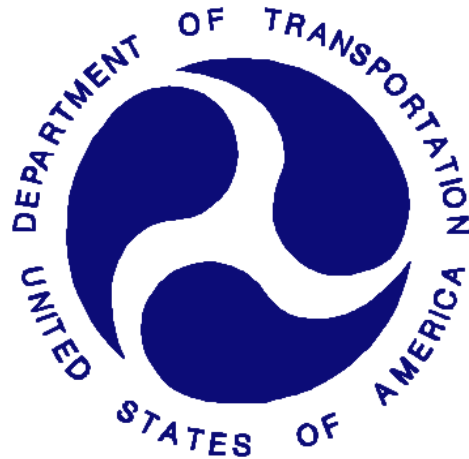


REPORT NUMBER: SPNCAP-MGA-2013-013

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

**VOLKSWAGEN AG GERMANY
2013 Volkswagen Tiguan S SUV
NHTSA No.: MD5803**

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



Test Date: September 24, 2012

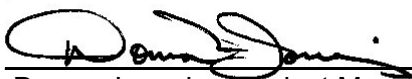
Final Report Date: October 25, 2012

FINAL REPORT

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

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Prepared by: 
Donna Janovicz, Project Manager

Approved by: 
Ben Fischer, Project Engineer

Approval Date: October 25, 2012

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

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

Date: _____

Technical Report Documentation Page

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4. Title and Subtitle Final Report of New Car Assessment Program Side Impact Pole Testing of a 2013 Volkswagen Tiguan S SUV, NHTSA No.: MD5803				5. Report Date October 25, 2012																																				
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7. Author(s) Donna Janovicz, Project Manager Ben Fischer, Project Engineer				8. Performing Organization Report No. SPNCAP-MGA-2013-013																																				
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12. Sponsoring Agency Name and Address United States Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards (NVS-111) 1200 New Jersey Ave, SE, Room W43-410 Washington, DC 20590				13. Type of Report and Period Covered: Final Test Report September 24 to October 25, 2012																																				
				14. Sponsoring Agency Code NVS-111																																				
15. Supplementary Notes																																								
16. Abstract A 32.20 km/h, 75° oblique impact Side NCAP Test was conducted on the subject 2013 Volkswagen Tiguan S SUV in accordance with the specifications of the Office of Crashworthiness Standards Side NCAP Pole Laboratory Test Procedure for the generation of consumer information on vehicle side pole crash protection. The test was conducted at MGA Research Corporation, in Burlington, Wisconsin, on September 24, 2012. The impact velocity was 32.2 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 21.4°C. The test vehicle post-test maximum crush was 383 mm at level 2. The test vehicle's performance was as follows: <table border="1" style="margin: 10px auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="2"></th> <th colspan="3">Driver ATD (SID-IIs)</th> </tr> <tr> <th>Measurement Description</th> <th>Units</th> <th>Threshold</th> <th colspan="2">Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td>N/A</td> <td>1000</td> <td colspan="2">402</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td>Gs</td> <td>82</td> <td colspan="2">61</td> </tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td> <td>N</td> <td>5525</td> <td colspan="2">4068</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38*</td> <td colspan="2">24</td> </tr> <tr> <td>Maximum Abdomen Rib Deflection</td> <td>mm</td> <td>45*</td> <td colspan="2">19</td> </tr> </tbody> </table> *Proposed IARV The two doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.								Driver ATD (SID-IIs)			Measurement Description	Units	Threshold	Result		Head Injury Criteria (HIC ₃₆)	N/A	1000	402		Resultant Lower Spine Acceleration	Gs	82	61		Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	4068		Maximum Thoracic Rib Deflection	mm	38*	24		Maximum Abdomen Rib Deflection	mm	45*	19	
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17. Key Words New Car Assessment Program (NCAP) Side Impact Pole Part 572V SID-IIs			18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division, NPO-411 1200 New Jersey Ave, SE Washington, DC 20590 e-mail: tis@nhtsa.dot.gov FAX: 202-493-2833																																					
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SECTION 1

TEST PURPOSE AND PROCEDURE

This side impact test is part of the MY 2013 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 2013 Volkswagen Tiguan S SUV. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Pole Laboratory Test Procedure, dated May 2012.

SECTION 2 SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a 2013 Volkswagen Tiguan S SUV. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 32.2 km/h. The test was conducted by MGA Research Corporation in Burlington, Wisconsin, on September 24, 2012. Pre-test and post-test photographs of the test vehicle and side impact dummy (SID-IIs) are included in Appendix A of this report.

One Part 572V (SID-IIs) dummy was placed in the driver designated seating position according to instructions specified in the OCWS Side NCAP Pole Laboratory Test Procedure dated May 2012. Camera locations and other pertinent camera information are included in this report.

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

- Head CG Triaxial Accelerometers (Primary and Redundant)
- Head 9-Axis Accelerometers
- Thorax Upper, Middle, and Lower Rib Displacement Potentiometers
- Abdomen Upper Rib and Lower Rib Displacement Potentiometers
- Lower Spine (T12) Triaxial Accelerometers
- Iliac Load Cell
- Acetabulum Load Cell

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

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

Measurement Description	Driver ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	402
Resultant Lower Spine Acceleration	Gs	82	61
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	4068
Maximum Thoracic Rib Deflection	mm	38*	24
Maximum Abdominal Rib Deflection	mm	45*	19

*Proposed IARV

Supplemental restraint information is given below:

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

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

GENERAL COMMENTS

There was no valid data collected for:

- Vehicle CG X after 32ms
- Vehicle CG Y after 32ms
- Left Floor Sill Y after 8ms
- Left Lower A-Post Y after 30ms
- Left Mid A-Post Y after 8ms
- Driver Seat Track Y after 13ms

Left Mid B-Post Y is questionable from 26-31ms

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

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2013 Volkswagen Tiguan S SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MD5803
 Test Date: 9/24/2012

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	MD5803	Traction Control System (TCS)	Yes
Model Year	2013	Auto-Leveling System	No
Make	Volkswagen	Automatic Door Locks (ADL)	Yes
Model	Tiguan	Power Window Auto-Reverse	Yes
Body Style	MPV	Other Optional Feature	N/A
VIN	WVGCV7AX3DW006022	Driver Front Airbag	Yes
Body Color	Wild Cherry Metallic	Driver Curtain Airbag	Yes
Odometer Reading (km/mi)	80 / 50	Driver Head/Torso Airbag	No
Engine Displacement (L)	2.0	Driver Torso Airbag	No
Type/No. Cylinders	4	Driver Torso/Pelvis Airbag	Yes
Engine Placement	Lateral	Driver Pelvis Airbag	No
Transmission Type	Manual	Driver Knee Airbag	No
Transmission Speeds	6	Rear Pass. Curtain Airbag	Yes
Overdrive	Yes	Rear Pass. Head/Torso Airbag	No
Final Drive	Front	Rear Pass. Torso Airbag	No
Roof Rack	No	Rear Pass. Torso/Pelvis Airbag	No
Sunroof/T-Top	No	Rear Pass. Pelvis Airbag	No
Running Boards	No	Driver Seat Belt Pretensioner	Yes
Tilt Steering Wheel	Yes	Rear Pass. Seat Belt Pretensioner	No
Power Seats	No	Driver Load Limiter	Yes
Anti-Lock Brakes (ABS)	Yes	Rear Pass. Load Limiter	No
All Wheel Drive (AWD)	No	Other Safety Restraint	N/A
Does owner's manual provide instructions to turn off automatic door locks?			No

DATA FROM CERTIFICATION LABEL

Manufactured By	Volkswagen AG Germany	GVWR (kg)	2170
Date of Manufacture	06/12	GAWR Front (kg)	1090
Vehicle Type	MPV	GAWR Rear (kg)	1130

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3		5	
Capacity Weight (VCW) (kg)				520	(A)
DSC x 68.04 kg				340	(B)
Rated Cargo and Luggage Weight (RCLW) (kg)				180	(A-B)

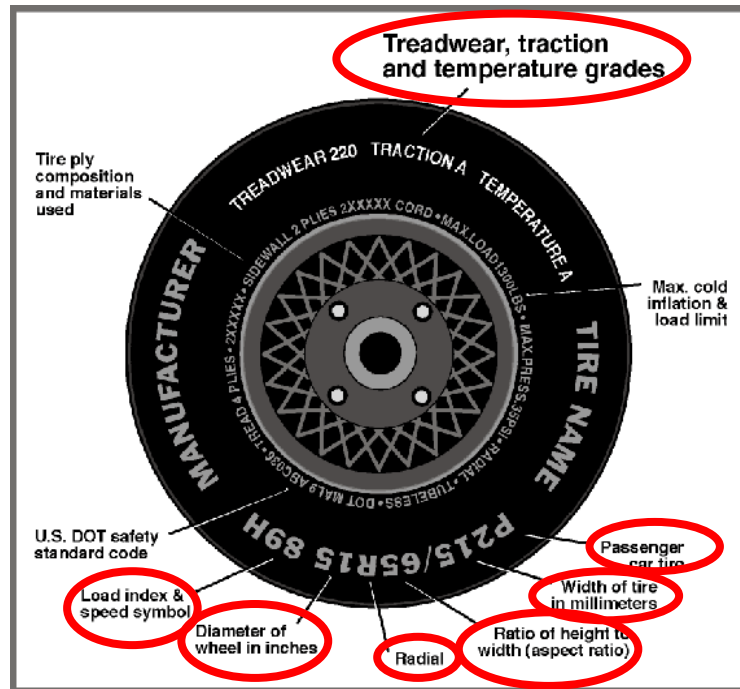
VEHICLE SEAT TYPE

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

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

Test Vehicle: 2013 Volkswagen Tiguan S SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MD5803
 Test Date: 9/24/2012



TIRE PLACARD INFORMATION

Measured Parameter	Front	Rear
Recommended Cold Tire Pressure (kPa)	240	240
Recommended Tire Size	215/65R16	215/65R16

TIRE SIDEWALL INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	300	300
Tire Size on Vehicle	215/65R16	215/65R16
Tire Manufacturer	Pirelli	Pirelli
Tire Name	Scorpion STR	Scorpion STR
Tire Type	Passenger	Passenger
Tire Width	215	215
Aspect Ratio	65	65
Radial	Yes	Yes
Wheel Diameter	16	16
Load Index/Speed Symbol	98H	98H
Treadwear	520	520
Traction Grade	A	A
Temperature Grade	A	A
Tire Material	Rubber	Rubber

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

Test Vehicle: 2013 Volkswagen Tiguan S SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MD5803
 Test Date: 9/24/2012

TEST PRESSURES

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

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	458.6	322.1		472.7	396.4		472.2	413.2	
Right	kg	440.9	318.4		459.0	393.3		443.6	398.8	
Ratio	%	58.4	41.6		54.1	45.9		53.0	47.0	
Totals	kg	899.5	640.5	1540.0	931.7	789.7	1721.4	915.8	812.0	1727.8

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1540.0	(A)
Actual Weight of 1 P572V ATD (SID-IIs) ATD Used	kg	52.2	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	136	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1728.2	(A+B+C)

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

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Ballast (if any)	94.8
Right taillight, spare tire & cover, jack & tools, rear cargo trim, rear tonneau cover, hub caps, left/right lower c-pillar carpet, right side mirror.	37.2

TEST VEHICLE ATTITUDES AND CG

	Units	As Delivered	As Tested	Fully Loaded	Meets Requirement***
Driver Door Sill Angle (front-to-rear)*	deg	-0.2	-0.1	0.6	Yes
Front Pass. Sill Angle (front-to-rear)*	deg	-0.4	-0.2	0.5	Yes
Front Bumper Angle (left-to-right)**	deg	-0.3	-0.3	-0.5	Yes
Rear Bumper Angle (left-to-right)**	deg	-0.2	-0.2	-0.3	Yes
Vehicle CG (Aft of Front Axle)	mm	1082	1193	1222	
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	11	8	19	

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

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

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

Test Vehicle: 2013 Volkswagen Tiguan S SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MD5803
 Test Date: 9/24/2012

SEAT POSITIONING

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

SCRL ANGLE RANGE

Seat	SCRL (°)		
	Max	Min	Mid
Driver Seat	21.0	16.4	18.7
Front Passenger Seat	20.8	16.2	18.5
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	18.7	Fixed	Max	Fixed	Fixed	Fixed
	18.7	Fixed	Mid	Fixed	Fixed	Fixed
	18.7	Fixed	Min	Fixed	Fixed	Fixed
Front Passenger Seat	18.5	Fixed	Max	Fixed	Fixed	Fixed
	18.5	Fixed	Mid	Fixed	Fixed	Fixed
	18.5	Fixed	Min	Fixed	Fixed	Fixed
Front Center Seat			Max			
			Mid			
			Min			
Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
	Fixed	Fixed	Mid	Fixed	Fixed	Fixed
	Fixed	Fixed	Min	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
	Fixed	Fixed	Mid	Fixed	Fixed	Fixed
	Fixed	Fixed	Min	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
	Fixed	Fixed	Mid	Fixed	Fixed	Fixed
	Fixed	Fixed	Min	Fixed	Fixed	Fixed

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

Test Vehicle: 2013 Volkswagen Tiguan S SUV
 Test Program: NCAP Side Pole Impact Test

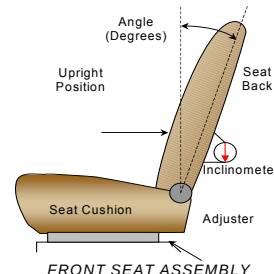
NHTSA No. MD5803
 Test Date: 9/24/2012

SEAT FORE/AFT POSITIONS

Seat	Total Fore/Aft Travel		Test Position from Forward-most Position	
	mm	Detents	mm	Detent
Driver Seat	230	51 (1 st as 0)	0	0 (1 st as 0)
Front Passenger Seat	230	51 (1 st as 0)	0	0 (1 st as 0)
Front Center Seat				
Struck Side Rear Seat	155	31 (1 st as 0)	155	31 (1 st as 0)
Non-Struck Side Rear Seat	155	31 (1 st as 0)	155	31 (1 st as 0)
Rear Center Seat	155	31 (1 st as 0)	155	31 (1 st as 0)

SEAT BACK ANGLE ADJUSTMENT

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



Seat	Total Seat Back Angle Range		Test Position from Vertical	
	Degrees	Detents	Degree	Detent
Driver Seat w/Seated Dummy	73.4		11.6	
Front Passenger Seat	30.2		10.6	
Front Center Seat				
Struck Side Rear Seat	22.3		10.0	5 (1 st as 0)
Non-Struck Side Rear Seat	22.3		10.0	5 (1 st as 0)
Rear Center Seat	22.3		10.0	5 (1 st as 0)

SEAT BELT ANCHORAGE ADJUSTMENT

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

	Total # of Positions	Placed in Position #
Driver Seat	4 (1 st as 1)	3 (uppermost as 0)

HEAD RESTRAINT ADJUSTMENT

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

	Total # of Positions	Placed in Position #
Driver Seat	5	Lowest

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

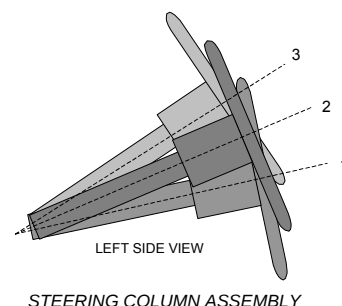
Test Vehicle: 2013 Volkswagen Tiguan S SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MD5803
 Test Date: 9/24/2012

STEERING COLUMN ADJUSTMENT

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

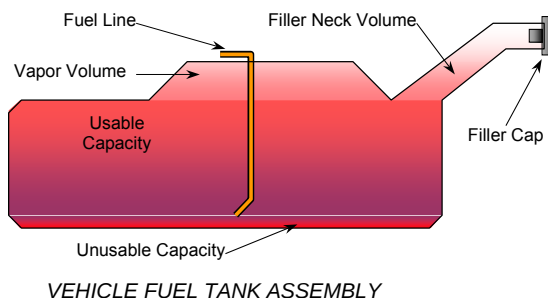
	Degrees	Fore/Aft Position (mm)
Lowermost, Position 1	63.8	164
Geometric Center, Position 2	61.5	141
Uppermost, Position 3	59.2	118
Telescoping Steering Wheel Travel		46
Test Position	61.5	141



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 runs for 2 seconds after ignition is switched on. If the engine doesn't run, the fuel pump stops running. If there is a crash signal, it will also stop running. The fuel pipe is on the right side.



FUEL TANK CAPACITY DATA

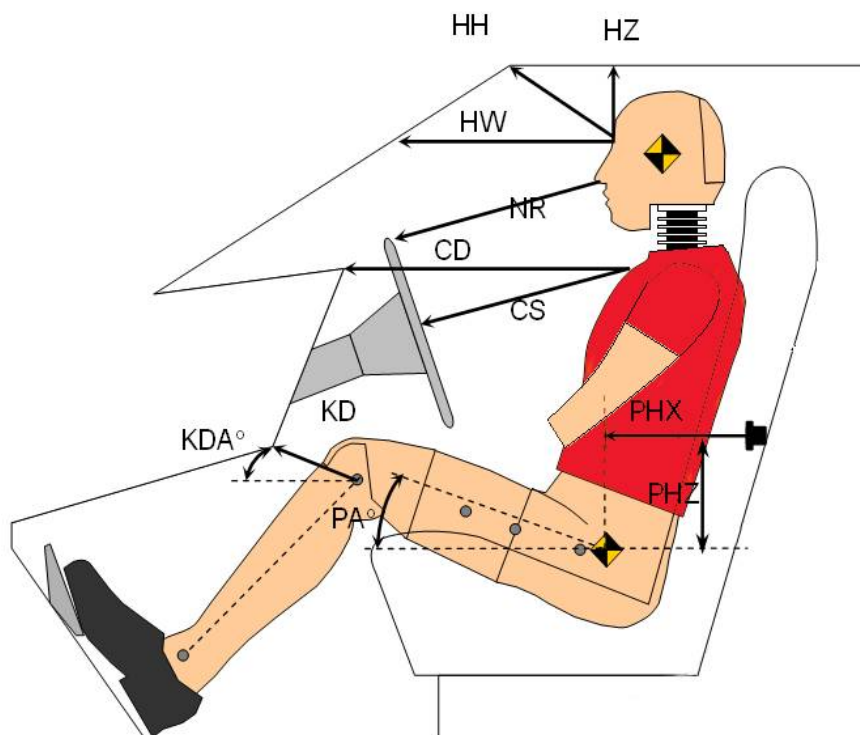
	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	64.3
Usable Capacity of "Optional Tank" (see Form No. 1)	
Usable Capacity of Standard Tank as Specified in Owner's Manual	60.5
Usable Capacity of Optional Tank as Specified in Owner's Manual	
93% of Usable Capacity	59.8
Actual Amount of Solvent Used	59.8
1/3 of Usable Capacity	21.4

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: 2013 Volkswagen Tiguan S SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No. MD5803
Test Date: 9/24/2012



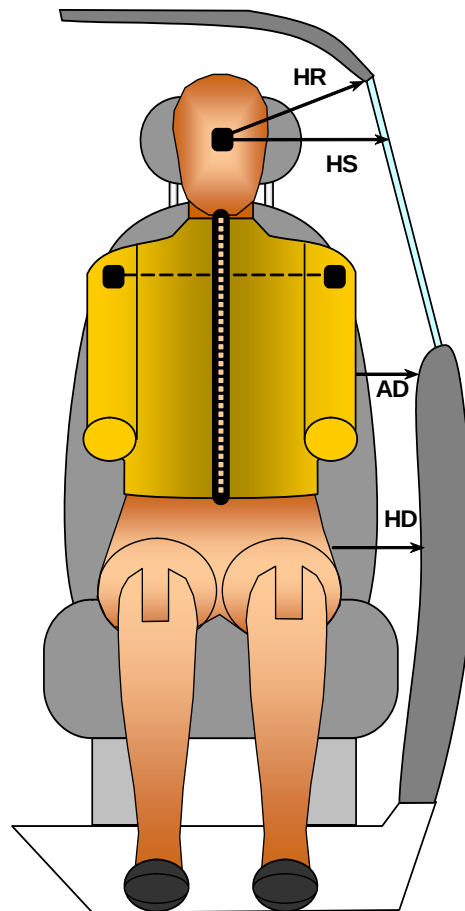
LEFT SIDE VIEW

Code	Measurement Description	Driver S/N 306	
		Length (mm)	Angle (°)
HH	Head to Header	343	
HW	Head to Windshield	652	
HZ	Head to Roof Liner	241	
NR	Nose to Rim	301	
CD	Chest to Dashboard	471	
CS	Chest to Steering Wheel	230	
KDL/KDAL°	Left Knee to Dash	165	34.2
KDR/KDAR°	Right Knee to Dash	153	35.7
PAX°	Pelvic Tilt Angle (X-Axis)		21.1
PAY°	Pelvic Tilt Angle (Y-Axis)		-0.6
PHX	Hip Point to Striker (X-Axis)	305	
PHZ	Hip Point to Striker (Z-Axis)	154	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2013 Volkswagen Tiguan S SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MD5803
 Test Date: 9/24/2012



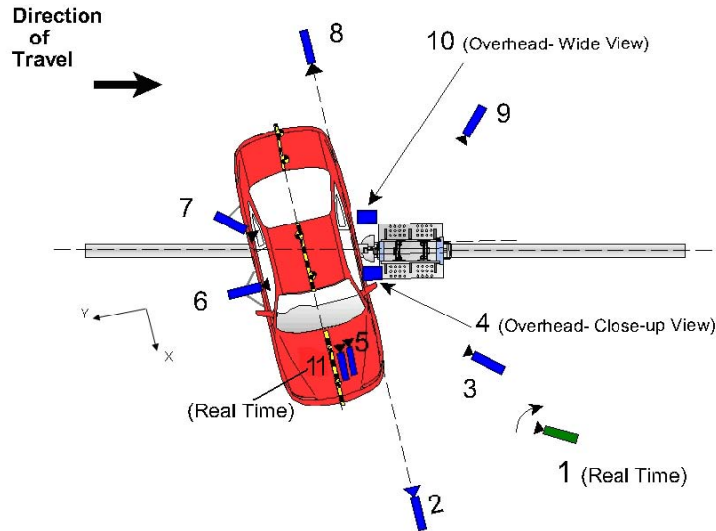
FRONT VIEW OF DUMMY

Code	Measurement Description	Driver S/N 306
		Length (mm)
HR	Head to Side Header	272
HS	Head to Side Window	385
AD	Arm to Door	189
HD	Hip Point to Door	157

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2013 Volkswagen Tiguan S SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No. MD5803
Test Date: 9/24/2012



Reference: (from Point of Impact for X and Y; from Ground for Z):
+X = Forward of Impact, + Y = Right of Impact, +Z = Down

Camera No.	View	Coordinates (mm)			Lens (mm)	Film Speed (fps)
		X*	Y*	Z*		
1	Real-Time Pan View					30
2	Front Ground Level	-190	5960	-1680	24	1000
3	Impact Side 45° Forward	-2870	3270	-1790	20	1000
4	Overhead Closeup	110	0	-4420	50	1000
5	Onboard – Driver Front				16	
6	Onboard – Driver Side				8	
7	Onboard – Driver Rear				8	
8	Rear Ground Level	-120	-6440	-1600	24	1000
9	Impact Side 45° Rearward	-4220	-3970	-1970	20	1000
10	Overhead Wide View	310	0	-4750	14	1000
11	Real-Time Dummy Front View					30

* All measurements accurate to ± 6 mm

Note: Vehicle was at a 75° angle to the rigid pole.

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

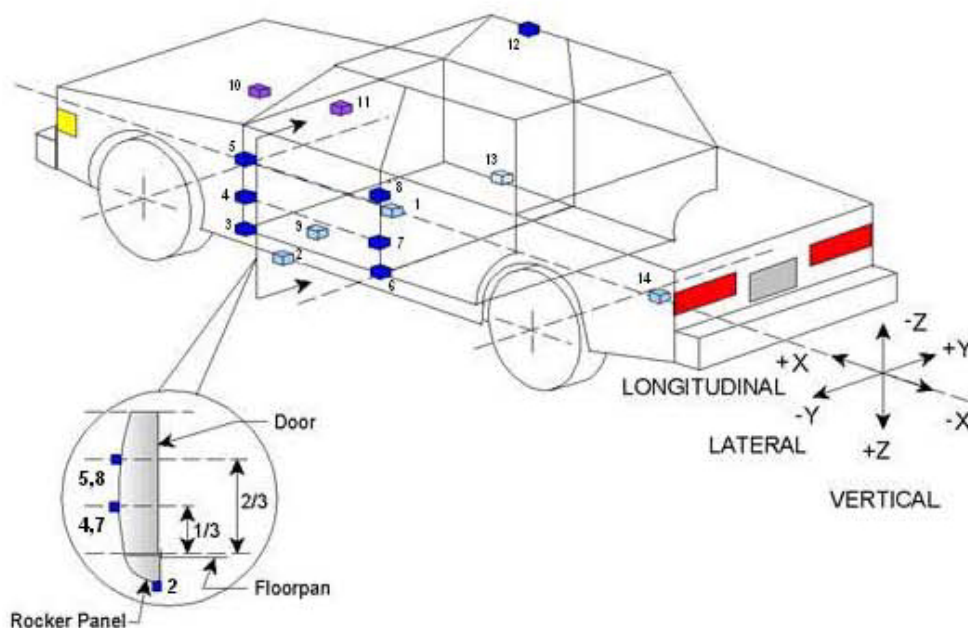
INSTRUMENTATION

	Number of Channels
Driver Dummy	22
Vehicle Structure	18
Pole Load Cells	8
TOTAL	48

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

Test Vehicle: 2013 Volkswagen Tiguan S SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No. MD5803
Test Date: 9/24/2012



	Accelerometer Location			
	ID	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2283	264	-280
2	Left Floor Sill	2689	-732	-235
3	A Pillar Sill	2998	-731	-250
4	A Pillar Low	2998	-808	-575
5	A Pillar Mid	3002	-808	-796
6	B Pillar Sill	1989	-736	-240
7	B Pillar Low	1938	-740	-562
8	B Pillar Mid	1938	-740	-870
9	Driver Seat Track	2228	-612	-395
10	Engine Top	3840	0	-797
11	Firewall	3412	34	-1030
12	Right Roof	1960	450	-1595
13	Right Floor Sill	2634	732	-280
14	Rear Floorpan	203	0	-517

Reference:

X – Test Vehicle Rear Bumper (+forward)

Y – Test Vehicle Centerline (+ to right)

Z – Ground Plane (+ down)

DATA SHEET NO. 7
RIGID POLE LOAD CELL DATA

Test Vehicle: 2013 Volkswagen Tiguan S SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No. MD5803
Test Date: 9/24/2012



254 mm Diameter Rigid Pole

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

**DATA SHEET NO. 8
POST-TEST OBSERVATIONS**

Test Vehicle: 2013 Volkswagen Tiguan S SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No. MD5803
Test Date: 9/24/2012

TEST DUMMY INFORMATION AND CONTACT POINTS

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

POST-TEST DOOR PERFORMANCE

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

POST-TEST SEAT PERFORMANCE

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

POST-TEST STRUCTURAL OBSERVATIONS

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

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

Test Vehicle: 2013 Volkswagen Tiguan S SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No. MD5803
Test Date: 9/24/2012

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

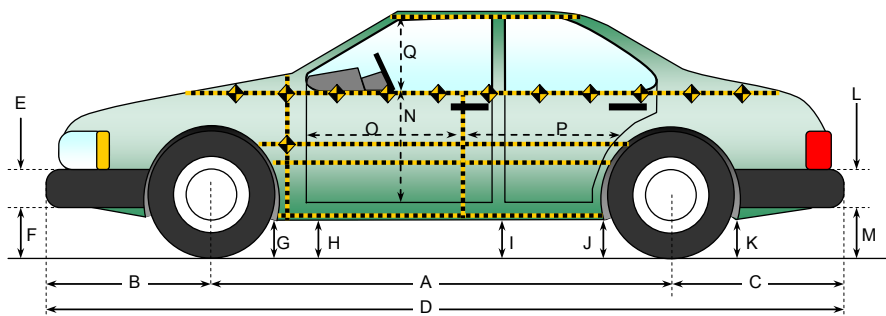
VEHICLE SPEED, VEHICLE ANGLE AT IMPACT, AND IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		1105
Actual Impact Point (Aft of Front Axle)	mm		1105
Horizontal Offset (+forward / -rearward)	mm	+/- 38 of Intended Impact Point	0
Angle Between Vehicle's Longitudinal Centerline and Line of Forward Motion	deg	75 +/- 3	75
Trap No. 1 Velocity (Primary)	km/h	31.4 to 33.0	32.2
Trap No. 2 Velocity (Redundant)	km/h	31.4 to 33.0	32.3

DATA SHEET NO. 9
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2013 Volkswagen Tiguan S SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No. MD5803
Test Date: 9/24/2012



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

LEFT SIDE VIEW

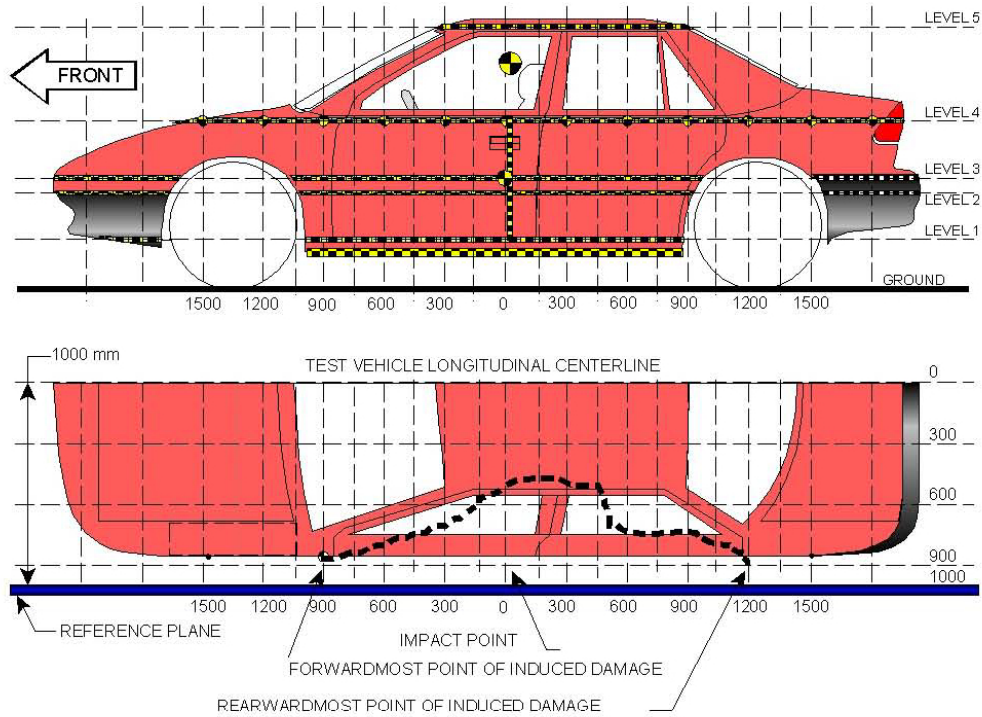
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2601	2477	124
B	Front Axle to FSOV	950	979	-29
C	Rear Axle to RSOV	890	920	-30
D	Total Vehicle Length at Centerline	4441	4376	65
E	Front Bumper Thickness	129	129	0
F	Front Bumper Bottom to Ground	441	468	-27
G	Sill Height at Front Wheel Well	247	234	13
H	Sill Height at Front Door Leading Edge	243	244	-1
I	Sill Height at B-Pillar	240	260	-20
J1	Sill Height at Rear Wheel Well	233	242	-9
J2	Pinch Weld Height at Rear Wheel Well	230	235	-5
K	Sill Height Aft of Rear Wheel Well	260	261	-1
L	Rear Bumper Thickness	108	108	0
M	Rear Bumper Bottom to Ground	407	395	12
N	Sill Height to Bottom of Front Window Sill	722	720	2
O	Front Door Leading Edge to Impact CL	595	596	-1
P	Rear Door Trailing Edge to Impact CL	1231	1259	-28
Q	Front Window Opening	472	463	9
R	Right Side Length	3315	3169	146
S	Left Side Length	3315	3324	-9
T	Vehicle Width at B-Pillars	1783	1663	120

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

Test Vehicle: 2013 Volkswagen Tiguan S SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MD5803
 Test Date: 9/24/2012



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

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Height Above Ground (mm)
1	Sill Top	317
2	Occupant Hip Point	655
3	Mid Door	678
4	Window Sill	995
5	Window Top	1531

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

Test Vehicle: 2013 Volkswagen Tiguan S SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MD5803
 Test Date: 9/24/2012

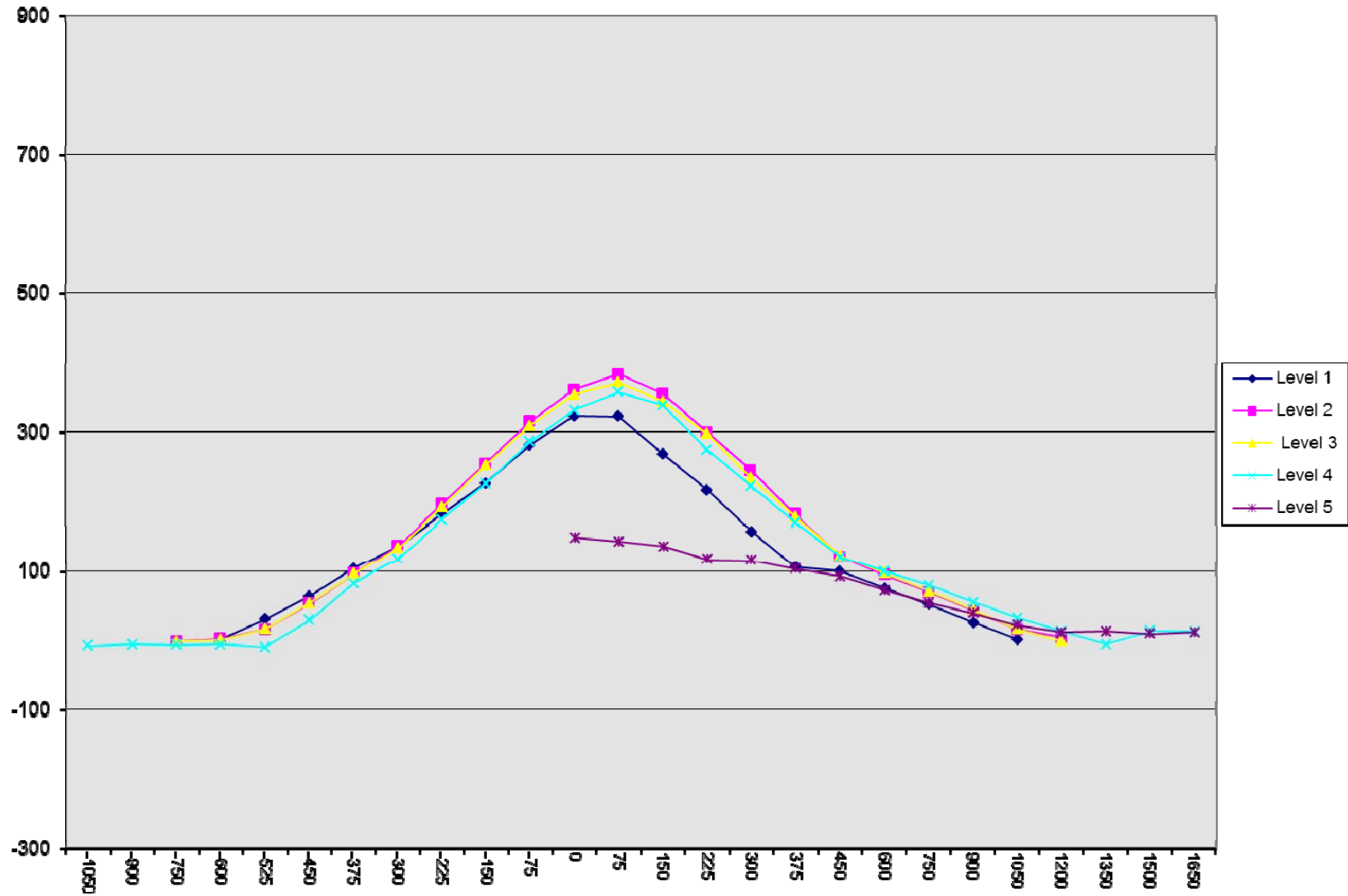
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1050				297					291					-6	
-900				285					281					-4	
-750		195	194	273			195	194	268			0	0	-5	
-600	233	209	211	262		237	213	213	258		4	4	2	-4	
-525	230	219	219	259		262	236	237	251		32	17	18	-8	
-450	229	219	219	259		294	273	274	289		65	54	55	30	
-375	229	217	220	252		333	313	316	335		104	96	96	83	
-300	230	216	220	250		367	353	354	368		137	137	134	118	
-225	229	214	220	248		410	410	412	422		181	196	192	174	
-150	229	213	219	246		455	467	471	471		226	254	252	225	
-75	229	210	217	245		510	525	526	531		281	315	309	286	
0	230	207	216	244	490	553	568	570	575	639	323	361	354	331	149
75	229	206	216	244	485	551	589	587	601	628	322	383	371	357	143
150	230	205	214	242	482	498	560	558	580	618	268	355	344	338	136
225	230	205	211	241	487	446	504	508	515	604	216	299	297	274	117
300	231	203	212	241	480	388	447	446	463	596	157	244	234	222	116
375	229	203	209	240	480	335	385	387	410	583	106	182	178	170	103
450	232	204	208	240	481	332	325	331	361	574	100	121	123	121	93
600	231	206	207	238	481	307	301	305	338	554	76	95	98	100	73
750	231	208	208	237	481	284	278	280	317	536	53	70	72	80	55
900	230	210	210	237	482	257	254	255	293	522	27	44	45	56	40
1050	229	213	212	237	484	232	230	230	271	507	3	17	18	34	23
1200		201	201	238	488		207	202	252	501		6	1	14	13
1350				239	497				235	511				-4	14
1500				244	511				259	522				15	11
1650				249	527				263	540				14	13

NOTE: Pre-test measurements are taken when the vehicle is in the "As Tested" weight condition. Vehicle measurements forward of the vertical impact reference line are negative. The crush profile grid is established prior to the test based on an estimated impact point. The final distance from impact is determined after the final dummy positioning and the pole is aligned with the center of gravity of the dummy's head.

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

Test Vehicle: 2013 Volkswagen Tiguan S SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No. MD5803
Test Date: 9/24/2012



DATA SHEET NO. 11
FMVSS NO. 301 STATIC ROLLOVER RESULTS

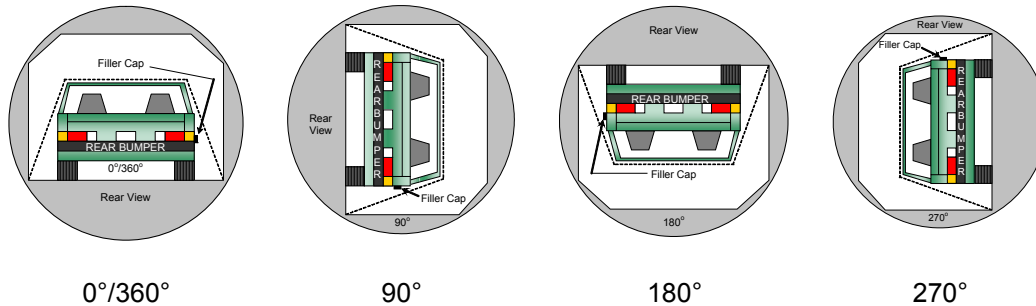
Test Vehicle: 2013 Volkswagen Tiguan S SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MD5803
 Test Date: 9/24/2012

Test Time: 10:27 am Temperature: 21.4° 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°	112	300	412
90° to 180°	113	300	413
180° to 270°	106	300	406
270° to 360°	111	300	411

FMVSS 301 ROLLOVER SPILLAGE TABLE (units in ounces)

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

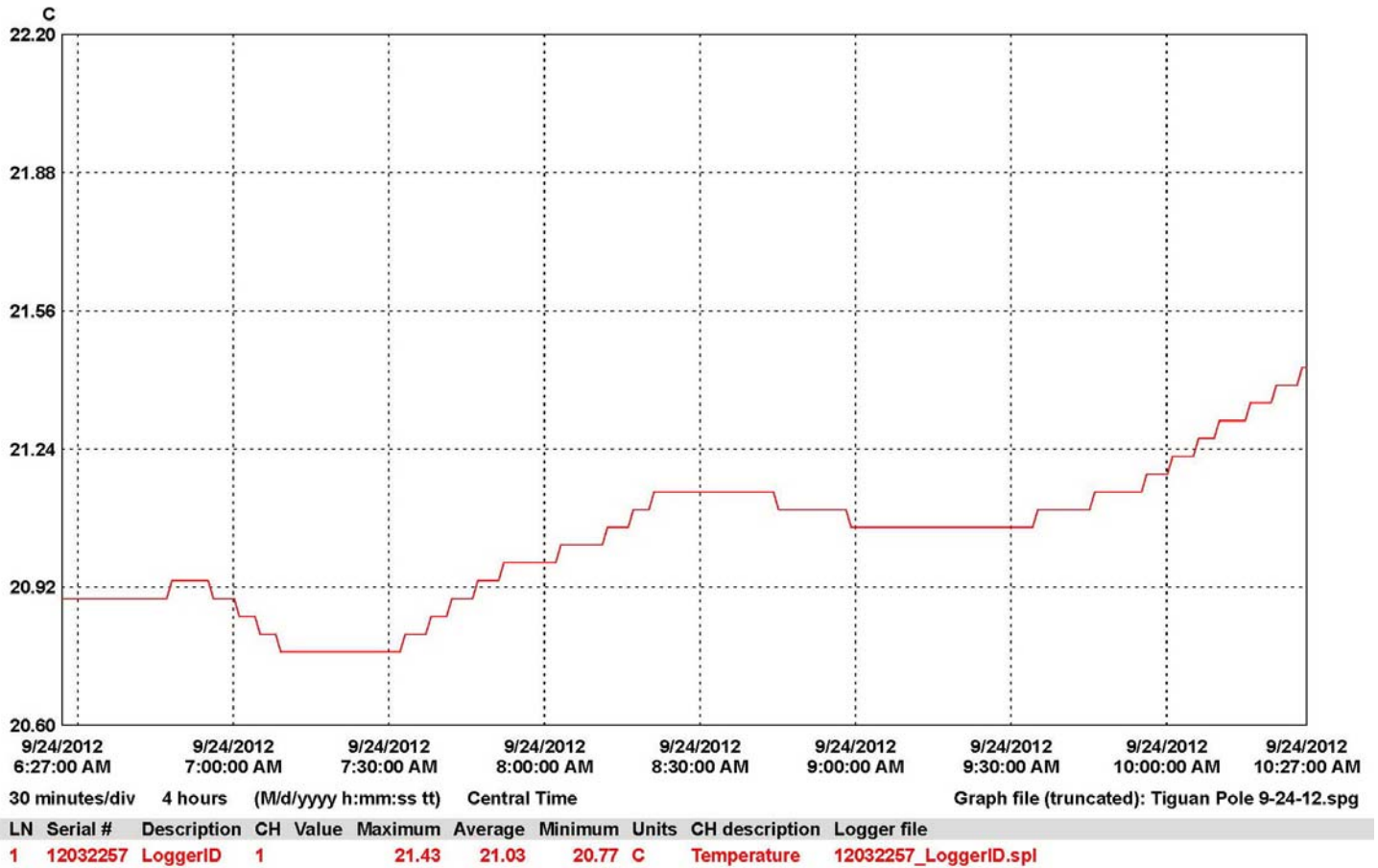
ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 12
DUMMY/VEHICLE TEMPERATURE STABILIZATION DATA

Test Vehicle: 2013 Volkswagen Tiguan S SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MD5803
 Test Date: 9/24/2012



APPENDIX A
PHOTOGRAPHS

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As Delivered Right Front $\frac{3}{4}$ View of Test Vehicle



As Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle



Pre-Test Frontal View of Test Vehicle



Post-Test Frontal View of Test Vehicle



Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle



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



Pre-Test Left Side View of Test Vehicle



Post-Test Left Side View of Test Vehicle



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



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



Pre-Test Rear View of Test Vehicle



Post-Test Rear View of Test Vehicle



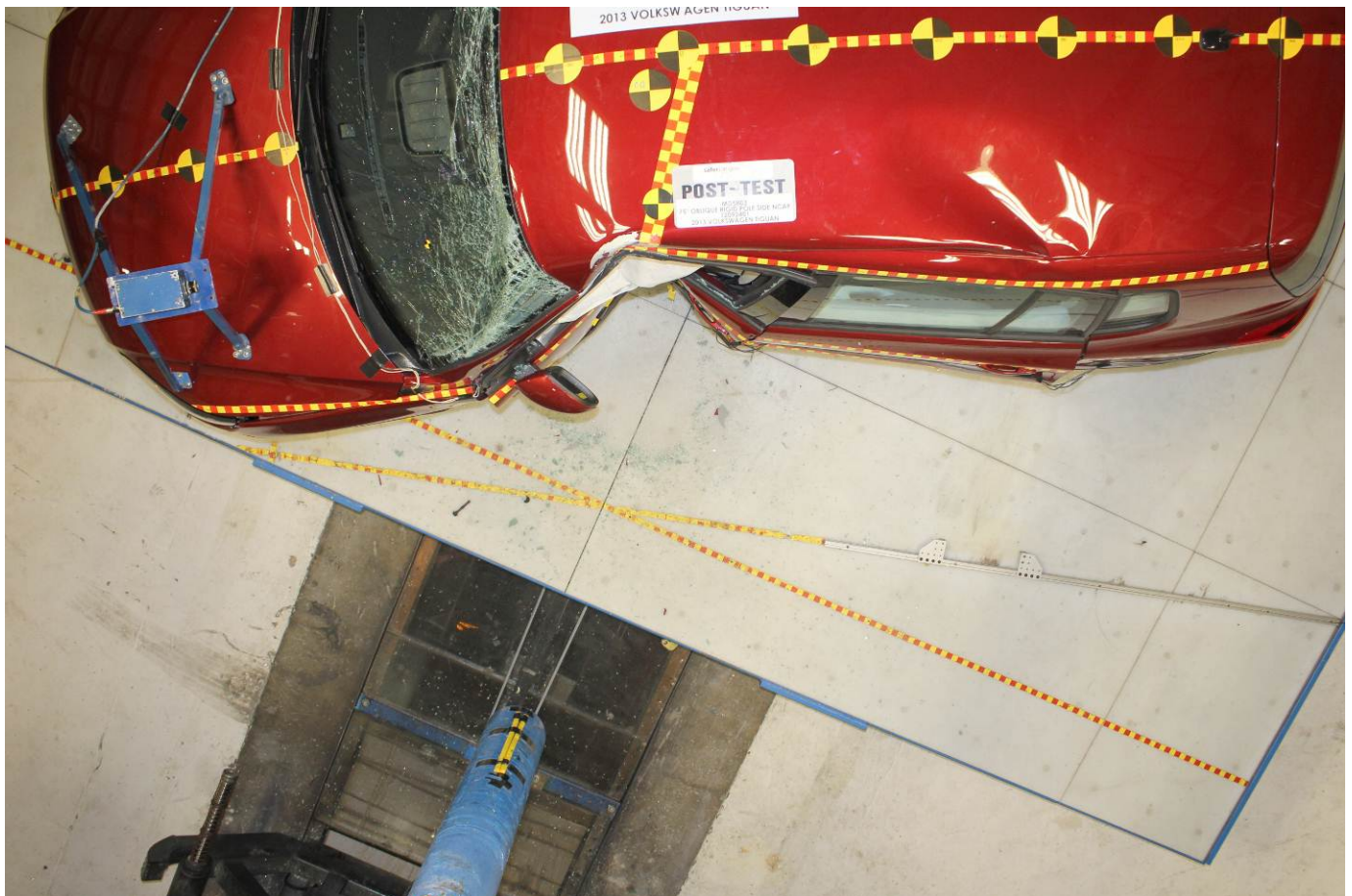
Pre-Test Right Side View of Test Vehicle



Post-Test Right Side View of Test Vehicle



Pre-Test Overhead View of Test Area



Post-Test Overhead View of Test Area



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



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



Pre-Test Close-Up View of Impact Point Target



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



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



Post-Test Front Close-Up View of Dummy



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



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



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



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



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



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



Pre-Test Overhead View of Dummy Thighs on Seat Pan



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



Pre-Test Left Side View of Dummy's Head Showing Dummy's Head is Level



Pre-Test Placement of Dummy's Feet



Pre-Test View of Belt Anchorage for Dummy



Pre-Test Left Side View of Steering Wheel



Pre-Test View of Disengaged Parking Brake



Pre-Test View of Parking Brake



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



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



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



Pre-Test Dummy and Door Clearance View



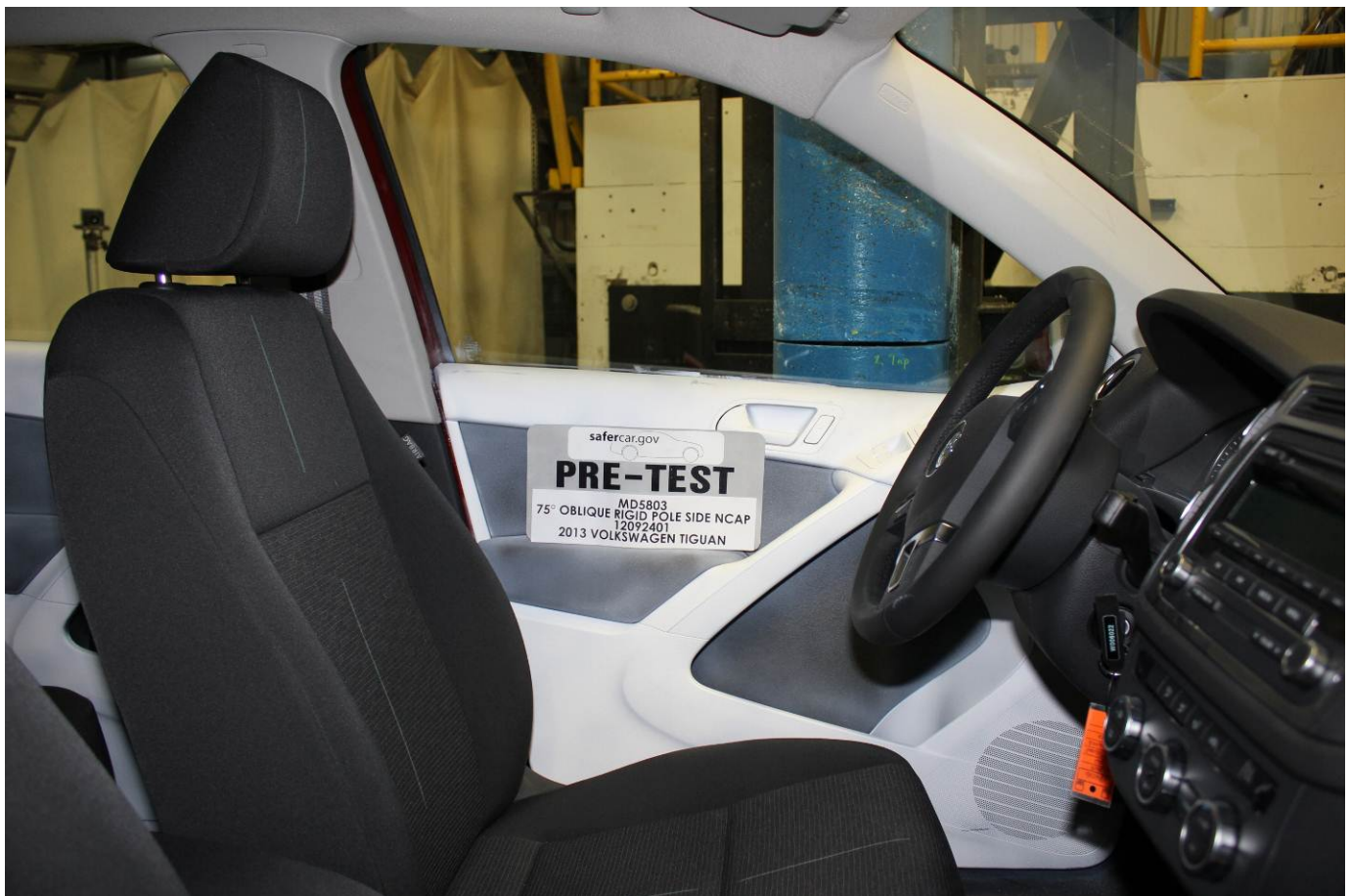
Post-Test Dummy and Door Clearance View



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



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



Pre-Test Inner Door Panel View



Post-Test Inner Door Panel View Showing Dummy Contact Location



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



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



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



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



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



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



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



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



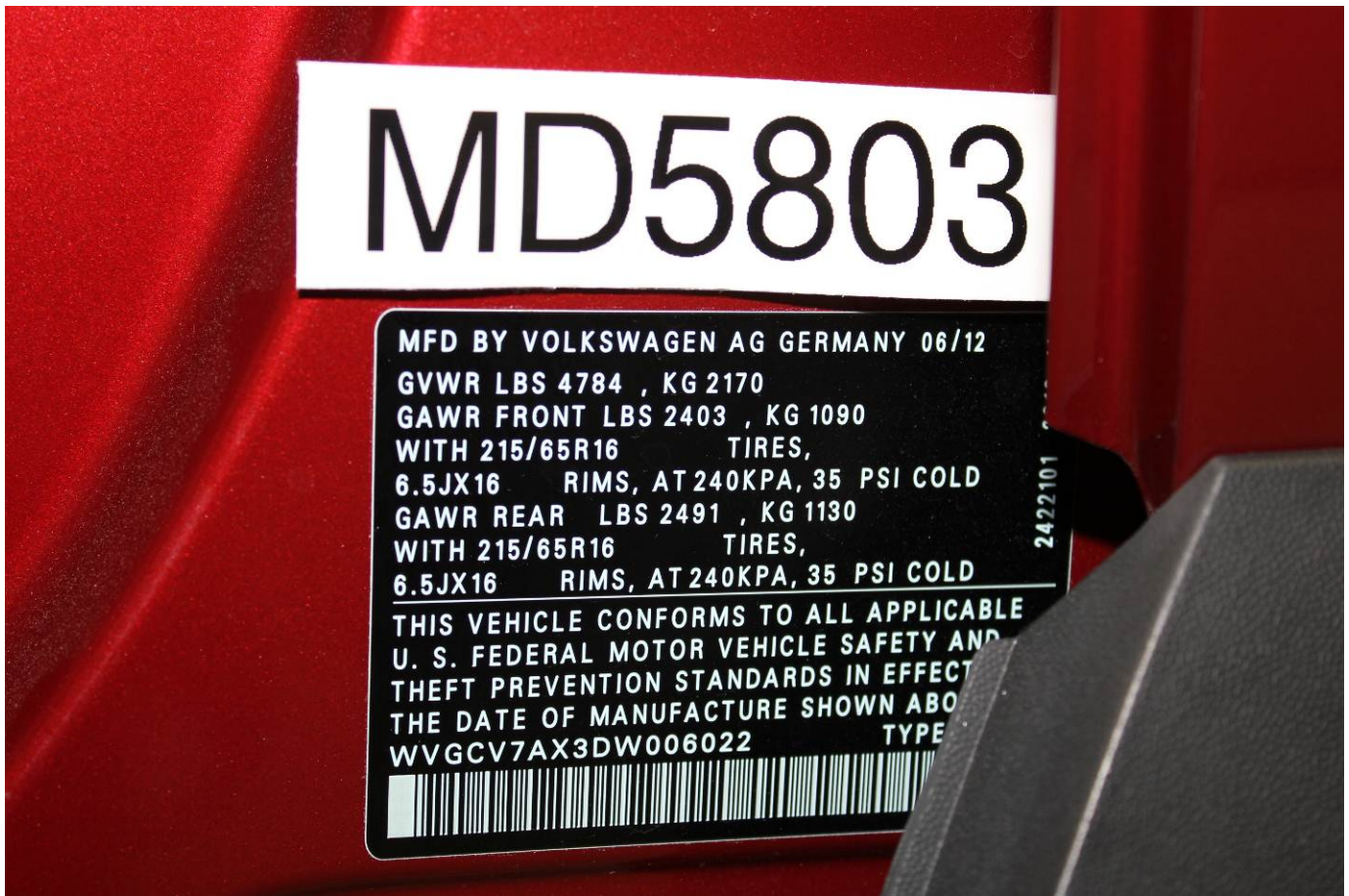
Post-Test Dummy Close-Up Pelvis Contact with Side Air Bag View



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



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



Close-Up View of Vehicle's Certification Label



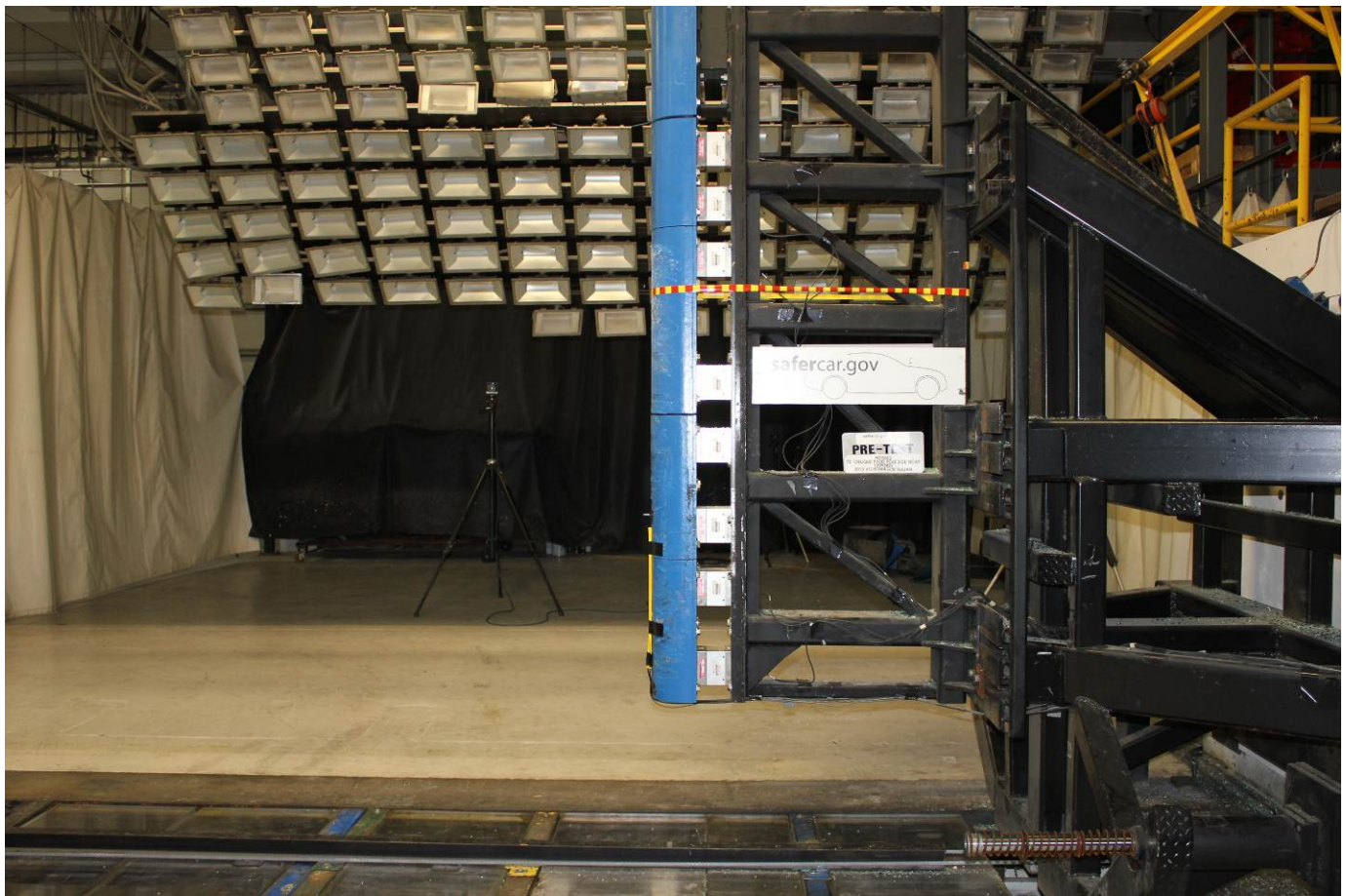
Close-Up View of Vehicle's Tire Information Placard or Label



Pre-Test Pole Barrier Front View



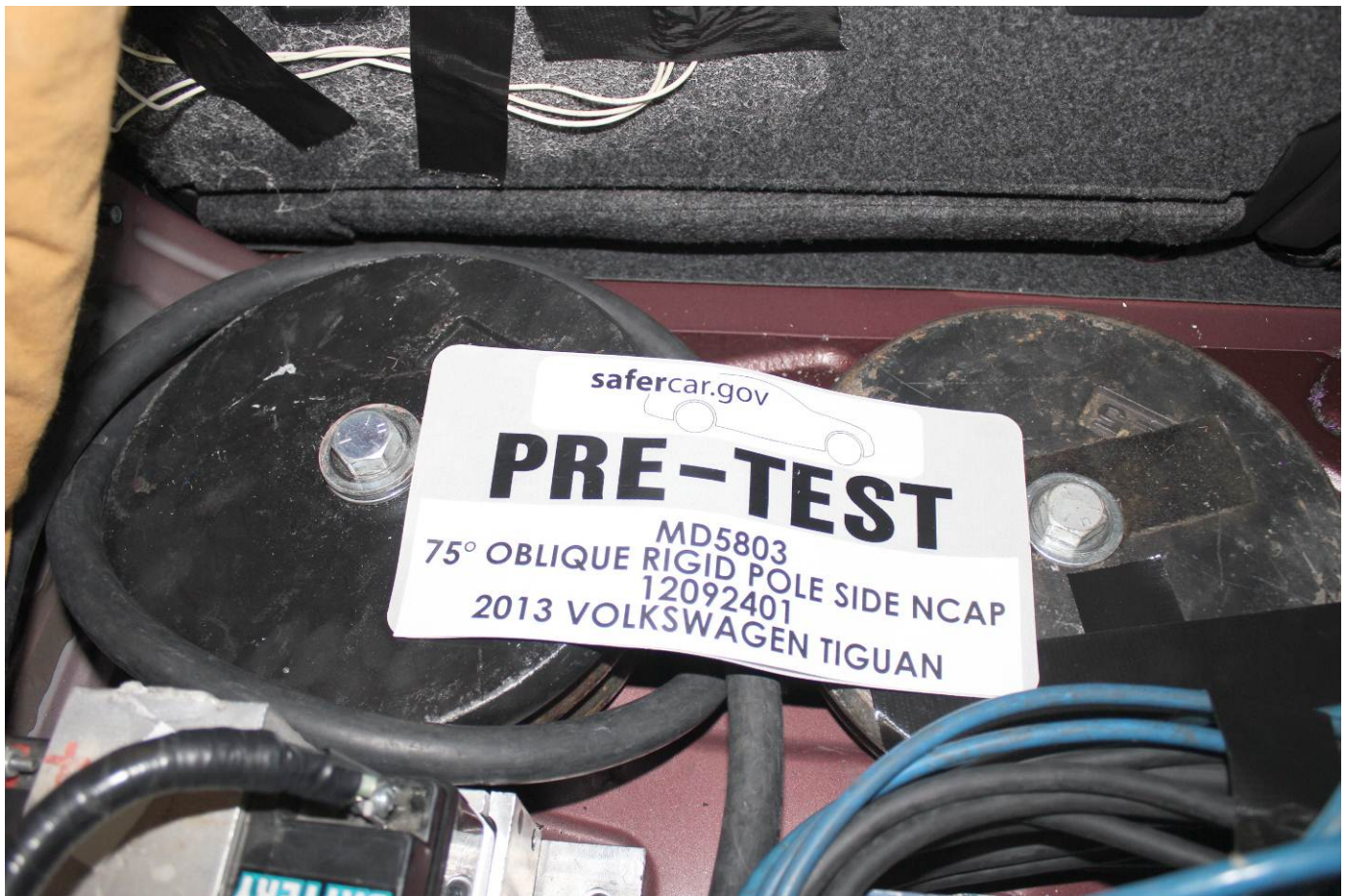
Post-Test Pole Barrier Front View



Pre-Test Pole Barrier Side View



Post-Test Pole Barrier Side View



Pre-Test Ballast View



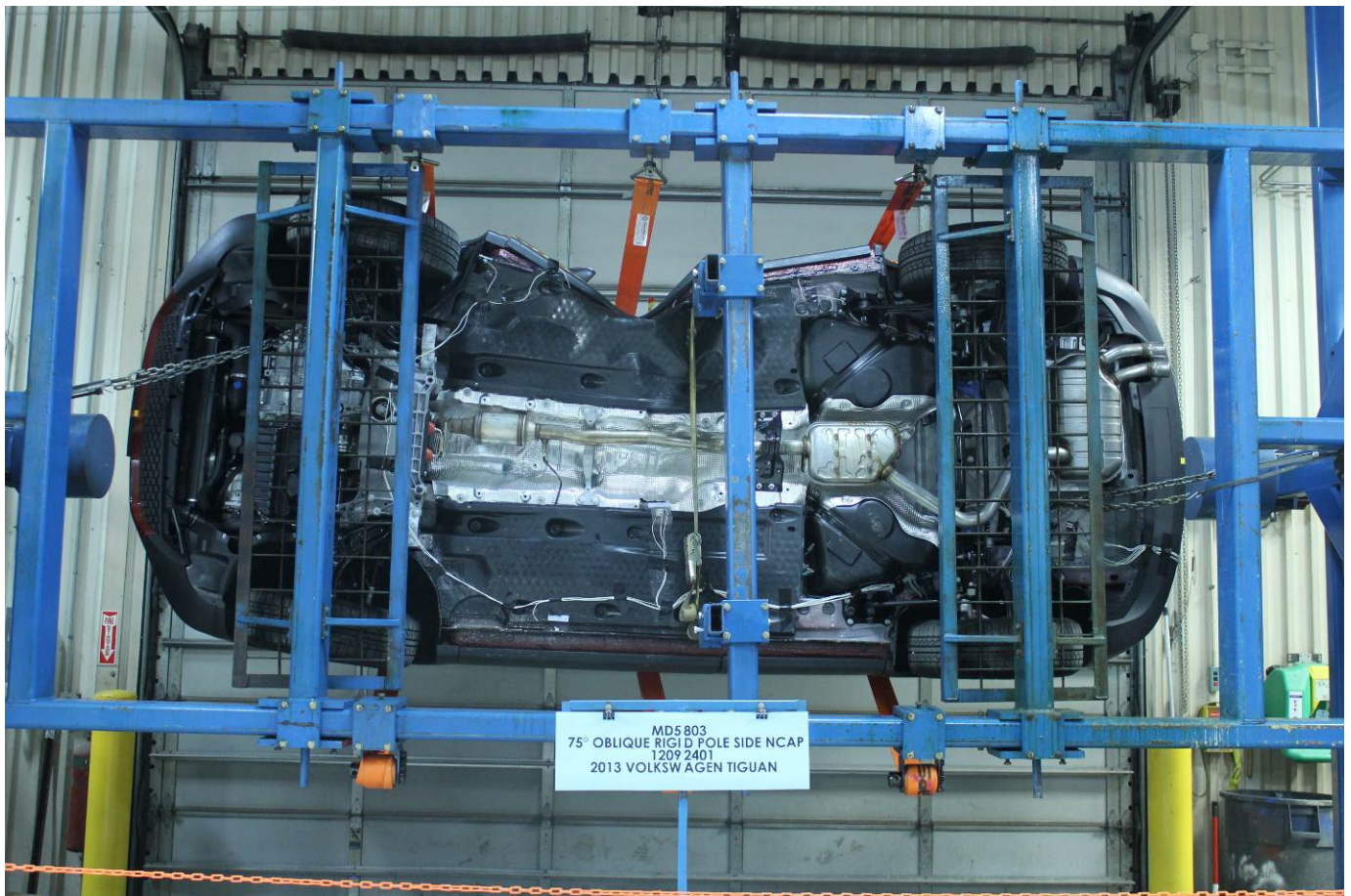
Pre-Test Ballast View



Post-Test Primary and Redundant Speed Trap Read-Out



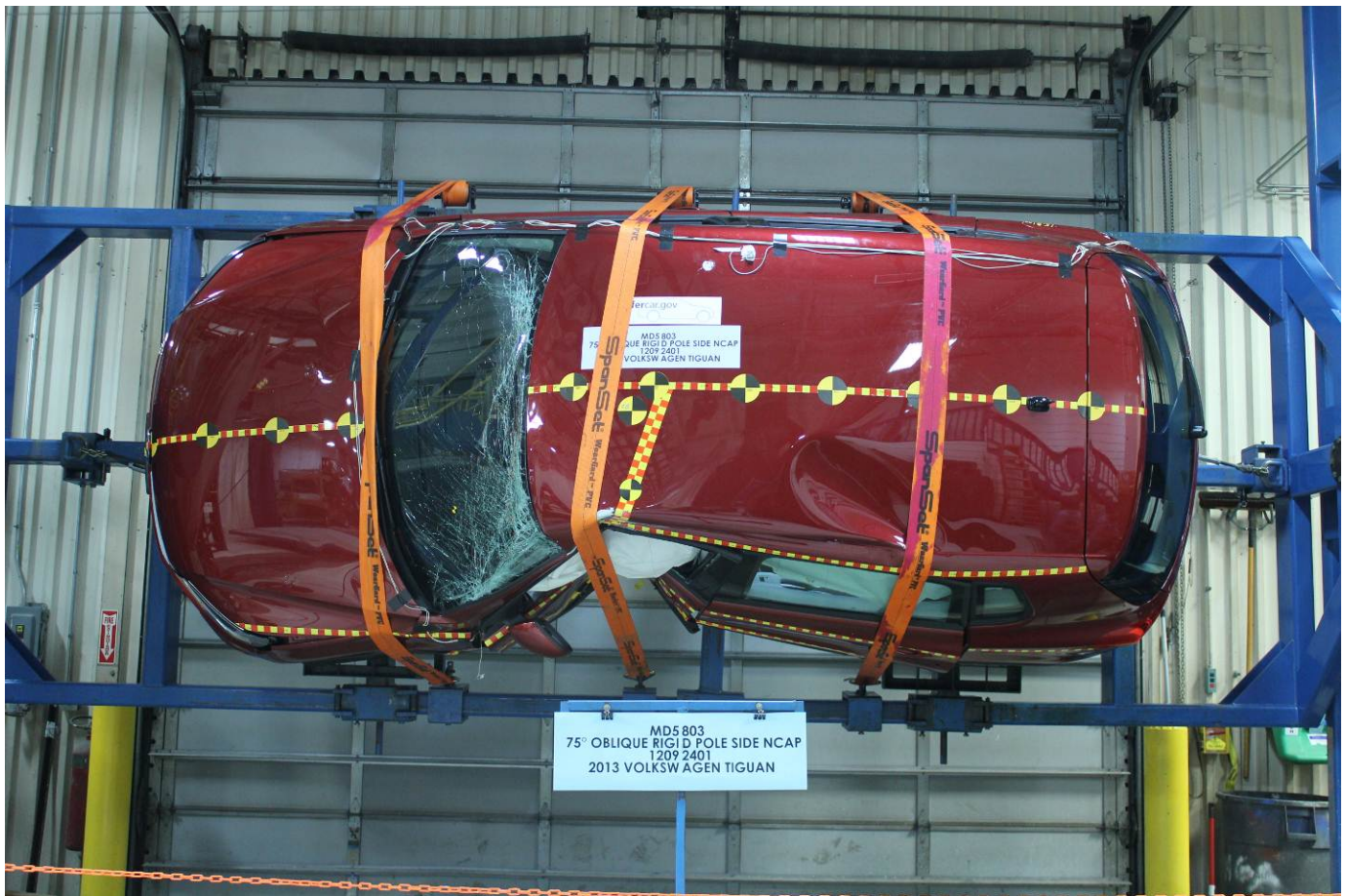
FMVSS No. 301 Static Rollover 0 Degrees



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

2013 Tiguan S

Exterior: Wild Cherry Metallic Exterior

Interior: Black Cloth Interior

The Only Compact SUV with Turbo Standard.



STANDARD FEATURES (unless replaced by options)

PERFORMANCE/HANDLING

- 2.0L TSI® Turbocharged, 200 Horsepower, 207 Lbs-ft torque in-line 4 cylinder direct injection engine
- Front-Wheel Drive
- Independent front & rear suspension
- Electro-mechanical power steering
- 16" steel wheels w/ 215/65R16, all-season tires

SAFETY/DURABILITY

- Driver & front passenger airbag supplemental restraint system
- Driver & front passenger side airbag supplemental restraint system
- Side Curtain Protection® head impact airbags, front & rear
- Anti-lock Braking System (ABS) w/ front & rear disc brakes
- Electronic Stabilization Control (ESC)
- 3-point safety belts, all seating positions
- Lower Anchors & Tethers for Children (LATCH)
- Child safety rear door locks
- Daytime Running Lights (DRL)
- Tire Pressure Monitoring System (TPMS)

COMFORT/CONVENIENCE

- Bluetooth® mobile telephone connectivity
- Trip computer
- Climatic air-conditioning
- Manually adjustable driver's seat w/ lumbar
- Manually adjustable passenger seat w/ lumbar & folding feature
- Split folding/ sliding rear seat w/ adjustable backrest
- Height adjustable, telescoping steering column
- Electronic parking brake w/ hill hold control
- Cruise control
- Anti-theft alarm w/ immobilizer theft deterrent system w/ remote locking
- AM/FM radio w/ in-dash single CD player & aux. input
- Power windows w/ auto up/down & pinch protection
- Power, heatable exterior mirrors w/ side blinkers
- Variable intermittent windshield wipers
- Front & rear carpeted floor mats
- Leather wrapped, multifunction steering wheel and shift knob

Manufacturer's Suggested Retail Price:

\$22,995.00

DRIVER CARE PACKAGE

WARRANTY INFORMATION

- Volkswagen New Vehicle Limited Warranty
- * 3 years/50,000 miles (whichever occurs first)
- Powertrain Limited Warranty
- * 5 years/60,000 miles (whichever occurs first)
- Limited Warranty against Corrosion Perforation
- * 12 years/unlimited mileage
- 24-HOUR ROADSIDE ASSISTANCE
- * 3 years/50,000 miles (whichever occurs first)
- (Towing, Jump Starts, Tire Changes, Out of Fuel, and Lock-Out)
- Provided by a third party supplier

VOLKSWAGEN CAREFREE MAINTENANCE

Scheduled maintenance services described in the Volkswagen Maintenance booklets are covered at no charge for 3 years/36,000 miles (whichever occurs first)

PACKAGES/OPTIONS

Wild Cherry Metallic Exterior
Black Cloth Interior
Climatic
6-Speed Manual Transmission

No Charge
No Charge
\$250.00
No Charge

Destination Charge

\$825.00

Total Price:

\$24,070.00

Fuel, license, title fees, taxes and dealer-installed accessories are not included.

PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS CARLINE: U.S./CANADIAN
PARTS CONTENT: 1%
MAJOR SOURCES OF FOREIGN PARTS CONTENT: GERMANY: 55%
FOR THIS VEHICLE: FINAL ASSEMBLY POINT: WOLFSBURG, GERMANY
COUNTRY OF ORIGIN: HUNGARY
ENGINE: HUNGARY
TRANSMISSION: GERMANY

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



Fuel Economy and Environment



Gasoline Vehicle

Fuel Economy

21 MPG
combined city/hwy
4.8 gallons per 100 miles
18 city
26 highway

SUVs range from 12 to 28 MPG. The best vehicle rates 112 MPG.

You spend \$1,900

more in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost \$2,700

Fuel Economy & Greenhouse Gas Rating (tailpipe only)

5 Best
1 10

This vehicle emits 417 grams of CO₂ per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also create emissions; learn more at fueleconomy.gov.

Smog Rating (tailpipe only)

5 Best
1 10

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 23 MPG and costs \$11,600 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$3.80 per gallon. MPG is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fueleconomy.gov

Calculate personalized estimates and compare vehicles

SOLD TO: 402648

FRANK BOUCHER VOLKSWAGEN
PO BOX 085690-9601 WASHINGTON AVE
RACINE, WI 53406

SHIP TO: 402648

FRANK BOUCHER VOLKSWAGEN
PO BOX 085690-9601 WASHINGTON AVE
RACINE, WI 53406

VIN: WVGCY7AX3DW06022

Port of Entry: HOUSTON

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

Not Rated Not Rated

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

Not Rated Not Rated

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

Who better to get you into a Volkswagen than us?

Volkswagen Credit



Monroney Label

Adjusting front and rear head restraints

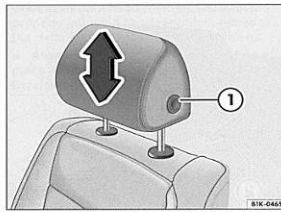


Fig. 40 Adjusting the front head restraints.

Please first read and note the introductory information and heed the WARNINGS on page 63.

All seats are equipped with head restraints. The rear center head restraint is designed only for the center seat on the rear bench. Therefore, only install the center head restraint in the center position.

There are notches in the head restraint guide rods so that the head restraint can lock into place. Only properly installed head restraints can lock into place at the adjustment range notches. In order to prevent inadvertent removal of the head restraints after installation, there are stops at the top and bottom of the adjustment range.

Adjusting the height

- Push the head restraint up in the direction of the arrow or down when the button ⇒ fig. 40 ① or ⇒ fig. 41 ① is pressed ⇒ ⚠.
- The head restraint must lock securely in the position selected.

Folding the outer rear head restraints down

- With the ② button pressed, fold the head restraint forward and down ⇒ ⚠.
- To use the seating area, fold the head restraint back up until it locks in place.

Proper head restraint adjustment

Adjust head restraints so that the upper edge of the head restraint is at least at eye level or higher. Position the back of the head as close as possible to the head restraint.

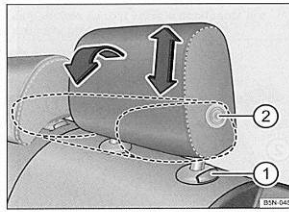


Fig. 41 Adjusting or folding the rear head restraints.

Adjusting the head restraint for short people

Push the head restraint down as far as it will go, even if this means the person's head is still below the top edge of the head restraint. A small gap may remain between the head restraint and the backrest when the head restraint is all the way down.

Adjusting the head restraint for tall people

Pull the head restraint up as far as it will go.

WARNING

Driving without head restraints or with improperly adjusted head restraints increases the risk of serious injuries in a collision.

- Always drive with the head restraints in place and properly adjusted to help minimize the risk of neck injury in a crash.
- Every person in the vehicle must have a properly adjusted head restraint to minimize the risk of neck injury in a crash. Each head restraint must be adjusted according to the occupants' size so that the upper edge is even with the top of the person's head, but no lower than eye level. Always sit so that the back of your head is as close as possible to the head restraint.
- Never adjust head restraint while driving.

Sitting properly and safely | 69

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

Removing and reinstalling head restraints

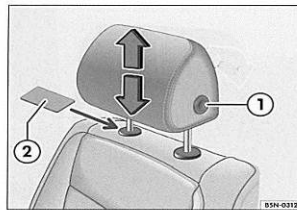


Fig. 42 Removing the front head restraints.

Please first read and note the introductory information and heed the WARNINGS on page 63.

All seats are equipped with head restraints. The rear center head restraint is designed only for the center seat on the rear bench. Therefore, only install the center head restraint in the center position.

Removing the front head restraints

- Sit in the back seat behind the head restraint you want to remove. Pull the head restraint all the way up ⇒ ⚠ in *Adjusting front and rear head restraints* on page 69. Recline the backrest with the head restraint so that there is enough overhead clearance to remove it.
- Slide a flat object, such as a plastic credit card, underneath the right side of the cap on the right-hand seat guide rod ⇒ fig. 42 ② or ⇒ fig. 43 ② to unlock the head restraint.
- Push the flat object (plastic card) in against the guide rod to depress a release button located under the cap (not visible).
- Use one hand to hold the release button in with the flat object. With your other hand, lift the same guide rod slightly to expose a notch in the rod at the bottom (can be seen and felt with fingers). The right-hand guide rod is now released.
- To release the left-hand guide rod, press button ⇒ fig. 42 ① or ⇒ fig. 43 ① in (towards guide rod) and hold.
- Pull the head restraint out completely while holding button ⇒ fig. 42 ① or ⇒ fig. 43 ①.

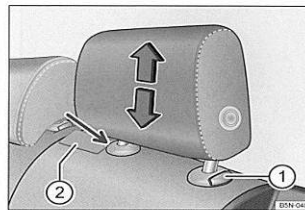


Fig. 43 Removing the rear head restraints.

Installing the front head restraints

- Position head restraint properly over the head restraint guides of the respective seat backrest and insert the head restraint into the guides.
- Push the head restraint down while pressing button ⇒ fig. 42 ① or ⇒ fig. 43 ①.
- Adjust the head restraint according to the occupant's size ⇒ page 69.

Removing the rear head restraint

- Unlock the rear bench and fold it forward ⇒ page 155.
- Pull the head restraint all the way up ⇒ ⚠.
- If necessary, press the flat blade of the screwdriver from the vehicle tool kit into the slit of the trim cap ② in the direction of the arrow and hold it in this position.
- At the same time press button ① while a second person pulls out the head restraint completely.
- Fold the backrest of the rear bench back so that it locks securely.

Reinstalling the rear head restraint

- Unlock the rear bench and fold it forward ⇒ page 155.
- Position head restraint properly over the head restraint guides of the respective seat backrest and insert the head restraint into the guides.
- Push the head restraint down while pressing button ①.
- Fold the backrest of the rear bench back so that it locks securely.
- Adjust the head restraint according to the occupant's size ⇒ page 69.

WARNING

Driving without head restraints or with improperly adjusted head restraints increases the risk of serious injuries in a collision.

- Always drive with the head restraints in place and properly adjusted to help minimize the risk of neck injury in crash.

WARNING (continued)

- Always reinstall head restraints as soon as possible so that vehicle occupants are properly protected.

NOTICE

When removing or reinstalling the head restraint, take care that the head restraint does not strike the headliner or the back of the front seat. The headliner or other parts of the vehicle could otherwise be damaged.

Adjusting the steering wheel position

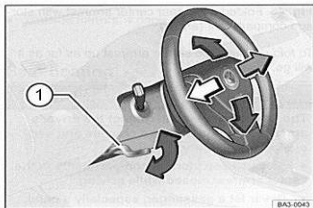


Fig. 44 Manual adjustment for steering wheel position.

Please first read and note the introductory information and heed the **WARNINGS** on page 63.

Adjust the steering wheel only when the vehicle is not moving.

- Push down on the lever $\Rightarrow$ fig. 44 .
- Adjust the steering wheel so that it can be held with hands at 9 o'clock and 3 o'clock positions on the outside of the steering wheel rim and with the arms slightly bent at the elbow.
- Pull the lever up firmly until it is flush with the steering column $\Rightarrow$.

WARNING

Improper use of the steering column adjustment feature can result in serious personal injury and even death.

- Always pull the lever firmly upward after adjusting the steering column so that the steering wheel does not change position suddenly while the vehicle is moving.
- Never adjust the steering column while the vehicle is moving. If you find that you need to adjust the steering wheel while driving, stop the vehicle in a safe place and make the proper adjustment.
- Never adjust the steering wheel so that it points toward your face. Always make sure that the steering wheel points toward your chest. Otherwise, the airbag system cannot protect you properly in the event of a crash.
- Always hold the steering wheel on the outside of the steering wheel rim with your hands at the 9 o'clock and 3 o'clock positions to help reduce the risk of serious personal injury if the driver airbag inflates.
- Never hold the steering wheel at the 12 o'clock position or with your hands anywhere inside the steering wheel or on the steering wheel hub. Holding the steering wheel the wrong way increases the risk of severe injury to the arms, hands, and head if the driver airbag deploys.

