

REPORT NUMBER: SINCAP-MGA-2015-045

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

**GM KOREA COMPANY
2015 Buick Encore SUV
NHTSA No.: O20150101**

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



Test Date: December 23, 2014

Final Report Date: March 5, 2015

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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Approval Date: March 5, 2015

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

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Technical Report Documentation Page

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15. Supplementary Notes																																																							
16. Abstract A 55/28 km/h 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the 2015 Buick Encore SUV in accordance with the specifications of the Office of Crashworthiness Standards NCAP Side Laboratory Test Procedure for the generation of consumer information on vehicle side crash protection. The test was conducted at MGA Research Corporation in Burlington, Wisconsin on December 23, 2014. The impact velocity of the Moving Deformable Barrier (MDB) was 61.8 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 21.2° C. The target vehicle post-test maximum crush was 214 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 colspan="4">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>73</td> </tr> <tr> <td>Maximum Thorax Rib Deflection</td> <td>mm</td> <td>44</td> <td>18</td> </tr> <tr> <td>Total Abdominal Force</td> <td>N</td> <td>2500</td> <td>532</td> </tr> <tr> <td>Pubic Symphysis Force</td> <td>N</td> <td>6000</td> <td>1725</td> </tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="4">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>100</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td>Gs</td> <td>82</td> <td>33</td> </tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td> <td>N</td> <td>5525</td> <td>2990</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38*</td> <td>20</td> </tr> <tr> <td>Maximum Abdomen Rib Deflection</td> <td>mm</td> <td>45*</td> <td>22</td> </tr> </tbody> </table> *Proposed IARV The doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.				Driver ATD (ES-2re)				Measurement Description	Units	Threshold	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	73	Maximum Thorax Rib Deflection	mm	44	18	Total Abdominal Force	N	2500	532	Pubic Symphysis Force	N	6000	1725	Passenger ATD (SID-IIs)				Measurement Description	Units	Threshold	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	100	Resultant Lower Spine Acceleration	Gs	82	33	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2990	Maximum Thoracic Rib Deflection	mm	38*	20	Maximum Abdomen Rib Deflection	mm	45*	22
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TABLE OF CONTENTS

<u>Section</u>		<u>Page No.</u>
1	Test Purpose and Procedure	1
2	Summary of Test Results	2
3	Occupant and Vehicle Information / Data Sheets	4
<u>Data Sheet No.</u>		<u>Page No.</u>
1	General Test and Vehicle Parameter Data	5
2	Seat, Seat Belt, Steering Wheel Adjustment and Fuel System Data	9
3	Dummy Longitudinal Clearance Dimensions	13
4	Dummy Lateral Clearance Dimensions	14
5	Camera and Instrumentation Data	15
6	Test Vehicle Accelerometer Locations	16
7	MDB Accelerometer Locations	17
8	Post-Test Observations	18
9	MDB Summary of Results	20
10	Test Vehicle Profile Measurements	21
11	Test Vehicle Exterior Crush Measurements	22
12	MDB Exterior Static Crush Measurements	25
13	Vehicle and MDB Damage Profile Distances	26
14	FMVSS No. 301 Static Rollover Results	27
15	Dummy/Vehicle Temperature Stabilization Data	28
<u>Appendix</u>		
A	Photographs	A
B	Dummy Response Data	B
C	Dummy Calibration and Performance Verification Data	C
D	Test Equipment and Instrumentation Calibration Data	D

SECTION 1

TEST PURPOSE AND PROCEDURE

This moving deformable barrier side impact test is part of the MY 2015 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 2015 Buick Encore SUV. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Laboratory Test Procedure dated September 2013.

SECTION 2 SUMMARY OF TEST RESULTS

A 2015 Buick Encore SUV 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 61.8 km/h. The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by MGA Research Corporation in Burlington, Wisconsin on December 23, 2014. Pre-test 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 September 2013. 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	73
Maximum Thorax Rib Deflection	mm	44	18
Total Abdominal Force	N	2500	532
Pubic Symphysis Force	N	6000	1725

	Passenger ATD (SID-IIs)		
Measurement Description	Units	Threshold	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	100
Resultant Lower Spine Acceleration	Gs	82	33
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2990
Maximum Thoracic Rib Deflection	mm	38*	20
Maximum Abdomen Rib Deflection	mm	45*	22

*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	Yes	No		
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso/Pelvis Airbag	Yes	Yes	Yes	Yes
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

Left Front Sill Y has questionable data from 8-25 ms.
Left Rear Sill Y has no valid data after 3 ms.
Left Lower A-Post Y has no valid data after 19 ms.
Left Lower B-Post Y has no valid data after 2 ms.
Left Mid B-Post Y has questionable data from 6-23 ms.

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: 2015 Buick Encore SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. O20150101
 Test Date: 12/23/2014

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	O20150101	Traction Control System (TCS)	Yes
Model Year	2015	Auto-Leveling System	No
Make	Buick	Automatic Door Locks (ADL)	Yes
Model	Encore	Power Window Auto-Reverse	Yes
Body Style	SUV	Other Optional Feature	N/A
VIN	KL4CJASB9FB033052	Driver Front Airbag	Yes
Body Color	Brilliant Blue Metallic	Driver Curtain Airbag	Yes
Odometer Reading (km/mi)	74 / 46	Driver Head/Torso Airbag	No
Engine Displacement (L)	1.4	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	Yes
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	Yes
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
		Other Restraint Feature	N/A

Does owner's manual provide instruction to turn off automatic door locks?	No
---	----

DATA FROM CERTIFICATION LABEL

Manufactured By	GM Korea Company	GVWR (kg)	1944
Date of Manufacture	09/14	GAWR Front (kg)	1065
Vehicle Type	MPV	GAWR Rear (kg)	995

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3		5	(A)
Capacity Weight (VCW) (kg)				428	(B)
DSC x 68.04 kg				340	(A-B)
Rated Cargo and Luggage Weight (RCLW)				88	

VEHICLE SEAT TYPE

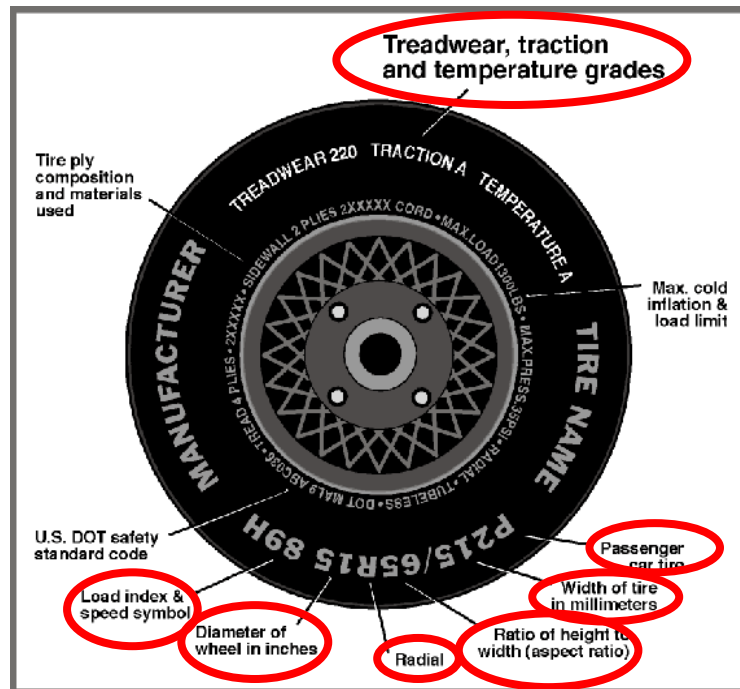
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						Manual	Power
Front Seat	X					w/lever	Driver only
Rear or Second Row			X		X		
Third Row Seat							

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

Test Vehicle: 2015 Buick Encore SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. O20150101
 Test Date: 12/23/2014

VEHICLE TIRE INFORMATION



Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	240	240
Recommended Tire Size	P215/55R18	P215/55R18
Tire Size on Vehicle	P215/55R18	P215/55R18
Tire Manufacturer	Continental	Continental
Tire Model	Contipro Contact	Contipro Contact
Treadwear	500	500
Traction	AA	AA
Temperature Grade	A	A
Tire Plies Sidewall	1 Polyester	1 Polyester
Tire Plies Body	1 Polyester, 2 Steel, 1 Polyamide	1 Polyester, 2 Steel, 1 Polyamide
Load Index/Speed Symbol	94H	94H
Tire Material	Rubber	Rubber
DOT Safety Code Left	P50A BN7 1314	P50A BN7 2014
DOT Safety Code Right	P50A BN7 1214	P50A BN7 1214

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

Test Vehicle: 2015 Buick Encore SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. O20150101
 Test Date: 12/23/2014

TEST PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	290	296	290	296
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 Pressure	200 ± 21	kPa	200	200	200	200

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	452.0	294.0		495.5	375.5		493.0	390.5	
Right	kg	434.5	277.5		449.0	348.0		440.5	351.0	
Ratio	%	60.8	39.2		56.6	43.4		55.7	44.3	
Totals	kg	886.5	571.5	1458.0	944.5	723.5	1668.0	933.5	741.5	1675.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1458.0	(A)
Sum of Actual Weight of 2 P572 ATDs Used	kg	129.3	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	88	(C)
Calculated Test Vehicle Target Weight (TVTW)	kg	1675.3	(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**

TEST VEHICLE ATTITUDES AND CG

	Units	Fully Loaded	As Tested	Meets Requirement***
Left Front	mm	742	740	Yes
Right Front	mm	751	749	Yes
Right Rear	mm	750	754	Yes
Left Rear	mm	737	747	Yes
Vehicle CG (Aft of Front Axle)	mm	1131	1108	
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	42	34	

*** 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.

Test height adjustable suspension setting, if applicable:	Not Applicable
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DATA SHEET NO. 1 (CONTINUED)
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2015 Buick Encore SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No. O20150101
Test Date: 12/23/2014

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Weight of Ballast, if any	51.7
None	0.0

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

Test Vehicle: 2015 Buick Encore SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. O20150101
 Test Date: 12/23/2014

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	26.2	16.2	21.2
Front Passenger Seat	Fixed	Fixed	Fixed
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	21.2	0	Max	66	66	66
			Mid	33	33	33
			Min	0	0	0
Front Passenger Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Front Center Seat			Max			
			Mid			
			Min			
Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed

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

Test Vehicle: 2015 Buick Encore SUV
 Test Program: NCAP Side MDB Impact Test

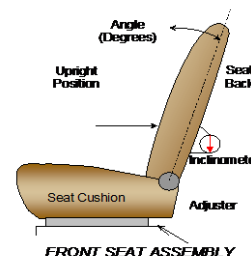
NHTSA No. O20150101
 Test Date: 12/23/2014

SEAT FORE/AFT POSITIONS

Seat	Total Fore/Aft Travel		Test Position from Forward-most Position	
	mm	Detents	mm	Detent
Driver Seat	246		123	
Front Passenger Seat	244	53 (1 st as 1)	122	26 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 adjusted following Appendix C, "Positioning Dummies in the Test Vehicle" in the NCAP Laboratory Test Procedure dated September 2013. The rear center and non-struck side rear outboard seat backs are positioned to match the struck side rear seat back.



Seat	Total Seat Back Angle Range		Test Position from Vertical	
	Degrees	Detents	Degrees	Detent
Driver Seat w/Seated Dummy	90.8	45 (1 st as 1)	5.6	20 th (1 st as 0)
Front Passenger Seat	42.2	22 (1 st as 1)	5.9	8 th (1 st as 0)
Front Center Seat				
Struck Side Rear Seat	Fixed	Fixed	18.7	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	18.7	Fixed
Rear Center Seat	Fixed	Fixed	18.7	Fixed

Seat back angles measured on headrest post.

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

Test Vehicle: 2015 Buick Encore SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. 020150101
 Test Date: 12/23/2014

SEAT BELT ANCHORAGE ADJUSTMENT

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

	Total # of Positions	Placed in Position #
Driver Seat	5 detents (1 st as 1)	0 th (uppermost as 0)
Rear Seat	Fixed	Not Applicable

HEAD RESTRAINT ADJUSTMENT

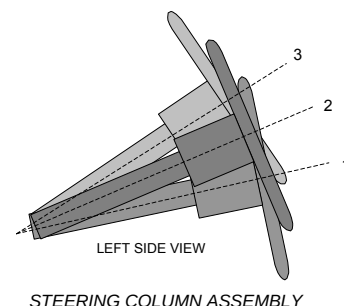
The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

	Total # of Positions	Placed in Position #
Driver Seat	5	Highest
Rear Seat	Fixed	Not Applicable

STEERING COLUMN ADJUSTMENT

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

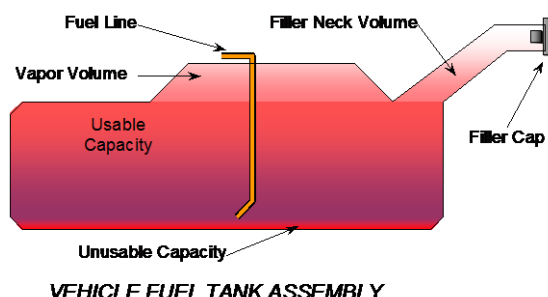
	Degrees	Fore/Aft Position (mm)
Lowermost, Position 1	68.6	236
Geometric Center, Position 2	66.9	218
Uppermost, Position 3	65.2	200
Telescoping Steering Wheel Travel		36
Test Position	66.9	218



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. The fuel pump will activate when the ignition key is turned to the 'On/Run' position. When the working pressure of fuel system is achieved; the pump will turn off. The fuel pipe is on the right side.



VEHICLE FUEL TANK ASSEMBLY

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

Test Vehicle: 2015 Buick Encore SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No. O20150101
Test Date: 12/23/2014

FUEL TANK CAPACITY DATA

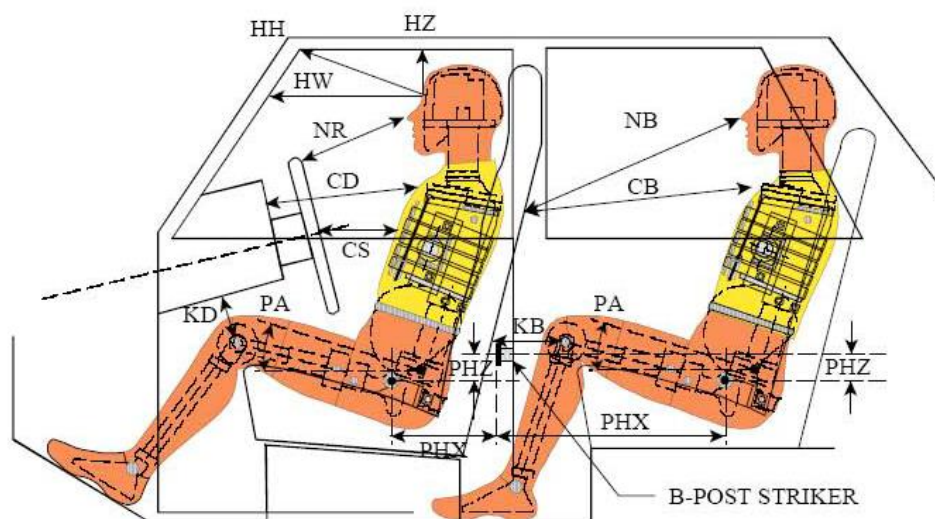
	Liters
Usable Capacity of "Standard" Tank (see Form No. 1)	53.0
Usable Capacity of "Optional" Tank (see Form No. 1)	
Usable Capacity of Standard Tank as Specified in Owner's Manual	53.0
Usable Capacity of Optional Tank as Specified in Owner's Manual	
93% of Usable Capacity	49.3
Actual Amount of Solvent Used	49.2
1/3 of Usable Capacity	17.7

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: 2015 Buick Encore SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No. O20150101
Test Date: 12/23/2014



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

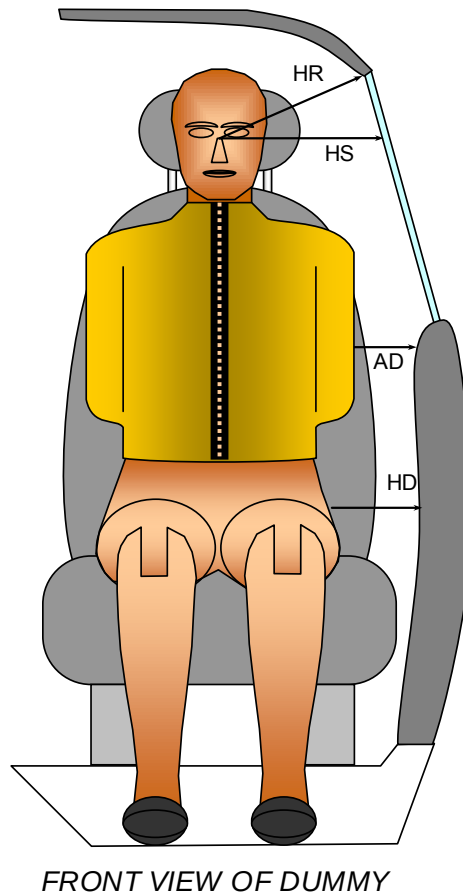
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length (mm)	Angle(°)	Length (mm)	Angle(°)
HH		Head to Header	488	19.6		
HW		Head to Windshield	801			
HZ	HZ	Head to Roof Liner	223		283	
NR	NB	Nose to Rim/Seat Back	489	9.5	455	16.0
CD	CB	Chest to Dashboard/Seat Back	629	8.4	432	5.3
CS		Chest to Steering Wheel	411	5.2		
KDL	KBL	Left Knee to Dash/Seat Back	225	18.8	175	16.1
KDR	KBR	Right Knee to Dash/Seat Back	209	19.2	180	17.2
PAX	PAX	Pelvic Tilt Angle X		23.3		23.7
	PAY	Pelvic Tilt Angle Y		1.1		-0.8
PHX	PHX	Hip Point to Striker (X-Axis)	116		270	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	150		220	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2015 Buick Encore SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. Q20150101
 Test Date: 12/23/2014



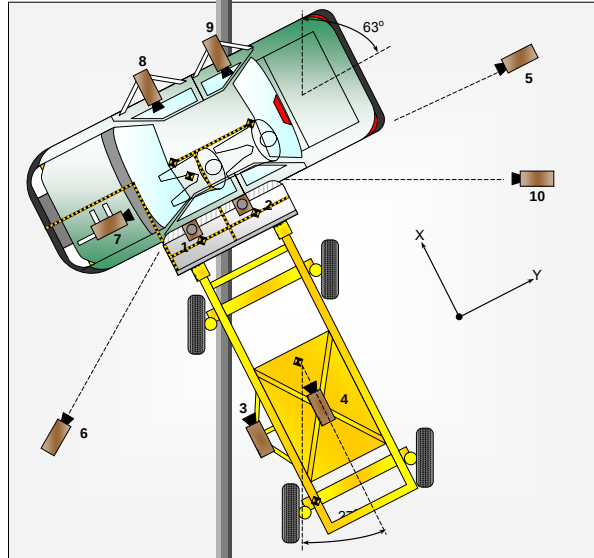
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver	Passenger
HR	Head to Side Header	mm	213	255
HS	Head to Side Window	mm	336	374
AD	Arm to Door	mm	120	165
HD	Hip Point to Door	mm	175	176

DATA SHEET NO. 5 CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2015 Buick Encore SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No. Q20150101
Test Date: 12/23/2014



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X*	Y*	Z*		
1	Overhead Overall	-120	190	-5050	14	1000
2	Overhead Close-Up	40	20	-5050	20	1000
3	Left Impact Point (MDB)				50	1000
4	Side Overall (MDB)				16	1000
5	Rear	30	5090	-1100	24	1000
6	Left Front	4210	-4390	-1100	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: None

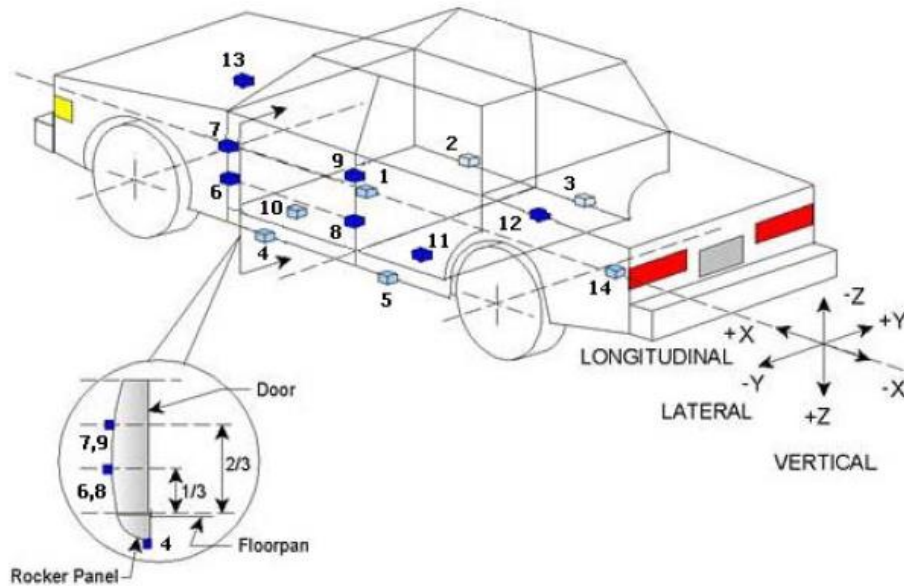
INSTRUMENTATION

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

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

Test Vehicle: 2015 Buick Encore SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. O20150101
 Test Date: 12/23/2014



TEST VEHICLE ACCELEROMETER LOCATIONS

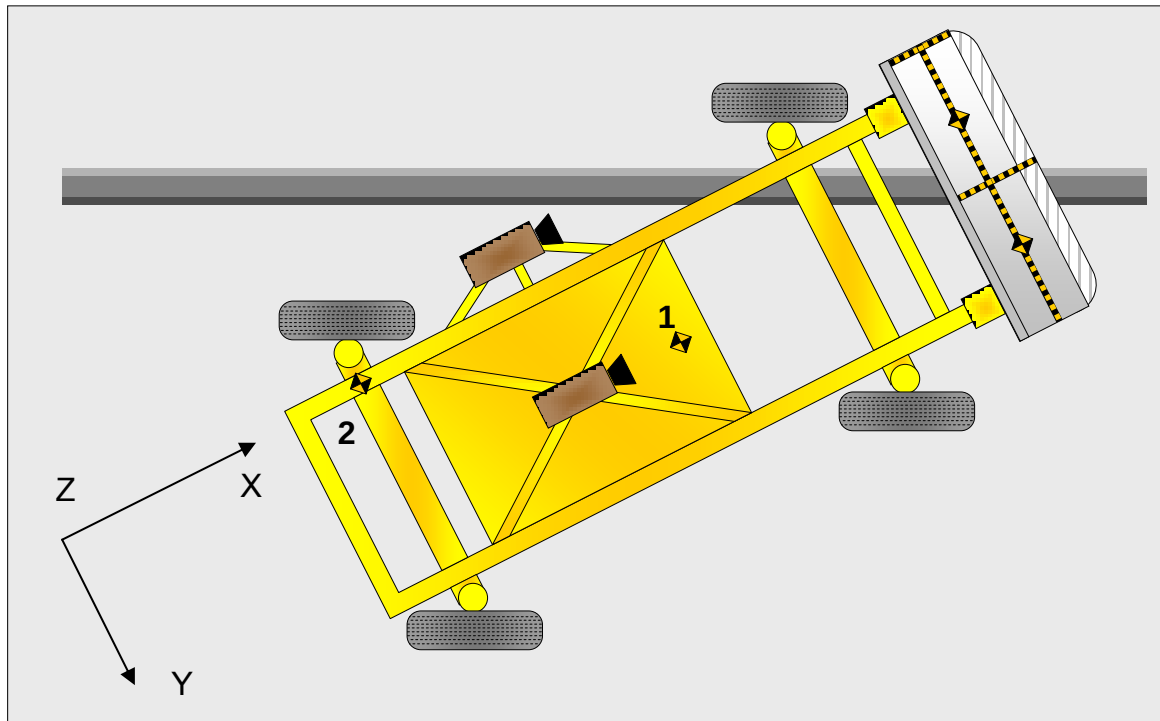
Accelerometer Location				
No.	ID	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2274	230	-240
2	Right Sill at Front Seat	2011	695	-285
3	Right Sill at Rear Seat	1240	698	-295
4	Left Sill at Front Door	2330	-694	-310
5	Left Sill at Rear Door	1301	-698	-290
6	Left Lower A-Post	2808	-798	-652
7	Left Middle A-Post	2818	-782	-850
8	Left Lower B-Post	1788	-677	-689
9	Left Middle B-Post	1776	-675	-906
10	Front Seat Track	1988	-340	-285
11	Rear Seat Structure	1566	-340	-465
12	Rt. Rear Occ. Compartment	1612	350	-239
13	Engine Block	3479	7	-832
14	Rear Above Axle	895	0	-555

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: 2015 Buick Encore SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. O20150101
 Test Date: 12/23/2014



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: 2015 Buick Encore SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No. 020150101
Test Date: 12/23/2014

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	Curtain Airbag, Headliner	Curtain Airbag
Left Side of Head	Curtain Airbag	Curtain Airbag
Back of Head	Headrest	Curtain Airbag, Headrest
Left Shoulder	Side Airbag, Door Panel	Side Airbag
Upper Torso	Side Airbag, Seatback	Side Airbag
Lower Torso	Side Airbag, Seatback	Side Airbag
Left Hip	Side Airbag, Seatpan	Side Airbag, Seatpan
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	Fixed	No	Fixed
Seat Disengagement from Floor Pan	No	Fixed	No	Fixed
Seat Back Movement from Initial Position	No	Fixed	No	Fixed
Seat Back Collapse	No	Fixed	No	Fixed

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: 2015 Buick Encore SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No. 020150101
Test Date: 12/23/2014

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side Driver		Struck Side Rear Passenger	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	Yes	No		
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso/Pelvis Airbag	Yes	Yes	Yes	Yes
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		2554
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		337
Actual Impact Point (Aft of Front Axle)	mm		331
Horizontal Offset (+forward / -rearward)	mm	+/- 50 of intended impact point	+6
Vertical Offset (+down / -up)	mm	+/- 20 of intended impact point	+3

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2015 Buick Encore SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No. O20150101
Test Date: 12/23/2014

MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1251
Overall Length Including Honeycomb Face	4115
Wheelbase of Framework Carriage	2595
CG Location aft of Front Axle	1134

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	390.0	300.1	
Right	kg	376.8	294.7	
Ratio	%	56.3	43.7	
Totals	kg	766.8	594.8	1361.6

SPEED AND ANGLE AT IMPACT DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	61.8
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.7
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90.0
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	62.9
MDB Crabbed Angle to MDB Forward Line of Motion	degrees	26 to 28	27.1

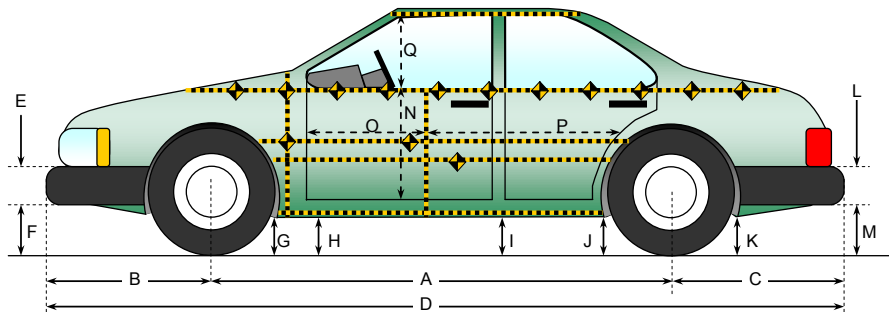
MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Vertical Location			From Centerline		Maximum Crush
Row	Description	Height	Distance	Direction	
A	Center of Bumper	432	800	Left	256
B	Top of Bumper	533	800	Left	171
C	Mid-Level	686	800	Left	111
D	Top of Stack	813	800	Left	198

DATA SHEET NO. 10
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2015 Buick Encore SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No. O20150101
Test Date: 12/23/2014



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

LEFT SIDE VIEW

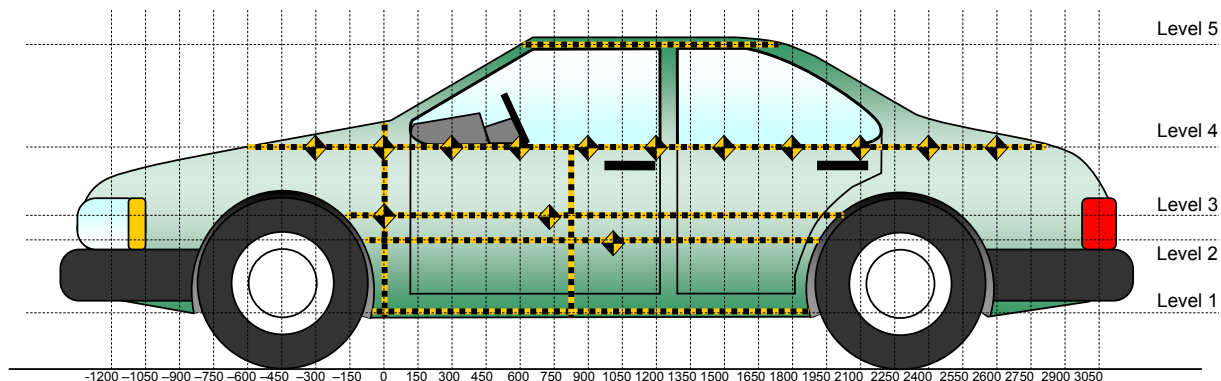
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2554	2565	-11
B	Front Axle to FSOV	943	932	11
C	Rear Axle to RSOV	776	774	2
D	Total Length at Centerline	4273	4271	2
E	Front Bumper Thickness	125	125	0
F	Front Bumper Bottom to Ground	201	197	4
G	Sill Height at Front Wheel Well	257	260	-3
H	Sill Height at Front Door Leading Edge	257	259	-2
I	Sill Height at B Pillar	256	259	-3
J1	Sill Height at Rear Wheel Well	258	250	8
J2	Pinch Weld Height at Rear Wheel Well	259	253	6
K	Sill Height Aft of Rear Wheel Well	281	266	15
L	Rear Bumper Thickness	110	110	0
M	Rear Bumper Bottom to Ground	367	366	1
N	Sill Height to Window Bottom Sill	820	772	48
O	Front Door Leading Edge to Impact CL	737	733	4
P	Rear Door Trailing Edge to Impact CL	1112	1035	77
Q	Front Window Opening	442	437	5
R	Right Side Length	3436	3436	0
S	Left Side Length	3436	3425	11
T	Vehicle Width at B Post	1748	1577	171

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

Test Vehicle: 2015 Buick Encore SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. O20150101
 Test Date: 12/23/2014



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	358	92	1050
2	Mid Door	644	214	1650
3	Occupant Hip Point	713	211	1650
4	Window Sill	1034	62	1200
5	Window Top	1539	4	600

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: 2015 Buick Encore SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. O20150101
 Test Date: 12/23/2014

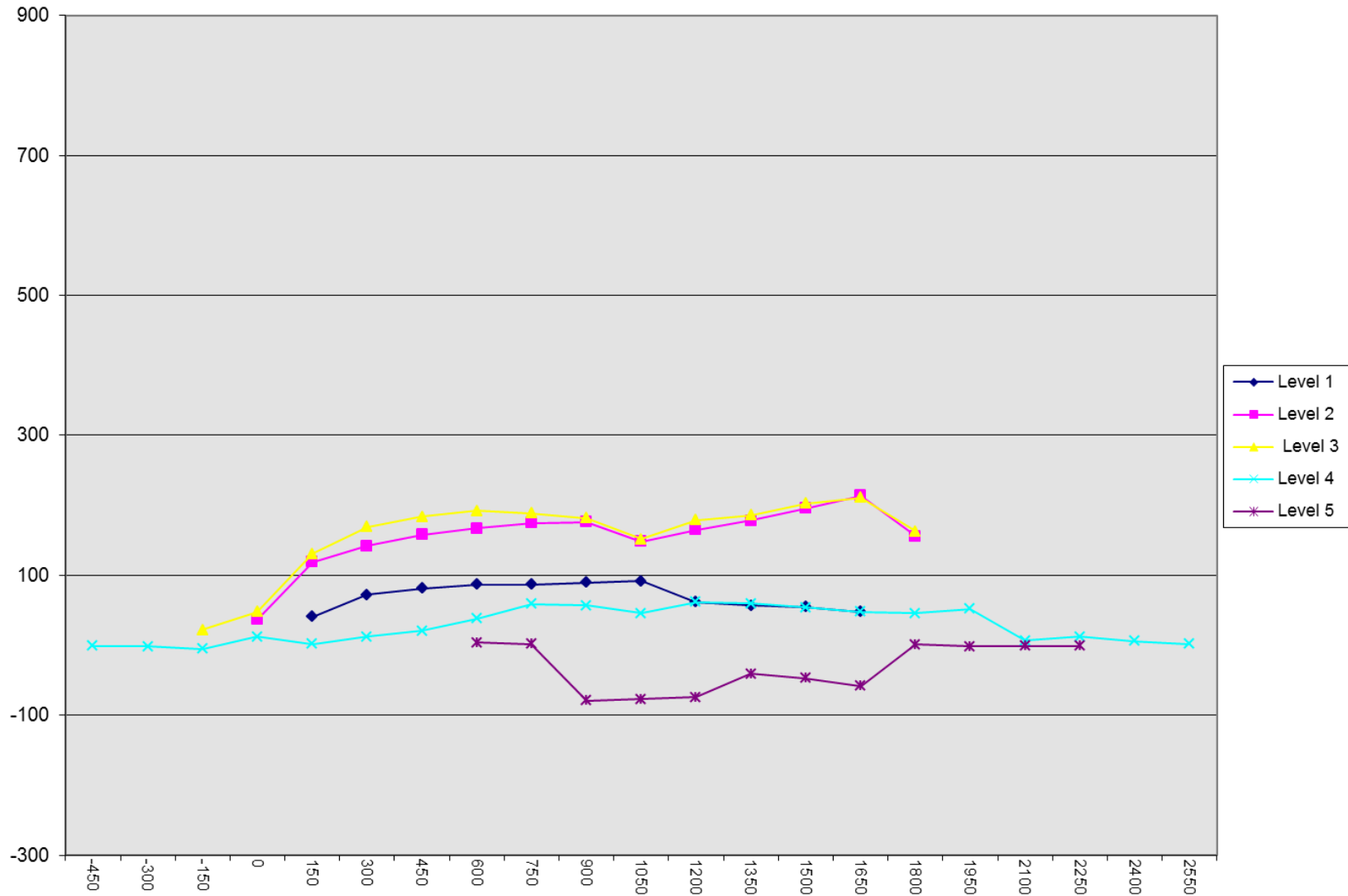
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-450				365					364					-1	
-300				346					344					-2	
-150			208	330				230	325				22	-5	
0		213	214	322			250	262	334			37	48	12	
150	244	226	226	315		285	345	357	317		41	119	131	2	
300	246	232	229	307		318	374	398	319		72	142	169	12	
450	247	235	231	300		328	393	415	321		81	158	184	21	
600	248	237	233	292	536	335	404	425	330	540	87	167	192	38	4
750	253	240	235	284	518	340	415	424	343	520	87	175	189	59	2
900	255	242	238	278	514	345	418	420	335	435	90	176	182	57	-79
1050	258	245	240	272	513	350	393	392	318	436	92	148	152	46	-77
1200	260	246	244	268	514	322	411	423	330	440	62	165	179	62	-74
1350	263	244	247	263	518	320	422	433	323	477	57	178	186	60	-41
1500	265	240	246	264	520	320	436	449	318	473	55	196	203	54	-47
1650	267	228	238	266	525	315	442	449	314	467	48	214	211	48	-58
1800		223	224	268	530		379	387	314	531		156	163	46	1
1950				280	538				332	536				52	-2
2100				275	543				282	542				7	-1
2250				278	560				290	559				12	-1
2400				289					295					6	
2550				308					310					2	

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

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

Test Vehicle: 2015 Buick Encore SUV
Test Program: NCAP Side MDB Impact Test

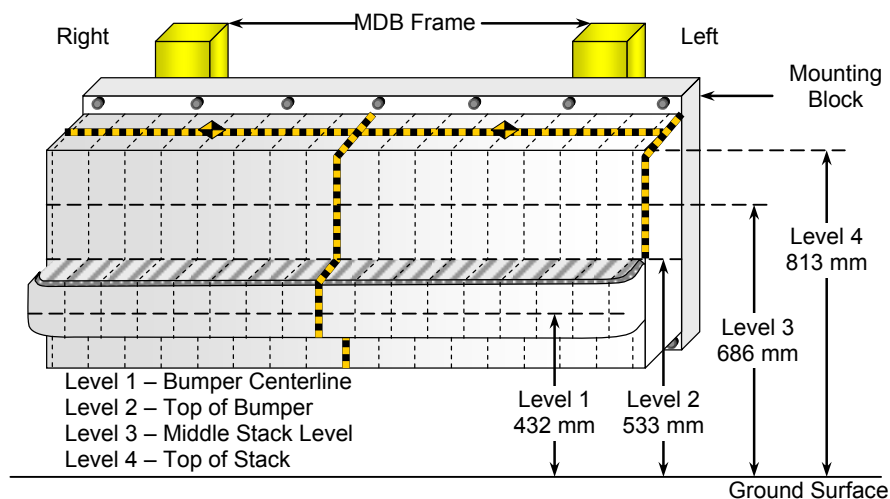
NHTSA No. O20150101
Test Date: 12/23/2014



DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2015 Buick Encore SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. O20150101
 Test Date: 12/23/2014



FRONT VIEW

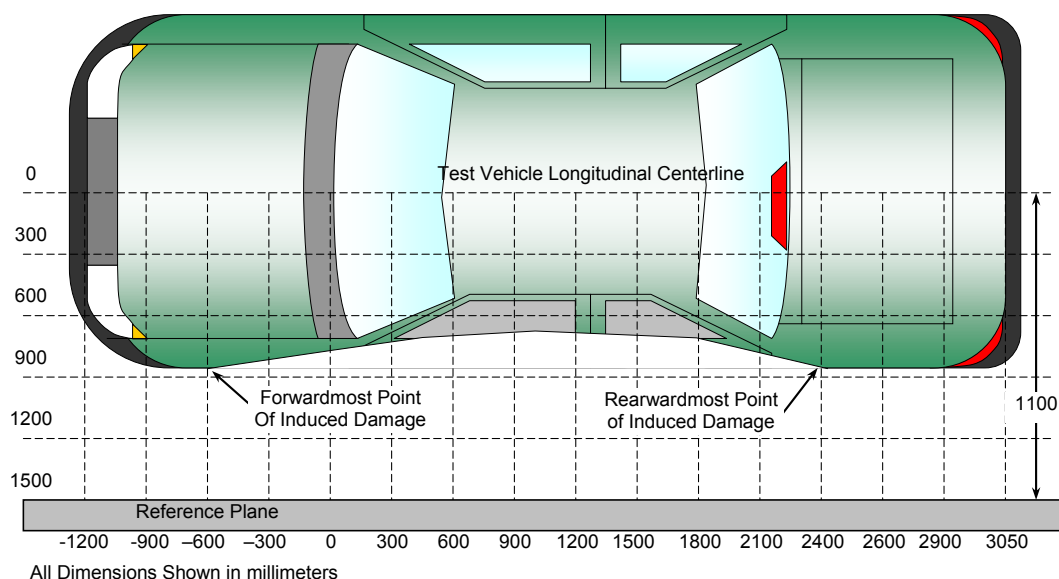
DEFORMABLE BARRIER STATIC CRUSH

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	34	32	33	40	54	79	115	105	86	73	72	84	90	103	108	110	198
3	46	28	29	36	45	47	66	86	56	53	48	51	59	69	86	106	111
2	123	120	115	112	105	99	104	113	114	116	122	126	127	129	134	147	171
1	223	215	214	213	217	211	217	221	220	218	217	222	225	221	229	245	256

DATA SHEET NO. 13
VEHICLE AND MDB DAMAGE PROFILE DISTANCES

Test Vehicle: 2015 Buick Encore SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. O20150101
 Test Date: 12/23/2014



TOP VIEW

VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance from Impact Point (mm)	Level	Pre-Test (mm)	Post-Test (mm)	Max. Static Crush (mm)
1	1900	3	217	310	93
2	1535	3	244	450	206
3	1170	3	244	410	166
4	805	3	236	423	187
5	440	3	231	413	182
6	75	3	220	278	58

MDB DAMAGE PROFILE DISTANCES

DPD	Distance from Center of MDB	Level	Post-Test (mm)
1	800 mm right of center	1	223
2	480 mm right of center	1	213
3	160 mm right of center	1	219
4	160 mm left of center	1	217
5	480 mm left of center	1	222
6	800 mm left of center	1	256

DATA SHEET NO. 14
FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2015 Buick Encore SUV
 Test Program: NCAP Side MDB Impact Test

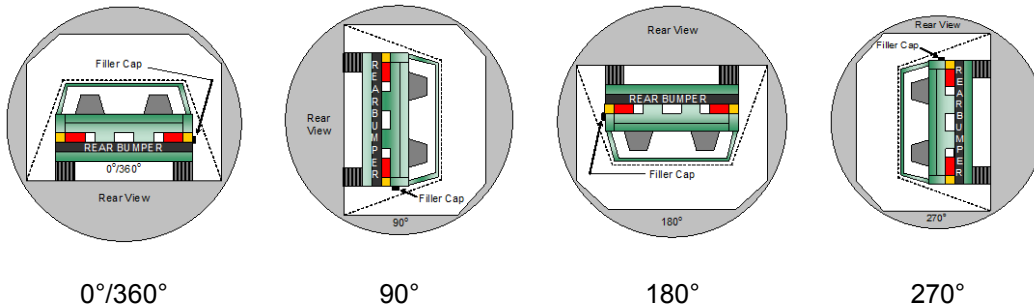
NHTSA No. O20150101
 Test Date: 12/23/2014

Test Time: 1:51 pm

Temperature: 21.2° 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°	113	300	413
90° to 180°	110	300	410
180° to 270°	108	300	408
270° to 360°	113	300	413

FMVSS 301 ROLLOVER SPILLAGE TABLE (units in ounces)

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

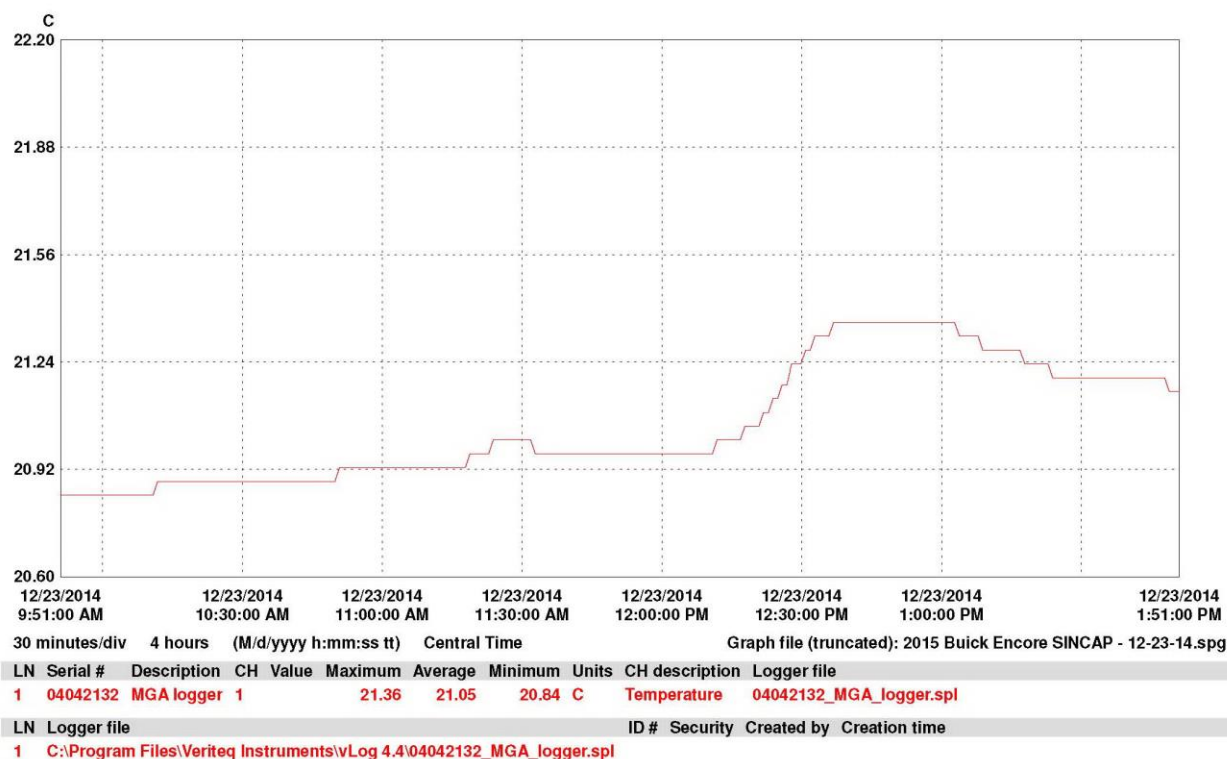
ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 15 **DUMMY/VEHICLE TEMPERATURE STABILIZATION DATA**

Test Vehicle: 2015 Buick Encore SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. O20150101
 Test Date: 12/23/2014



APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

		<u>Page No.</u>
Photo No. 1.	As Delivered Right Front Three-Quarter View of Test Vehicle	A-1
Photo No. 2.	As Delivered Left Rear Three-Quarter View of Test Vehicle	A-1
Photo No. 3.	Pre-Test Frontal View of Test Vehicle	A-2
Photo No. 4.	Post-Test Frontal View of Test Vehicle	A-2
Photo No. 5.	Pre-Test Left Front Three-Quarter View of Test Vehicle	A-3
Photo No. 6.	Post-Test Left Front Three-Quarter View of Test Vehicle	A-3
Photo No. 7.	Pre-Test Left Side View of Test Vehicle	A-4
Photo No. 8.	Post-Test Left Side View of Test Vehicle	A-4
Photo No. 9.	Pre-Test Left Three-Quarter Rear View of Test Vehicle	A-5
Photo No. 10.	Post-Test Left Three-Quarter Rear View of Test Vehicle	A-5
Photo No. 11.	Pre-Test Rear View of Test Vehicle	A-6
Photo No. 12.	Post-Test Rear View of Test Vehicle	A-6
Photo No. 13.	Pre-Test Right Side View of Test Vehicle	A-7
Photo No. 14.	Post-Test Right Side View of Test Vehicle	A-7
Photo No. 15.	Pre-Test Overhead View of Test Area	A-8
Photo No. 16.	Post-Test Overhead View of Test Area	A-8
Photo No. 17.	Pre-Test Left Side View of MDB Positioned Against Side of Test Vehicle	A-9
Photo No. 18.	Pre-Test Right Side View of MDB Positioned Against Side of Test Vehicle	A-9
Photo No. 19.	Pre-Test Close-Up View of Impact Point Target	A-10
Photo No. 20.	Post-Test Close-Up View of Impact Point Target	A-10
Photo No. 21.	Pre-Test Left Front Door Latch Close-Up	A-11
Photo No. 22.	Post-Test Left Front Door Latch Close-Up	A-11
Photo No. 23.	Pre-Test Left Rear Door Latch Close-Up	A-12

		<u>Page No.</u>
Photo No. 24.	Post-Test Left Rear Door Latch Close-Up	A-12
Photo No. 25.	Pre-Test Front Close-Up View of Driver Dummy	A-13
Photo No. 26.	Post-Test Front Close-Up View of Driver Dummy	A-13
Photo No. 27.	Pre-Test Left Side View of Driver Dummy Showing Belt and Chalking	A-14
Photo No. 28.	Pre-Test Left Side View of Driver Dummy Shoulder and Door Top View	A-14
Photo No. 29.	Post-Test Left Side View of Driver Dummy Shoulder and Door Top View	A-15
Photo No. 30.	Pre-Test Frontal View of Driver Seat Back Prior to Dummy Positioning	A-15
Photo No. 31.	Pre-Test Frontal View of Driver Dummy Head and Shoulders in Relation to Head Restraint	A-16
Photo No. 32.	Pre-Test Frontal View of Driver Seat Pan Prior to Dummy Positioning	A-16
Photo No. 33.	Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan	A-17
Photo No. 34.	Pre-Test Placement of Driver Dummy's Feet	A-17
Photo No. 35.	Pre-Test View of Belt Anchorage for Driver Dummy	A-18
Photo No. 36.	Pre-Test Left Side View of Steering Wheel	A-18
Photo No. 37.	Pre-Test View of Disengaged Parking Brake	A-19
Photo No. 38.	Pre-Test View of Parking Brake	A-19
Photo No. 39.	Pre-Test Close-Up Left Side View of Driver Seat Track	A-20
Photo No. 40.	Pre-Test Close-Up Left Side View of Driver Seat Back	A-20
Photo No. 41.	Pre-Test Close-Up View of Driver Seat Back or Head Restraint	A-21
Photo No. 42.	Pre-Test Driver Dummy and Door Clearance View	A-21
Photo No. 43.	Post-Test Driver Dummy and Door Clearance View	A-22
Photo No. 44.	Pre-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment	A-22
Photo No. 45.	Post-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment	A-23
Photo No. 46.	Pre-Test Driver Inner Door Panel View	A-23
Photo No. 47.	Post-Test Driver Inner Door Panel View	A-24

		<u>Page No.</u>
Photo No. 48.	Post-Test Driver Dummy Close-up Head Contact with Vehicle Interior View	A-24
Photo No. 49.	Post-Test Driver Dummy Close-up Head Contact with Side Airbag View	A-25
Photo No. 50.	Post-Test Driver Dummy Close-up Torso Contact with Vehicle Interior View	A-25
Photo No. 51.	Post-Test Driver Dummy Close-up Torso Contact with Vehicle Interior View	A-26
Photo No. 52.	Post-Test Driver Dummy Close-up Torso Contact with Side Airbag View	A-26
Photo No. 53.	Post-Test Driver Dummy Close-up Pelvis Contact with Vehicle Interior View	A-27
Photo No. 54.	Post-Test Driver Dummy Close-up Pelvis Contact with Side Airbag View	A-27
Photo No. 55.	Post-Test Driver Dummy Close-up Knee Contact View	A-28
Photo No. 56.	Pre-Test Left Side View of Rear Passenger Dummy Showing Belt and Chalking	A-28
Photo No. 57.	Pre-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View	A-29
Photo No. 58.	Post-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View	A-29
Photo No. 59.	Pre-Test Frontal View of Rear Passenger Seat Back Prior to Dummy Positioning	A-30
Photo No. 60.	Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint	A-30
Photo No. 61.	Pre-Test Overhead View of Rear Passenger Seat Pan Prior to Dummy Positioning	A-31
Photo No. 62.	Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan	A-31
Photo No. 63.	Pre-Test View of Rear Passenger Dummy's Neck Showing Position of Adjustable Neck Bracket	A-32
Photo No. 64.	Pre-Test View of Rear Passenger Dummy's Head Showing Dummy's Head is Level	A-32
Photo No. 65.	Pre-Test Placement of Rear Passenger Dummy's Feet	A-33
Photo No. 66.	Pre-Test View of Belt Anchorage for Rear Passenger Dummy	A-33
Photo No. 67.	Pre-Test Close-Up Left Side View of Rear Passenger Seat Track	A-34
Photo No. 68.	Pre-Test Close-Up Left Side View of Rear Passenger Seat Back	A-34
Photo No. 69.	Pre-Test Close-up View of Rear Passenger Seat Back or Head Restraint	A-35
Photo No. 70.	Pre-Test Rear Passenger Dummy and Door Clearance View	A-35
Photo No. 71.	Post-Test Rear Passenger Dummy and Door Clearance View	A-36

		<u>Page No.</u>
Photo No. 72.	Pre-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment	A-36
Photo No. 73.	Post-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment	A-37
Photo No. 74.	Pre-Test Rear Passenger Inner Door Panel View	A-37
Photo No. 75.	Post-Test Rear Passenger Inner Door Panel View	A-38
Photo No. 76.	Post-Test Rear Passenger Dummy Close-up Head Contact with Vehicle Interior View	A-38
Photo No. 77.	Post-Test Rear Passenger Dummy Close-up Head Contact with Side Airbag View	A-39
Photo No. 78.	Post-Test Rear Passenger Dummy Close-up Torso Contact with Vehicle Interior View	A-39
Photo No. 79.	Post-Test Rear Passenger Dummy Close-up Torso Contact with Side Airbag View	A-40
Photo No. 80.	Post-Test Rear Passenger Dummy Close-up Pelvis Contact with Vehicle Interior View	A-40
Photo No. 81.	Post-Test Rear Passenger Dummy Close-up Pelvis Contact with Side Airbag View	A-41
Photo No. 82.	Post-Test Rear Passenger Dummy Close-up Knee Contact View	A-41
Photo No. 83.	Pre-Test View of Fuel Filler Cap or Fuel Filler Neck	A-42
Photo No. 84.	Post-Test View of Fuel Filler Cap or Fuel Filler Neck	A-42
Photo No. 85.	Pre-Test Front View of MDB Impactor Face	A-43
Photo No. 86.	Post-Test Front View of MDB Impactor Face	A-43
Photo No. 87.	Pre-Test Top View of MDB Impactor Face	A-44
Photo No. 88.	Post-Test Top View of MDB Impactor Face	A-44
Photo No. 89.	Pre-Test Left Side View of MDB Impactor Face	A-45
Photo No. 90.	Post-Test Left Side View of MDB Impactor Face	A-45
Photo No. 91.	Pre-Test Right Side View of MDB Impactor Face	A-46
Photo No. 92.	Post-Test Right Side View of MDB Impactor Face	A-46
Photo No. 93.	Close-Up View of Vehicle's Certification Label	A-47
Photo No. 94.	Close-Up View of Vehicle's Tire Information Placard or Label	A-47
Photo No. 95.	Pre-Test Ballast View	A-48

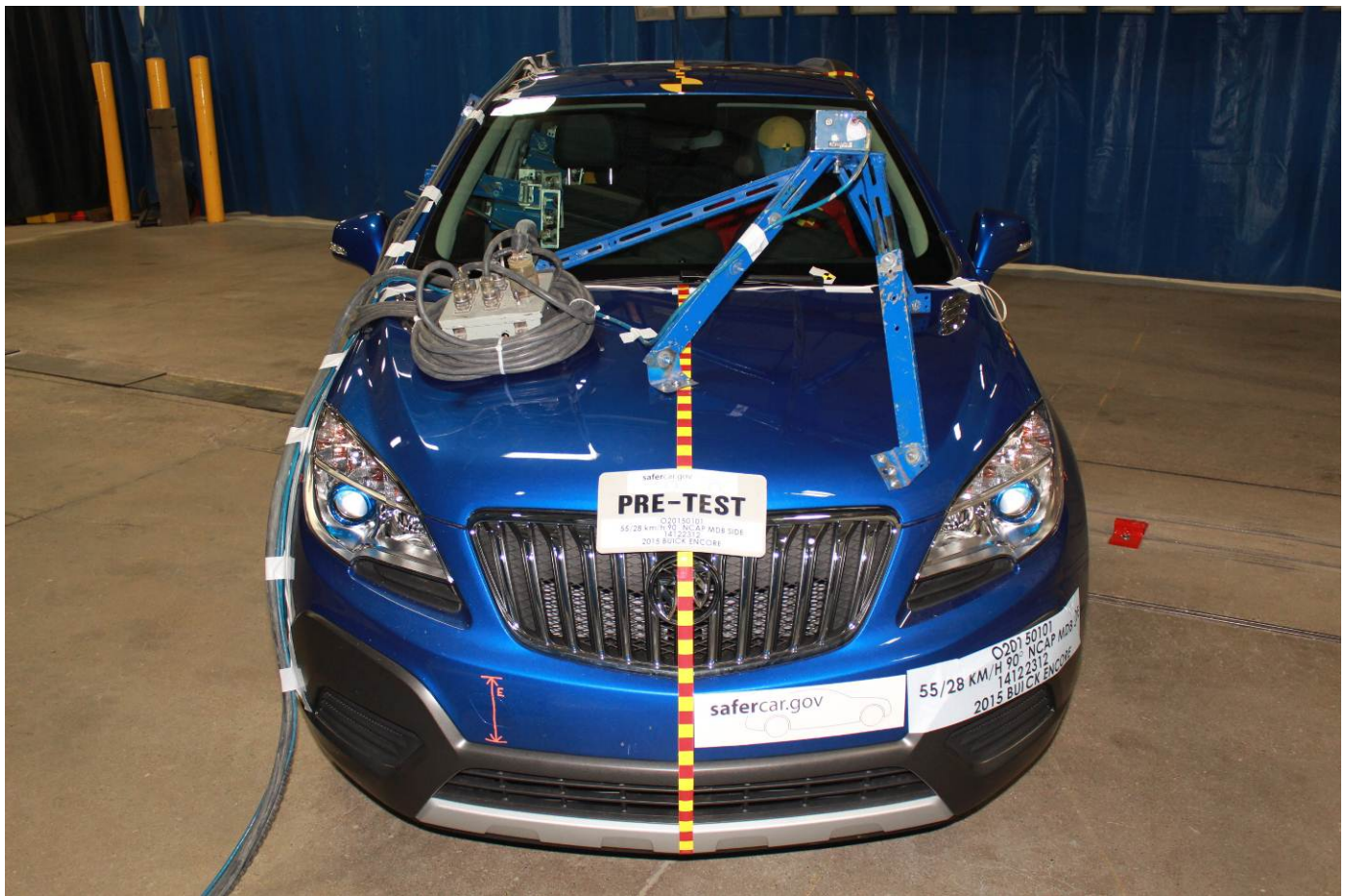
		<u>Page No.</u>
Photo No. 96.	Post-Test Primary and Redundant Speed Trap Read-Out	A-48
Photo No. 97.	FMVSS No. 301 Static Rollover 0 Degrees	A-49
Photo No. 98.	FMVSS No. 301 Static Rollover 90 Degrees	A-49
Photo No. 99.	FMVSS No. 301 Static Rollover 180 Degrees	A-50
Photo No. 100.	FMVSS No. 301 Static Rollover 270 Degrees	A-50
Photo No. 101.	FMVSS No. 301 Static Rollover 360 Degrees	A-51
Photo No. 102.	Impact Event	A-51
Photo No. 103.	Monroney Label	A-52
Photo No. 104.	Driver Head Restraint Use and Adjustment Information from Vehicle Owner's Manual	A-52
Photo No. 105.	Left Rear Passenger Head Restraint Use and Adjustment Information from Vehicle Owner's Manual	A-53



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



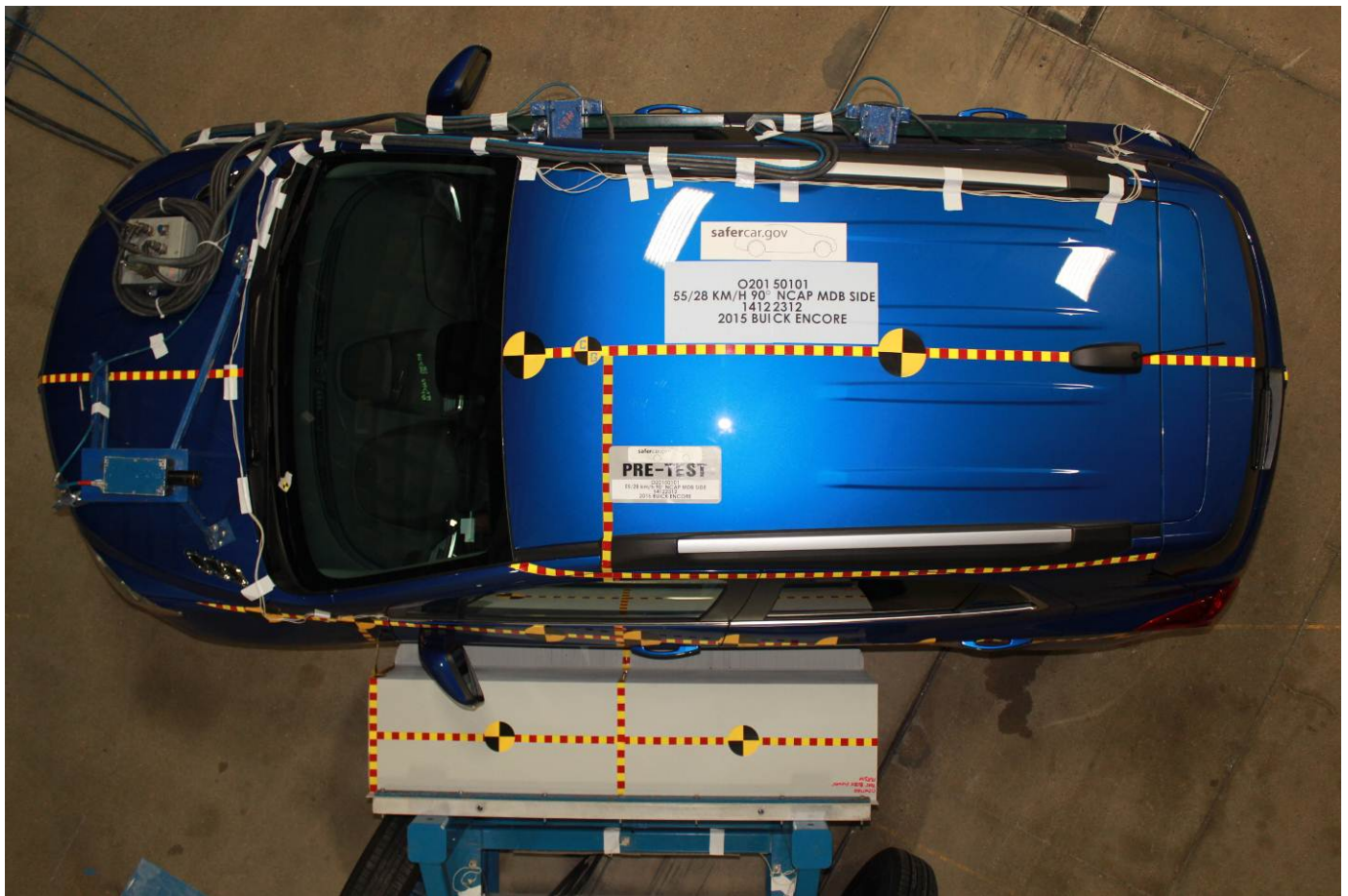
Post-Test Rear View of Test Vehicle



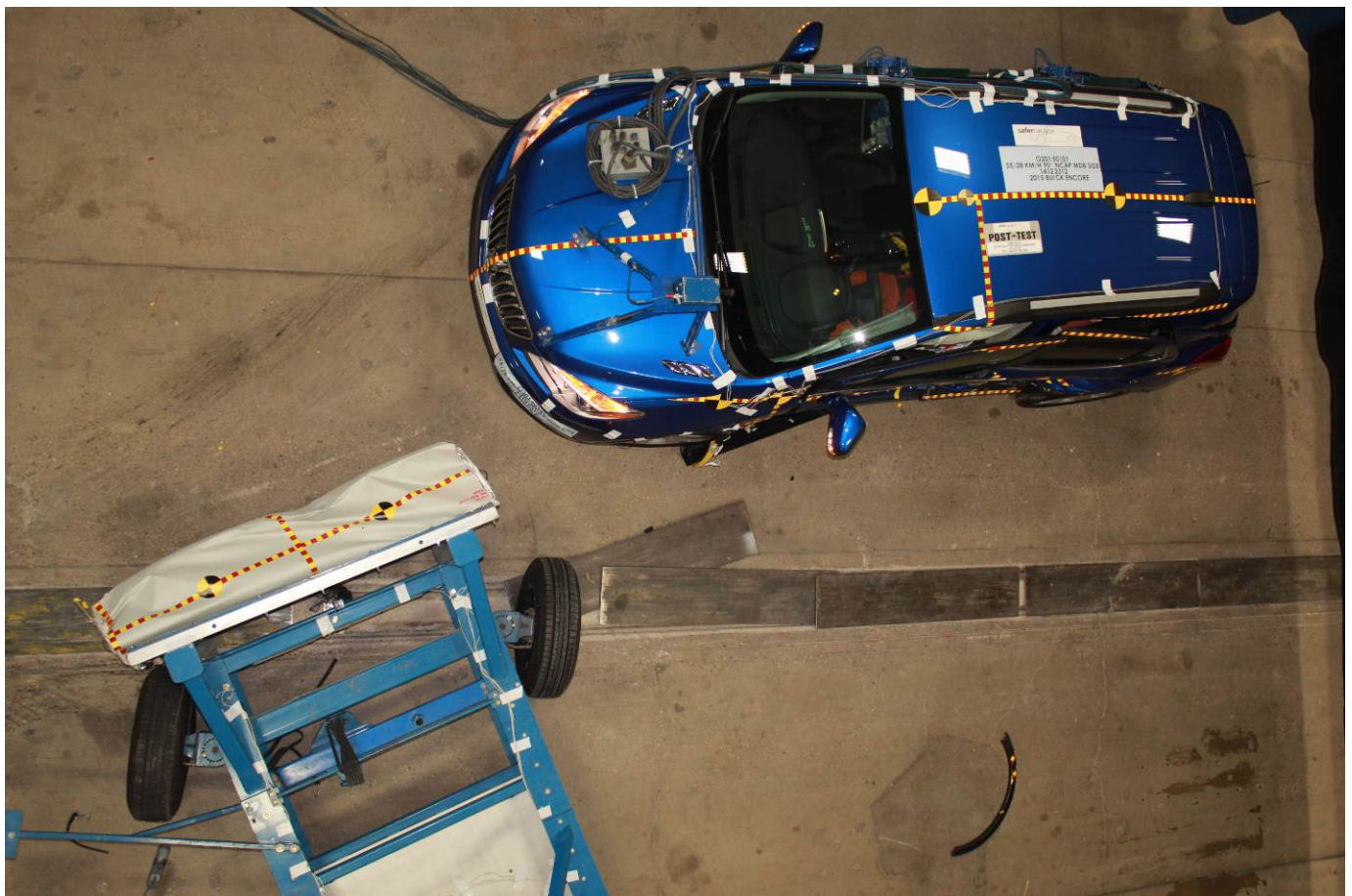
Pre-Test Right Side View of Test Vehicle



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



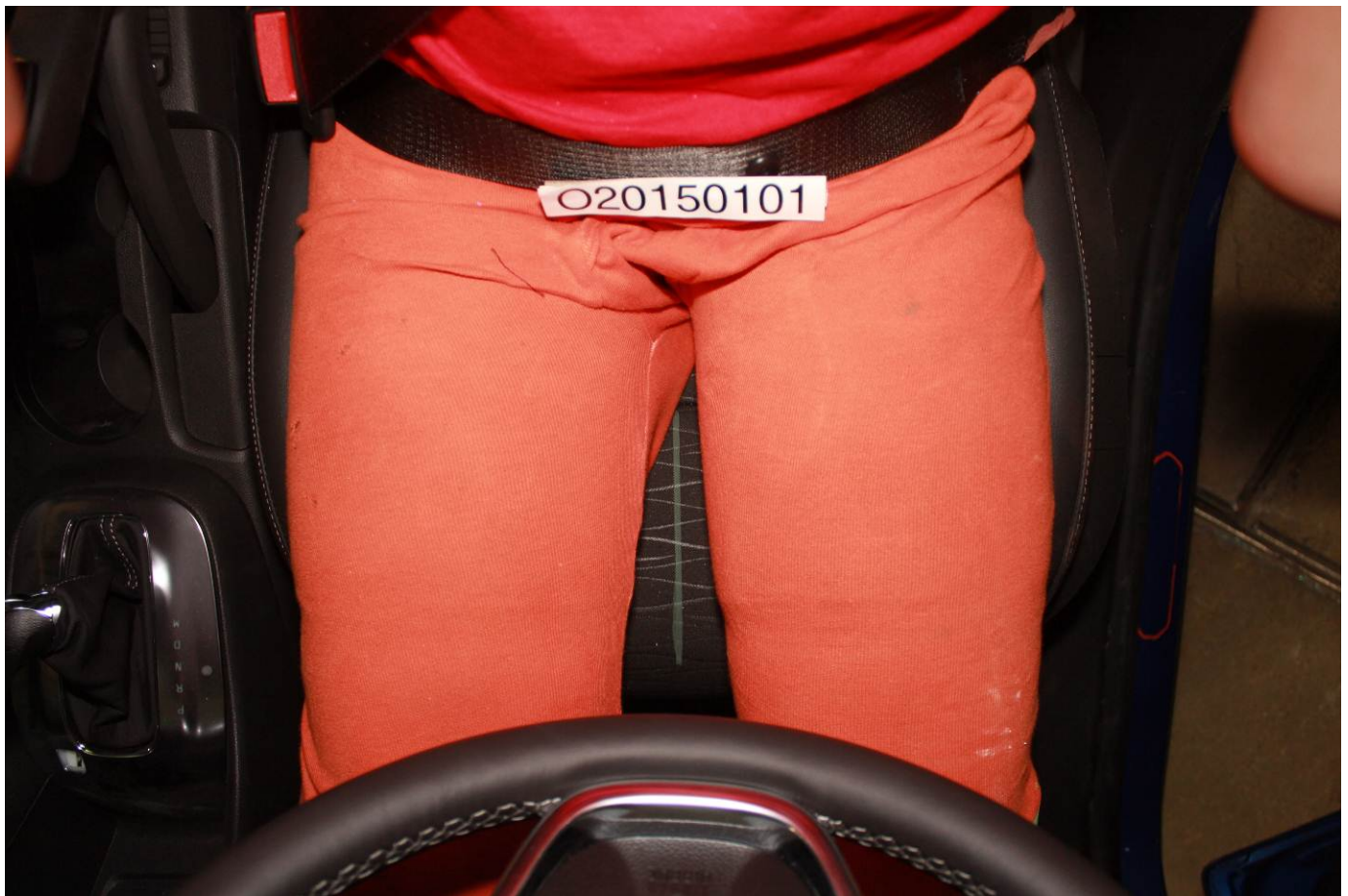
Pre-Test Frontal View of Driver Seat Back Prior to Dummy Positioning



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



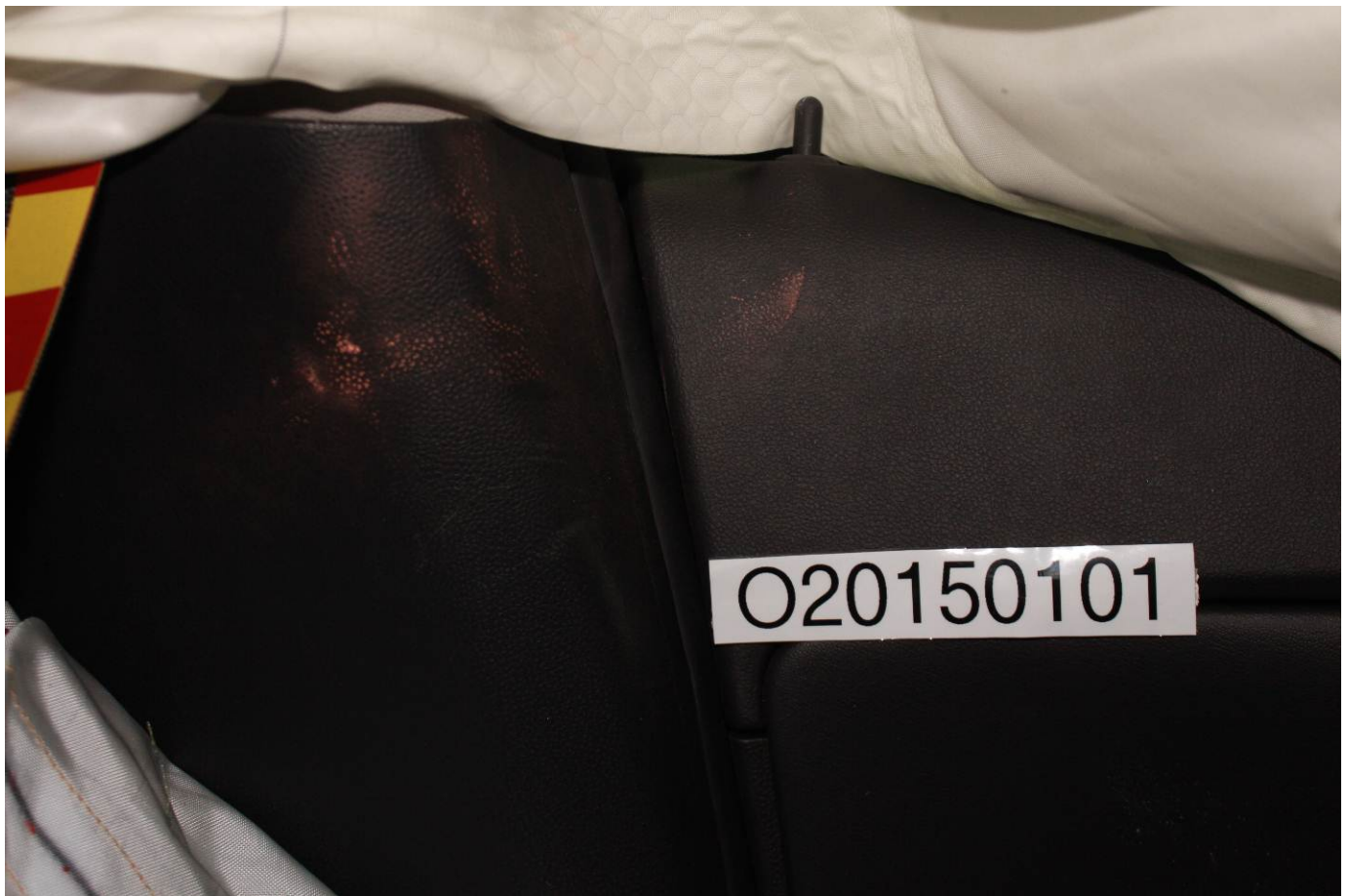
Post-Test Driver Dummy Close-up Head Contact with Vehicle Interior View



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



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



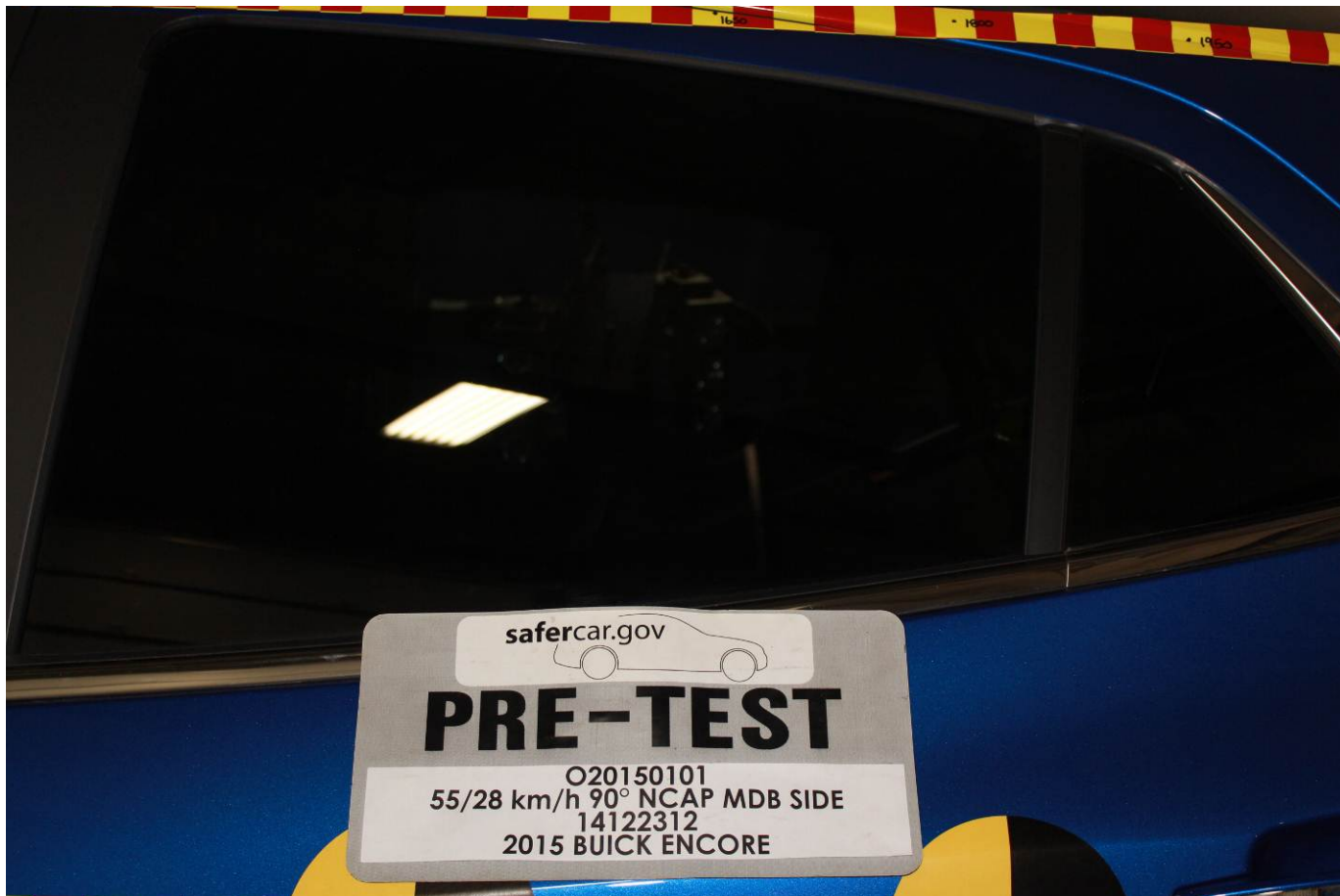
Post-Test Driver Dummy Close-up Pelvis Contact with Side Airbag View



Post-Test Driver Dummy Close-up Knee Contact View



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



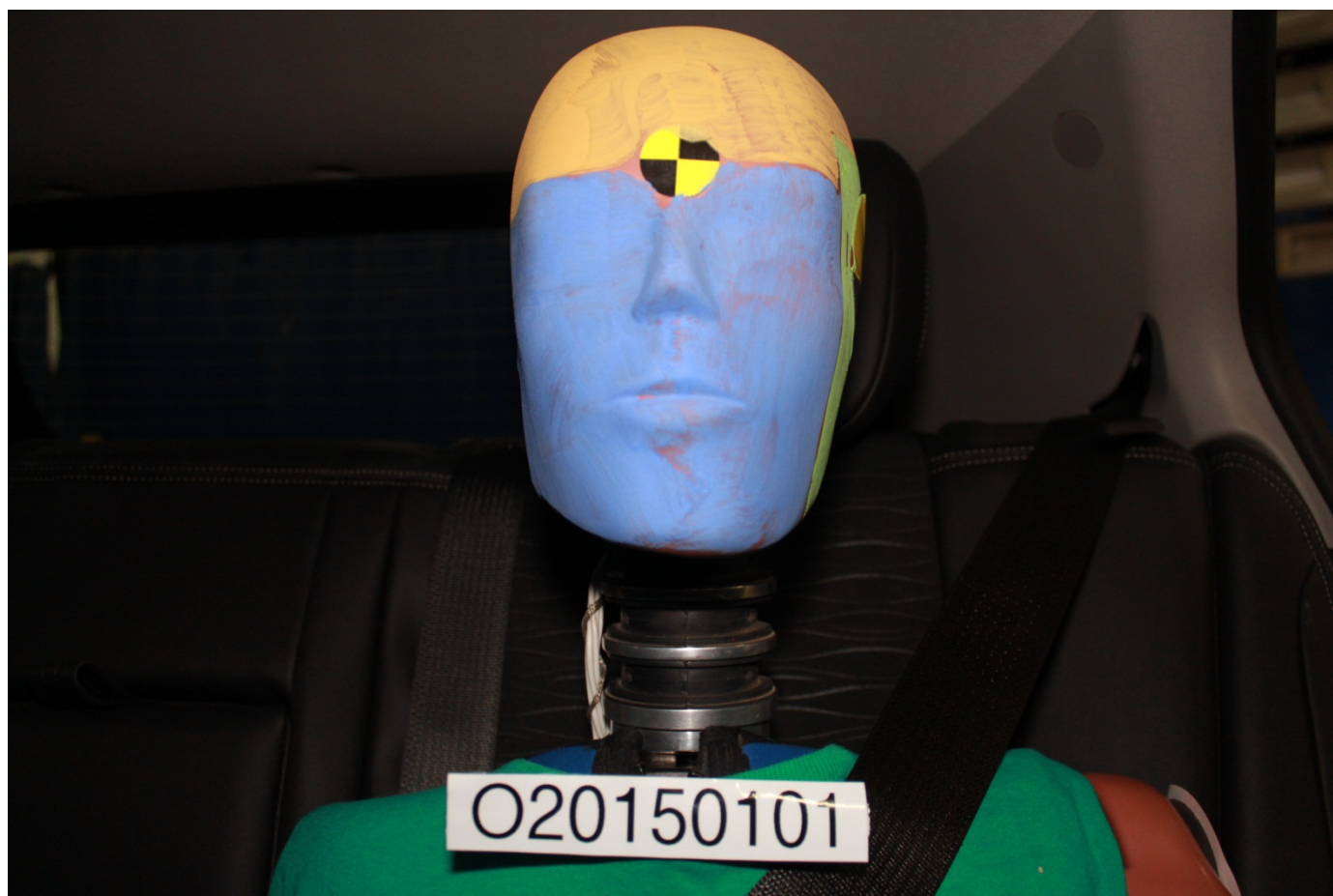
Pre-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View



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



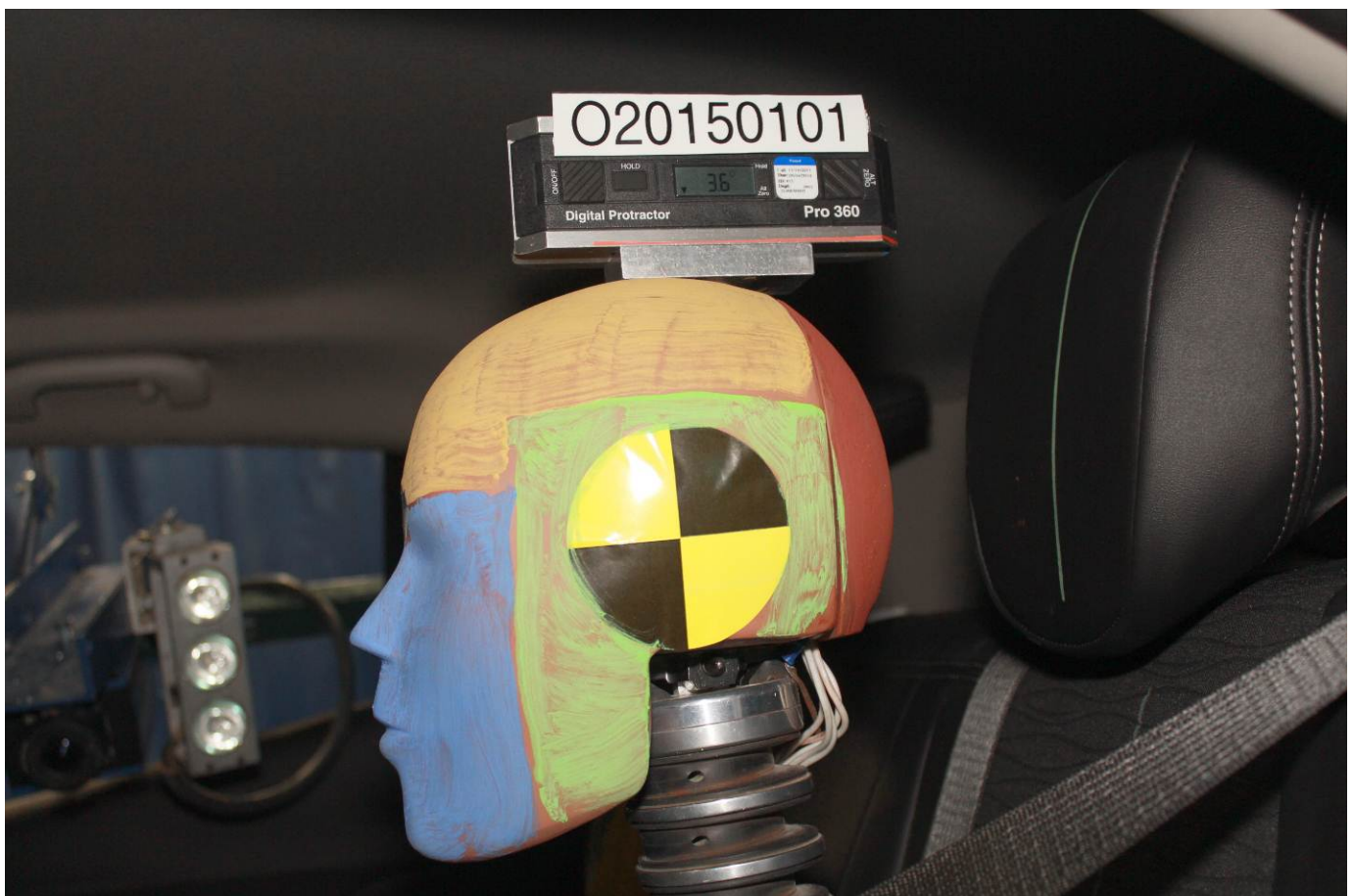
Pre-Test Overhead View of Rear Passenger Seat Pan Prior to Dummy Positioning



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



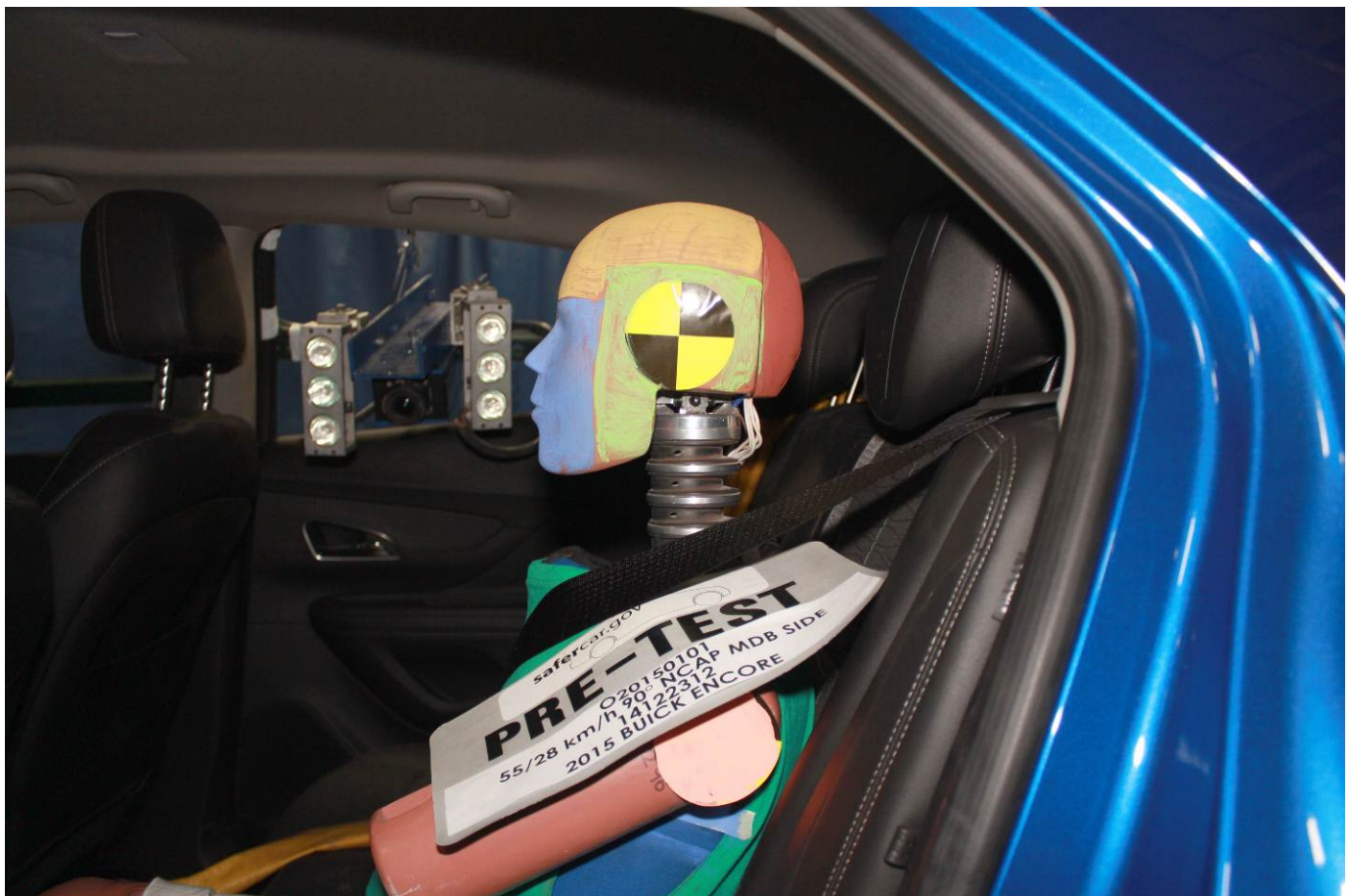
Pre-Test Placement of Rear Passenger Dummy's Feet



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 Side Airbag View



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



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



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



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



Post-Test Rear Passenger Dummy Close-up Knee Contact 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

O20150101

GM MFD BY GM KOREA COMPANY 09 / 14

GVWR 4286 LB GAWR FRT 2348 LB GAWR RR 2194 LB

THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S. FEDERAL MOTOR VEHICLE SAFETY AND THEFT PREVENTION STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.

