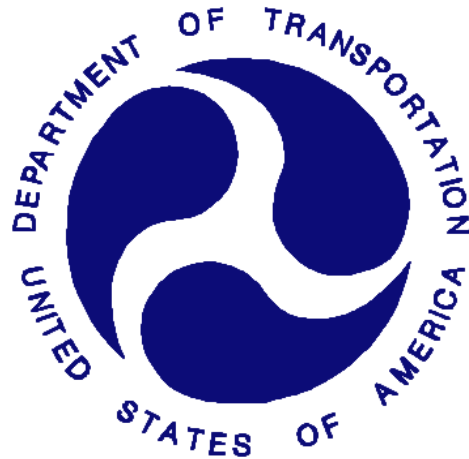


REPORT NUMBER: SINCAP-MGA-2012-073

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

**GENERAL MOTORS OF CANADA LTD.
2012 Buick Regal with eAssist 4-Dr Sedan
NHTSA No.: MC0119**

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



Test Date: March 6, 2012

Final Report Date: April 27, 2012

FINAL REPORT

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

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Prepared by: 
Donna Janovicz, Project Manager

Approved by: 
Ben Fischer, Project Engineer

Approval Date: April 27, 2012

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

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

Date: _____

Technical Report Documentation Page

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4. Title and Subtitle Final Report of New Car Assessment Program Side Impact MDB Testing of a 2012 Buick Regal with eAssist 4-Dr Sedan; NHTSA No.: MC0119		5. Report Date April 27, 2012																																																					
		6. Performing Organization Code MGA																																																					
7. Author(s) Donna Janovicz, Project Manager Ben Fischer, Project Engineer		8. Performing Organization Report No. SINCAP-MGA-2012-073																																																					
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12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards (NVS-111) 1200 New Jersey Ave, SE, Room W43-410 Washington, D.C. 20590		13. Type of Report and Period Covered: Final Test Report March 6, 2012 to April 27, 2012																																																					
		14. Sponsoring Agency Code NVS-111																																																					
15. Supplementary Notes																																																							
16. Abstract A 55/28 km/h 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2012 Buick Regal with eAssist 4-Dr Sedan 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 March 6, 2012. The impact velocity of the Moving Deformable Barrier (MDB) was 62.5 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 21.1°C. The target vehicle post-test maximum crush was 186 mm at level 2. The test vehicle's performance was as follows: <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th colspan="3">Driver ATD (ES-2re)</th> </tr> <tr> <th>Measurement Description</th> <th>Units</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td>N/A</td> <td>1000</td> <td>172</td> </tr> <tr> <td>Maximum Thorax Rib Deflection</td> <td>mm</td> <td>44</td> <td>19</td> </tr> <tr> <td>Total Abdominal Force</td> <td>N</td> <td>2500</td> <td>734</td> </tr> <tr> <td>Pubic Symphysis Force</td> <td>N</td> <td>6000</td> <td>1468</td> </tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th colspan="3">Passenger ATD (SID-IIs)</th> </tr> <tr> <th>Measurement Description</th> <th>Units</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td>N/A</td> <td>1000</td> <td>378</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td>Gs</td> <td>82</td> <td>65</td> </tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td> <td>N</td> <td>5525</td> <td>3761</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38*</td> <td>44</td> </tr> <tr> <td>Maximum Abdomen Rib Deflection</td> <td>mm</td> <td>45*</td> <td>16</td> </tr> </tbody> </table> *Proposed IARV 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.					Driver ATD (ES-2re)			Measurement Description	Units	Threshold	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	172	Maximum Thorax Rib Deflection	mm	44	19	Total Abdominal Force	N	2500	734	Pubic Symphysis Force	N	6000	1468		Passenger ATD (SID-IIs)			Measurement Description	Units	Threshold	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	378	Resultant Lower Spine Acceleration	Gs	82	65	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3761	Maximum Thoracic Rib Deflection	mm	38*	44	Maximum Abdomen Rib Deflection	mm	45*	16
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SECTION 1

TEST PURPOSE AND PROCEDURE

This moving deformable barrier side impact test is part of the MY 2012 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-09-D-00124. The purpose of this test is to generate comparative side impact performance in a 2012 Buick Regal with eAssist 4-Dr Sedan. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Laboratory Test Procedure dated August 2011.

SECTION 2 SUMMARY OF TEST RESULTS

A 2012 Buick Regal with eAssist 4-Dr Sedan 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 62.5 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 March 6, 2012. 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 August 2011. 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)

Primary and Redundant Head CG Triaxial Accelerometers
Chest Upper Rib, Middle Rib, and Lower Rib Y-Axis Displacement Potentiometers
Abdomen Forward, Middle, and Rear Y-Axis Load Cells
Lower Spine (T12) Triaxial Accelerometers
Pubic Symphysis Y-Axis Load Cell

PASSENGER ATD (SID-IIs)

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

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

Dummy Injury readings were recorded as follows:

DUMMY INJURY VALUES

Driver ATD (ES-2re)			
Measurement Description	Units	Threshold	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	172
Maximum Thorax Rib Deflection	mm	44	19
Total Abdominal Force	N	2500	734
Pubic Symphysis Force	N	6000	1468

Passenger ATD (SID-IIs)			
Measurement Description	Units	Threshold	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	378
Resultant Lower Spine Acceleration	Gs	82	65
Total Pelvic Force	N	5525	3761
Maximum Thoracic Rib Deflection	mm	38*	44
Maximum Abdomen Rib Deflection	mm	45*	16

*Proposed IARV

Supplemental restraint information is given below:

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side Driver		Struck Side Rear Passenger	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	No			
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso/Abdomen/Pelvis Airbag	Yes	Yes	No	
Seat Belt Pretensioner	Yes	Yes	No	
Seat Belt Load Limiter	Yes		No	
Other				

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

GENERAL COMMENTS

There was no valid data collected for:

Left Front Sill Y after 15ms

Left Lower A-Post Y

Left Lower B-Post Y

Left Mid B-Post Y

Vehicle CG Z is questionable from 14-27ms

Left Rear Sill Y is questionable from 75-81ms

Driver Seat Track Y is questionable from 11-23ms

Left Rear Seat Y is questionable from 4-6ms

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

SECTION 3
OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2012 Buick Regal with eAssist 4-Dr Sedan
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MC0119
 Test Date: 3/06/2012

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	MC0119	Traction Control System (TCS)	Yes
Model Year	2012	Auto-Leveling System	No
Make	Buick	Automatic Door Locks (ADL)	Yes
Model	Regal eAssist	Power Window Auto-Reverse	No
Body Style	Sedan	Other Optional Feature	N/A
VIN	2G4GR5ER6C9123753	Driver Front Airbag	Yes
Body Color	Quicksilver Metallic	Driver Curtain Airbag	Yes
Odometer Reading (km/mi)	319 / 198	Driver Head/Torso Airbag	No
Engine Displacement (L)	2.4	Driver Torso Airbag	No
Type/No. Cylinders	4	Driver Torso/Pelvis Airbag	Yes
Engine Placement	Lateral	Driver Pelvis Airbag	No
Transmission Type	Automatic	Driver Knee Airbag	No
Transmission Speeds	6	Rear Pass. Curtain Airbag	Yes
Overdrive	Yes	Rear Pass. Head/Torso Airbag	No
Final Drive	Front	Rear Pass. Torso Airbag	No
Roof Rack	No	Rear Pass. Torso/Pelvis Airbag	No
Sunroof/T-Top	No	Rear Pass. Pelvis Airbag	No
Running Boards	No	Driver Seat Belt Pretensioner	Yes
Tilt Steering Wheel	Yes	Rear Pass. Seat Belt Pretensioner	No
Power Seats	Driver Only	Driver Load Limiter	Yes
Anti-Lock Brakes (ABS)	Yes	Rear Pass. Load Limiter	No
All Wheel Drive (AWD)	No	Other Safety Restraint	N/A
Does owner's manual provide instruction to turn off automatic door locks?			No

DATA FROM CERTIFICATION LABEL

Manufactured By	General Motors of Canada Ltd.	GVWR (kg)	2069
Date of Manufacture	09/11	GAWR Front (kg)	1071
Vehicle Type	Passenger Car	GAWR Rear (kg)	998

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3		5	
Capacity Weight (VCW) (kg)				410	(A)
DSC x 68.04 kg				340	(B)
Rated Cargo and Luggage Weight (RCLW)				70	(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		X		
Third Row Seat							

GENERAL TEST AND VEHICLE PARAMETER DATA

NHTSA No. MC0119
Test Date: 3/06/2012

[illegible]

Measured Parameter	Front	Rear
Recommended Cold Tire Pressure (kPa)	240	240
Recommended Tire Size	P235/50R17	P235/50R17

Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	300	300
Tire Size on Vehicle	P235/50R17	P235/50R17
Tire Manufacturer	Michelin	Michelin
Tire Name	ENERGY SAVER A/S	ENERGY SAVER A/S
Tire Type	Passenger	Passenger
Tire Width	235	235
Aspect Ratio	50	50
Radial	Yes	Yes
Wheel Diameter	17	17
Load Index/Speed Symbol	95T	95T
Treadwear	480	480
Traction Grade	A	A
Temperature Grade	B	B
Tire Material	Rubber	Rubber

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

Test Vehicle: 2012 Buick Regal with eAssist 4-Dr Sedan
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MC0119
 Test Date: 3/06/2012

TEST PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kpa	240	240	240	240
Tire Placard	kpa	240	240	240	240
Owner's Manual	kpa				
As Tested	kpa	240	240	240	240

MDB TIRE SPECIFICATIONS

	Requirement	Units	LF	RF	LR	RR
Tire Size	P205/75R15	N/A	P205/75R15	P205/75R15	P205/75R15	P205/75R15
Tire	200 ± 21	kpa	220	220	220	220

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	508.5	333.8		528.4	432.3		548.4	425.0	
Right	kg	472.7	332.5		472.7	406.9		476.3	397.4	
Ratio	%	59.6	40.4		54.4	45.6		55.5	44.5	
Totals	kg	981.2	666.3	1647.5	1001.1	839.2	1840.3	1024.7	822.4	1847.1

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1647.5	(A)
Sum of Actual Weight of 2 P572 ATDs Used	kg	129.3	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	70	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1846.8	(A+B+C)

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

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Weight of Ballast, if any	44.9
Right taillight, air pump, trunk cargo cover, right trunk lining.	5.9

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

Test Vehicle:	<u>2012 Buick Regal with eAssist 4-Dr Sedan</u>	NHTSA No.	<u>MC0119</u>
Test Program:	<u>NCAP Side MDB Impact Test</u>	Test Date:	<u>3/06/2012</u>

TEST VEHICLE ATTITUDES AND CG

	Units	Fully Loaded	As Tested	Meets Requirement***
Left Front	mm	706	699	Yes
Right Front	mm	716	707	Yes
Right Rear	mm	708	698	Yes
Left Rear	mm	698	688	Yes
Vehicle CG (Aft of Front Axle)	mm	1218	1247	
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	43	35	

*** The "As Tested" vehicle attitude measurements must be equal to or within ± 10 mm of the "Fully Loaded" vehicle attitude measurements at each wheel well.

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

Test Vehicle: 2012 Buick Regal with eAssist 4-Dr Sedan
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MC0119
 Test Date: 3/06/2012

SEAT POSITIONING

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

SCRL ANGLE RANGE

Seat	SCRL (°)		
	Max	Min	Mid
Driver Seat	23.3	12.5	17.9
Front Passenger Seat	21.4	16.7	19.1
Front Center Seat			
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCR Height (mm)	SCR Height Position	SCR Height (mm)		
				Rear- most	Mid- Fore/Aft	Forward- Most
Driver Seat	17.9	34	Max	68	68	68
	17.9	34	Mid	34	34	34
	17.9	34	Min	0	0	0
Front Passenger Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
	Fixed	Fixed	Mid	Fixed	Fixed	Fixed
	Fixed	Fixed	Min	Fixed	Fixed	Fixed
Front Center Seat			Max			
			Mid			
			Min			
Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
	Fixed	Fixed	Mid	Fixed	Fixed	Fixed
	Fixed	Fixed	Min	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
	Fixed	Fixed	Mid	Fixed	Fixed	Fixed
	Fixed	Fixed	Min	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
	Fixed	Fixed	Mid	Fixed	Fixed	Fixed
	Fixed	Fixed	Min	Fixed	Fixed	Fixed

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

Test Vehicle: 2012 Buick Regal with eAssist 4-Dr Sedan
 Test Program: NCAP Side MDB Impact Test

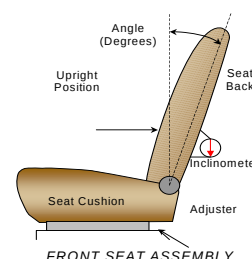
NHTSA No. MC0119
 Test Date: 3/06/2012

SEAT FORE/AFT POSITIONS

Seat	Total Fore/Aft Travel		Test Position from Forward-most Position	
	mm	Detents	mm	Detent
Driver Seat	270		135	
Front Passenger Seat	270	59 (1 st as 0)	135	30 th (1 st as 0)
Front Center Seat				
Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Non-Struck Side	Fixed	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed	Fixed

SEAT BACK ANGLE ADJUSTMENT

The driver's seat back is positioned to the manufacturer's designated design angle. The front passenger's seat back is positioned in a similar manner as the driver's seat back. The struck side rear seat back is fixed. The rear center and non-struck side rear outboard seat backs are also fixed.



Seat	Total Seat Back Angle Range		Test Position from Vertical	
	Degrees	Detents	Degrees	Detent
Driver Seat w/Seated Dummy	91.8		-11.7	
Front Passenger Seat	90.0		-11.3	
Front Center Seat				
Struck Side Rear Seat	Fixed	Fixed	17.6*	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	17.6*	Fixed
Rear Center Seat	Fixed	Fixed	17.6*	Fixed

*Seat back was fixed, angle measured on headrest post.

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

Test Vehicle: 2012 Buick Regal with eAssist 4-Dr Sedan NHTSA No. MC0119
 Test Program: NCAP Side MDB Impact Test Test Date: 3/06/2012

SEAT BELT ANCHORAGE ADJUSTMENT

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

	Total # of Positions	Placed in Position #
Driver Seat	4 detents (1 st as 0)	0 (uppermost as 0)
Rear Seat	Fixed	Not Applicable

HEAD RESTRAINT ADJUSTMENT

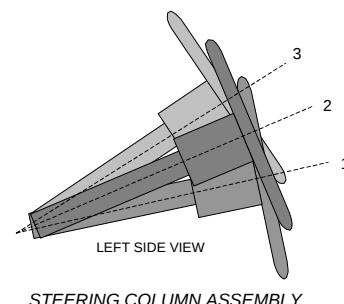
The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

	Total # of Positions	Placed in Position #
Driver Seat	9	Highest
Rear Seat	5	Lowest

STEERING COLUMN ADJUSTMENT

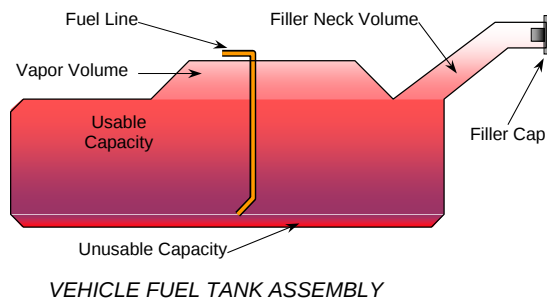
Steering wheel and column adjustments are made so that the steering wheel geometric locus is described when it moves through its full range of motion.

	Degrees	Fore/Aft Position (mm)
Lowermost, Position 1	70.4	242
Geometric Center, Position 2	68.3	214
Uppermost, Position 3	66.2	186
Telescoping Steering Wheel Travel		56
Test Position	68.3	214



FUEL PUMP

Describe the fuel pump type, details about how it operates and the location of the fuel filler pipe. The vehicle is equipped with an electric fuel pump. Pump will run when engine is running. Also, it will run briefly when ignition key is turned to the "on" position without starting the engine. The fuel pipe is on the right side.



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

Test Vehicle: 2012 Buick Regal with eAssist 4-Dr Sedan NHTSA No. MC0119
 Test Program: NCAP Side MDB Impact Test Test Date: 3/06/2012

FUEL TANK CAPACITY DATA

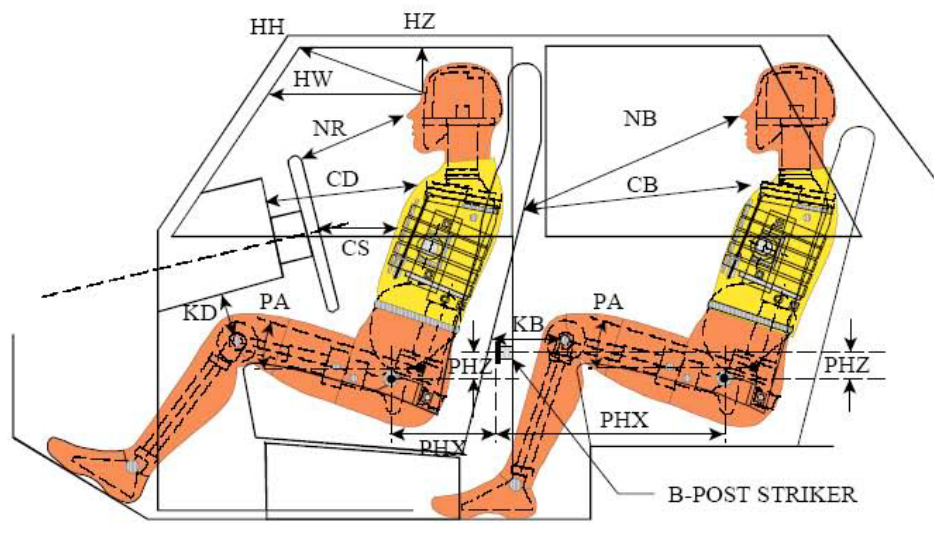
	Liters
Usable Capacity of "Standard" Tank (see Form No. 1)	59.8
Usable Capacity of "Optional" Tank (see Form No. 1)	
Usable Capacity of Standard Tank as Specified in Owner's Manual	59.8
Usable Capacity of Optional Tank as Specified in Owner's Manual	
93% of Usable Capacity	55.6
Actual Amount of Solvent Used	55.6
1/3 of Usable Capacity	19.9

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

DATA SHEET NO. 3 DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2012 Buick Regal with eAssist 4-Dr Sedan
Test Program: NCAP Side MDB Impact Test

NHTSA No. MC0119
Test Date: 3/06/2012



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

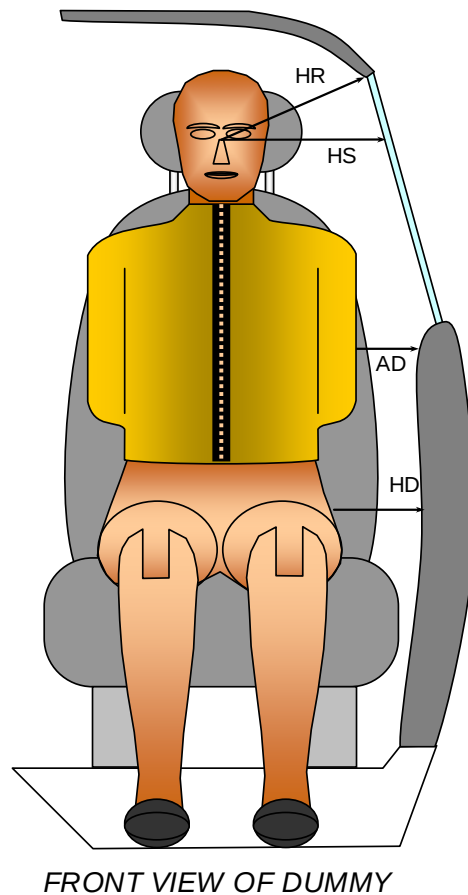
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver S/N 032		Passenger S/N 296	
			Length (mm)	Angle(°)	Length (mm)	Angle(°)
HH		Head to Header	453	11.8		
HW		Head to Windshield	752			
HZ	HZ	Head to Roof Liner	200		215	
NR	NB	Nose to Rim/Seat Back	504	12.2	514	17.3
CD	CB	Chest to Dashboard/Seat Back	640	6.3	477	12.5
CS		Chest to Steering Wheel	415	5.2		
KDL	KBL	Left Knee to Dash/Seat Back	200	28.4	204	29.5
KDR	KBR	Right Knee to Dash/Seat Back	178	32.3	207	35.7
PAX	PAX	Pelvic Tilt Angle X		26.8		28.6
	PAY	Pelvic Tilt Angle Y		-0.9		-1.2
PHX	PHX	Hip Point to Striker (X-Axis)	165		231	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	197		268	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2012 Buick Regal with eAssist 4-Dr Sedan
Test Program: NCAP Side MDB Impact Test

NHTSA No. MC0119
Test Date: 3/06/2012



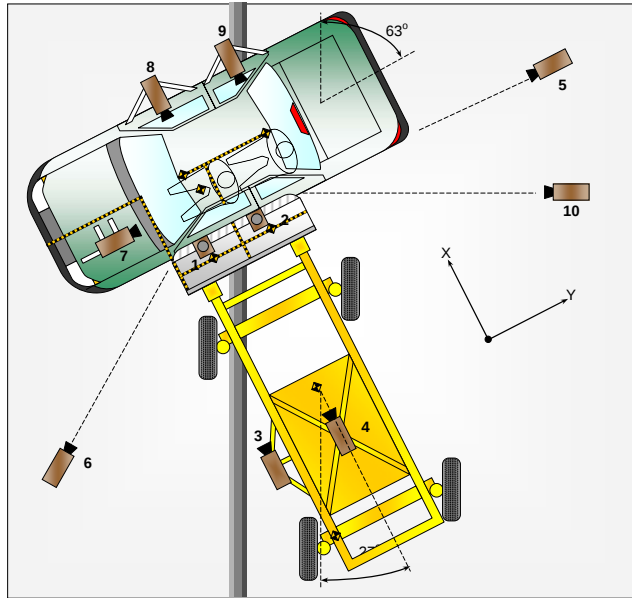
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver S/N 032	Passenger S/N 296
HR	Head to Side Header	mm	192	207
HS	Head to Side Window	mm	339	269
AD	Arm to Door	mm	121	170
HD	Hip Point to Door	mm	164	181

DATA SHEET NO. 5 CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2012 Buick Regal with eAssist 4-Dr Sedan
Test Program: NCAP Side MDB Impact Test

NHTSA No. MC0119
Test Date: 3/06/2012



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X*	Y*	Z*		
1	Overhead Overall	100	590	-4860	14	1000
2	Overhead Close-Up	100	470	-4860	20	1000
3	Left Impact Point (MDB)				50	1000
4	Side Overall (MDB)				16	1000
5	Rear	110	4520	-1100	24	1000
6	Left Front	2340	-4390	-1090	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 ± 6 mm

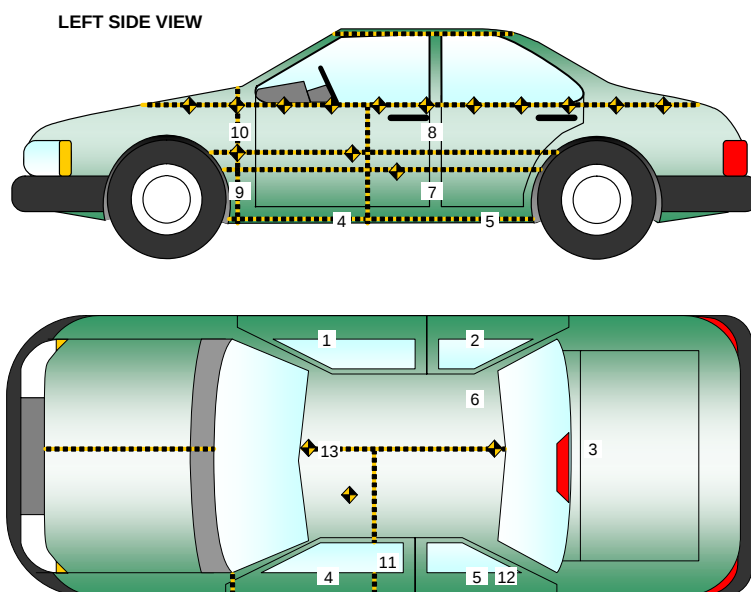
Explain why camera(s) did not operate as intended: Not Applicable

INSTRUMENTATION

Driver Dummy Channels	16
Passenger Dummy Channels	16
Vehicle Structure Accelerometers	23
MDB Accelerometers	5
MDB Contacts	2
Total	62

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

Test Vehicle: 2012 Buick Regal with eAssist 4-Dr Sedan NHTSA No. MC0119
Test Program: NCAP Side MDB Impact Test Test Date: 3/06/2012



TEST VEHICLE ACCELEROMETER LOCATIONS

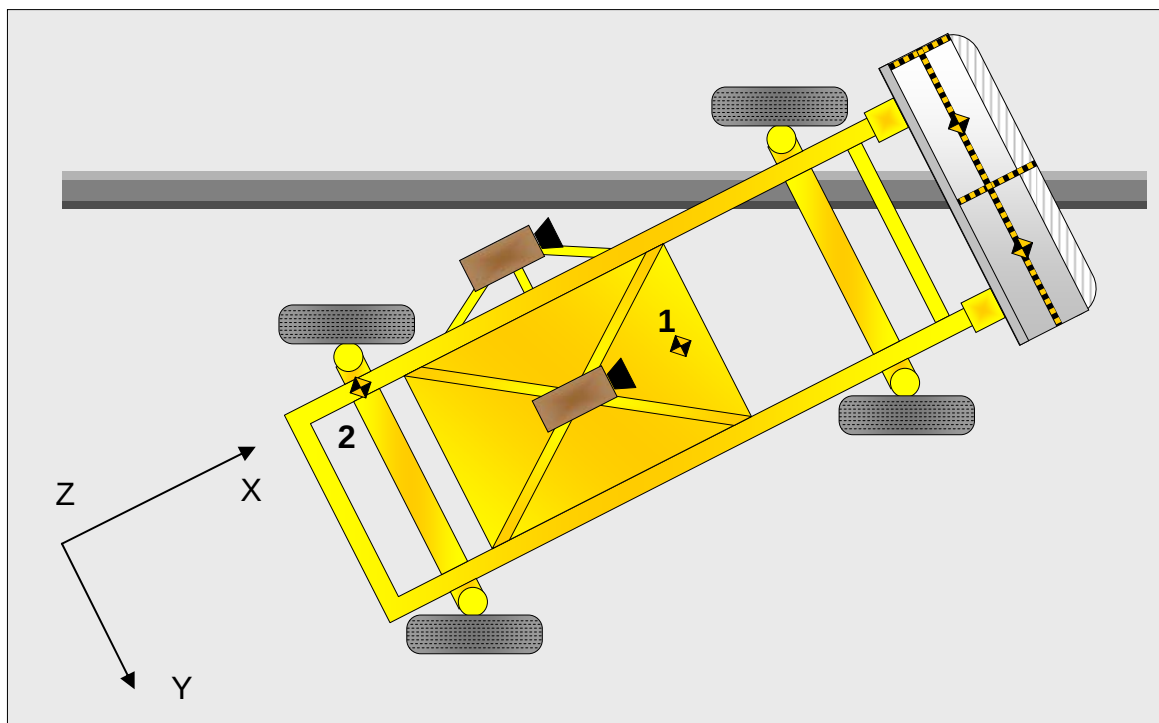
Accelerometer Location				
No.	ID	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2622	-150	-174
2	Right Sill at Front Seat	2399	745	-201
3	Right Sill at Rear Seat	1907	735	-211
4	Left Sill at Front Door	2399	-745	-196
5	Left Sill at Rear Door	1872	-735	-201
6	Left Lower A-Post	3184	-722	-482
7	Left Middle A-Post	3214	-821	-745
8	Left Lower B-Post	2114	-728	-540
9	Left Middle B-Post	2311	-729	-790
10	Front Seat Track	2408	-552	-390
11	Rear Seat Structure	1911	-358	-301
12	Rt. Rear Occ. Compartment	1974	538	-230
13	Engine Block	3954	21	-804
14	Rear Above Axle	947	0	-373

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

DATA SHEET NO. 7
MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2012 Buick Regal with eAssist 4-Dr Sedan
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MC0119
 Test Date: 3/06/2012



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
POST-TEST OBSERVATIONS

Test Vehicle: 2012 Buick Regal with eAssist 4-Dr Sedan
Test Program: NCAP Side MDB Impact Test

NHTSA No. MC0119
Test Date: 3/06/2012

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Front Seat Dummy (ES-2re)	Rear Seat Dummy (SID-IIs)
Face	Curtain Airbag	Curtain Airbag
Top of Head	Headliner	Curtain Airbag, Headliner
Left Side of Head	Curtain Airbag, Headliner	Curtain Airbag
Back of Head	Curtain Airbag, Headliner, Headrest	Curtain Airbag, Headrest, Seatback
Left Shoulder	Door Panel	Door Panel
Upper Torso	Side Airbag, Seatback	Door Panel, Seatback
Lower Torso	Side Airbag, Seatback	Door Panel, Seatback
Left Hip	Side Airbag	Door Panel, Seat Cushion
Left Knee	Door Panel	Door Panel

POST-TEST DOOR PERFORMANCE

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

POST-TEST SEAT PERFORMANCE

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

POST-TEST STRUCTURAL OBSERVATIONS

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

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

Test Vehicle: 2012 Buick Regal with eAssist 4-Dr Sedan NHTSA No. MC0119
 Test Program: NCAP Side MDB Impact Test Test Date: 3/06/2012

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side Driver		Struck Side Rear Passenger	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	No			
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso/Abdomen/Pelvis Airbag	Yes	Yes	No	
Seat Belt Pretensioner	Yes	Yes	No	
Seat Belt Load Limiter	Yes		No	
Other				

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		2735
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		428
Actual Impact Point (Aft of Front Axle)	mm		438
Horizontal Offset (+forward / -rearward)	mm	+/- 50 of intended impact point	-10
Vertical Offset (+down / -up)	mm	+/- 20 of intended impact point	+2

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2012 Buick Regal with eAssist 4-Dr Sedan NHTSA No. MC0119
Test Program: NCAP Side MDB Impact Test Test Date: 3/06/2012

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 ANGLE AT IMPACT DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.5
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	90.1
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	63.1
MDB Crabbed Angle to MDB Forward Line of Motion	degrees	26 to 28	26.9

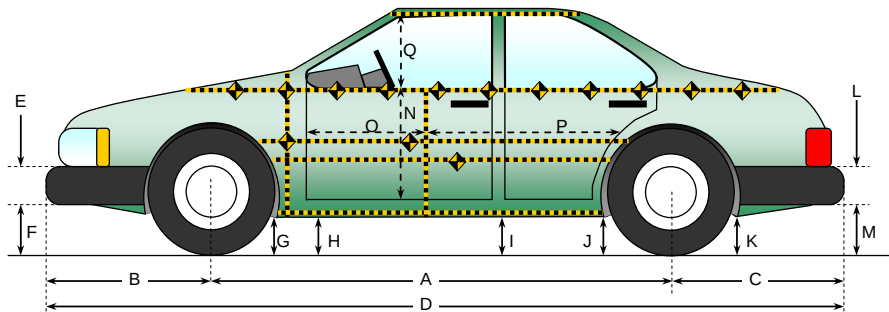
MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Vertical Location			From Centerline		Maximum Crush
Row	Description	Height	Distance	Direction	
A	Center of Bumper	432	800	Right	224
B	Top of Bumper	533	700	Right	135
C	Mid-Level	686	800	Left	109
D	Top of Stack	813	800	Left	103

DATA SHEET NO. 10
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2012 Buick Regal with eAssist 4-Dr Sedan
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MC0119
 Test Date: 3/06/2012



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

LEFT SIDE VIEW

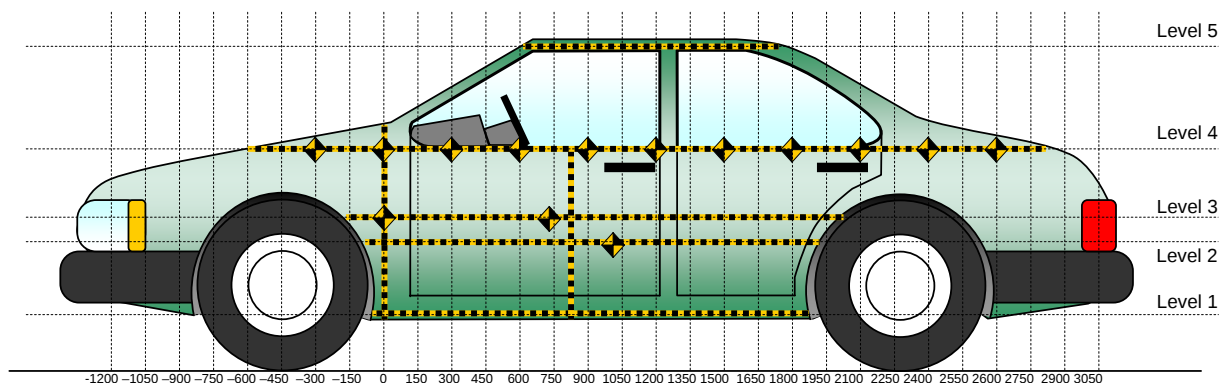
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2735	2725	10
B	Front Axle to FSOV	1034	1032	2
C	Rear Axle to RSOV	1077	1077	0
D	Total Length at Centerline	4846	4834	12
E	Front Bumper Thickness	140	140	0
F	Front Bumper Bottom to Ground	245	254	-9
G	Sill Height at Front Wheel Well	163	170	-7
H	Sill Height at Front Door Leading Edge	163	163	0
I	Sill Height at B Pillar	162	157	5
J1	Sill Height at Rear Wheel Well	161	169	-8
J2	Pinch Weld Height at Rear Wheel Well	166	167	-1
K	Sill Height Aft of Rear Wheel Well	218	224	-6
L	Rear Bumper Thickness	124	124	0
M	Rear Bumper Bottom to Ground	330	345	-15
N	Sill Height to Window Bottom Sill	750	692	58
O	Front Door Leading Edge to Impact CL	802	788	14
P	Rear Door Trailing Edge to Impact CL	1108	1103	5
Q	Front Window Opening	414	412	2
R	Right Side Length	3528	3526	2
S	Left Side Length	3528	3498	30
T	Vehicle Width at B Post	1819	1675	144

DATA SHEET NO. 11 **TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2012 Buick Regal with eAssist 4-Dr Sedan
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MC0119
 Test Date: 3/06/2012



All Measurements Shown in mm

LEFT SIDE VIEW

MAXIMUM EXTERIOR CRUSH MEAUREMENTS

Level	Measurement Description	Height Above Ground (mm)	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	220	68	1200
2	Occupant Hip Point	502	186	450
3	Mid Door	605	185	1800
4	Window Sill	918	123	1650
5	Window Top	1384	27	1200

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

DATA SHEET NO. 11 (CONTINUED)
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2012 Buick Regal with eAssist 4-Dr Sedan NHTSA No. MC0119
 Test Program: NCAP Side MDB Impact Test Test Date: 3/06/2012

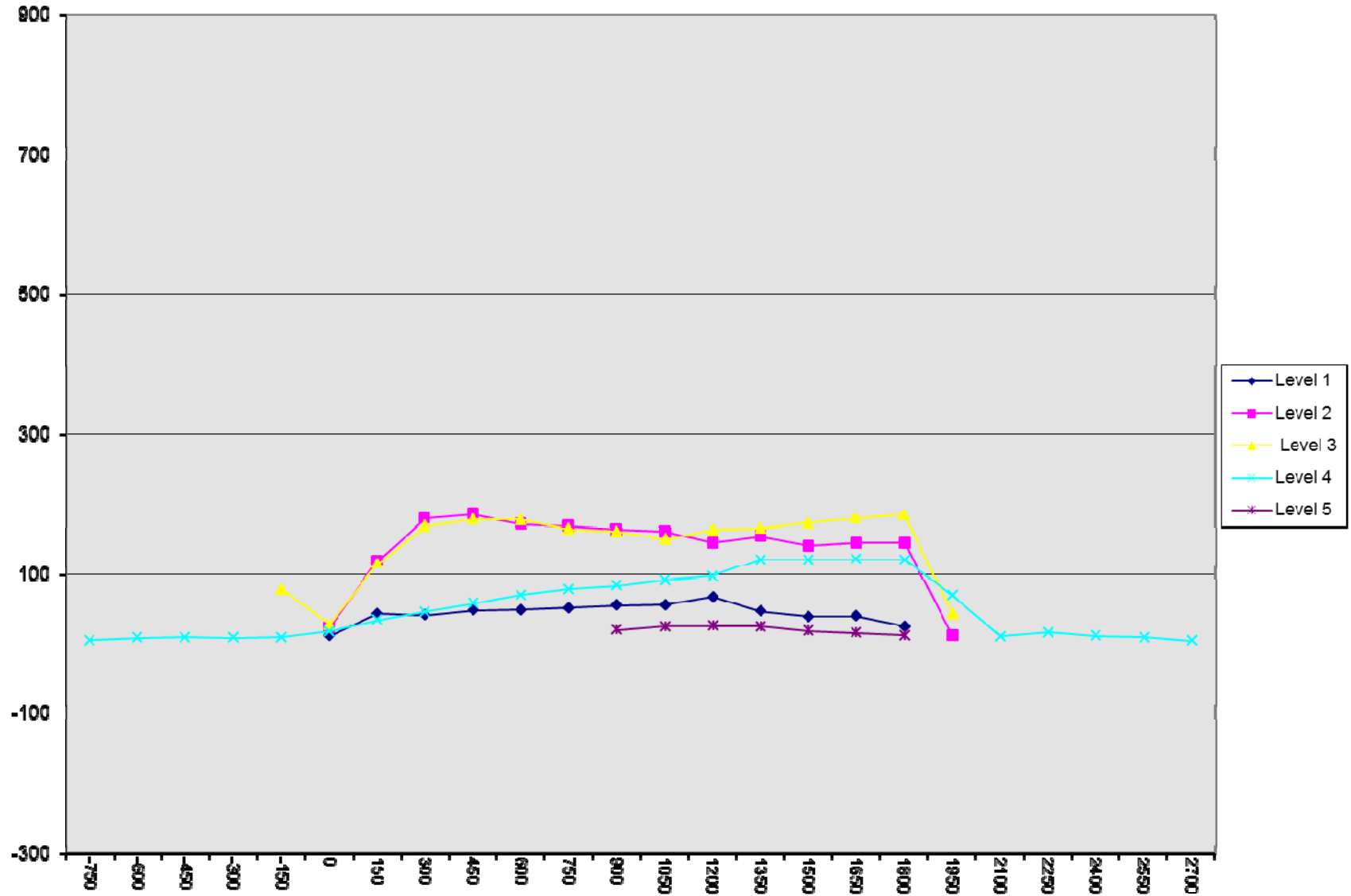
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-750				367					374					7	
-600				345					355					10	
-450				325					336					11	
-300				308					318					10	
-150			179	295				258	306				79	11	
0	231	191	191	280		244	216	220	299		13	25	29	19	
150	237	195	192	270		281	315	308	305		44	120	116	35	
300	236	200	194	261		278	380	363	308		42	180	169	47	
450	235	199	191	254		284	385	370	313		49	186	179	59	
600	234	196	190	248		284	368	368	319		50	172	178	71	
750	233	195	190	242		286	364	355	321		53	169	165	79	
900	234	195	189	239	491	290	359	350	323	512	56	164	161	84	21
1050	235	195	189	235	485	292	356	340	327	511	57	161	151	92	26
1200	236	196	191	233	486	304	342	355	330	513	68	146	164	97	27
1350	240	199	194	232	490	288	354	360	354	516	48	155	166	122	26
1500	242	201	196	233	495	282	343	370	355	515	40	142	174	122	20
1650	248	206	200	236	503	289	352	380	359	520	41	146	180	123	17
1800	250	209	205	239	516	276	355	390	361	530	26	146	185	122	14
1950		191	196	241			204	240	311			13	44	70	
2100				246					258					12	
2250				255					273					18	
2400				264					277					13	
2550				275					286					11	
2700				294					300					6	

NOTE: Pre-test measurements are taken when the vehicle is in the "As Tested" weight condition. Vehicle measurements forward of the vertical impact reference line are negative. The crush profile grid is established prior to the test based on an estimated impact point.

DATA SHEET NO. 11 (CONTINUED)
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2012 Buick Regal with eAssist 4-Dr Sedan
Test Program: NCAP Side MDB Impact Test

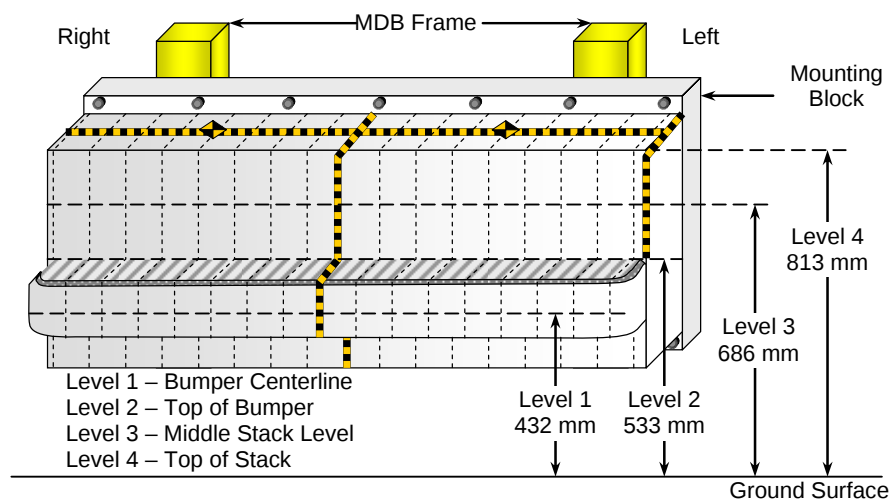
NHTSA No. MC0119
Test Date: 3/06/2012



DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2012 Buick Regal with eAssist 4-Dr Sedan
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MC0119
 Test Date: 3/06/2012



DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center (mm)								C _L	Distance Left of Center (mm)							
	800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
4	40	29	27	13	22	47	87	65	40	43	38	48	53	62	74	88	103
3	47	45	33	31	29	26	35	59	39	25	20	14	16	23	35	59	109
2	129	135	132	116	105	85	75	73	69	75	78	88	85	81	83	82	101
1	224	201	187	181	180	180	159	152	155	145	140	131	126	122	124	141	144

DATA SHEET NO. 13
FMVSS 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

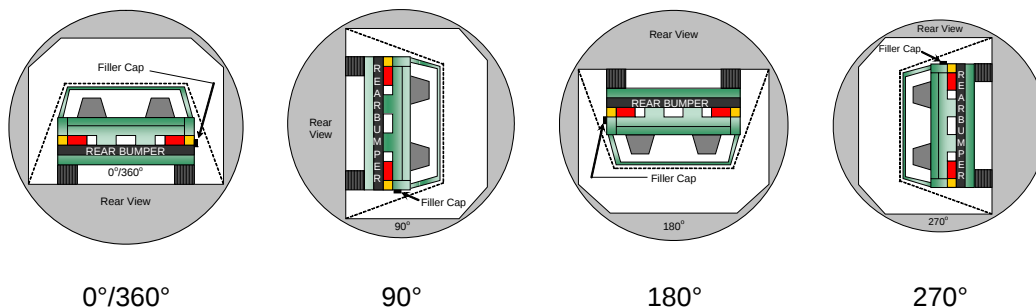
Test Vehicle: 2012 Buick Regal with eAssist 4-Dr Sedan
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MC0119
 Test Date: 3/06/2012

Test Time: 12:13 pm Temperature: 21.1° 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°	148	300	448
90° to 180°	140	300	440
180° to 270°	118	300	418
270° to 360°	165	300	465

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

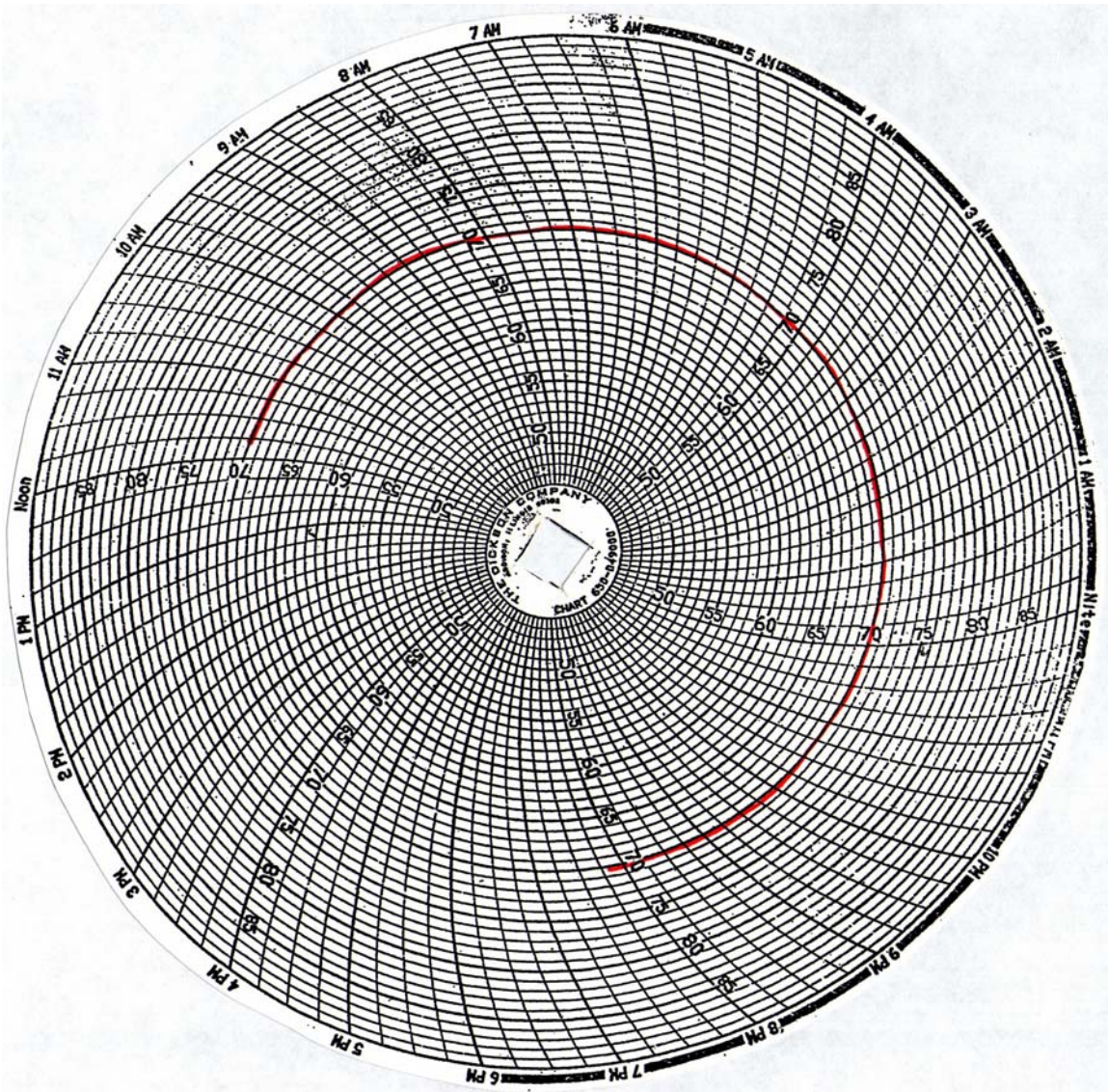
ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 14
DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

Test Vehicle: 2012 Buick Regal with eAssist 4-Dr Sedan
Test Program: NCAP Side MDB Impact Test

NHTSA No. MC0119
Test Date: 3/06/2012



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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



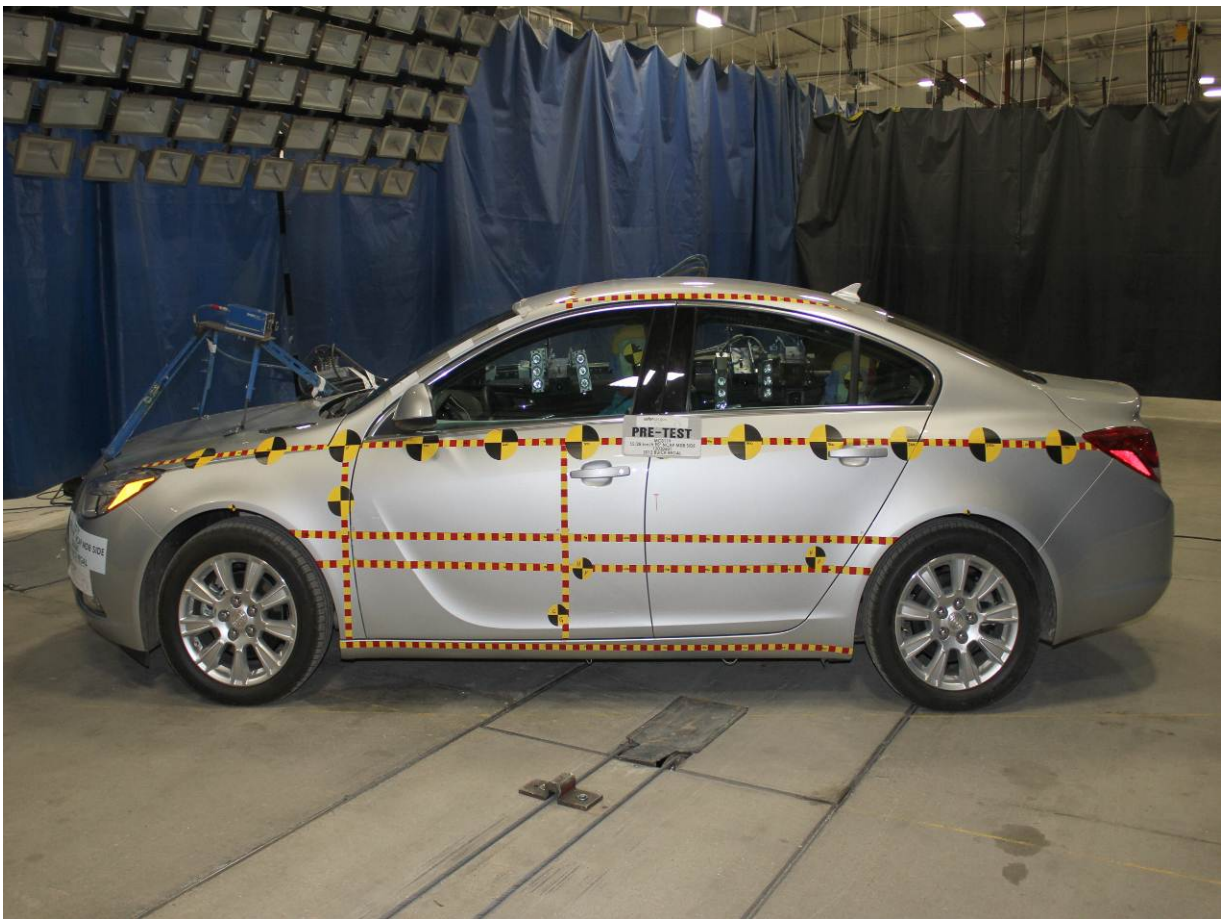
Post-Test Frontal View of Test Vehicle



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



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



Pre-Test Left Side View of Test Vehicle



Post-Test Left Side View of Test Vehicle



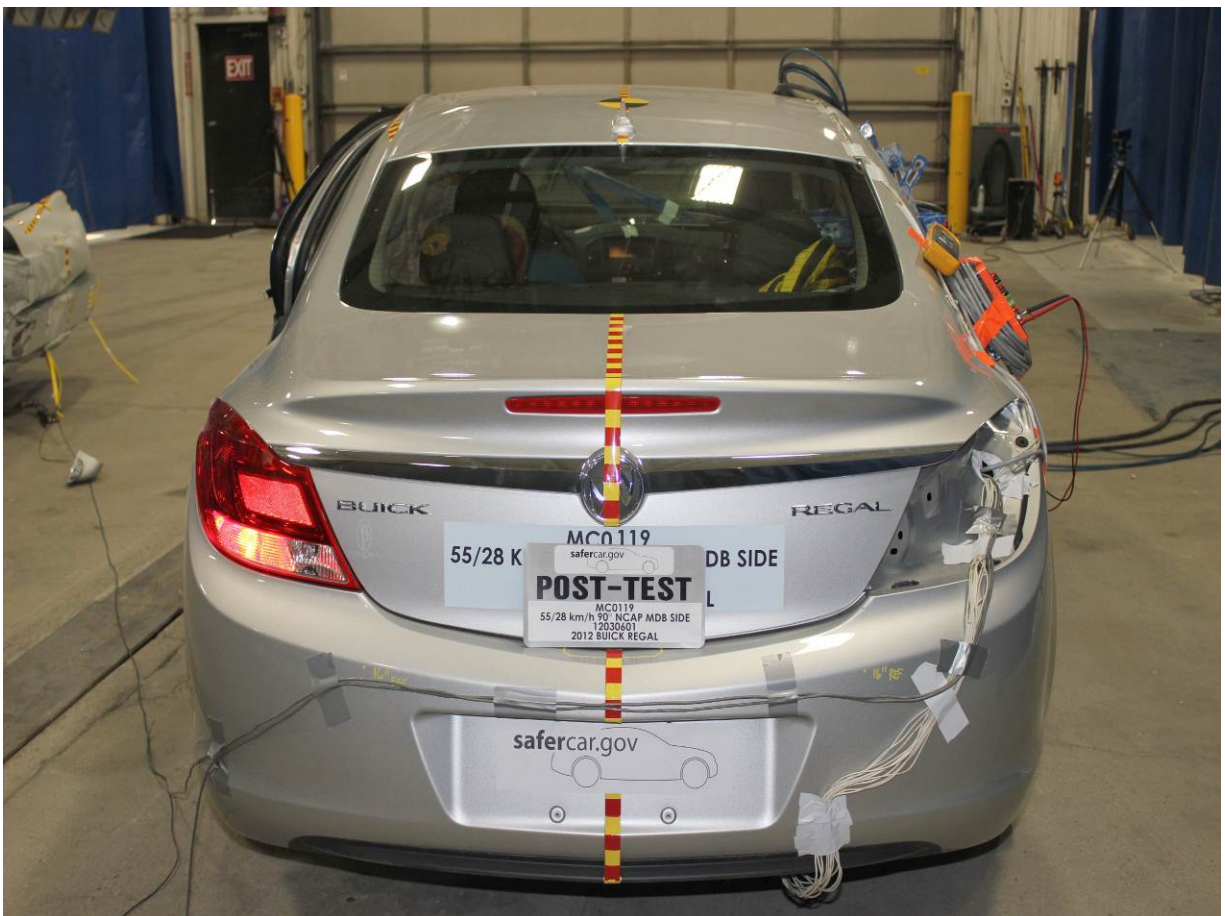
Pre-Test Left Three-Quarter Rear View of Test Vehicle



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



Pre-Test Rear View of Test Vehicle



Post-Test Rear View of Test Vehicle



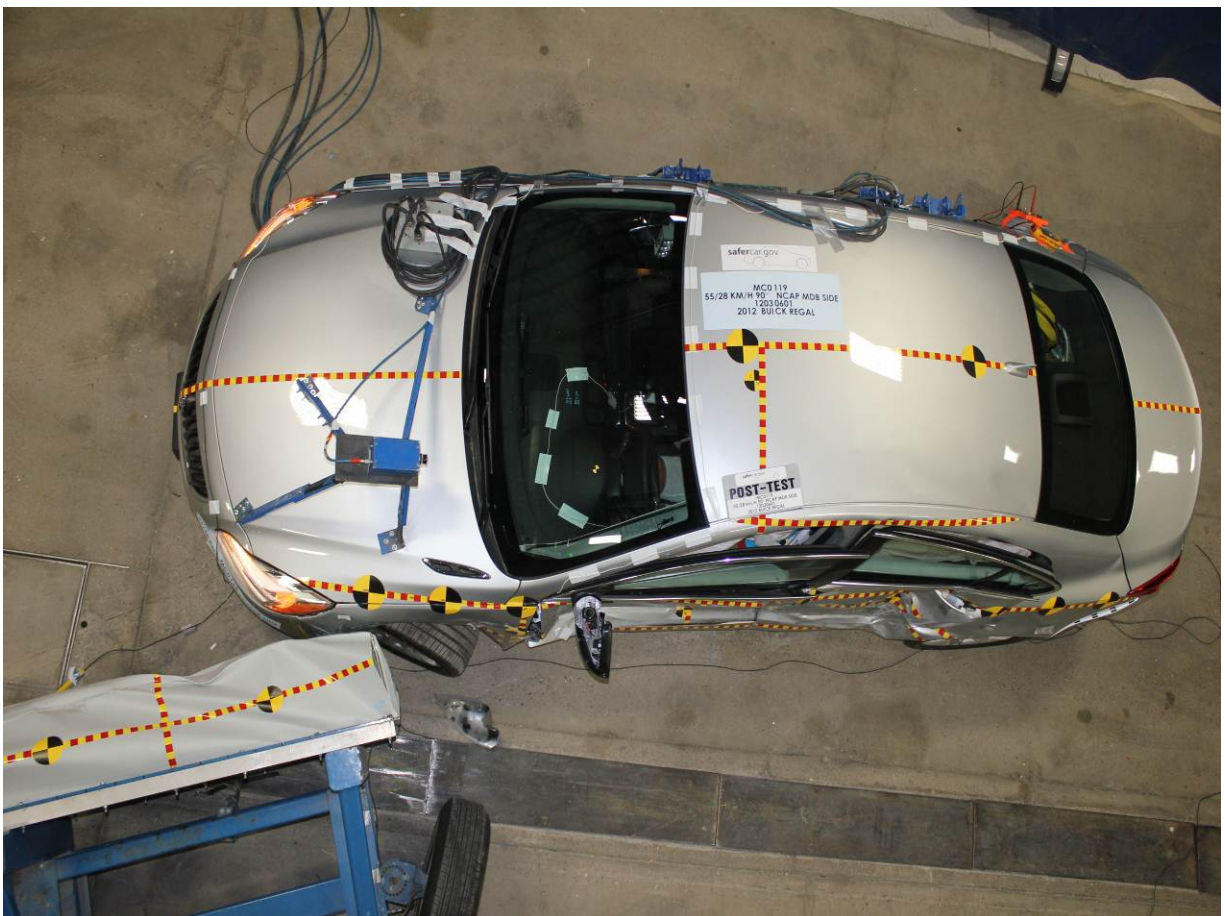
Pre-Test Right Side View of Test Vehicle



Post-Test Right Side View of Test Vehicle



Pre-Test Overhead View of Test Area



Post-Test Overhead View of Test Area



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 Front Close-Up View of Driver Dummy



Post-Test Front Close-Up View of Driver Dummy



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



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 Disengaged Parking Brake



Pre-Test View of Parking Brake



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



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



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



Pre-Test Driver Dummy and Door Clearance View



Post-Test Driver Dummy and Door Clearance View



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



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



Pre-Test Driver Inner Door Panel View



Post-Test Driver Inner Door Panel View



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



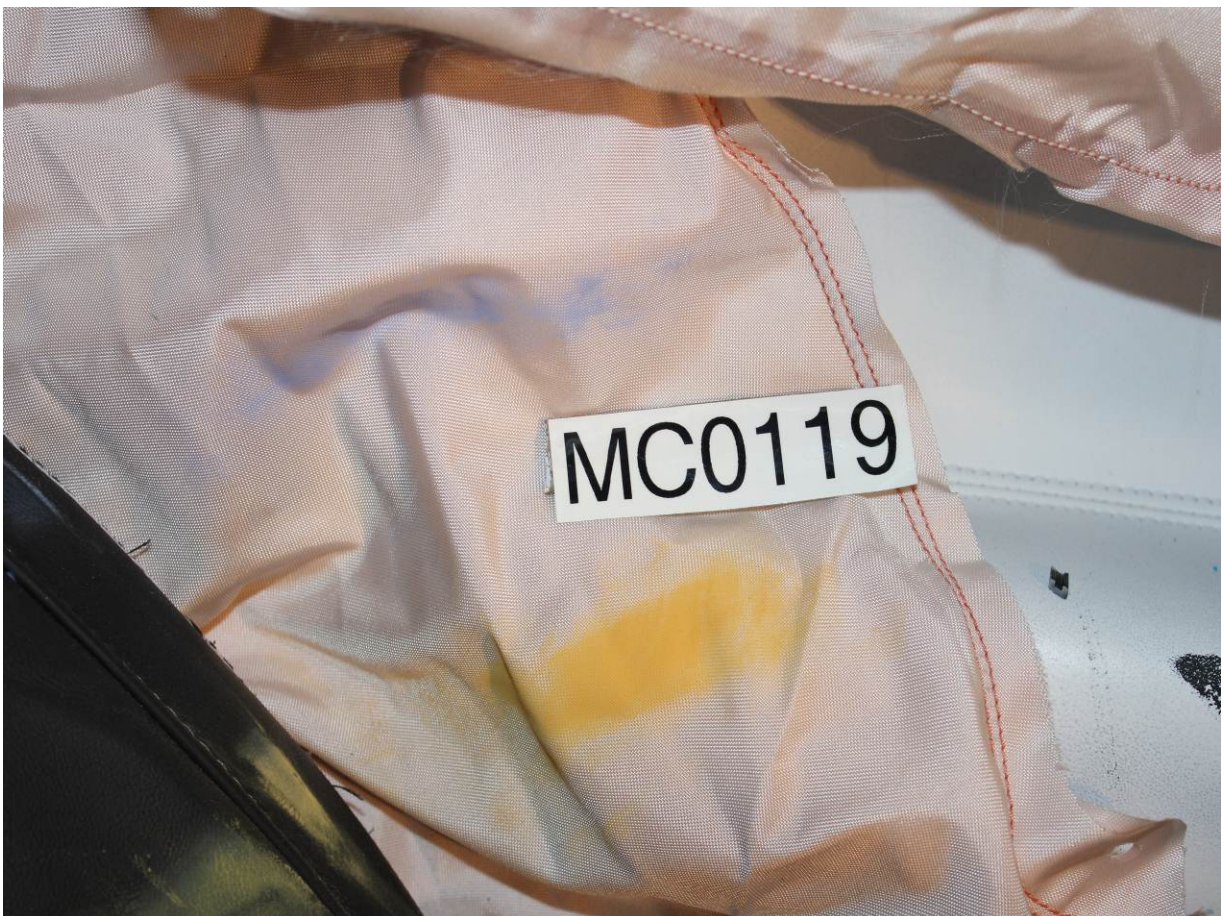
Post-Test Driver Dummy Close-up Head Contact with Vehicle Interior View



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



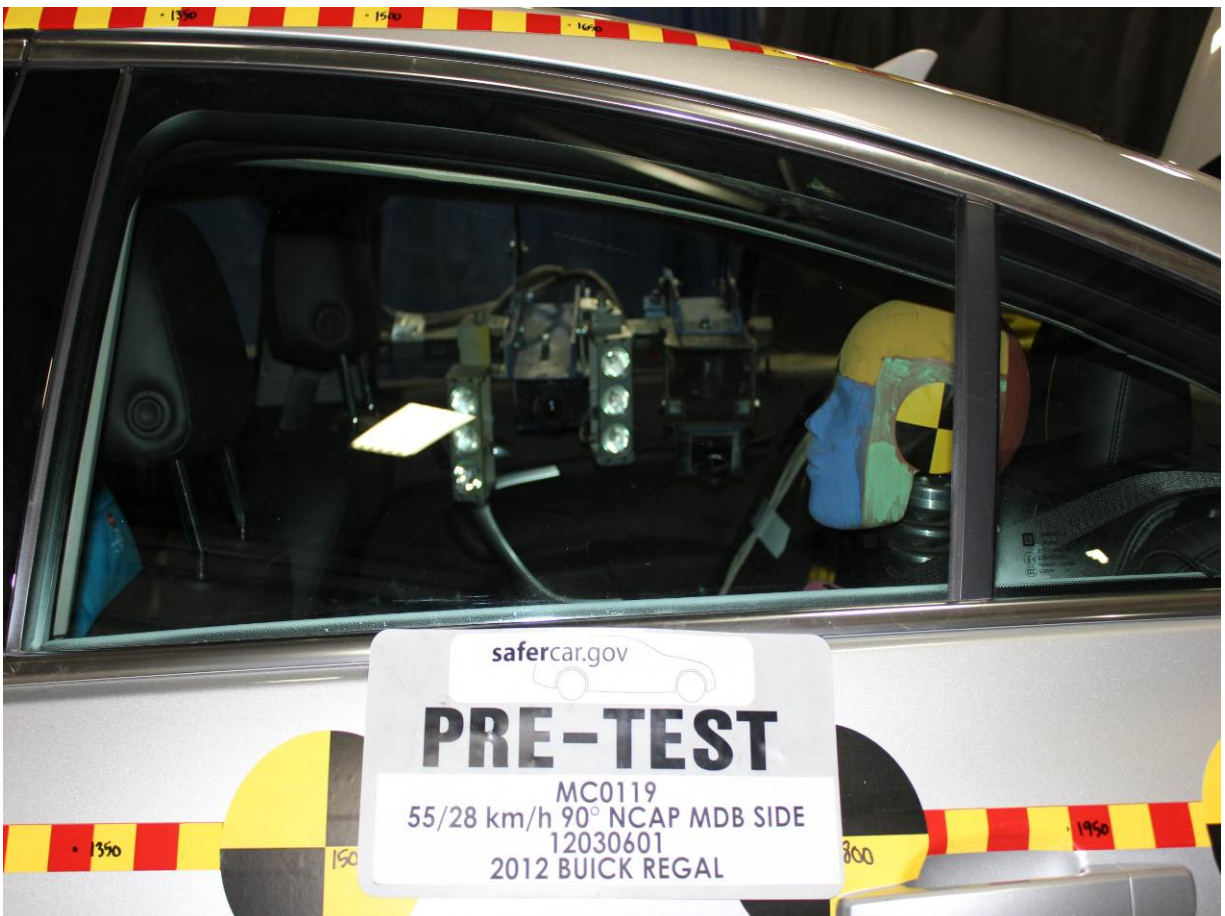
Post-Test Driver Dummy Close-up Pelvis Contact with Vehicle Interior View



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



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



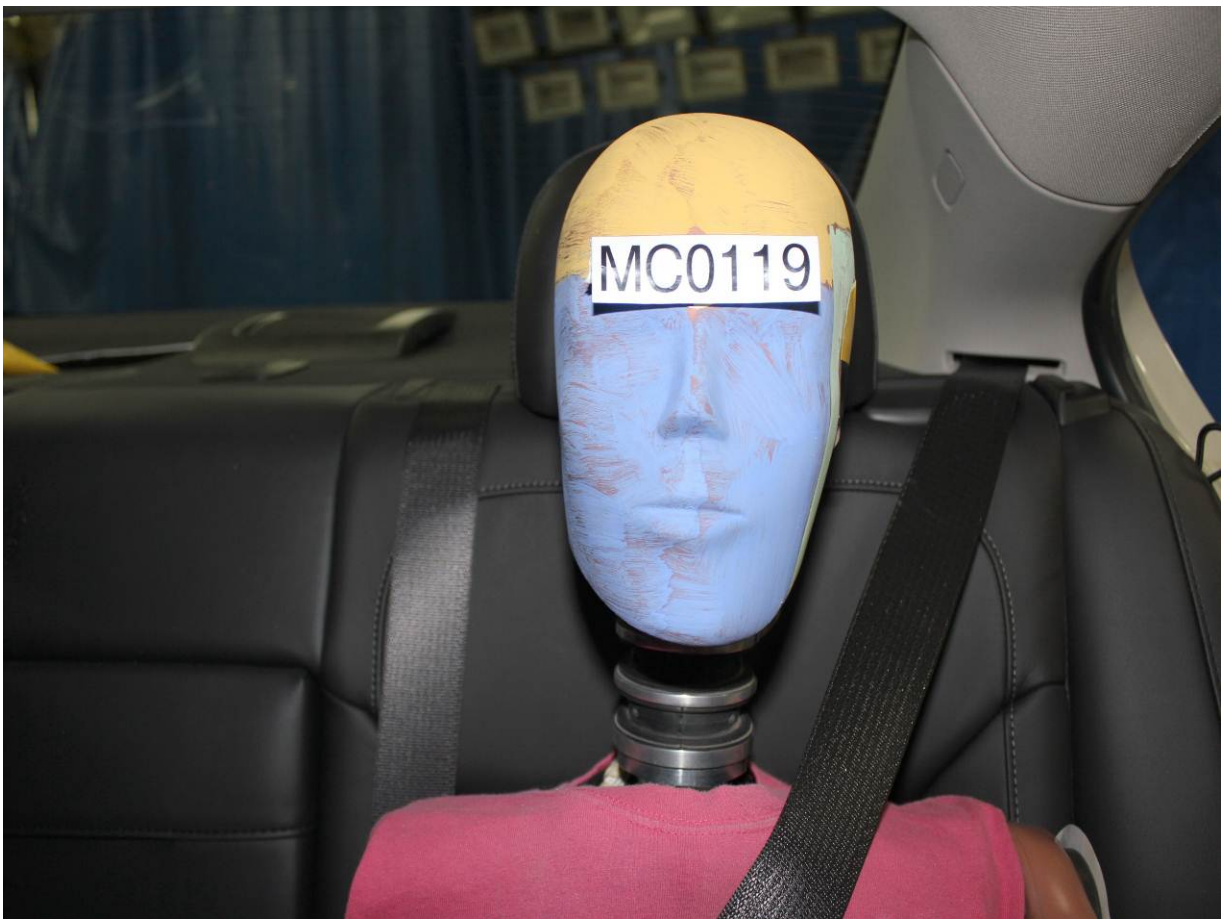
Pre-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View



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



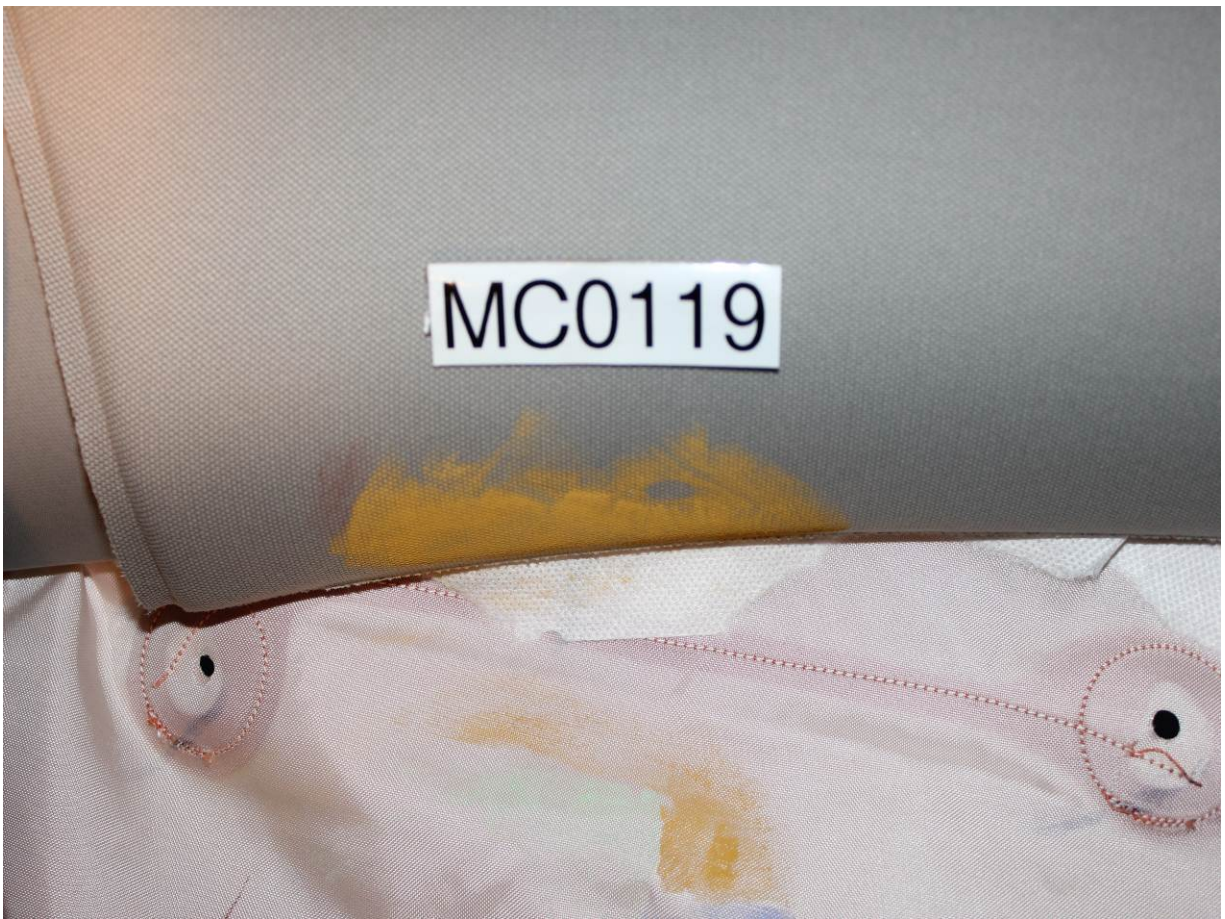
Post-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment



