 to 6.10	5.43	Pass
	25-100 ms	m/s	5.50 to 6.20	5.69	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	-41	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	119	Pass
Overall Test Results					Pass

*Jessica Hall*  
Laboratory Technician

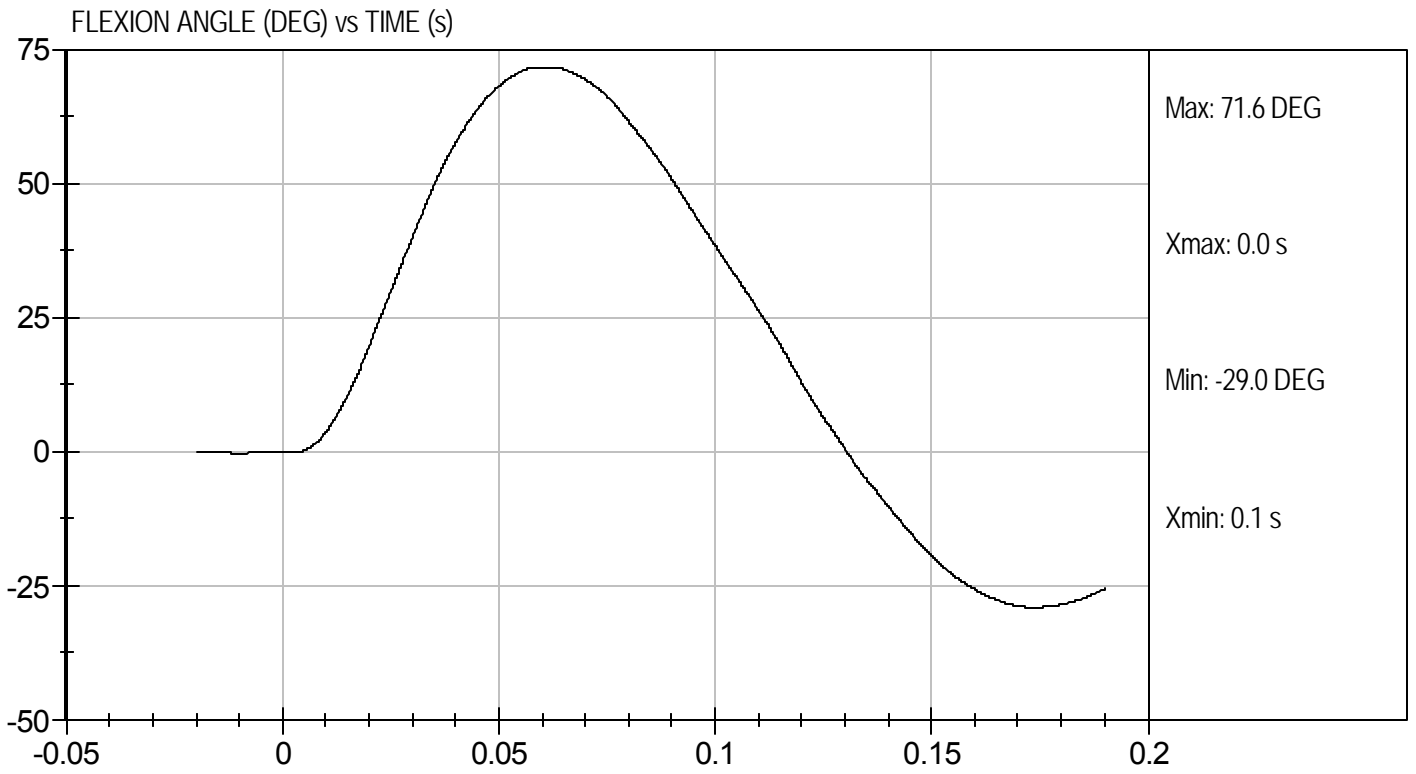
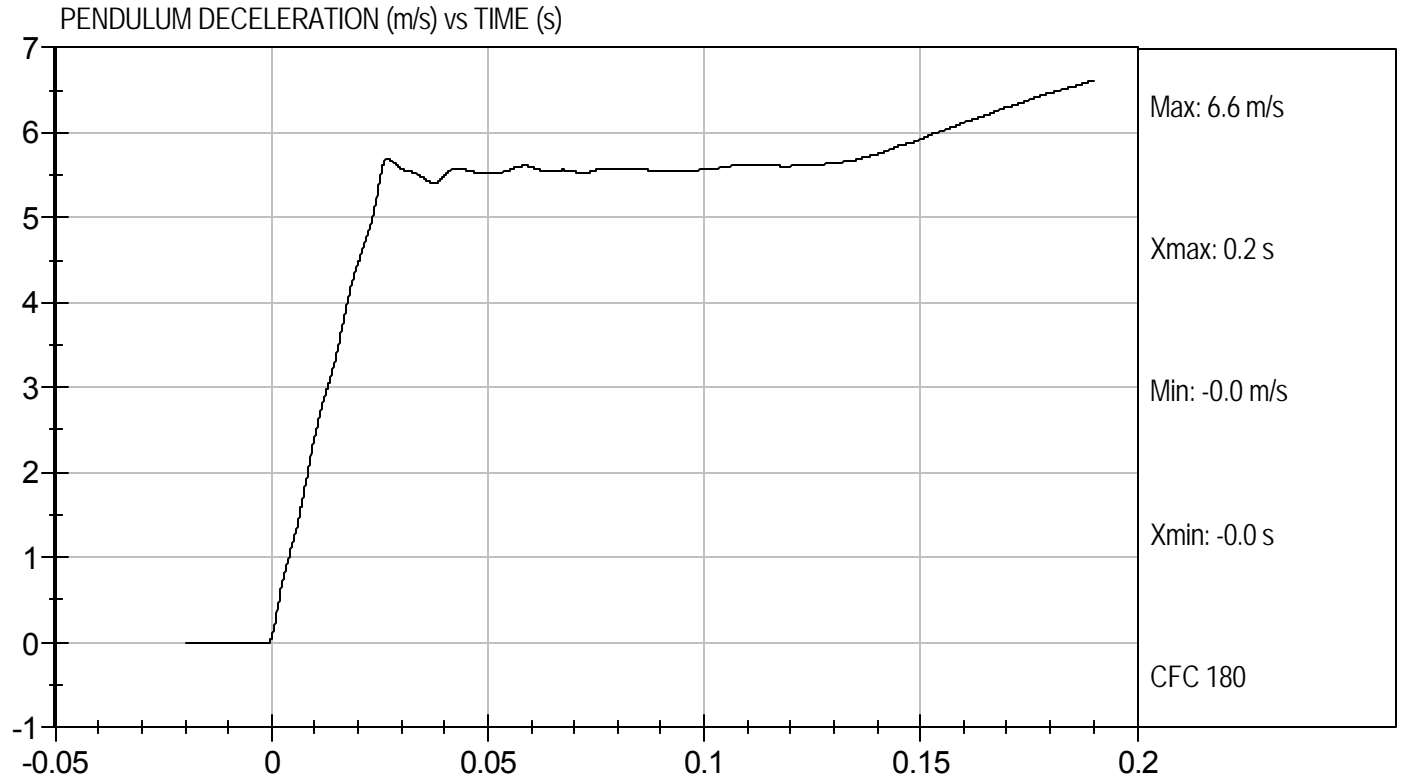
12/1/10  
Test Date

*David Winkelbauer*  
Approved By



Test Desc: Neck Bending  
Component ID: D104202

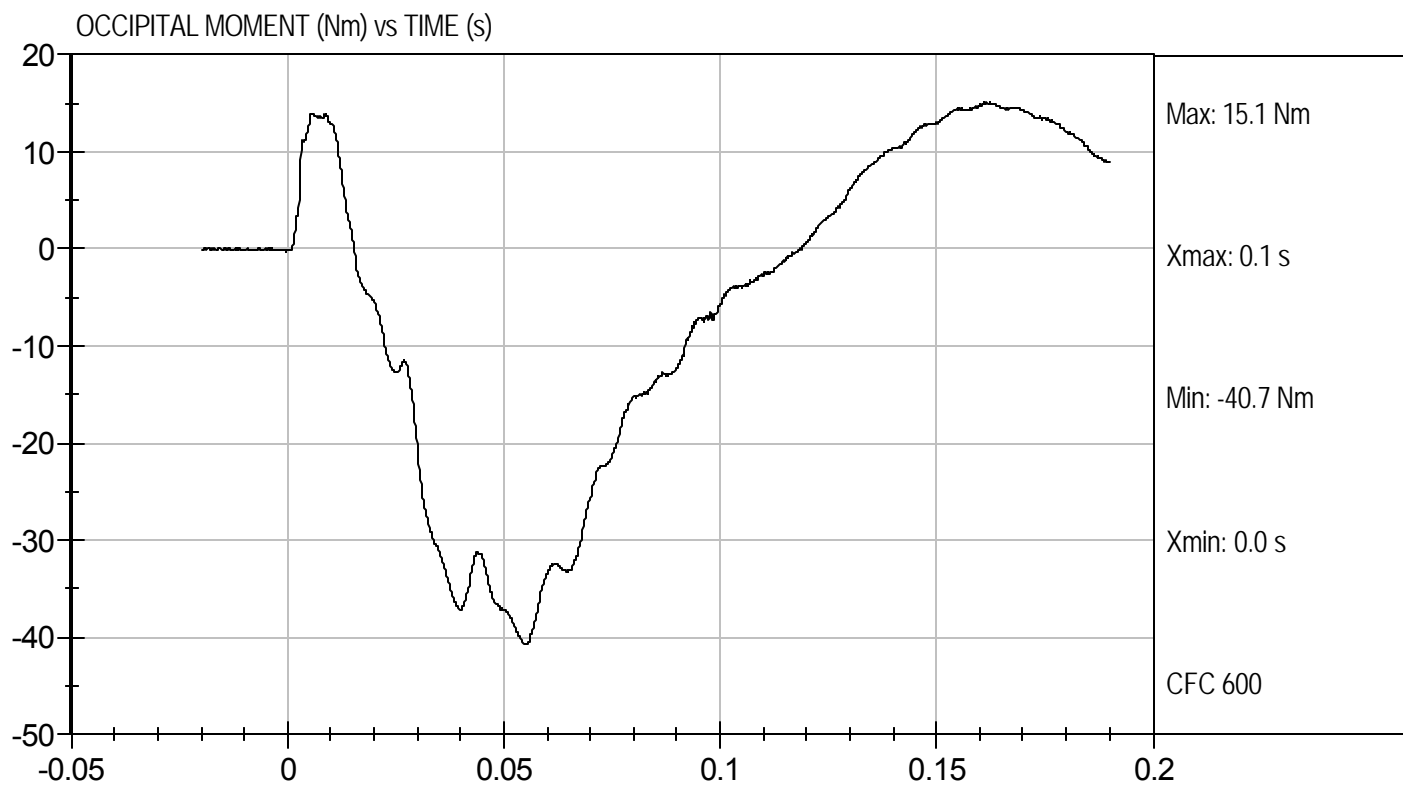
Test Date: 12/1/10  
Velocity: 18.12 ft/s, 5.52 m/s





Test Desc: Neck Bending  
Component ID: D104202

Test Date: 12/1/10  
Velocity: 18.12 ft/s, 5.52 m/s



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

ATD Serial No: 306

Test ID: D104203

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22.1	Pass
Laboratory Relative Humidity	%	10 to 70	18	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	30	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	19	Pass
Overall Test Results				Pass