KL4CJASB9FB033052 TYPE: MPV

MODEL : 4JU76

	TIRE SIZE	SPEED RTG	RIM	COLD TIRE PRESSURE
FRT	P215/55R18	H		240KPA, 35 PSI
RR	P215/55R18	H		240KPA, 35 PSI
SPA	T125/70R16	M	16x4.0T	420KPA, 60 PSI

SEE OWNER'S MANUAL FOR MORE INFORMATION.

Close-Up View of Vehicle's Certification Label

TIRE AND LOADING INFORMATION

SEATING CAPACITY	TOTAL 5	FRONT 2	REAR 3
------------------	---------	---------	--------

The combined weight of occupants and cargo should never exceed 428 kg or 944 lbs.

TIRE	ORIGINAL SIZE	COLD TIRE PRESSURE
FRONT	P215/55R18 94H	240 kpa, 35 psi
REAR	P215/55R18 94H	240 kpa, 35 psi
SPARE	T125/70R16 M	420 kpa, 60 psi

SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION

3319U 95353319

O20150101

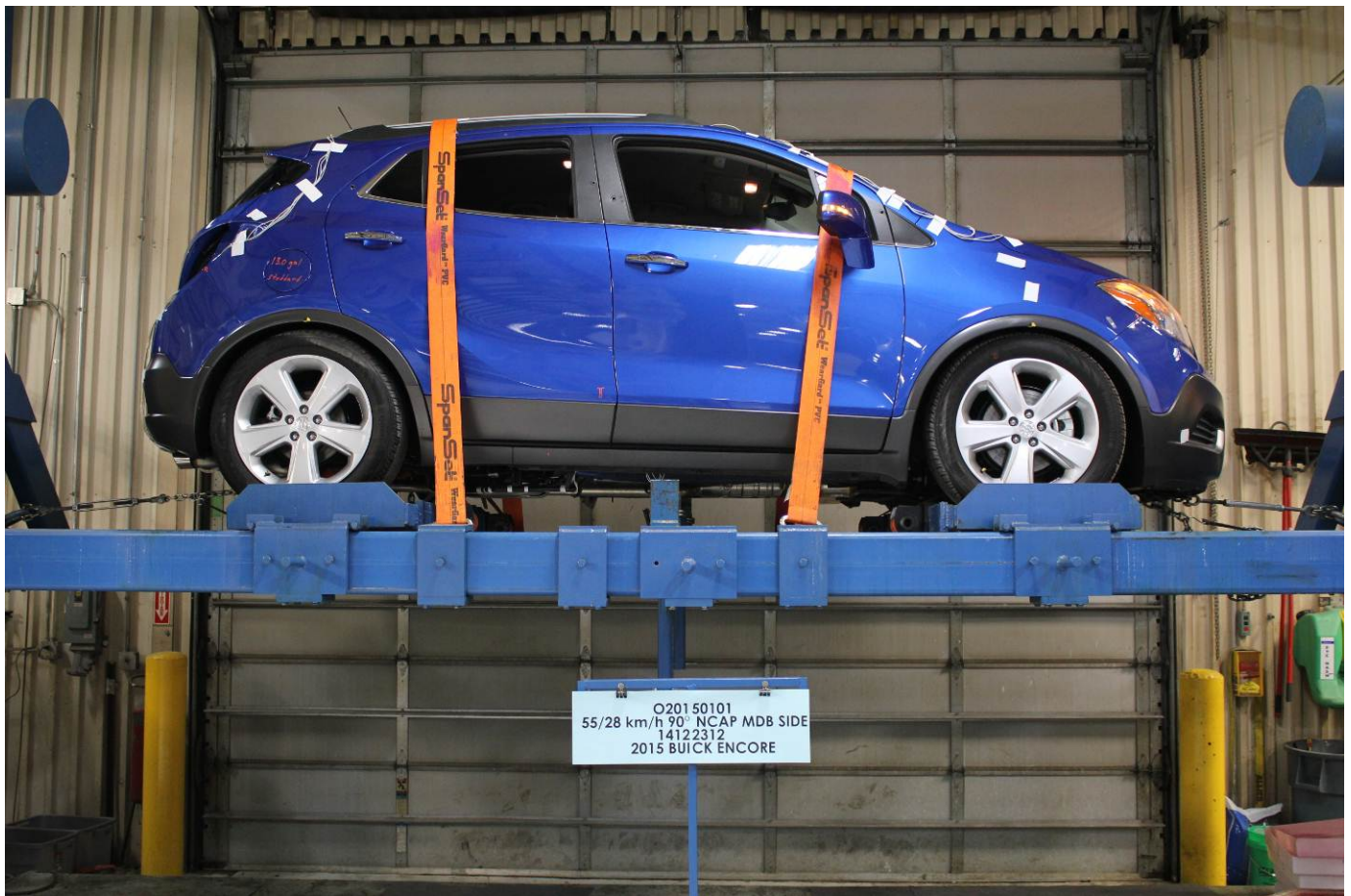
Close-Up View of Vehicle's Tire Information Placard or Label



Pre-Test Ballast View



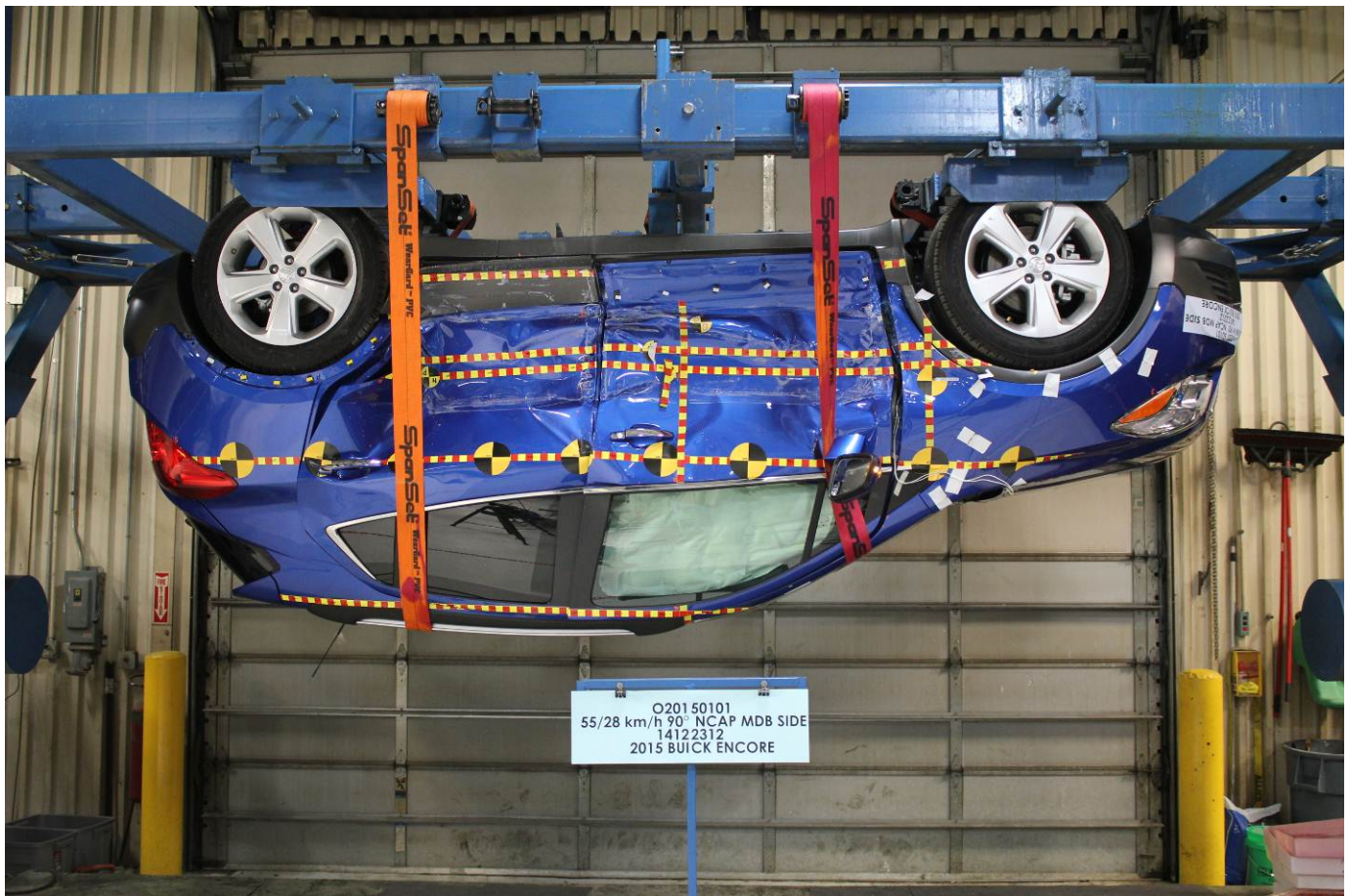
Post-Test Primary and Redundant Speed Trap Read-Out



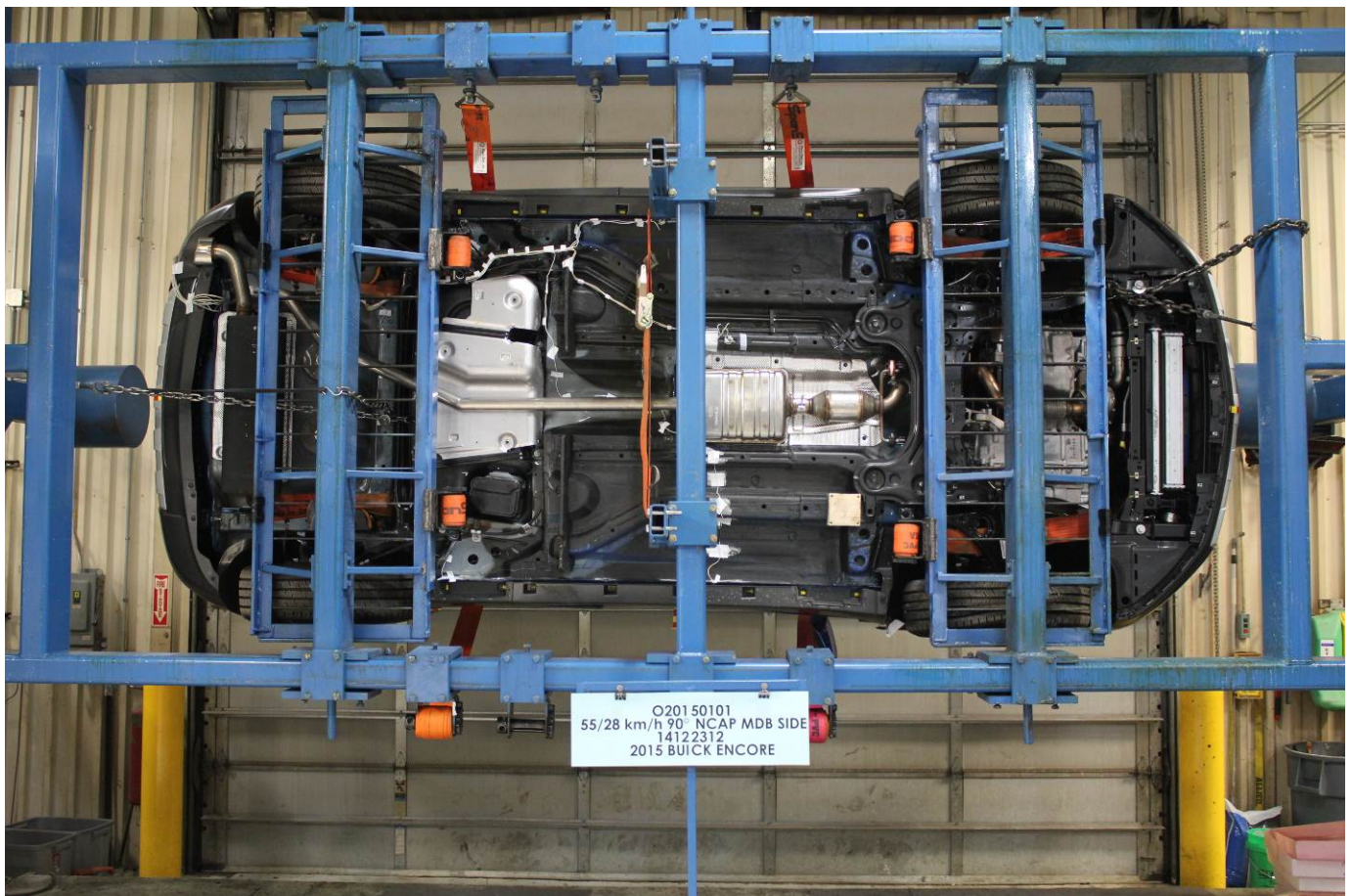
FMVSS No. 301 Static Rollover 0 Degrees



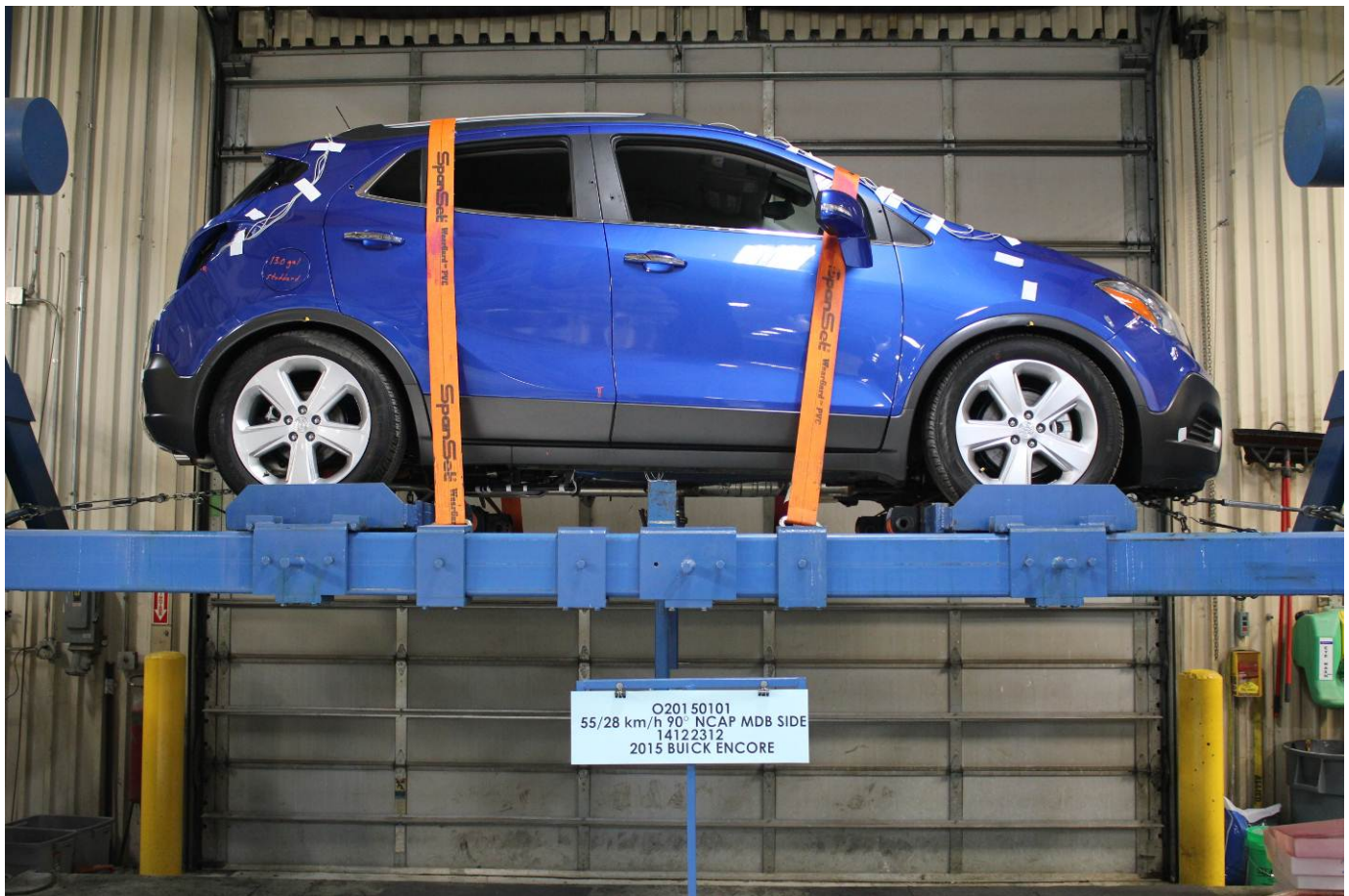
FMVSS No. 301 Static Rollover 90 Degrees



FMVSS No. 301 Static Rollover 180 Degrees



FMVSS No. 301 Static Rollover 270 Degrees



FMVSS No. 301 Static Rollover 360 Degrees



Impact Event



BUICK

2015 ENCORE FWD



**EXTERIOR: BRILLIANT BLUE METALLIC
INTERIOR: EBONY**

**ENGINE, ECOTEC TURBO 1.4L
TRANSMISSION, 6 SPD AUTOMATIC**

Visit us at www.buick.com

STANDARD EQUIPMENT

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

- 4 YEAR/50,000 MILE LIMITED BUMPER-TO-BUMPER WARRANTY SEE DEALER FOR DETAILS
- 6 YEAR/70,000 MILE POWERTRAIN LIMITED WARRANTY SEE DEALER FOR DETAILS
- SCHEDULED MAINTENANCE 219/24,000 MILES
- OIL & FILTER
- 4 WHEEL TIRE ROTATION SEE WWW.BUICK.COM OR DEALER FOR DETAILS

MECHANICAL

- ENGINE, ECOTEC TURBO 1.4L VVT, DOHC 4-CYLINDER
- TRANSMISSION, 6 SPD AUTOMATIC

SAFETY & SECURITY

- REMOTE KEYLESS ENTRY W/ PANIC ALARM

- AIRBAGS, DRIVER & FRONT PASSENGER: FRONTAL, KNEE, SIDE IMPACT & HEAD CURTAIN; REAR OUTBOARD PASSENGERS: SIDE IMPACT & HEAD CURTAIN
- STABILITRAK-STABILITY CONTROL SYSTEM W/ TRACTION CONTROL
- ANTI LOCK BRAKE SYSTEM
- 4 WHEEL DISC BRAKES
- HEADLAMP CONTROL AUTOMATIC ON & OFF
- TIRE PRESSURE MONITOR (EXCL. SPARE TIRE)
- REAR VISION CAMERA
- THEFT DETECTION SYSTEM

INTERIOR

- QUIET TUNING
- SEAT ADJUSTER, DRIVER 6-WAY POWER W/ MANUAL RECLINE
- SEAT ADJUSTER, FRONT PASSENGER 2-WAY MANUAL
- SEATBACK, PASSENGER FLAT-FOLD

- SEAT, REAR 60/40 SPLIT-BENCH, FOLDING
- POWER WINDOW W/ EXPRESS DRIVER UP/DOWN
- WINDOW FRONT PASSENGER & REAR POWER EXPRESS DOWN
- STORAGE, FRT PASS. UNDERSEAT
- AIR CONDITIONING
- VISORS, DRIVER/FRONT PASSENGER W/ ILLUMINATED VANITY MIRRORS
- CARGO COVER, REAR, STOWABLE
- POWER DOOR LOCKS WITH LOCKOUT PROTECTION
- LEATHER WRAP STEERING WHEEL
- STEERING COLUMN, TILT & TELESCOPIC
- DRIVER INFORMATION CENTER
- STEERING WHEEL CONTROLS
- UPSCALE CLOTH WITH LEATHERETTE ACCENTS

EXTERIOR

- TIRE, COMPACT SPARE
- ROOF RACK, SIDE RAILS
- WHEELS, 18" CAST ALUMINUM

CONNECTIVITY FEATURES

- 6 MTH ONSTAR(R) DIRECTIONS & CONNECTIONS W/ AUTOMATIC CRASH RESPONSE & TURN-BY-TURN NAV PLUS 5-YEAR ONSTAR BASIC PLAN (OMITS SAFETY, SECURITY & NAV) (SEE ONSTAR.COM)
- ONSTAR(R) 4G LTE WI-FI(R) HOTSPOT W/ 3GB/3MO DATA TRIAL
- COLOR DISPLAY RADIO W/ 7 SCREEN, INTELLILINK, USB PORT, INPUT JACK
- XM RADIO + SERVICE SUBSCRIPTION SOLD SEPARATELY BY SIRIUSXM AFTER 3 MTHS
- AUDIO SYSTEM, 6-SPEAKER
- BLUETOOTH FOR PHONE AND MUSIC

OPTIONS & PRICING

MANUFACTURER'S SUGGESTED RETAIL PRICE	
STANDARD VEHICLE PRICE	\$24,065.00
OPTIONS INSTALLED BY THE MANUFACTURER (MAY REPLACE STANDARD EQUIPMENT SHOWN)	
FLOOR MATS, ALL WEATHER FRONT AND REAR (DEALER INSTALLED)	140.00
TOTAL OPTIONS	\$140.00
TOTAL VEHICLE & OPTIONS	\$24,205.00
DESTINATION CHARGE	925.00
TOTAL VEHICLE PRICE*	\$25,130.00

EPA DOT Fuel Economy and Environment

Fuel Economy

28 MPG combined city/hwy

25 MPG city

33 MPG highway

3.6 gallons per 100 miles

You save \$1,500 in fuel costs over 5 years compared to the average new vehicle.

Annual fuel Cost \$1,900

Fuel Economy & Greenhouse Gas Rating (tailpipe only)

Smog Rating (tailpipe only)

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 24 MPG and costs \$11,000 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$3.59 per gallon. MPGe is miles per gallon (petroleum equivalent). Vehicle emissions are a significant cause of climate change and smog.

fuel economy.gov

Calculate personalized estimates and compare vehicles

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.

Frontal Crash

Driver Passenger

★★★★★

Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.

Side Crash

Front seat Rear seat

★★★★★

Based on the risk of injury in a side impact.

Rollover

★★★★★

Based on the risk of rollover in a single-vehicle crash.

Star ratings range from 1 to 5 stars (★★★★★) with 5 being the highest. Source: National Highway Traffic Safety Administration (NHTSA) www.safercar.gov or 1-888-327-4236

Equipped with the safety and connectivity of OnStar!

Visit onstar.com for details.

PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS CARLINE:
U.S./CANADIAN PARTS CONTENT: 3%
MAJOR SOURCES OF FOREIGN PARTS CONTENT: KOREA 67%
CHINA 19%

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

FOR THIS VEHICLE:
FINAL ASSEMBLY POINT: BUPYEONG GU, IN KOREA
COUNTRY OF ORIGIN: KOREA
ENGINE: KOREA
TRANSMISSION: KOREA

ORDER NO. RPH212 SALES CODE E
SALES MODEL CODE 42478
DEALER NO. 48882
FINAL ASSEMBLY: BUPYEONG GU, IN KOREA
VIN KL4CJAS89F8033052

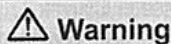
DEALER TO WHOM DELIVERED
BOUCHER BUICK GMC
1907 E MORELAND RD
WAUKESHA, WI 53186-4020

BM

Monroney Label

3-2 Seats and Restraints

Head Restraints



Warning

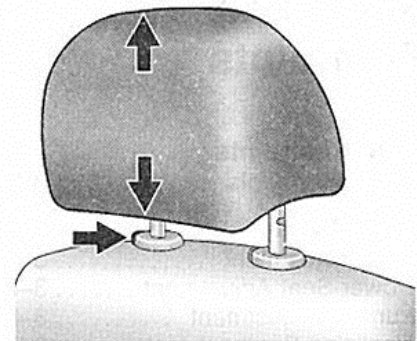
With head restraints that are not installed and adjusted properly, there is a greater chance that occupants will suffer a neck/spinal injury in a crash. Do not drive until the head restraints for all occupants are installed and adjusted properly.

Front Seats

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



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 chances of a neck injury in a crash.



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

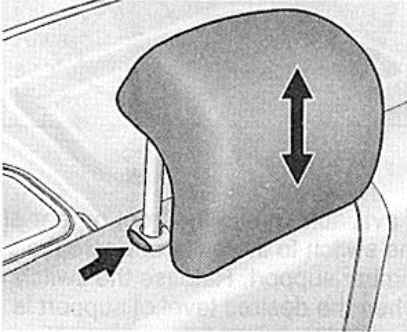
To lower the head restraint, press the button, located on the top of the seatback, and push the head restraint down. Try to move the head restraint after the button is released to make sure that it is locked in place.

The front seat outboard head restraints are not removable.

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

Rear Seats

The rear seats have head restraints in the outboard seating positions that can be lowered for better visibility when the rear seat is unoccupied.



To lower the head restraint, press the button, located on the top of the seatback, and push the head restraint down.

When an occupant is in the seat, always return the head restraint to the upright position. Pull the head restraint up and push it rearward until it locks into place. Push and pull on the head restraint to make sure that it is locked.

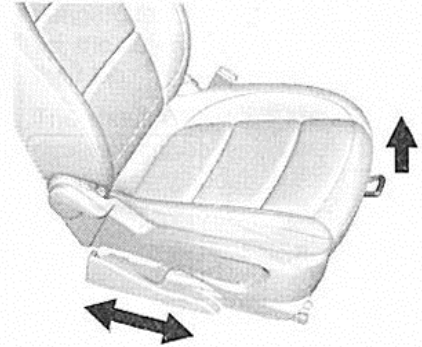
Rear outboard head restraints are not removable.

Front Seats

Seat Adjustment

Warning

You can lose control of the vehicle if you try to adjust a driver seat while the vehicle is moving. Adjust the driver seat only when the vehicle is not moving.



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

APPENDIX B
DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS
Driver Dummy Instrumentation Plots

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

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

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)

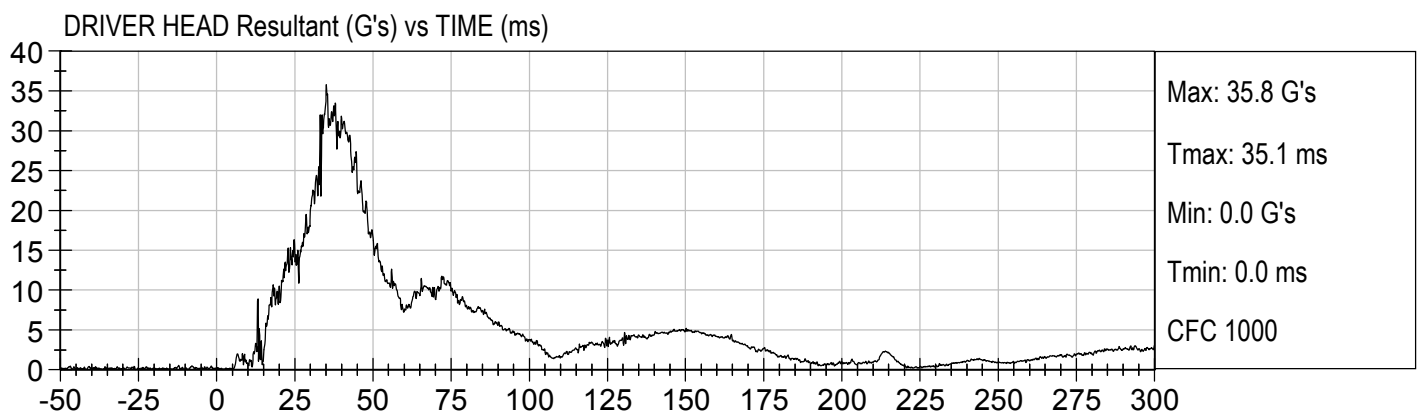
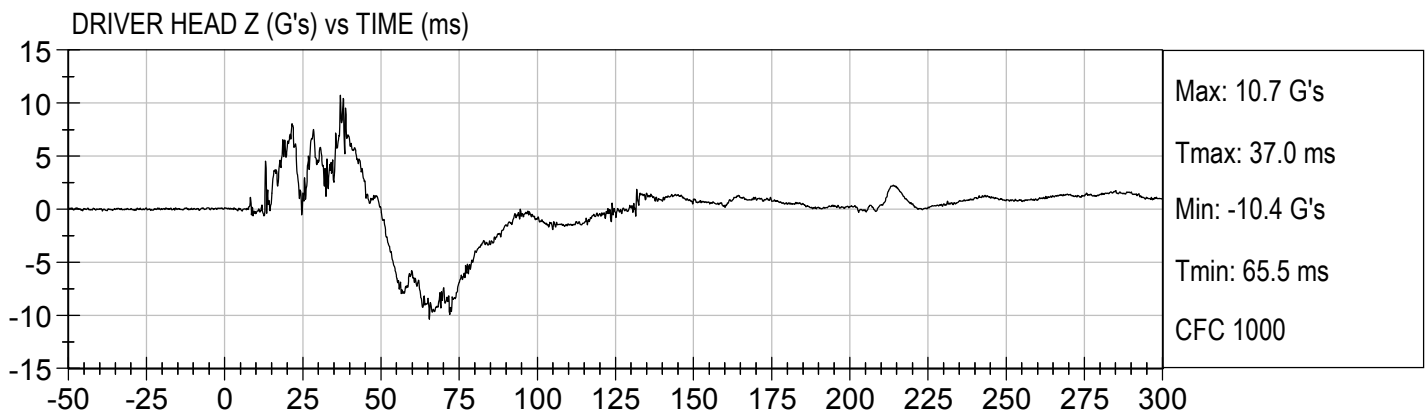
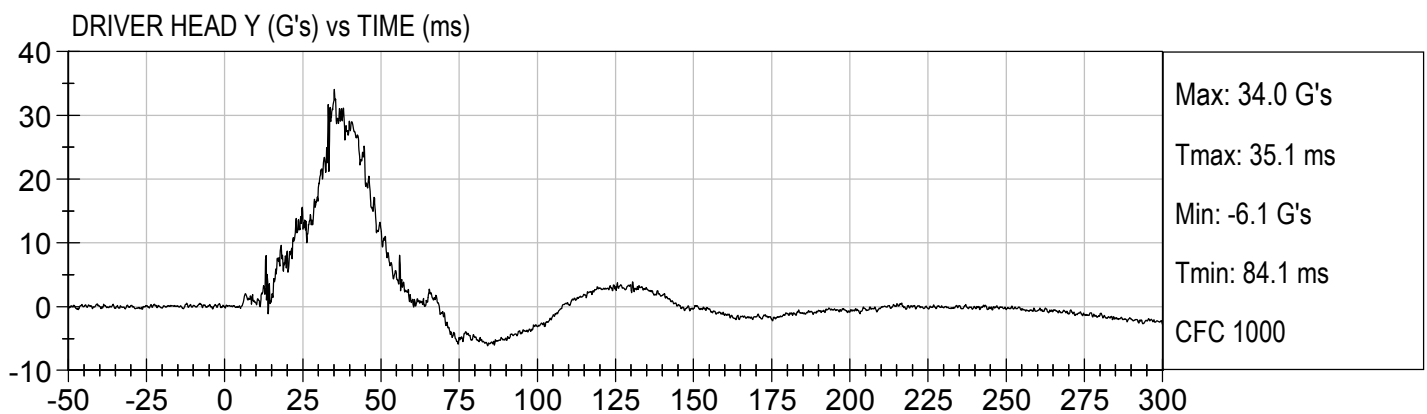
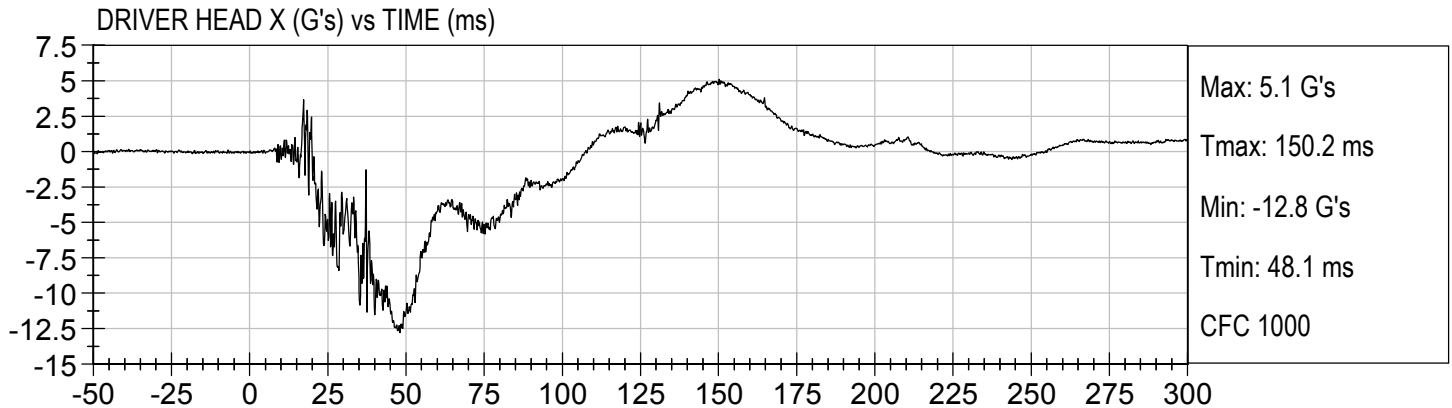
MDB Center of Gravity Acceleration (Z)

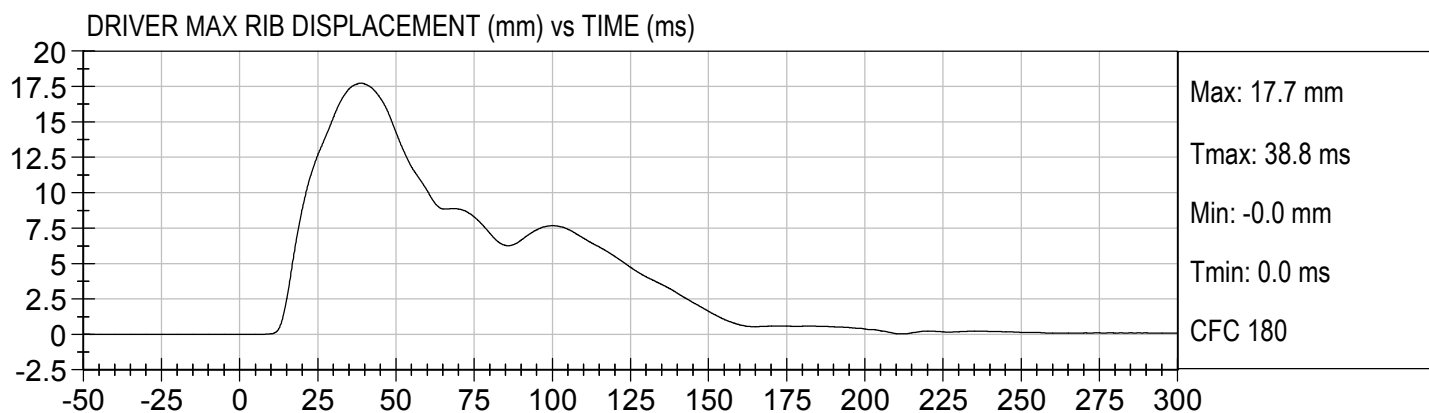
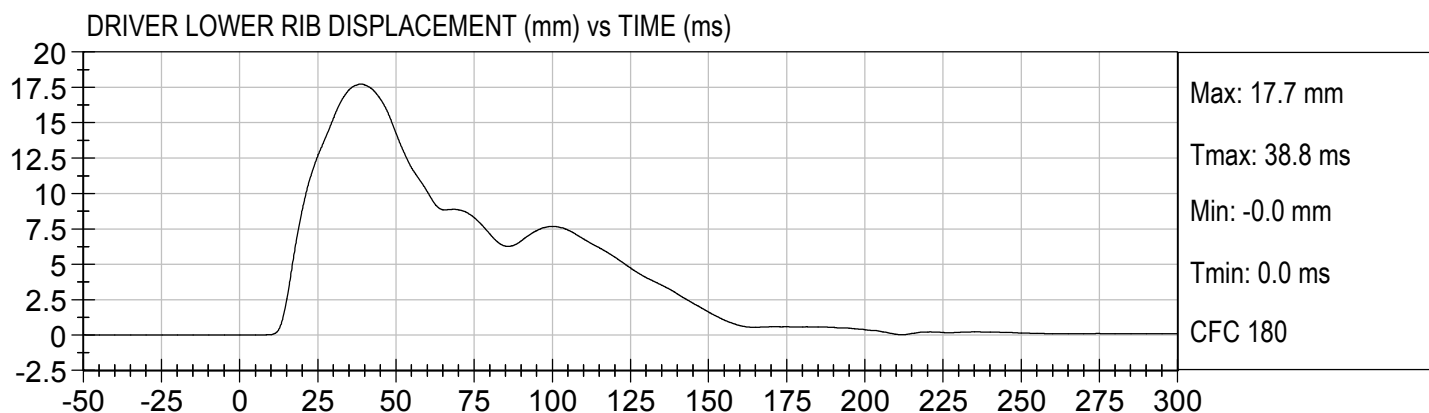
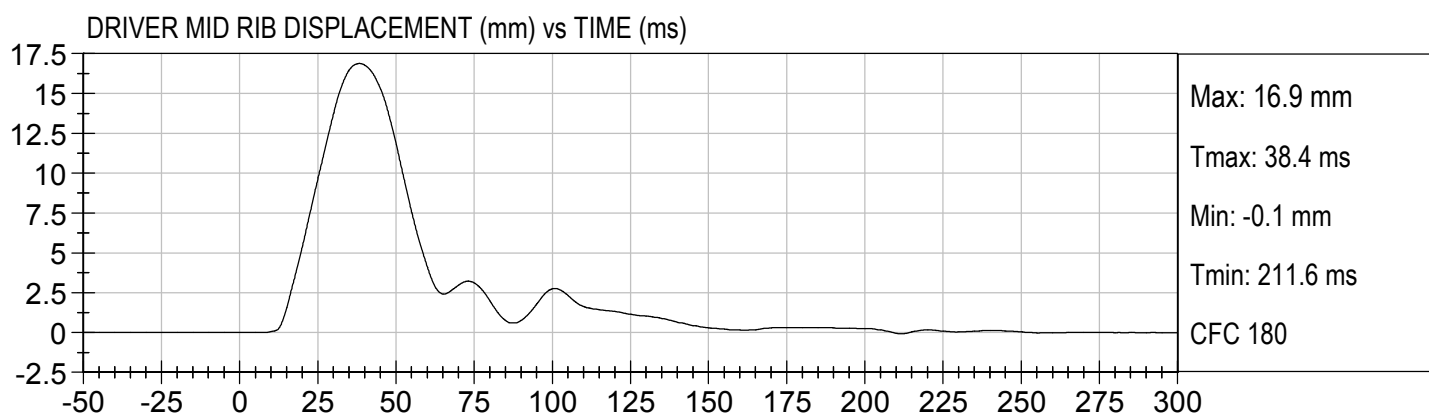
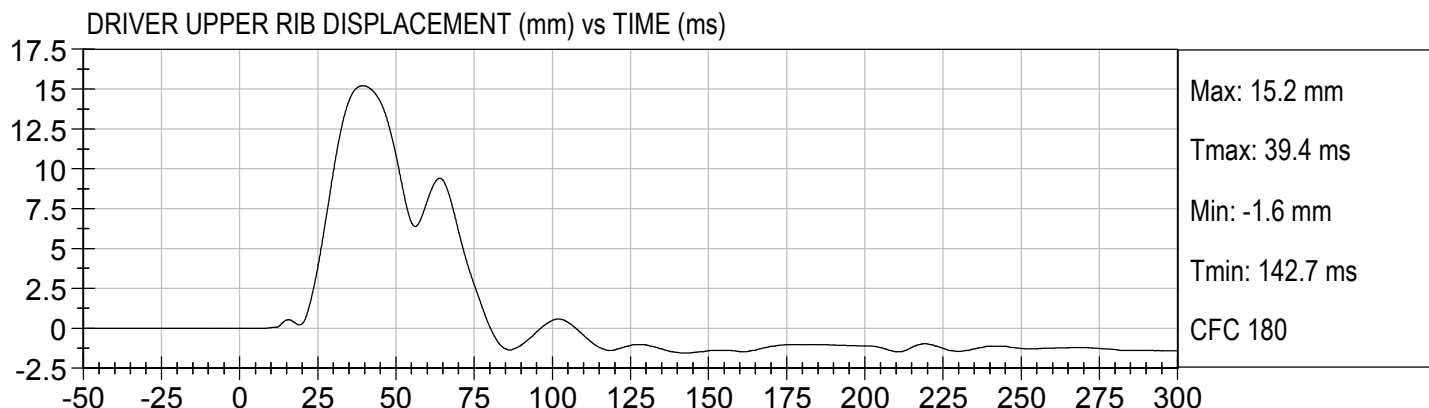
MDB Rear Acceleration (X)

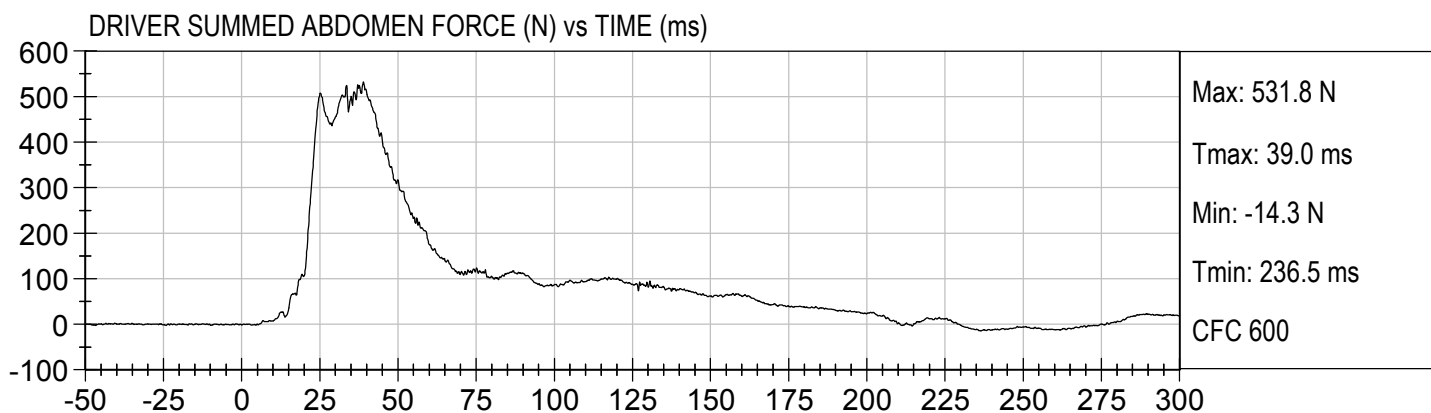
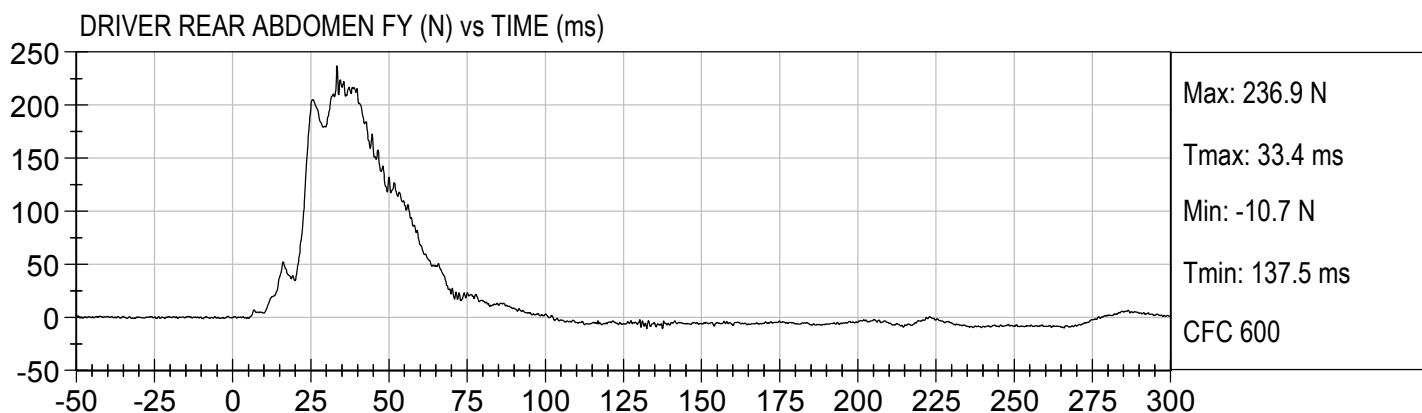
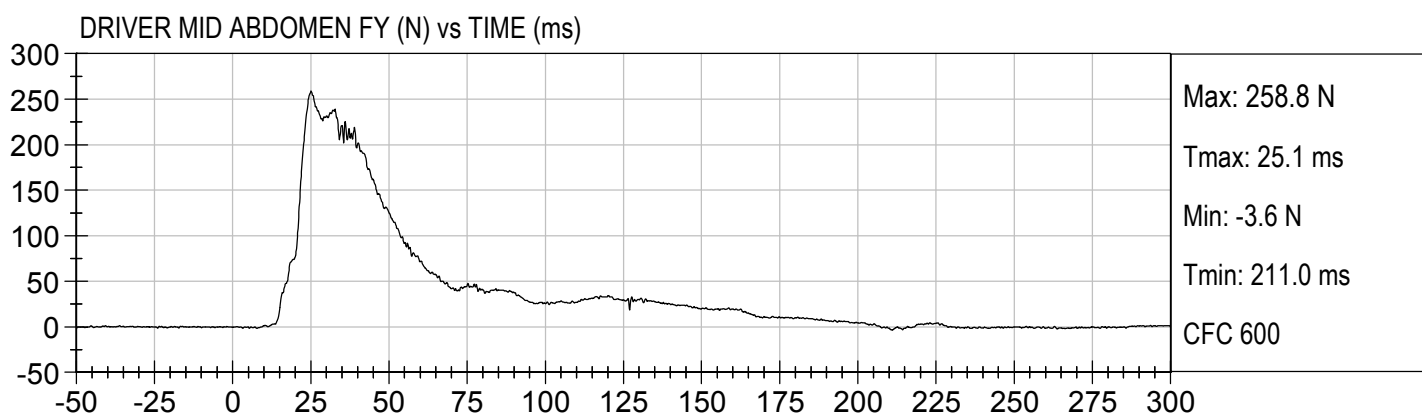
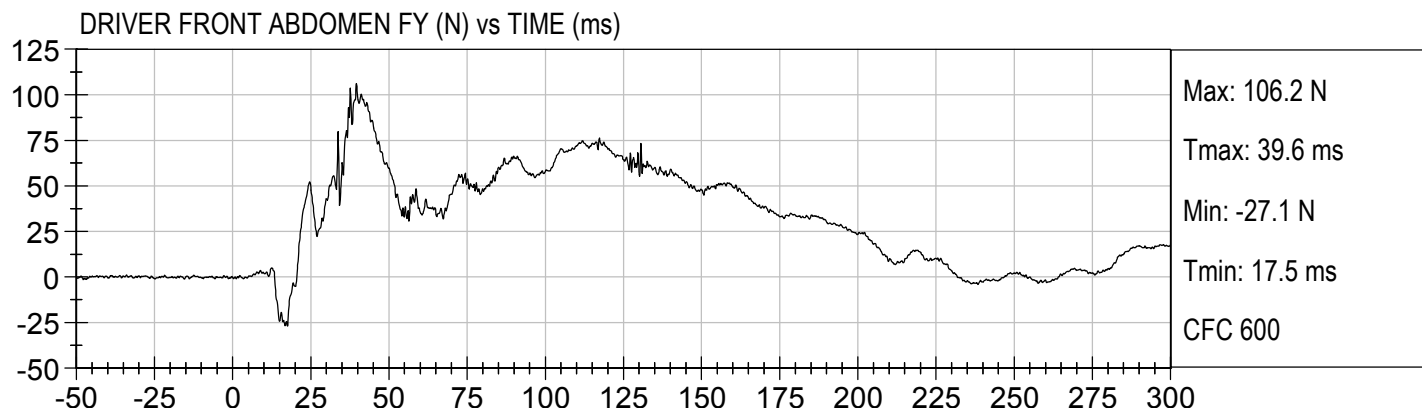
MDB Rear Acceleration (Y)

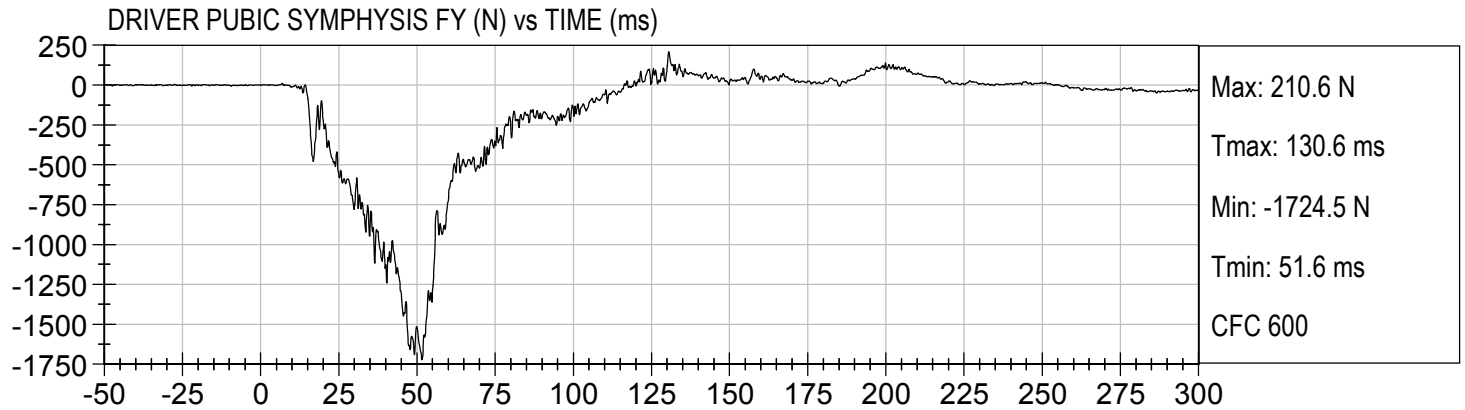
Left MDB Contact Switch

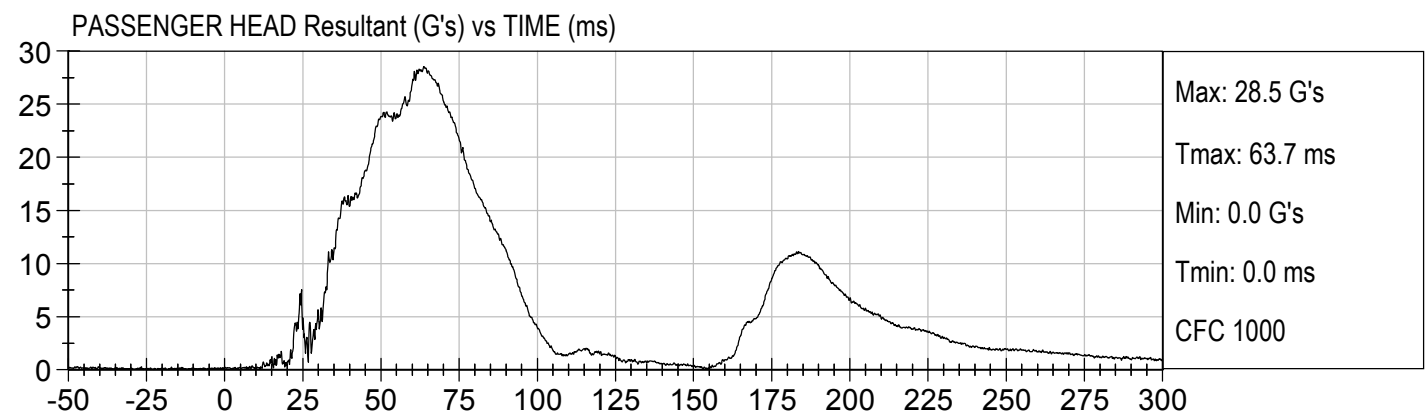
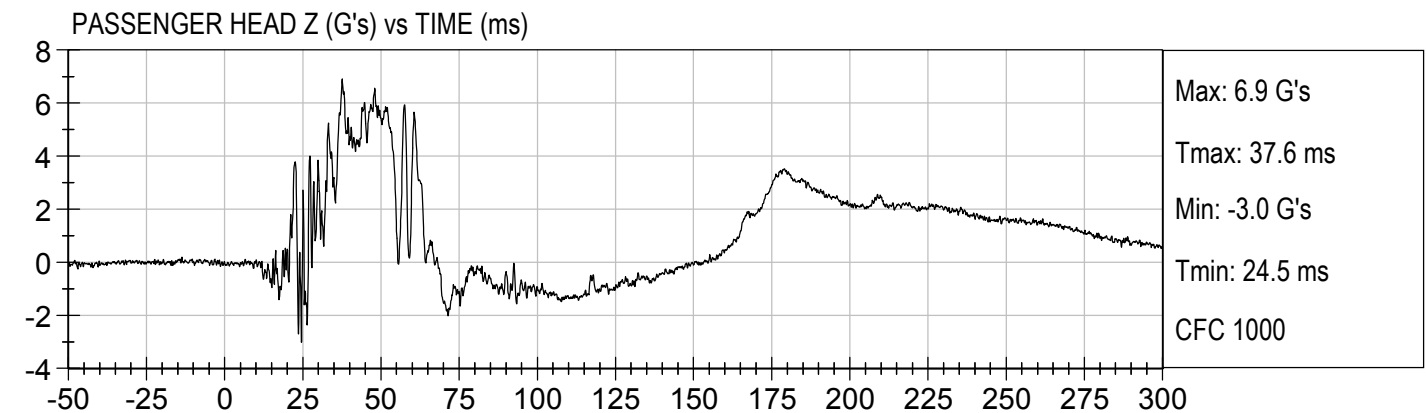
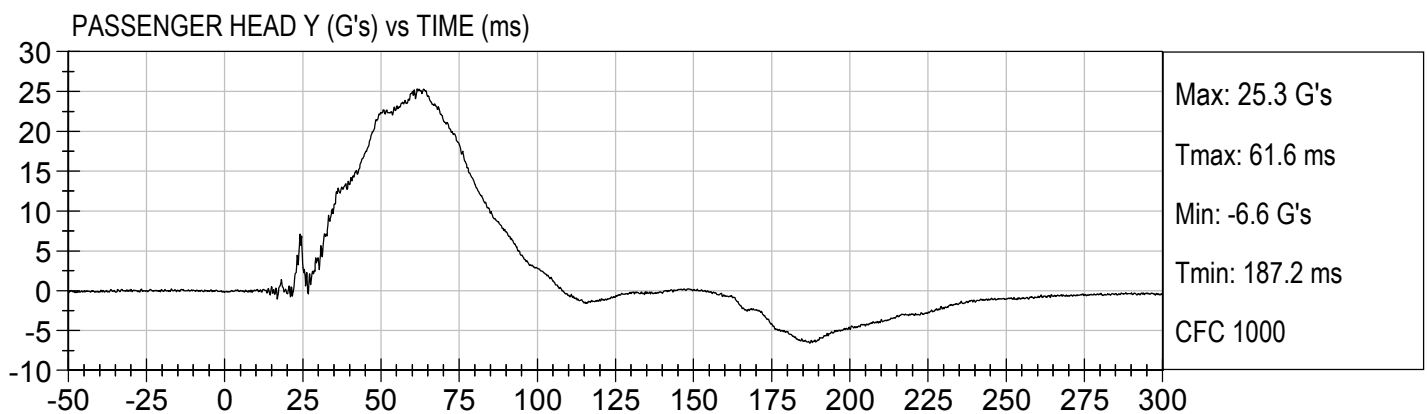
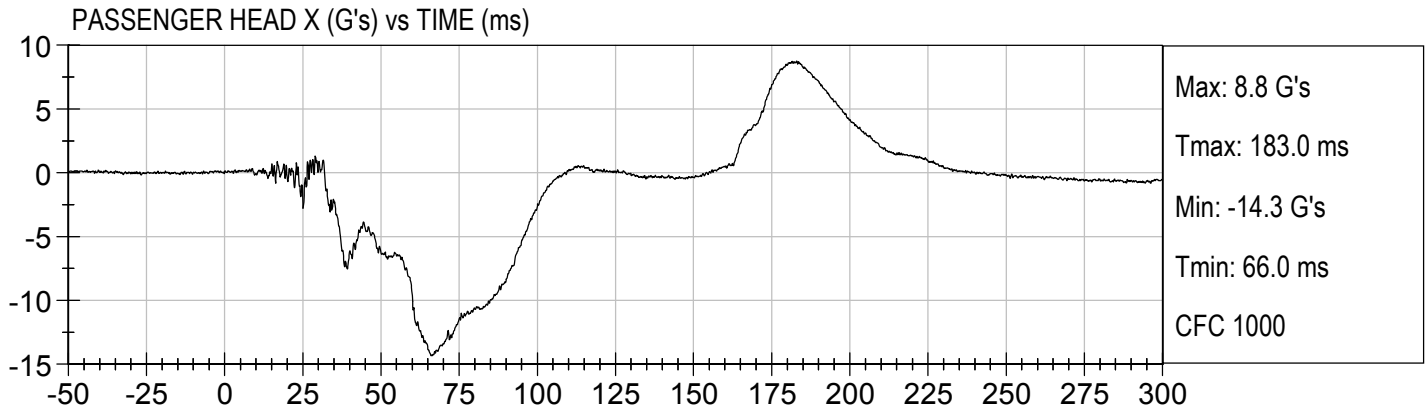
Right MDB Contact Switch

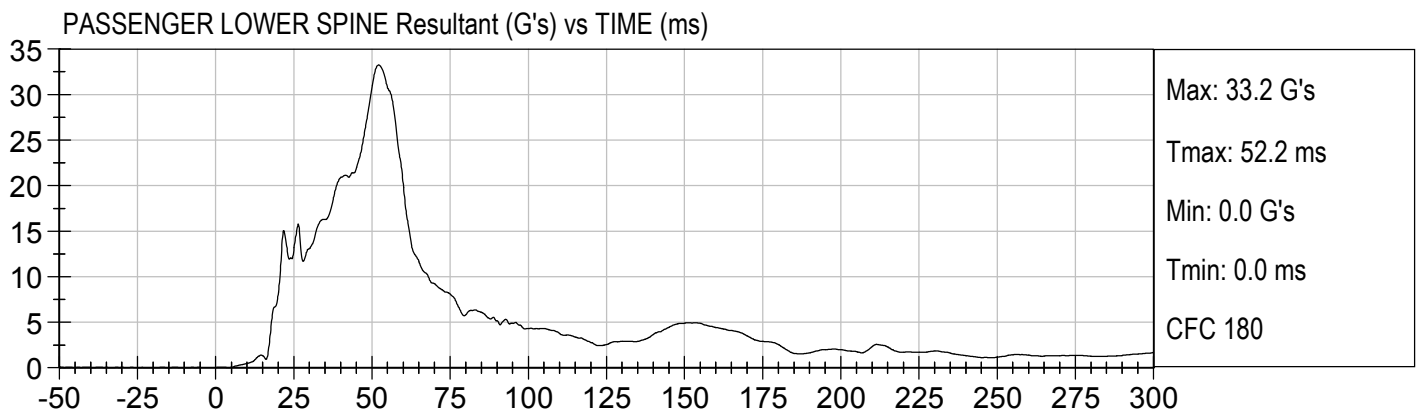
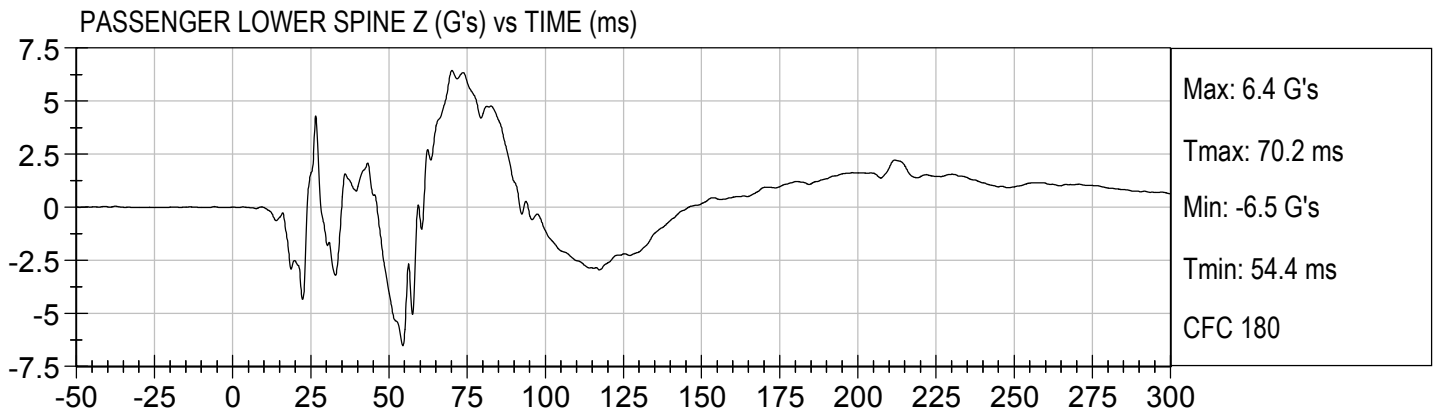
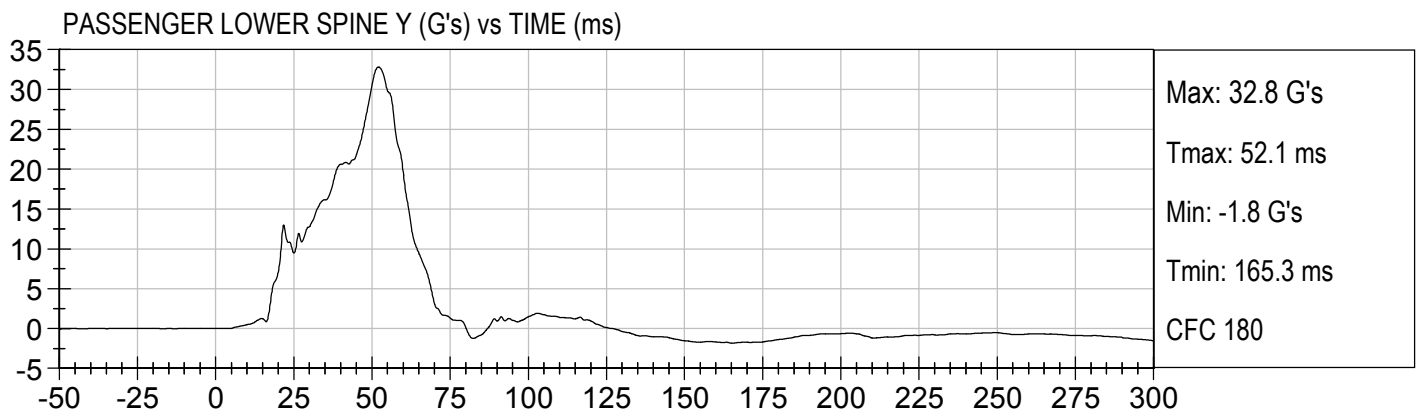
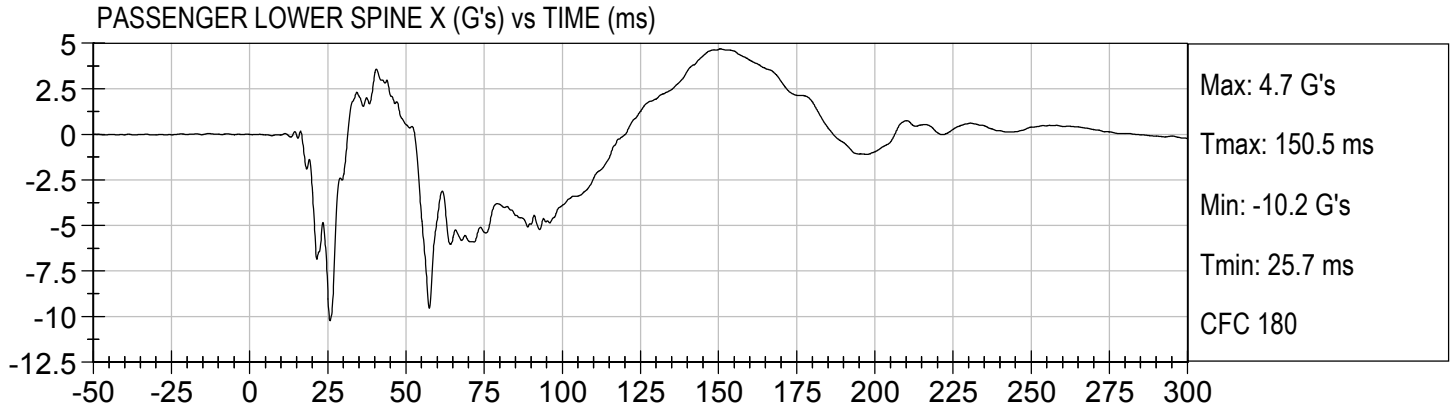


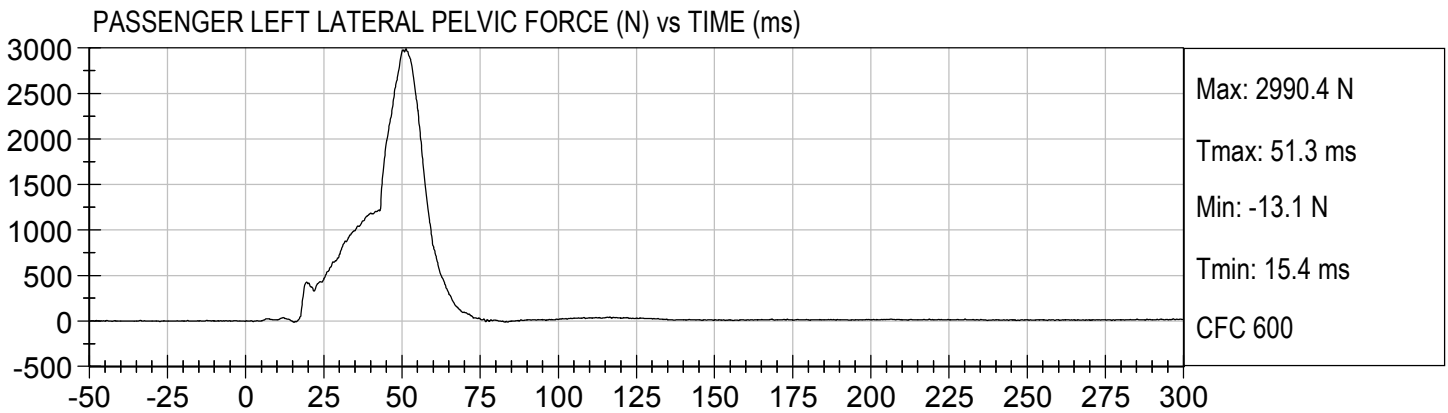
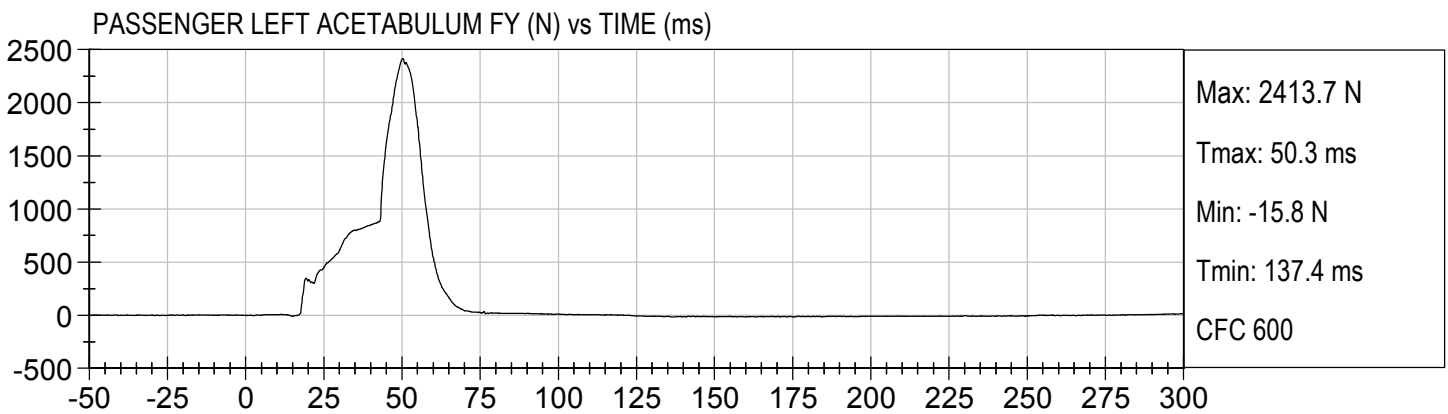
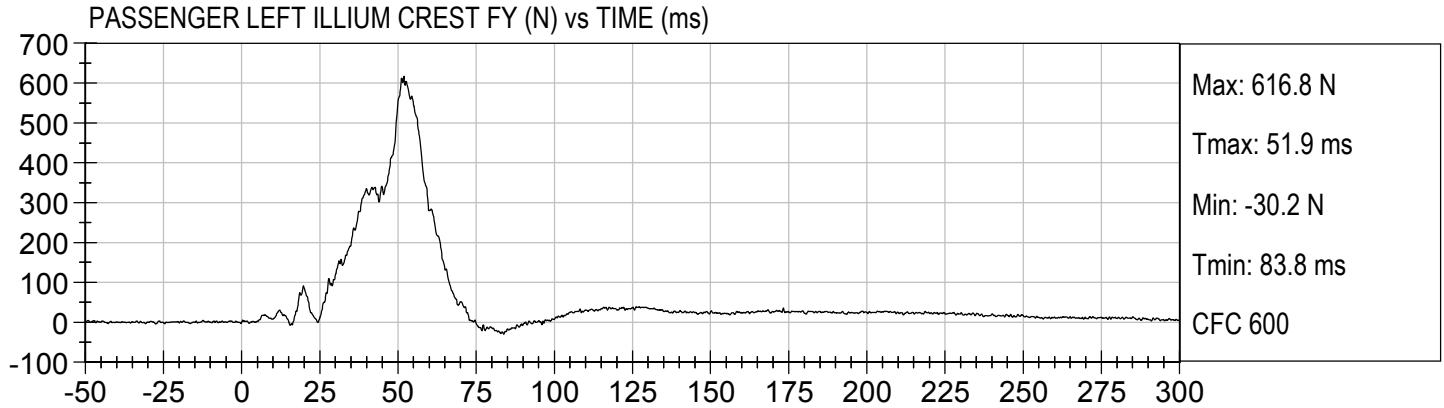












APPENDIX C
DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

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: 032Test ID: D144401

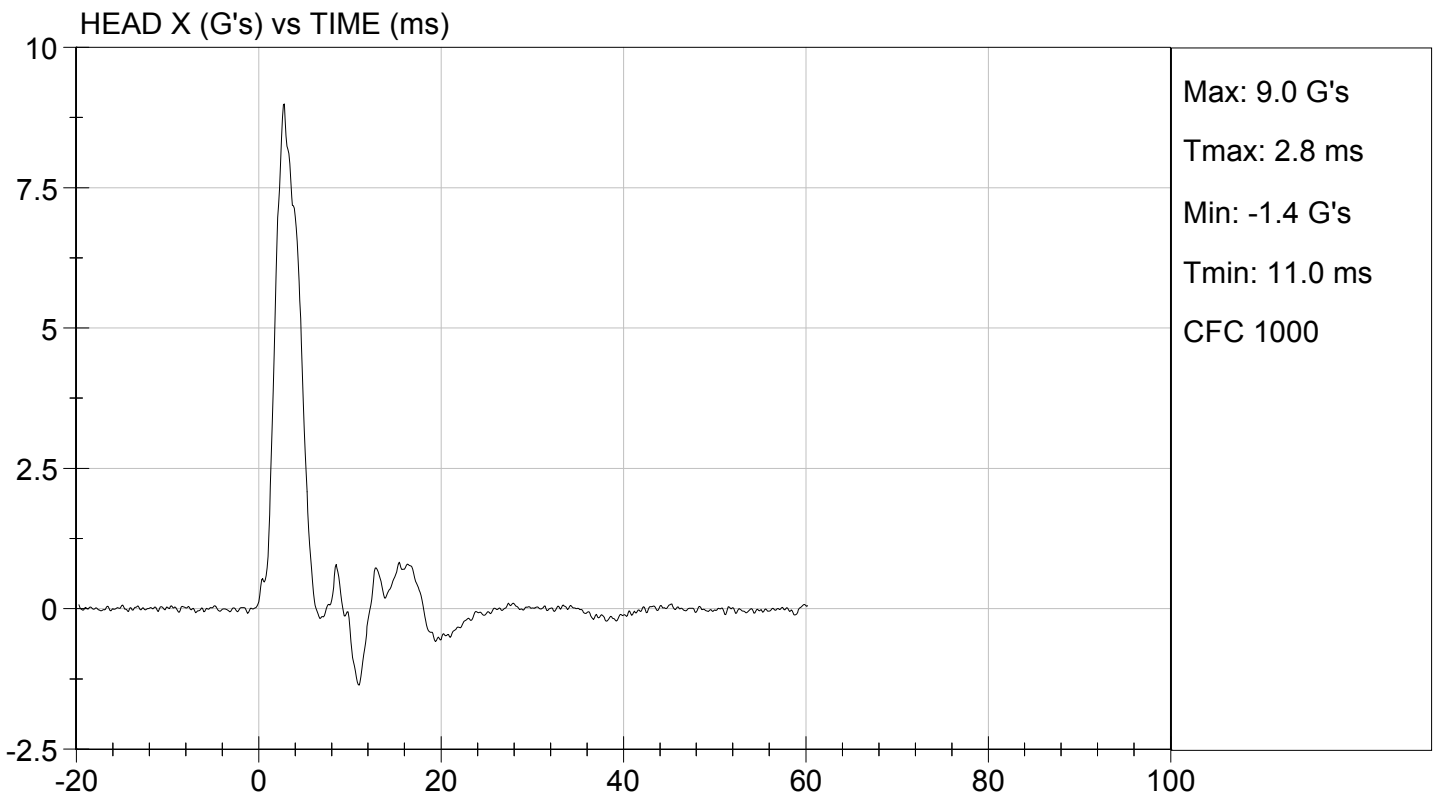
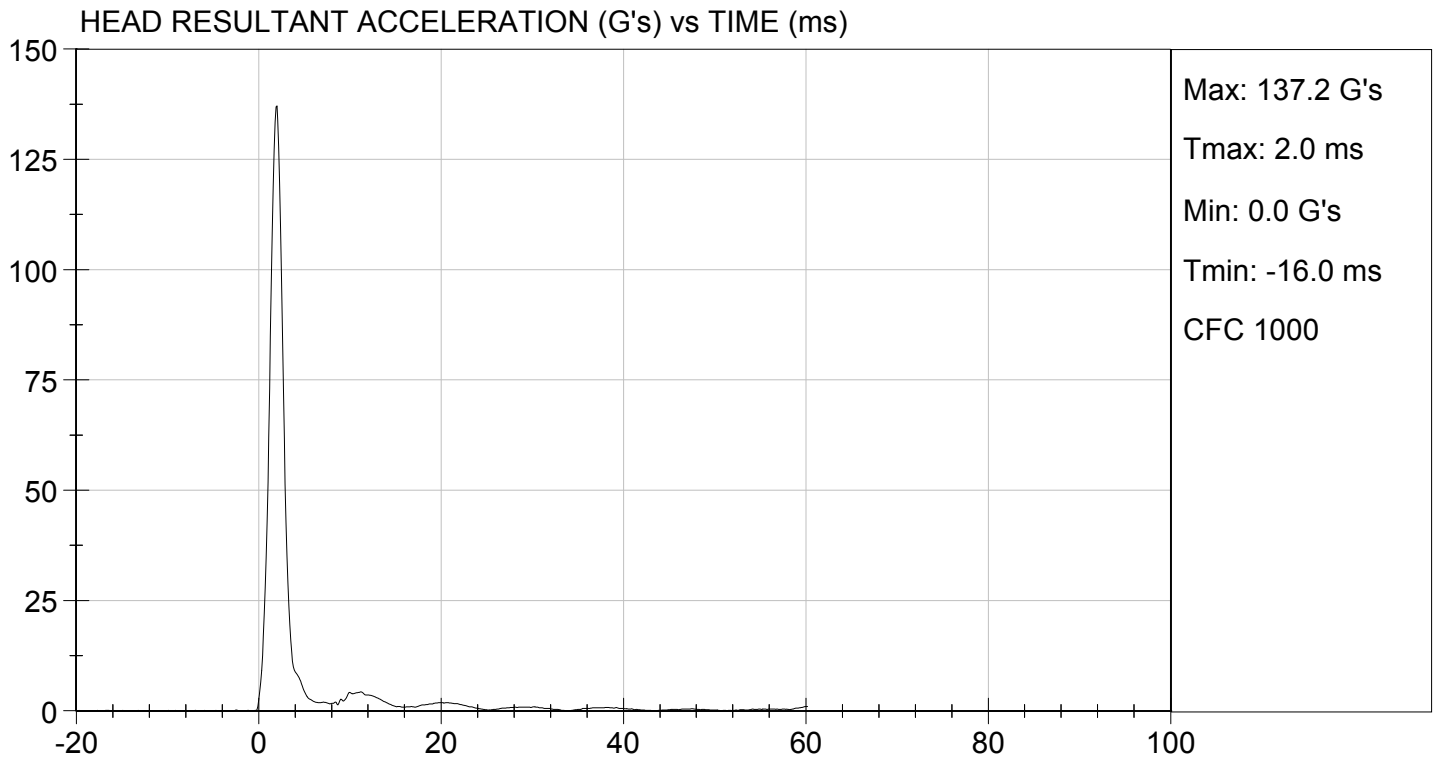
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	27	Pass
Peak Resultant Acceleration	G's	125 to 155	137	Pass
Peak Longitudinal Acceleration	G's	<= +/- 15.0	9.0	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 15% of peak	Yes	Pass
Overall Test Results				Pass