Pre-Test Rear Passenger Inner Door Panel View



Post-Test Rear Passenger Inner Door Panel View



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



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



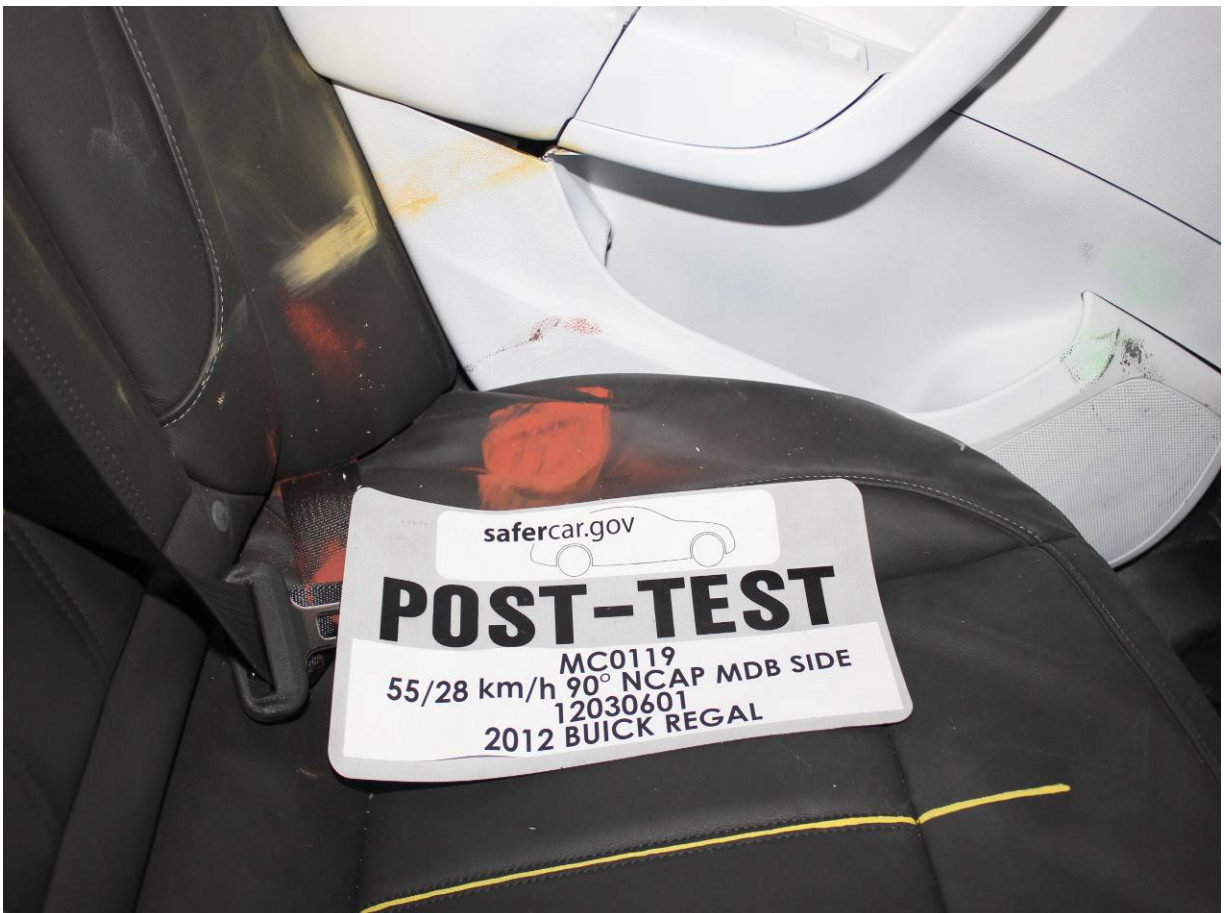
Post-Test Rear Passenger Dummy Close-up Head Contact with Side Airbag View



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

PHOTOGRAPH NOT APPLICABLE

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



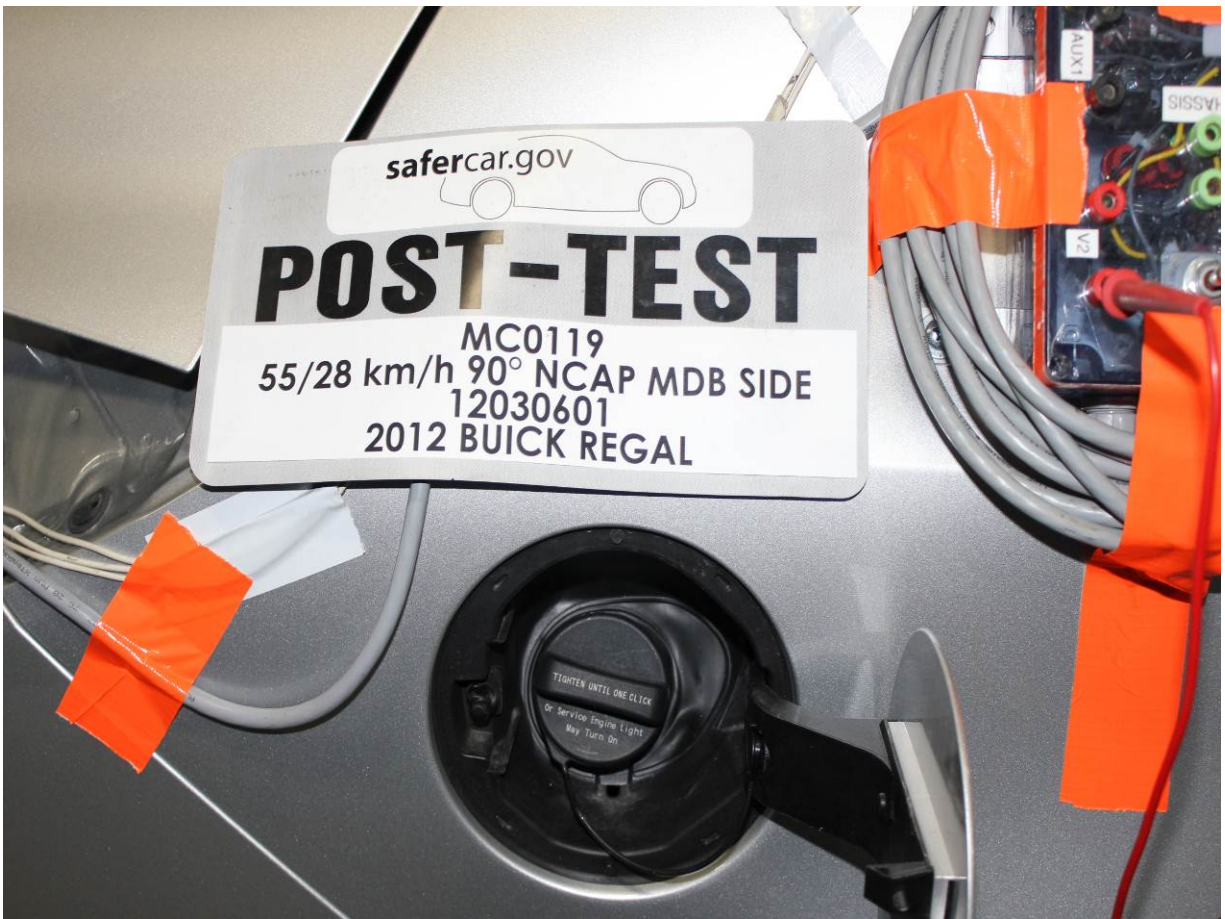
Post-Test Rear Passenger Dummy Close-up Pelvis Contact with Vehicle Interior View

PHOTOGRAPH NOT APPLICABLE

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



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



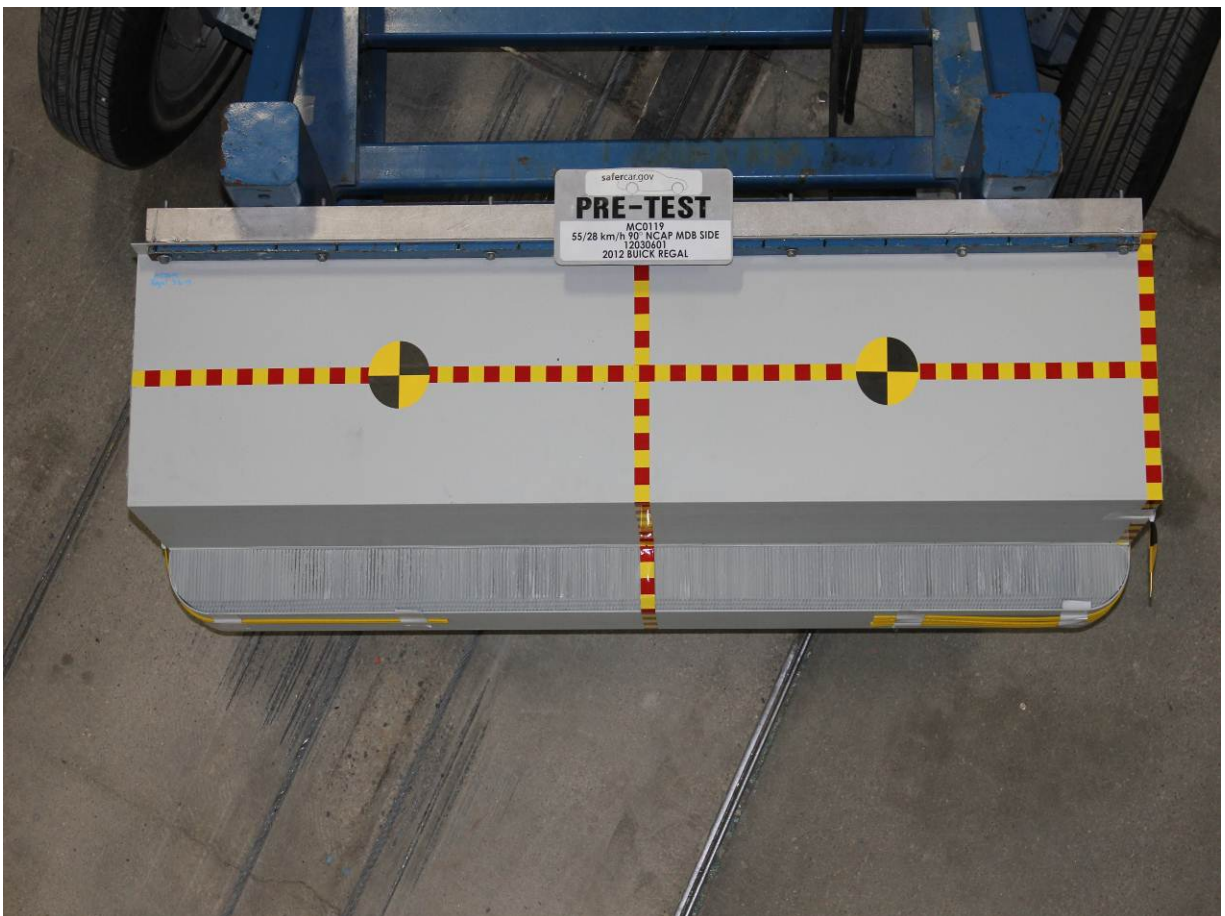
Post-Test View of Fuel Filler Cap or Fuel Filler Neck



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



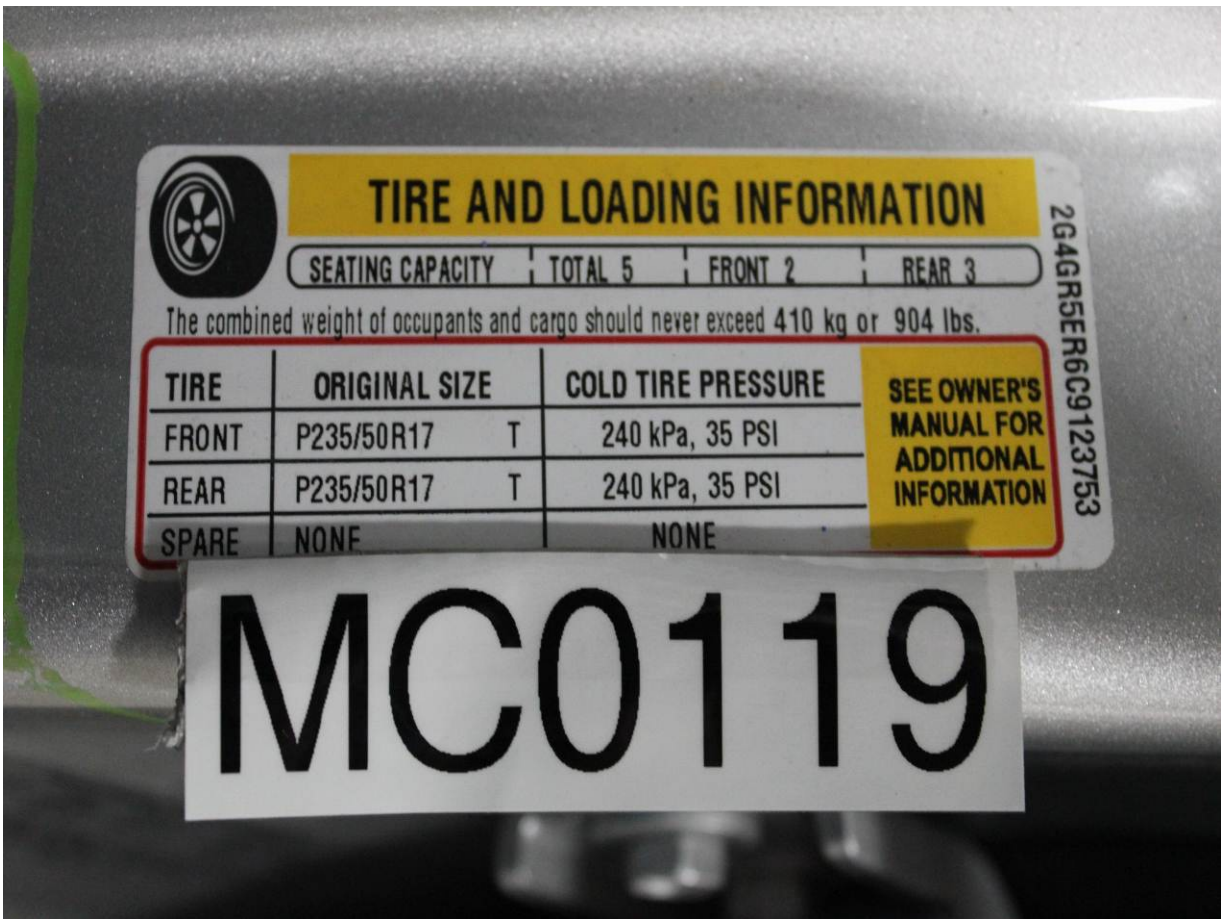
Pre-Test Right Side View of MDB Impactor Face



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



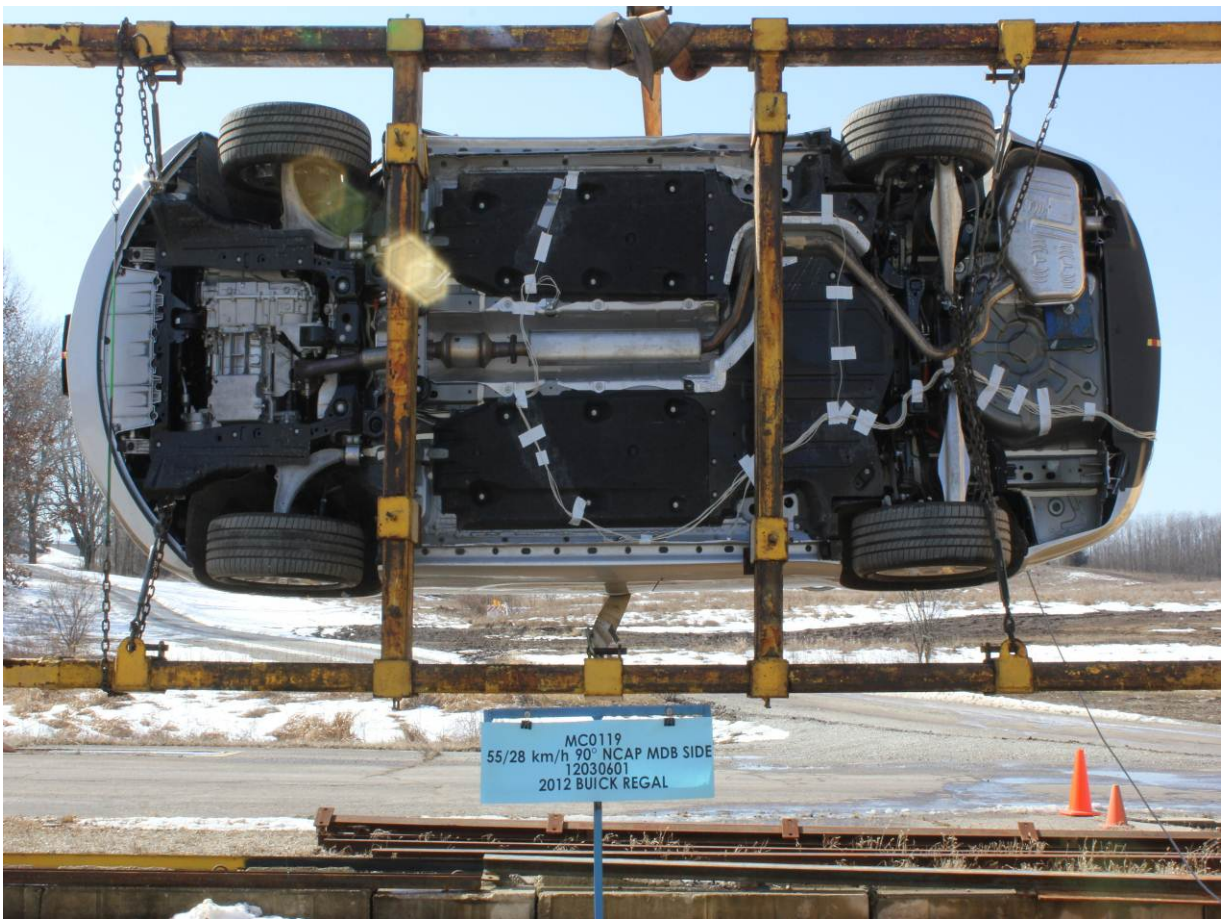
Pre-Test Ballast View



Post-Test Primary and Redundant Speed Trap Read-Out



FMVSS No. 301 Static Rollover 0 Degrees



FMVSS No. 301 Static Rollover 90 Degrees



FMVSS No. 301 Static Rollover 180 Degrees



FMVSS No. 301 Static Rollover 270 Degrees



FMVSS No. 301 Static Rollover 360 Degrees



Impact Event



2012 REGAL

EXTERIOR: QUICKSILVER METALLIC
INTERIOR: EBONY W/ PIANO BLACK
ACCENTS

ENGINE: ECOTEC 2.4L DOHC 4CYL
TRANSMISSION: 6-SPEED AUTOMATIC

Visit us at www.buick.com

STANDARD EQUIPMENT			
ITEMS FEATURED BELOW ARE INCLUDED AT NO EXTRA CHARGE IN THE STANDARD VEHICLE PRICE SHOWN			
• 5 YEAR / 100,000 MILE POWERTRAIN LIMITED WARRANTY SEE DEALER FOR DETAILS			
• 4 YEAR/50,000 MILE BUMPER-TO-BUMPER WARRANTY SEE DEALER FOR DETAILS			
MECHANICAL			
• ENGINE, 2.4L ECOTEC DOHC 4 CYL 16V W/ VVT			
• TRANSMISSION, 6 SPD AUTOMATIC			
SAFETY & SECURITY			
• 2011 TOP SAFETY PICK AWARD FROM THE INSURANCE INSTITUTE FOR HIGHWAY SAFETY			
• 6 MOS. ONSTAR DIRECTIONS & CONNECTIONS W/ AUTOMATIC CRASH RESPONSE, TURN-BY-TURN NAVIGATION, AND ONSTAR REMOTE LINK (ASK DEALER ABOUT			
(GEOGRAPHIC COVERAGE)			
• ANTILOCK BRAKE SYSTEM, 4 WHEEL DISC			
• STABILITRAK-STABILITY CONTROL SYSTEM W/ TRACTION CONTROL			
• AIRBAGS, DUAL FRONTAL, HEAD CURTAIN SIDE AIRBAGS, FRONT SIDE IMPACT AIRBAGS			
• AIRBAG SENSING SYSTEM, PASSENGER			
• DAYTIME RUNNING LAMPS			
• REAR CHILD SEAT LATCH ANCHORS			
• REAR DR LOCKS, CHILD SECURITY			
• TIRE PRESSURE MONITORING SYSTEM			
EXTERIOR			
• WHEELS, 18" PAINTED ALLOY			
• HEADLAMPS, HALOGEN W/ FLASH TO PASS, AUTOMATIC ON/OFF			
• FRONT FOG LAMPS			
• POWER DUAL OUTSIDE MIRRORS, HEATED			
INTERIOR			
• POWER OUTLETS (2) 12 VOLT			
• PWR SEAT ADJUST, DRIVER, 8 WAY			
• PWR SEAT ADJUST, DRIVER 4-WAY LUMBAR			
• AIR CONDITIONING, DUAL ZONE CLIMATE CONTROL			
• AIR FILTRATION SYSTEM			
• BLUETOOTH FOR PHONE			
• CONVENIENCE NET, TRUNK			
• CRUISE CONTROL			
• DRIVER & FRONT PASSENGER HEATED SEATS			
• FLOOR MATS, FRONT & REAR			
• DRIVER INFORMATION CENTER			
• INSIDE REARVIEW MIRROR, AUTO DIMMING			
• LEATHER WRAP STEERING WHEEL			
• POWER WINDOWS, DRIVER & PASSENGER EXPRESS UP/DOWN			
• POWER DOOR LOCKS WITH LOCKOUT PROTECTION			
• REAR SEAT, 60/40 SPLIT FOLDING SEATBACK			
• REMOTE KEYLESS ENTRY			
• SEATS, LEATHER APPOINTED			
• STEERING COLUMN, TILT AND TELESCOPIC			
• STEERING WHEEL CONTROLS			
• AUX/AM/FM STEREO, CD PLAYER			
• USB PORT			
• AUDIO SYSTEM, 7 SPEAKERS			
• XM RADIO + SERVICE SUBSCRIPTION SOLD SEPARATELY BY SIRIUSXM AFTER 3 MTHS			
OPTIONS & PRICING			
MANUFACTURER'S SUGGESTED RETAIL PRICE			
STANDARD VEHICLE PRICE		\$26,670.00	
OPTIONS INSTALLED BY THE MANUFACTURER (MAY REPLACE STANDARD EQUIPMENT SHOWN)			
ENGINE, ECOTEC 2.4L DOHC 4CYL WITH E-ASSIST, AND 17"		2,000.00	
MACHINED ALLOY WHEELS REPLACING 18" PAINTED ALLOY WHEELS		-50.00	
UNIT BUILD WITHOUT POWER MIRROR TURN SIGNAL INDICATORS			
TOTAL OPTIONS		\$1,950.00	
TOTAL VEHICLE & OPTIONS		\$28,620.00	
DESTINATION CHARGE		860.00	
TOTAL VEHICLE PRICE*		\$29,480.00	

EPA Fuel Economy Estimates <table border="1"> <tr> <td> GASOLINE CITY MPG 25 Expected range for most drivers 20 to 30 MPG *Fuel economy when operating on E85 will yield different values than gasoline. See Fuel Economy Guide for more information. </td><td> HYBRID VEHICLE* GASOLINE - ELECTRICITY Estimated Annual Fuel Cost \$1,915 based on 15,000 miles at \$3.70 per gallon of GASOLINE Combined GASOLINE Fuel Economy This Vehicle 29 TO ESTIMATE YOUR ANNUAL FUEL COST, SEE THE FREE FUEL ECONOMY GUIDE </td><td> GASOLINE HIGHWAY MPG 36 Expected range for most drivers 29 to 43 MPG Your actual mileage will vary depending on how you drive and maintain your vehicle. </td></tr> </table> See the FREE Fuel Economy Guide at dealers or www.fueleconomy.gov	GASOLINE CITY MPG 25 Expected range for most drivers 20 to 30 MPG *Fuel economy when operating on E85 will yield different values than gasoline. See Fuel Economy Guide for more information.	HYBRID VEHICLE* GASOLINE - ELECTRICITY Estimated Annual Fuel Cost \$1,915 based on 15,000 miles at \$3.70 per gallon of GASOLINE Combined GASOLINE Fuel Economy This Vehicle 29 TO ESTIMATE YOUR ANNUAL FUEL COST, SEE THE FREE FUEL ECONOMY GUIDE	GASOLINE HIGHWAY MPG 36 Expected range for most drivers 29 to 43 MPG Your actual mileage will vary depending on how you drive and maintain your vehicle.	GOVERNMENT 5-STAR SAFETY RATINGS Overall Vehicle Score Based on the combined ratings of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight. <table border="1"> <tr> <td>Frontal Crash</td> <td>Driver Passenger</td> <td>To Be Rated To Be Rated</td> </tr> <tr> <td>Side Crash</td> <td>Front seat Rear seat</td> <td>To Be Rated To Be Rated</td> </tr> <tr> <td>Rollover</td> <td></td> <td>To Be Rated</td> </tr> </table> Star ratings range from 1 to 5 stars (★ ★ ★ ★ ★) with 5 being the highest. Source: National Highway Traffic Safety Administration (NHTSA) www.safercar.gov or 1-888-327-4236	Frontal Crash	Driver Passenger	To Be Rated To Be Rated	Side Crash	Front seat Rear seat	To Be Rated To Be Rated	Rollover		To Be Rated	PARTS CONTENT INFORMATION FOR VEHICLES IN THIS CARLINE: U.S./CANADIAN PARTS CONTENT: 60% MAJOR SOURCES OF FOREIGN PARTS CONTENT: MEXICO 15% NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS. FOR THIS VEHICLE: FINAL ASSEMBLY POINT: OSHAWA, ON CANADA COUNTRY OF ORIGIN: ENGINE: UNITED STATES TRANSMISSION: UNITED STATES © 2011 General Motors LLC. GM, Buick, Regal, 2011 - 1/1/2011 ORDER NO. PRODUCT SALES CODE DEALER MODEL CODE (GMR) DEALER NO. AND PINAL ASSEMBLY OSHAWA, ON CANADA VIN 2G4GR6E6C9123753 REISSUE DEALER TO WHOM DELIVERED: SOMMER'S AUTOMOTIVE P.O. BOX 97 MEQUON, WI 53092-0097
GASOLINE CITY MPG 25 Expected range for most drivers 20 to 30 MPG *Fuel economy when operating on E85 will yield different values than gasoline. See Fuel Economy Guide for more information.	HYBRID VEHICLE* GASOLINE - ELECTRICITY Estimated Annual Fuel Cost \$1,915 based on 15,000 miles at \$3.70 per gallon of GASOLINE Combined GASOLINE Fuel Economy This Vehicle 29 TO ESTIMATE YOUR ANNUAL FUEL COST, SEE THE FREE FUEL ECONOMY GUIDE	GASOLINE HIGHWAY MPG 36 Expected range for most drivers 29 to 43 MPG Your actual mileage will vary depending on how you drive and maintain your vehicle.												
Frontal Crash	Driver Passenger	To Be Rated To Be Rated												
Side Crash	Front seat Rear seat	To Be Rated To Be Rated												
Rollover		To Be Rated												

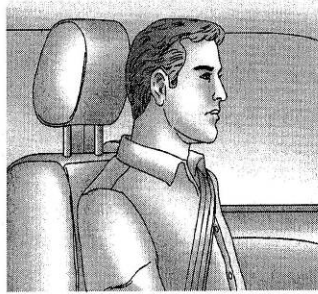
Monroney Label

Head Restraints

The vehicle's front and rear seats have adjustable head restraints in the outboard seating positions.

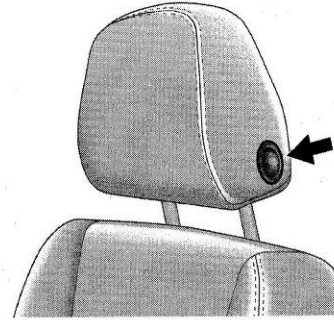
WARNING

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



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

Front Seat



To raise or lower the head restraint, press the release button located on the side of the head restraint and pull up or push the head restraint down and release the button.

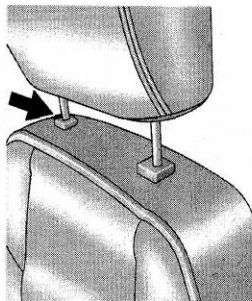
Pull and push on the head restraint after the button is released to make sure that it is locked in place.

The front head restraints are not designed to be removed.

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

Seats and Restraints 3-3

Rear Seat



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

Push down on the head restraint after the button is released to make sure that it is locked in place.

If you are installing a child restraint in the rear seat, see "Securing a Child Restraint Designed for the LATCH System" under *Lower Anchors and Tethers for Children (LATCH System)* on page 3-42.

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



Post-Test Driver Dummy Knee Contact with Vehicle Interior View



Post-Test Rear Passenger Dummy Knee Contact with Vehicle Interior View

APPENDIX B

DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS
Driver Dummy Instrumentation Plots

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

Additional Driver & 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)
Passenger Head Acceleration Redundant (X)
Passenger Head Acceleration Redundant (Y)
Passenger Head Acceleration Redundant (Z)

Vehicle Instrumentation Data

Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
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)

Left Side Sill at Front Seat Acceleration (Y)
Left Side Sill at Rear Seat 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)
Right Rear Occupant Compartment Acceleration (Y)
Engine Block (X)
Engine Block (Y)
Rear Floorpan Above Axle Acceleration (X)
Rear Floorpan Above Axle Acceleration (Y)
Rear Floorpan Above Axle Acceleration (Z)

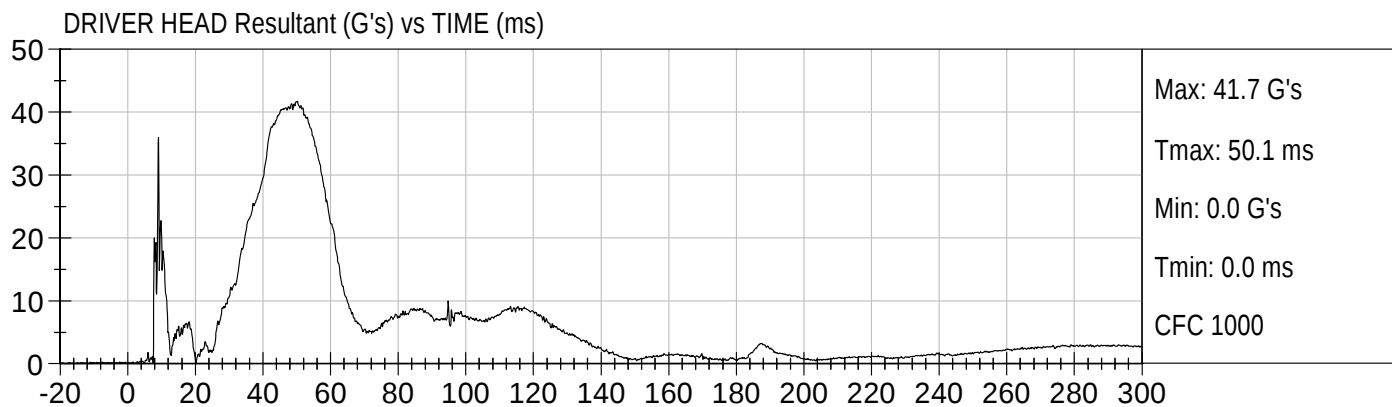
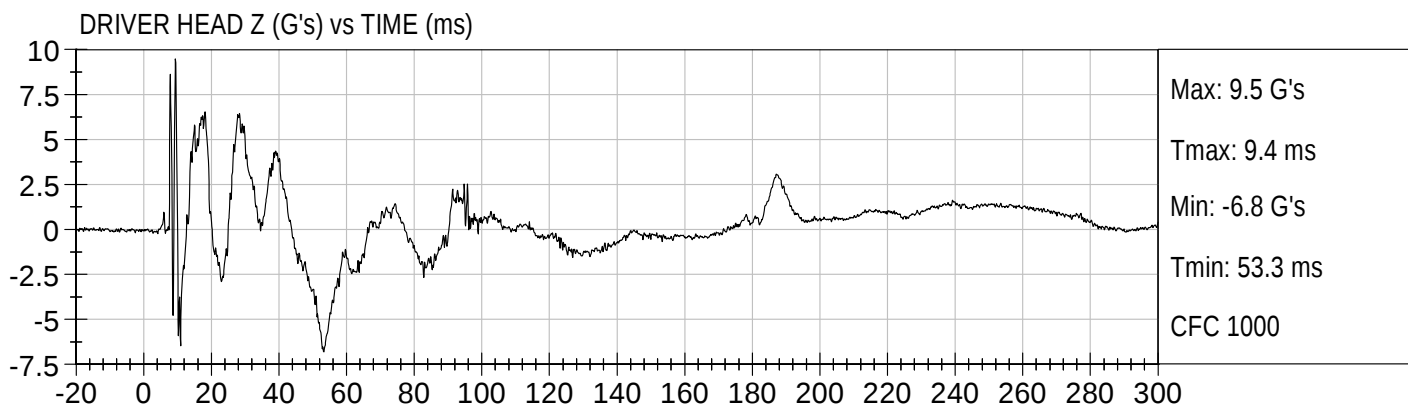
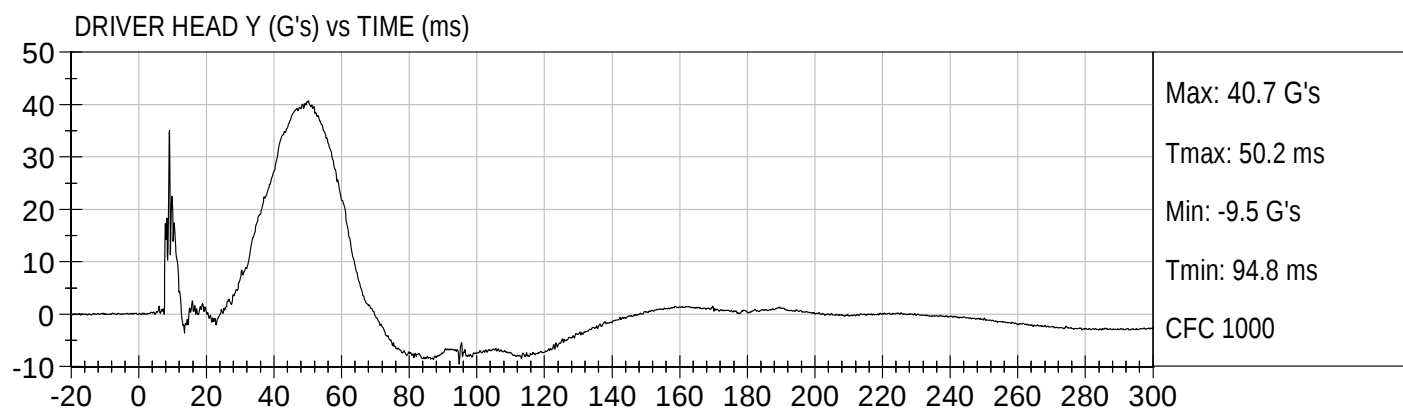
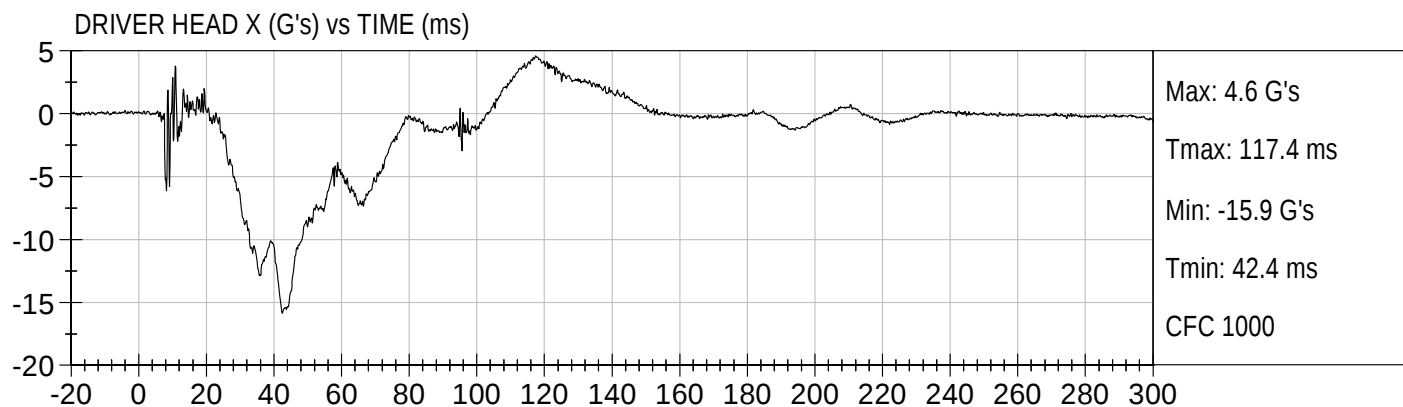
MDB Instrumentation Data

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



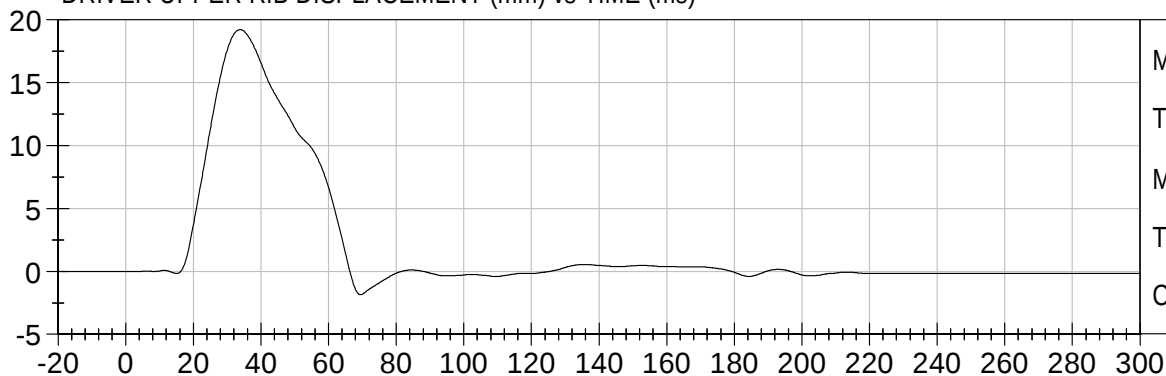
55/28 km/h 90° MDB Side Impact
2012 Buick Regal - MC0119

Test Date: 03/06/2012
Speed: 38.8 mph (62.5 km/h)



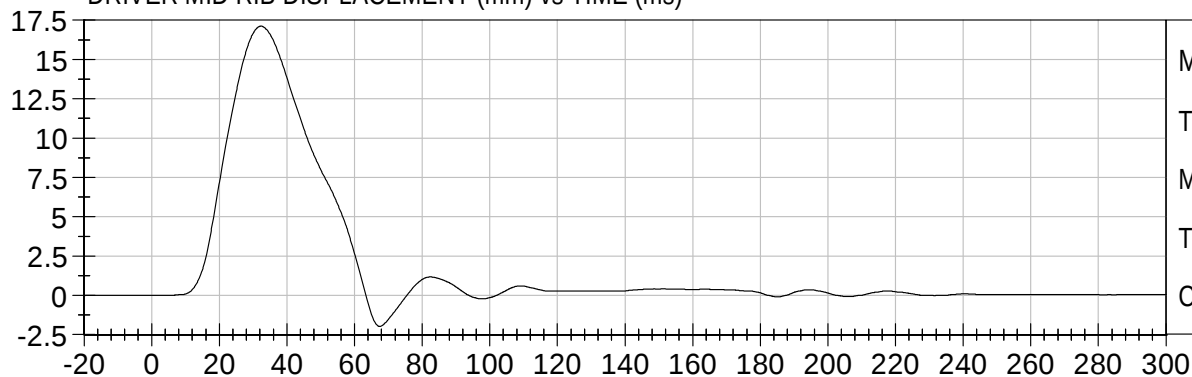


DRIVER UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



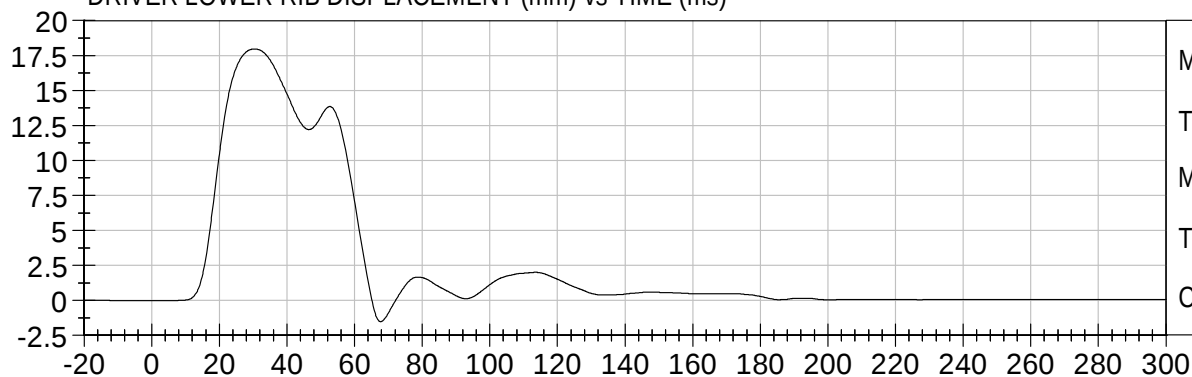
Max: 19.2 mm
Tmax: 33.9 ms
Min: -1.9 mm
Tmin: 69.5 ms
CFC 180

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



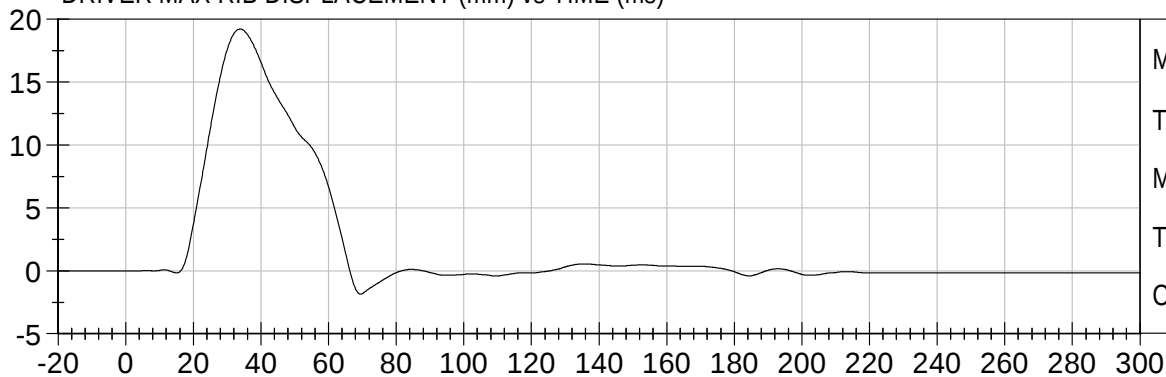
Max: 17.1 mm
Tmax: 32.3 ms
Min: -2.0 mm
Tmin: 67.4 ms
CFC 180

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



Max: 18.0 mm
Tmax: 30.4 ms
Min: -1.5 mm
Tmin: 67.7 ms
CFC 180

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

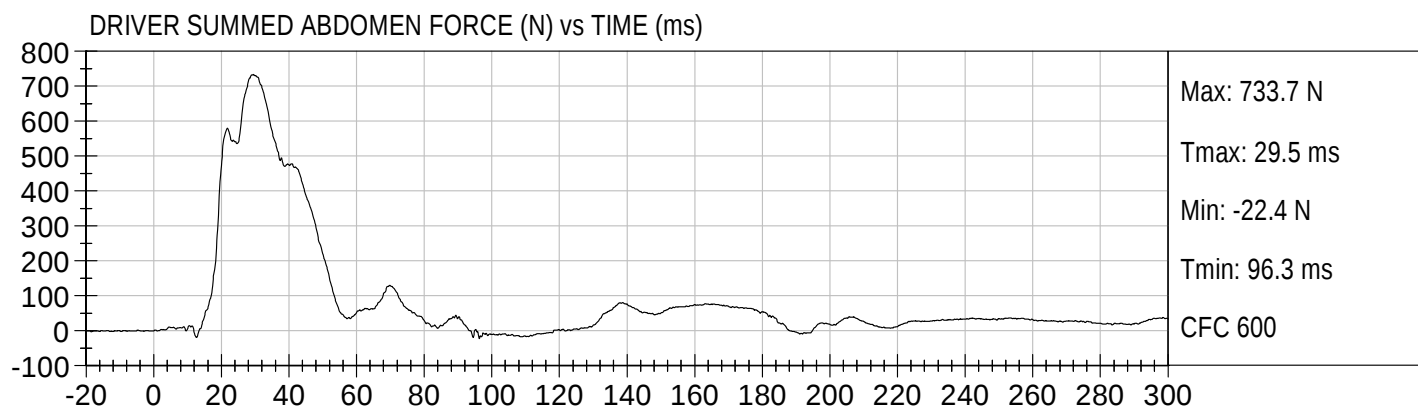
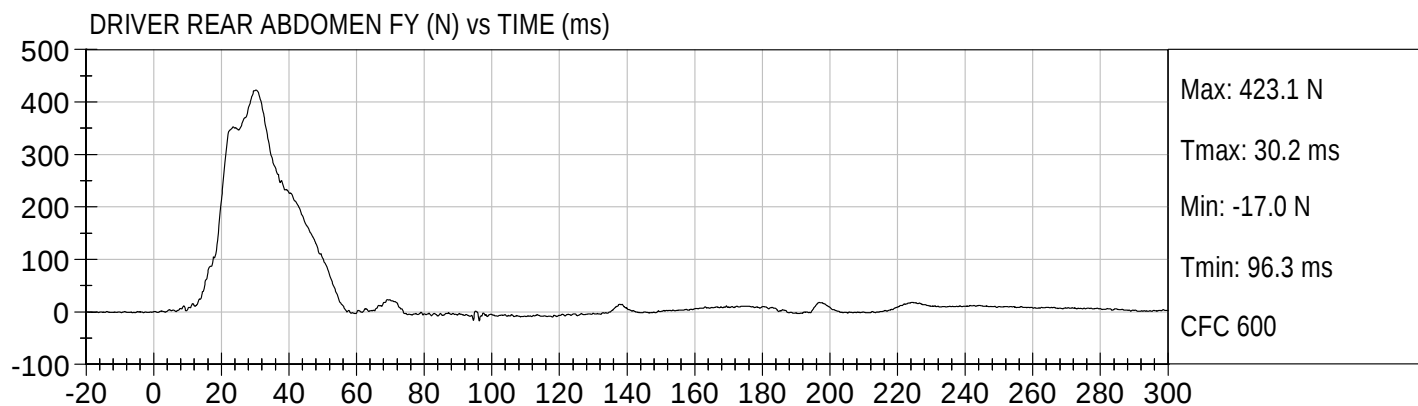
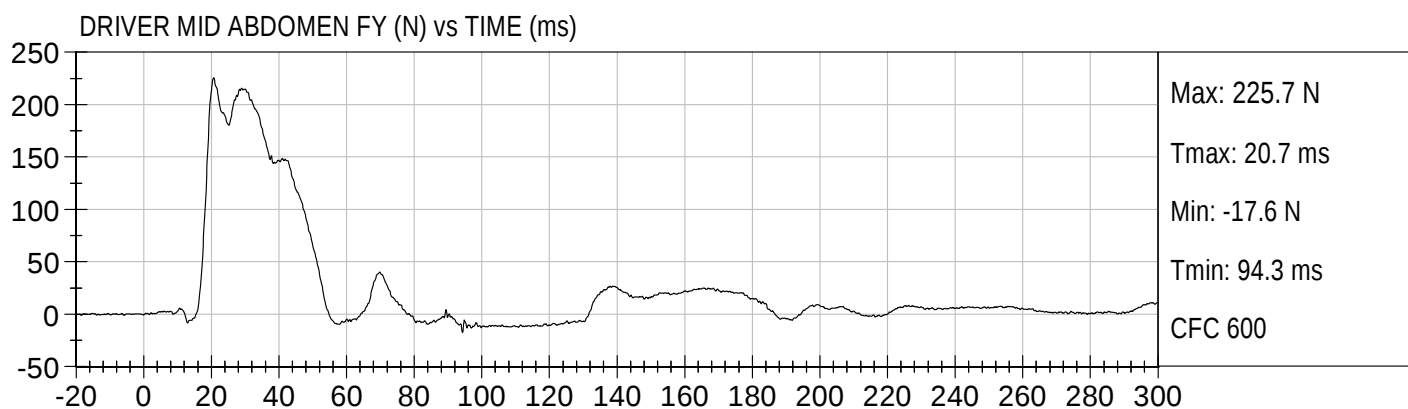
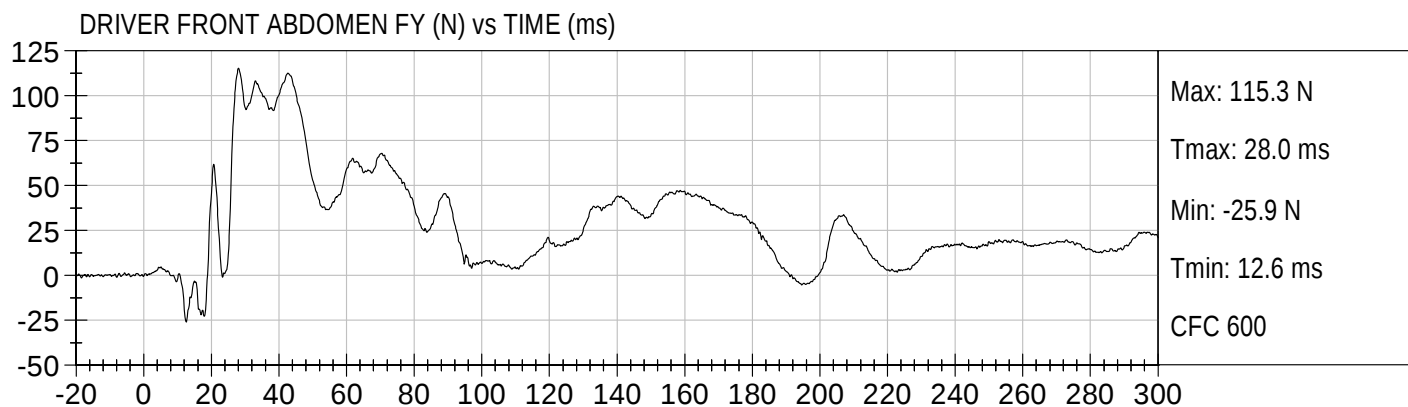


Max: 19.2 mm
Tmax: 33.9 ms
Min: -1.9 mm
Tmin: 69.5 ms
CFC 180



55/28 km/h 90° MDB Side Impact
2012 Buick Regal - MC0119

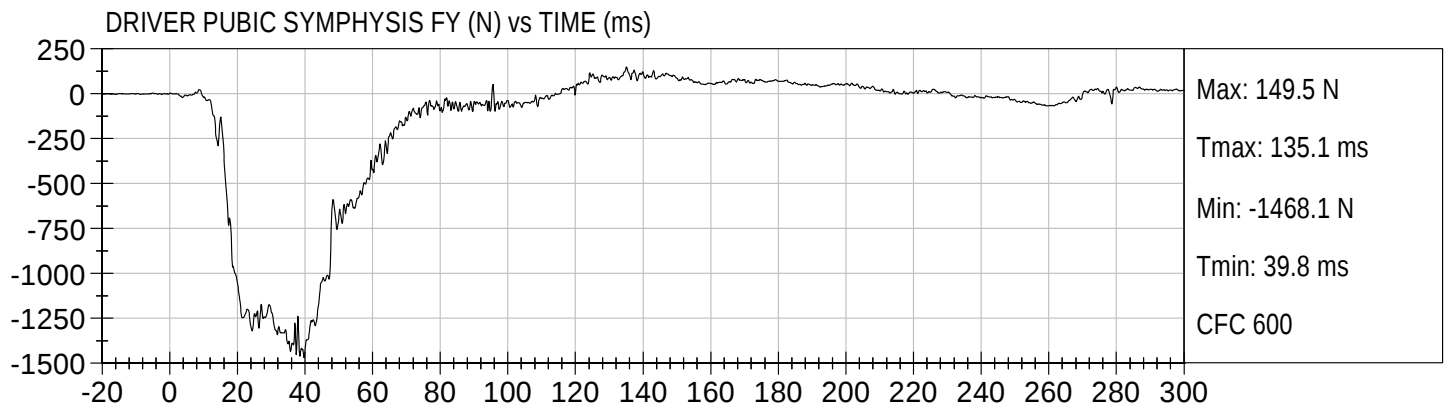
Test Date: 03/06/2012
Speed: 38.8 mph (62.5 km/h)





55/28 km/h 90° MDB Side Impact
2012 Buick Regal - MC0119

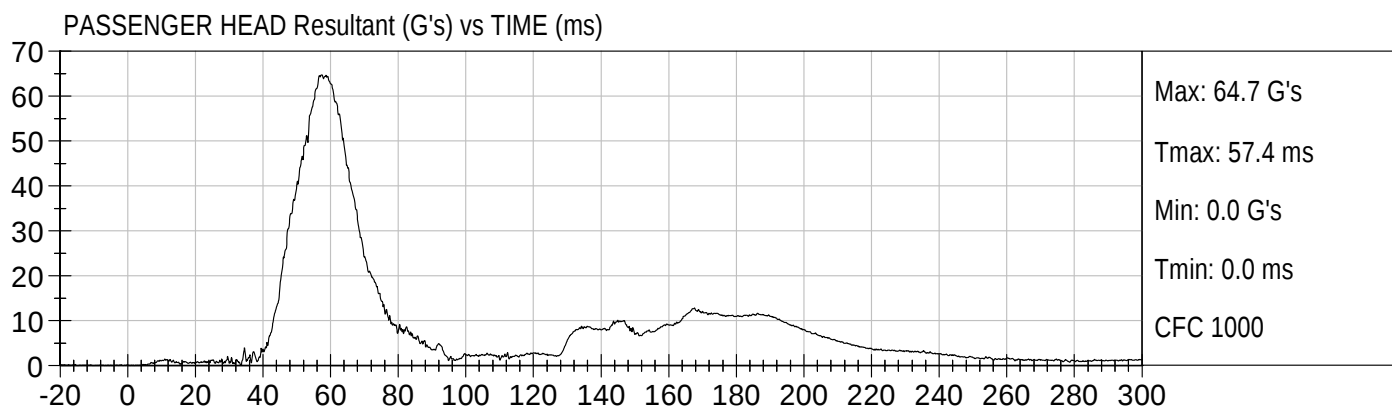
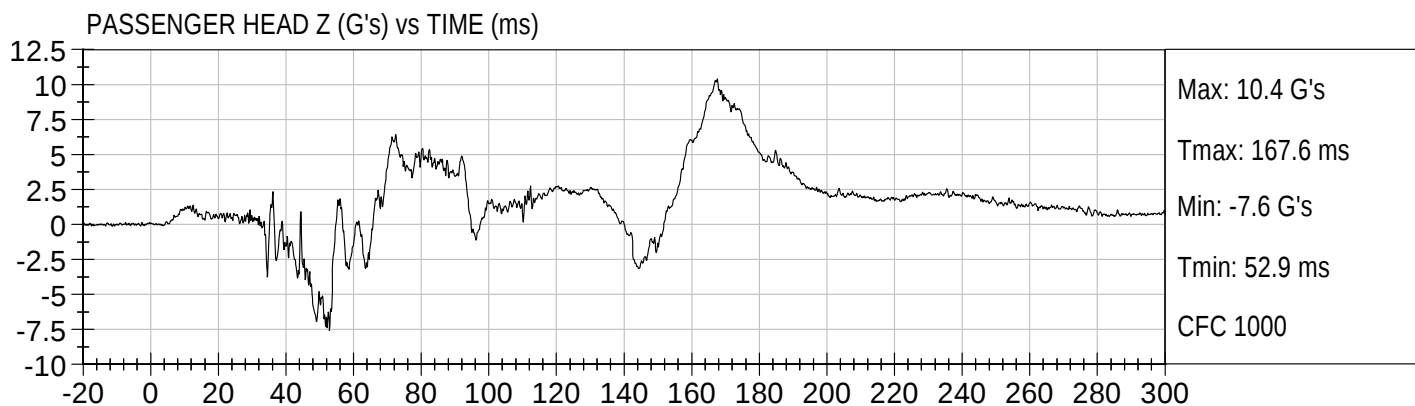
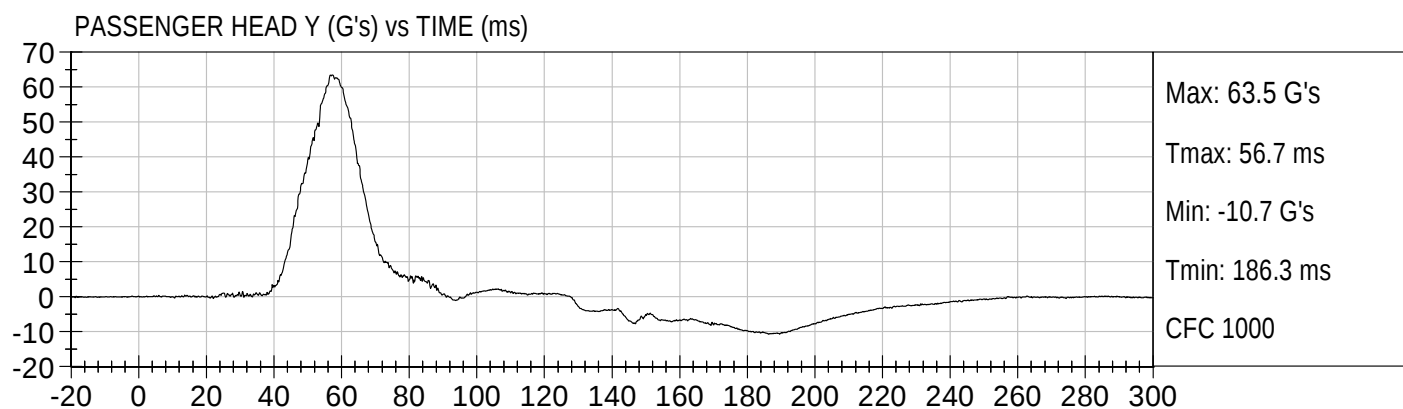
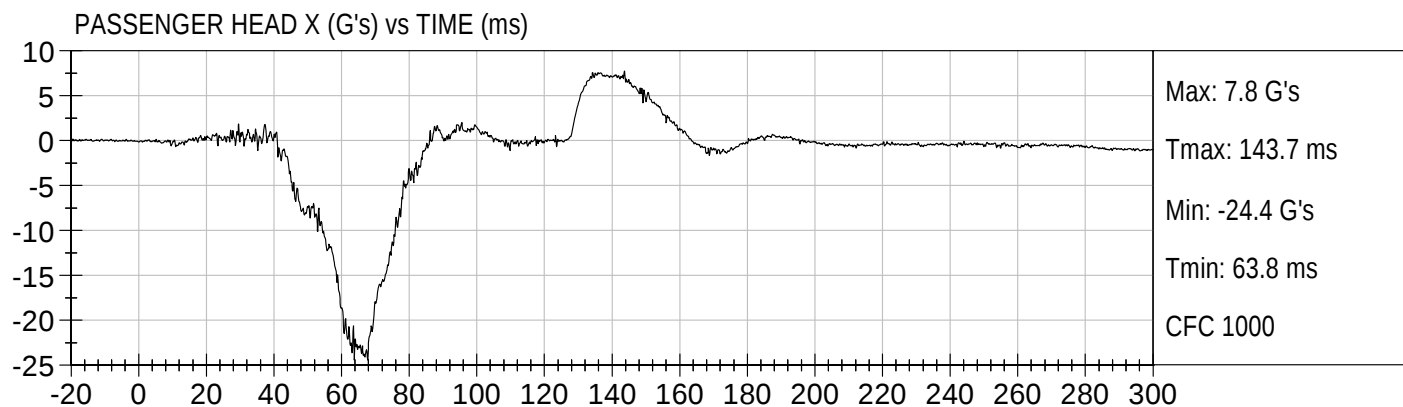
Test Date: 03/06/2012
Speed: 38.8 mph (62.5 km/h)





55/28 km/h 90° MDB Side Impact
2012 Buick Regal - MC0119

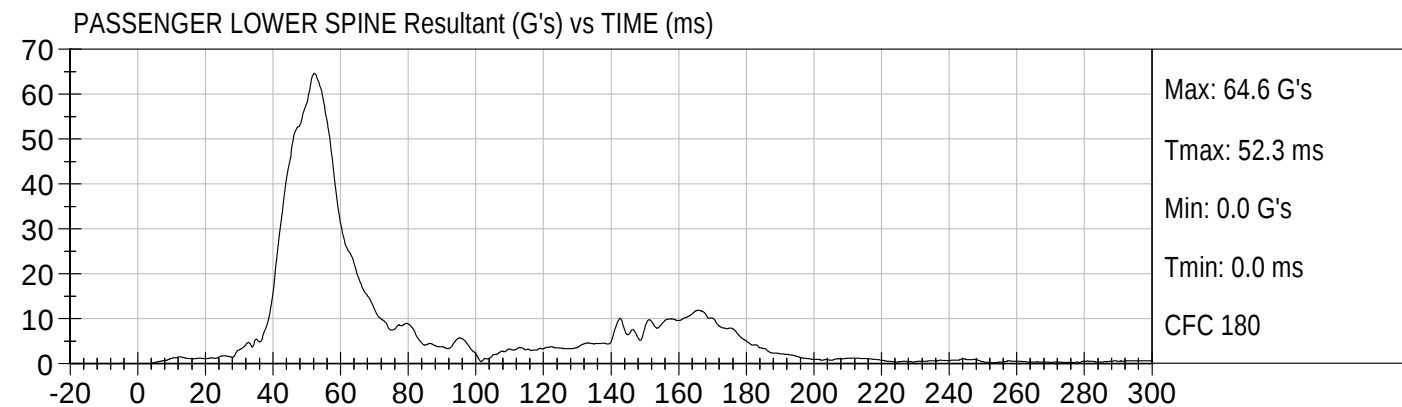
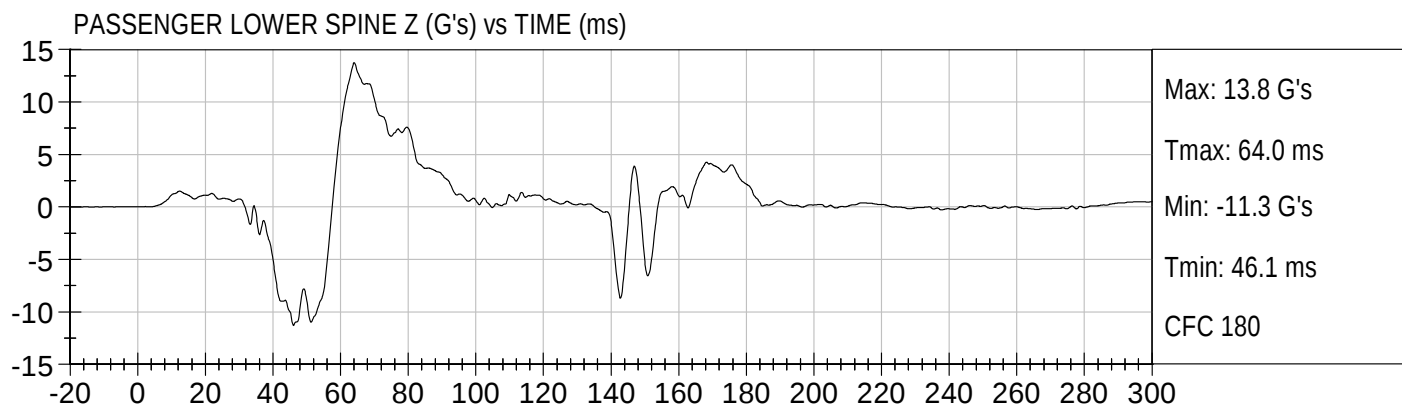
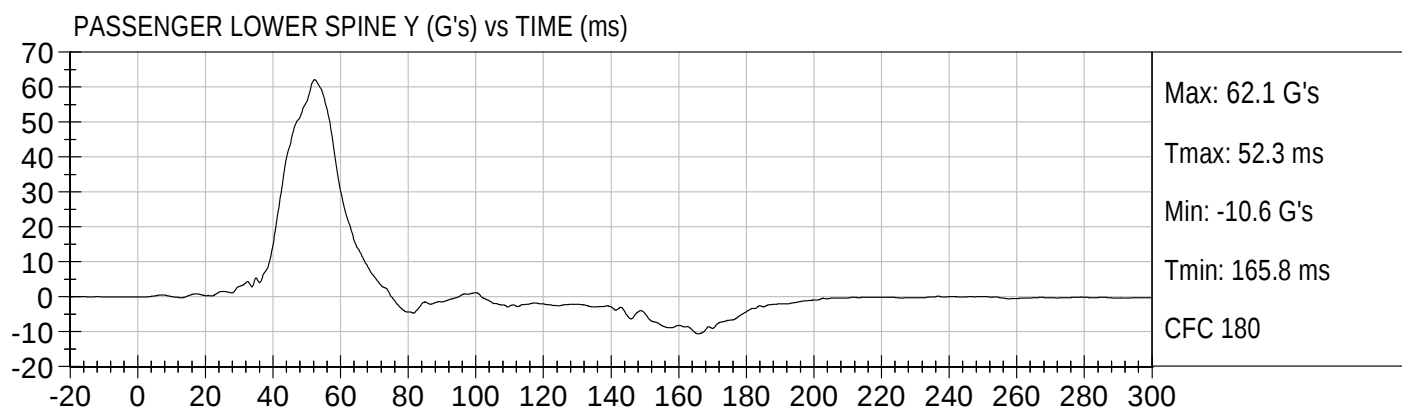
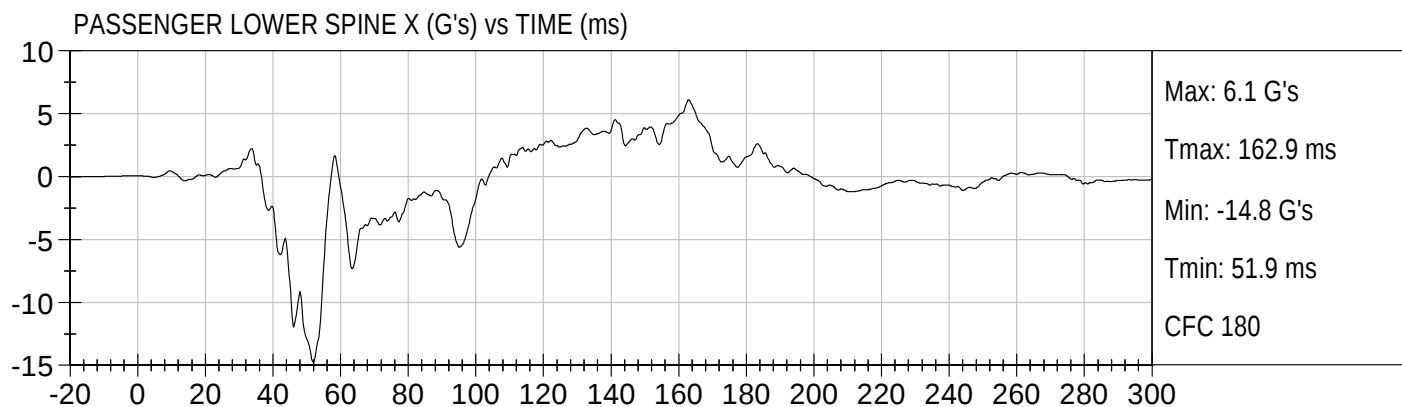
Test Date: 03/06/2012
Speed: 38.8 mph (62.5 km/h)





55/28 km/h 90° MDB Side Impact
2012 Buick Regal - MC0119

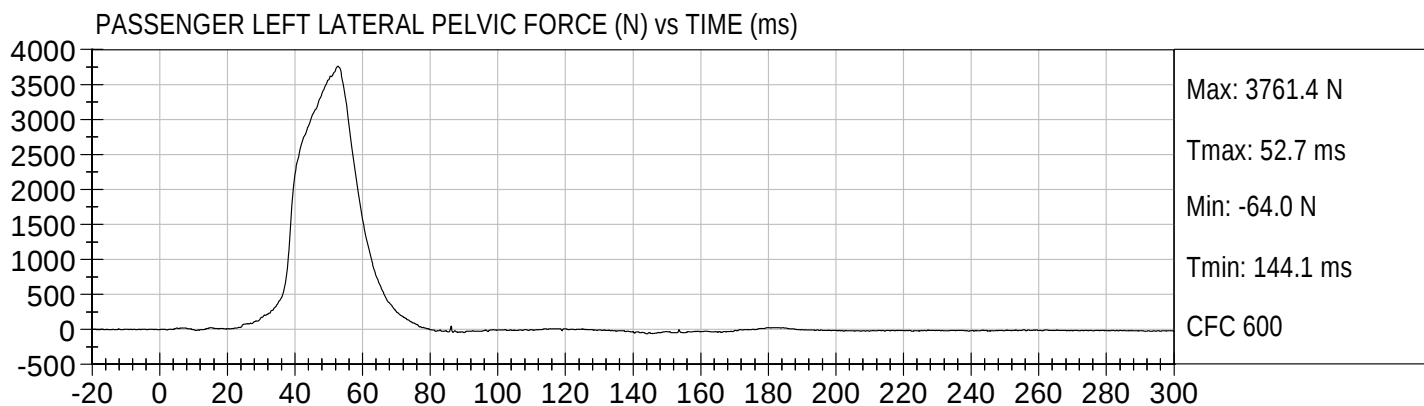
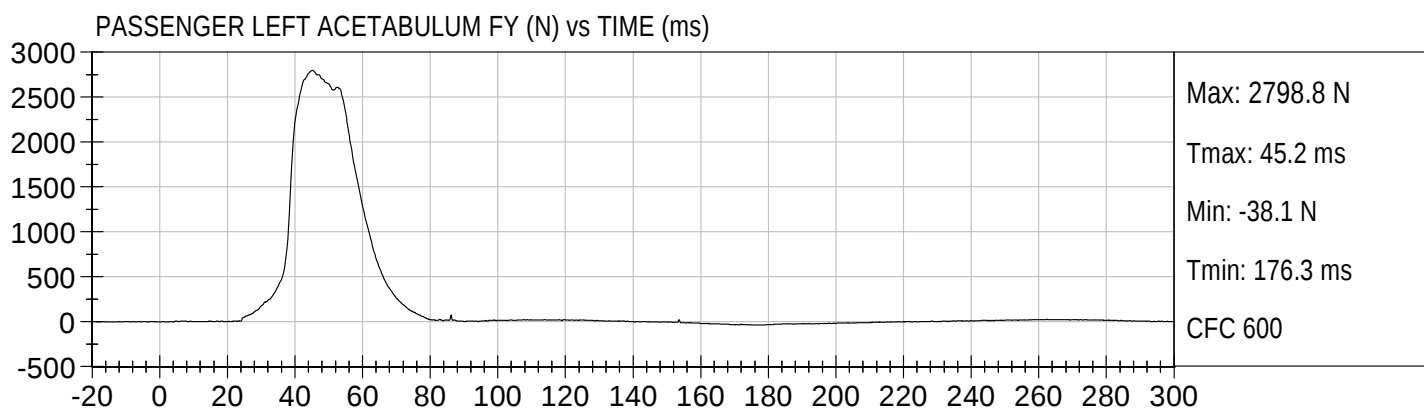
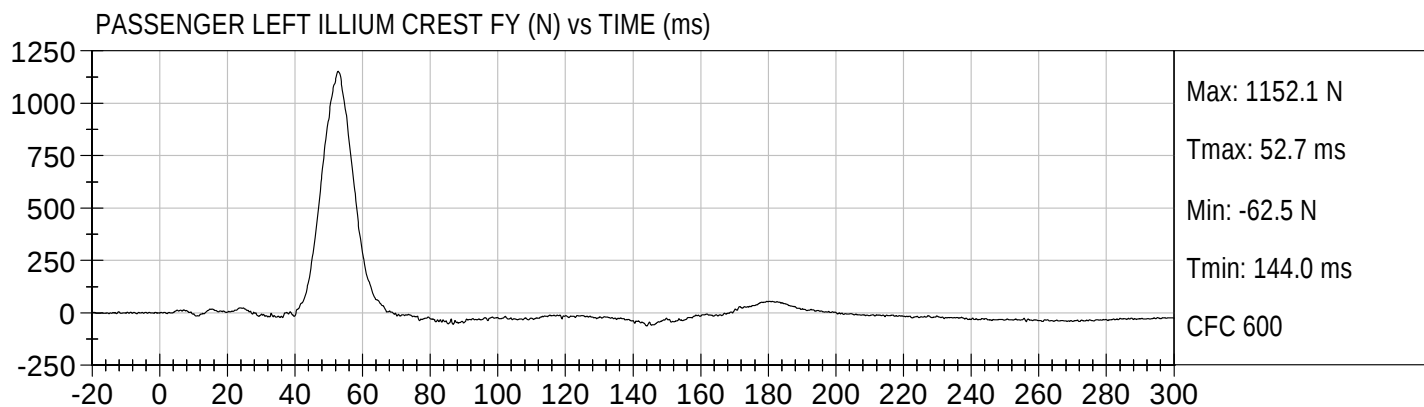
Test Date: 03/06/2012
Speed: 38.8 mph (62.5 km/h)





55/28 km/h 90° MDB Side Impact
2012 Buick Regal - MC0119

Test Date: 03/06/2012
Speed: 38.8 mph (62.5 km/h)