Jessica Gall  
 Laboratory Technician

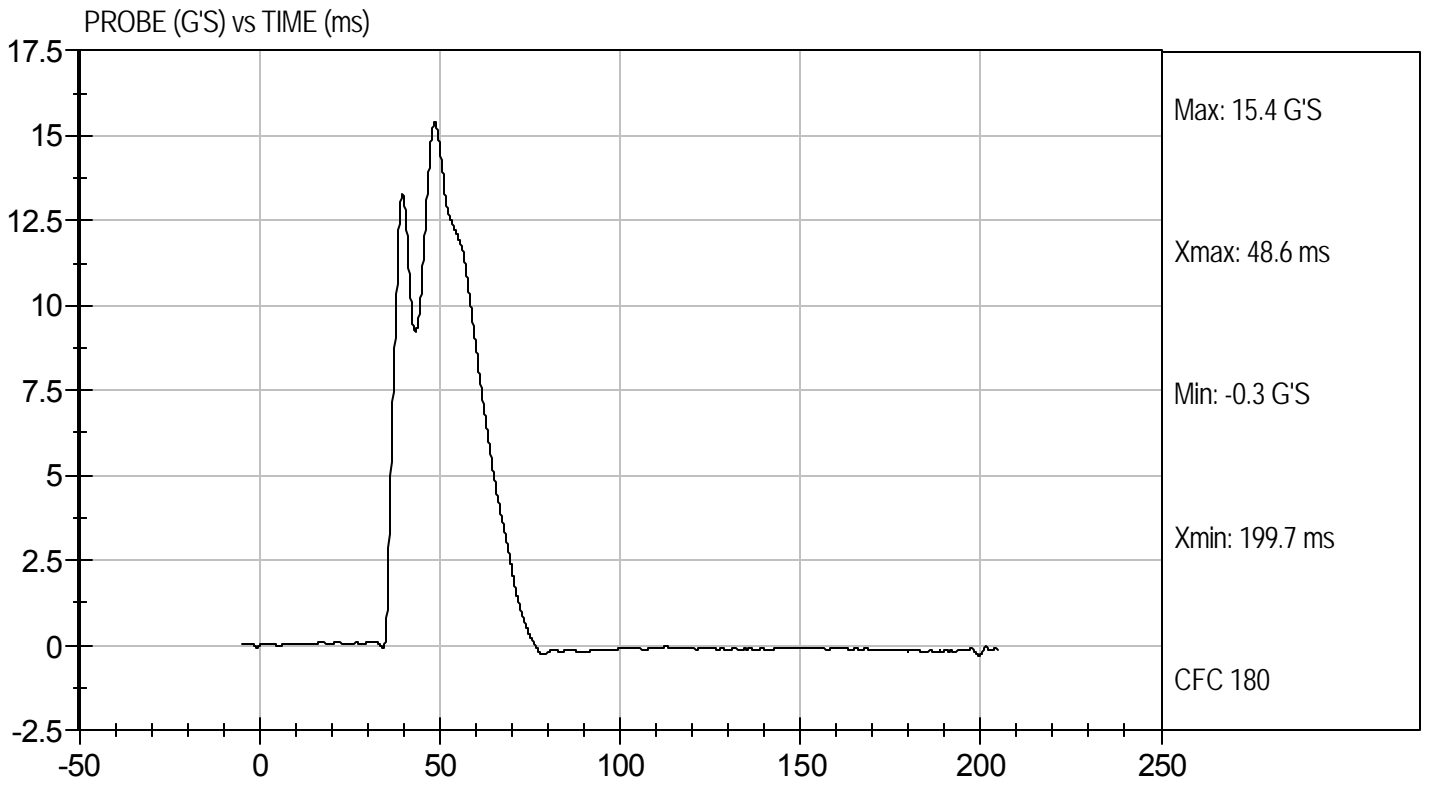
12/2/10  
 Test Date

David Winkelbauer  
 Approved By



Test Desc: Shoulder Impact  
Component ID: D104203

Test Date: 12/2/10  
Velocity: 14.36 ft/s, 4.38 m/s

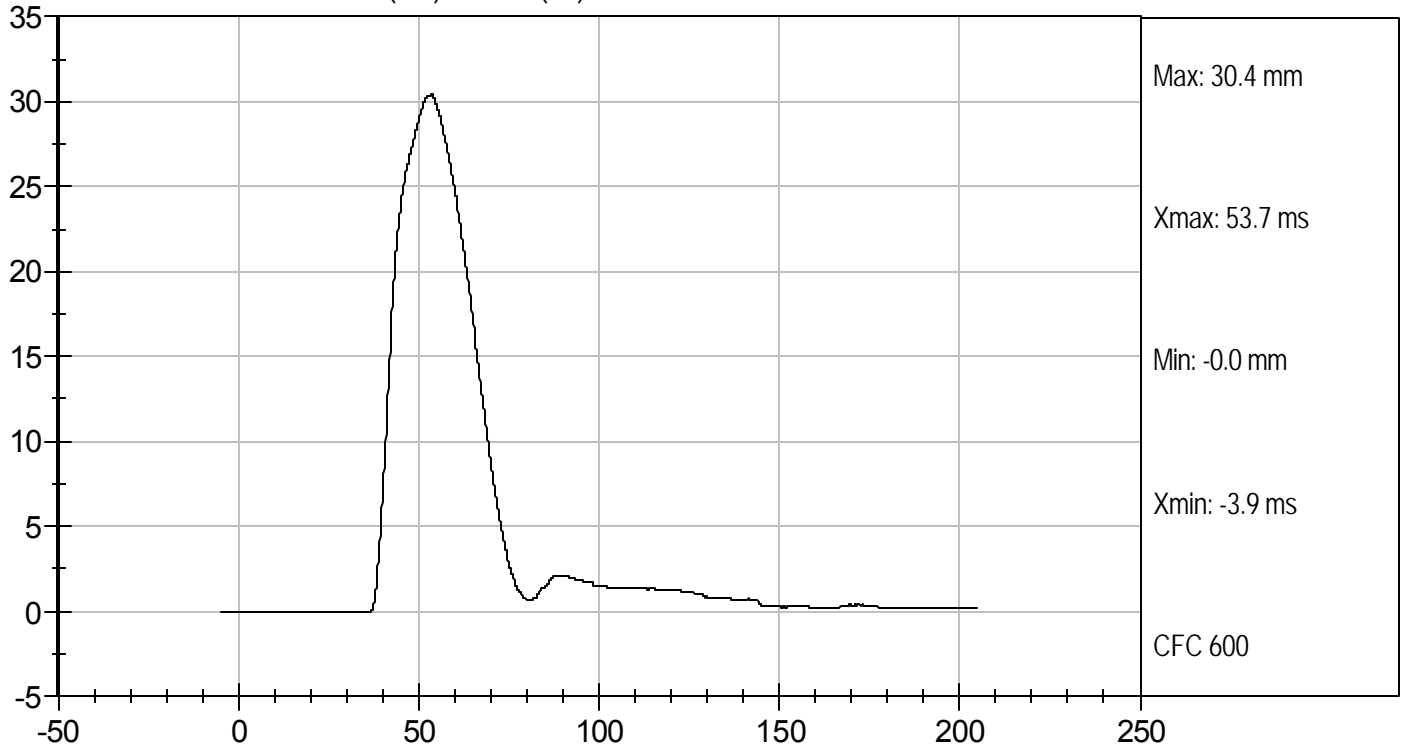




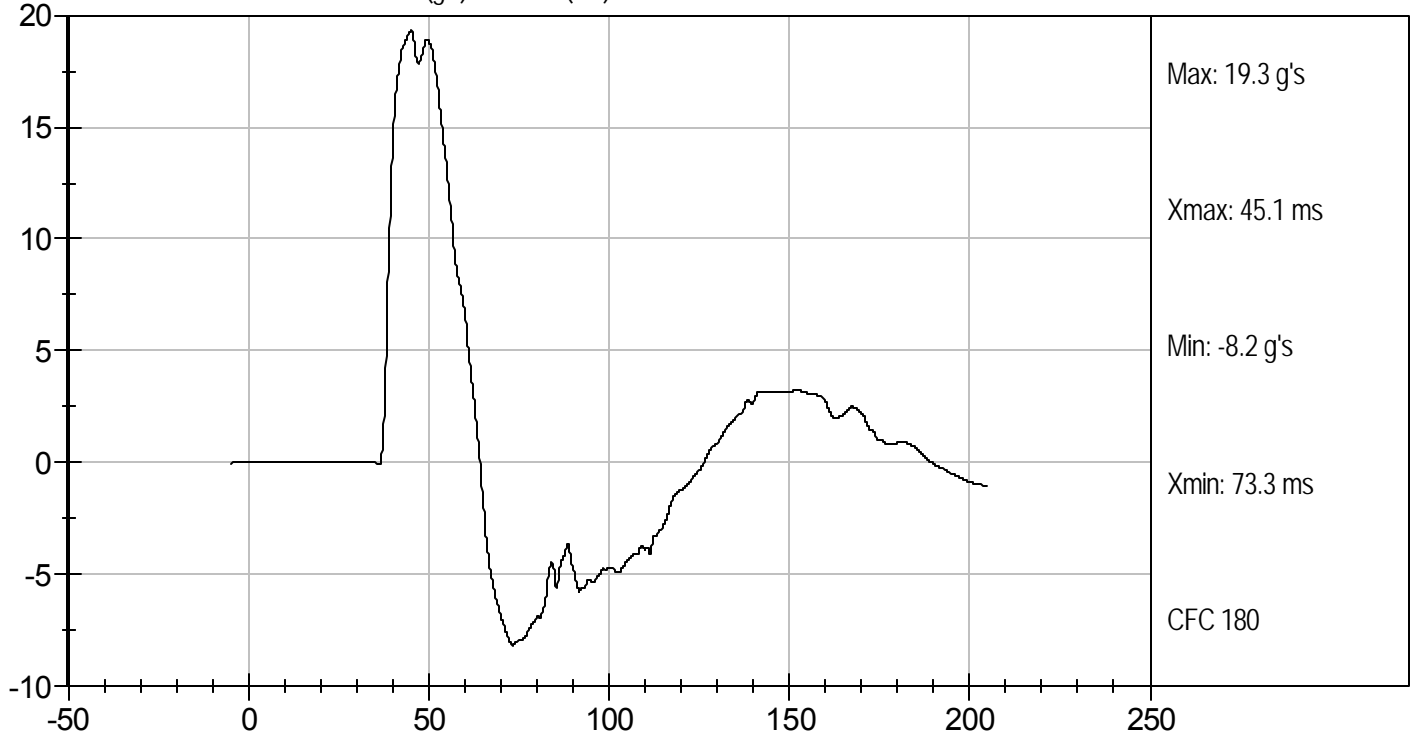
Test Desc: Shoulder Impact  
Component ID: D104203

Test Date: 12/2/10  
Velocity: 14.36 ft/s, 4.38 m/s

SHOULDER DISPLACEMENT (mm) vs TIME (ms)



UPPER SPINE ACCELERATION (g's) vs TIME (ms)



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

ATD Serial No: 306

Test I.D: D104204

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	22.1	Pass
Humidity	%	10 to 70	18	Pass
Impact Velocity	m/s	6.60 to 6.80	6.68	Pass
Peak Impactor Acceleration	G's	30 to 36	33	Pass
Shoulder Displacement	mm	31 to 40	33	Pass
Upper Rib Displacement	mm	25 to 32	26	Pass
Middle Rib Displacement	mm	30 to 36	30	Pass
Lower Rib Displacement	mm	32 to 38	34	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	41	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	32	Pass
Overall Test Results				Pass