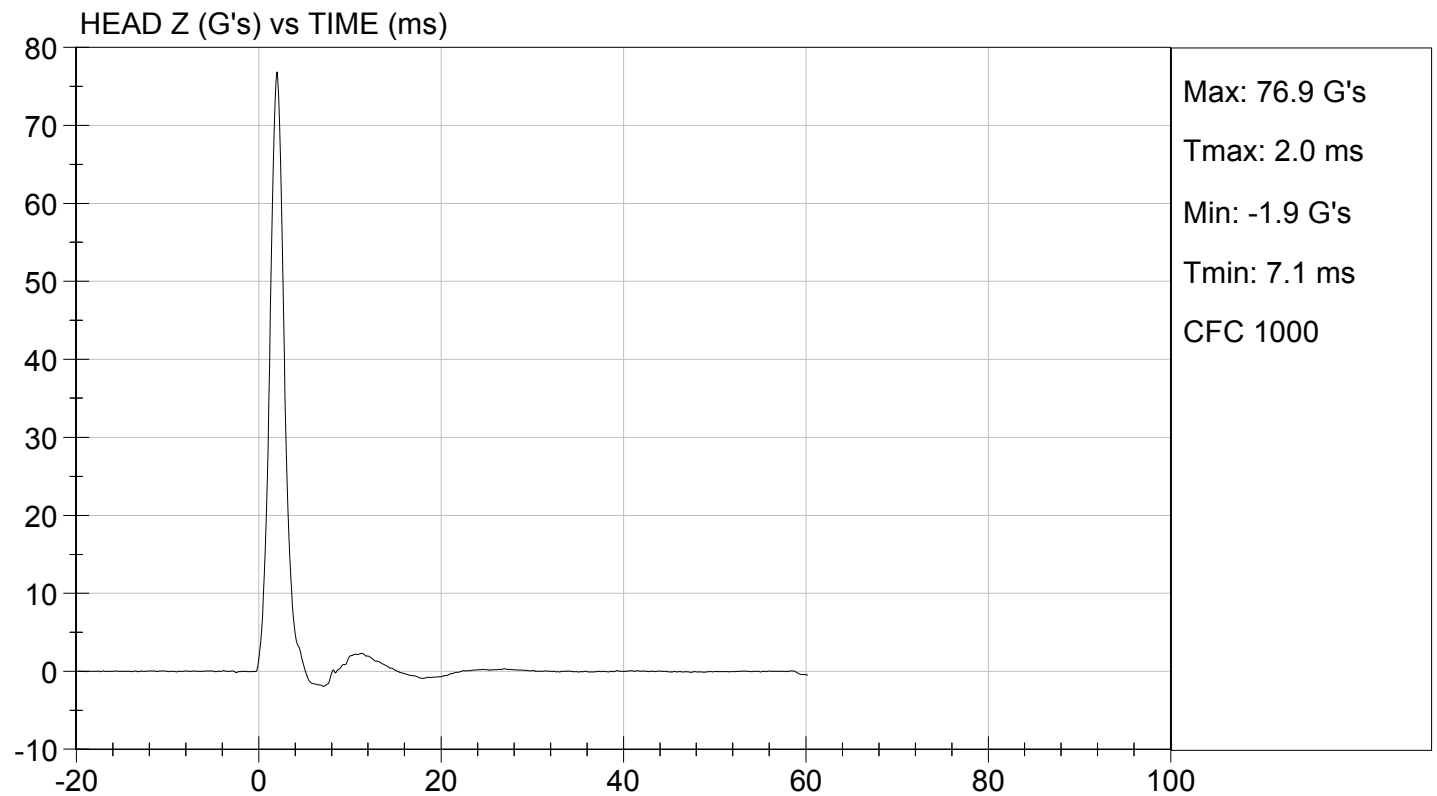
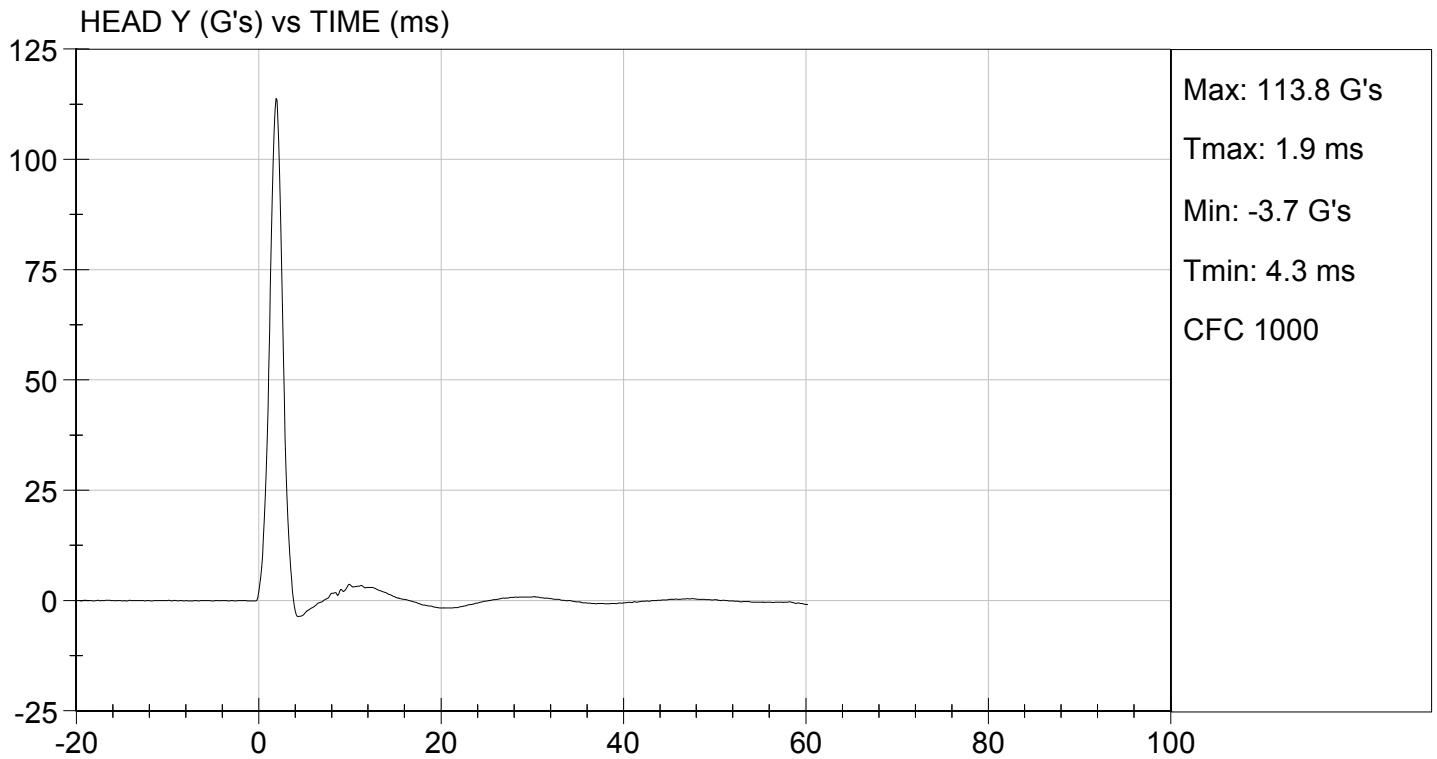

Laboratory Technician

12/12/2014

Test Date


Approved By



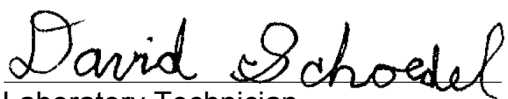


MGA RESEARCH CORPORATION
NECK PENDULUM TEST
ES-2re DUMMY

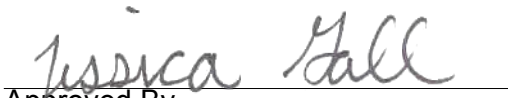
ATD Serial No: 032

Test I.D: D144402

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	27	Pass
Pendulum Speed		m/s	3.30 to 3.50	3.36	Pass
Pendulum Velocity	1 ms	m/s	-0.05 to 0.00	-0.02	Pass
	3 ms	m/s	-0.25 to -0.375	-0.32	Pass
	14 ms	m/s	-3.20 to -3.70	-3.24	Pass
	17 ms	m/s	>= -3.70	-3.24	Pass
Maximum Flexion Angle		deg	49.0 to 59.0	53.8	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	60.0	Pass
Overall Results					Pass


 Laboratory Technician

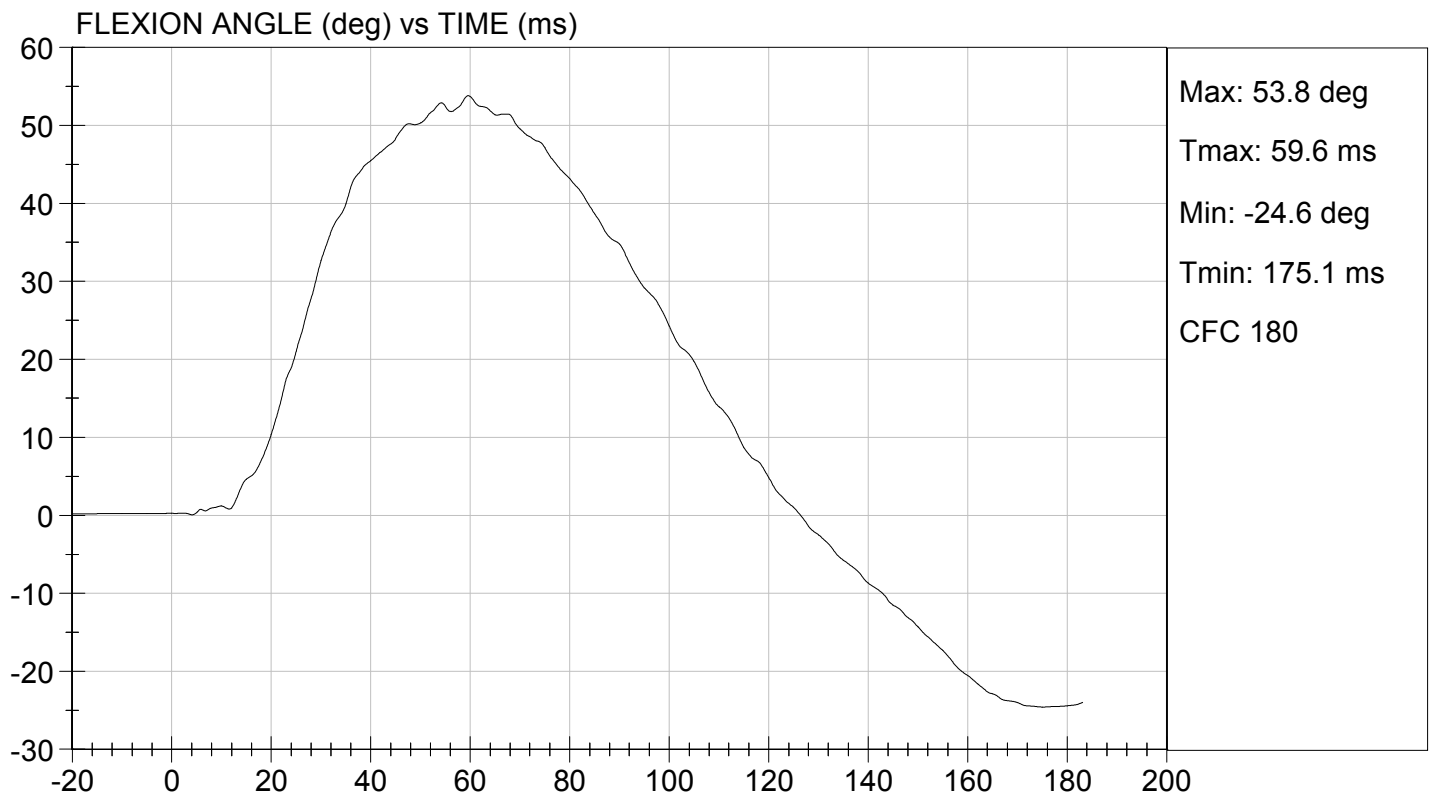
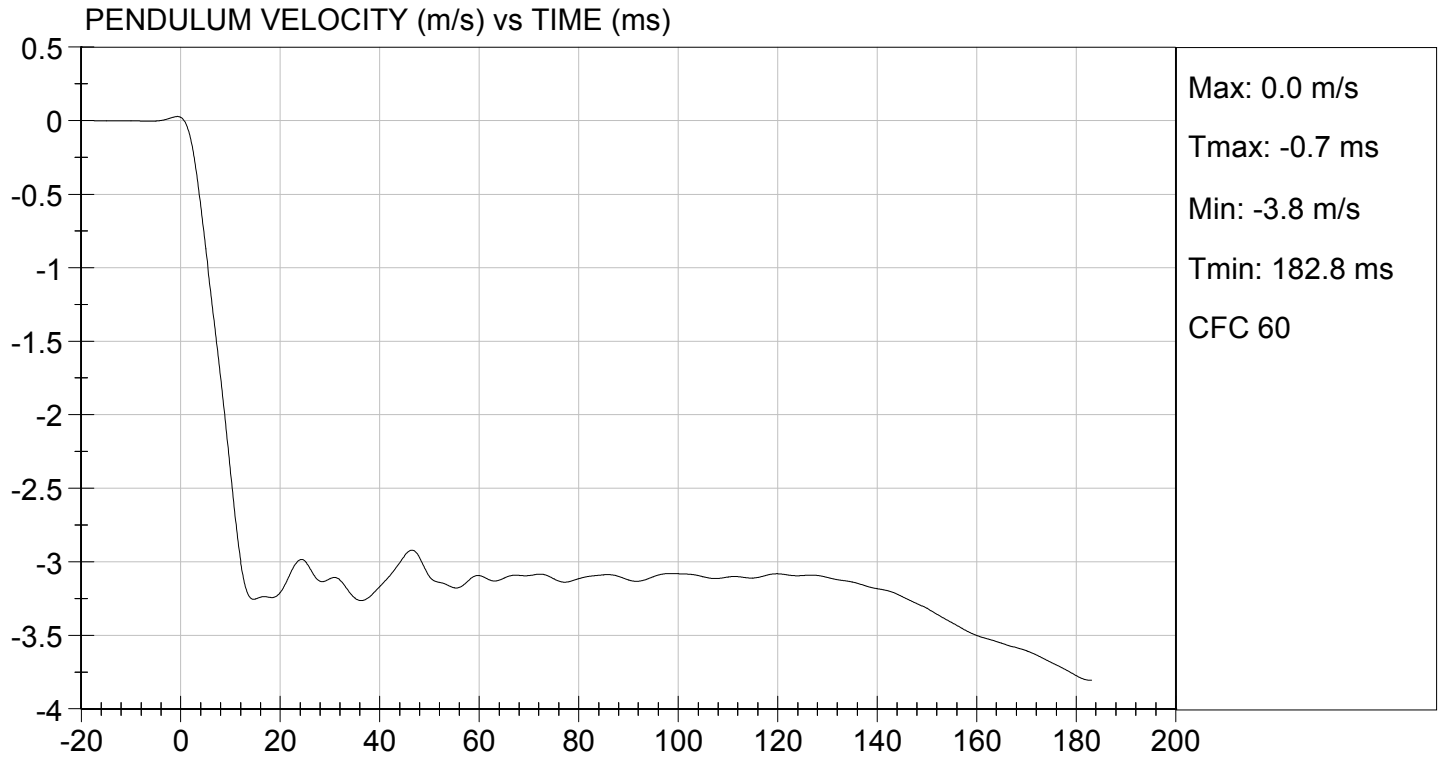
12/12/2014
 Test Date


 Approved By



TEST DESC: NECK BENDING
VELOCITY: 11.04 ft/s, 3.36 m/s

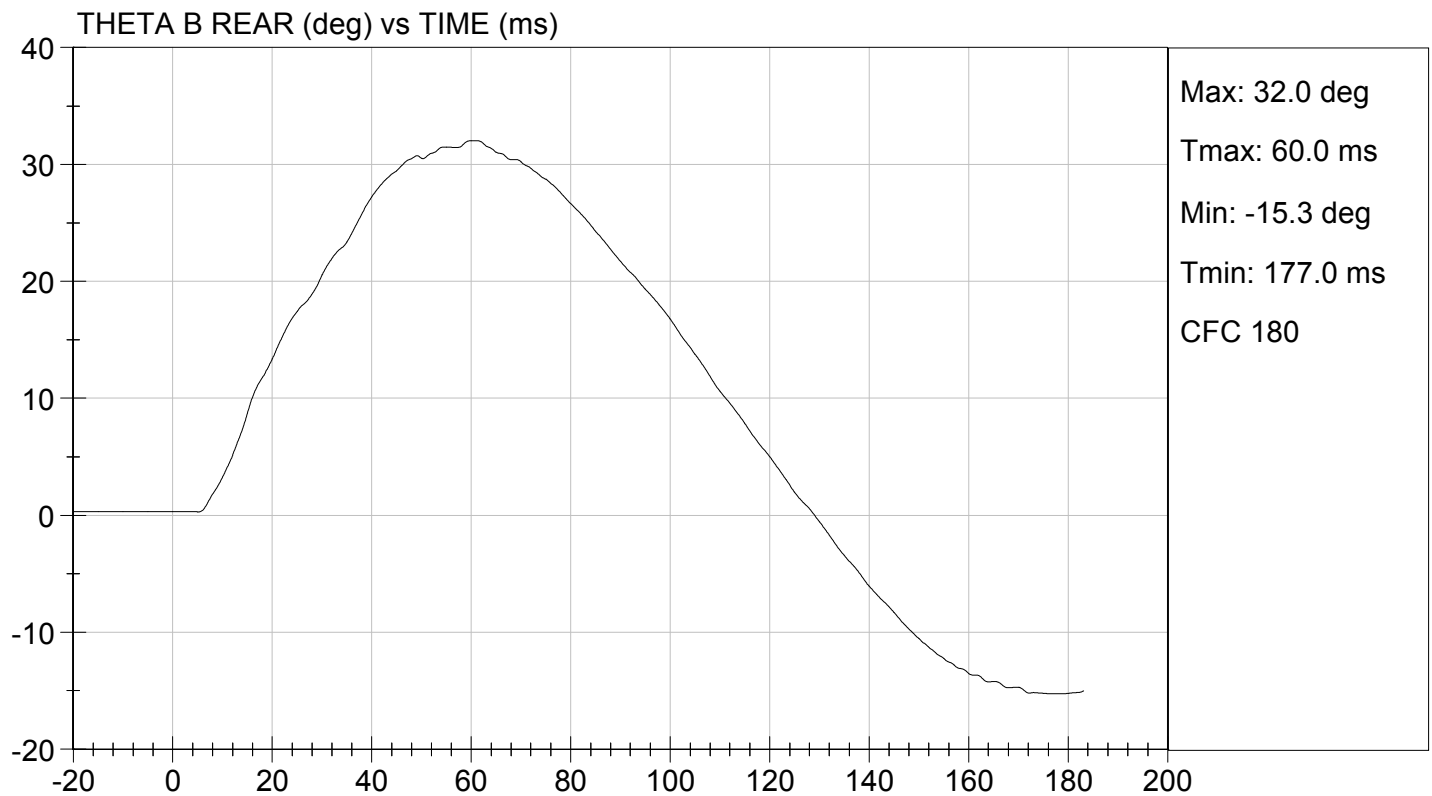
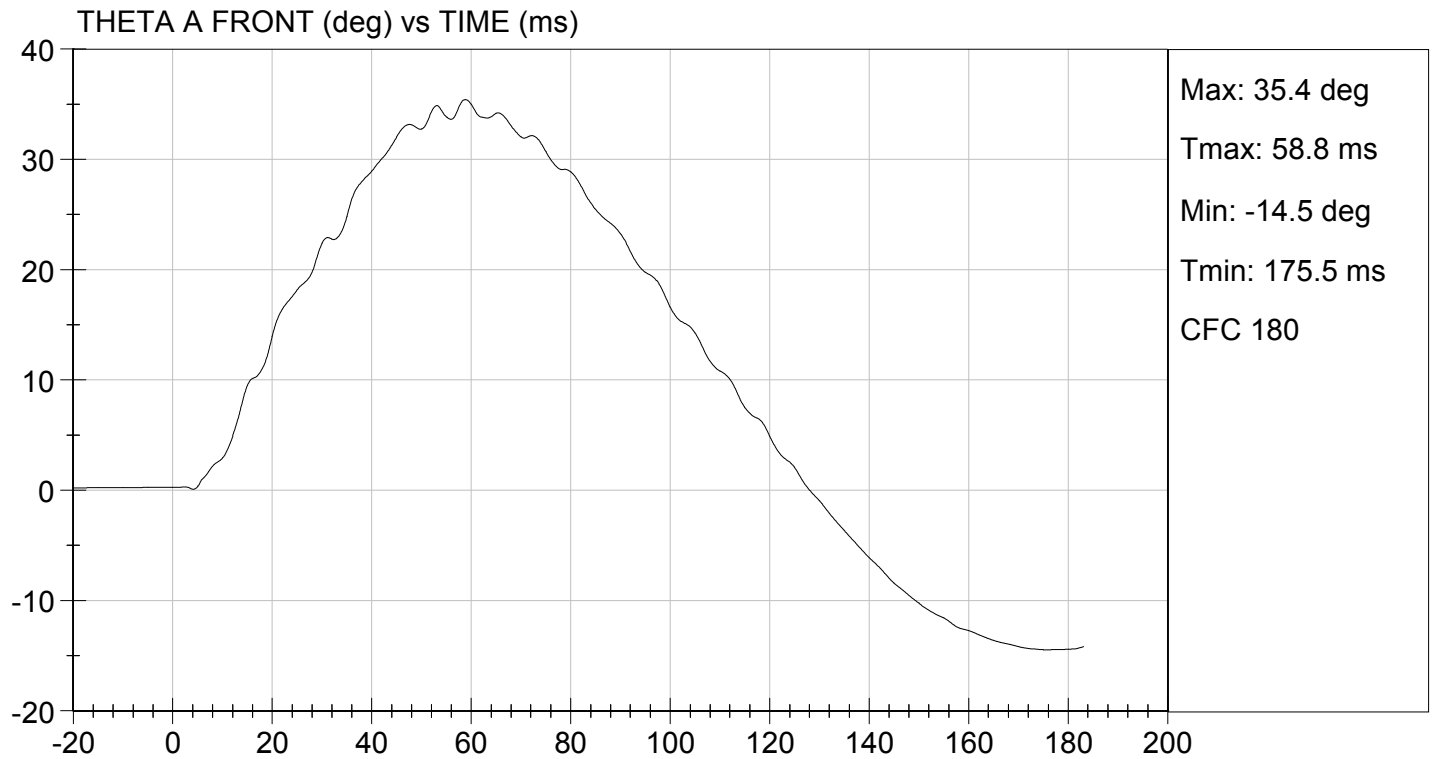
TEST DATE: 12/12/2014
TEST #: D144402





TEST DESC: NECK BENDING
VELOCITY: 11.04 ft/s, 3.36 m/s

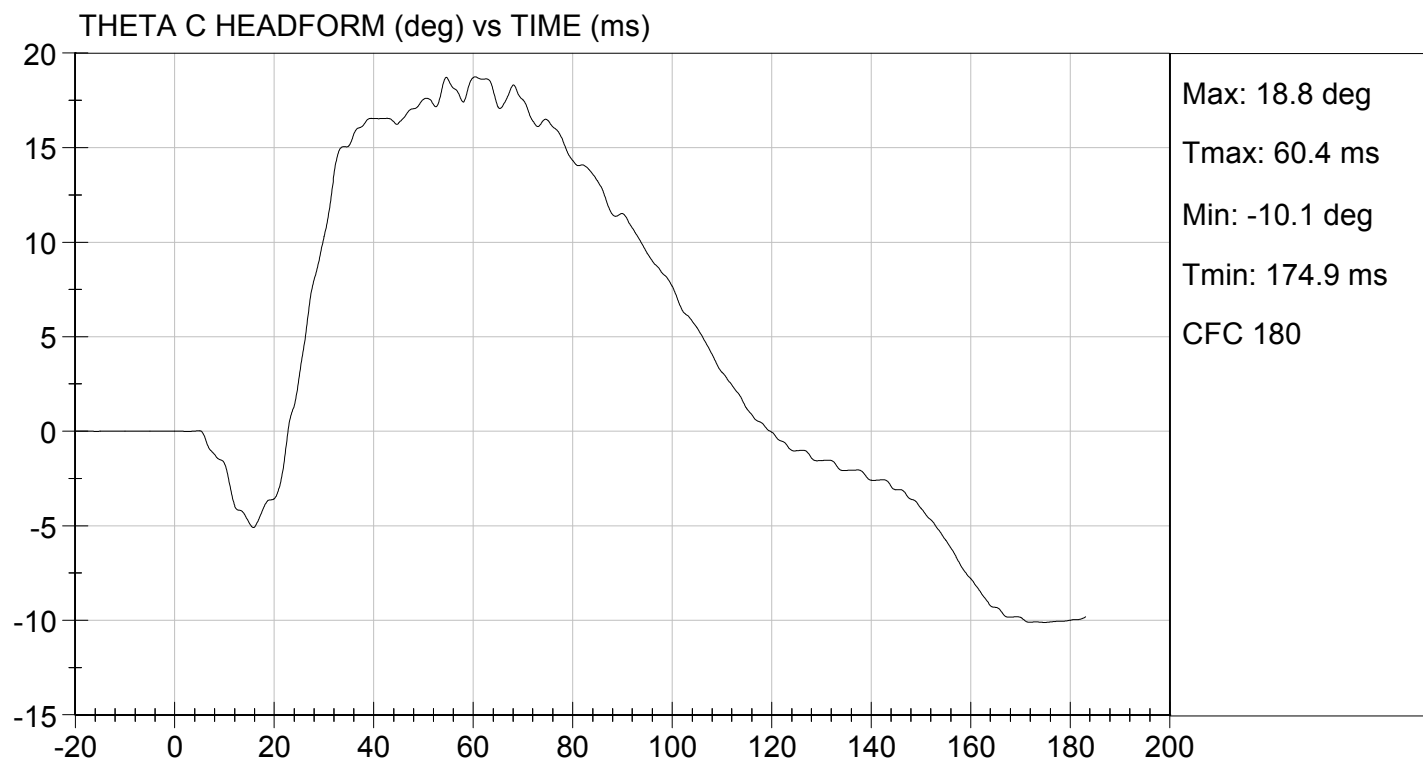
TEST DATE: 12/12/2014
TEST #: D144402





TEST DESC: NECK BENDING
VELOCITY: 11.04 ft/s, 3.36 m/s

TEST DATE: 12/12/2014
TEST #: D144402



MGA RESEARCH CORPORATION

SHOULDER IMPACT TEST

ES-2re DUMMY

ATD Serial No: 032

Test I.D: D144403

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	40	Pass
Pendulum Speed	m/s	4.20 to 4.40	4.34	Pass
Peak Impactor Acceleration	G's	7.5 to 10.5	8.4	Pass
Overall Test Results				Pass


Laboratory Technician

12/15/2014

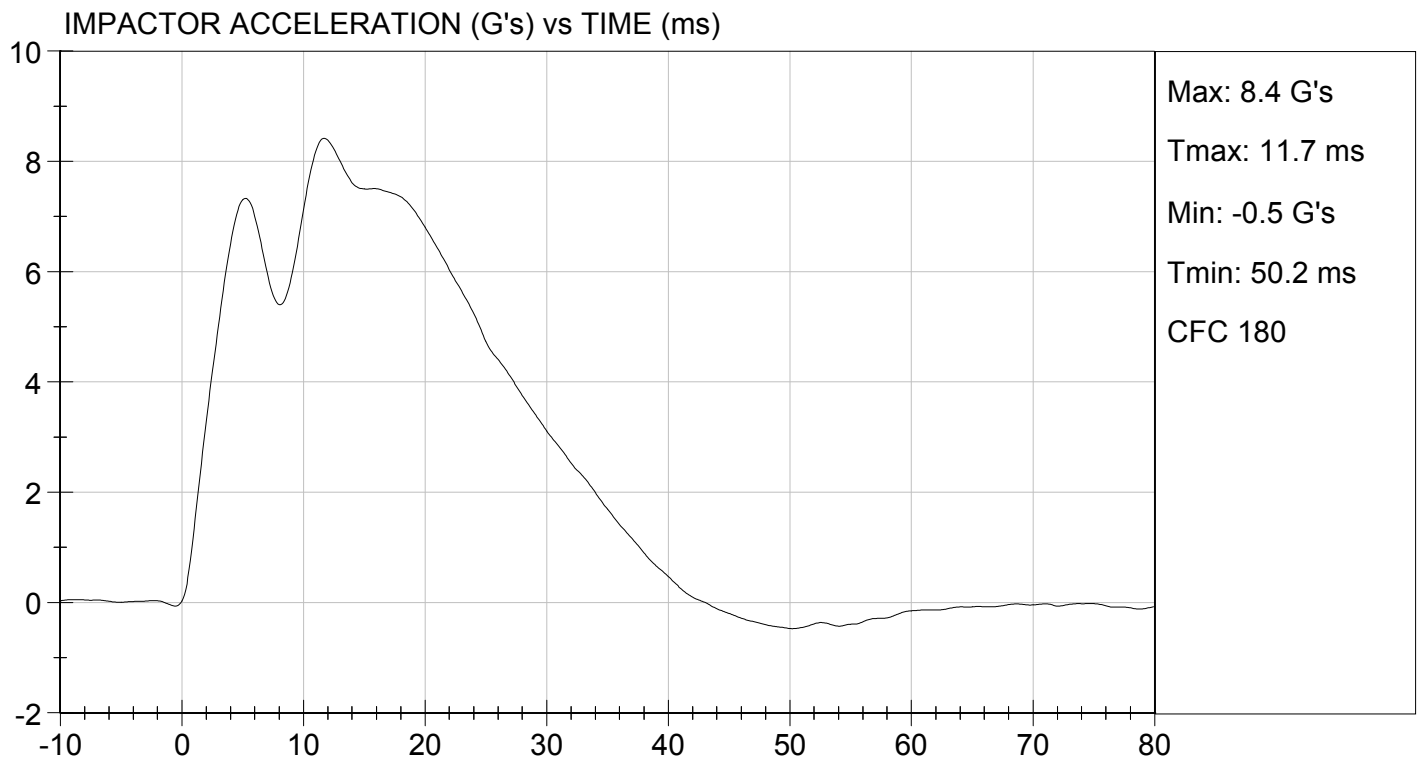
Test Date


Approved By



TEST DESC: SHOULDER IMPACT
VELOCITY: 14.25 ft/s, 4.34 m/s

TEST DATE: 12/15/2014
TEST #: D144403



MGA RESEARCH CORPORATION

UPPER RIB TEST

ES-2re DUMMY

ATD Serial No: 032

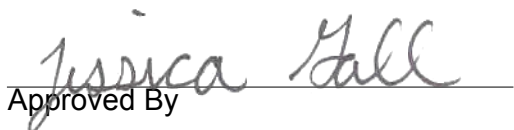
Test I.D: D144404

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	25	Pass
Displacement at 459 mm	mm	36.0 to 40.0	39.6	Pass
Displacement at 815 mm	mm	46.0 to 51.0	49.5	Pass
Overall Test Results				Pass


Laboratory Technician

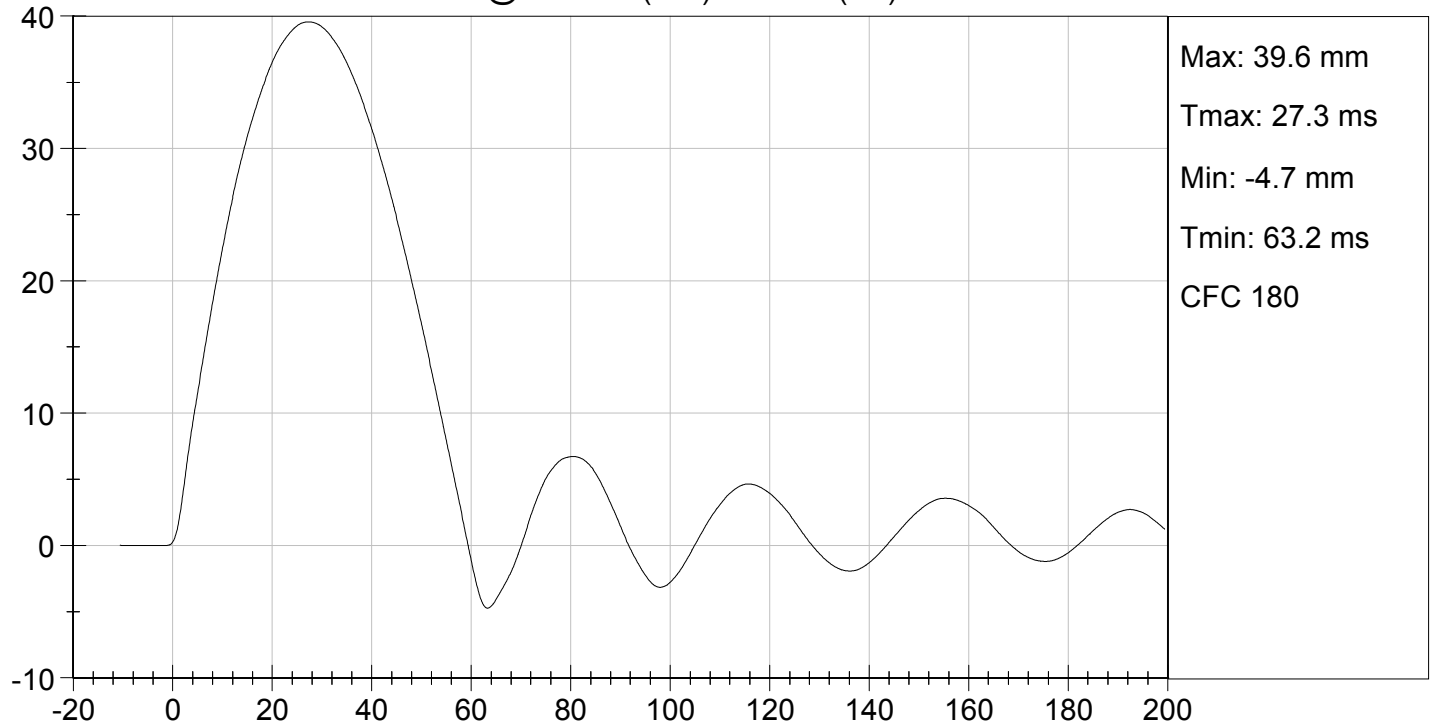
12/12/2014

Test Date

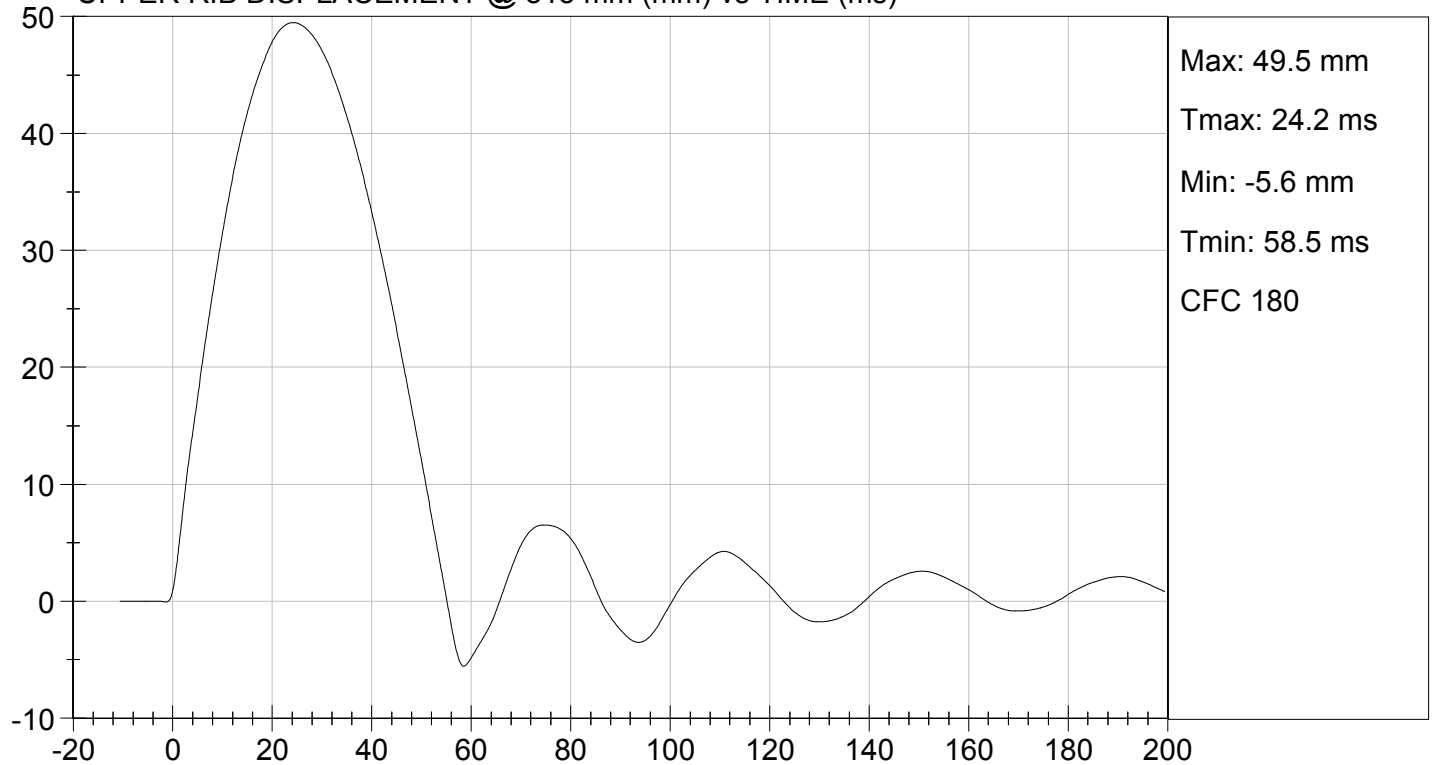

Approved By



UPPER RIB DISPLACEMENT @ 459 mm (mm) vs TIME (ms)



UPPER RIB DISPLACEMENT @ 815 mm (mm) vs TIME (ms)



MGA RESEARCH CORPORATION

MID RIB TEST

ES-2re DUMMY

ATD Serial No: 032

Test I.D: D144405

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	25	Pass
Displacement at 459 mm	mm	36.0 to 40.0	38.5	Pass
Displacement at 815 mm	mm	46.0 to 51.0	49.0	Pass
Overall Test Results				Pass


Laboratory Technician

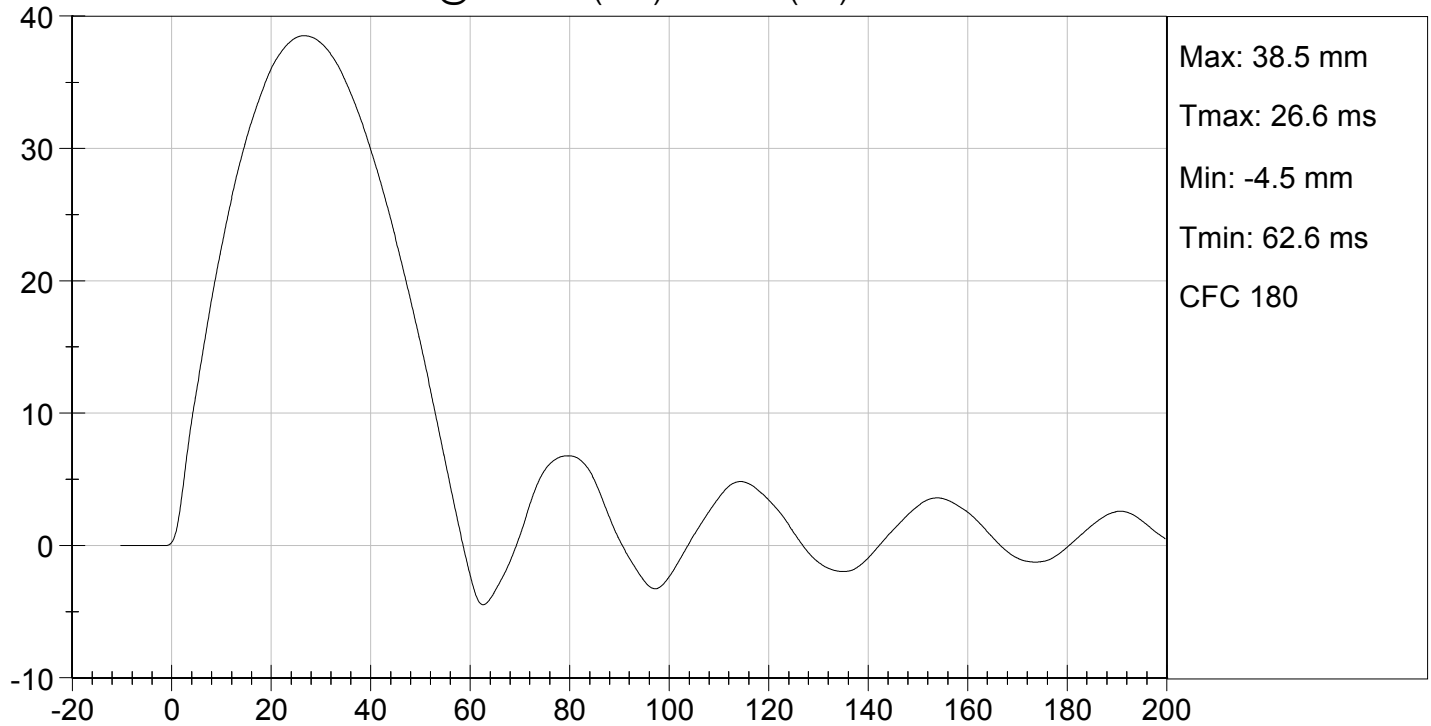
12/12/2014

Test Date

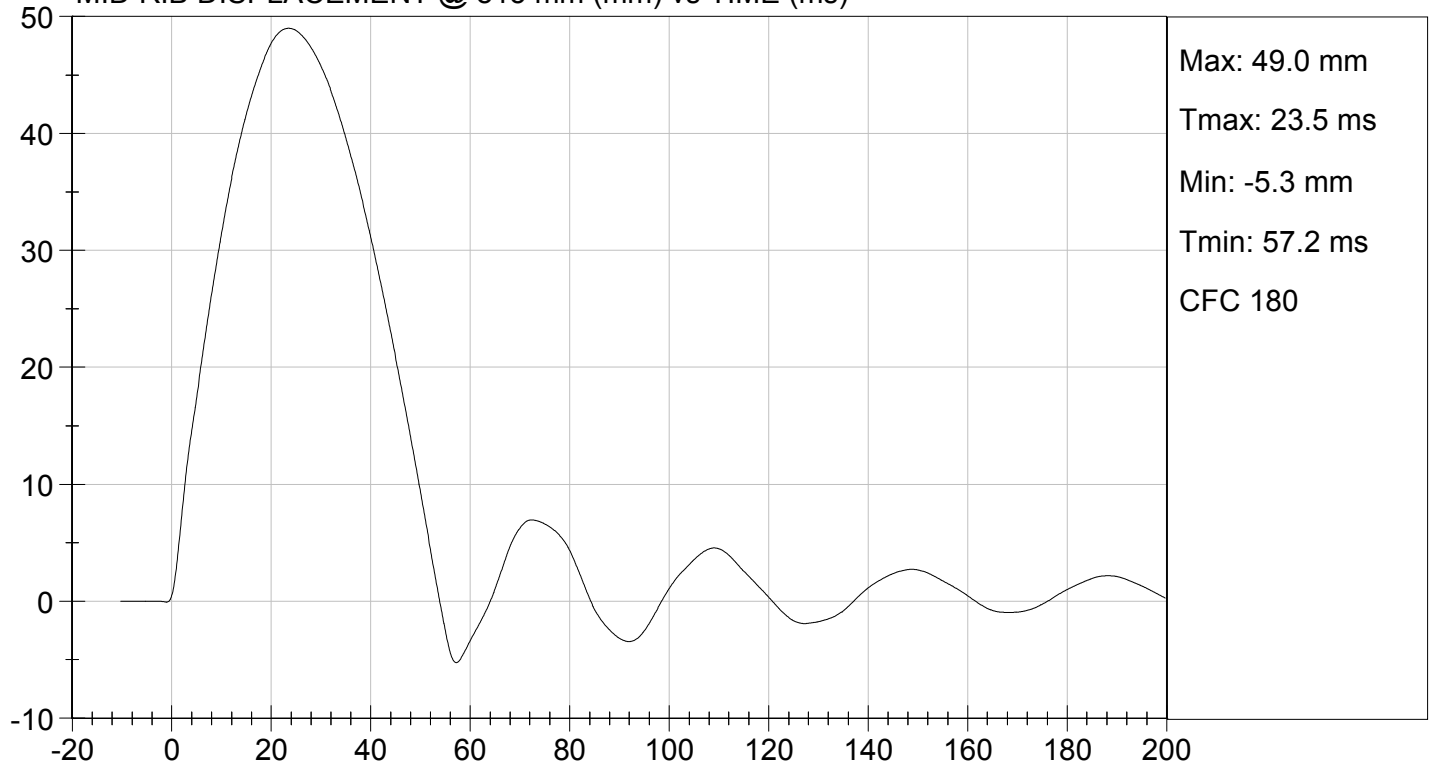

Approved By



MID RIB DISPLACEMENT @ 459 mm (mm) vs TIME (ms)



MID RIB DISPLACEMENT @ 815 mm (mm) vs TIME (ms)



MGA RESEARCH CORPORATION

LOWER RIB TEST

ES-2re DUMMY

ATD Serial No: 032

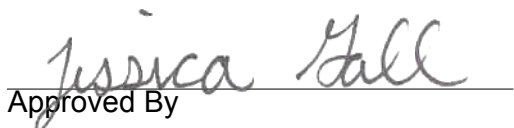
Test I.D: D144406

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	25	Pass
Displacement at 459 mm	mm	36.0 to 40.0	38.8	Pass
Displacement at 815 mm	mm	46.0 to 51.0	49.4	Pass
Overall Test Results				Pass


Laboratory Technician

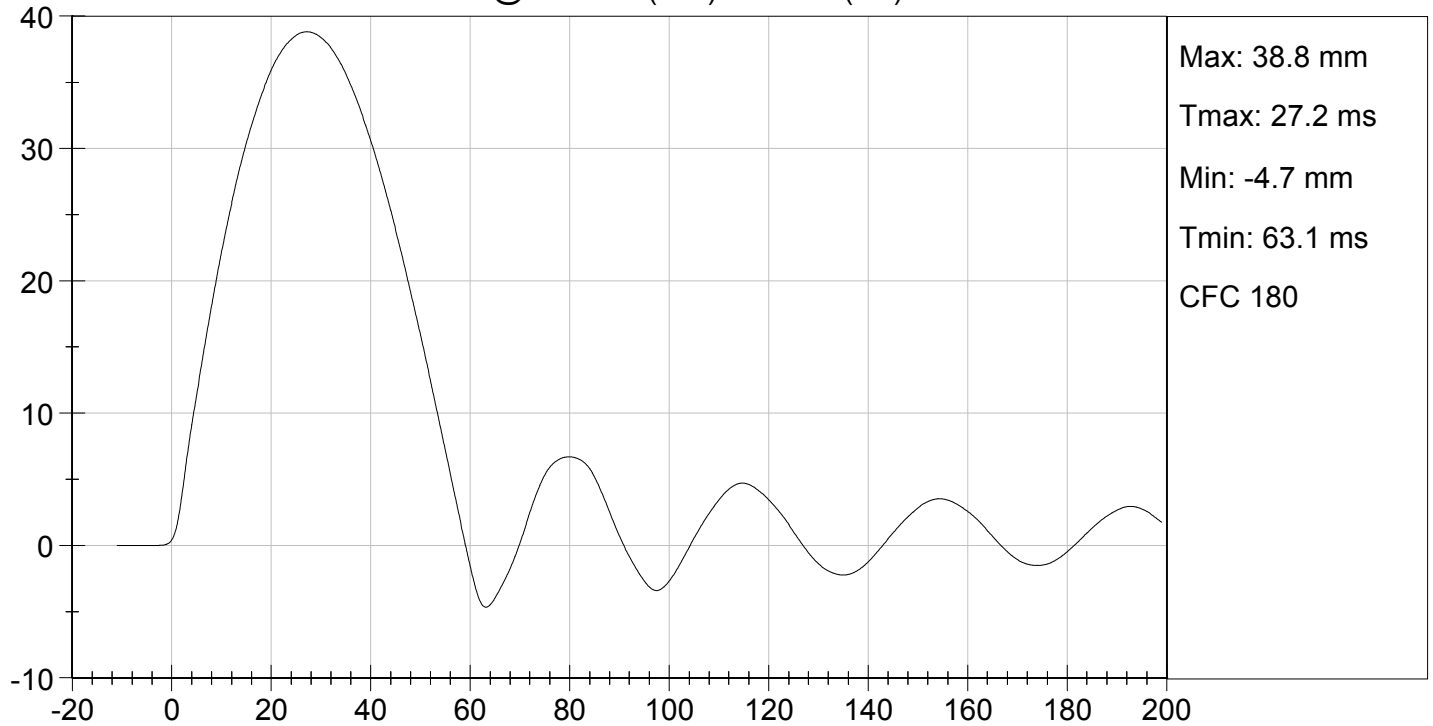
12/12/2014

Test Date

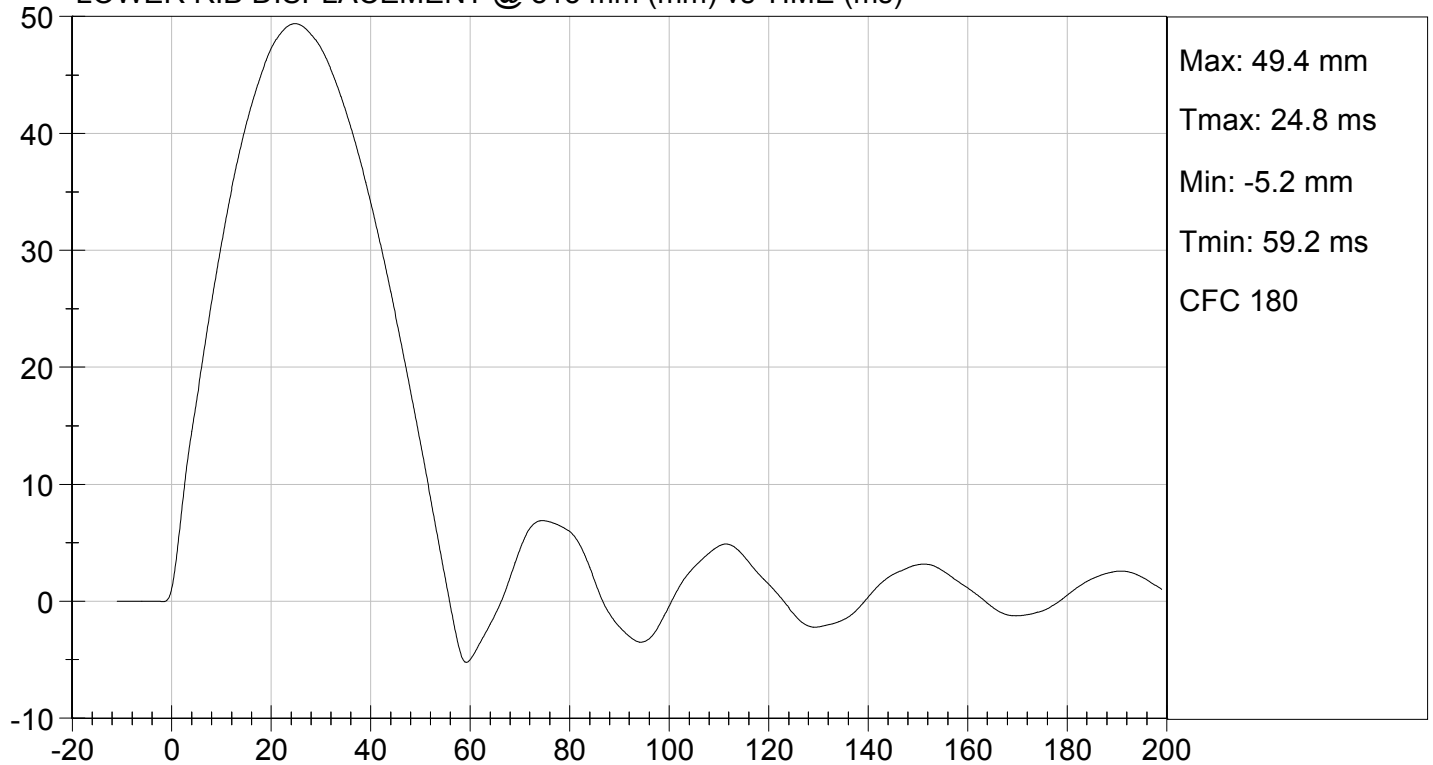

Approved By



LOWER RIB DISPLACEMENT @ 459 mm (mm) vs TIME (ms)



LOWER RIB DISPLACEMENT @ 815 mm (mm) vs TIME (ms)



MGA RESEARCH CORPORATION**THORAX IMPACT TEST****ES-2re DUMMY****ATD Serial No:** 032**Test I.D:** D144400

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.4	Pass
Humidity	%	10 to 70	40	Pass
Probe Speed	m/s	5.40 to 5.60	5.58	Pass
Maximum Impactor Force (after 6 ms)	N	5100 to 6200	5366	Pass
Upper Rib Displacement	mm	34.0 to 41.0	38.2	Pass
Middle Rib Displacement	mm	37.0 to 45.0	41.3	Pass
Lower Rib Displacement	mm	37.0 to 44.0	40.6	Pass
Overall Test Results				Pass


Laboratory Technician

12/15/2014

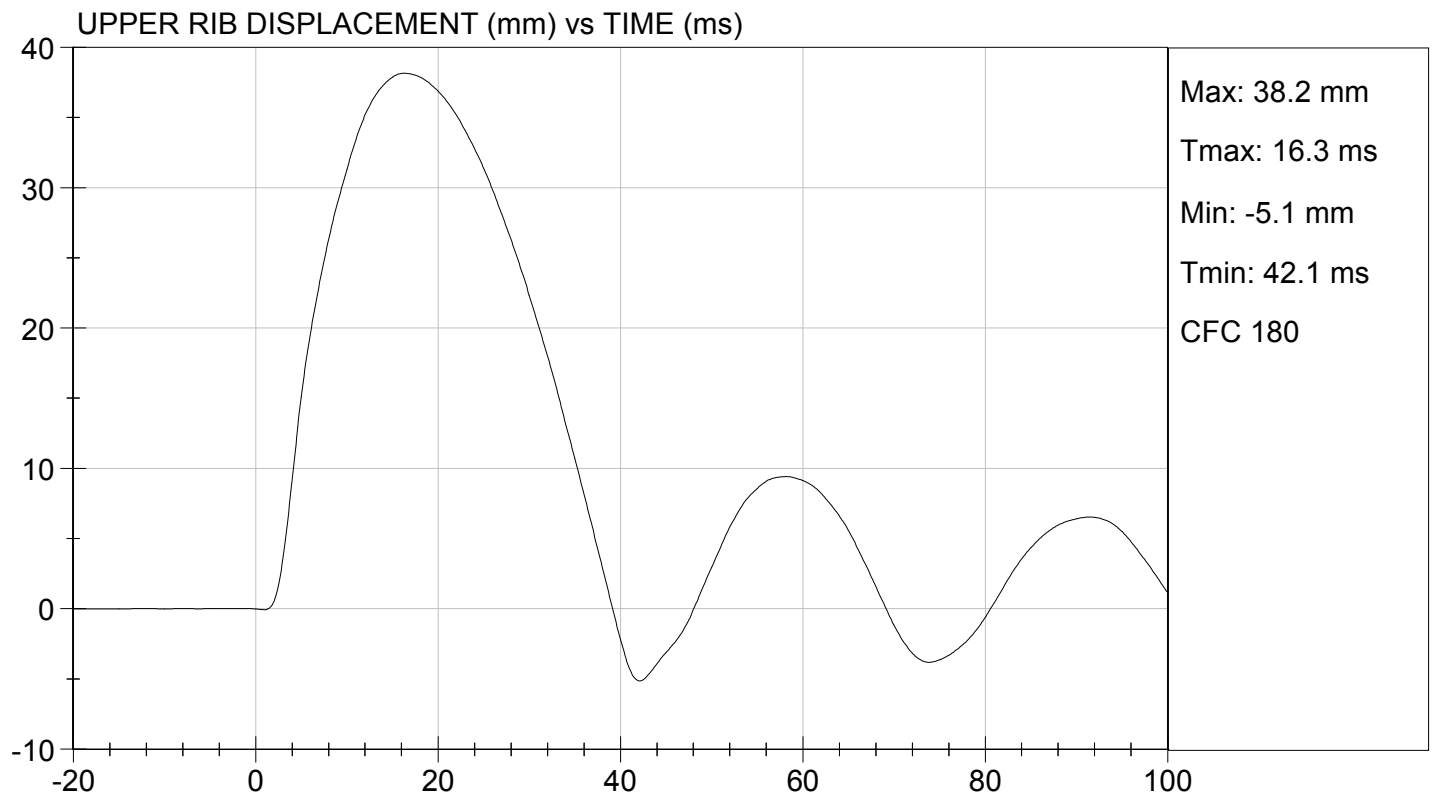
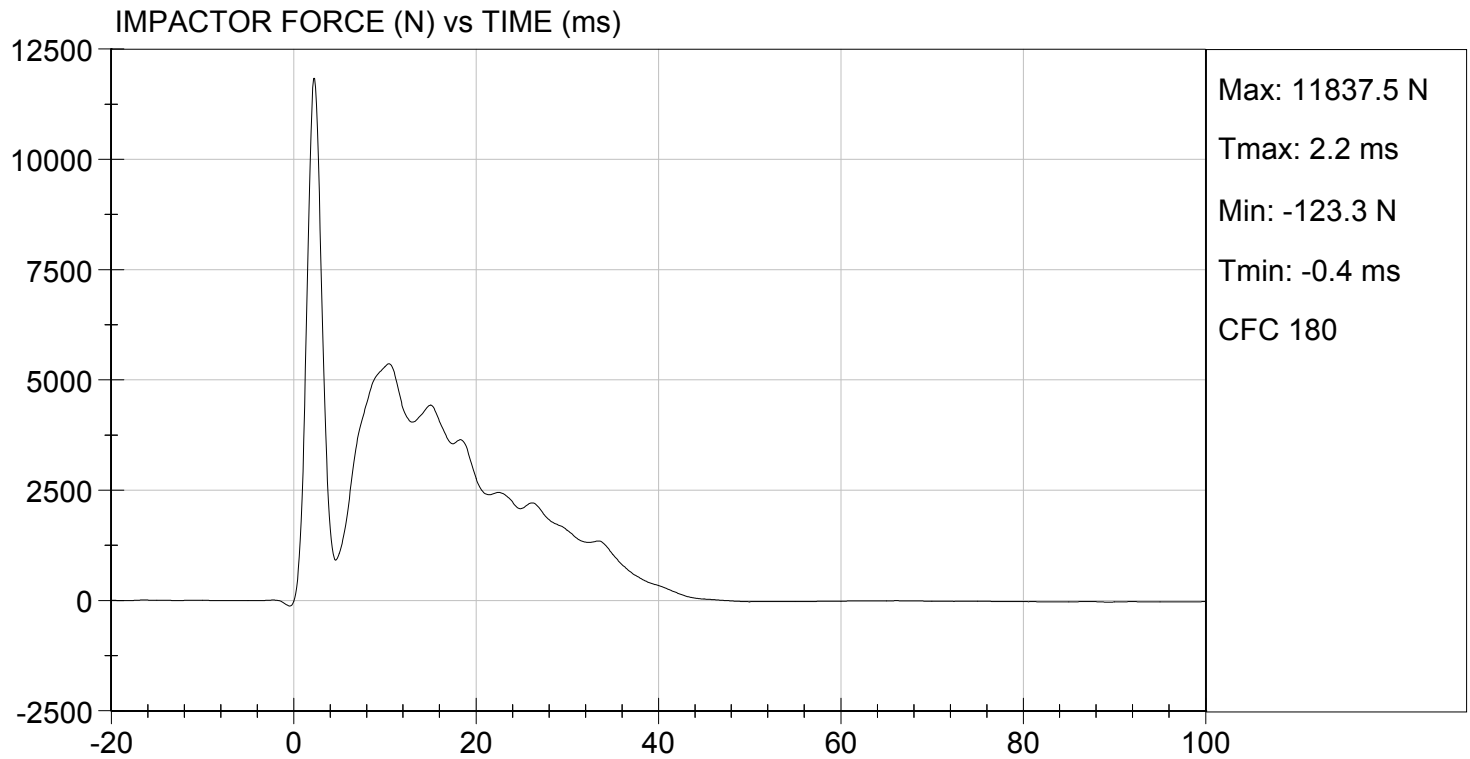
Test Date


Approved By



TEST DESC: THORAX IMPACT
VELOCITY: 18.32 ft/s, 5.58 m/s

TEST DATE: 12/15/2014
TEST #: D144400

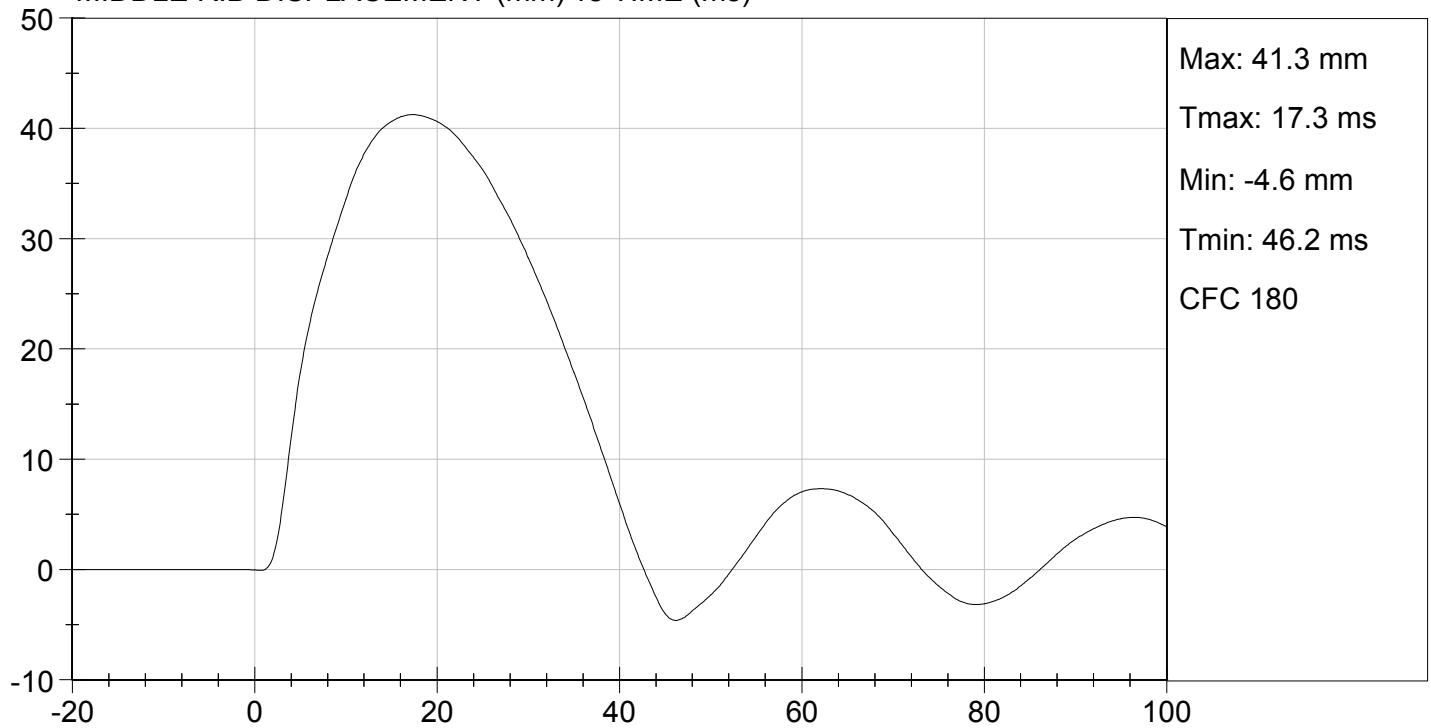




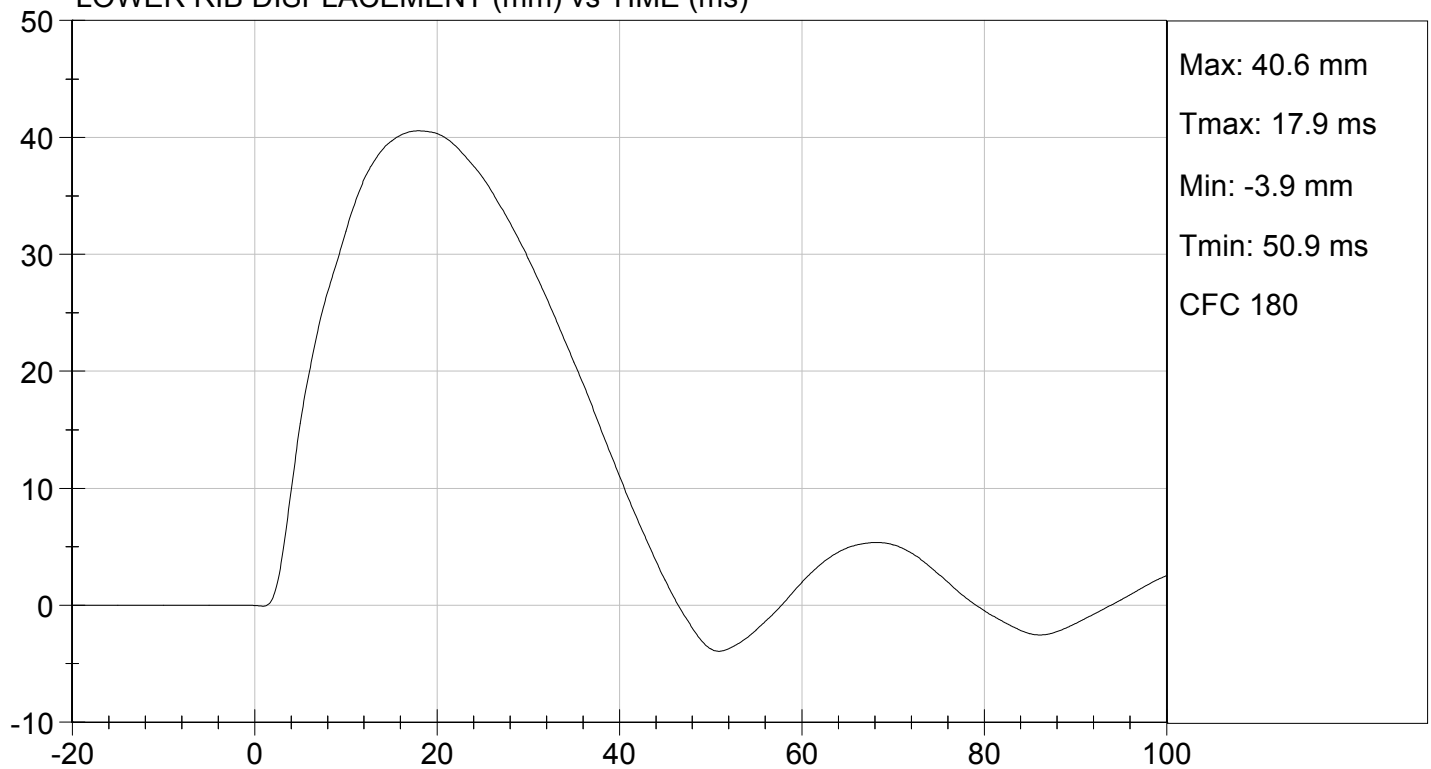
TEST DESC: THORAX IMPACT
VELOCITY: 18.32 ft/s, 5.58 m/s

TEST DATE: 12/15/2014
TEST #: D144400

MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



MGA RESEARCH CORPORATION

ABDOMEN TEST

ES-2re DUMMY

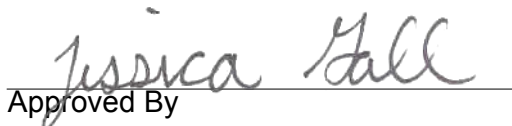
ATD Serial No: 032

Test I.D: D144407

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	40	Pass
Probe Speed	m/s	3.90 to 4.10	4.10	Pass
Maximum Impactor Force	N	4000 to 4800	4290	Pass
Time of Maximum Impactor Force	ms	10.6 to 13.0	10.6	Pass
Maximum Total Abdomen Force	N	2200 to 2700	2218	Pass
Time of Maximum Abdomen Force	ms	10.0 to 12.3	10.9	Pass
Overall Test Results				Pass


Laboratory Technician

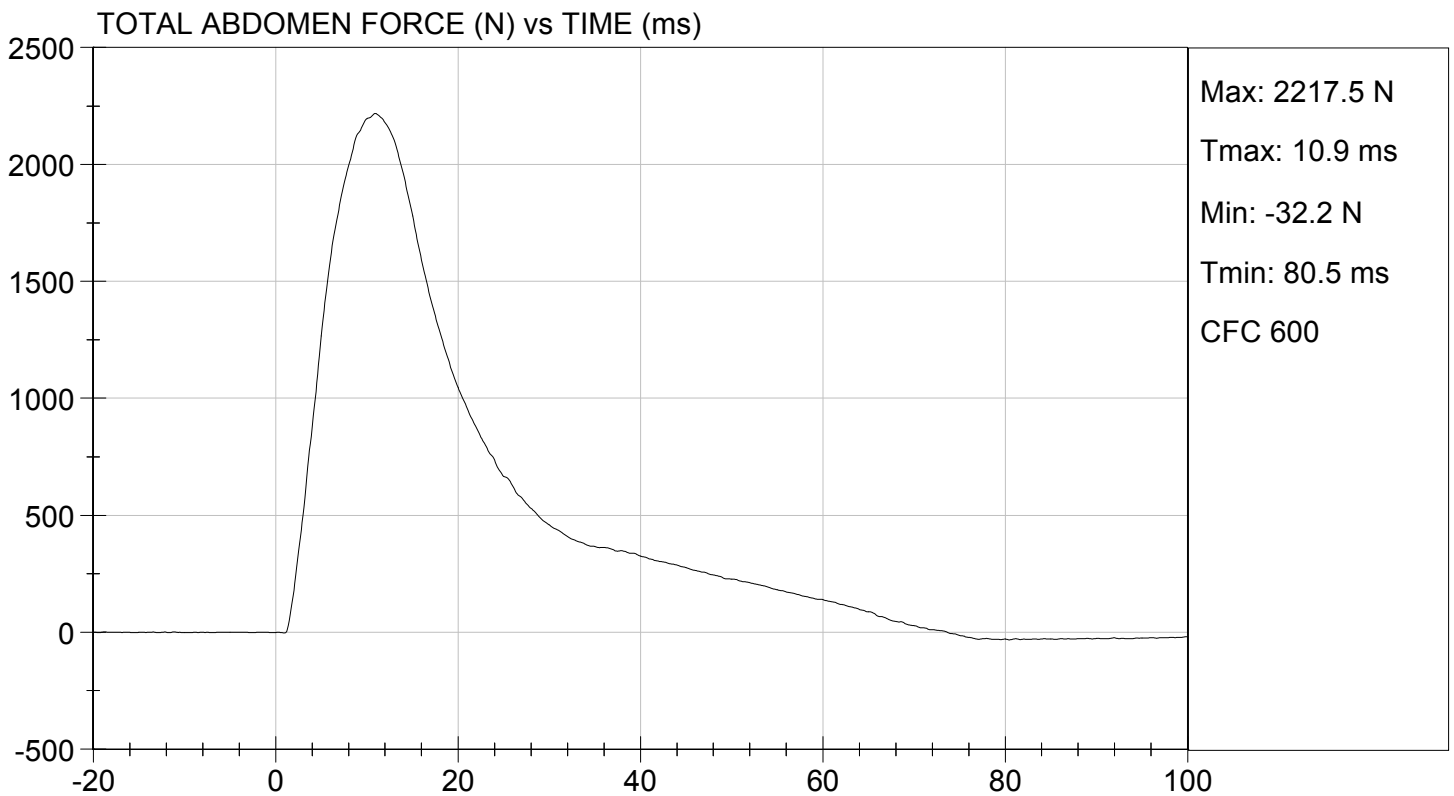
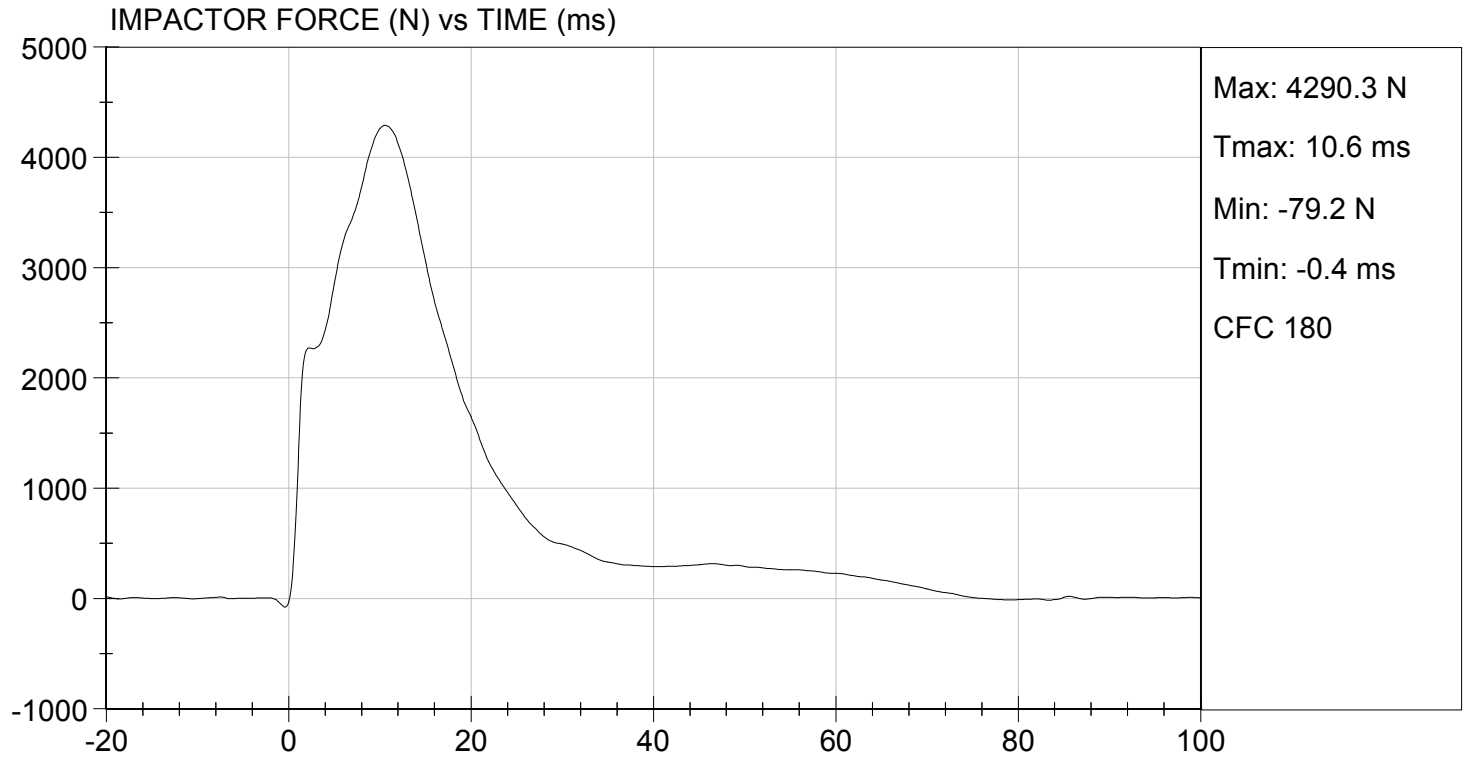
12/15/2014
Test Date


Approved By



TEST DESC: ABDOMEN IMPACT
VELOCITY: 13.44 ft/s, 4.10 m/s

TEST DATE: 12/15/2014
TEST #: D144407

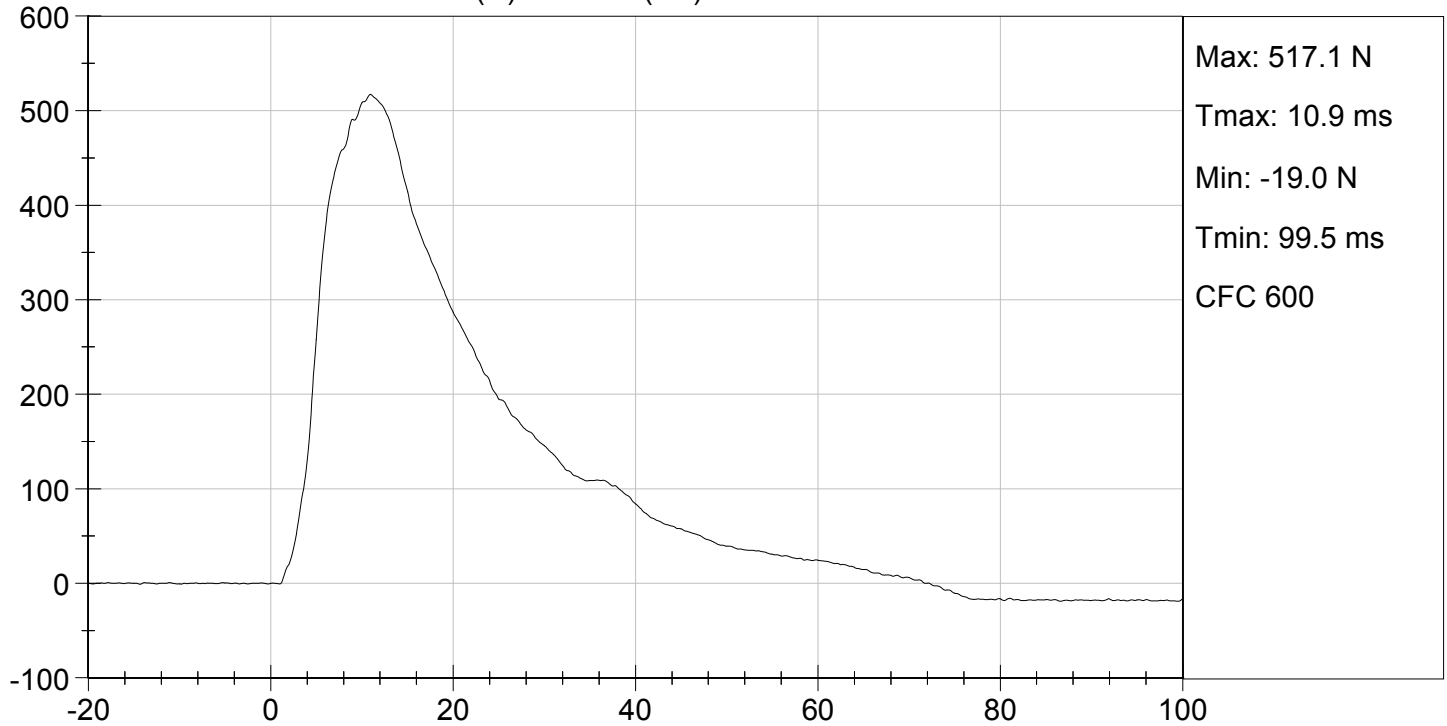




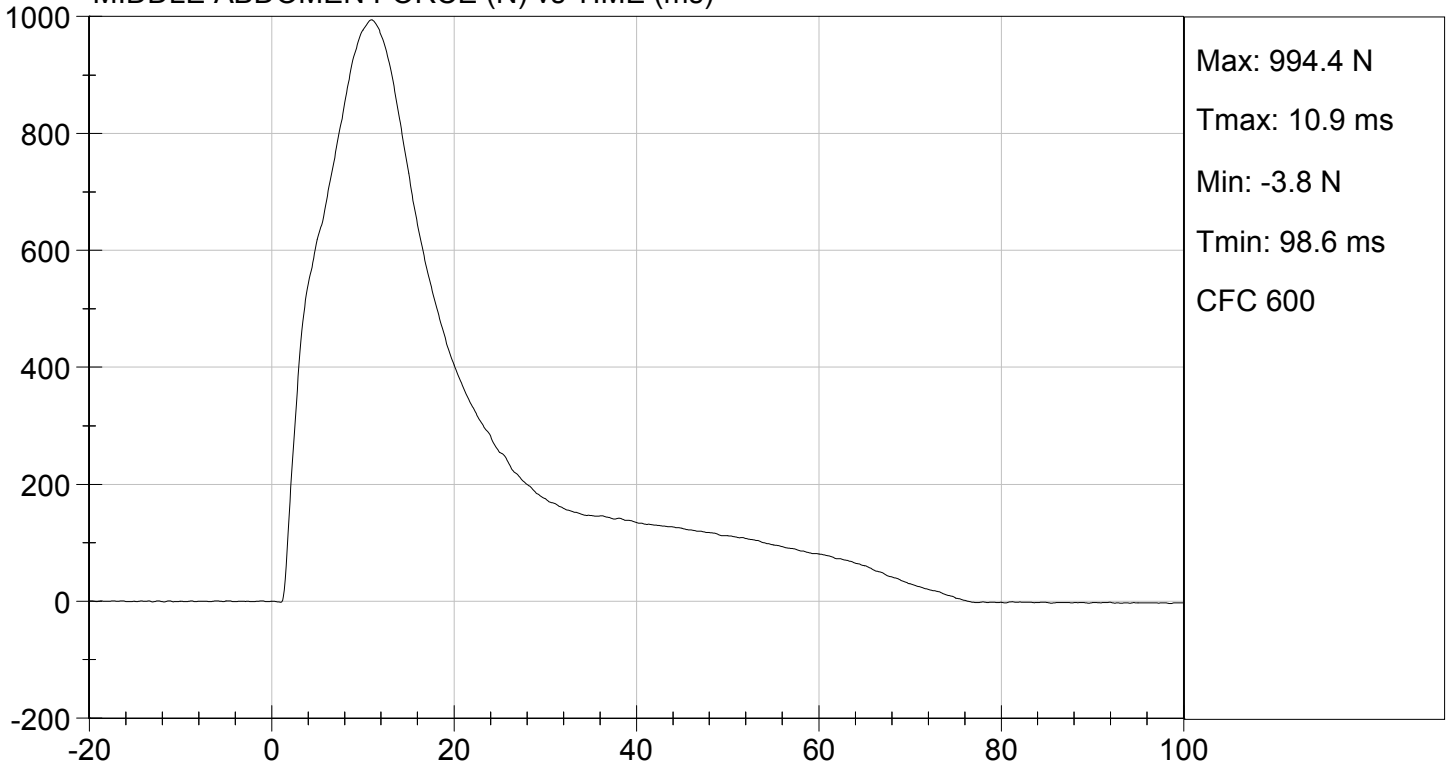
TEST DESC: ABDOMEN IMPACT
VELOCITY: 13.44 ft/s, 4.10 m/s