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

APPENDIX B

VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS
Driver Dummy Instrumentation Plots

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Figure No. 1.	Driver 9 Axis Head CG Acceleration (X) vs. Time	B-1
Figure No. 2.	Driver 9 Axis Head CG Acceleration (Y) vs. Time	B-1
Figure No. 3.	Driver 9 Axis Head CG Acceleration (Z) vs. Time	B-1
Figure No. 4.	Driver 9 Axis Head CG Resultant Acceleration (X) vs. Time	B-1
Figure No. 5.	Driver Lower Spine T12 Acceleration (X) vs. Time	B-2
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Figure No. 7.	Driver Lower Spine T12 Acceleration (Z) vs. Time	B-2
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Figure No. 9.	Driver Iliac Wing Force on Impact Side (Y) vs. Time	B-3
Figure No. 10.	Driver Acetabulum Force on Impact Side (Y) vs. Time	B-3
Figure No. 11.	Driver Total Pelvis Force on Impact Side (Y) vs. Time	B-3

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

Additional Driver Dummy Instrumentation Data

Driver 9 Axis Head CG Redundant Acceleration (X) vs. Time

Driver 9 Axis Head CG Redundant Acceleration (Y) vs. Time

Driver 9 Axis Head CG Redundant Acceleration (Z) vs. Time

Driver 9 Axis Head X Arm Y

Driver 9 Axis Head X Arm Z

Driver 9 Axis Head Y Arm X

Driver 9 Axis Head Y Arm Z

Driver 9 Axis Head Z Arm X

Driver 9 Axis Head Z Arm Y

**Additional Driver Dummy Instrumentation Data
(Continued)**

Driver Upper Thorax Rib Deflection (Y)
Driver Middle Thorax Rib Deflection (Y)
Driver Lower Thorax Rib Deflection (Y)
Driver Upper Abdomen Rib Deflection (Y)
Driver Lower Abdomen Rib Deflection (Y)

Vehicle Instrumentation Data

Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Left Floor Sill Acceleration (Y)
Left A-Pillar Sill Acceleration (Y)
Left Lower A-Pillar Acceleration (Y)
Left Mid A-Pillar Acceleration (Y)
Left B-Pillar Sill Acceleration (Y)
Left Lower B-Pillar Acceleration (Y)
Left Mid B-Pillar Acceleration (Y)
Driver Seat Track at Dummy Hip Point Acceleration (Y)
Engine Top Acceleration (X)
Engine Top Acceleration (Y)
Firewall Center Acceleration (Y)
Right Roof at Vertical Impact Reference Line Acceleration (Y)
Right Sill at Vertical Impact Reference Line Acceleration (Y)
Rear Floorpan Behind Rear Axle at Centerline Acceleration (X)
Rear Floorpan Behind Rear Axle at Centerline Acceleration (Y)

Pole Instrumentation Data

Load Cell Pole Barrier #1 Force (Y)

Load Cell Pole Barrier #2 Force (Y)

Load Cell Pole Barrier #3 Force (Y)

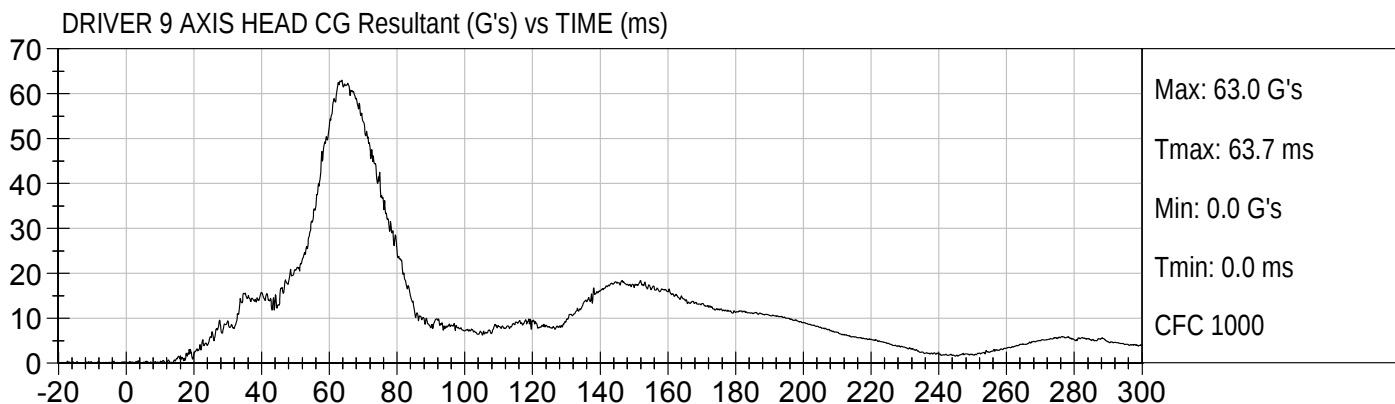
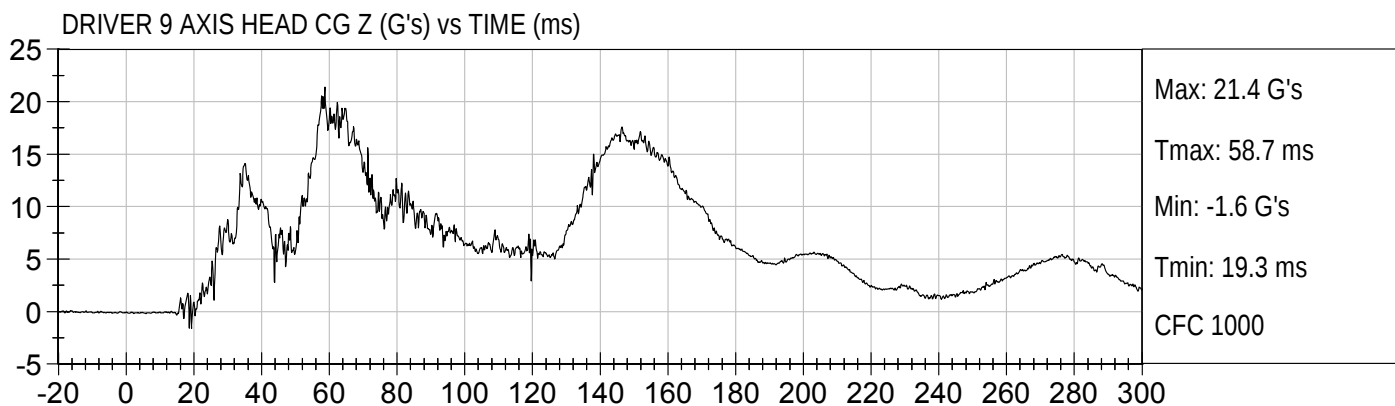
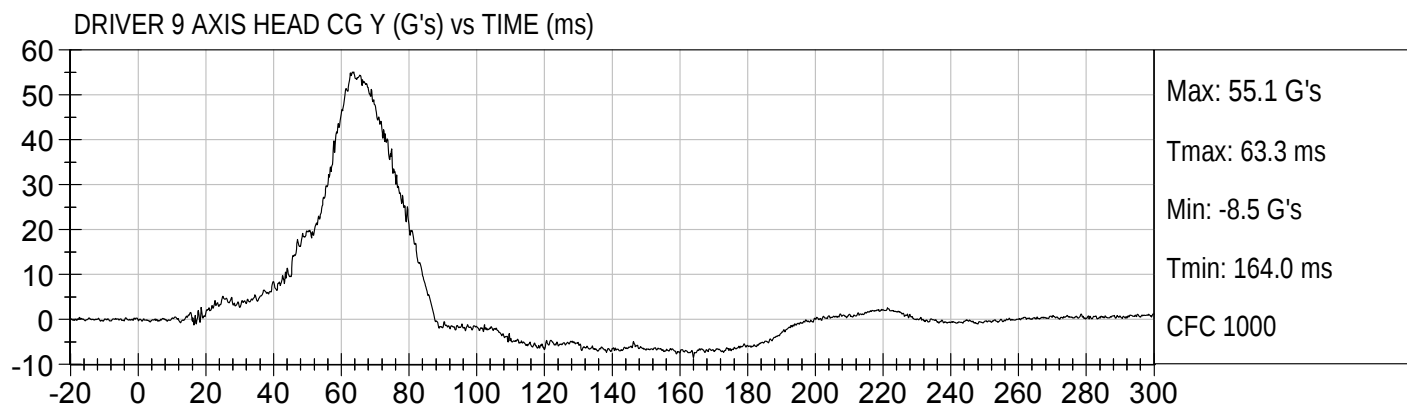
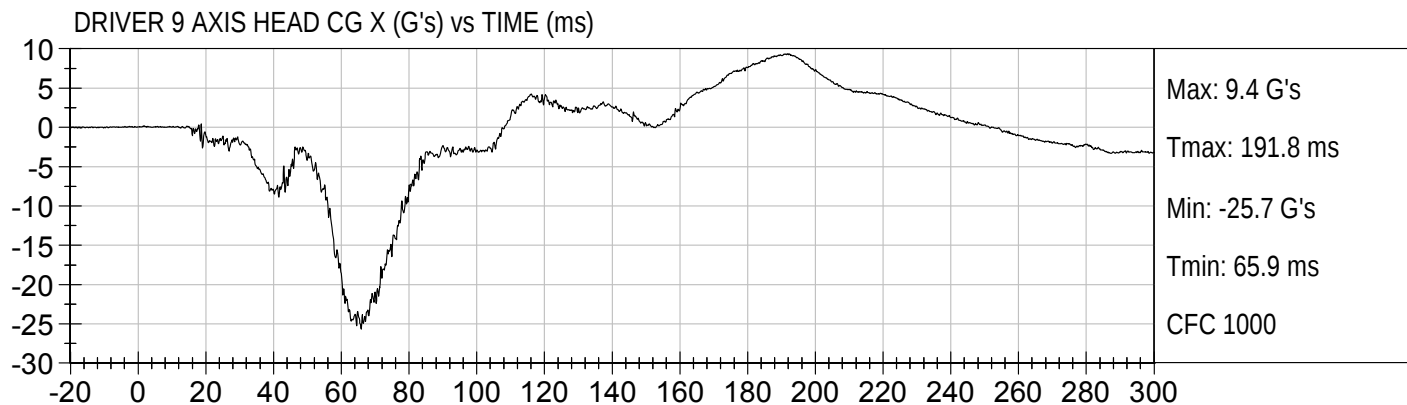
Load Cell Pole Barrier #4 Force (Y)

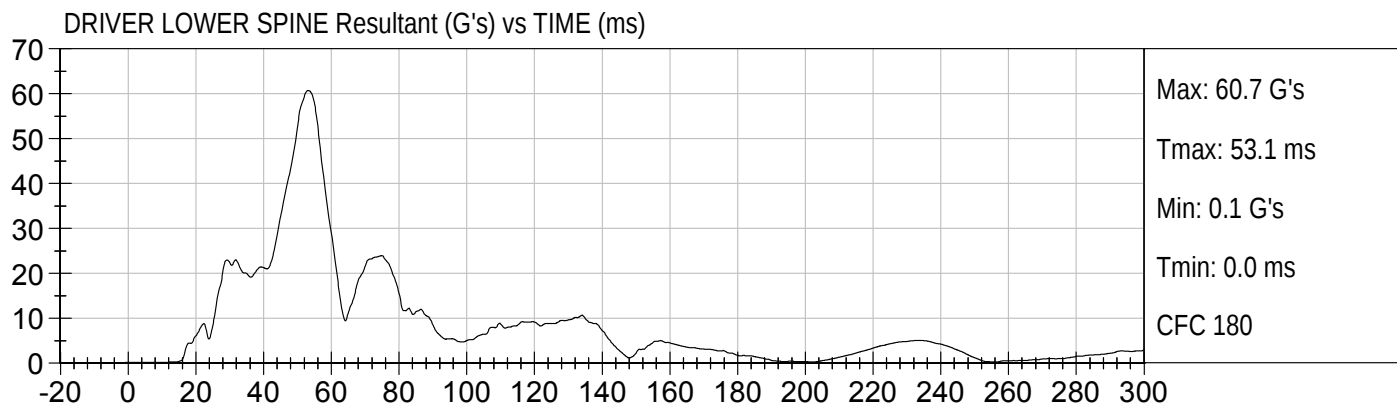
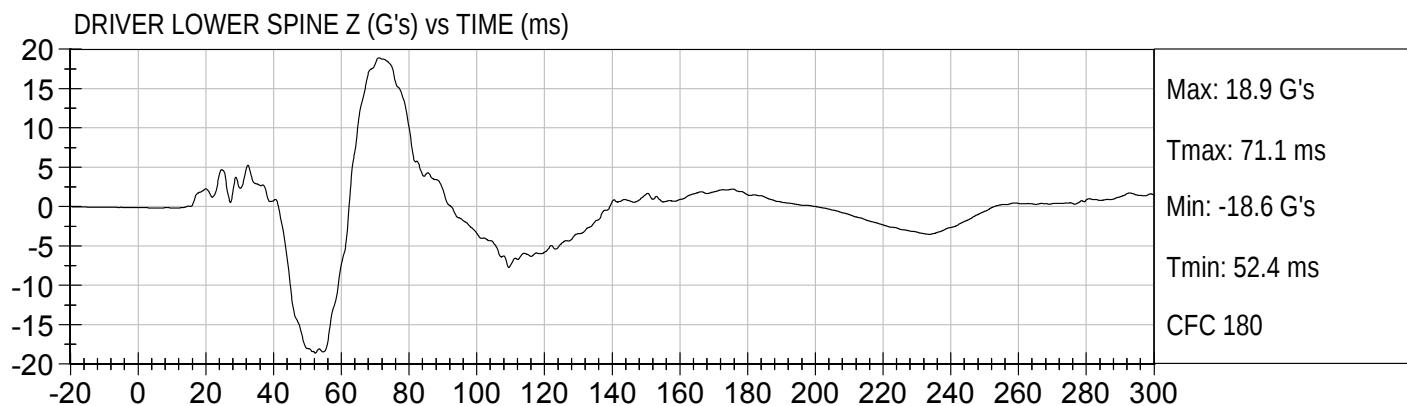
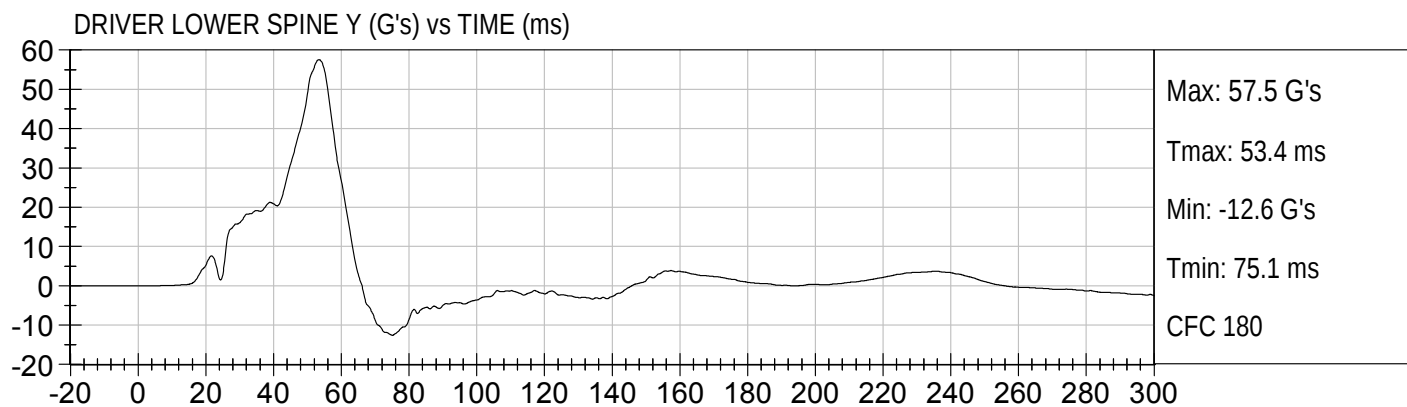
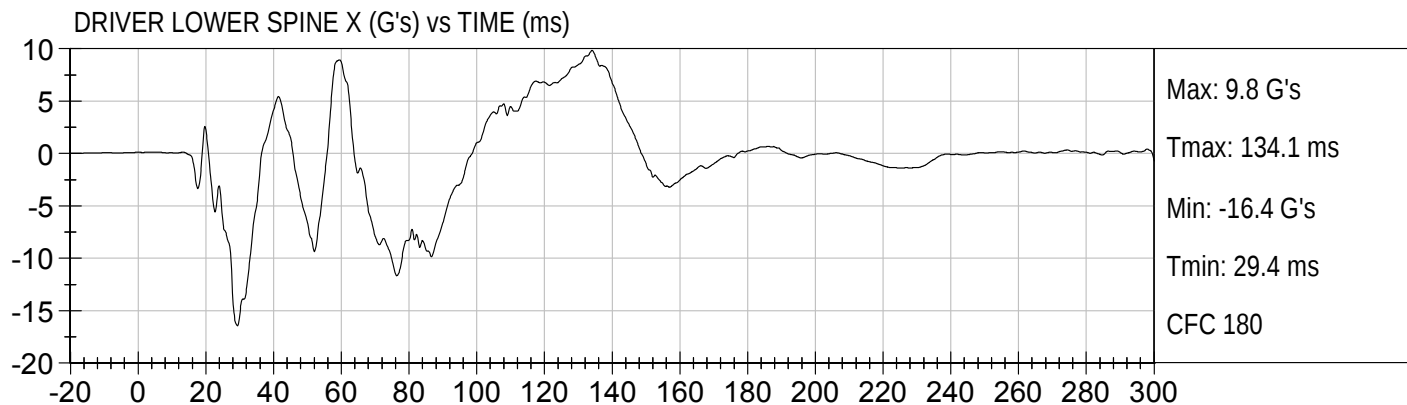
Load Cell Pole Barrier #5 Force (Y)

Load Cell Pole Barrier #6 Force (Y)

Load Cell Pole Barrier #7 Force (Y)

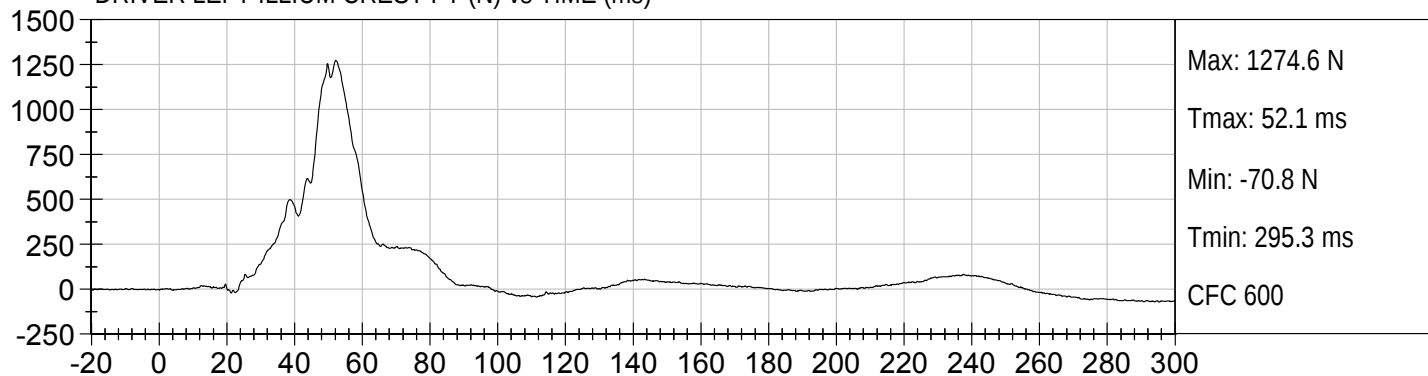
Load Cell Pole Barrier #8 Force (Y)







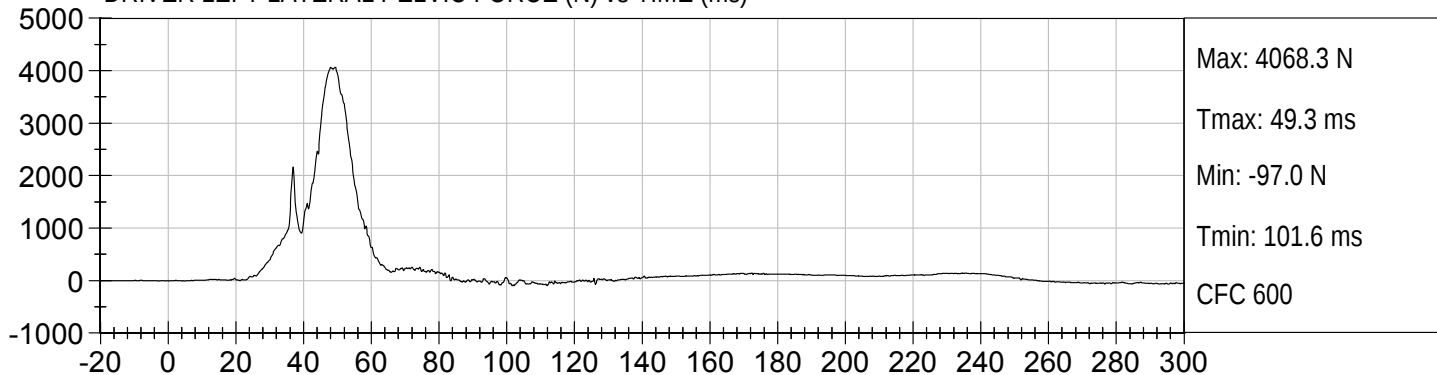
DRIVER LEFT ILLIUM CREST FY (N) vs TIME (ms)



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



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



APPENDIX C

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

SID-IIsD External Measurements
SN: 306

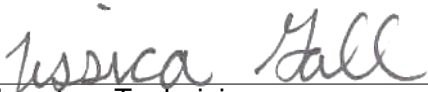
No.	Name	Spec. (mm)	Result	Pass/Fail
A	Sitting Height	772 - 788	785	Pass
B	Shoulder Pivot Height	437 - 453	449	Pass
C	H-point Height	79 - 89	86	Pass
D	H-point from Seatback	141 - 151	147	Pass
E	Shoulder Pivot from Backline	97 - 107	99	Pass
F	Thigh Clearance	119 -135	120	Pass
G	Head Breadth	140 - 148	141	Pass
H	Head Back from Backline	40 - 46	45	Pass
I	Head Depth	178 - 188	182	Pass
J	Head Circumference	541 - 551	550	Pass
K	Buttock to Knee Length	514 - 540	538	Pass
L	Popliteal Height	343 - 369	349	Pass
M	Knee Pivot to Floor Height	392 - 409	394	Pass
N	Buttock Popliteal Length	416 - 442	435	Pass
O	Chest Depth w/o Jacket	195 - 211	198	Pass
P	Foot Length	216 - 232	222	Pass
Q	Hip Breadth (w/ pelvic plugs)	313 - 323	317	Pass
R	Arm Length	249 - 259	250	Pass
S	Knee Joint to Seatback	477 - 493	483	Pass
V	Shoulder Width	341 - 357	351	Pass
W	Foot Width	78 - 94	82	Pass
Y	Chest Circumference w/ jacket	851 - 881	863	Pass
Z	Waist Circumference	761 - 791	782	Pass

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

ATD Serial No: 306

Test ID: D123141

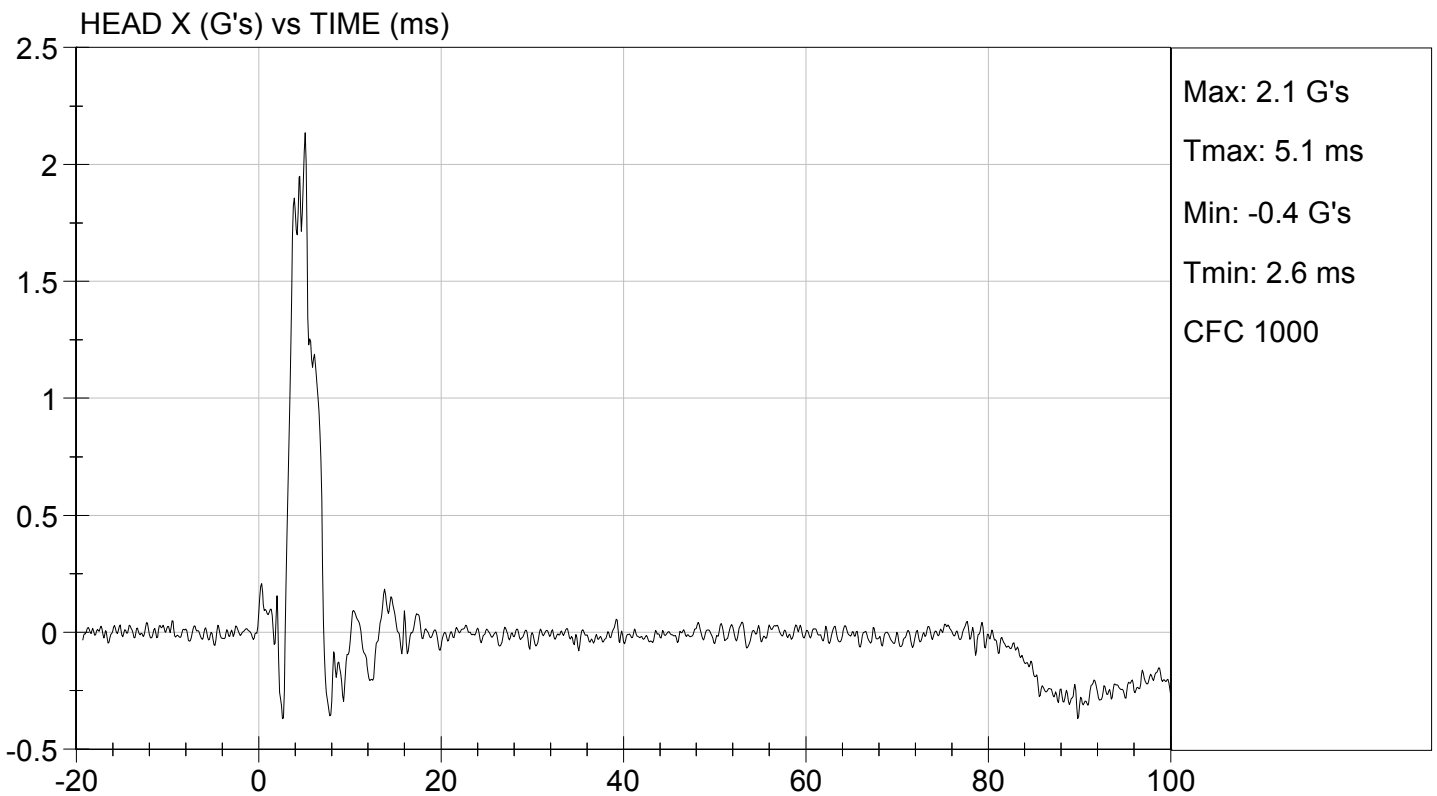
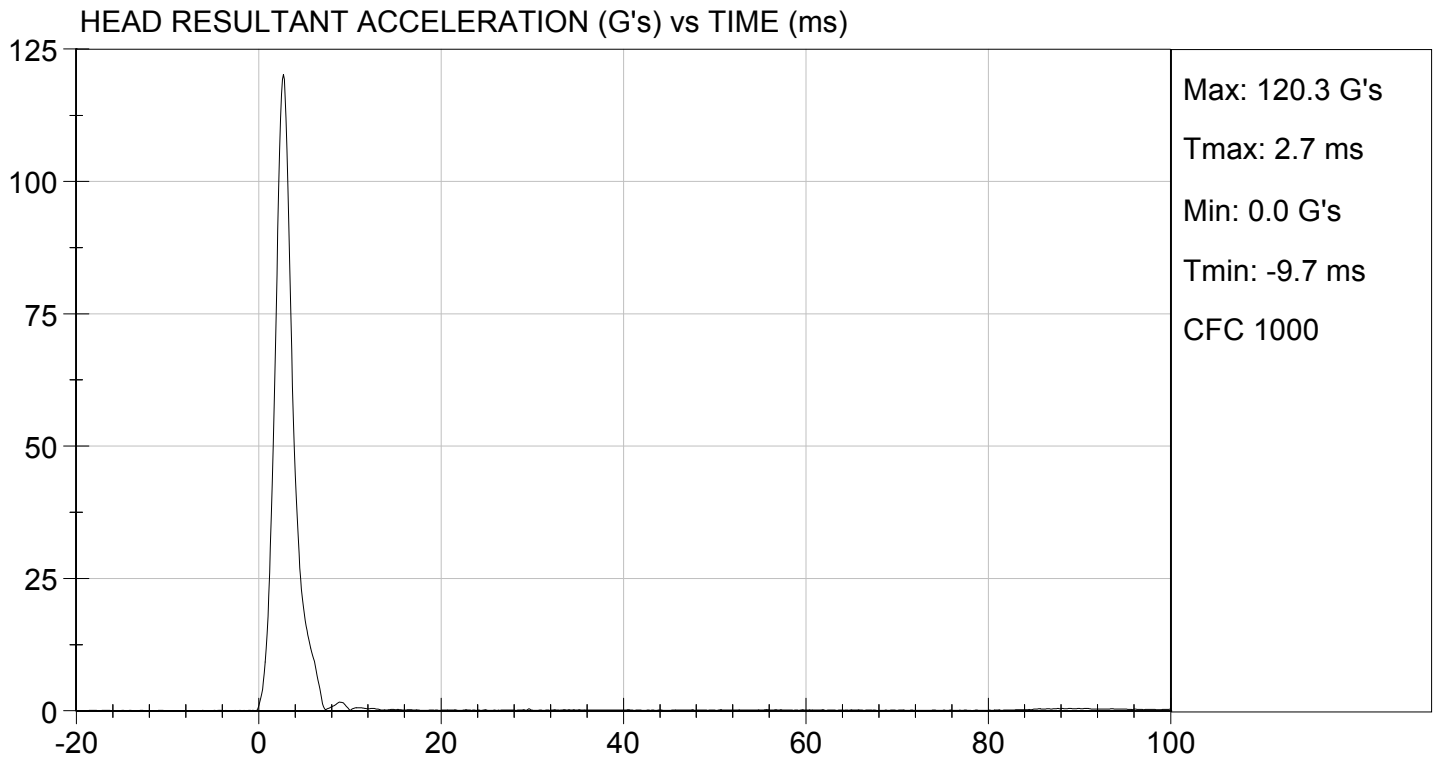
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	44	Pass
Peak Resultant Acceleration	G's	115 to 137	120	Pass
Peak Longitudinal Acceleration	G's	+/- 15	2.1	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	<15%	Yes	Pass
			Overall Test Results	Pass

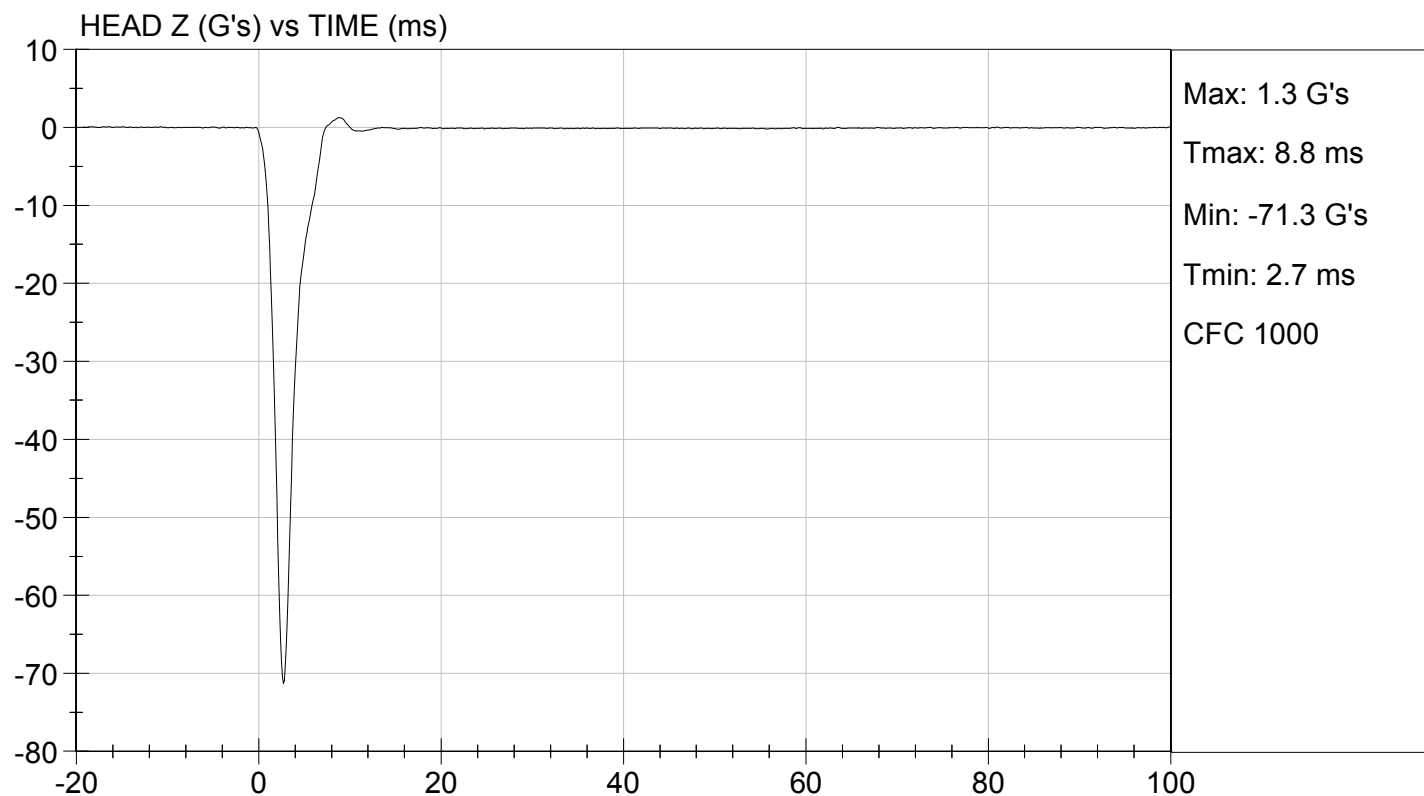
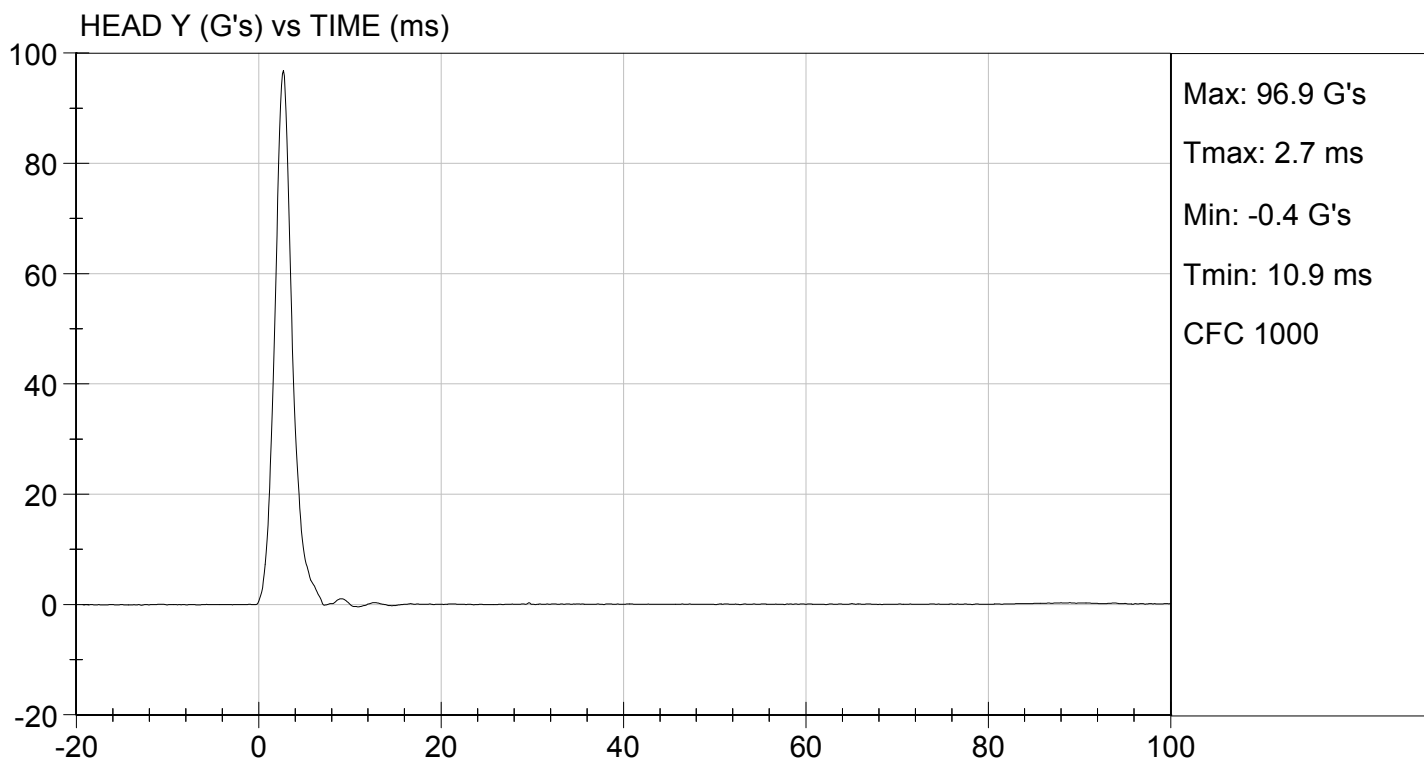

Laboratory Technician

08/28/2012

Test Date


Approved By



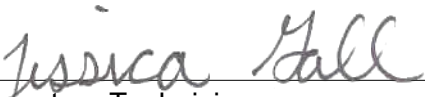


MGA RESEARCH CORPORATION
LATERAL NECK PENDULUM TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

Test I.D: D123142

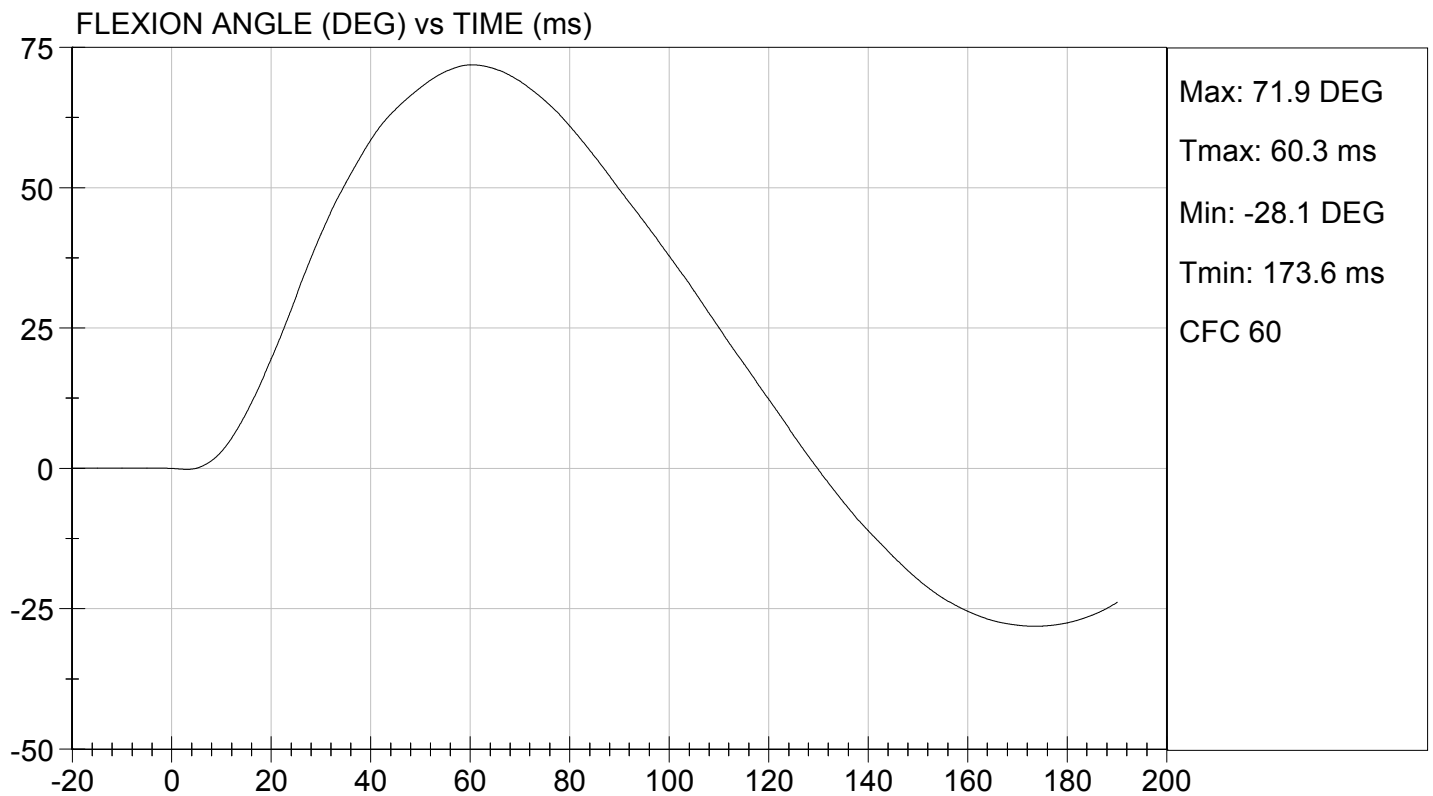
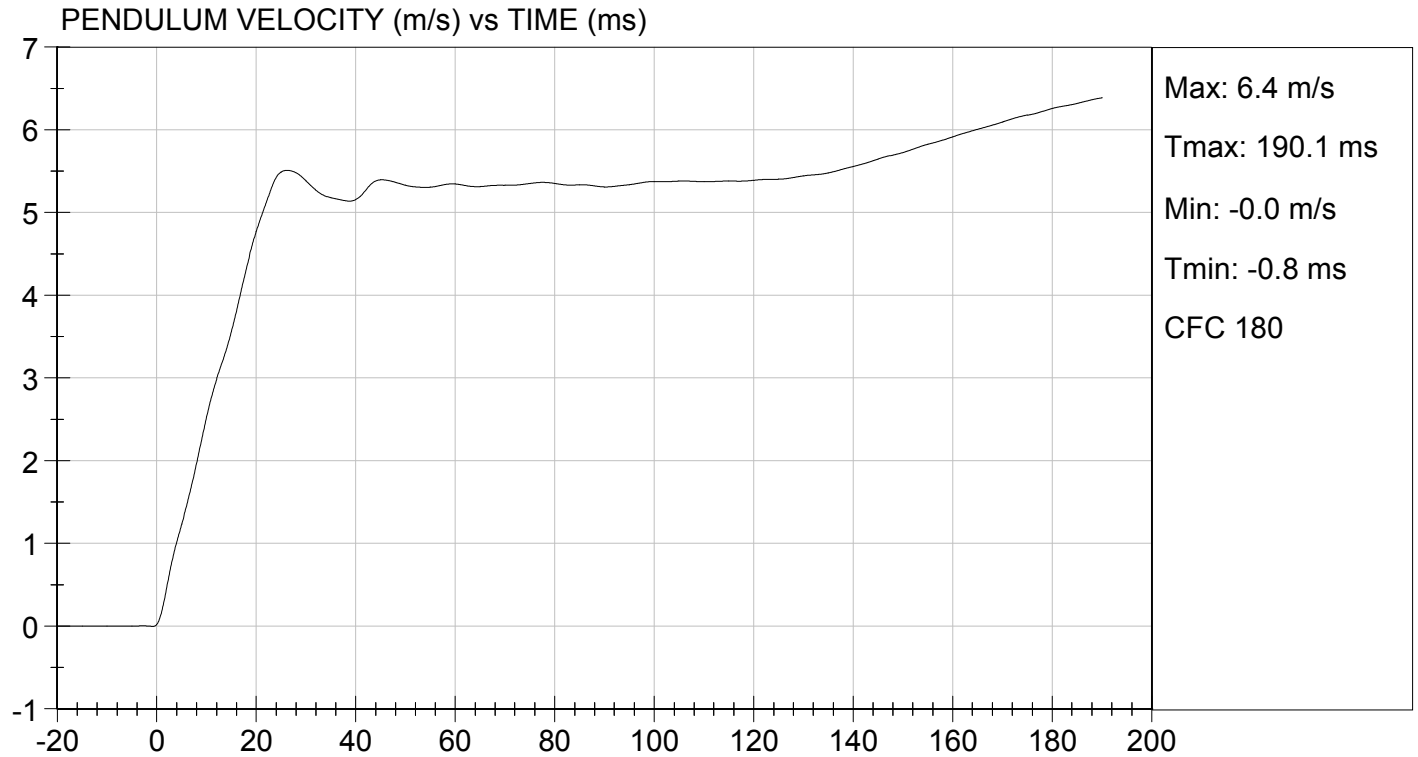
Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	21.5	Pass
Humidity		%	10 to 70	44	Pass
Impact Velocity		m/s	5.51 to 5.63	5.58	Pass
Pendulum Velocity	10 ms	m/s	2.20 to 2.80	2.53	Pass
	15 ms	m/s	3.30 to 4.10	3.56	Pass
	20 ms	m/s	4.40 to 5.40	4.77	Pass
	25 ms	m/s	5.40 to 6.10	5.49	Pass
	25-100 ms	m/s	5.50 to 6.20	5.51	Pass
Maximum D-Plane Rotation		deg	71 to 81	72	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	60	Pass
Maximum Occipital Condyle Moment		Nm	-44 to -36	-42	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	116	Pass
Overall Test Results				Pass	


 Laboratory Technician

08/28/2012

Test Date

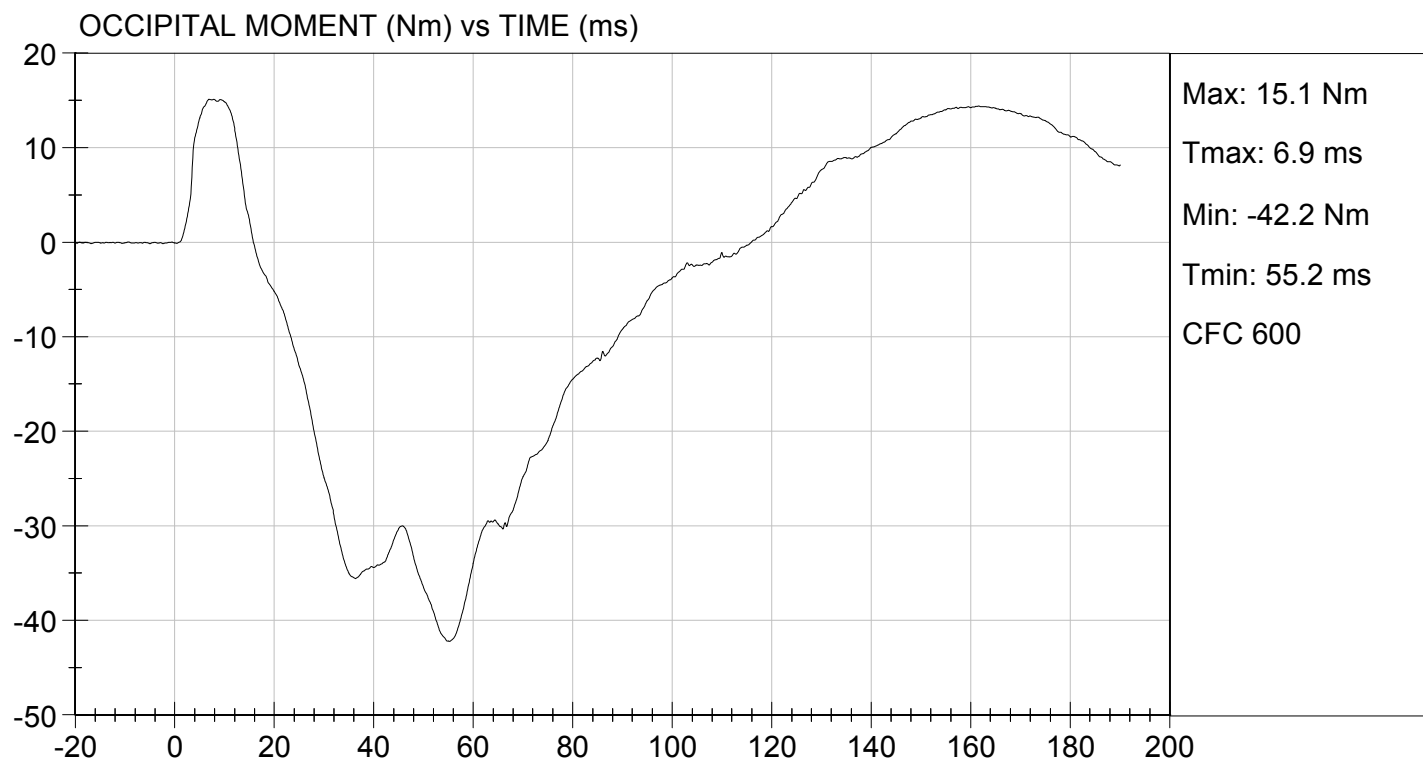

 Approved By





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

TEST DATE: 08/28/2012
TEST #: D123142



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

ATD Serial No: 306

Test ID: D123143

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	44	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Maximum Probe Acceleration	G's	13 to 18	15	Pass
Shoulder Displacement	mm	28 to 37	29	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	18	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