Jessica Gall  
Laboratory Technician

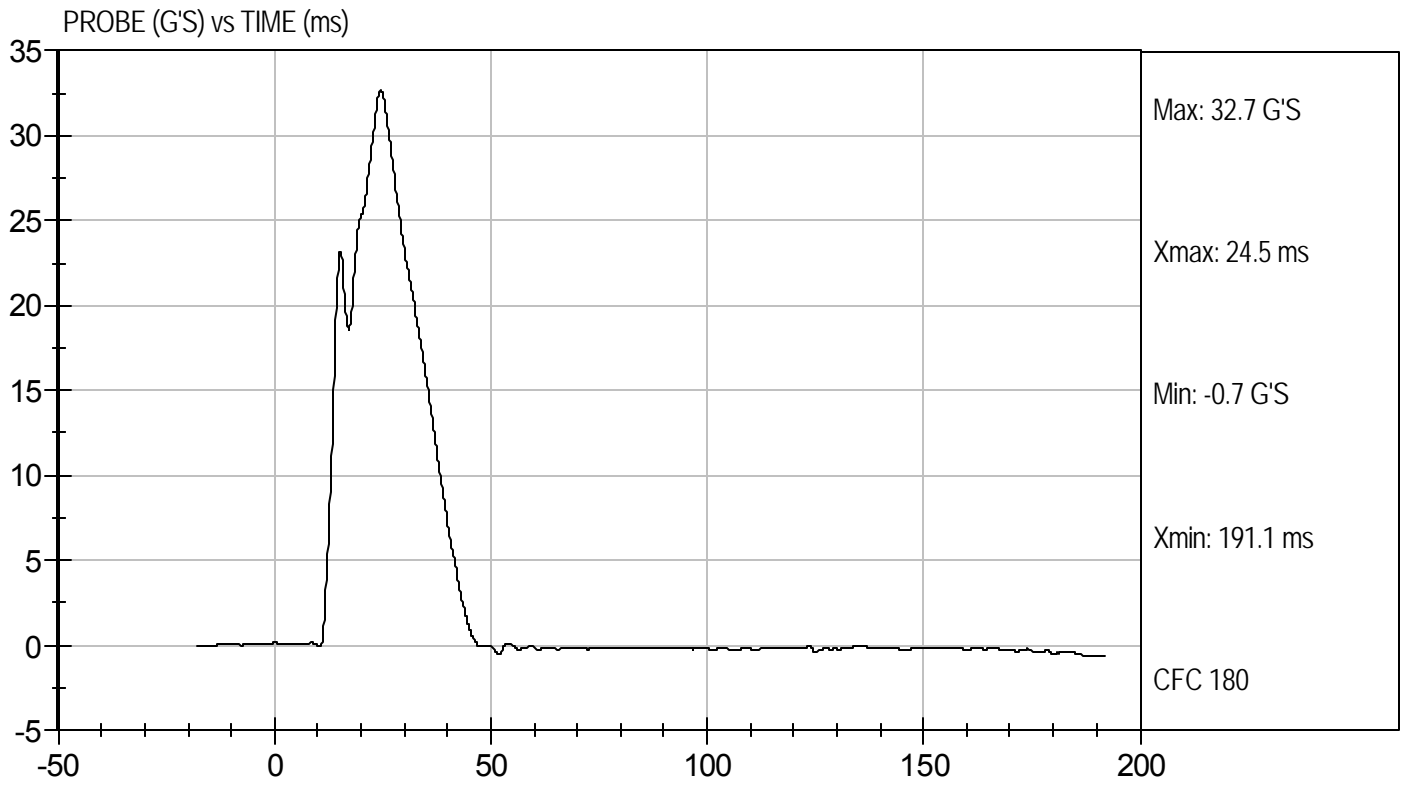
12/2/10  
Test Date

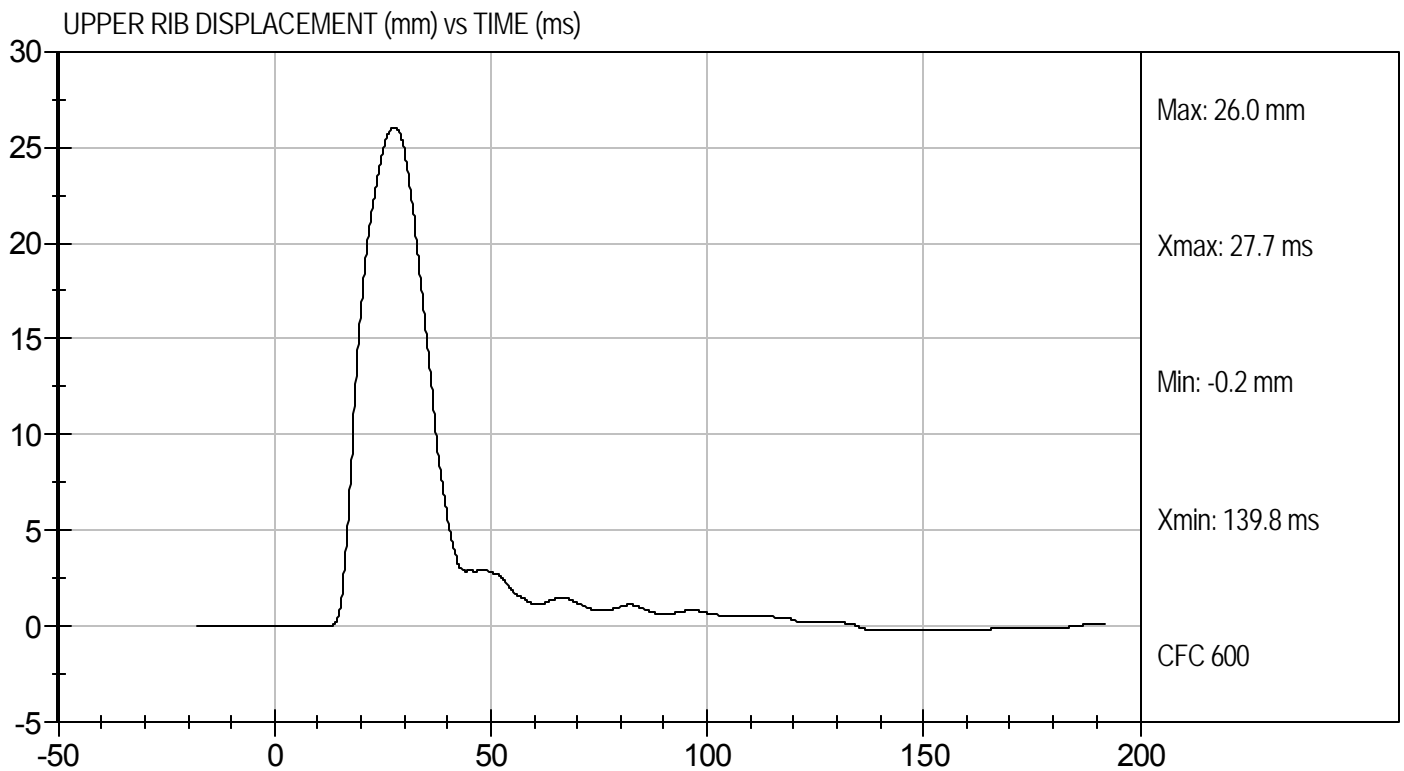
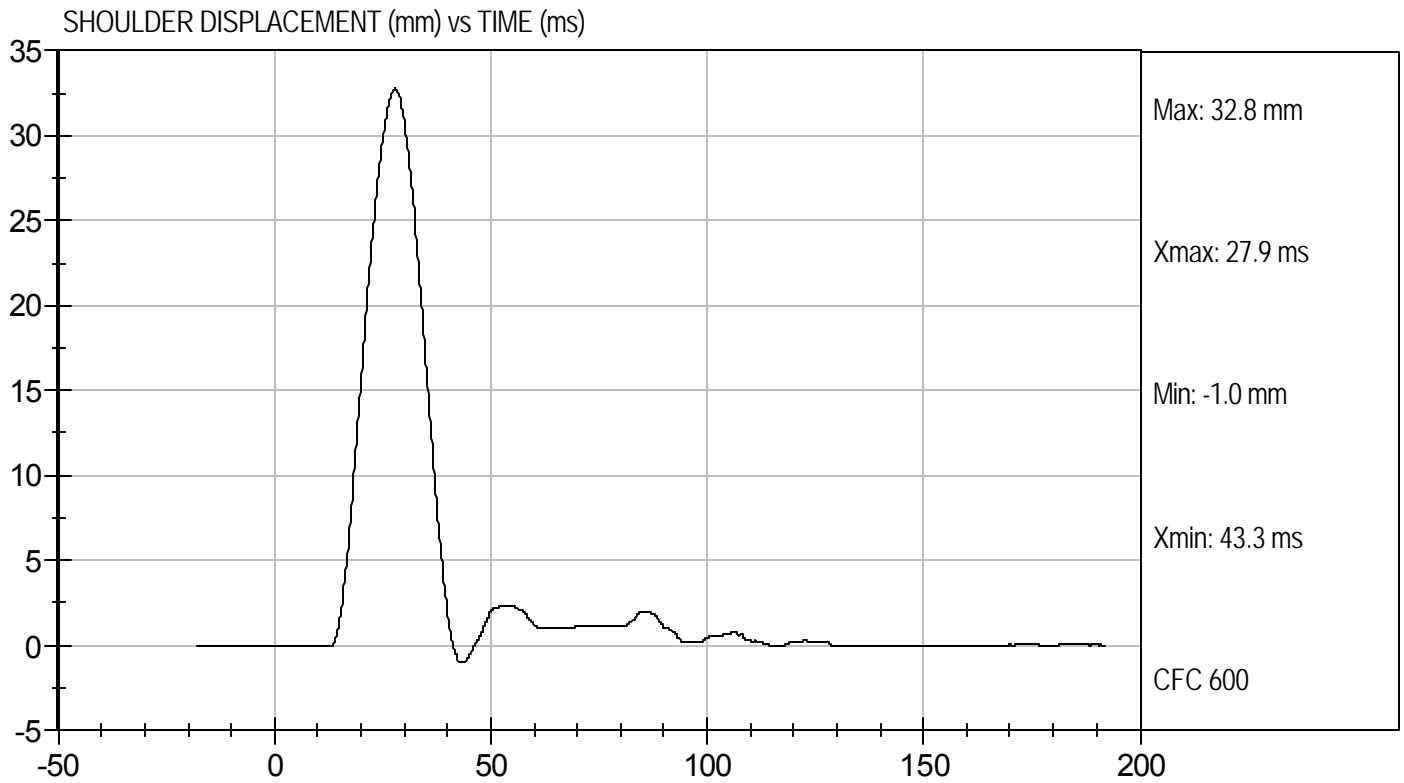
David Winkelbauer  
Approved By



Test Desc: Thorax With Arm  
Component ID: D104204

Test Date: 12/2/10  
Velocity: 21.9 ft/s, 6.68 m/s



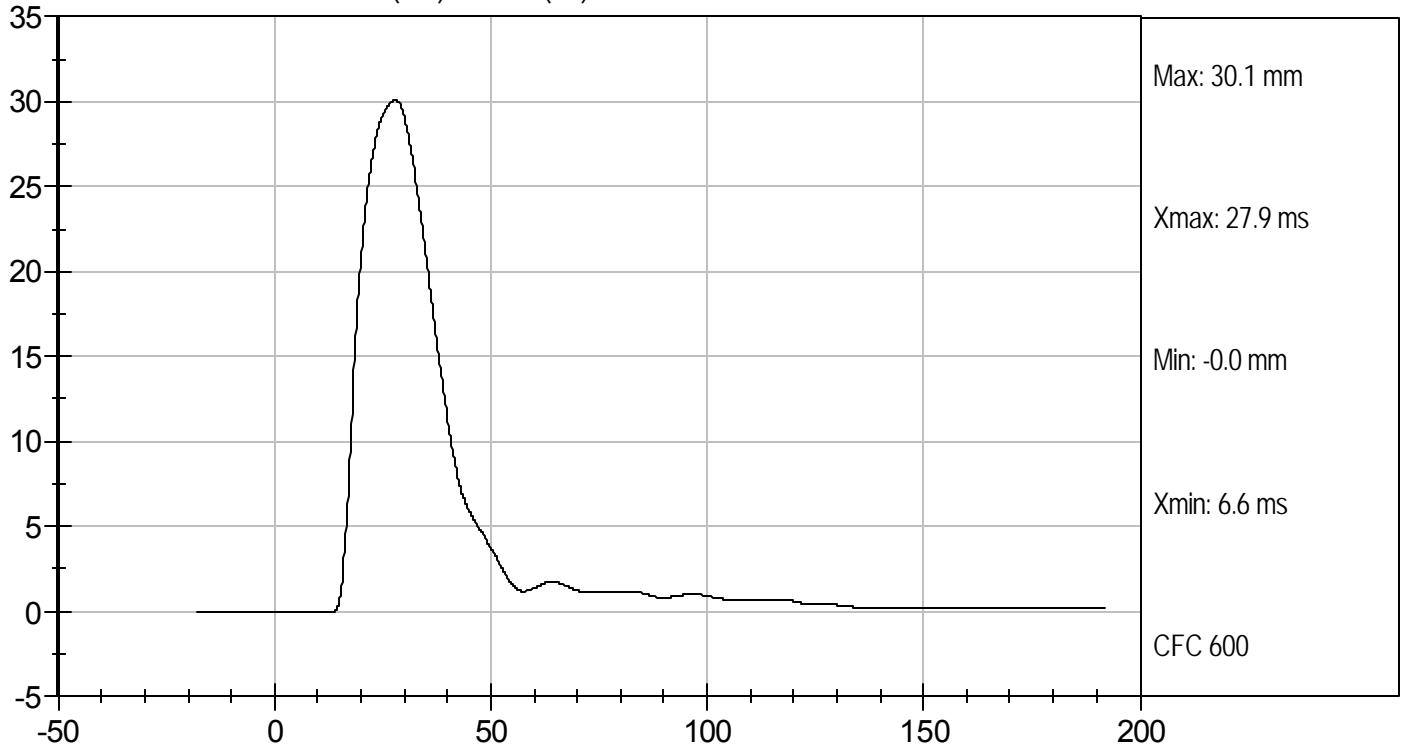




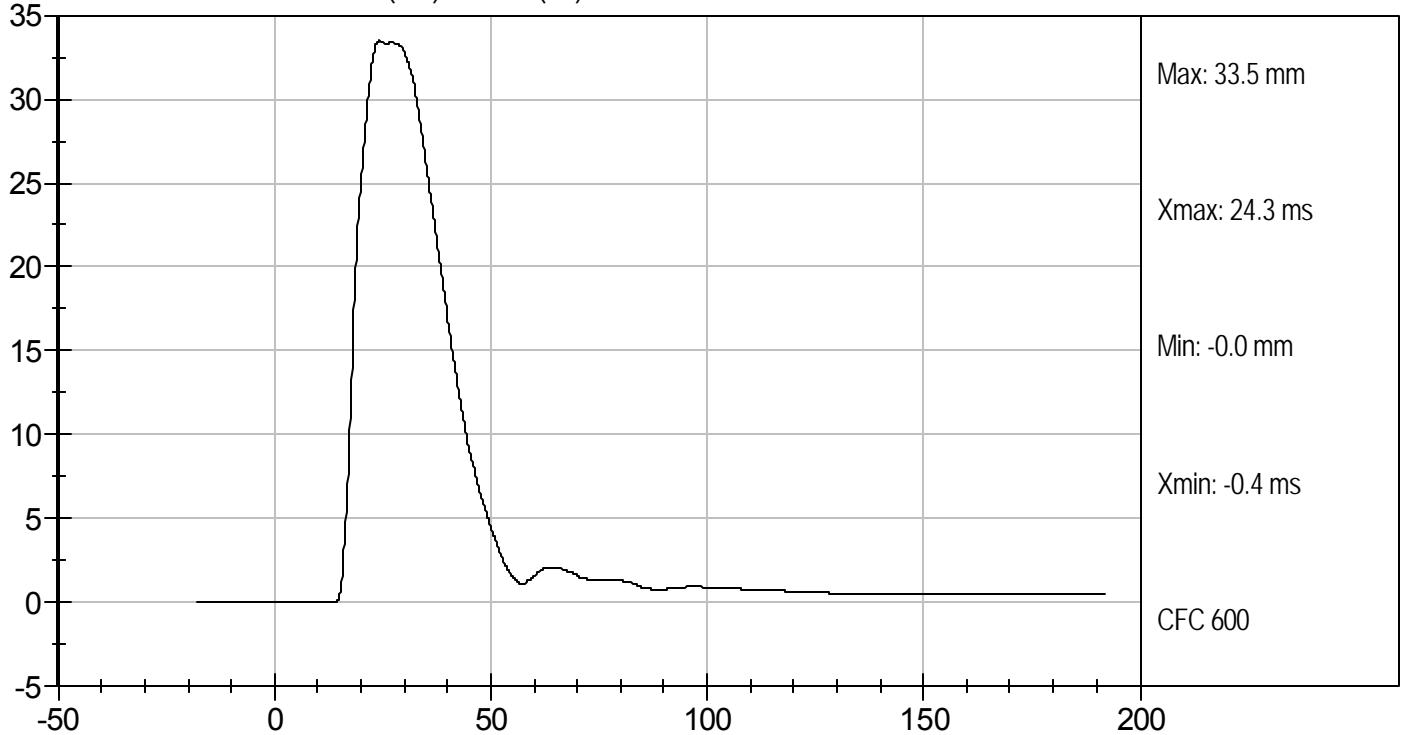
Test Desc: Thorax With Arm  
Component ID: D104204