TEST DATE: 12/15/2014
TEST #: D144407

FRONT ABDOMEN FORCE (N) vs TIME (ms)



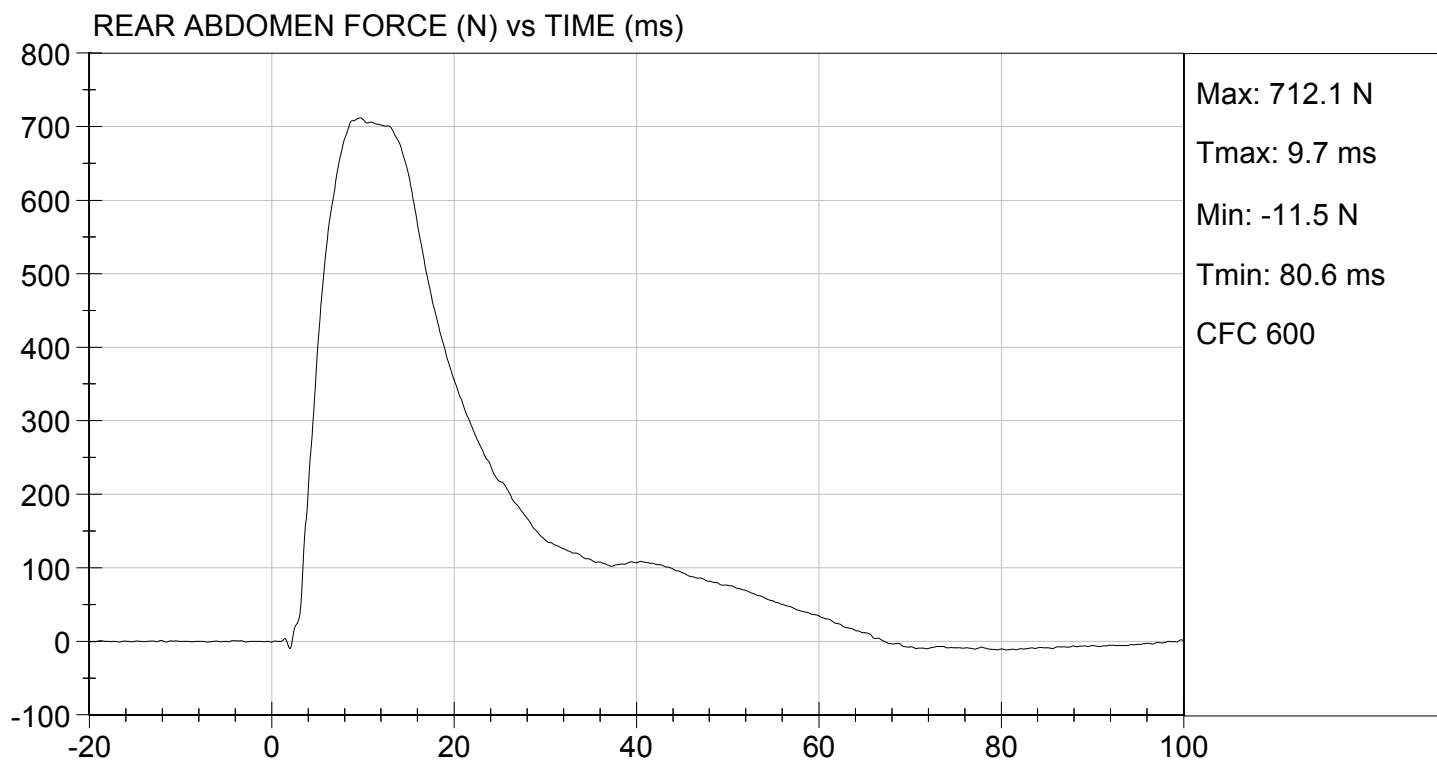
MIDDLE ABDOMEN FORCE (N) vs TIME (ms)





TEST DESC: ABDOMEN IMPACT
VELOCITY: 13.44 ft/s, 4.10 m/s

TEST DATE: 12/15/2014
TEST #: D144407



MGA RESEARCH CORPORATION
LUMBAR SPINE TEST
ES-2re DUMMY

ATD Serial No: 032

Test I.D: D144408

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	27	Pass
Pendulum Speed		m/s	5.95 to 6.15	6.12	Pass
Pendulum Velocity	1 ms	m/s	-0.05 to 0.00	-0.00	Pass
	3.7 ms	m/s	-0.425 to -0.24	-0.393	Pass
	27 ms	m/s	-6.50 to -5.80	-5.91	Pass
	30 ms	m/s	>= -6.50	-5.96	Pass
Maximum Flexion Angle		deg	45.0 to 55.0	46.9	Pass
Time of Maximum Flexion Angle		ms	39.0 to 53.0	44.5	Pass
Headform Rotation Decay to Initial Position		ms	37 to 57	44	Pass
Overall Results					Pass

David Schoedel
Laboratory Technician

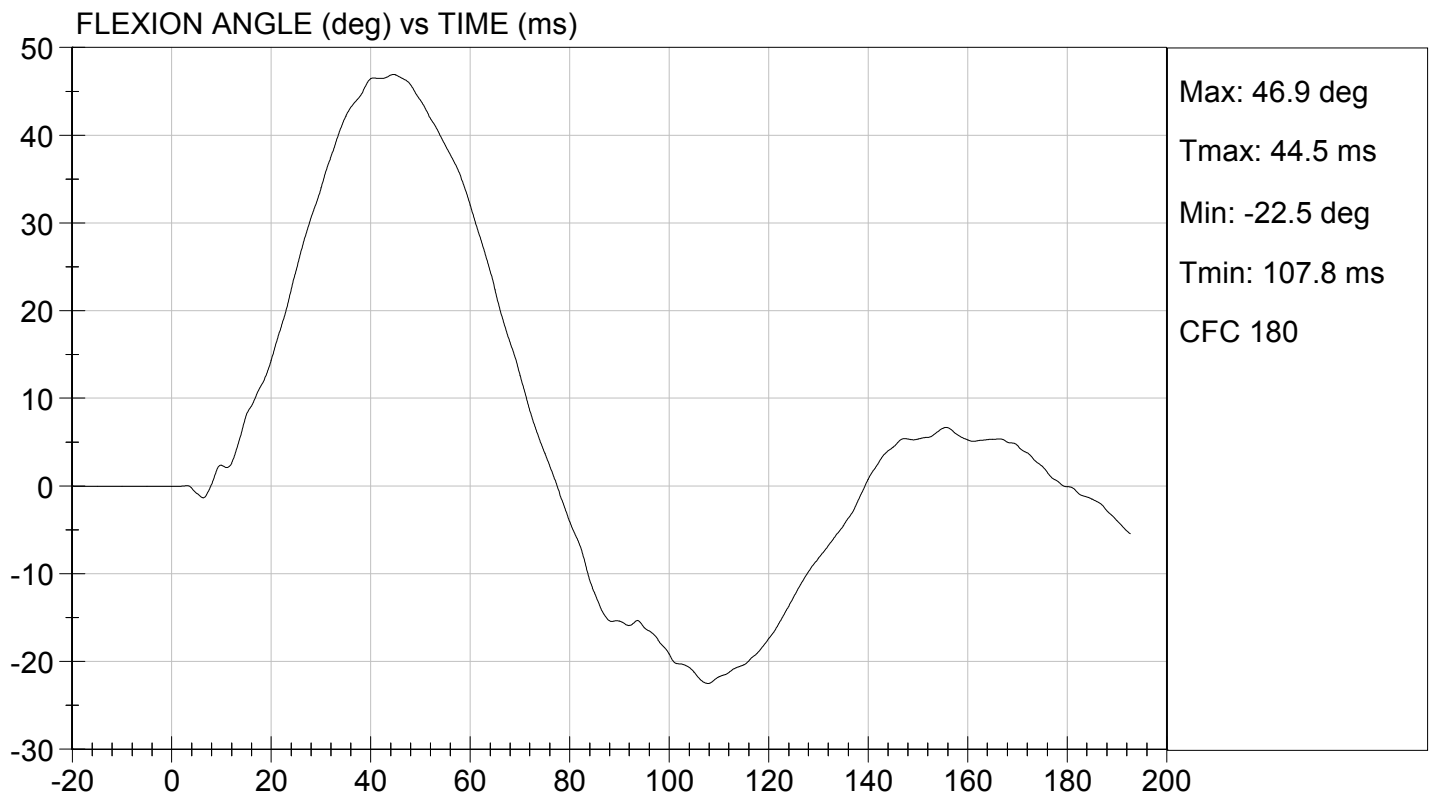
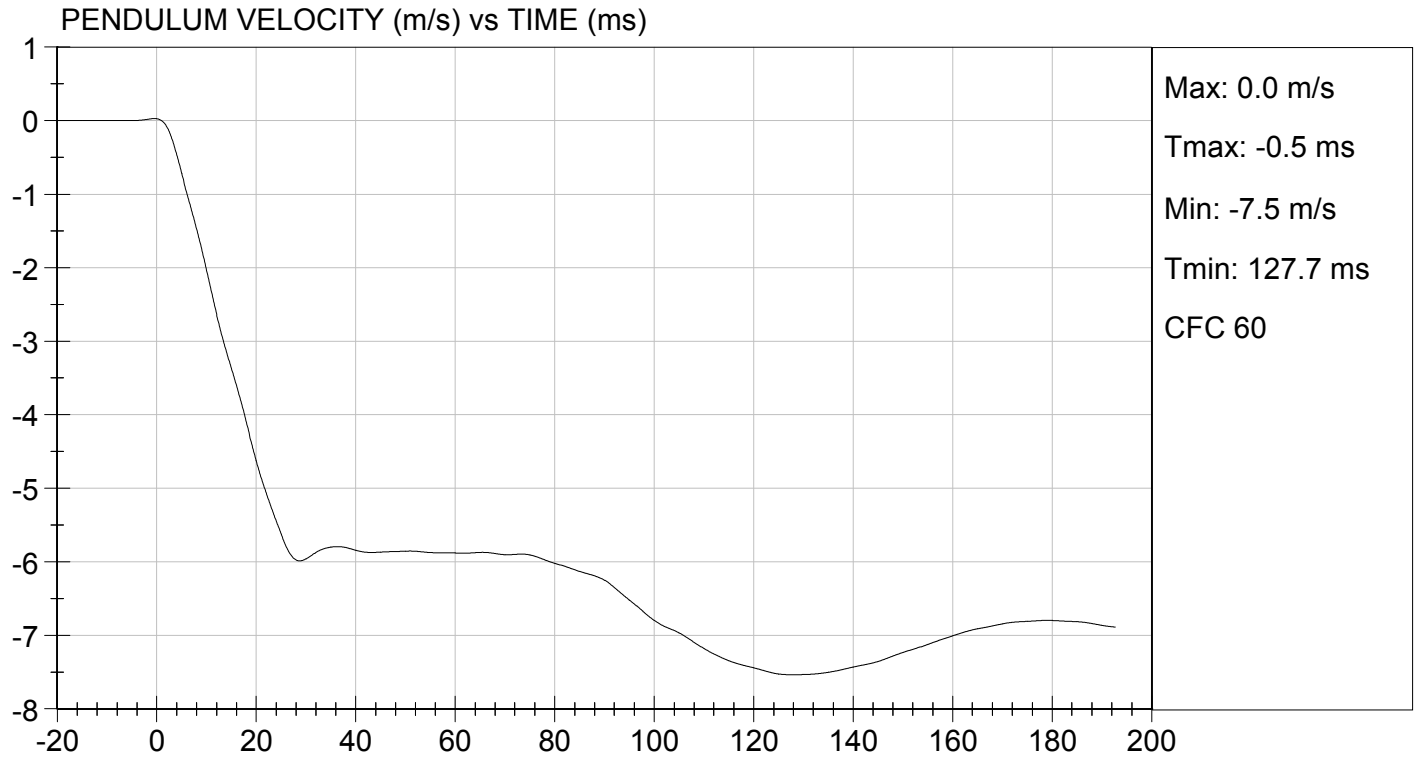
12/12/2014
Test Date

Jessica Hall
Approved By



TEST DESC: LUMBAR BENDING
VELOCITY: 20.08 ft/s, 6.12 m/s

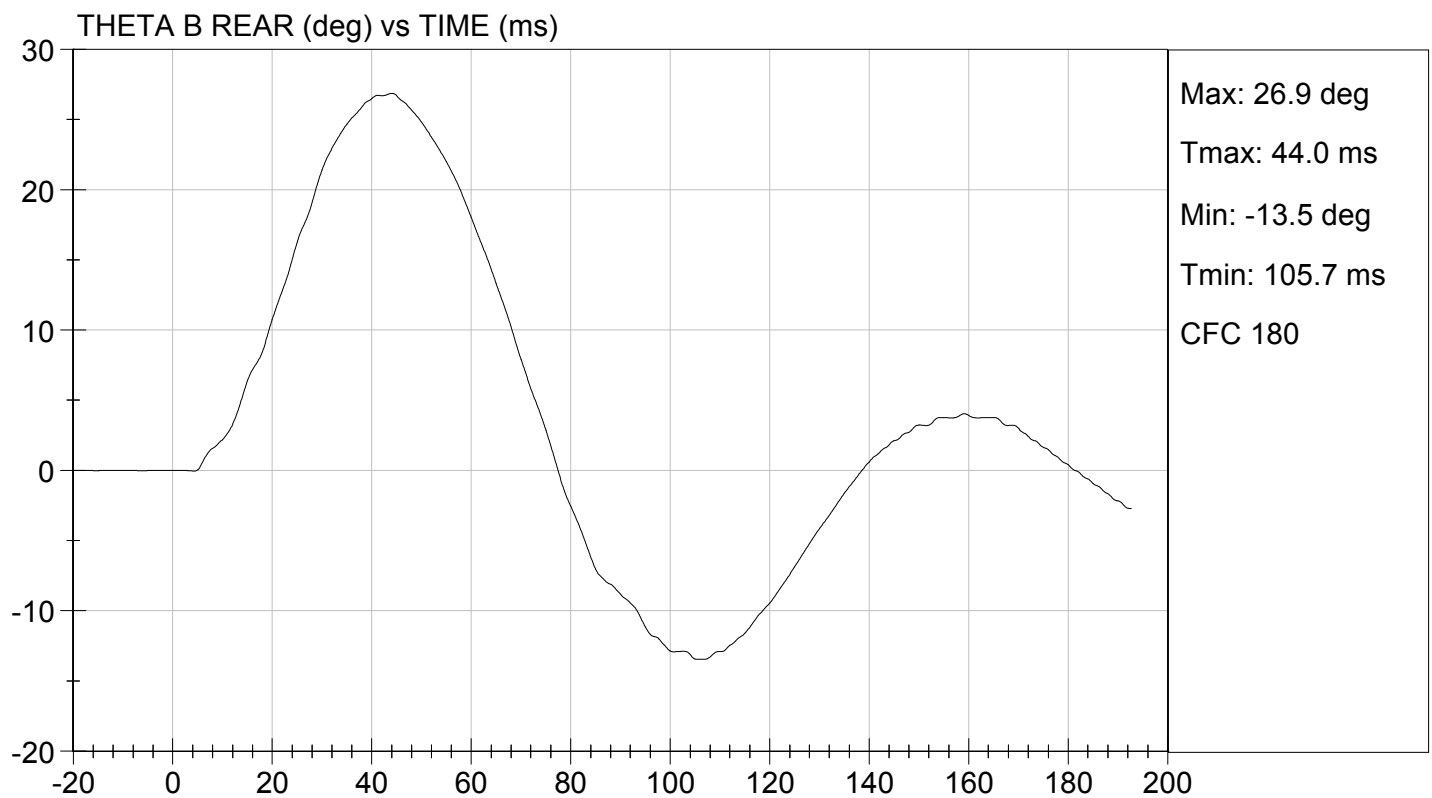
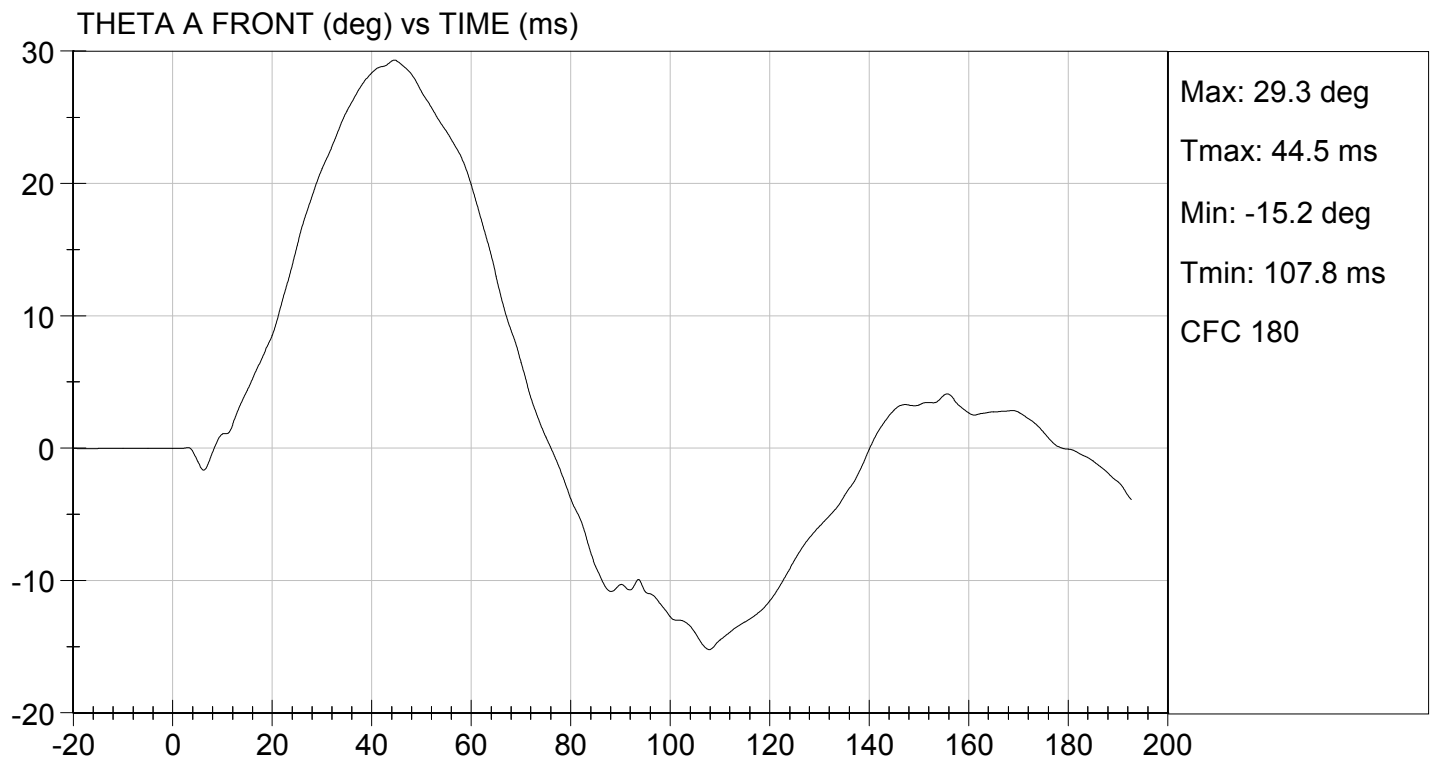
TEST DATE: 12/12/2014
TEST #: D144408





TEST DESC: LUMBAR BENDING
VELOCITY: 20.08 ft/s, 6.12 m/s

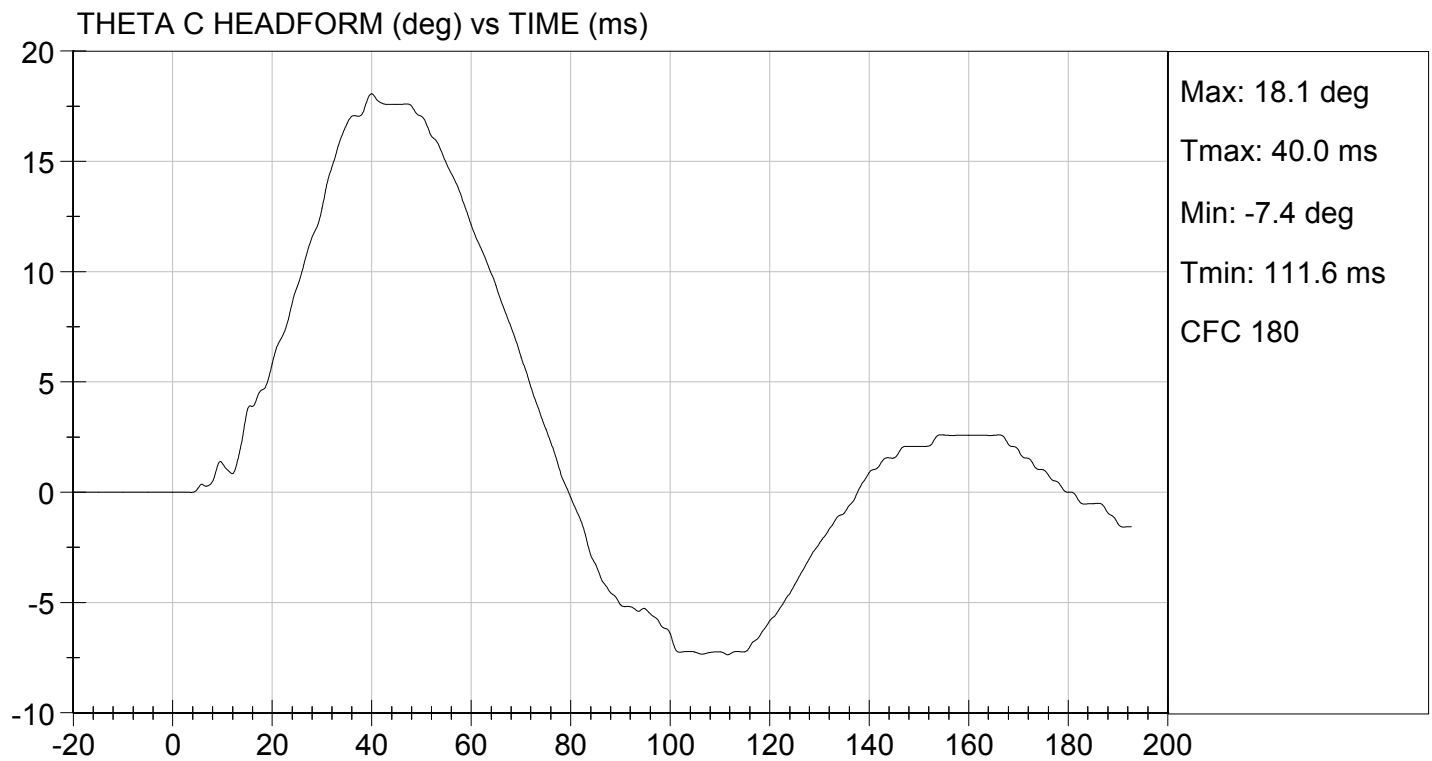
TEST DATE: 12/12/2014
TEST #: D144408





TEST DESC: LUMBAR BENDING
VELOCITY: 20.08 ft/s, 6.12 m/s

TEST DATE: 12/12/2014
TEST #: D144408



MGA RESEARCH CORPORATION

**PELVIS TEST
ES-2re DUMMY**

ATD Serial No: 032

Test I.D: D144409

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	40	Pass
Probe Speed	m/s	4.20 to 4.40	4.27	Pass
Maximum Impactor Force	N	4700 to 5400	4866	Pass
Time of Maximum Impactor Force	ms	11.8 to 16.1	13.4	Pass
Maximum Pubic Force	N	1230 to 1590	1277	Pass
Time of Maximum Pubic Force	ms	12.2 to 17.0	14.7	Pass
Overall Test Results				Pass


Laboratory Technician

12/15/2014

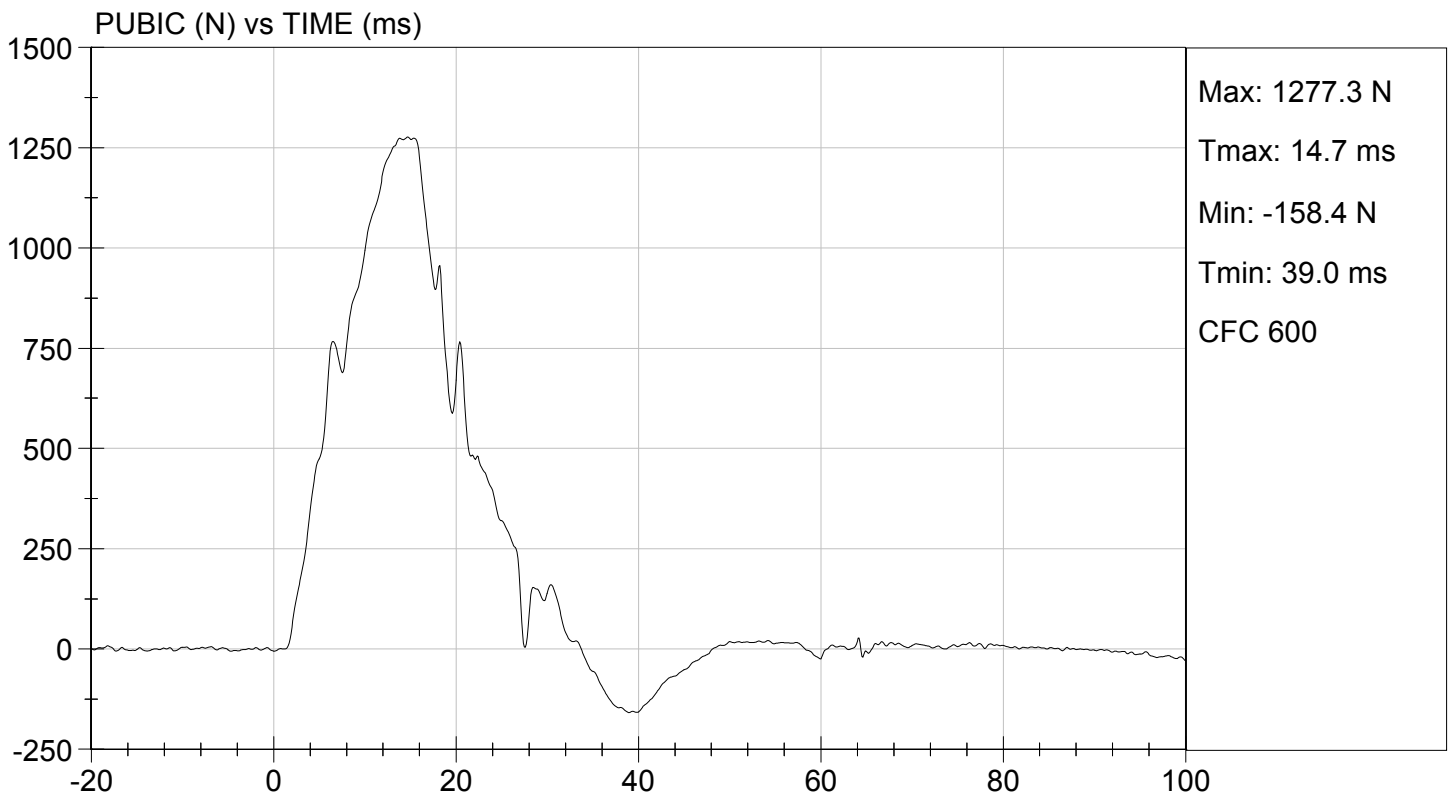
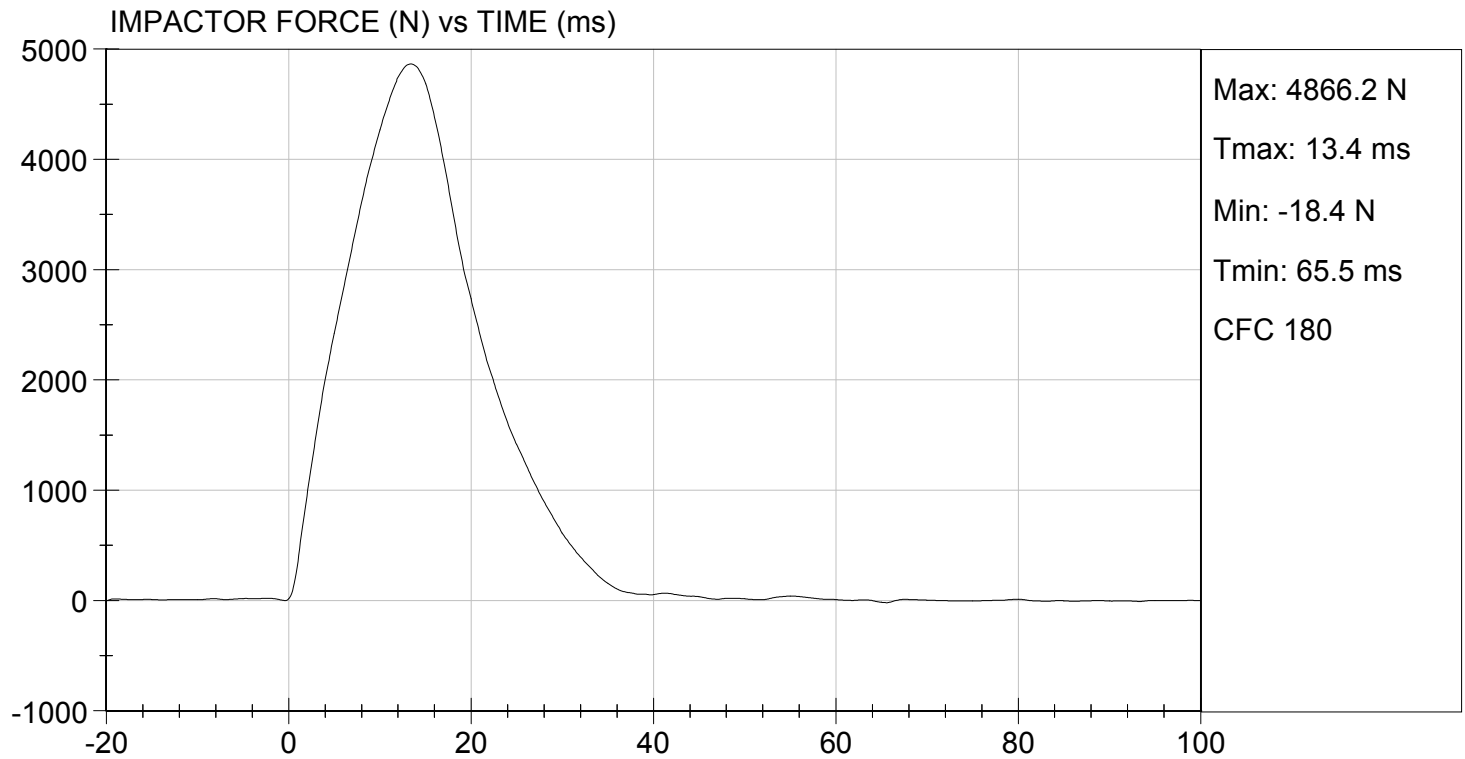
Test Date


Approved By



TEST DESC: PELVIS IMPACT
VELOCITY: 14.01 ft/s, 4.27 m/s

TEST DATE: 12/15/2014
TEST #: D144409



MGA RESEARCH CORPORATION

HEAD DROP TEST

ES-2re DUMMY

ATD Serial No: 032

Test ID: D144561

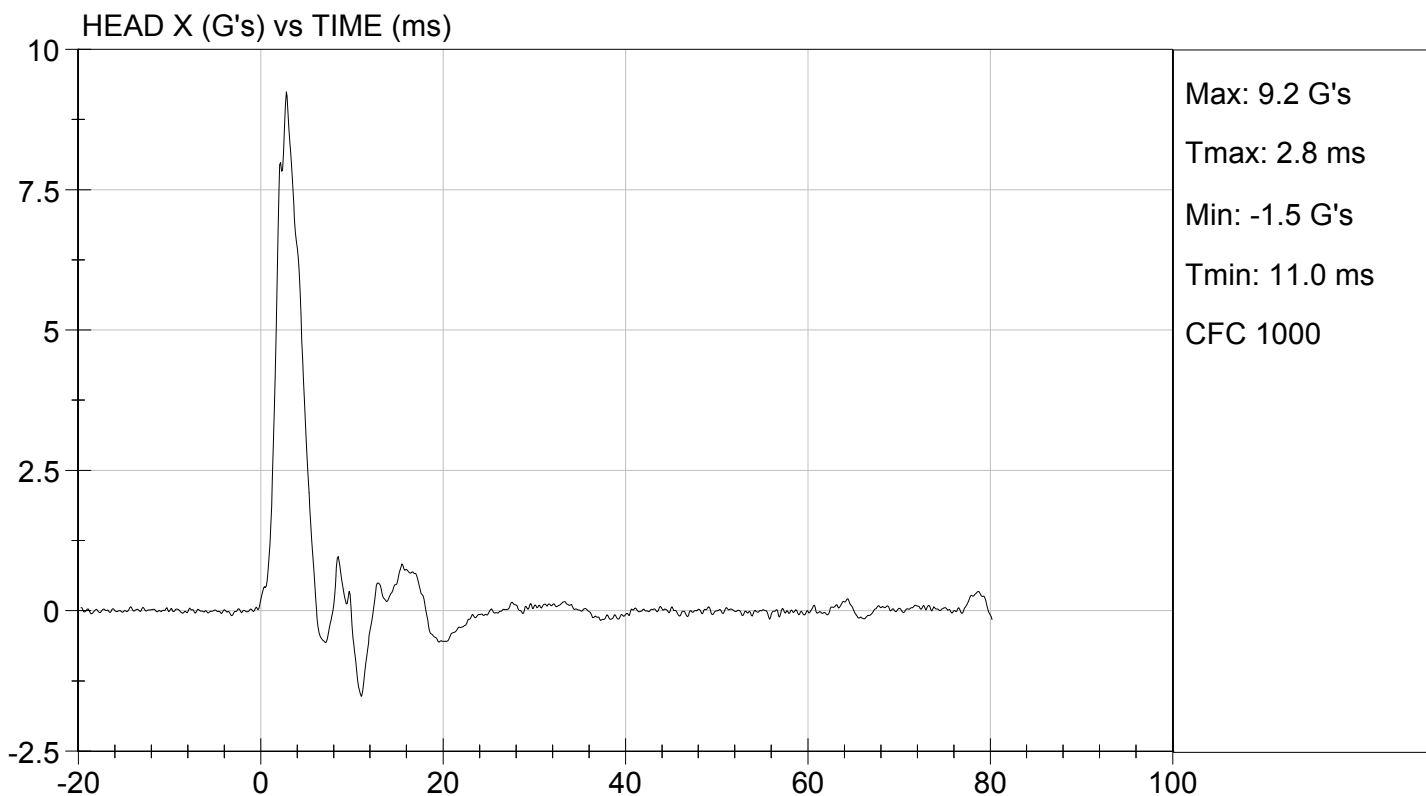
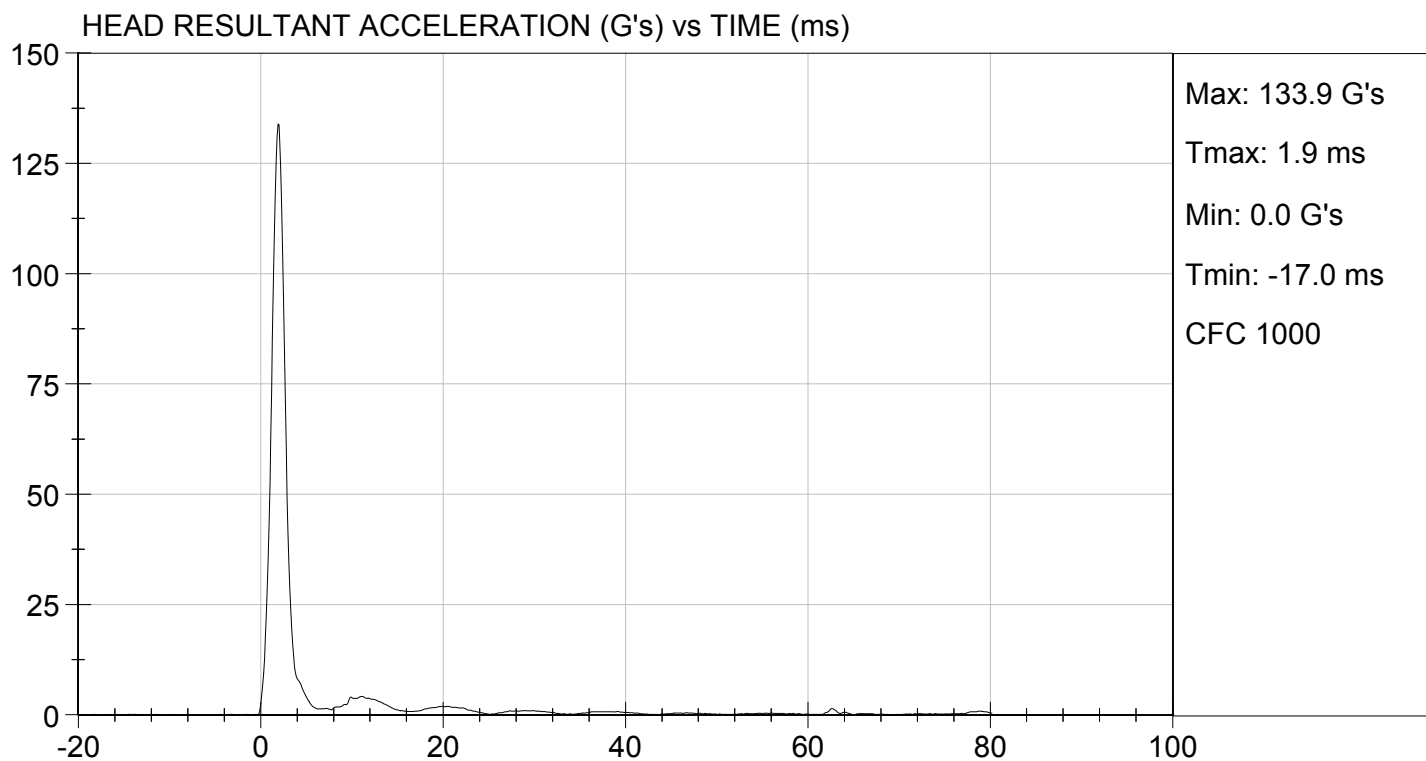
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Peak Resultant Acceleration	G's	125 to 155	134	Pass
Peak Longitudinal Acceleration	G's	<= +/- 15.0	9.2	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 15% of peak	Yes	Pass
Overall Test Results				Pass

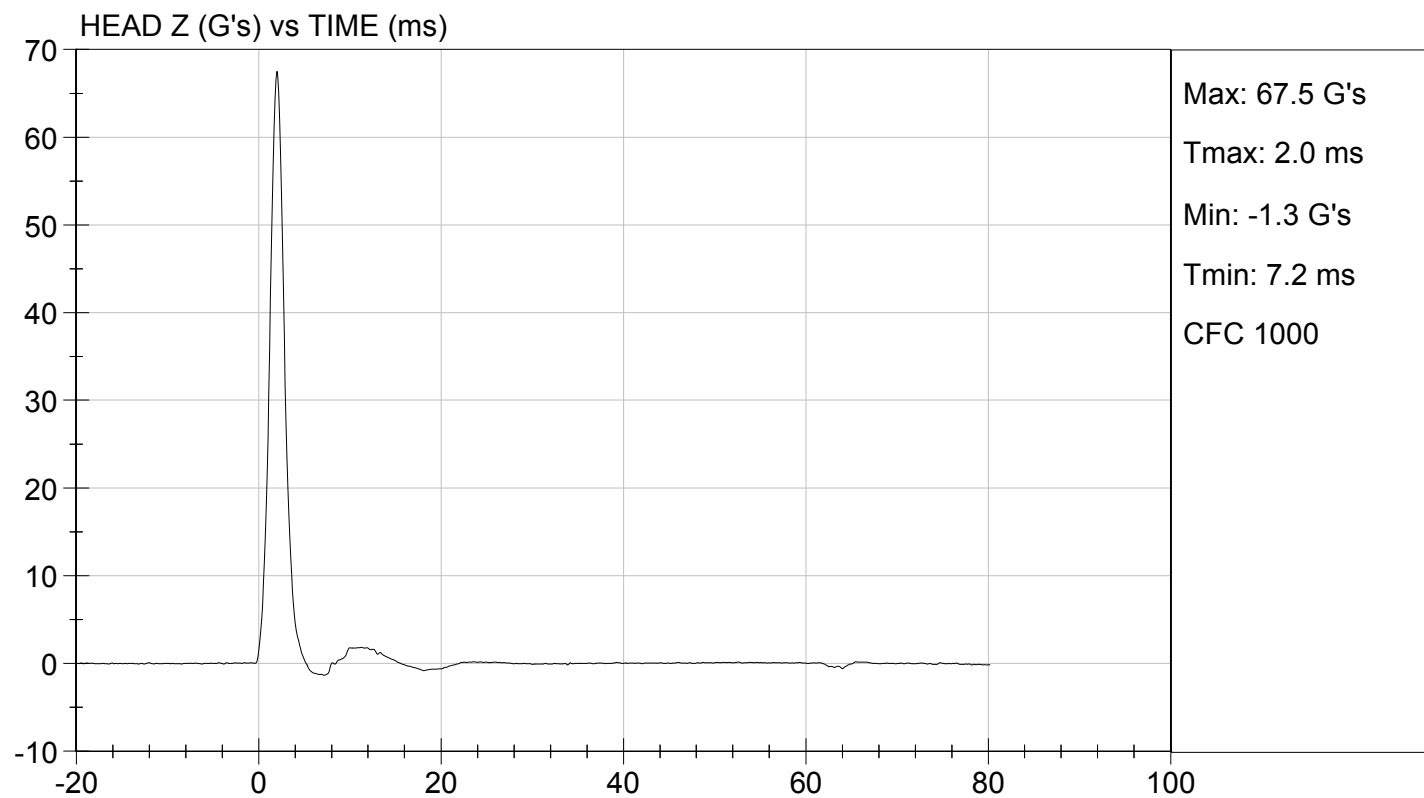
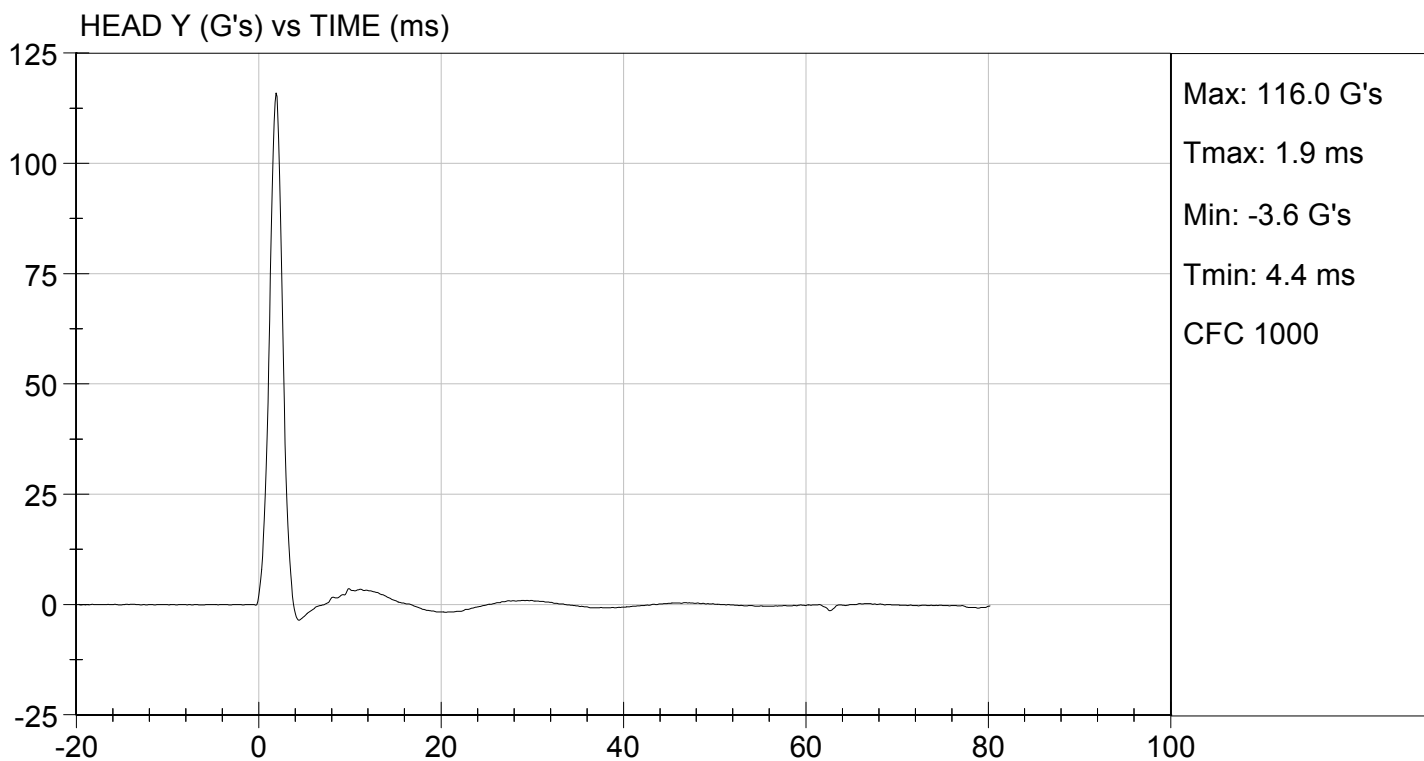

Laboratory Technician

12/29/2014

Test Date


Approved By





MGA RESEARCH CORPORATION
NECK PENDULUM TEST
ES-2re DUMMY

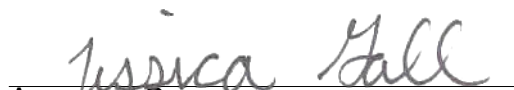
ATD Serial No: 032

Test I.D: D144562

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.6	Pass
Laboratory Relative Humidity		%	10 to 70	17	Pass
Pendulum Speed		m/s	3.30 to 3.50	3.39	Pass
Pendulum Velocity	1 ms	m/s	-0.05 to 0.00	-0.02	Pass
	3 ms	m/s	-0.25 to -0.375	-0.32	Pass
	14 ms	m/s	-3.20 to -3.70	-3.27	Pass
	17 ms	m/s	>= -3.70	-3.37	Pass
Maximum Flexion Angle		deg	49.0 to 59.0	52.0	Pass
Time of Maximum Flexion Angle		ms	54.0 to 66.0	59.1	Pass
Head Rotation Decay Time to 0 Degree		ms	53.0 to 88.0	59.6	Pass
Overall Results					Pass


 Laboratory Technician

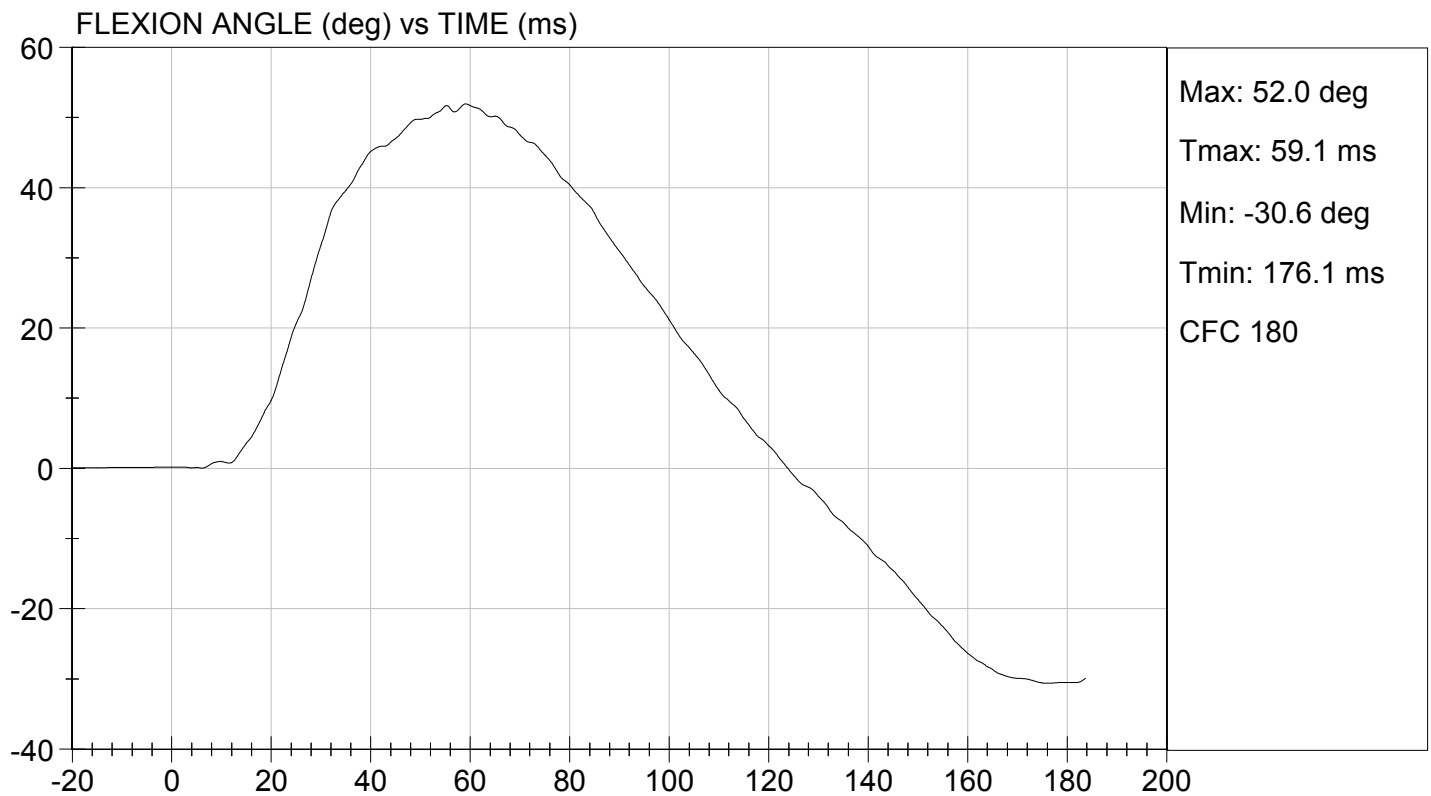
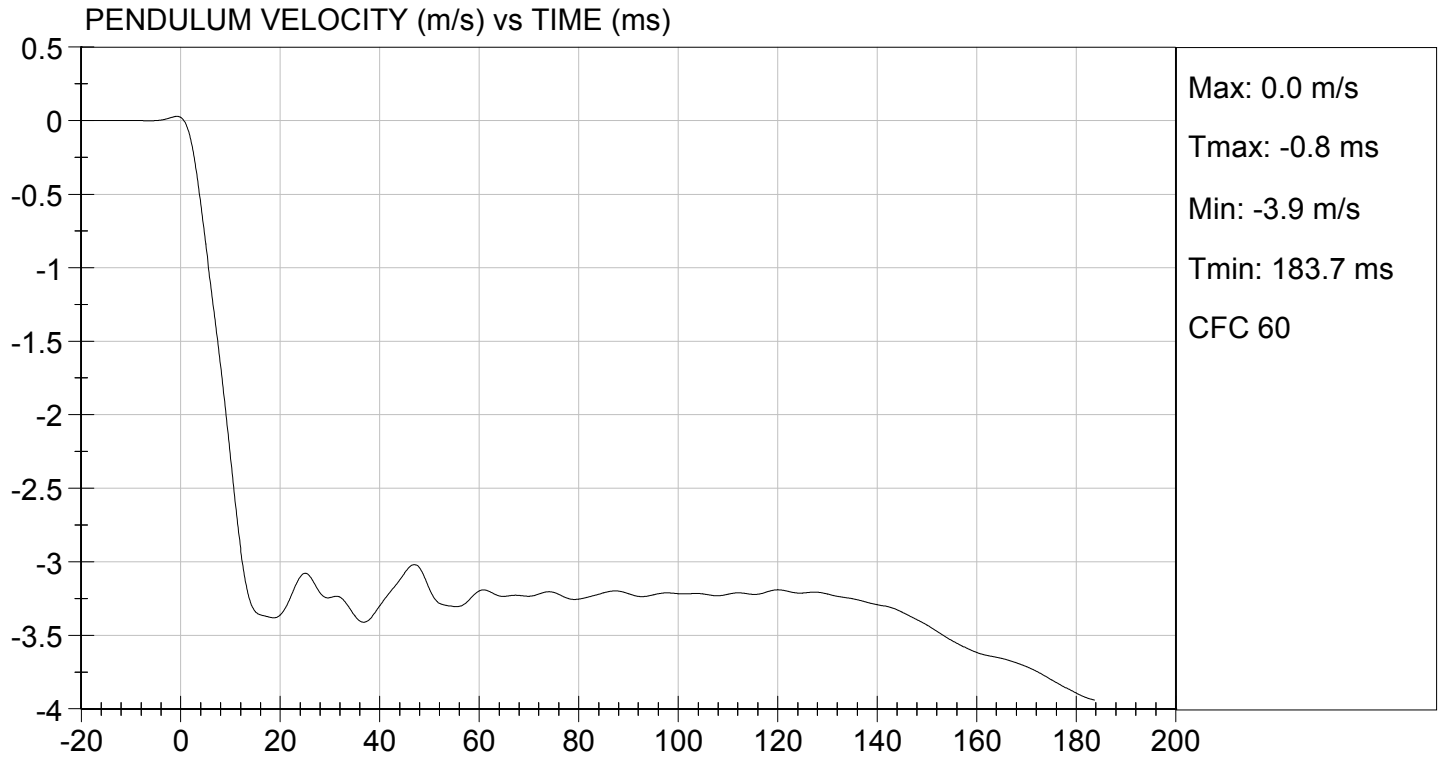
12/29/2014
 Test Date


 Approved By



TEST DESC: NECK BENDING
VELOCITY: 11.11 ft/s, 3.39 m/s

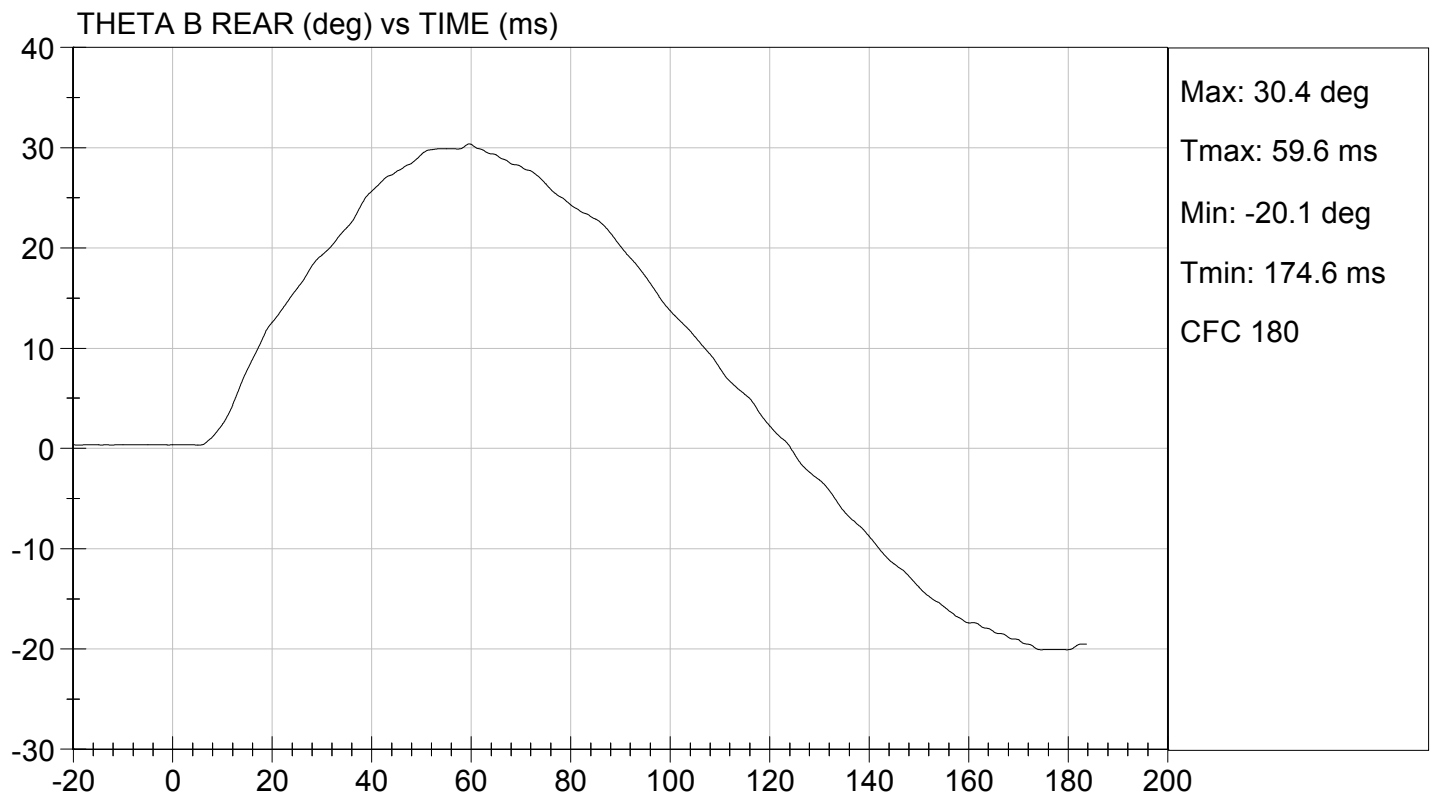
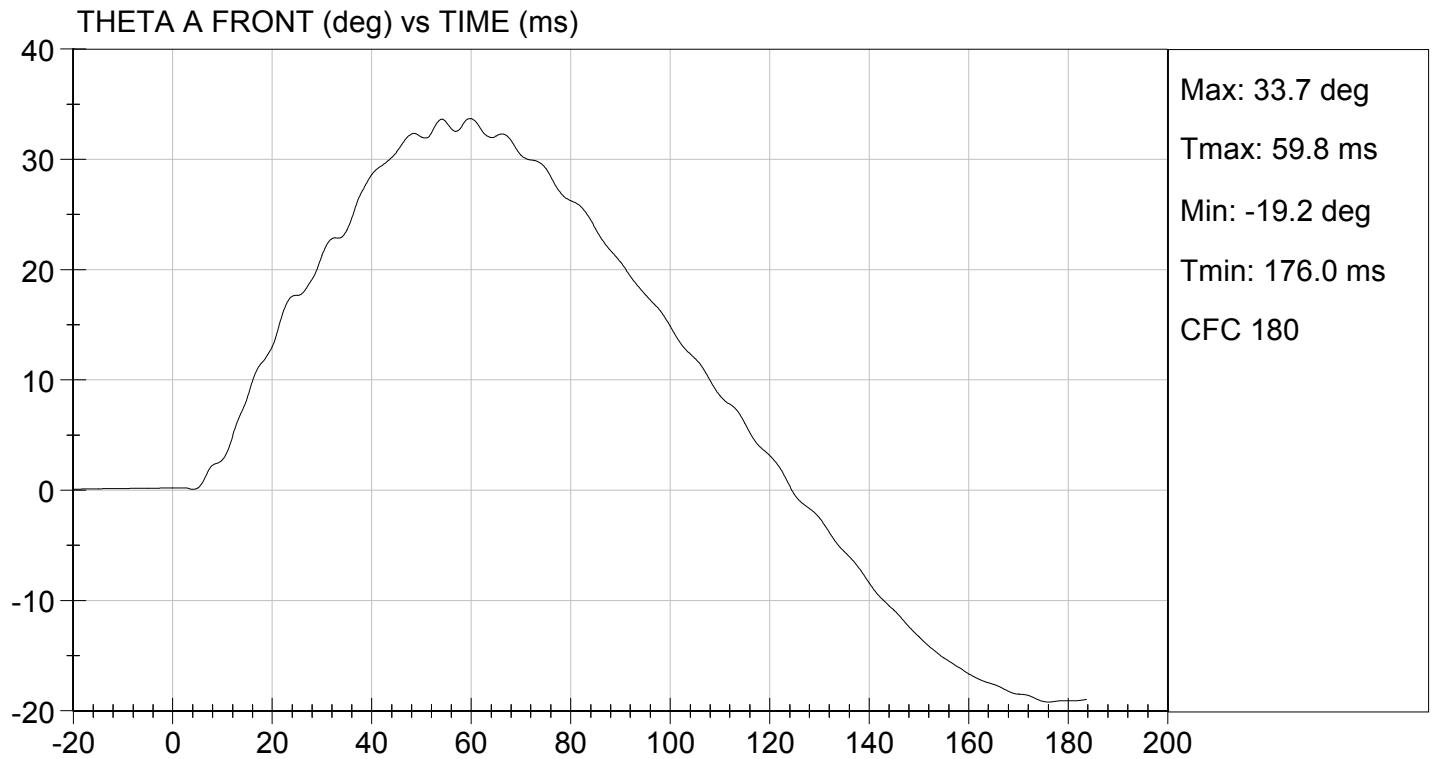
TEST DATE: 12/29/2014
TEST #: D144562





TEST DESC: NECK BENDING
VELOCITY: 11.11 ft/s, 3.39 m/s

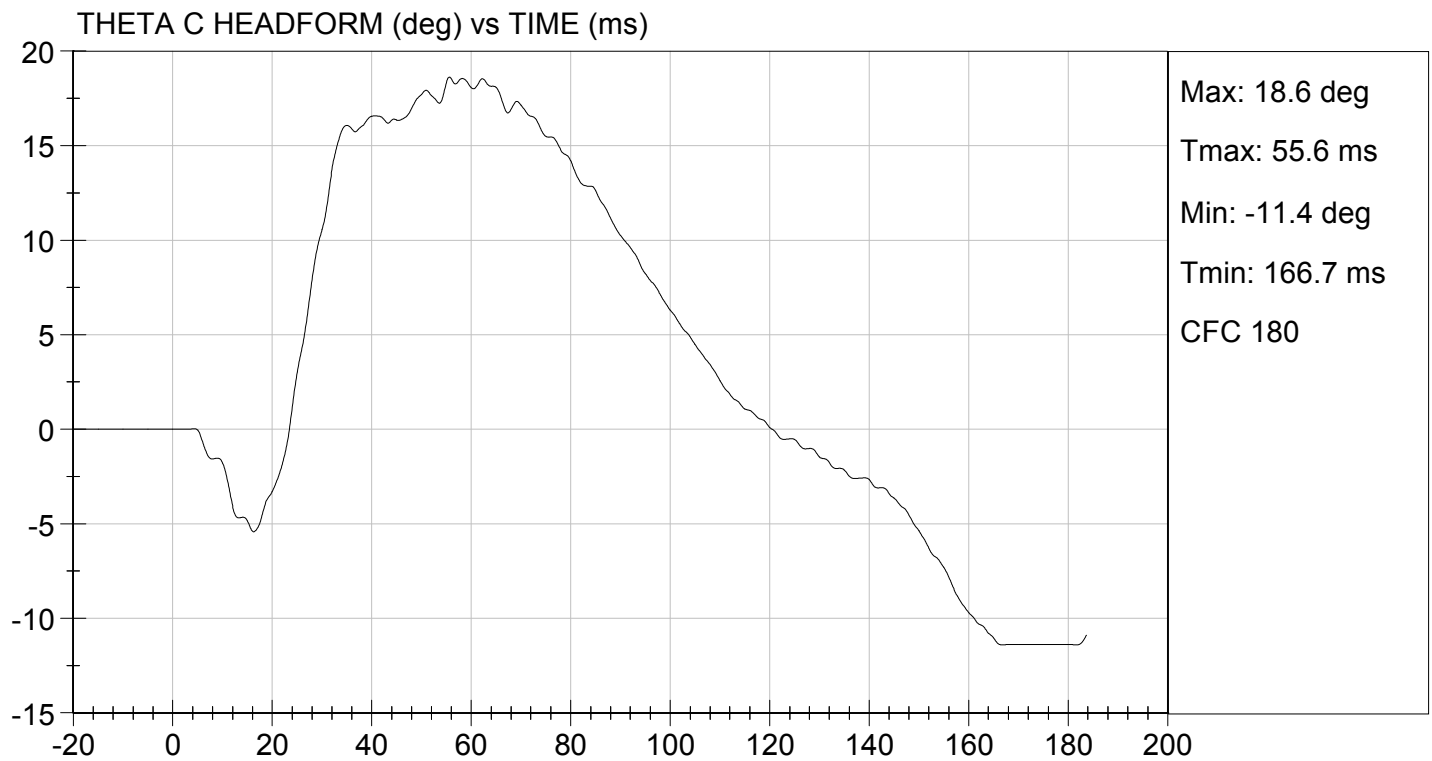
TEST DATE: 12/29/2014
TEST #: D144562





TEST DESC: NECK BENDING
VELOCITY: 11.11 ft/s, 3.39 m/s

TEST DATE: 12/29/2014
TEST #: D144562



MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
ES-2re DUMMY

ATD Serial No: 032

Test I.D: D144563

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	18	Pass
Pendulum Speed	m/s	4.20 to 4.40	4.38	Pass
Peak Impactor Acceleration	G's	7.5 to 10.5	9.4	Pass
Overall Test Results				Pass


Laboratory Technician

12/29/2014

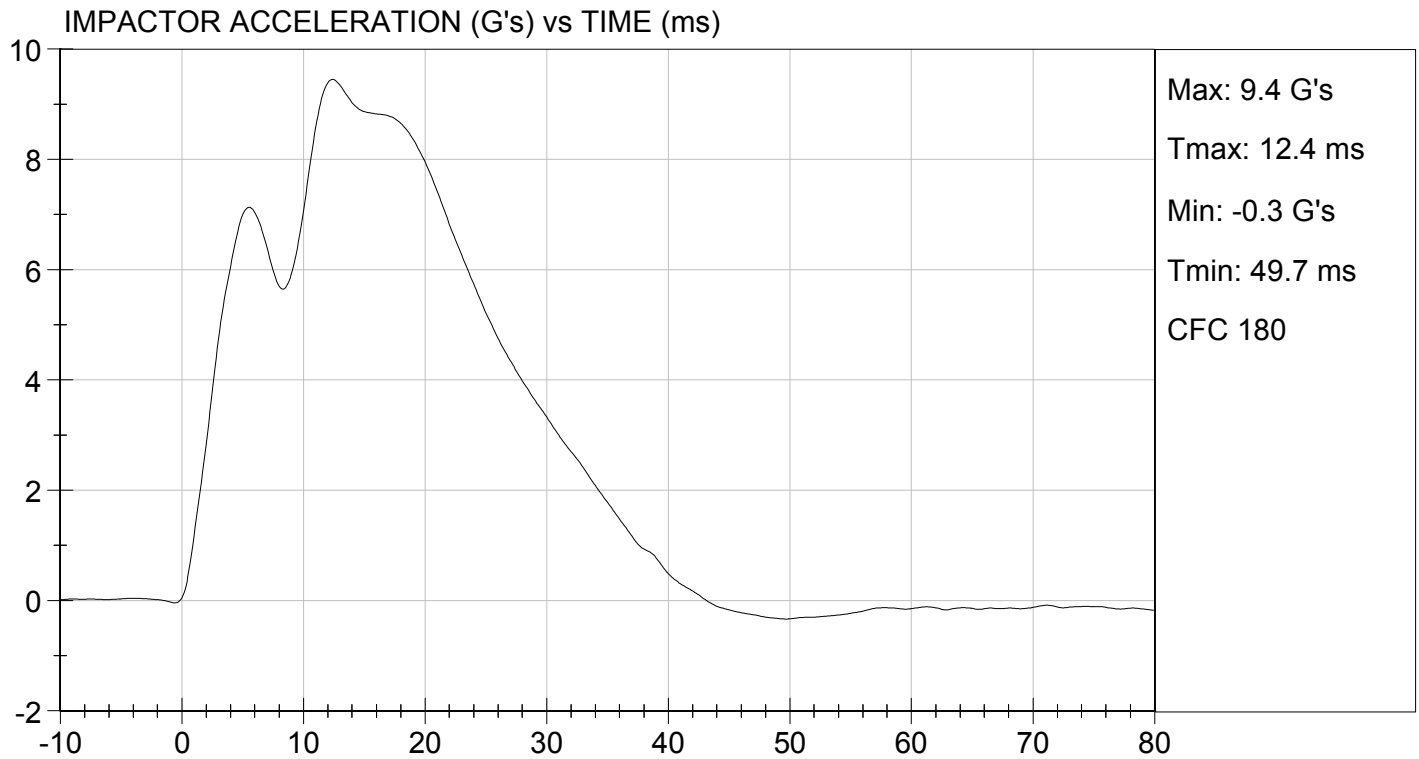
Test Date


Approved By



TEST DESC: SHOULDER IMPACT
VELOCITY: 14.37 ft/s, 4.38 m/s

TEST DATE: 12/29/2014
TEST #: D144563



MGA RESEARCH CORPORATION

UPPER RIB TEST

ES-2re DUMMY

ATD Serial No: 032

Test I.D: D144564

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	19	Pass
Displacement at 459 mm	mm	36.0 to 40.0	39.3	Pass
Displacement at 815 mm	mm	46.0 to 51.0	49.1	Pass
Overall Test Results				Pass


Laboratory Technician

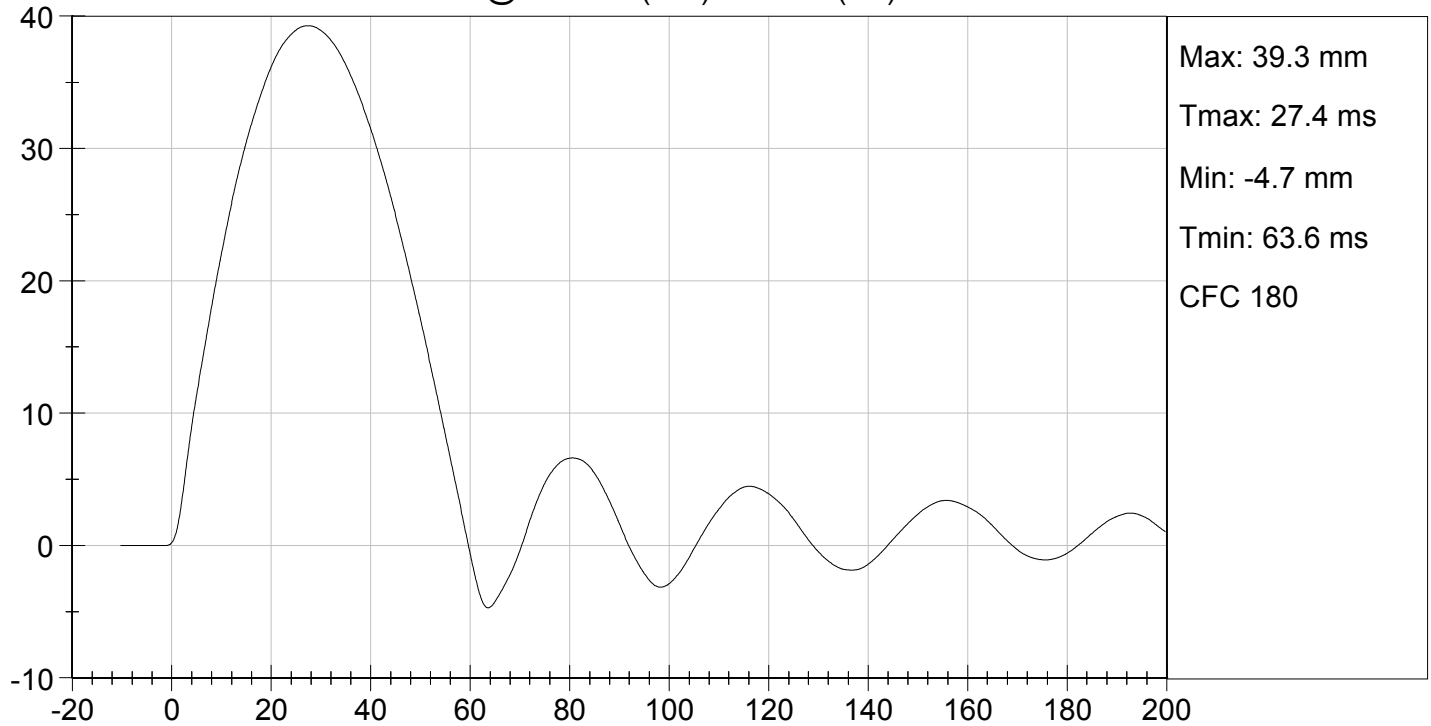
12/29/2014

Test Date

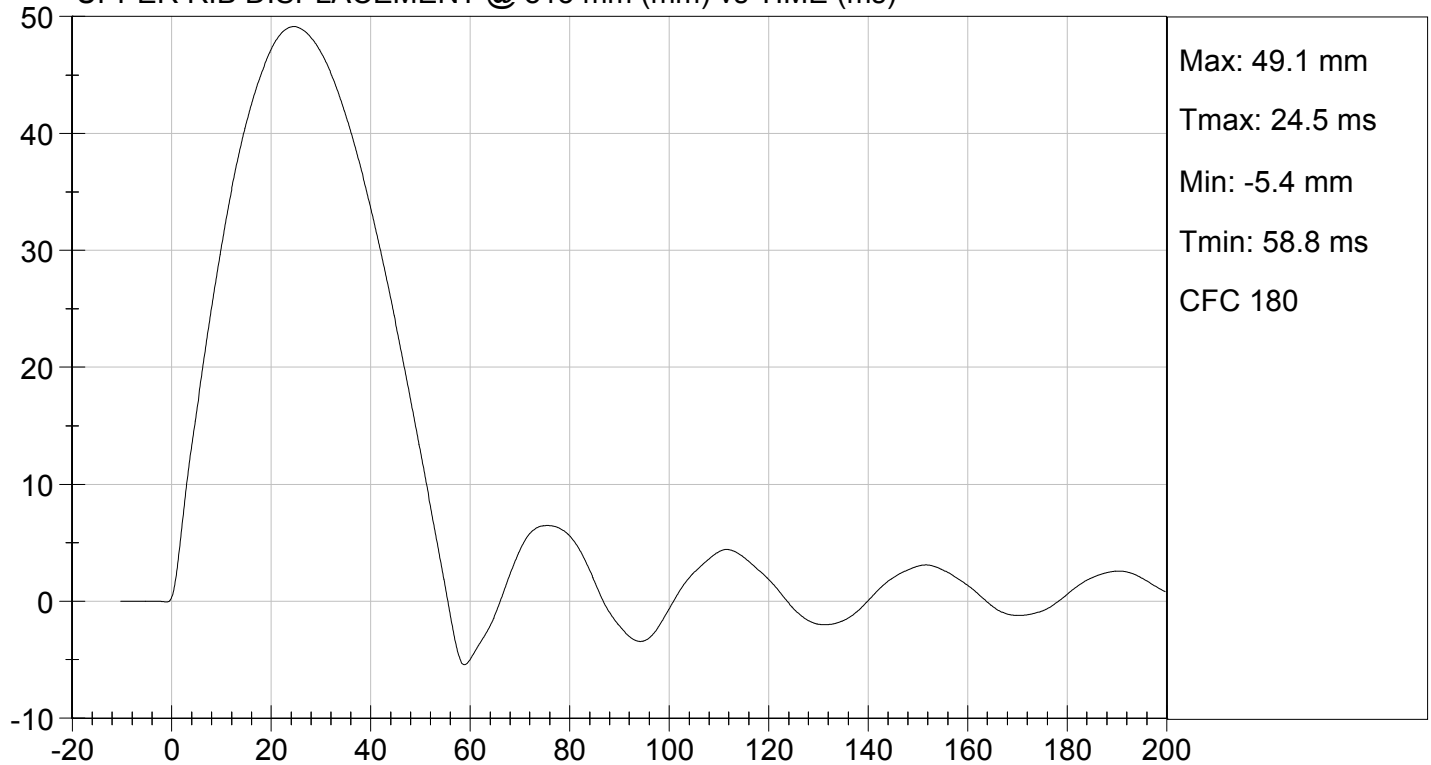

Approved By



UPPER RIB DISPLACEMENT @ 459 mm (mm) vs TIME (ms)



UPPER RIB DISPLACEMENT @ 815 mm (mm) vs TIME (ms)



MGA RESEARCH CORPORATION

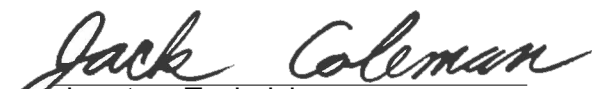
MID RIB TEST

ES-2re DUMMY

ATD Serial No: 032

Test I.D: D144565

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	19	Pass
Displacement at 459 mm	mm	36.0 to 40.0	39.0	Pass
Displacement at 815 mm	mm	46.0 to 51.0	48.8	Pass
Overall Test Results				Pass