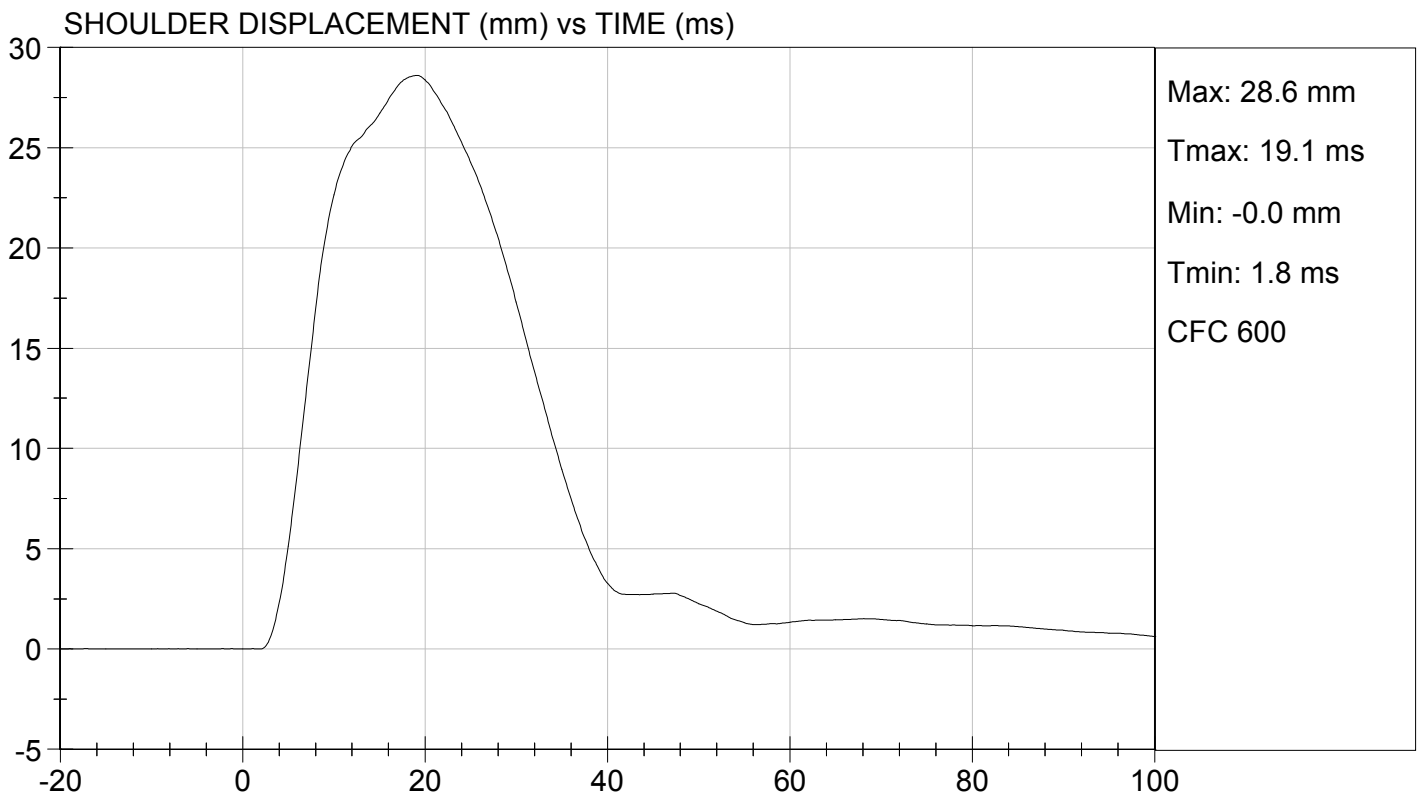
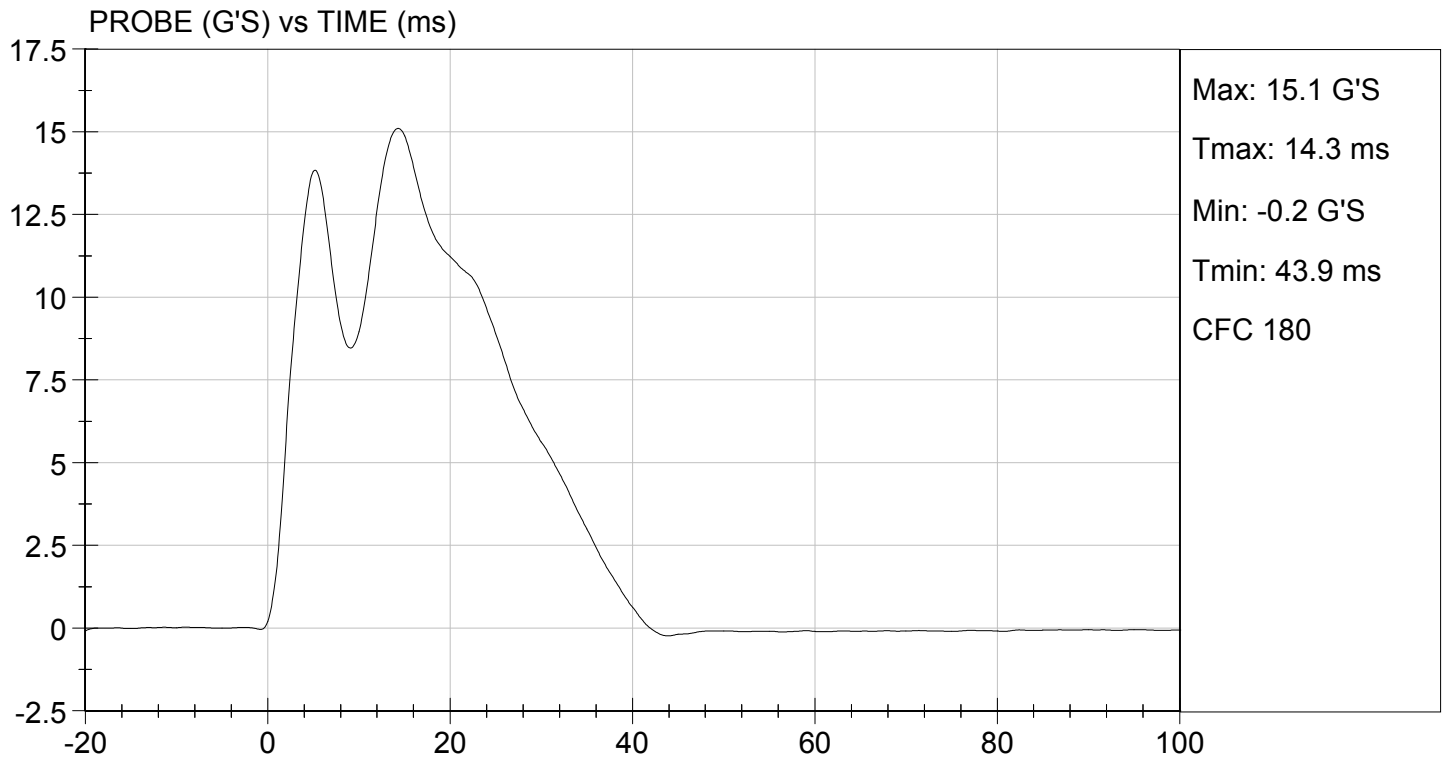
08/28/2012
Test Date

David Winkelbauer
Approved By



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

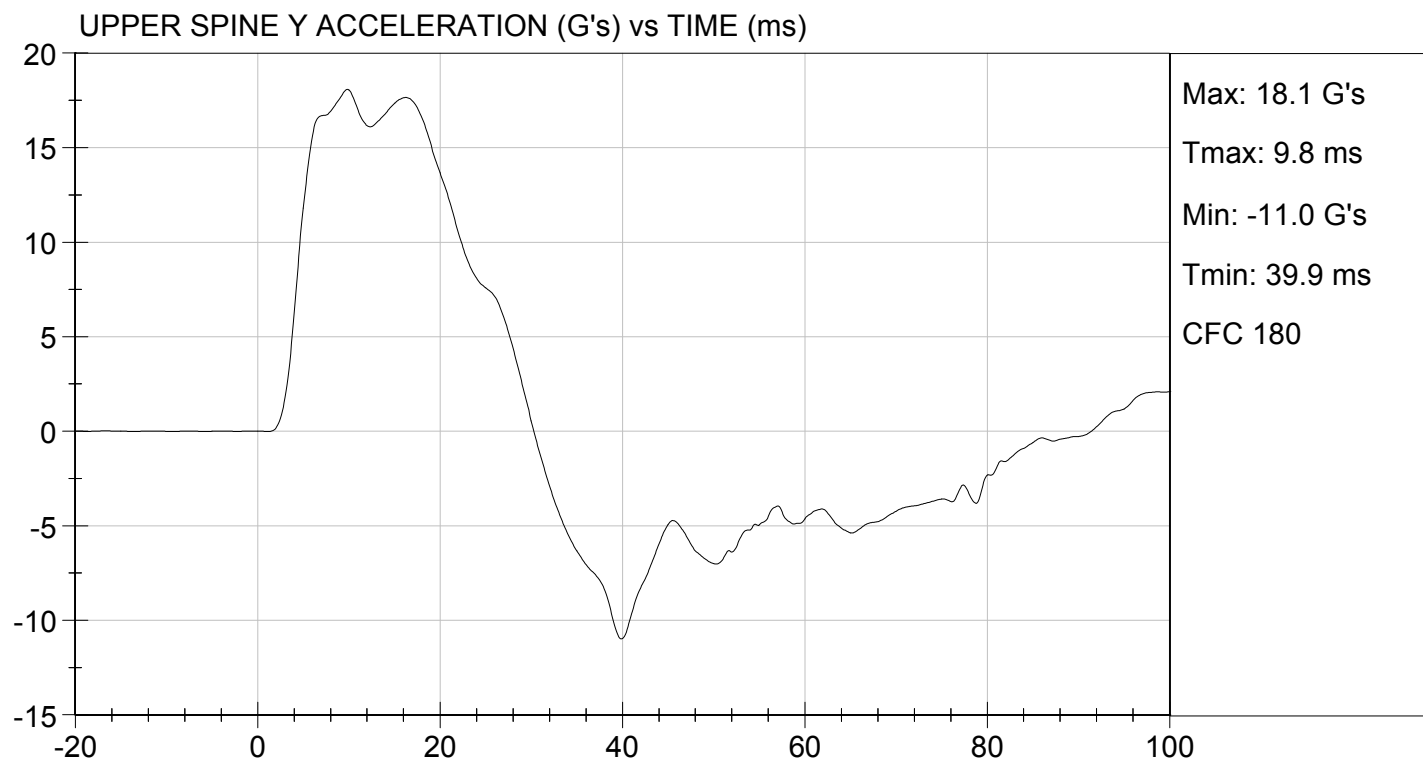
TEST DATE: 08/28/2012
TEST #: D123143





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

TEST DATE: 08/28/2012
TEST #: D123143



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

ATD Serial No: 306

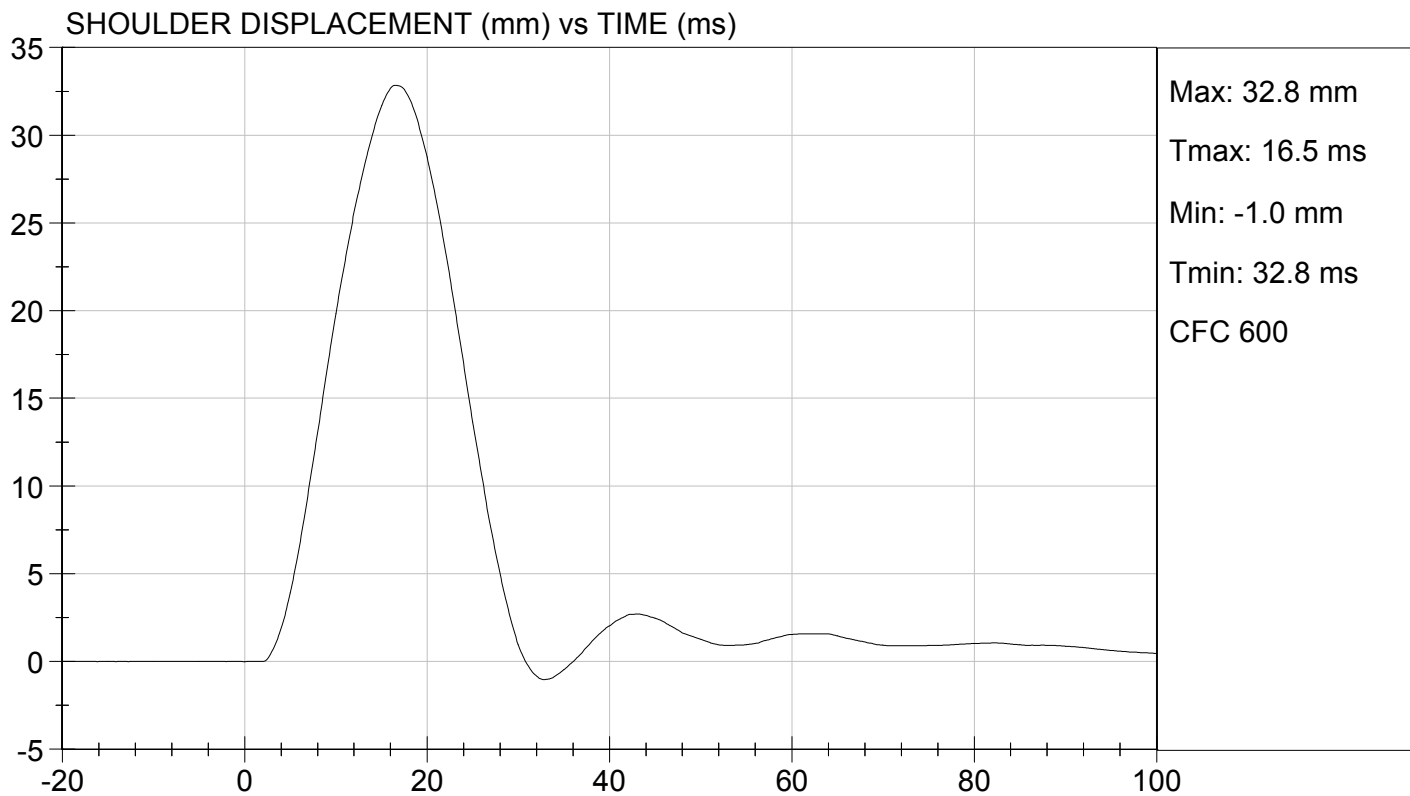
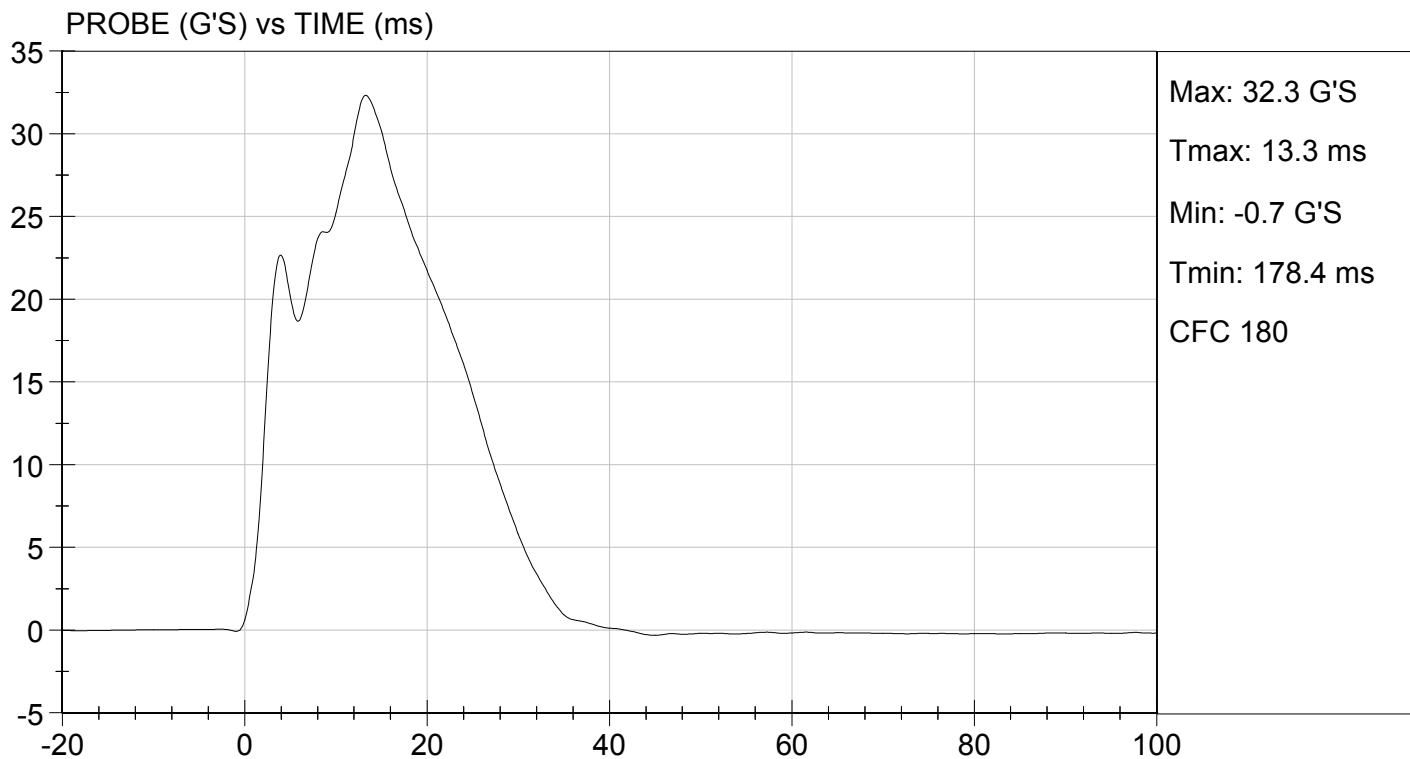
Test I.D: D123144

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.0	Pass
Humidity	%	10 to 70	44	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	Pass
Maximum Probe Acceleration	G's	30 to 36	32	Pass
Shoulder Displacement	mm	31 to 40	33	Pass
Upper Rib Displacement	mm	25 to 32	27	Pass
Middle Rib Displacement	mm	30 to 36	31	Pass
Lower Rib Displacement	mm	32 to 38	35	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	40	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	31	Pass
Overall Test Results				Pass


 Laboratory Technician

08/28/2012
 Test Date

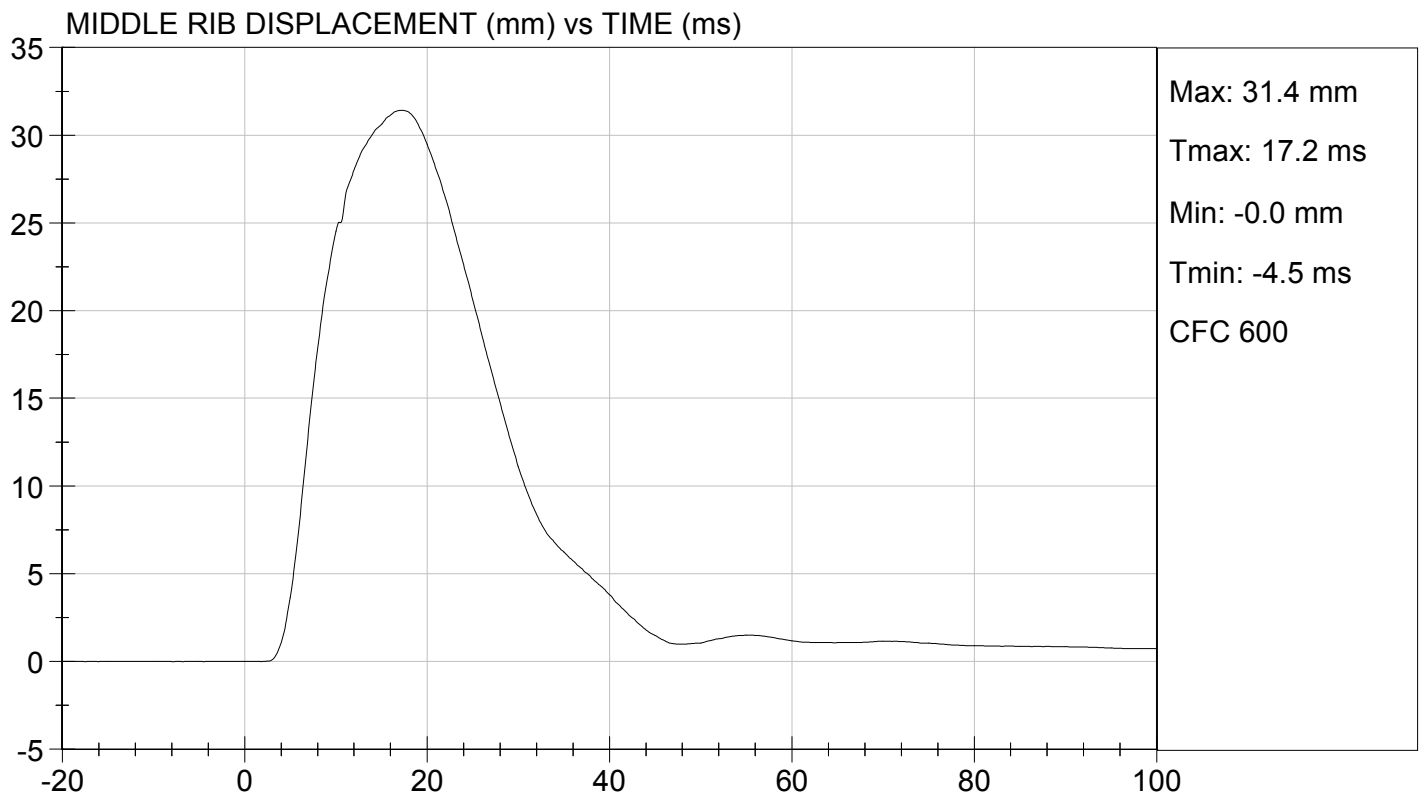
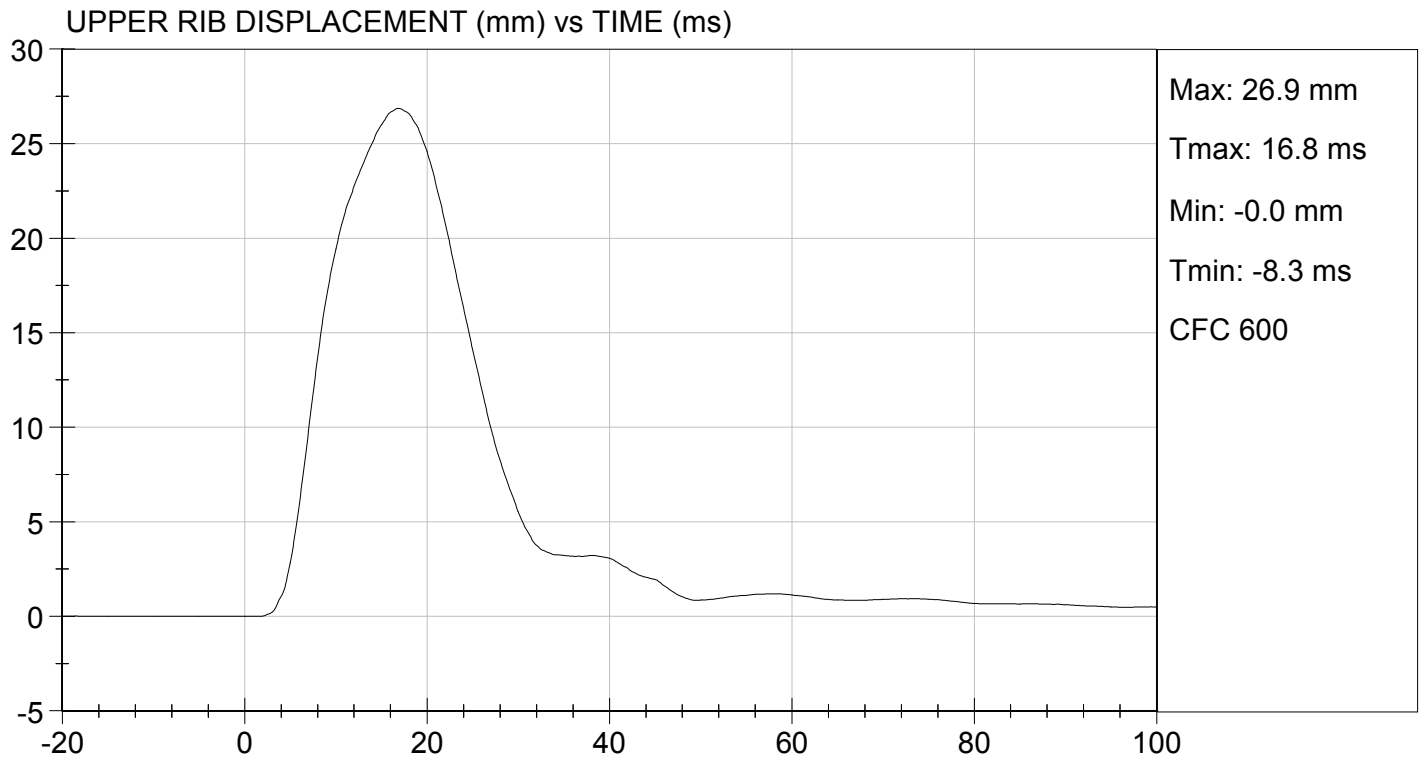

 Approved By





TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.22 ft/s, 6.77 m/s

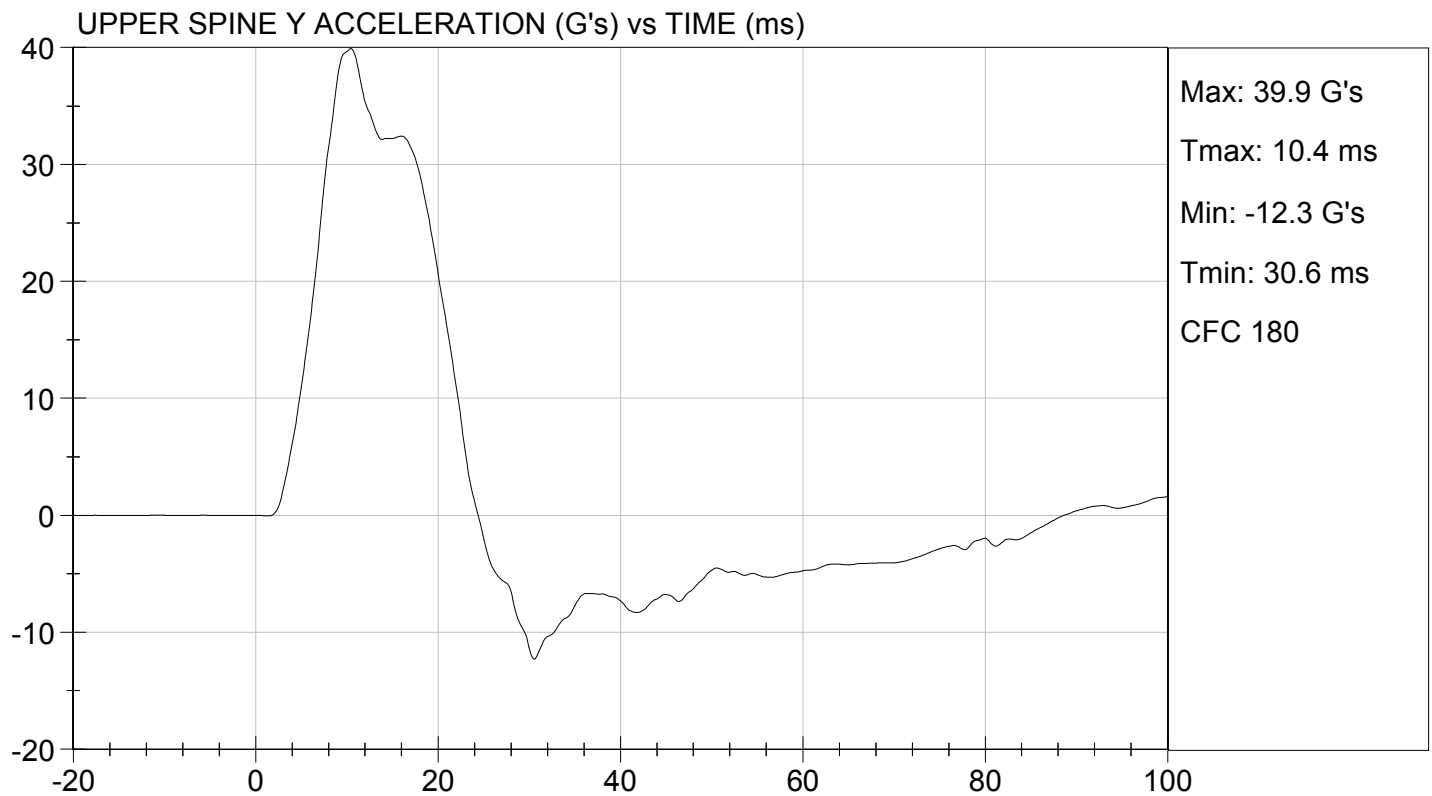
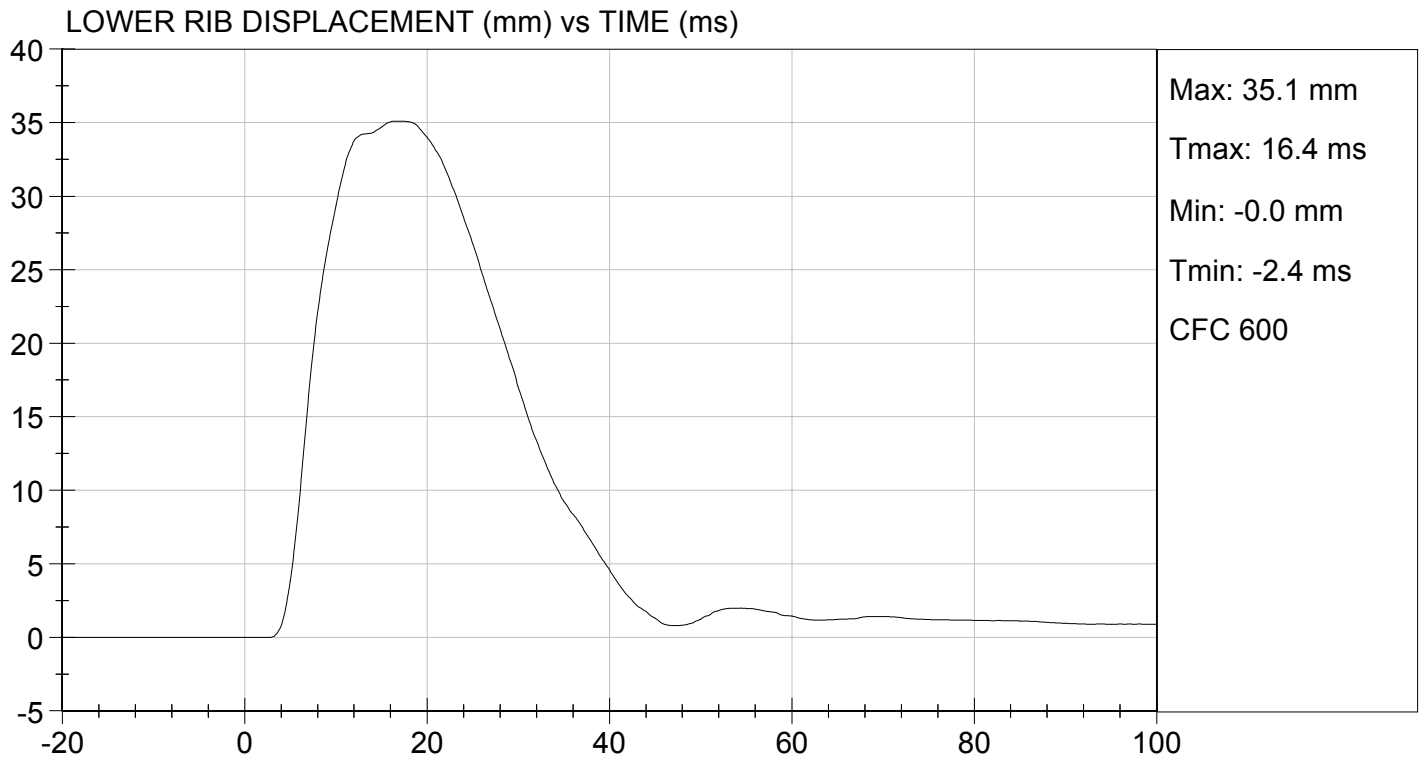
TEST DATE: 08/28/2012
TEST #: D123144





TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.22 ft/s, 6.77 m/s

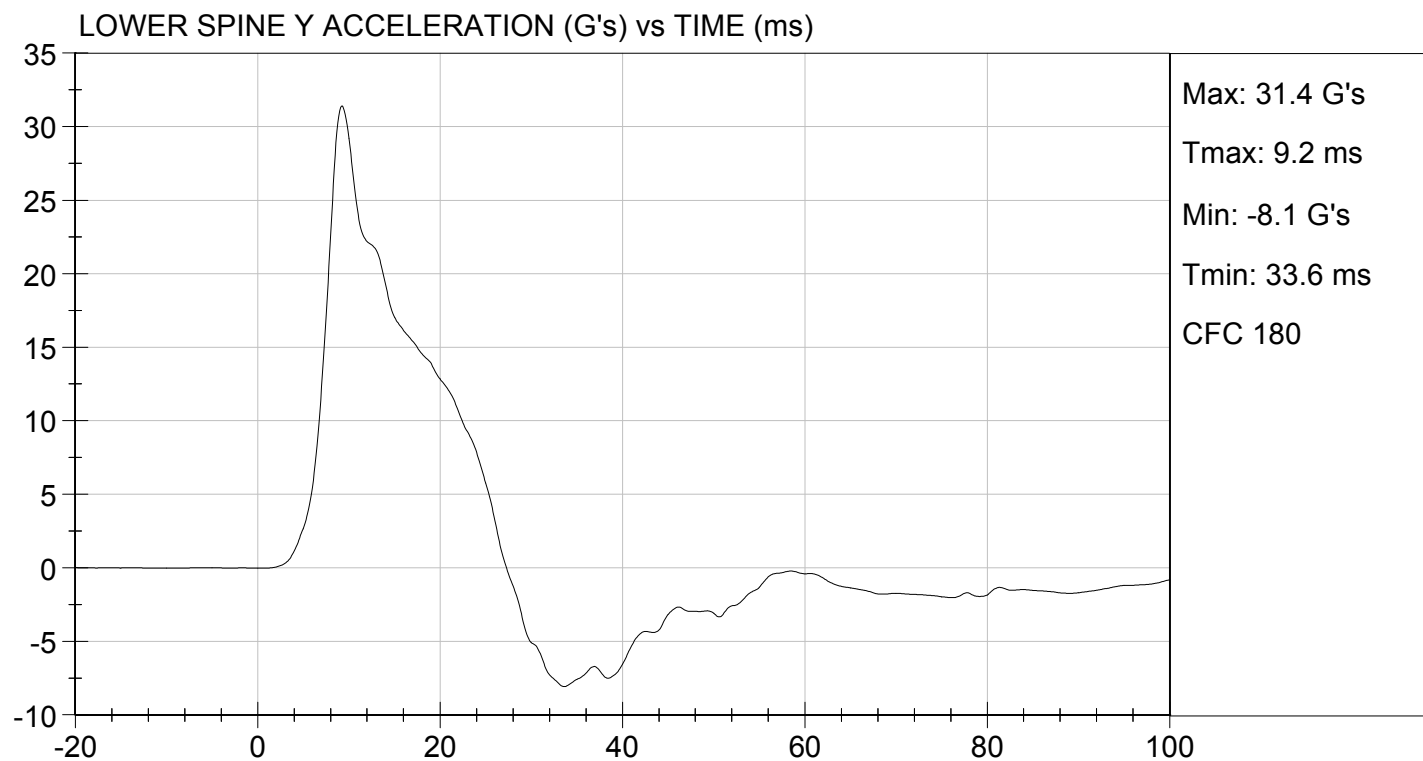
TEST DATE: 08/28/2012
TEST #: D123144





TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.22 ft/s, 6.77 m/s

TEST DATE: 08/28/2012
TEST #: D123144

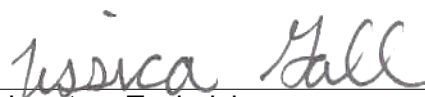


MGA RESEARCH CORPORATION
THORAX (WITHOUT ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

Test I.D: D123145

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.0	Pass
Humidity	%	10 to 70	44	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Maximum Probe Acceleration	G's	14 to 18	15	Pass
Upper Rib Displacement	mm	32 to 40	36	Pass
Middle Rib Displacement	mm	39 to 45	41	Pass
Lower Rib Displacement	mm	35 to 43	40	Pass
Upper Spine (T1) Y Acceleration	G's	13 to 17	15	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	9	Pass
Overall Test Results				Pass


 Laboratory Technician

08/28/2012

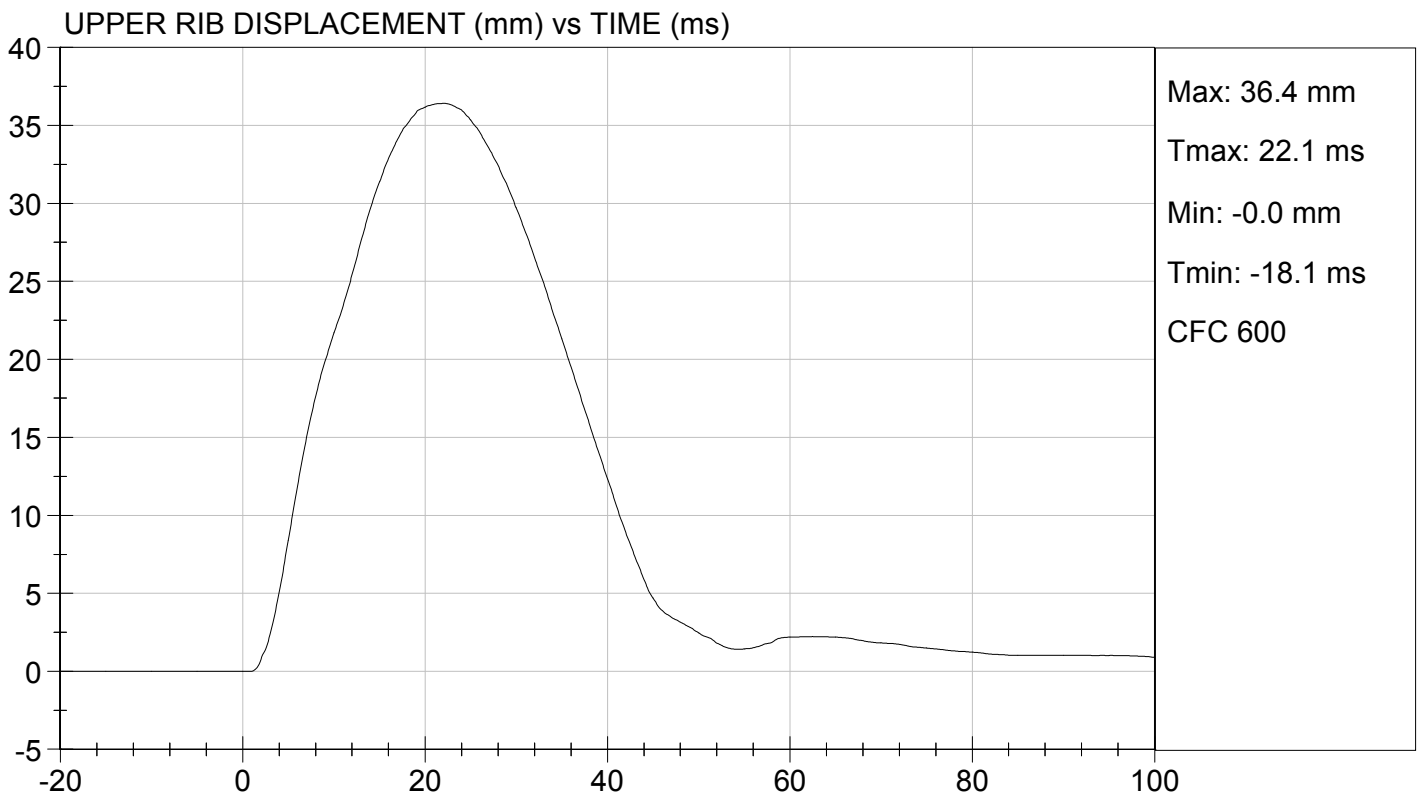
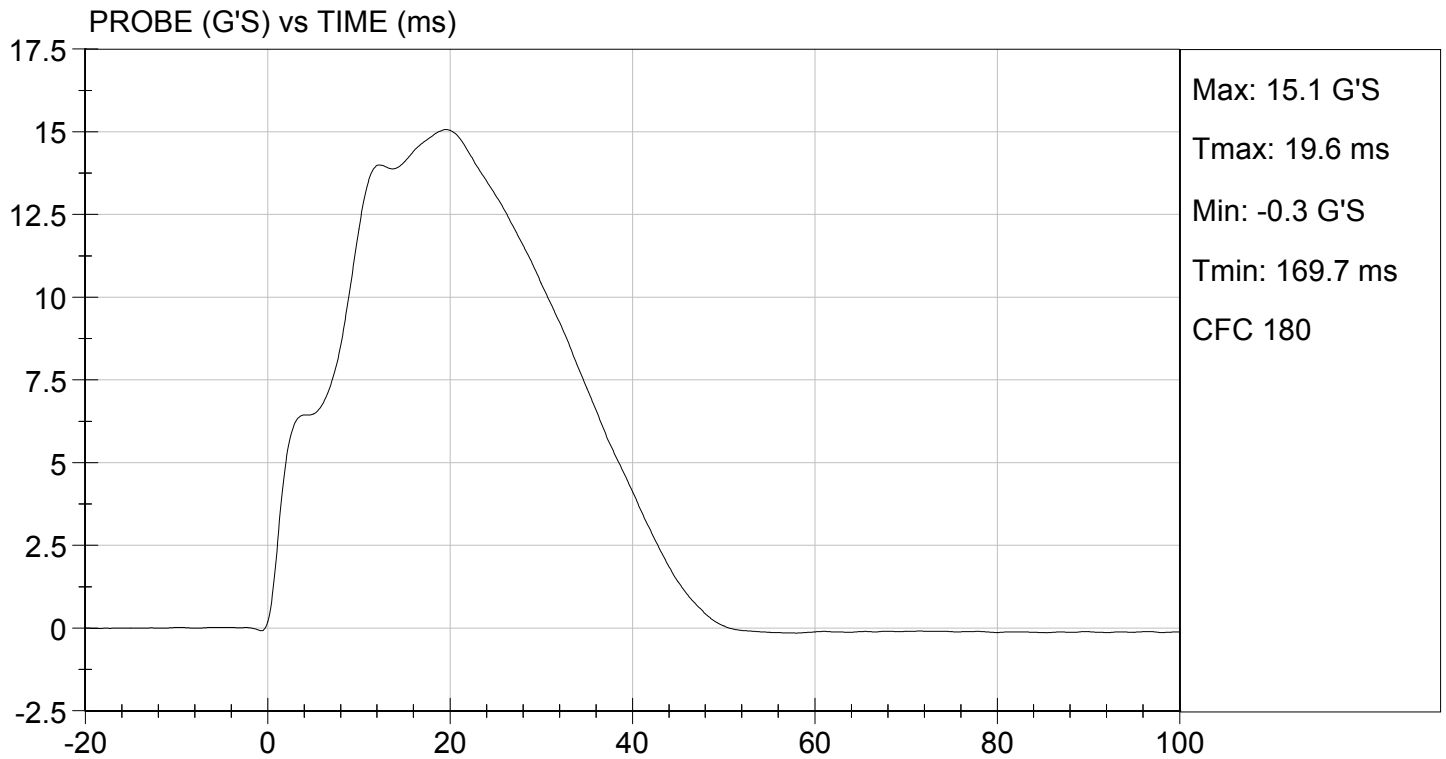
Test Date


 Approved By



TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.25 ft/s, 4.34 m/s

TEST DATE: 08/28/2012
TEST #: D123145

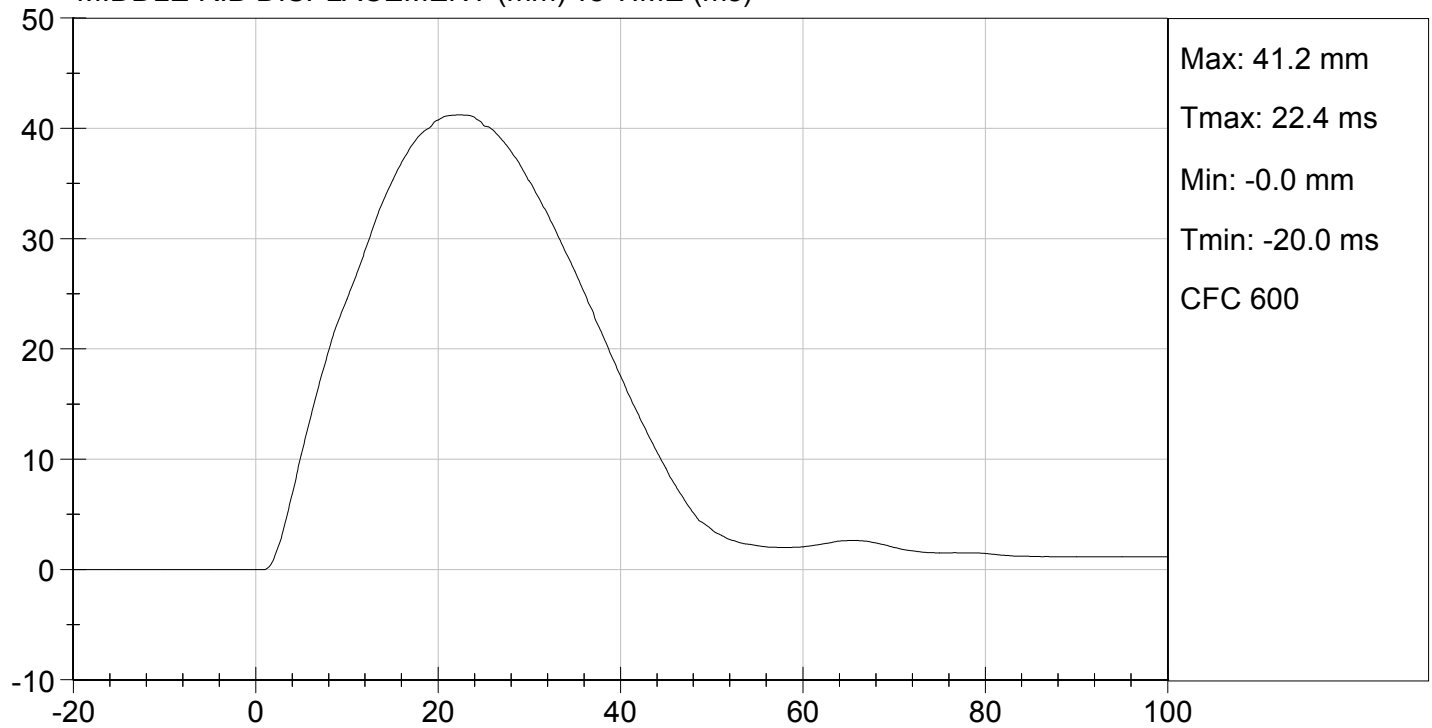




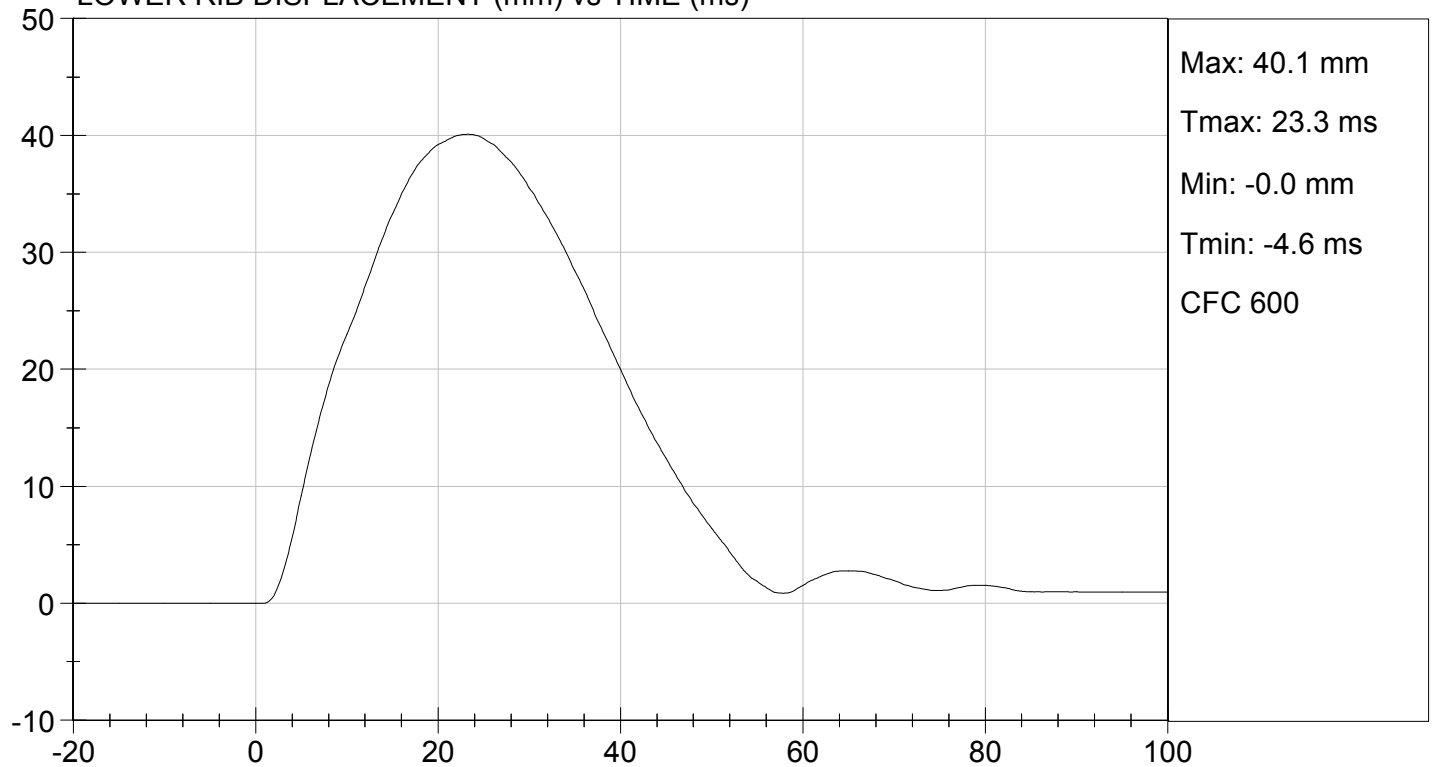
TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.25 ft/s, 4.34 m/s