Test Date: 12/2/10  
Velocity: 21.9 ft/s, 6.68 m/s

MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



LOWER RIB DISPLACEMENT (mm) vs TIME (ms)

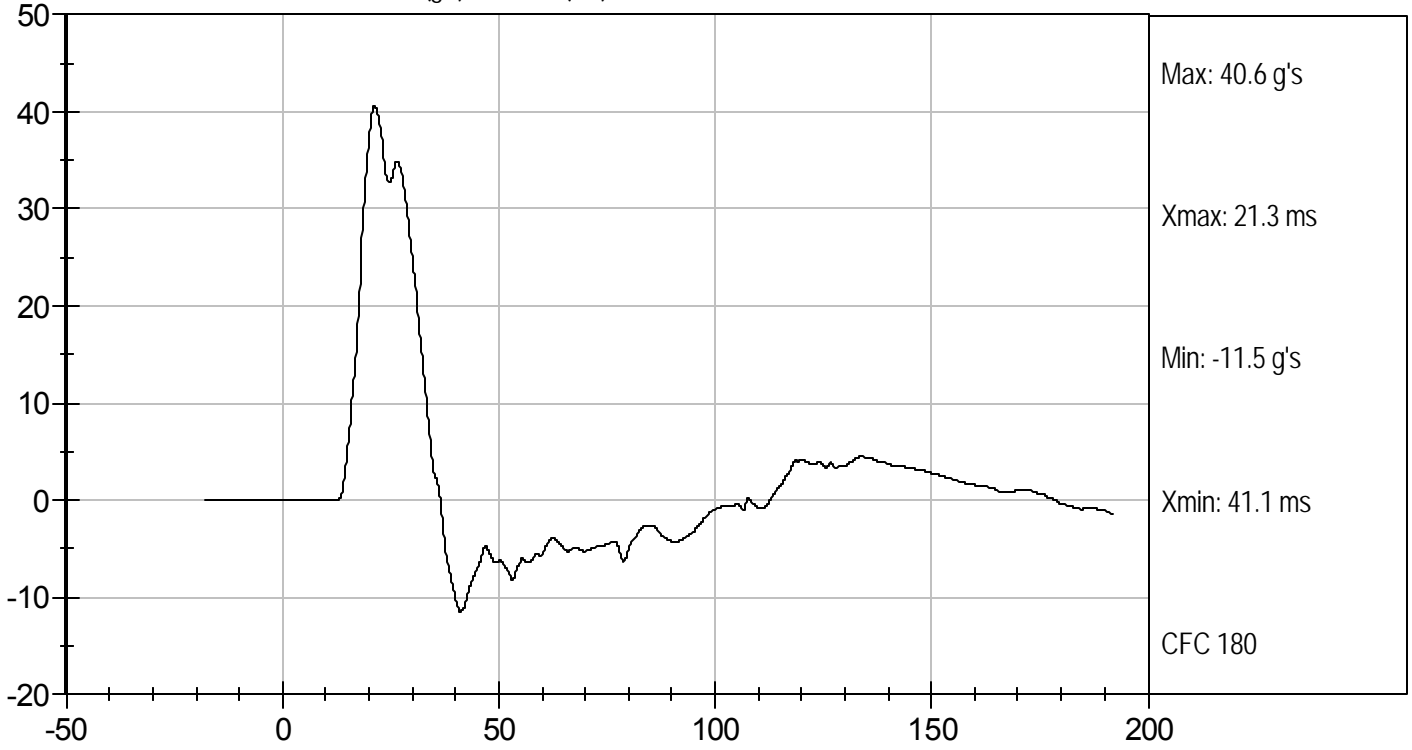




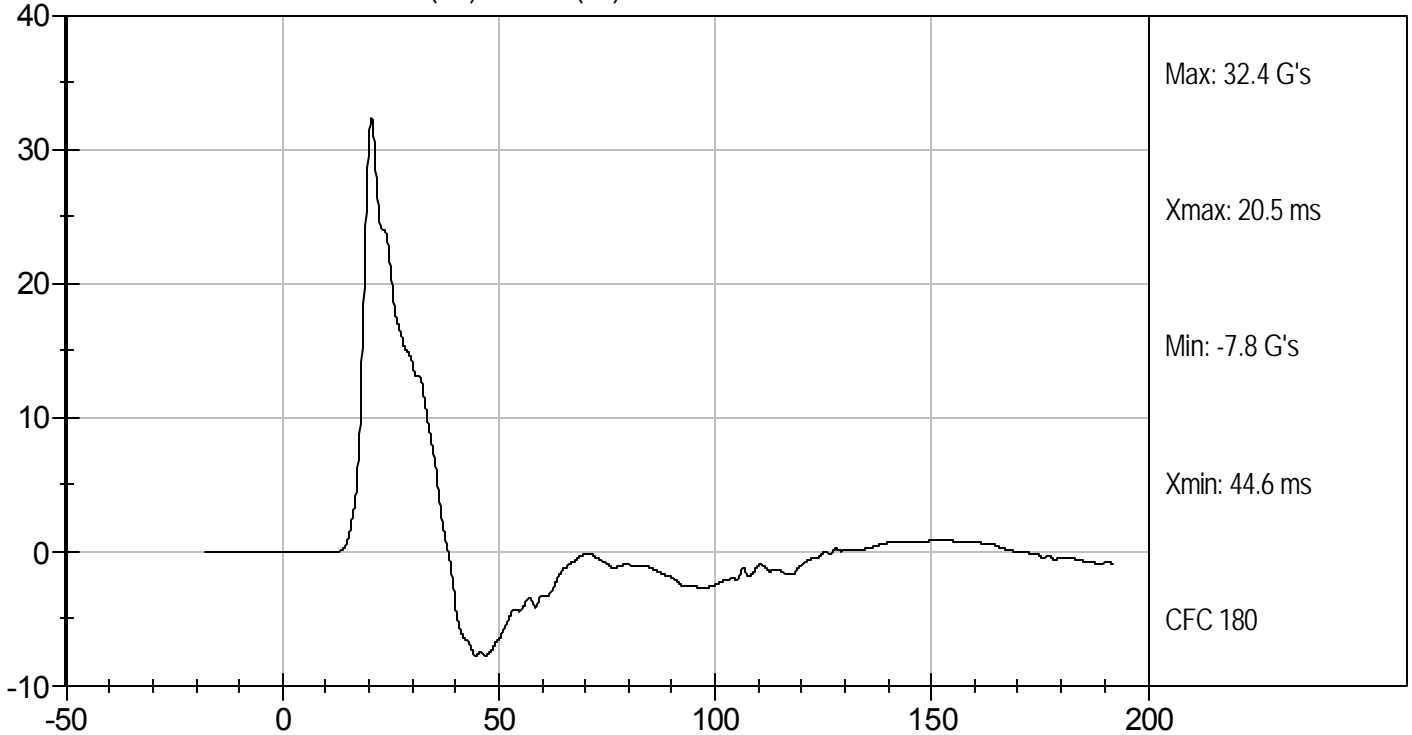
Test Desc: Thorax With Arm  
Component ID: D104204

Test Date: 12/2/10  
Velocity: 21.9 ft/s, 6.68 m/s

UPPER SPINE ACCELERATION (g's) vs TIME (ms)



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



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

ATD Serial No: 306

Test I.D: D104205

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	22.0	Pass
Humidity	%	10 to 70	18	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Peak Impactor Force	G's	14 to 18	16	Pass
Upper Rib Displacement	mm	32 to 40	33	Pass
Middle Rib Displacement	mm	39 to 45	39	Pass
Lower Rib Displacement	mm	35 to 43	38	Pass
Upper Spine (T1) Y Acceleration	G's	13 to 17	15	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	10	Pass
Overall Test Results				Pass