APPENDIX C

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

ES-2re External Measurements
SN: 032

No.	Name	Spec. (mm)	Result	Pass/Fail
1	Sitting Height	900 - 918	915	Pass
2	Seat to Shoulder Joint	558 - 572	568	Pass
3	Seat to Lower Face of Thoracic Spine Box	346 - 356	355	Pass
4	Seat to Hip Joint (center of bolt)	97 - 103	98	Pass
5	Sole to Seat, Sitting	333 - 451	440	Pass
6	Head Width	152 - 158	157	Pass
7	Shoulder/Arm Width	461 - 479	464	Pass
8	Thorax Width	322 - 332	323	Pass
9	Abdomen Width	273 - 287	281	Pass
10	Pelvis Lap Width	359 - 373	370	Pass
11	Head Depth	196 - 206	203	Pass
12	Thorax Depth	262 - 272	264	Pass
13	Abdomen Depth	194 - 204	196	Pass
14	Pelvis Depth	235 - 245	236	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150 - 160	151	Pass
16	Back of Buttocks to Front Knee	597 - 615	607	Pass

MGA RESEARCH CORPORATION
HEAD DROP TEST
ES-2re DUMMY

ATD Serial No: 032

Test ID: D12721

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	125 to 155	146	Pass
Peak Longitudinal Acceleration	G's	+/- 15	-8.4	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 15% of peak	Yes	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

2/29/12
Test Date

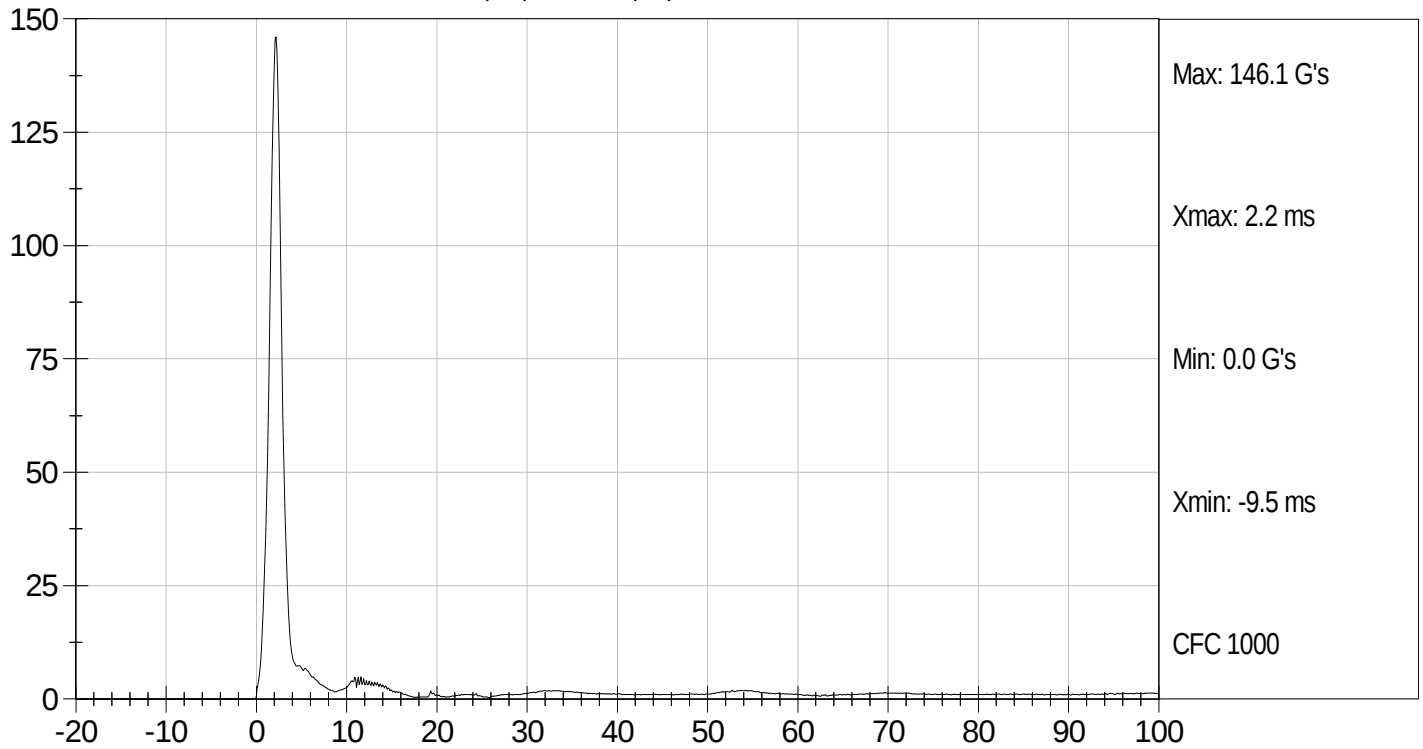
David Winkelbauer
Approved By



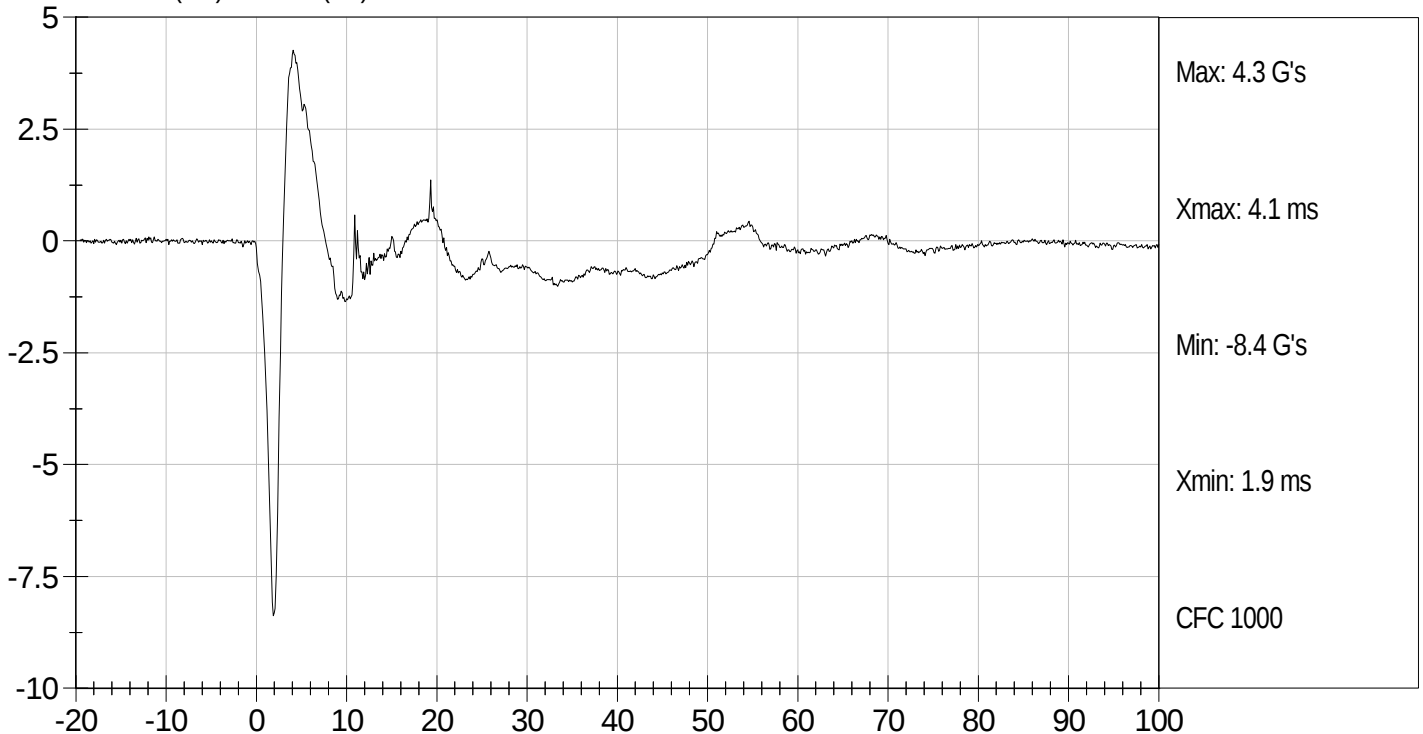
Test Desc: Head Drop
Component ID: D12721

Test Date: 2/29/12
Velocity: 0 ft/s, 0 m/s

PEAK RESULTANT ACCELERATION (G's) vs TIME (ms)



HEAD X (G's) vs TIME (ms)



MGA RESEARCH CORPORATION
NECK PENDULUM TEST
ES-2re DUMMY

ATD Serial No: 032

Test I.D: D12722

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	18.0 to 22.0	22.0	Pass
Laboratory Relative Humidity		%	10 to 70	22	Pass
Pendulum Speed		m/s	3.3 to 3.5	3.3	Pass
Pendulum Deceleration	1 ms	m/s	0.00 to -0.05	-0.01	Pass
	3 ms	m/s	-0.25 to -0.375	-0.33	Pass
	14 ms	m/s	-3.20 to -3.70	-3.33	Pass
Maximum Flexion Angle		deg	49.0 to 59.0	52.1	Pass
Time of Maximum Flexion Angle		ms	54.0 to 66.0	59.6	Pass
Head Rotation Decay Time to 0 degree		ms	53.0 to 88.0	60.5	Pass
Overall Test Results					Pass


 Laboratory Technician

2/28/12
 Test Date

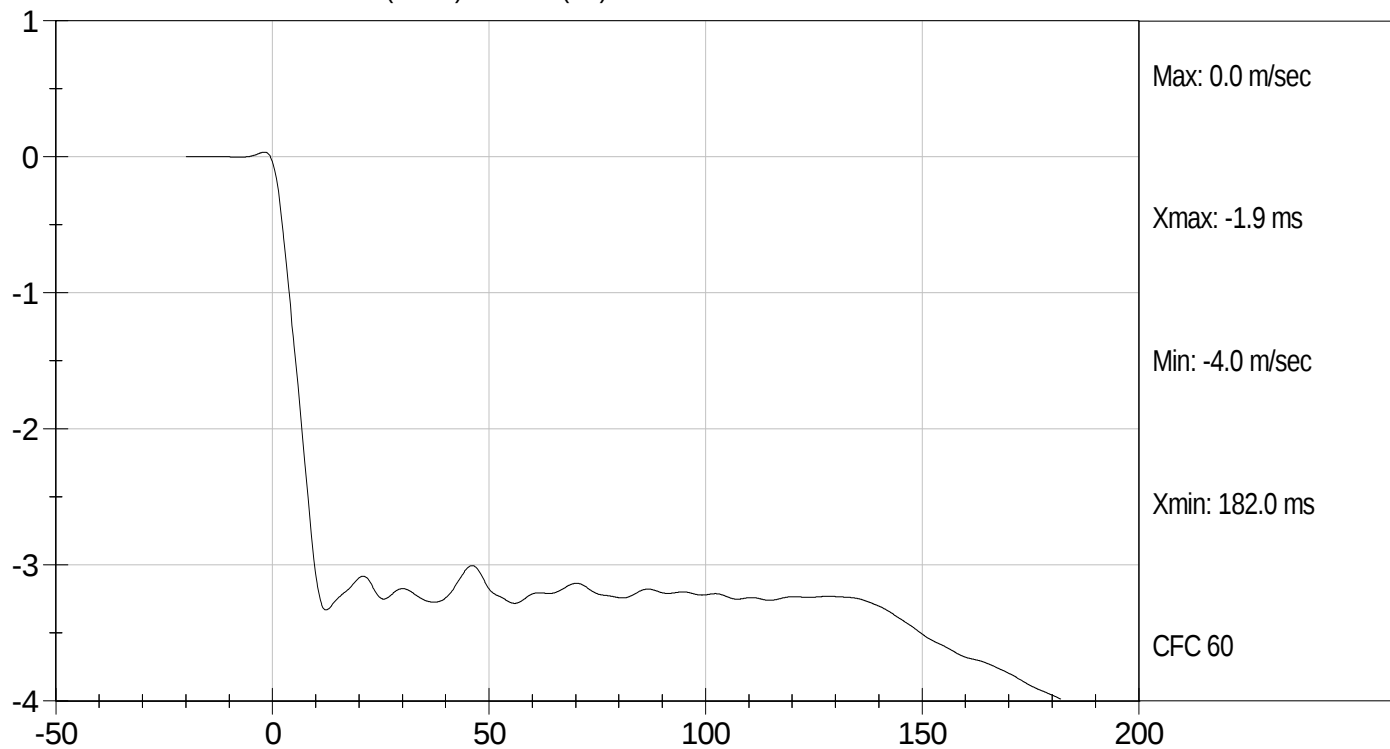

 Approved By



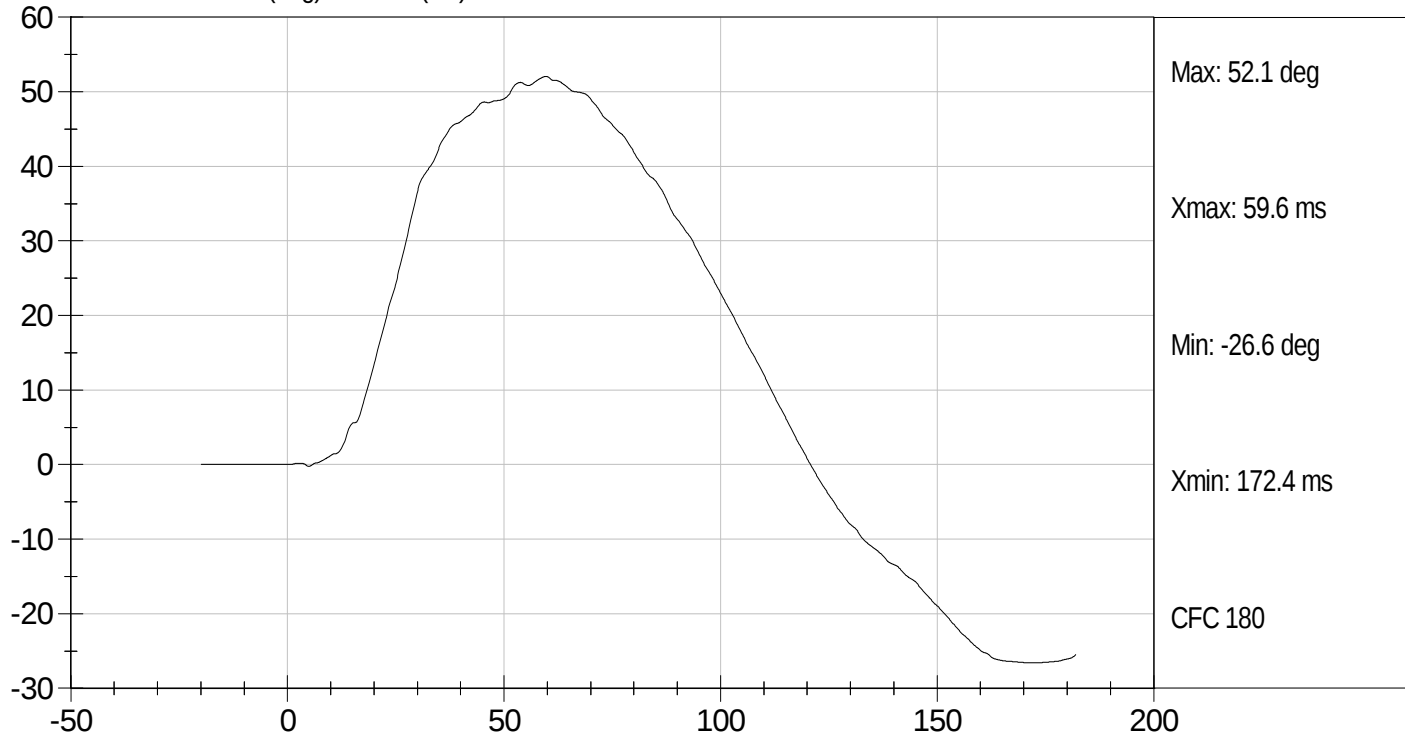
Test Desc: Neck Bending
Component ID: D12722

Test Date: 2/28/12
Velocity: 10.89 ft/s, 3.3 m/s

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



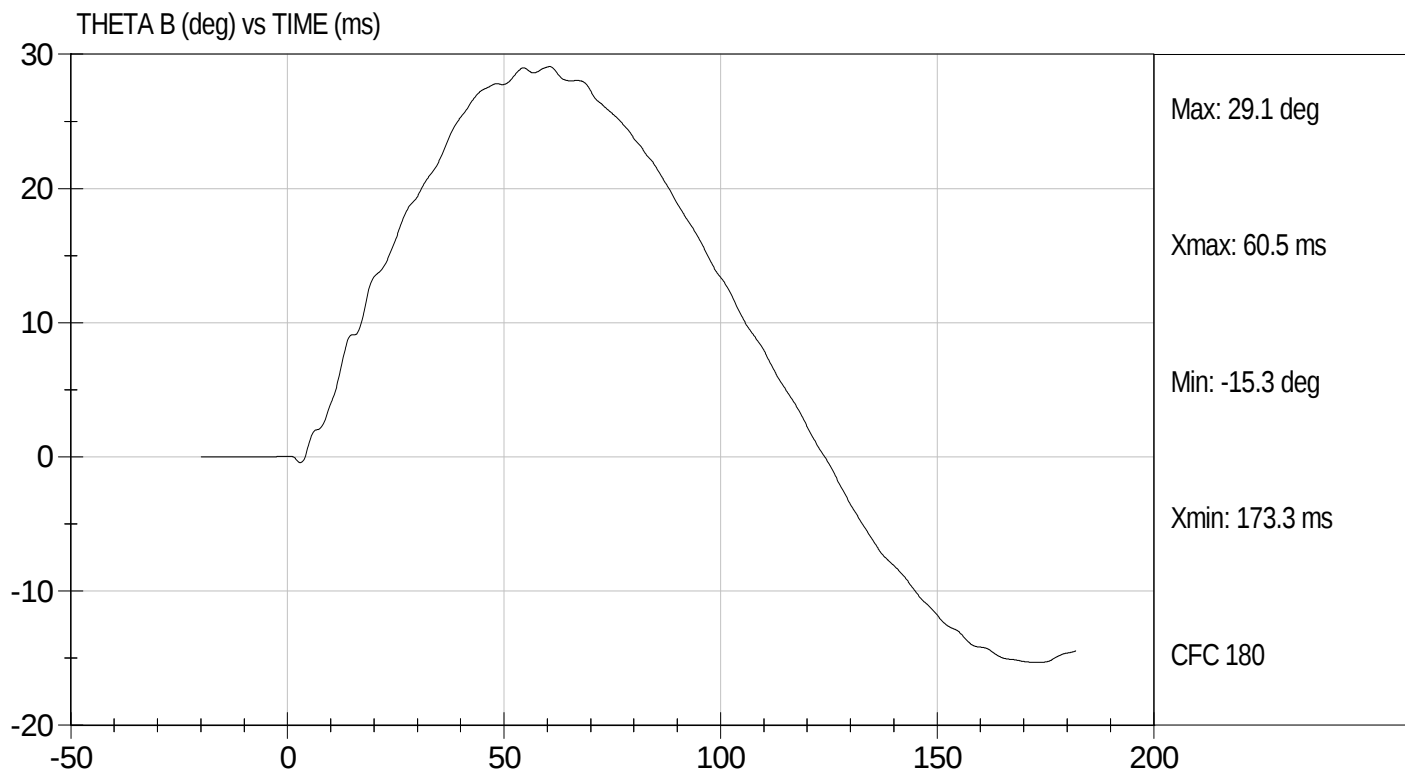
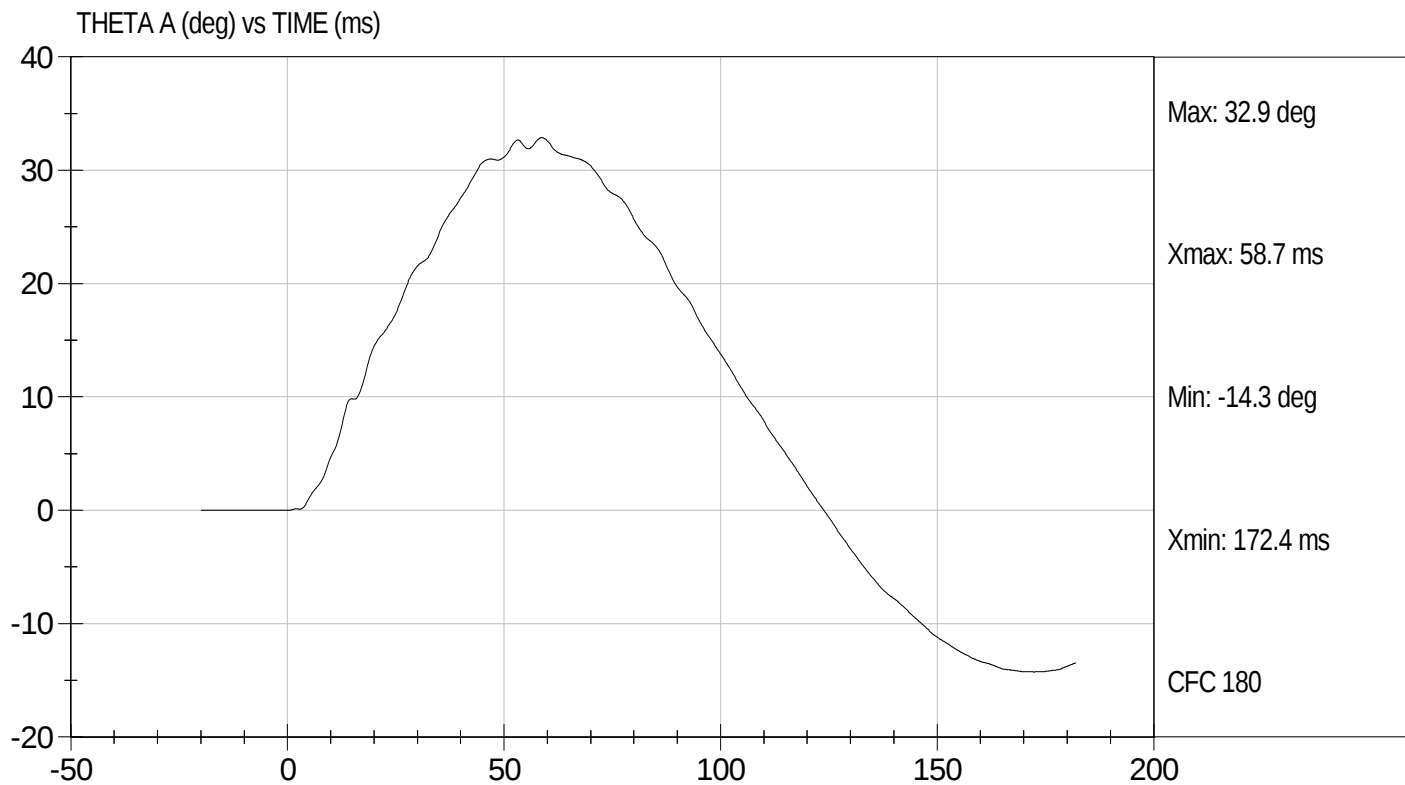
FLEXION ANGLE (deg) vs TIME (ms)





Test Desc: Neck Bending
Component ID: D12722

Test Date: 2/28/12
Velocity: 10.89 ft/s, 3.3 m/s



MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
ES-2re DUMMY

ATD Serial No: 032

Test I.D: D12723

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Pendulum Speed	m/s	4.2 to 4.4	4.3	Pass
Peak Shoulder Acceleration	G's	7.5 to 10.5	9.7	Pass
Time of Peak Shoulder Acceleration	ms	NA	13.2	Pass
Overall Test Results			Pass	


Laboratory Technician

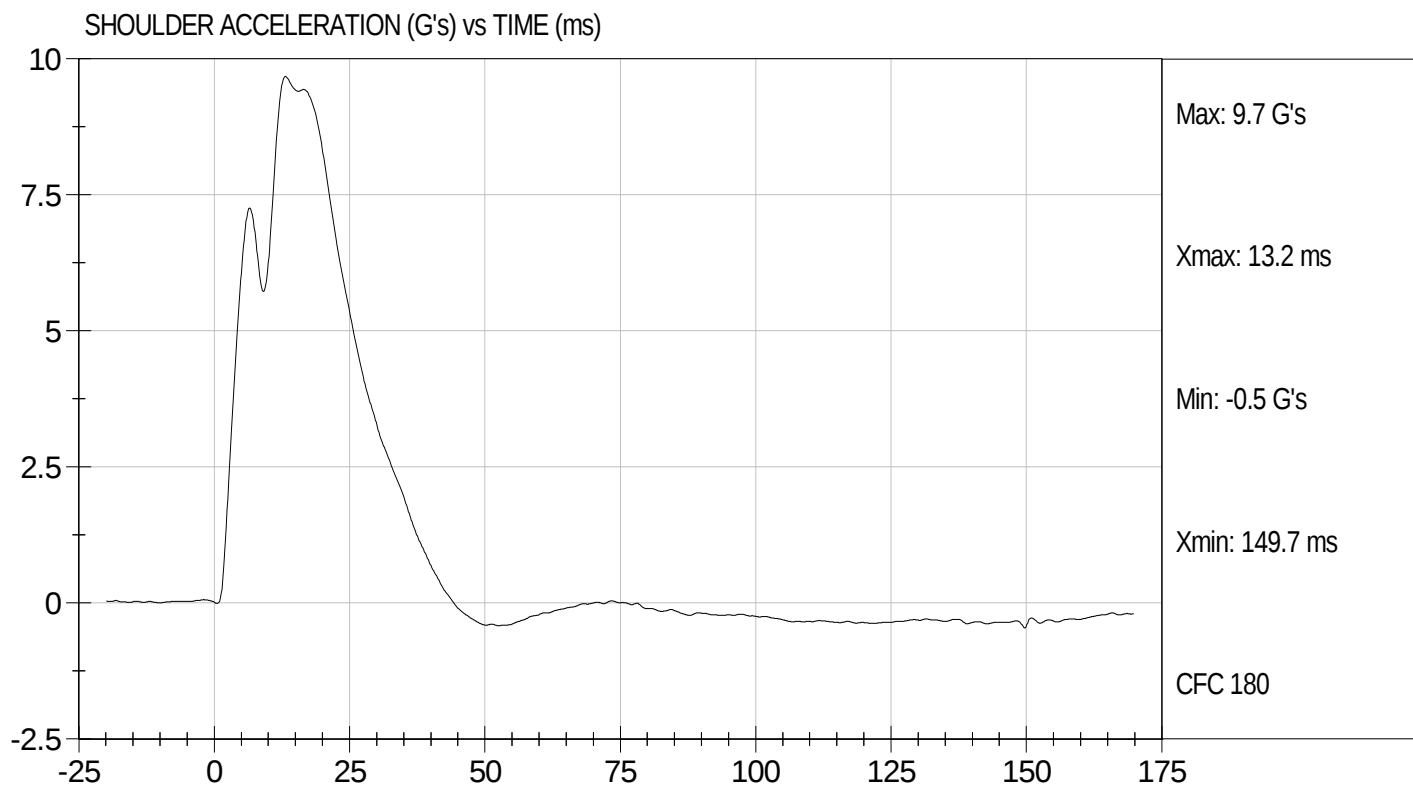
2/28/12
Test Date


Approved By



Test Desc: Shoulder Impact
Component ID: D12723

Test Date: 2/28/12
Velocity: 14.25 ft/s, 4.3 m/s



MGA RESEARCH CORPORATION

UPPER RIB TEST

ES-2re DUMMY

ATD Serial No: 032

Test I.D: D12724

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Displacement at 3 m/s	mm	36.0 to 40.0	37.4	Pass
Displacement at 4 m/s	mm	46.0 to 51.0	47.9	Pass
			Overall Test Results	Pass

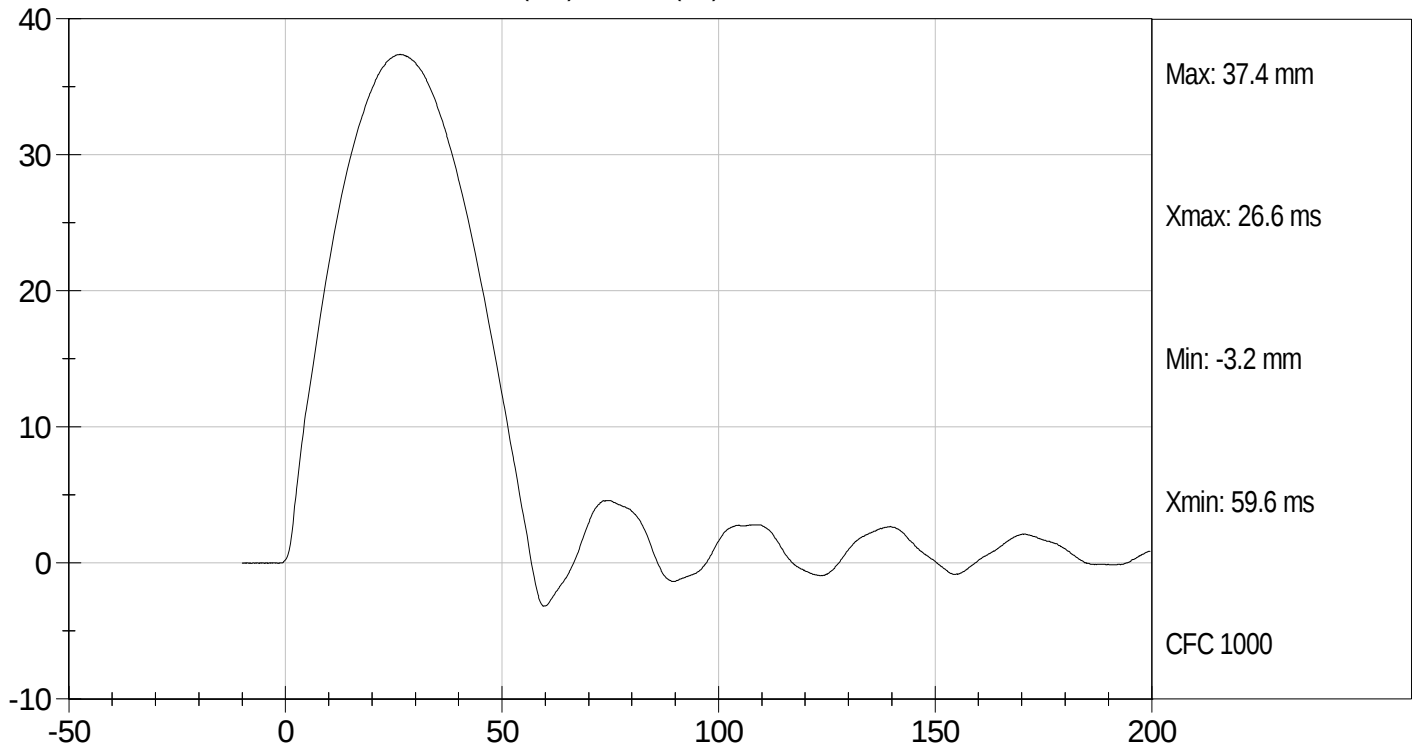

Laboratory Technician

2/29/12
Test Date

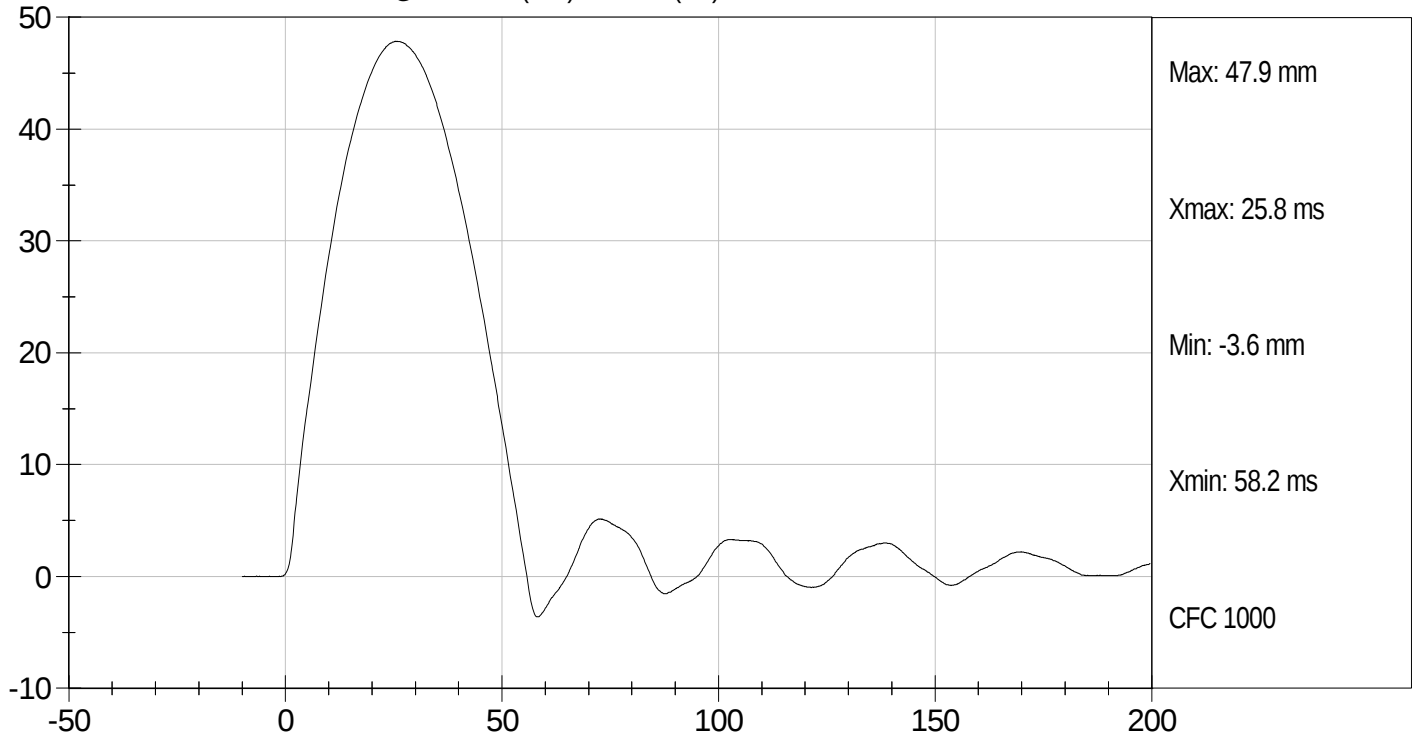

Approved By



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: D12725

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Displacement at 3 m/s	mm	36.0 to 40.0	37.3	Pass
Displacement at 4 m/s	mm	46.0 to 51.0	47.6	Pass
Overall Test Results				Pass

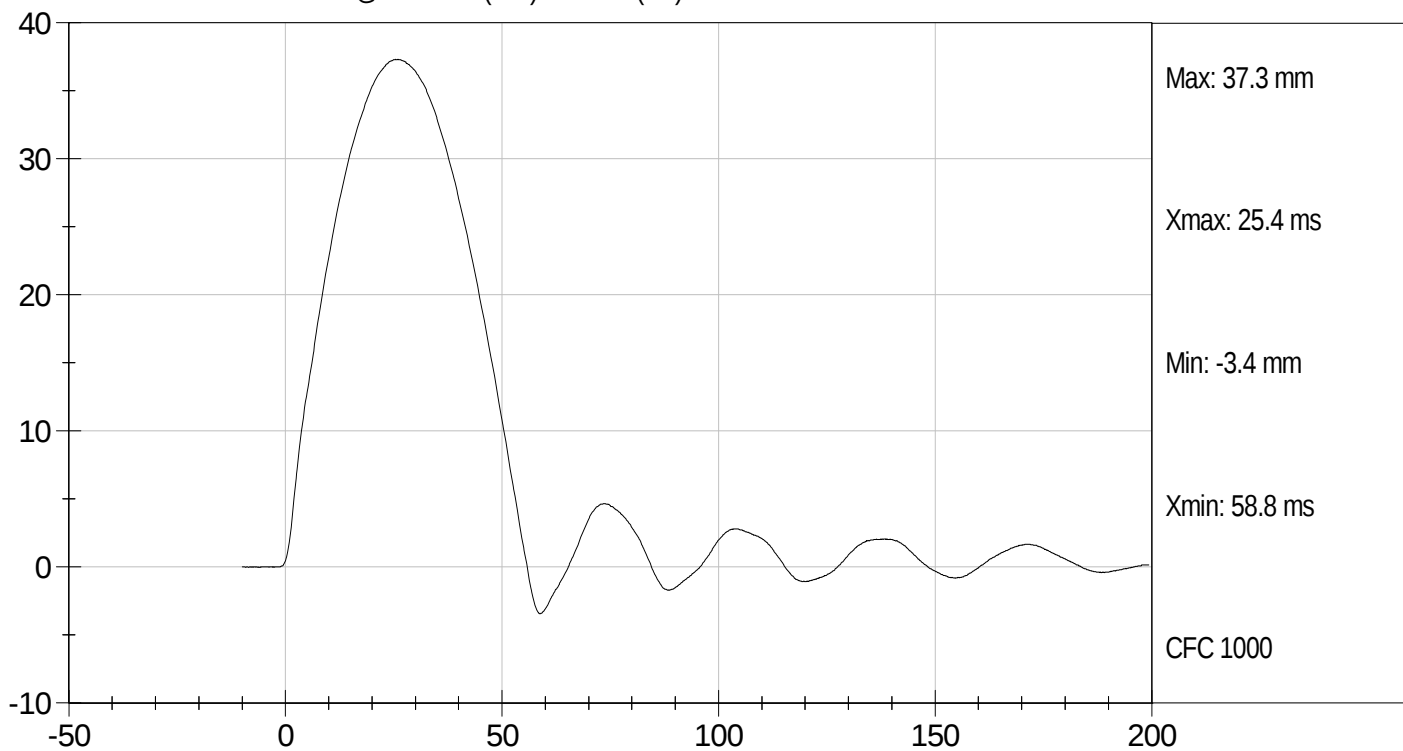
Jessica Hall
Laboratory Technician

2/29/12
Test Date

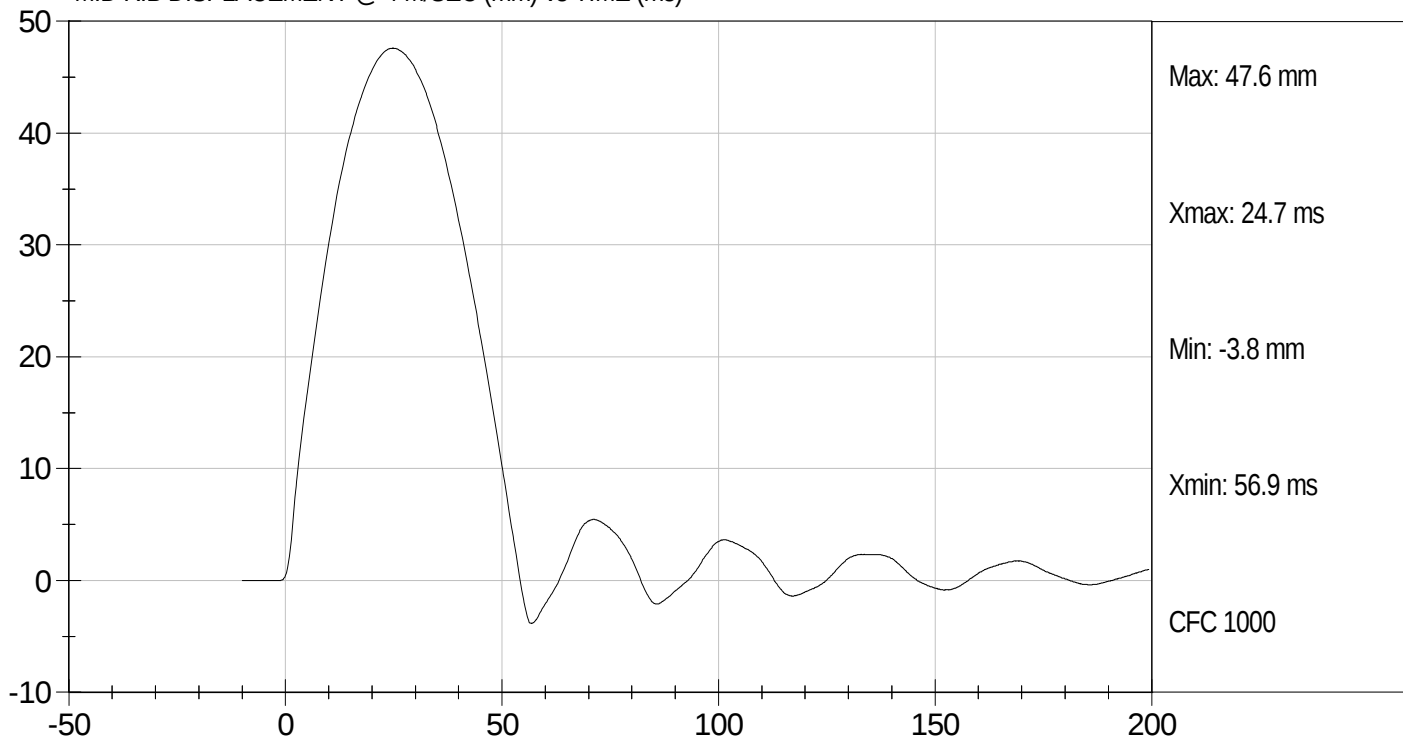
David Winkelbauer
Approved By



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



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



MGA RESEARCH CORPORATION

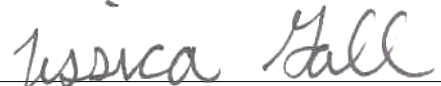
LOWER RIB TEST

ES-2re DUMMY

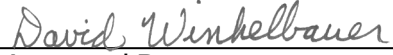
ATD Serial No: 032

Test I.D: D12726

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	30	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	48.2	Pass
Overall Test Results				Pass

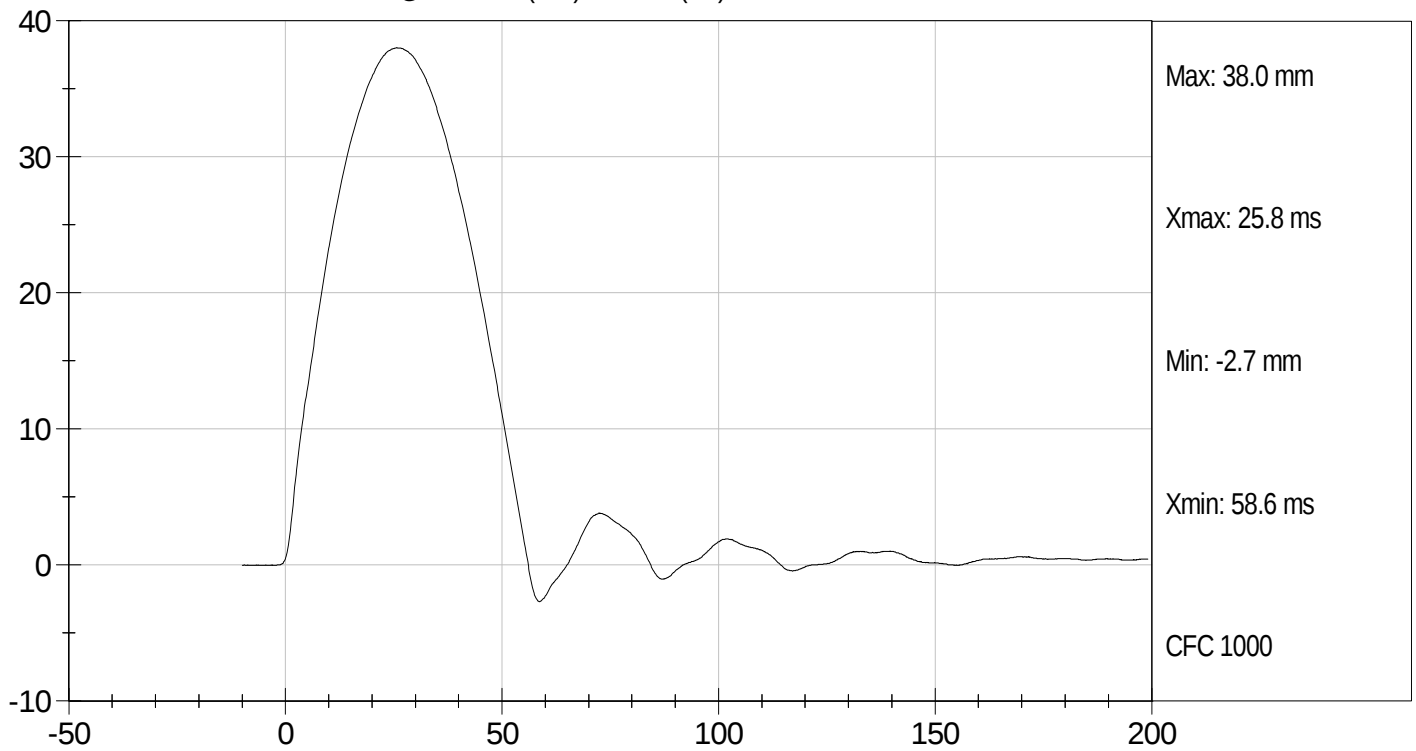

Laboratory Technician

2/29/12
Test Date

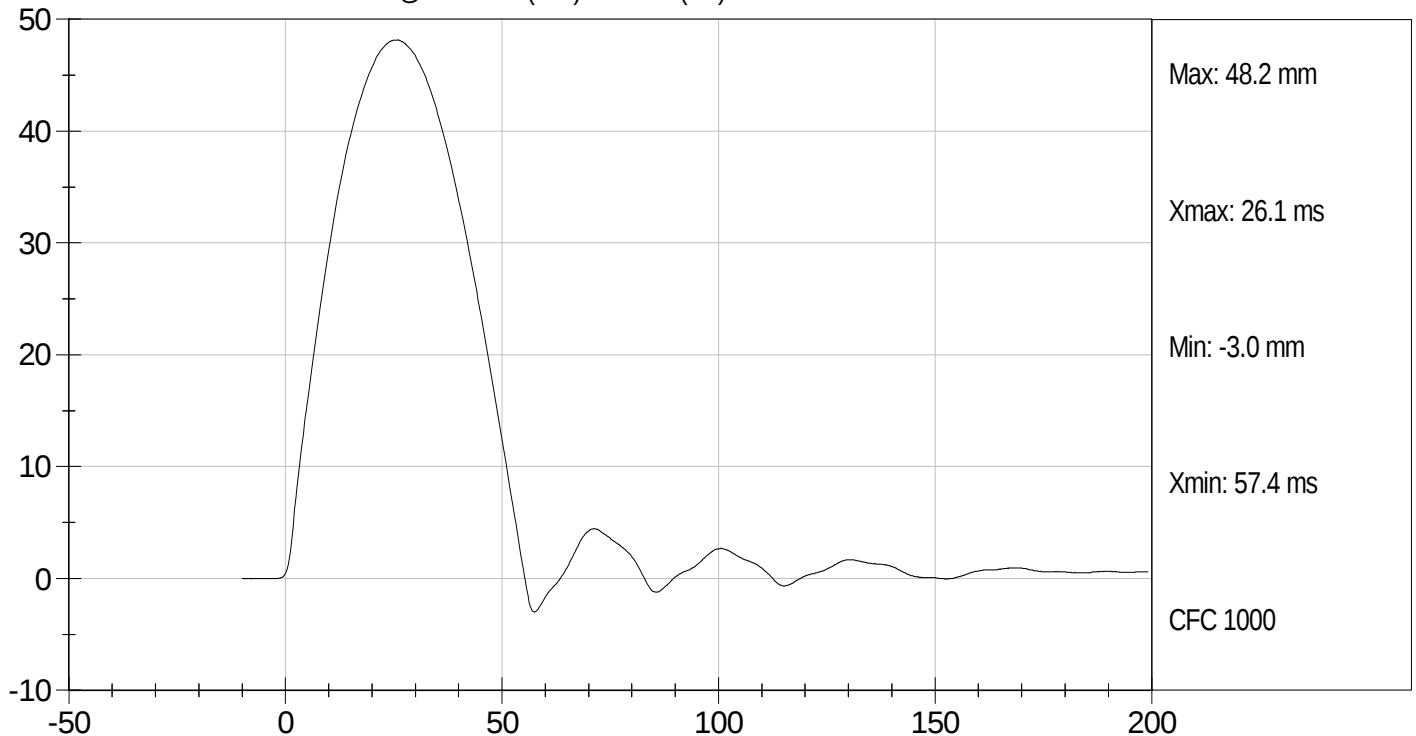

Approved By



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



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

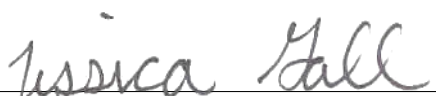


MGA RESEARCH CORPORATION
FULL BODY THORAX IMPACT TEST
ES-2re DUMMY

ATD Serial No: 032

Test I.D: D12720

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.9	Pass
Humidity	%	10 to 70	21	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	5.29	Pass
Upper Rib Displacement	mm	34.0 to 41.0	35.9	Pass
Middle Rib Displacement	mm	37.0 to 45.0	39.4	Pass
Lower Rib Displacement	mm	37.0 to 44.0	39.3	Pass
			Overall Test Results	Pass


Laboratory Technician

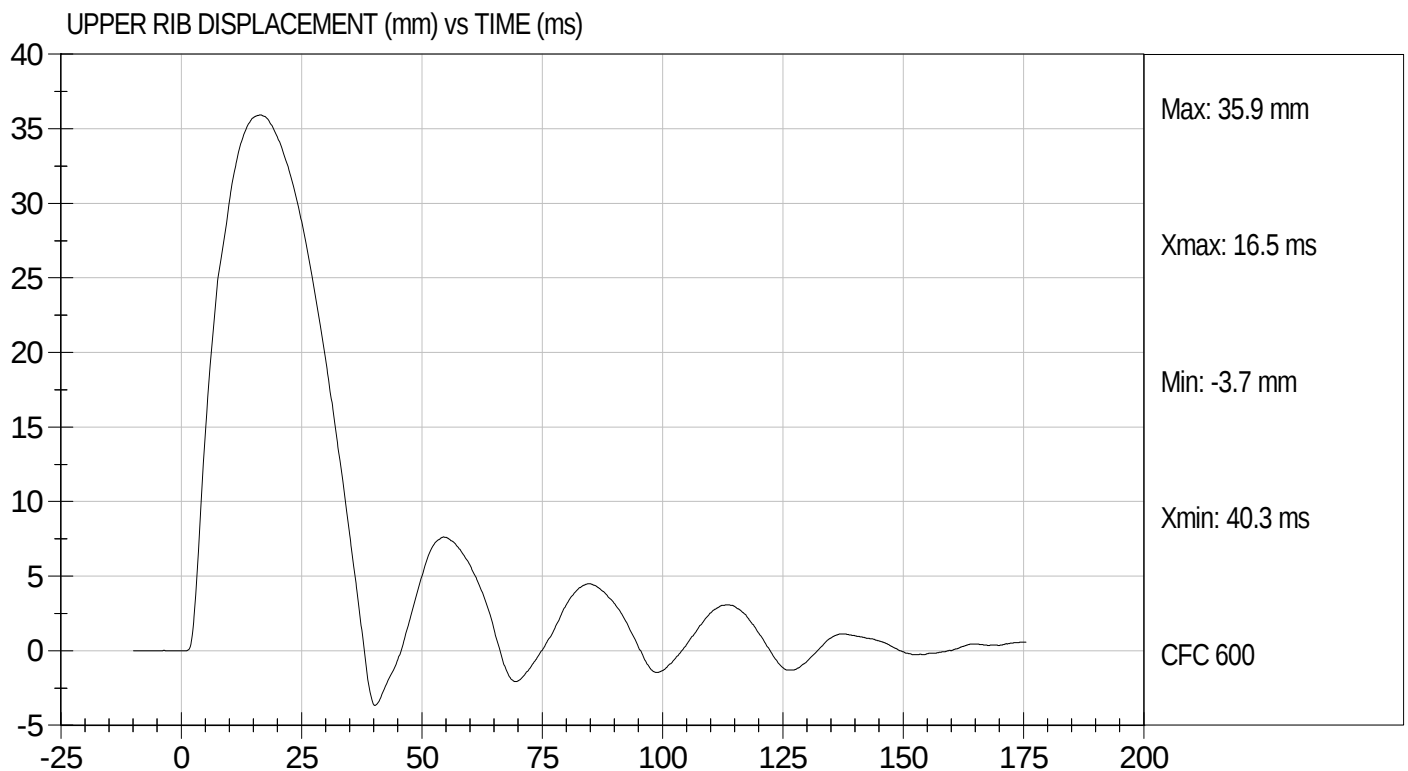
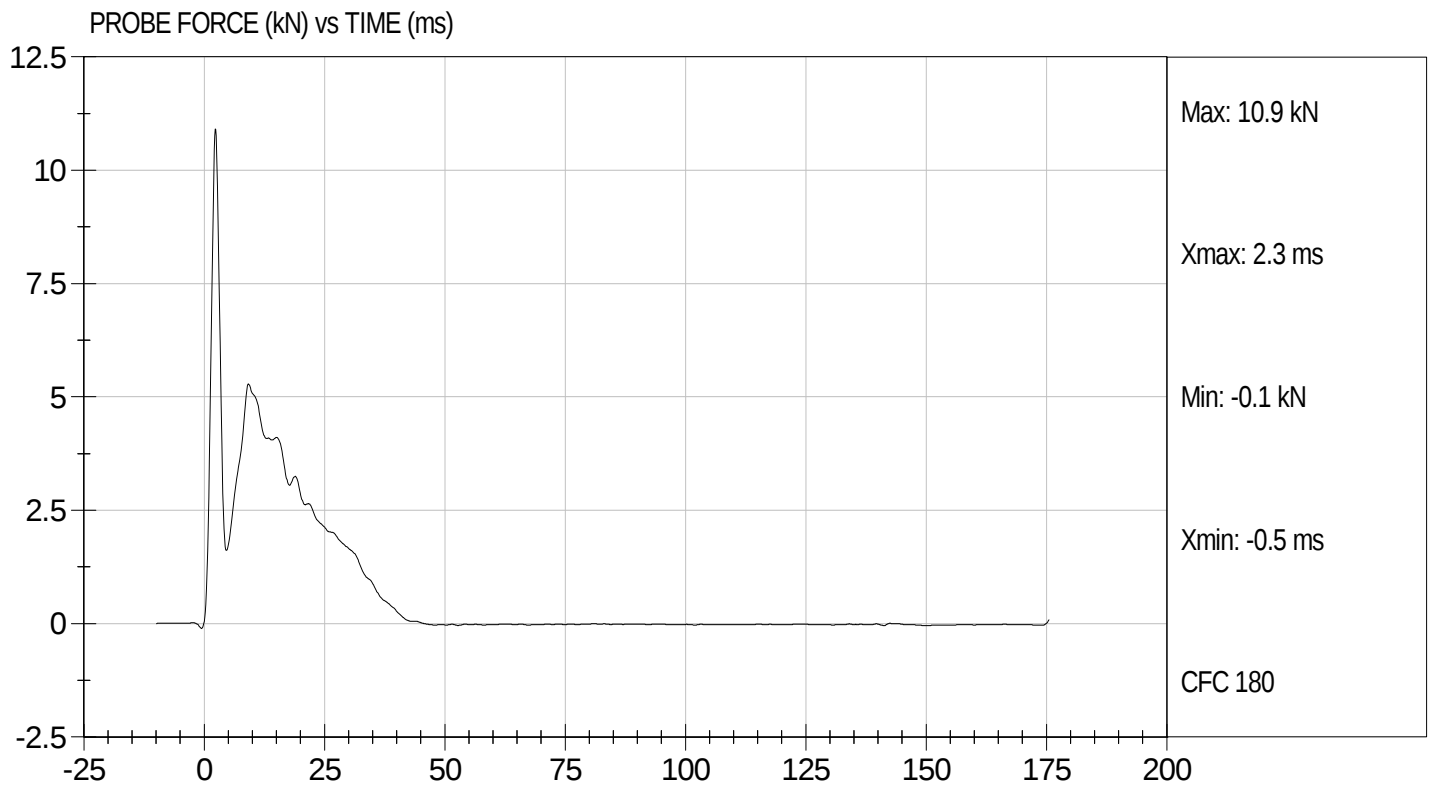
2/28/12
Test Date


Approved By



Test Desc: Thorax Impact
Component ID: D12720

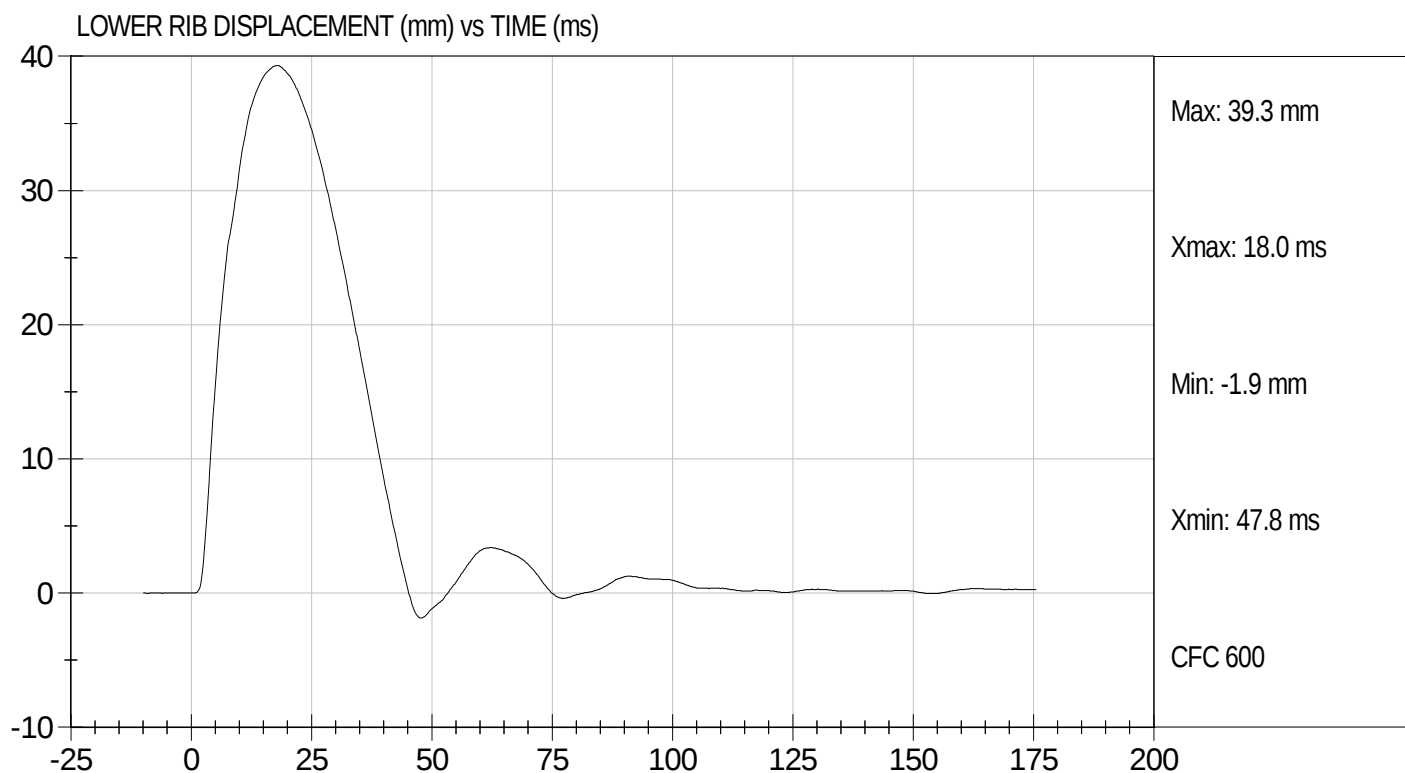
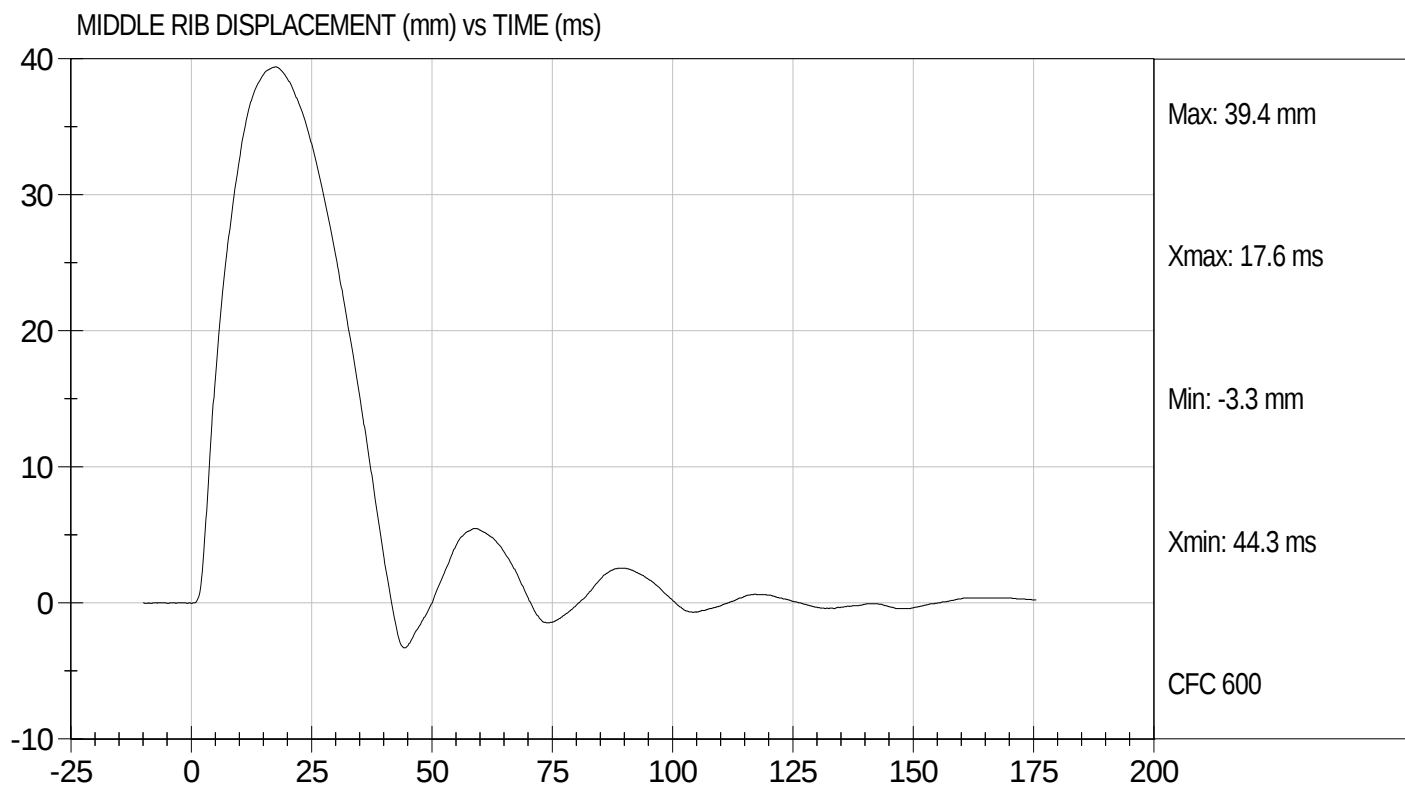
Test Date: 2/28/12
Velocity: 18.32 ft/s, 5.58 m/s





Test Desc: Thorax Impact
Component ID: D12720

Test Date: 2/28/12
Velocity: 18.32 ft/s, 5.58 m/s



MGA RESEARCH CORPORATION

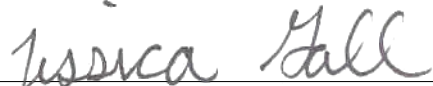
ABDOMEN TEST

ES-2re DUMMY

ATD Serial No: 032

Test I.D: D12727

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Probe Speed	m/s	3.90 to 4.10	4.00	Pass
Maximum Impact Force	kN	4.00 to 4.80	4.21	Pass
Time of Maximum Impactor Force	ms	10.60 to 13.00	10.70	Pass
Maximum Total Abdomen Force	kN	2.20 to 2.70	2.53	Pass
Time of Maximum Abdomen Force	ms	10.00 to 12.30	10.30	Pass
Overall Test Results				Pass


 Laboratory Technician

2/28/12
 Test Date

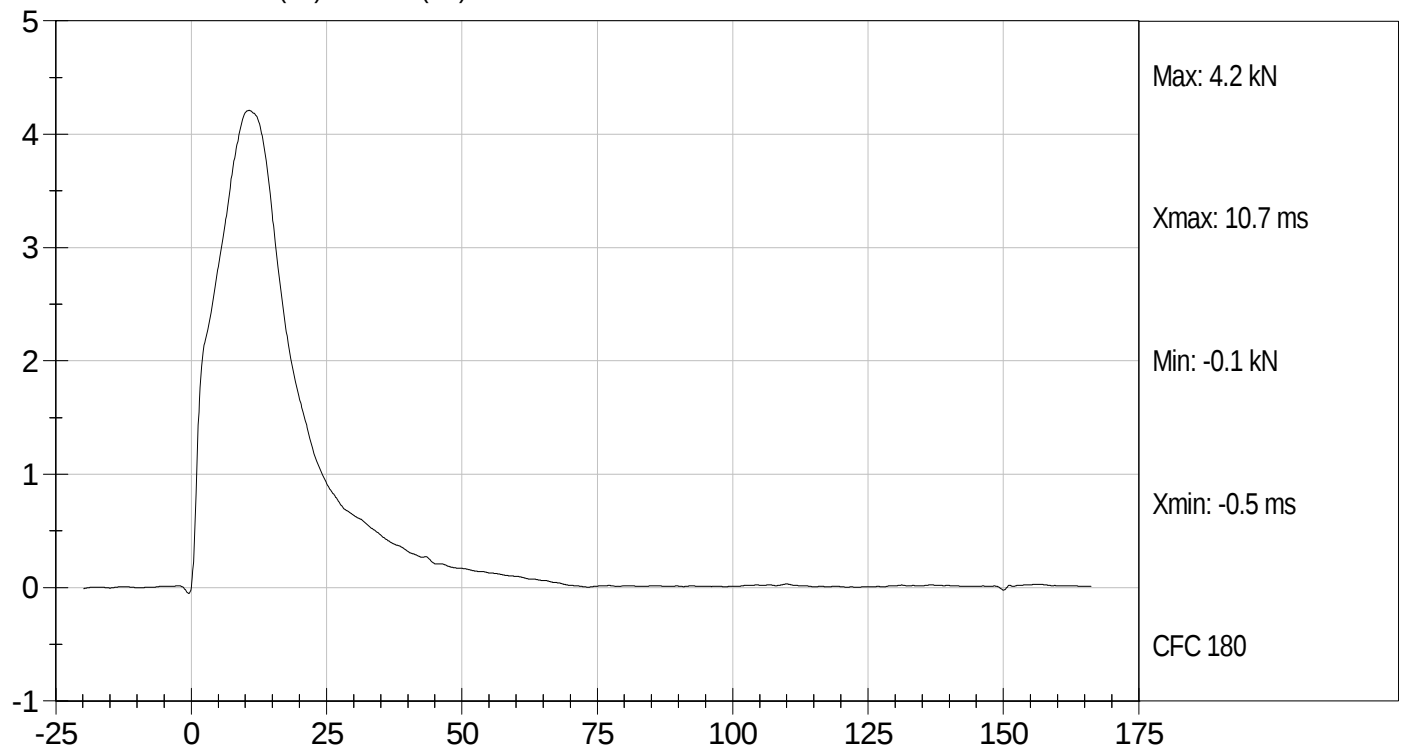

 Approved By



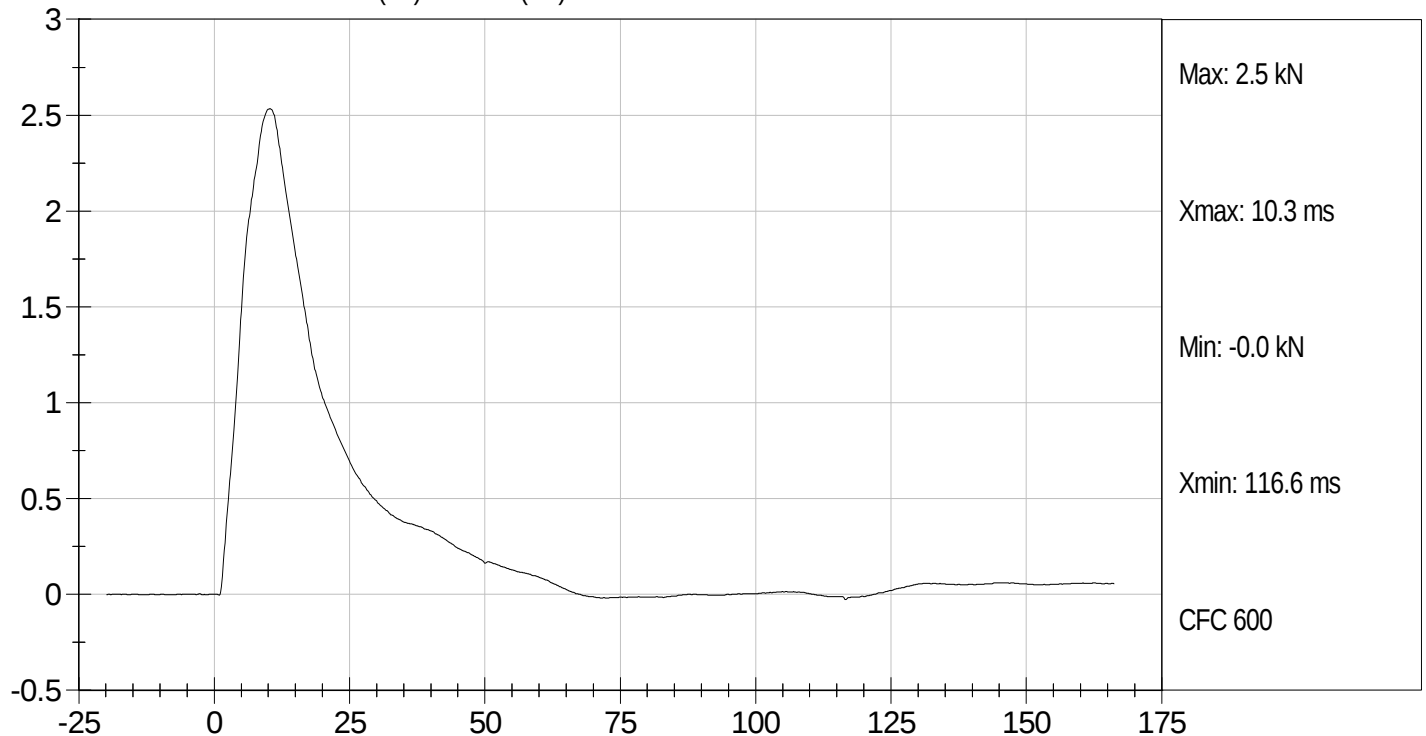
Test Desc: Abdomen Impact
Component ID: D12727

Test Date: 2/28/12
Velocity: 13.12 ft/s, 4.00 m/s

IMPACTOR FORCE (kN) vs TIME (ms)



TOTAL ABDOMEN FORCE (kN) vs TIME (ms)