TEST DATE: 08/28/2012
TEST #: D123145

MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



LOWER RIB DISPLACEMENT (mm) vs TIME (ms)

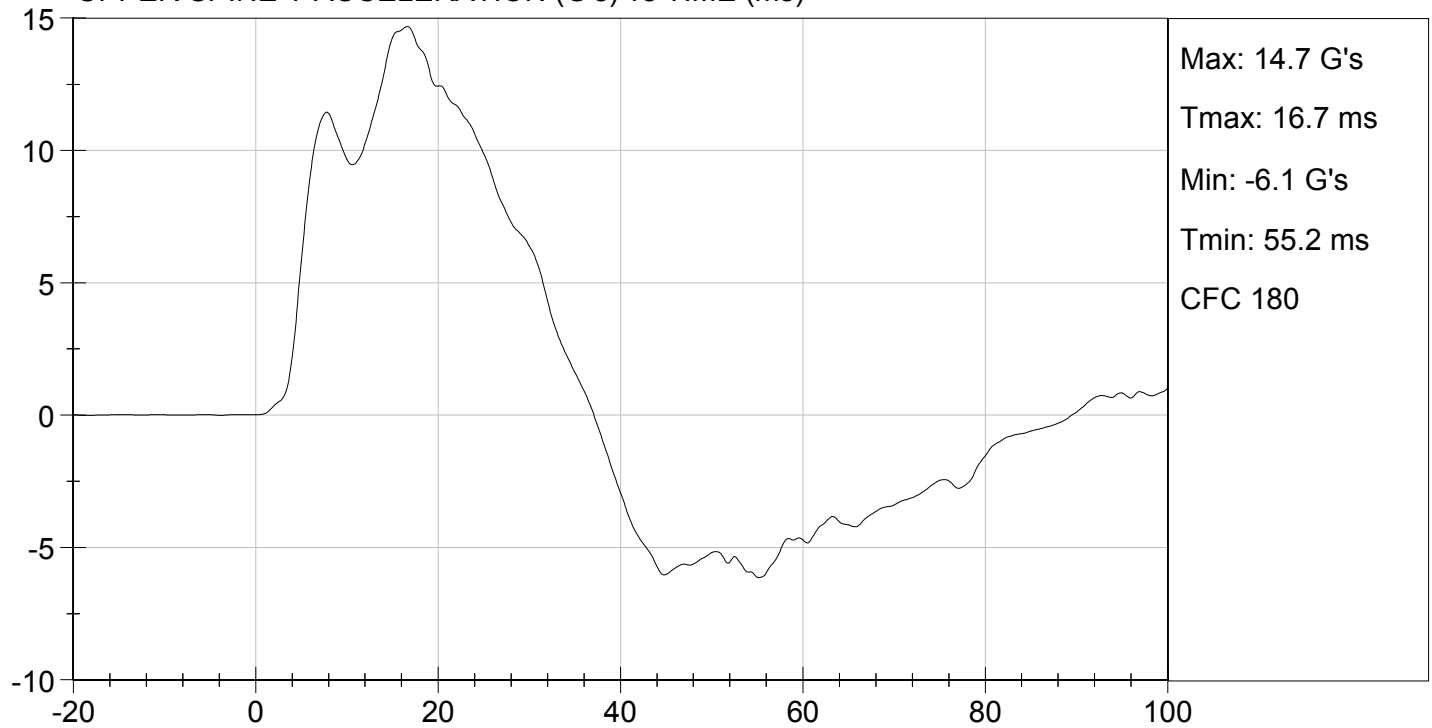




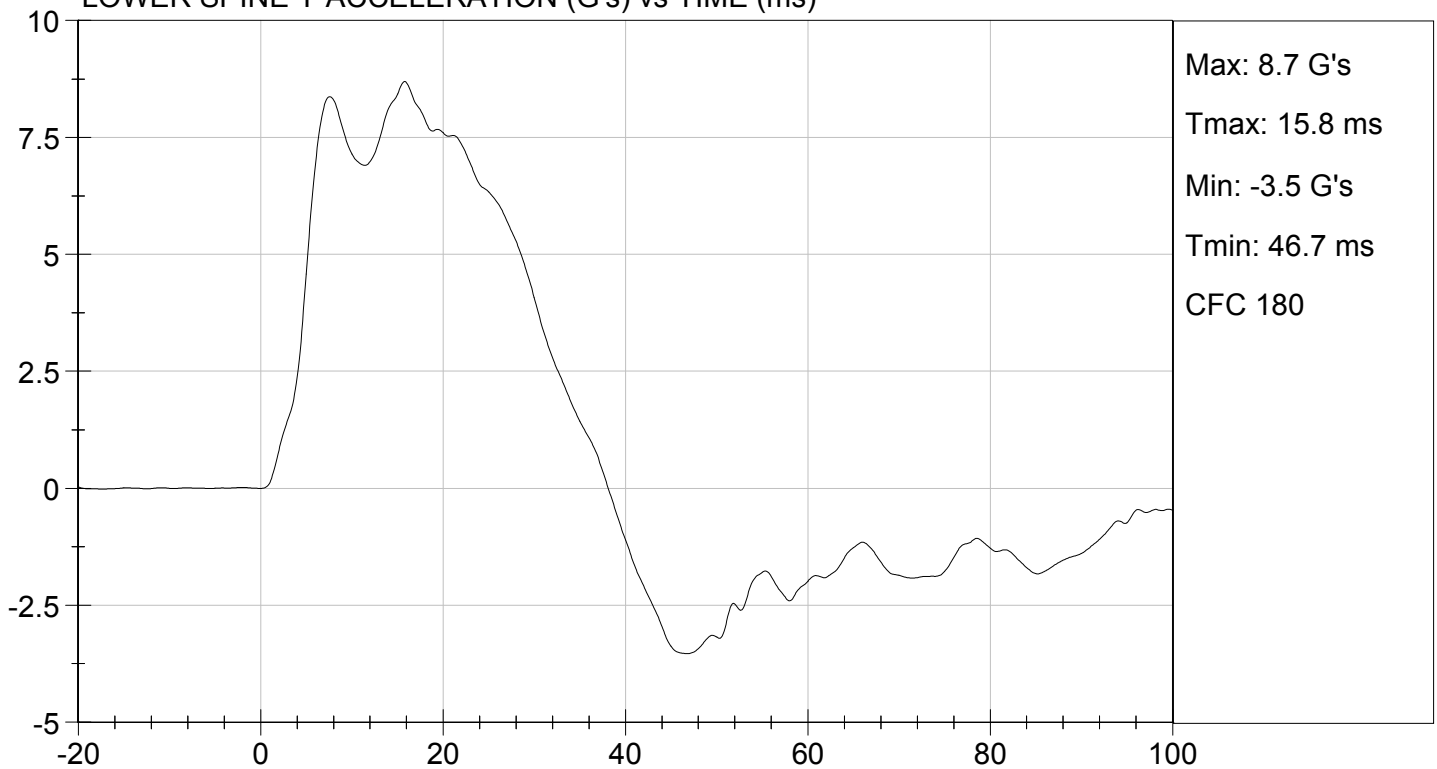
TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.25 ft/s, 4.34 m/s

TEST DATE: 08/28/2012
TEST #: D123145

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



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



MGA RESEARCH CORPORATION

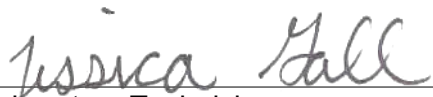
ABDOMINAL IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

Test I.D: D123146

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.0	Pass
Humidity	%	10 to 70	44	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	Pass
Maximum Probe Acceleration	G's	12 to 16	13	Pass
Upper Abdomen Rib Displacement	mm	36 to 47	39	Pass
Lower Abdomen Rib Displacement	mm	33 to 44	40	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	10	Pass
Overall Test Results				Pass


Laboratory Technician

08/28/2012

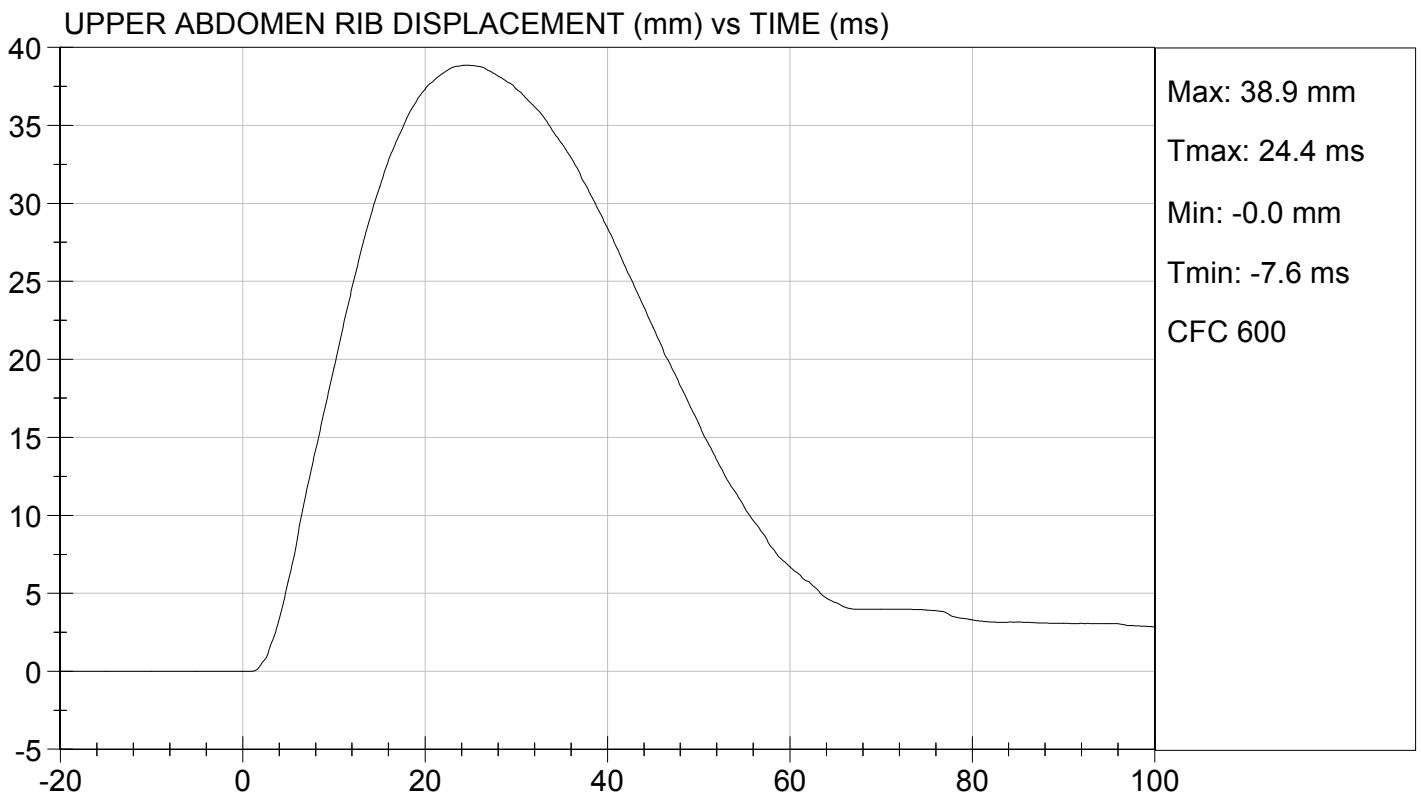
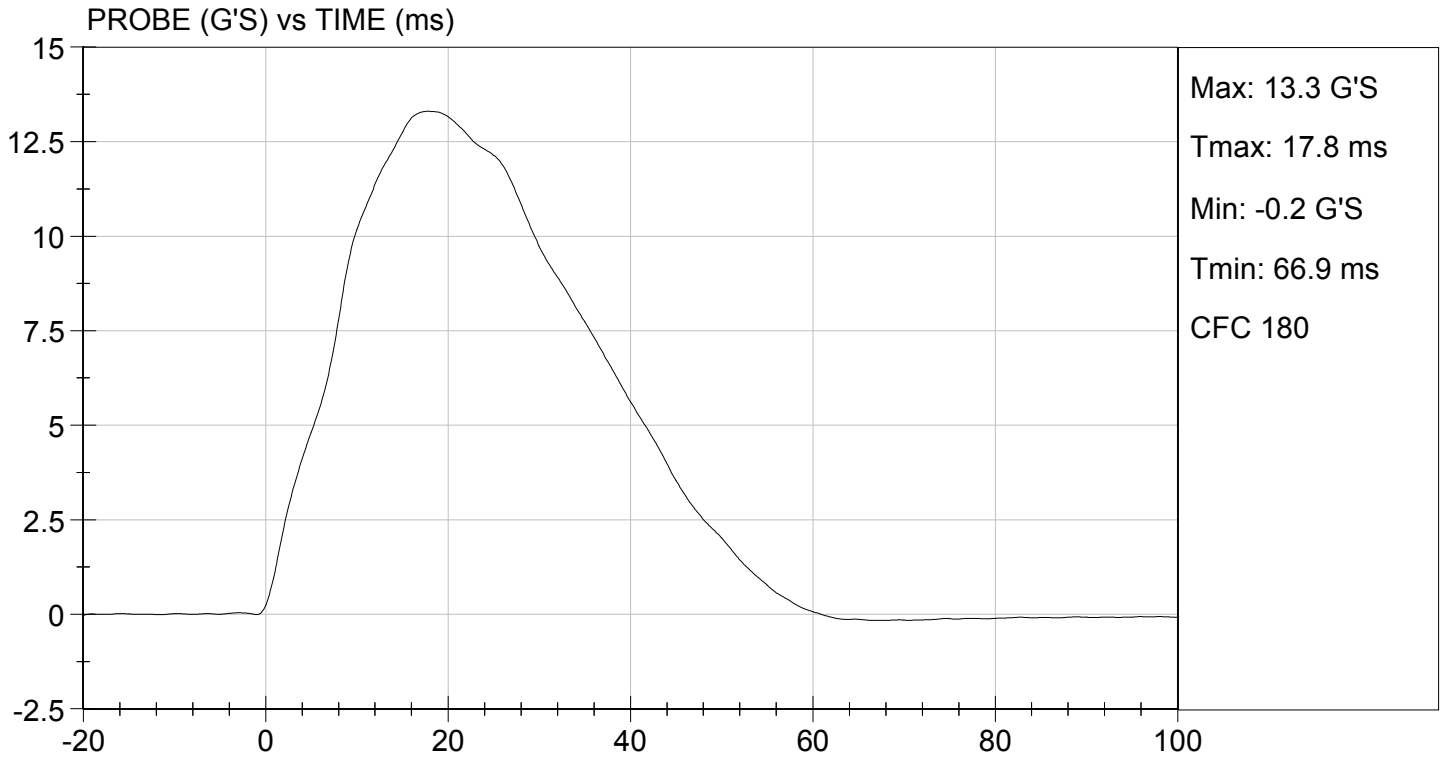
Test Date


Approved By



TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.12 ft/s, 4.30 m/s

TEST DATE: 08/28/2012
TEST #: D123146

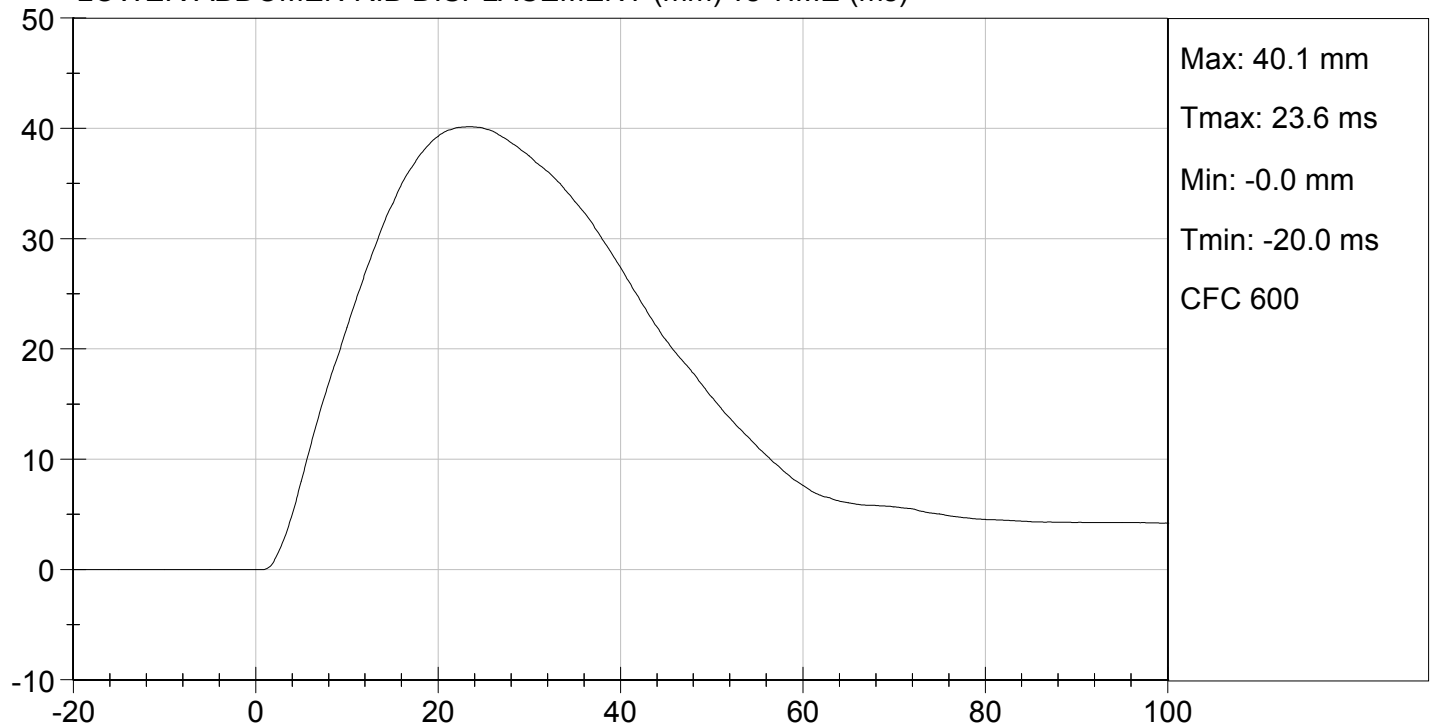




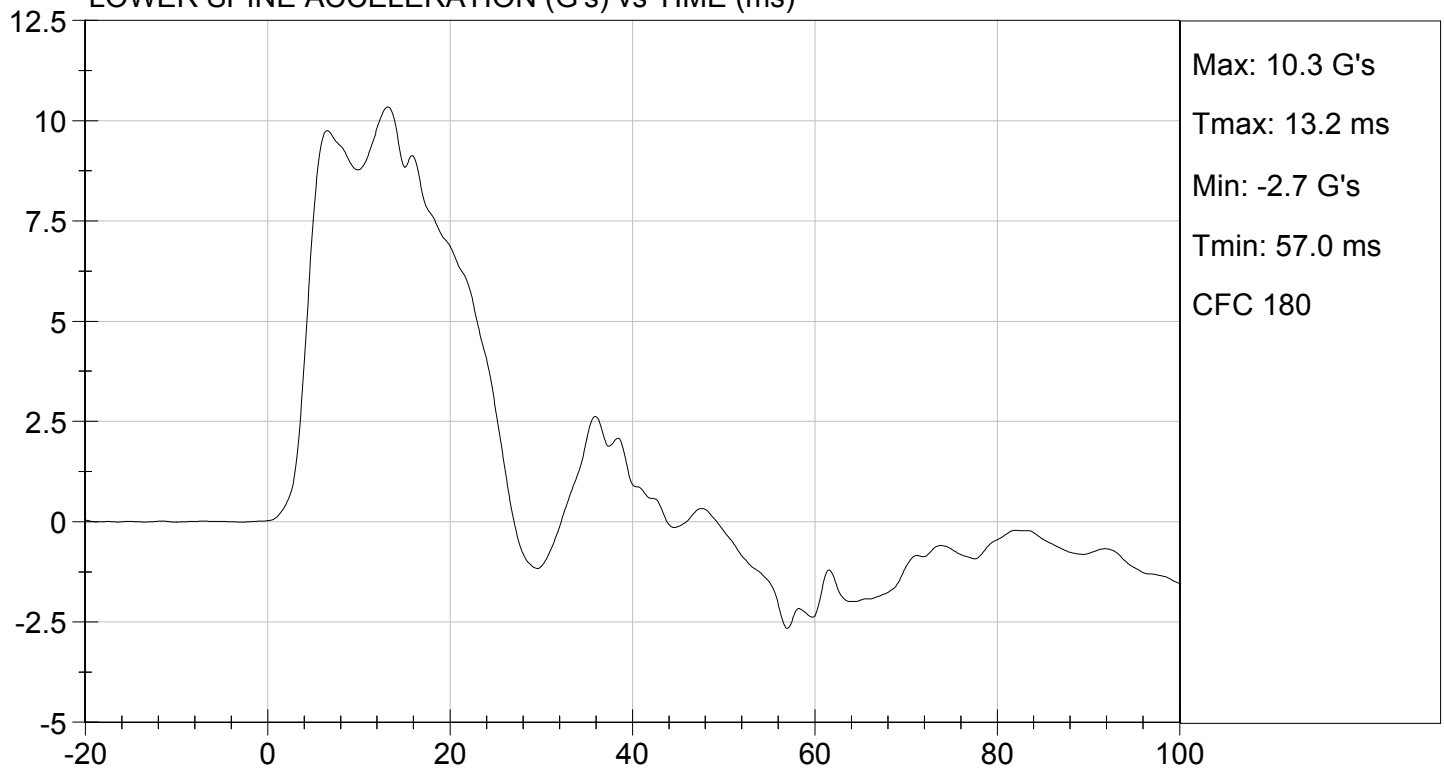
TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.12 ft/s, 4.30 m/s

TEST DATE: 08/28/2012
TEST #: D123146

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



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



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

Test I.D: D123147

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.0	Pass
Humidity	%	10 to 70	44	Pass
Impact Velocity	m/s	6.60 to 6.80	6.68	Pass
Maximum Probe Acceleration	G's	38 to 47	44	Pass
Pelvis Y Acceleration After 6 ms	G's	34 to 42	42	Pass
Peak Acetabulum Force	N	3600 to 4300	3,923	Pass
Overall Test Results				Pass


Laboratory Technician

08/28/2012

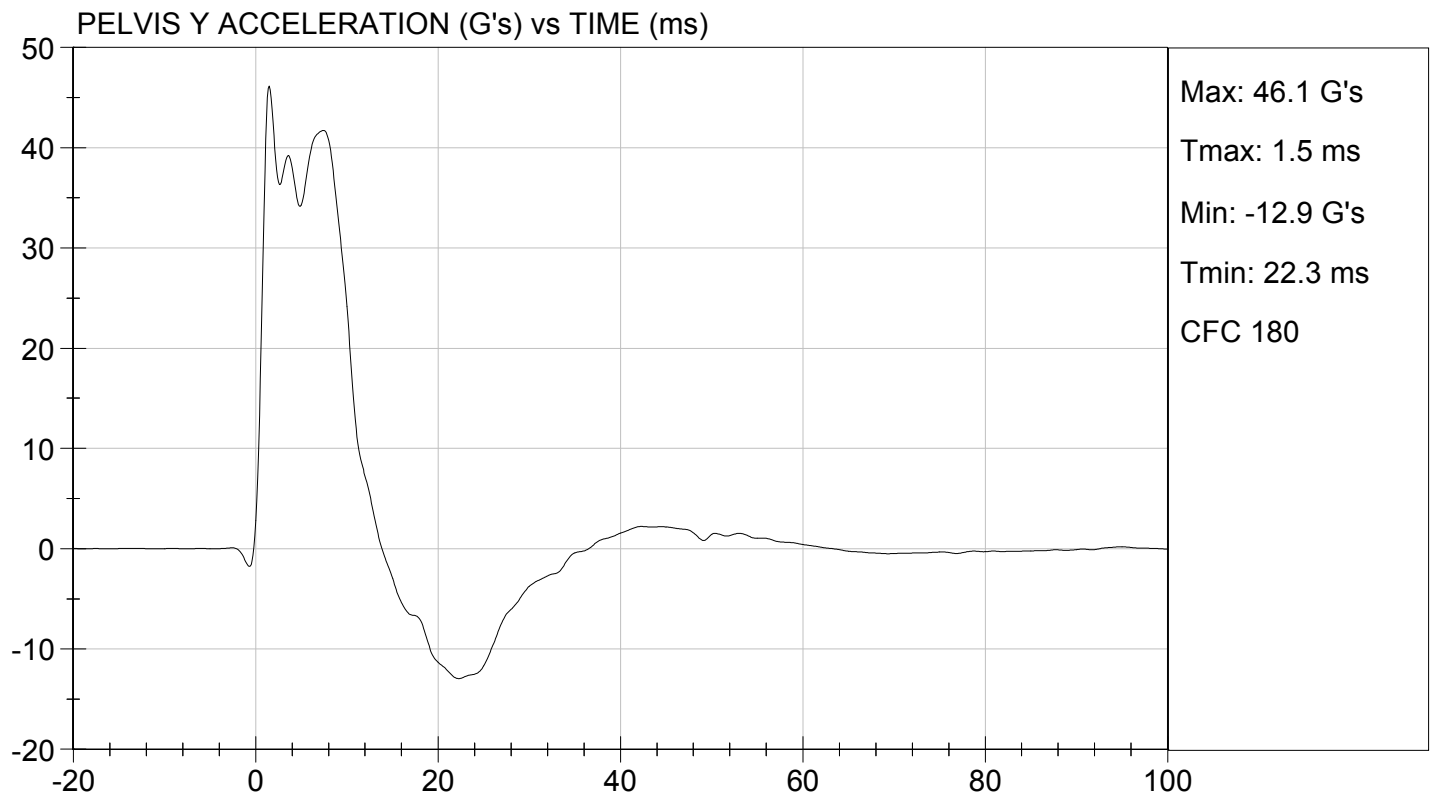
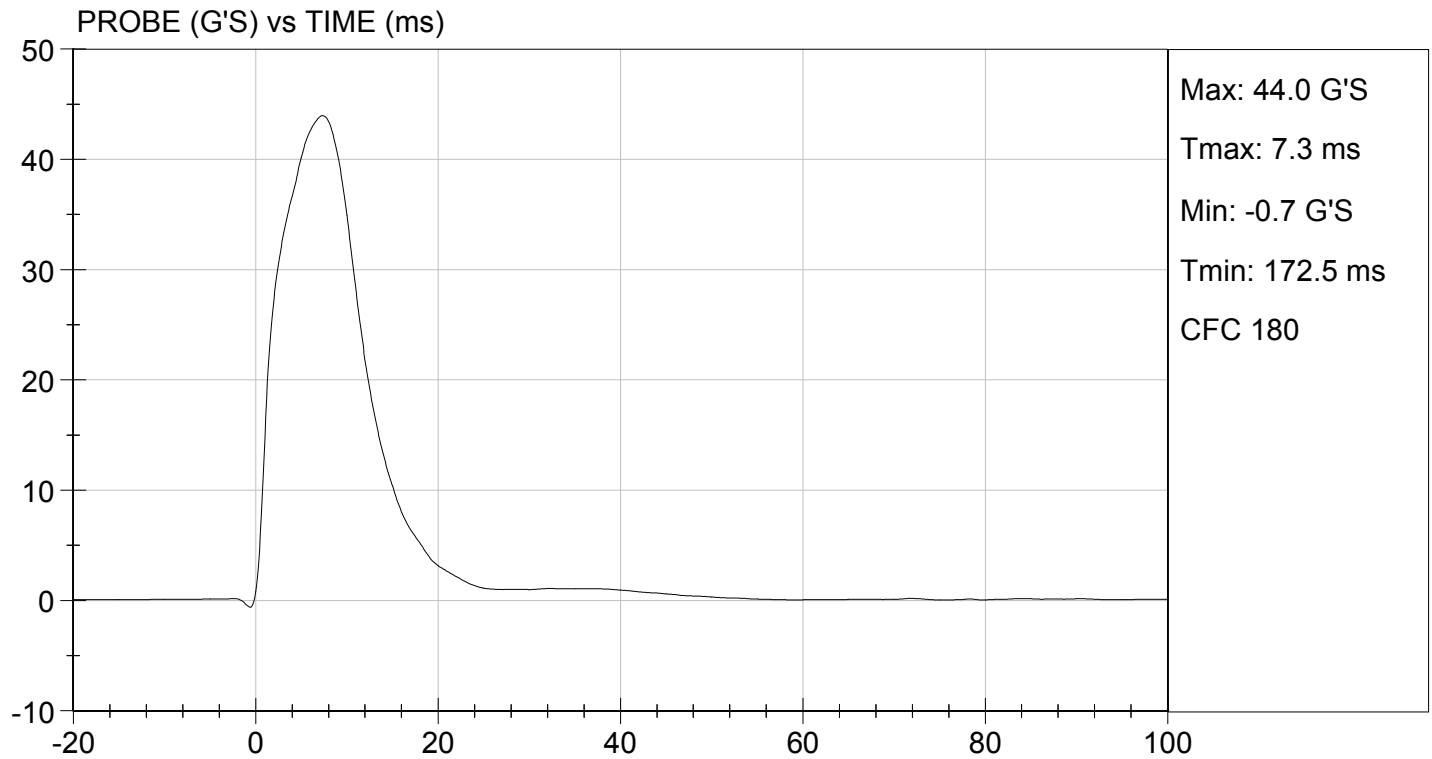
Test Date


Approved By



TEST DESC: PELVIS IMPACT
VELOCITY: 21.90 ft/s, 6.68 m/s

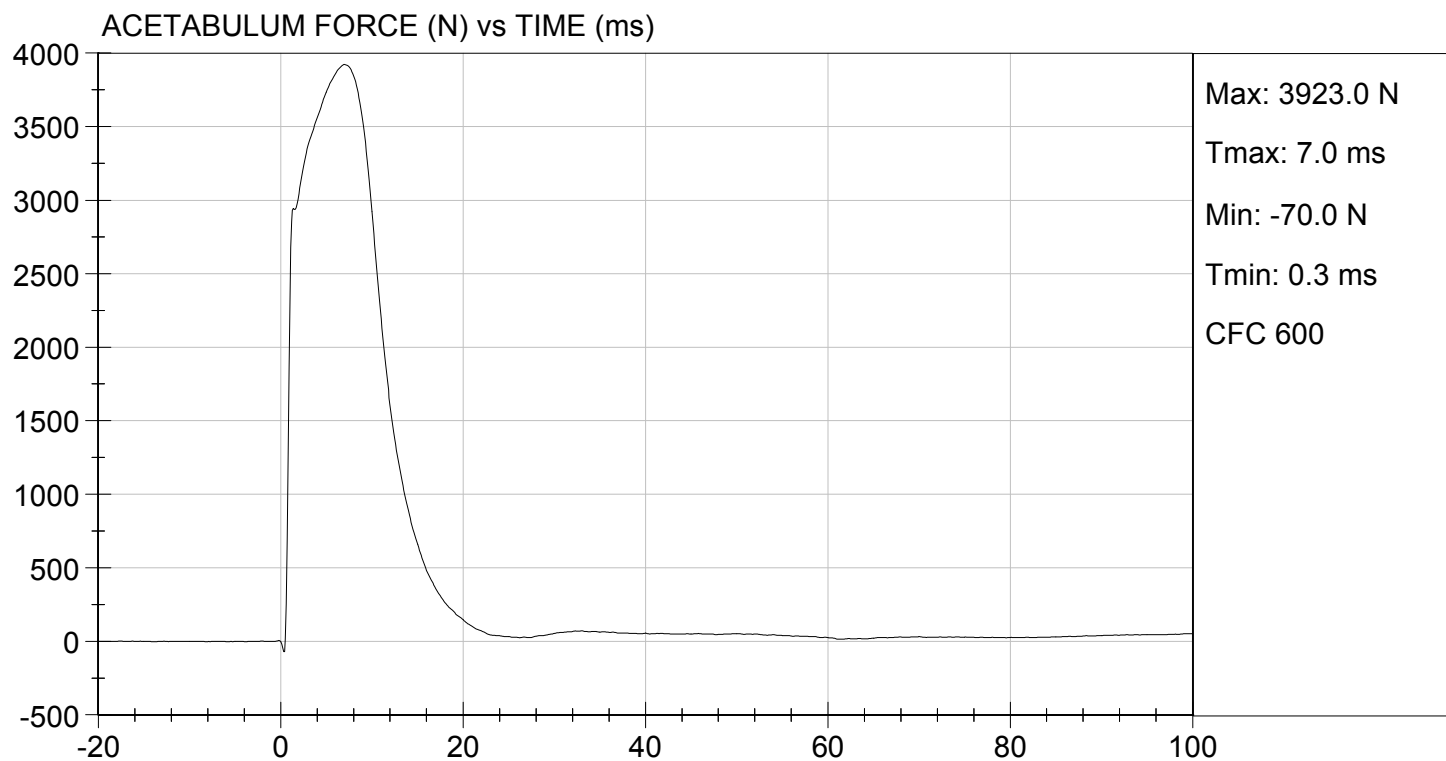
TEST DATE: 08/28/2012
TEST #: D123147





TEST DESC: PELVIS IMPACT
VELOCITY: 21.90 ft/s, 6.68 m/s

TEST DATE: 08/28/2012
TEST #: D123147



MGA RESEARCH CORPORATION

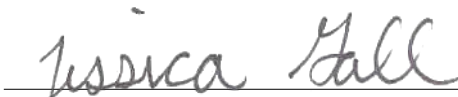
ILIAC IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

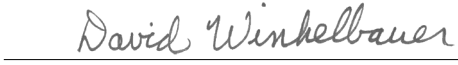
Test I.D: D123148

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.0	Pass
Humidity	%	10 to 70	44	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	Pass
Maximum Probe Acceleration	G's	36 to 45	37	Pass
Pelvis Y Acceleration	G's	28 to 39	29	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4,325	Pass
Overall Test Results				Pass


Laboratory Technician

08/28/2012

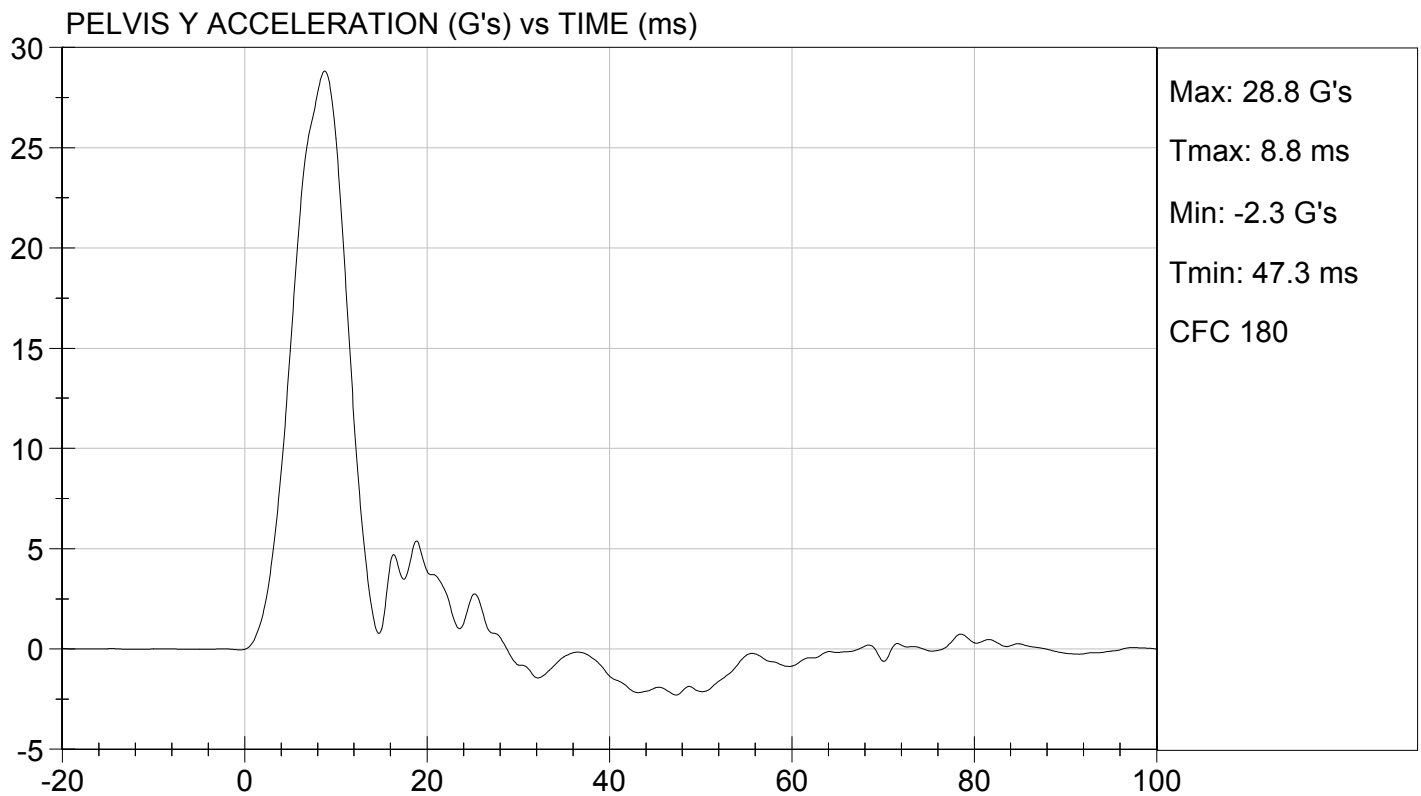
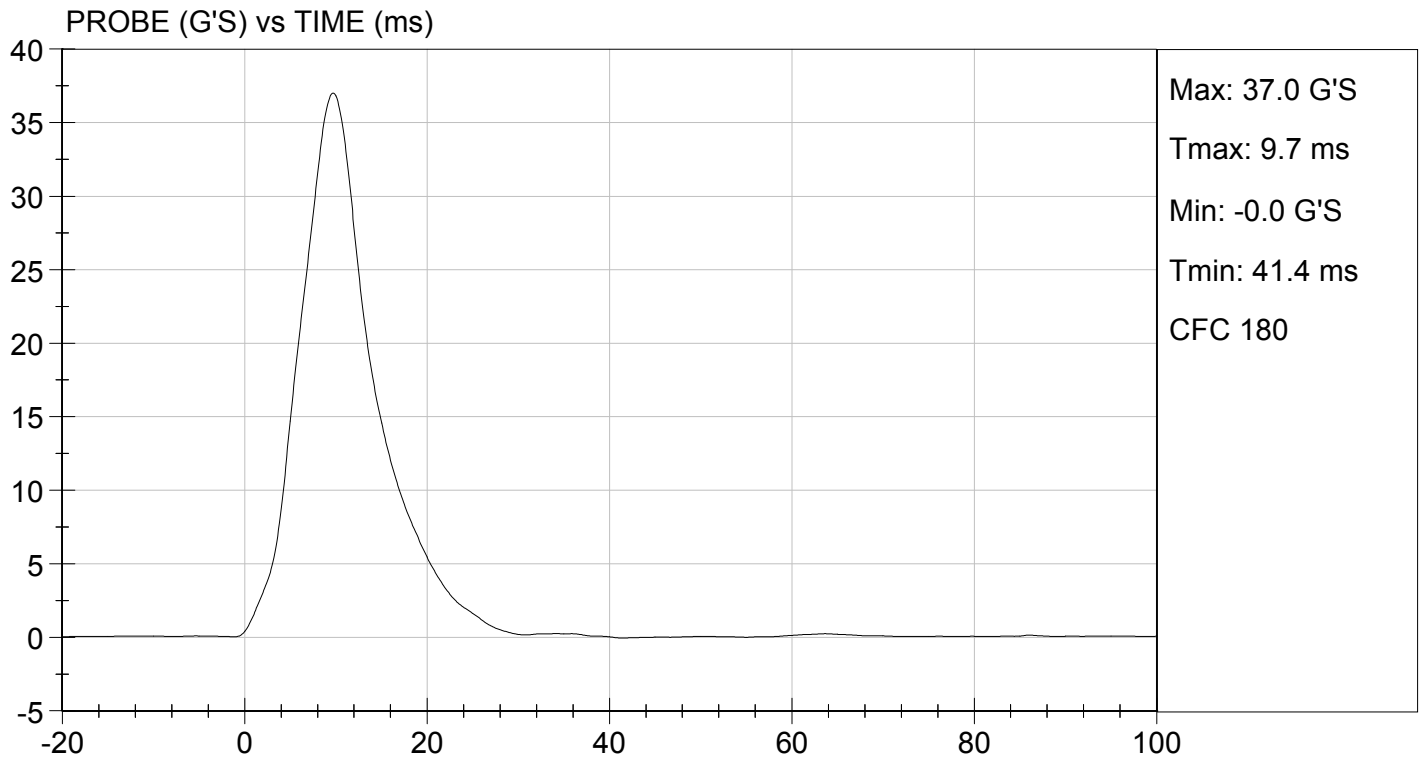
Test Date