Jessica Hall  
Laboratory Technician

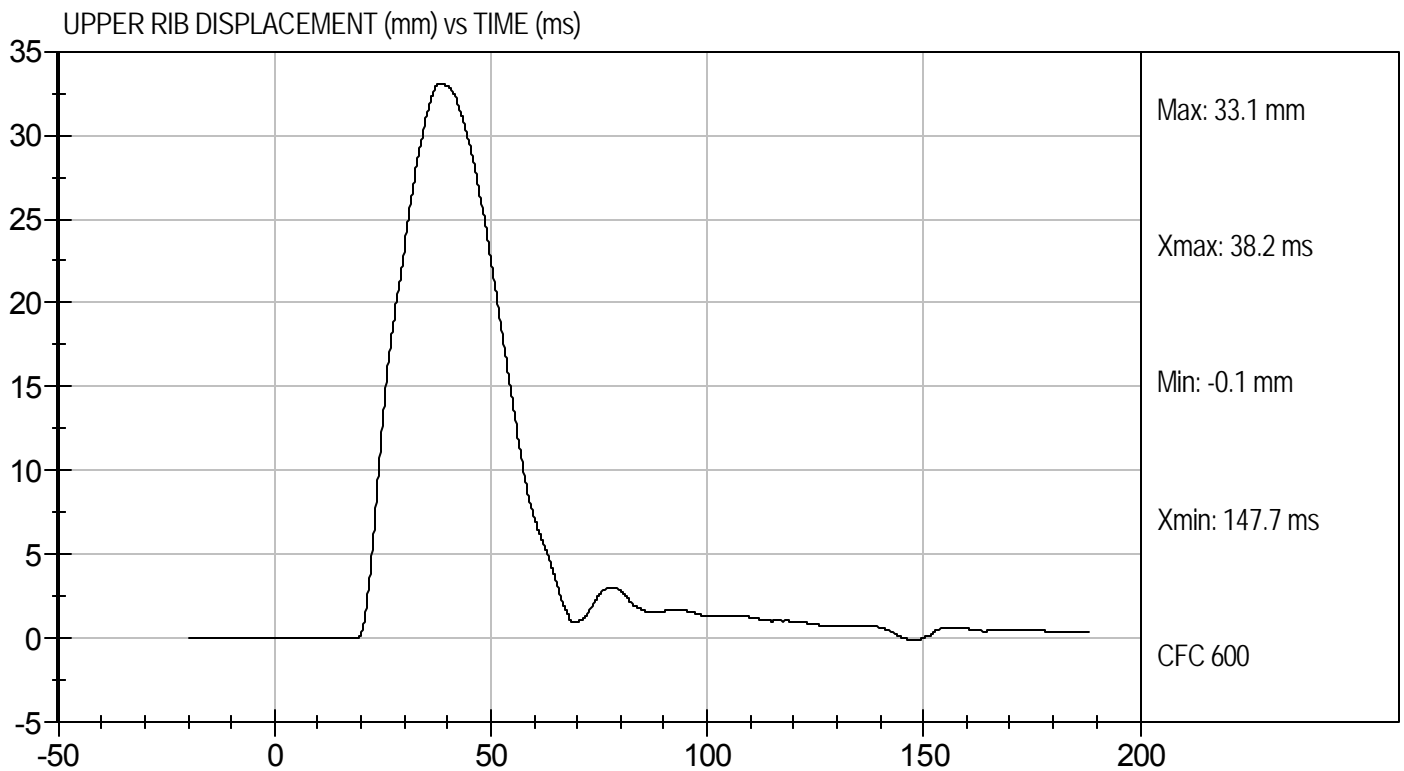
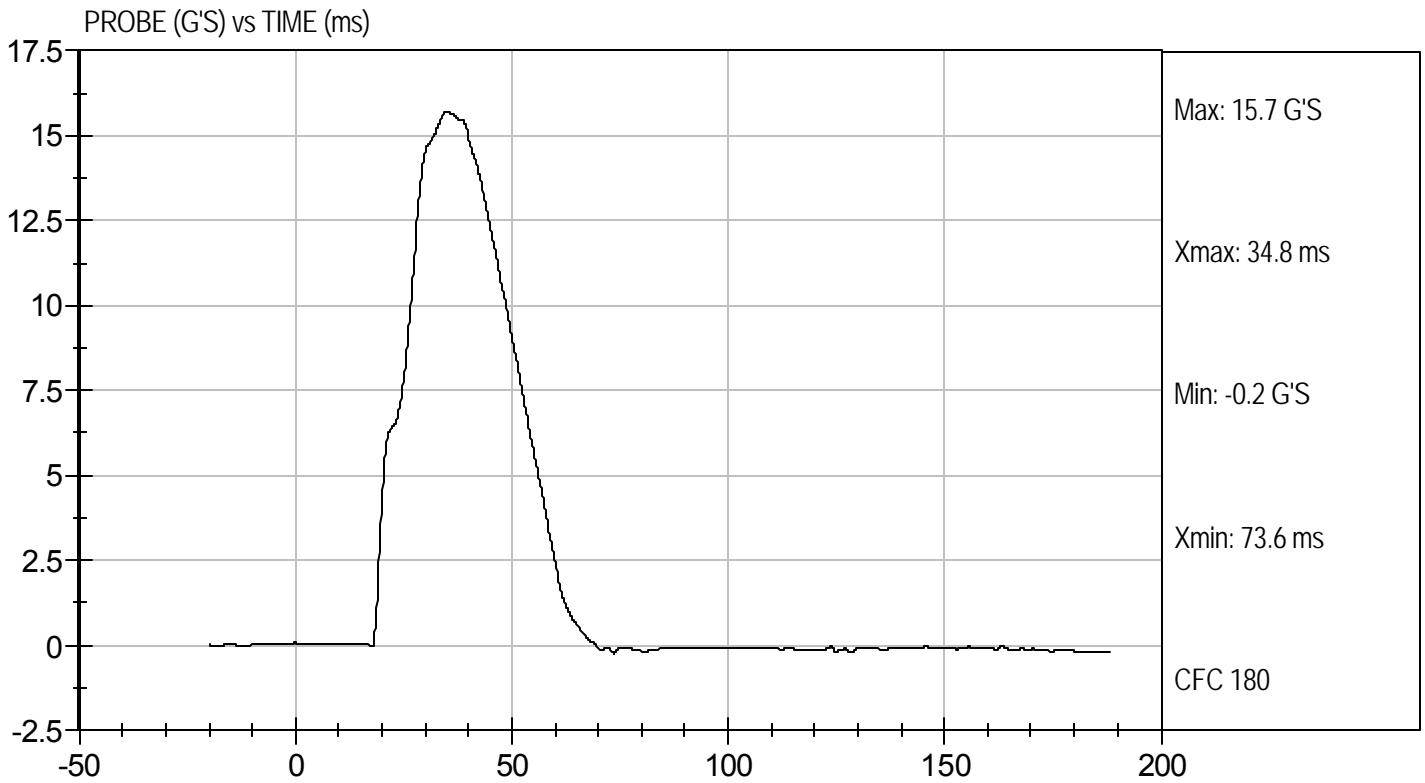
12/2/10  
Test Date

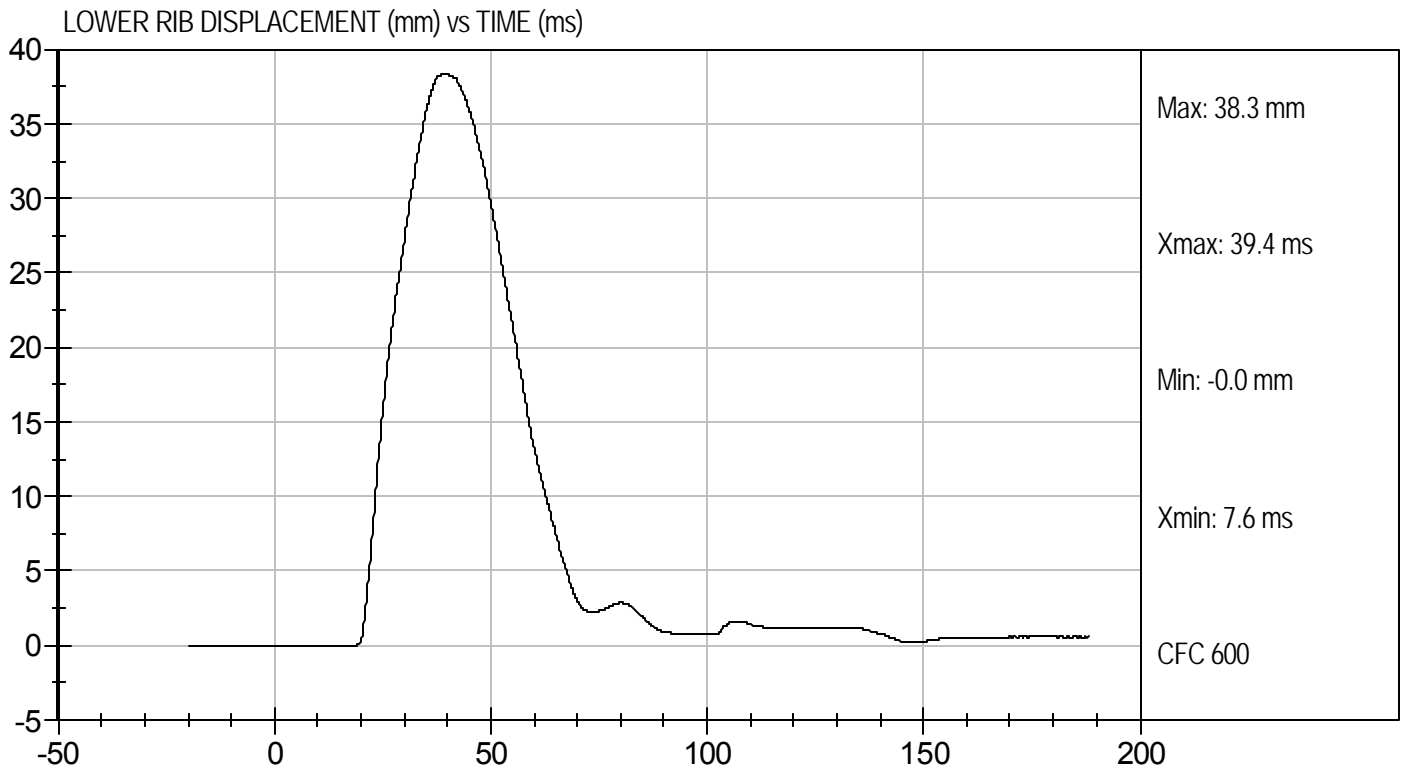
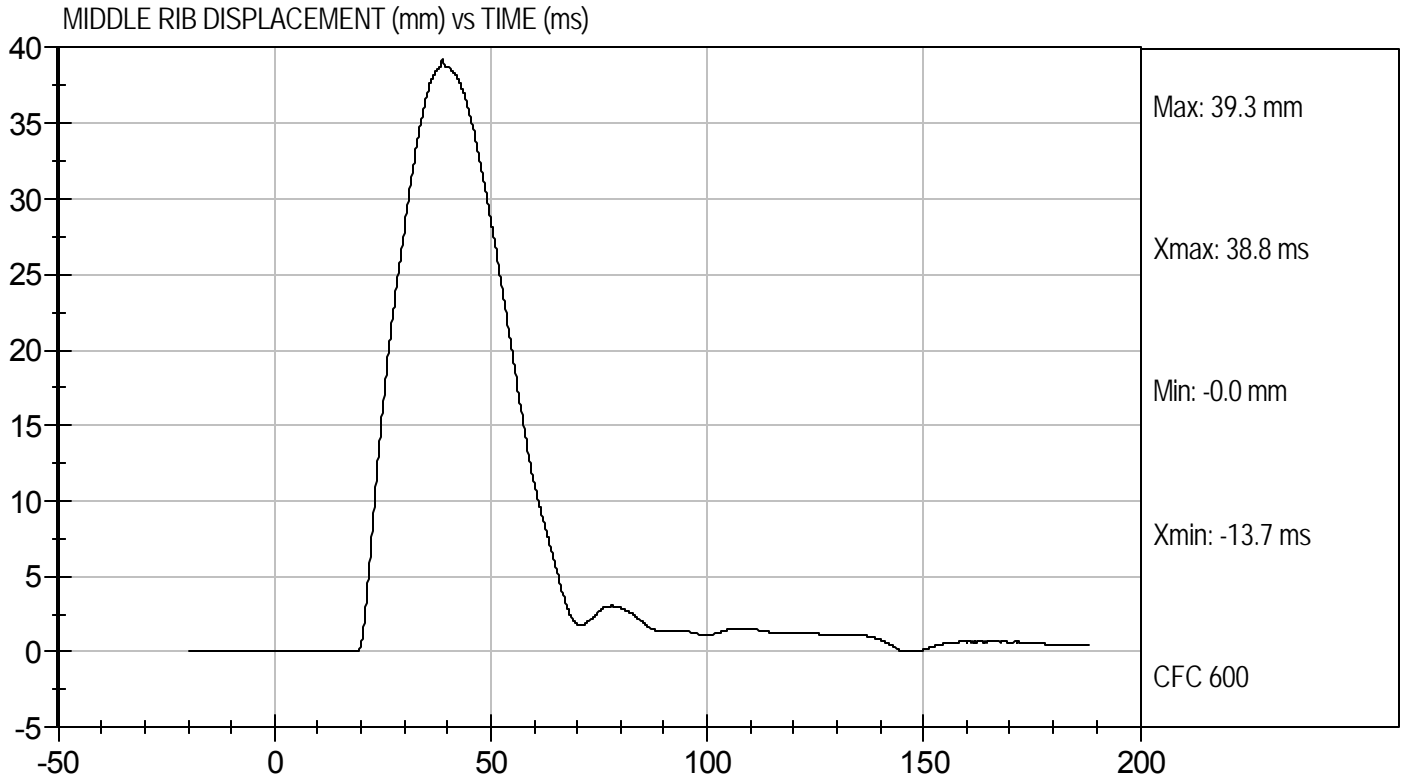
David Winkelbauer  
Approved By