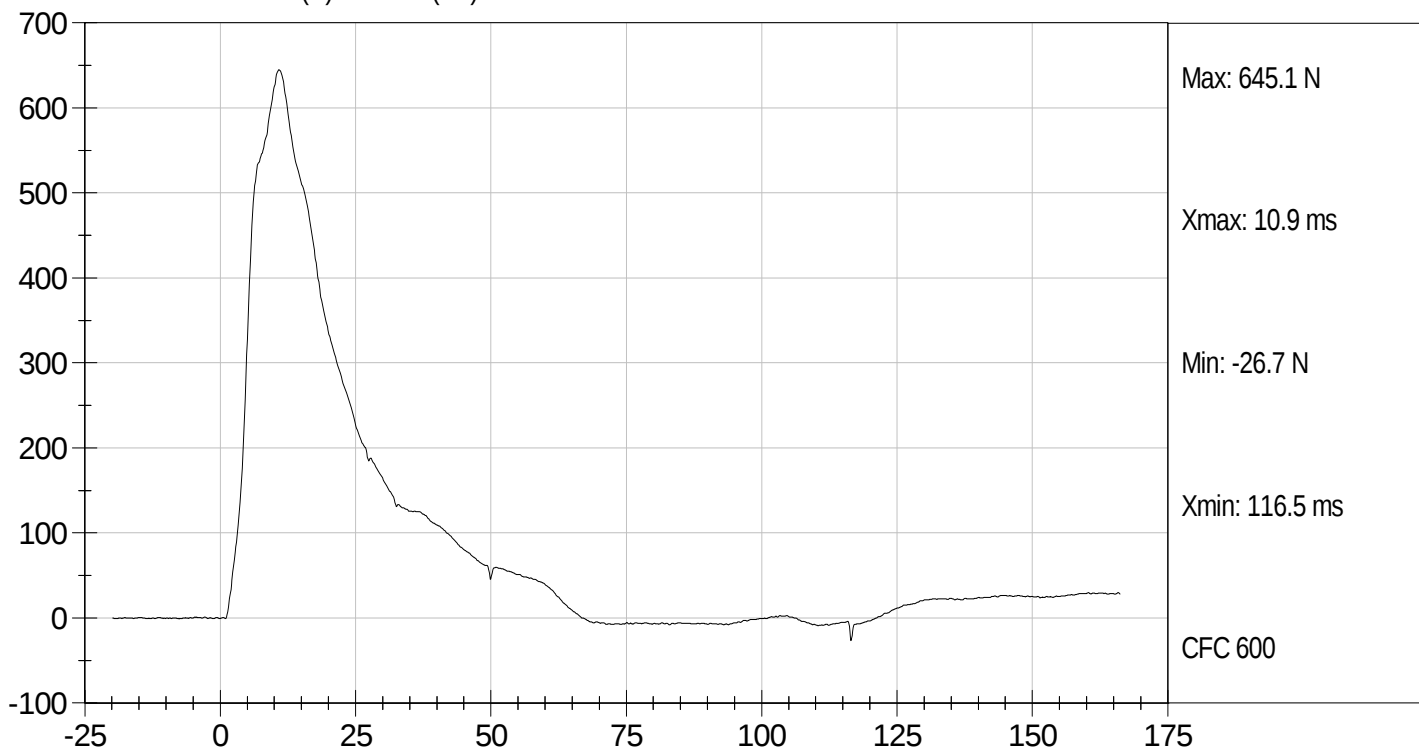




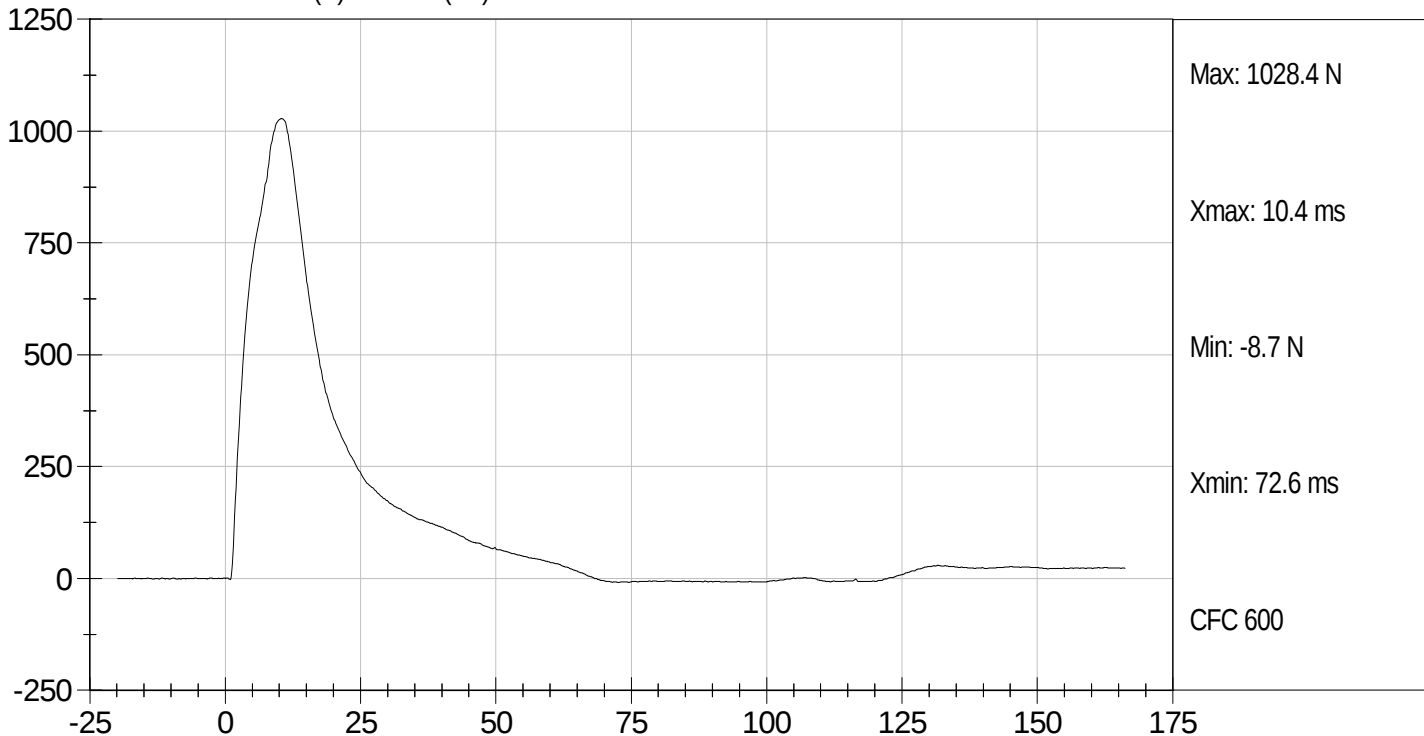
Test Desc: Abdomen Impact
Component ID: D12727

Test Date: 2/28/12
Velocity: 13.12 ft/s, 4.00 m/s

ABDOMEN FRONT (N) vs TIME (ms)



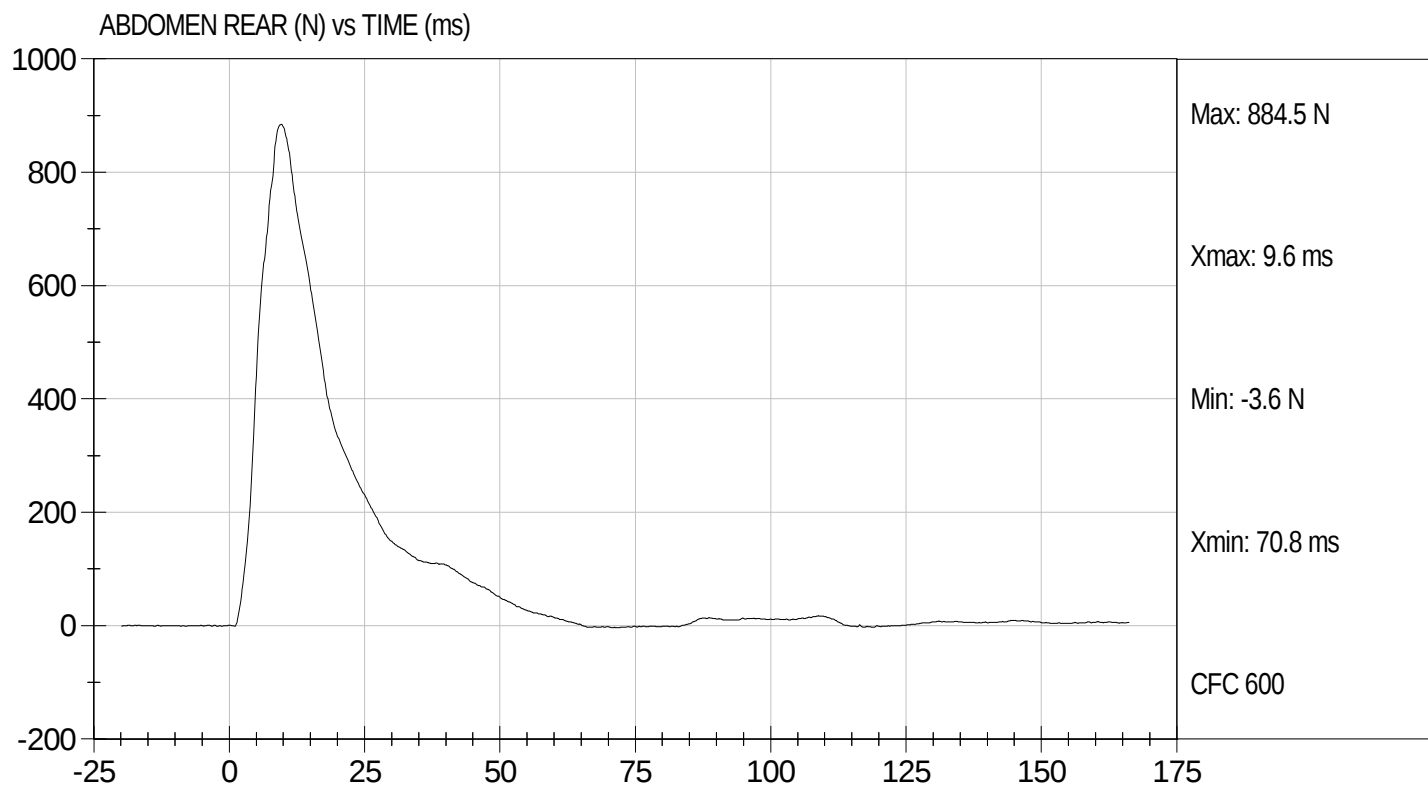
ABDOMEN MIDDLE (N) vs TIME (ms)





Test Desc: Abdomen Impact
Component ID: D12727

Test Date: 2/28/12
Velocity: 13.12 ft/s, 4.00 m/s

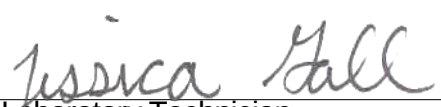


MGA RESEARCH CORPORATION
LUMBAR SPINE TEST
ES-2re DUMMY

ATD Serial No: 032

Test I.D: D12728

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity		%	10 to 70	19	Pass
Pendulum Speed		m/s	5.95 to 6.15	6.12	Pass
Pendulum Deceleration	1 ms	m/s	-0.05 to 0.00	-0.01	Pass
	3.7 ms	m/s	-0.425 to -0.24	-0.42	Pass
	27 ms	m/s	-6.50 to -5.80	-5.81	Pass
	30 ms	m/s	>= -6.5	-5.70	Pass
Maximum Flexion Angle		deg	45.0 to 55.0	48.5	Pass
Time of Maximum Flexion Angle		ms	39.0 to 53.0	41.5	Pass
Headform Rotation Decay to Initial Position		ms	37 to 57	42	Pass
Overall Results					Pass


 Laboratory Technician

2/28/12
 Test Date

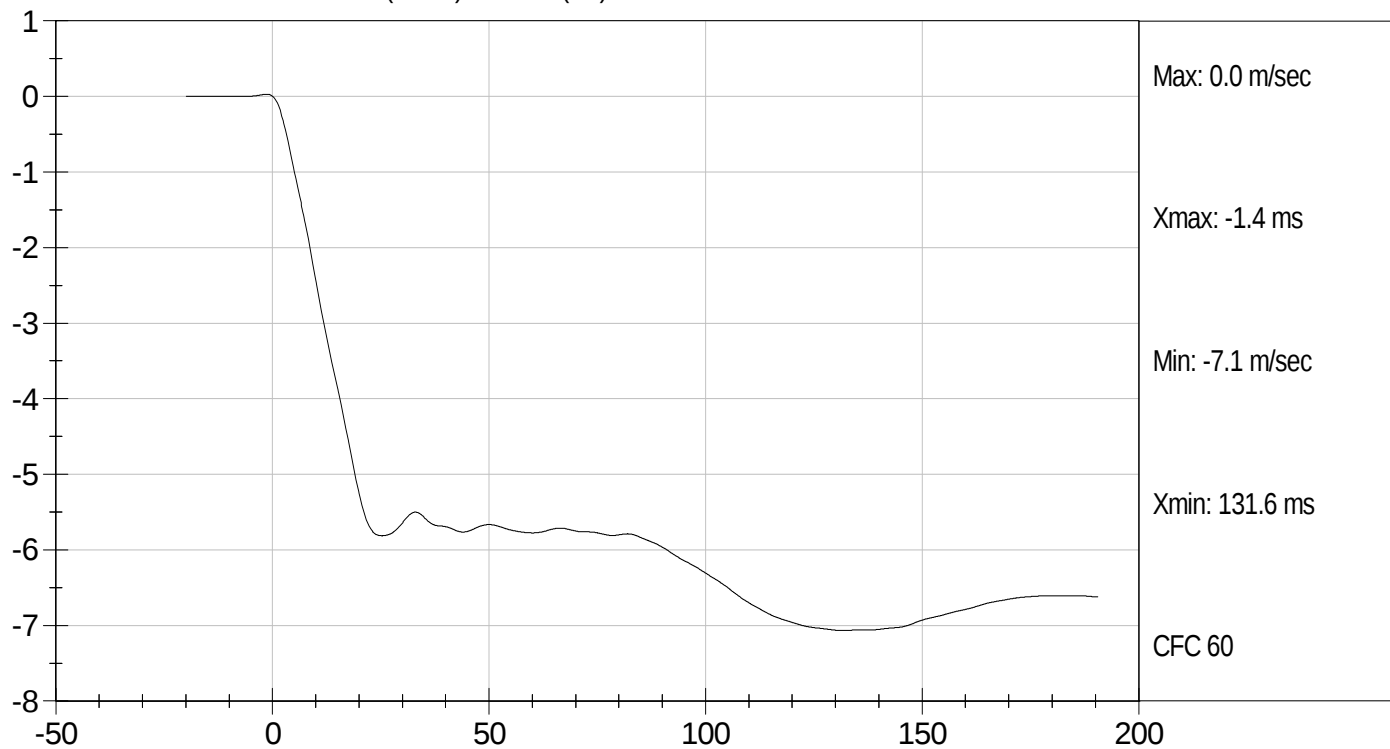

 Approved By



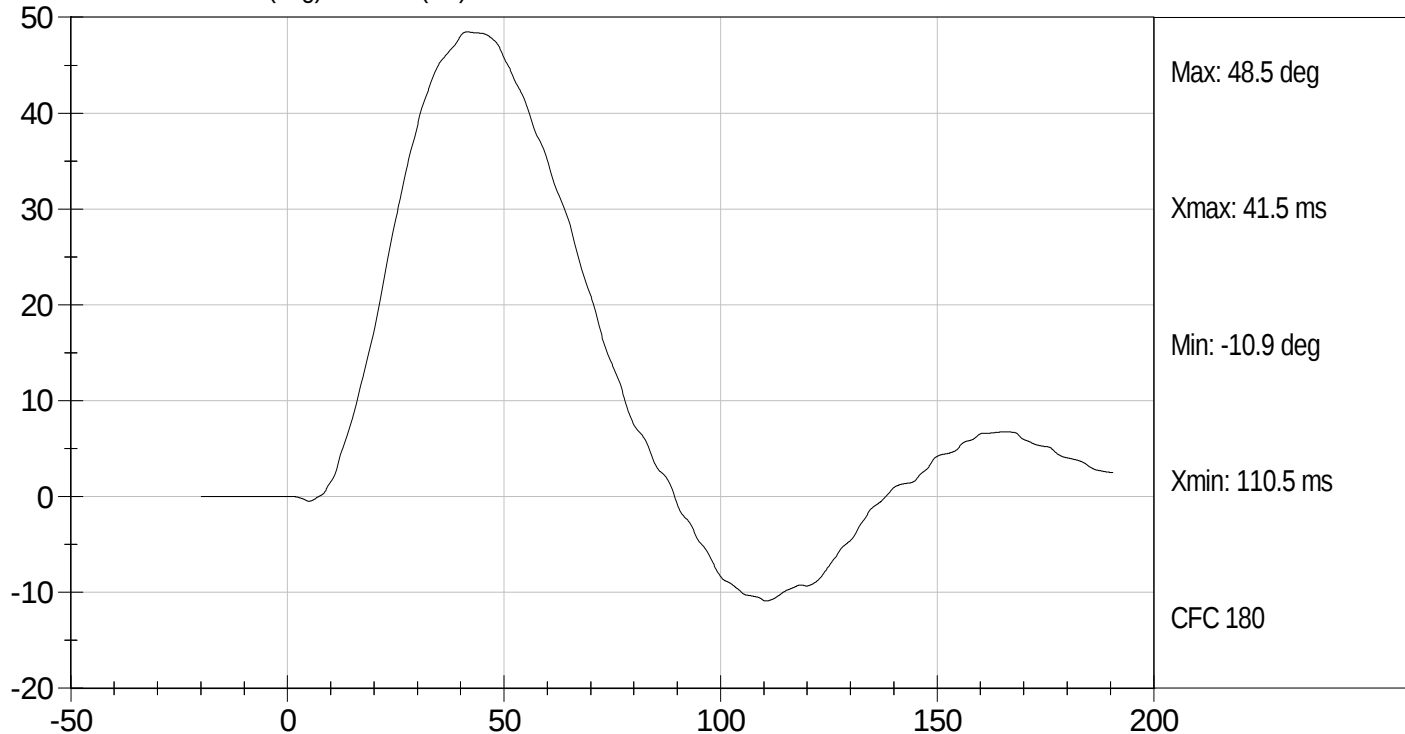
Test Desc: Lumbar Bending
Component ID: D12728

Test Date: 2/28/12
Velocity: 20.08 ft/s, 6.12 m/s

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



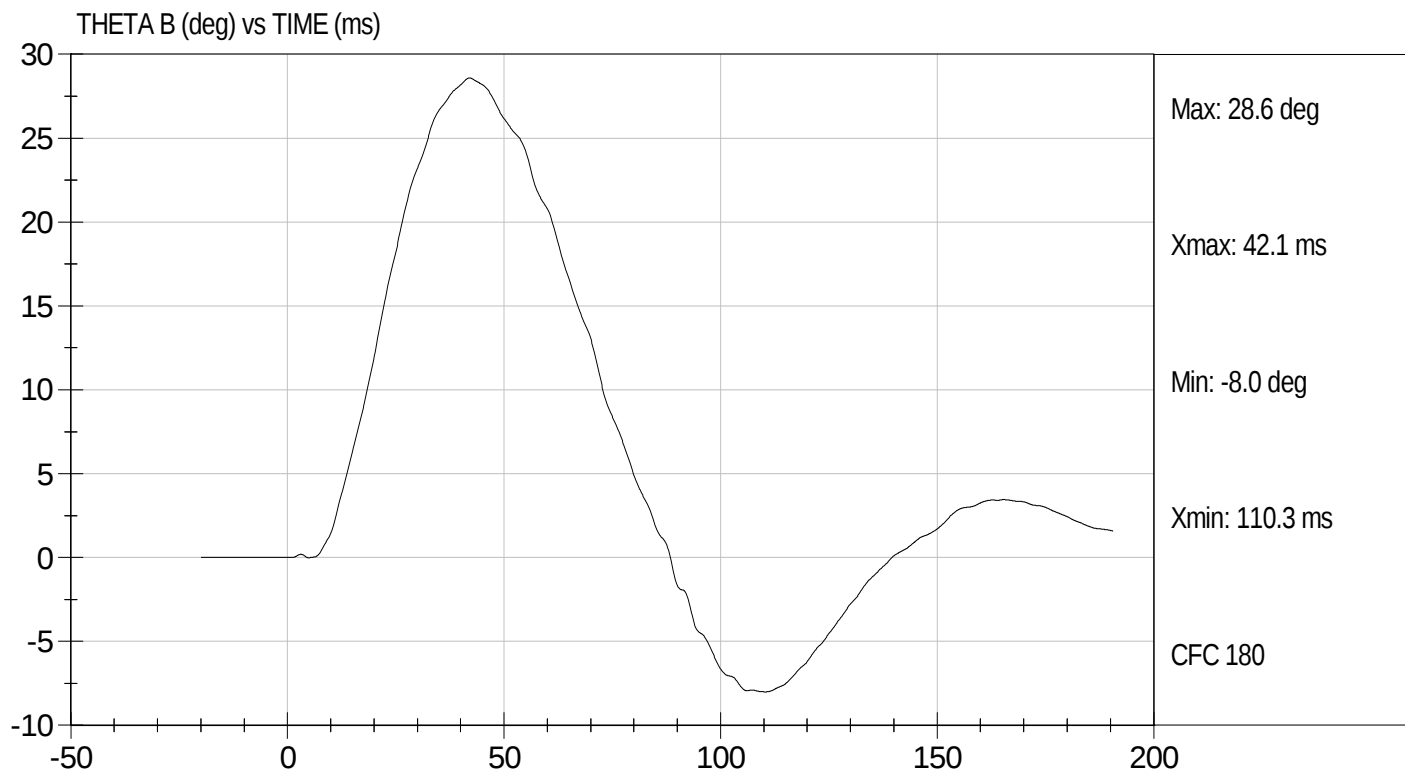
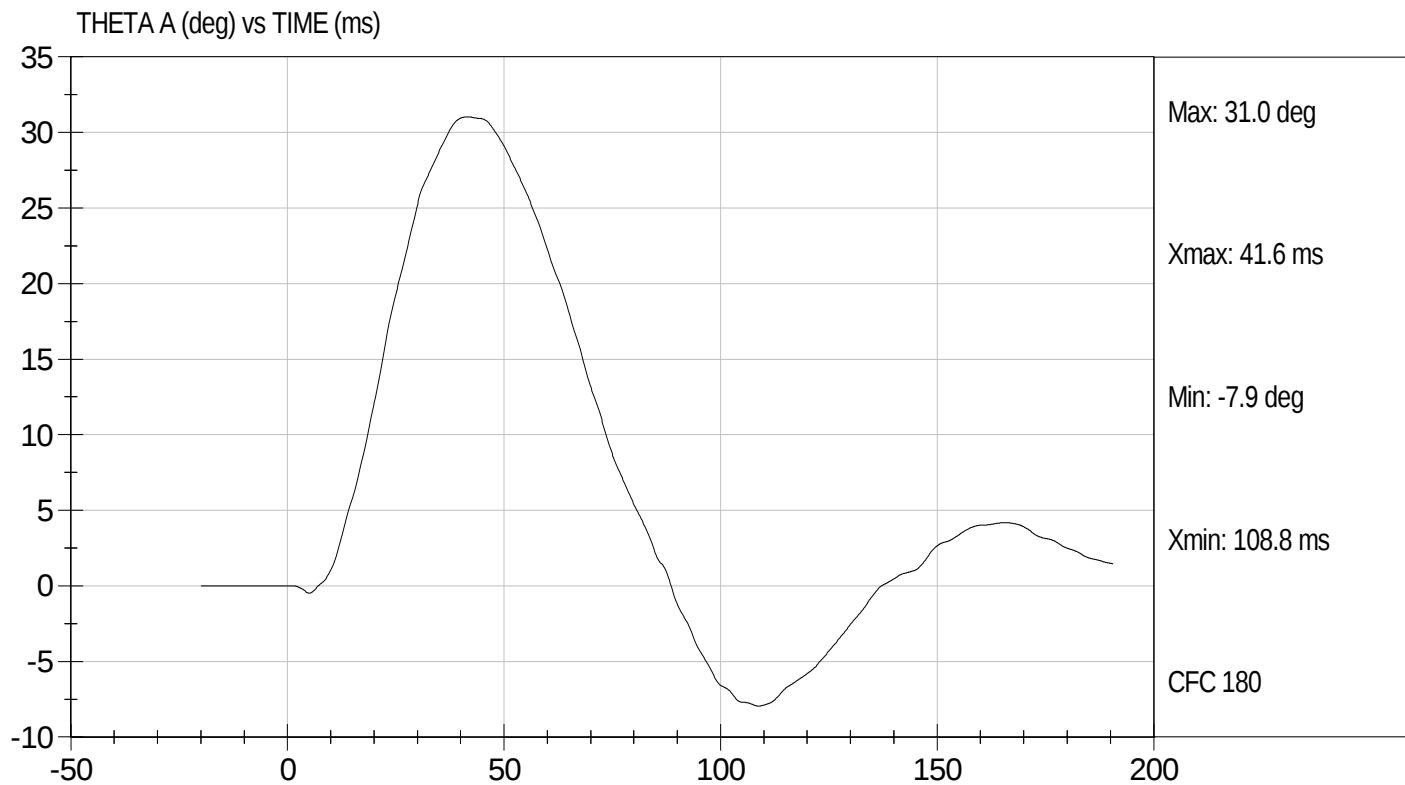
FLEXION ANGLE (deg) vs TIME (ms)





Test Desc: Lumbar Bending
Component ID: D12728

Test Date: 2/28/12
Velocity: 20.08 ft/s, 6.12 m/s



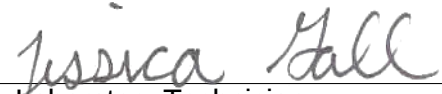
MGA RESEARCH CORPORATION

PELVIS TEST

ES-2re DUMMY

ATD Serial No: 032Test I.D: D12729

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
Probe Speed	m/s	4.20 to 4.40	4.38	Pass
Maximum Impactor Force	kN	4.70 to 5.40	4.99	Pass
Time of Maximum Impactor Force	ms	11.80 to 16.10	12.80	Pass
Maximum Pubic Force	kN	1.23 to 1.59	1.32	Pass
Time of Maximum Pubic Force	ms	12.20 to 17.00	13.70	Pass
Overall Test Results				Pass


Laboratory Technician

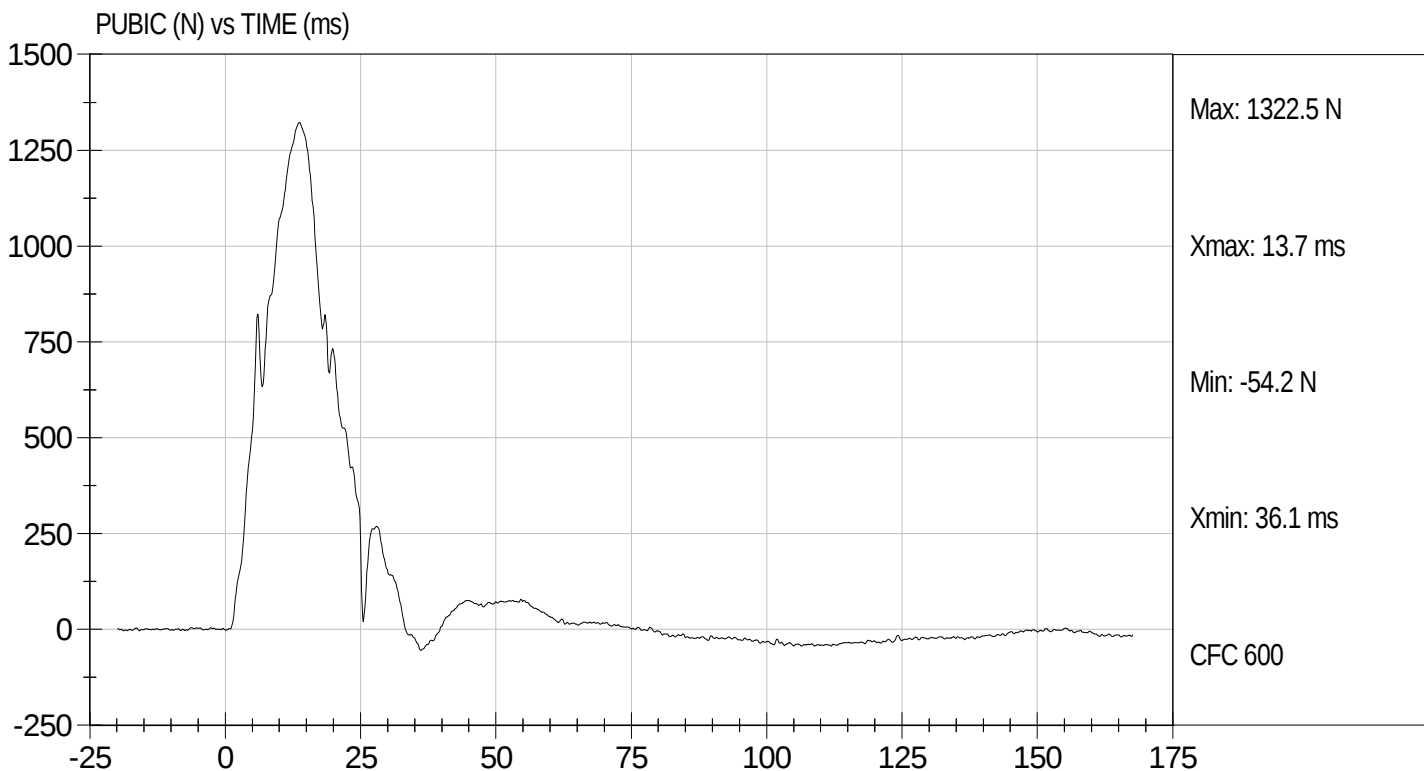
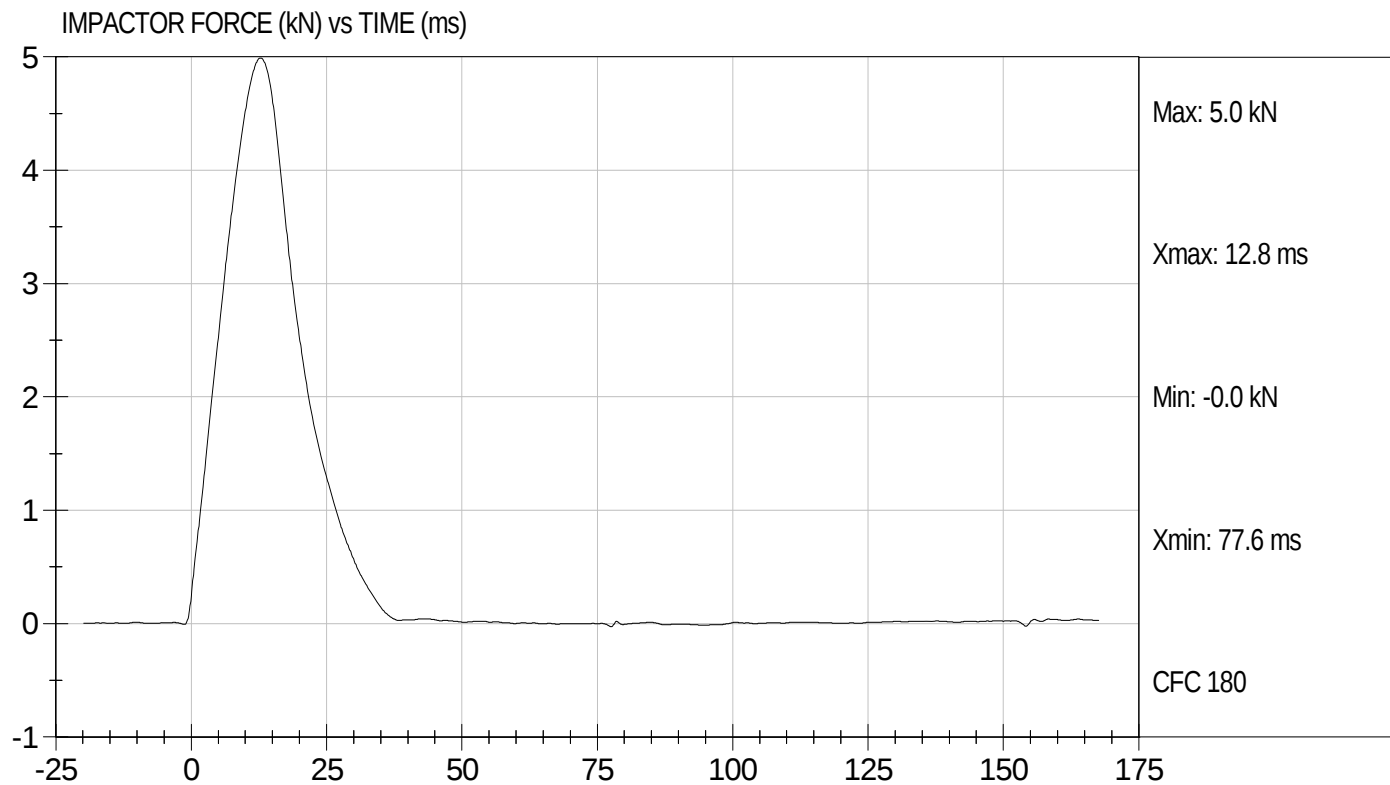
2/28/12
Test Date


Approved By



Test Desc: Pelvis Impact
Component ID: D12729

Test Date: 2/28/12
Velocity: 14.37 ft/s, 4.38 m/s

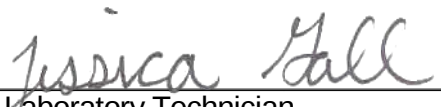


MGA RESEARCH CORPORATION
HEAD DROP TEST
ES-2re DUMMY

ATD Serial No: 032

Test ID: D12851

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	18	Pass
Peak Resultant Acceleration	G's	125 to 155	141	Pass
Peak Longitudinal Acceleration	G's	+/- 15	-13.9	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 15% of peak	Yes	Pass
Overall Test Results				Pass


Laboratory Technician

3/6/12
Test Date

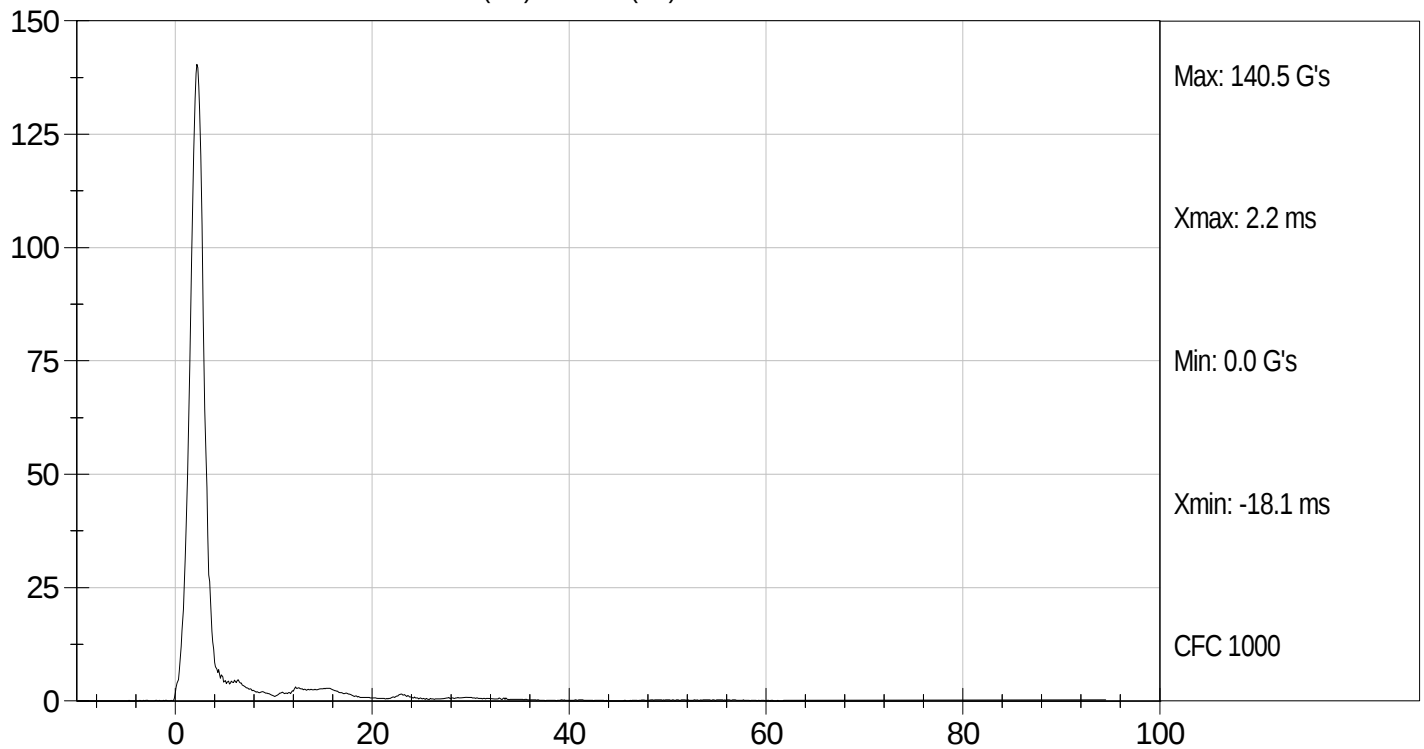

Approved By



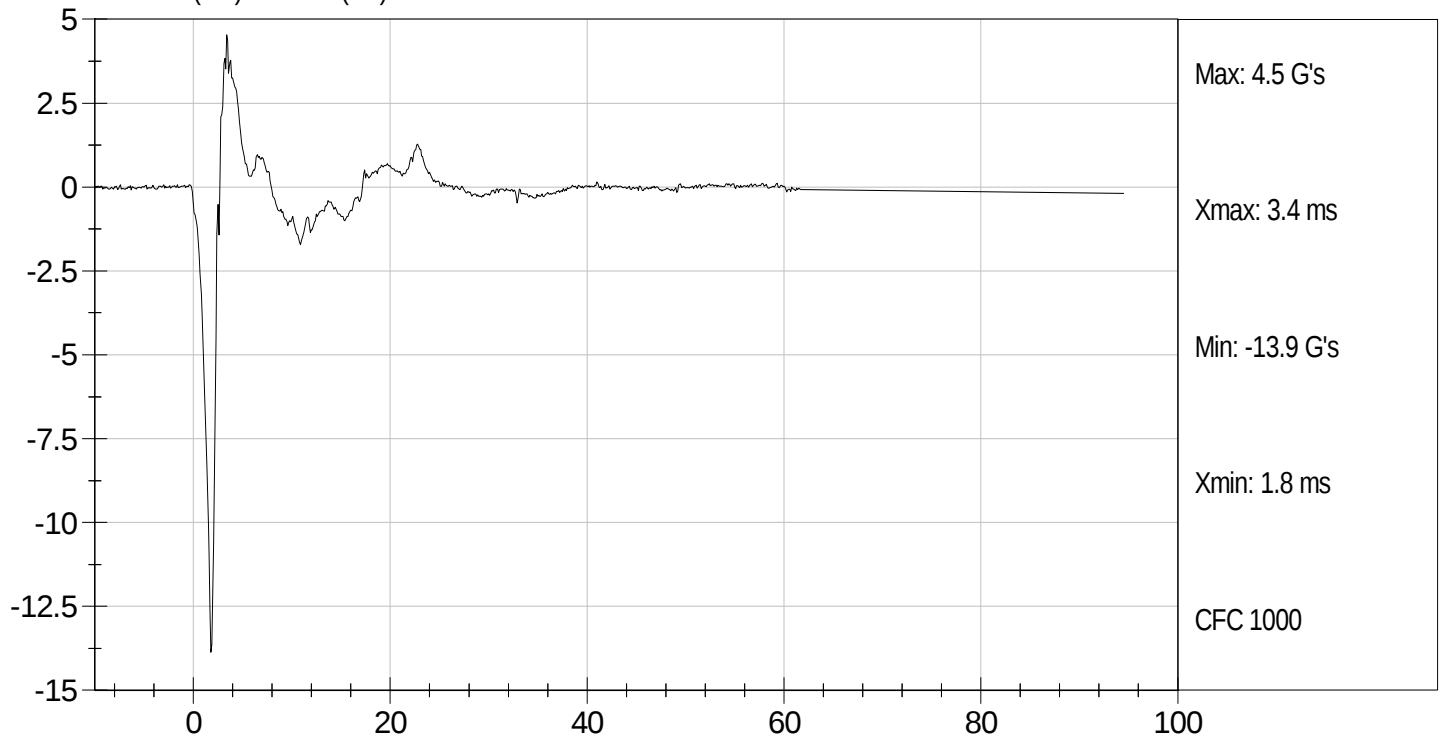
Test Desc: Head Drop
Component ID: D12851

Test Date: 3/6/12
Velocity: 0 ft/s, 0 m/s

PEAK RESULTANT ACCELERATION (G's) vs TIME (ms)



HEAD X (G's) vs TIME (ms)



MGA RESEARCH CORPORATION
NECK PENDULUM TEST
ES-2re DUMMY

ATD Serial No: 032

Test I.D: D12852

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	18.0 to 22.0	22.0	Pass
Laboratory Relative Humidity		%	10 to 70	25	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	-0.32	Pass
	14 ms	m/s	-3.20 to -3.70	-3.33	Pass
Maximum Flexion Angle		deg	49.0 to 59.0	52.4	Pass
Time of Maximum Flexion Angle		ms	54.0 to 66.0	57.2	Pass
Head Rotation Decay Time to 0 degree		ms	53.0 to 88.0	56.2	Pass
Overall Test Results					Pass


 Laboratory Technician

3/6/12
 Test Date

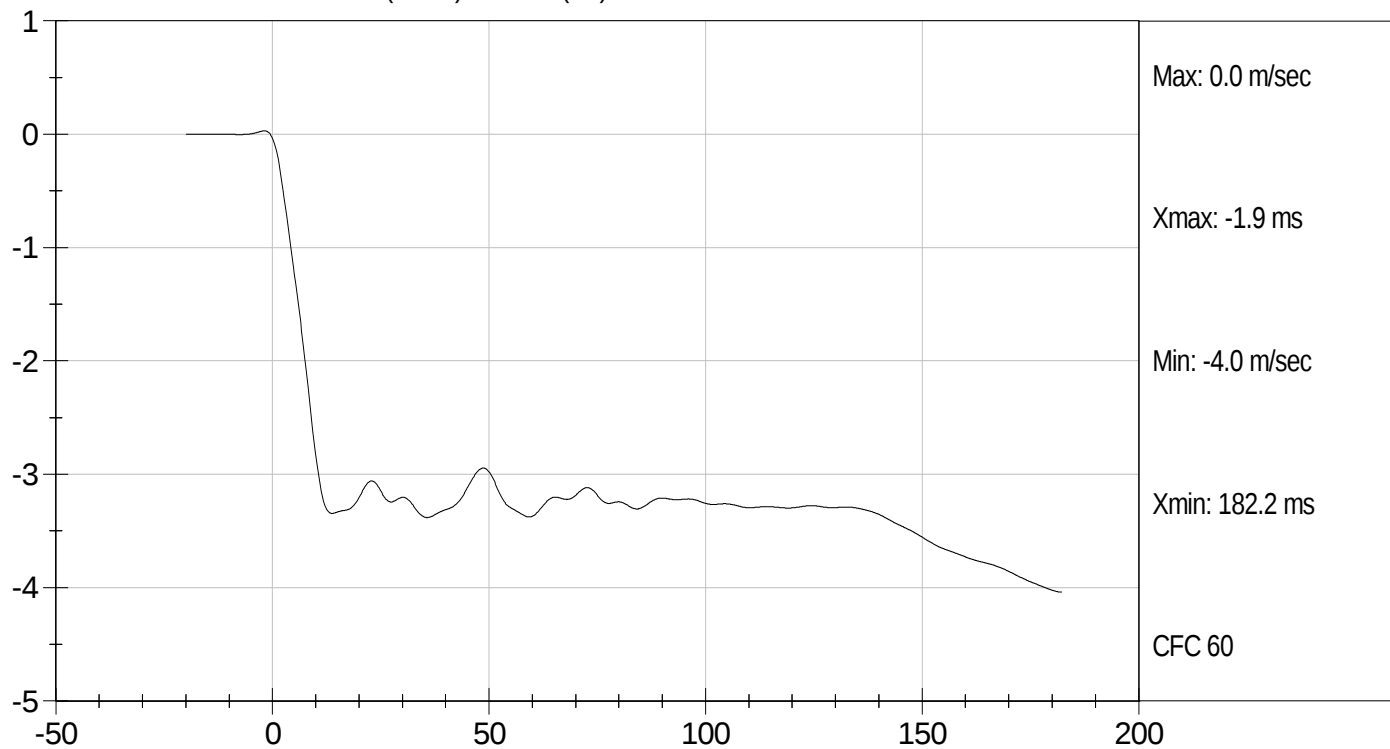

 Approved By



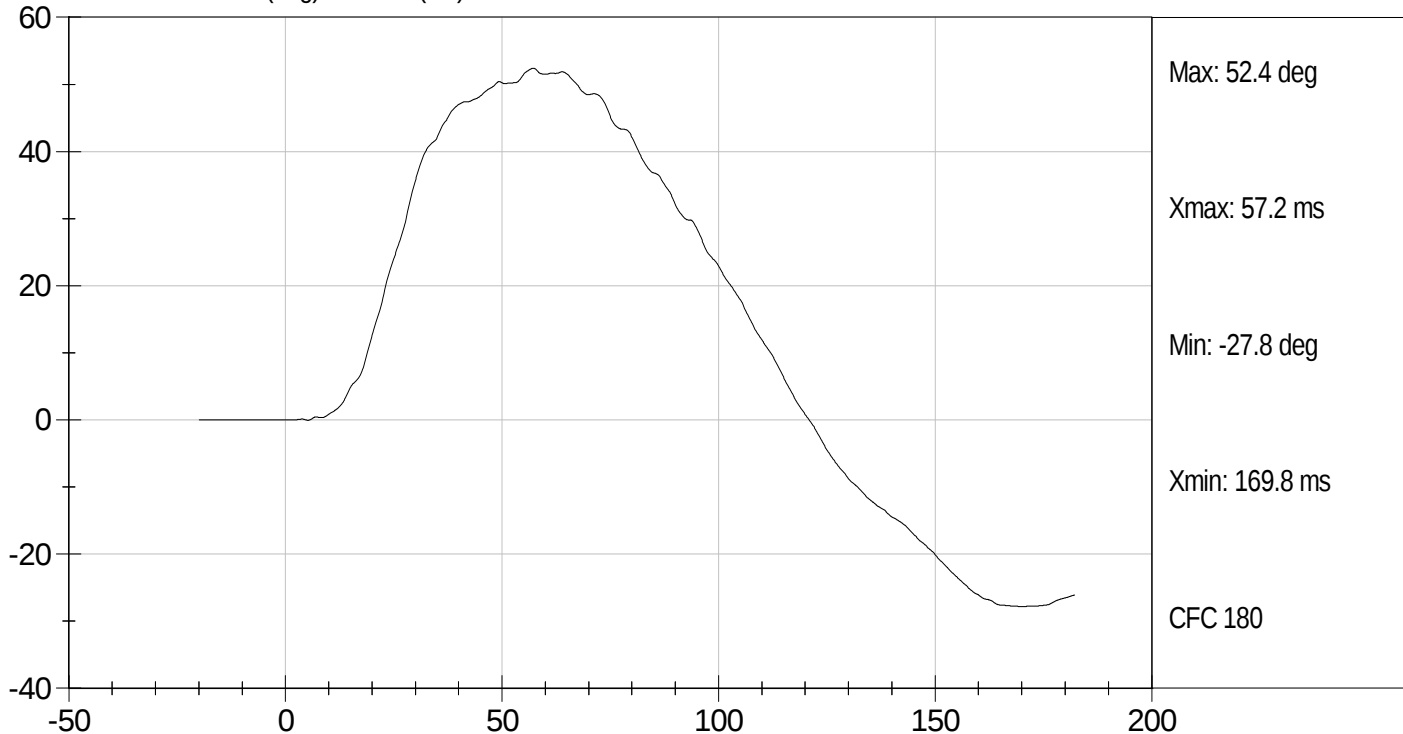
Test Desc: Neck Bending
Component ID: D12852

Test Date: 3/6/12
Velocity: 10.89 ft/s, 3.3 m/s

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



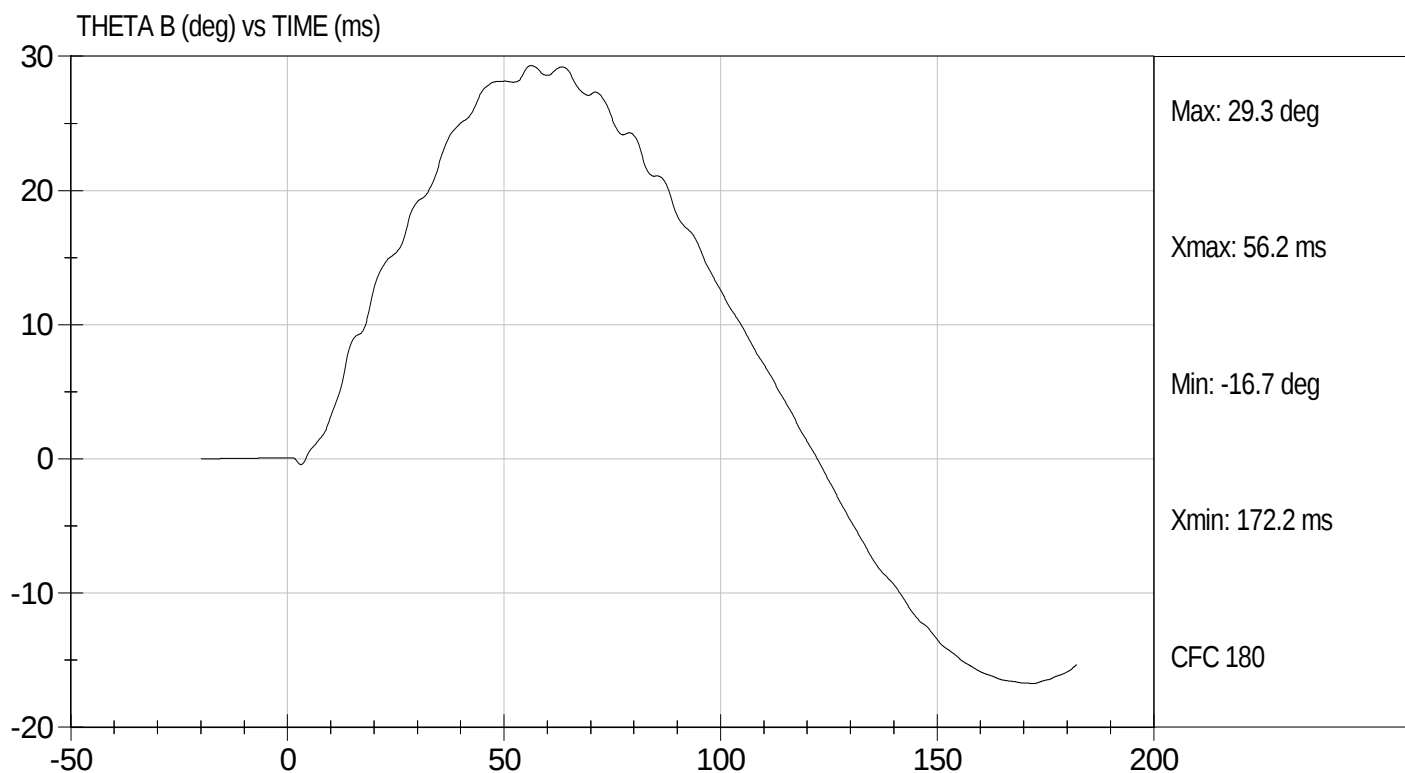
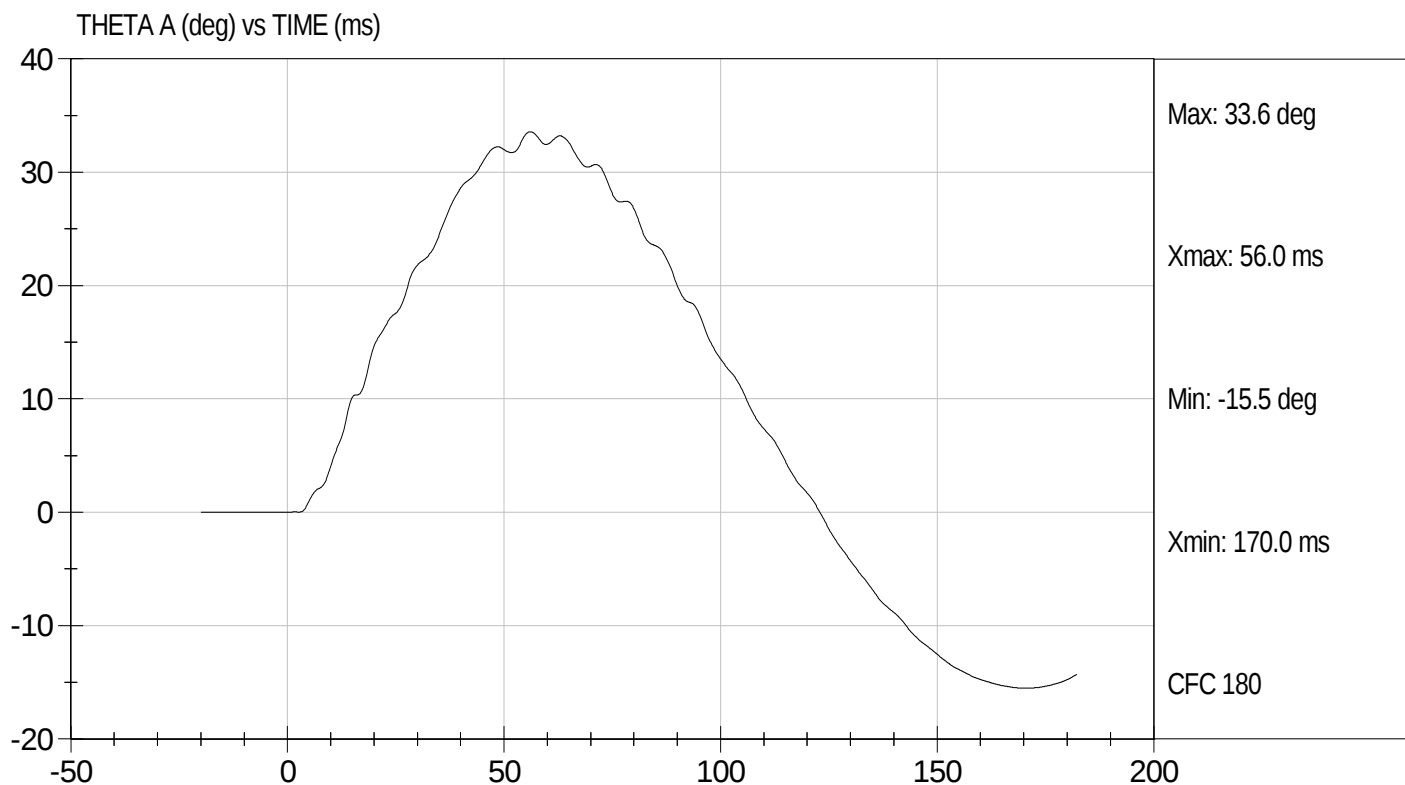
FLEXION ANGLE (deg) vs TIME (ms)





Test Desc: Neck Bending
Component ID: D12852

Test Date: 3/6/12
Velocity: 10.89 ft/s, 3.3 m/s



MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
ES-2re DUMMY

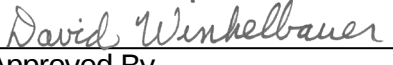
ATD Serial No: 032

Test I.D: D12853

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Pendulum Speed	m/s	4.2 to 4.4	4.3	Pass
Peak Shoulder Acceleration	G's	7.5 to 10.5	10.0	Pass
Time of Peak Shoulder Acceleration	ms	NA	17.0	Pass
Overall Test Results			Pass	


Laboratory Technician

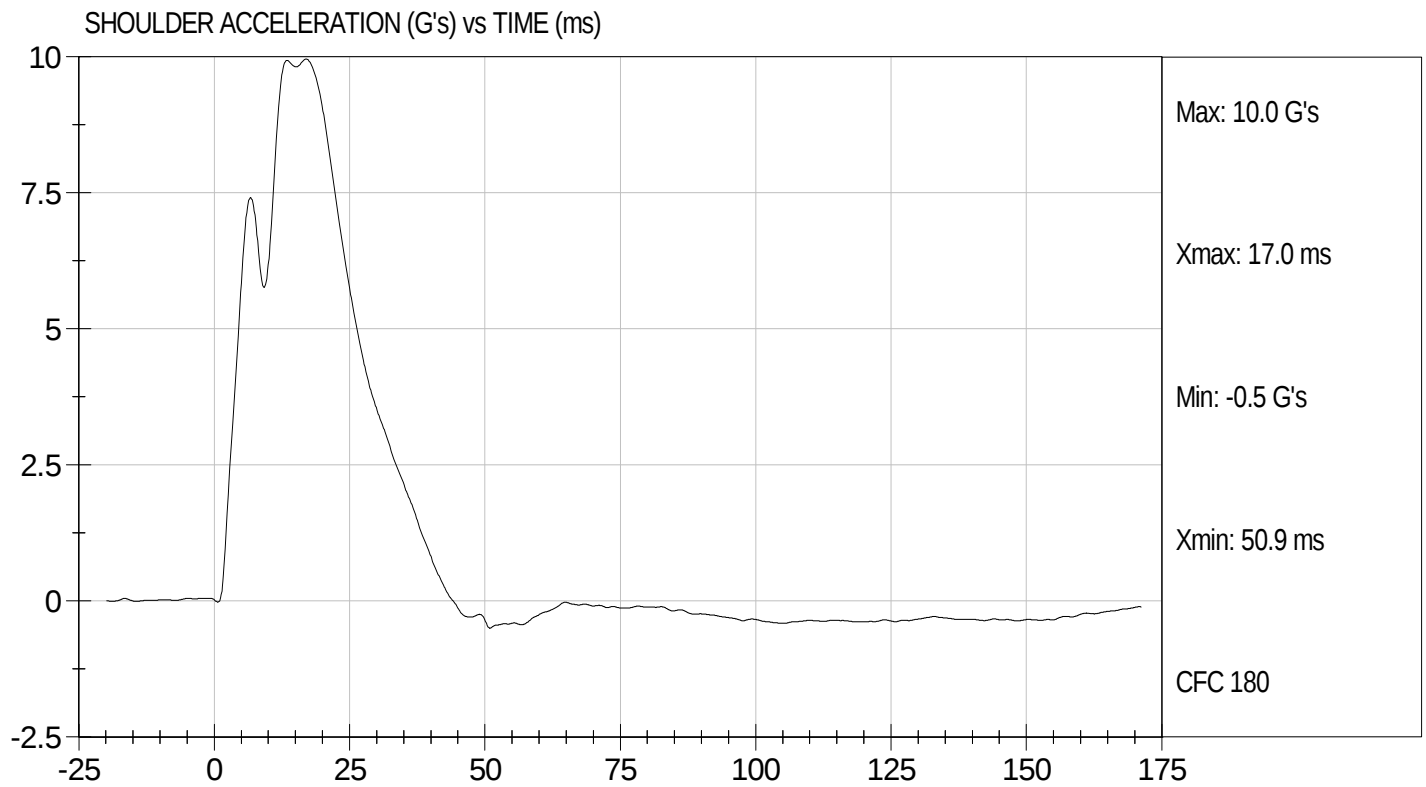
3/6/12
Test Date


Approved By



Test Desc: Shoulder Impact
Component ID: D12853

Test Date: 3/6/12
Velocity: 14.25 ft/s, 4.3 m/s



MGA RESEARCH CORPORATION

UPPER RIB TEST

EUROSID 2 DUMMY

ATD Serial No: 032

Test I.D: D12854

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	31	Pass
Displacement at 3 m/s	mm	36.0 to 40.0	37.6	Pass
Displacement at 4 m/s	mm	46.0 to 51.0	48.4	Pass
Overall Test Results				Pass

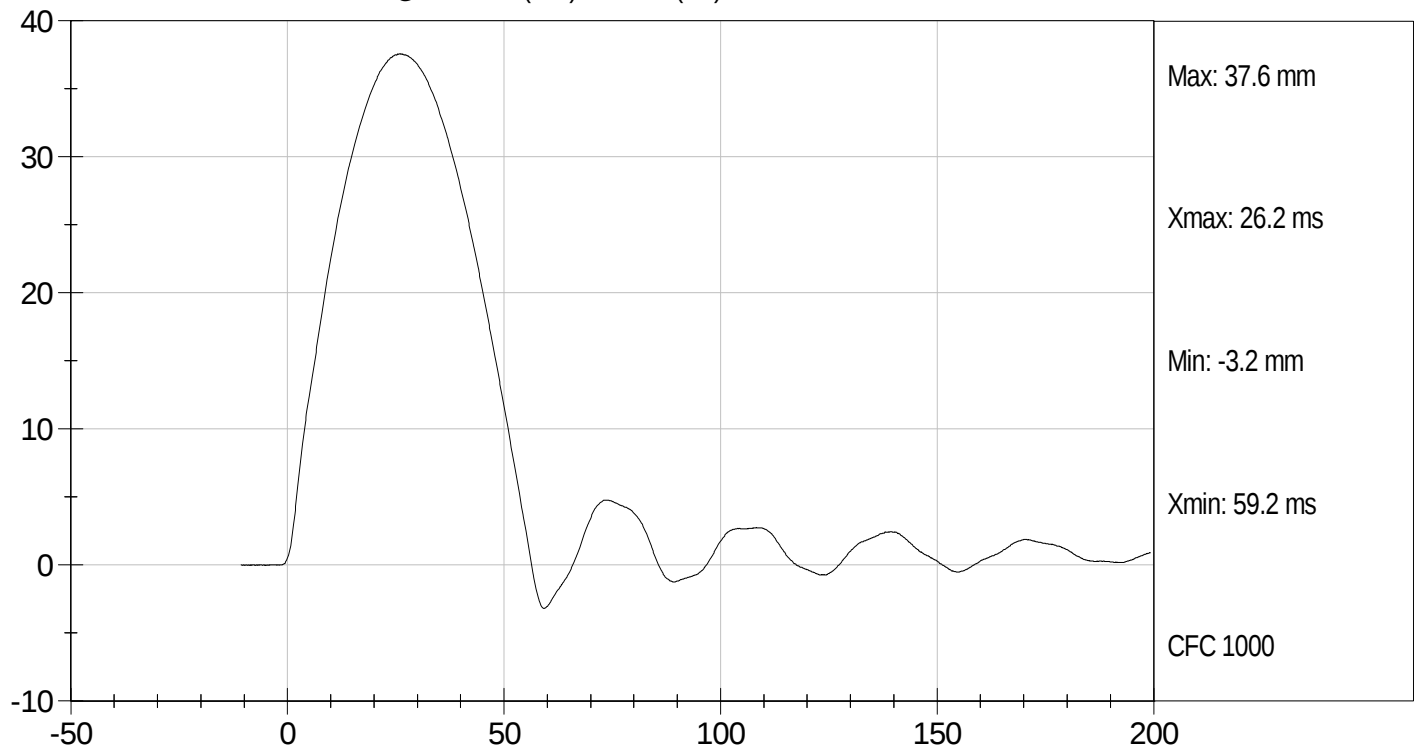

Laboratory Technician

3/6/12
Test Date

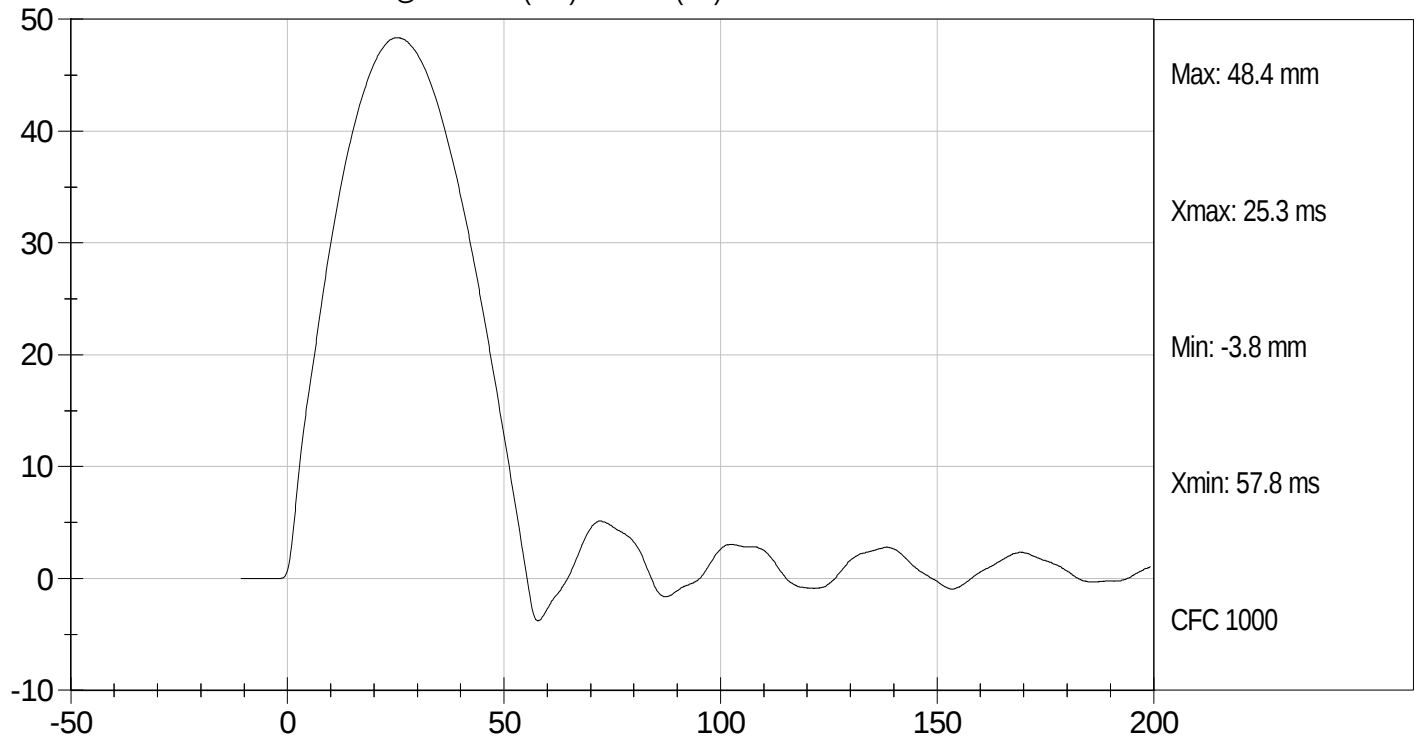

Approved By



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



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



MGA RESEARCH CORPORATION

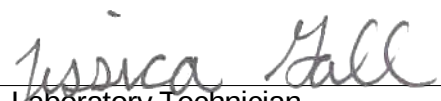
MID RIB TEST

EUROSID 2 DUMMY

ATD Serial No: 032

Test I.D: D12855

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	31	Pass
Displacement at 3 m/s	mm	36.0 to 40.0	36.8	Pass
Displacement at 4 m/s	mm	46.0 to 51.0	48.1	Pass
			Overall Test Results	Pass

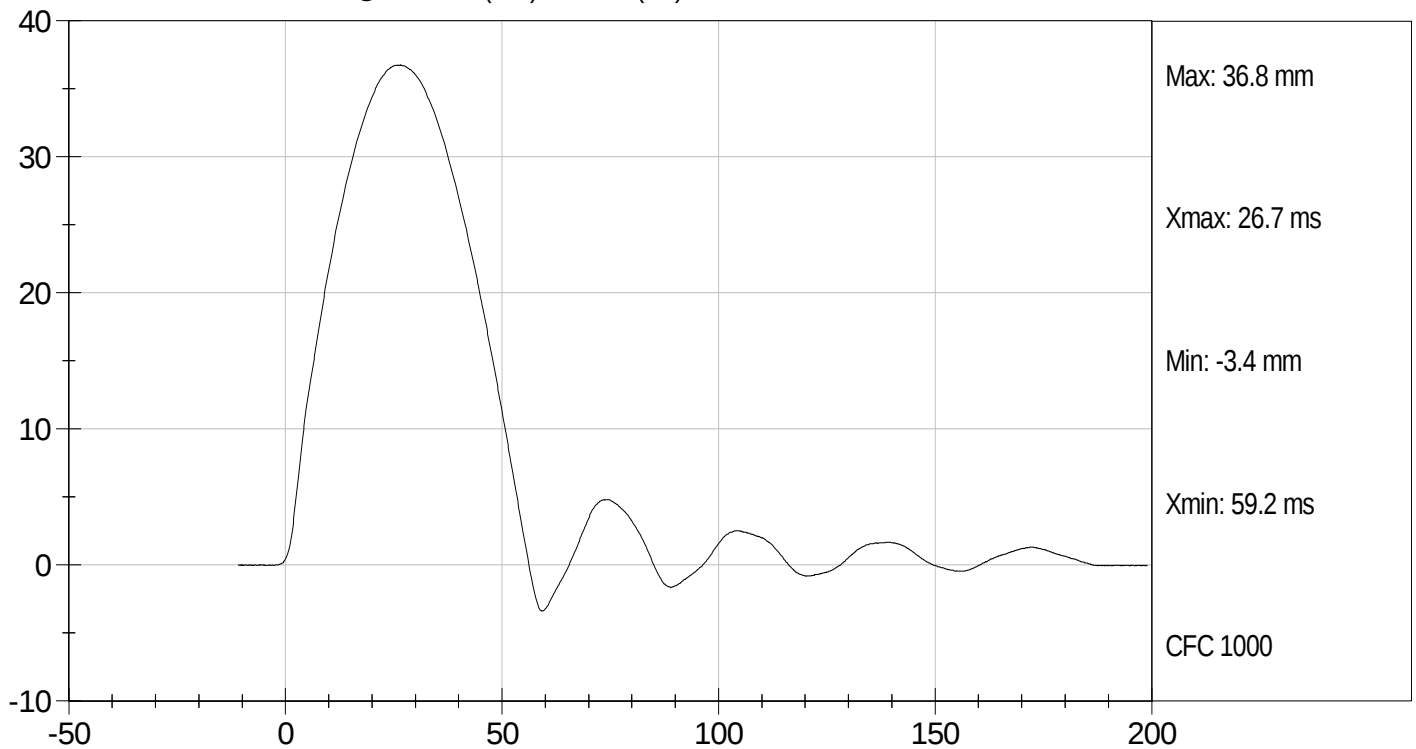

Laboratory Technician

3/6/12
Test Date

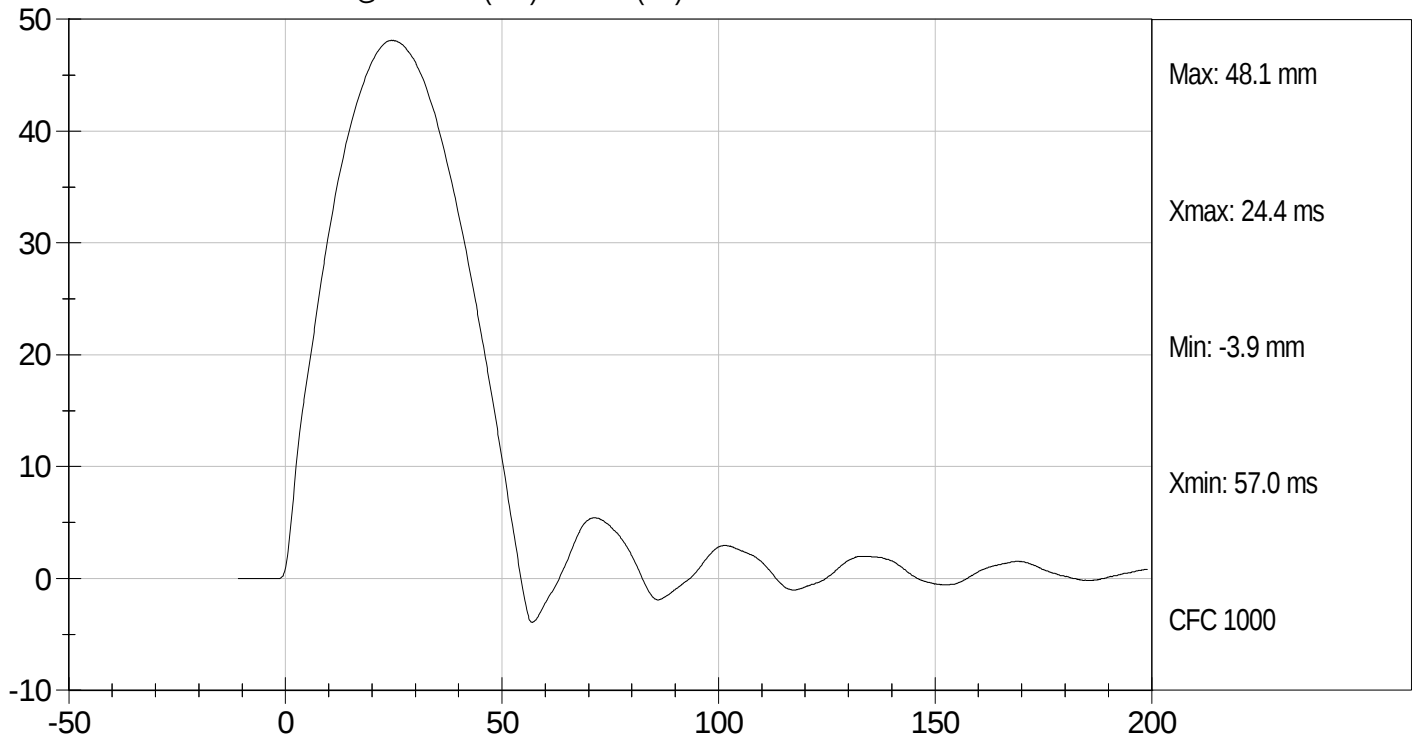

Approved By



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
EUROSID 2 DUMMY**

ATD Serial No: 032

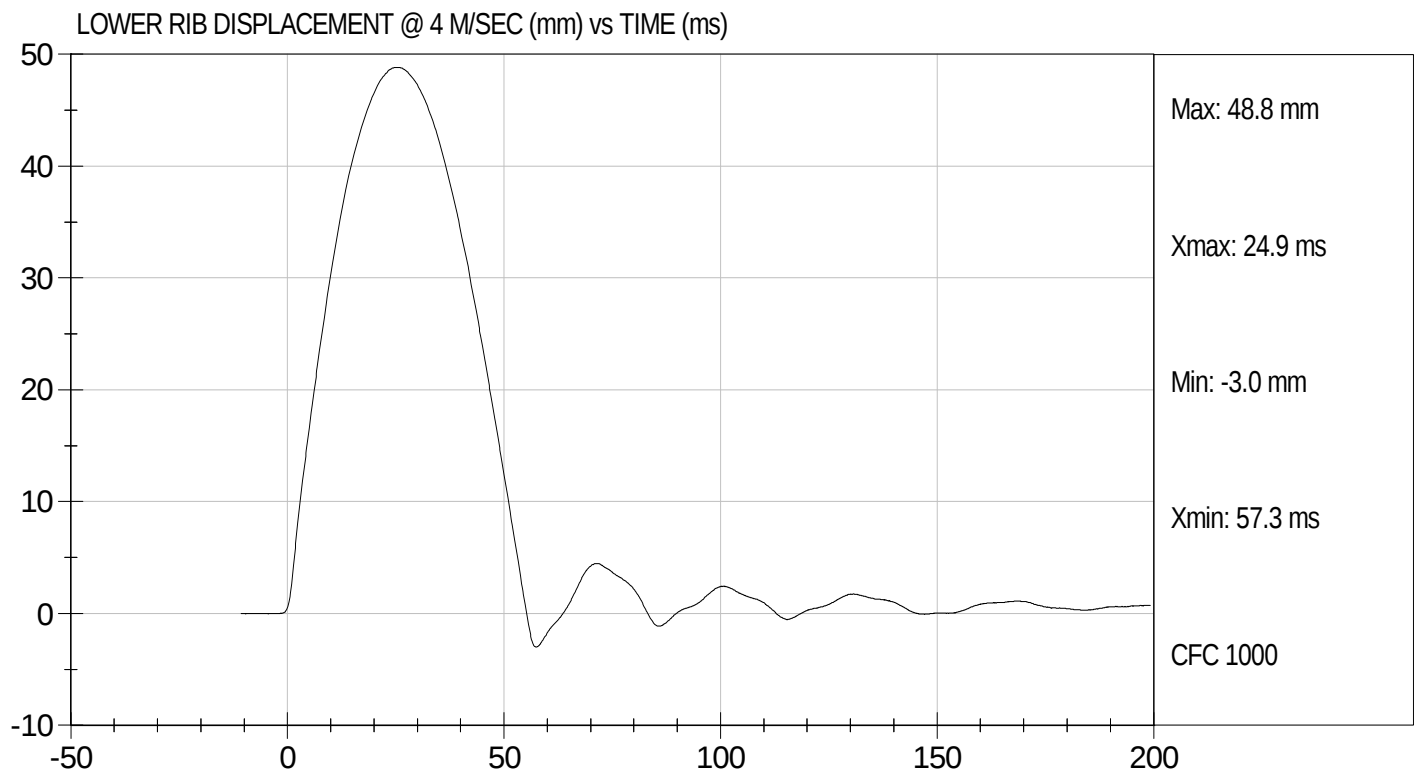
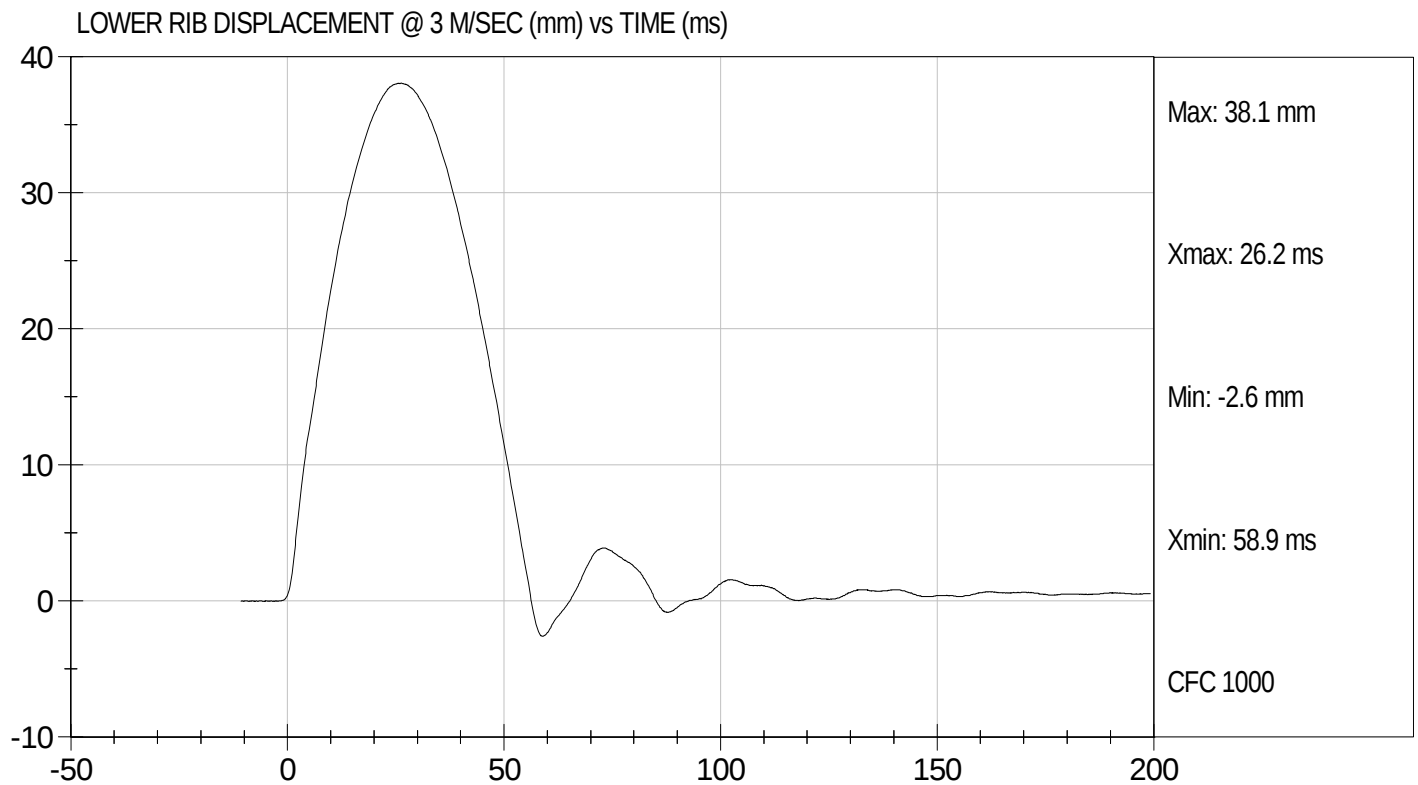
Test I.D: D12856