Approved By



TEST DESC: ILLIAC
VELOCITY: 14.12 ft/s, 4.30 m/s

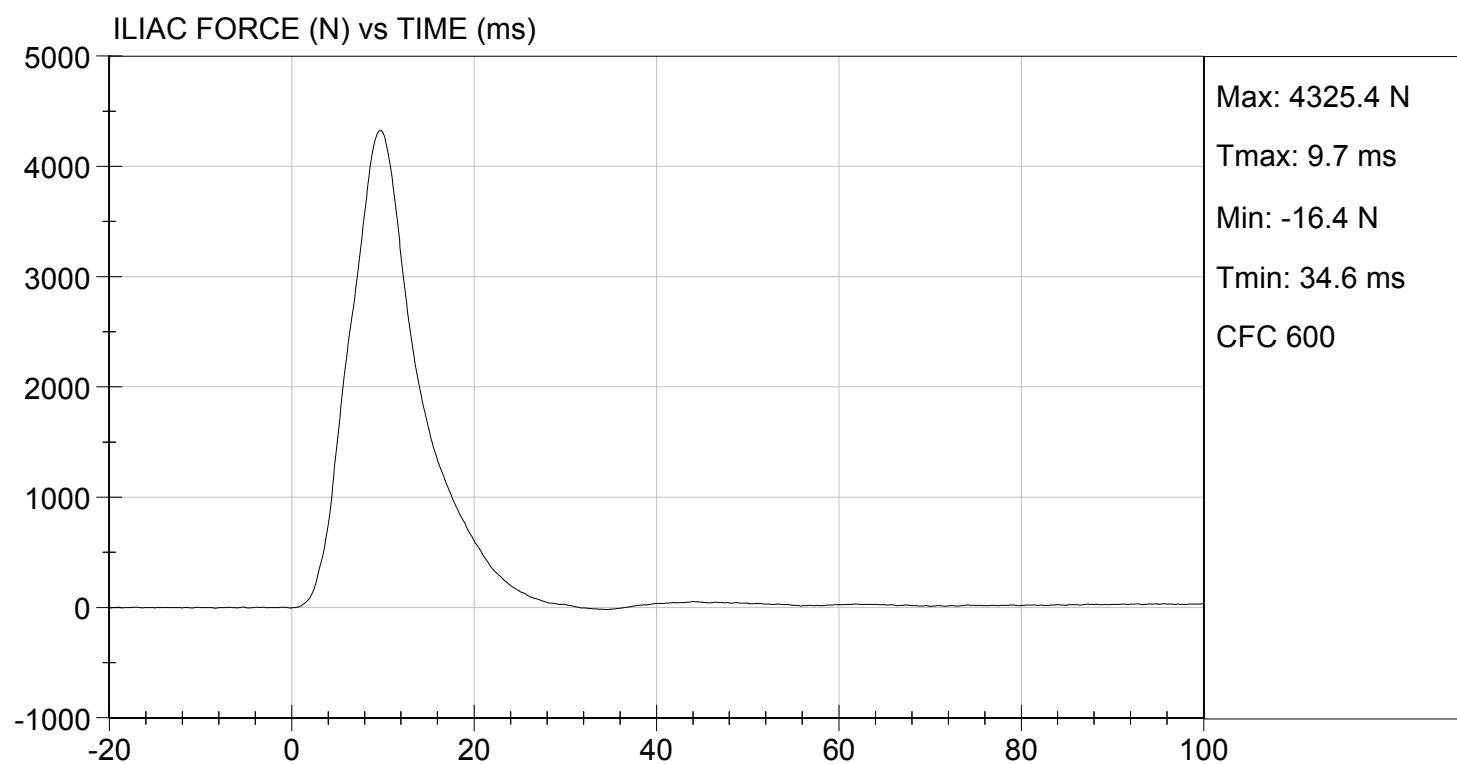
TEST DATE: 08/28/2012
TEST #: D123148





TEST DESC: ILLIAC
VELOCITY: 14.12 ft/s, 4.30 m/s

TEST DATE: 08/28/2012
TEST #: D123148



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

ATD Serial No: 306

Test ID: D123521

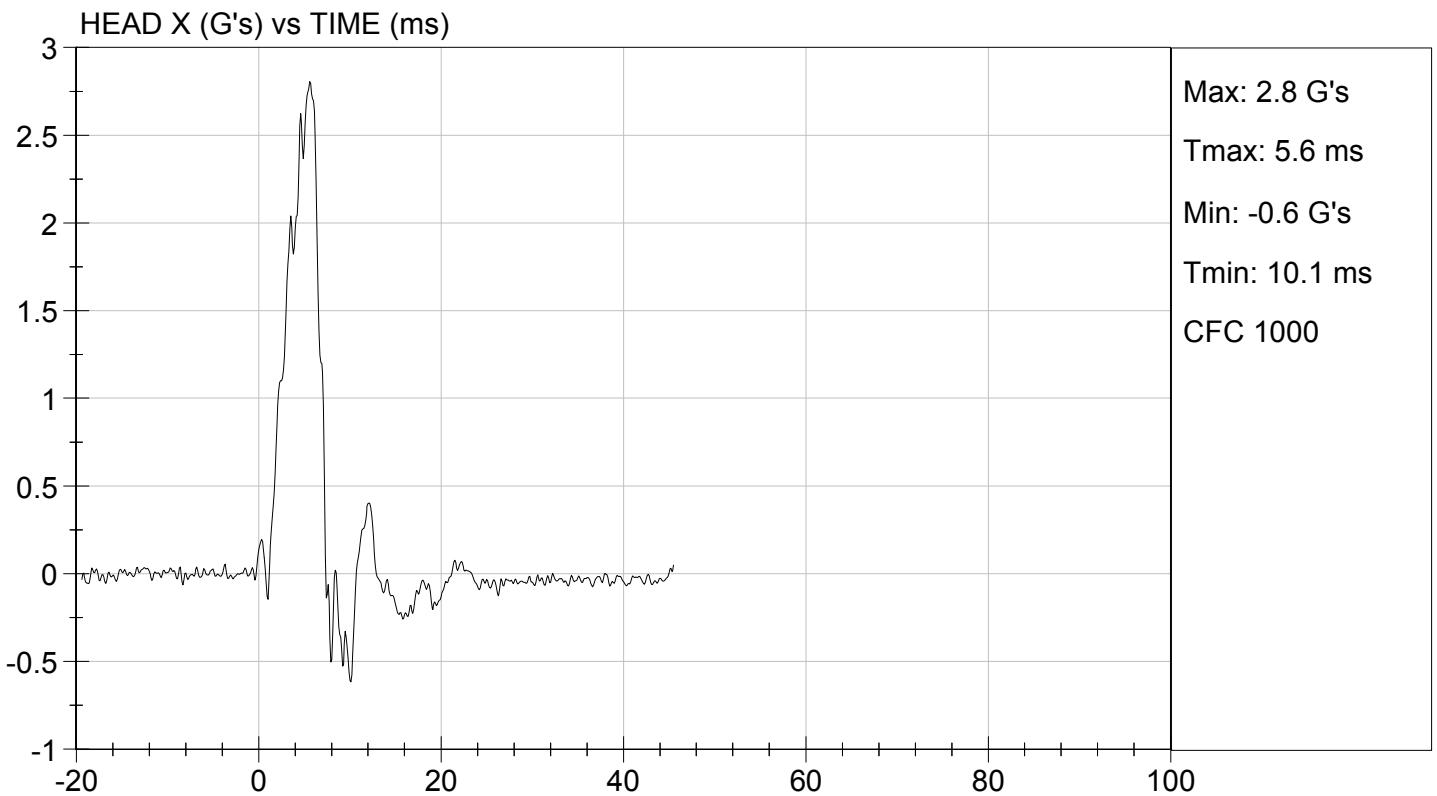
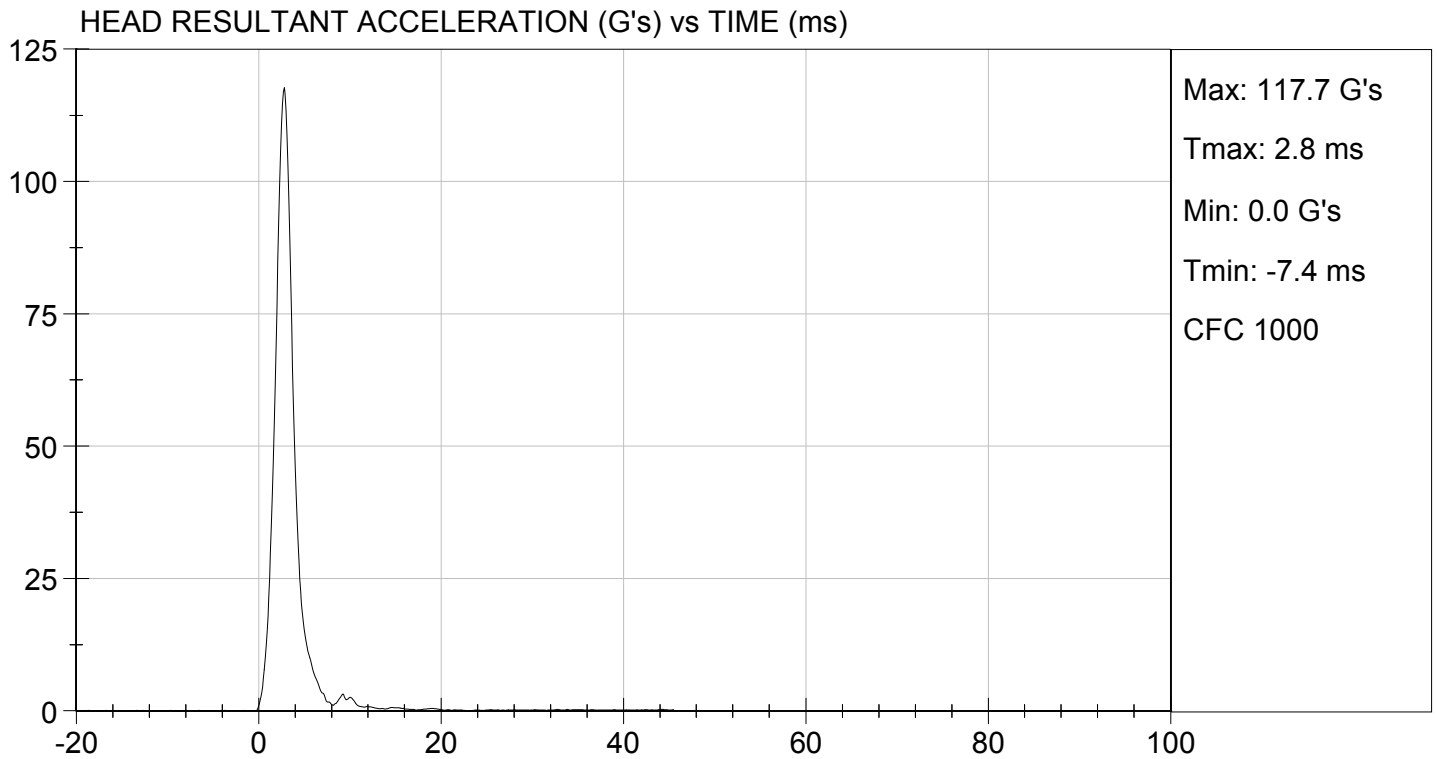
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	32	Pass
Peak Resultant Acceleration	G's	115 to 137	118	Pass
Peak Longitudinal Acceleration	G's	+/- 15	2.8	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	<15%	Yes	Pass
Overall Test Results			Pass	

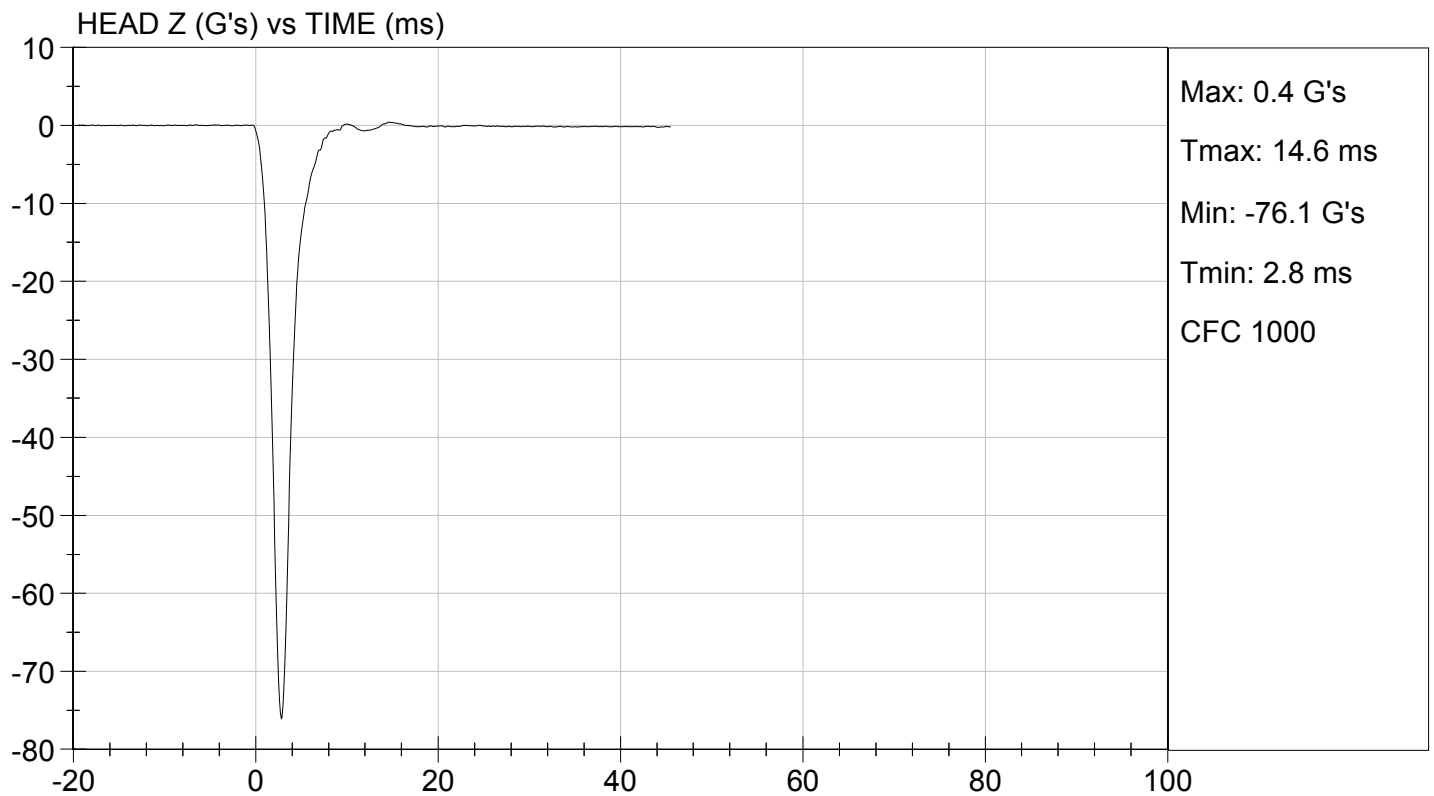
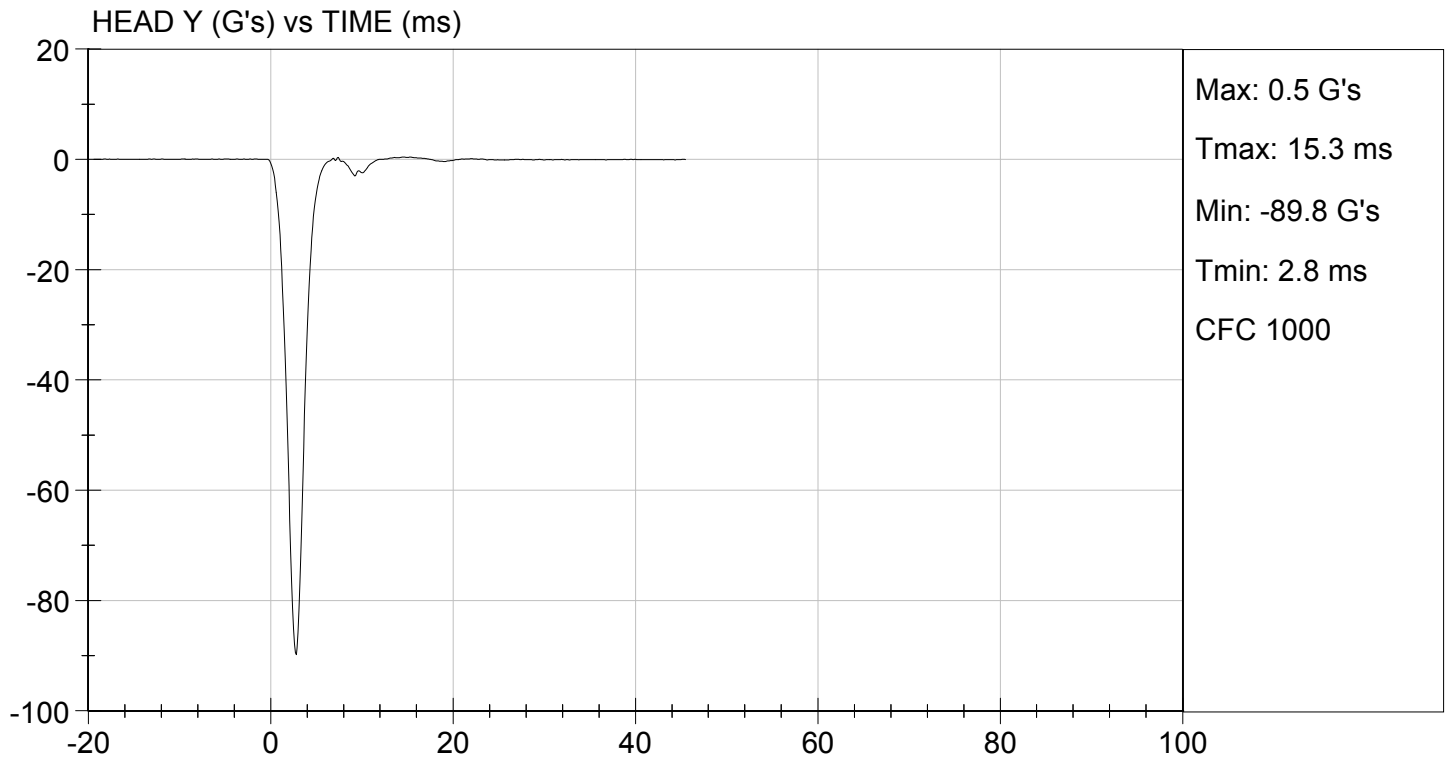

Laboratory Technician

09/24/2012

Test Date


Approved By





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

ATD Serial No: 306

Test I.D: D123522

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	21.5	Pass
Humidity		%	10 to 70	32	Pass
Impact Velocity		m/s	5.51 to 5.63	5.58	Pass
Pendulum Velocity	10 ms	m/s	2.20 to 2.80	2.51	Pass
	15 ms	m/s	3.30 to 4.10	3.61	Pass
	20 ms	m/s	4.40 to 5.40	4.80	Pass
	25 ms	m/s	5.40 to 6.10	5.49	Pass
	25-100 ms	m/s	5.50 to 6.20	5.51	Pass
Maximum D-Plane Rotation		deg	71 to 81	72	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	60	Pass
Maximum Occipital Condyle Moment		Nm	-44 to -36	-43	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	115	Pass
Overall Test Results				Pass	

Jessica Hall
Laboratory Technician

09/24/2012

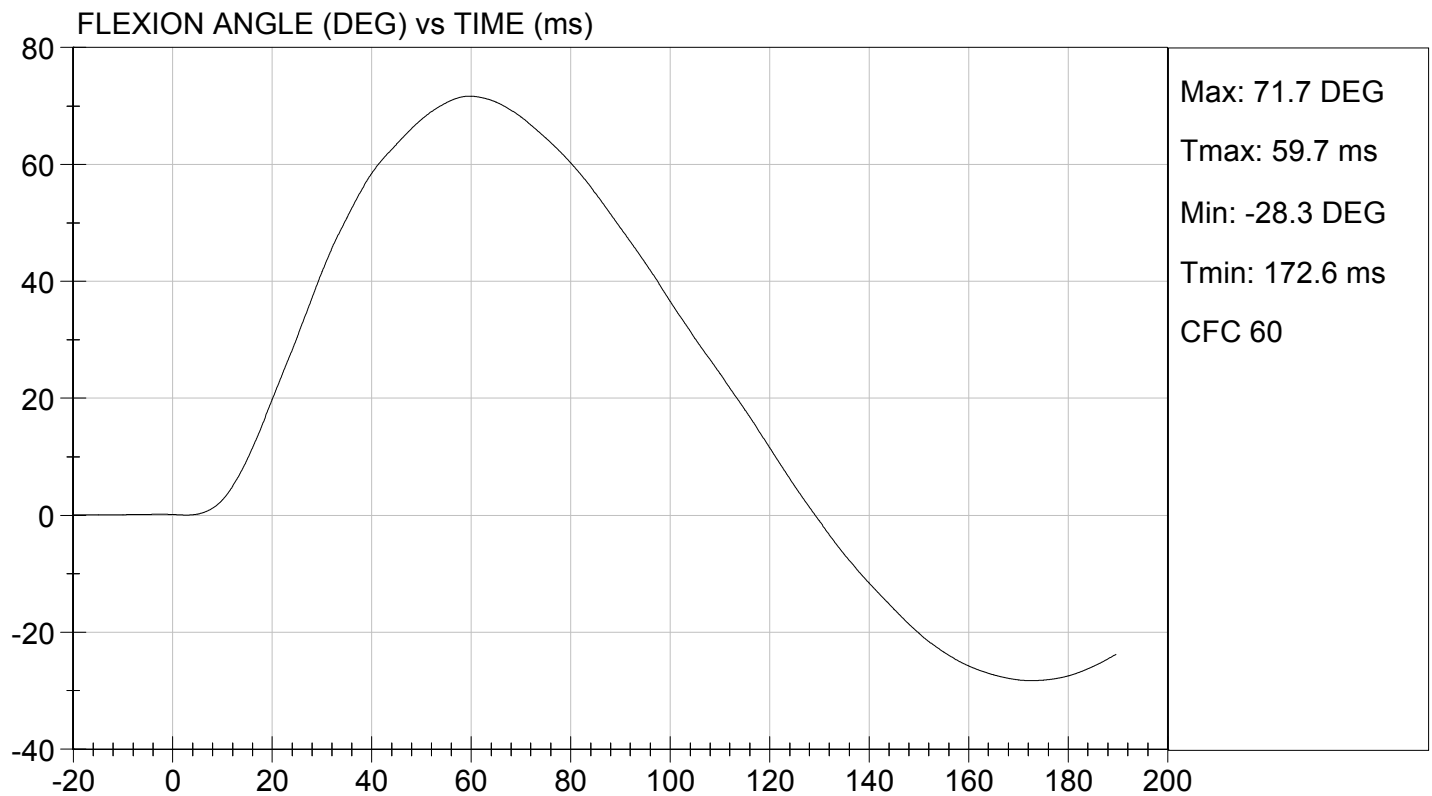
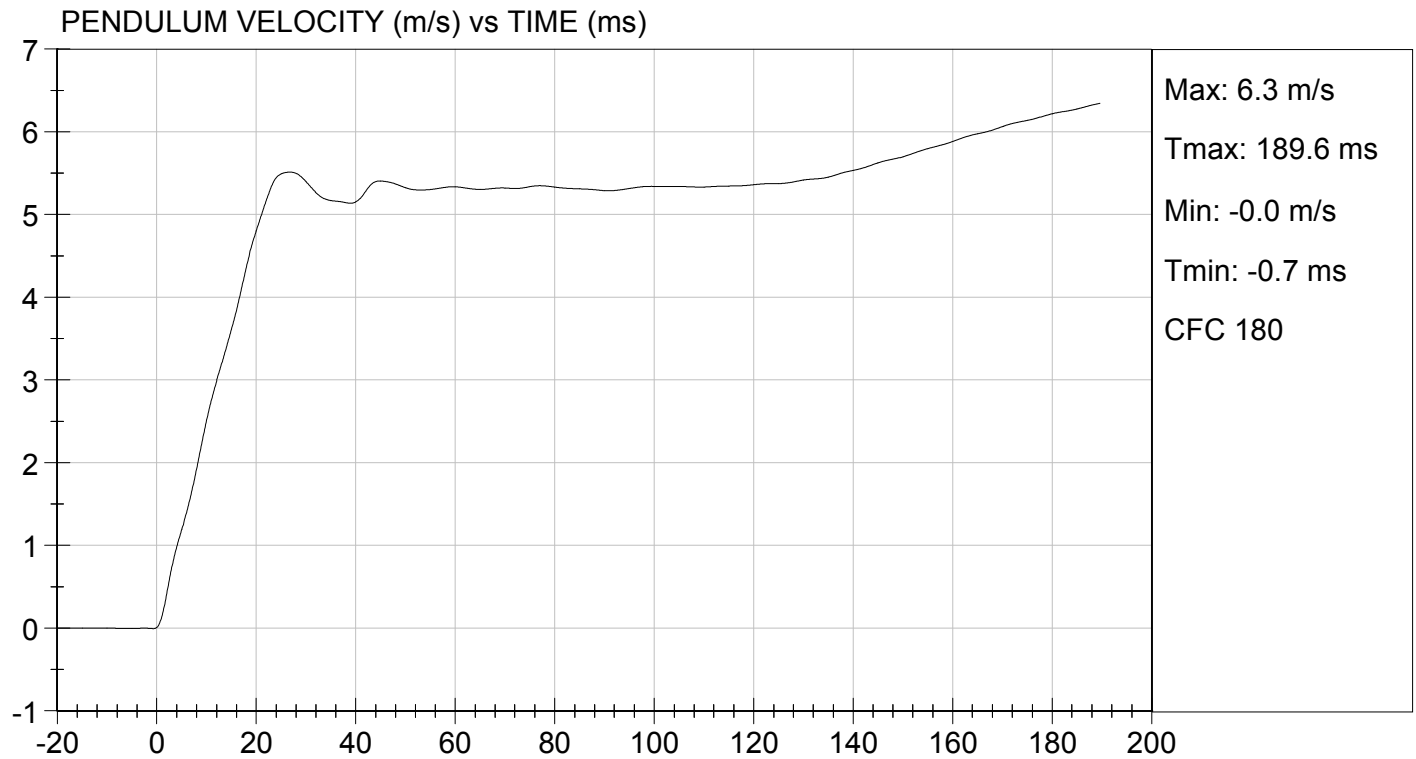
Test Date

David Winkelbauer
Approved By



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

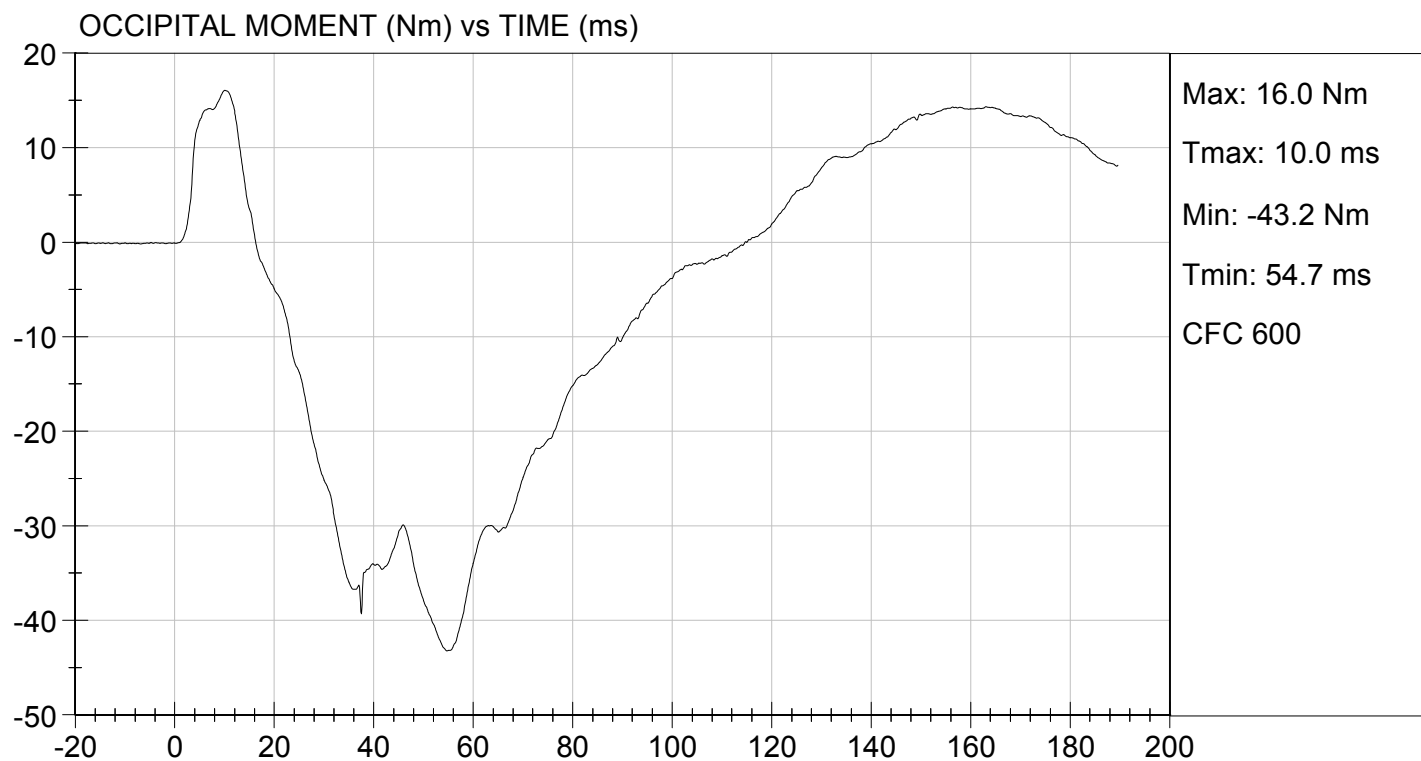
TEST DATE: 09/24/2012
TEST #: D123522





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

TEST DATE: 09/24/2012
TEST #: D123522

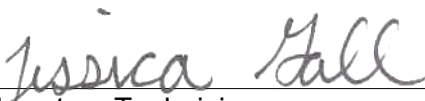


MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

Test ID: D123523

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	31	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Maximum Probe Acceleration	G's	13 to 18	16	Pass
Shoulder Displacement	mm	28 to 37	29	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	18	Pass
			Overall Test Results	Pass


Laboratory Technician

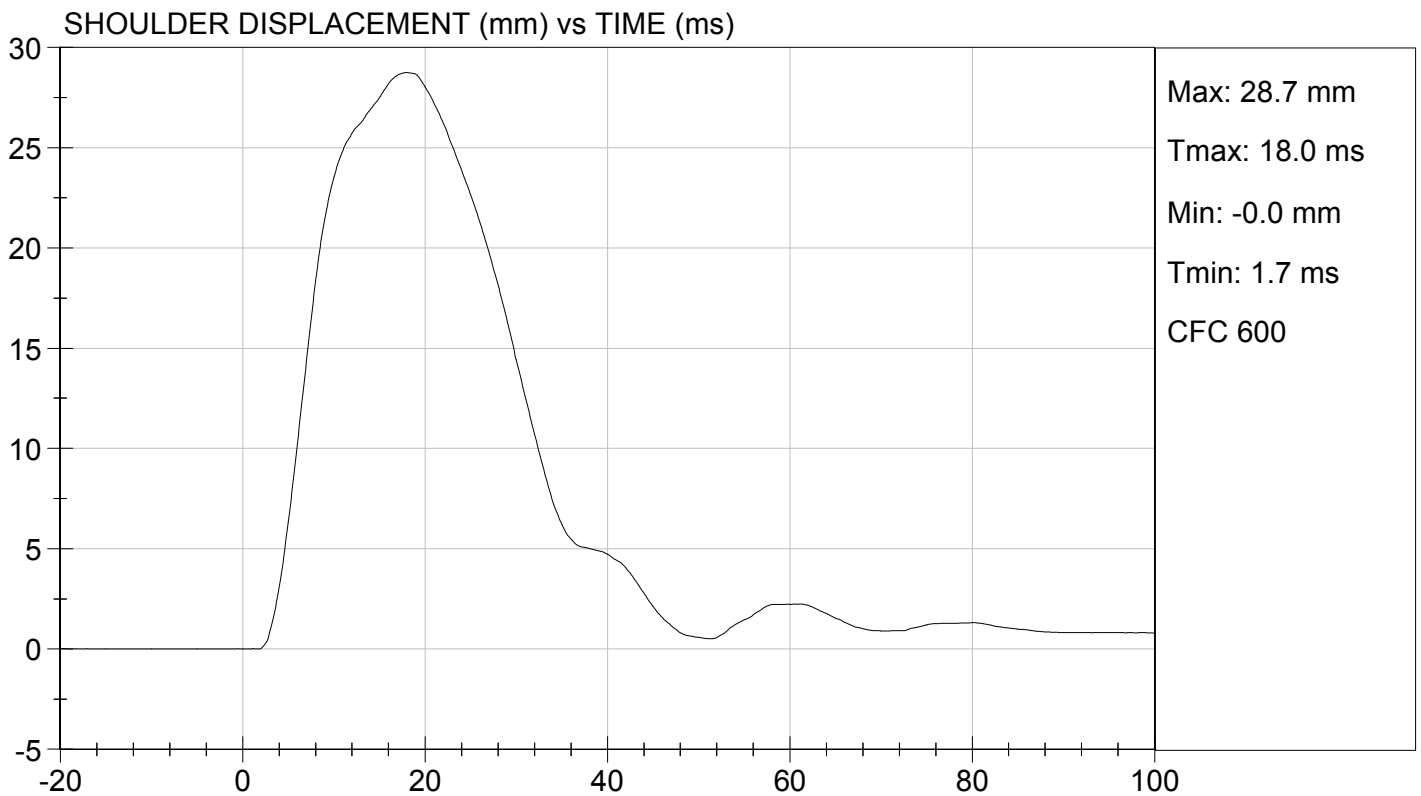
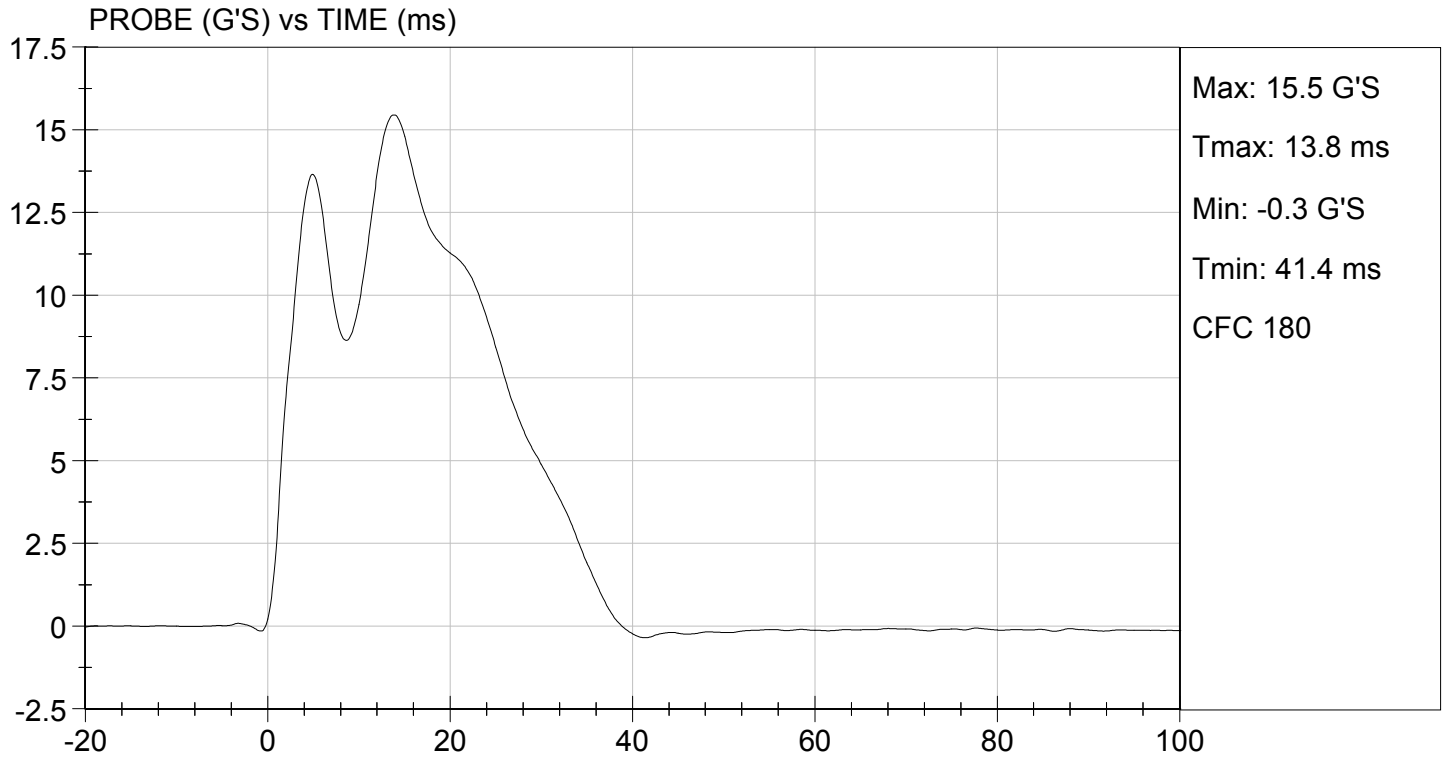
09/24/2012
Test Date


Approved By



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

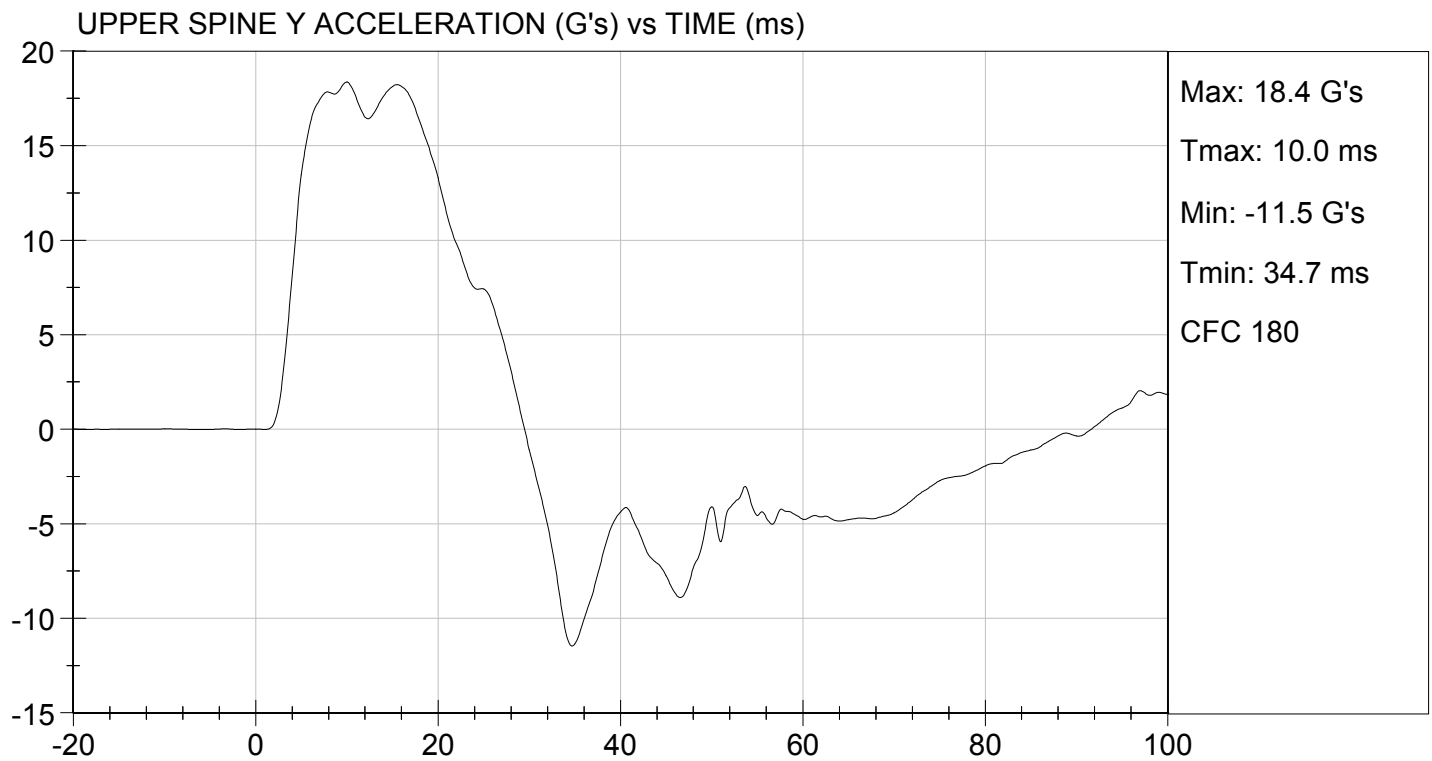
TEST DATE: 09/24/2012
TEST #: D123523





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

TEST DATE: 09/24/2012
TEST #: D123523

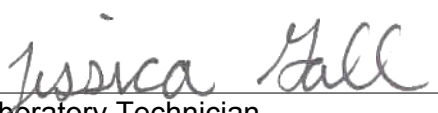


MGA RESEARCH CORPORATION
THORAX (WITH ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

Test I.D: D123524

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.0	Pass
Humidity	%	10 to 70	31	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	Pass
Maximum Probe Acceleration	G's	30 to 36	32	Pass
Shoulder Displacement	mm	31 to 40	32	Pass
Upper Rib Displacement	mm	25 to 32	27	Pass
Middle Rib Displacement	mm	30 to 36	32	Pass
Lower Rib Displacement	mm	32 to 38	36	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	40	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	31	Pass
Overall Test Results				Pass


 Laboratory Technician

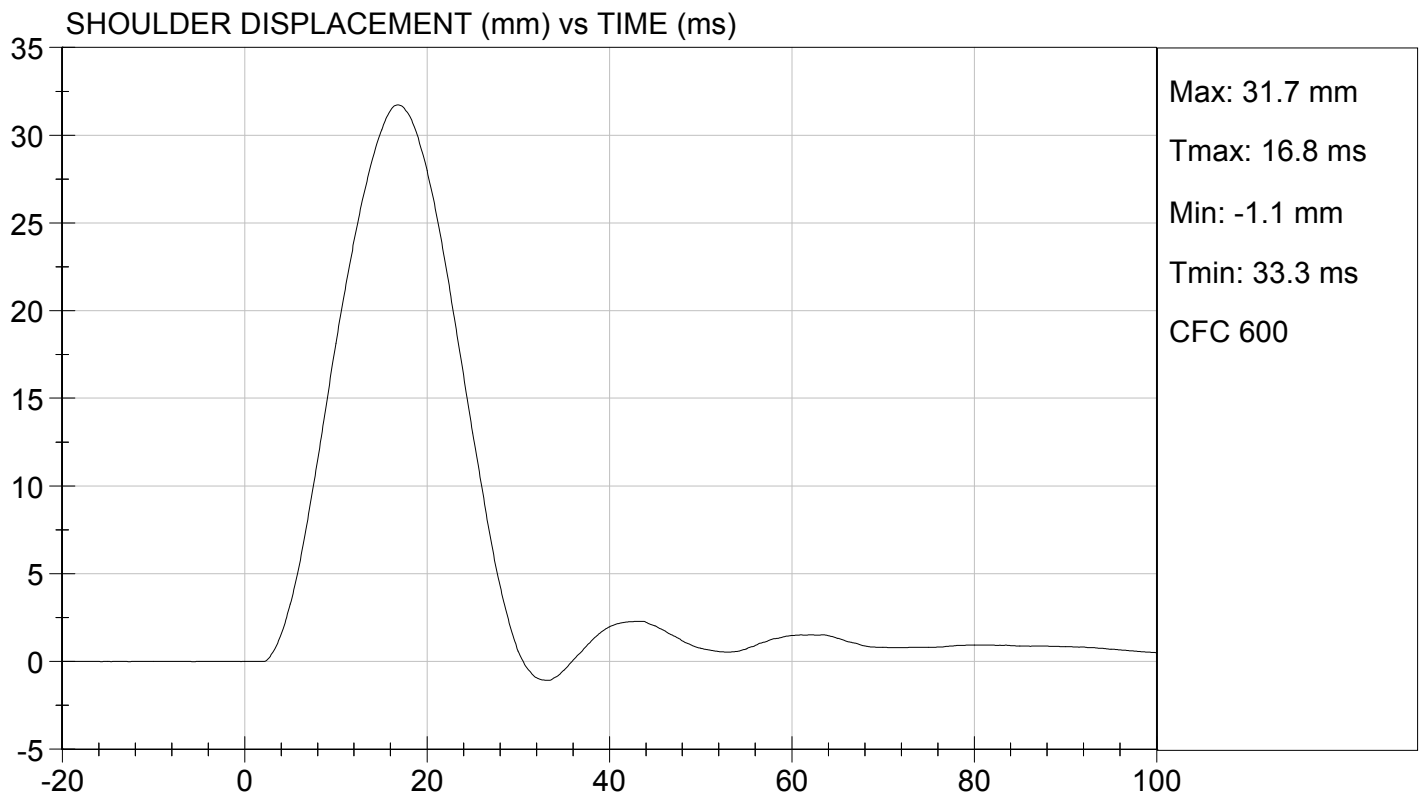
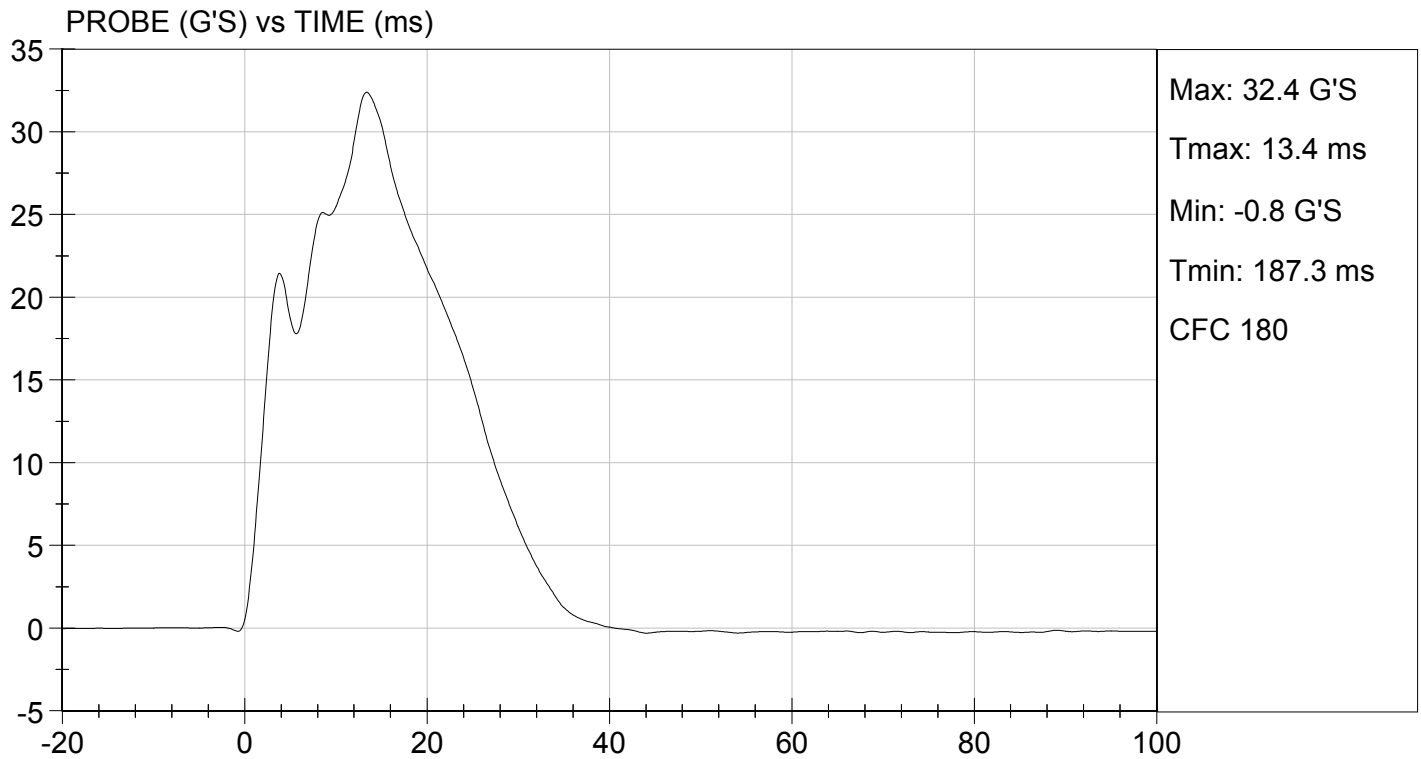
09/24/2012
 Test Date