Test Desc: Thorax Without Arm  
Component ID: D104205

Test Date: 12/2/10  
Velocity: 14.36 ft/s, 4.38 m/s

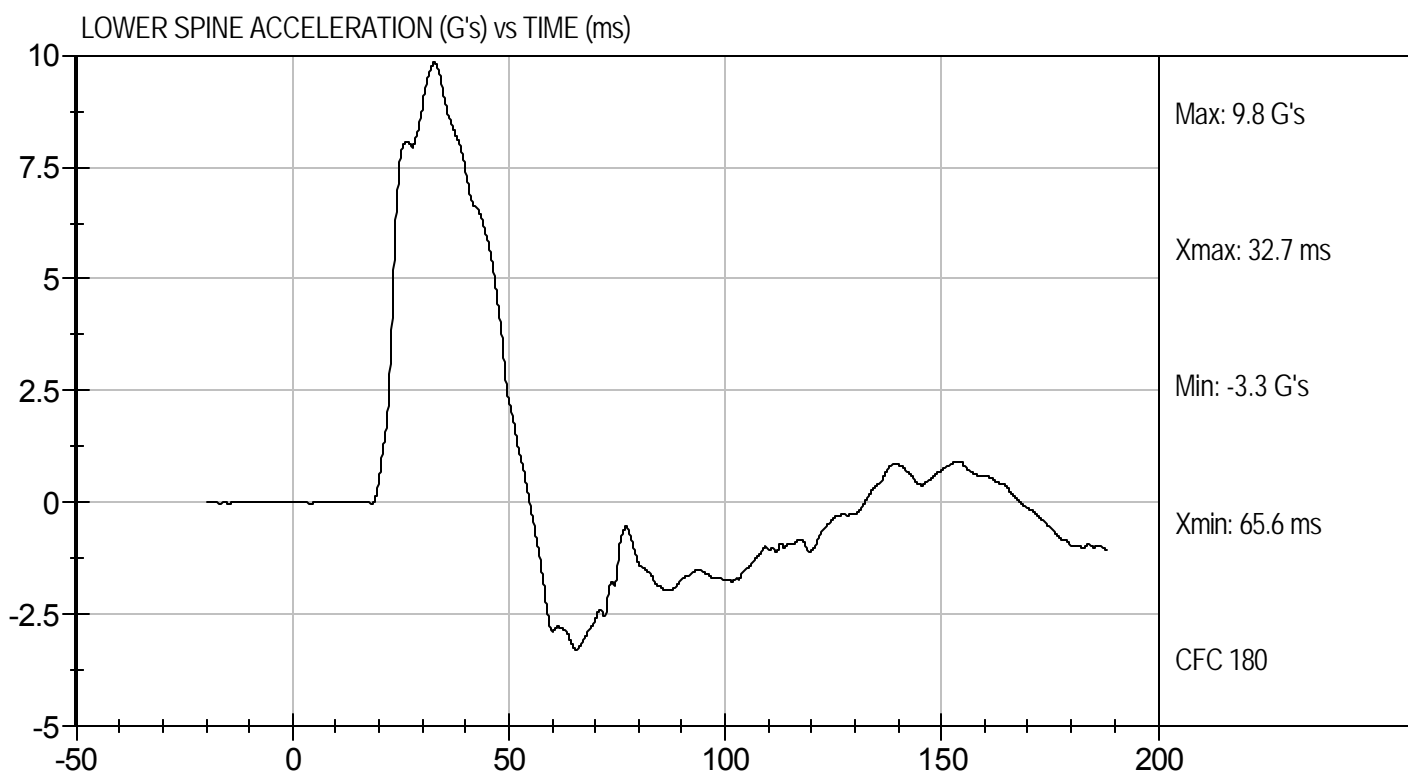
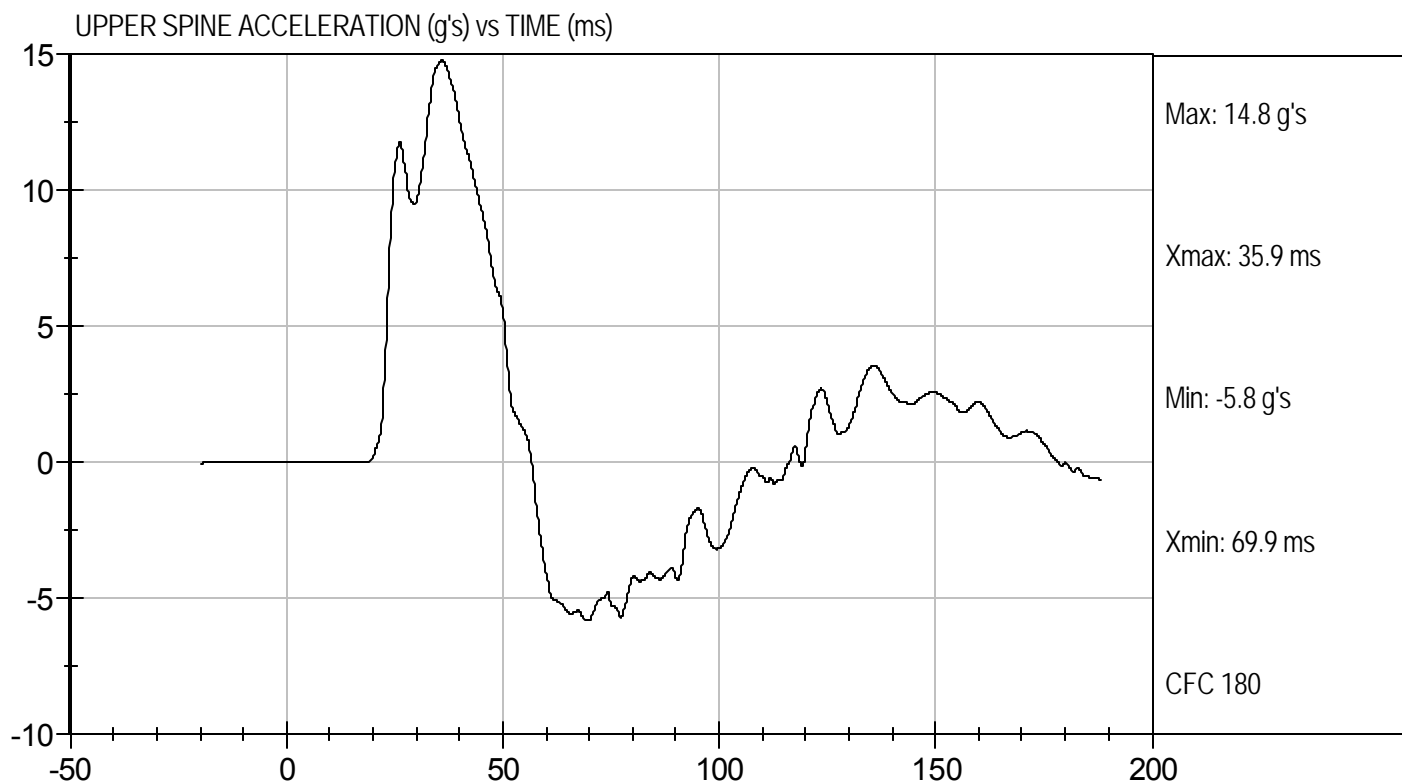






Test Desc: Thorax Without Arm  
Component ID: D104205

Test Date: 12/2/10  
Velocity: 14.36 ft/s, 4.38 m/s



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

ATD Serial No: 306

Test I.D: D104206

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	22.0	Pass
Humidity	%	10 to 70	18	Pass
Impact Velocity	m/s	4.20 to 4.40	4.27	Pass
Peak Impactor Acceleration	G's	12 to 16	15	Pass
Upper Rib Displacement	mm	36 to 47	41	Pass
Lower Rib Displacement	mm	33 to 44	38	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	12	Pass
Overall Test Results				Pass

*Jessica Hall*  
 \_\_\_\_\_  
 Laboratory Technician

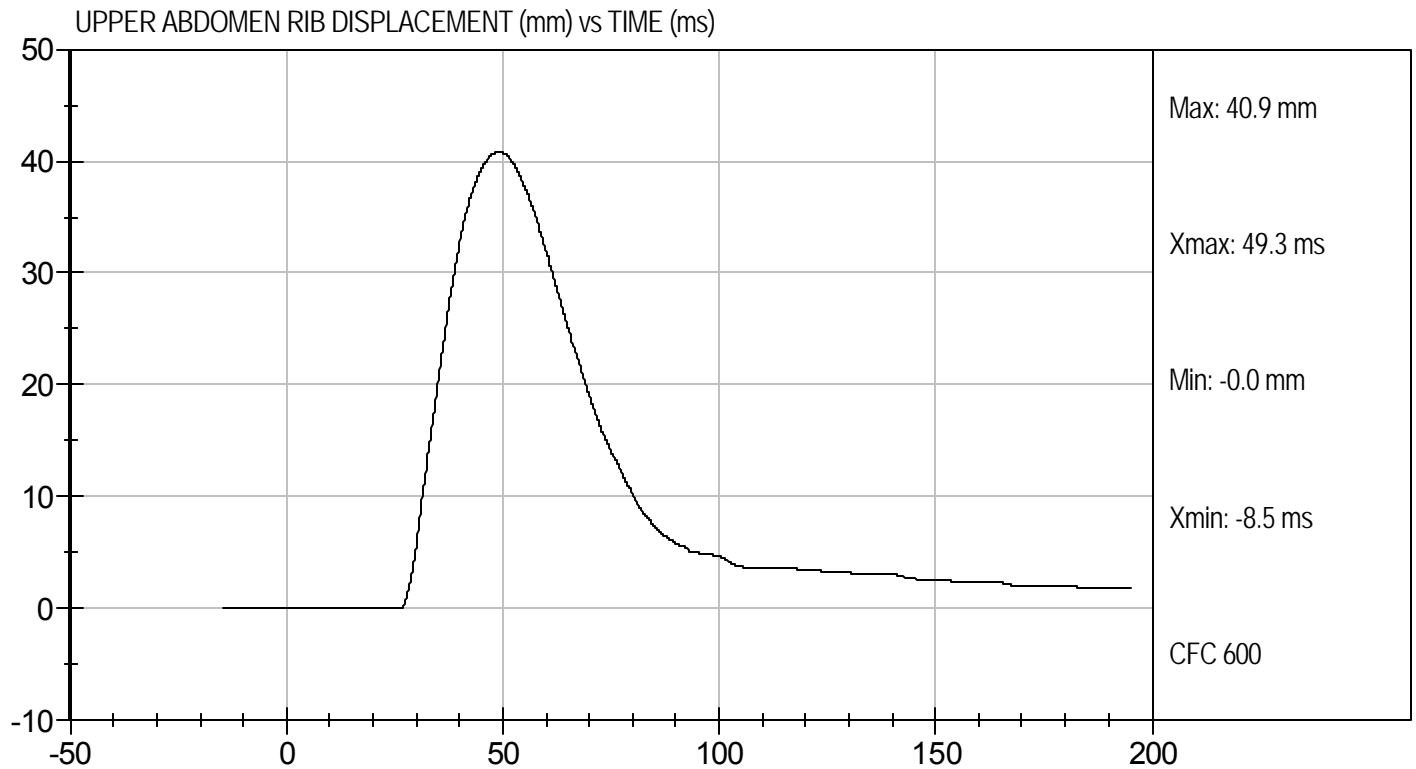
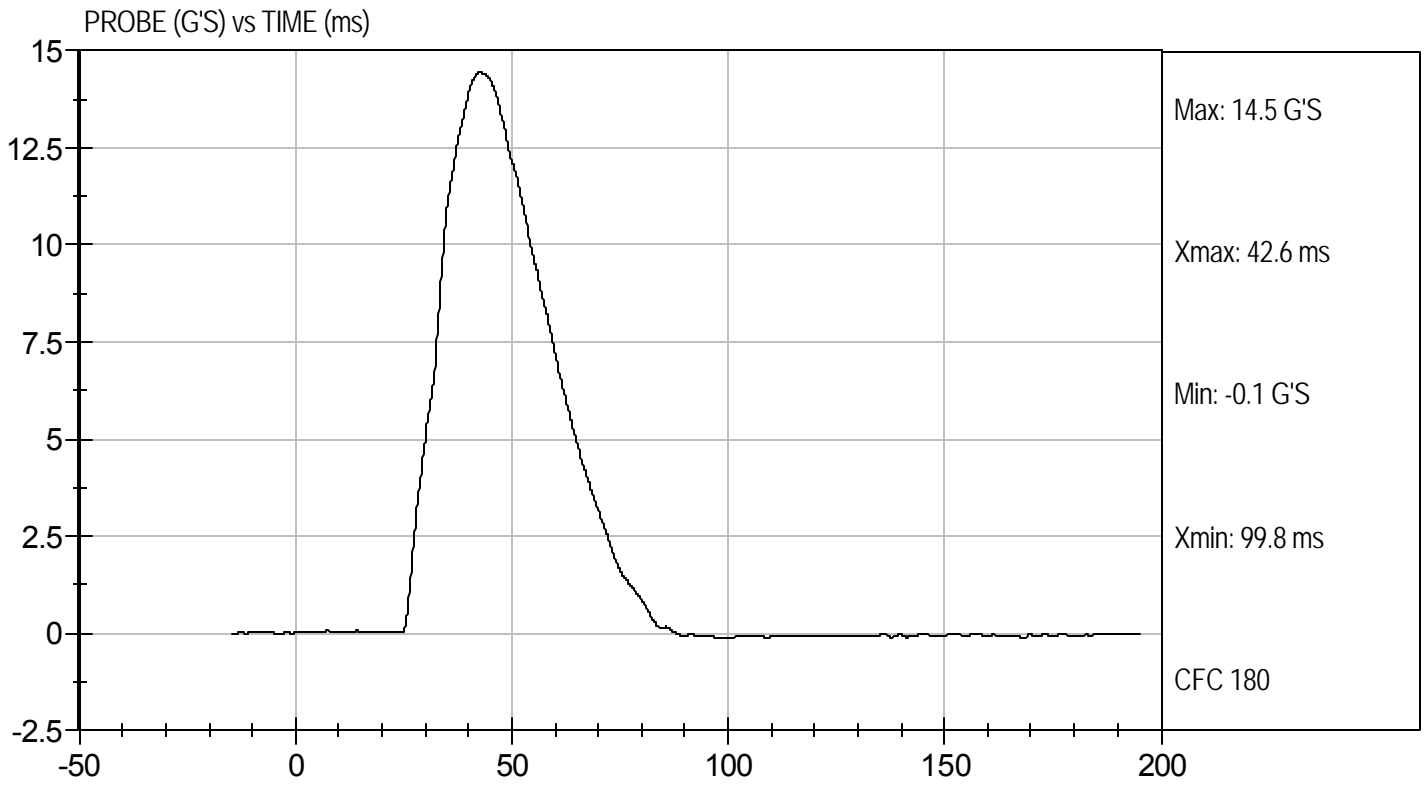
12/2/10  
 \_\_\_\_\_  
 Test Date