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	31	Pass
Displacement at 3 m/s	mm	36.0 to 40.0	38.1	Pass
Displacement at 4 m/s	mm	46.0 to 51.0	48.8	Pass
			Overall Test Results	Pass


Laboratory Technician

3/6/12
Test Date


Approved By

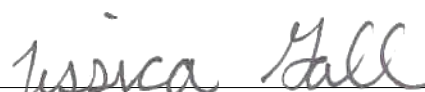


MGA RESEARCH CORPORATION
FULL BODY THORAX IMPACT TEST
ES-2re DUMMY

ATD Serial No: 032

Test I.D: D12850

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.8	Pass
Humidity	%	10 to 70	20	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	5.24	Pass
Upper Rib Displacement	mm	34.0 to 41.0	36.4	Pass
Middle Rib Displacement	mm	37.0 to 45.0	39.2	Pass
Lower Rib Displacement	mm	37.0 to 44.0	38.7	Pass
			Overall Test Results	Pass


Laboratory Technician

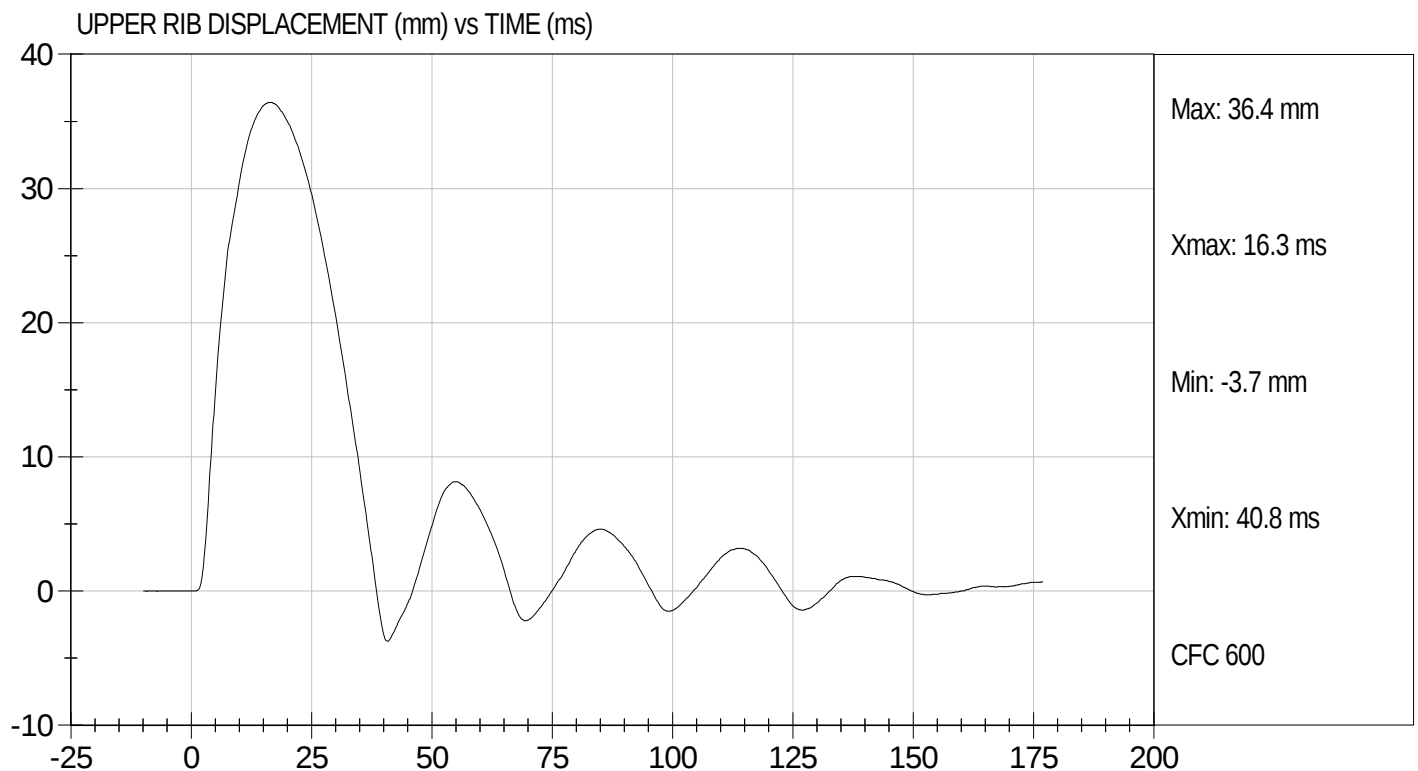
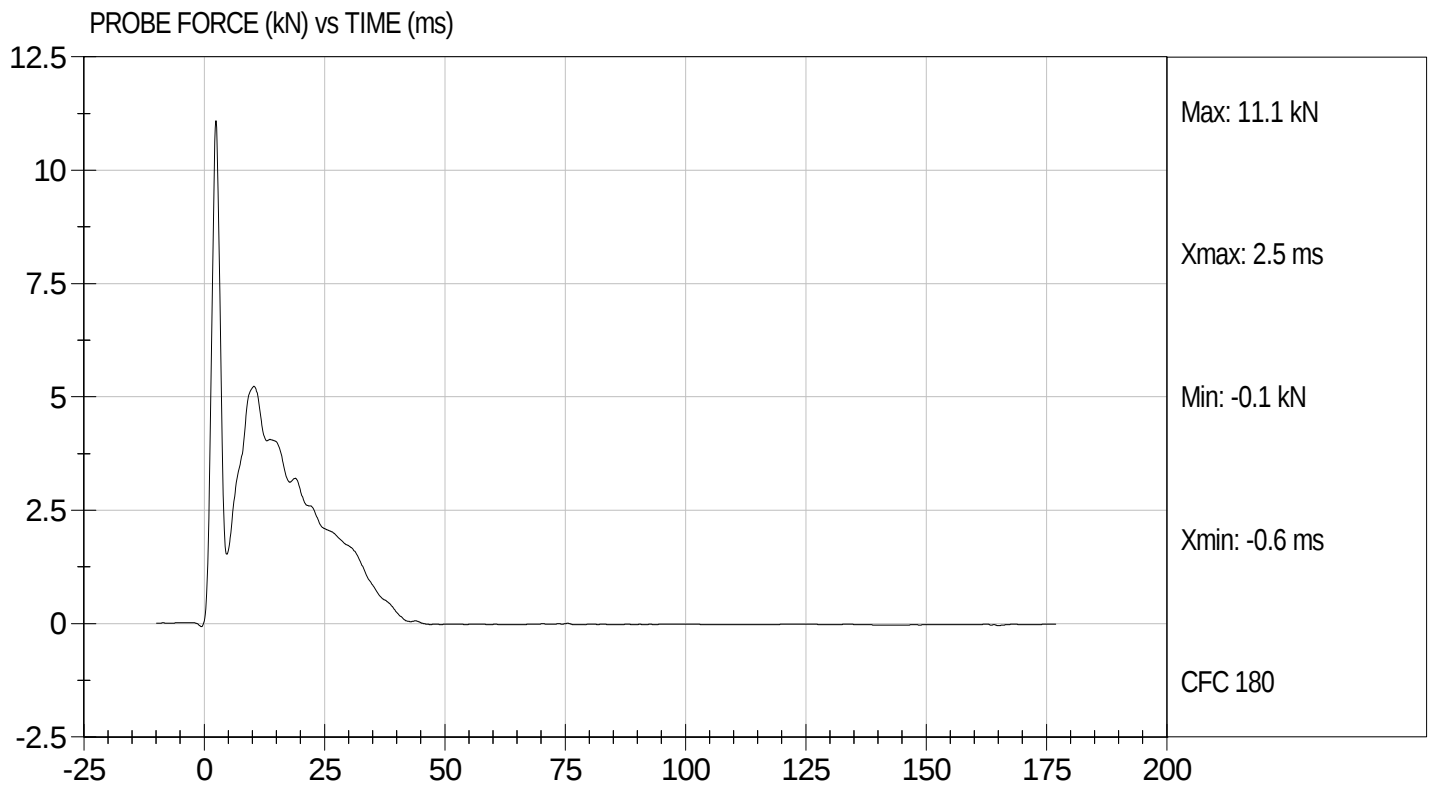
3/6/12
Test Date


Approved By



Test Desc: Thorax Impact
Component ID: D12850

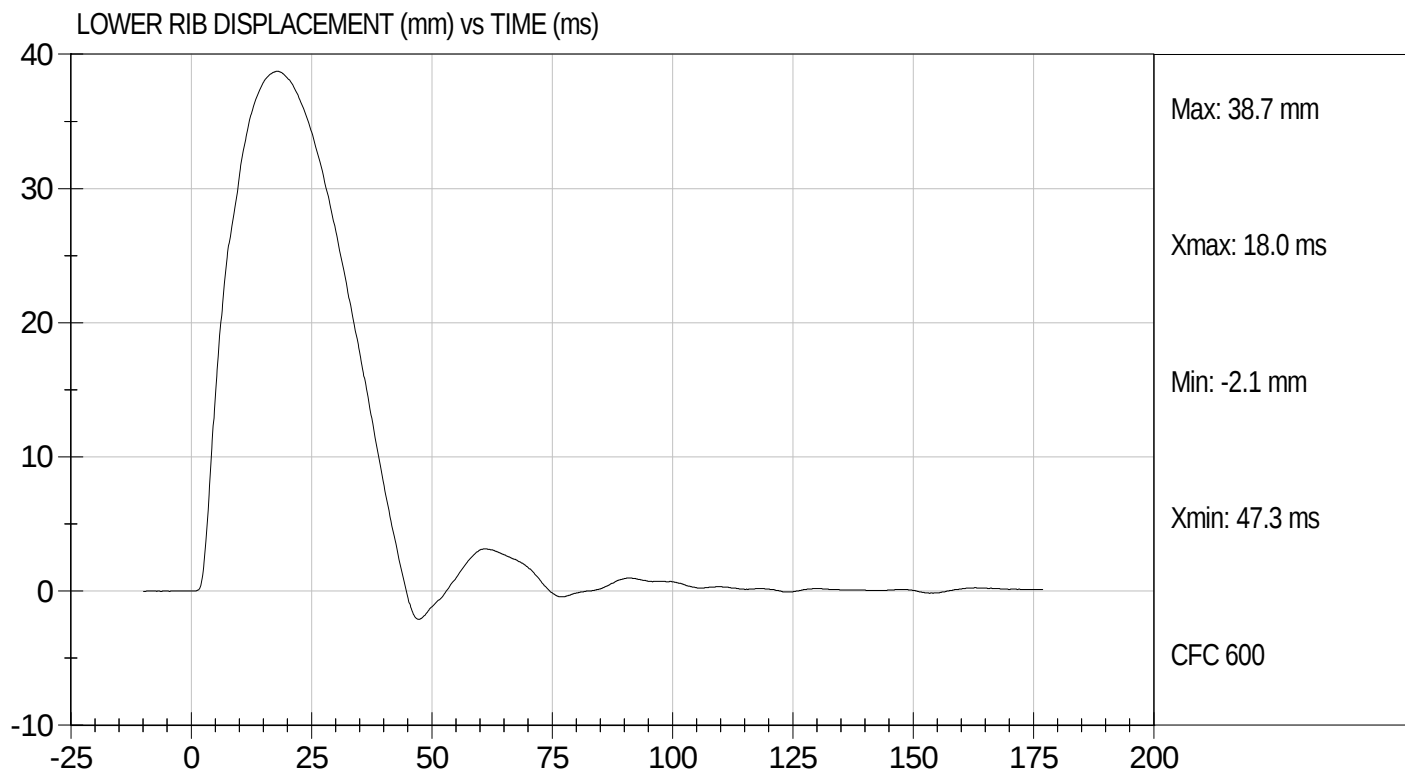
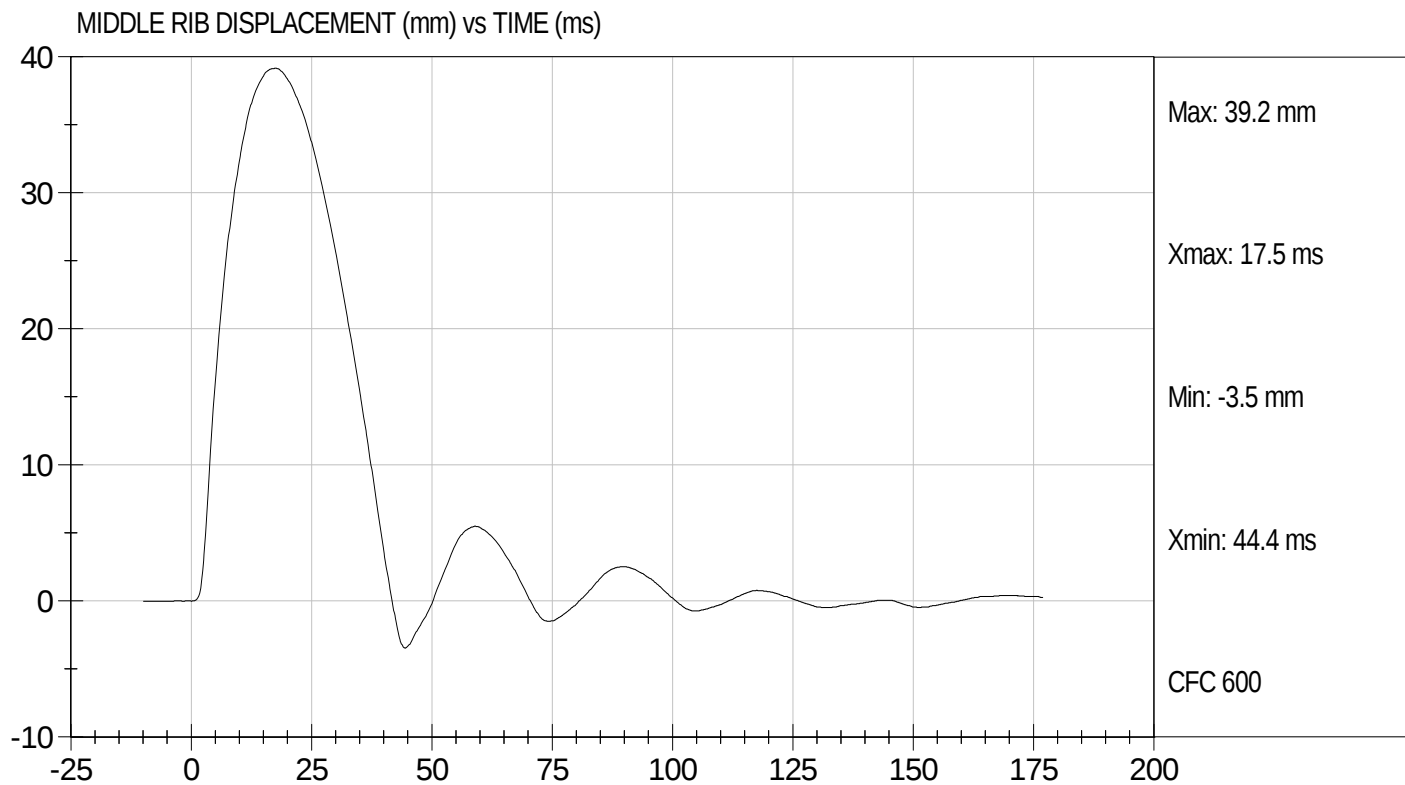
Test Date: 3/6/12
Velocity: 18.32 ft/s, 5.58 m/s





Test Desc: Thorax Impact
Component ID: D12850

Test Date: 3/6/12
Velocity: 18.32 ft/s, 5.58 m/s



MGA RESEARCH CORPORATION

ABDOMEN TEST

ES-2re DUMMY

ATD Serial No: 032

Test I.D: D12857

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Probe Speed	m/s	3.90 to 4.10	3.97	Pass
Maximum Impact Force	kN	4.00 to 4.80	4.12	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	2.44	Pass
Time of Maximum Abdomen Force	ms	10.00 to 12.30	10.40	Pass
Overall Test Results				Pass


Laboratory Technician

3/6/12
Test Date

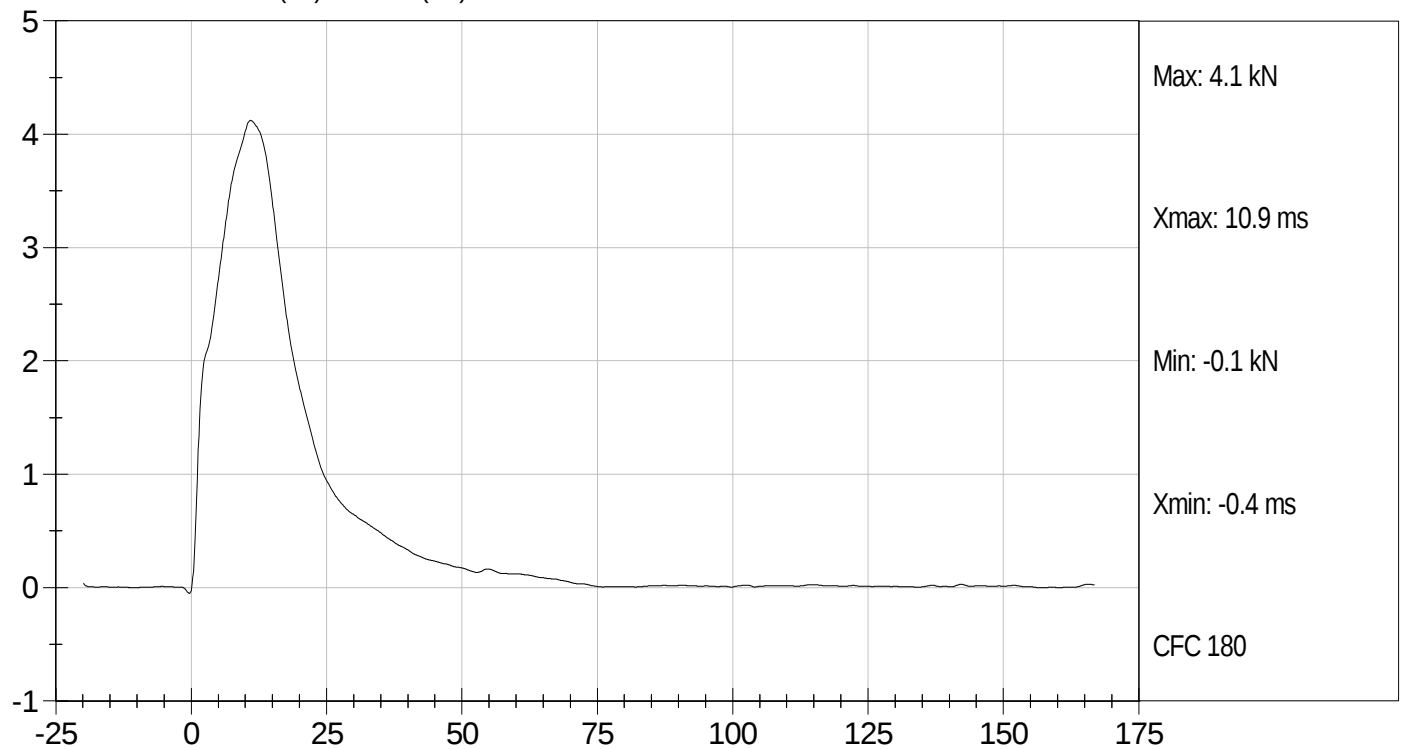

Approved By



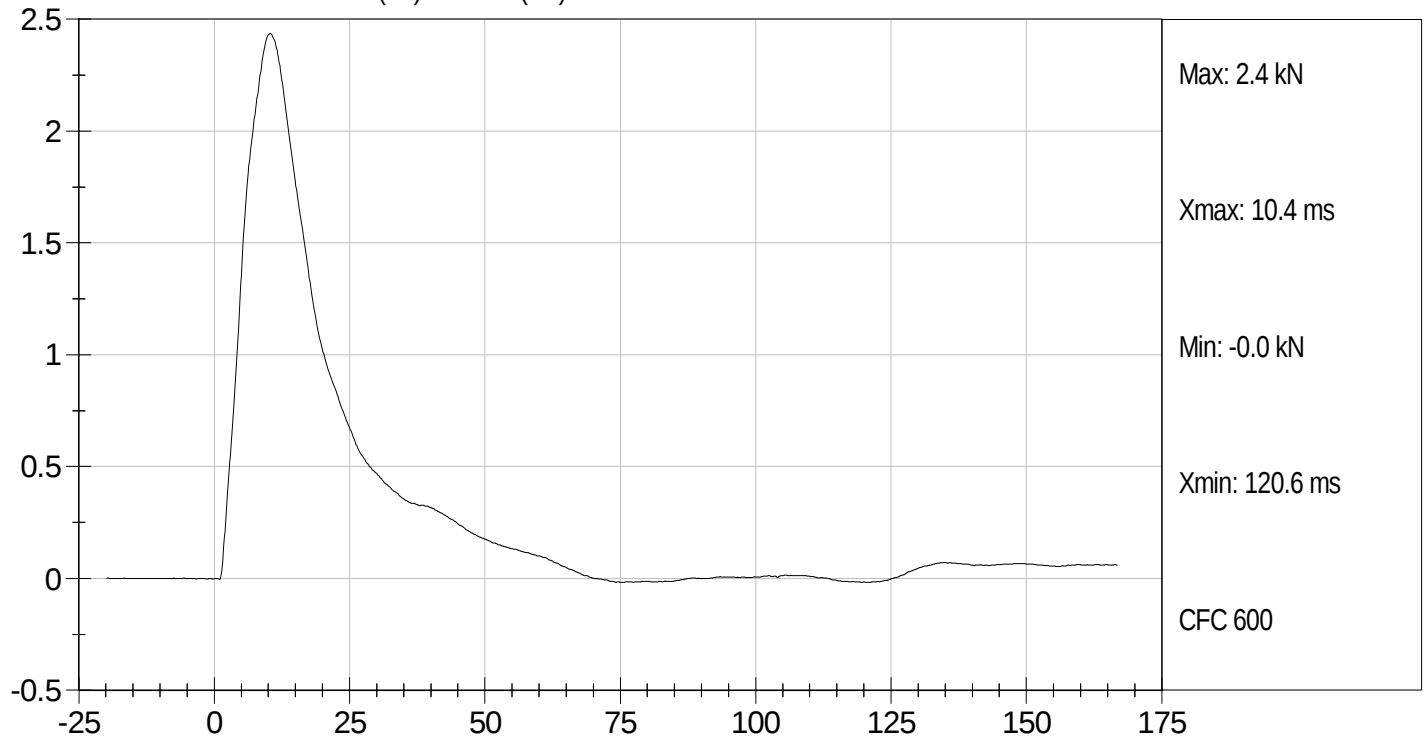
Test Desc: Abdomen Impact
Component ID: D12857

Test Date: 3/6/12
Velocity: 13.02 ft/s, 3.97 m/s

IMPACTOR FORCE (kN) vs TIME (ms)



TOTAL ABDOMEN FORCE (kN) vs TIME (ms)

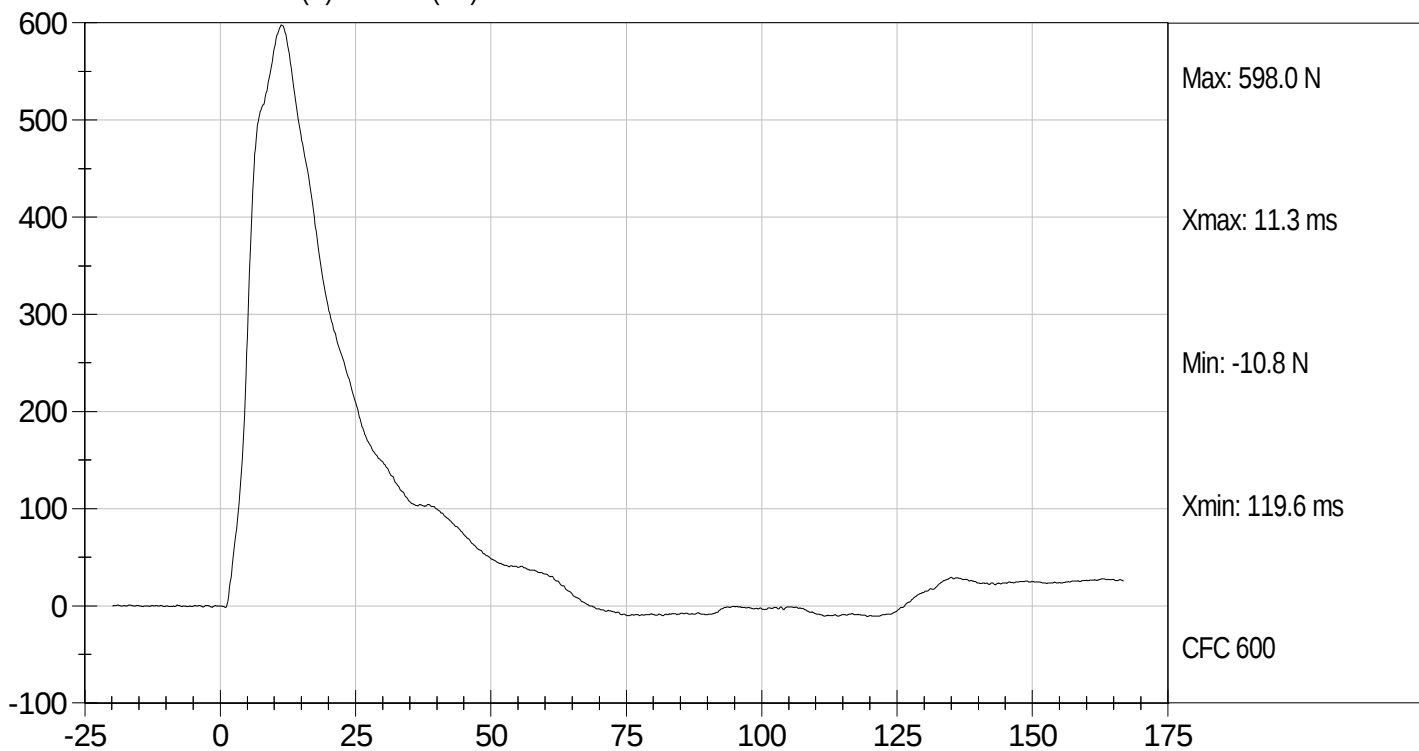




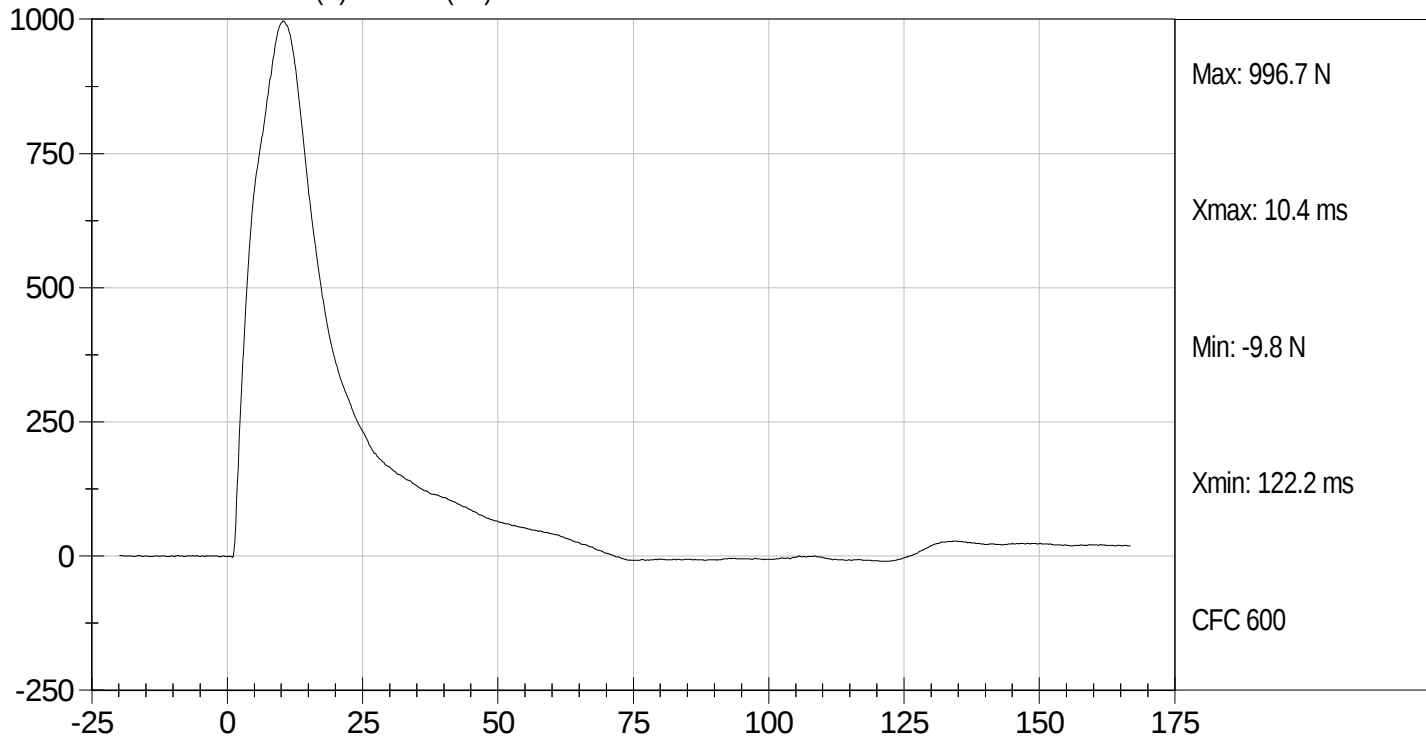
Test Desc: Abdomen Impact
Component ID: D12857

Test Date: 3/6/12
Velocity: 13.02 ft/s, 3.97 m/s

ABDOMEN FRONT (N) vs TIME (ms)



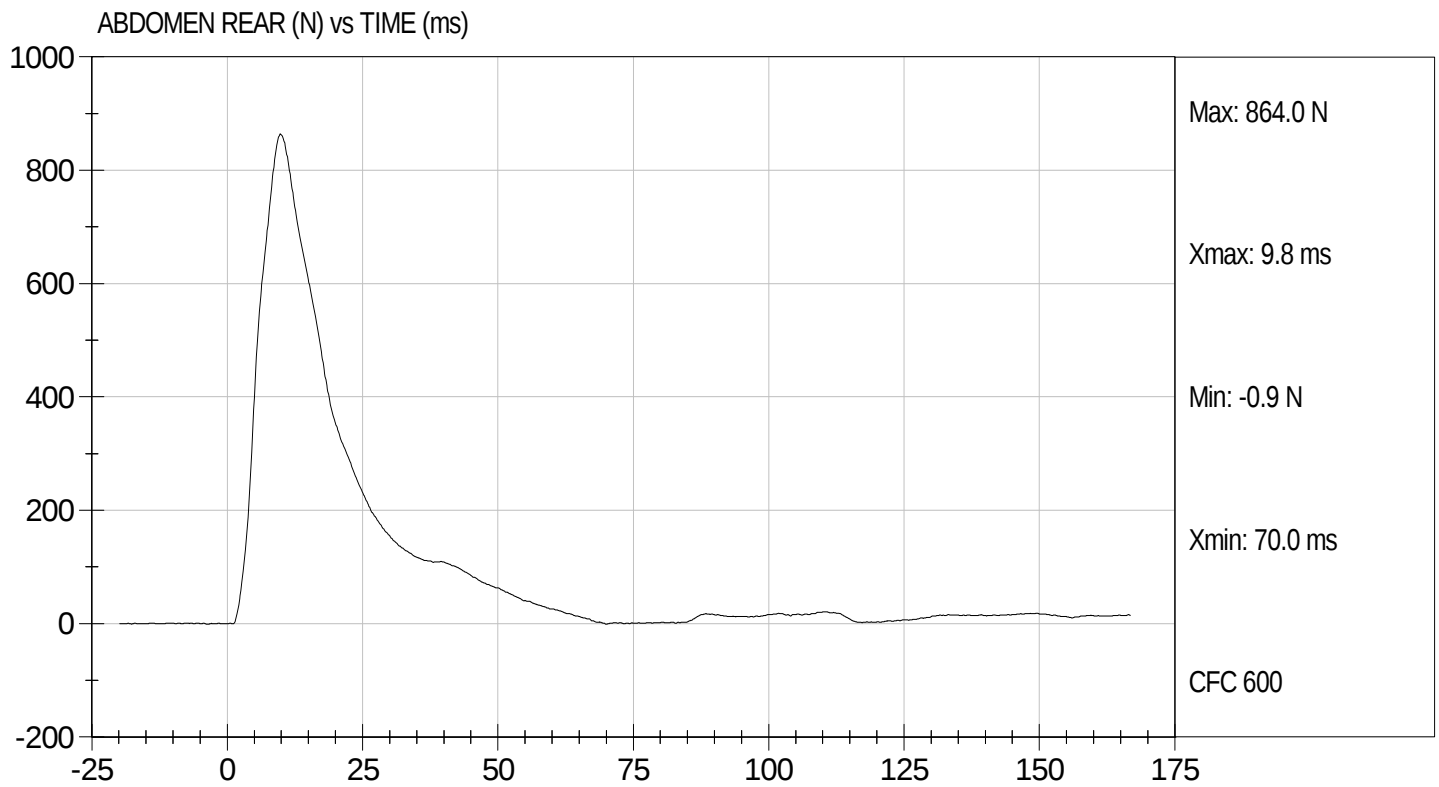
ABDOMEN MIDDLE (N) vs TIME (ms)





Test Desc: Abdomen Impact
Component ID: D12857

Test Date: 3/6/12
Velocity: 13.02 ft/s, 3.97 m/s



MGA RESEARCH CORPORATION
LUMBAR SPINE TEST
ES-2re DUMMY

ATD Serial No: 032

Test I.D: D12858

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity		%	10 to 70	25	Pass
Pendulum Speed		m/s	5.95 to 6.15	6.12	Pass
Pendulum Deceleration	1 ms	m/s	-0.05 to 0.00	-0.01	Pass
	3.7 ms	m/s	-0.425 to -0.24	-0.41	Pass
	27 ms	m/s	-6.50 to -5.80	-5.86	Pass
	30 ms	m/s	>= -6.5	-5.76	Pass
Maximum Flexion Angle		deg	45.0 to 55.0	47.9	Pass
Time of Maximum Flexion Angle		ms	39.0 to 53.0	41.8	Pass
Headform Rotation Decay to Initial Position		ms	37 to 57	45	Pass
Overall Results					Pass


 Laboratory Technician

3/6/12
 Test Date

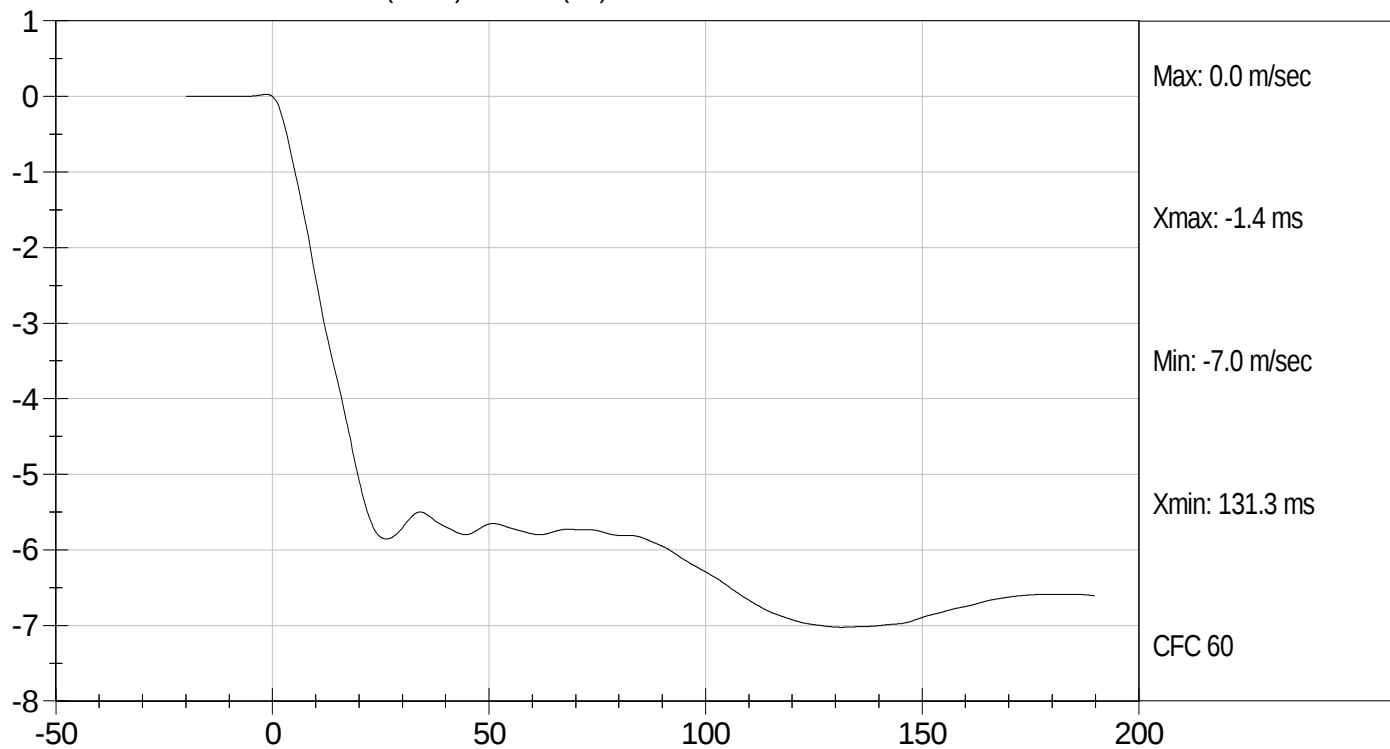

 Approved By



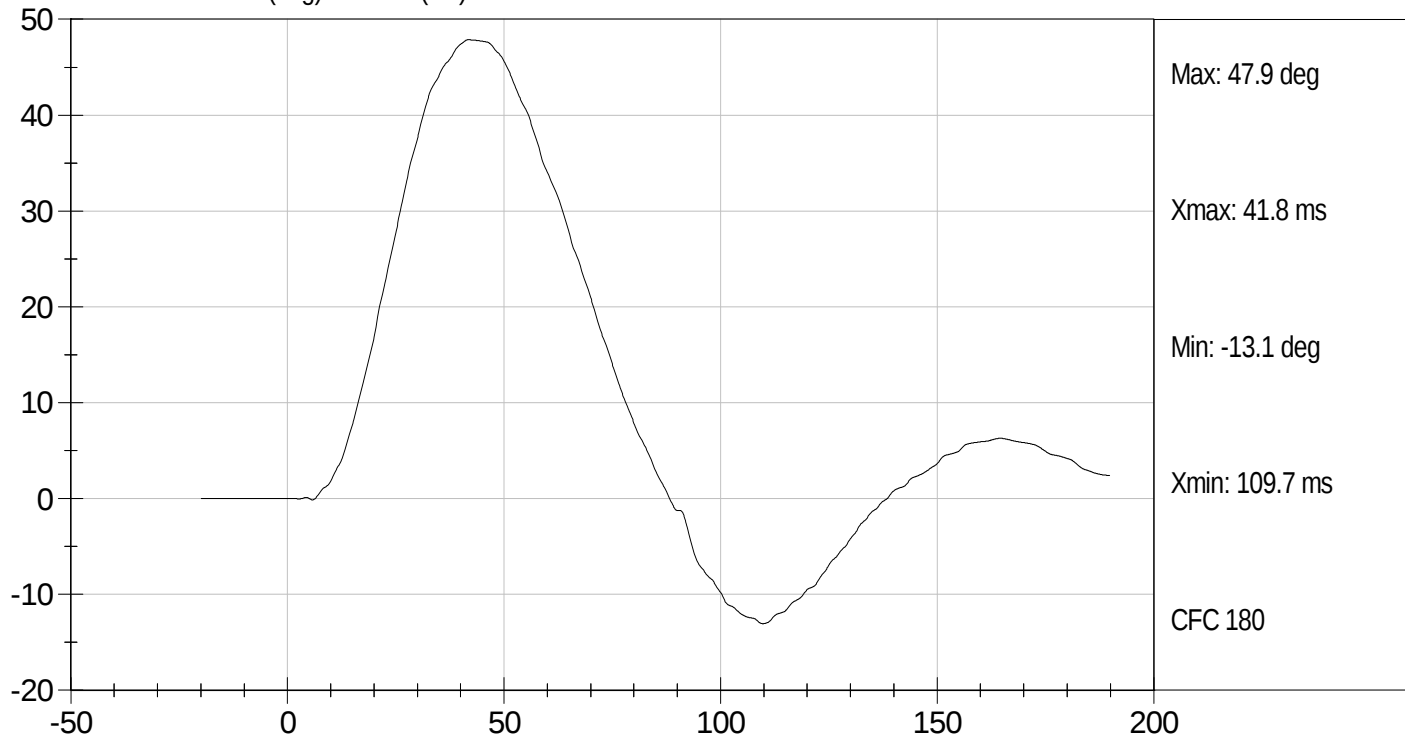
Test Desc: Lumbar Bending
Component ID: D12858

Test Date: 3/6/12
Velocity: 20.08 ft/s, 6.12 m/s

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



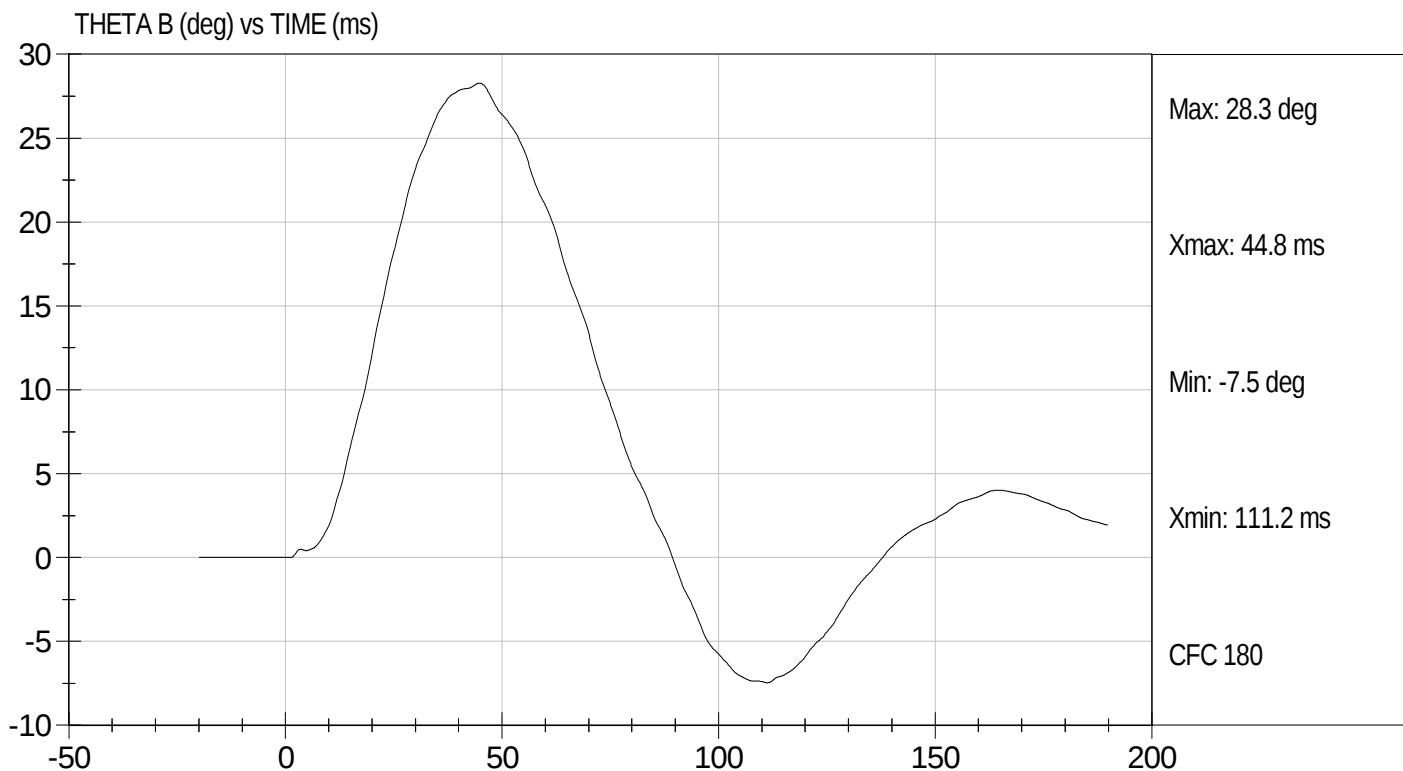
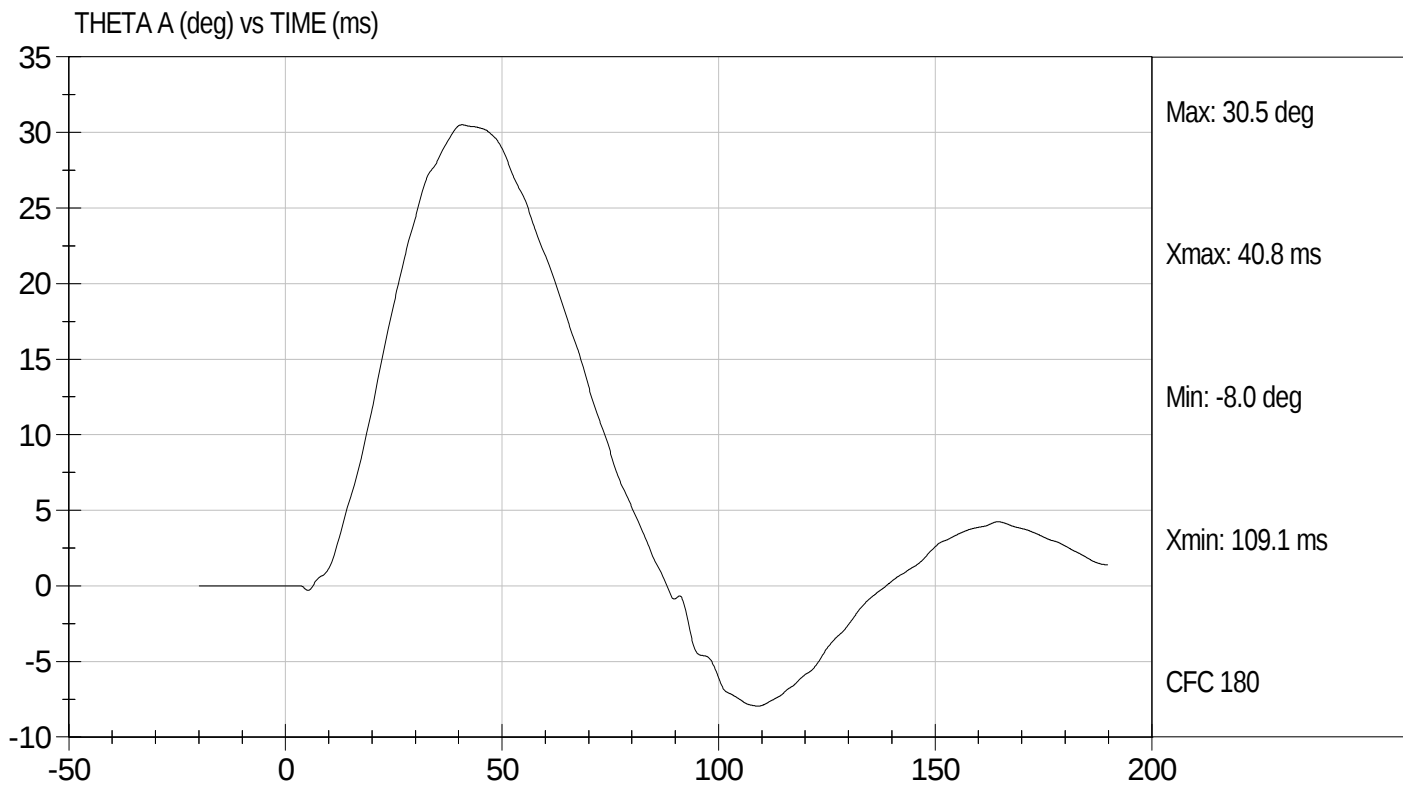
FLEXION ANGLE (deg) vs TIME (ms)





Test Desc: Lumbar Bending
Component ID: D12858

Test Date: 3/6/12
Velocity: 20.08 ft/s, 6.12 m/s



MGA RESEARCH CORPORATION

**PELVIS TEST
ES-2re DUMMY**

ATD Serial No: 032

Test I.D: D12859

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Probe Speed	m/s	4.20 to 4.40	4.34	Pass
Maximum Impactor Force	kN	4.70 to 5.40	5.11	Pass
Time of Maximum Impactor Force	ms	11.80 to 16.10	13.10	Pass
Maximum Pubic Force	kN	1.23 to 1.59	1.43	Pass
Time of Maximum Pubic Force	ms	12.20 to 17.00	14.10	Pass
Overall Test Results				Pass


Laboratory Technician

3/6/12
Test Date

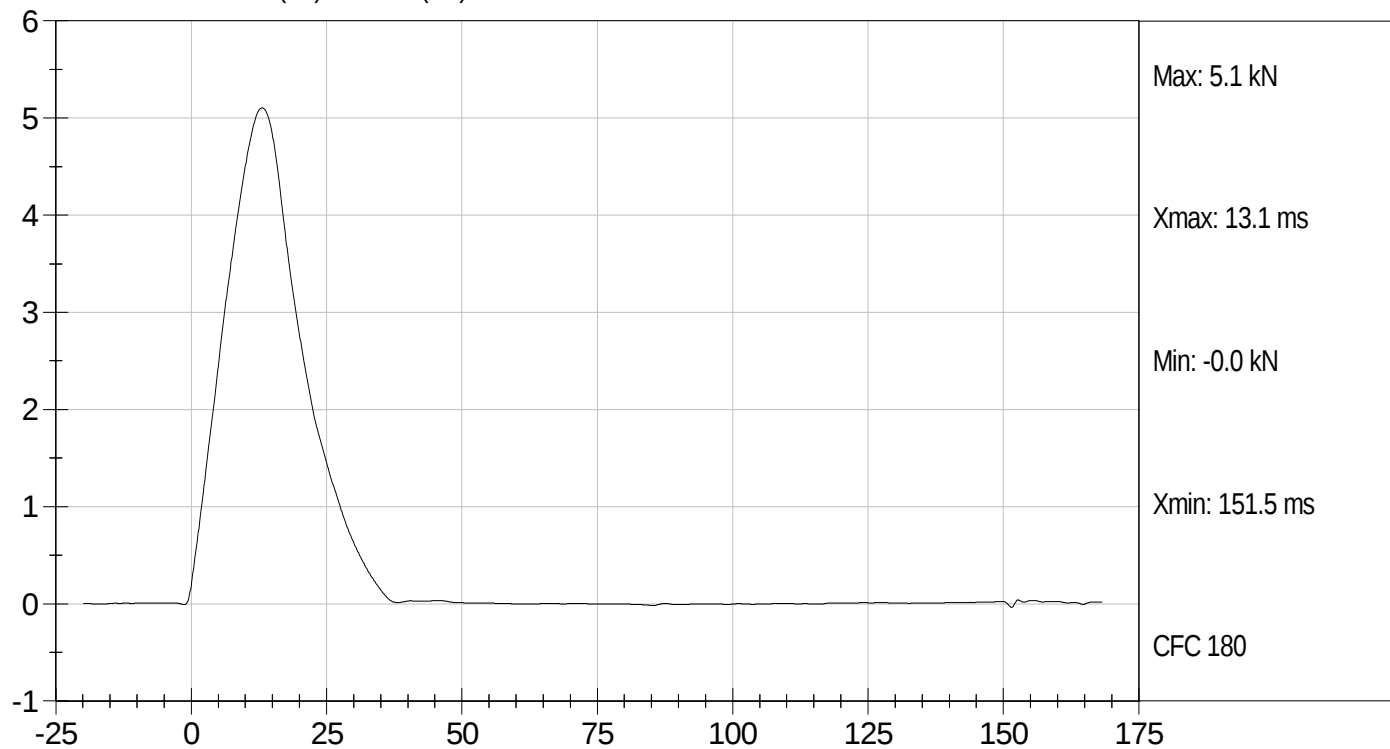

Approved By



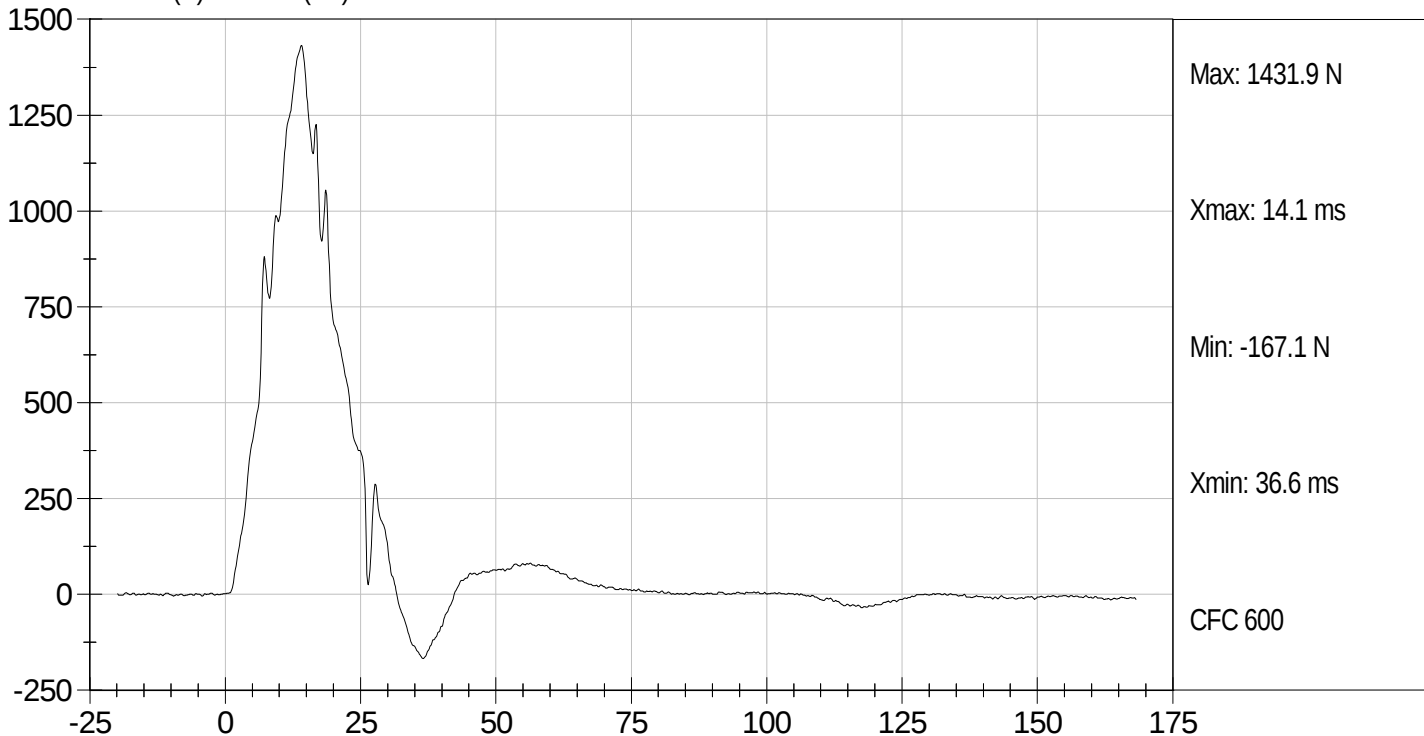
Test Desc: Pelvis Impact
Component ID: D12859

Test Date: 3/6/12
Velocity: 14.25 ft/s, 4.38 m/s

IMPACTOR FORCE (kN) vs TIME (ms)



PUBIC (N) vs TIME (ms)



SID-IIsD External Measurements
SN: 296

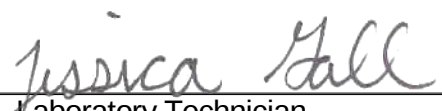
No.	Name	Spec. (mm)	Result	Pass/Fail
A	Sitting Height	772 - 788	784	Pass
B	Shoulder Pivot Height	437 - 453	442	Pass
C	H-point Height	79 - 89	83	Pass
D	H-point from Seatback	141 - 151	145	Pass
E	Shoulder Pivot from Backline	97 - 107	99	Pass
F	Thigh Clearance	119 -135	121	Pass
G	Head Breadth	140 - 148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

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

ATD Serial No: 296

Test ID: D12731

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Peak Resultant Acceleration	G's	115 to 137	121	Pass
Peak Longitudinal Acceleration	G's	+/- 15	3.1	Pass
Unimodal	N/A	<15%	Yes	Pass
Overall Test Results				Pass


Laboratory Technician

2/28/12
Test Date

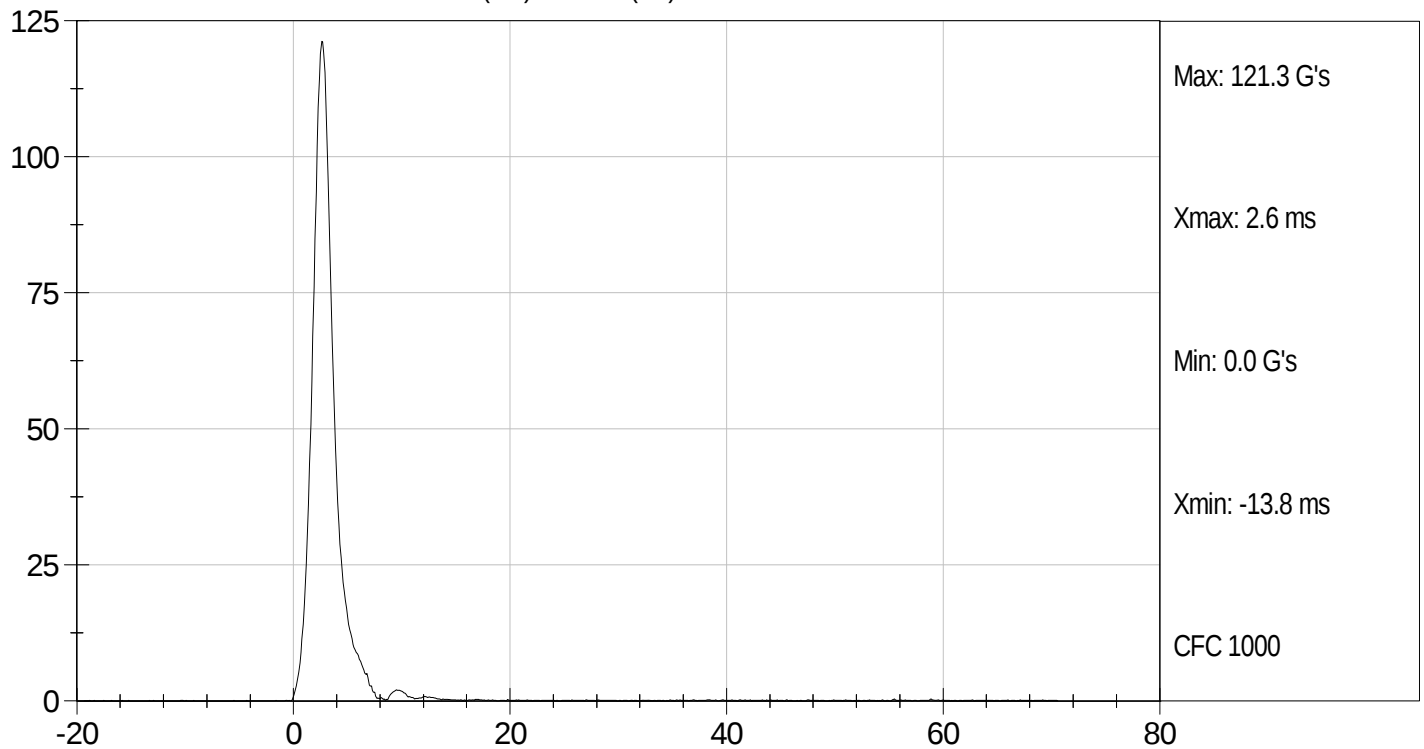

Approved By



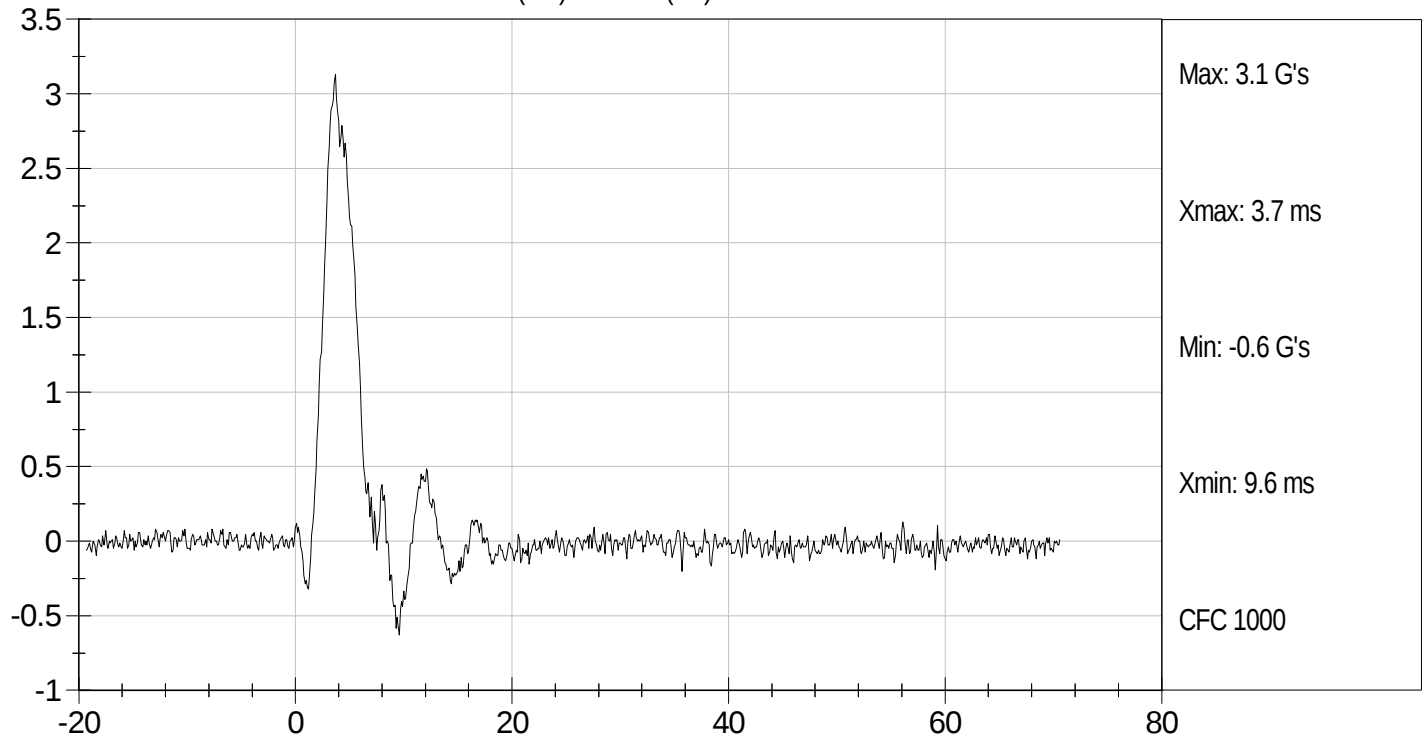
Test Desc: Head Drop
Component ID: D12731

Test Date: 2/28/12
Velocity: 0 ft/s, 0 m/s

PEAK RESULTANT ACCELERATION (G's) vs TIME (ms)



PEAK LONGITUDINAL ACCELERATION (G's) vs TIME (ms)



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

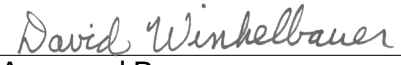
ATD Serial No: 296

Test I.D: D12732

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	22.0	Pass
Humidity		%	10 to 70	22	Pass
Impact Velocity		m/s	5.51 to 5.63	5.58	Pass
Delta Velocity	10 ms	m/s	2.20 to 2.80	2.67	Pass
	15 ms	m/s	3.30 to 4.10	3.79	Pass
	20 ms	m/s	4.40 to 5.40	5.04	Pass
	25 ms	m/s	5.40 to 6.10	5.52	Pass
	25-100 ms	m/s	5.50 to 6.20	5.55	Pass
Maximum D-Plane Rotation		deg	71 to 81	74	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	62	Pass
Maximum Occipital Condyle Moment during Rotation Interval Nm			-44 to -36	-38	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	118	Pass
Overall Test Results					Pass


 Laboratory Technician

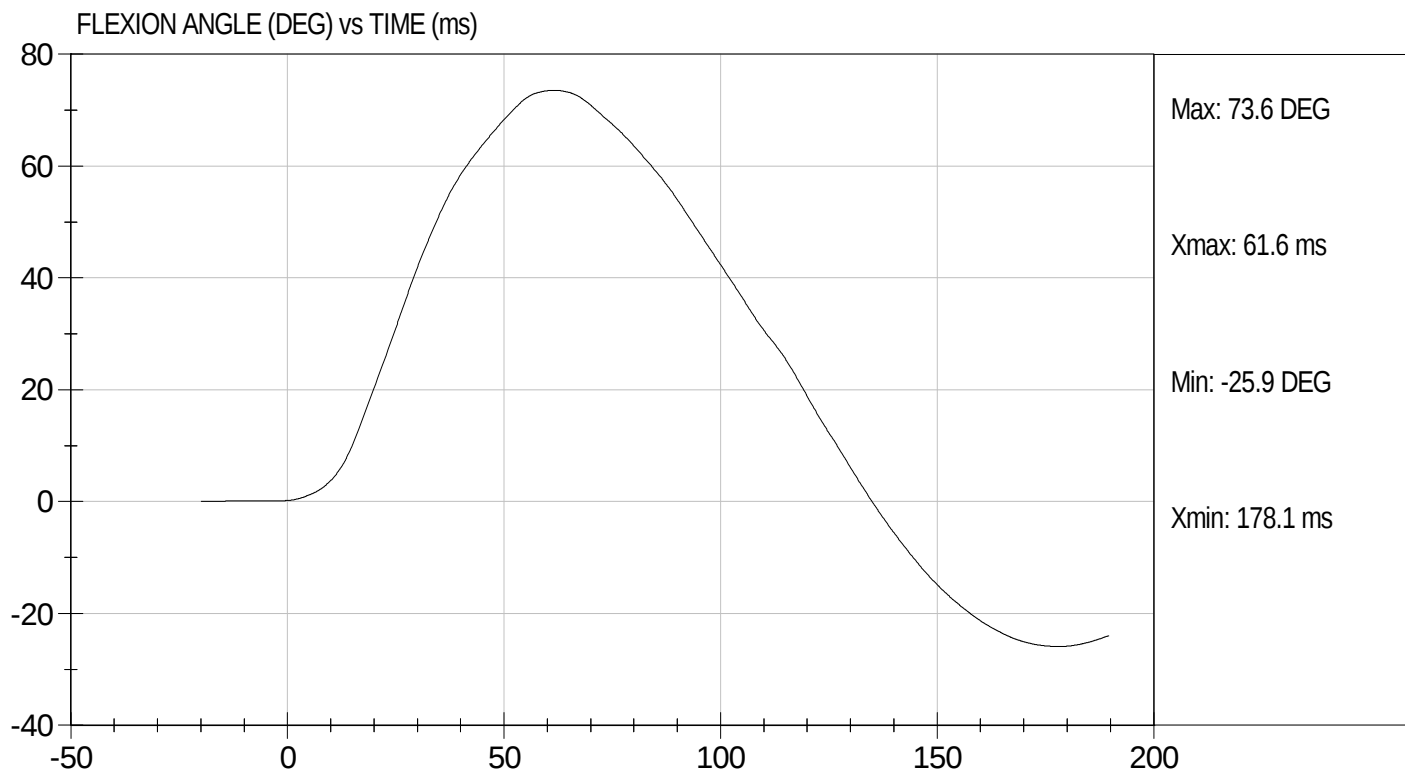
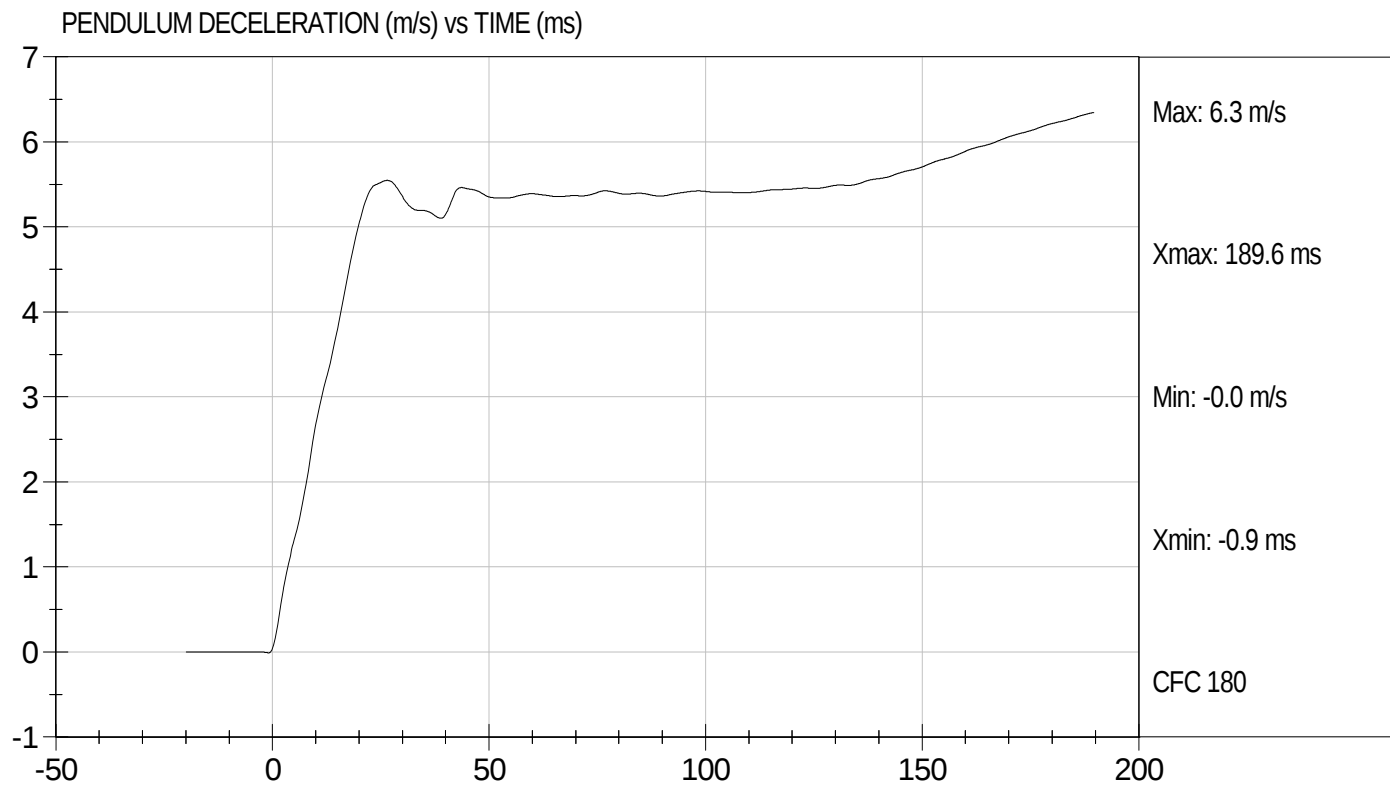
2/28/12
 Test Date