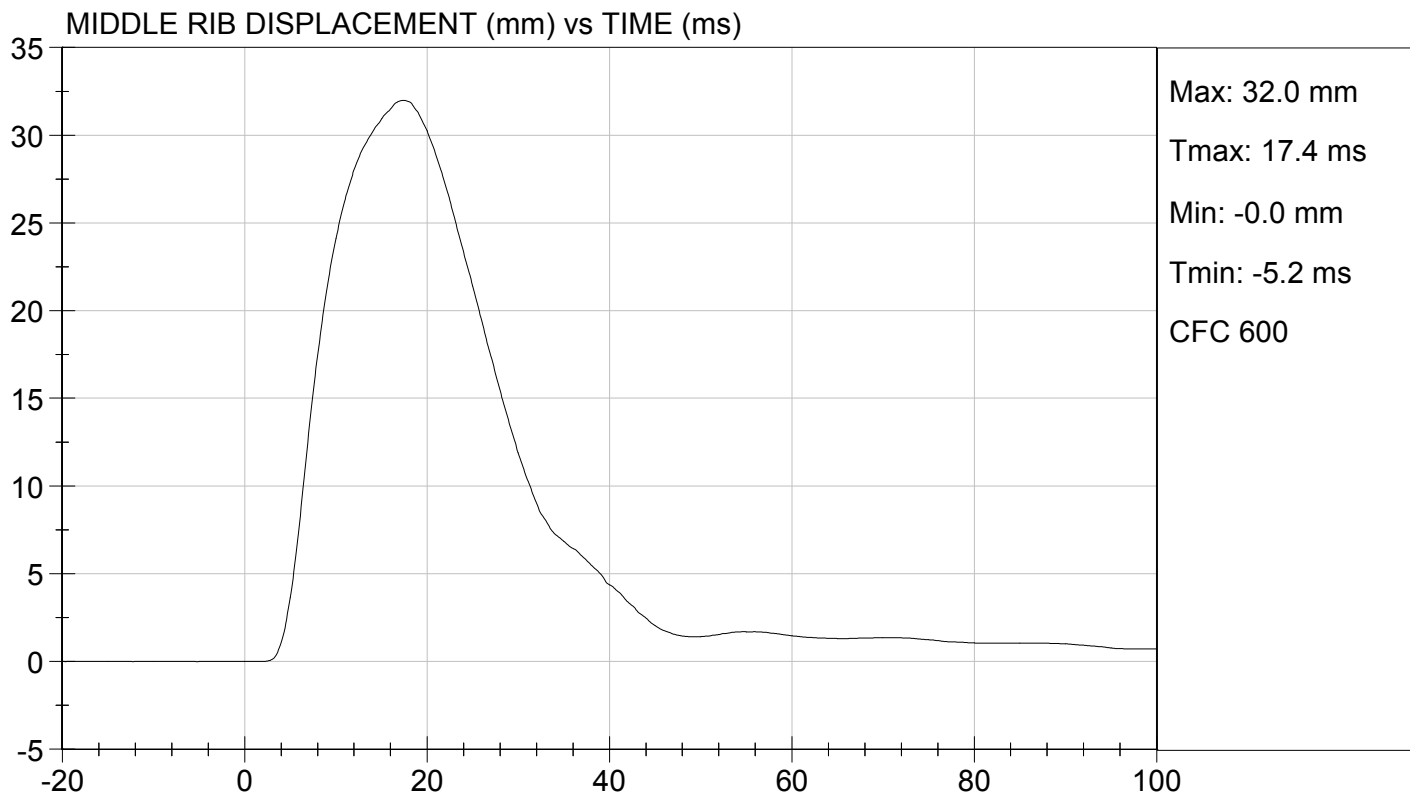
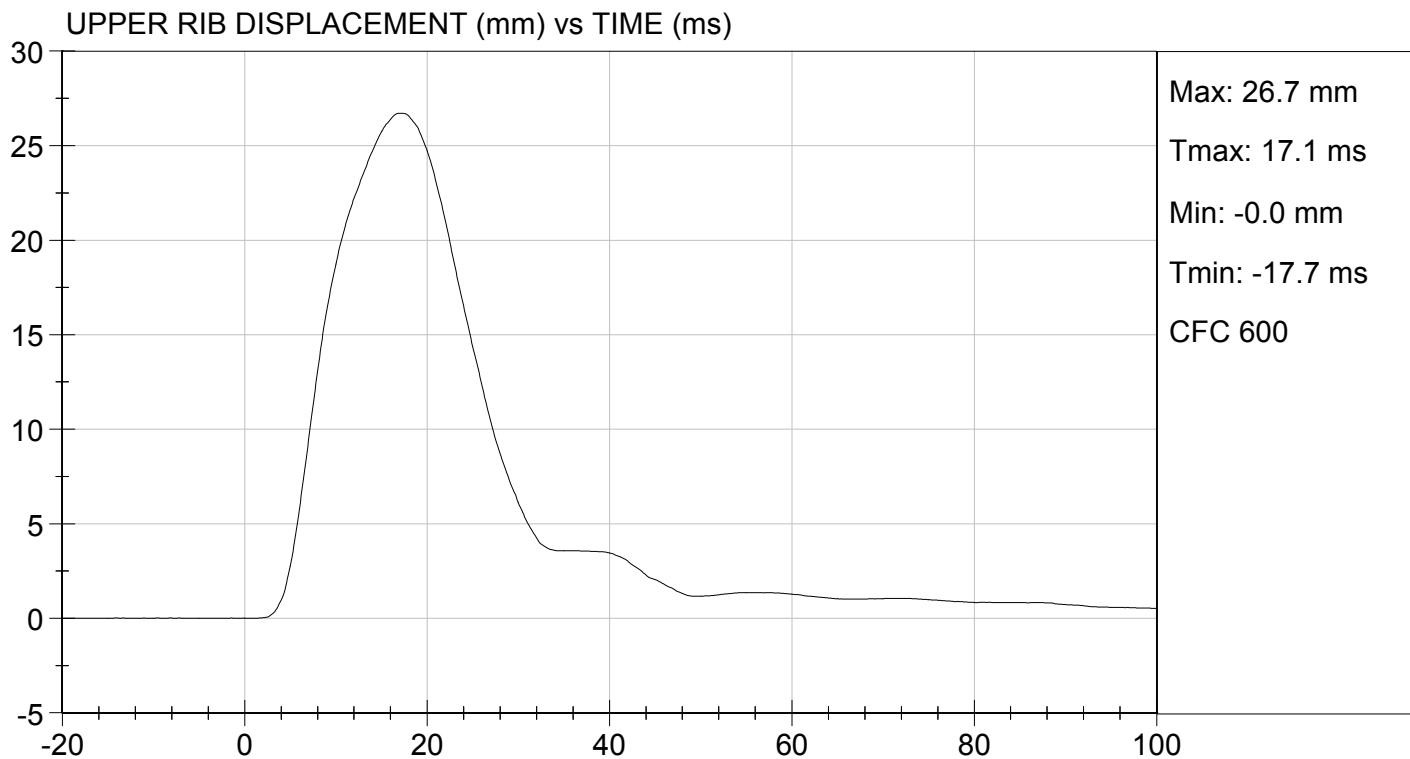

 Approved By



TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.22 ft/s, 6.77 m/s

TEST DATE: 09/24/2012
TEST #: D123524

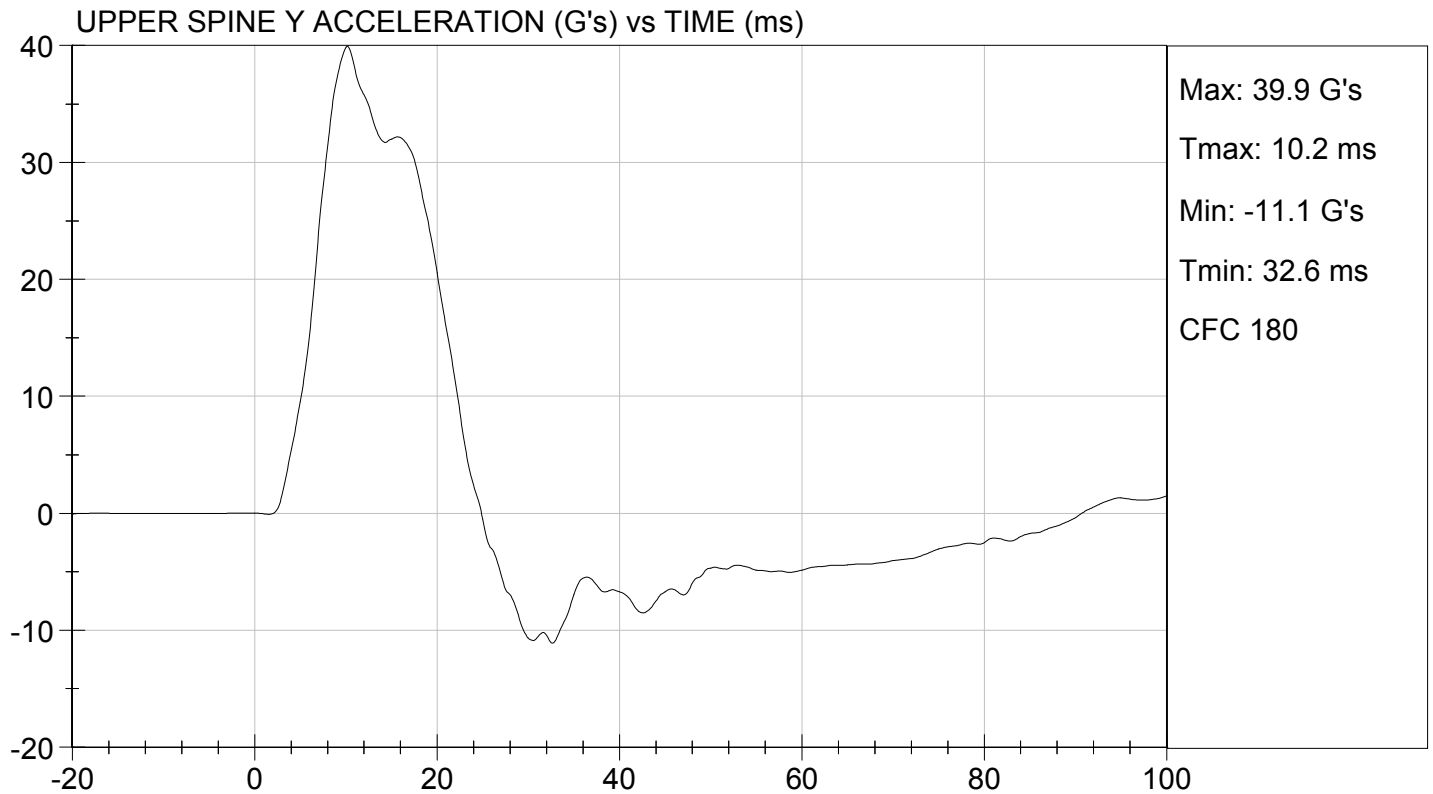
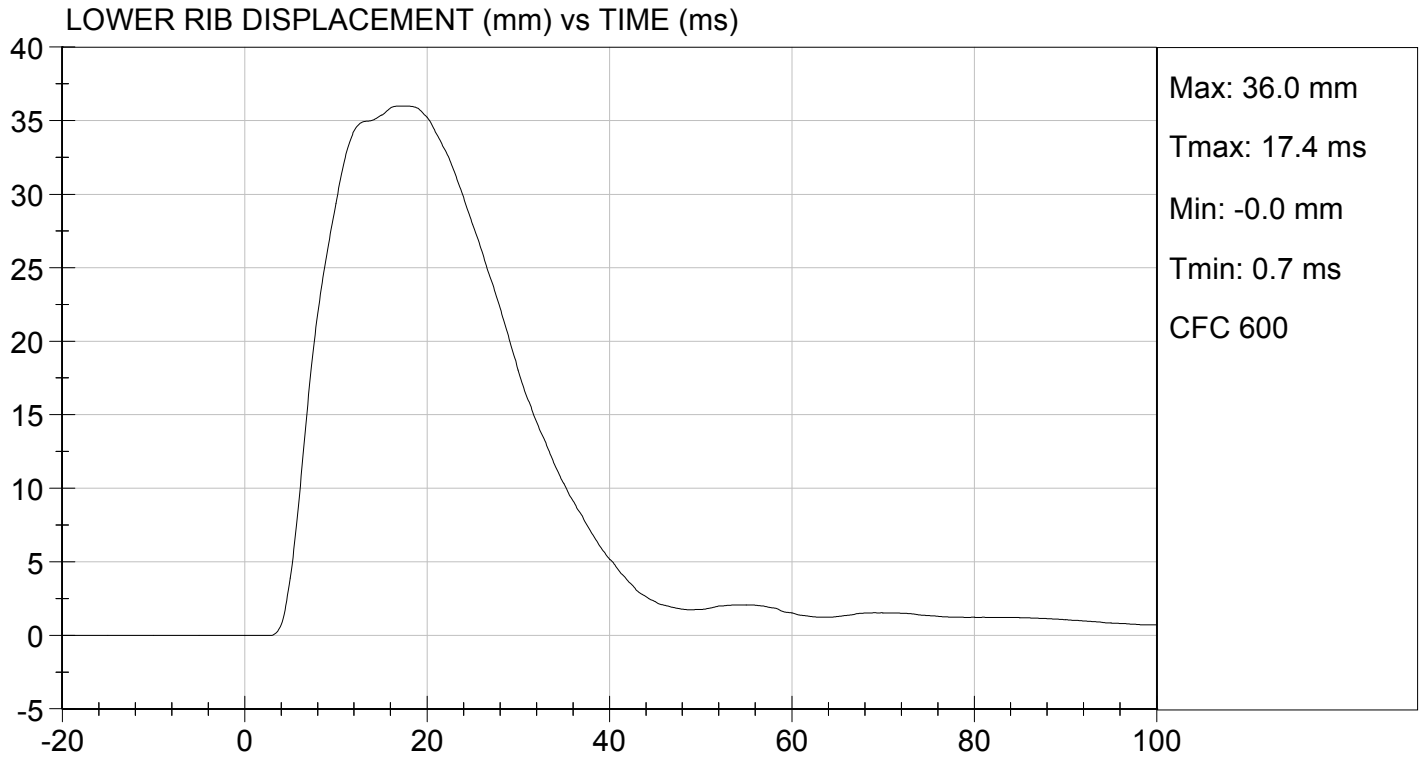






TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.22 ft/s, 6.77 m/s

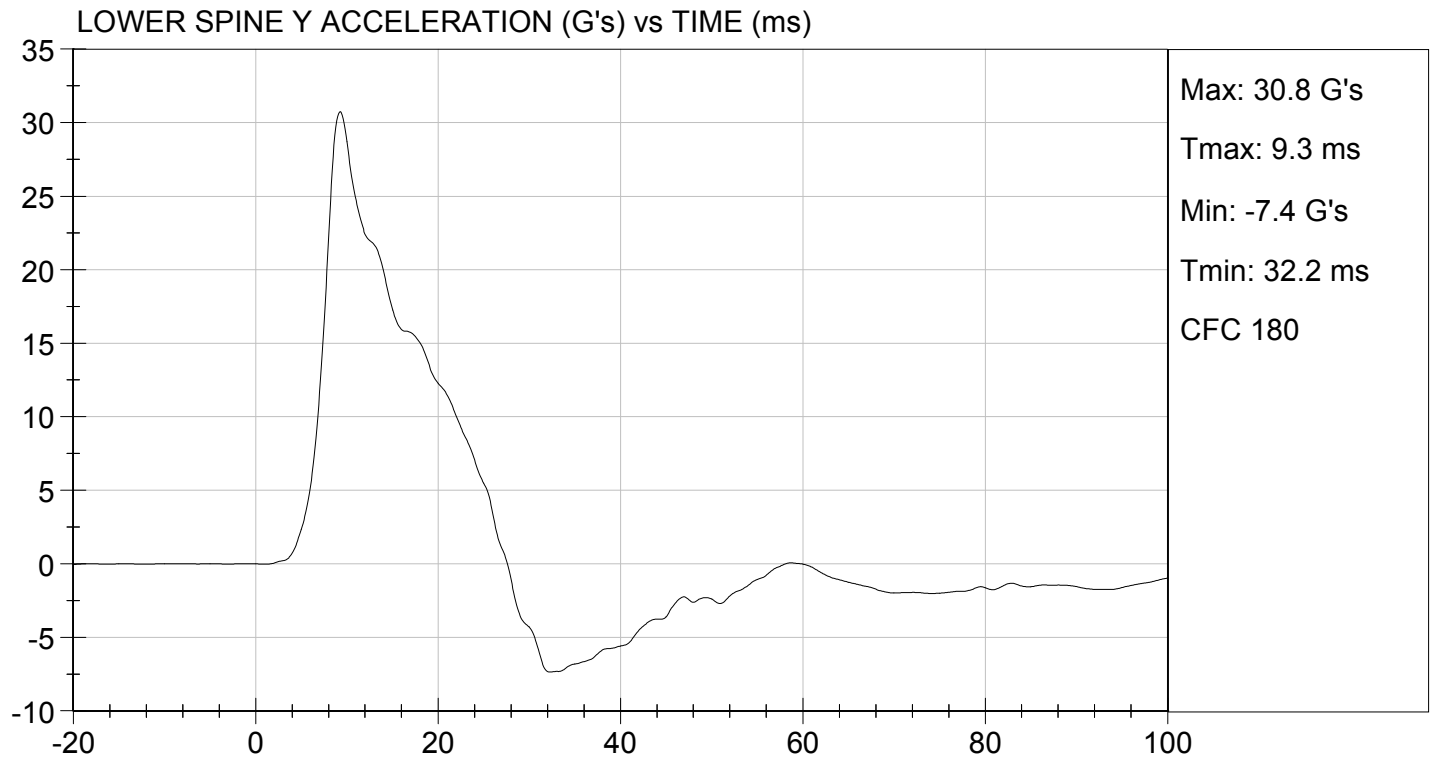
TEST DATE: 09/24/2012
TEST #: D123524





TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.22 ft/s, 6.77 m/s

TEST DATE: 09/24/2012
TEST #: D123524

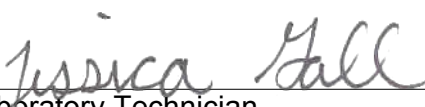


MGA RESEARCH CORPORATION
THORAX (WITHOUT ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

Test I.D: D123525

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.1	Pass
Humidity	%	10 to 70	31	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Maximum Probe Acceleration	G's	14 to 18	16	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	42	Pass
Upper Spine (T1) Y Acceleration	G's	13 to 17	15	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	10	Pass
Overall Test Results				Pass


 Laboratory Technician

09/24/2012

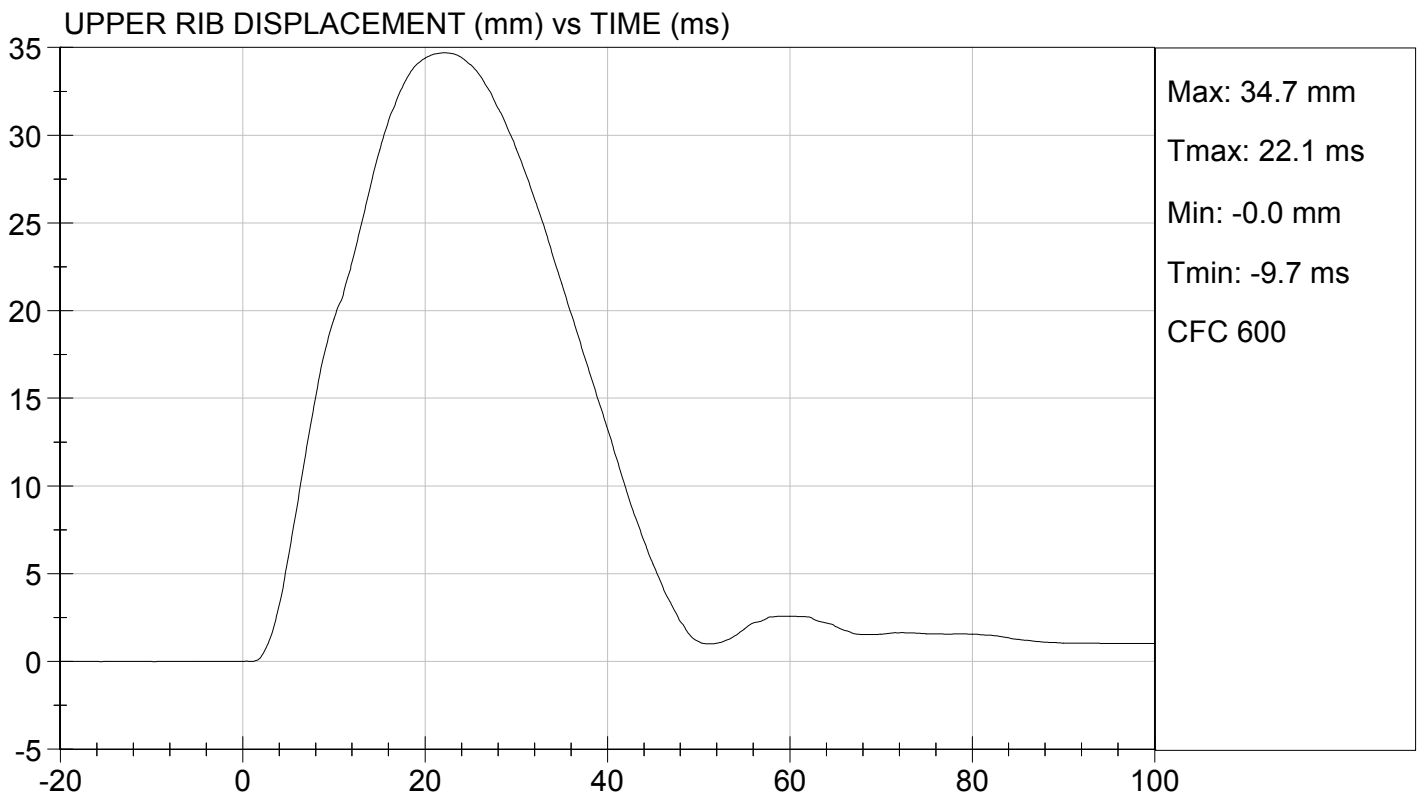
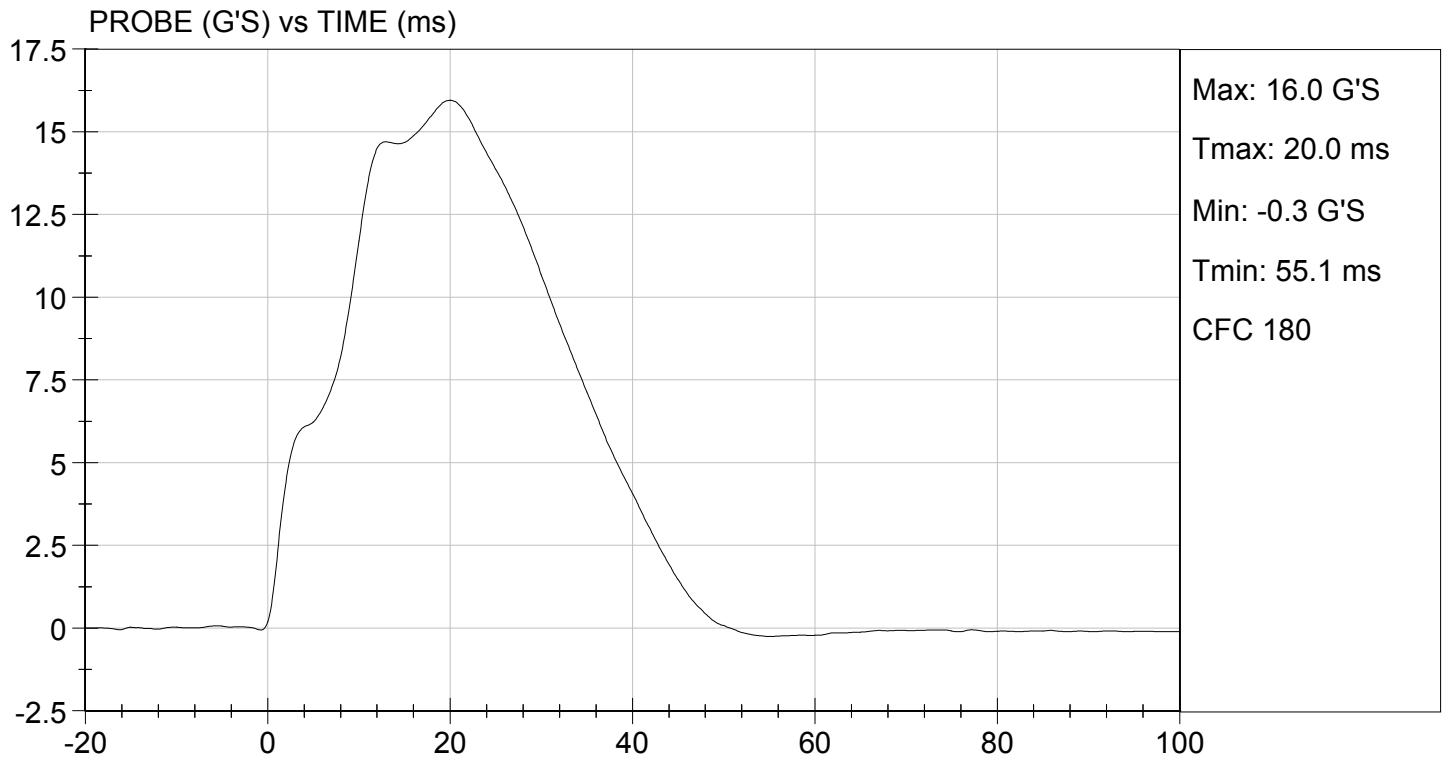
Test Date


 Approved By



TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.37 ft/s, 4.38 m/s

TEST DATE: 09/24/2012
TEST #: D123525

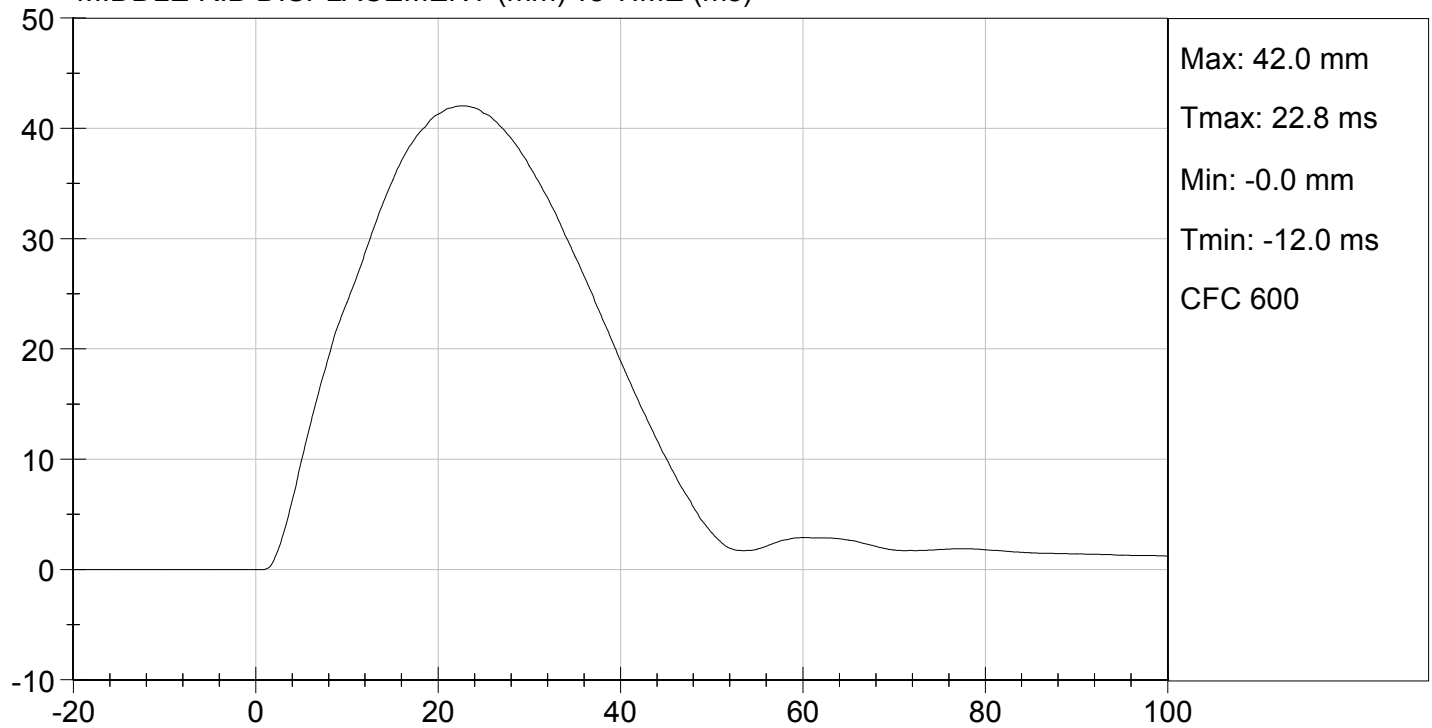




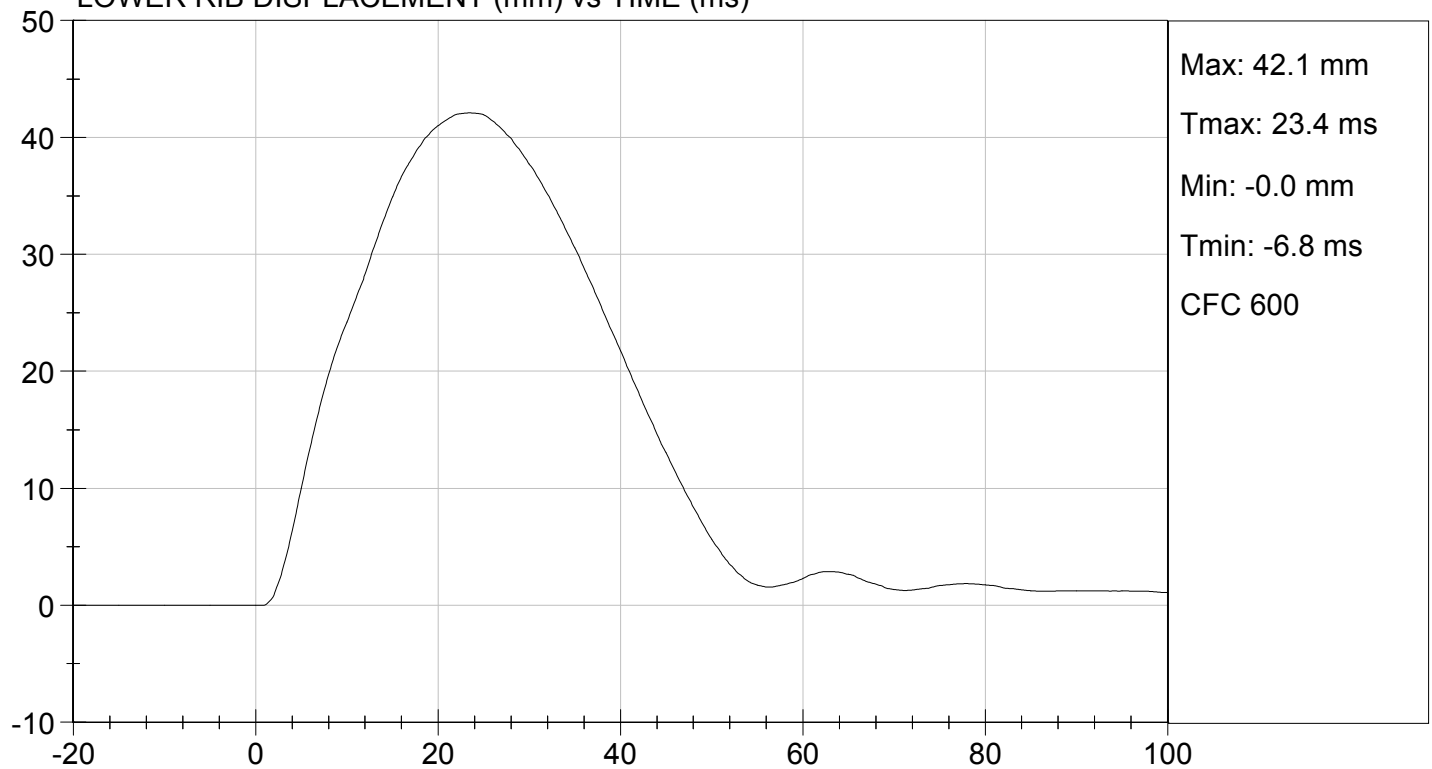
TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.37 ft/s, 4.38 m/s

TEST DATE: 09/24/2012
TEST #: D123525

MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



LOWER RIB DISPLACEMENT (mm) vs TIME (ms)

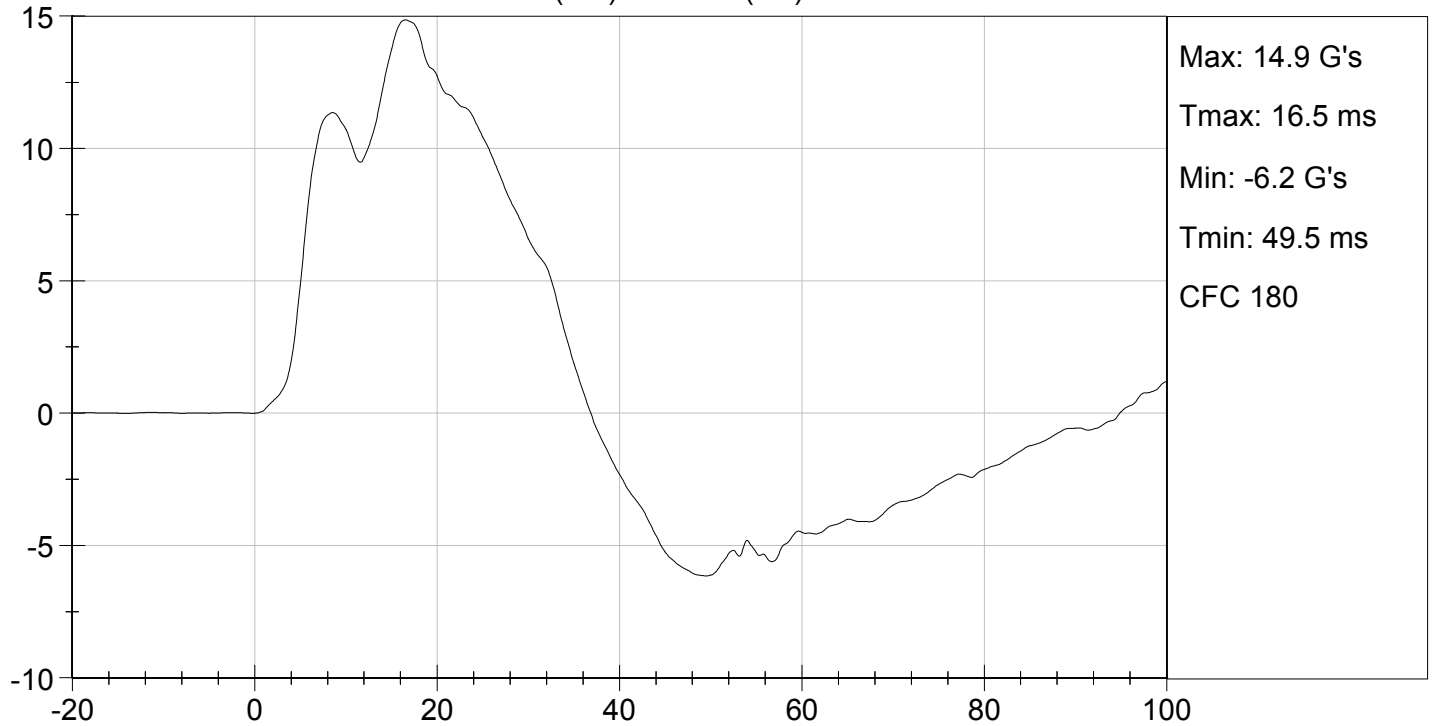




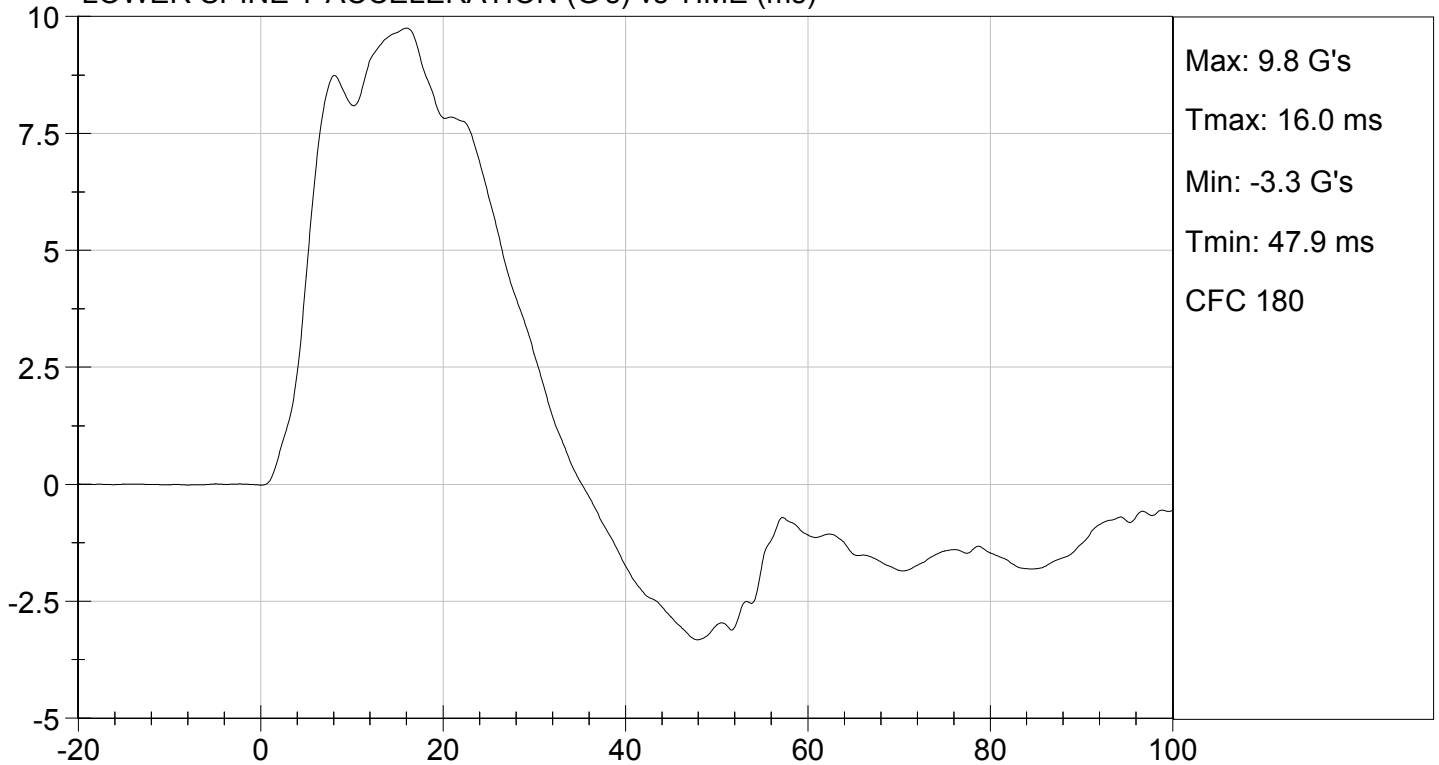
TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.37 ft/s, 4.38 m/s

TEST DATE: 09/24/2012
TEST #: D123525

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: 306

Test I.D: D123526

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.1	Pass
Humidity	%	10 to 70	31	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Maximum Probe Acceleration	G's	12 to 16	13	Pass
Upper Abdomen Rib Displacement	mm	36 to 47	40	Pass
Lower Abdomen Rib Displacement	mm	33 to 44	35	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	10	Pass
Overall Test Results				Pass