*David Winkelbauer*  
 \_\_\_\_\_  
 Approved By



Test Desc: Abdomen Impact  
Component ID: D104206

Test Date: 12/2/10  
Velocity: 14.0 ft/s, 4.27 m/s

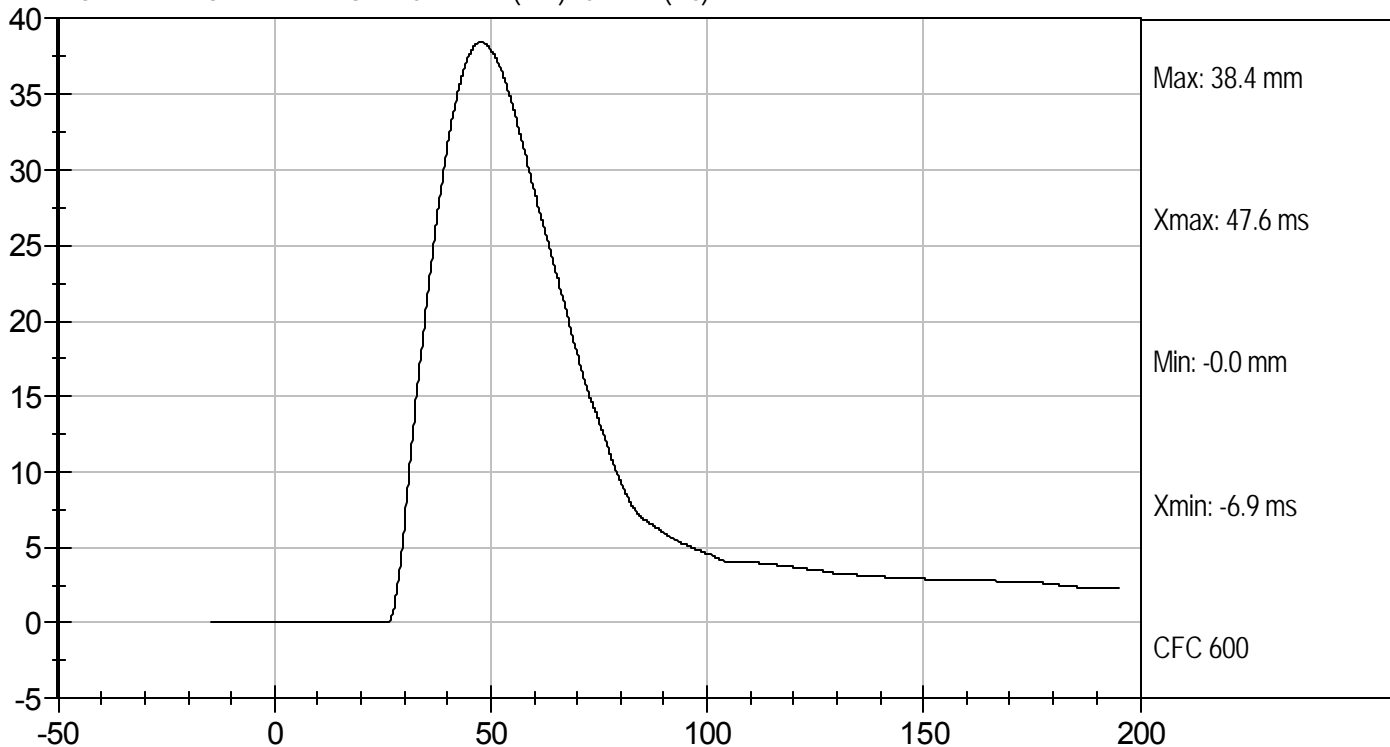




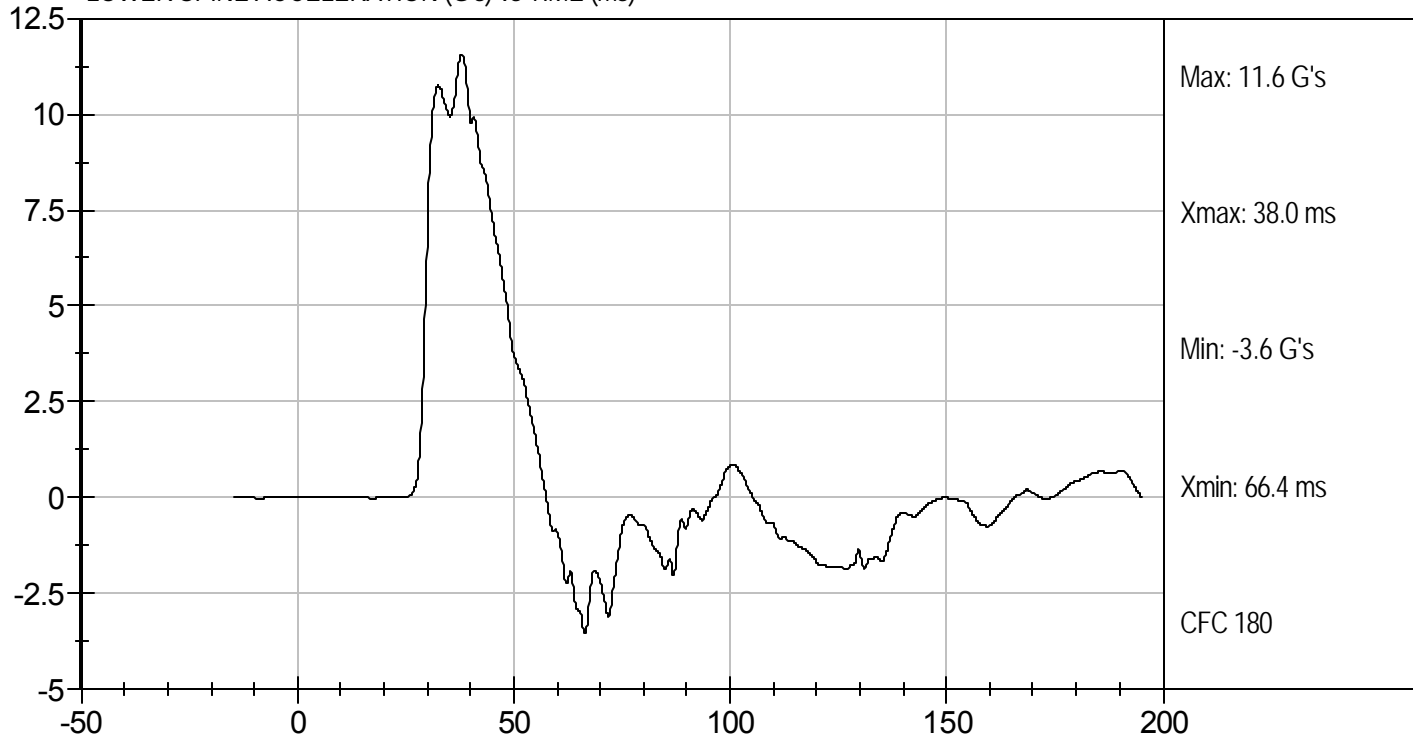
Test Desc: Abdomen Impact  
Component ID: D104206

Test Date: 12/2/10  
Velocity: 14.0 ft/s, 4.27 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: 306

Test I.D: D104207

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	22.2	Pass
Humidity	%	10 to 70	18	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	35	Pass
Peak Acetabulum Force	N	3600 to 4300	4061	Pass
Overall Test Results				Pass

*Jessica Hall*  
 Laboratory Technician

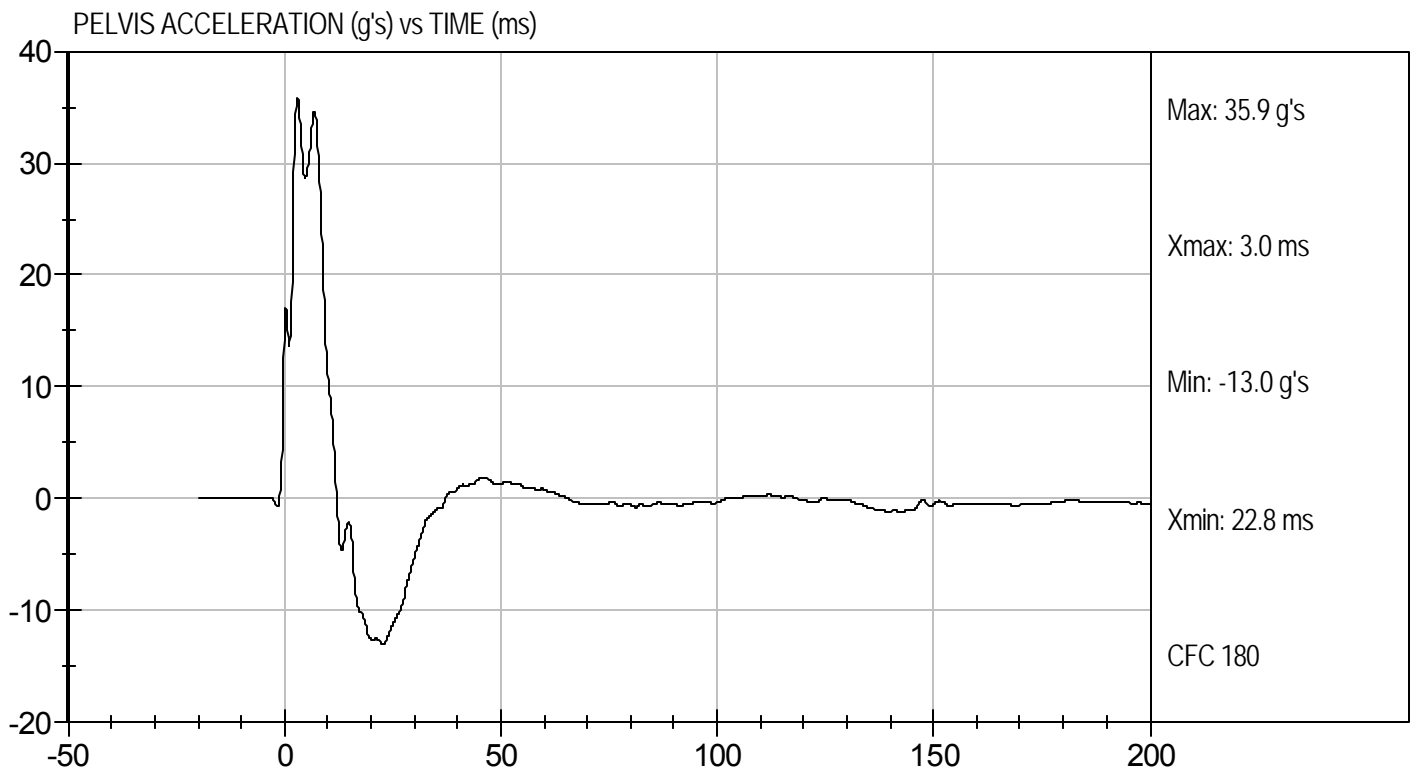
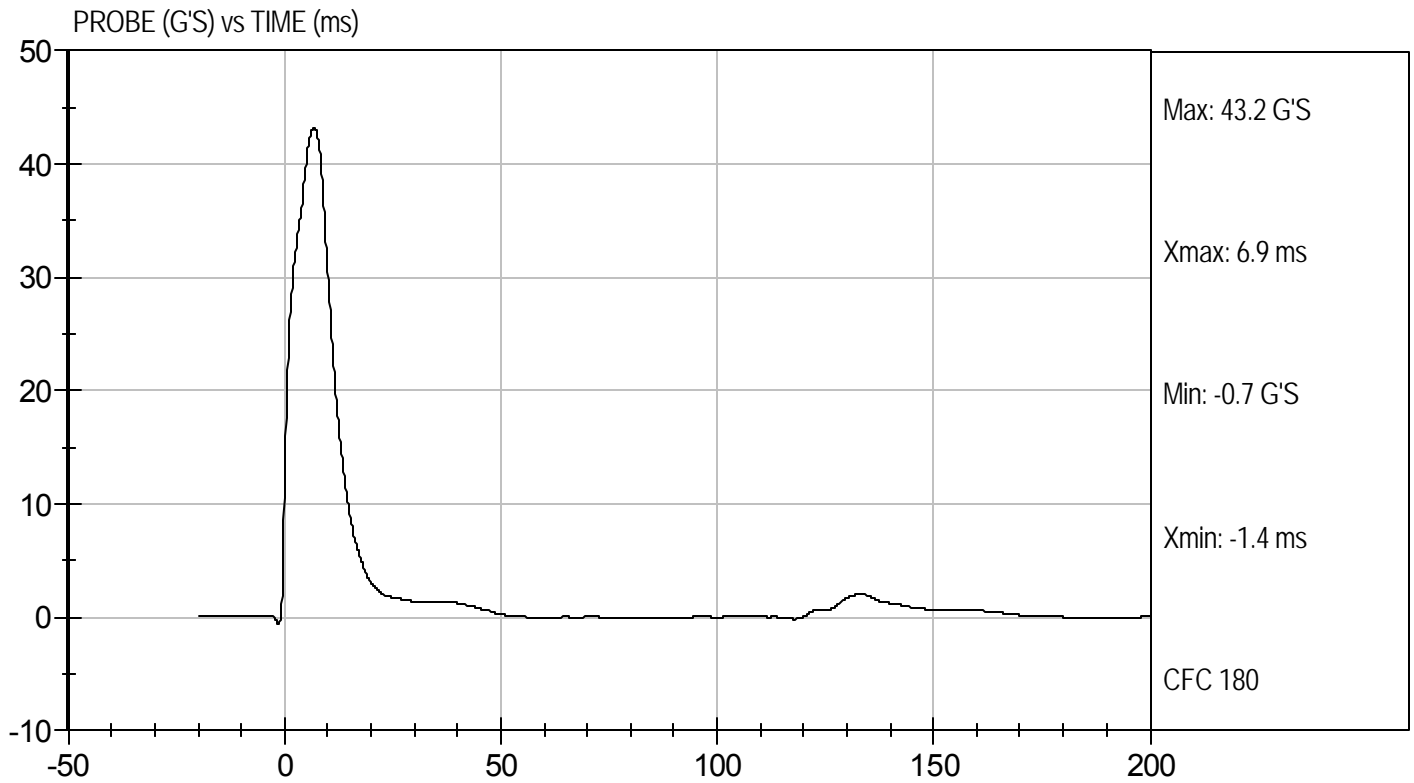
12/2/10  
 Test Date