 Approved By



Test Desc: Neck Bending
Component ID: D12732

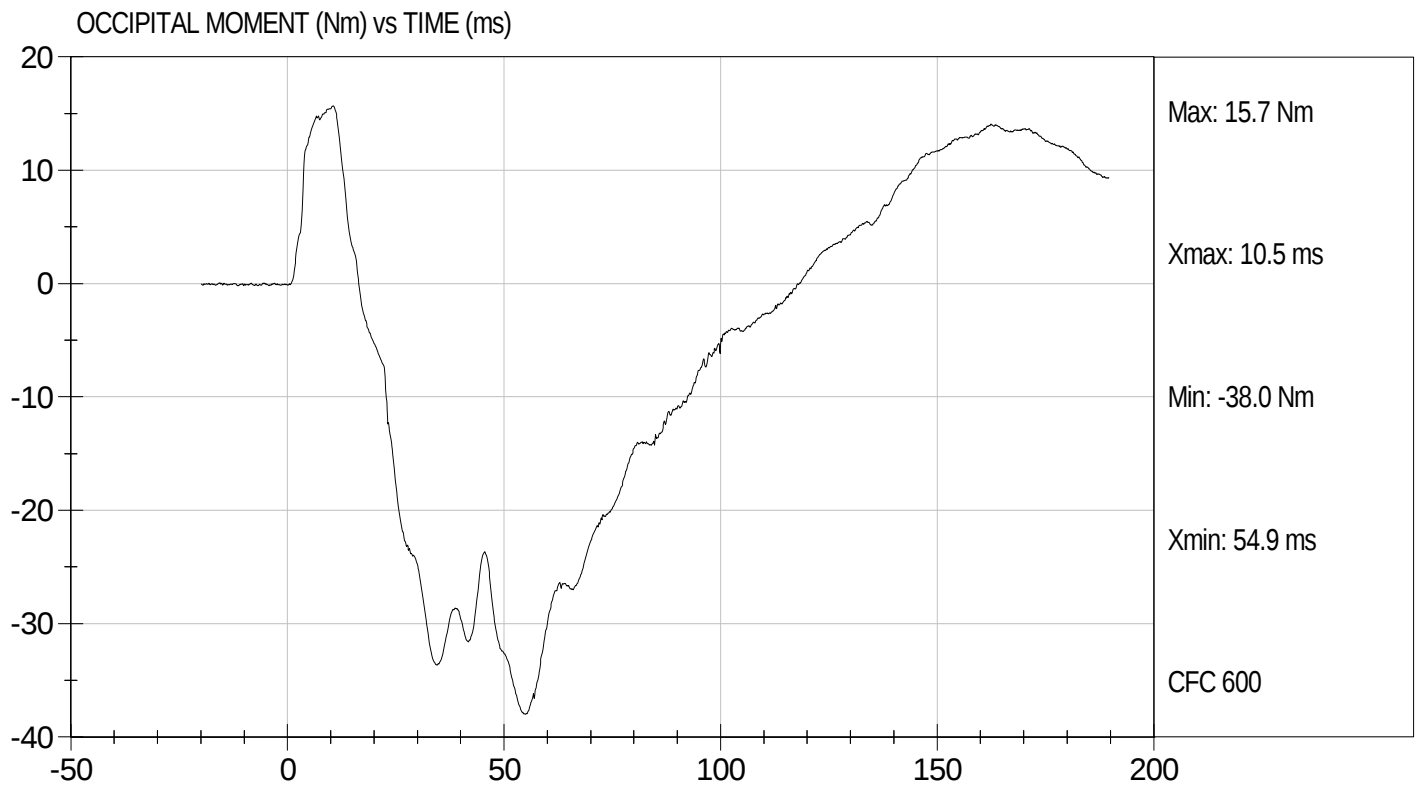
Test Date: 2/28/12
Velocity: 18.31 ft/s, 5.58 m/s





Test Desc: Neck Bending
Component ID: D12732

Test Date: 2/28/12
Velocity: 18.31 ft/s, 5.58 m/s



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

ATD Serial No: 296

Test ID: D12733

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	23	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Maximum Probe Acceleration	G's	13 to 18	15	Pass
Shoulder Displacement	mm	28 to 37	31	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	19	Pass
Overall Test Results				Pass


Laboratory Technician

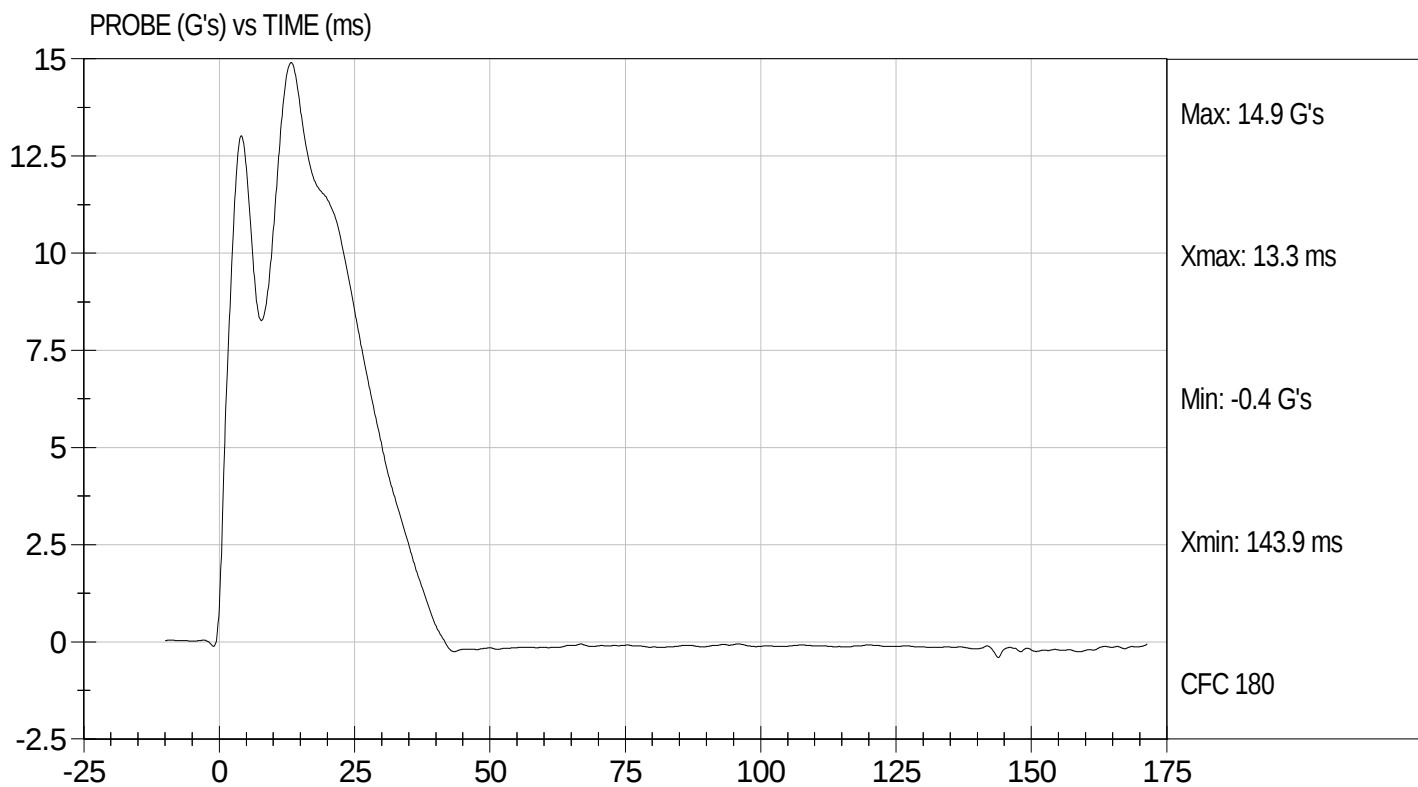
2/28/12
Test Date


Approved By



Test Desc: Shoulder Impact
Component ID: D12733

Test Date: 2/28/12
Velocity: 14.24 ft/s, 4.34 m/s

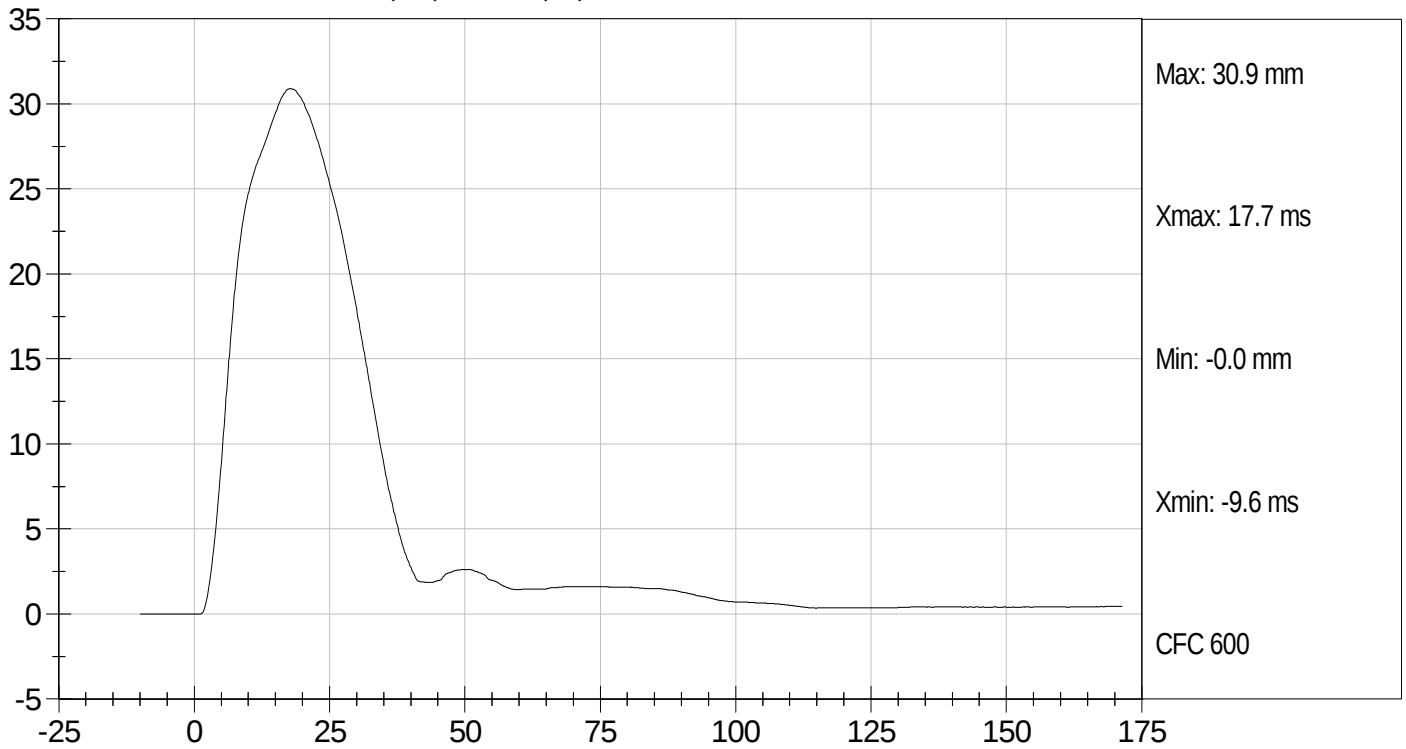




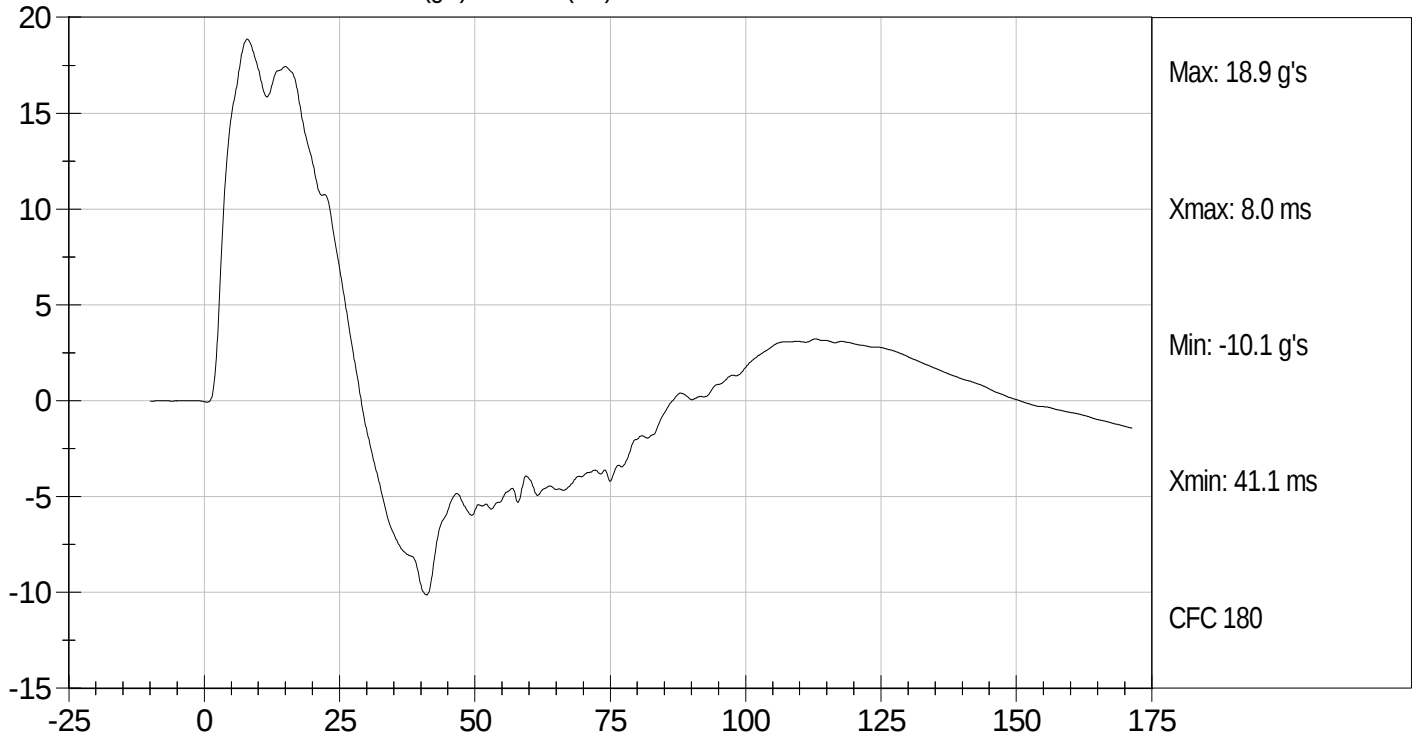
Test Desc: Shoulder Impact
Component ID: D12733

Test Date: 2/28/12
Velocity: 14.24 ft/s, 4.34 m/s

SHOULDER DISPLACEMENT (mm) vs TIME (ms)



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

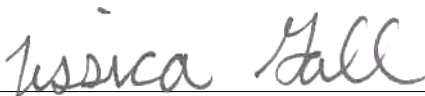


MGA RESEARCH CORPORATION
THORAX (WITH ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D12734

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	22.0	Pass
Humidity	%	10 to 70	23	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	Pass
Peak Impactor Acceleration	G's	30 to 36	32	Pass
Shoulder Displacement	mm	31 to 40	36	Pass
Upper Rib Displacement	mm	25 to 32	28	Pass
Middle Rib Displacement	mm	30 to 36	32	Pass
Lower Rib Displacement	mm	32 to 38	33	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	38	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	33	Pass
			Overall Test Results	Pass


Laboratory Technician

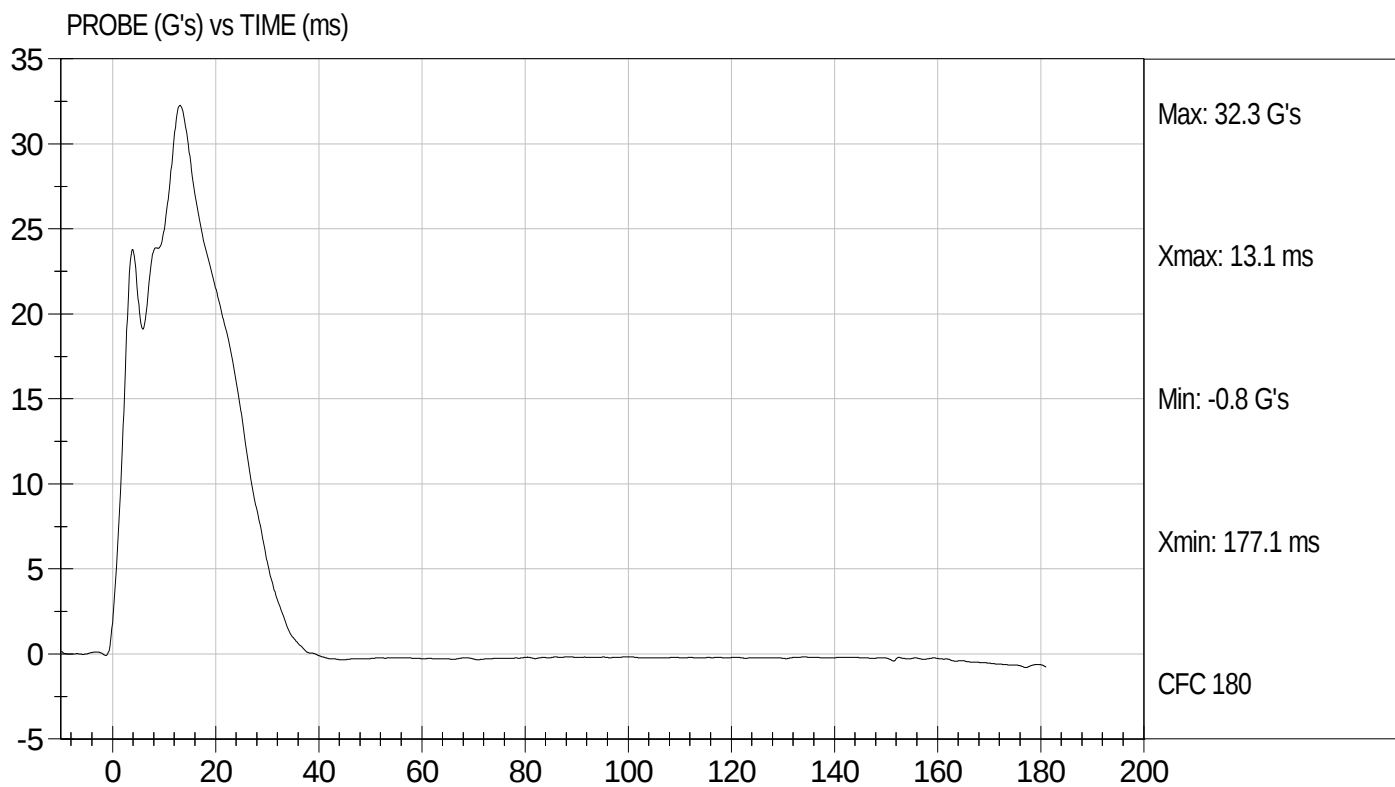
2/28/12
Test Date


Approved By



Test Desc: Thorax With Arm
Component ID: D12734

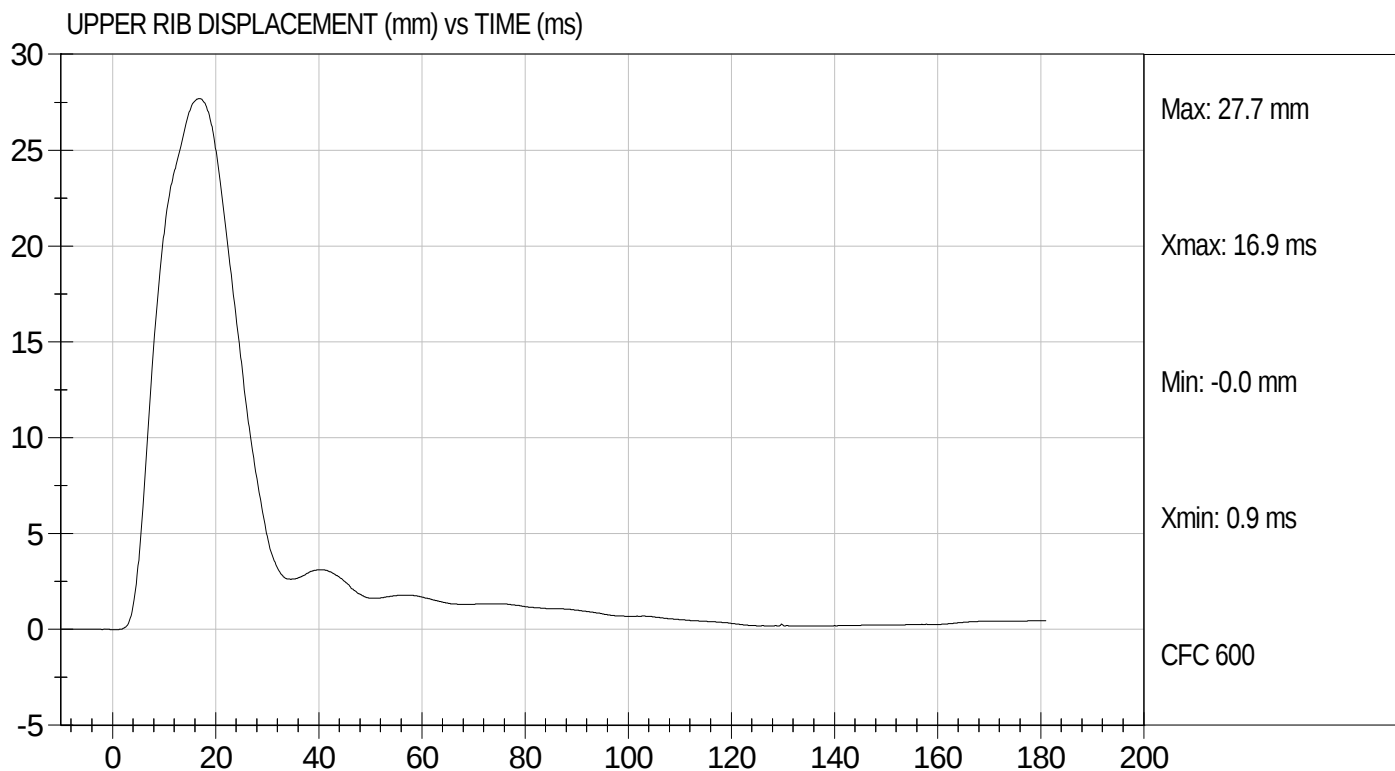
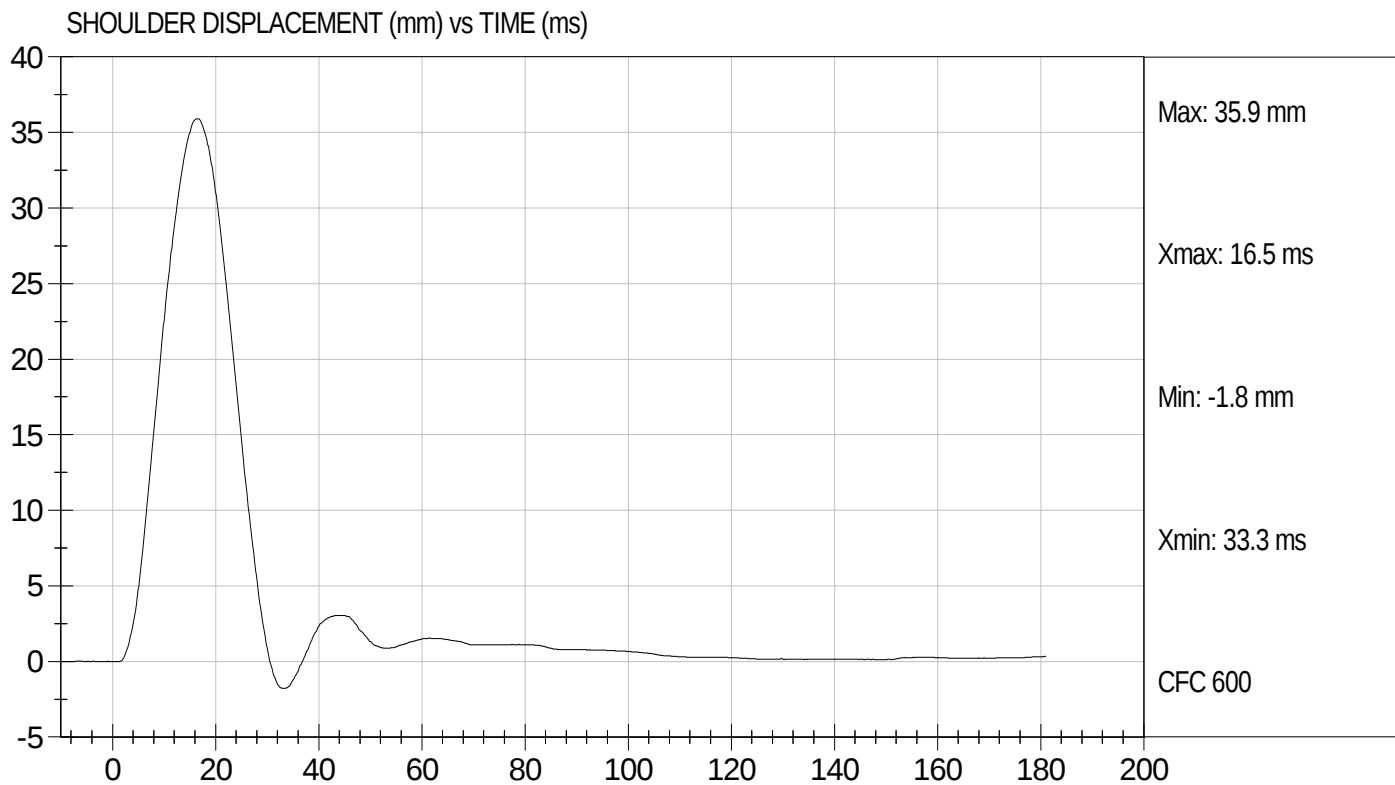
Test Date: 2/28/12
Velocity: 22.22 ft/s, 6.77 m/s





Test Desc: Thorax With Arm
Component ID: D12734

Test Date: 2/28/12
Velocity: 22.22 ft/s, 6.77 m/s

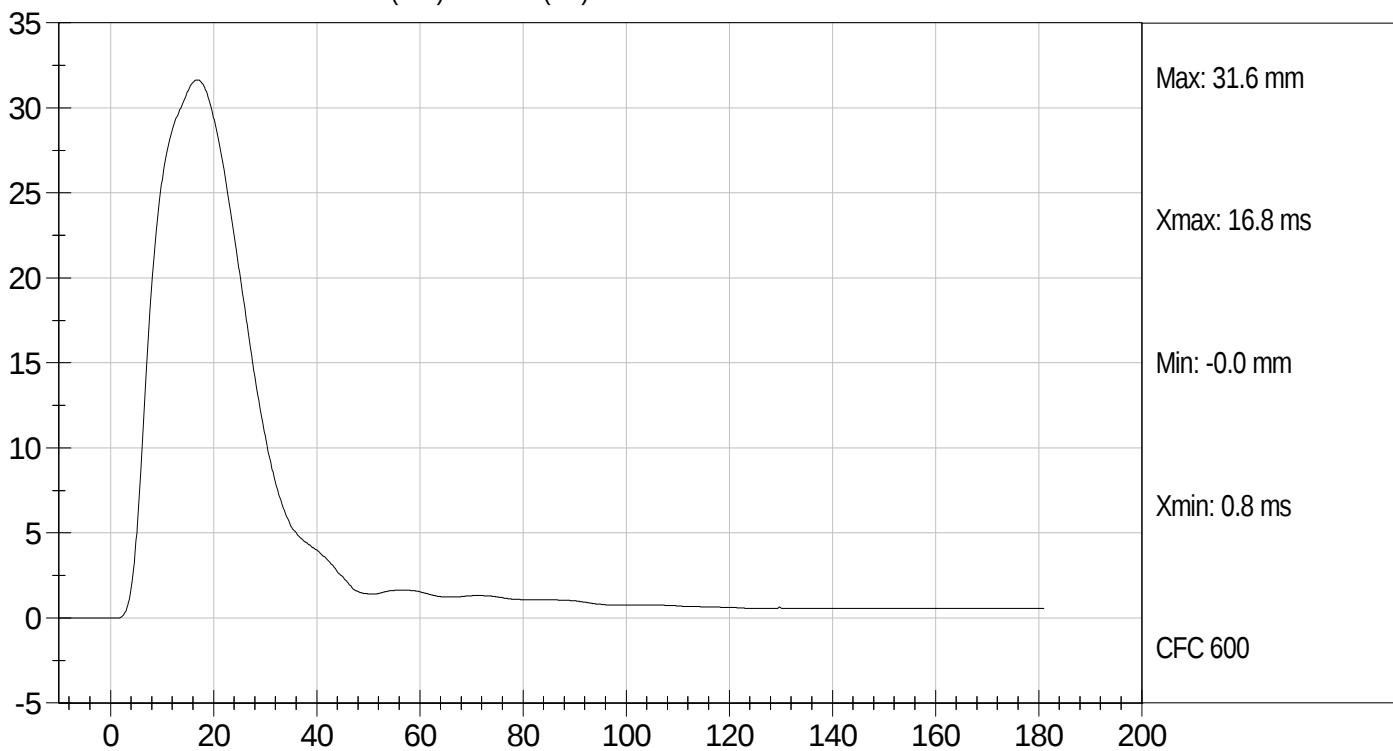




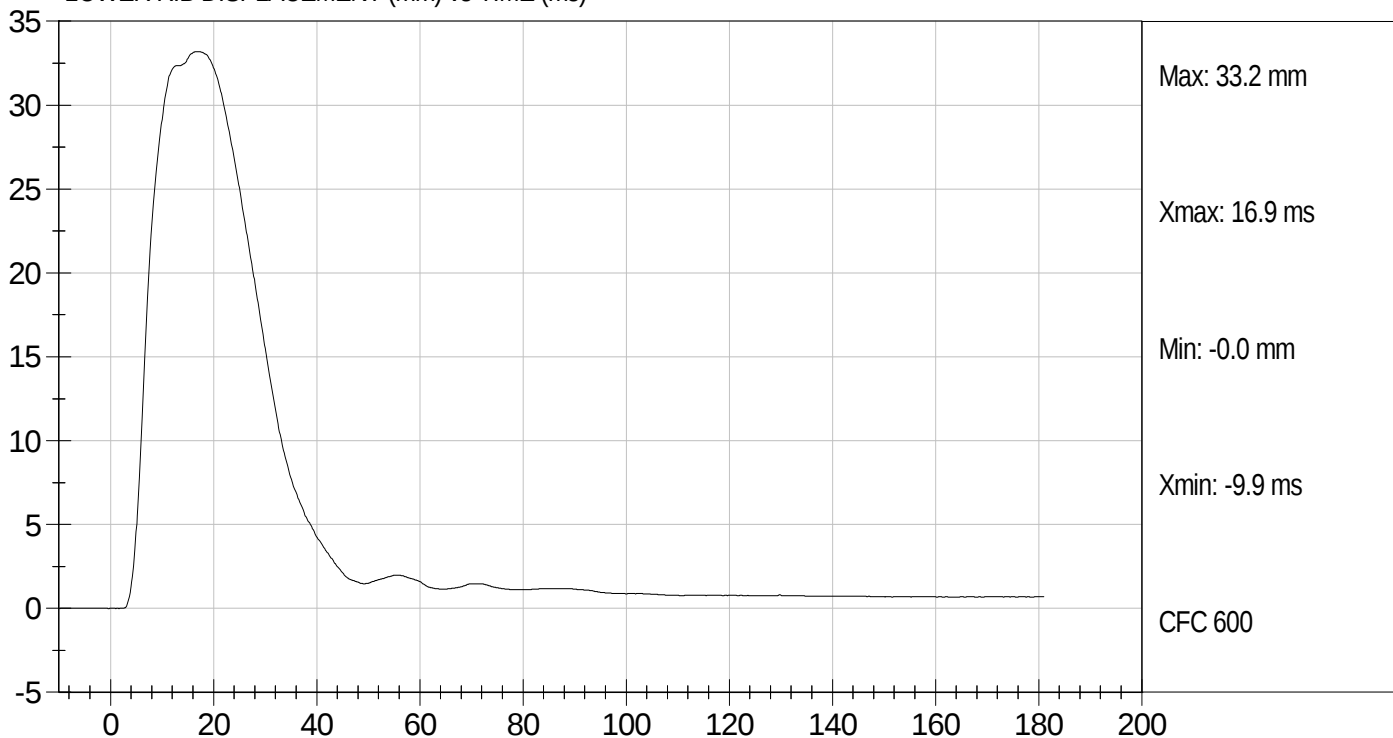
Test Desc: Thorax With Arm
Component ID: D12734

Test Date: 2/28/12
Velocity: 22.22 ft/s, 6.77 m/s

MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



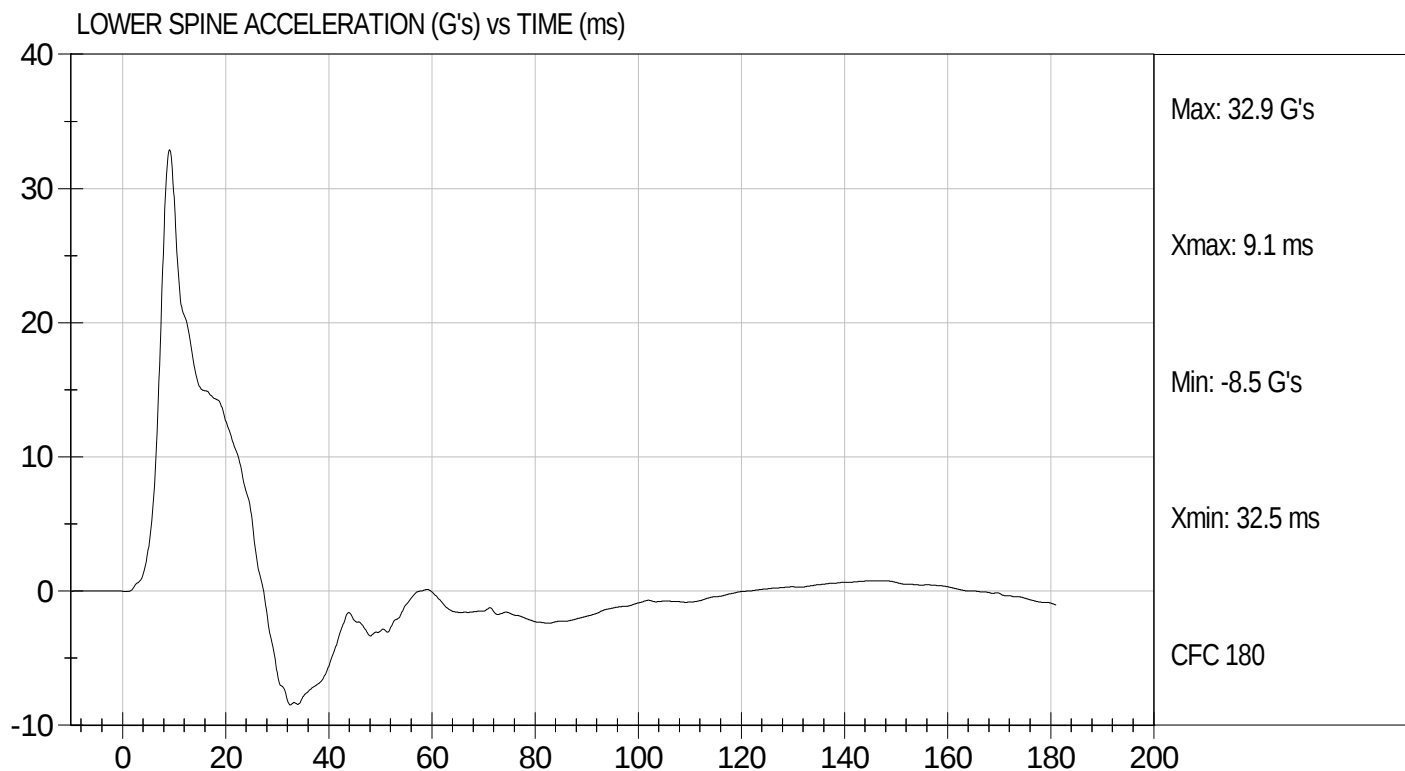
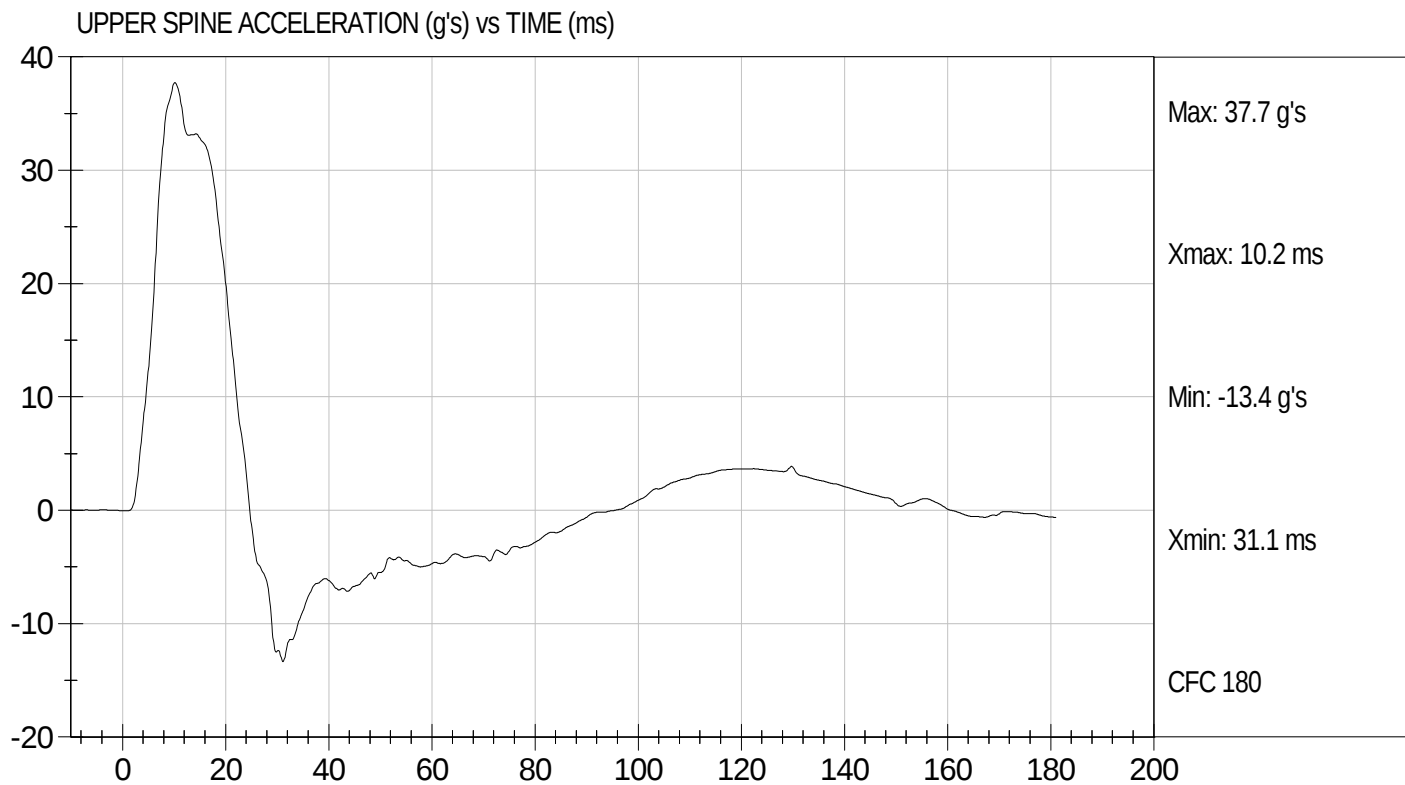
LOWER RIB DISPLACEMENT (mm) vs TIME (ms)





Test Desc: Thorax With Arm
Component ID: D12734

Test Date: 2/28/12
Velocity: 22.22 ft/s, 6.77 m/s



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

ATD Serial No: 296

Test I.D: D12735

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	22.0	Pass
Humidity	%	10 to 70	23	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Peak Impactor Force	G's	14 to 18	15	Pass
Upper Rib Displacement	mm	32 to 40	35	Pass
Middle Rib Displacement	mm	39 to 45	41	Pass
Lower Rib Displacement	mm	35 to 43	39	Pass
Upper Spine (T1) Y Acceleration	G's	13 to 17	14	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	9	Pass
Overall Test Results				Pass


Laboratory Technician

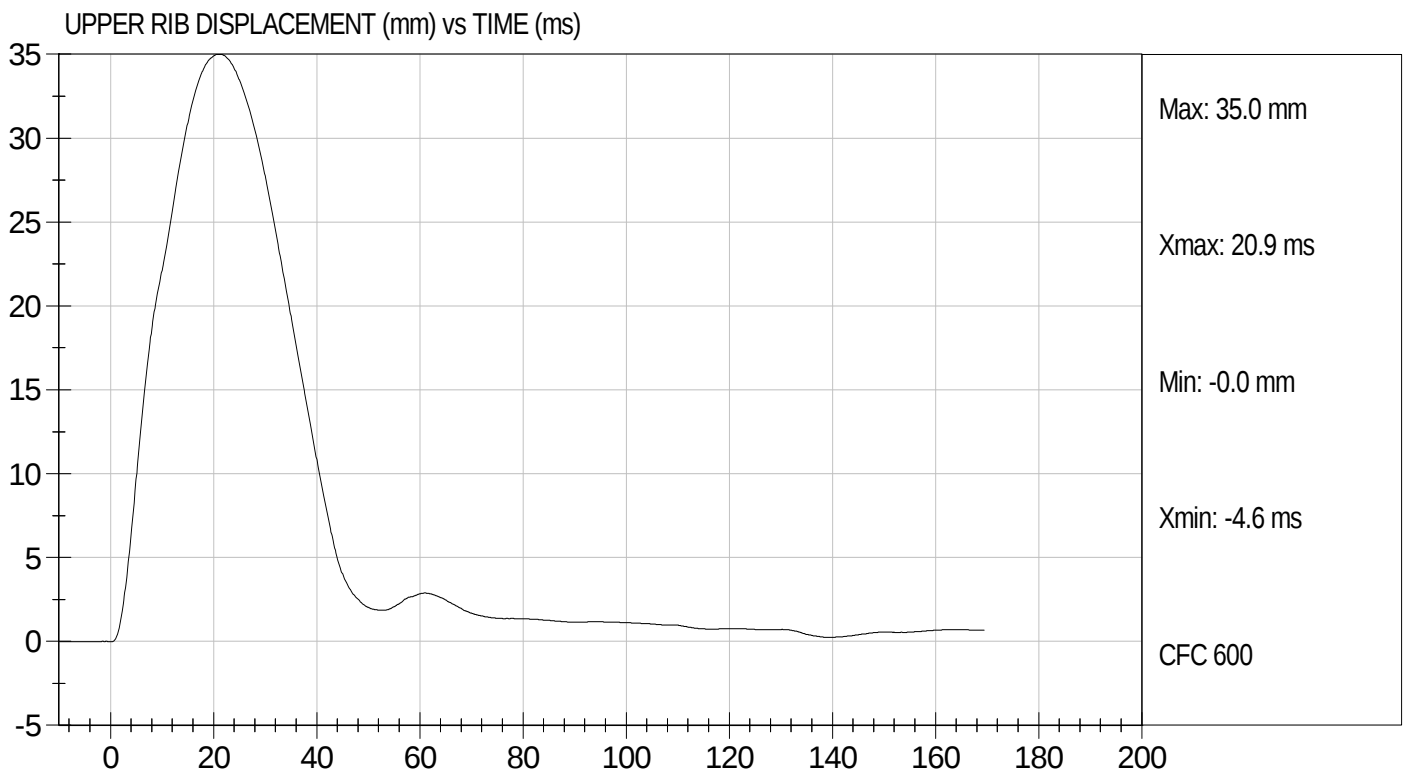
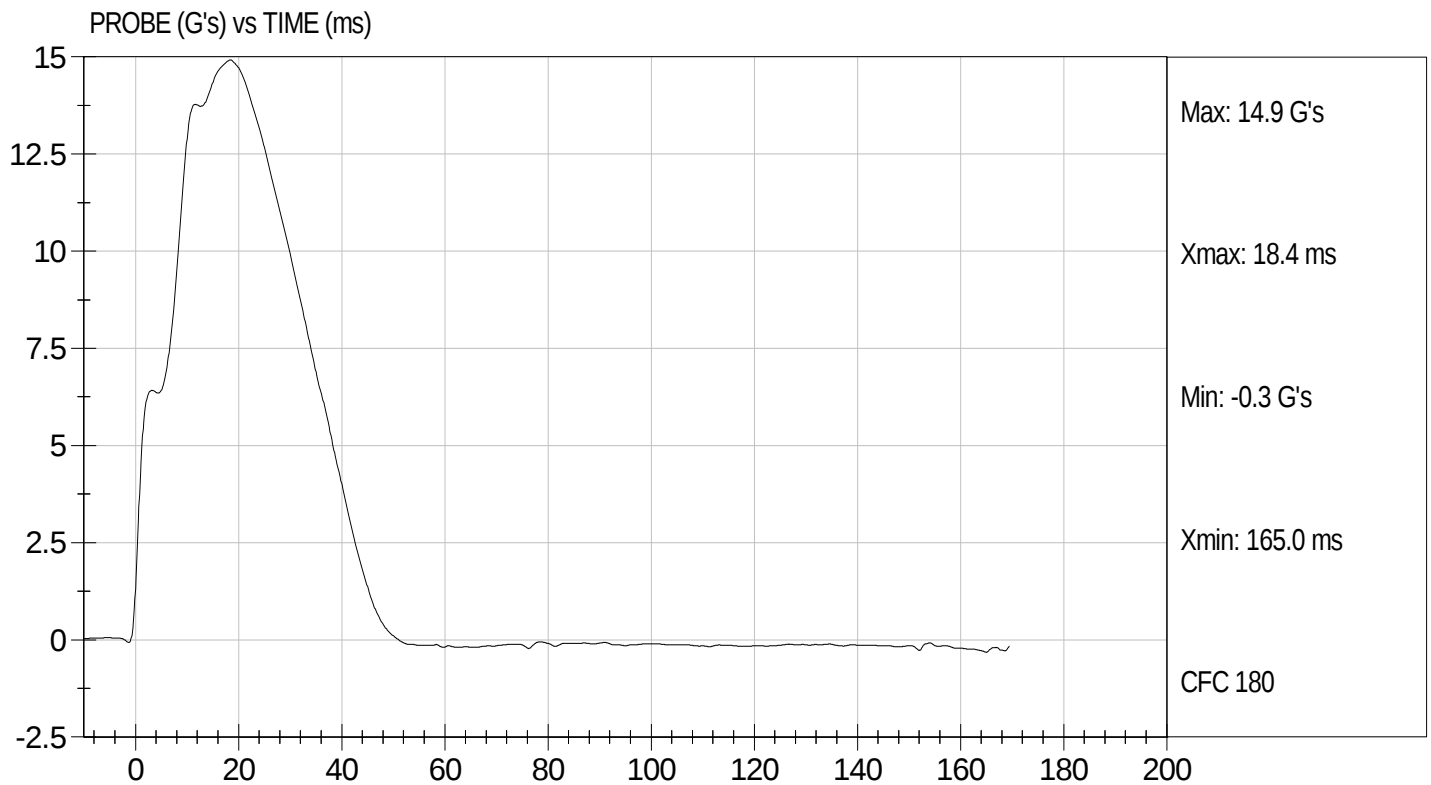
2/28/12
Test Date


Approved By



Test Desc: Thorax Without Arm
Component ID: D12735

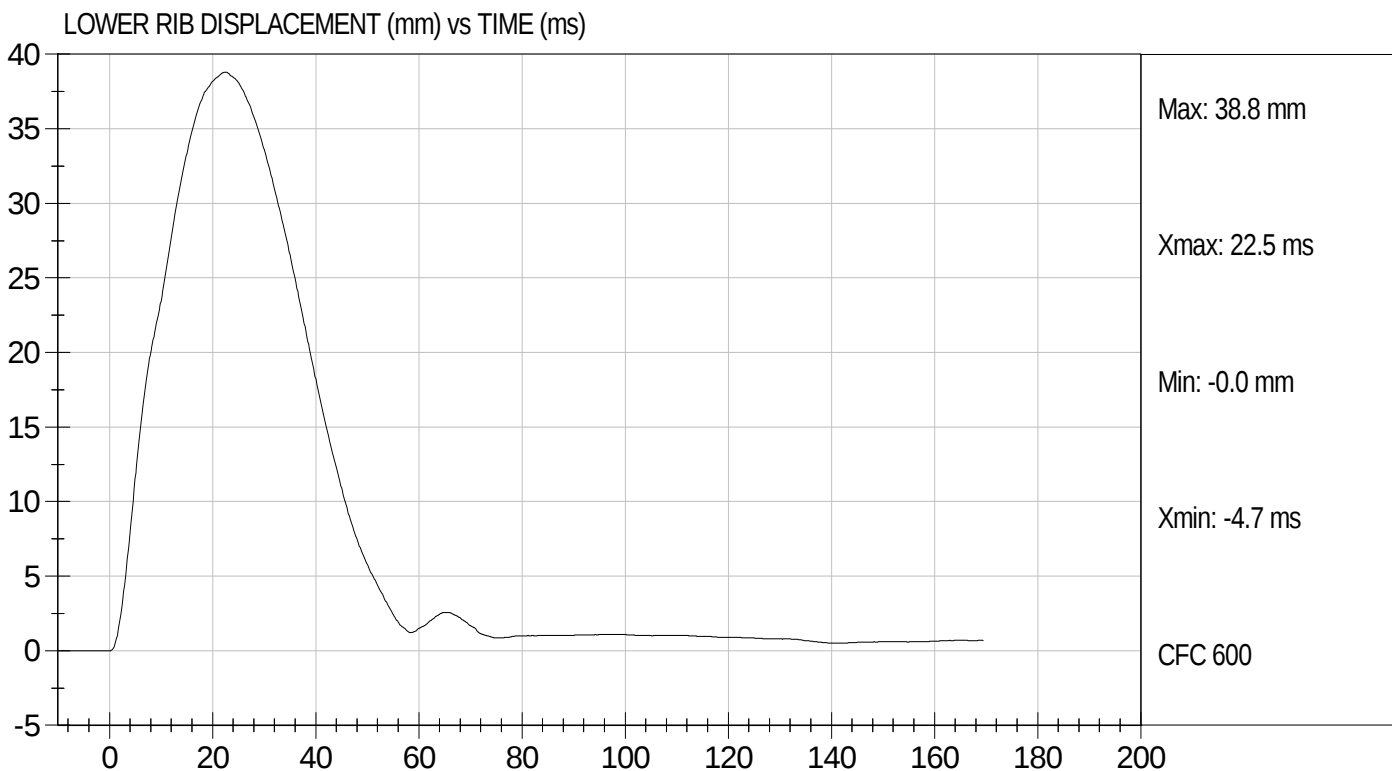
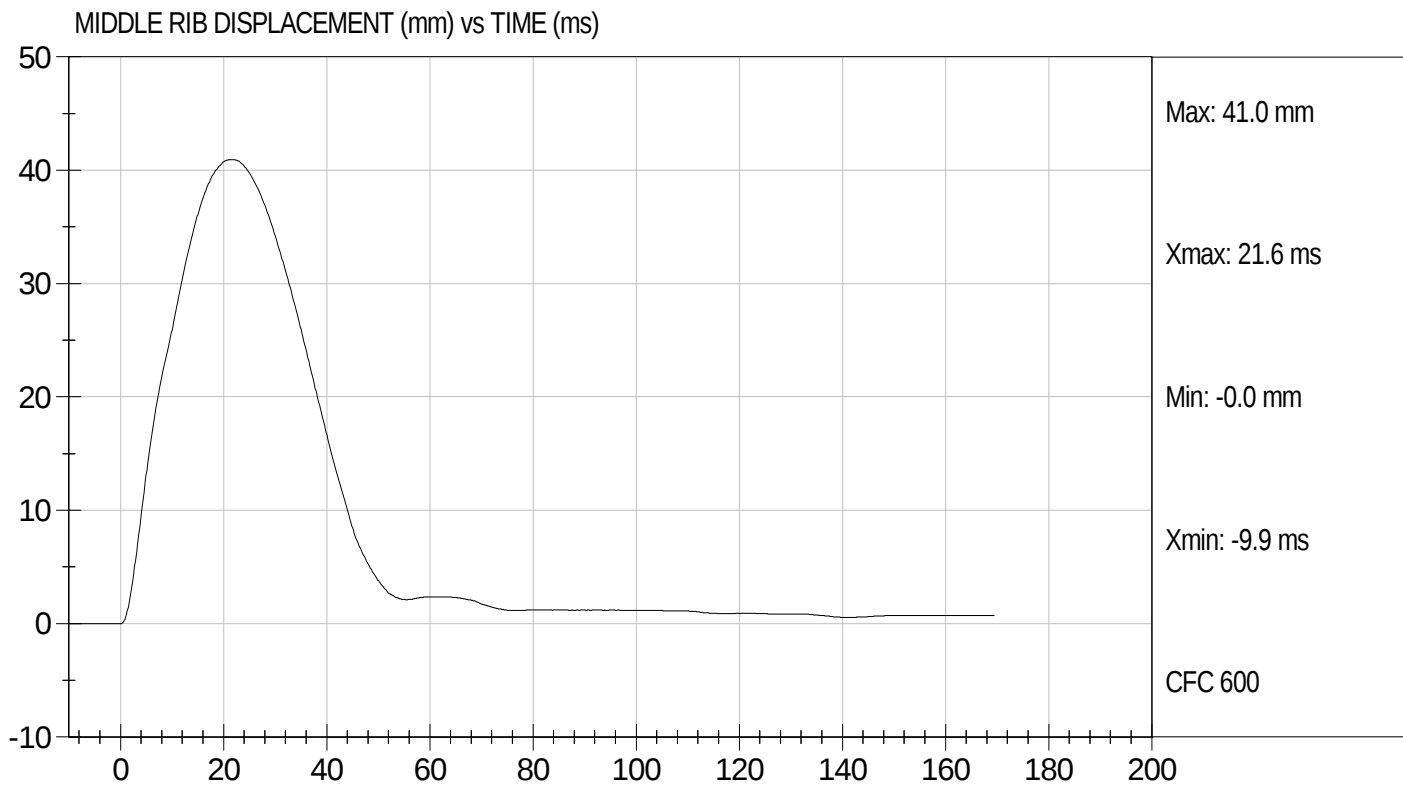
Test Date: 2/28/12
Velocity: 14.24 ft/s, 4.34 m/s





Test Desc: Thorax Without Arm
Component ID: D12735

Test Date: 2/28/12
Velocity: 14.24 ft/s, 4.34 m/s

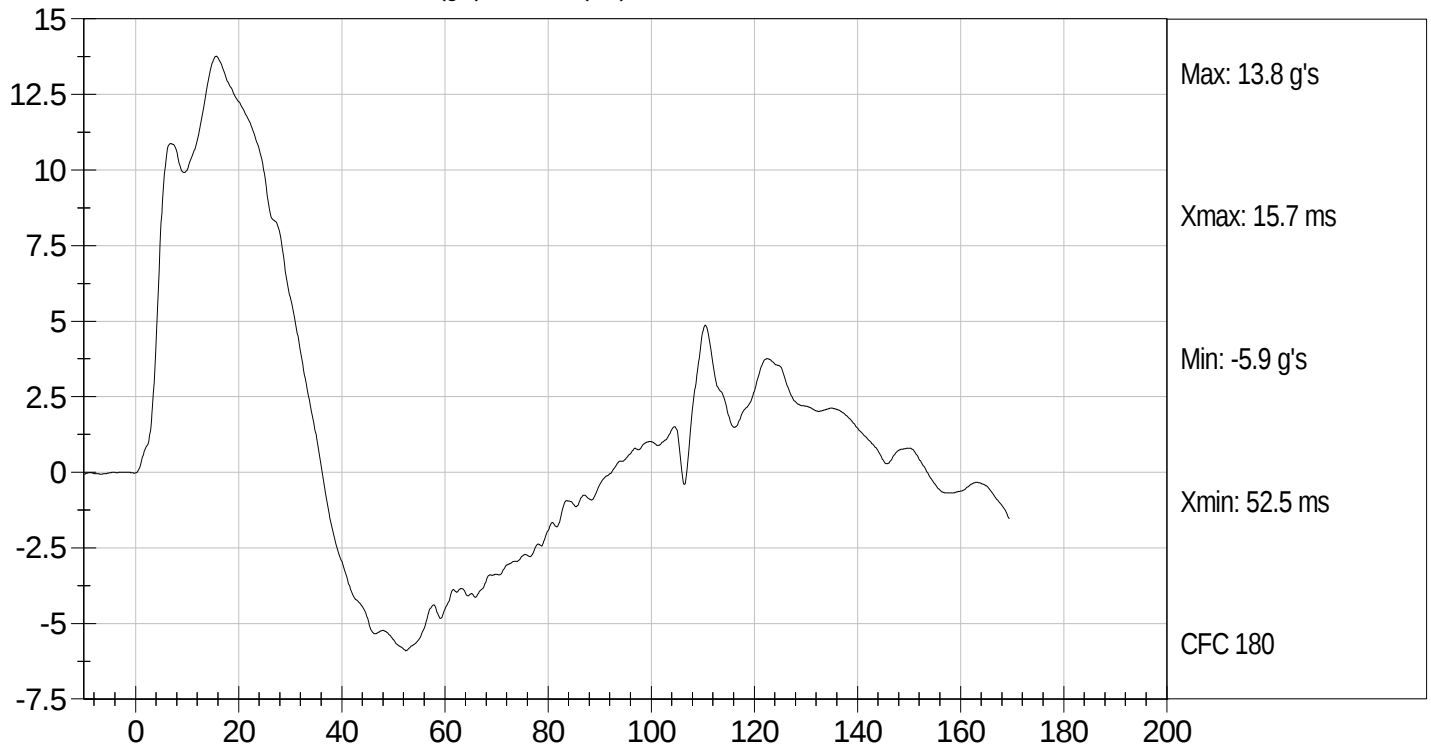




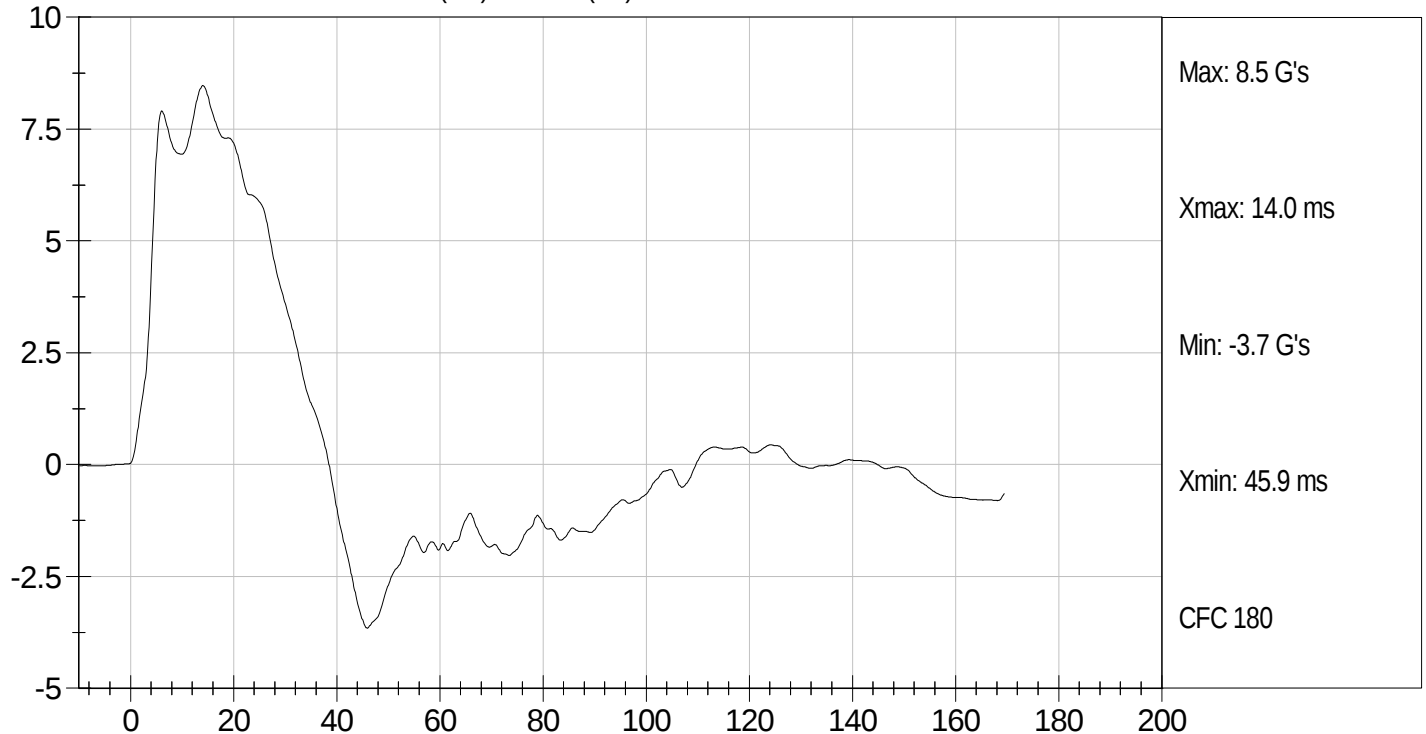
Test Desc: Thorax Without Arm
Component ID: D12735

Test Date: 2/28/12
Velocity: 14.24 ft/s, 4.34 m/s

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



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

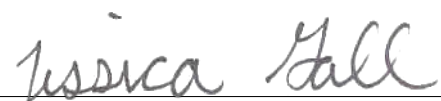


MGA RESEARCH CORPORATION
ABDOMINAL IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D12736

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	22.0	Pass
Humidity	%	10 to 70	23	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Peak Impactor Acceleration	G's	12 to 16	14	Pass
Upper Rib Displacement	mm	36 to 47	39	Pass
Lower Rib Displacement	mm	33 to 44	38	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	11	Pass
Overall Test Results				Pass


Laboratory Technician

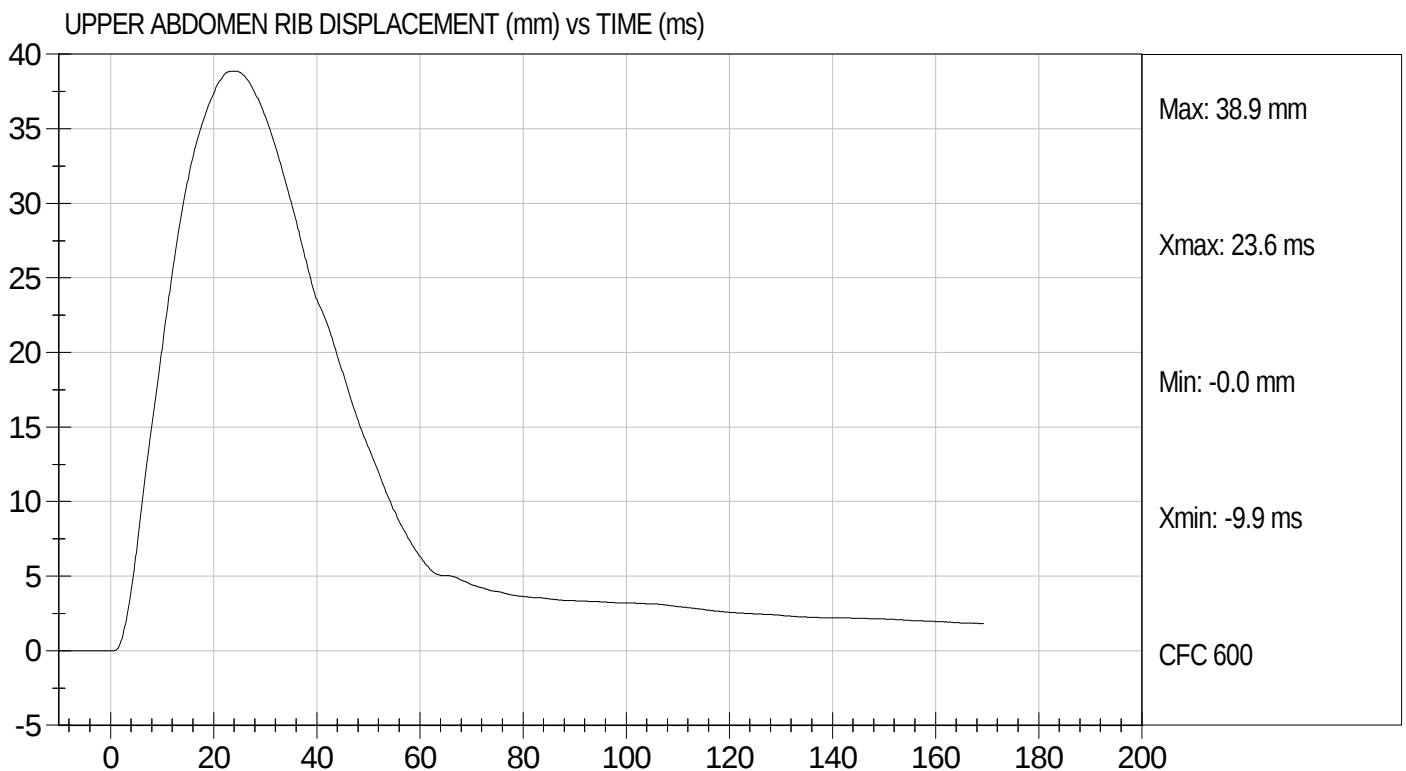
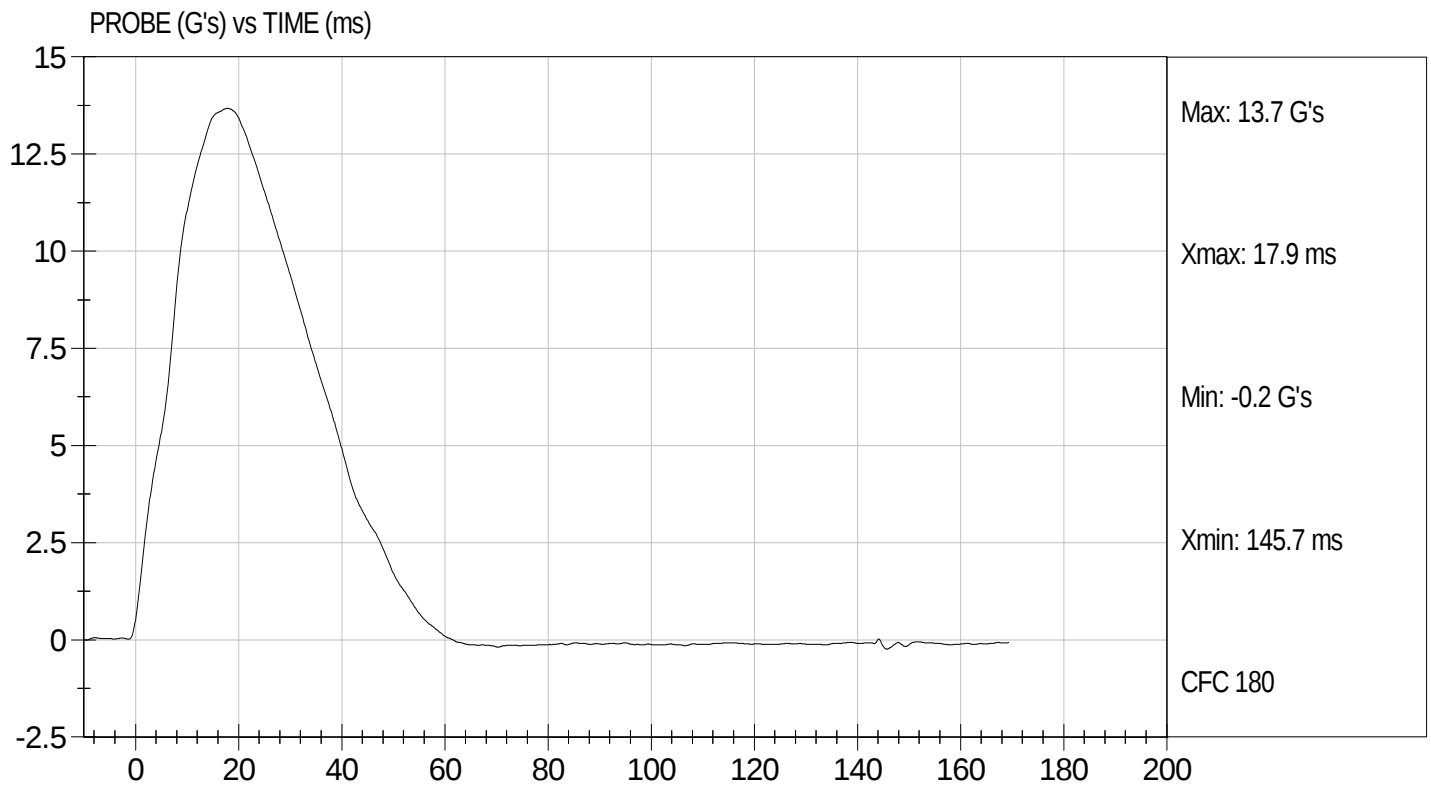
2/28/12
Test Date