Laboratory Technician

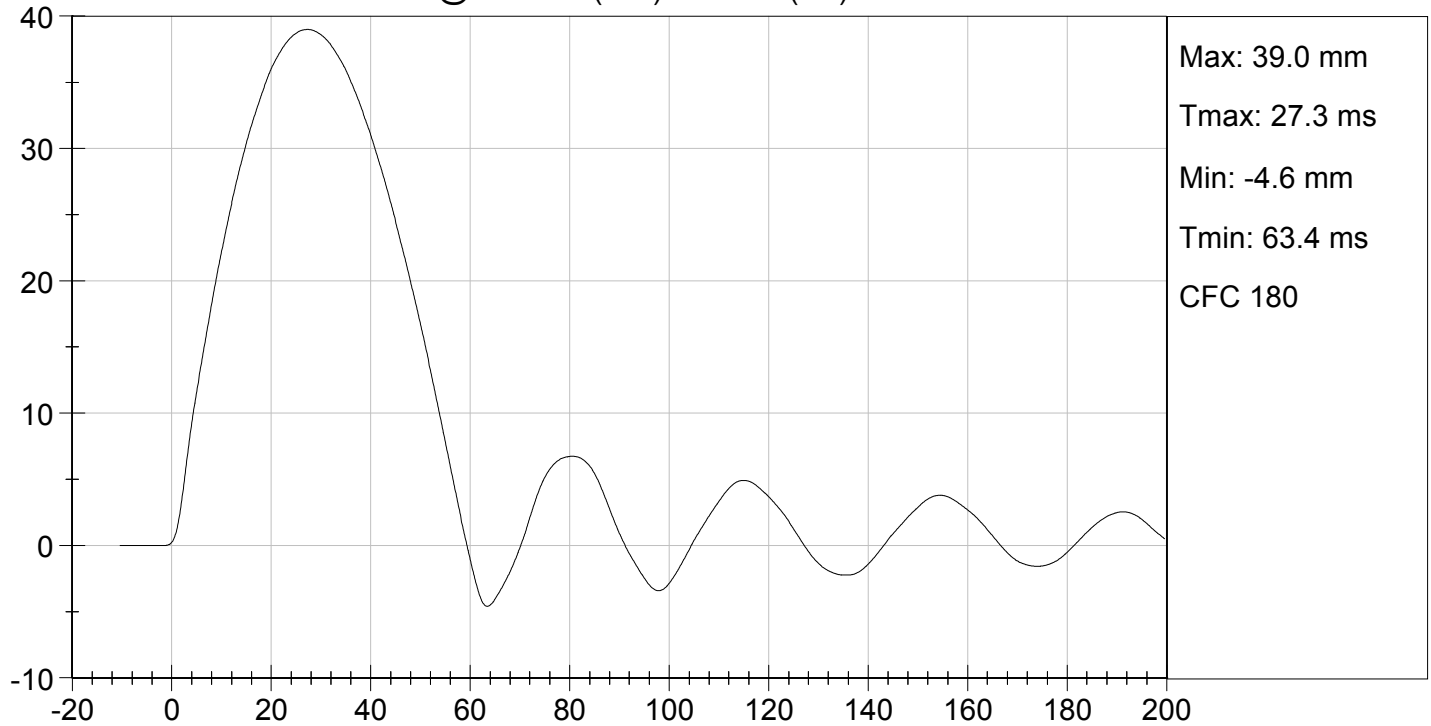
12/29/2014

Test Date

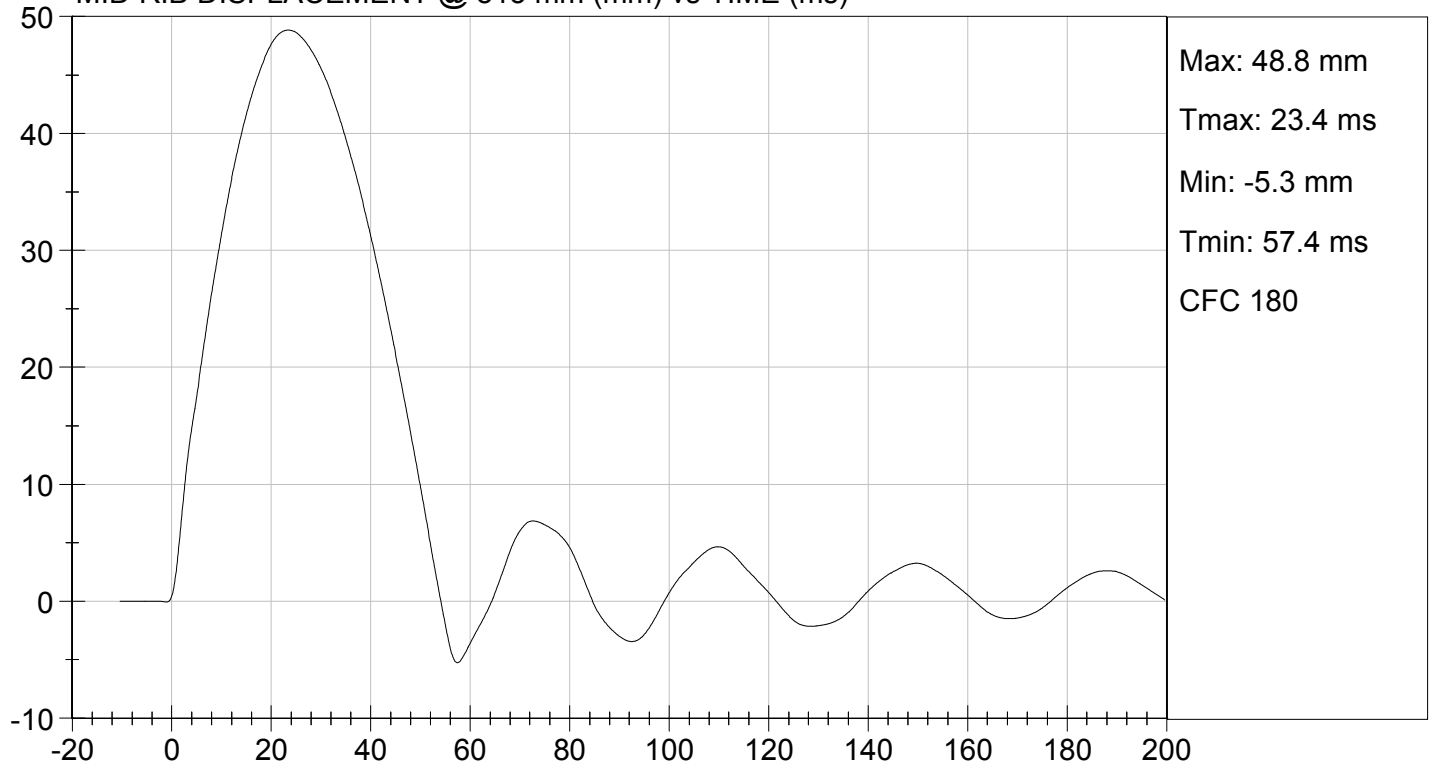

Approved By



MID RIB DISPLACEMENT @ 459 mm (mm) vs TIME (ms)



MID RIB DISPLACEMENT @ 815 mm (mm) vs TIME (ms)



MGA RESEARCH CORPORATION

LOWER RIB TEST

ES-2re DUMMY

ATD Serial No: 032

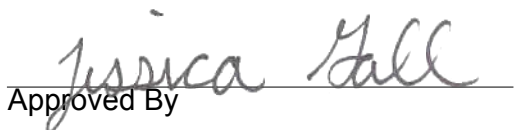
Test I.D: D144566

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	19	Pass
Displacement at 459 mm	mm	36.0 to 40.0	38.3	Pass
Displacement at 815 mm	mm	46.0 to 51.0	49.5	Pass
Overall Test Results				Pass

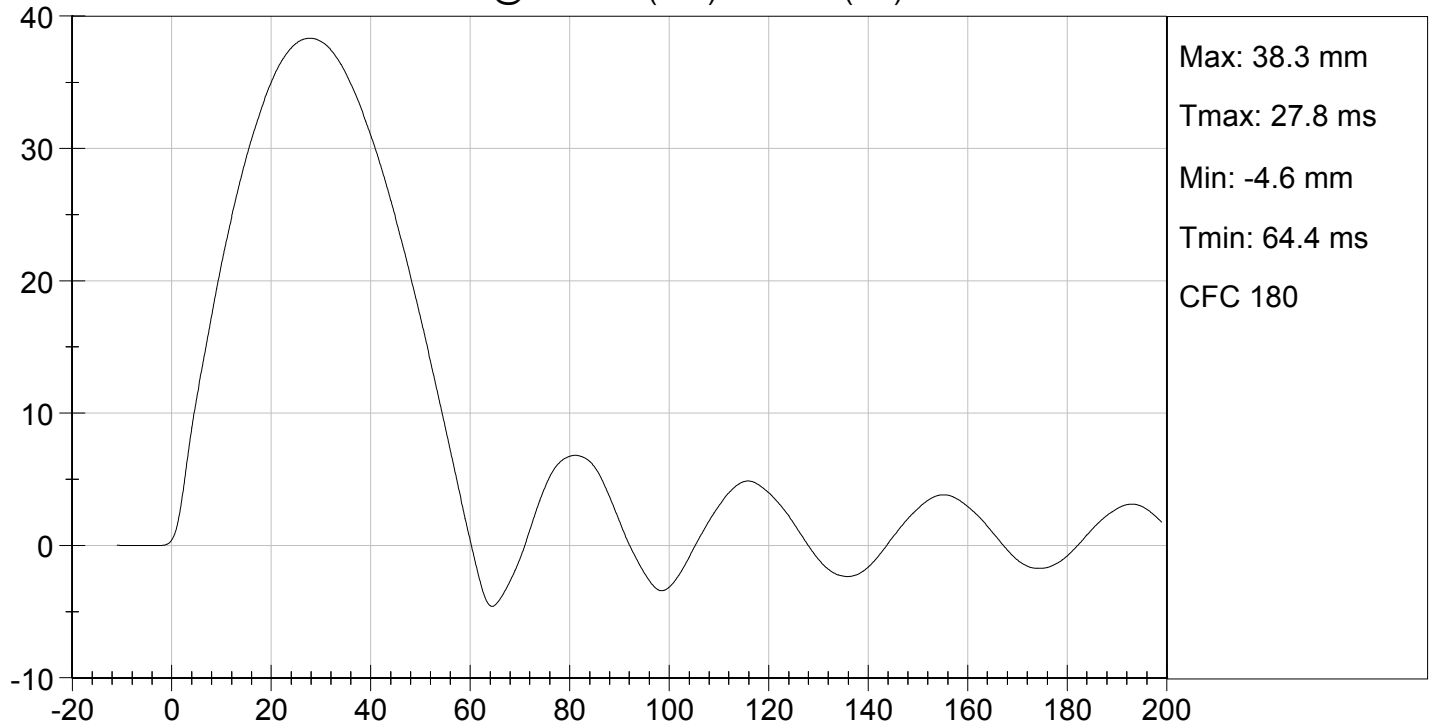

Laboratory Technician

12/29/2014

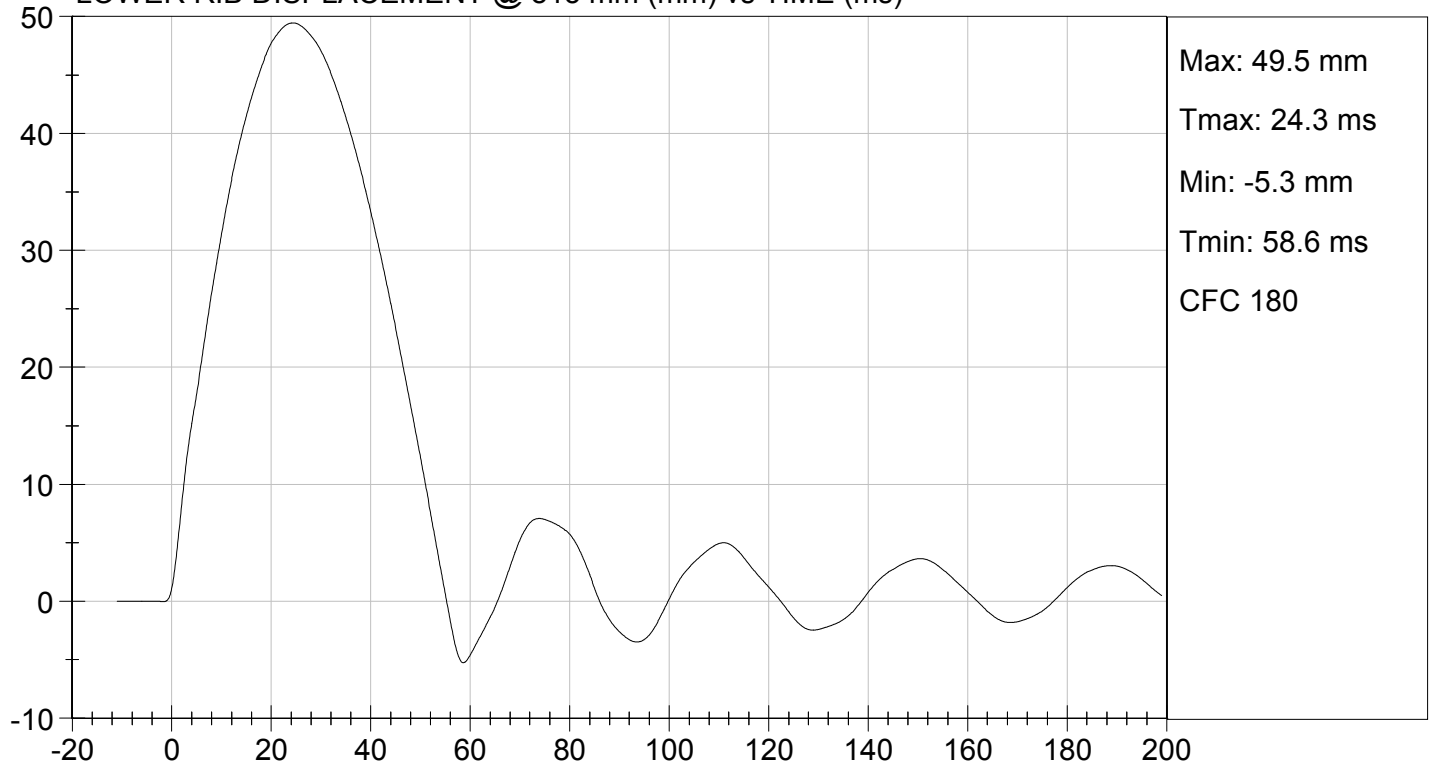
Test Date


Approved By

LOWER RIB DISPLACEMENT @ 459 mm (mm) vs TIME (ms)



LOWER RIB DISPLACEMENT @ 815 mm (mm) vs TIME (ms)



MGA RESEARCH CORPORATION

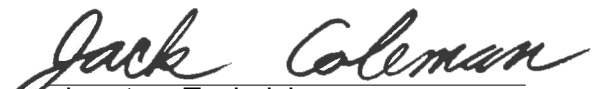
THORAX IMPACT TEST

ES-2re DUMMY

ATD Serial No: 032

Test I.D: D144560

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.6	Pass
Humidity	%	10 to 70	18	Pass
Probe Speed	m/s	5.40 to 5.60	5.58	Pass
Maximum Impactor Force (after 6 ms)	N	5100 to 6200	5805	Pass
Upper Rib Displacement	mm	34.0 to 41.0	39.1	Pass
Middle Rib Displacement	mm	37.0 to 45.0	42.3	Pass
Lower Rib Displacement	mm	37.0 to 44.0	41.1	Pass
Overall Test Results				Pass


Laboratory Technician

12/29/2014

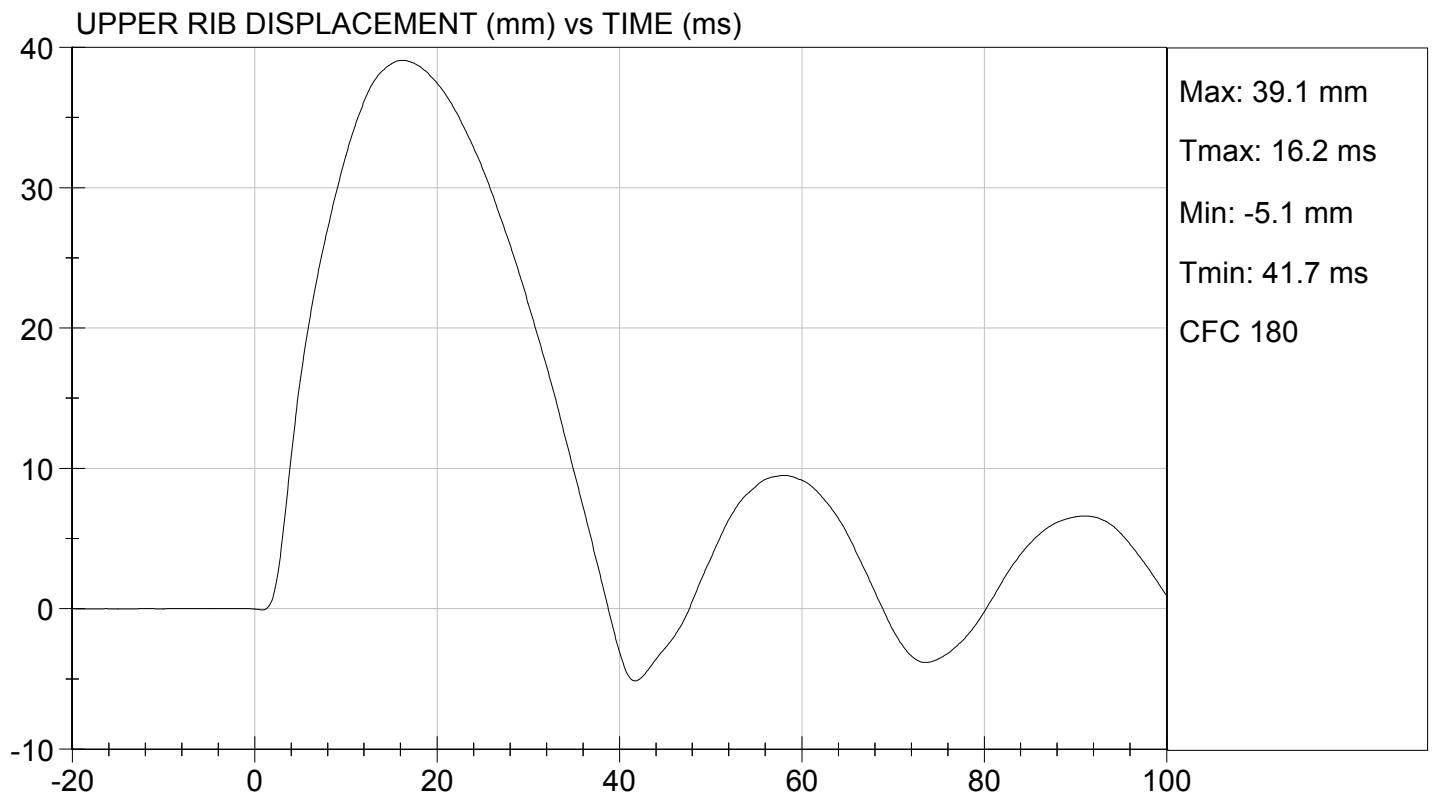
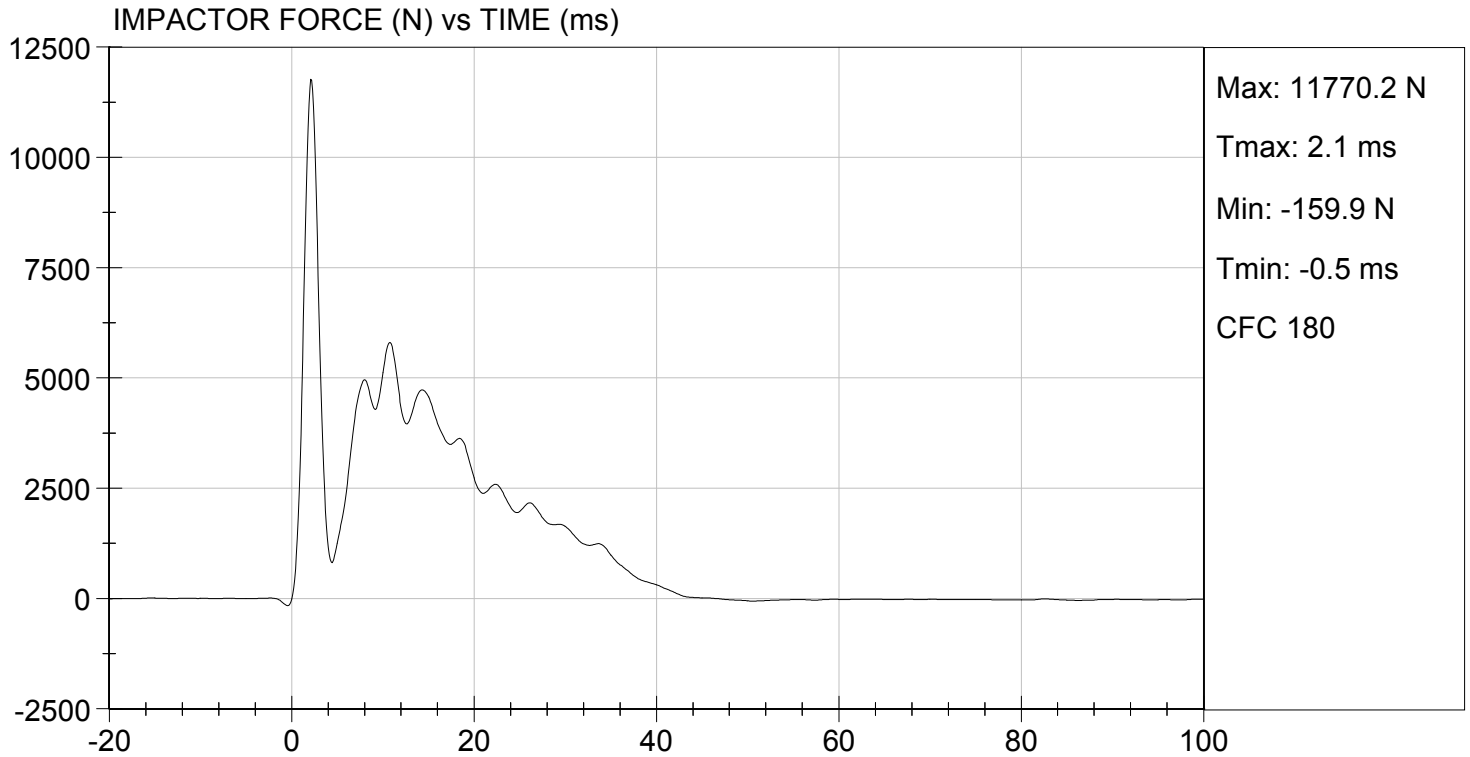
Test Date


Approved By



TEST DESC: THORAX IMPACT
VELOCITY: 18.32 ft/s, 5.58 m/s

TEST DATE: 12/29/2014
TEST #: D144560

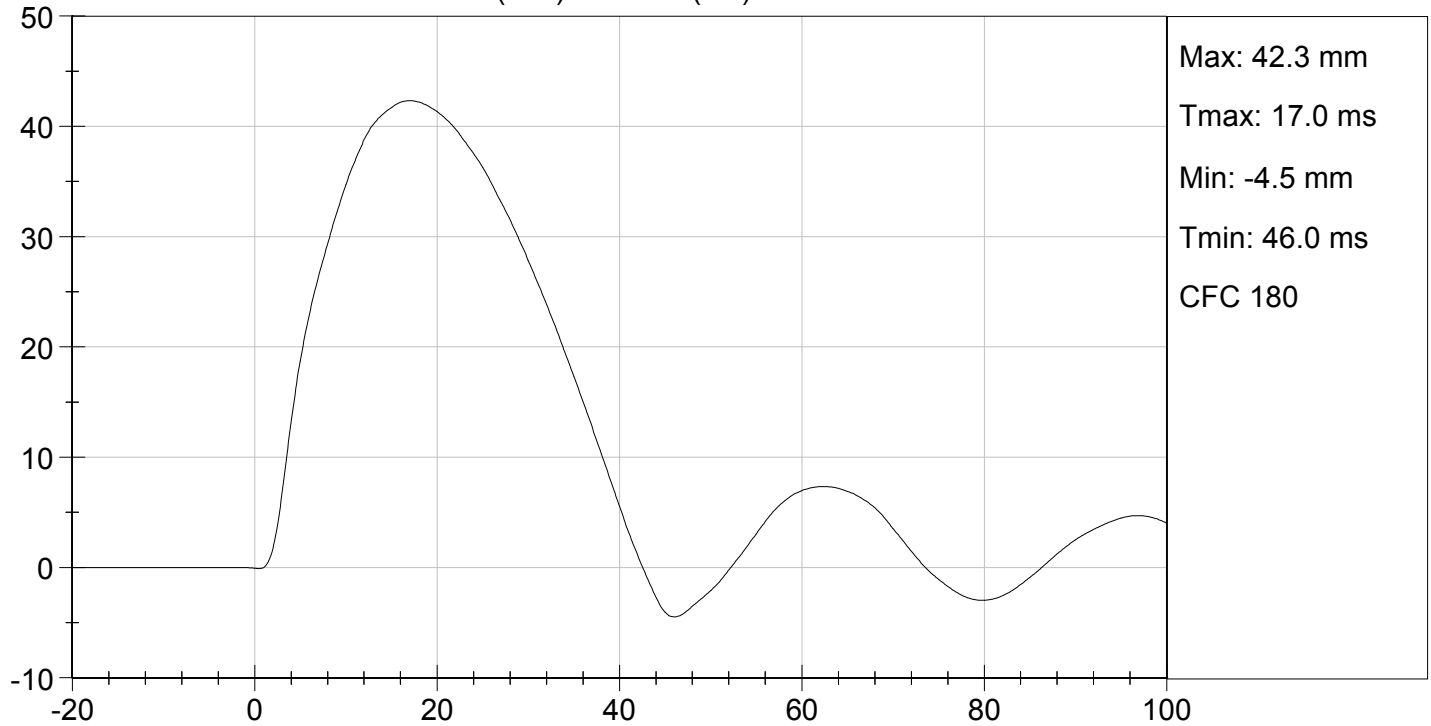




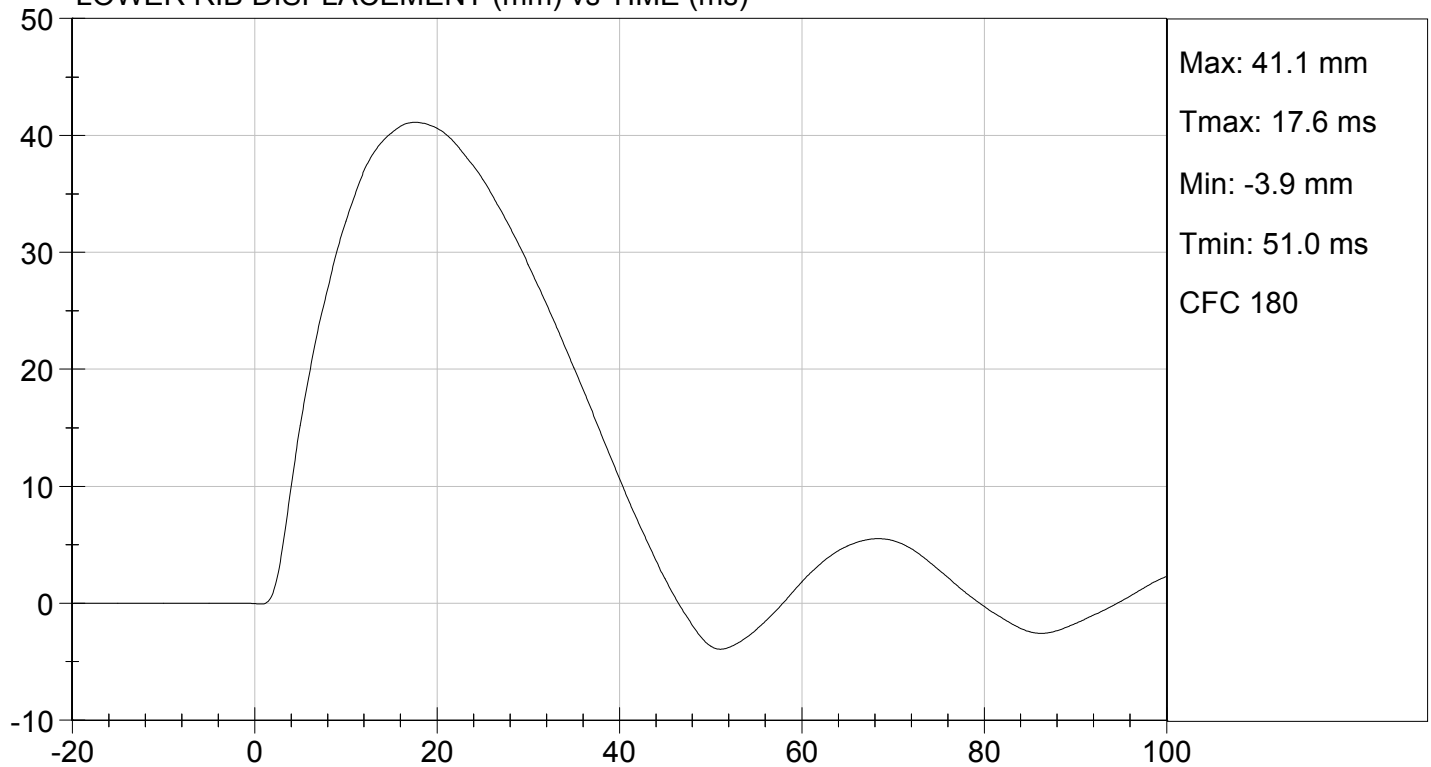
TEST DESC: THORAX IMPACT
VELOCITY: 18.32 ft/s, 5.58 m/s

TEST DATE: 12/29/2014
TEST #: D144560

MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



MGA RESEARCH CORPORATION**ABDOMEN TEST****ES-2re DUMMY**ATD Serial No: 032Test I.D: D144567

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	18	Pass
Probe Speed	m/s	3.90 to 4.10	4.10	Pass
Maximum Impactor Force	N	4000 to 4800	4487	Pass
Time of Maximum Impactor Force	ms	10.6 to 13.0	10.6	Pass
Maximum Total Abdomen Force	N	2200 to 2700	2215	Pass
Time of Maximum Abdomen Force	ms	10.0 to 12.3	10.2	Pass
Overall Test Results				Pass


Laboratory Technician

12/29/2014

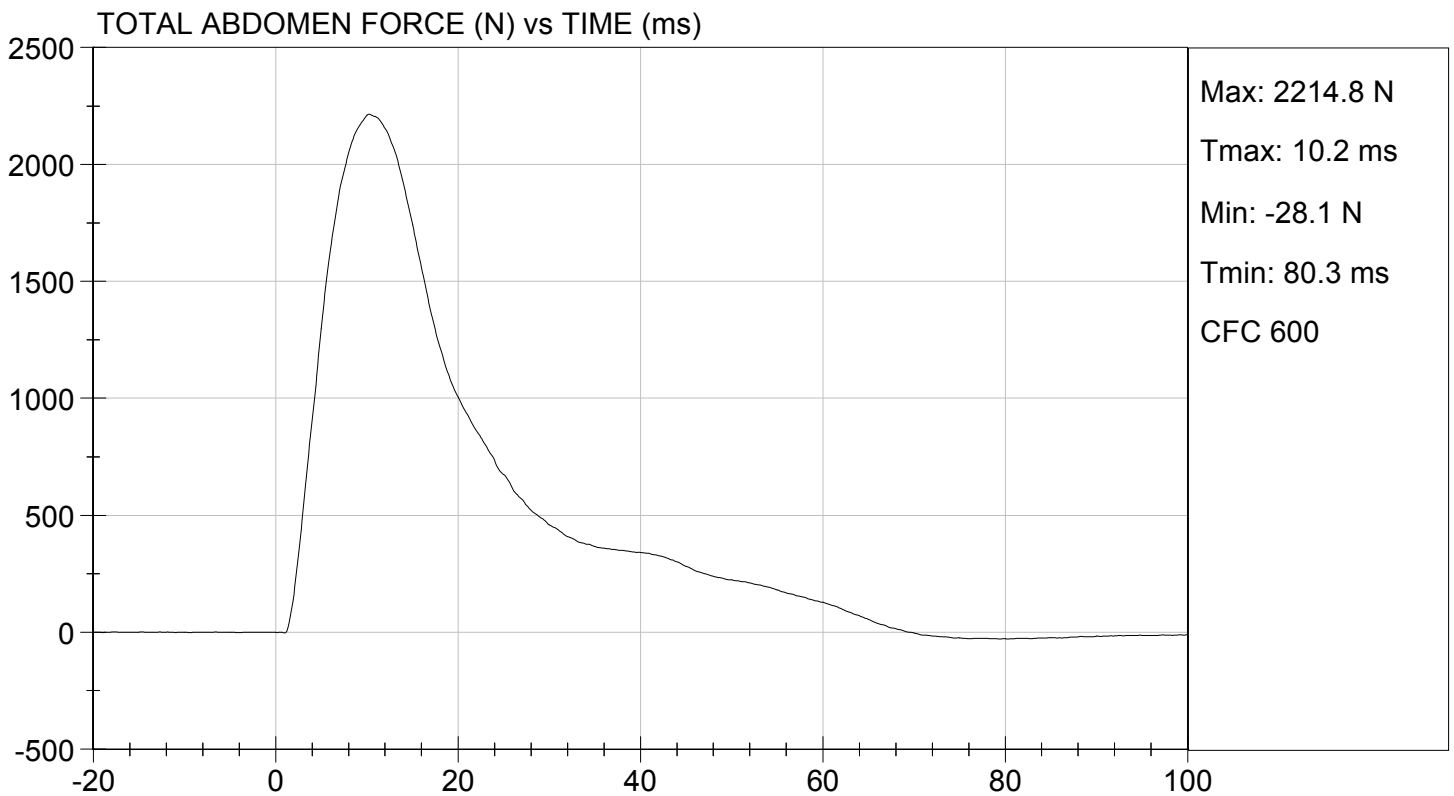
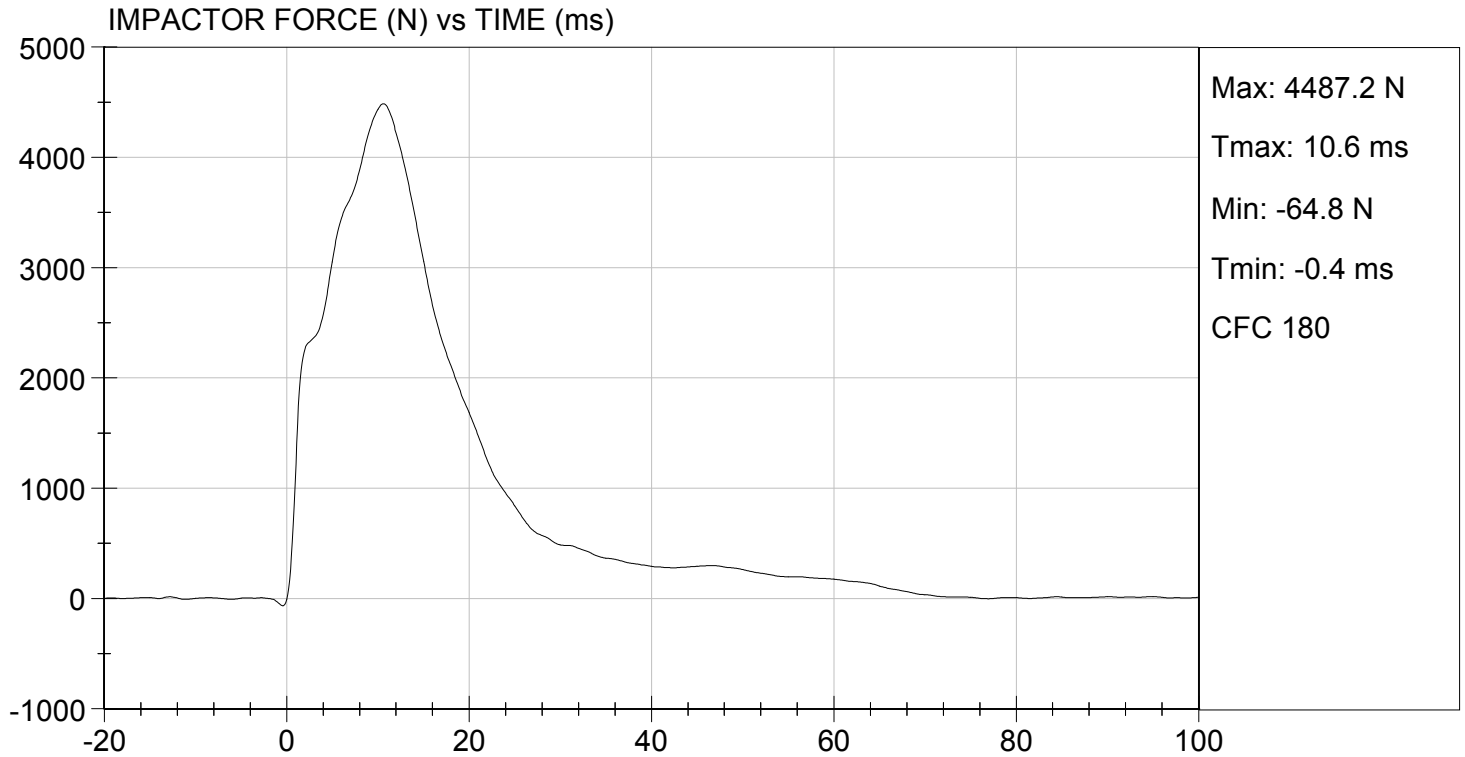
Test Date


Approved By



TEST DESC: ABDOMEN IMPACT
VELOCITY: 13.44 ft/s, 4.10 m/s

TEST DATE: 12/29/2014
TEST #: D144567

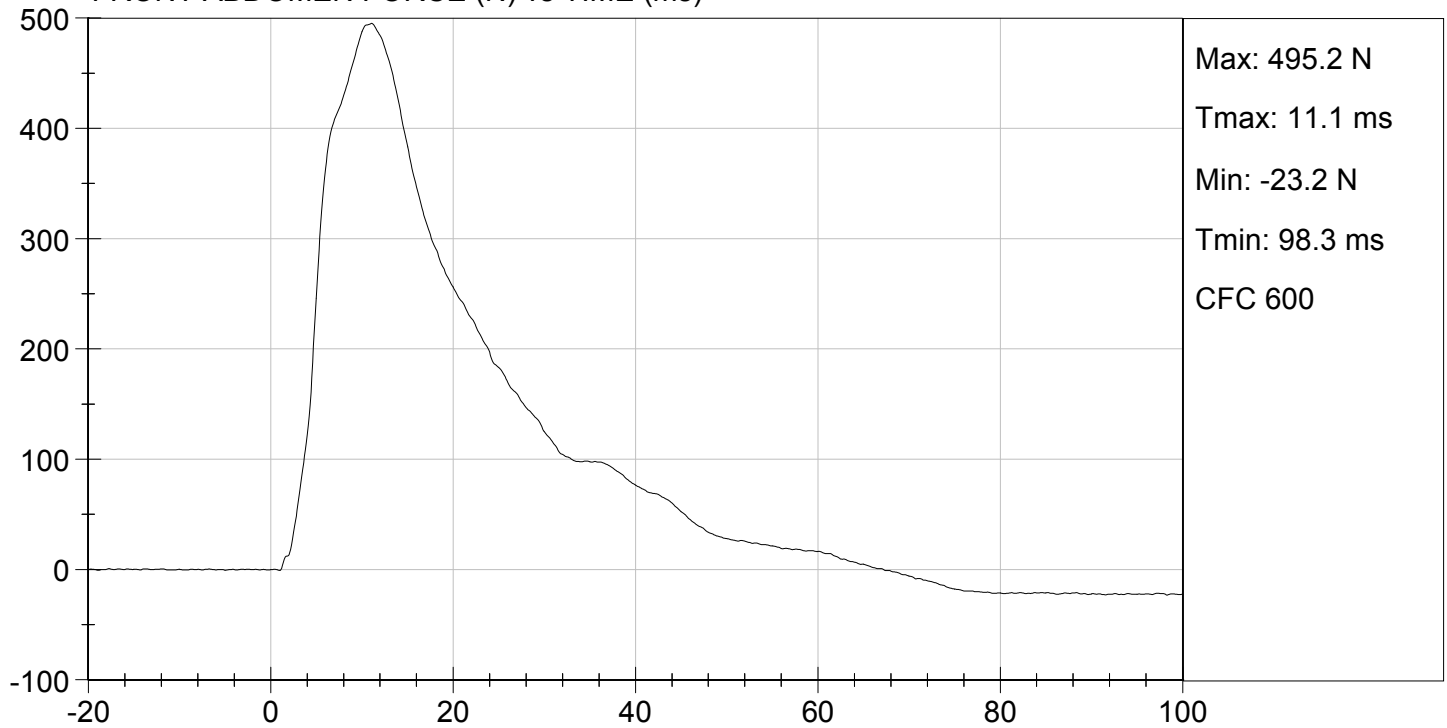




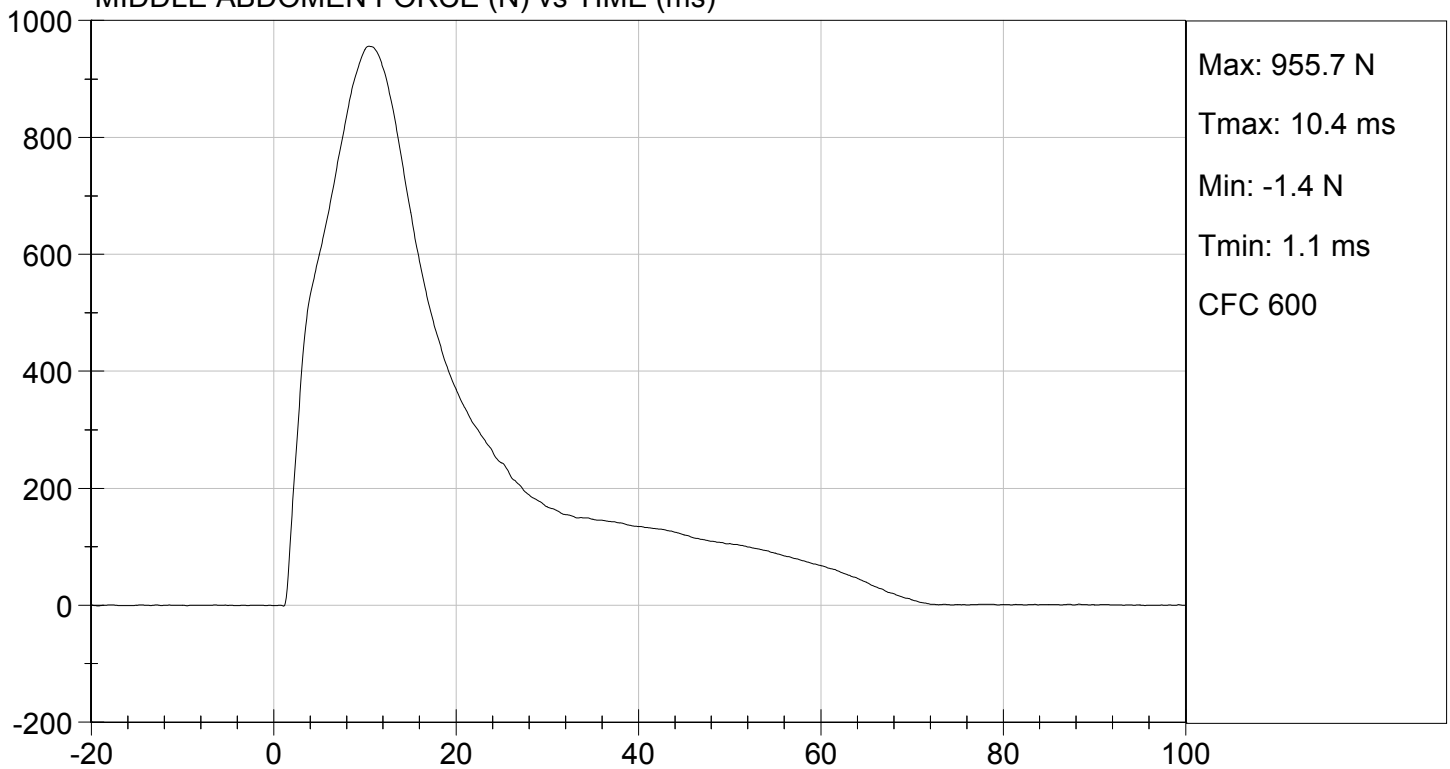
TEST DESC: ABDOMEN IMPACT
VELOCITY: 13.44 ft/s, 4.10 m/s

TEST DATE: 12/29/2014
TEST #: D144567

FRONT ABDOMEN FORCE (N) vs TIME (ms)



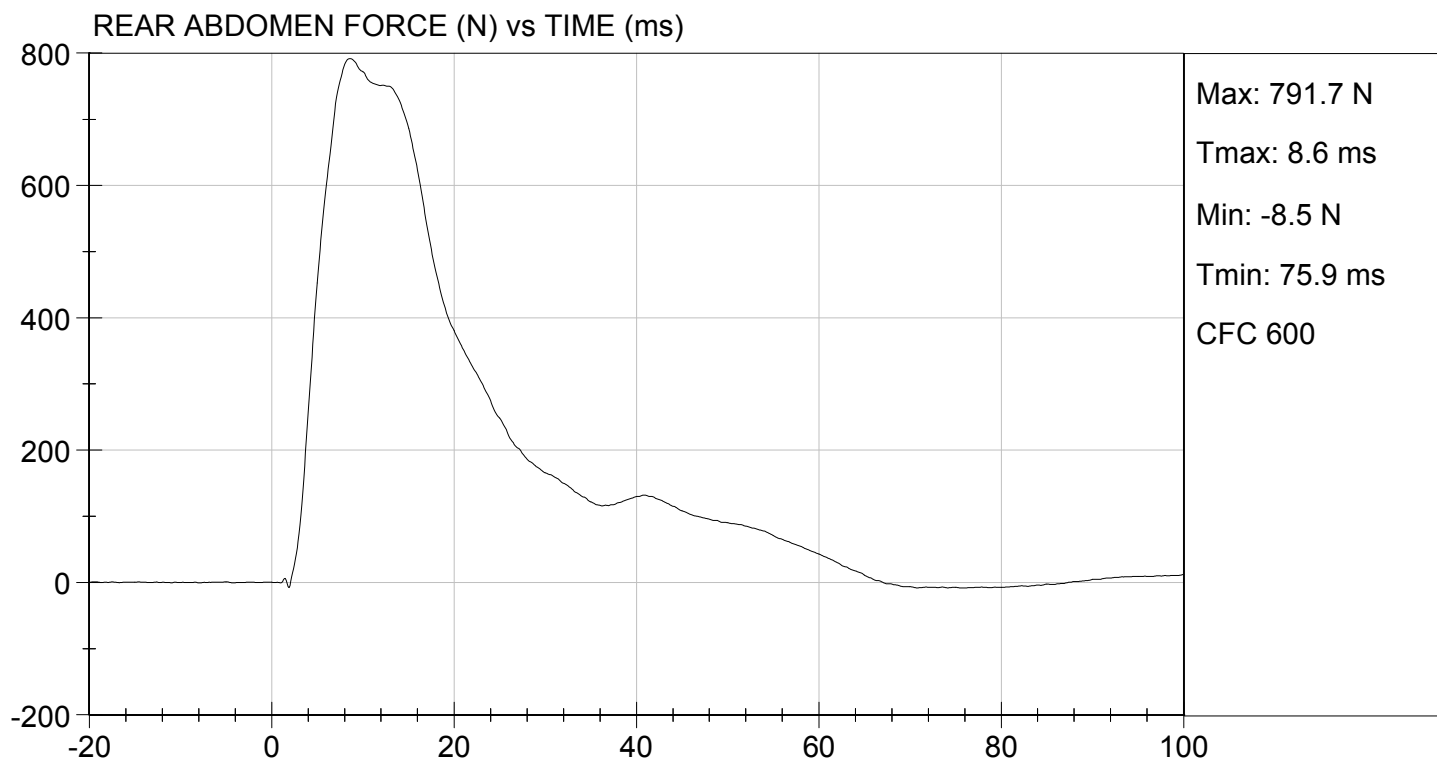
MIDDLE ABDOMEN FORCE (N) vs TIME (ms)





TEST DESC: ABDOMEN IMPACT
VELOCITY: 13.44 ft/s, 4.10 m/s

TEST DATE: 12/29/2014
TEST #: D144567



MGA RESEARCH CORPORATION
LUMBAR SPINE TEST
ES-2re DUMMY

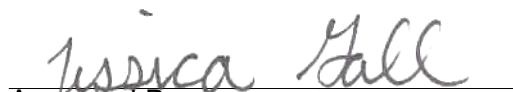
ATD Serial No: 032

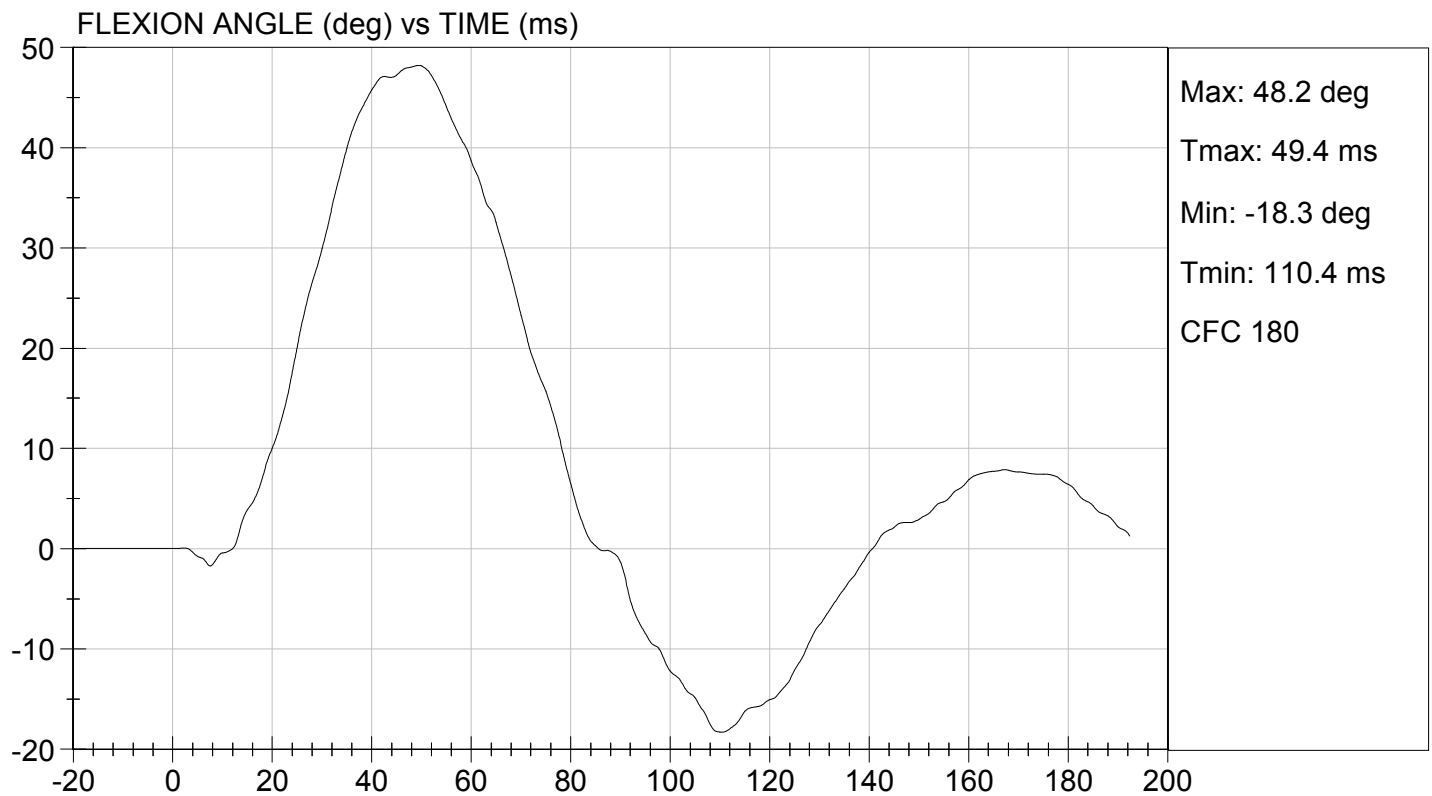
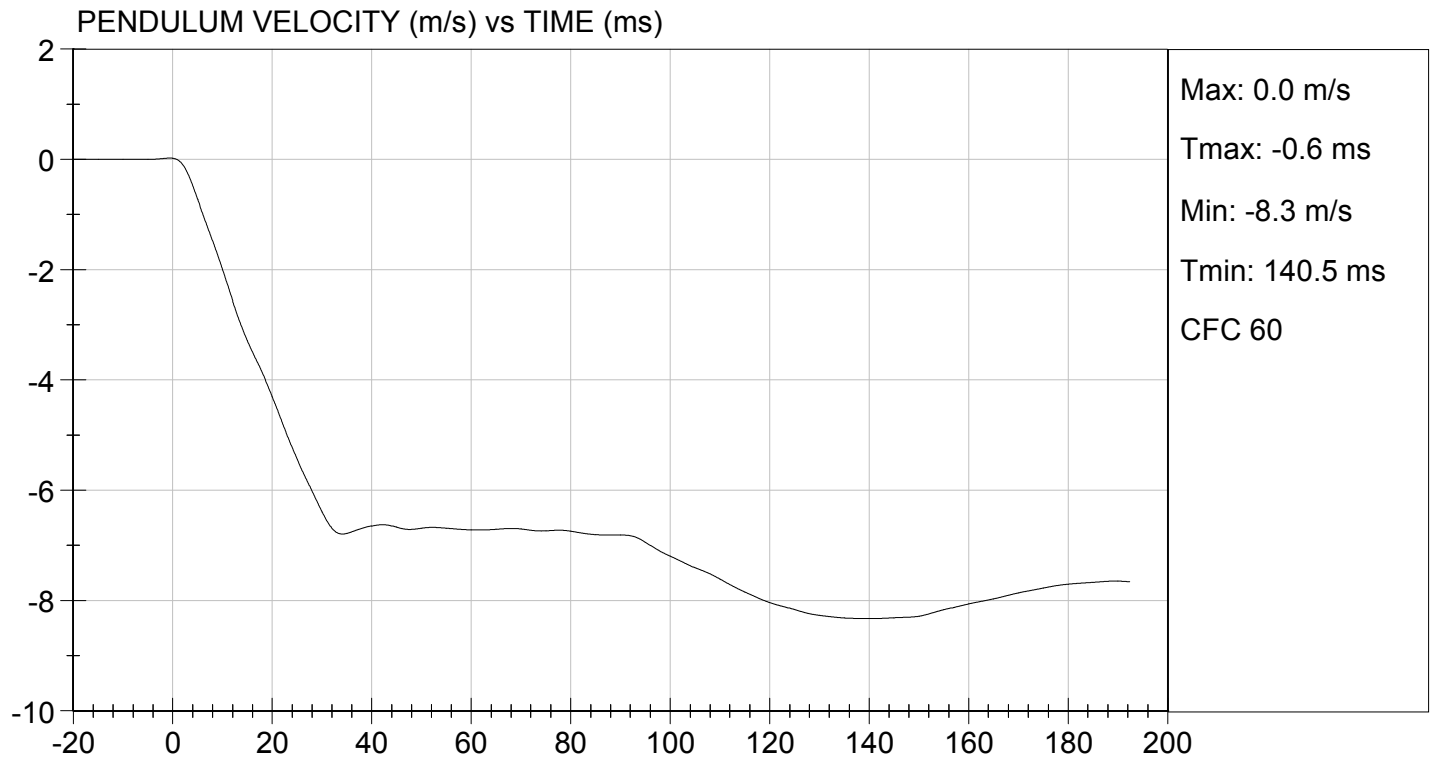
Test I.D: D144568

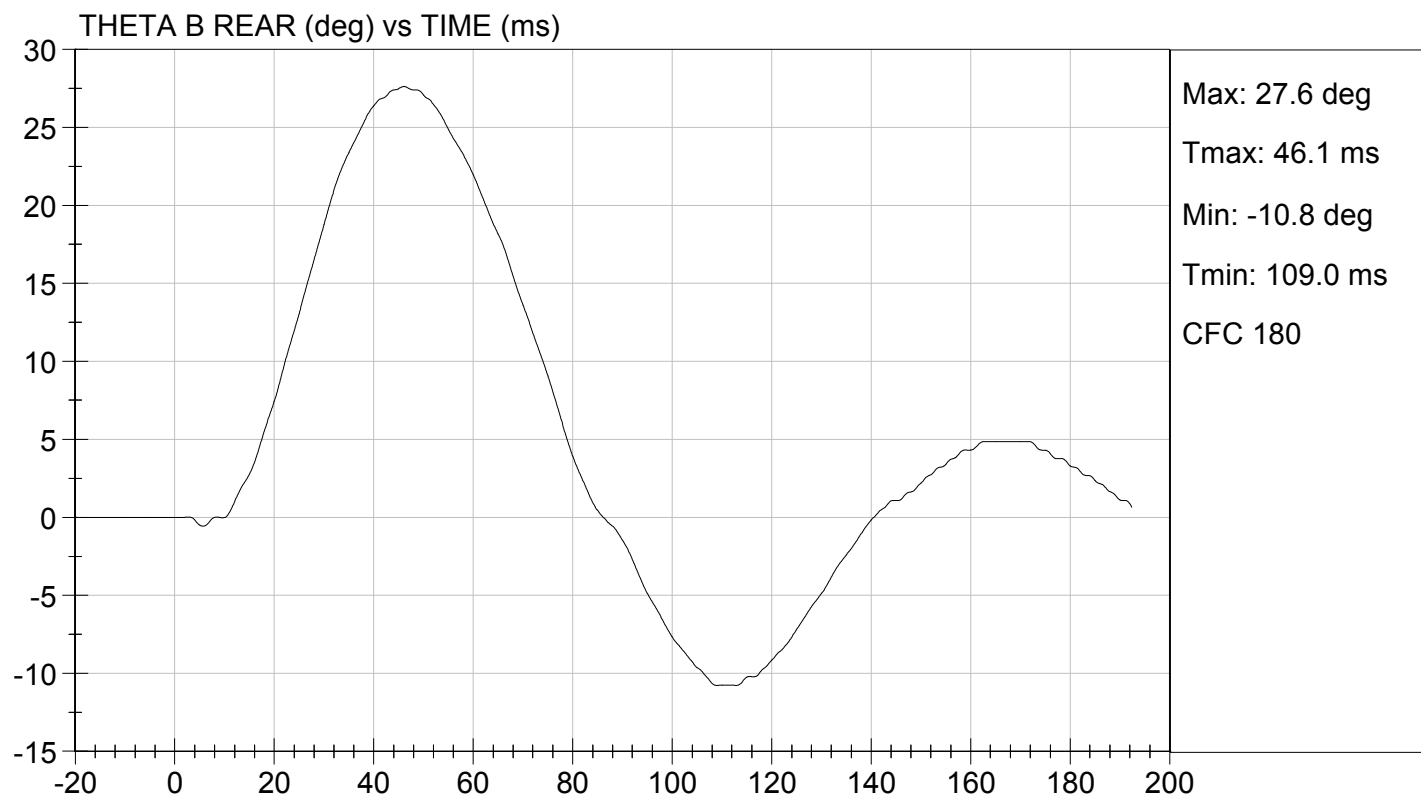
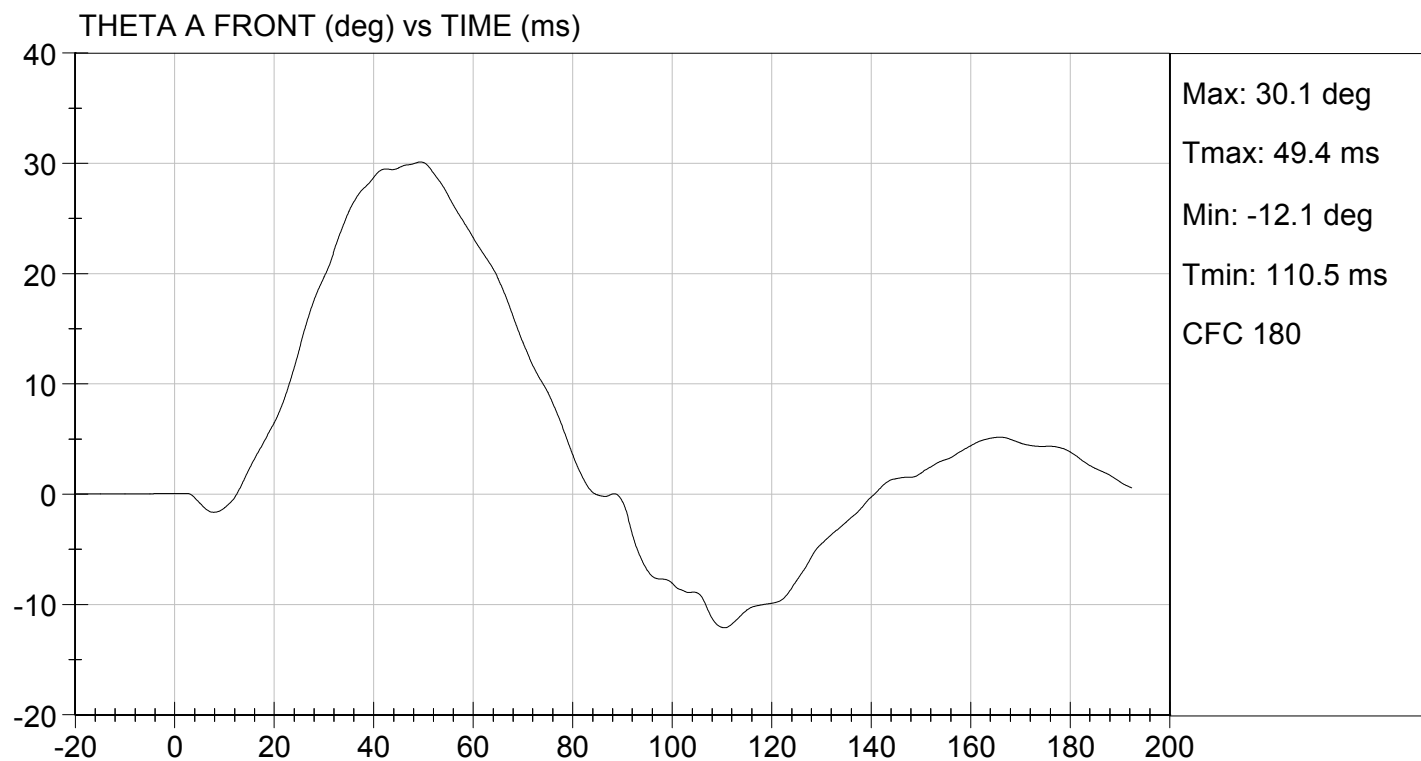
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.0	Pass
Laboratory Relative Humidity		%	10 to 70	20	Pass
Pendulum Speed		m/s	5.95 to 6.15	6.12	Pass
Pendulum Velocity	1 ms	m/s	-0.05 to 0.00	-0.01	Pass
	3.7 ms	m/s	-0.425 to -0.24	-0.406	Pass
	27 ms	m/s	-6.50 to -5.80	-5.83	Pass
	30 ms	m/s	>= -6.50	-6.39	Pass
Maximum Flexion Angle		deg	45.0 to 55.0	48.2	Pass
Time of Maximum Flexion Angle		ms	39.0 to 53.0	49.4	Pass
Headform Rotation Decay to Initial Position		ms	37 to 57	46	Pass
Overall Results					Pass


 Laboratory Technician

12/29/2014
 Test Date


 Approved By

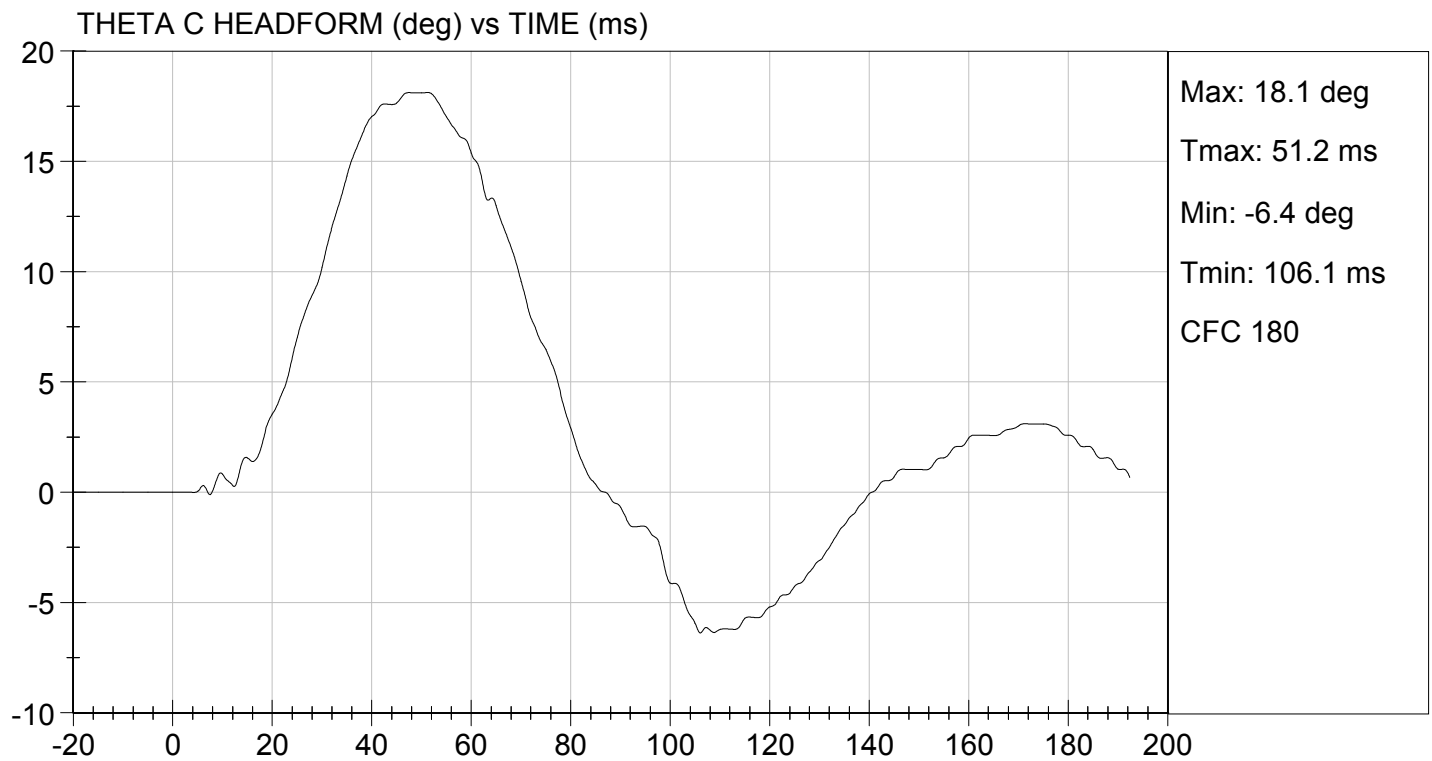






TEST DESC: LUMBAR BENDING
VELOCITY: 20.08 ft/s, 6.12 m/s

TEST DATE: 12/29/2014
TEST #: D144568



MGA RESEARCH CORPORATION

**PELVIS TEST
ES-2re DUMMY**

ATD Serial No: 032

Test I.D: D144569

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	18	Pass
Probe Speed	m/s	4.20 to 4.40	4.27	Pass
Maximum Impactor Force	N	4700 to 5400	4858	Pass
Time of Maximum Impactor Force	ms	11.8 to 16.1	12.9	Pass
Maximum Pubic Force	N	1230 to 1590	1264	Pass
Time of Maximum Pubic Force	ms	12.2 to 17.0	13.5	Pass
Overall Test Results				Pass


Laboratory Technician

12/29/2014

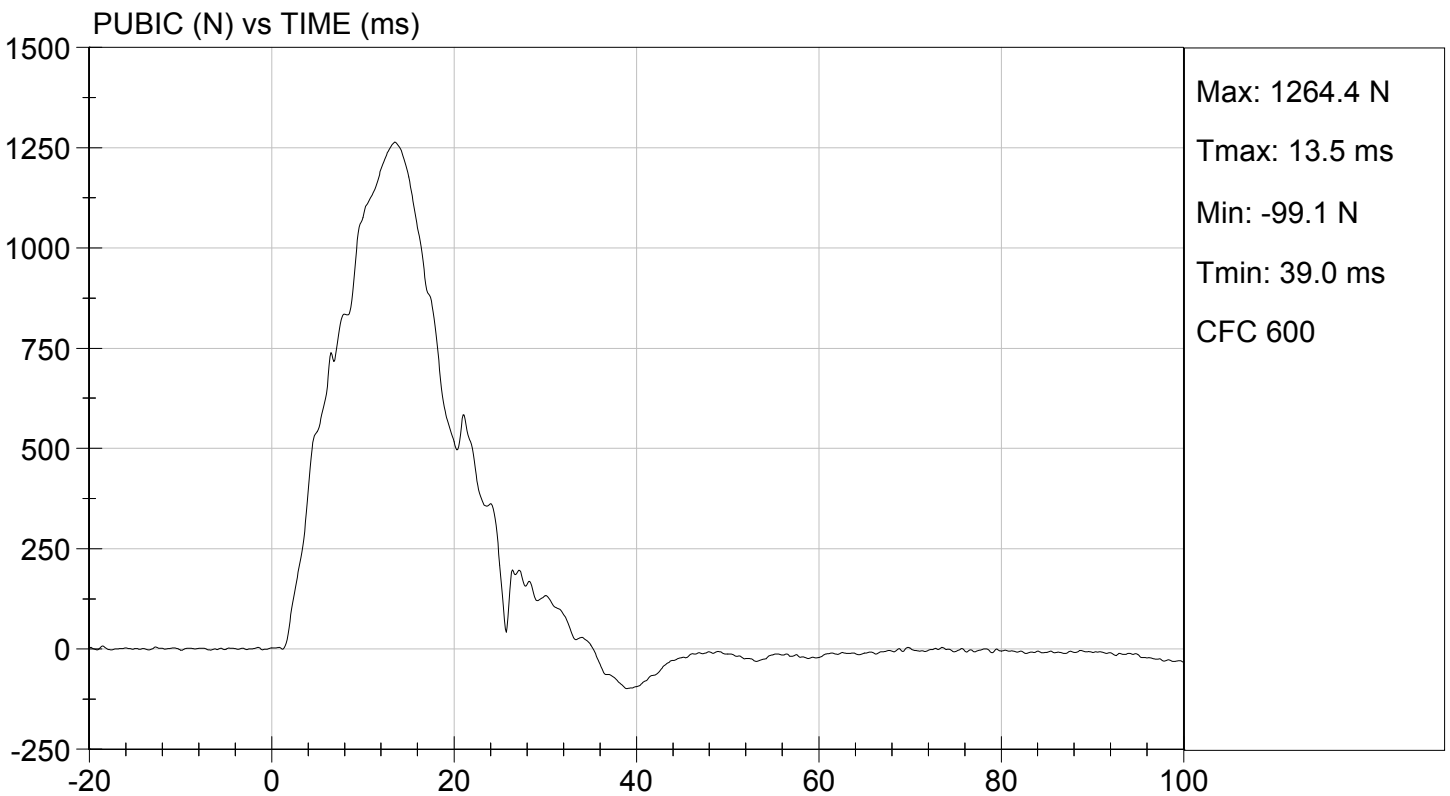
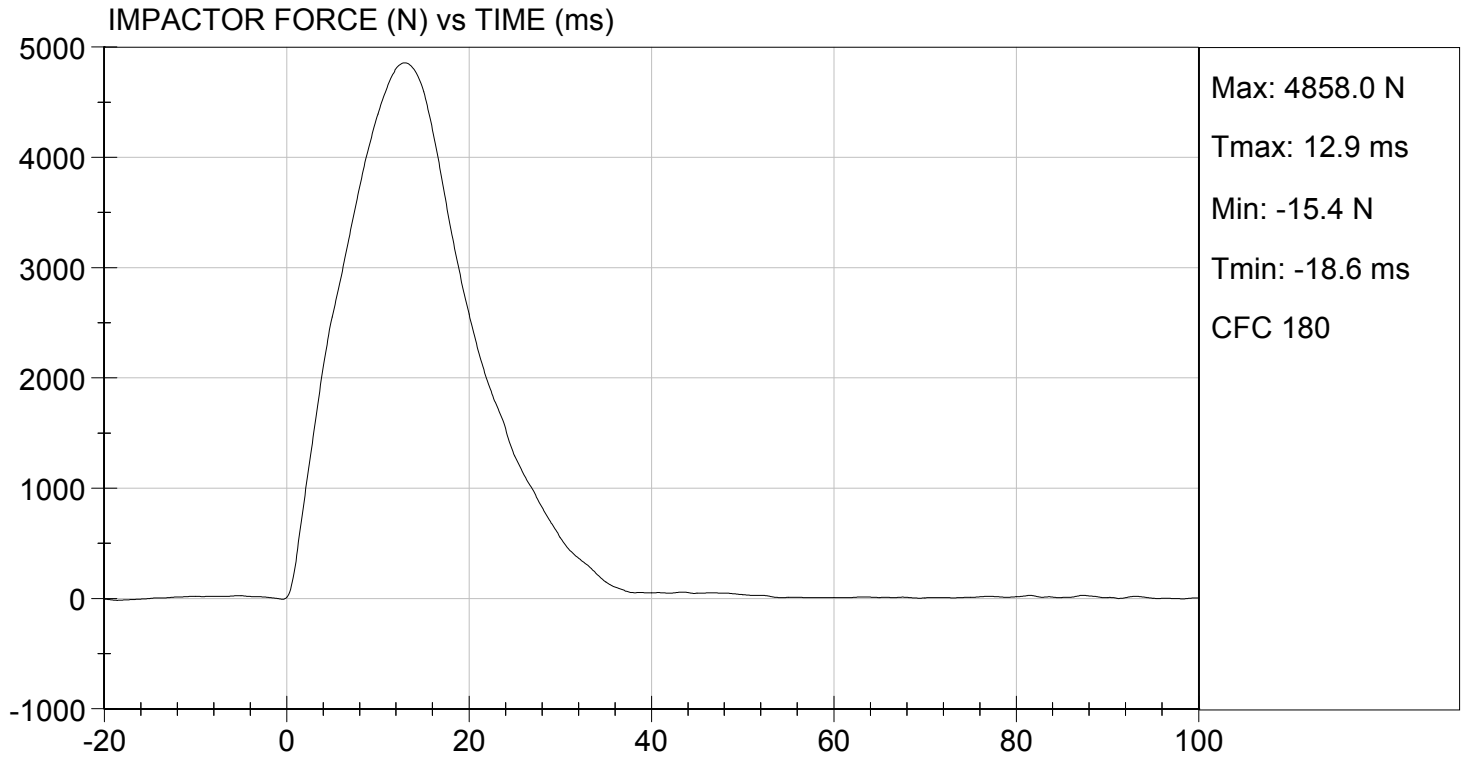
Test Date


Approved By



TEST DESC: PELVIS IMPACT
VELOCITY: 14.01 ft/s, 4.27 m/s

TEST DATE: 12/29/2014
TEST #: D144569



SID-IIsD External Measurements
SN: 296

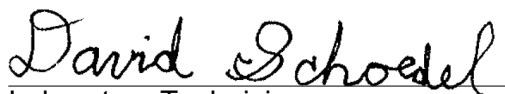
No.	Name	Spec. (mm)	Result	Pass/Fail
A	Sitting Height	772 - 788	784	Pass
B	Shoulder Pivot Height	437 - 453	442	Pass
C	H-point Height	79 - 89	83	Pass
D	H-point from Seatback	141 - 151	145	Pass
E	Shoulder Pivot from Backline	97 - 107	99	Pass
F	Thigh Clearance	119 -135	121	Pass
G	Head Breadth	140 - 148	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: D144391

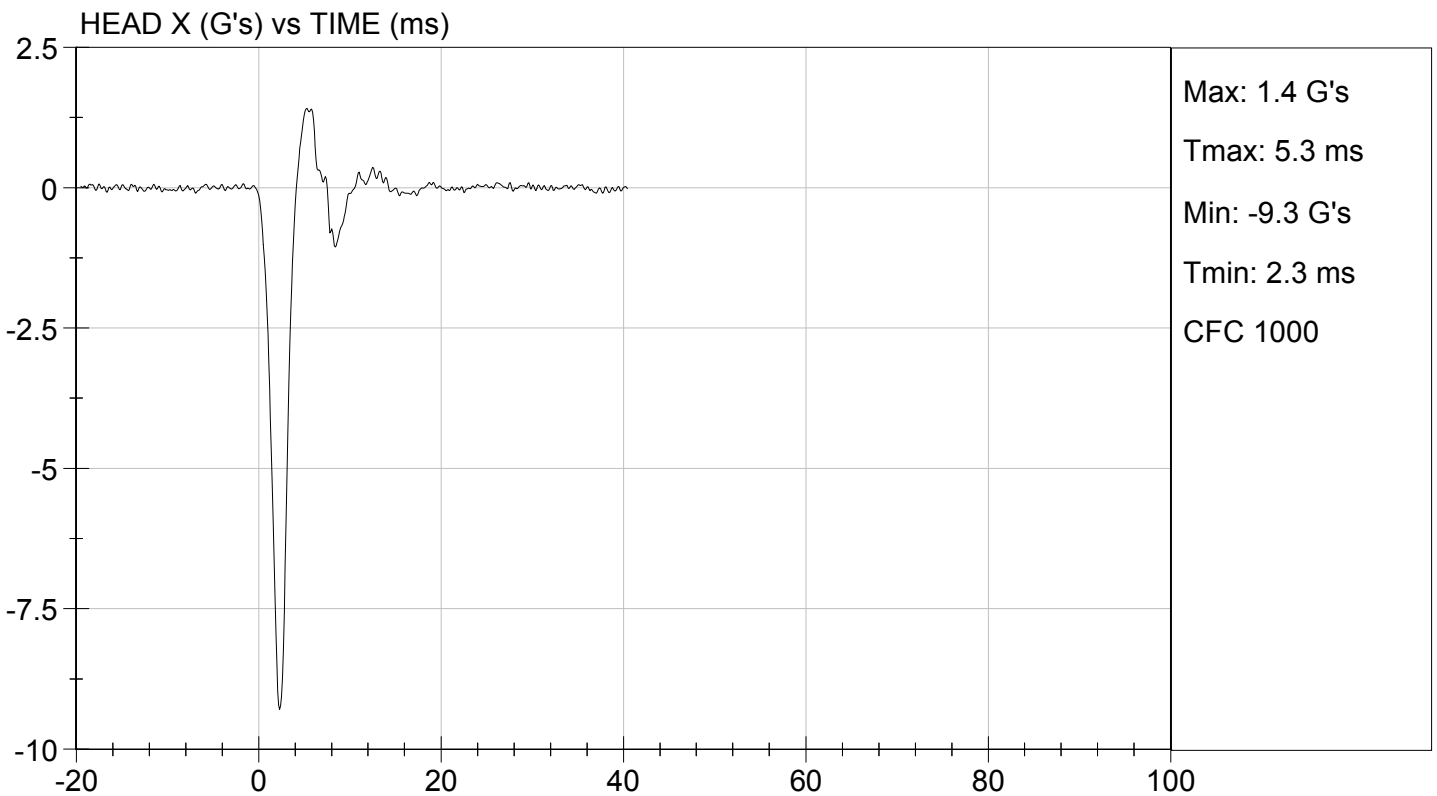
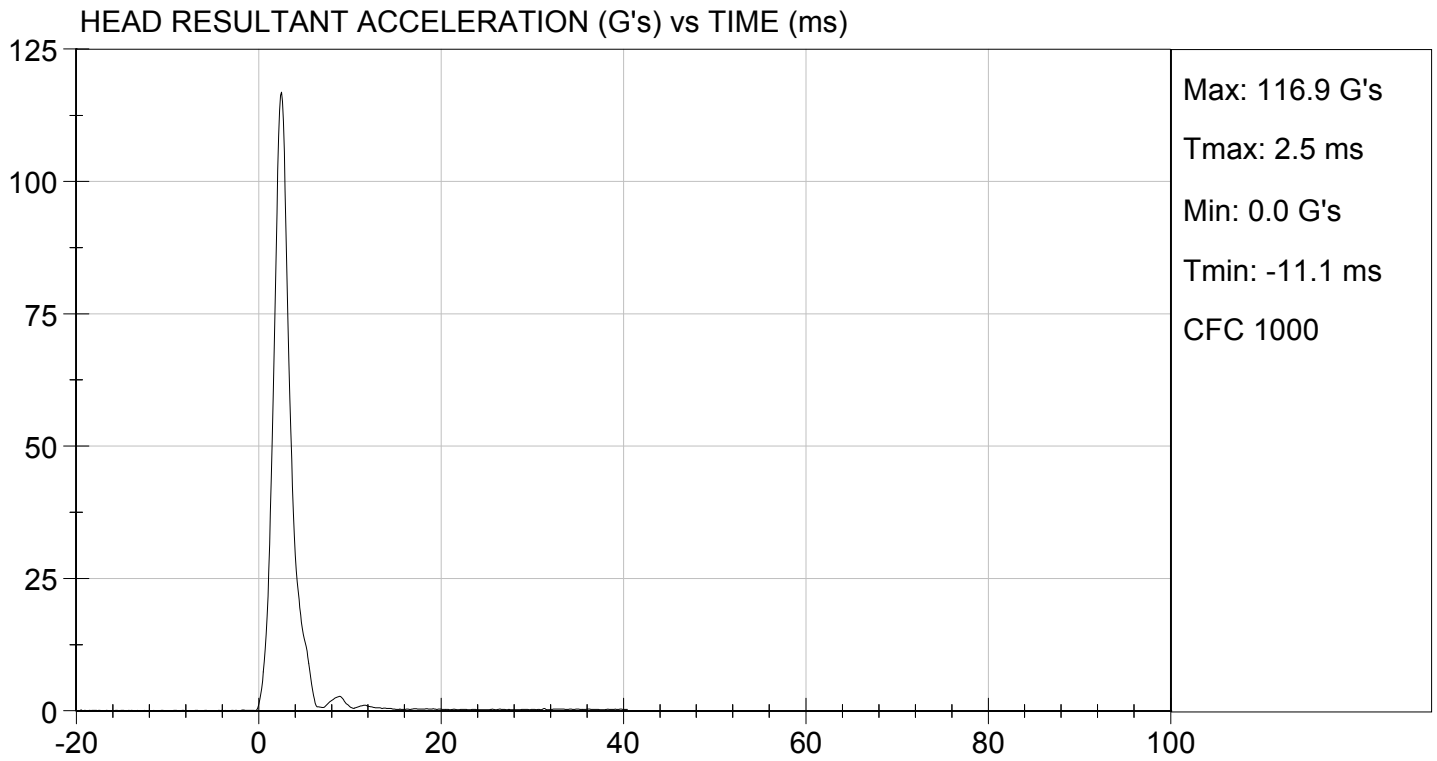
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22.1	Pass
Laboratory Relative Humidity	%	10 to 70	26	Pass
Peak Resultant Acceleration	G's	115 to 137	117	Pass
Peak Longitudinal Acceleration	G's	+/- 15	-9.3	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	<15%	Yes	Pass
Overall Test Results			Pass	