Jessica Gall
Laboratory Technician

09/24/2012

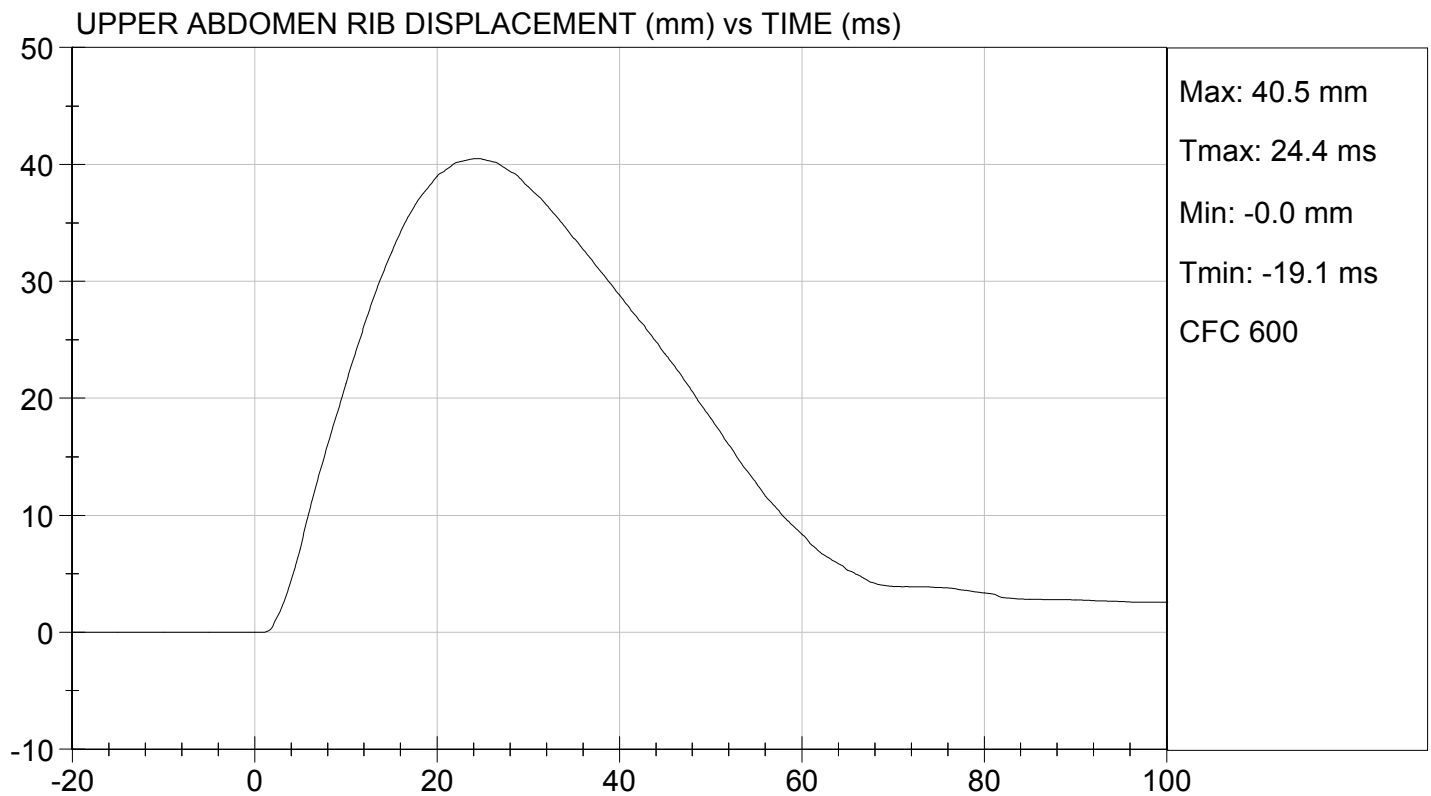
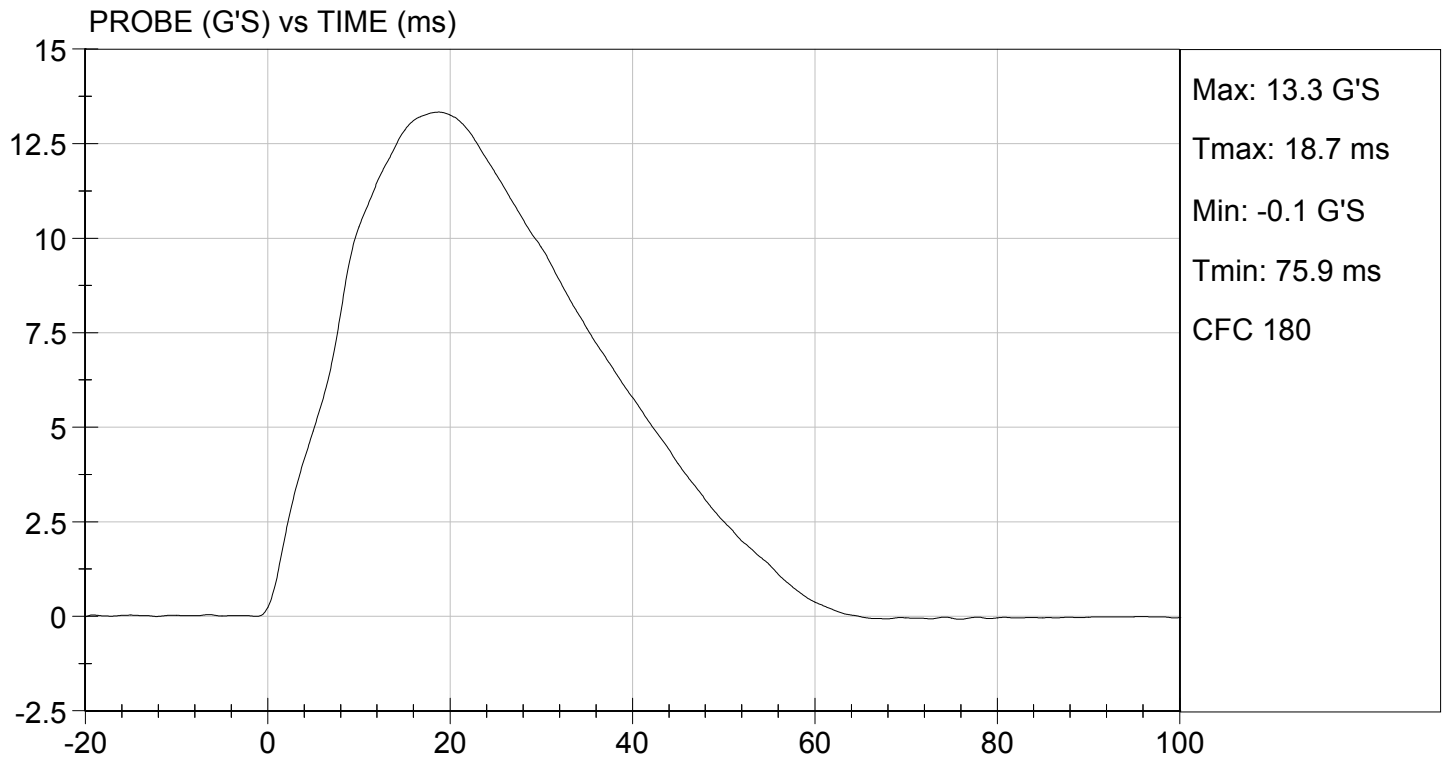
Test Date

David Winkelbauer
Approved By



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

TEST DATE: 09/24/2012
TEST #: D123526

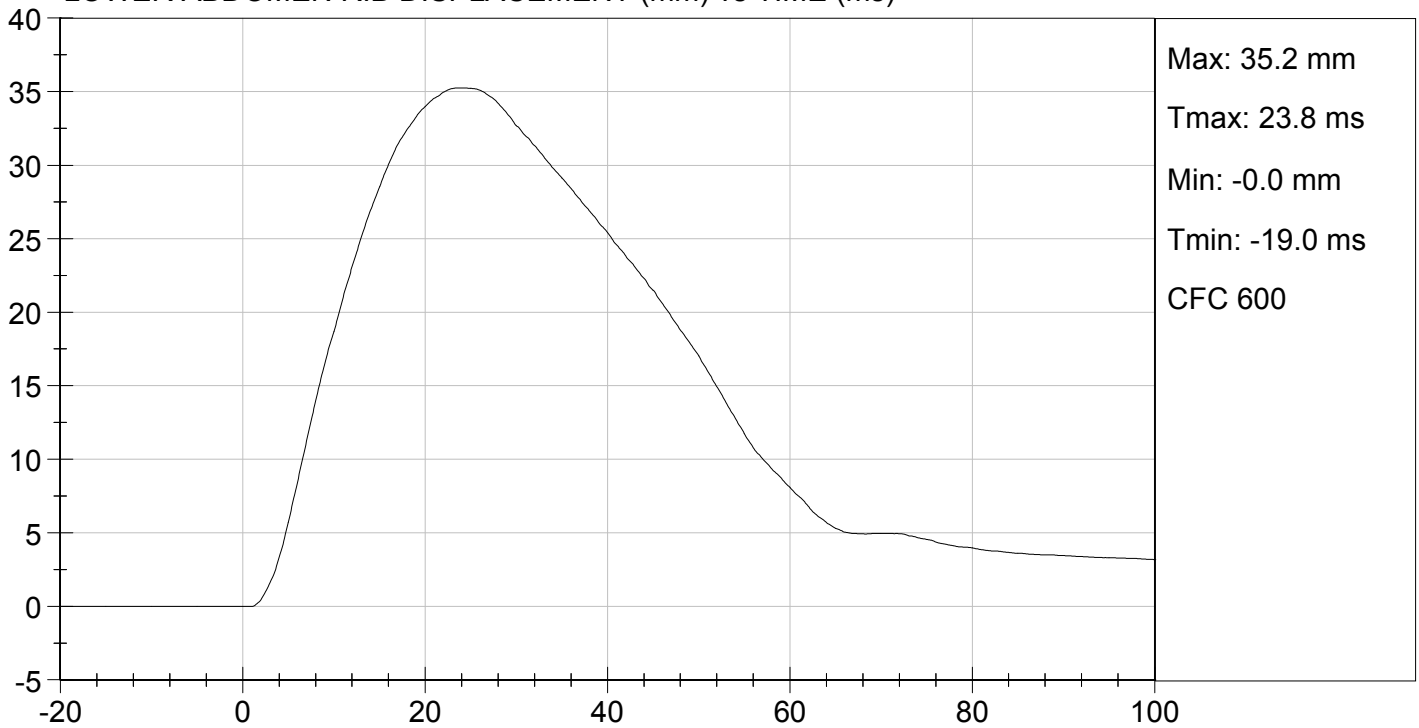




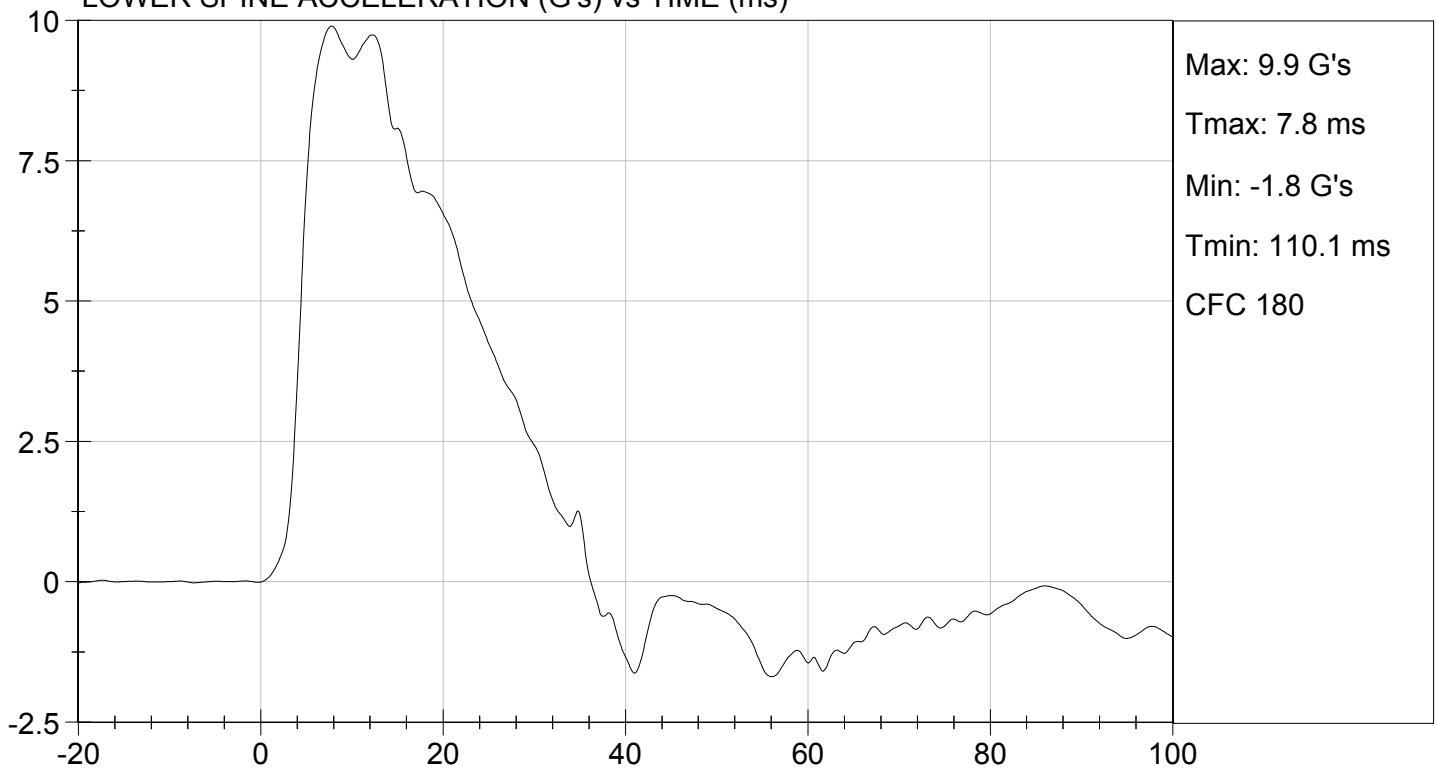
TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.37 ft/s, 4.38 m/s

TEST DATE: 09/24/2012
TEST #: D123526

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



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



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

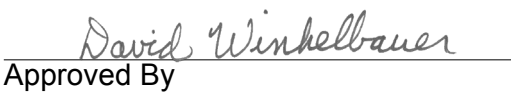
Test I.D: D123527

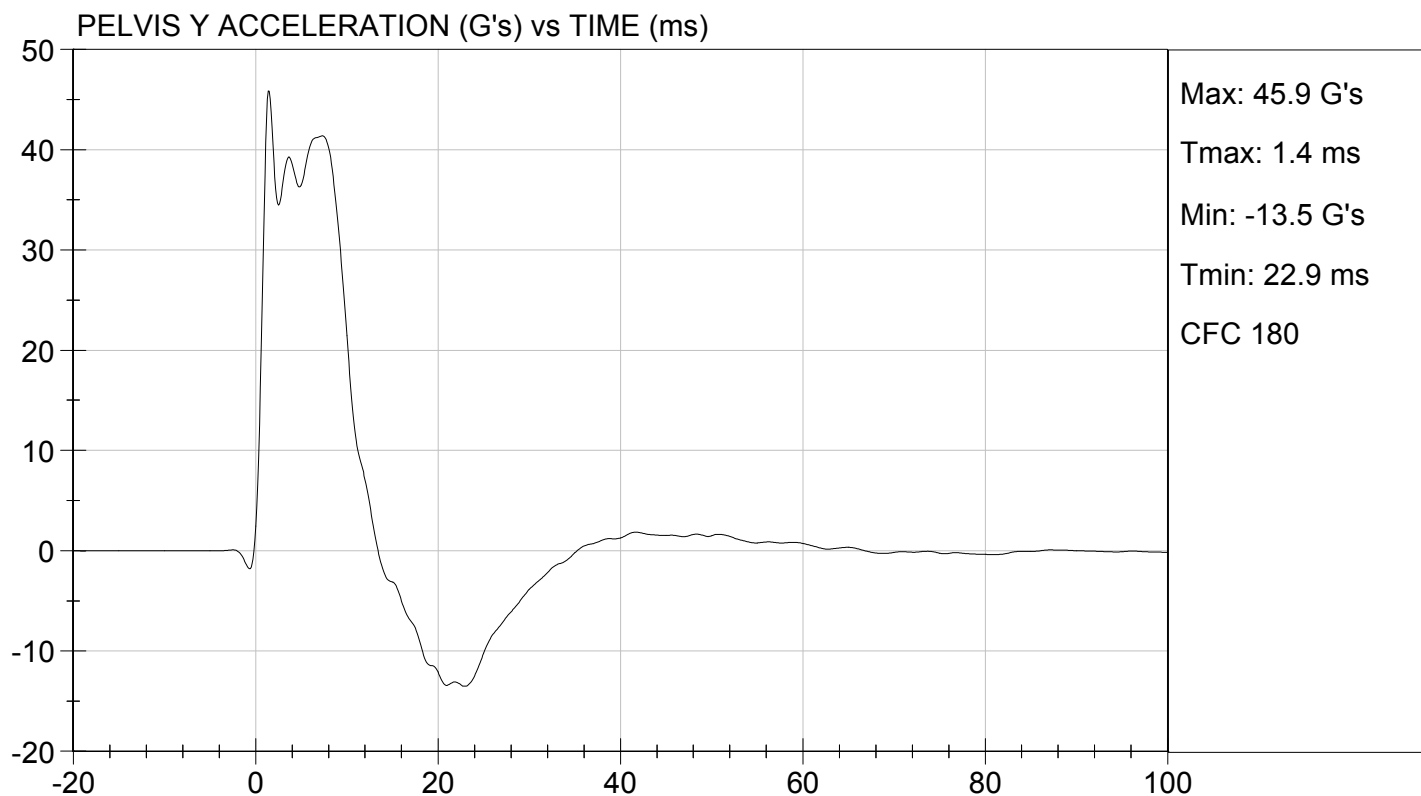
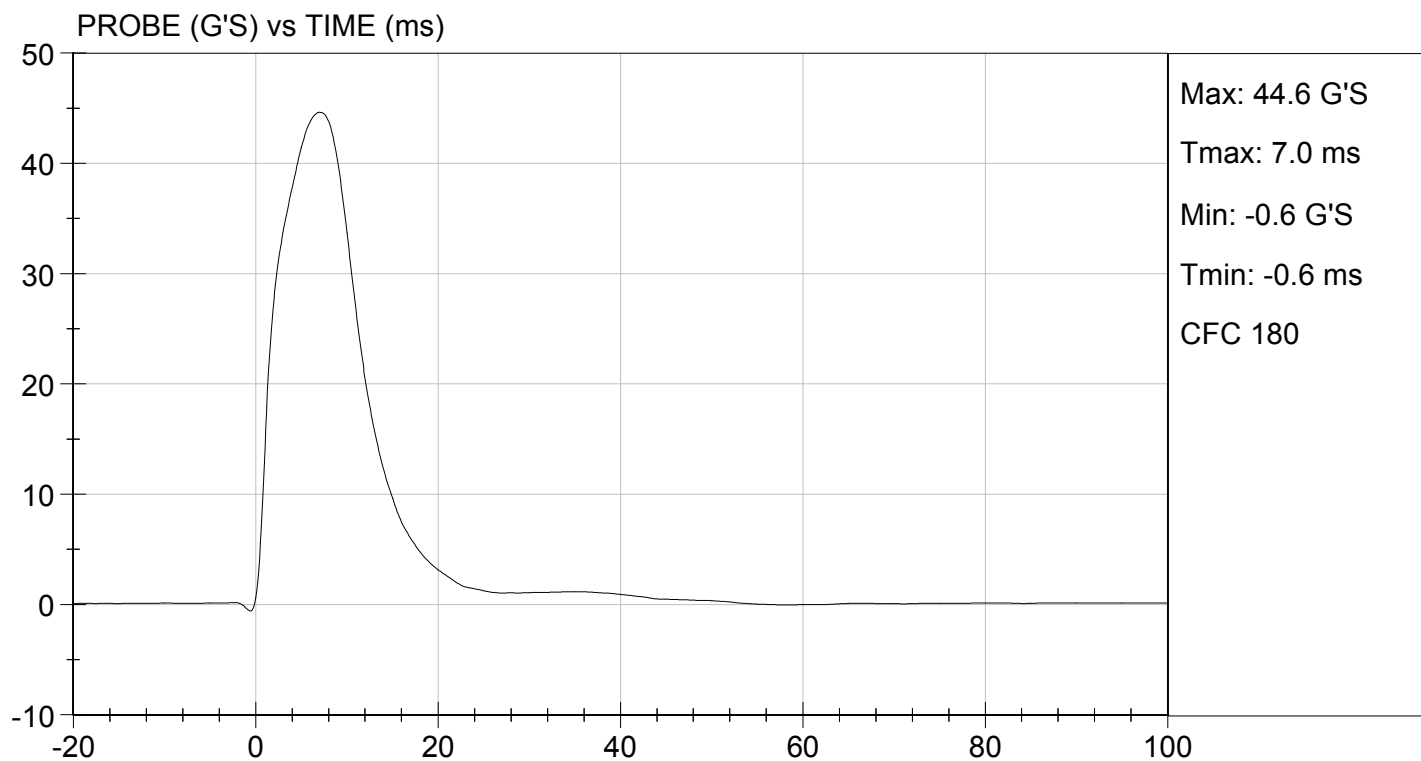
Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	36	Pass
Impact Velocity	m/s	6.60 to 6.80	6.68	Pass
Maximum Probe Acceleration	G's	38 to 47	45	Pass
Pelvis Y Acceleration After 6 ms	G's	34 to 42	41	Pass
Peak Acetabulum Force	N	3600 to 4300	4,035	Pass
Overall Test Results				Pass


Laboratory Technician

09/25/2012

Test Date

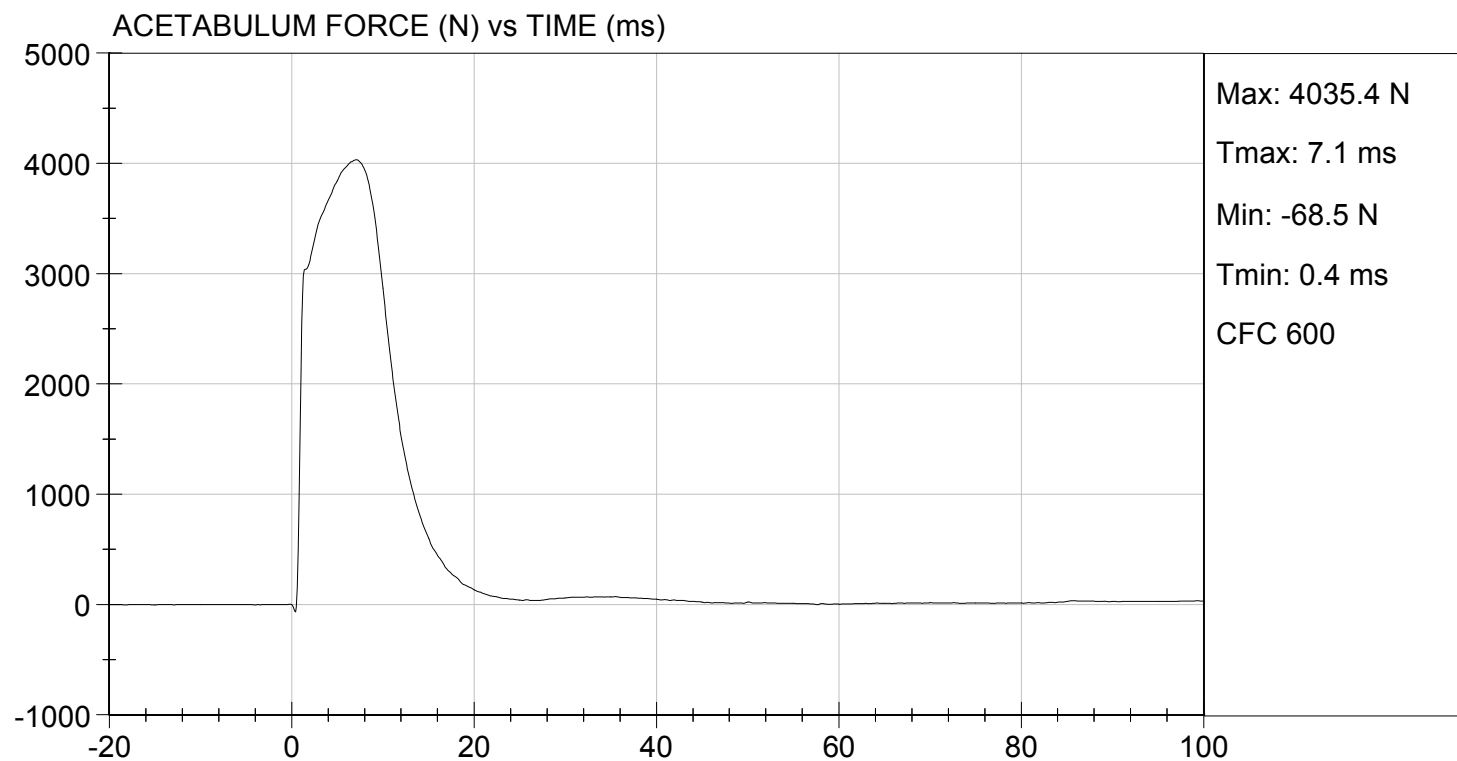

Approved By





TEST DESC: PELVIS IMPACT
VELOCITY: 21.90 ft/s, 6.68 m/s

TEST DATE: 09/25/2012
TEST #: D123527



MGA RESEARCH CORPORATION

ILIAC IMPACT TEST

SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 306

Test I.D: D123528

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	36	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	Pass
Maximum Probe Acceleration	G's	36 to 45	38	Pass
Pelvis Y Acceleration	G's	28 to 39	31	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4,609	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

09/25/2012

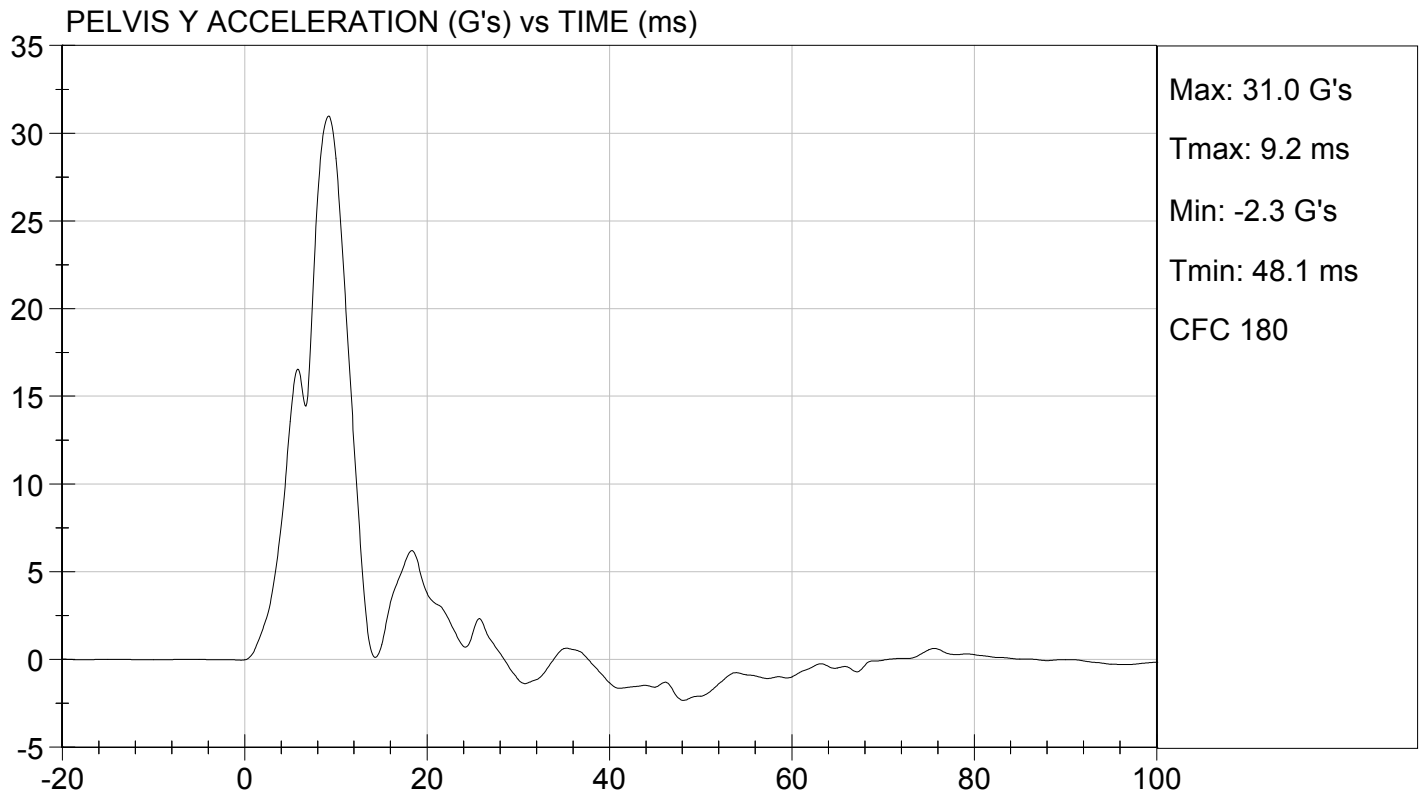
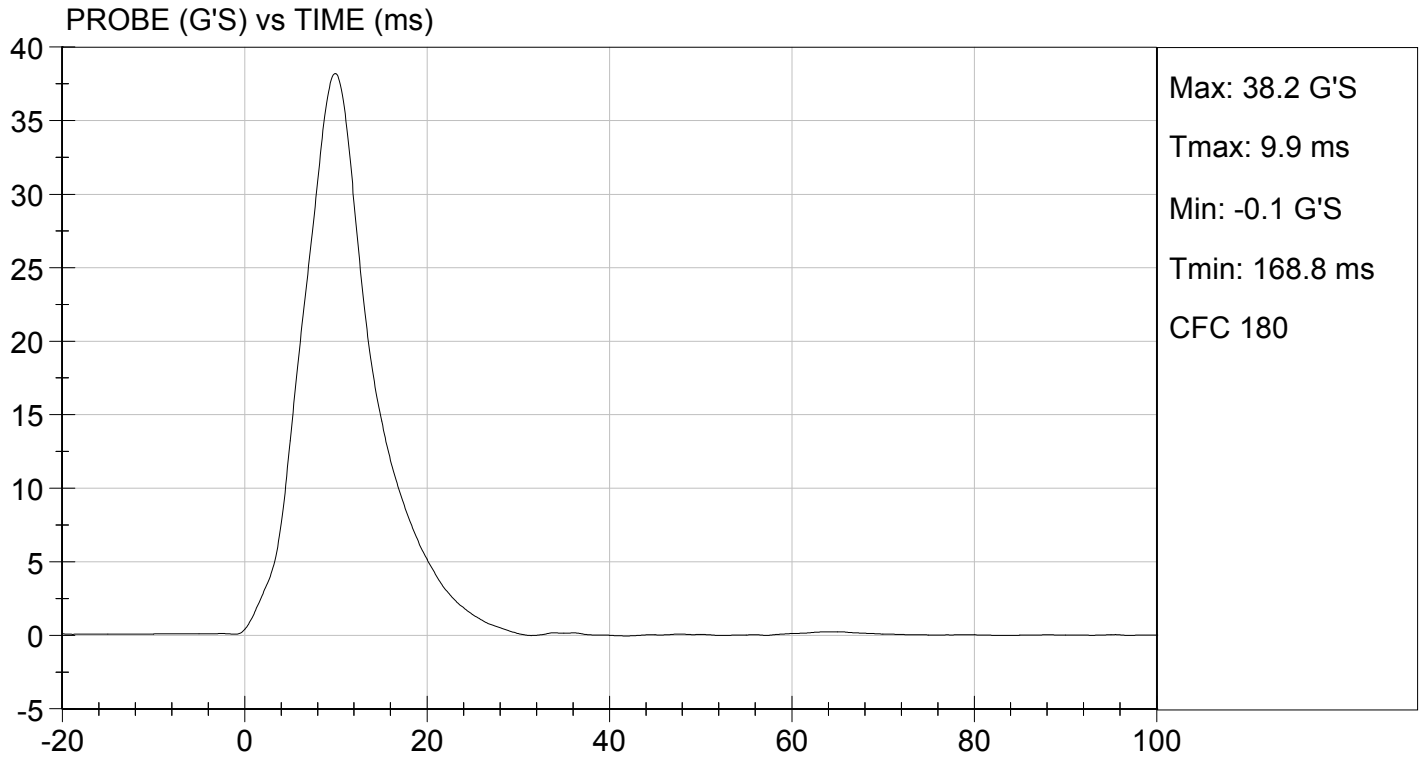
Test Date

David Winkelbauer
Approved By



TEST DESC: ILLIAC
VELOCITY: 14.12 ft/s, 4.30 m/s

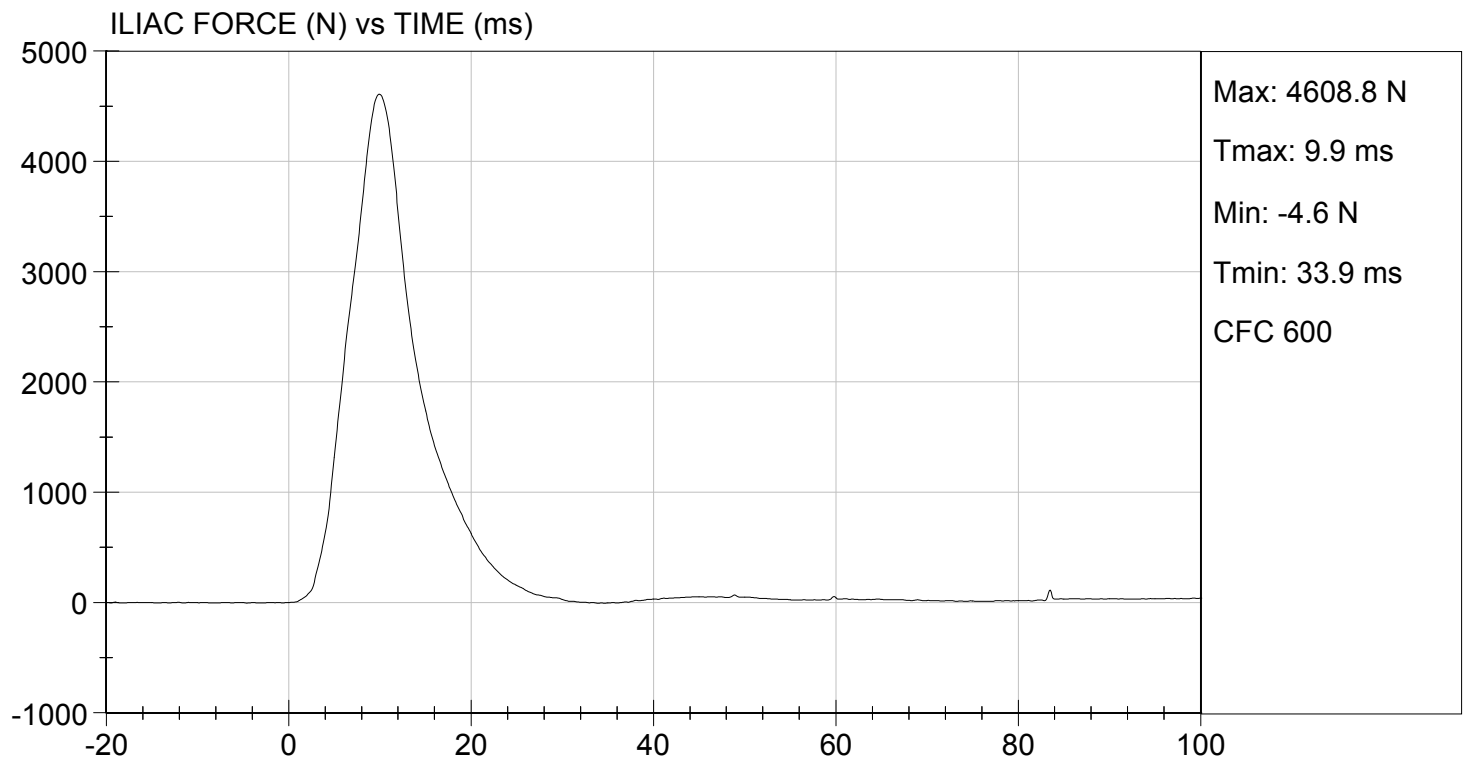
TEST DATE: 09/25/2012
TEST #: D123528



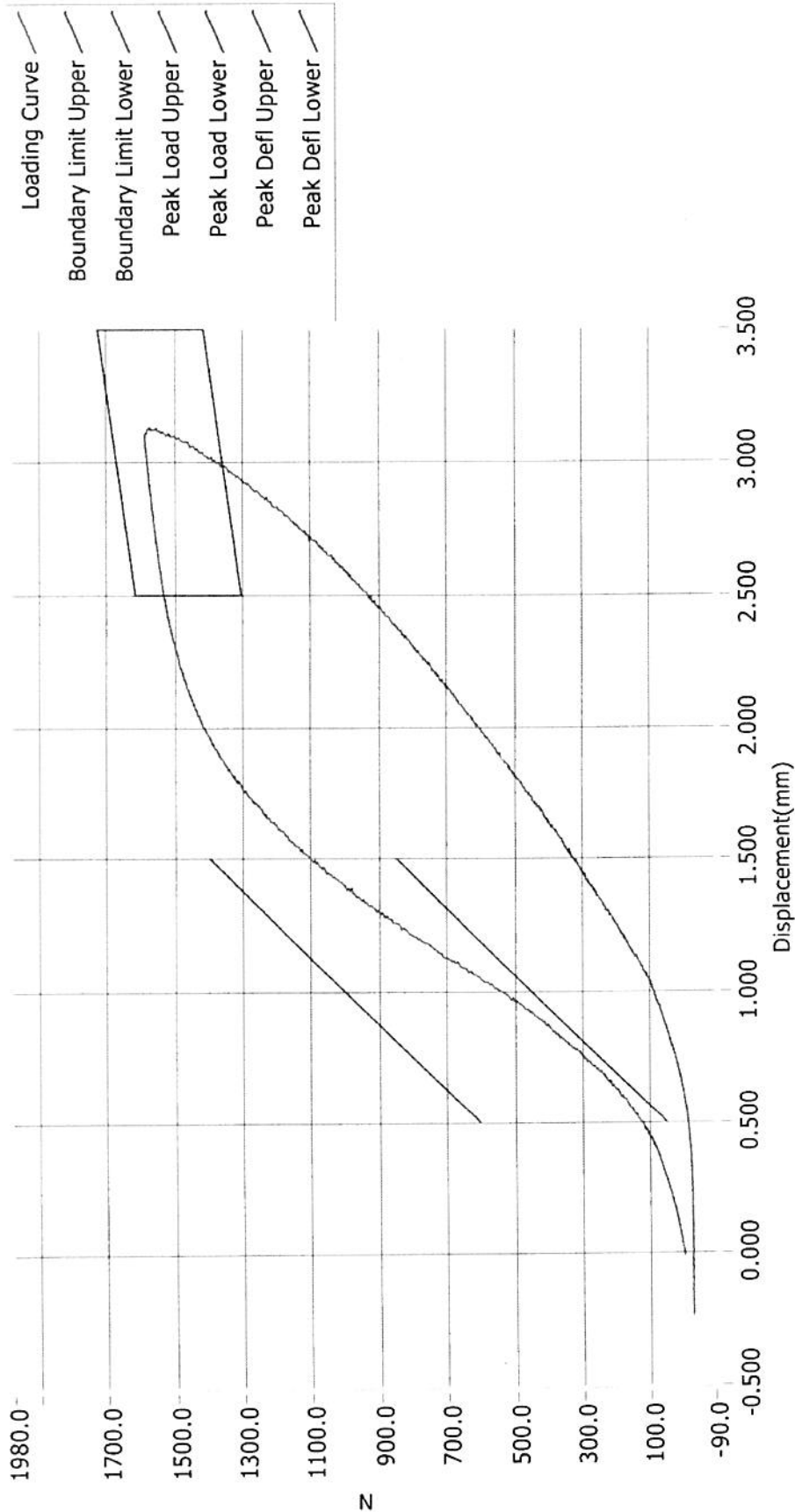


TEST DESC: ILLIAC
VELOCITY: 14.12 ft/s, 4.30 m/s

TEST DATE: 09/25/2012
TEST #: D123528



Resultant Data - SIDIIs Plug Compression

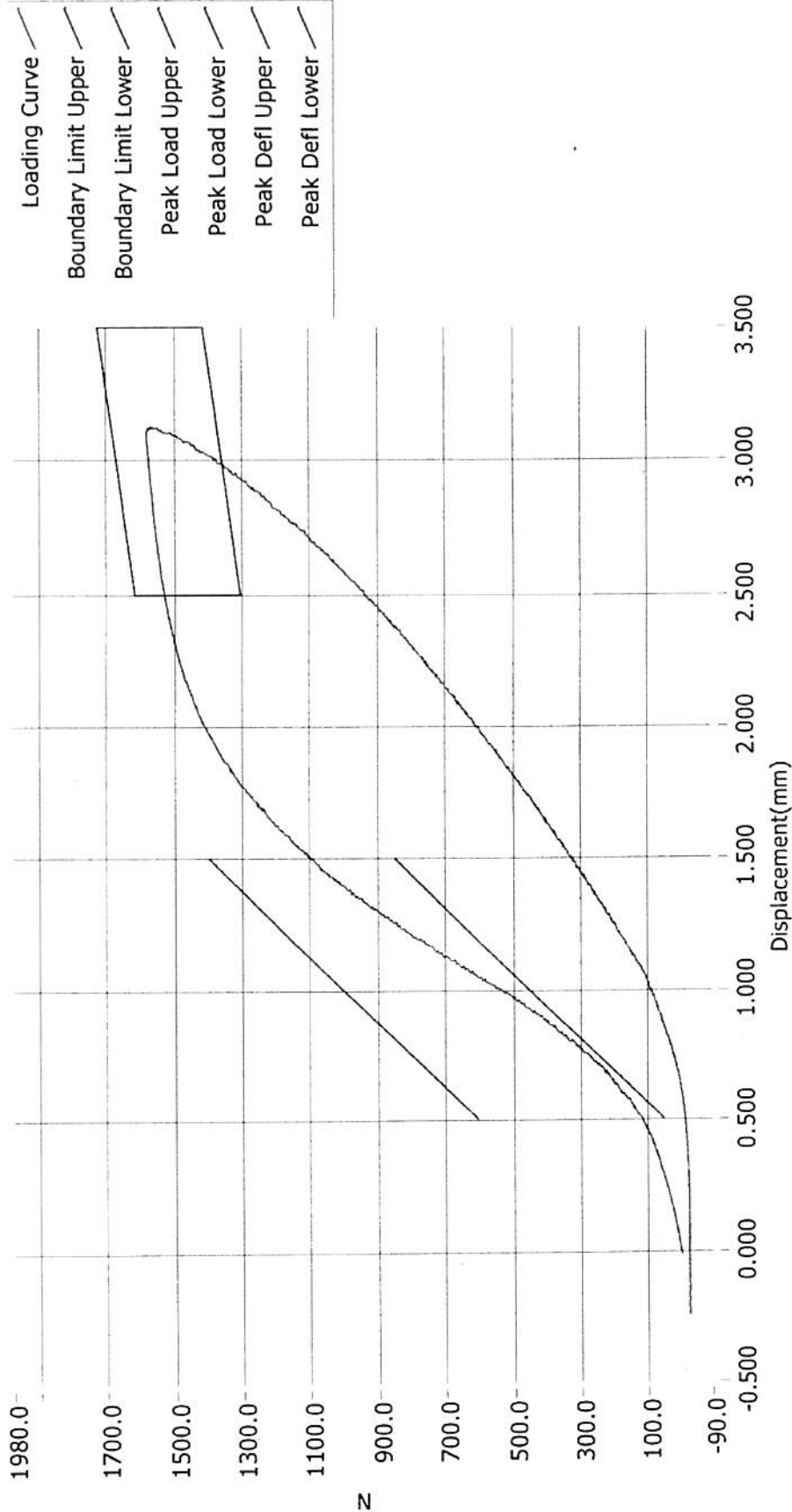


ATD Calibration Lab

<u>Test ID</u>	<u>Part Serial Number</u>	<u>Test Date</u>	<u>Test Time</u>
	49154	12/8/2011	12:49 AM
<u>Cert ID</u>	<u>ATD Serial Number</u>	<u>ATD Type</u>	
	N/A	SIDIIs	

Current Date : 12/8/2011 Current Time : 00:50:49

Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
	49133	12/7/2011	11:40 PM
Cert ID	ATD Serial Number	ATD Type	
	N/A	SIDIIs	

Current Date : 12/7/2011

Current Time : 23:40:47

APPENDIX D

TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 – Dummy Instrumentation

			SID-IIs S/N 306			
			Serial Number	Manufacturer	Calibration Date	
9 Axis Head CG (Primary)			X	P67884	Endevco	05/23/12
			Y	P67886	Endevco	05/23/12
			Z	P67887	Endevco	05/23/12
9 Axis Head CG (Redundant)			Xr	P67888	Endevco	05/23/12
			Yr	P67889	Endevco	05/23/12
			Zr	P67890	Endevco	05/23/12
9 Axis Head X			Y	P72788	Endevco	08/08/12
			Z	P72789	Endevco	08/08/12
9 Axis Head Y			X	P72790	Endevco	08/08/12
			Z	P73705	Endevco	08/08/12
9 Axis Head Z			X	P73707	Endevco	08/08/12
			Y	P73708	Endevco	08/08/12
Displacement Potentiometers	Thoracic Rib	Upper	Y	G1187	FTSS	05/23/12
		Middle	Y	G1261	FTSS	05/23/12
		Lower	Y	G1270	FTSS	05/23/12
	Abdominal Rib	Upper	Y	G1287	FTSS	05/23/12
		Lower	Y	G1304	FTSS	05/23/12
Lower Spine Accelerometers (T12)			X	P67508	Endevco	05/23/12
			Y	P67510	Endevco	05/23/12
			Z	P67511	Endevco	05/23/12
Acetabulum Load Cell			Y	ACG111	FTSS	05/09/12
Iliac Wing Load Cell			Y	IWG226	FTSS	05/14/12
Pelvis Plug (struck side)				49154	FTSS	12/08/11
Pelvis Plug (non-struck side)				49133	FTSS	12/07/11

Table 2 – Vehicle Instrumentation

		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	P77694	Endevco	07/31/12
Vehicle Center of Gravity	Y	P77695	Endevco	07/31/12
Vehicle Center of Gravity	Z	P77696	Endevco	07/31/12
Left Floor Sill	Y	P59311	Endevco	06/14/12
A-Pillar Sill	Y	P68860	Endevco	07/21/12
A-Pillar Low	Y	P63325	Endevco	08/15/12
A-Pillar Mid	Y	P48166	Endevco	06/12/12
B-Pillar Sill	Y	P59283	Endevco	07/12/12
B-Pillar Low	Y	P59251	Endevco	06/12/12
B-Pillar Mid	V	P47852	Endevco	07/18/12
Driver Seat	Y	P59313	Endevco	04/23/12
Engine Top	X	P68845	Endevco	07/21/12
Engine Top	Y	P68846	Endevco	07/21/12
Firewall	Y	P63206	Endevco	04/10/12
Right Roof	Y	P77758	Endevco	07/23/12
Right Floor Sill	Y	P63262	Endevco	07/21/12
Rear Floorpan	X	P63554	Endevco	08/15/12
Rear Floorpan	Y	P63553	Endevco	08/15/12

Table 3 – Pole Instrumentation

	Serial Number	Manufacturer	Calibration Date
Load Cell 1	DG6277	FTSS	09/05/12
Load Cell 2	DG6278	FTSS	09/05/12
Load Cell 3	DG6279	FTSS	09/05/12
Load Cell 4	DG6280	FTSS	09/05/12
Load Cell 5	DG6281	FTSS	09/05/12
Load Cell 6	DG6283	FTSS	09/05/12
Load Cell 7	DG6284	FTSS	09/05/12
Load Cell 8	DG6282	FTSS	09/05/12