Approved By



Test Desc: Abdomen Impact
Component ID: D12736

Test Date: 2/28/12
Velocity: 14.24 ft/s, 4.34 m/s

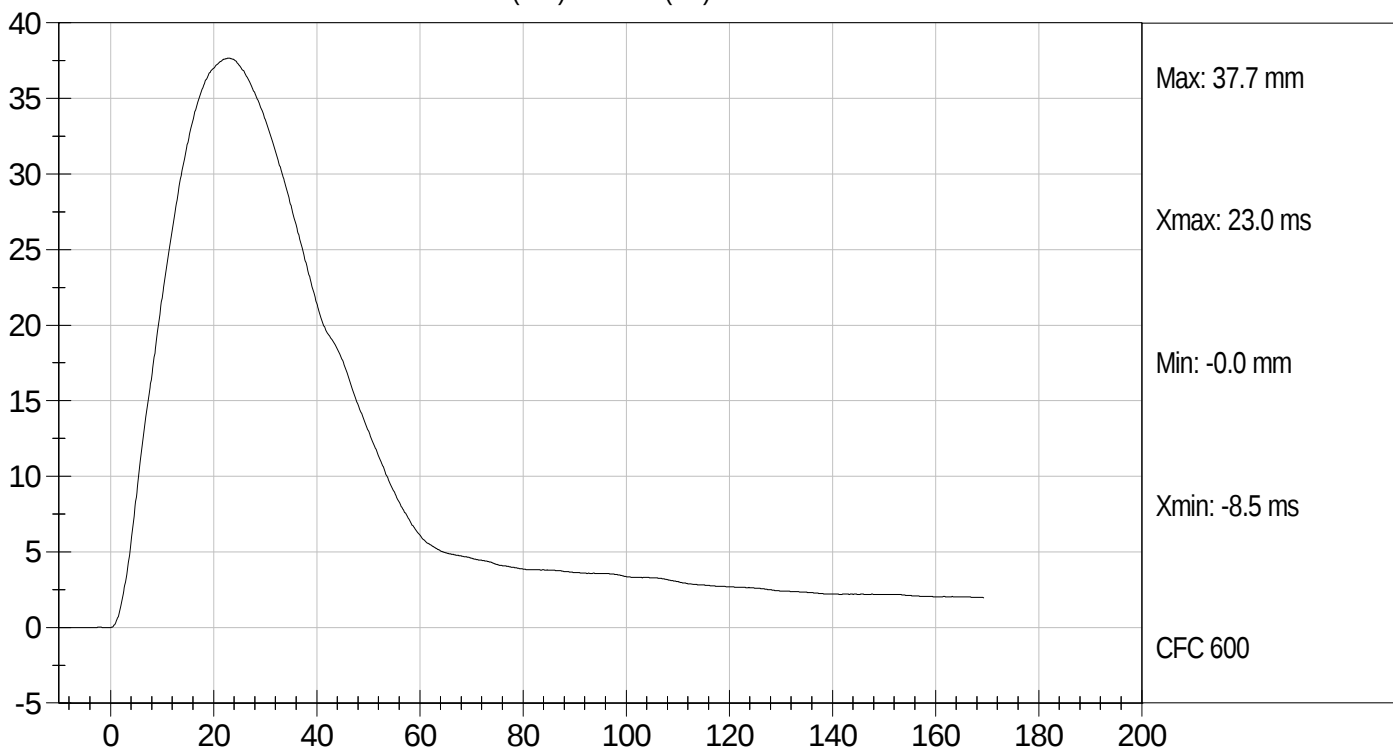




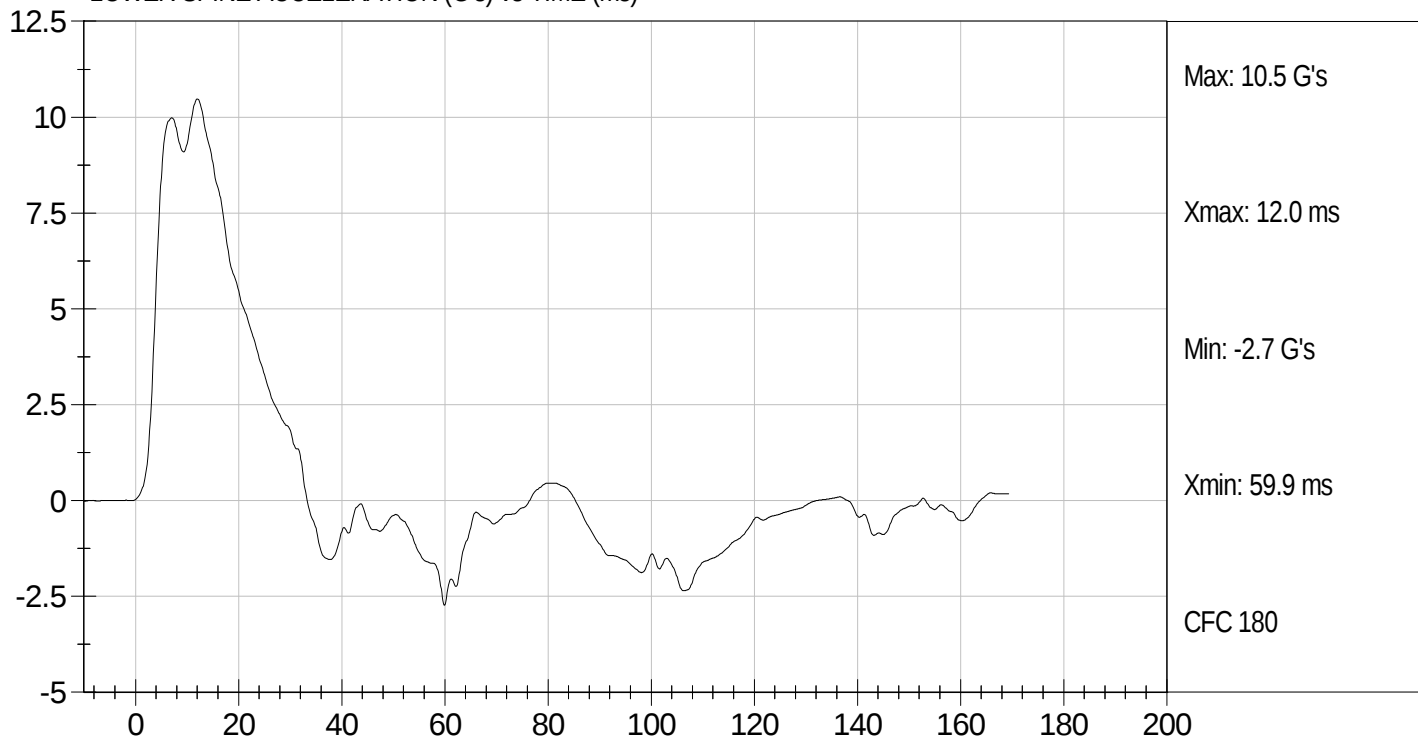
Test Desc: Abdomen Impact
Component ID: D12736

Test Date: 2/28/12
Velocity: 14.24 ft/s, 4.34 m/s

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



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

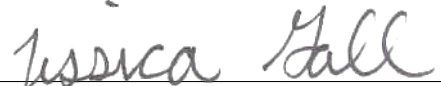


MGA RESEARCH CORPORATION
PELVIS IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

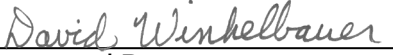
ATD Serial No: 296

Test I.D: D12737

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.6	Pass
Humidity	%	10 to 70	30	Pass
Impact Velocity	m/s	6.60 to 6.80	6.68	Pass
Peak Impactor Acceleration	G's	38 to 47	43	Pass
Pelvis Y Acceleration after 6 ms	G's	34 to 42	41	Pass
Peak Acetabulum Force	N	3600 to 4300	4112	Pass
Overall Test Results				Pass


Laboratory Technician

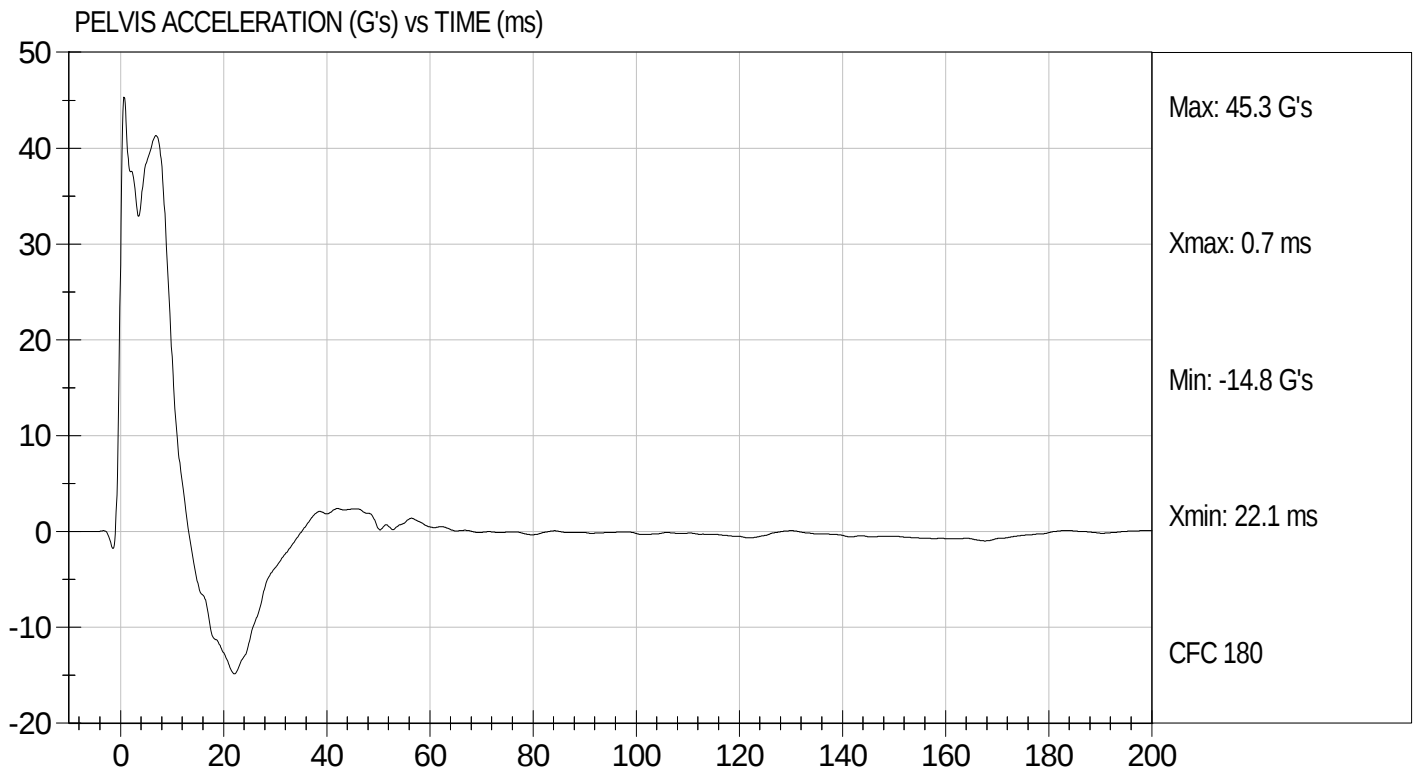
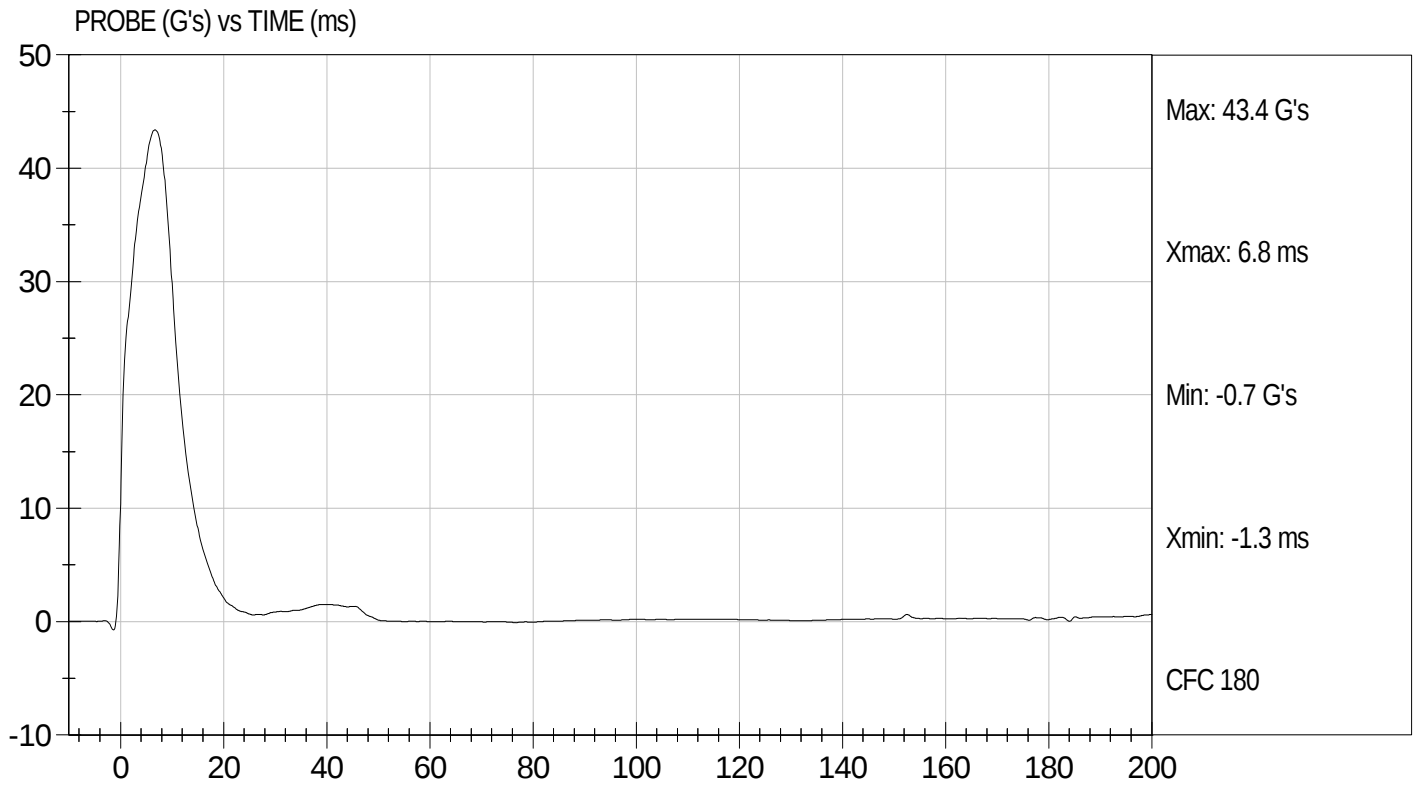
2/29/12
Test Date


Approved By



Test Desc: Pelvis Impact
Component ID: D12737

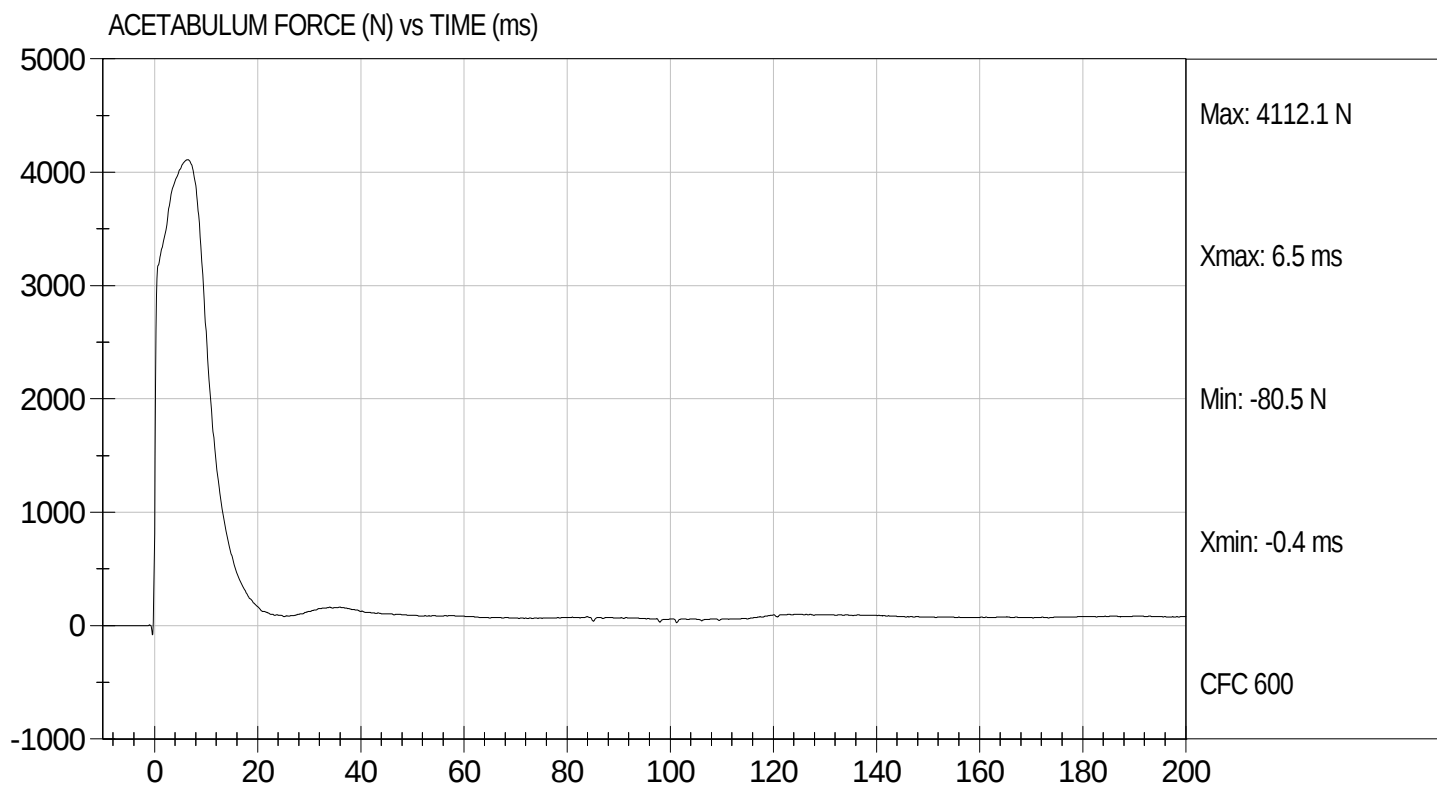
Test Date: 2/29/12
Velocity: 21.9 ft/s, 6.68 m/s





Test Desc: Pelvis Impact
Component ID: D12737

Test Date: 2/29/12
Velocity: 21.9 ft/s, 6.68 m/s

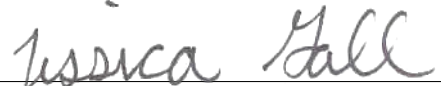


MGA RESEARCH CORPORATION
ILIAC IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

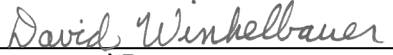
ATD Serial No: 296

Test I.D: D12738

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.6	Pass
Humidity	%	10 to 70	30	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Peak Impactor Acceleration	G's	36 to 45	37	Pass
Pelvis Y Acceleration	G's	28 to 39	28	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4492	Pass
Overall Test Results				Pass


Laboratory Technician

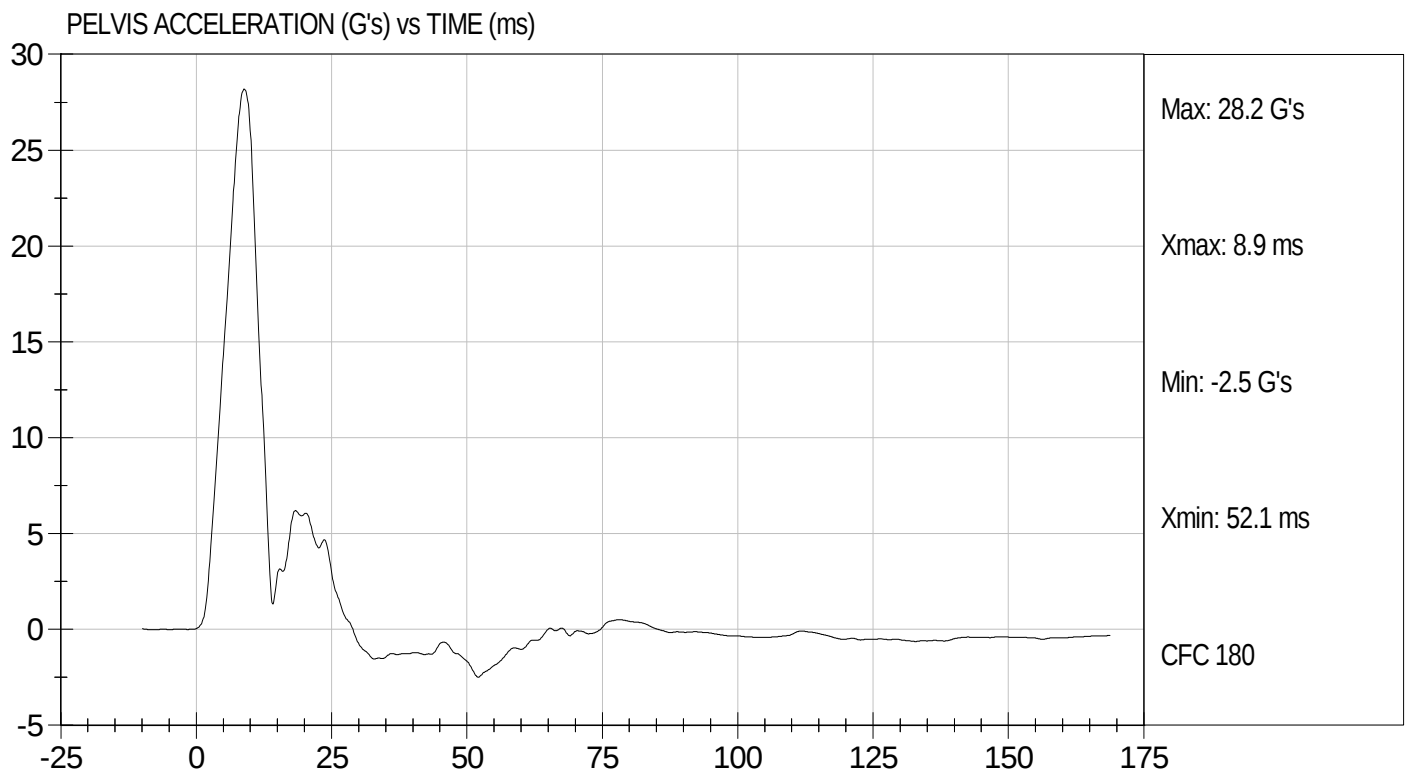
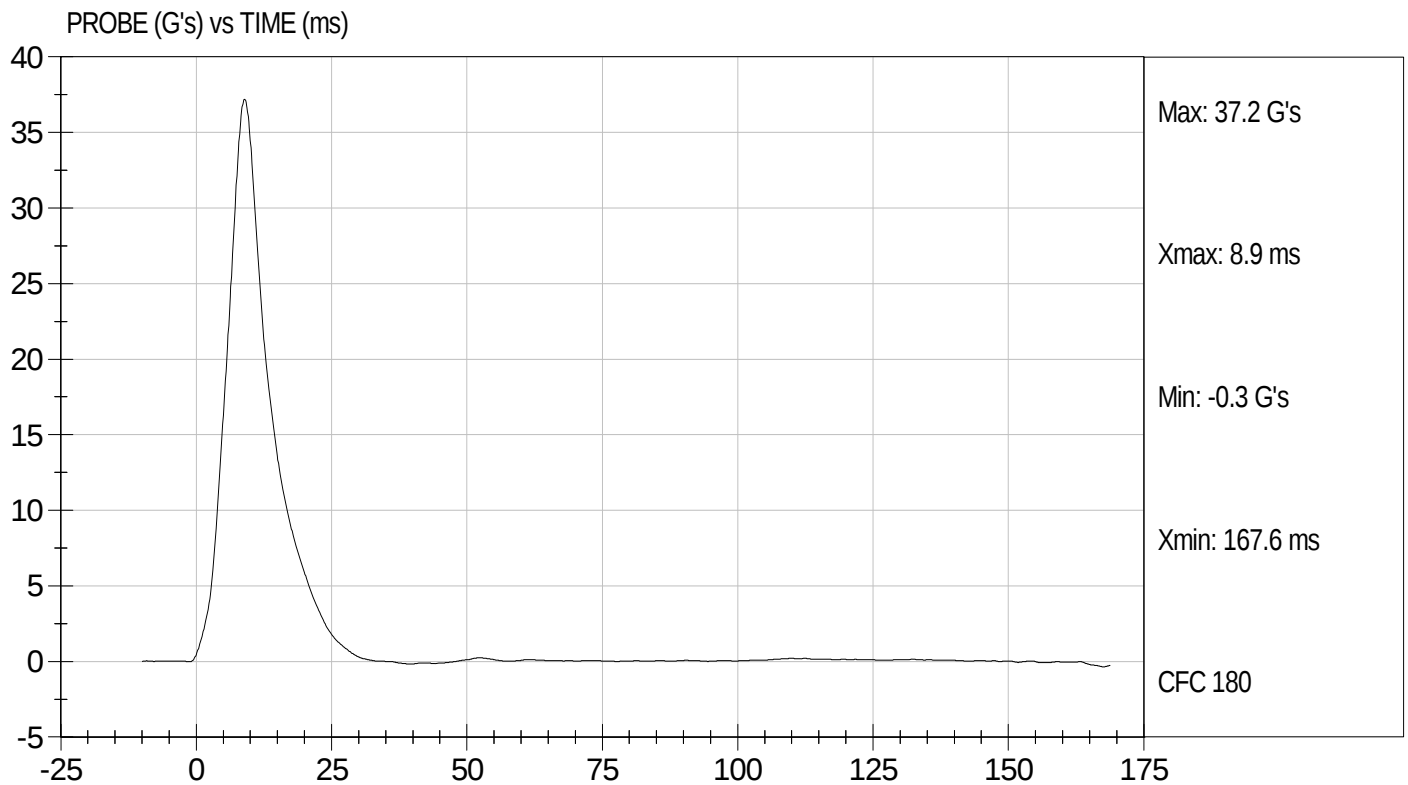
2/29/12
Test Date


Approved By



Test Desc: Iliac Impact
Component ID: D12738

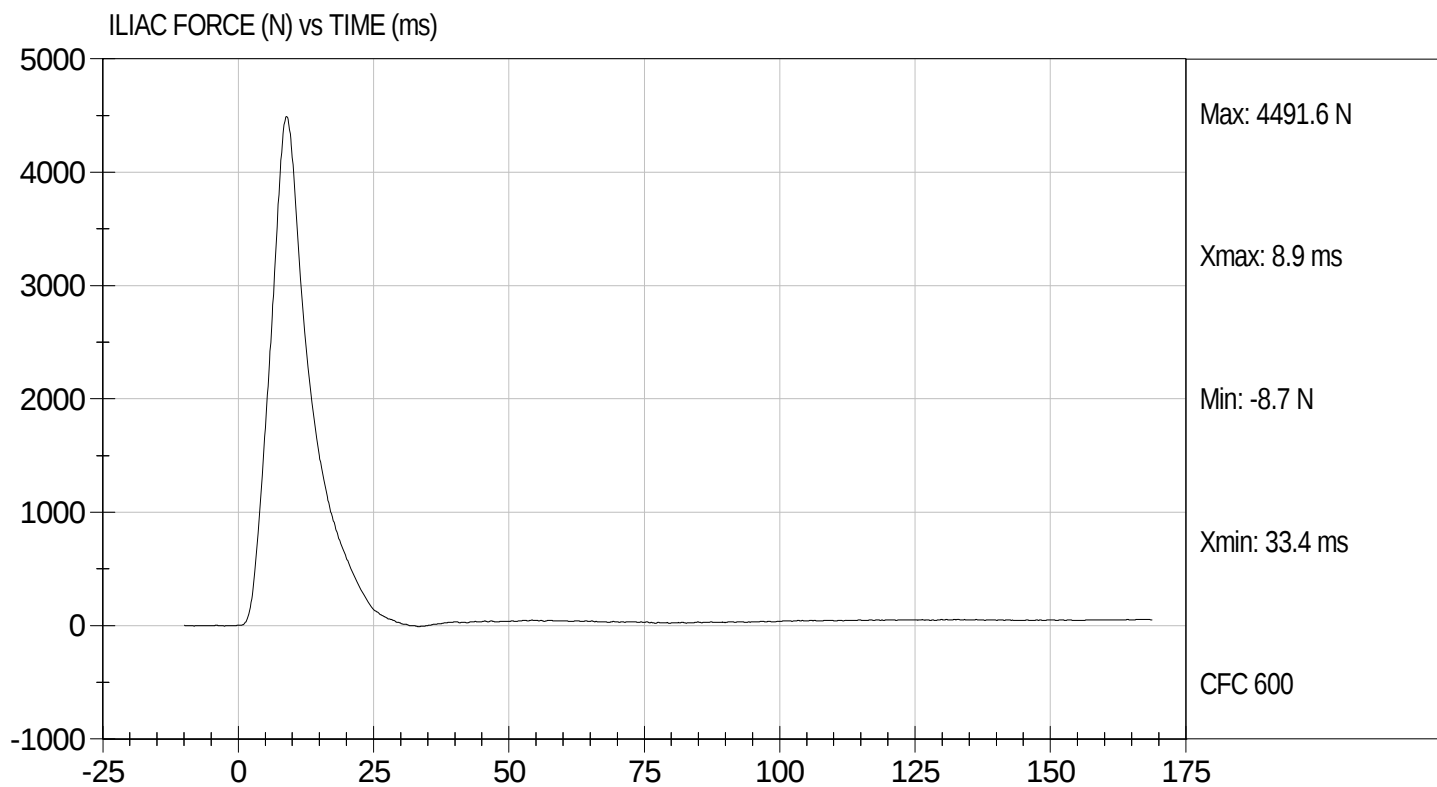
Test Date: 2/29/12
Velocity: 14.36 ft/s, 4.38 m/s





Test Desc: Iliac Impact
Component ID: D12738

Test Date: 2/29/12
Velocity: 14.36 ft/s, 4.38 m/s

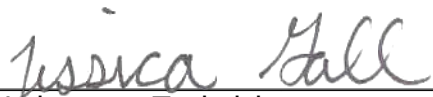


MGA RESEARCH CORPORATION
HEAD DROP TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test ID: D12861

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	18	Pass
Peak Resultant Acceleration	G's	115 to 137	123	Pass
Peak Longitudinal Acceleration	G's	+/- 15	-4.3	Pass
Unimodal	N/A	<15%	Yes	Pass
Overall Test Results				Pass


Laboratory Technician

3/6/12
Test Date

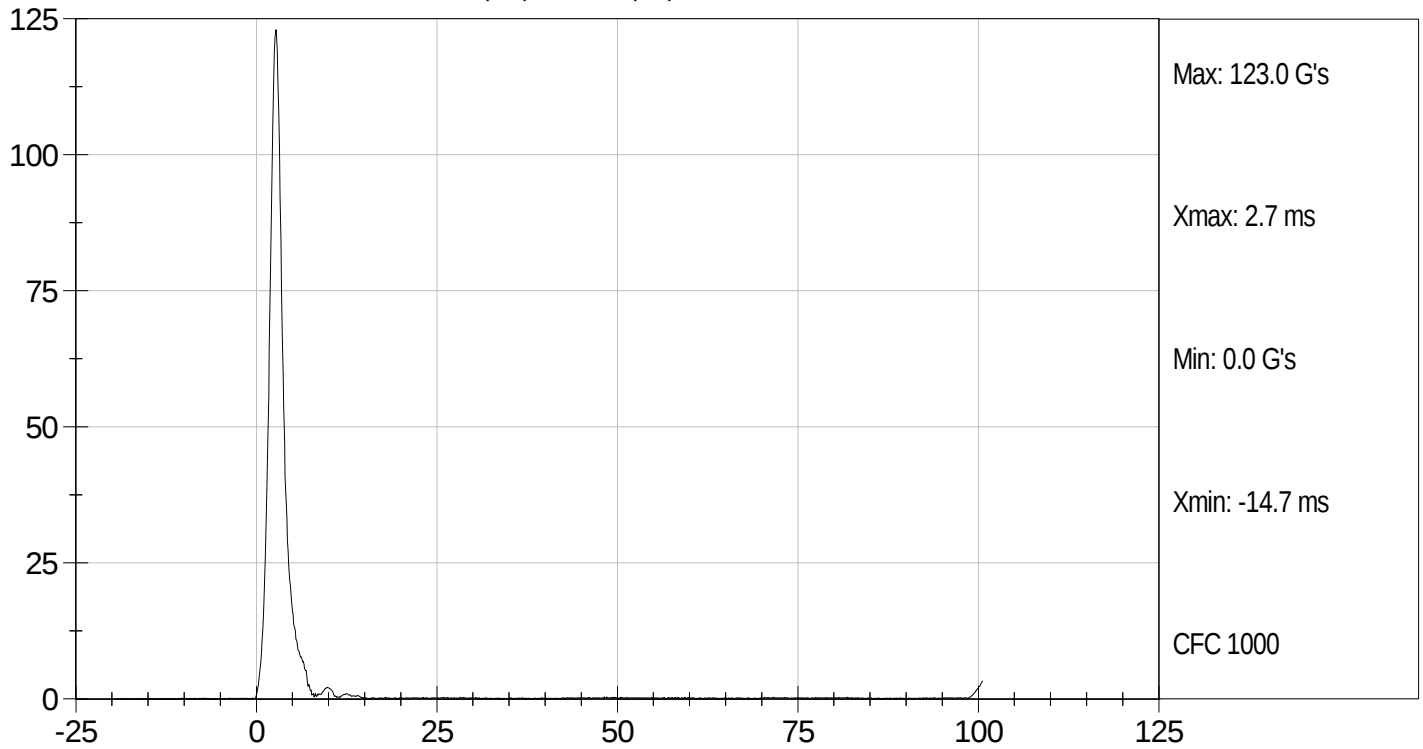

Approved By



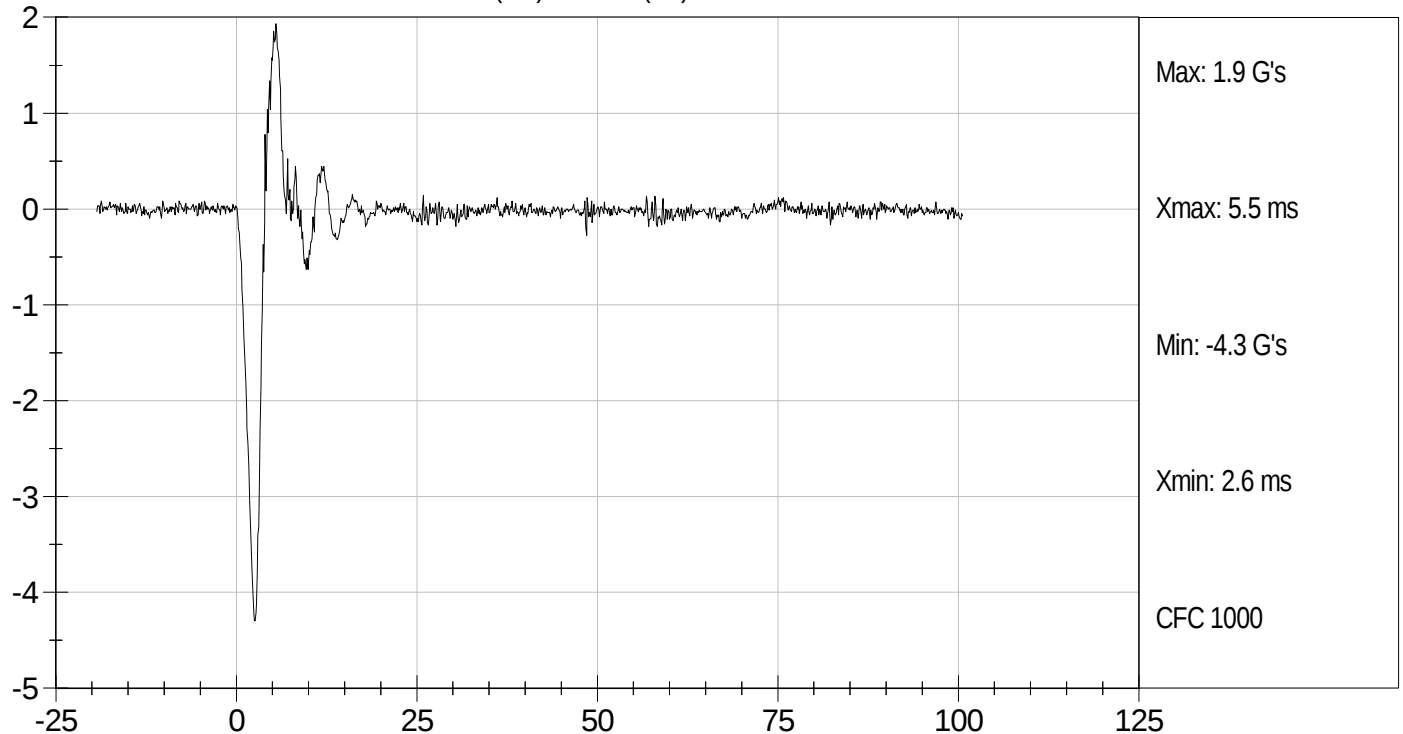
Test Desc: Head Drop
Component ID: D12861

Test Date: 3/6/12
Velocity: 0 ft/s, 0 m/s

PEAK RESULTANT ACCELERATION (G's) vs TIME (ms)



PEAK LONGITUDINAL ACCELERATION (G's) vs TIME (ms)



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

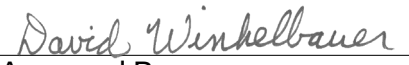
ATD Serial No: 296

Test I.D: D12862

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	22.0	Pass
Humidity		%	10 to 70	28	Pass
Impact Velocity		m/s	5.51 to 5.63	5.58	Pass
Delta Velocity	10 ms	m/s	2.20 to 2.80	2.51	Pass
	15 ms	m/s	3.30 to 4.10	3.56	Pass
	20 ms	m/s	4.40 to 5.40	4.77	Pass
	25 ms	m/s	5.40 to 6.10	5.49	Pass
	25-100 ms	m/s	5.50 to 6.20	5.50	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	-42	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	116	Pass
Overall Test Results					Pass


 Laboratory Technician

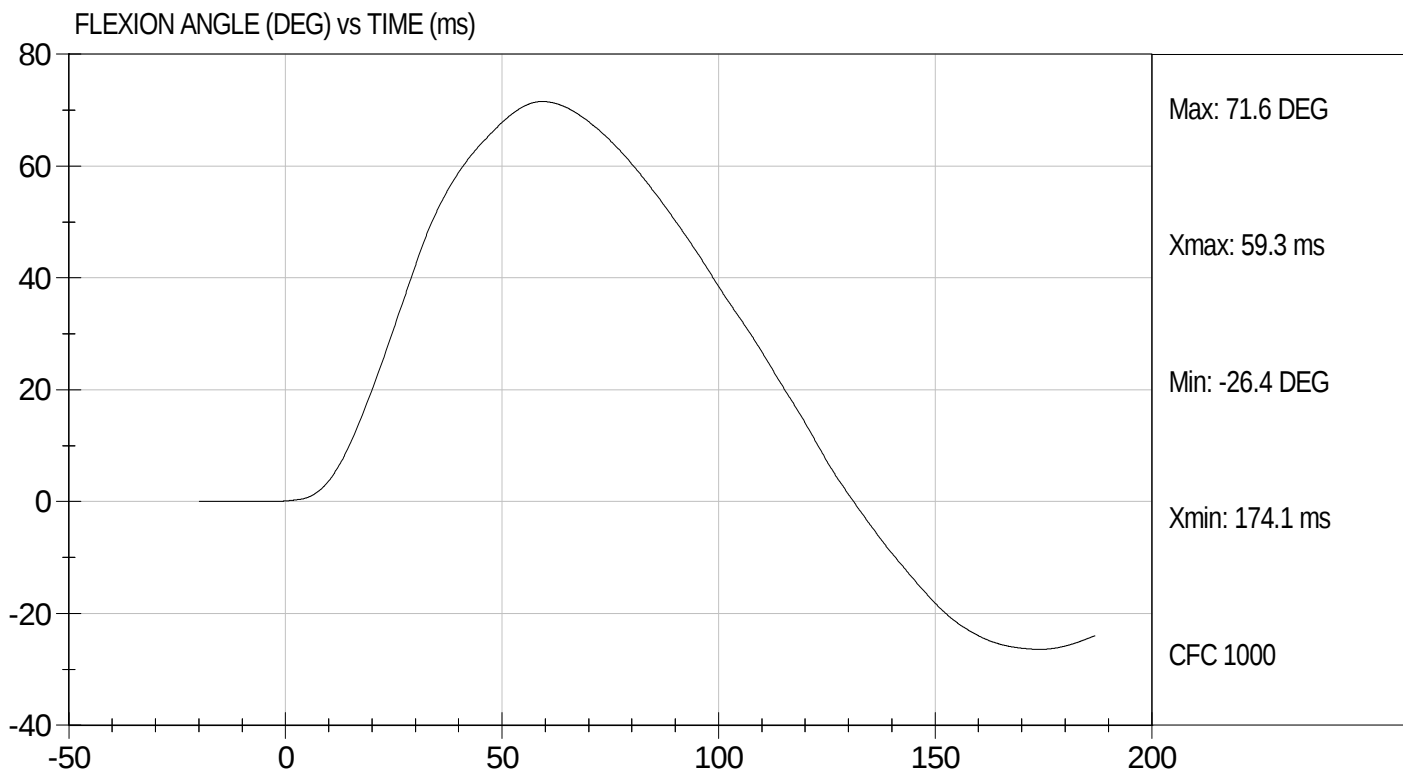
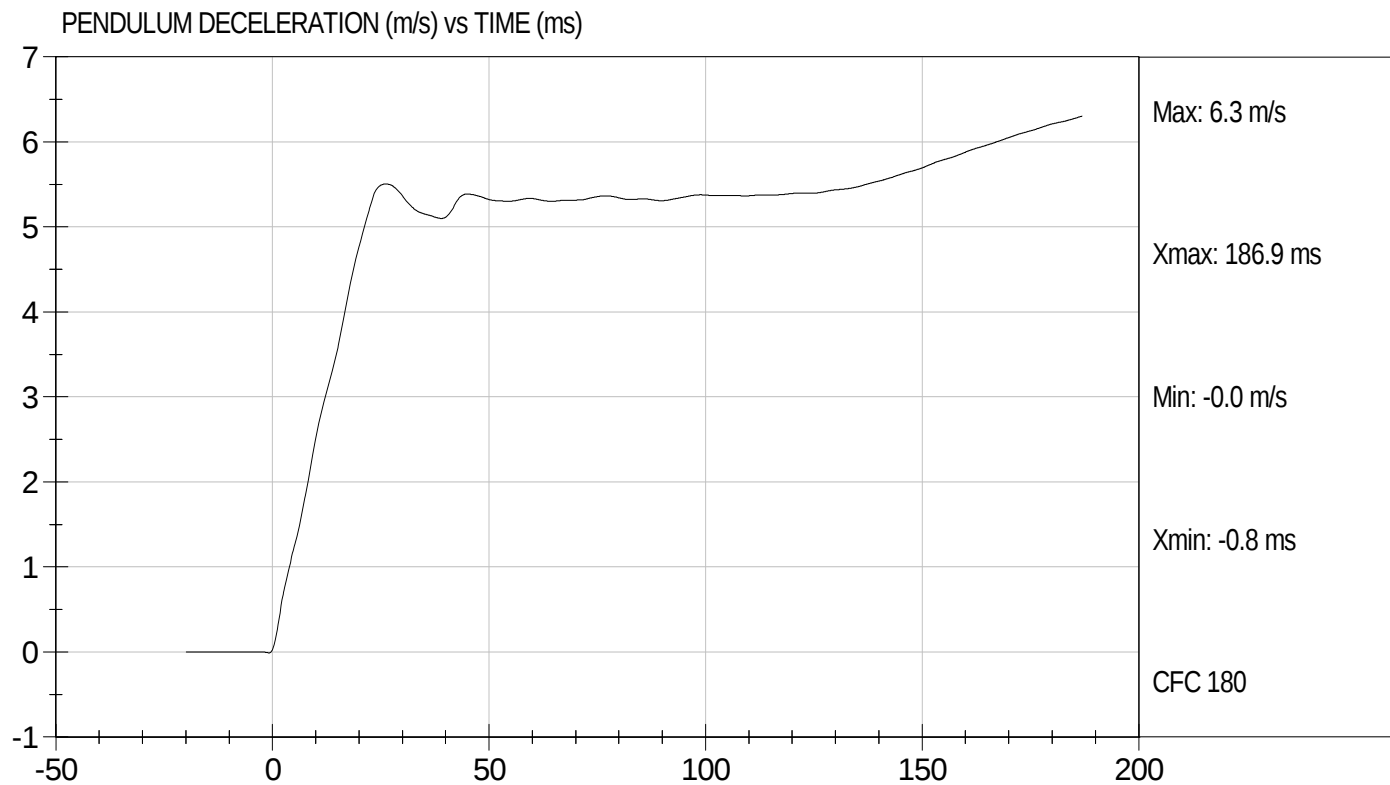
3/6/12
 Test Date


 Approved By



Test Desc: Neck Bending
Component ID: D12862

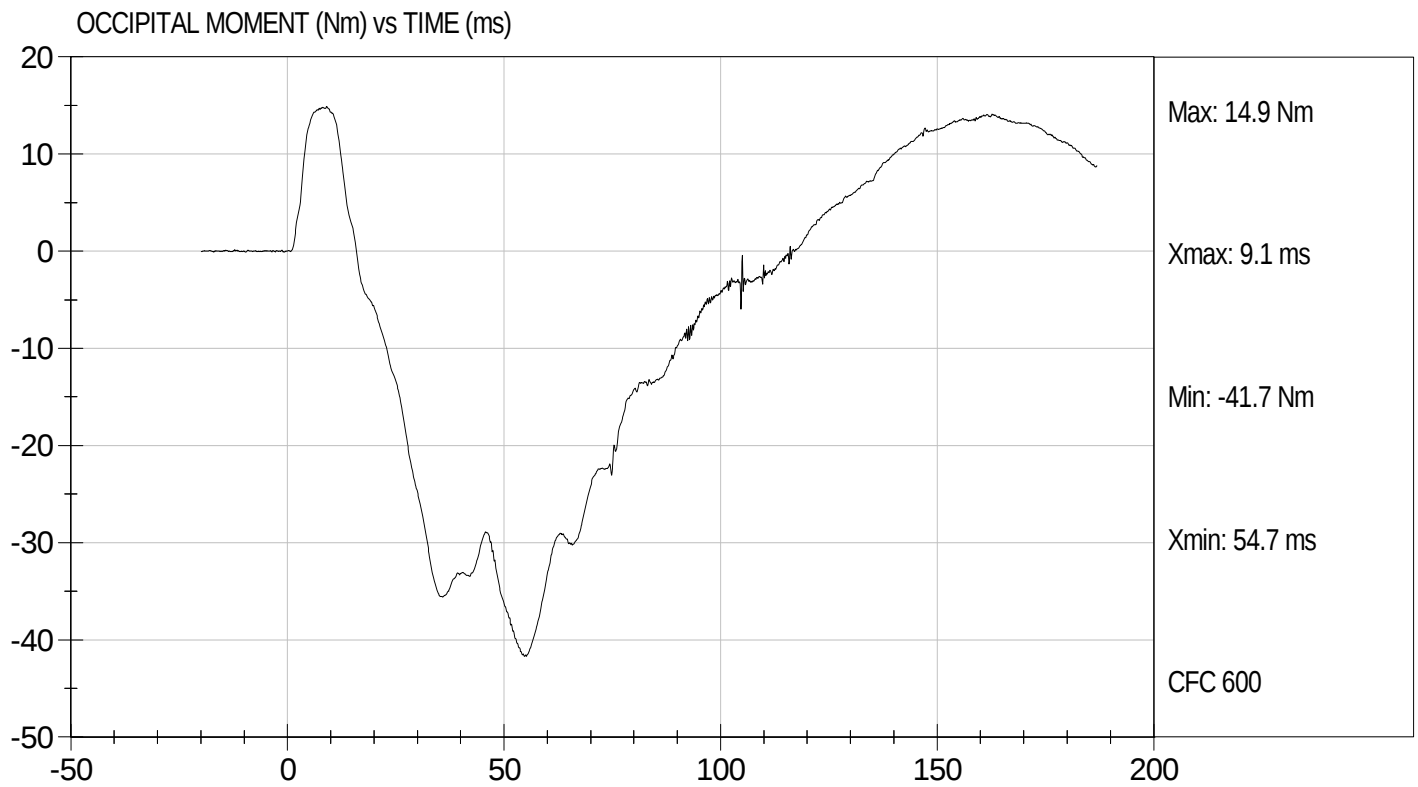
Test Date: 3/6/12
Velocity: 18.32 ft/s, 5.58 m/s





Test Desc: Neck Bending
Component ID: D12862

Test Date: 3/6/12
Velocity: 18.32 ft/s, 5.58 m/s

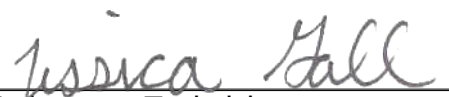


MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
SID-ILs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test ID: D12863

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Maximum Probe Acceleration	G's	13 to 18	15	Pass
Shoulder Displacement	mm	28 to 37	31	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	18	Pass
Overall Test Results				Pass


Laboratory Technician

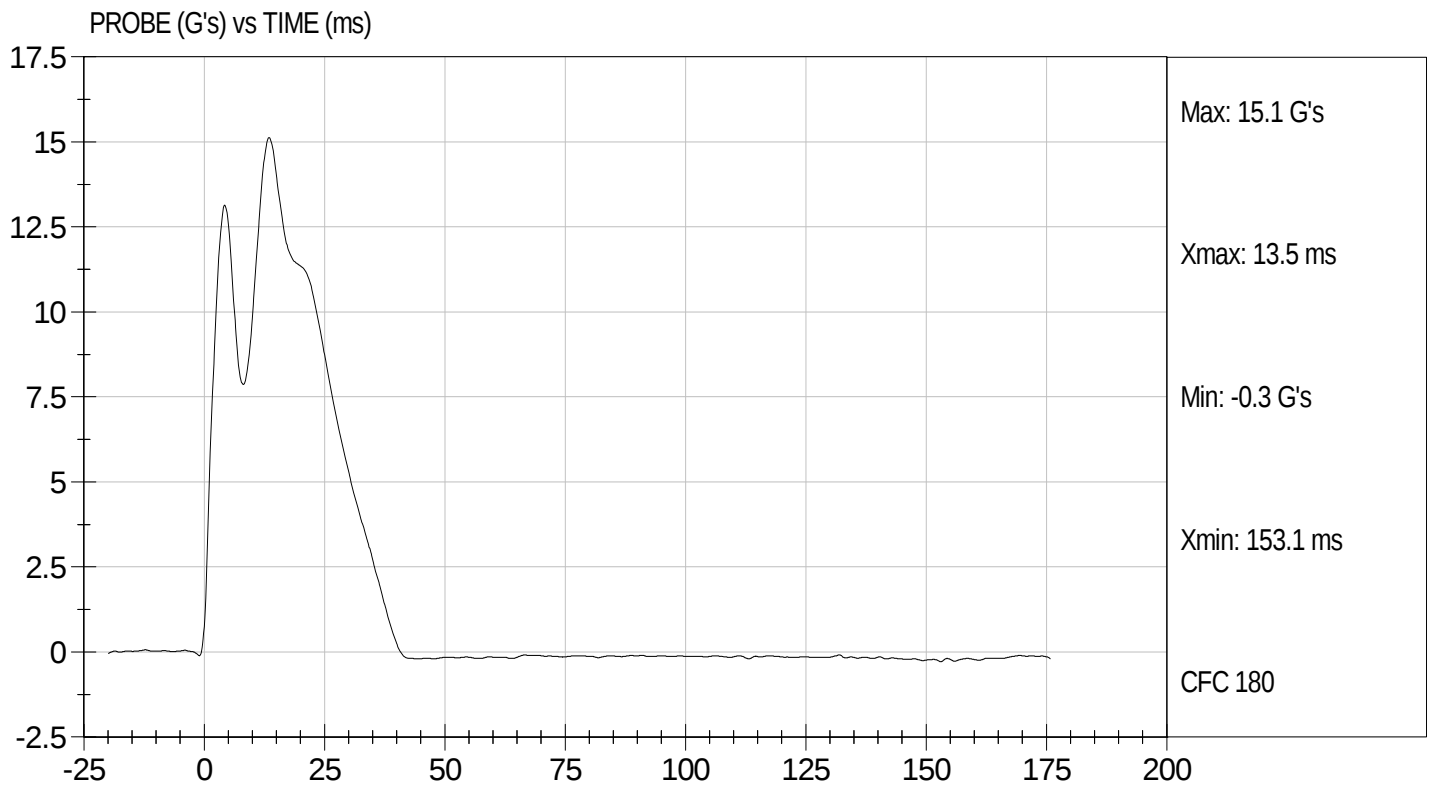
3/6/12
Test Date


Approved By



Test Desc: Shoulder Impact
Component ID: D12863

Test Date: 3/6/12
Velocity: 14.37 ft/s, 4.38 m/s

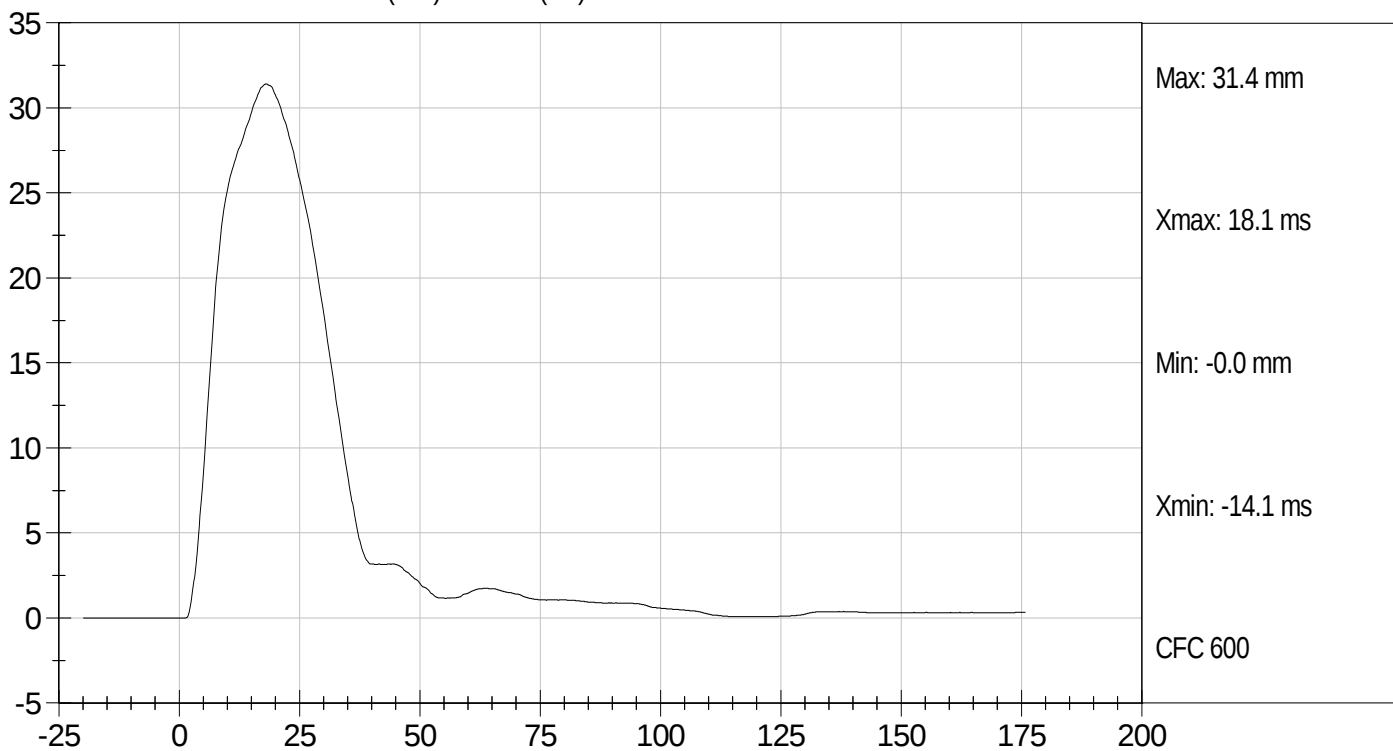




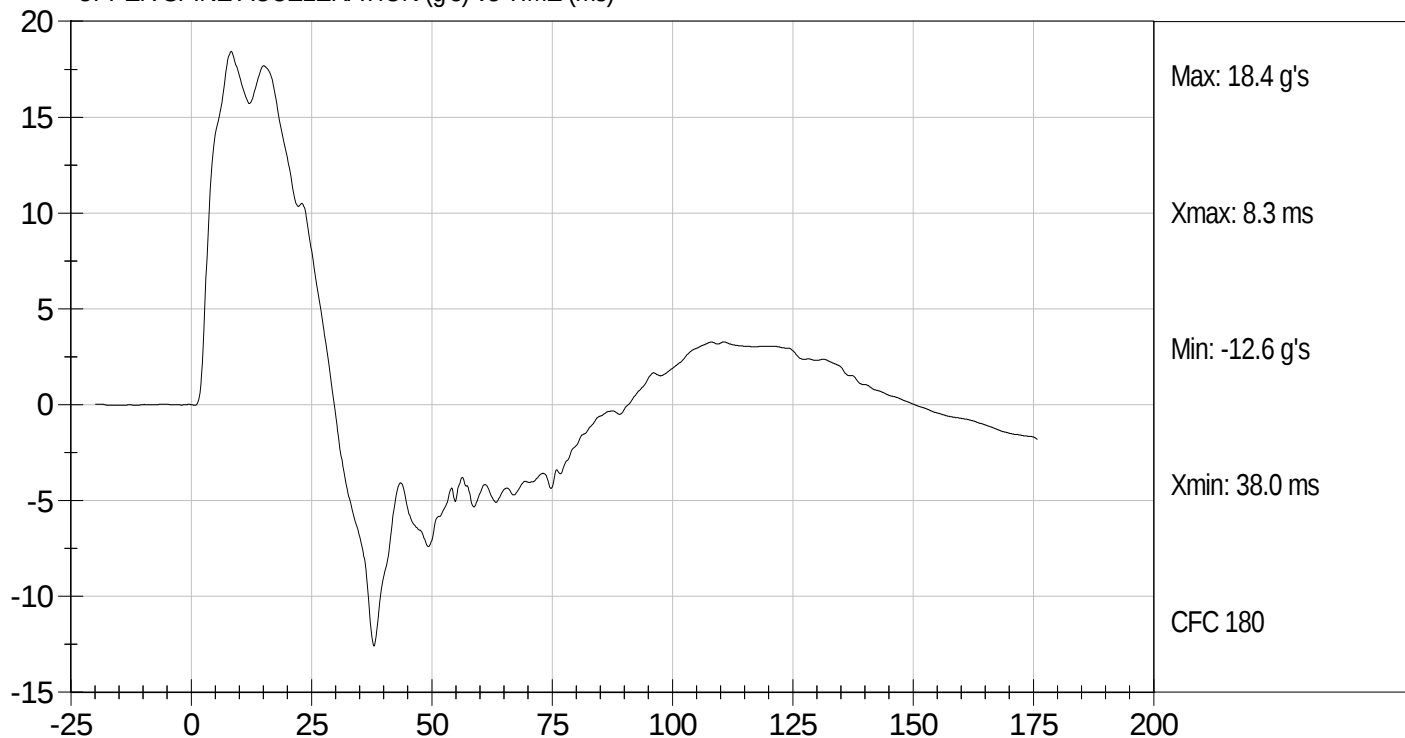
Test Desc: Shoulder Impact
Component ID: D12863

Test Date: 3/6/12
Velocity: 14.37 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: 296

Test I.D: D12864

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	22.0	Pass
Humidity	%	10 to 70	19	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	Pass
Peak Impactor Acceleration	G's	30 to 36	32	Pass
Shoulder Displacement	mm	31 to 40	35	Pass
Upper Rib Displacement	mm	25 to 32	28	Pass
Middle Rib Displacement	mm	30 to 36	32	Pass
Lower Rib Displacement	mm	32 to 38	35	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	37	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	31	Pass
Overall Test Results				Pass


 Laboratory Technician

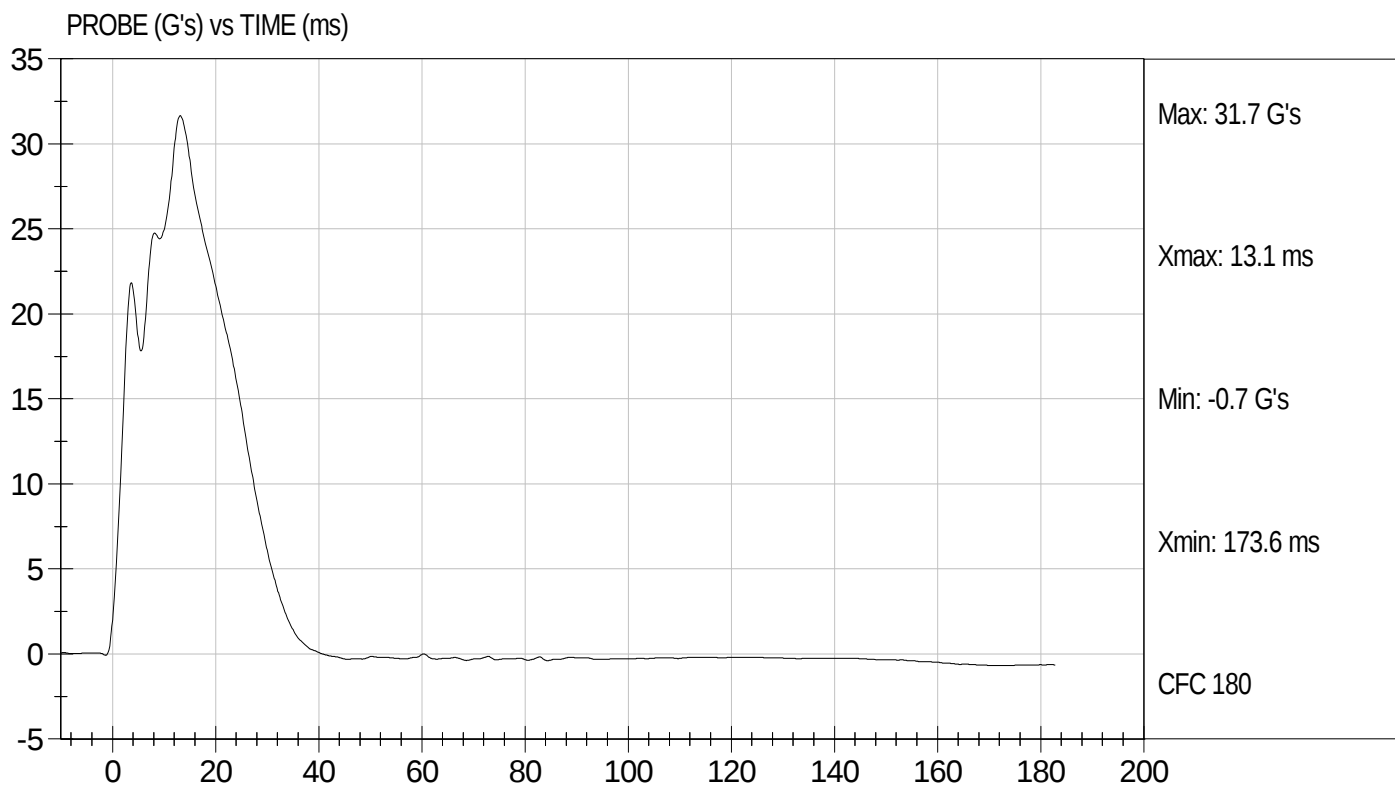
3/6/12
 Test Date


 Approved By



Test Desc: Thorax With Arm
Component ID: D12864

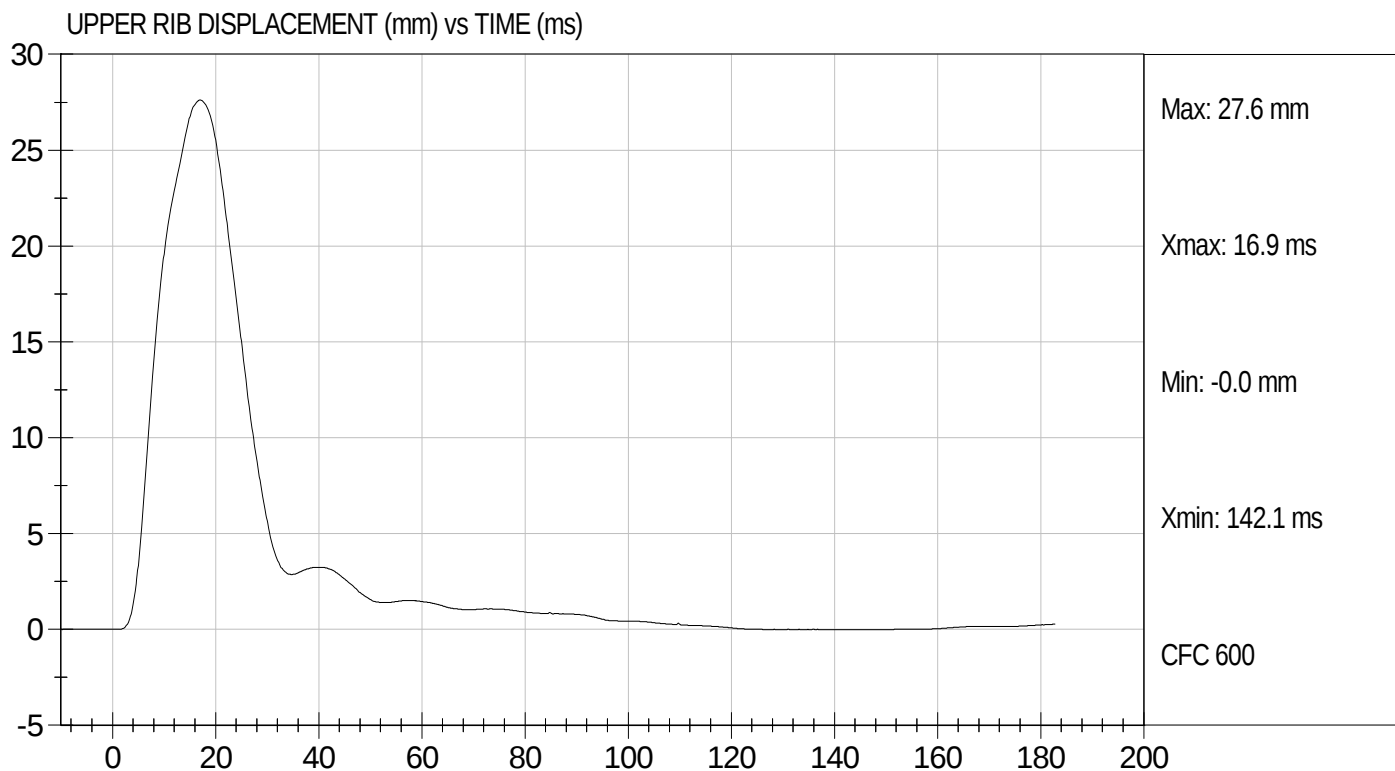
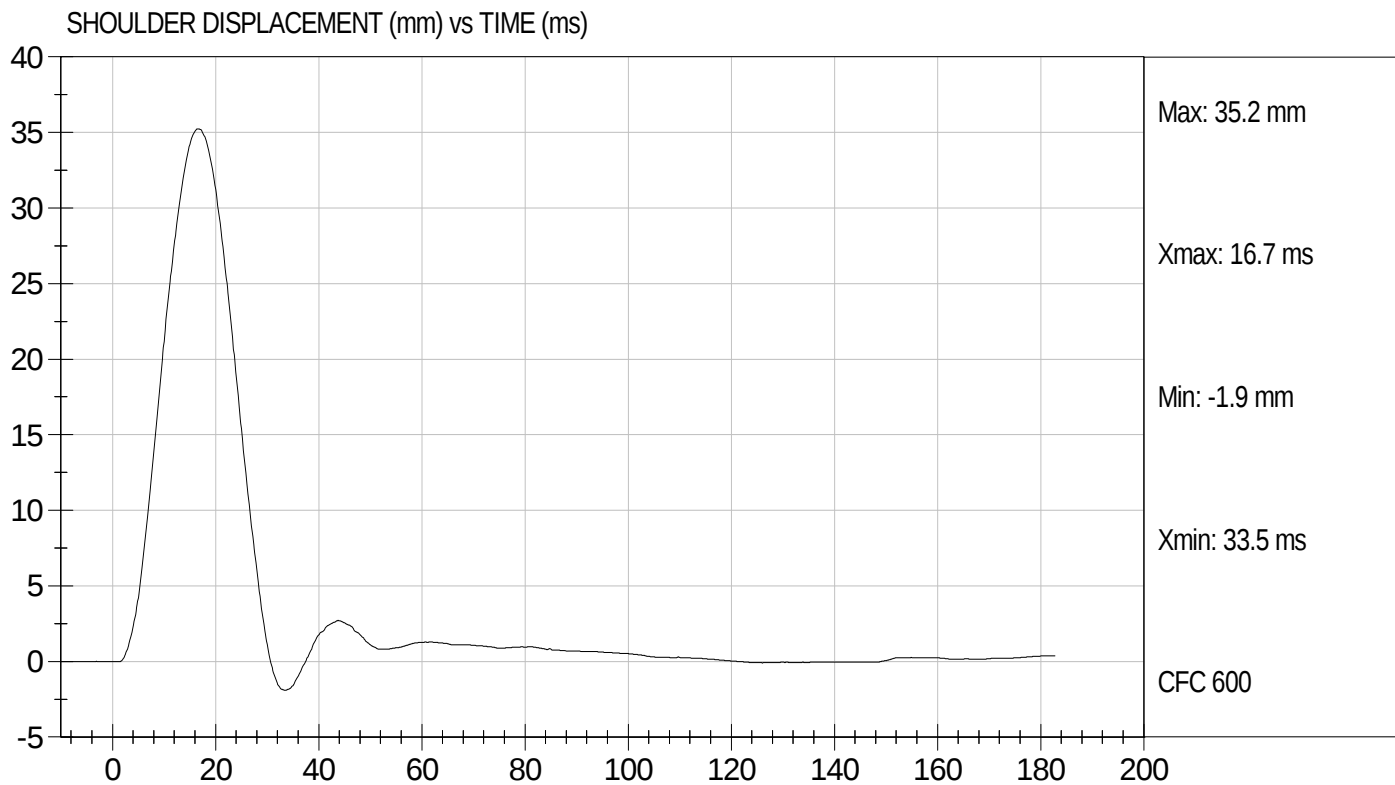
Test Date: 3/6/12
Velocity: 22.22 ft/s, 6.77 m/s





Test Desc: Thorax With Arm
Component ID: D12864

Test Date: 3/6/12
Velocity: 22.22 ft/s, 6.77 m/s

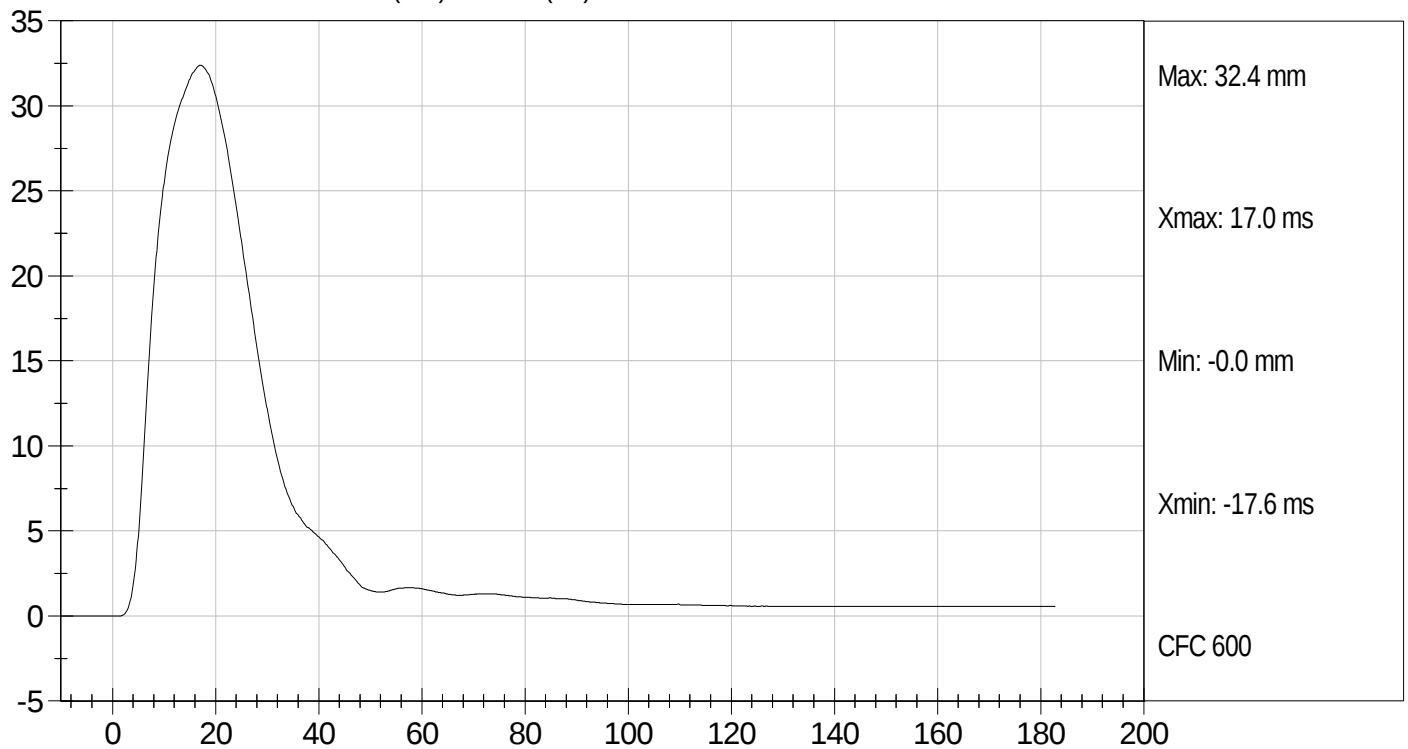




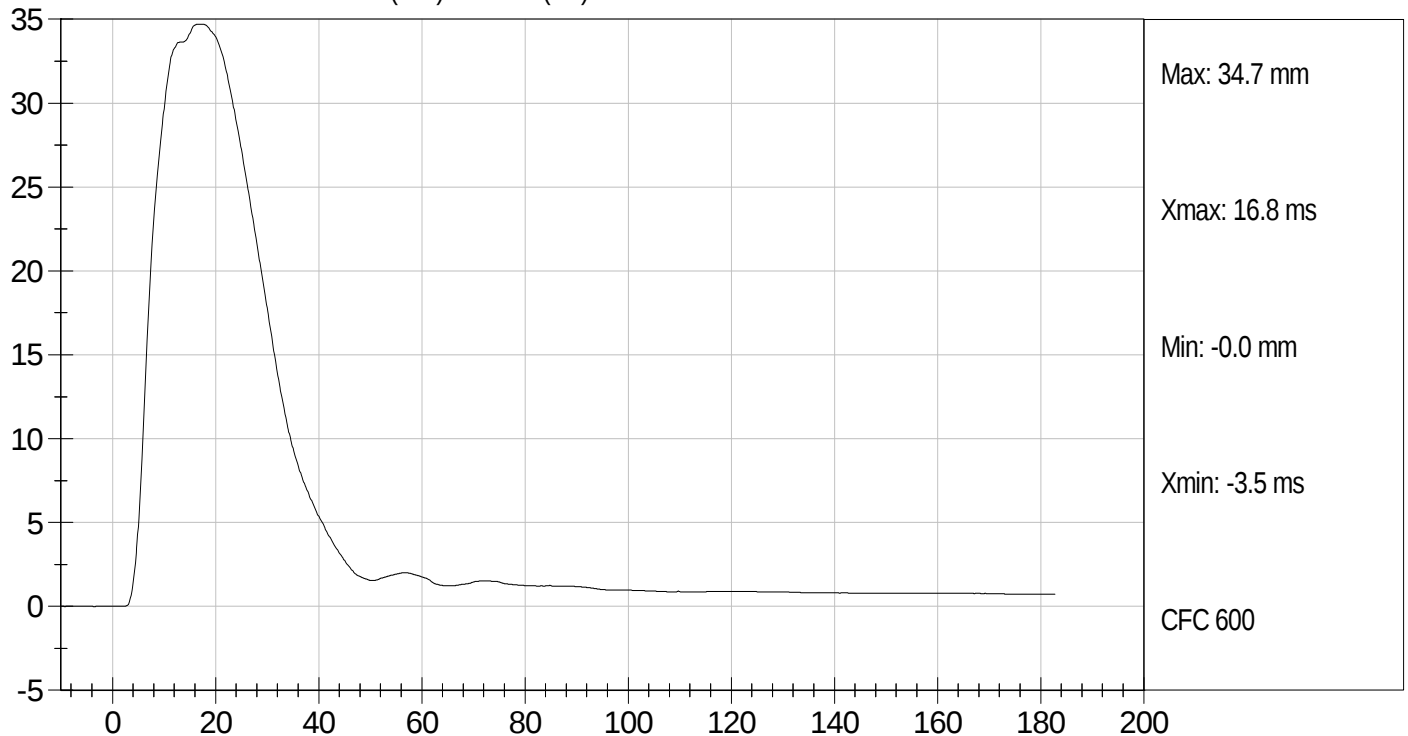
Test Desc: Thorax With Arm
Component ID: D12864