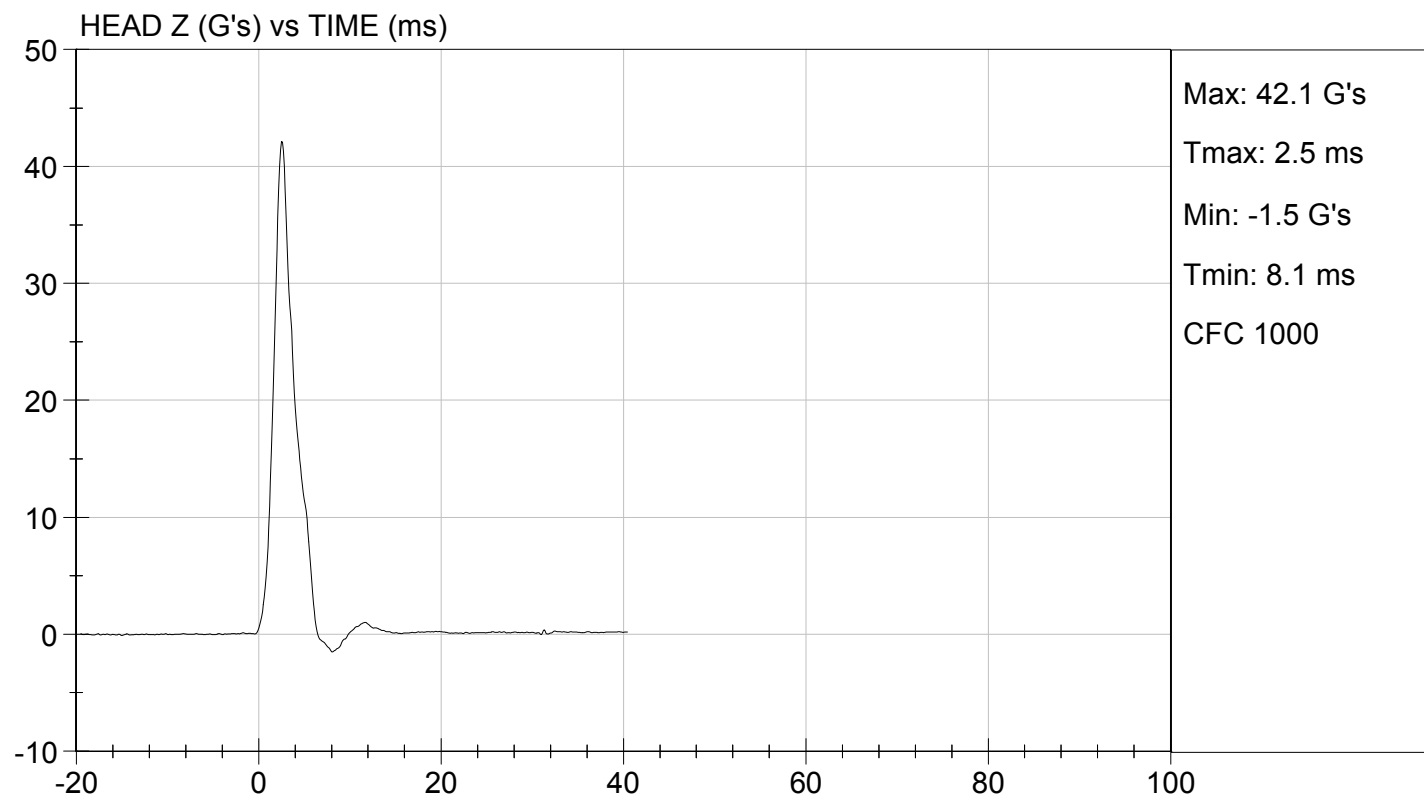
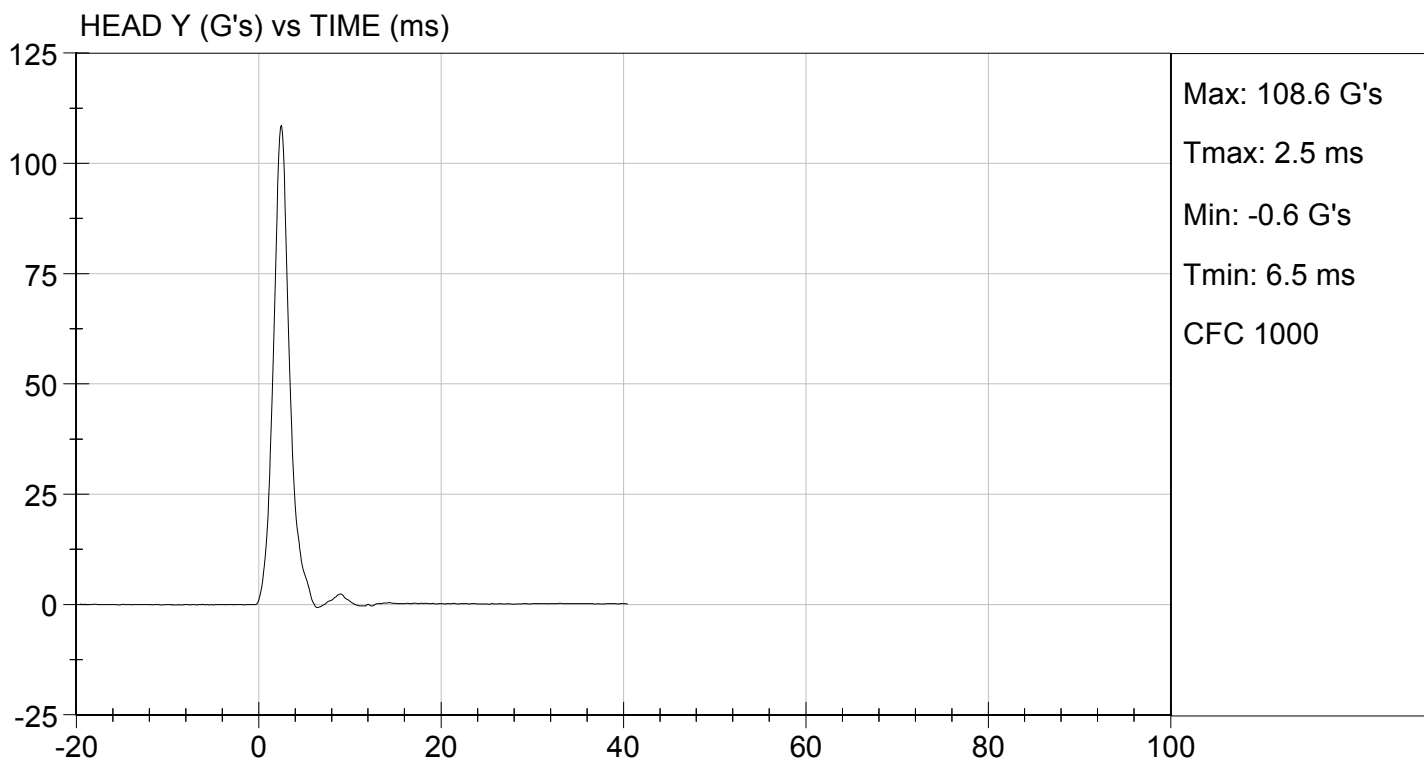

Laboratory Technician

12/12/2014

Test Date


Approved By





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

ATD Serial No: 296

Test I.D: D144392

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	21.8	Pass
Humidity		%	10 to 70	27	Pass
Impact Velocity		m/s	5.51 to 5.63	5.58	Pass
Pendulum Velocity	10 ms	m/s	2.20 to 2.80	2.41	Pass
	15 ms	m/s	3.30 to 4.10	3.56	Pass
	20 ms	m/s	4.40 to 5.40	4.71	Pass
	25 ms	m/s	5.40 to 6.10	5.67	Pass
	25-100 ms	m/s	5.50 to 6.20	6.08	Pass
Maximum D-Plane Rotation		deg	71 to 81	75	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	60	Pass
Maximum Occipital Condyle Moment		Nm	-44 to -36	-38	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	120	Pass
Overall Test Results					Pass

David Schoedel
Laboratory Technician

12/12/2014

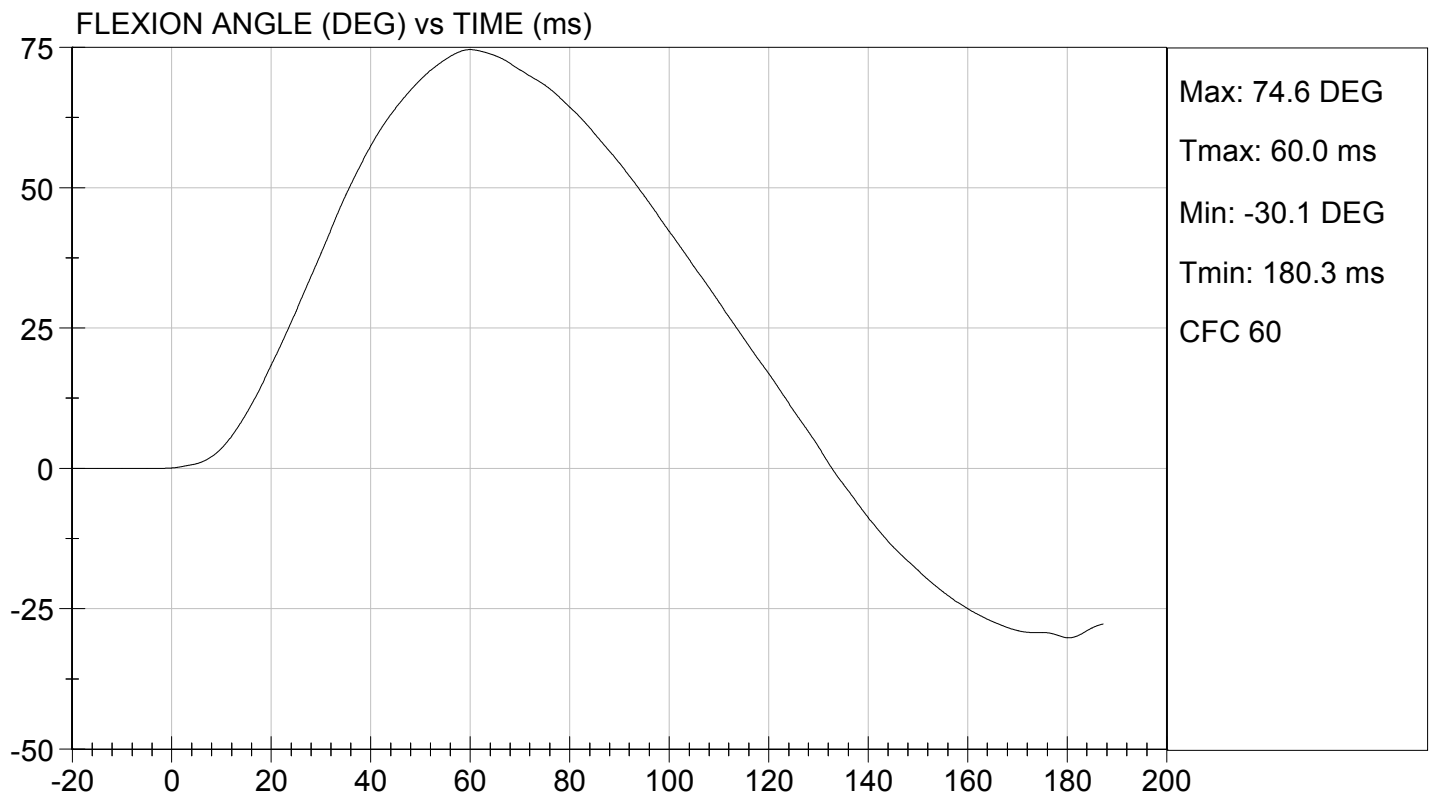
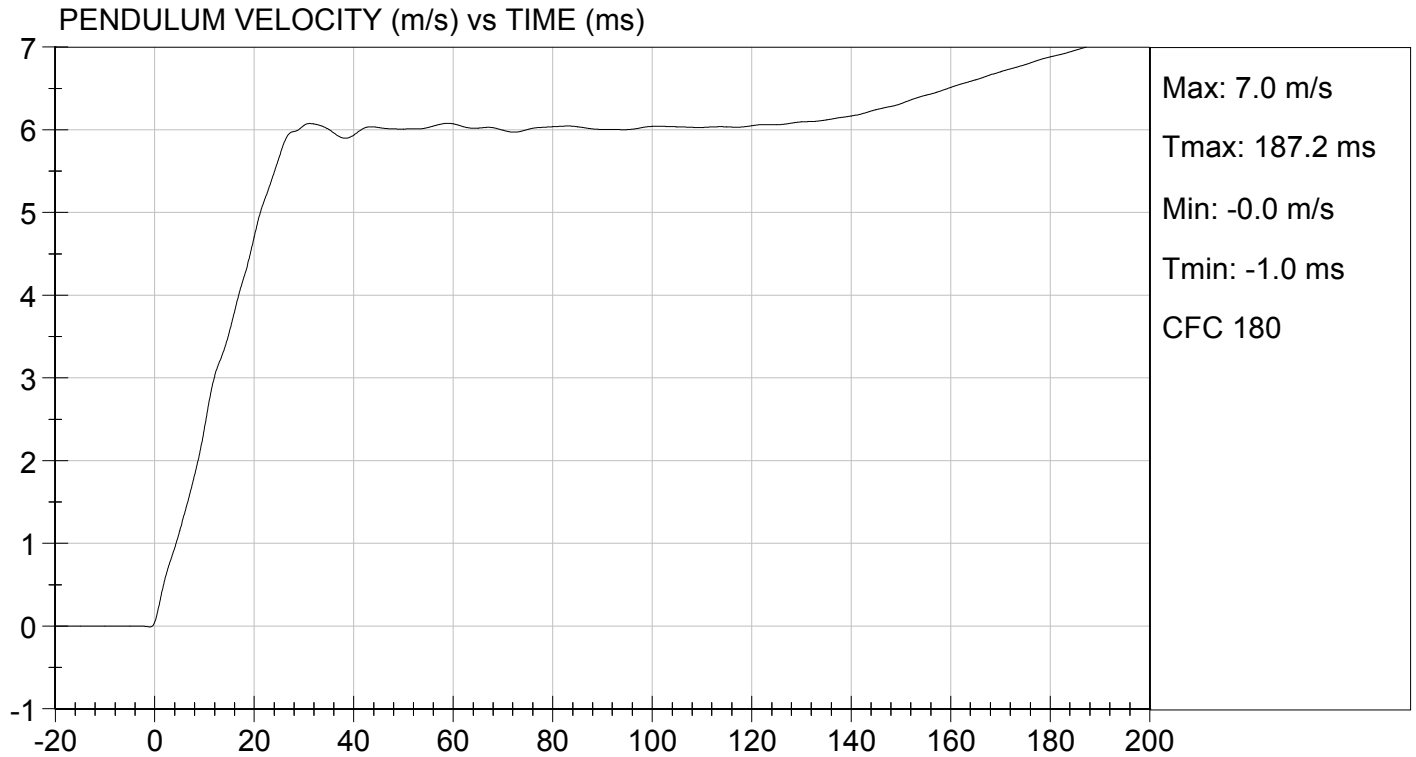
Test Date

Jessica Hall
Approved By



TEST DESC: NECK BENDING
VELOCITY: 18.32 ft/s, 5.58 m/s

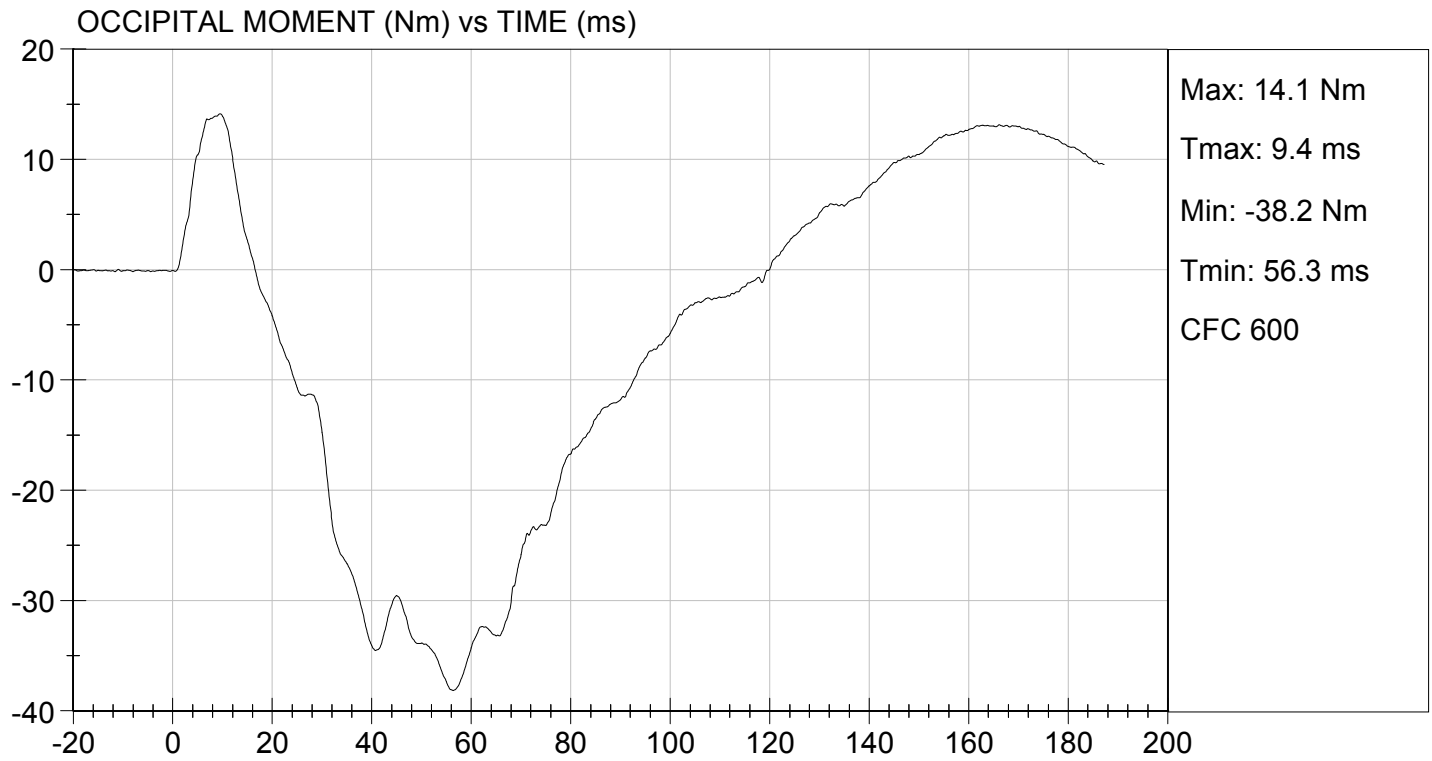
TEST DATE: 12/12/2014
TEST #: D144392





TEST DESC: NECK BENDING
VELOCITY: 18.32 ft/s, 5.58 m/s

TEST DATE: 12/12/2014
TEST #: D144392



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

ATD Serial No: 296

Test ID: D144393

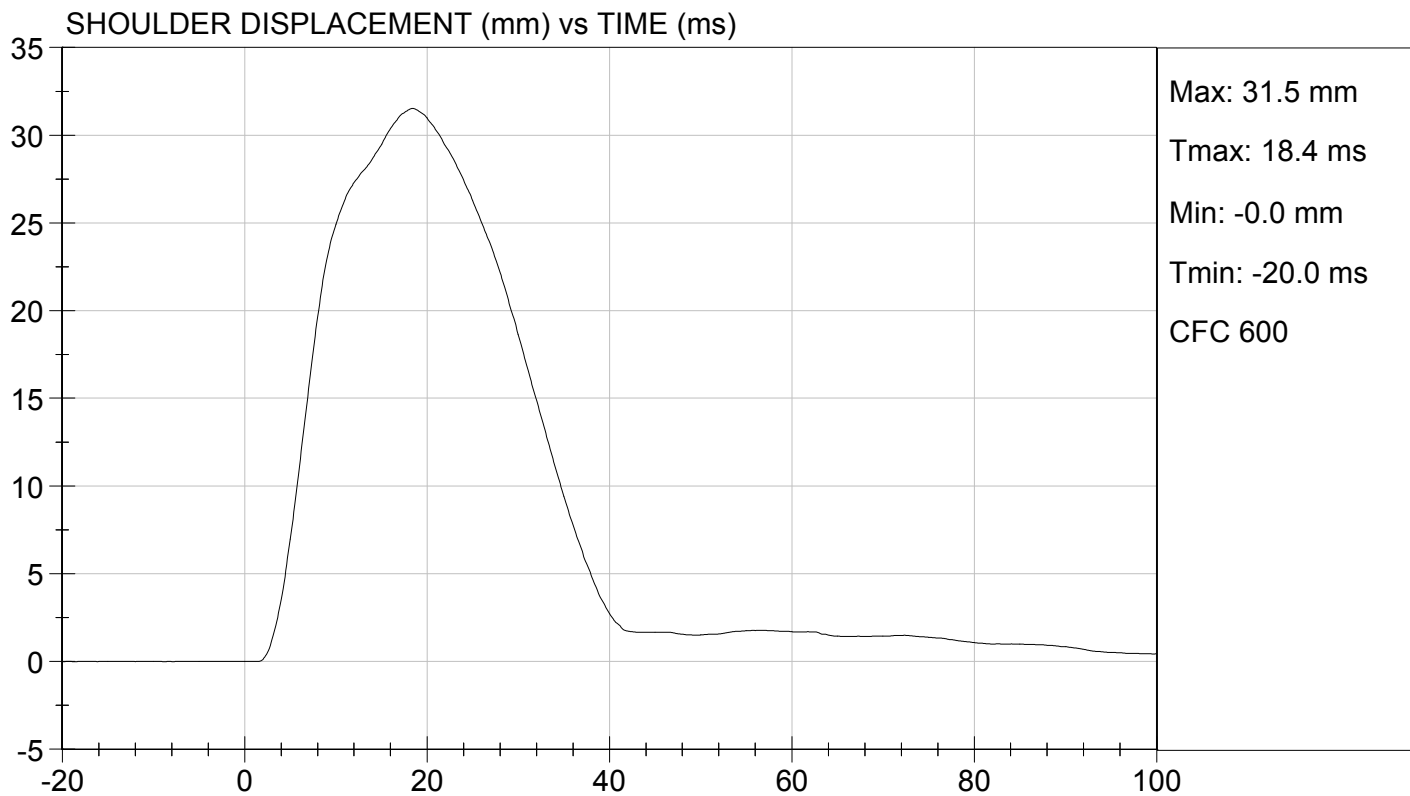
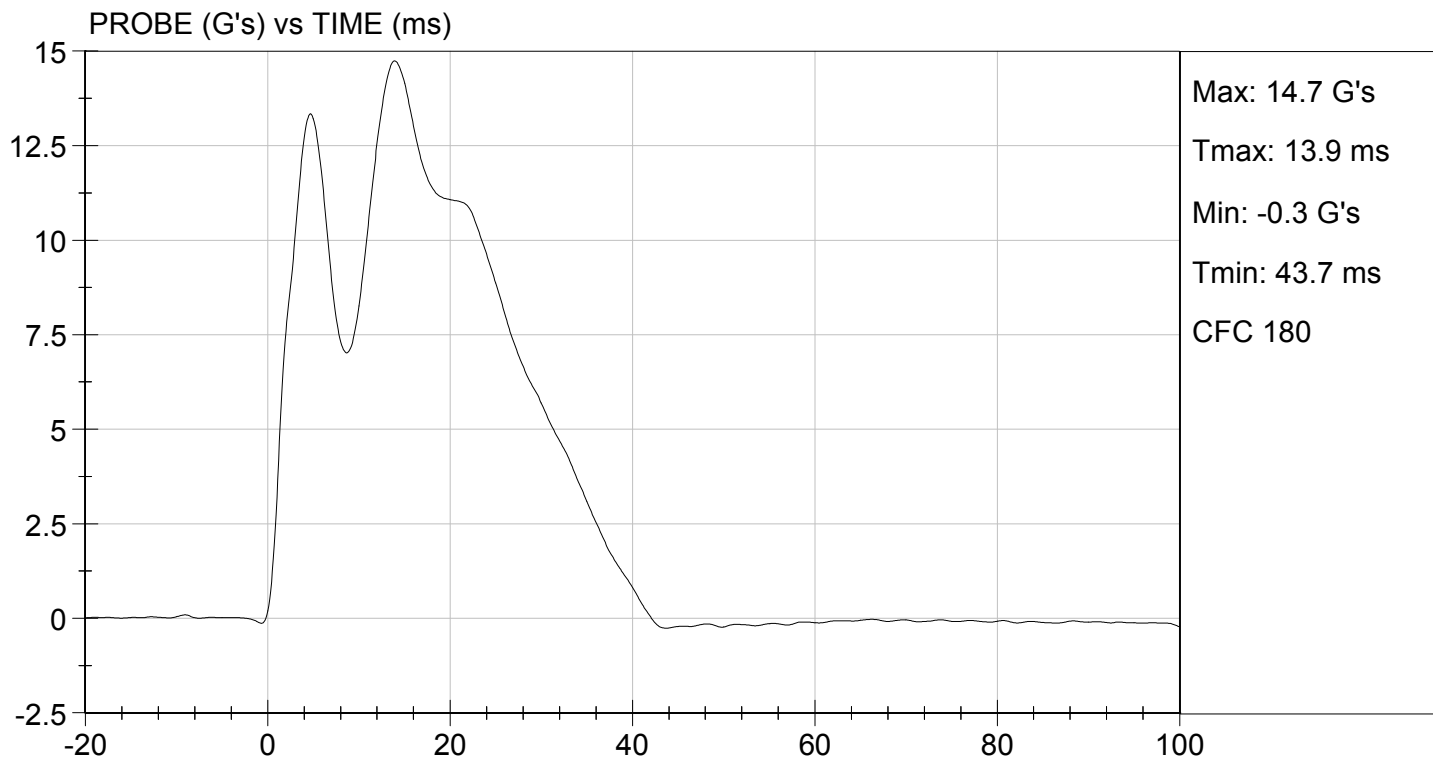
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22.1	Pass
Laboratory Relative Humidity	%	10 to 70	26	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Maximum Probe Acceleration	G's	13 to 18	15	Pass
Shoulder Displacement	mm	28 to 37	32	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	17	Pass
Overall Test Results				Pass

David Schoedel
Laboratory Technician

12/12/2014

Test Date

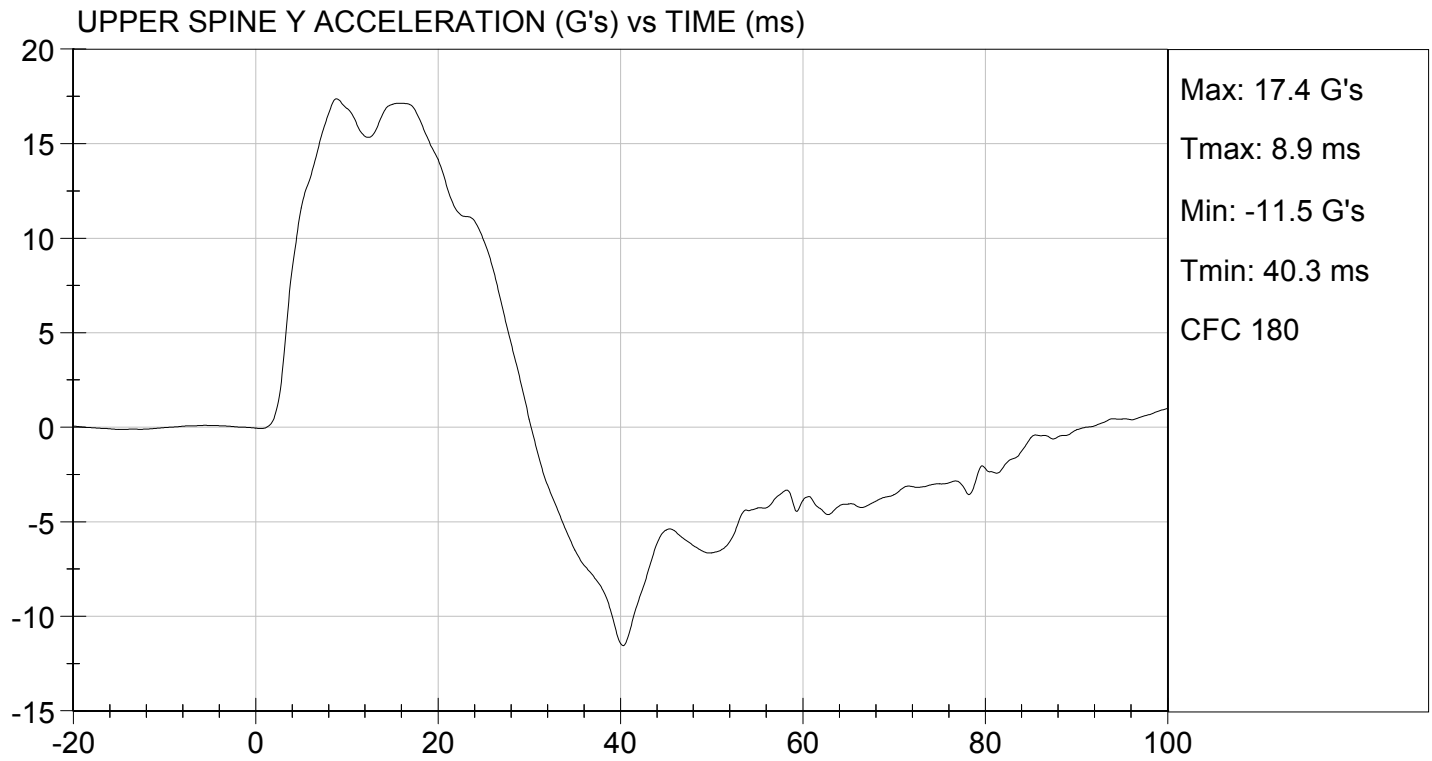
Jessica Hall
Approved By





TEST DESC: SHOULDER IMPACT
VELOCITY: 14.25 ft/s, 4.34 m/s

TEST DATE: 12/12/2014
TEST #: D144393



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

ATD Serial No: 296

Test I.D: D144394

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	22.1	Pass
Humidity	%	10 to 70	26	Pass
Impact Velocity	m/s	6.60 to 6.80	6.68	Pass
Maximum Probe Acceleration	G's	30 to 36	30	Pass
Shoulder Displacement	mm	31 to 40	37	Pass
Upper Rib Displacement	mm	25 to 32	29	Pass
Middle Rib Displacement	mm	30 to 36	33	Pass
Lower Rib Displacement	mm	32 to 38	35	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	36	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	30	Pass
Overall Test Results				Pass

David Schoedel
Laboratory Technician

12/12/2014

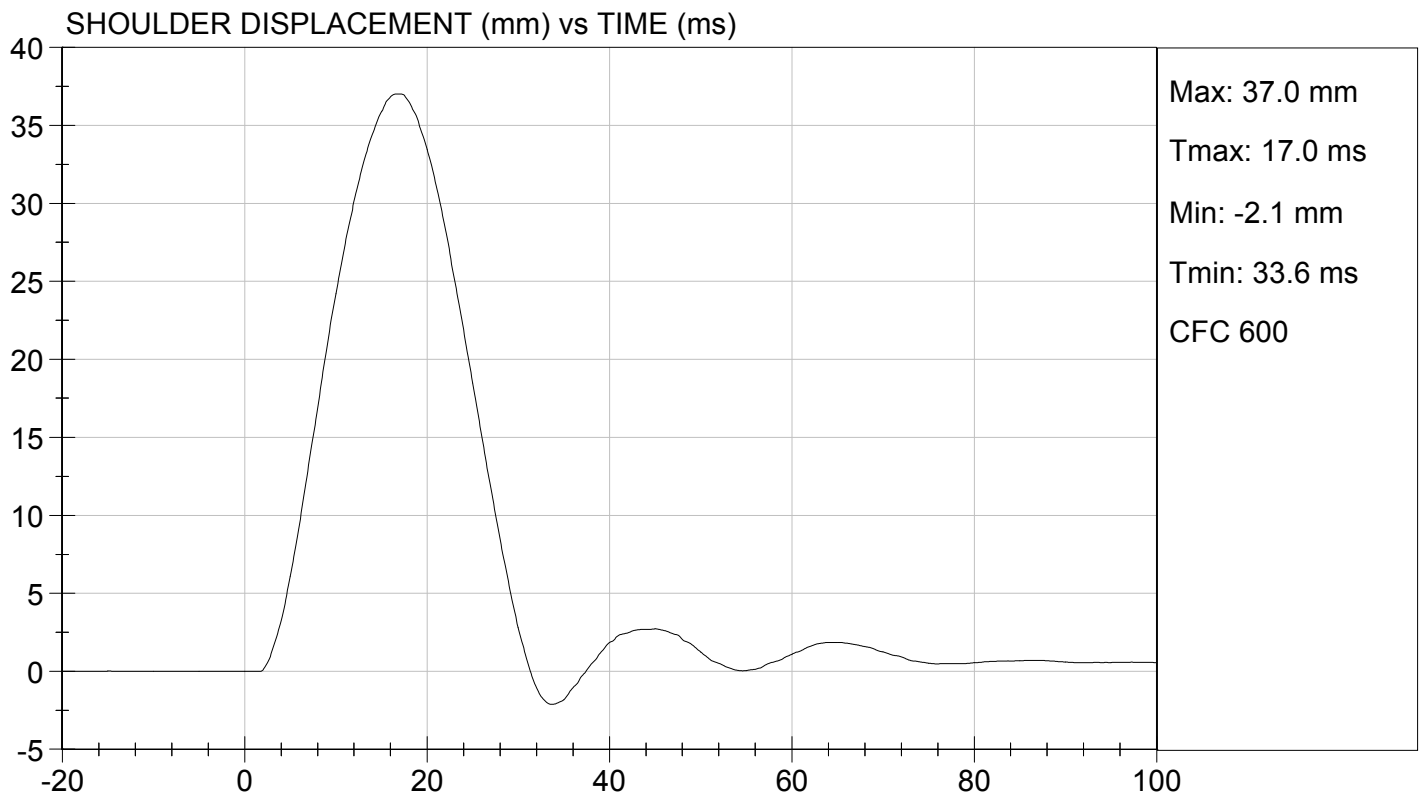
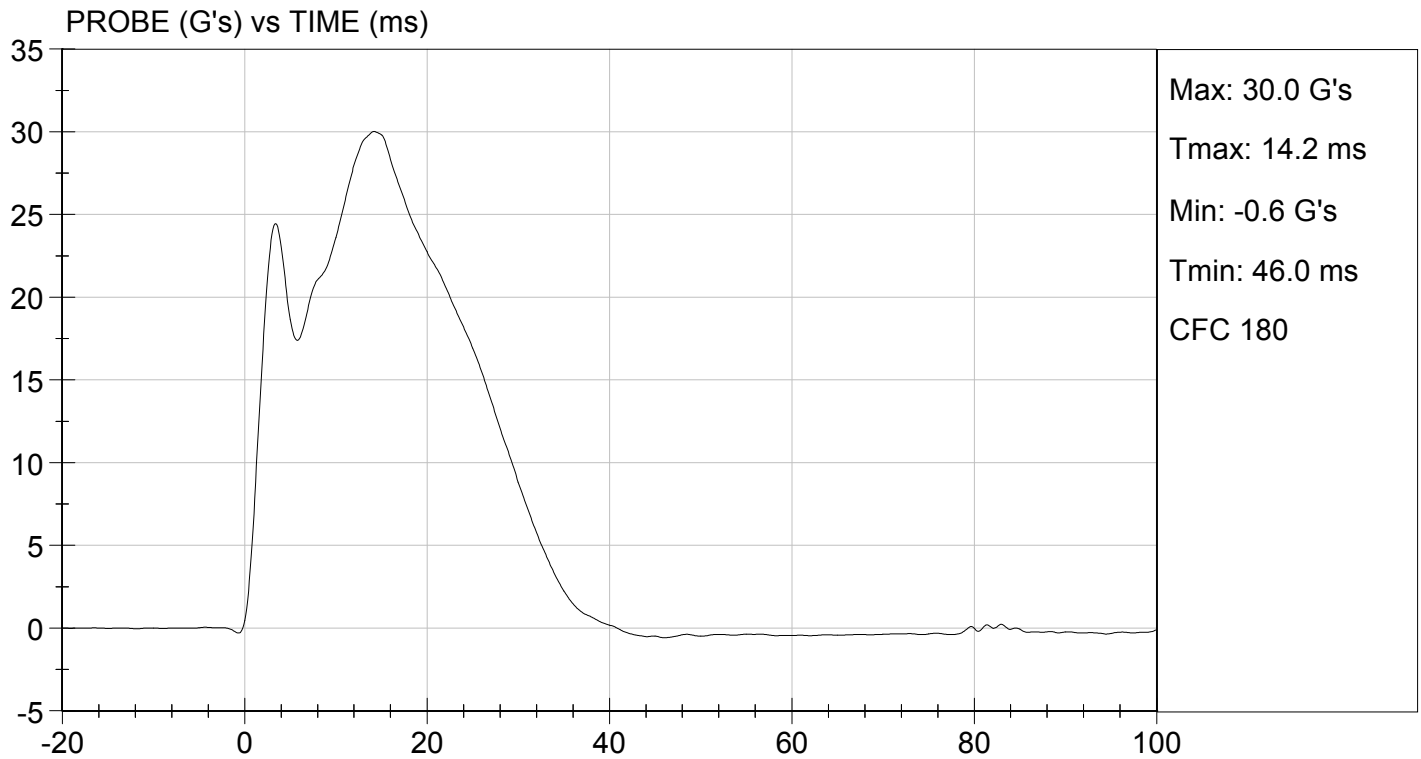
Test Date

Jessica Hall
Approved By



TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 21.93 ft/s, 6.68 m/s

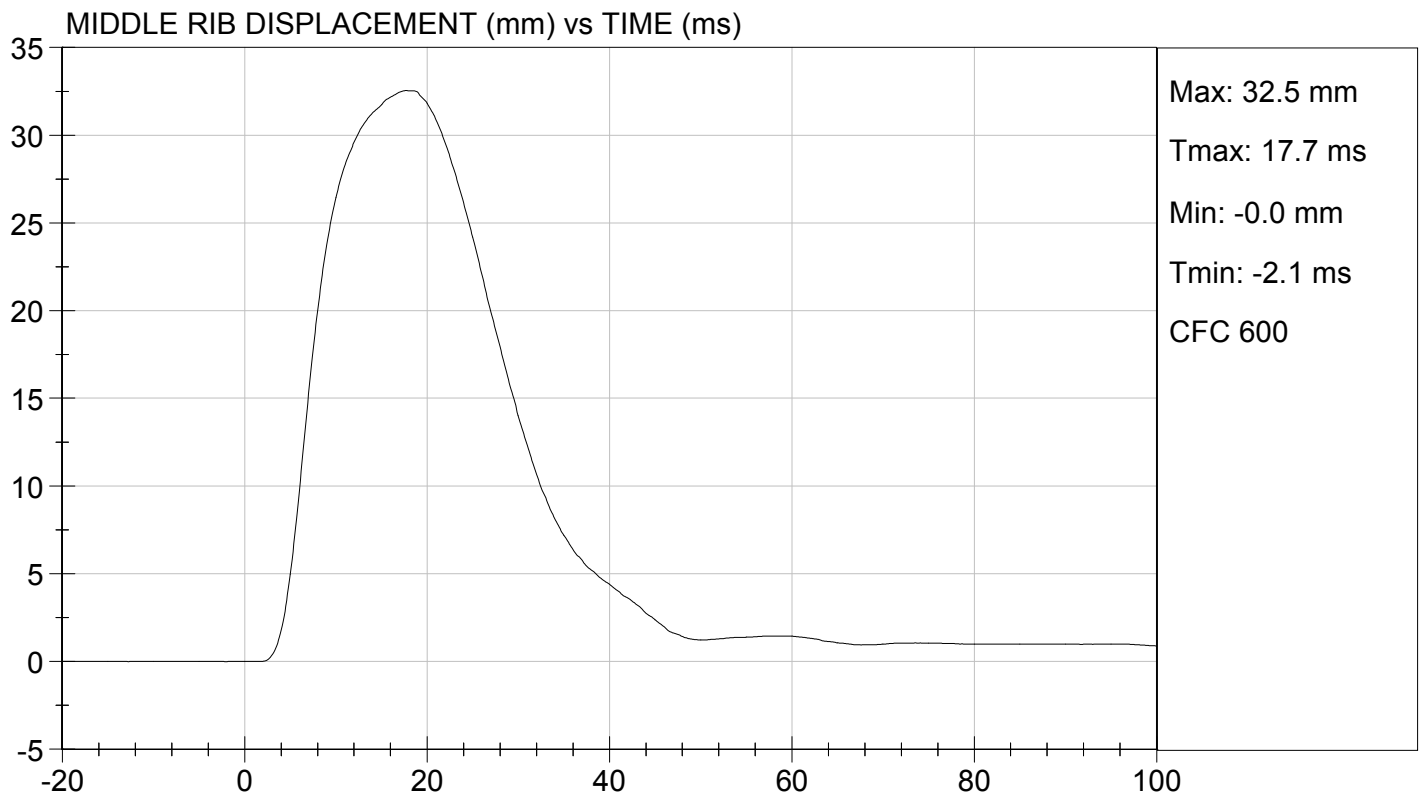
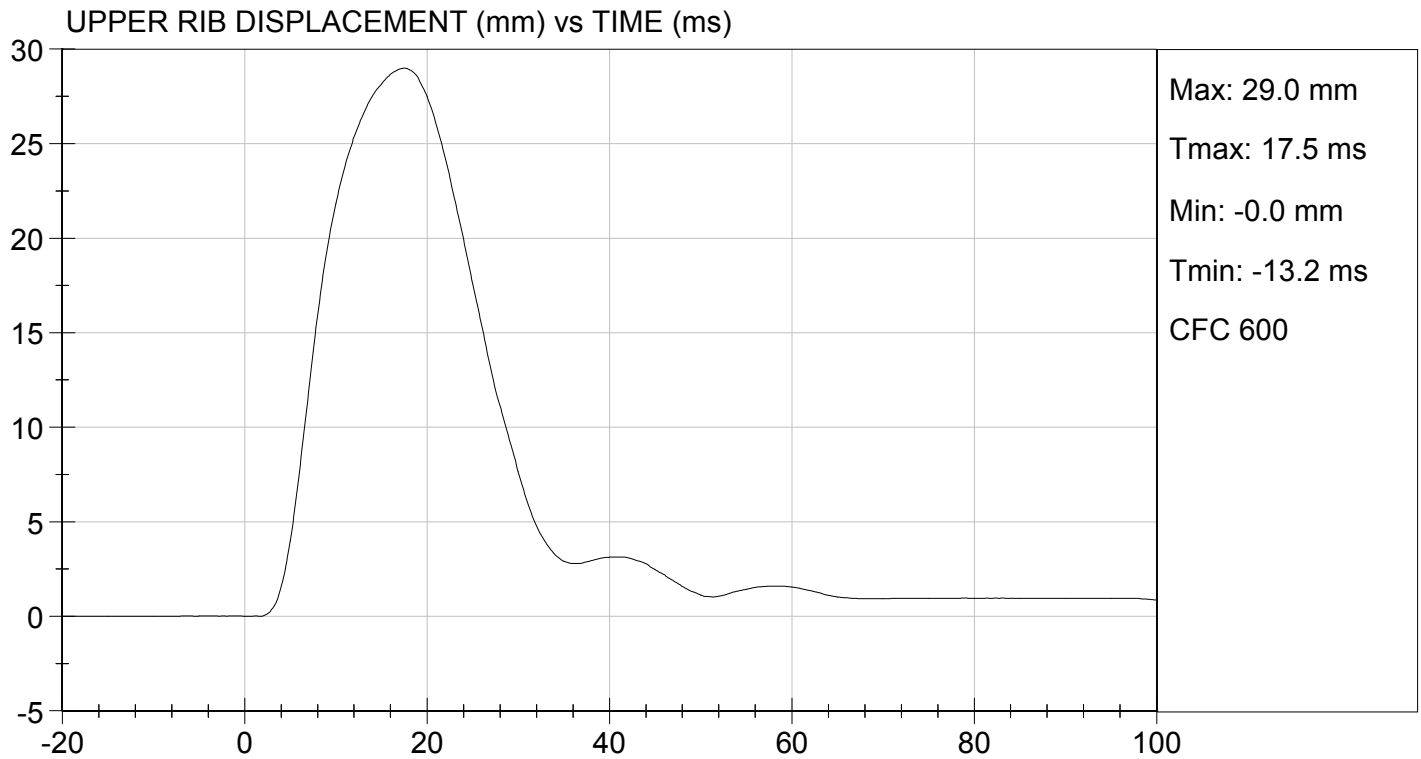
TEST DATE: 12/12/2014
TEST #: D144394





TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 21.93 ft/s, 6.68 m/s

TEST DATE: 12/12/2014
TEST #: D144394

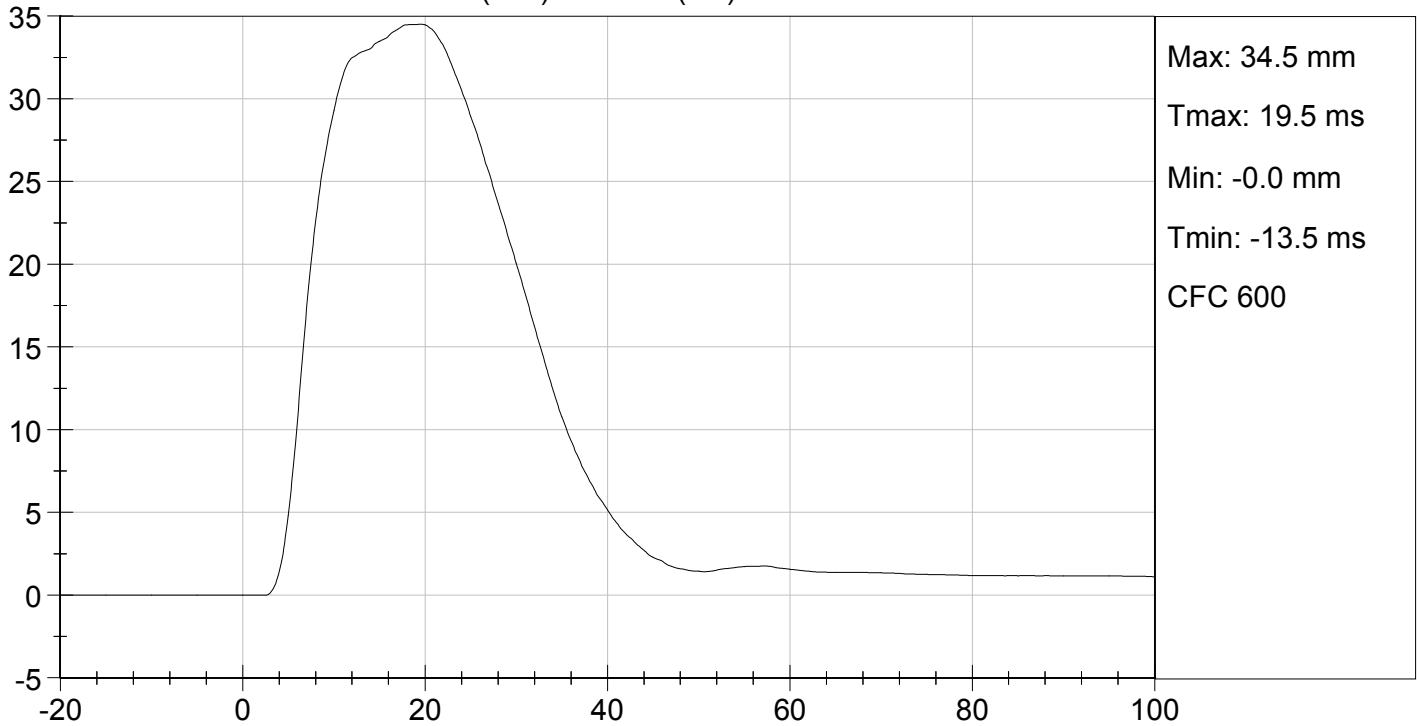




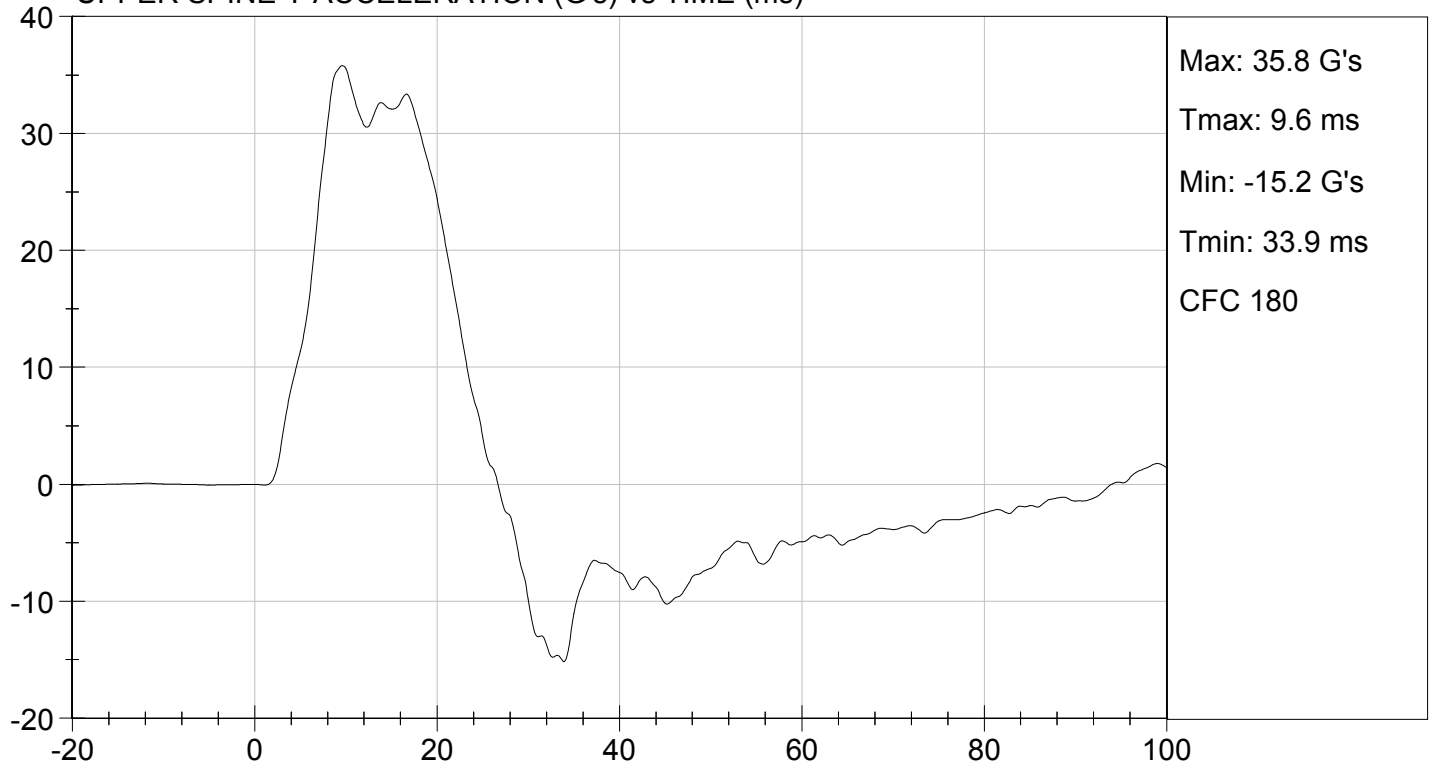
TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 21.93 ft/s, 6.68 m/s

TEST DATE: 12/12/2014
TEST #: D144394

LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



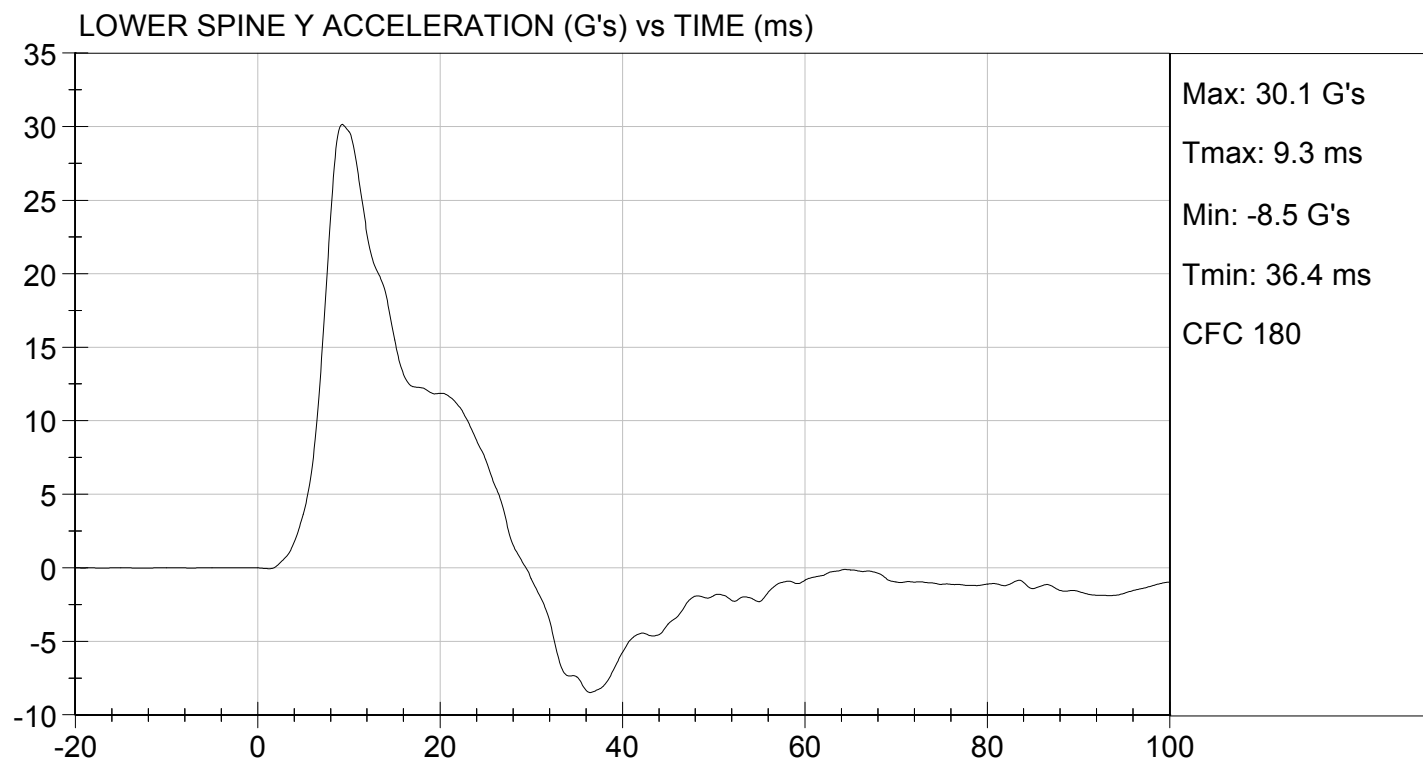
UPPER SPINE Y ACCELERATION (G's) vs TIME (ms)





TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 21.93 ft/s, 6.68 m/s

TEST DATE: 12/12/2014
TEST #: D144394

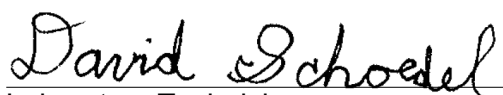


MGA RESEARCH CORPORATION
THORAX (WITHOUT ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

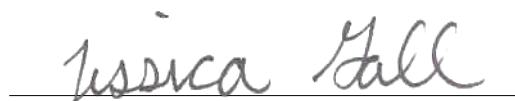
Test I.D: D144395

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	22.1	Pass
Humidity	%	10 to 70	26	Pass
Impact Velocity	m/s	4.20 to 4.40	4.27	Pass
Maximum Probe Acceleration	G's	14 to 18	15	Pass
Upper Rib Displacement	mm	32 to 40	38	Pass
Middle Rib Displacement	mm	39 to 45	43	Pass
Lower Rib Displacement	mm	35 to 43	41	Pass
Upper Spine (T1) Y Acceleration	G's	13 to 17	13	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	8	Pass
			Overall Test Results	Pass


Laboratory Technician

12/12/2014

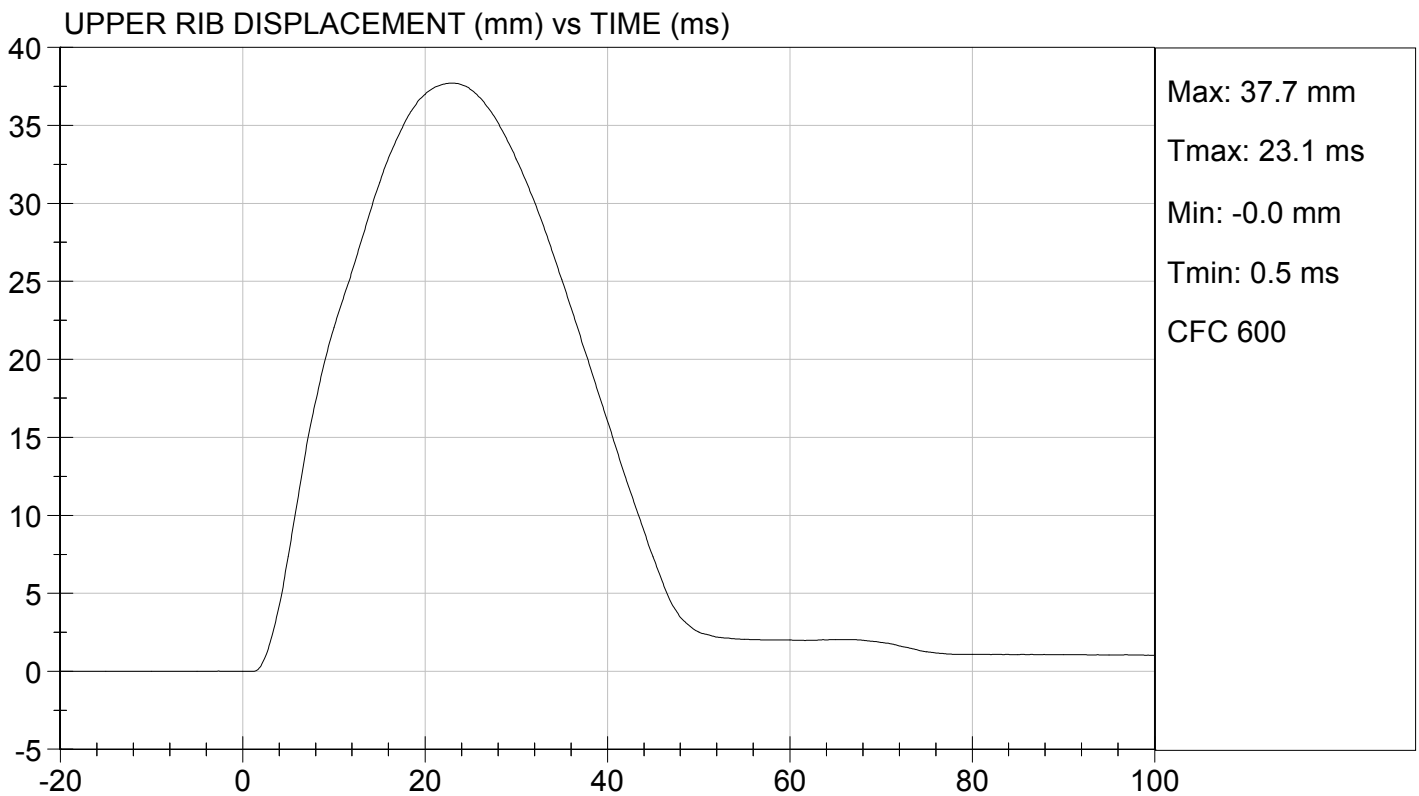
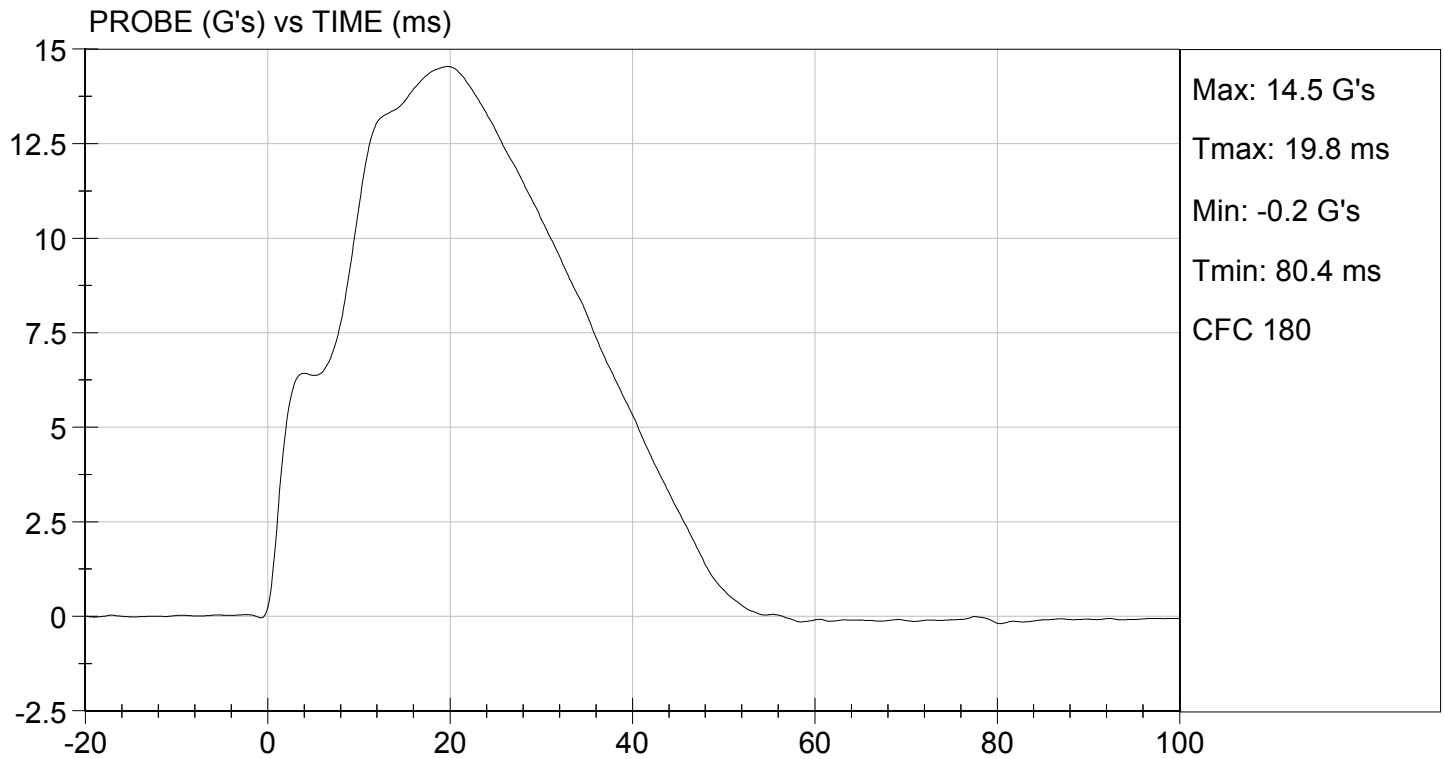
Test Date


Approved By



TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.01 ft/s, 4.27 m/s

TEST DATE: 12/12/2014
TEST #: D144395

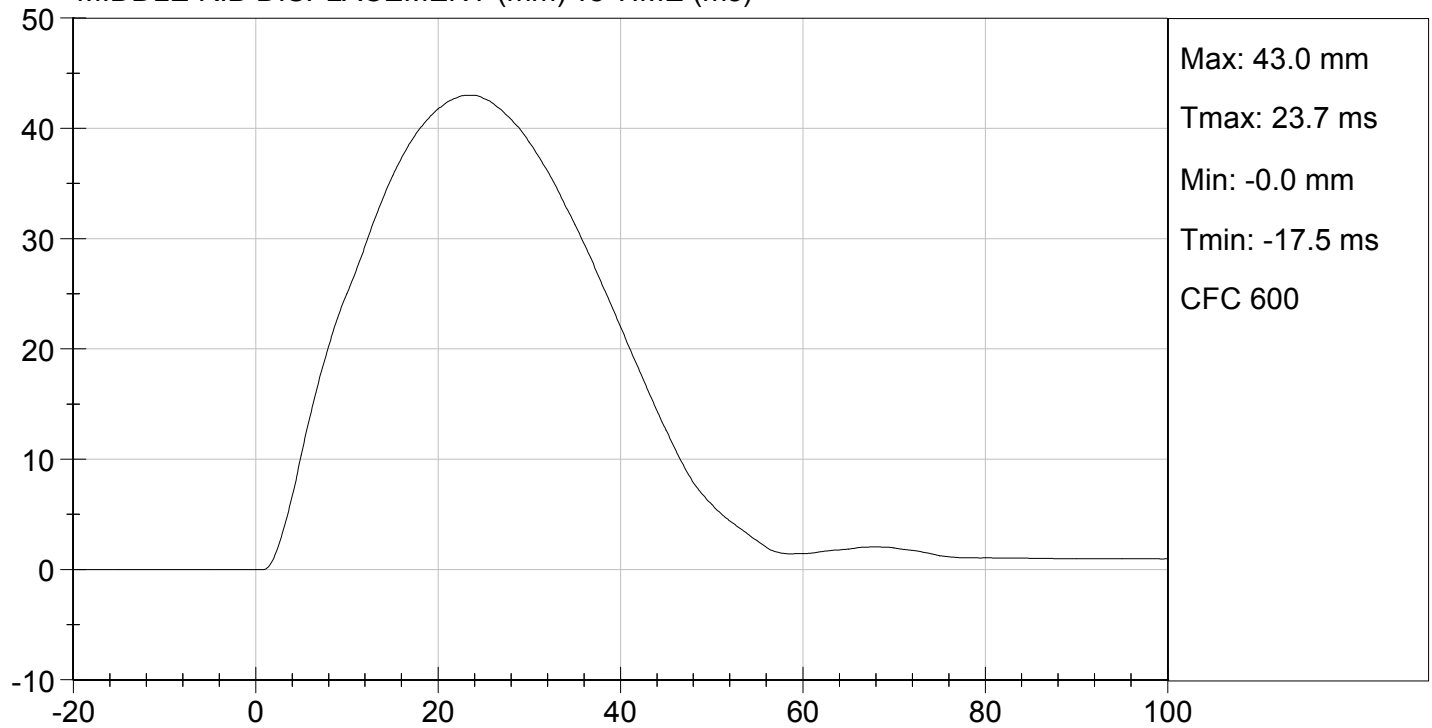




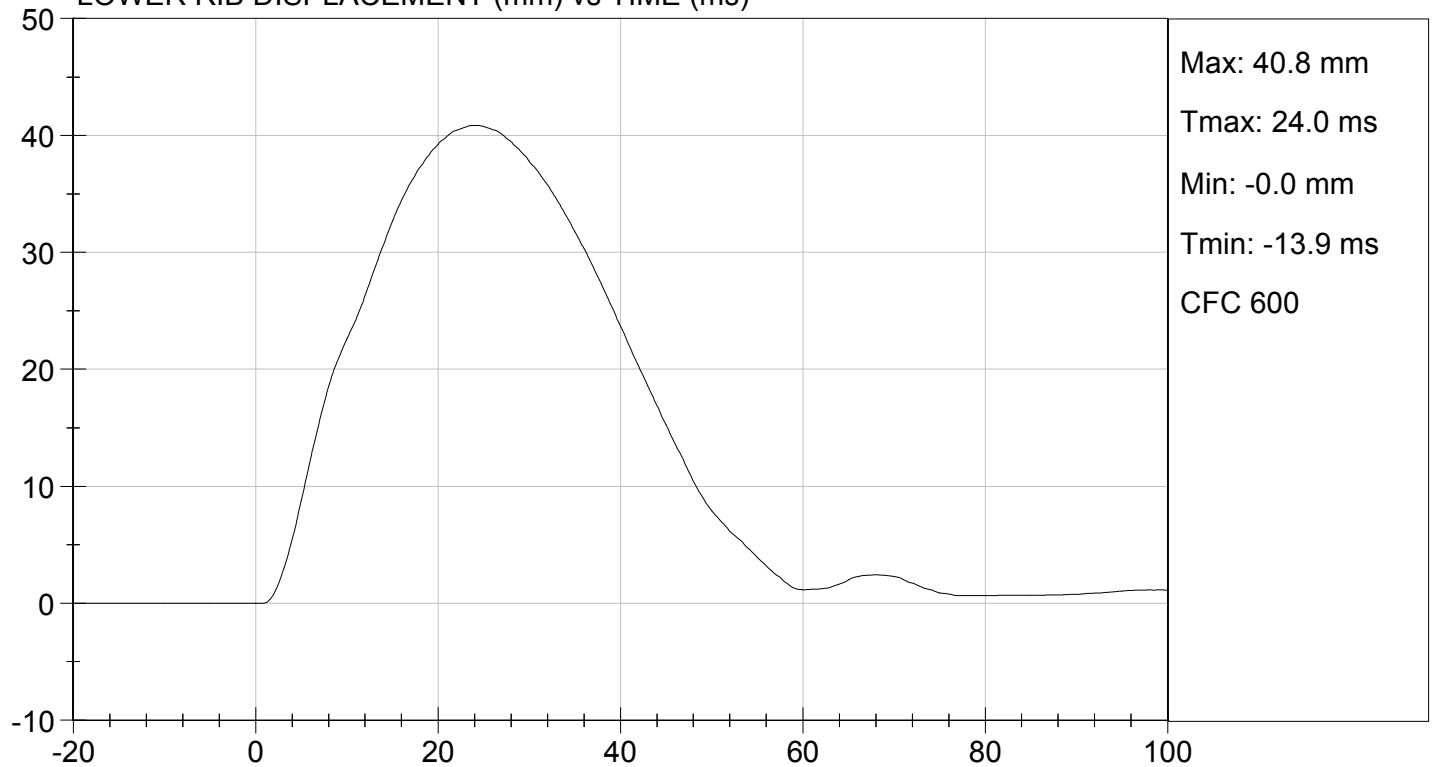
TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.01 ft/s, 4.27 m/s

TEST DATE: 12/12/2014
TEST #: D144395

MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)

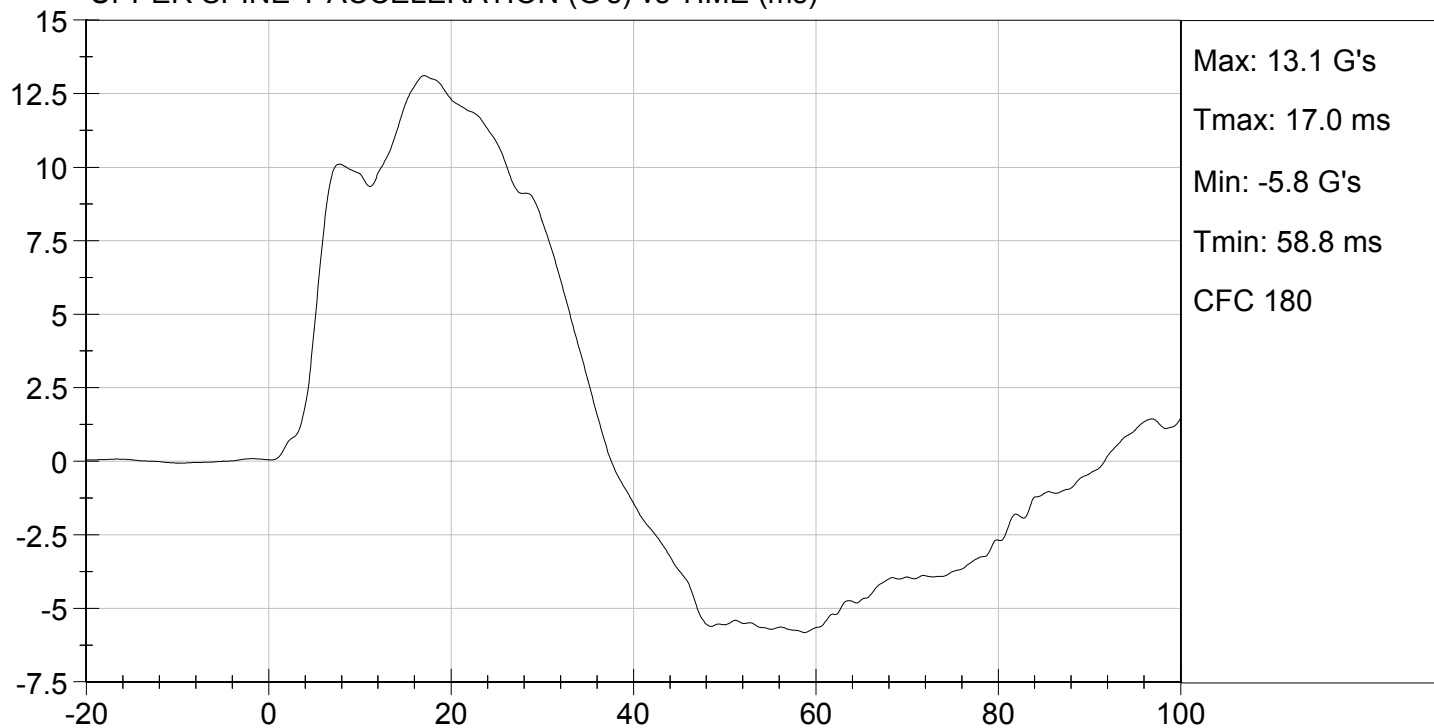


LOWER RIB DISPLACEMENT (mm) vs TIME (ms)

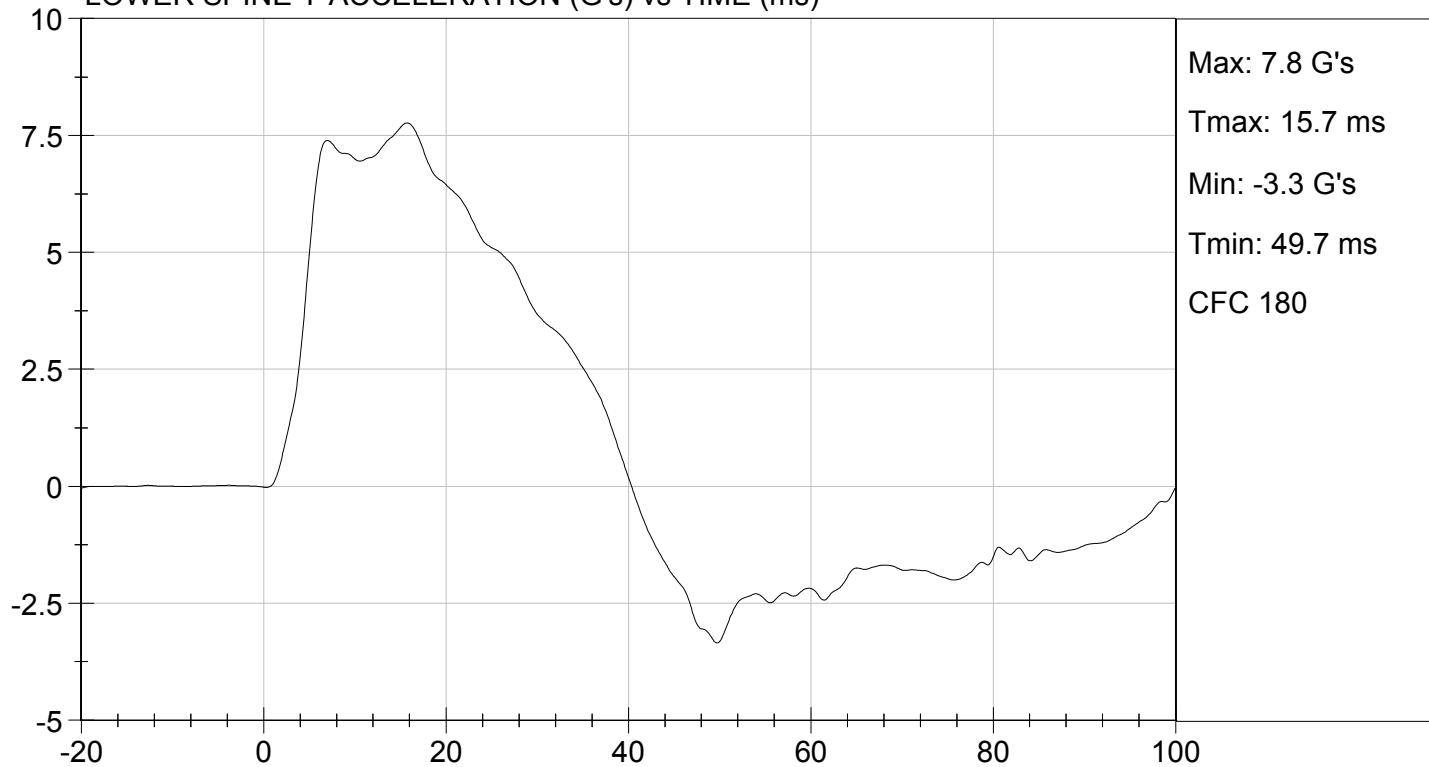




UPPER SPINE Y ACCELERATION (G's) vs TIME (ms)



LOWER SPINE Y 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: D144396

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	22.1	Pass
Humidity	%	10 to 70	26	Pass
Impact Velocity	m/s	4.20 to 4.40	4.23	Pass
Maximum Probe Acceleration	G's	12 to 16	13	Pass
Upper Abdomen Rib Displacement	mm	36 to 47	41	Pass
Lower Abdomen Rib Displacement	mm	33 to 44	42	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	10	Pass
Overall Test Results				Pass

David Schoedel
Laboratory Technician

12/12/2014

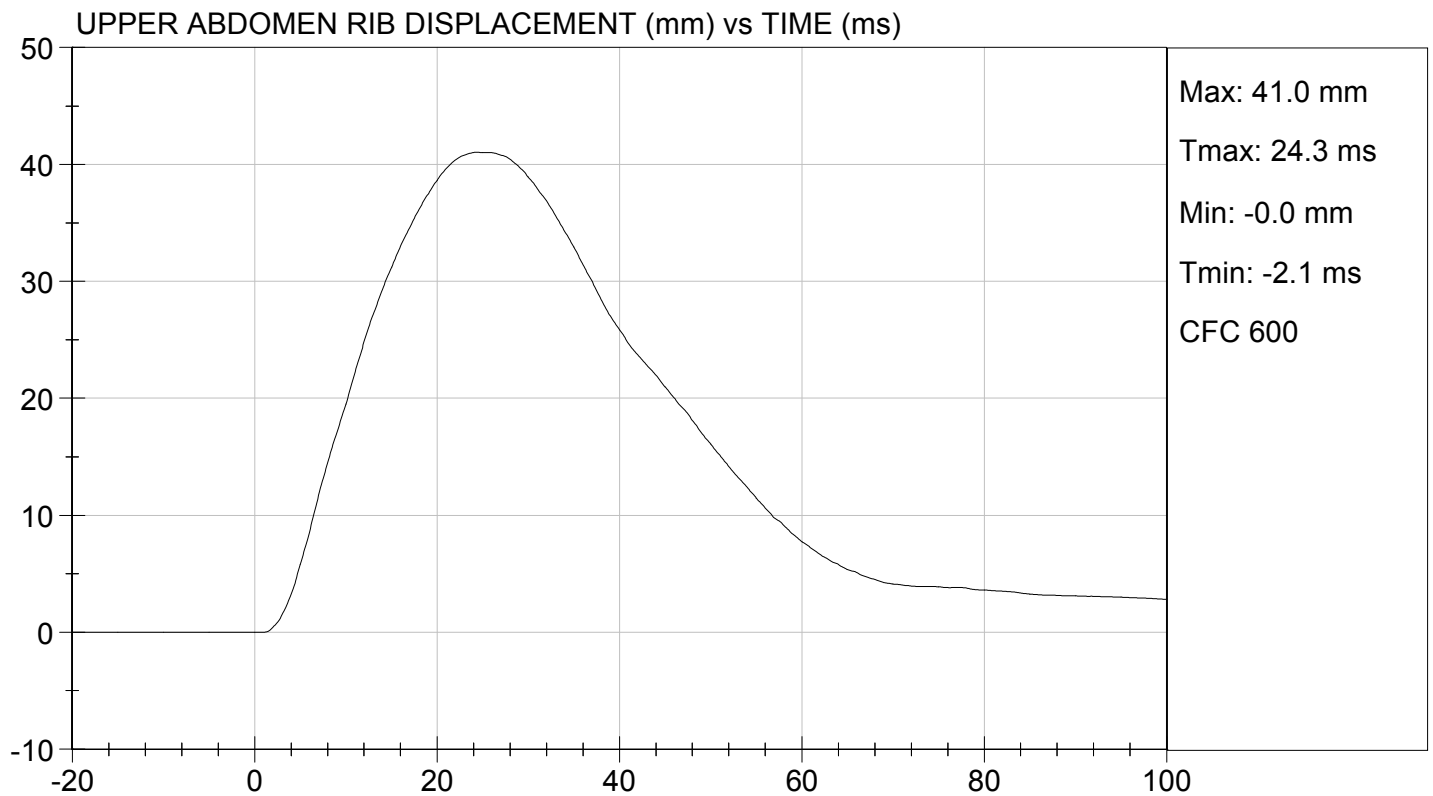
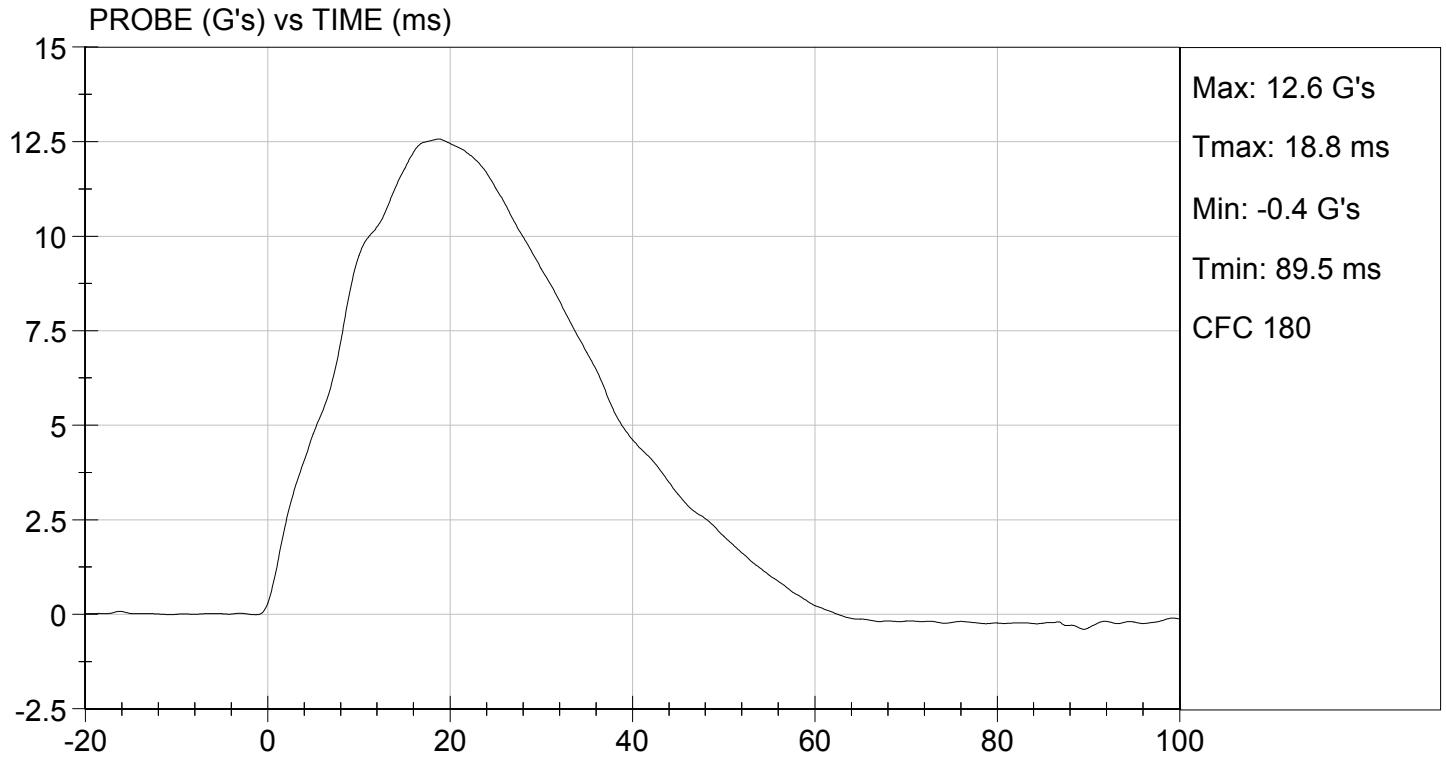
Test Date