*David Winkelbauer*  
 Approved By



Test Desc: Pelvis Impact  
Component ID: D104207

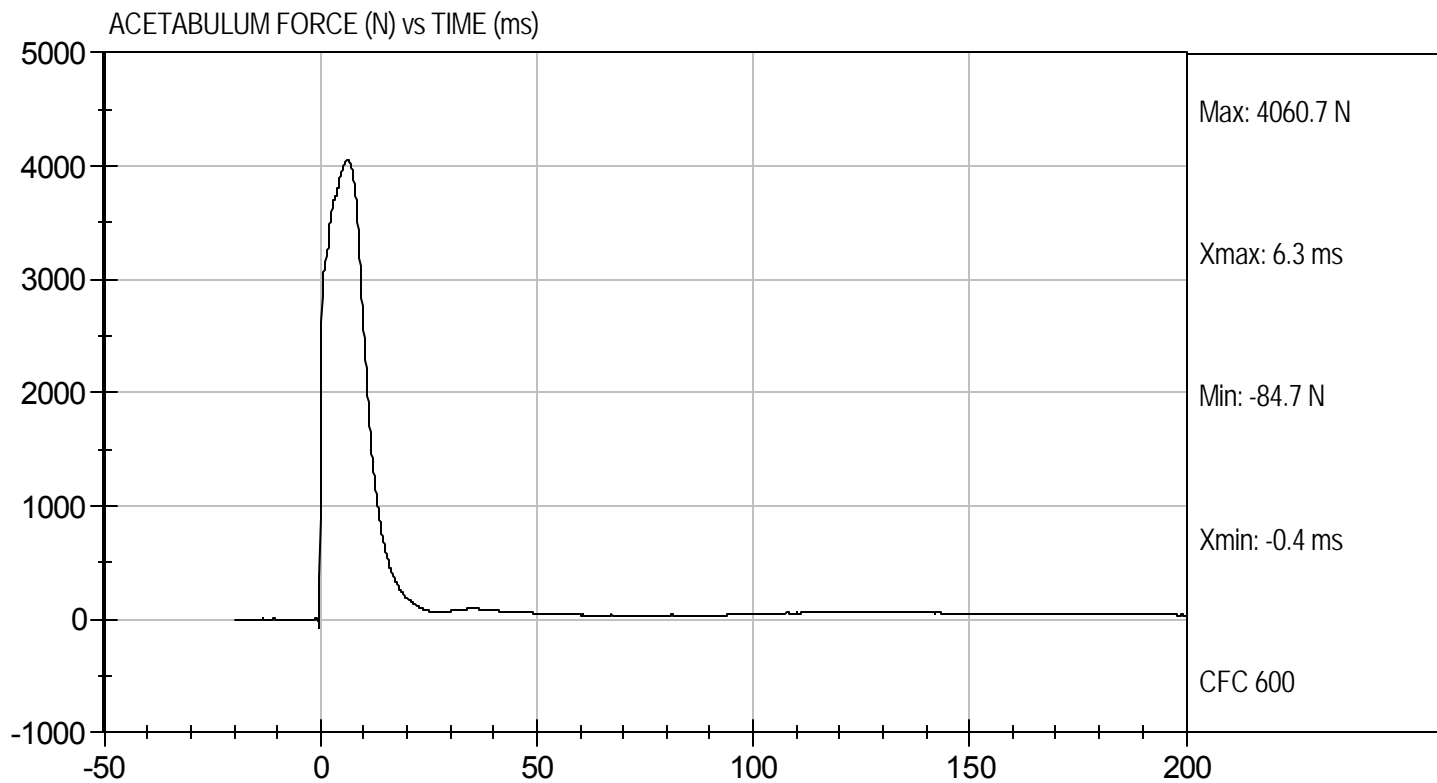
Test Date: 12/2/10  
Velocity: 22.2 ft/s, 6.77 m/s





Test Desc: Pelvis Impact  
Component ID: D104207

Test Date: 12/2/10  
Velocity: 22.2 ft/s, 6.77 m/s



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

ATD Serial No: 306

Test I.D: D104208

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	22.2	Pass
Humidity	%	10 to 70	18	Pass
Impact Velocity	m/s	4.20 to 4.40	4.27	Pass
Peak Impactor Acceleration	G's	36 to 45	40	Pass
Pelvis Y Acceleration	G's	28 to 39	30	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4852	Pass
Overall Test Results				Pass

*Jessica Gall*  
 \_\_\_\_\_  
 Laboratory Technician

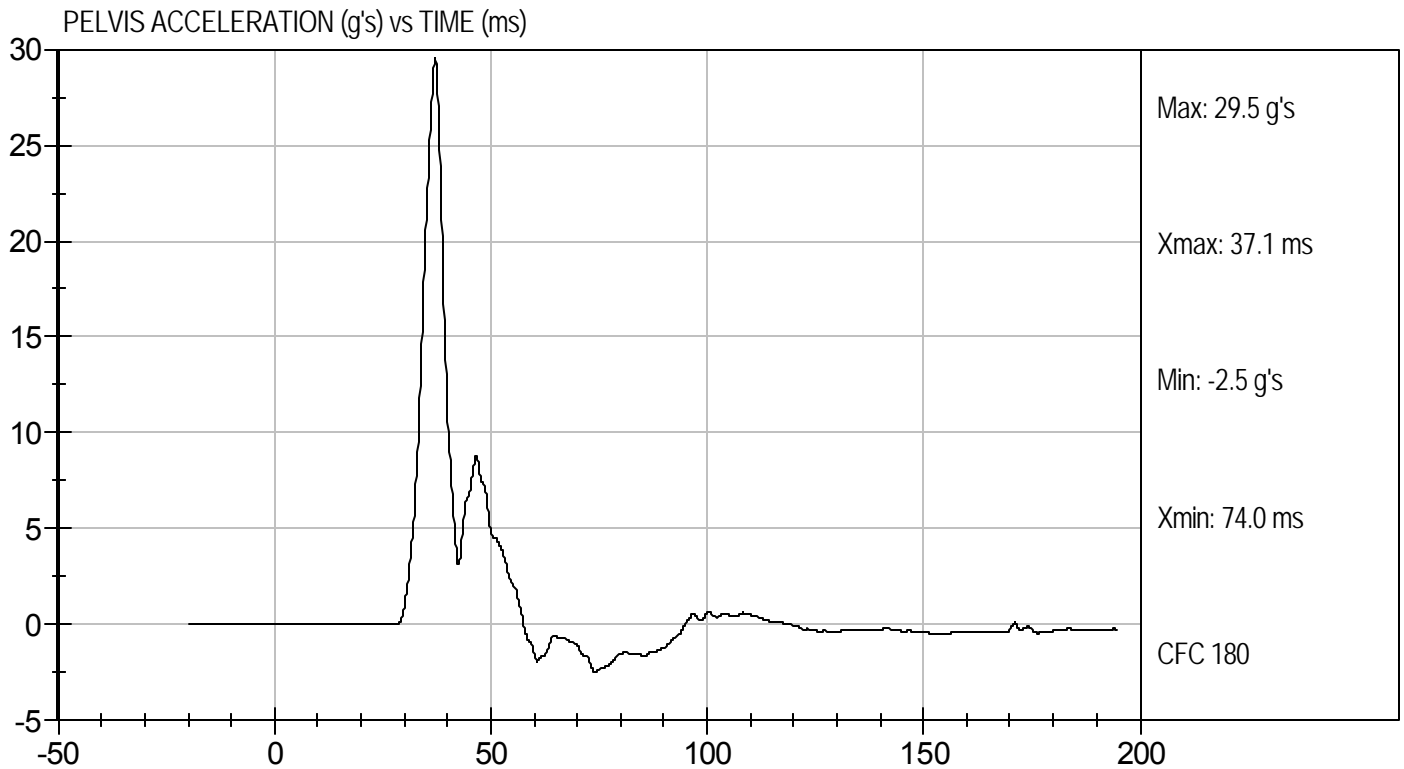
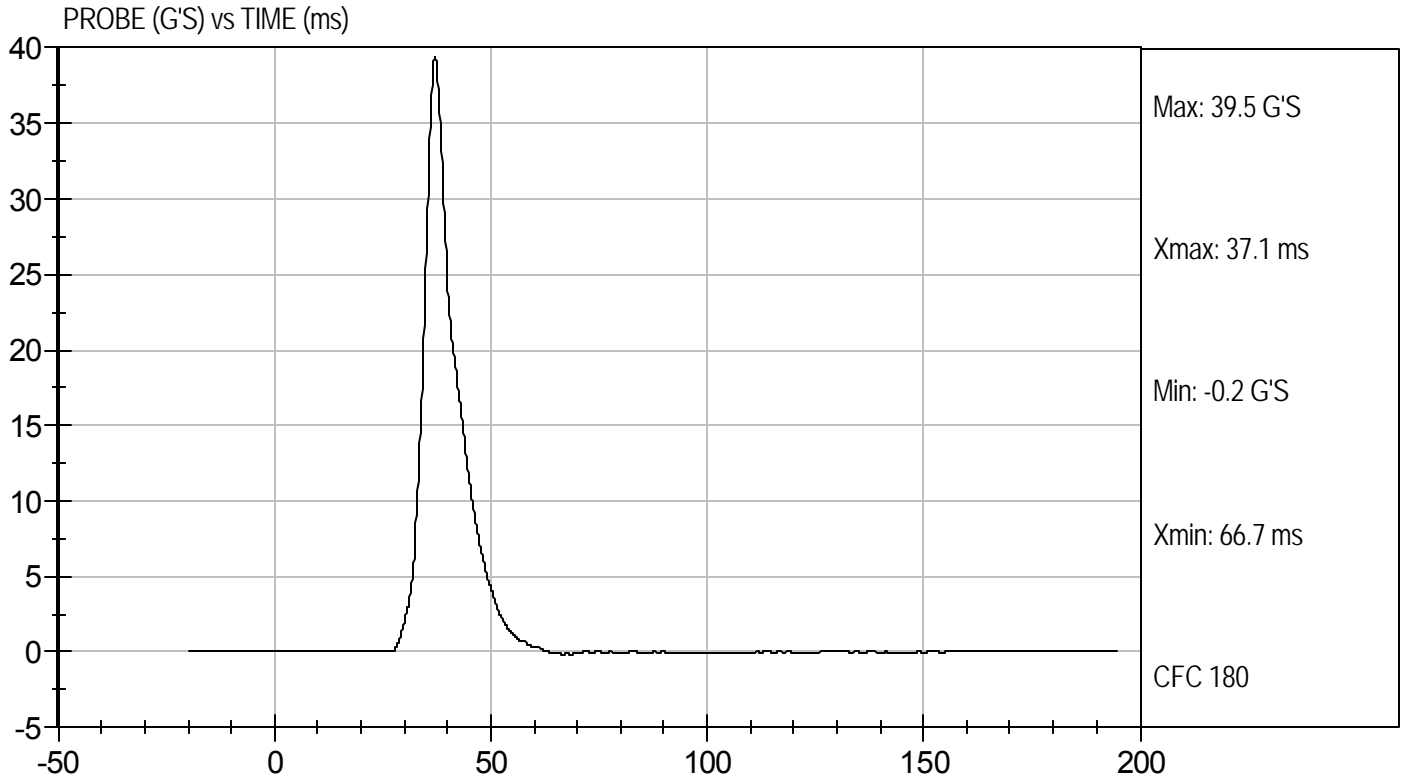
12/2/10  
 \_\_\_\_\_  
 Test Date

*David Winkelbauer*  
 \_\_\_\_\_  
 Approved By



Test Desc: Iliac Impact  
Component ID: D104208

Test Date: 12/2/10  
Velocity: 14.00 ft/s, 4.27 m/s





Test Desc: Iliac Impact  
Component ID: D104208

Test Date: 12/2/10  
Velocity: 14.00 ft/s, 4.27 m/s