Test Date: 3/6/12
Velocity: 22.22 ft/s, 6.77 m/s

MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



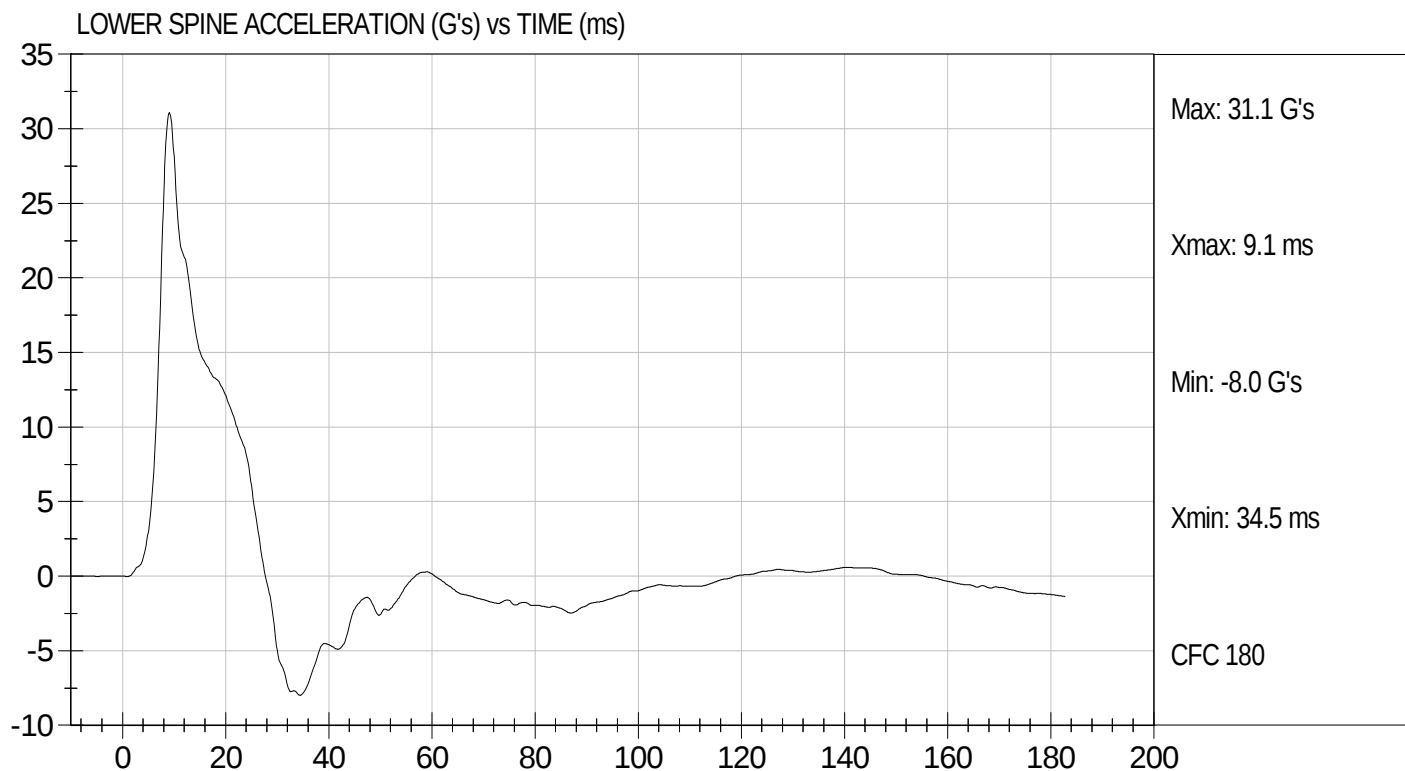
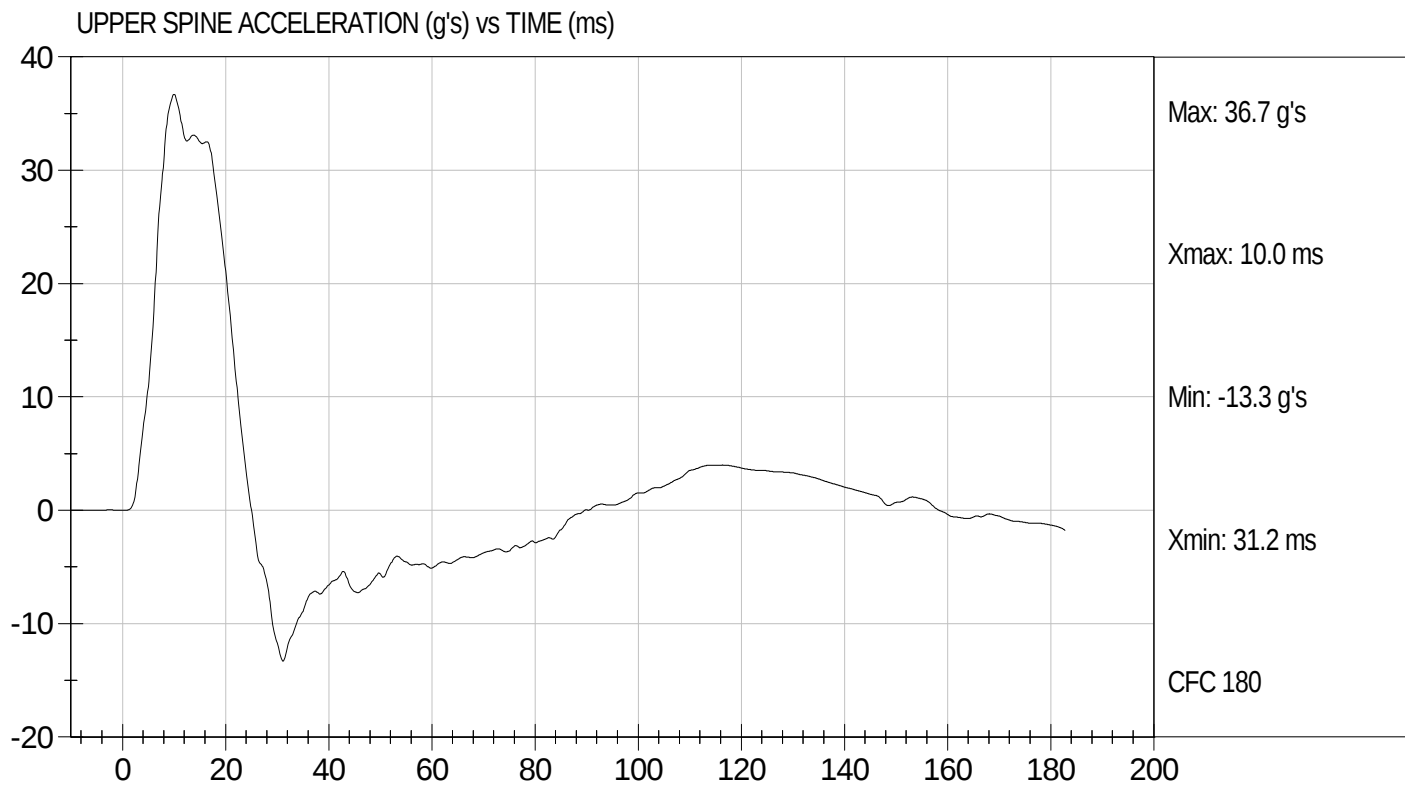
LOWER RIB DISPLACEMENT (mm) vs TIME (ms)





Test Desc: Thorax With Arm
Component ID: D12864

Test Date: 3/6/12
Velocity: 22.22 ft/s, 6.77 m/s



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

ATD Serial No: 296

Test I.D: D12865

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.9	Pass
Humidity	%	10 to 70	19	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Peak Impactor Force	G's	14 to 18	15	Pass
Upper Rib Displacement	mm	32 to 40	35	Pass
Middle Rib Displacement	mm	39 to 45	42	Pass
Lower Rib Displacement	mm	35 to 43	40	Pass
Upper Spine (T1) Y Acceleration	G's	13 to 17	13	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	9	Pass
Overall Test Results				Pass


 Laboratory Technician

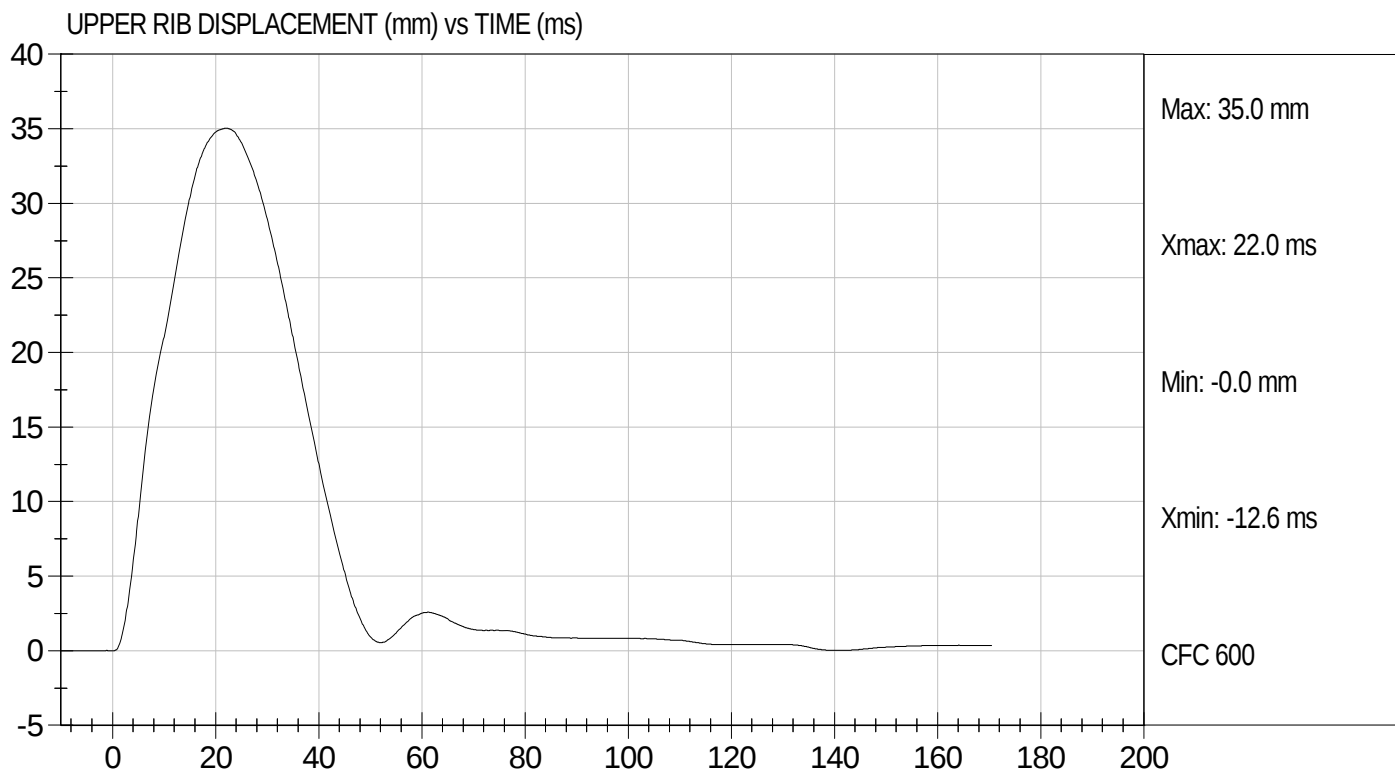
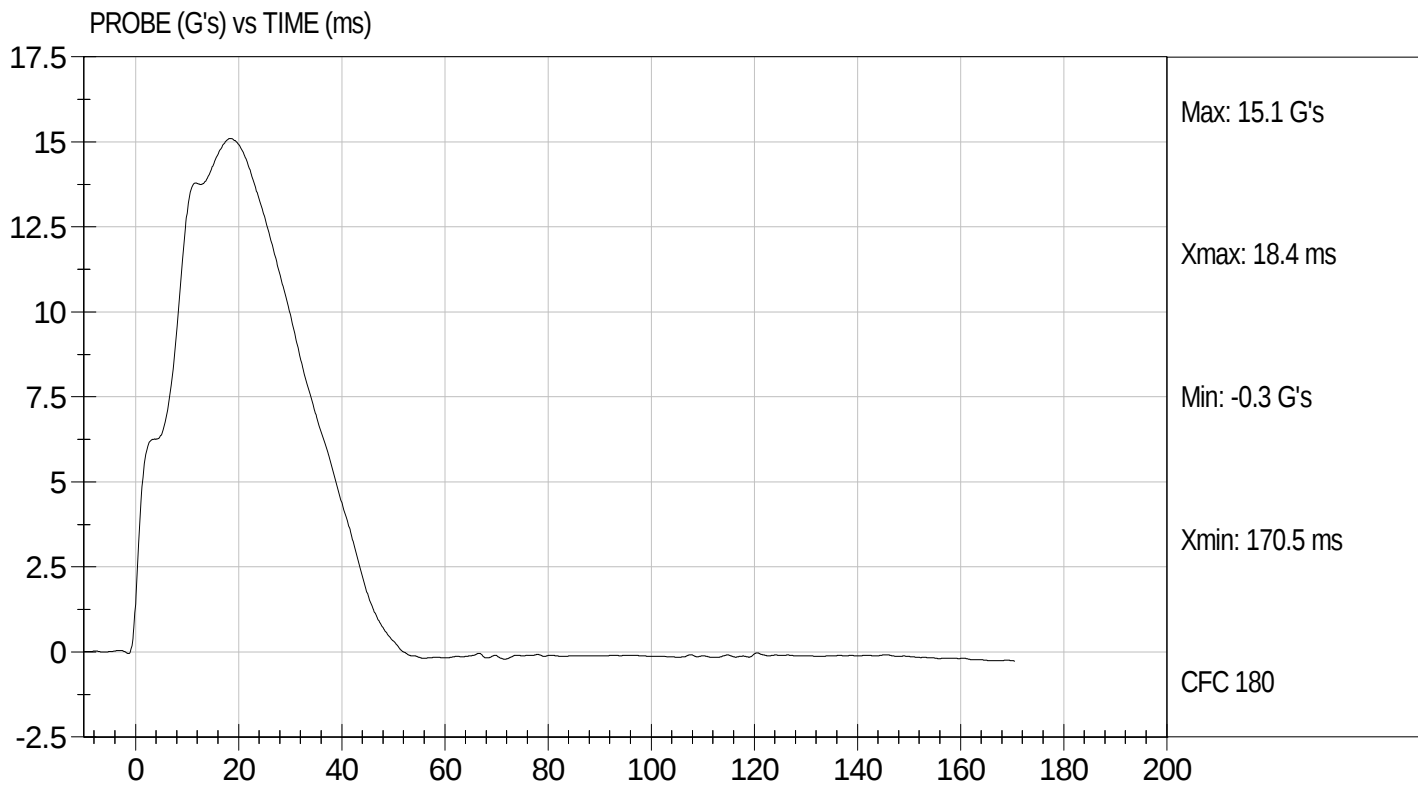
3/6/12
 Test Date


 Approved By



Test Desc: Thorax Without Arm
Component ID: D12865

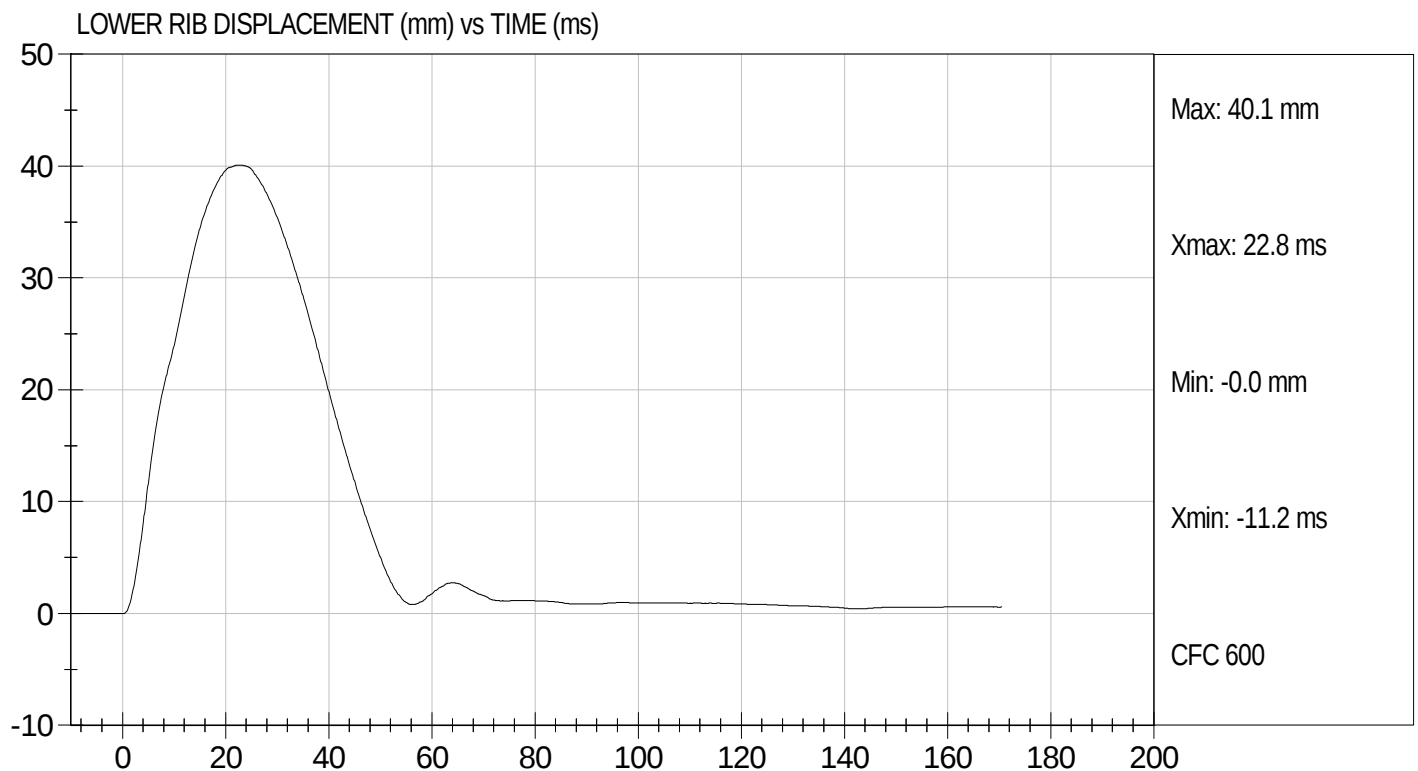
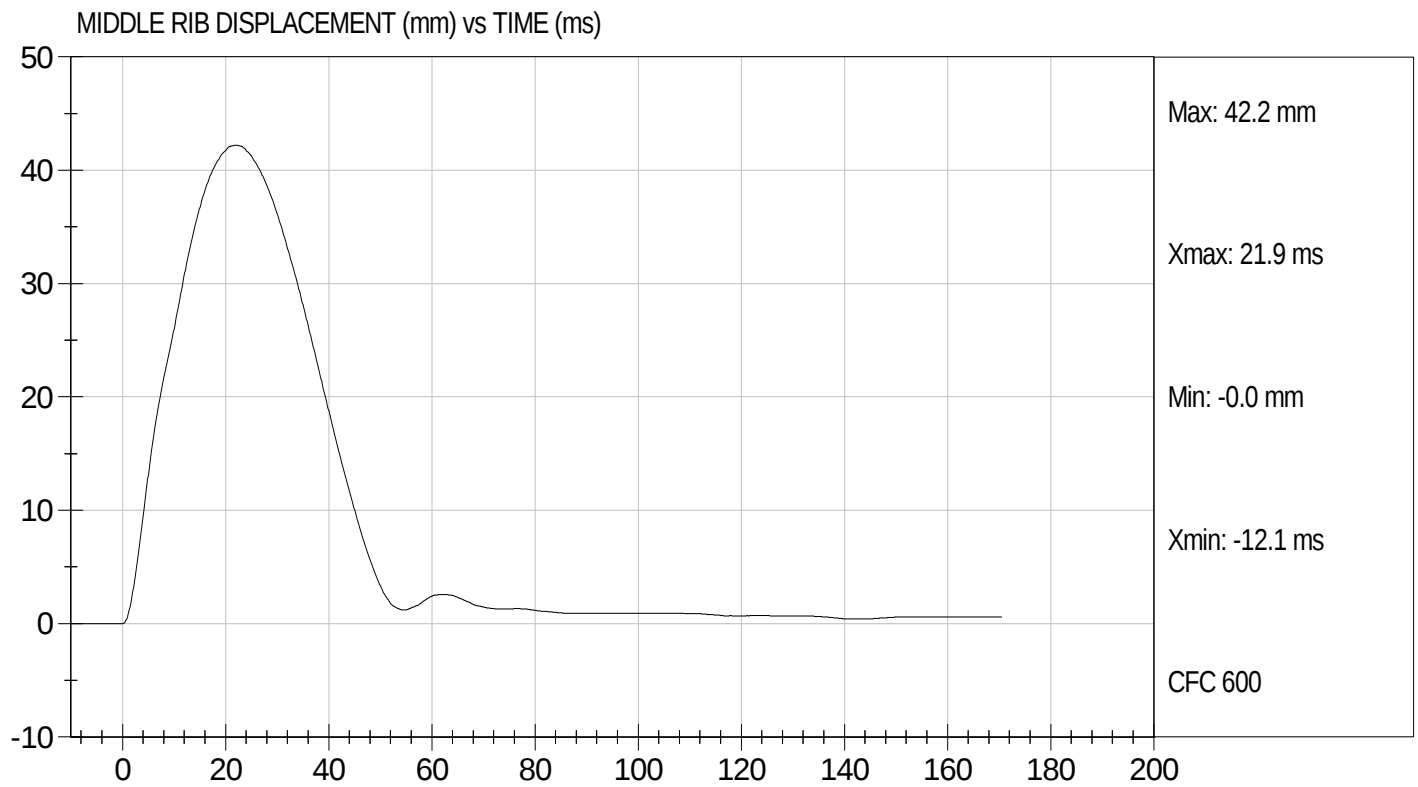
Test Date: 3/6/12
Velocity: 14.25 ft/s, 4.34 m/s





Test Desc: Thorax Without Arm
Component ID: D12865

Test Date: 3/6/12
Velocity: 14.25 ft/s, 4.34 m/s

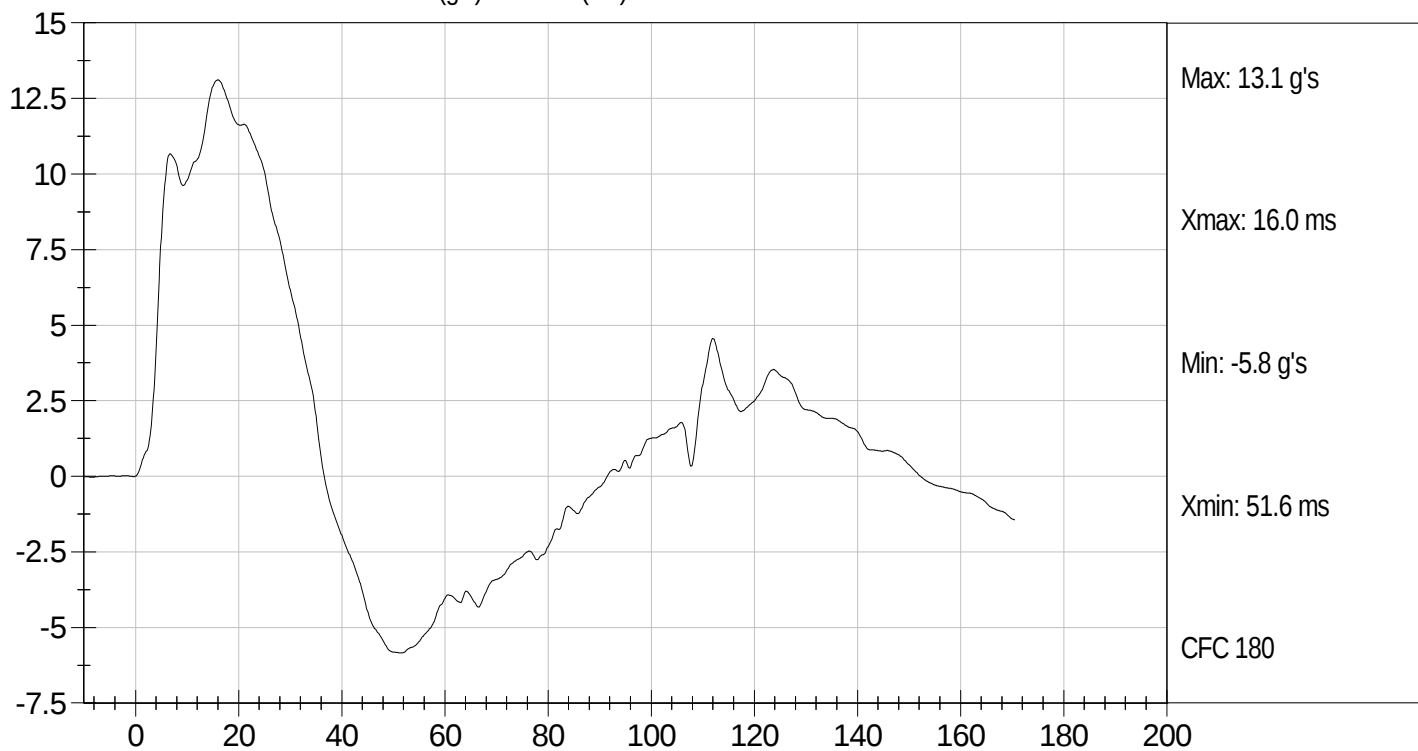




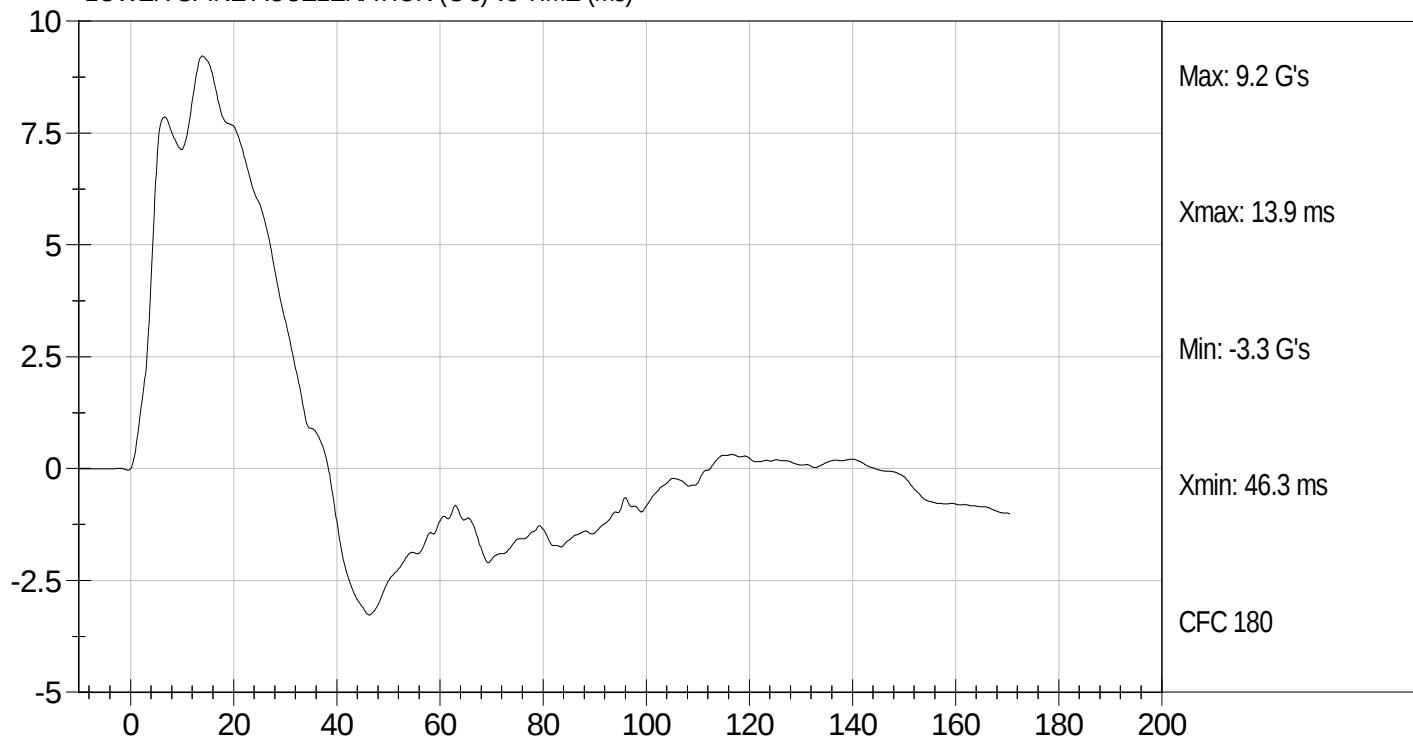
Test Desc: Thorax Without Arm
Component ID: D12865

Test Date: 3/6/12
Velocity: 14.25 ft/s, 4.34 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

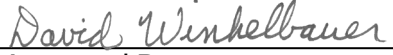
ATD Serial No: 296

Test I.D: D12866

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 Acceleration	G's	12 to 16	13	Pass
Upper Rib Displacement	mm	36 to 47	41	Pass
Lower Rib Displacement	mm	33 to 44	40	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	11	Pass
Overall Test Results				Pass


Laboratory Technician

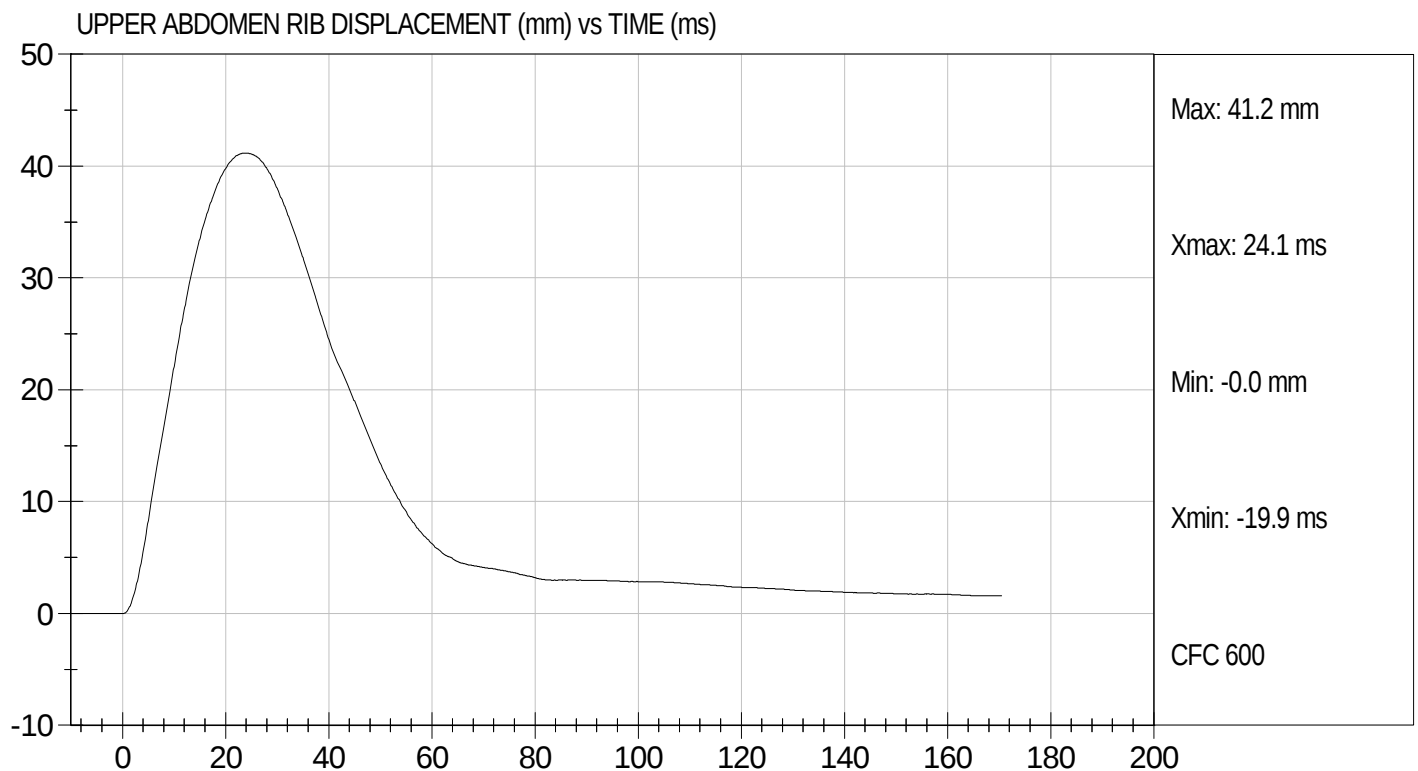
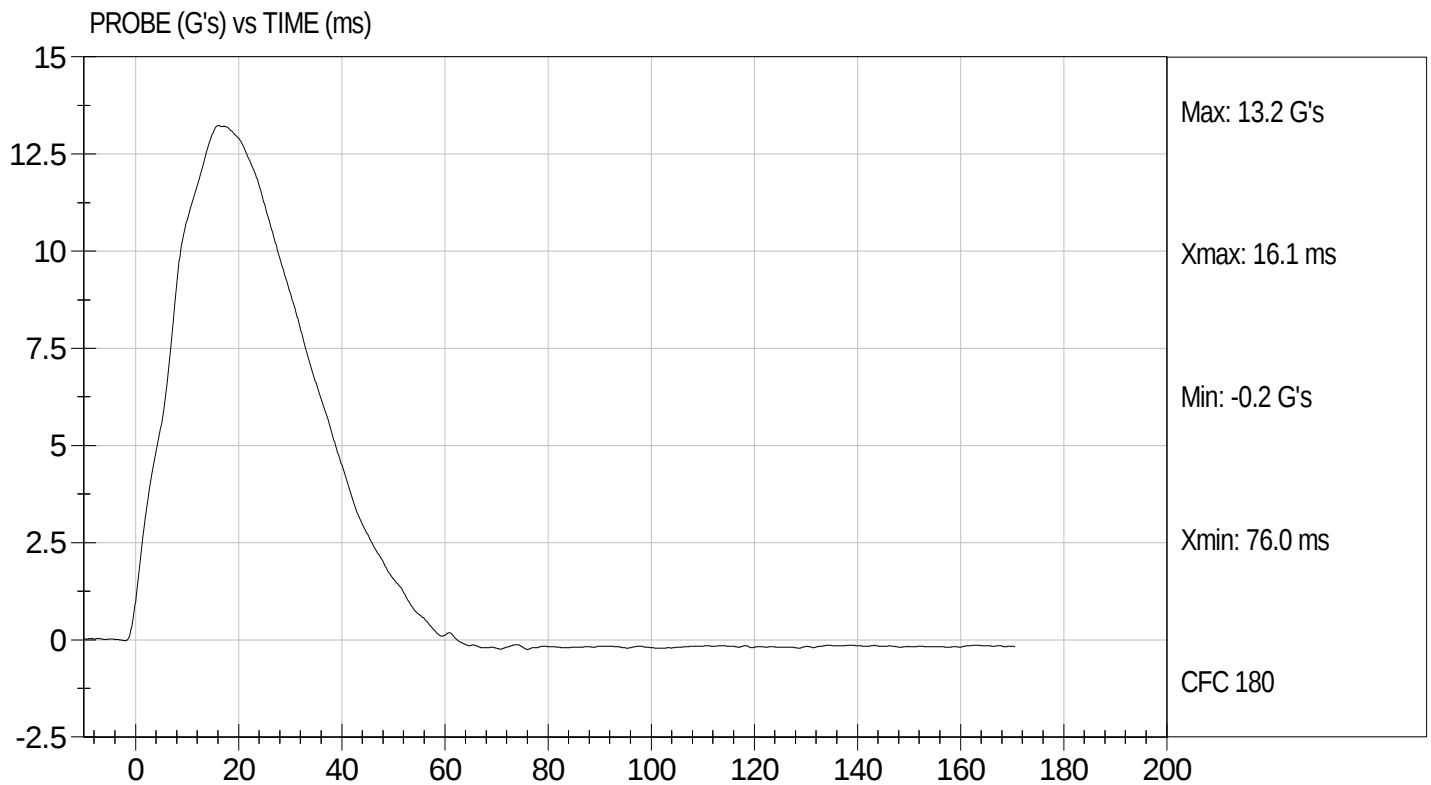
3/6/12
Test Date


Approved By



Test Desc: Abdomen Impact
Component ID: D12866

Test Date: 3/6/12
Velocity: 14.37 ft/s, 4.38 m/s

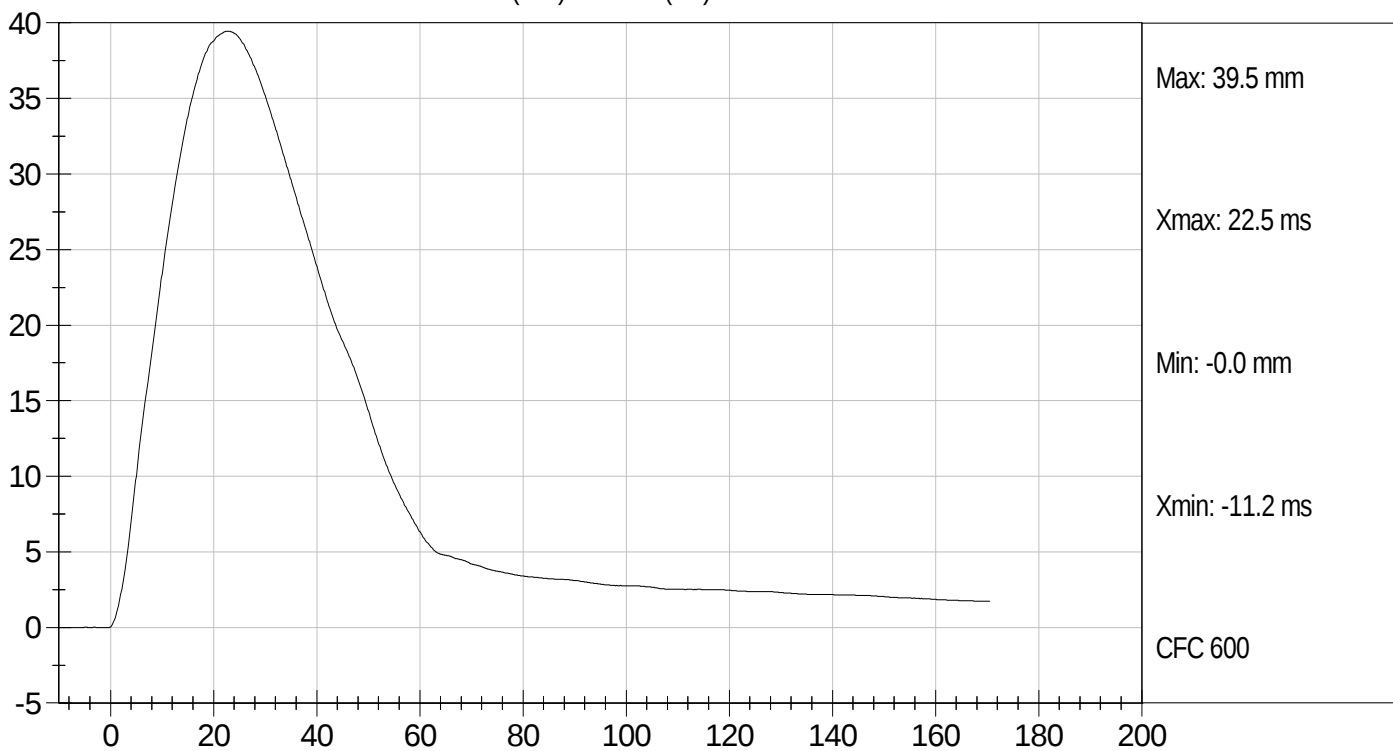




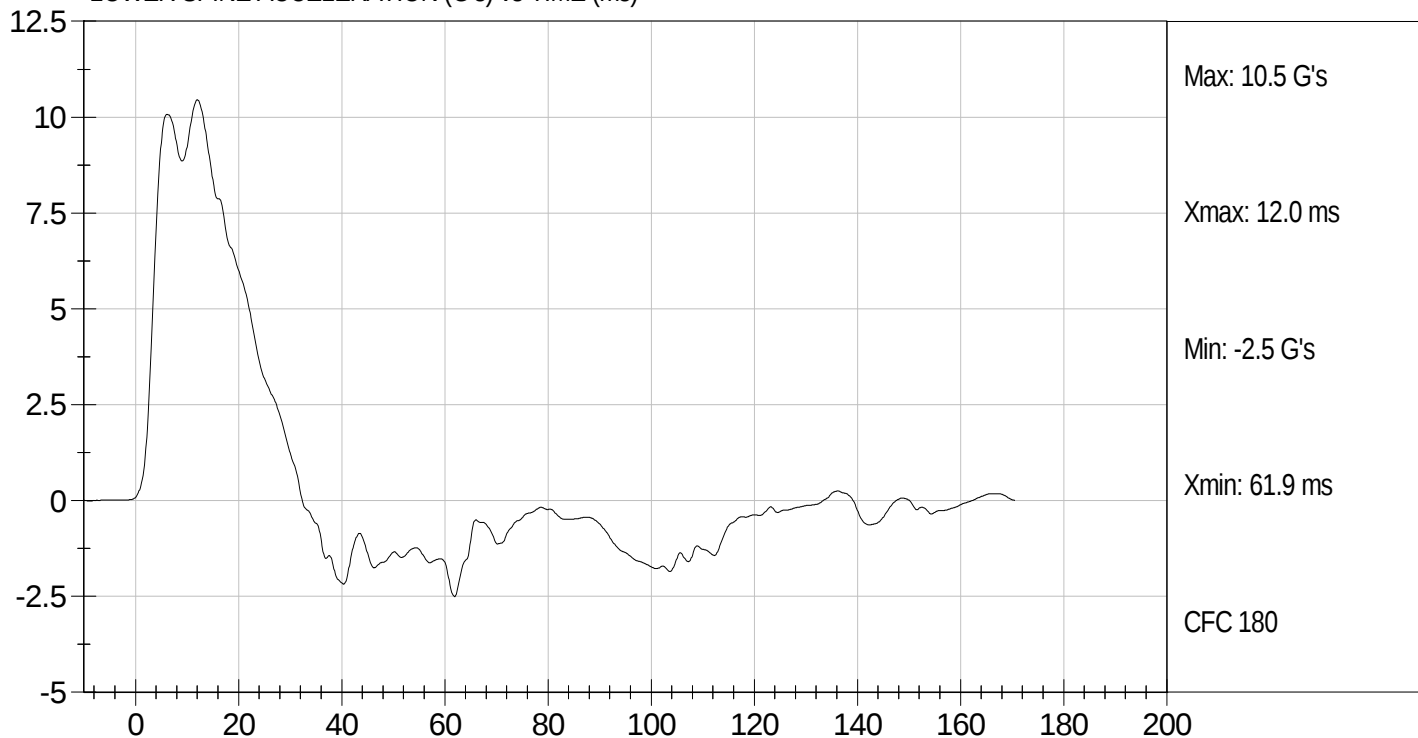
Test Desc: Abdomen Impact
Component ID: D12866

Test Date: 3/6/12
Velocity: 14.37 ft/s, 4.38 m/s

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



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

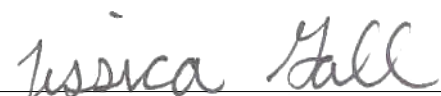


MGA RESEARCH CORPORATION
PELVIS IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D12867

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	6.60 to 6.80	6.74	Pass
Peak Impactor Acceleration	G's	38 to 47	44	Pass
Pelvis Y Acceleration after 6 ms	G's	34 to 42	41	Pass
Peak Acetabulum Force	N	3600 to 4300	4114	Pass
Overall Test Results				Pass


Laboratory Technician

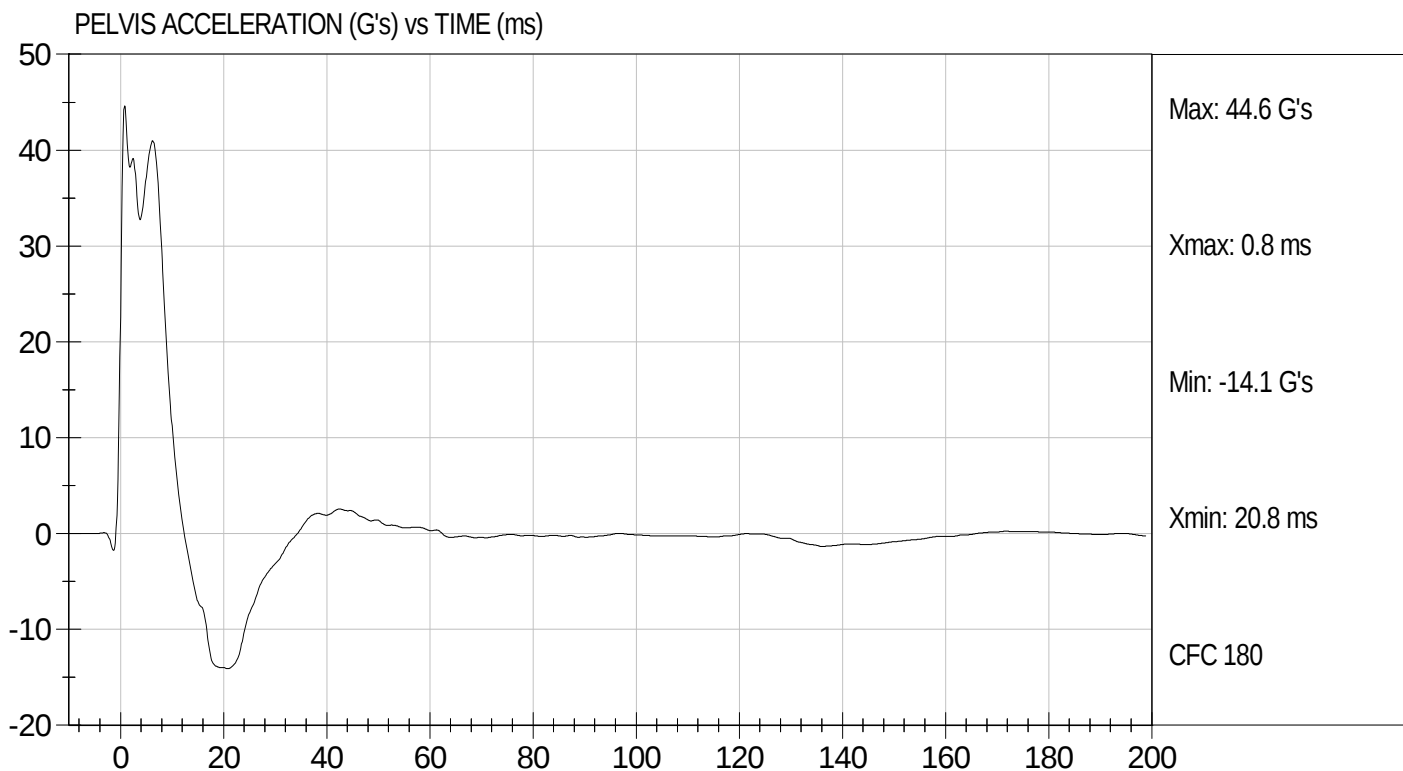
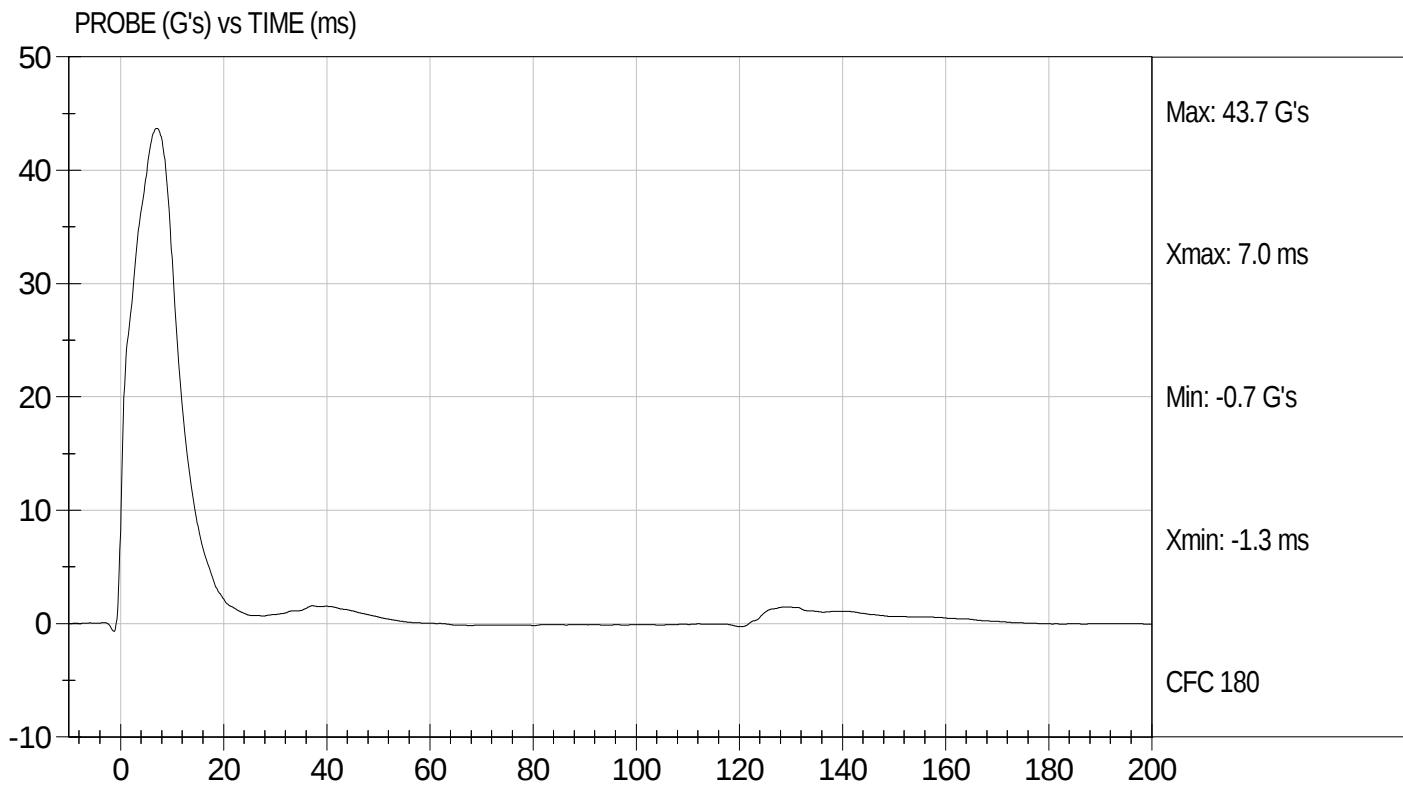
3/6/12
Test Date


Approved By



Test Desc: Pelvis Impact
Component ID: D12867

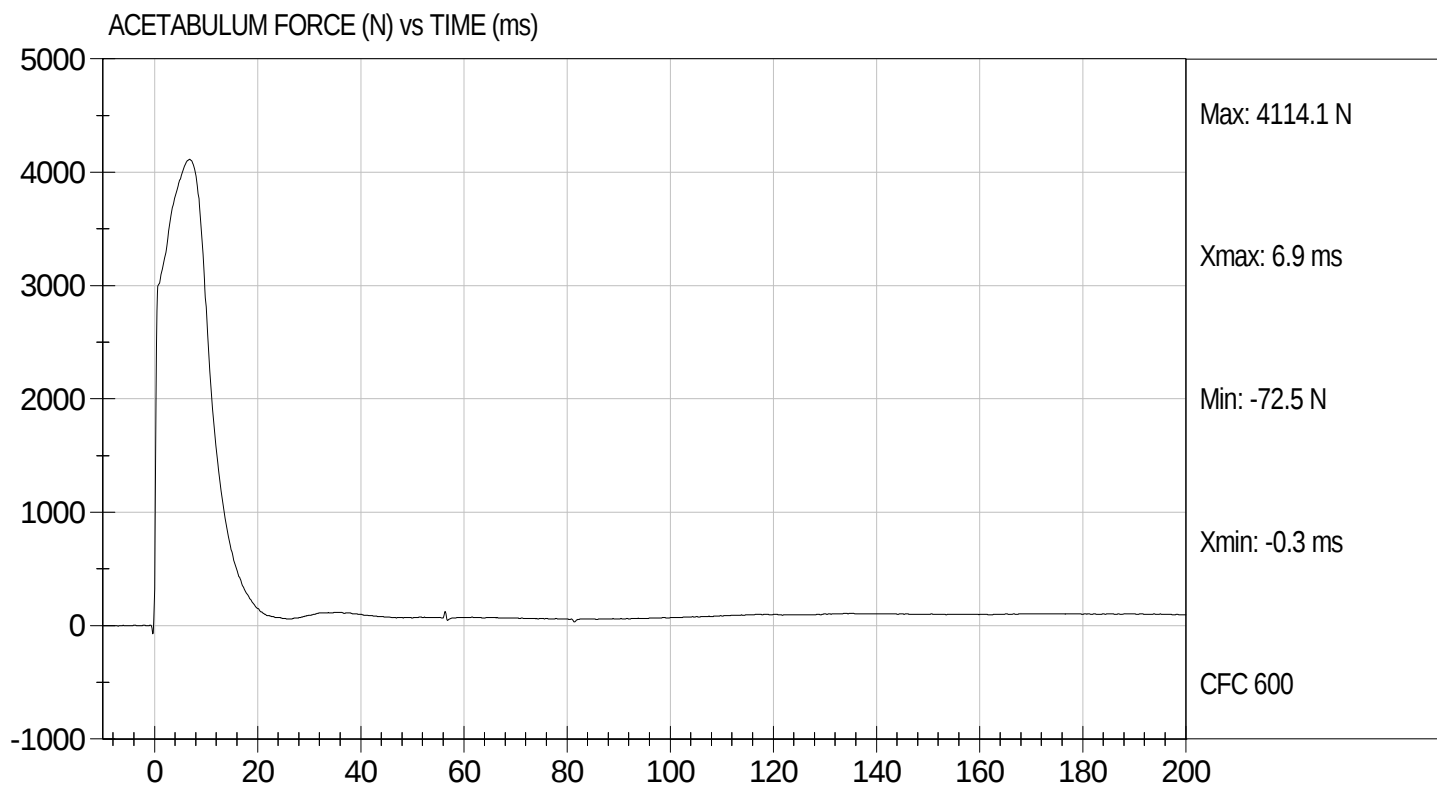
Test Date: 3/6/12
Velocity: 22.10 ft/s, 6.74 m/s





Test Desc: Pelvis Impact
Component ID: D12867

Test Date: 3/6/12
Velocity: 22.10 ft/s, 6.74 m/s



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

ATD Serial No: 296

Test I.D: D12868

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	4.34	Pass
Peak Impactor Acceleration	G's	36 to 45	37	Pass
Pelvis Y Acceleration	G's	28 to 39	29	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4505	Pass
Overall Test Results			Pass	


Laboratory Technician

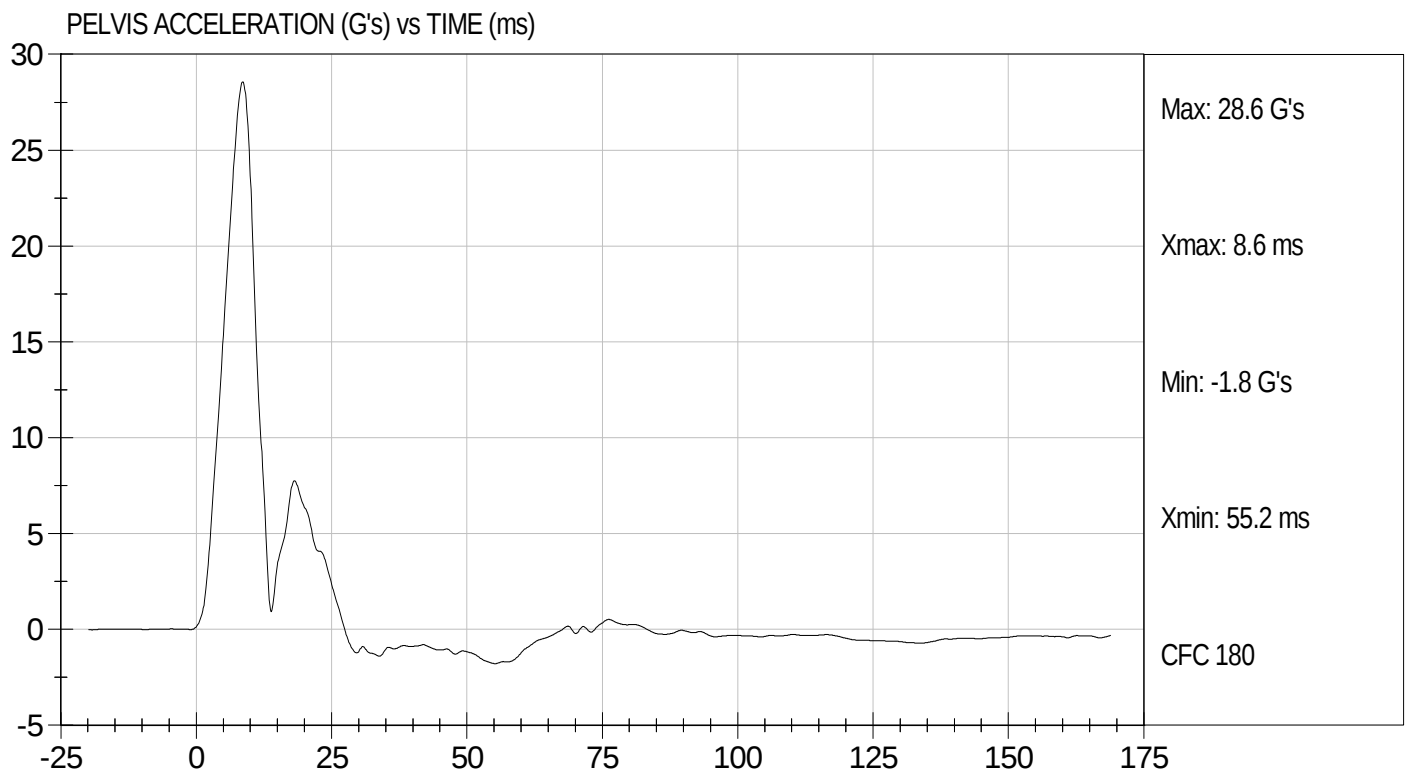
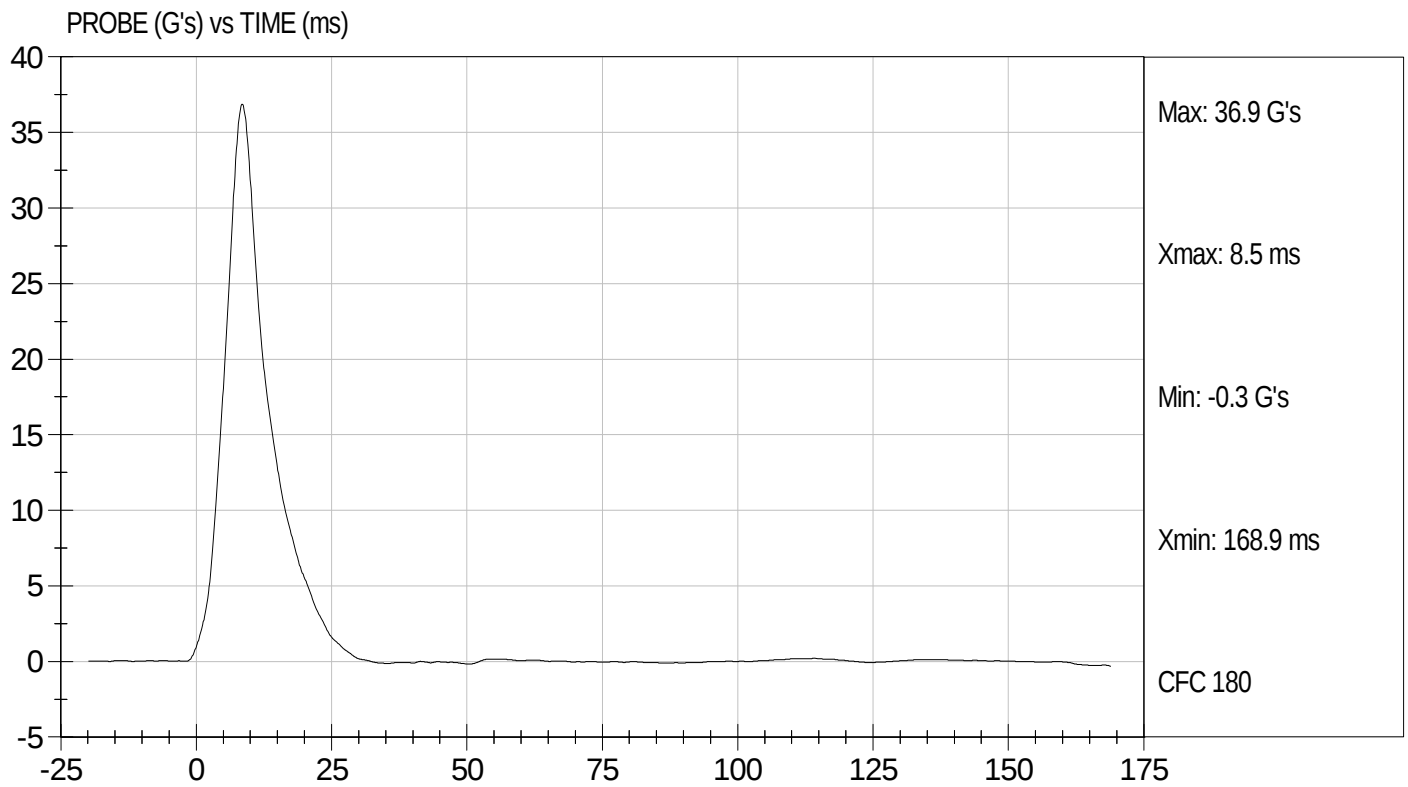
3/6/12
Test Date


Approved By



Test Desc: Iliac Impact
Component ID: D12868

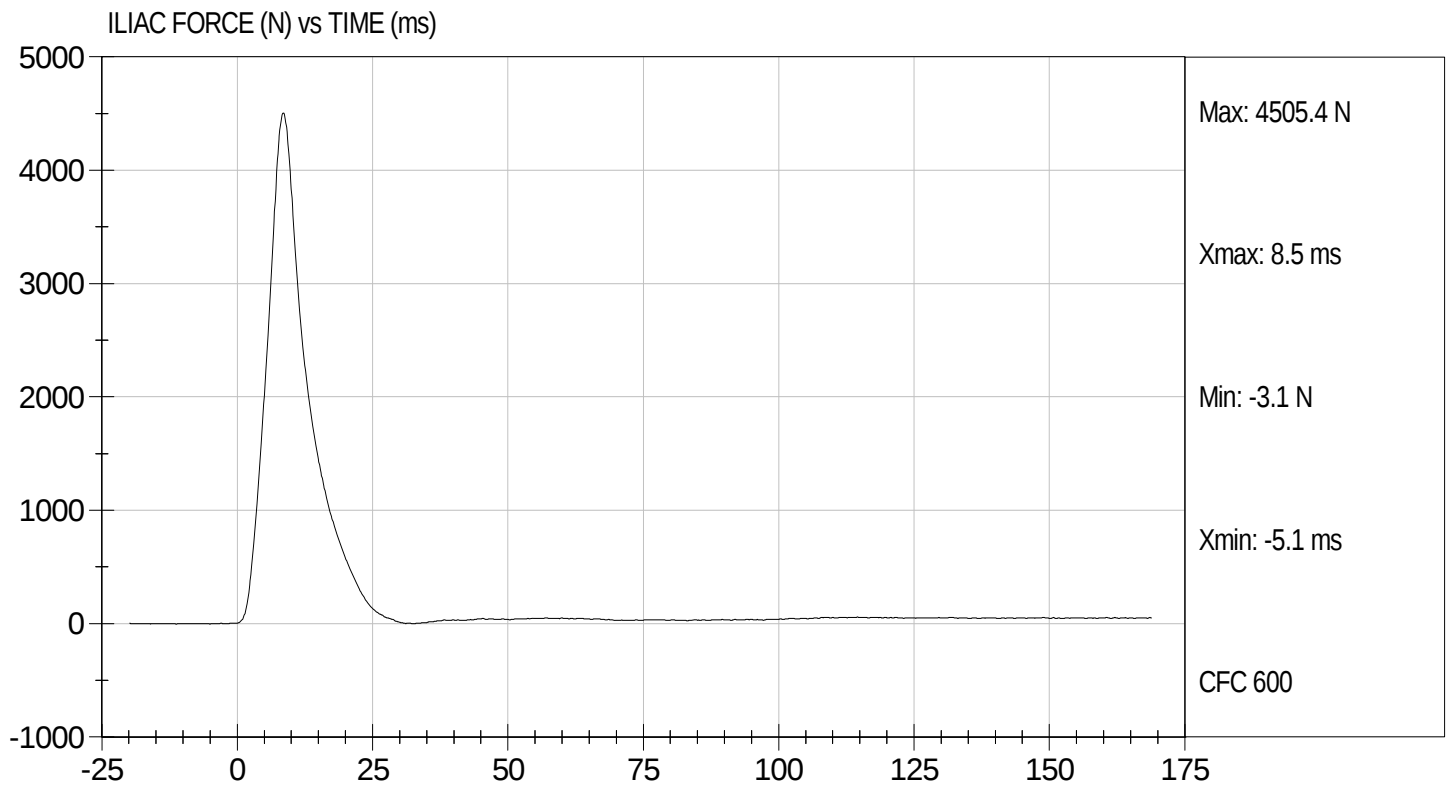
Test Date: 3/6/12
Velocity: 14.25 ft/s, 4.34 m/s





Test Desc: Iliac Impact
Component ID: D12868

Test Date: 3/6/12
Velocity: 14.25 ft/s, 4.34 m/s



APPENDIX D

TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 – Dummy Instrumentation (ES-2re)

			ES-2re S/N 032		
			Serial Number	Manufacturer	Calibration Date
Head Accelerometers		X	P73737	Endevco	10/04/11
		Y	P73738	Endevco	10/04/11
		Z	P73740	Endevco	10/04/11
Head Accelerometers		Xr	P66627	Endevco	10/10/11
		Yr	P73753	Endevco	10/04/11
		Zr	P73754	Endevco	10/04/11
Thorax Rib Displacement Potentiometers	Upper	Y	G176	Honeywell	10/12/11
	Middle	Y	G169	Honeywell	10/12/11
	Lower	Y	G164	Honeywell	10/12/11
Abdomen Load Cells	Forward	Y	ABG1513	Denton	05/20/11
	Middle	Y	ABG1531	Denton	05/20/11
	Rear	Y	ABG1536	Denton	05/20/11
Lower Spine Accelerometers (T12)		X	P73742	Endevco	10/04/11
		Y	P73743	Endevco	10/04/11
		Z	P73749	Endevco	10/04/11
Pubic Symphysis Load Cell		Y	PG462	Denton	05/20/11

Table 2 – Dummy Instrumentation (SID-IIs)

			SID-IIs S/N 296			
			Serial Number	Manufacturer	Calibration Date	
Head Accelerometers			X	P67363	Endevco	10/13/11
			Y	P67364	Endevco	10/13/11
			Z	P67365	Endevco	10/13/11
Head Accelerometers			X	P64023	Endevco	10/13/11
			Y	P66672	Endevco	10/13/11
			Z	P66762	Endevco	10/13/11
Displacement Potentiometers	Thoracic Rib	Upper	Y	G012	FTSS	02/15/12
		Middle	Y	G1163	FTSS	10/18/11
		Lower	Y	G1158	FTSS	10/18/11
	Abdominal Rib	Upper	Y	G1146	FTSS	10/18/11
		Lower	Y	G1126	FTSS	10/18/11
Lower Spine Accelerometers (T12)			X	P67286	Endevco	09/22/11
			Y	P67289	Endevco	09/22/11
			Z	P67291	Endevco	09/22/11
Acetabulum Load Cell			Y	ACG269	FTSS	12/23/11
Iliac Wing Load Cell			Y	IWG282	FTSS	12/23/11
Pelvis Plug (struck side)				42593	FTSS	06/22/11
Pelvis Plug (non-struck side)				42599	FTSS	06/22/11

Table 3 – Vehicle Instrumentation

		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	P63502	Endevco	10/25/11
Vehicle Center of Gravity	Y	P63500	Endevco	10/25/11
Vehicle Center of Gravity	Z	P63501	Endevco	10/25/11
Right Sill at Front Seat	X	P59317	Endevco	10/20/11
Right Sill at Front Seat	Y	P59316	Endevco	10/20/11
Right Sill at Front Seat	Z	P59315	Endevco	10/20/11
Right Sill at Rear Seat	X	P63506	Endevco	10/25/11
Right Sill at Rear Seat	Y	P63508	Endevco	10/25/11
Right Sill at Rear Seat	Z	P63507	Endevco	10/25/11
Left Sill at Front Door	Y	P63210	Endevco	01/12/12
Left Sill at Rear Door	Y	P63395	Endevco	12/13/11
Left A-Post Lower	Y	P59251	Endevco	12/13/11
Left A-Post Middle	Y	P59275	Endevco	11/04/11
Left B-Post Lower	Y	P47111	Endevco	09/12/11
Left B-Post Middle	Y	P59305	Endevco	10/20/11
Front Seat Track	Y	P55674	Endevco	01/12/12
Rear Seat Track or Structure	Y	P63339	Endevco	01/12/12
Right Rear Occ. Compartment	Y	P63282	Endevco	11/04/11
Engine Block	X	P59390	Endevco	12/13/11
Engine Block	Y	P59391	Endevco	12/13/11
Rear Floorpan Above Axle	X	P63292	Endevco	01/13/12
Rear Floorpan Above Axle	Y	P63291	Endevco	01/13/12
Rear Floorpan Above Axle	Z	P63293	Endevco	01/13/12

Table 4 – MDB Instrumentation

		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	P59379	Endevco	12/14/11
MDB Center of Gravity	Y	P59380	Endevco	12/14/11
MDB Center of Gravity	Z	P59381	Endevco	12/14/11
Left Frame at Rear Axle Centerline	X	P59279	Endevco	12/13/11
Left Frame at Rear Axle Centerline	Y	P59280	Endevco	12/13/11