Jessica Hall
Approved By



TEST DESC: ABDOMEN IMPACT
VELOCITY: 13.89 ft/s, 4.23 m/s

TEST DATE: 12/12/2014
TEST #: D144396

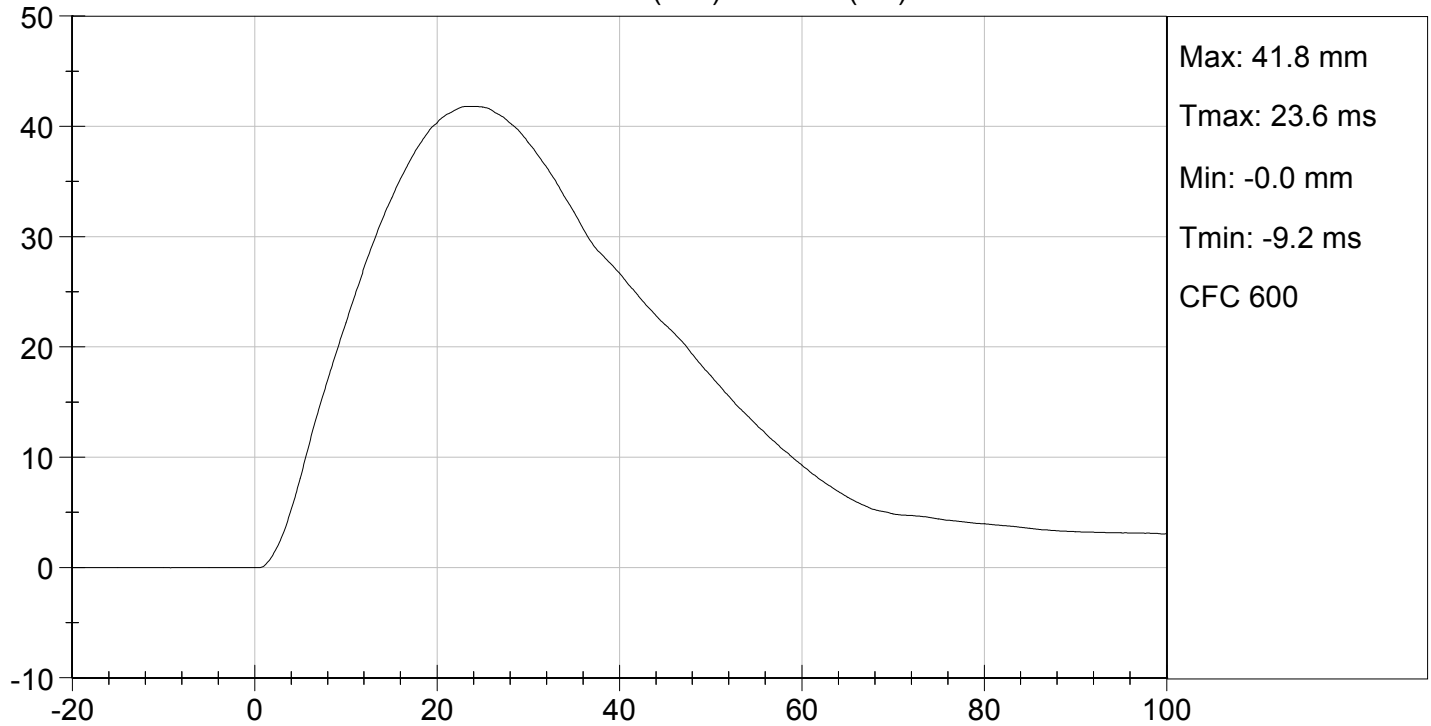




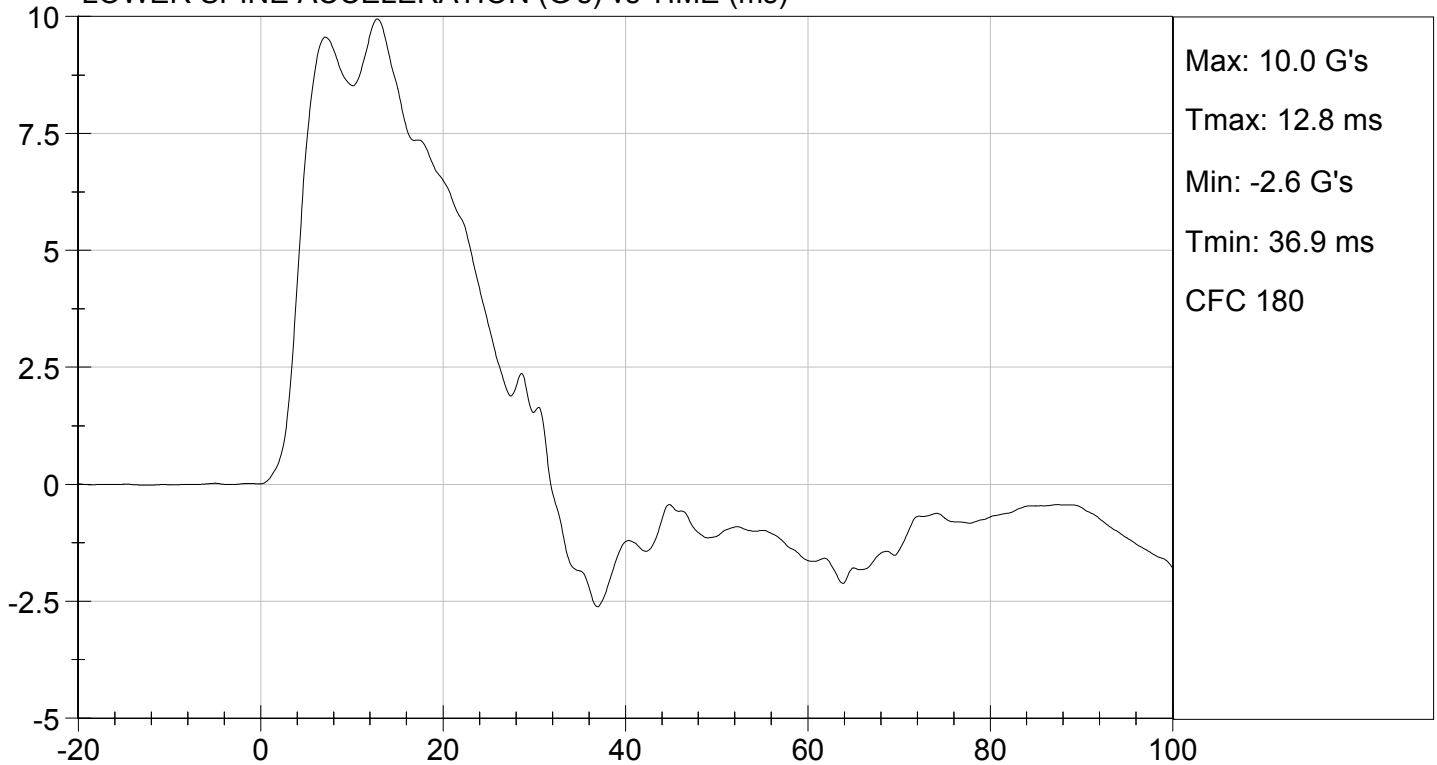
TEST DESC: ABDOMEN IMPACT
VELOCITY: 13.89 ft/s, 4.23 m/s

TEST DATE: 12/12/2014
TEST #: D144396

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: D144397

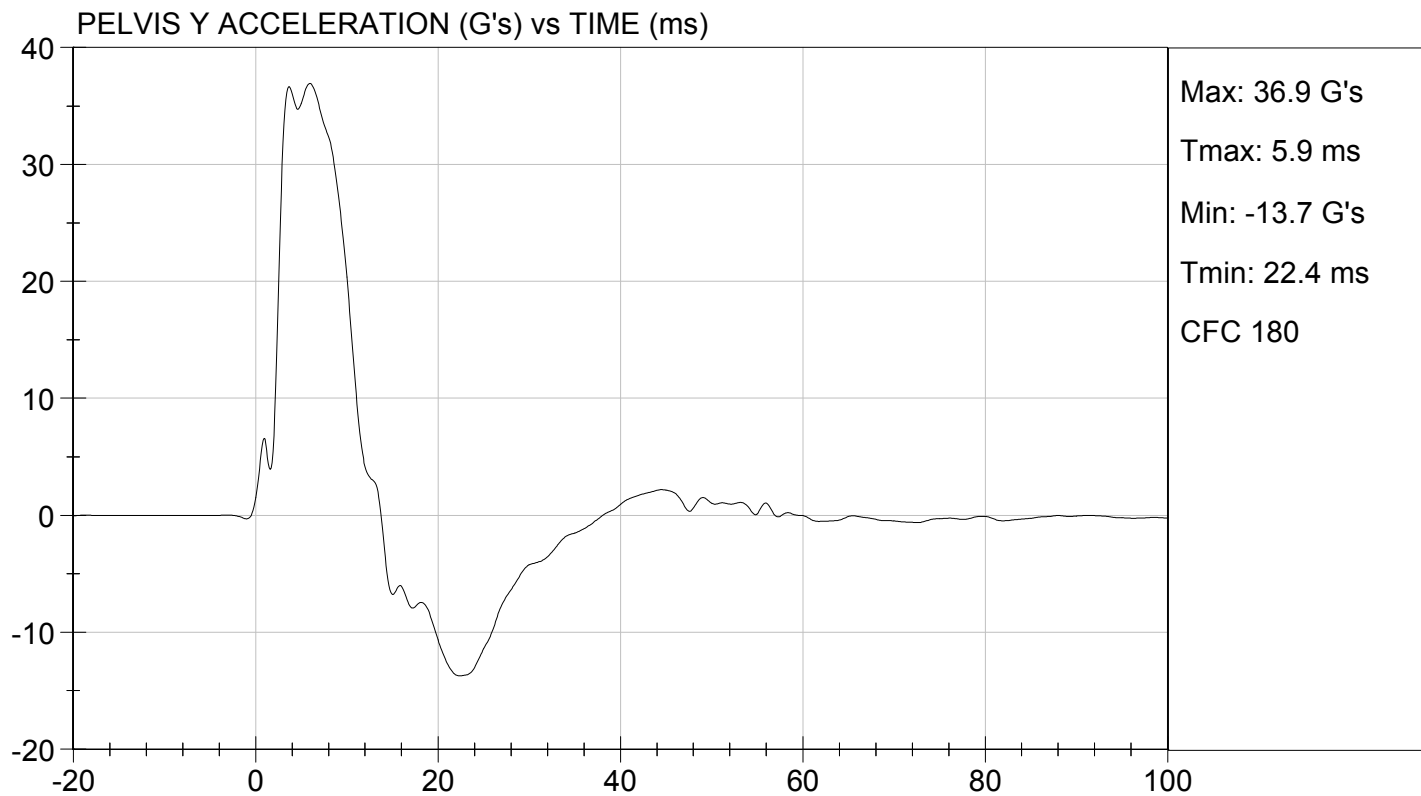
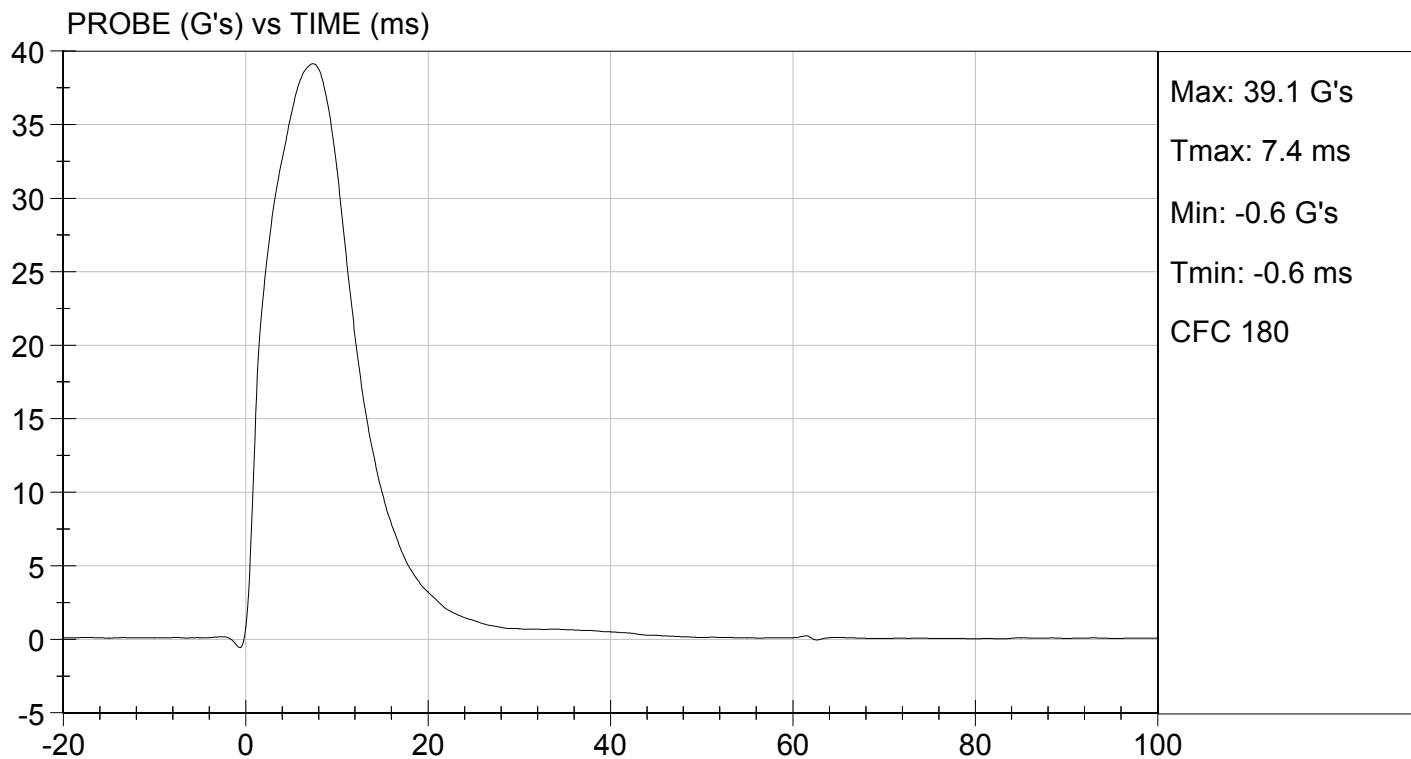
Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	22.1	Pass
Humidity	%	10 to 70	26	Pass
Impact Velocity	m/s	6.60 to 6.80	6.68	Pass
Maximum Probe Acceleration	G's	38 to 47	39	Pass
Pelvis Y Acceleration After 6 ms	G's	34 to 42	37	Pass
Peak Acetabulum Force	N	3600 to 4300	4,073	Pass
Overall Test Results				Pass

David Schoedel
Laboratory Technician

12/12/2014

Test Date

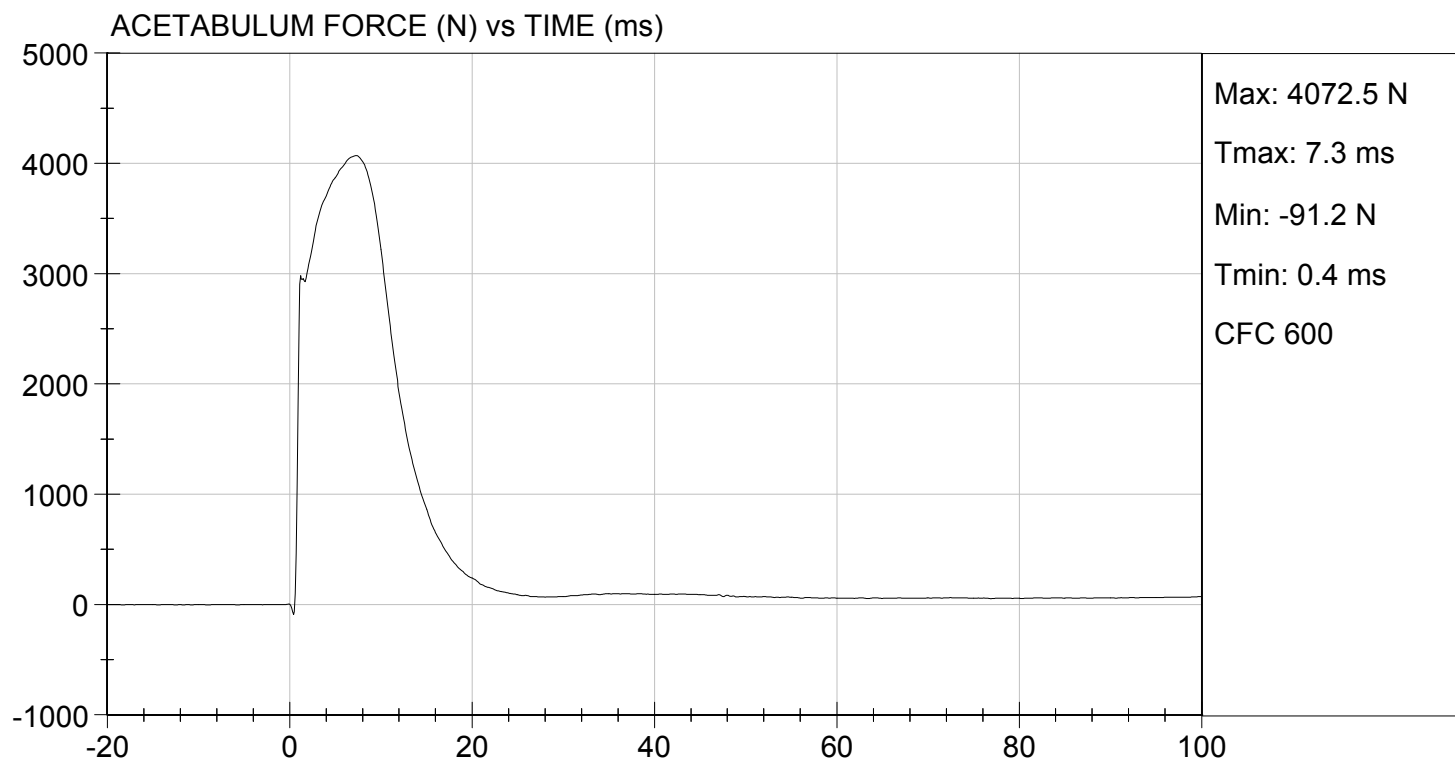
Jessica Hall
Approved By





TEST DESC: PELVIS IMPACT
VELOCITY: 21.93 ft/s, 6.68 m/s

TEST DATE: 12/12/2014
TEST #: D144397



MGA RESEARCH CORPORATION

ILIAC IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D144398

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	22.1	Pass
Humidity	%	10 to 70	26	Pass
Impact Velocity	m/s	4.20 to 4.40	4.27	Pass
Maximum Probe Acceleration	G's	36 to 45	41	Pass
Pelvis Y Acceleration	G's	28 to 39	31	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4,817	Pass
Overall Test Results				Pass

David Schoedel
Laboratory Technician

12/12/2014

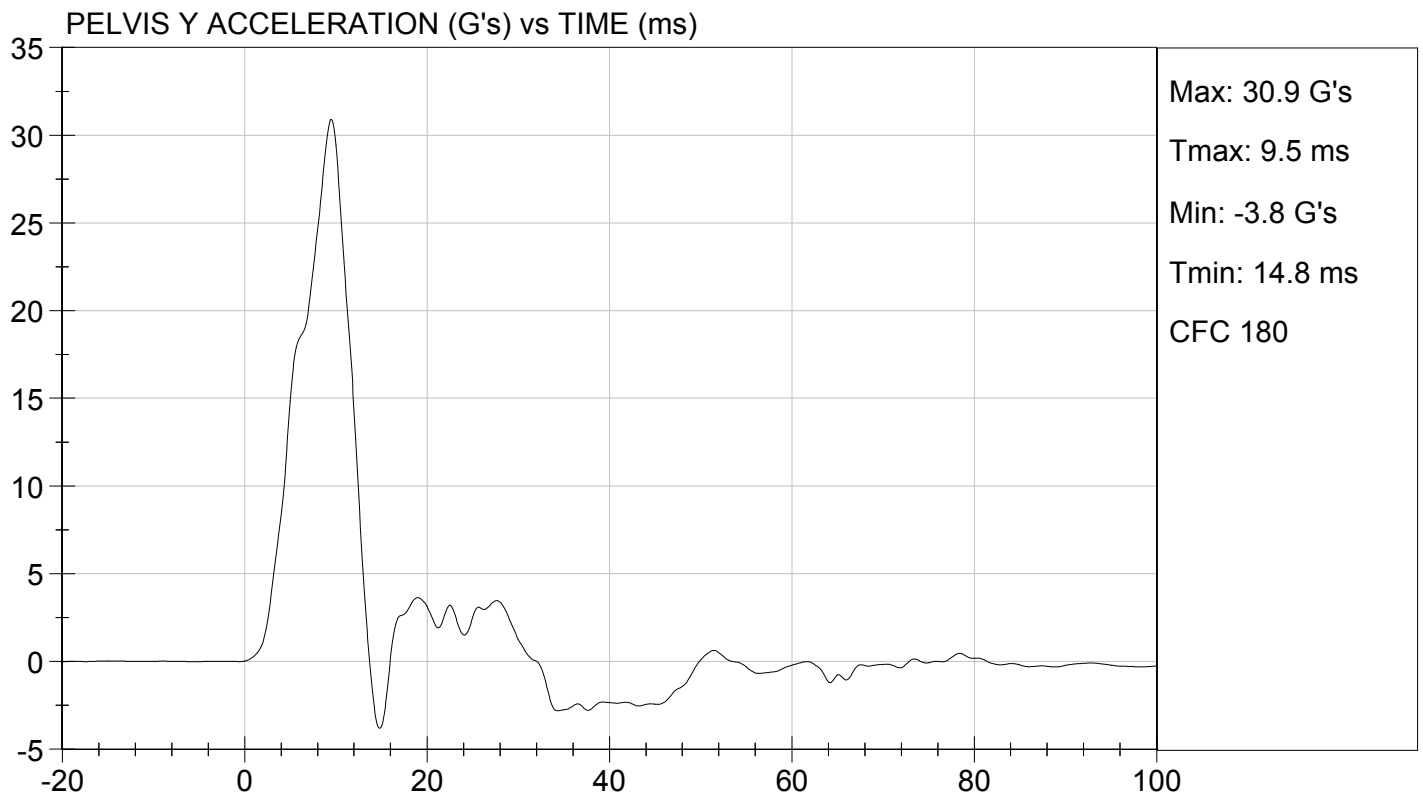
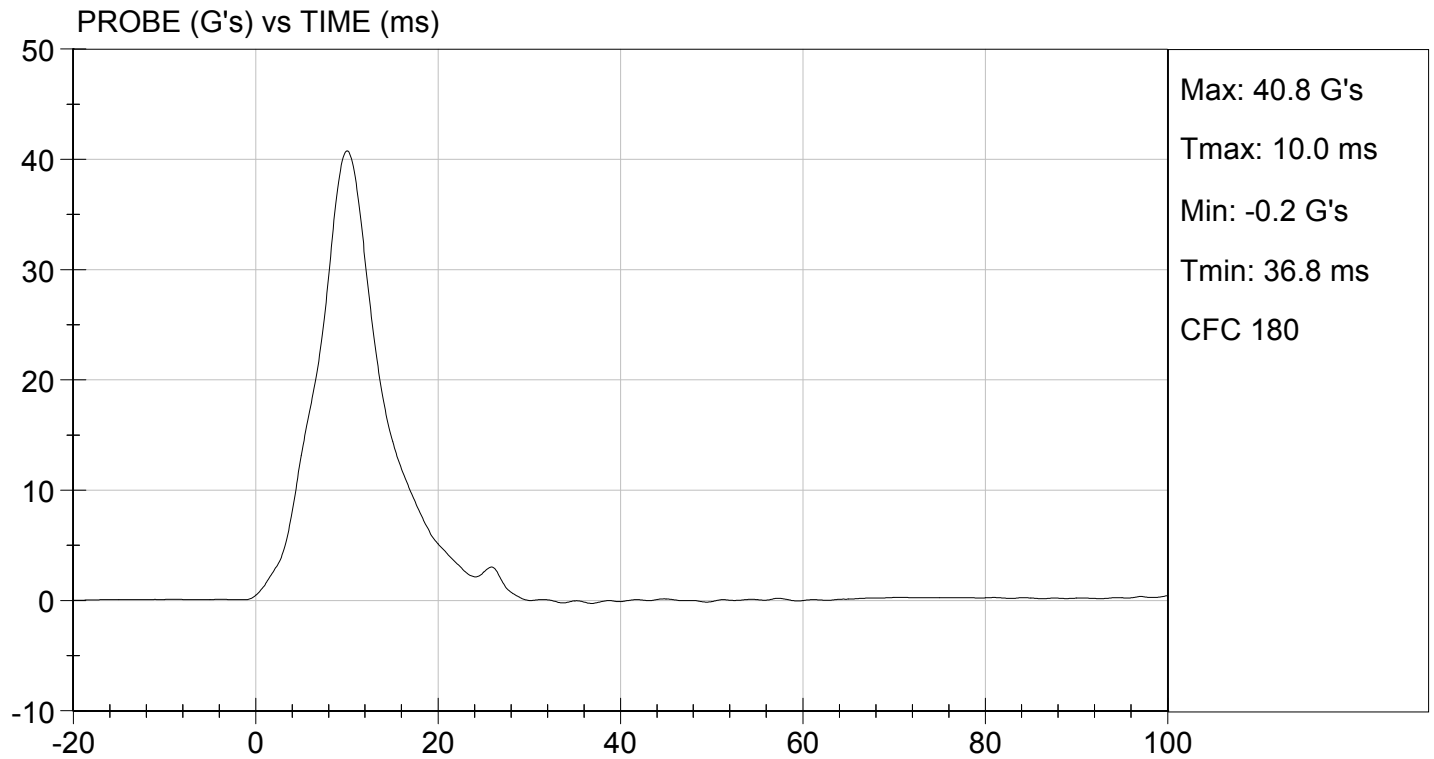
Test Date

Jessica Hall
Approved By



TEST DESC: ILLIAC
VELOCITY: 14.01 ft/s, 4.27 m/s

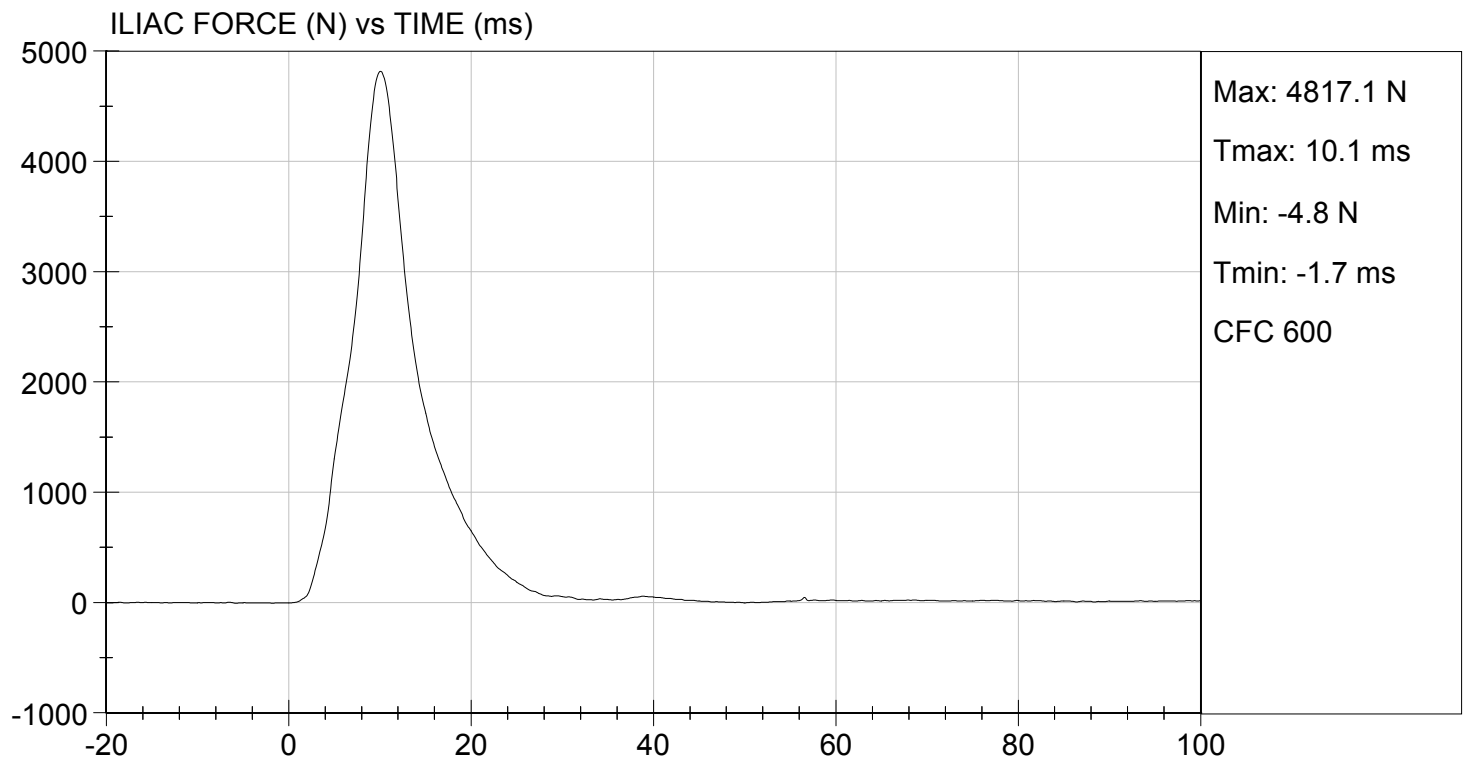
TEST DATE: 12/12/2014
TEST #: D144398





TEST DESC: ILLIAC
VELOCITY: 14.01 ft/s, 4.27 m/s

TEST DATE: 12/12/2014
TEST #: D144398



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

ATD Serial No: 296

Test ID: D144571

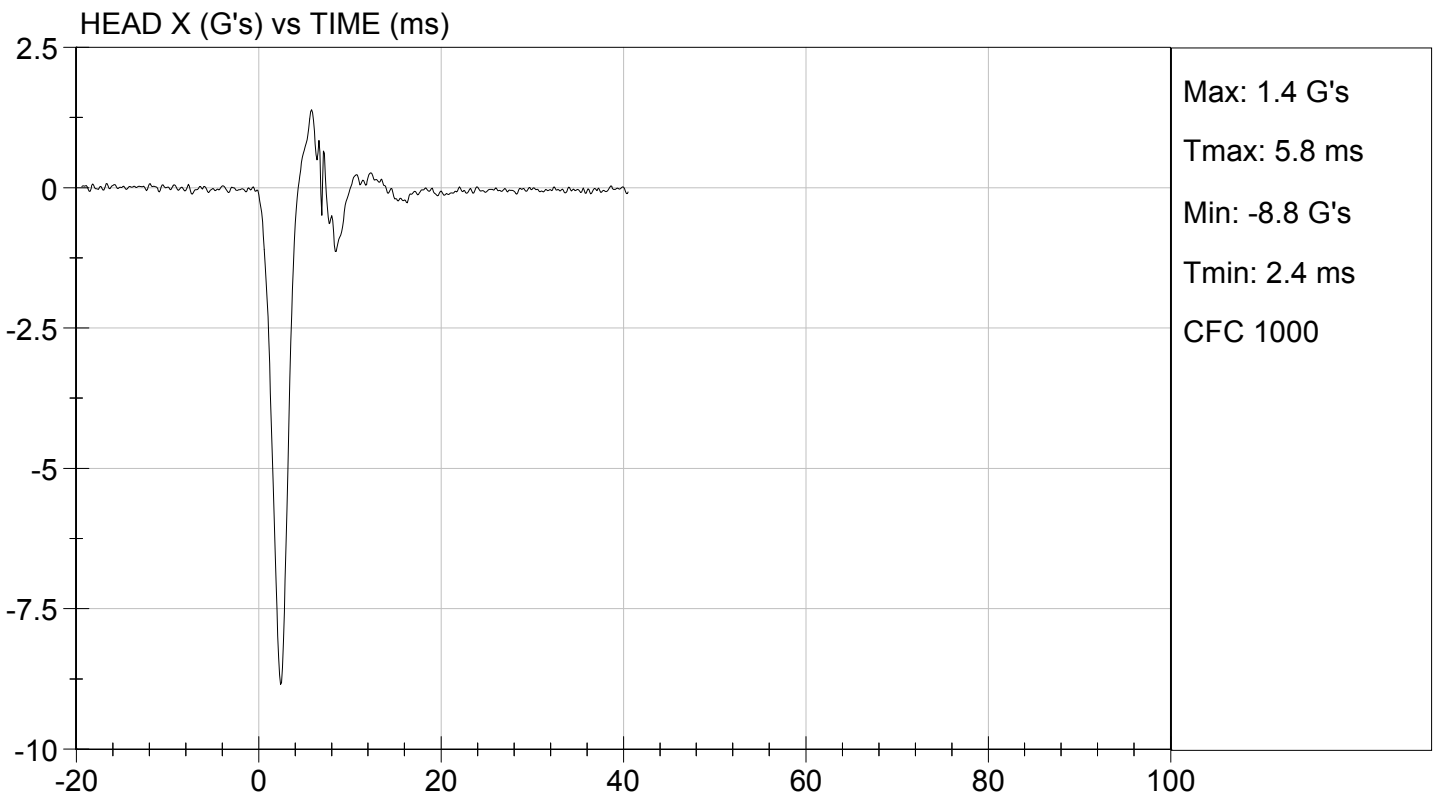
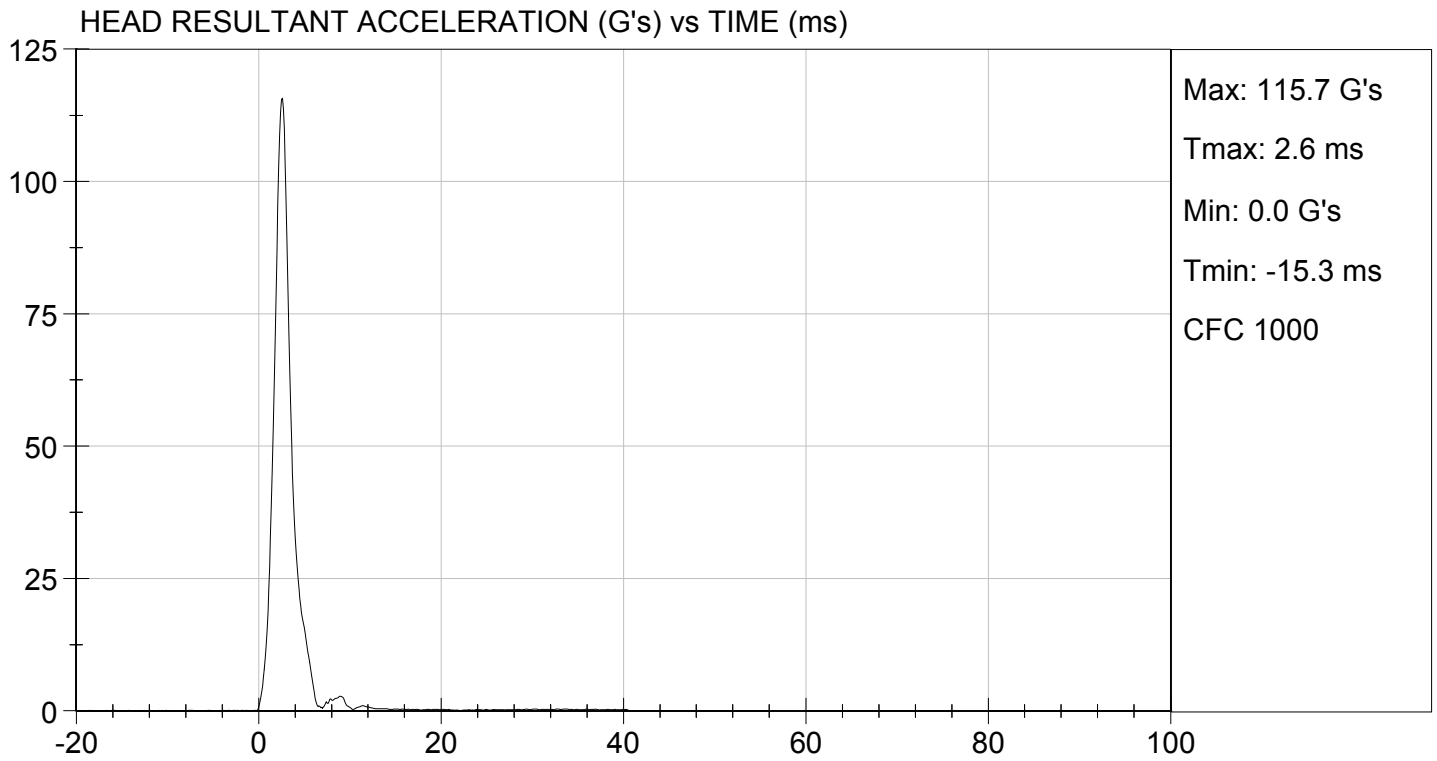
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	20.7	Pass
Laboratory Relative Humidity	%	10 to 70	20	Pass
Peak Resultant Acceleration	G's	115 to 137	116	Pass
Peak Longitudinal Acceleration	G's	+/- 15	-8.8	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	<15%	Yes	Pass
Overall Test Results			Pass	

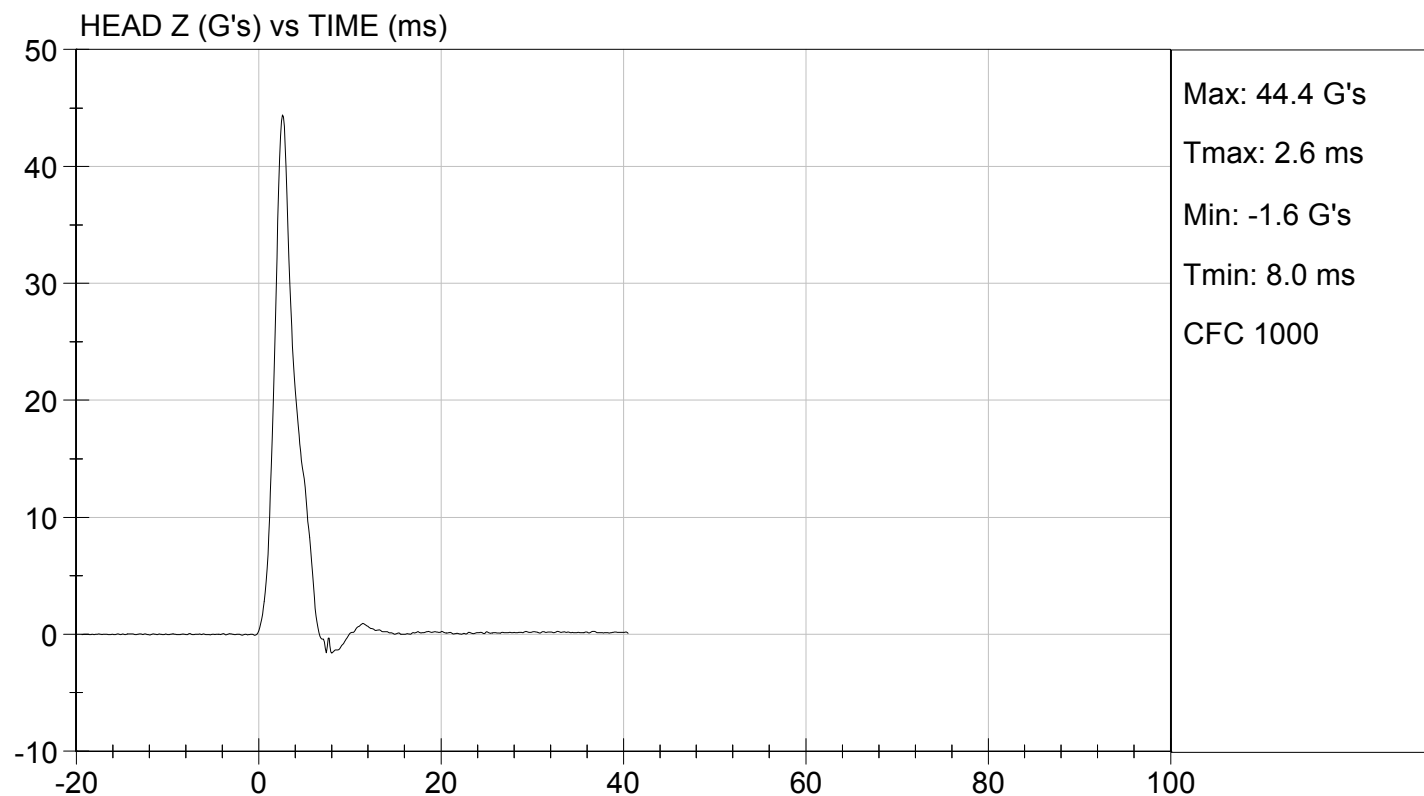
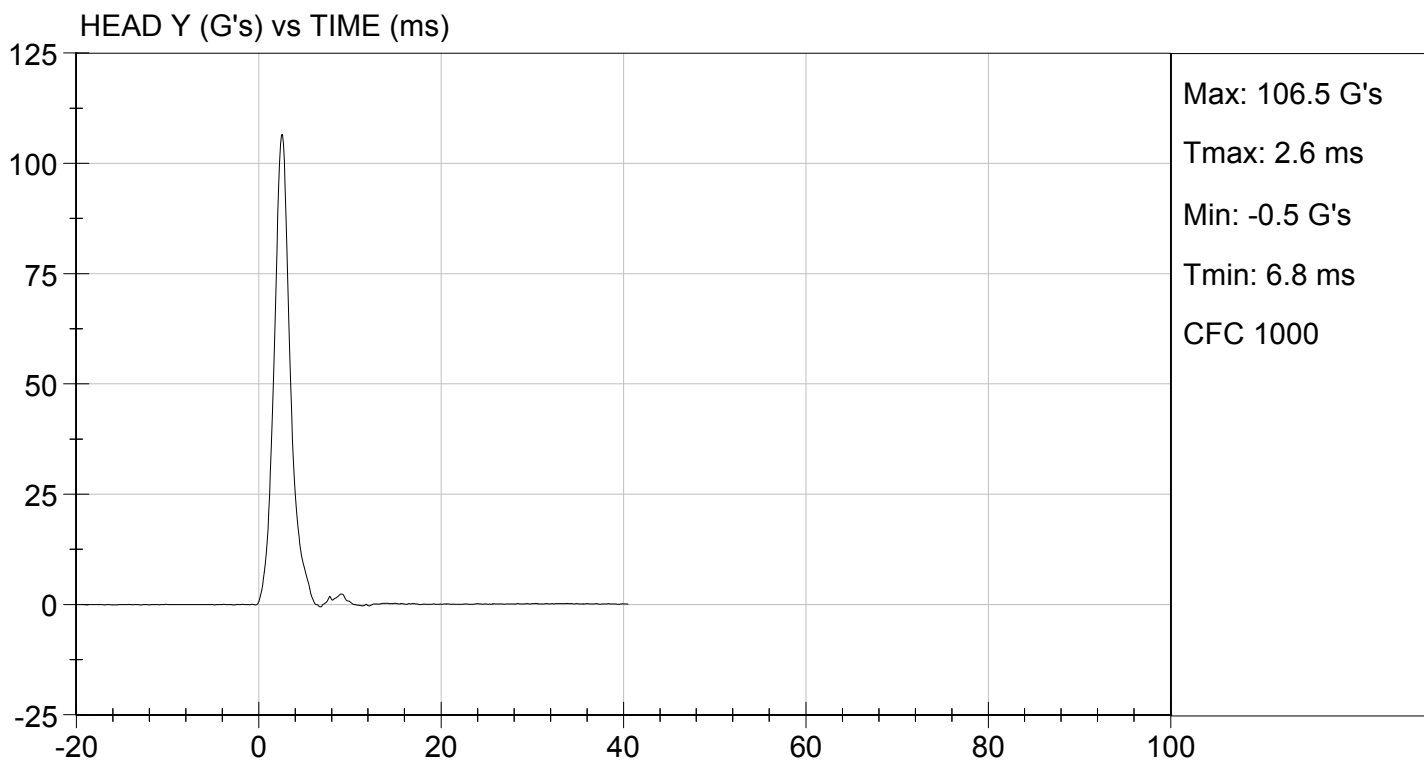
David Schoedel
Laboratory Technician

12/29/2014

Test Date

Jessica Hall
Approved By





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

ATD Serial No: 296

Test I.D: D144572

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	21.0	Pass
Humidity		%	10 to 70	20	Pass
Impact Velocity		m/s	5.51 to 5.63	5.63	Pass
Pendulum Velocity	10 ms	m/s	2.20 to 2.80	2.64	Pass
	15 ms	m/s	3.30 to 4.10	3.73	Pass
	20 ms	m/s	4.40 to 5.40	4.94	Pass
	25 ms	m/s	5.40 to 6.10	5.61	Pass
	25-100 ms	m/s	5.50 to 6.20	5.61	Pass
Maximum D-Plane Rotation		deg	71 to 81	73	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	58	Pass
Maximum Occipital Condyle Moment		Nm	-44 to -36	-42	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	115	Pass
Overall Test Results				Pass	

David Schoedel
Laboratory Technician

12/29/2014

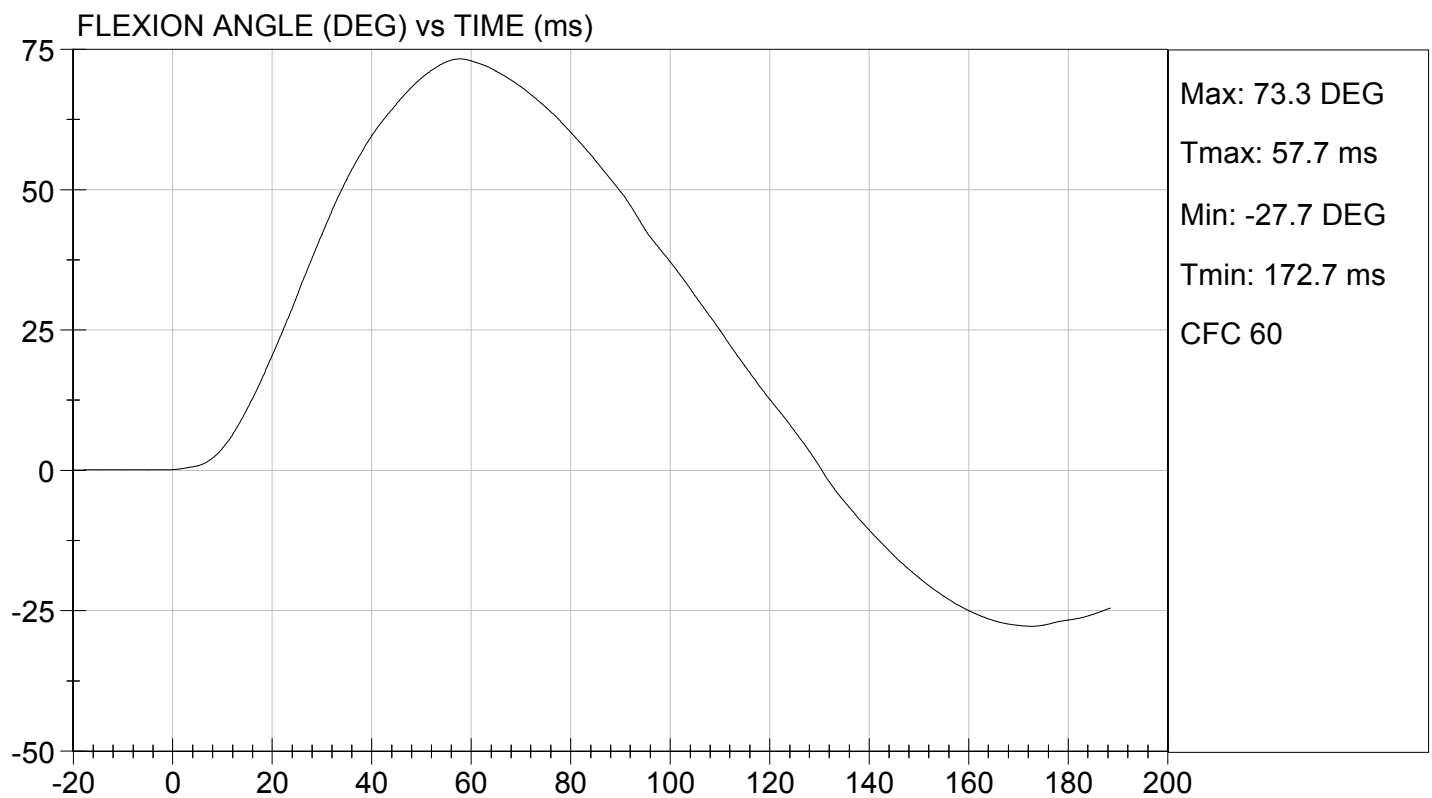
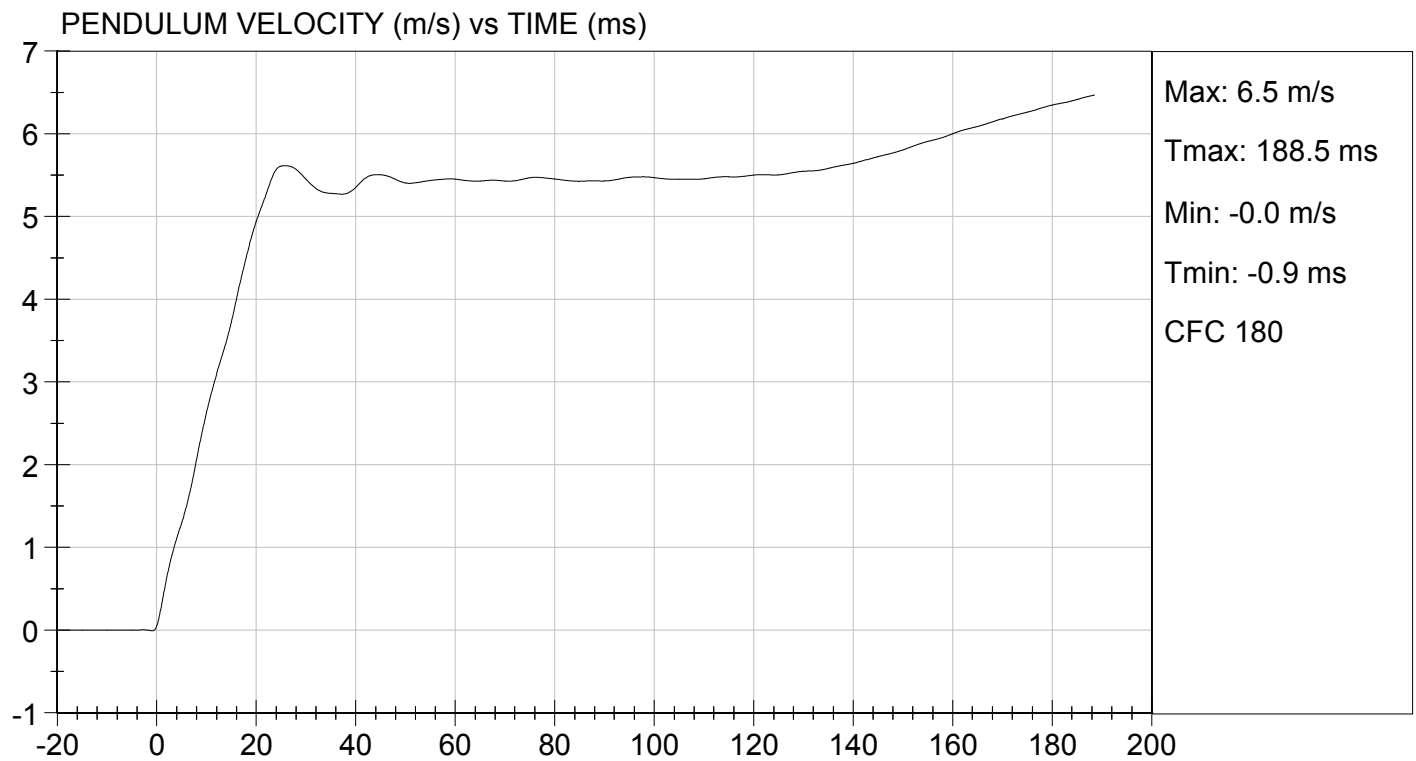
Test Date

Jessica Hall
Approved By



TEST DESC: NECK BENDING
VELOCITY: 18.47 ft/s, 5.63 m/s

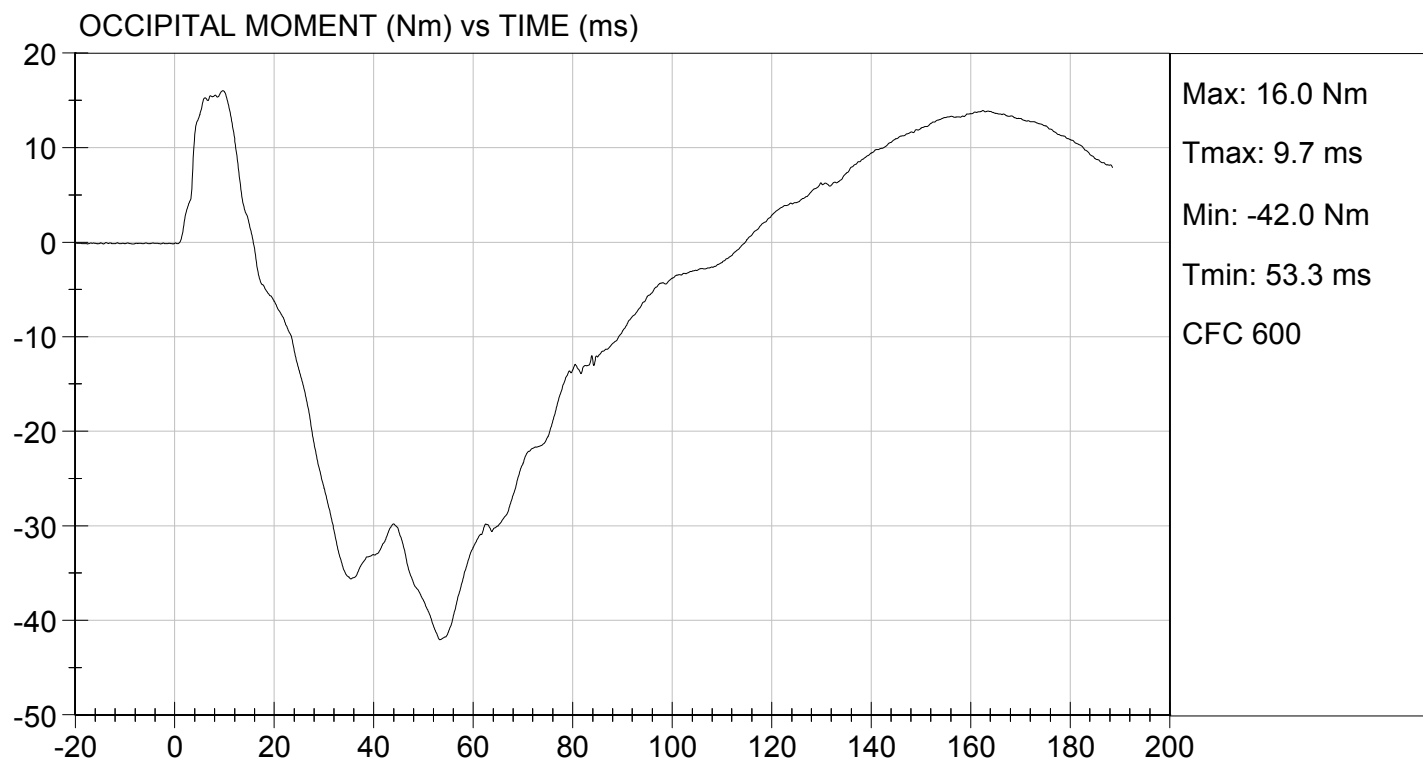
TEST DATE: 12/29/2014
TEST #: D144572





TEST DESC: NECK BENDING
VELOCITY: 18.47 ft/s, 5.63 m/s

TEST DATE: 12/29/2014
TEST #: D144572



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

ATD Serial No: 296

Test ID: D144573

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22.2	Pass
Laboratory Relative Humidity	%	10 to 70	34	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Maximum Probe Acceleration	G's	13 to 18	15	Pass
Shoulder Displacement	mm	28 to 37	31	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	18	Pass
Overall Test Results			Pass	

David Schoedel
Laboratory Technician

12/23/2014

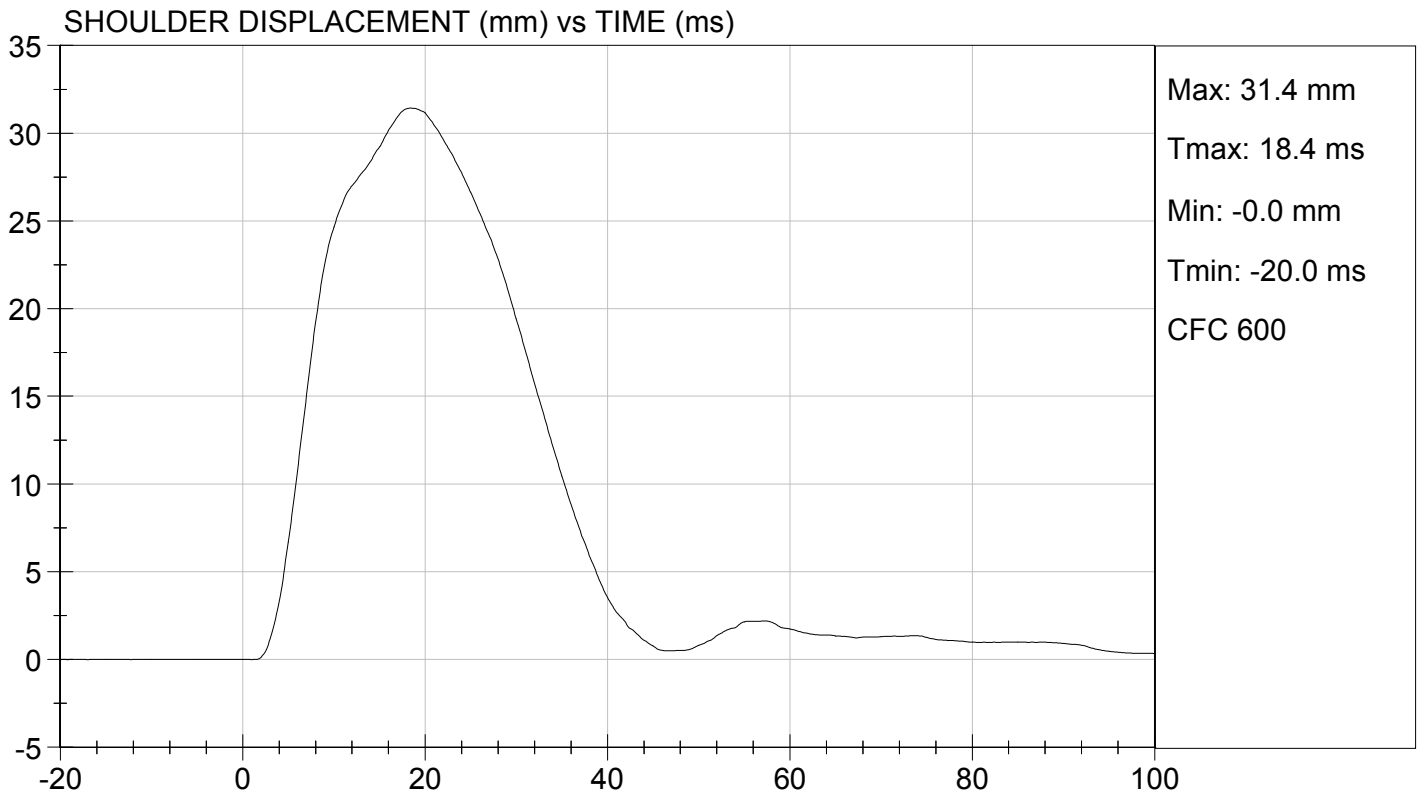
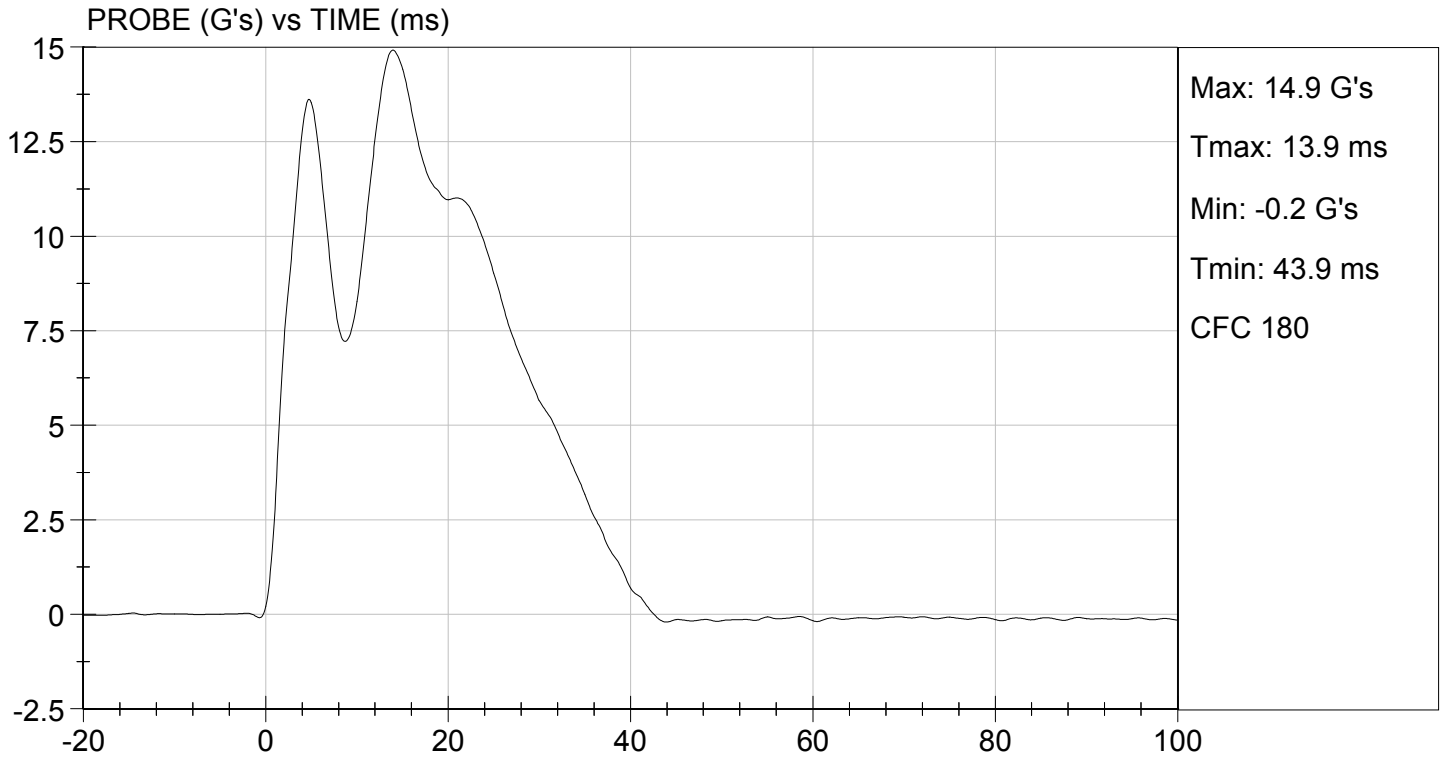
Test Date

Jessica Hall
Approved By



TEST DESC: SHOULDER IMPACT
VELOCITY: 14.25 ft/s, 4.34 m/s

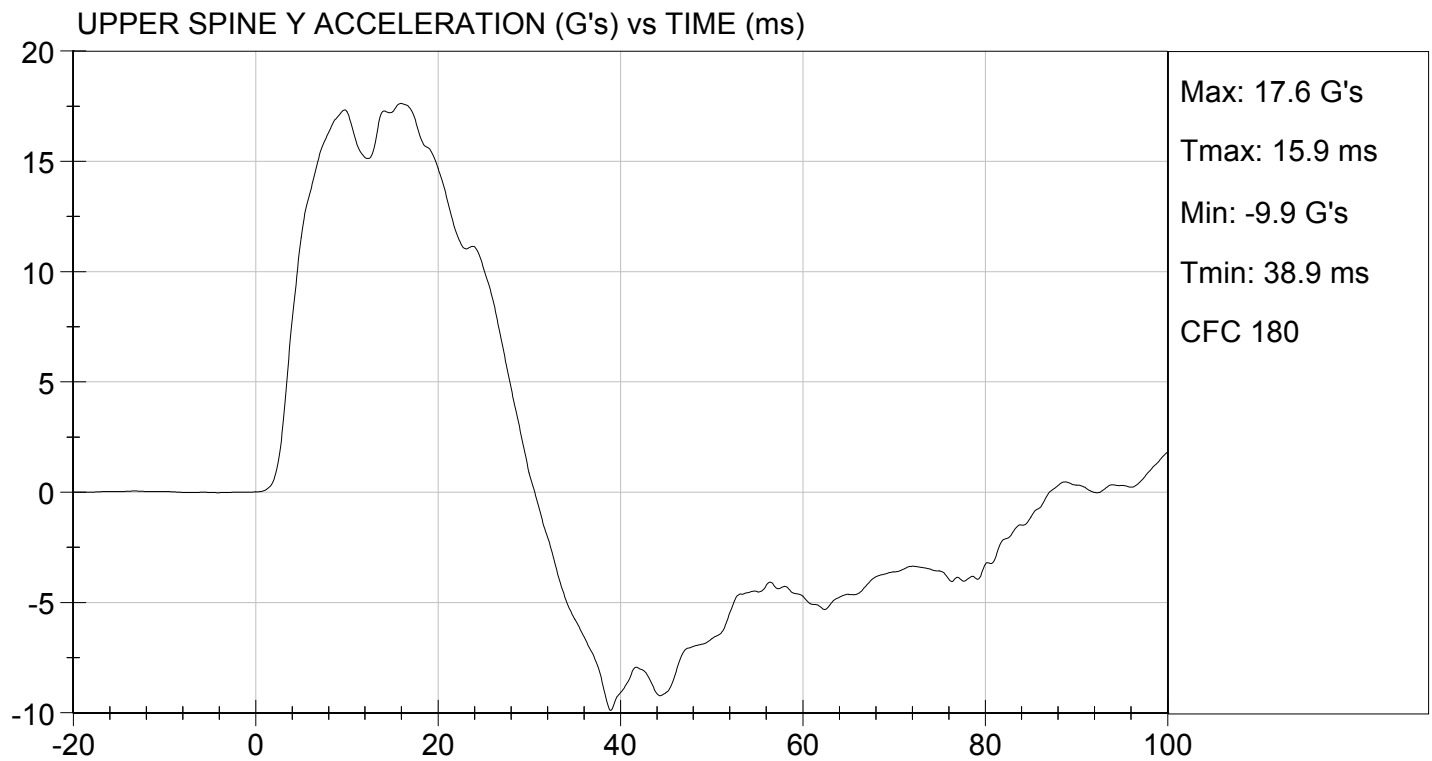
TEST DATE: 12/23/2014
TEST #: D144573





TEST DESC: SHOULDER IMPACT
VELOCITY: 14.25 ft/s, 4.34 m/s

TEST DATE: 12/23/2014
TEST #: D144573



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

ATD Serial No: 296

Test I.D: D144574

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	22.2	Pass
Humidity	%	10 to 70	34	Pass
Impact Velocity	m/s	6.60 to 6.80	6.68	Pass
Maximum Probe Acceleration	G's	30 to 36	30	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	35	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	30	Pass
Overall Test Results				Pass

David Schoedel
Laboratory Technician

12/23/2014

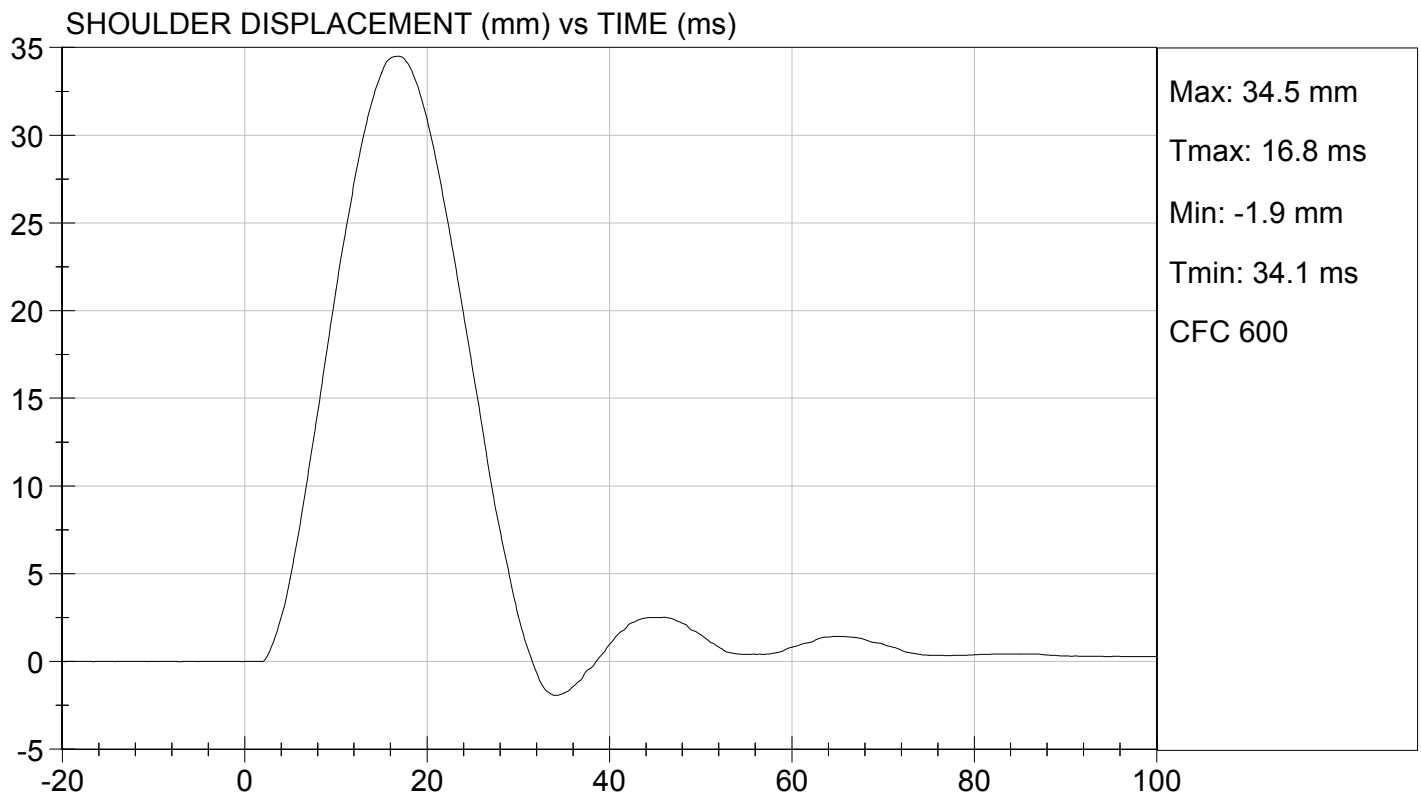
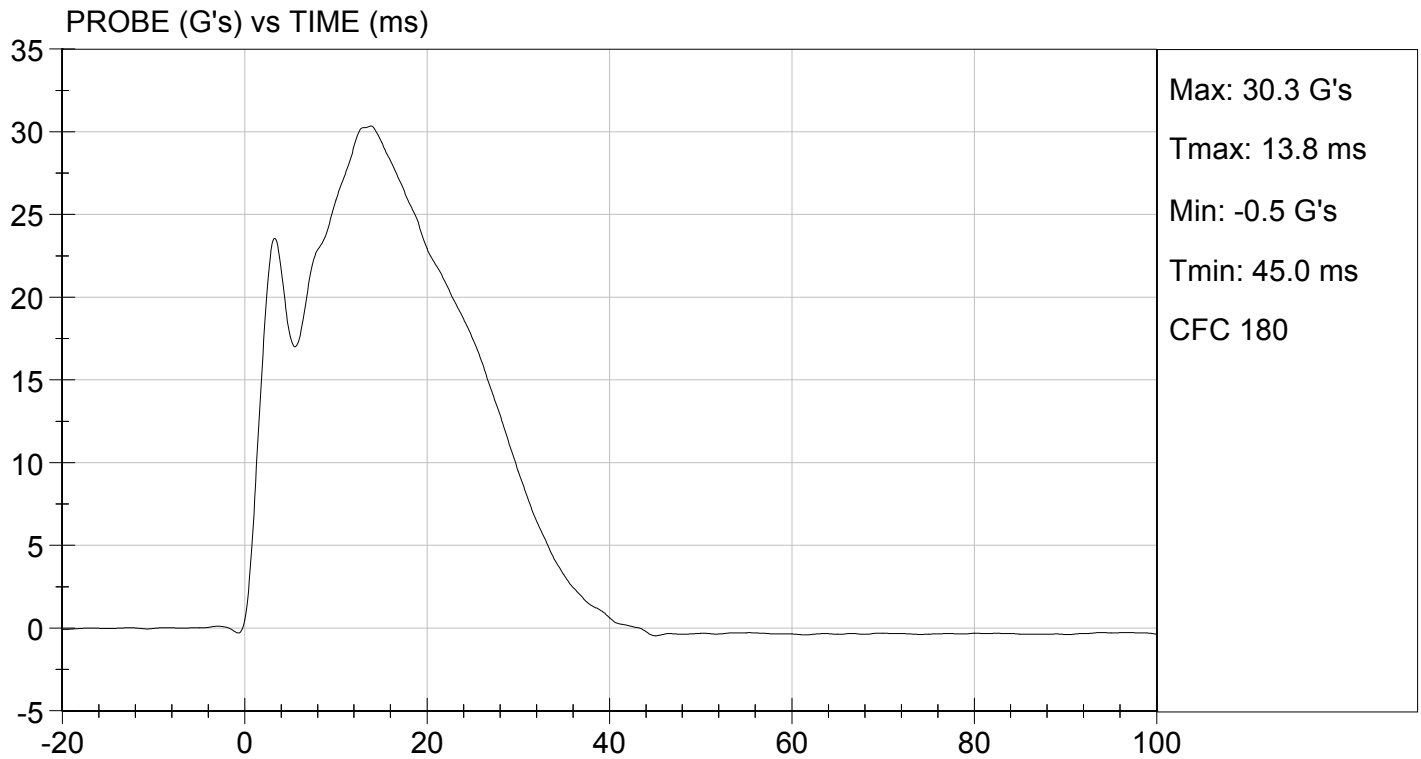
Test Date

Jessica Hall
Approved By



TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 21.93 ft/s, 6.68 m/s

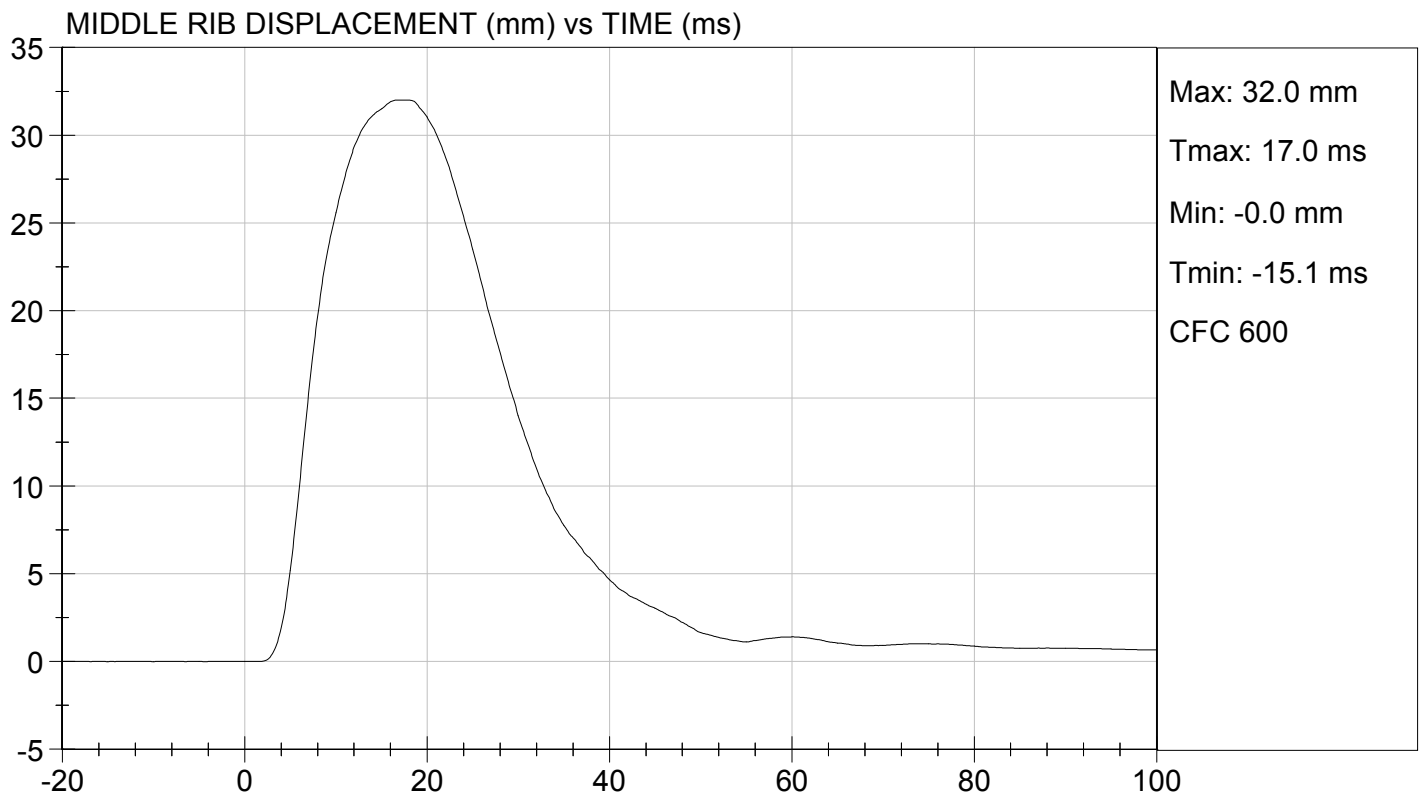
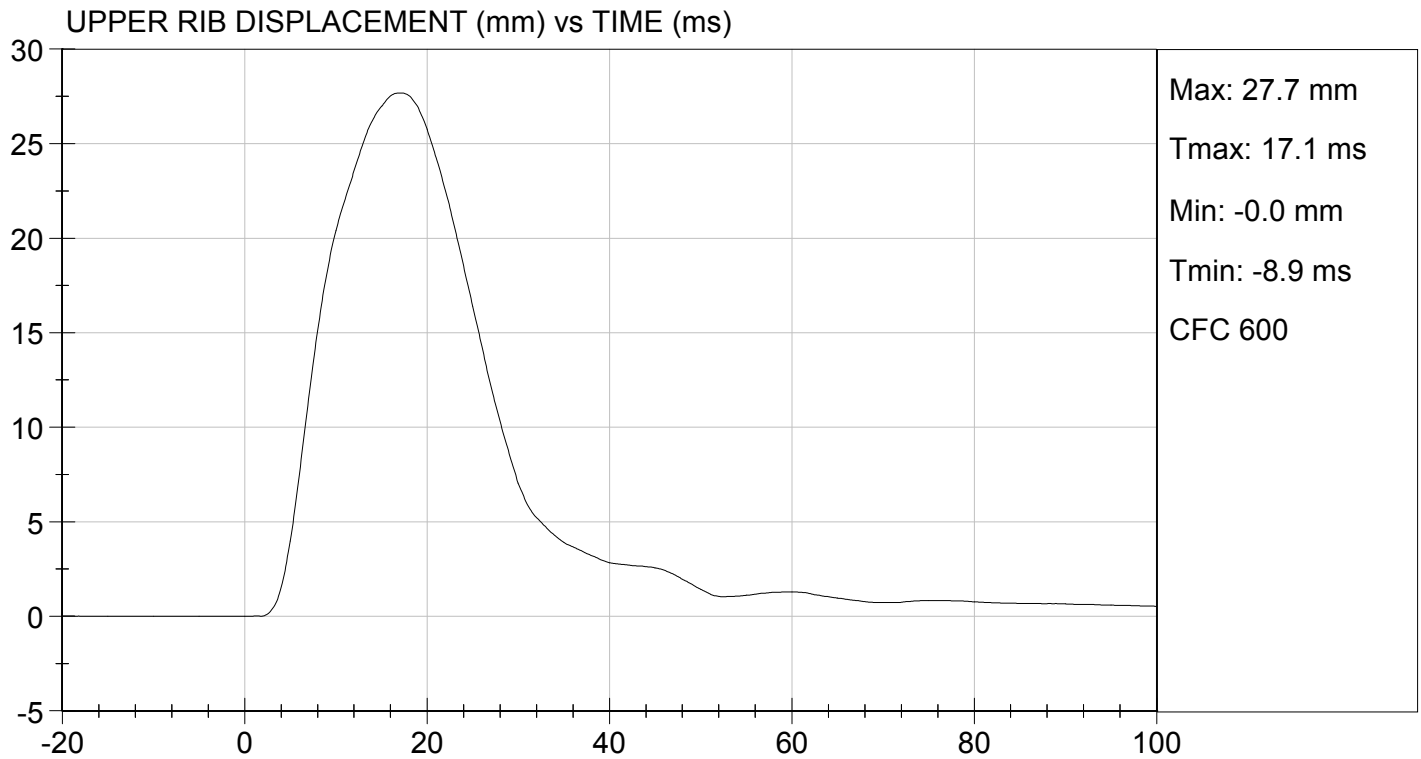
TEST DATE: 12/23/2014
TEST #: D144574





TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 21.93 ft/s, 6.68 m/s

TEST DATE: 12/23/2014
TEST #: D144574

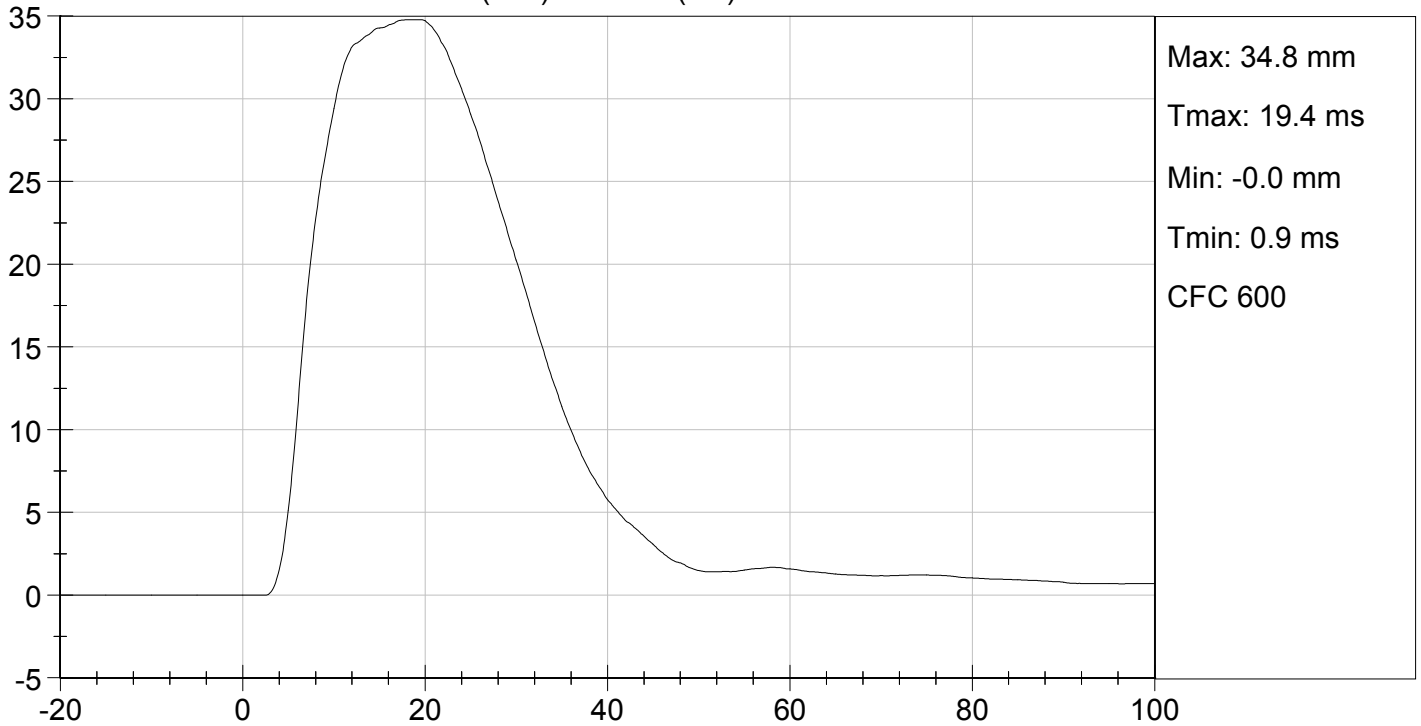




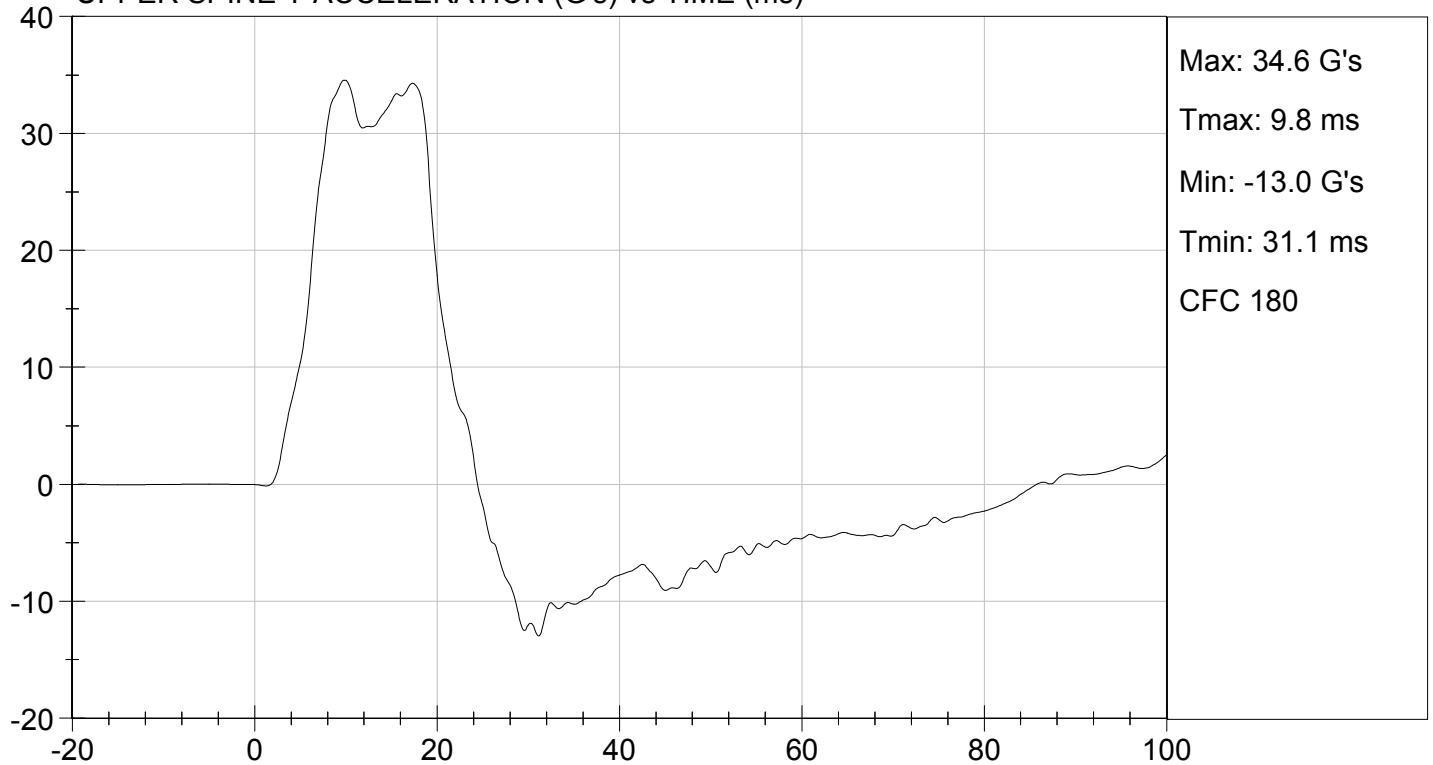
TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 21.93 ft/s, 6.68 m/s

TEST DATE: 12/23/2014
TEST #: D144574

LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



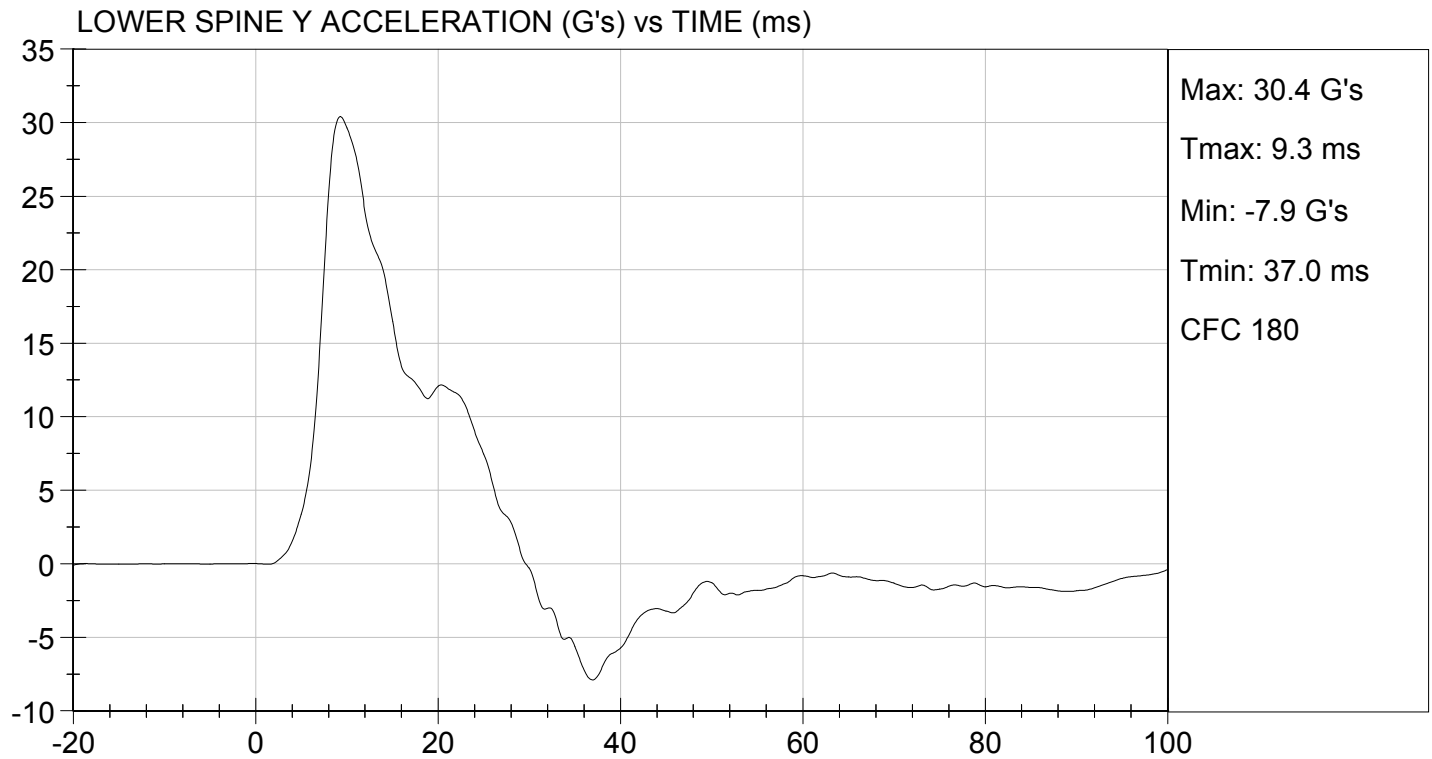
UPPER SPINE Y ACCELERATION (G's) vs TIME (ms)





TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 21.93 ft/s, 6.68 m/s

TEST DATE: 12/23/2014
TEST #: D144574

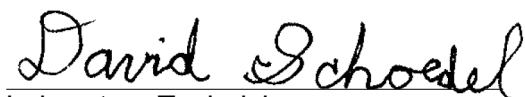


MGA RESEARCH CORPORATION
THORAX (WITHOUT ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

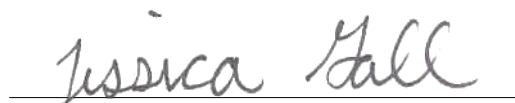
Test I.D: D144575

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	22.2	Pass
Humidity	%	10 to 70	34	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	Pass
Maximum Probe Acceleration	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	41	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

12/23/2014

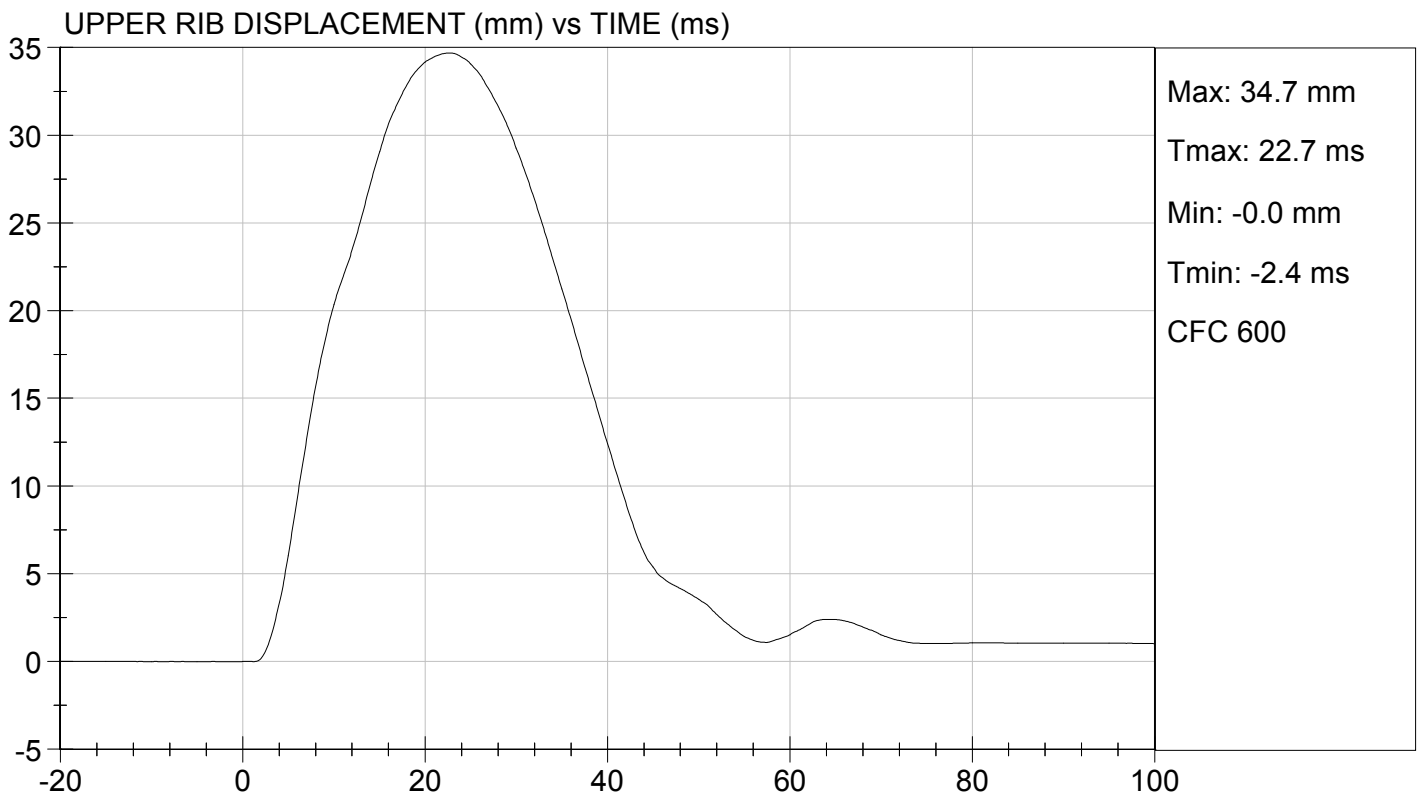
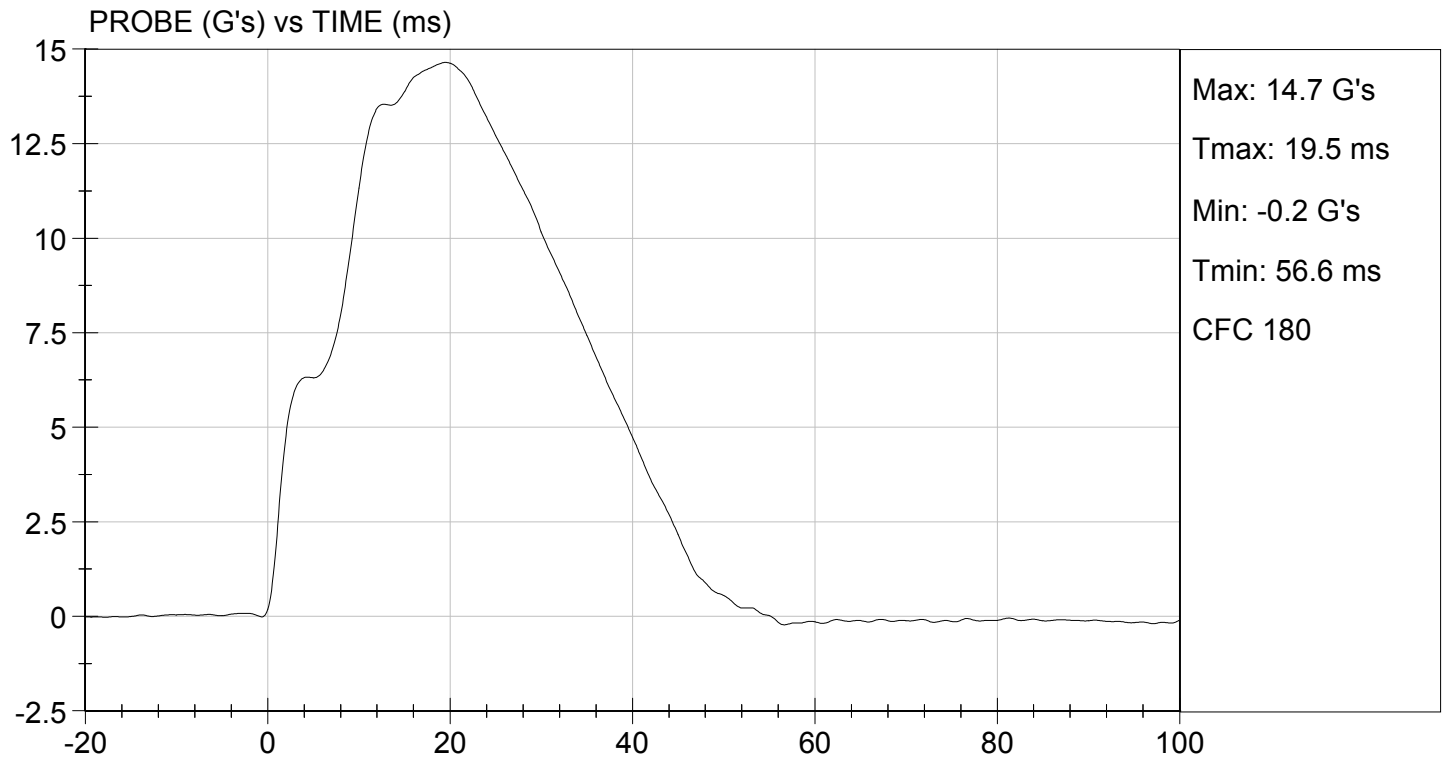
Test Date


Approved By



TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.12 ft/s, 4.30 m/s

TEST DATE: 12/23/2014
TEST #: D144575

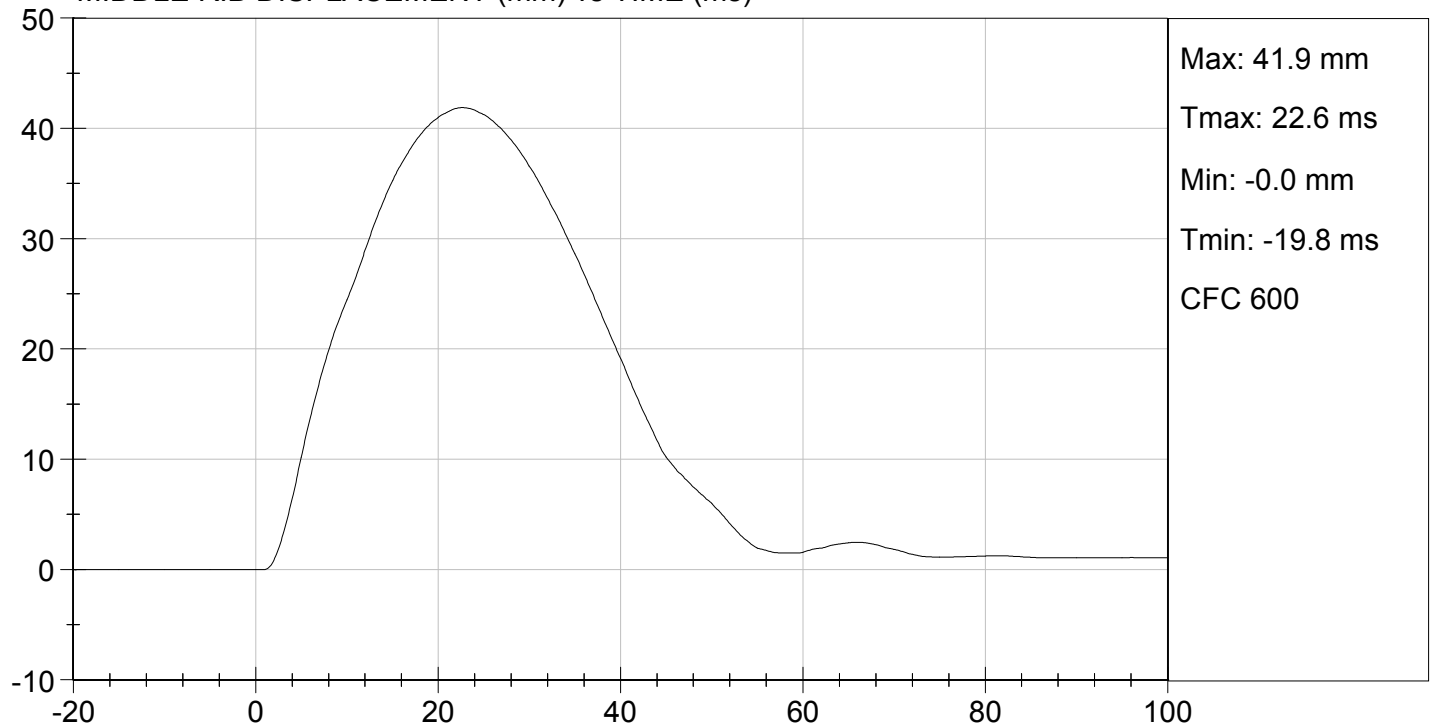




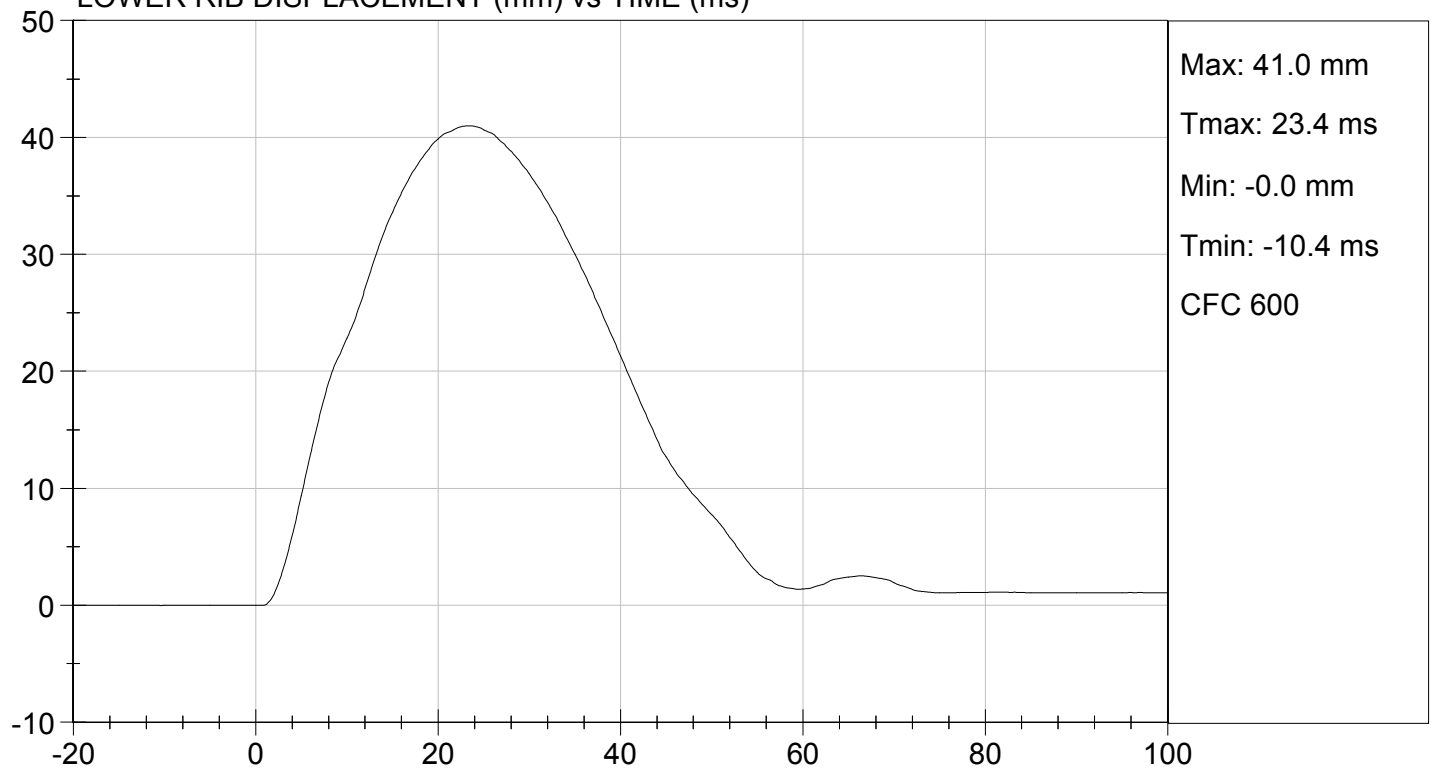
TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.12 ft/s, 4.30 m/s

TEST DATE: 12/23/2014
TEST #: D144575

MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



LOWER RIB DISPLACEMENT (mm) vs TIME (ms)

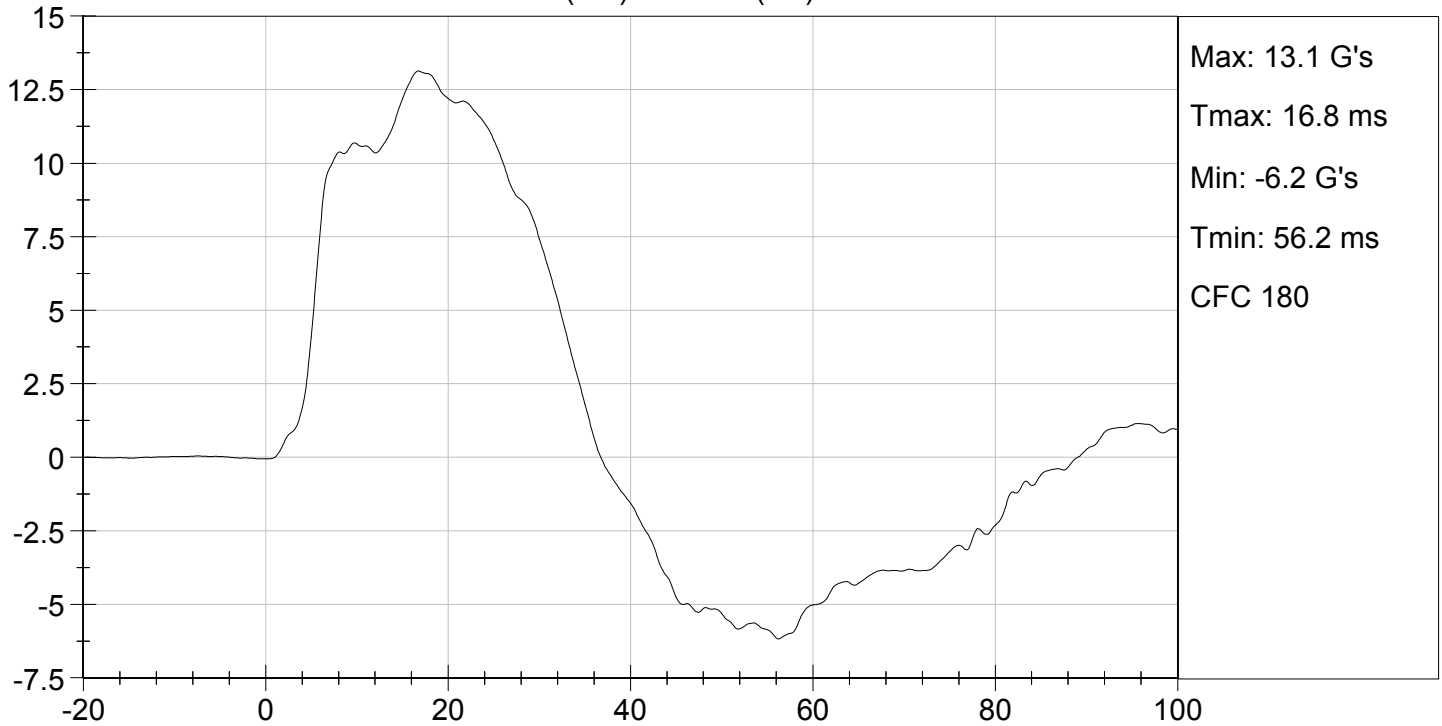




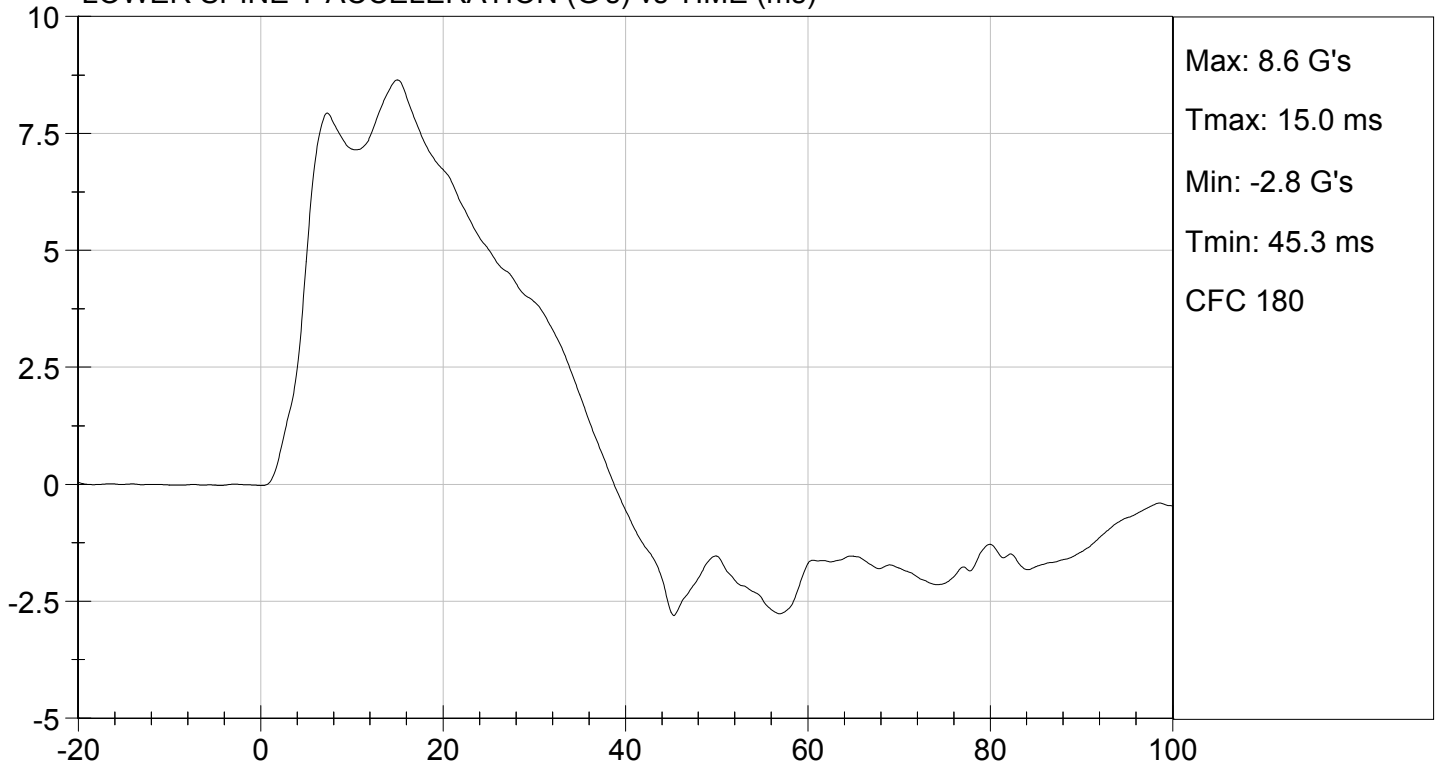
TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.12 ft/s, 4.30 m/s

TEST DATE: 12/23/2014
TEST #: D144575

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



LOWER SPINE Y 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: D144576

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	22.2	Pass
Humidity	%	10 to 70	34	Pass
Impact Velocity	m/s	4.20 to 4.40	4.27	Pass
Maximum Probe Acceleration	G's	12 to 16	12	Pass
Upper Abdomen Rib Displacement	mm	36 to 47	41	Pass
Lower Abdomen Rib Displacement	mm	33 to 44	41	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	10	Pass
Overall Test Results				Pass

David Schoedel
Laboratory Technician

12/23/2014

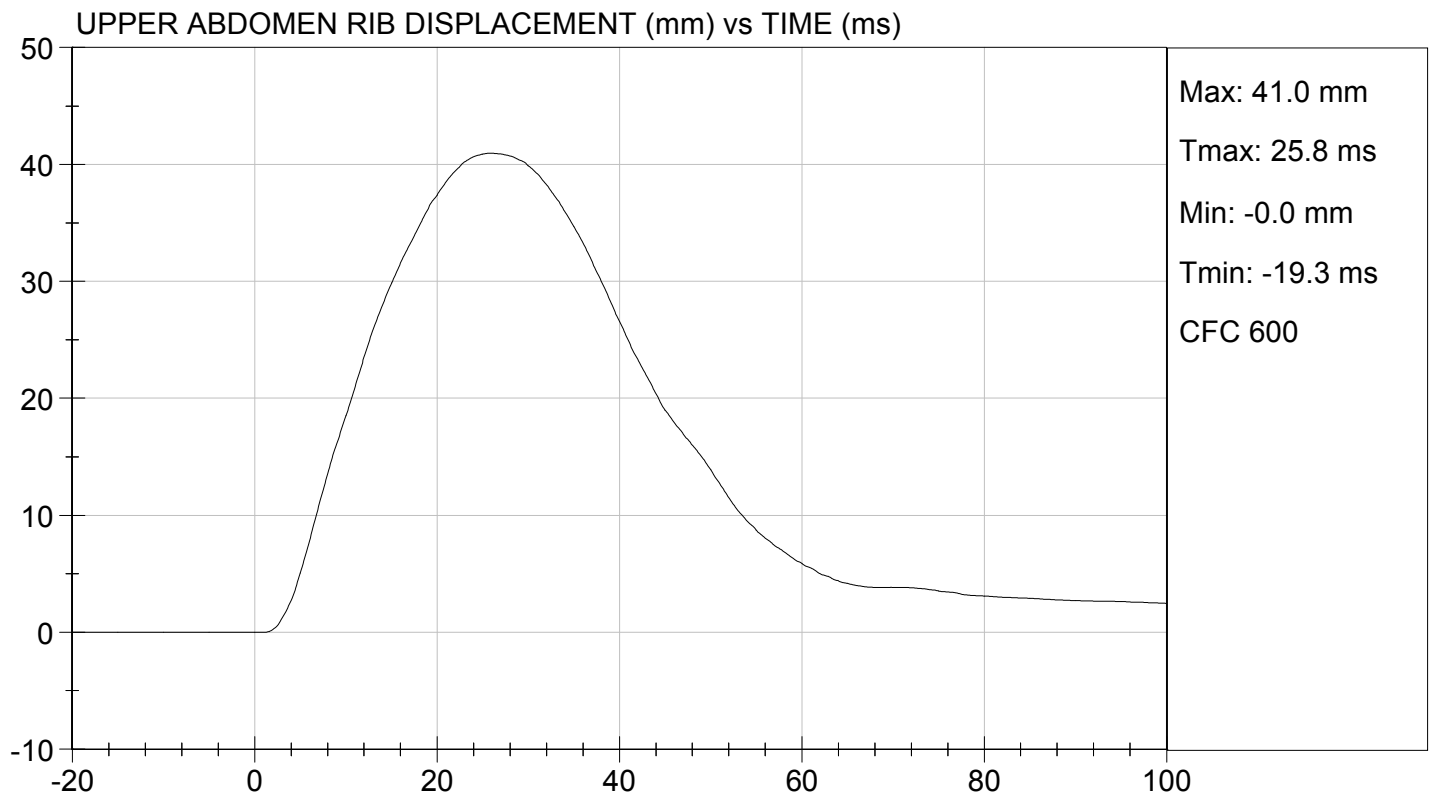
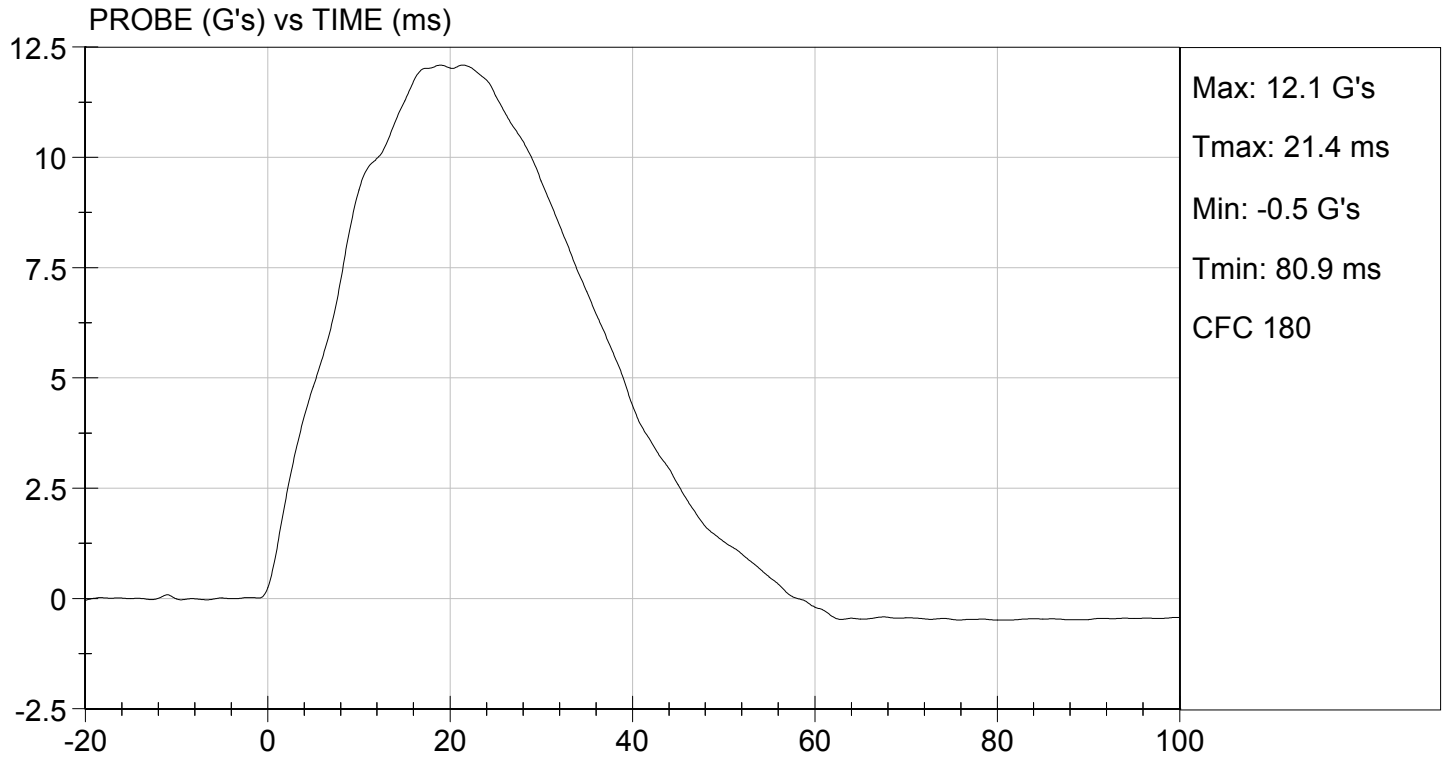
Test Date

Jessica Hall
Approved By



TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.01 ft/s, 4.27 m/s

TEST DATE: 12/23/2014
TEST #: D144576

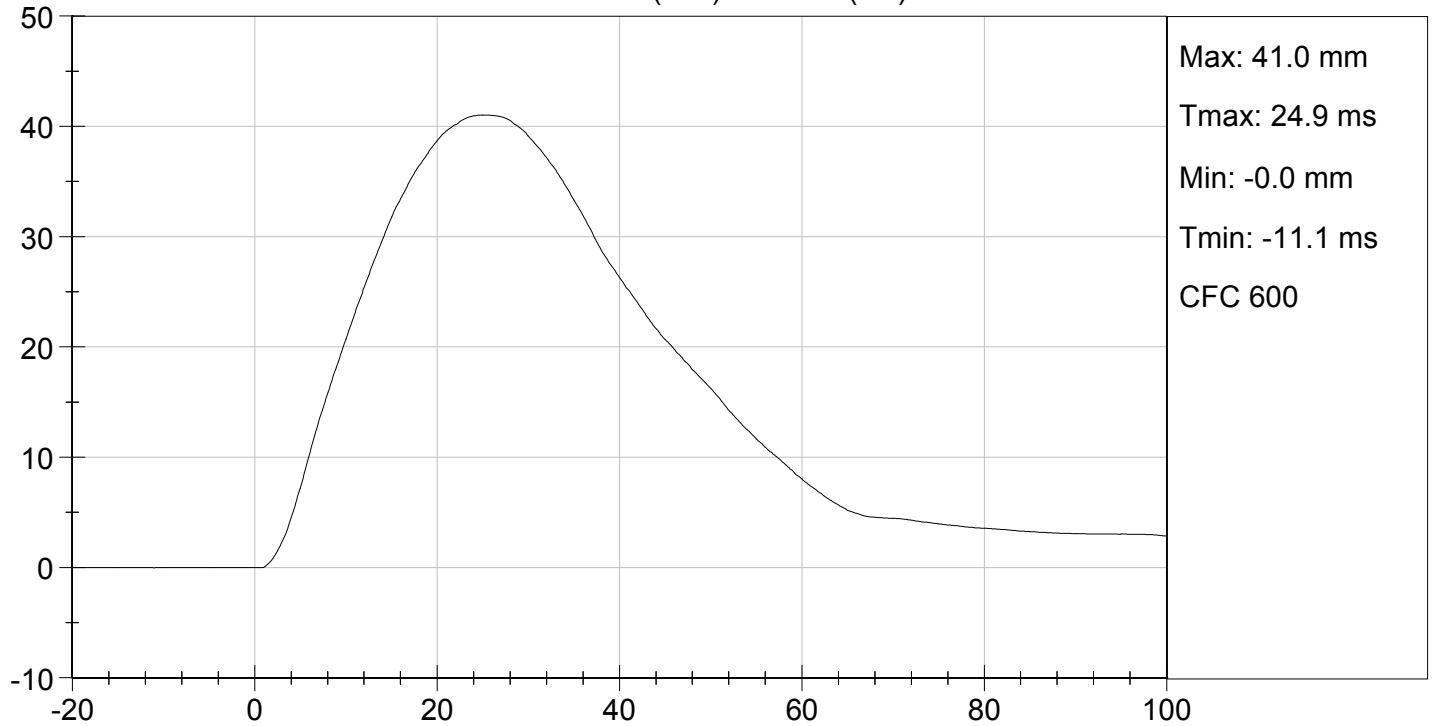




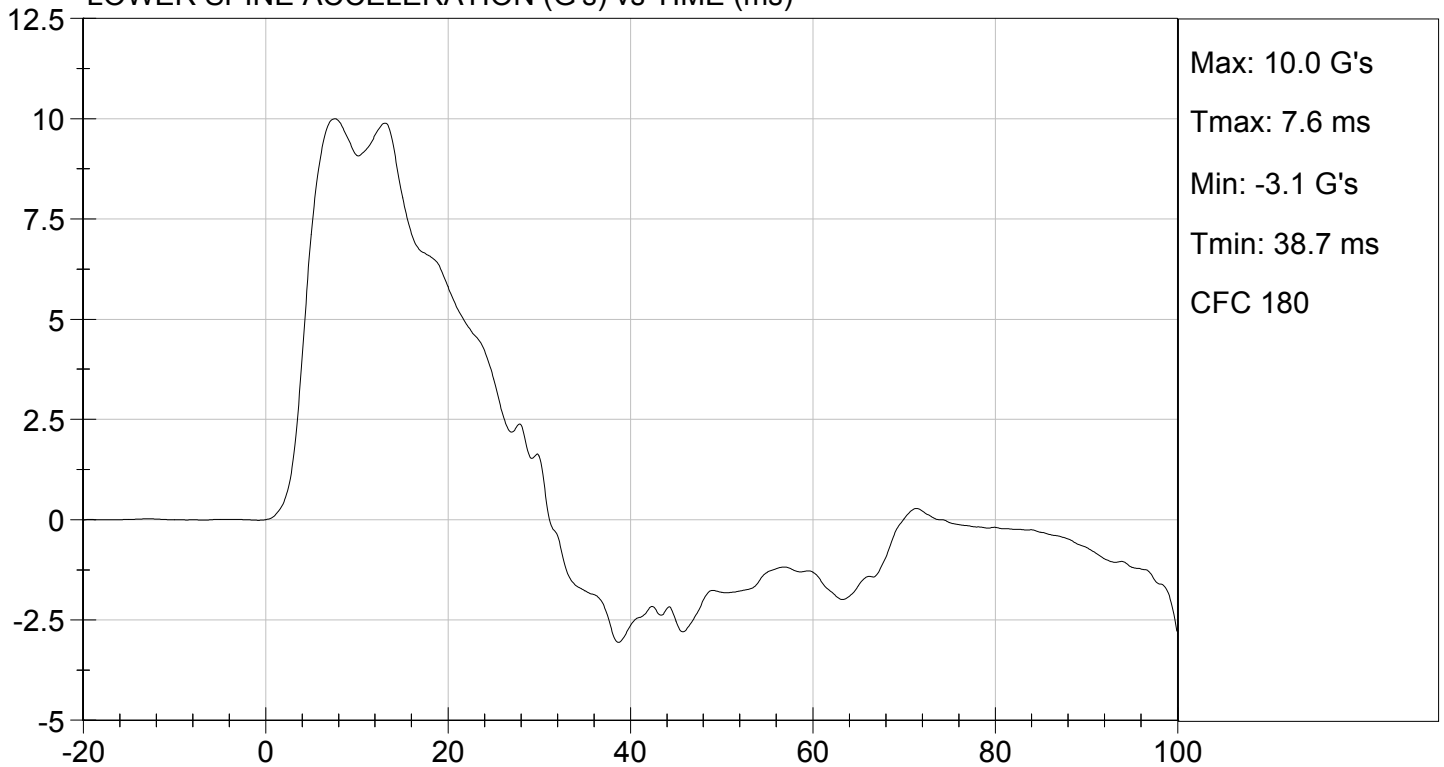
TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.01 ft/s, 4.27 m/s

TEST DATE: 12/23/2014
TEST #: D144576

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: D144577

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	22.2	Pass
Humidity	%	10 to 70	34	Pass
Impact Velocity	m/s	6.60 to 6.80	6.68	Pass
Maximum Probe Acceleration	G's	38 to 47	39	Pass
Pelvis Y Acceleration After 6 ms	G's	34 to 42	38	Pass
Peak Acetabulum Force	N	3600 to 4300	4,090	Pass
Overall Test Results				Pass

David Schoedel

Laboratory Technician

12/23/2014

Test Date

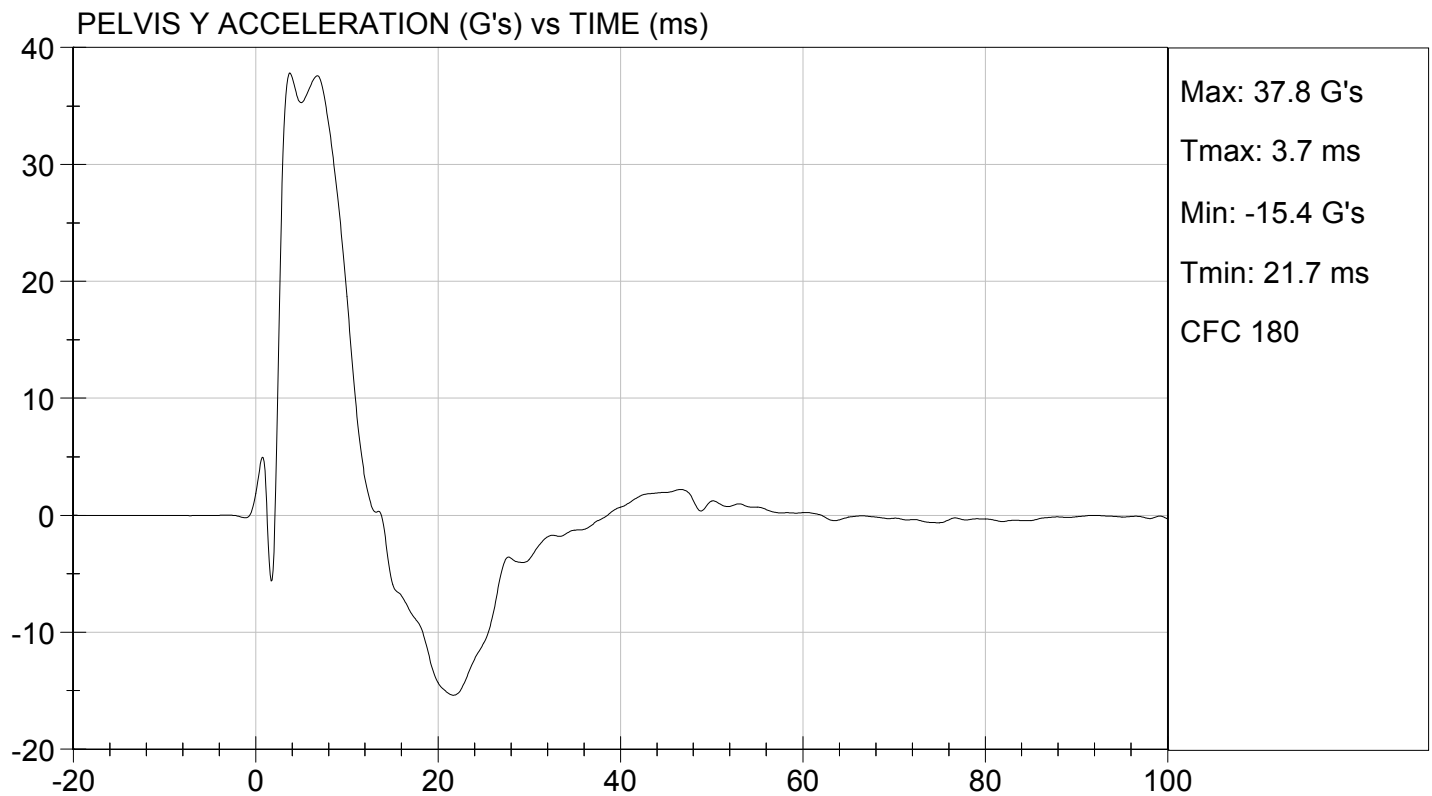
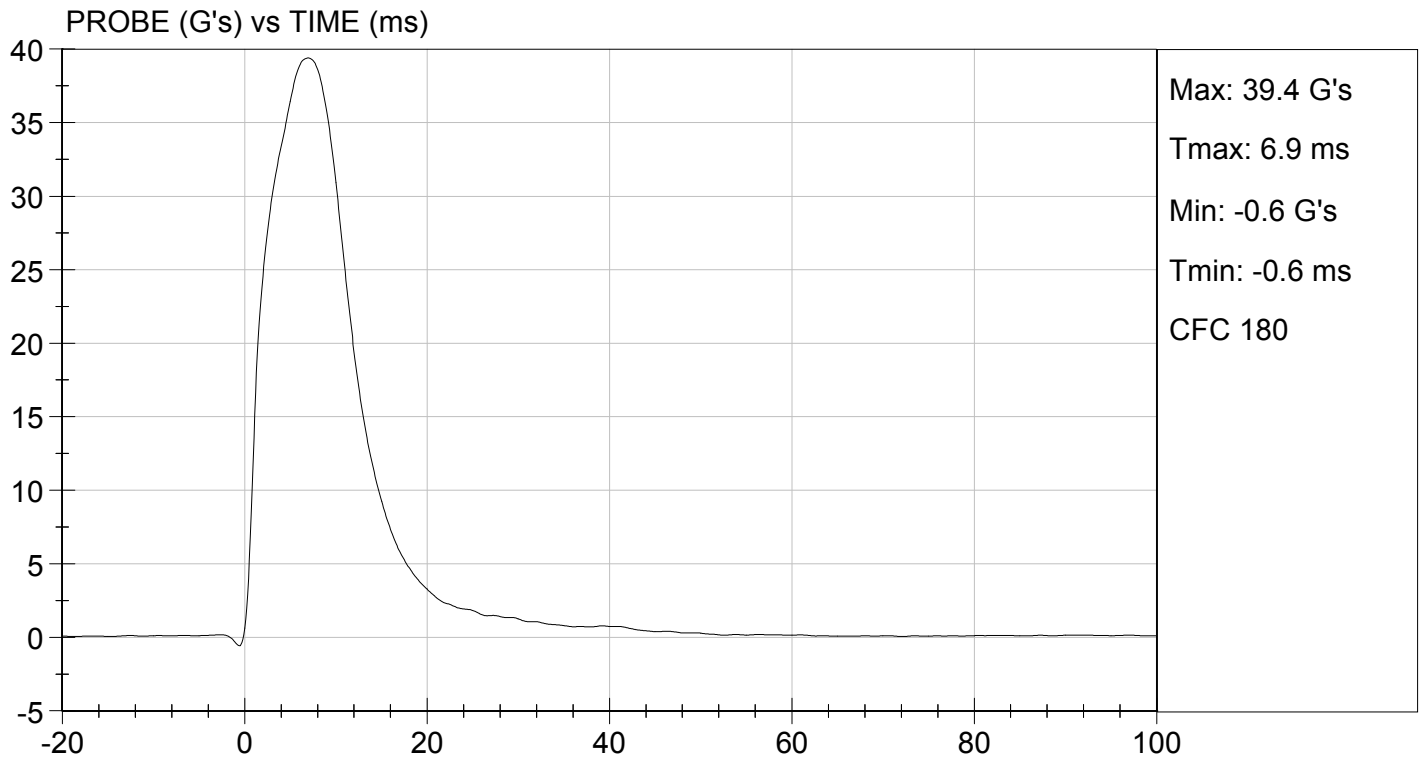
Jessica Hall

Approved By



TEST DESC: PELVIS IMPACT
VELOCITY: 21.93 ft/s, 6.68 m/s

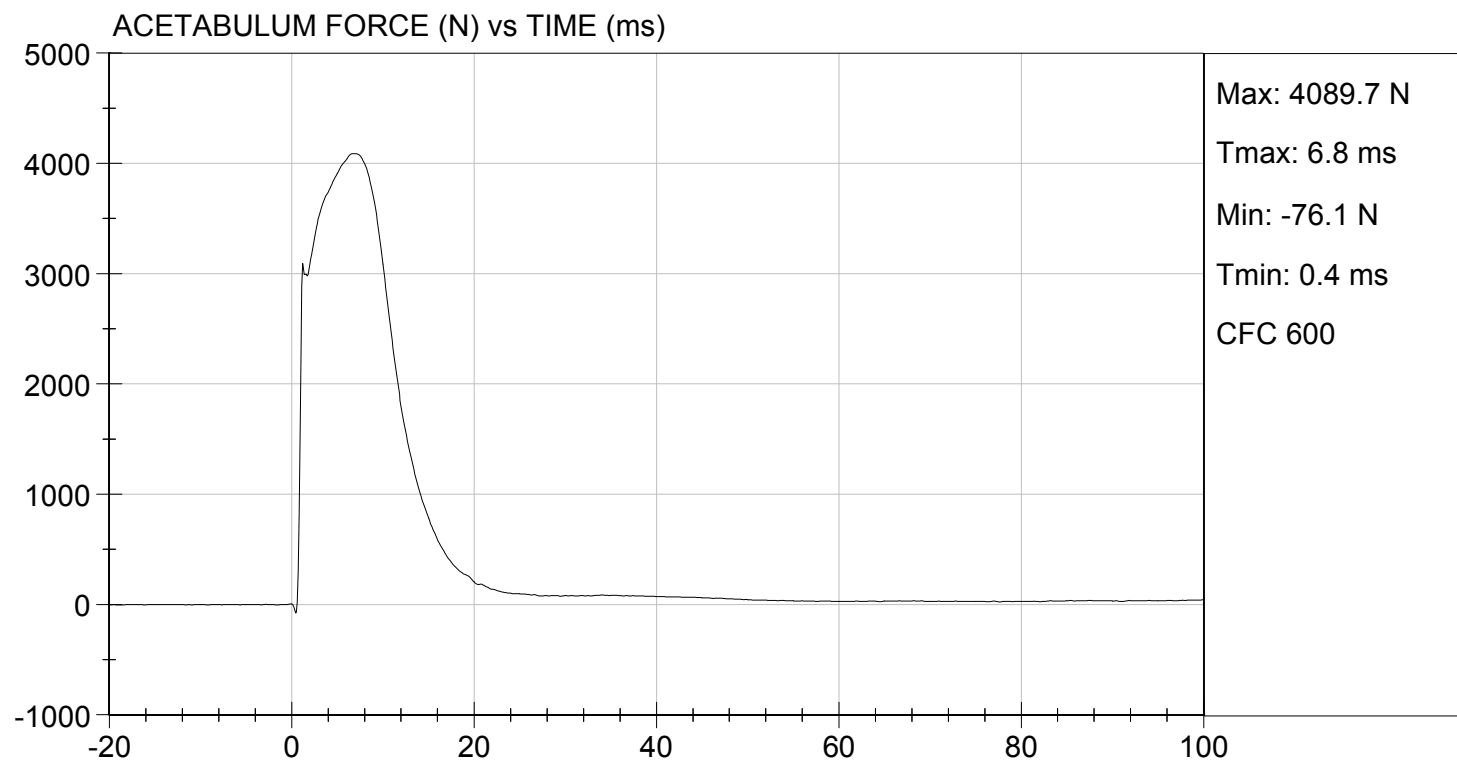
TEST DATE: 12/23/2014
TEST #: D144577





TEST DESC: PELVIS IMPACT
VELOCITY: 21.93 ft/s, 6.68 m/s

TEST DATE: 12/23/2014
TEST #: D144577



MGA RESEARCH CORPORATION

ILIAC IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D144578

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	22.2	Pass
Humidity	%	10 to 70	34	Pass
Impact Velocity	m/s	4.20 to 4.40	4.23	Pass
Maximum Probe Acceleration	G's	36 to 45	41	Pass
Pelvis Y Acceleration	G's	28 to 39	33	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4,988	Pass
Overall Test Results				Pass

David Schoedel
Laboratory Technician

12/23/2014

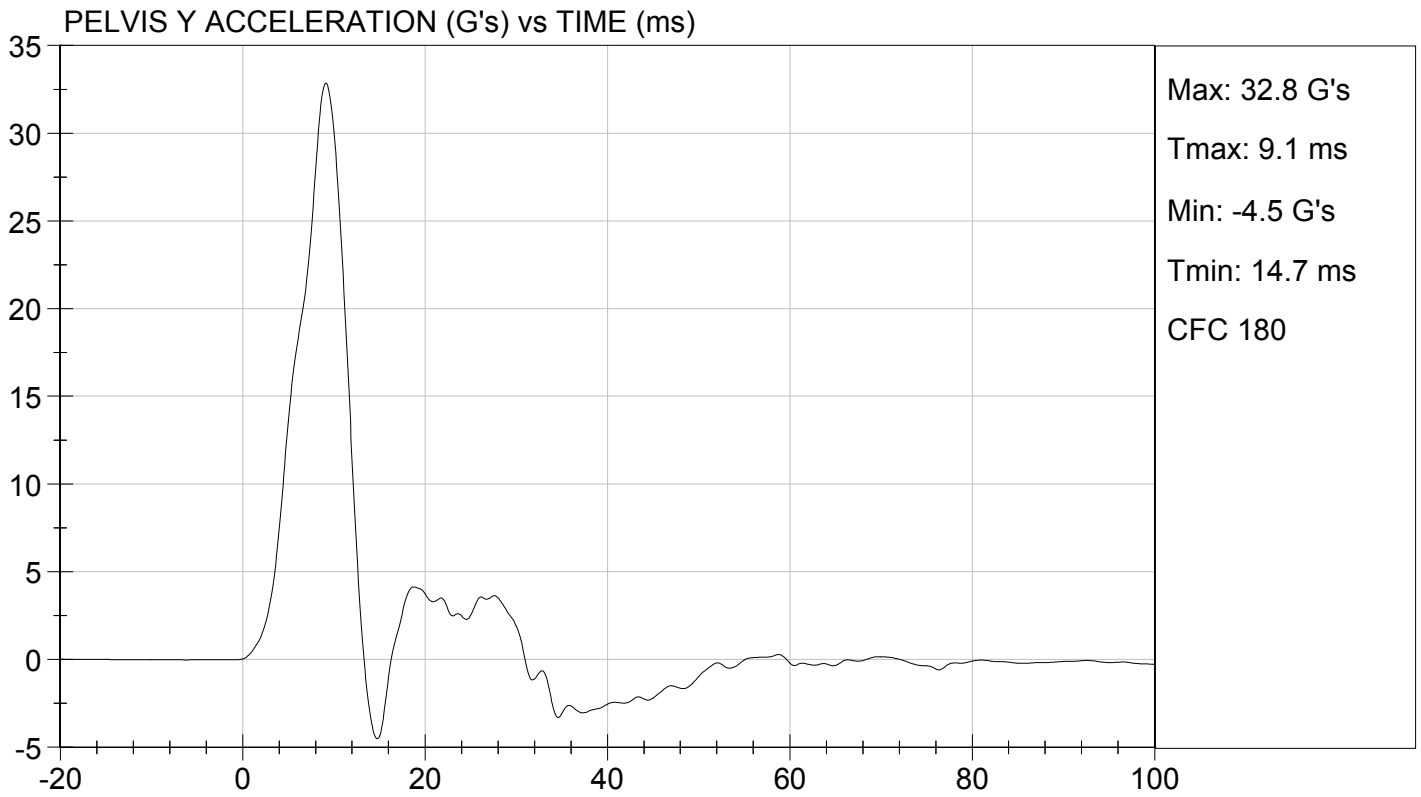
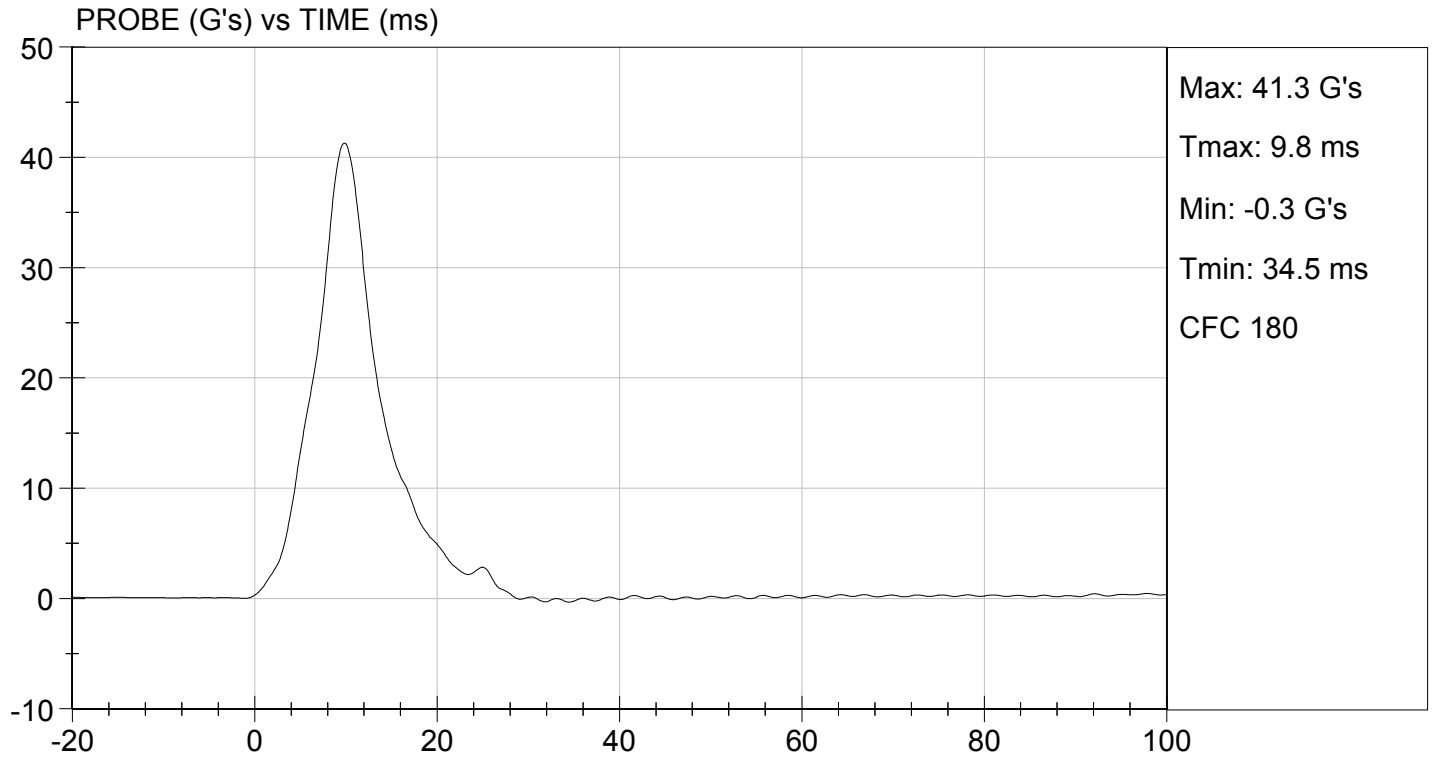
Test Date

Jessica Hall
Approved By



TEST DESC: ILLIAC
VELOCITY: 13.89 ft/s, 4.23 m/s

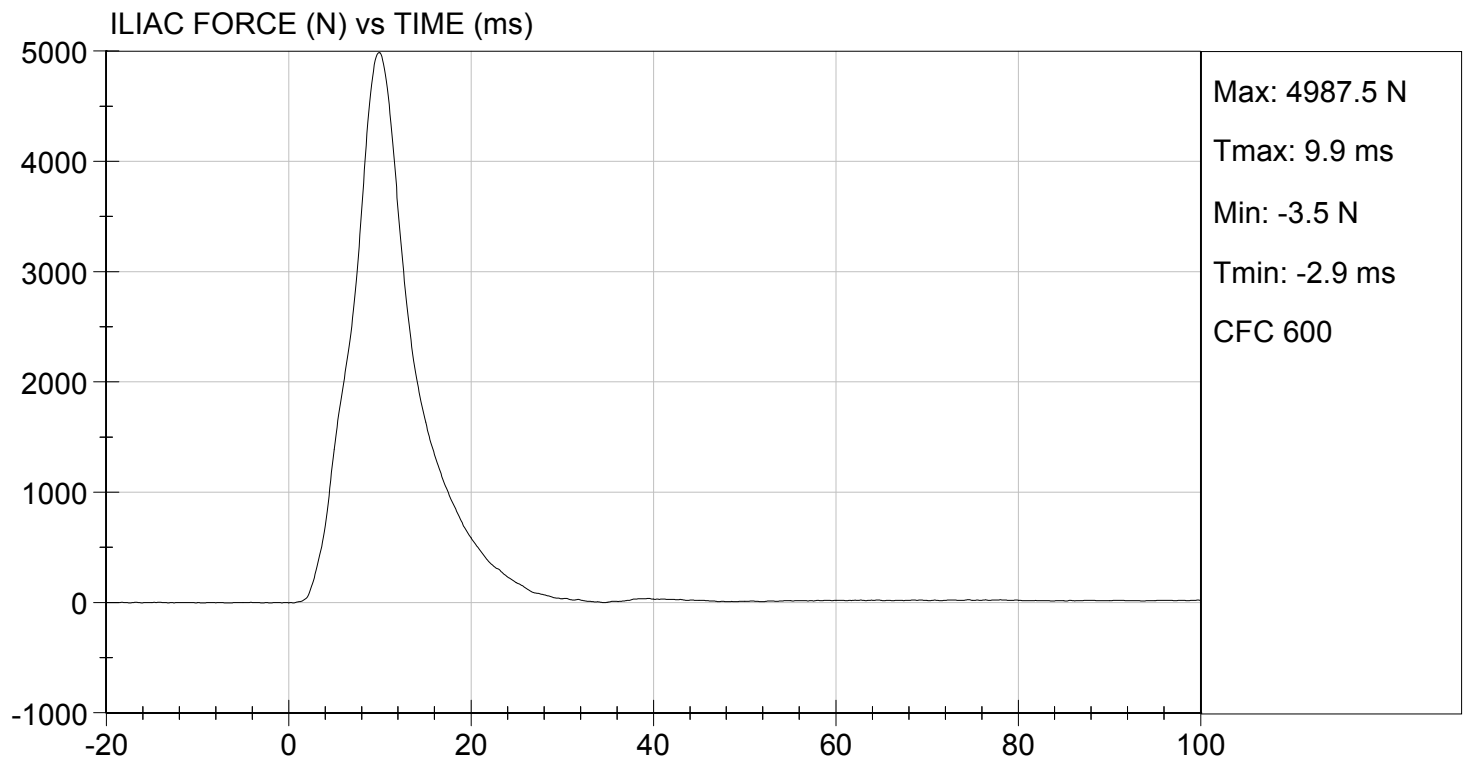
TEST DATE: 12/23/2014
TEST #: D144578



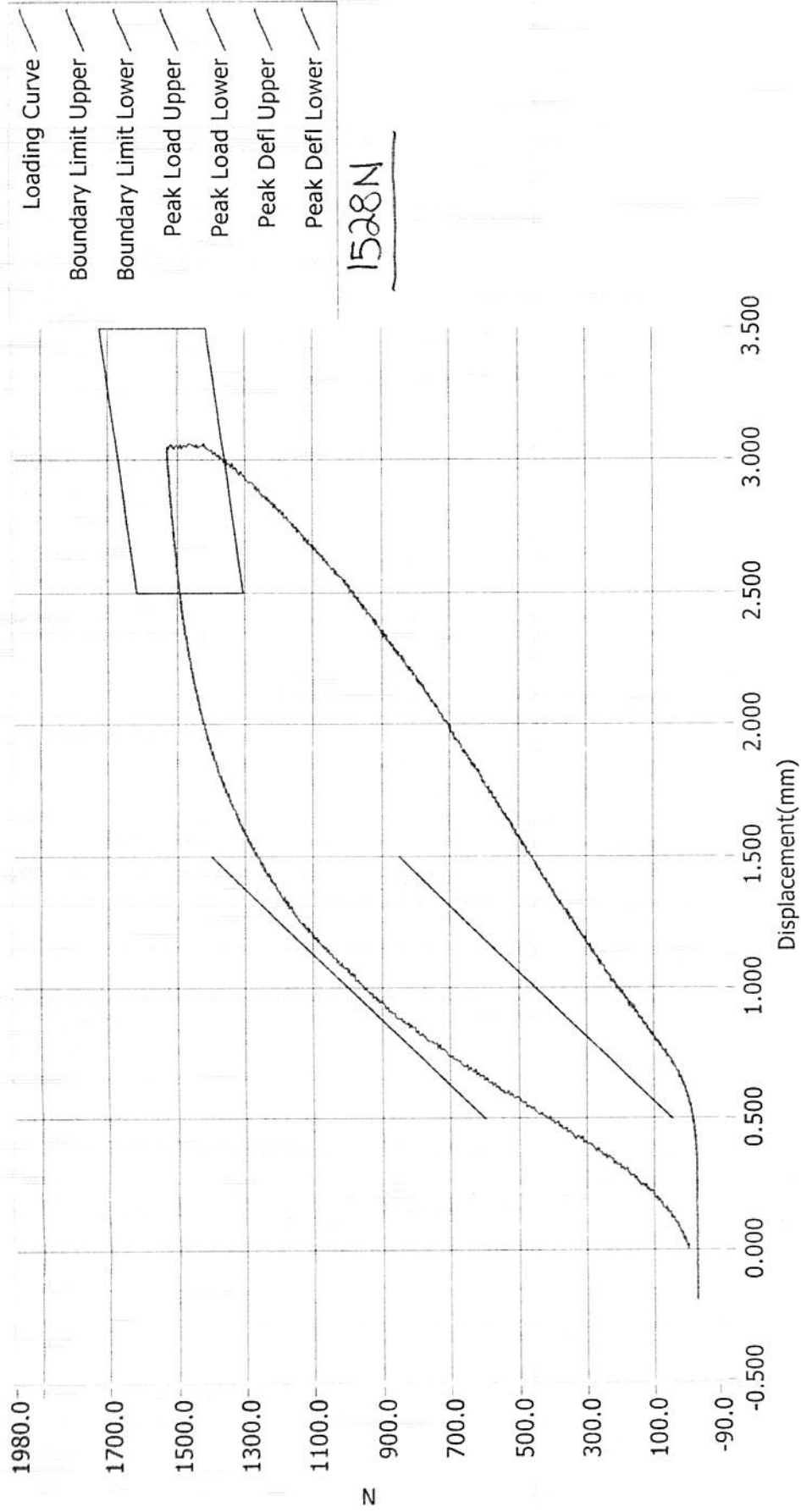


TEST DESC: ILLIAC
VELOCITY: 13.89 ft/s, 4.23 m/s

TEST DATE: 12/23/2014
TEST #: D144578



Resultant Data - SIDIIs Plug Compression

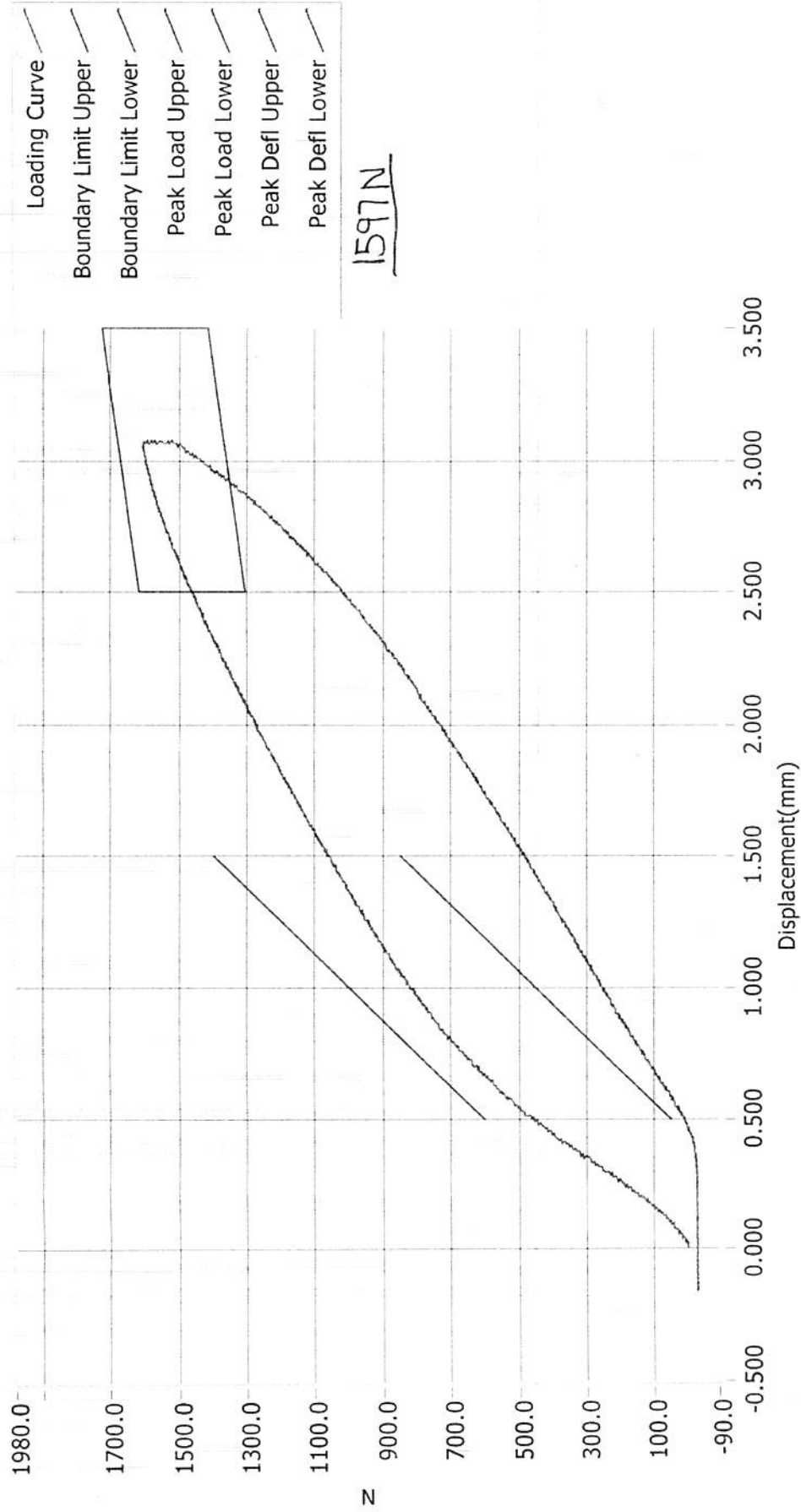


ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
	70611	12/12/2013	7:58 PM
Cert ID	ATD Serial Number	ATD Type	
	N/A	SIDIIs	

Current Date : 12/12/2013 Current Time : 19:58:50

Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
	70597	12/12/2013	7:44 PM
Cert ID	ATD Serial Number	ATD Type	
	N/A	SIDIIs	

Current Date : 12/12/2013

Current Time : 19:45:08

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 CG Accelerometers		X	P79575	Endevco	08/11/14
		Y	P79577	Endevco	08/11/14
		Z	P79578	Endevco	08/11/14
		Xr	P79799	Endevco	08/11/14
		Yr	P79802	Endevco	08/11/14
		Zr	P79803	Endevco	08/11/14
Thorax Rib Displacement Potentiometers	Upper	Y	G176	Honeywell	08/11/14
	Middle	Y	G169	Honeywell	08/11/14
	Lower	Y	G164	Honeywell	08/11/14
Abdomen Load Cells	Forward	Y	ABG1532	Denton	01/09/14
	Middle	Y	ABG1534	Denton	01/09/14
	Rear	Y	ABG1535	Denton	01/09/14
Lower Spine Accelerometers (T12)		X	P78853	Endevco	08/08/14
		Y	P78861	Endevco	08/08/14
		Z	P78863	Endevco	08/08/14
Public Symphysis Load Cell		Y	PG461	Denton	01/09/14

Table 2 – Dummy Instrumentation (SID-IIs)

			SID-IIs S/N 296			
			Serial Number	Manufacturer	Calibration Date	
Head CG Accelerometers			X	P84436	Endevco	08/11/14
			Y	P84439	Endevco	08/11/14
			Z	P84440	Endevco	08/11/14
			Xr	P84450	Endevco	08/11/14
			Yr	P84456	Endevco	08/11/14
			Zr	P84457	Endevco	08/11/14
Displacement Potentiometers	Thoracic Rib	Upper	Y	G012	Servo	08/12/14
		Middle	Y	G1163	FTSS	08/12/14
		Lower	Y	G1158	FTSS	08/12/14
	Abdominal Rib	Upper	Y	G1146	FTSS	08/12/14
		Lower	Y	G1126	FTSS	08/12/14
Lower Spine Accelerometers (T12)			X	P84437	Endevco	08/11/14
			Y	P84442	Endevco	08/11/14
			Z	P84443	Endevco	08/11/14
Acetabulum Load Cell			Y	ACG268	Denton	01/09/14
Iliac Wing Load Cell			Y	IWG282	Denton	01/09/14
Pelvis Plug (struck side)				70611	FTSS	12/12/13
Pelvis Plug (non-struck side)				70597	FTSS	12/12/13

Table 3 – Vehicle Instrumentation

			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	P67534	Endevco	09/18/14
	Vehicle Center of Gravity	Y	P67533	Endevco	09/18/14
	Vehicle Center of Gravity	Z	P67532	Endevco	09/18/14
2	Right Sill at Front Seat	X	P85121	Endevco	08/08/14
	Right Sill at Front Seat	Y	P85120	Endevco	08/08/14
	Right Sill at Front Seat	Z	P85119	Endevco	08/08/14
3	Right Sill at Rear Seat	X	P59380	Endevco	07/15/14
	Right Sill at Rear Seat	Y	P59379	Endevco	07/15/14
	Right Sill at Rear Seat	Z	P59381	Endevco	07/15/14
4	Left Sill at Front Door	Y	P73158	Endevco	08/21/14
5	Left Sill at Rear Door	Y	P77623	Endevco	08/25/14
6	Left A-Post Lower	Y	P79404	Endevco	07/28/14
7	Left A-Post Middle	Y	P66821	Endevco	12/09/14
8	Left B-Post Lower	Y	P73763	Endevco	07/28/14
9	Left B-Post Middle	Y	P74326	Endevco	07/16/14
10	Front Seat Track	Y	P63385	Endevco	10/31/14
11	Rear Seat Track or Structure	Y	P77630	Endevco	08/25/14
12	Right Rear Occ. Compartment	Y	P74350	Endevco	07/18/14
13	Engine Block	X	P82294	Endevco	10/31/14
	Engine Block	Y	P82295	Endevco	10/31/14
14	Rear Floorpan Above Axle	X	P85141	Endevco	09/18/14
	Rear Floorpan Above Axle	Y	P85142	Endevco	09/18/14
	Rear Floorpan Above Axle	Z	P73875	Endevco	07/15/14

Table 4 – MDB Instrumentation

		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	P85036	Endevco	08/08/14
MDB Center of Gravity	Y	P85038	Endevco	08/08/14
MDB Center of Gravity	Z	P85037	Endevco	08/08/14
Left Frame at Rear Axle Centerline	X	P67517	Endevco	08/18/14
Left Frame at Rear Axle Centerline	Y	P67518	Endevco	08/18/14